WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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Built at Desert Navy Base

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Used on Columbia Basin Canal Job

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Portrait of Brig. Gen. Bruton

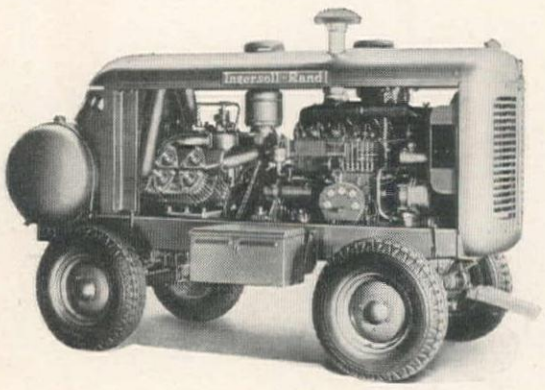
All-Hydraulic Fill Job
Los Angeles Shoreline Extended

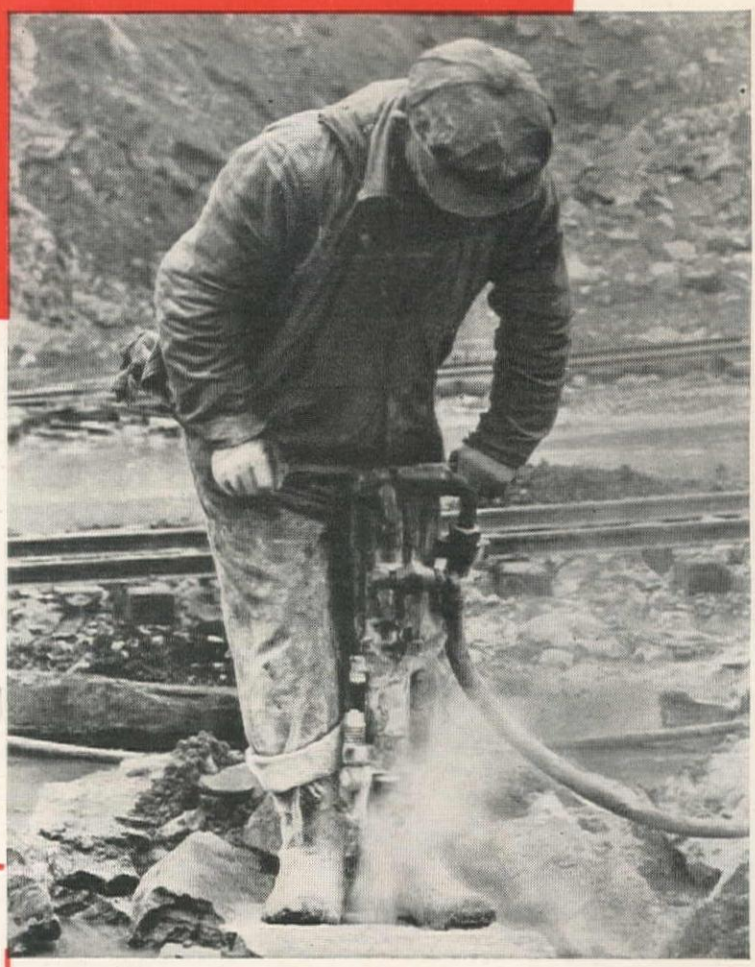
Driving Bacon Tunnel
Columbia Basin Bore Progresses

SNOW SURVEYORS yearly determine the water content of the snow-pack lying on each watershed in the Western States to predict the assured runoff of precious water. For an analytical forecast of the amount and distribution of the runoff in each state for 1948, turn to page 85.



GET FULL PRESSURE AT THE AIR TOOL





Keep compressor *valves clean.* Lubricate with Texaco.

For the clean valves that mean full air pressure, lubricate your compressors with *Texaco Cetus, Alcaid or Algol Oil.* These oils have been especially refined to remove the impurities that form hard carbon deposits.

In addition, *Texaco Cetus, Alcaid and Algol Oils* keep piston rings free, and ports and air lines clear. You are assured trouble-free operation . . . greater efficiency . . . lower maintenance costs.

Texaco Cetus, Alcaid and Algol Oils have all been specially developed for air compressor lubrication. The type of compressor and the requirements of the particular job determine which to use. Your Texaco Lubrication Engineer will gladly advise you.

Just call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

FOR BETTER DRILL PERFORMANCE use Texaco Rock Drill Lubricants EP. They prevent rust in service and in storage, resist washout, protect moving parts against wear even in the severest service. They meet the requirements of leading rock drill manufacturers.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN . . . TEXACO STAR THEATER every Wednesday night featuring Gordon MacRae and Evelyn Knight . . . ABC Network.

Buy the best for the heart of the job!



That's why LOWDERMILK BROS. Denver, Colorado have bought their Fourth NORTHWEST

Lowdermilk Bros. of Denver, Colorado, appreciate the meaning of the *Key Spots* when it comes to buying a Shovel, Crane, Dragline or Pullshovel.

When the success of your whole contract depends on the performance of the machine in the heart of the job you can't afford to have anything but the best. Then you will find that Northwest design and construction, Northwest dependability, the Northwest "Feather-Touch" Clutch Control, Cushion Clutch, Uniform Pressure Swing Clutches and other Northwest advantages mean money.

The high quality of Northwest performance is the thing that makes one out of every three Northwests sold a repeat order. Plan for a Northwest in the heart of your job and follow the Northwest Crowd.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street Chicago 3, Illinois



BETTER ROADS FOR A BETTER WORLD · 45th Annual Convention and Road Show · SOLDIER FIELD CHICAGO · JULY 16-24, 1948

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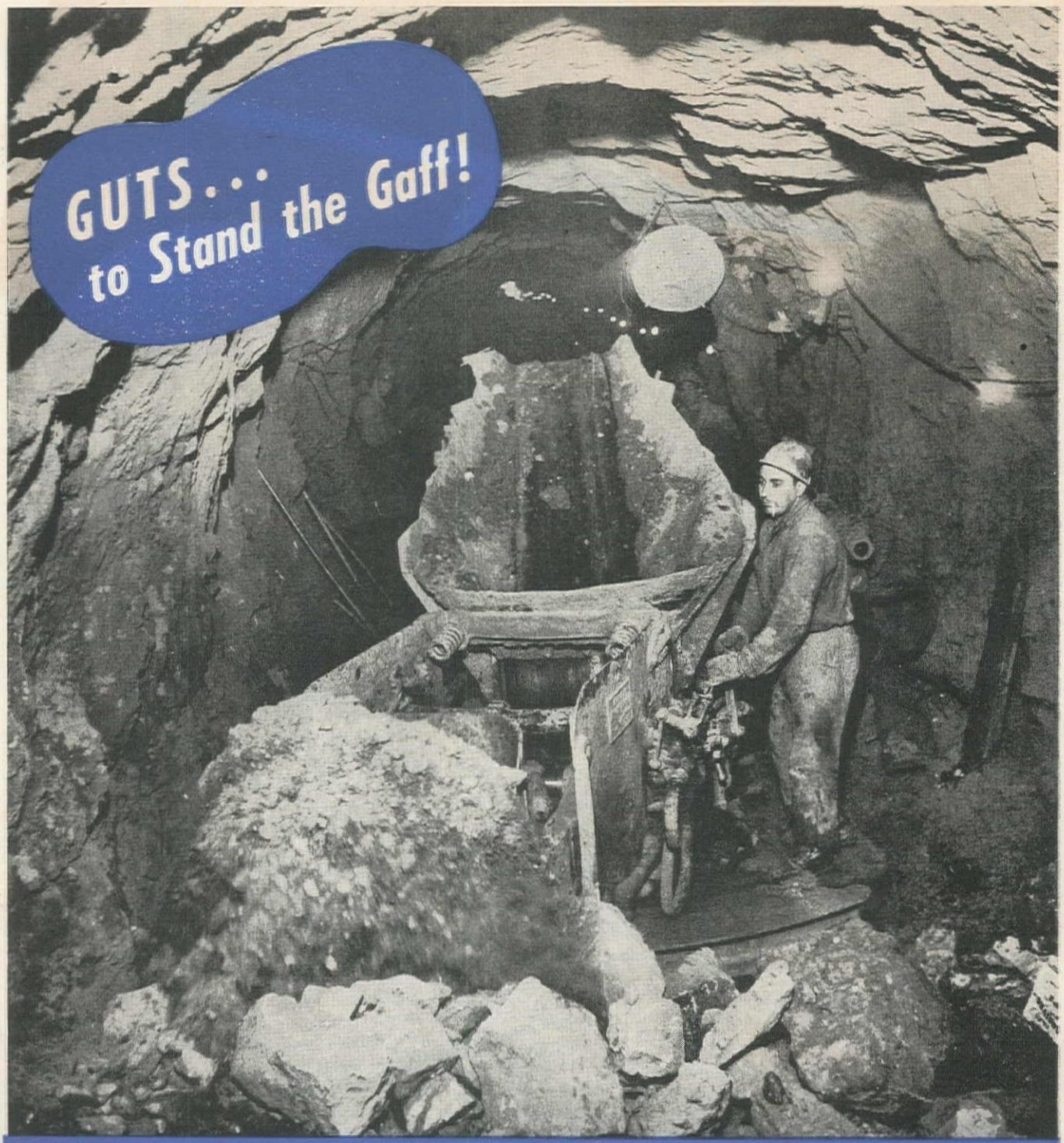
PORTLAND, OREGON
Blazer Machinery Co.

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Completing the Big Thompson project in Colorado the Tunnel Contractors, Inc. are using Eimco Model 40's on both ends of one tunnel and averaging better than 100 ft. a day advance in the 12' x 12' bore.

High speed tunnel driving requires dependable, heavy duty equipment. Eimco RockerShovels have answered the requirements set by the contractors and are turning in record advance figures every day.

Investigate the Eimco Model 40 for your large tunnels. Write for Bulletin L-1009.

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THE EIMCO CORPORATION

The World's Largest Manufacturer of Underground Rock Loading Machines

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Covering the Western Half of the National Construction Field

LESS TIME OFF . . .
MORE TIME TO HAUL

KOEHRING HEAVY DUTY



The hauling unit built by a shovel manufacturer for work with shovels.

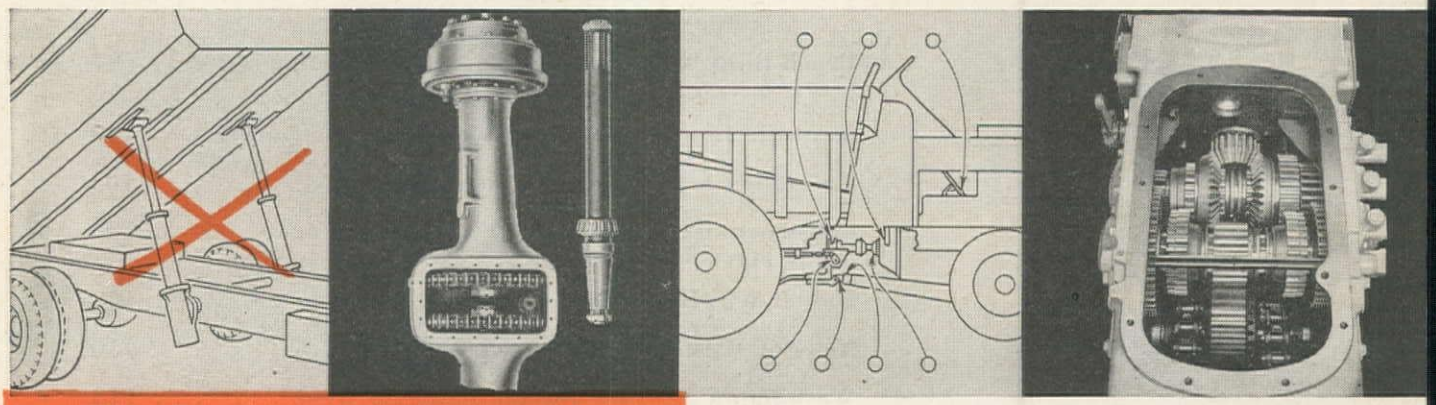
Dumptor Maintenance Time Stays Low in Tough Service, Because: —

1 No body hoist maintenance. Dumptor has no body hoist. Gravity alone tips 6-yard body in one second, even in zero weather.

2 Dumptor drive axle is built for toughest rock hauling. They're chrome nickel steel, 4" in diameter, protected by heavy cast steel axle housing.

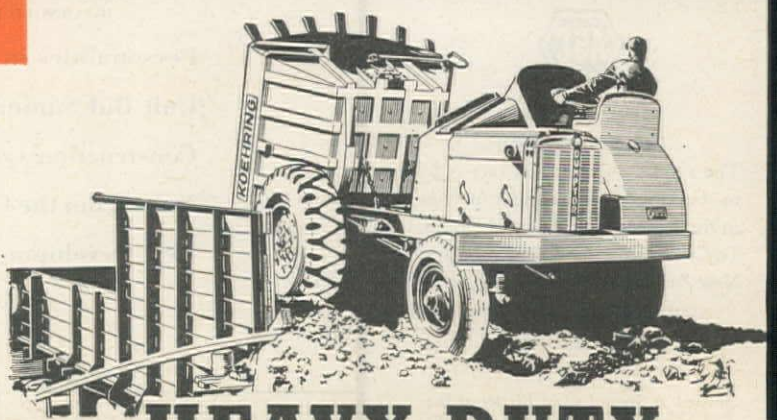
3 Lubrication Chart shows just 7 daily lubrication points on Dumptor chassis. Daily lubrication wastes no haul time on Dumptor.

4 Transmission runs in oil . . No need for continuous refilling oil-tight case. Transmission, designed especially for shuttle service, eliminates slow turn.



KOEHRING

Bay Cities Equipment, Inc., *Oakland*
Columbia Equipment Co., *Portland, Boise*
Harron, Rickard & McCone Co. of Southern California, *Los Angeles*
Kimball Equipment Co., *Salt Lake City*
McKelvy Machinery Co., *Denver*
Moore Equipment Co., *Stockton*
Neil B. McGinnis Co., *Phoenix*
Pacific Hoist & Derrick Co., *Seattle*
The Harry Cornelius Co., *Albuquerque*
Western Machinery Co., *Spokane*



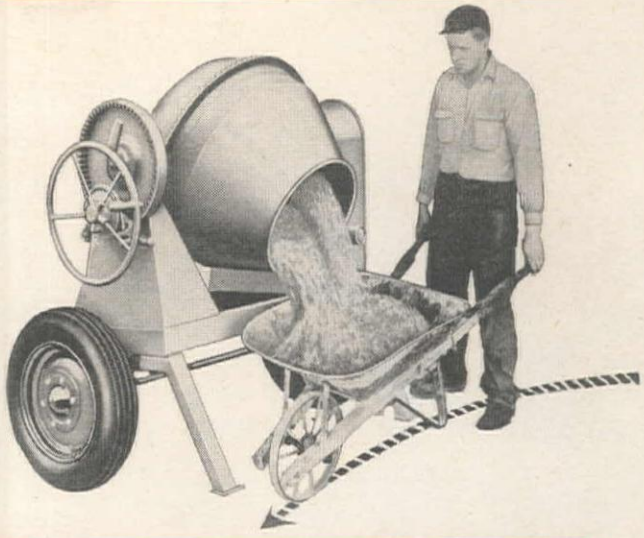
HEAVY-DUTY

KWIK-MIX

New 3½-S End Tilter

A New Kwik-Mix Dandie

"Dandie" quality in every detail. Modern high strength welded construction. Thorough mixing action. End discharge saves effort — you don't back and turn loaded wheelbarrow. Approach mixer from either side or from the front. Spotting area is unobstructed. Trails fast, safely, because it rides on leaf springs.



Bay Cities Equipment, Inc.	Oakland
Columbia Equipment Company	Portland, Boise
Harron, Rickard & McCone Co. of So. Calif.	Los Angeles
Kimball Equipment Company	Salt Lake City
McKelvy Machinery Company	Denver
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Neil B. McGinnis Company	Phoenix
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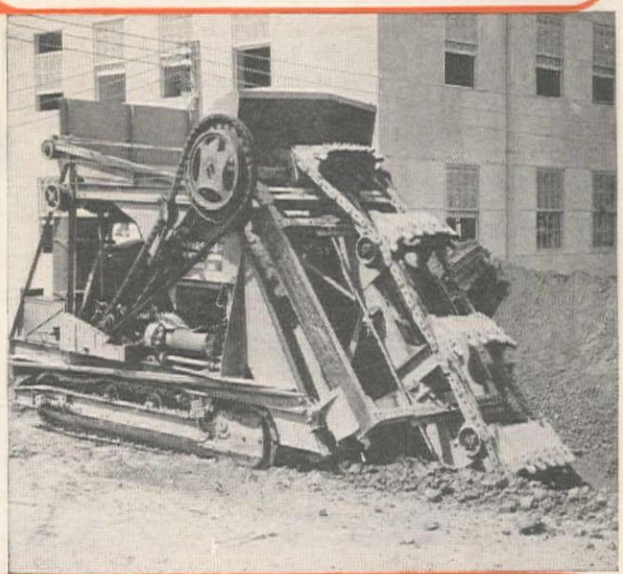
PARSONS

310 Trenches 15′ Deep

Heavy Duty Trenchliner*

Parsons big, husky 310 Trenchliner keeps cost down, profits up on sewer, gas and water main jobs. Built-in strength makes every pound of weight pay off in extra hours of heavy duty trenching. Digs up to 15′ deep, 54″ wide. Telescoping boom shifts across entire width of Trenchliner. Power shifts arc type spoil conveyor.

*Trade Mark Reg. U. S. Pat. Off.



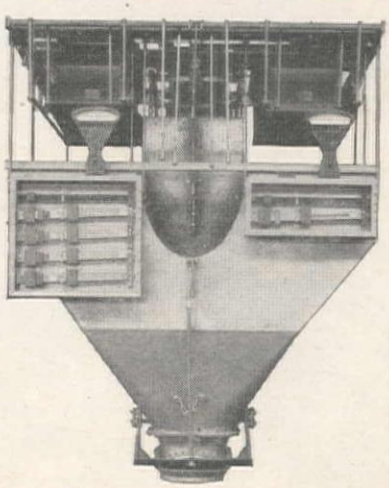
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JOHNSON

Cuts Cement Loss

Concentric Aggregate-Cement Batcher

Costly cement loss is prevented by the Johnson patented Batcher because cement is weighed on separate scales. Concentric arrangement of aggregates around cement batcher discharge protects against added loss — ribbon feeding of cement in center of aggregate stream helps mixing action. See your Johnson distributor.



Cramer Machinery Company	Portland
Edward R. Bacon Company	San Francisco
Harron, Rickard & McCone Co. of So. Calif.	Los Angeles
McKelvy Machinery Company	Denver
Neil B. McGinnis Company	Phoenix
Pacific Hoist & Derrick Company	Seattle
The Harry Cornelius Company	Albuquerque
Western Machinery Company	Spokane
Western Machinery Company	Salt Lake City





Arizona "Caterpillar" D7 Tractor and No. 70 Scraper leveling farmland for cotton near Buckeye. Owner J. C. Higgins says: "The No. 70 is a dandy. Ease of loading is what I like best. We can fill the scraper without the pusher. This saves me money, as I can have the pusher tractor working on some other job."

They all

Iowa "Caterpillar" D7 Tractor and No. 70 Scraper leveling ground for Muscatine athletic field. Owner Lee Osborne says: "If I can have two months more of good weather, this scraper won't owe me a thing. It's a fine scraper and it has a fine dealer service behind it. I wouldn't think of buying this type of equipment from anyone but 'Caterpillar'."

Indiana "Caterpillar" D7 Tractor and No. 70 Scraper grading road for subdivision. Lowell Engineering Company's Lyle W. Brown says: "This scraper makes loading easier—can load in 2nd gear. Swung low to ground for balance. Can get in close quarters. Large tires give good flotation in sandy soil. Allows good visibility of road and cutting edge."





New York "Caterpillar" D8 Tractor and No. 80 Scraper stripping overburden for gravel pit to supply sub-base for highway. Owner, Rochester Concrete Construction Co., Inc. Operator Leon Jackson says: "It's the easiest scraper to load I've ever used and I can dump in 6th gear."



California "Caterpillar" D8 Tractor and No. 80 Scraper loading and dumping shale rock on county road widening job. For Monterey County Highway Department, Mr. H. Cozzens says: "We do a lot of changing from 'dozer to scraper work and appreciate the ease of quick mounting. The No. 80 Scraper is the easiest and fastest loading, and operator says cable control is the smoothest he has ever used."



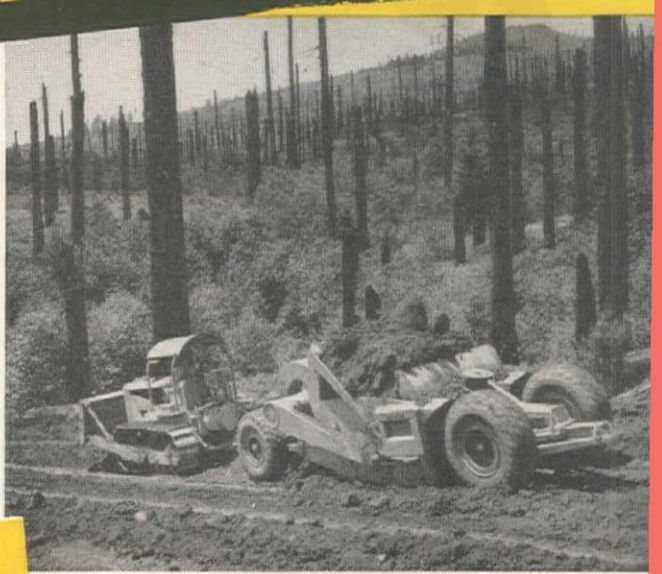
Colorado "Caterpillar" D8 Tractor and No. 80 Scraper building 25-foot fire-wall for refinery tank yard in soft, sandy soil. Owner Fred DeBetz says: "I have used most makes of scrapers and this No. 80 'Caterpillar' is by far the best I have ever used."

cheer for "CATERPILLAR" SCRAPERS

The success of "Caterpillar" products has always been based on outstanding performance in the field. As with Tractors and Engines, it is the fine performance of "Caterpillar" Scrapers that brings from owners and operators in all parts of the country such statements as are quoted here.

(The standard model No. 70 Scraper is priced at $6050; the No. 80, $8565—both F.O.B. Peoria, subject to change without notice.)

CATERPILLAR TRACTOR CO., San Leandro, Calif.; Peoria, Ill.



CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL
ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Washington "Caterpillar" D7 Tractor, No. 7S Bulldozer and No. 70 Scraper building new road to open up new farmland. Messrs. A. N. Stanley, James Reilly and Charles L. Hall, Commissioners of Clark County, owner, write: "The county's past success with 'Caterpillar' Motor Graders prompted us to buy this new 'Caterpillar' Diesel Tractor and Scraper. We like them so well that we are now considering the purchase of another D7 Tractor and No. 70 Scraper."

THE INSIDE STORY OF OUTSTANDING PERFORMANCE

Years of Planning, Testing, Proving and Training Behind A-C Equipment



TORTURE TESTED

. . . at Proving Grounds

After long research and engineering, Allis-Chalmers and Allied experimental models are built and sent through the most gruelling grind on our Proving Grounds that can be conceived. They operate 24 hours a day on all types of tests . . . in mud, sand, rock and gravel. Tractors are driven at high speed over staggered railroad ties — really torture tested!

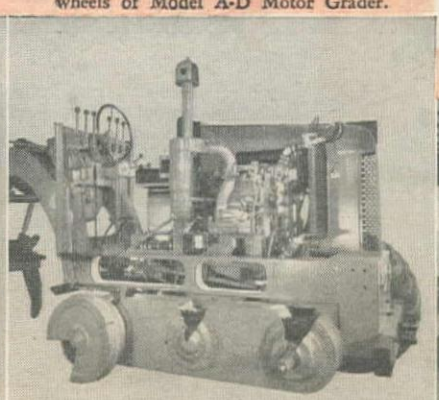
. . . in the Field

After they prove their ability on the Proving Grounds they are sent into the field. Here they are tested under a variety of conditions, on every type of job . . . the toughest in the country! The contractor's own operators put them through their paces. A-C field engineers constantly check and study their performance . . . movies are made for further observation. When they are put into production they are ready . . . ready to give outstanding performance, anywhere!

Interior view of one of the Educational Trucks.



Cut-away of controls, engine and driving wheels of Model A-D Motor Grader.



Classroom views of mechanic's school at Springfield, Ill.







BRUTE FORCE!
Laying cable takes real stamina and staying power — well supplied by the HD-19, Torque Converter Tractor.

BACKED BY SKILLED SERVICE

Factory-Trained Mechanics
Schools for dealer mechanics are in constant session at our factory in Springfield, Ill. Courses combine lectures with laboratory work. Equipment is torn down and put back together. Cut-away views show assemblies in operating position and in operation.

Industrial Educational Trucks
Here is education on wheels for entire dealer personnel. These trucks travel about the country — from one dealer to another — carry cut-aways of principal assemblies and teardown engines.

Home Office Service
Highly-skilled factory servicemen are available to dealers for advice and assistance. Service Manuals and Instruction Books prepared by this department give you and the dealer detailed information on servicing and operating Allis-Chalmers machines.

Allis-Chalmers Parts
Complete stocks of replacement parts — made in same factory, to same specifications as original parts — are carried by your A-C dealer.

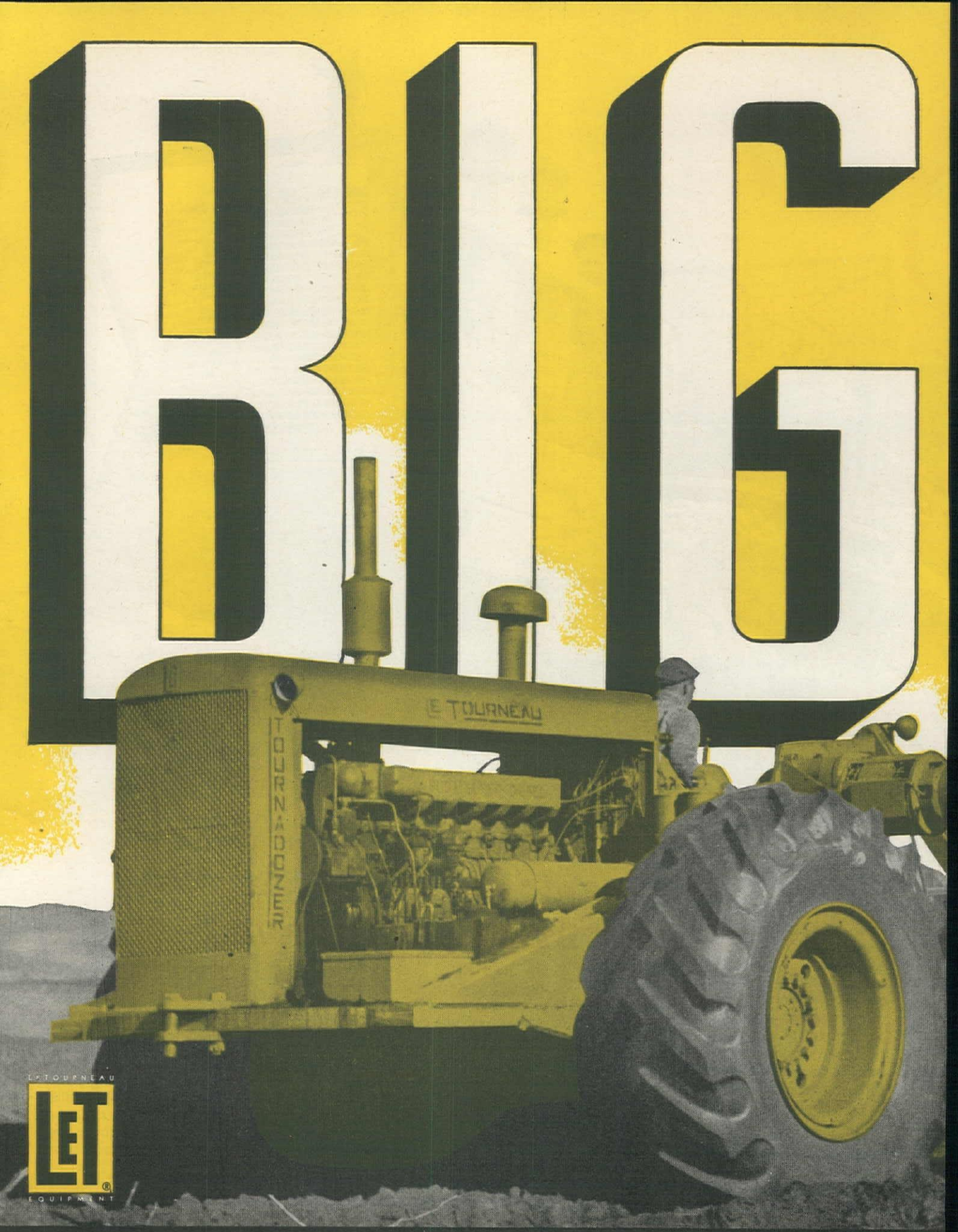
Matched Line of Allied Equipment
It is designed and built in cooperation with A-C . . . undergoes same rigid tests . . . and is sold and serviced through A-C dealers.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Originator Of The Torque Converter Tractor

BETTER ROADS FOR A BETTER WORLD
45th Annual Convention and Road Show
SOLDIER FIELD CHICAGO
JULY 16-24, 1948

B.I.G



E. TOURNEAU
LET
EQUIPMENT

TOURNADOZERS

300 h.p. PUSHER loads up to 30 yards in less than 1 minute

WITH TODAY'S biggest team of dirtmovers, the B Tournadozer and B Tournapull, you have, for the first time, a perfect combination of BIG matched high-speed dirtmoving equipment. The new B pusher behind the B Tournapull gets big loads fast — up to 30 heaped yards in less than a minute. This dozer has speed and maneuverability to synchronize its full 300 h.p. instantly with the 225 h.p. on the Tournapull . . . it's this matched equipment that gives you accurate pushing and cutting control. Both Tournapull and Tournadozer have instantaneous gear selection without shifting . . . both have instantaneous electric controls. Both units drive on big (24.00 x 29) tires built with the new tapered beads and rayon cords to take safely, the tremendous traction developed . . . tremendous loads carried. These new type tires permit low pressure flotation for work in sand and muck. They're interchangeable — from Tournadozer to Tournapull.

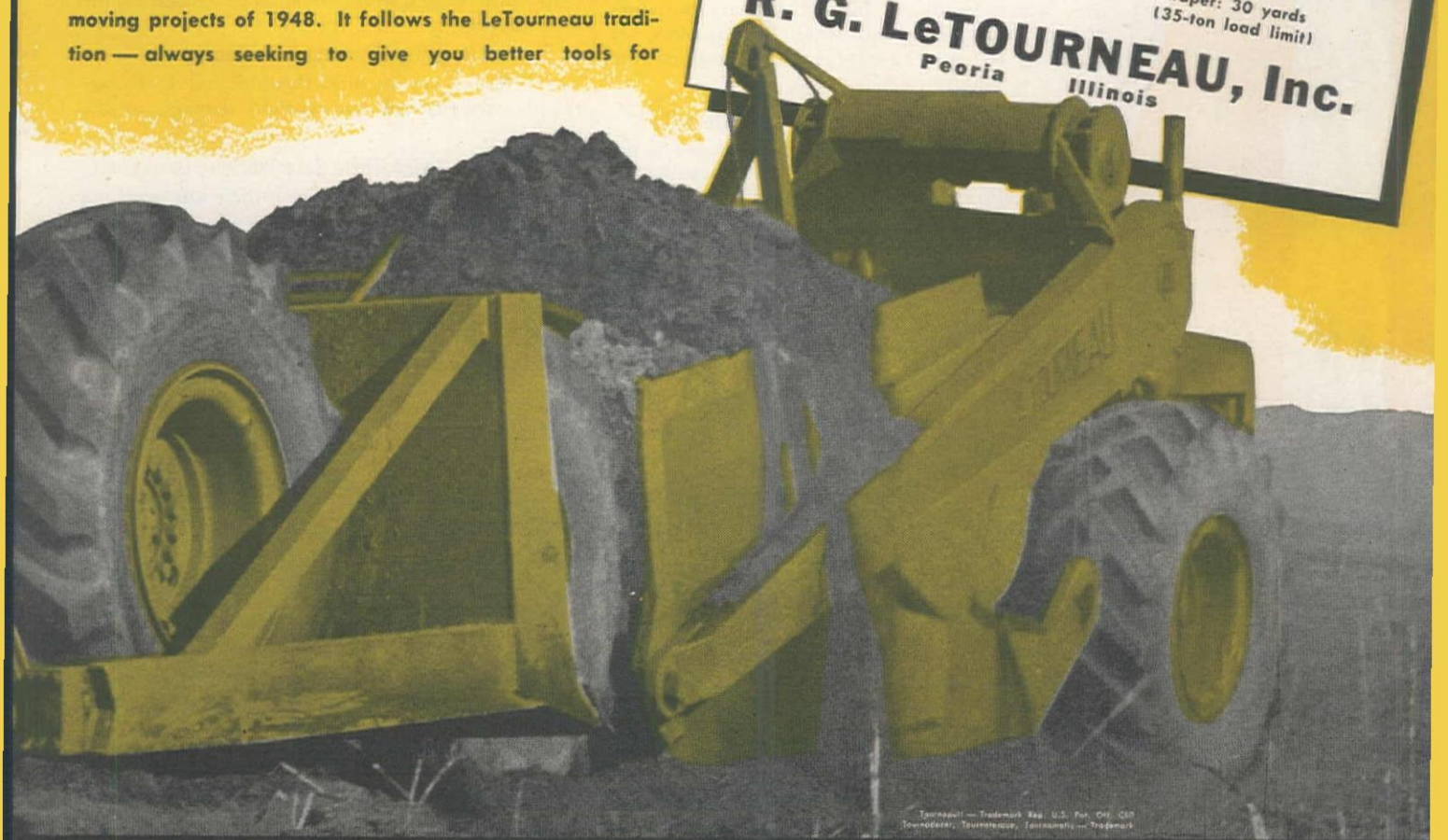
You will see this B combination on a lot of the big dirtmoving projects of 1948. It follows the LeTourneau tradition — always seeking to give you better tools for increased production and lowest cost. With this new B Tournapull and B Tournadozer team we can give you a NEW and more profitable "lowest net cost per yard."

See your LeTourneau Distributor now. Ask him to show you how these "B for BIG" LeTourneau dirtmovers can improve YOUR profit possibilitiies for 1948.

Specifications

	B TOURNADOZER	B TOURNAPULL
Engine	300 hp Diesel	225 hp Diesel
Speeds		
1st gear	Fwd. and Rev. 1.6	Fwd. and Rev. 2.00
2nd gear	Fwd. and Rev. 3.3	Fwd. and Rev. 4.00
3rd gear	Fwd. and Rev. 6.8	Forward 8.00
4th gear	Fwd. and Rev. 13.6	Forward 16.00
Tires	24.00 x 29	24.00 x 29
Control	Tournatorque electric	Tournatorque electric
Transmission	Constant Mesh–Tournamatic	Constant Mesh–Tournamatic
Drive	4-wheel	2-wheel
Working Weight	25 tons	22 tons empty
Load Capacity	Blade: 5½ cu. yds. top soil	Scraper: 30 yards (35-ton load limit)

R. G. LeTOURNEAU, Inc.
Peoria Illinois



Tournapull — Trademark Reg. U.S. Pat. Off. G.B.
Tournadozer, Tournatorque, Tournamatic — Trademark

TOURNAPULLS

BUILT TOUGHER—MORE FLEXIBL

Tuffy Slings

NOW DELIVERED TO YOU AS A COMPLETE PACKAGE WITH REQUIRED FITTINGS—READY TO HITCH ON TO TOUGH JOBS

Up to now, no rope construction ever performed in sling service to suit Union Wire Rope technicians. Producing a sling construction that would stand up during long service on any kind of a load, under any kind of pull and using every type of hitch, has been a major project in Union Wire Rope laboratories for a long, long time.

Tuffy Slings are the result, the basic secret of which is an entirely new 9 part rope construction with strands so interlaced that the extra strength, flexibility and wearing toughness are amazing in every type of service. You have to see it to believe it.

Machine Fabrication Insures Uniformity

Not only did Union Wire Rope engineers set sling construction many years ahead—they also originated a method of machine fabricating the basic rope of which Tuffy Slings are made thus eliminating the inequalities of hand making.

Cutting Any One or Two of the 9 Interlaced Strands Will Not Result in Rope Stranding.

Eye Splices Develop More Than 95% of Rope Strength —Will Resist Crushing Flat

Tuffy Sling strand interlacing makes possible the forming of eyes that will not crush flat with splices which develop 95% of the strength of the rope.

Unique Construction Prevents Rotating of Load

On straight pulls, Tuffy Slings do not rotate the load since their interlaced strands neutralize the load torque.

Flexibility Prevents Kink Damage

Tuffy Slings are so ultra-flexible that kinks are readily straightened out without damage to the rope.

Proof-Test to Twice Their Safe Working Load Limit

Metal tags on Tuffy Slings give their safe working load limits on straight pulls. Each sling or leg of a bridal sling is proof-tested to twice the safe working load.



UNION WIRE ROPE CORP

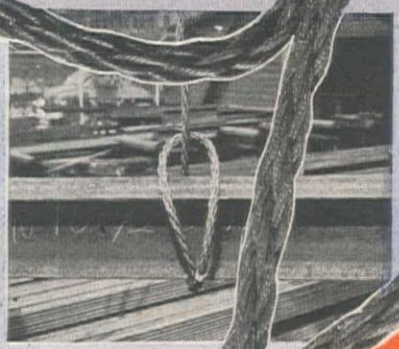
UNIO

Wire Ro

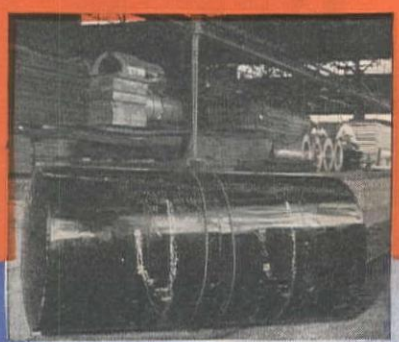
O WEAR LONGER

ENTIRELY NEW *Interlaced* 9 PART CONSTRUCTION

Patents Pending









So Flexible you can tie it into a knot or kink and unkink it without materially damaging the rope.

Watch the Old Ways Out and the New Ways In at Chicago, July 16-24, 1948

GOOD ROADS SHOW

It's the World's Fair of Construction. No construction man can afford to miss it. It is there that professional and practical men of the industry will determine upon the best methods, materials and machines with which to speed up the reconstruction of America's arteries of progress—highways, roads, streets, airports and waterways as well as flood control, soil conservation and irrigation.

At Soldier Field, Chicago, July 16-24, 1948, in a gigantic arena the size of 30 football fields, you'll see hundreds of mechanical miracles ranging from a ¼-inch Tuffy Sling up to machines weighing 200 tons.

Without the cost-cutting, man-hour-saving machinery which the construction equipment industry has designed, engineered and developed, the tremendous construction job confronting America could not be accomplished for ten times prevailing costs.

Be there! Watch the old ways out and the new ways in at the World's Fair of Construction.

UNION WIRE ROPE CORPORATION

2146 Manchester Ave. Kansas City 3, Mo.

☐ Send Facts on Tuffy Slings Including Safe Working Loads of 9 Sizes Which You Deliver as Complete Packages.

For Tuffy Slings — See Your Union Wire Rope Distributor (Listed in Yellow Section of Your Telephone Directory) and/or Send This Coupon.

FIRM NAME .....

ADDRESS .....

CITY ..... ZONE .....

STATE .....

DEPENDABLE

For hundreds of Heavy

53 H.P. at 1500 R.P.M.

THE INTERNATIONAL UD-9

DIESEL POWER UNIT

There is no better heavy-duty engine of half a hundred horsepower than this 4-cylinder, valve-in-head International Diesel. It provides dependable, low-cost power for operating rock crushers, conveyors, fans, pumps, hoists, pavers, compressors and many other units of equipment for construction and road building.

The UD-9 develops 53 horsepower at 1500 r.p.m. This is *working horsepower*, for industrial intermittent load applications. And it is economical power because of the operating efficiency and ruggedness of the International design.

Yes, for low-cost, dependable power there is no question about the superiority of the engine or power unit that bears the International name. Your International Industrial Power Distributor is prepared to prove this to your complete satisfaction.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue · Chicago 1, Illinois



Road surfacing—two UD-9 Diesels power the job economically.



Ditching moves ahead on schedule with UD-9 power.

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

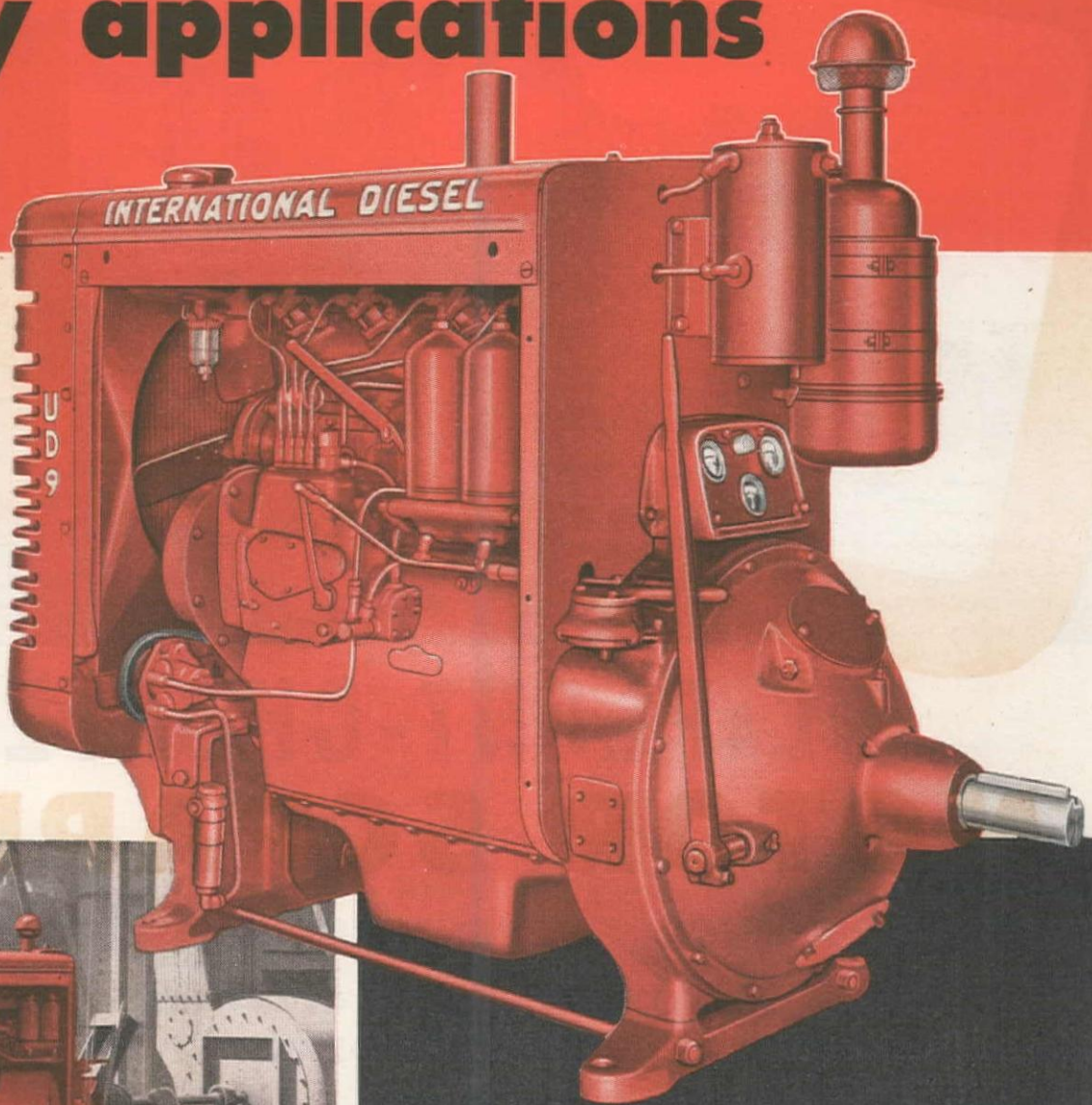
INTERNATIONAL

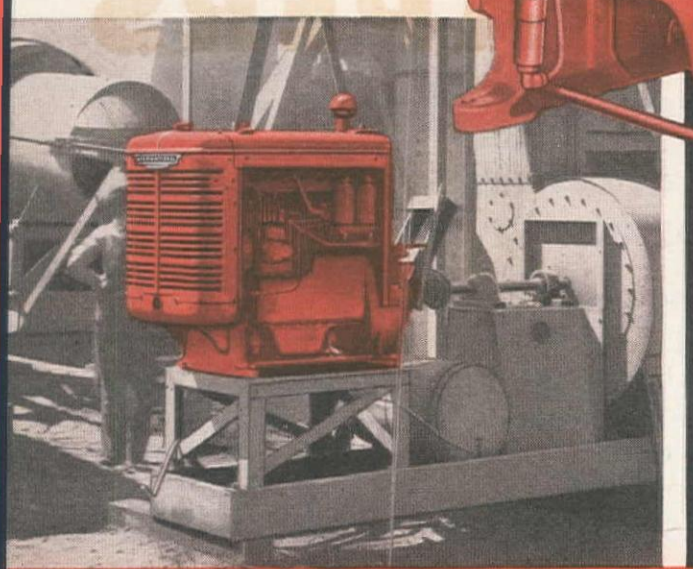




LOW-COST POWER
-Duty applications

Dependability is built into International Diesel Power Units. Construction features that make them superior for all heavy-duty powering jobs include: self-contained, all-weather starting system; advanced design combustion for maximum utilization of fuel; single-plunger International fuel injection pump that meters fuel accurately to meet all load conditions as interpreted by a sensitive, variable-speed governor and torque control; induction-hardened crankshaft; precision-type bearings; full-pressure lubrication; by-pass type thermostatic cooling, and adequate, efficient filtering of fuel, lube and air.





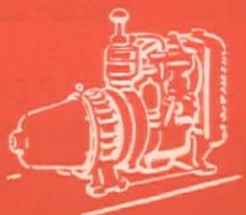
Applications of the UD-9 Diesel Power Unit as shown in the pictures to the left are representative of the many and diverse uses to which this dependable power may be put. International Diesels have the lugging ability—the hang on under load—to pull through and deliver the power you require at all times . . . at lowest cost for fuel, lubrication and maintenance.

Low-cost power for large-capacity blowers: the UD-9.

INTERNATIONAL HARVESTER

Industrial Power







Curved offset edge for better penetration — better boiling action — better balanced loads.



LaPLANT-CHOATE MOTOR SCRAPERS

. . . produce more yards at lower cost

because **THEY CONSISTENTLY GIVE YOU MORE HOURS OF TROUBLE-FREE PERFORMANCE!**

With an absolute minimum of working parts, easy, trouble-free operation and maintenance assures a unit that will work hour after hour without costly down-time.

Simplicity of controls means easy operation. Double-acting hydraulic steering assures safe, positive steering with 60° turns each way without danger of jackknifing.

Improved, air-actuated LPC power control unit operates scraper with peak efficiency. Sixteen horsepower per struck yard of capacity for "plenty of power," up and down grade, in any material.

The scraper units are modern LPC scrapers which have been proved, by competitive test, to be the easiest loading, fastest spreading scrapers on the market!

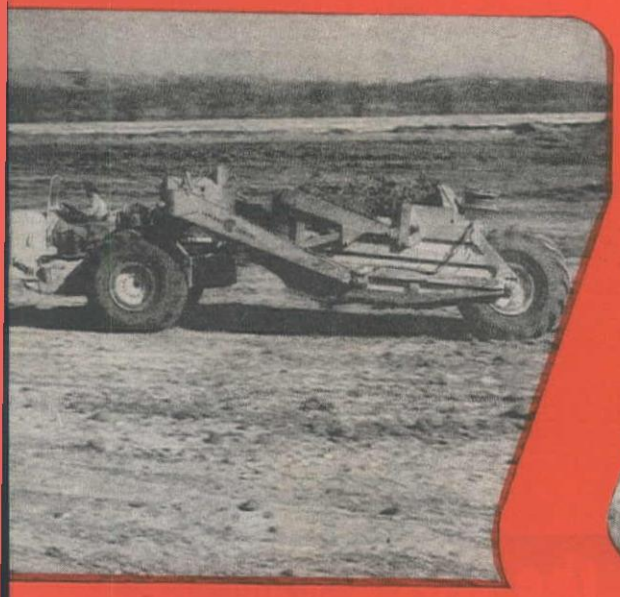
See your nearest LPC distributor for complete details and operating data. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Avenue, Oakland, California.

LaPLANT-CHOATE

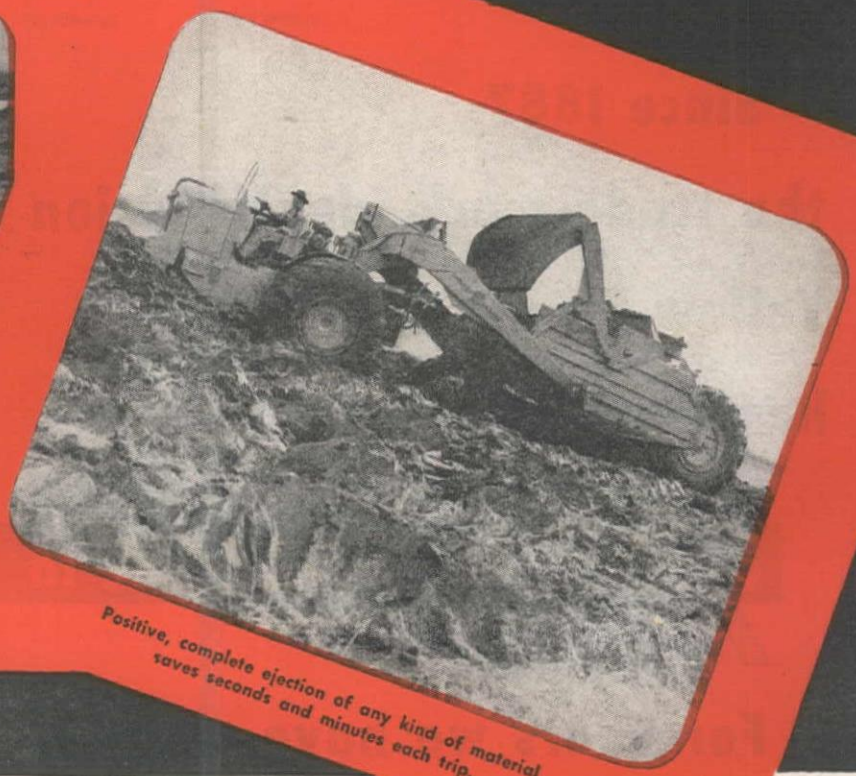
HIGH SPEED EARTHMOVING EQUIPMENT

FOR LOWEST POSSIBLE COST PER YARD..PER JOB..PER YEAR

BETTER ROADS FOR A BETTER WORLD — 45th Annual Convention and Road Show — SOLDIER FIELD CHICAGO — JULY 16-24, 1948



Four speeds forward — up to 18 m.p.h. — more trips per hour — more profit per job.



Positive, complete ejection of any kind of material saves seconds and minutes each trip.

Get the facts from your nearest LaPlant-Choate Distributor

ENGINEERING SALES SERVICE, INC.
410 Capitol Boulevard
BOISE, IDAHO

GENERAL EQUIPMENT COMPANY
1201 East 2nd Street
RENO, NEVADA

HEINER EQUIPMENT & SUPPLY CO.
501 W. Seventh Street South
SALT LAKE CITY, UTAH

INDUSTRIAL EQUIPMENT COMPANY OF SOUTHERN CALIFORNIA
4441 Santa Fe Avenue
LOS ANGELES 11, CALIFORNIA

N. C. RIBBLE CO.
1304 N. Fourth Street
ALBUQUERQUE, NEW MEXICO

WESTERN MACHINERY COMPANY
1004 Speer Boulevard
DENVER, COLORADO

WESTERN MACHINERY COMPANY
760-762 Folsom Street
SAN FRANCISCO, CALIFORNIA

WESTERN CONSTRUCTION EQUIPMENT CO.
505 N. 24th Street
BILLINGS, MONTANA

218 W. Pine Street
MISSOULA, MONTANA

INDUSTRIAL EQUIPMENT COMPANY OF ARIZONA
720 S. 19th Avenue
PHOENIX, ARIZONA

Since 1887
the trade-mark identification of
Yellow Strand Wire Rope
has been a

Yellow Strand in the ROPE

For years we have used
Yellow on our reels and
Yellow in our advertising;
but when you buy wire rope,
the way to be certain of getting
genuine Yellow Strand
is to look for the

Yellow Strand in the ROPE



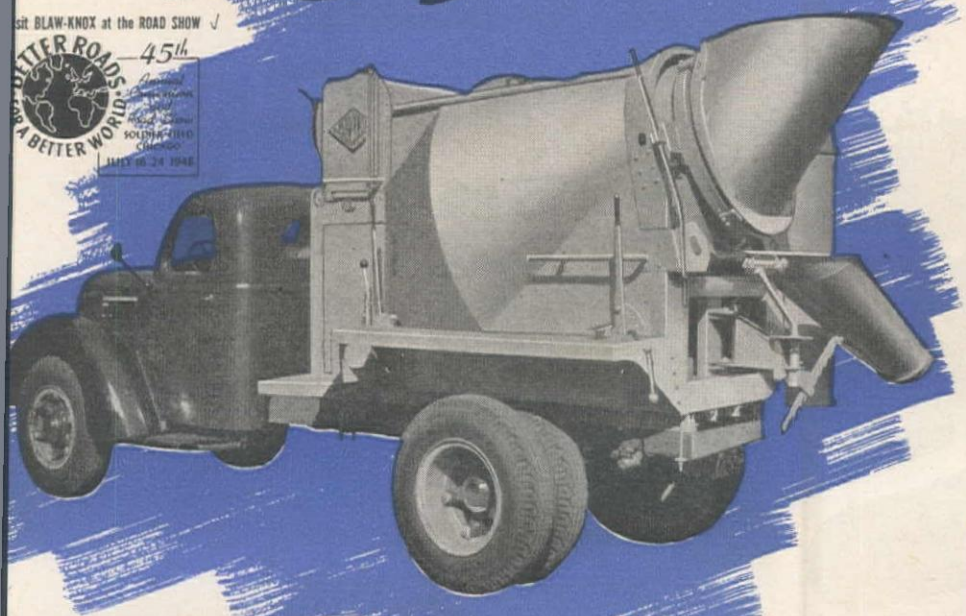
Broderick & Bascom Rope Co., St. Louis

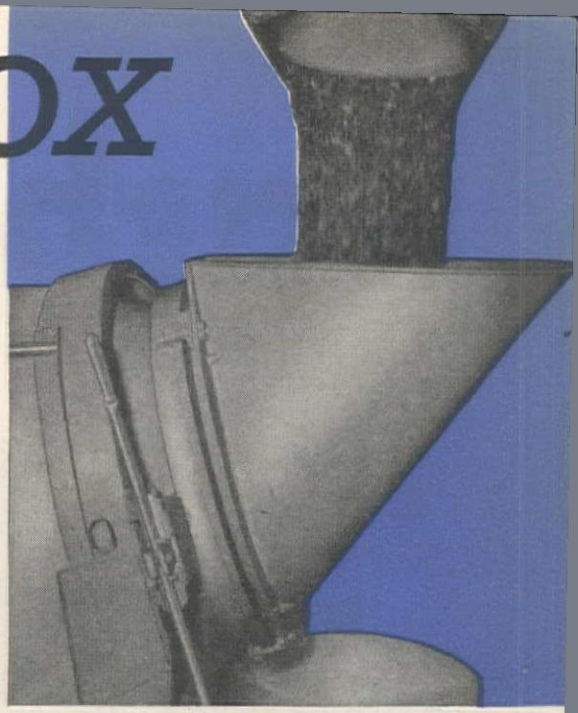
Branches: New York, Chicago, Houston, Portland, Seattle

Factories: St. Louis, Seattle, Peoria

The BLAW-KNOX Hi-Boy TRUKMIXER

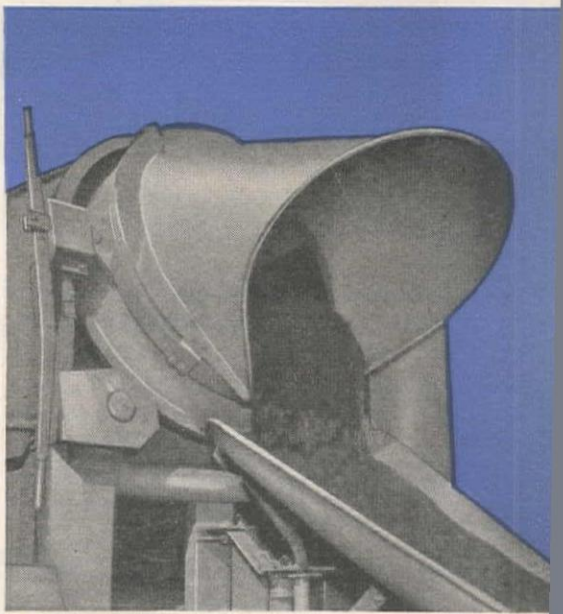
Visit BLAW-KNOX at the ROAD SHOW





CHARGING . . . Latch holds hopper in upright position to receive and swallow fast flow of material for the batch.

WITH THE EXCLUSIVE REVOLVING HOPPER



DISCHARGING . . . Latch has been released permitting hopper to be rotated 180° by the mixing drum movement, where it is *automatically* held in inverted position for discharging. Seal between drum and hopper is never broken.

Check the salient features ★ of this ENTIRELY NEW PRINCIPLE IN TRUCK MIXERS, then send for complete data.

★ ***No Leakage*** of concrete at rear end seal.

★ ***No Maintenance of Seal Required*** between rear end hopper and drum—eliminates lay-up of Trukmixer for repairs—just grease the seal twice a day.

★ ***Faster Charging***—unrestricted 32" opening from rear end hopper into mixing drum—no obstructions.

★ ***Faster Discharge***—no gate to open—just invert rear end hopper.

★ ***Faster and More Thorough Mixing*** due to wide spiral blade design.

★ ***Mixes and Discharges Zero Slump Concrete.***

★ ***Discharges All the Concrete***—empties the drum completely.

★ ***No Segregation*** of concrete.

★ ***Higher Elevation of Discharge***—confining sub-chute is eliminated.

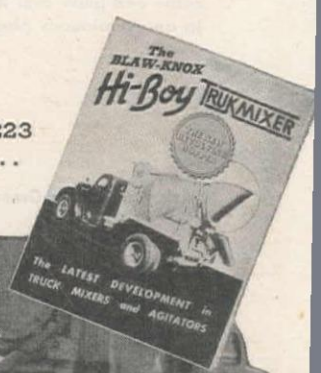
★ Made in 2, 3 and 4½ cu. yd. mixer capacities with corresponding larger agitator capacities. All controls simplified for one-man operation . . . For complete data on the BLAW-KNOX HI-BOY TRUKMIXER, send today for Bulletin No. 2223.

BLAW-KNOX DIVISION of Blaw-Knox Company
2102 Farmers Bank Building • Pittsburgh 22, Pa.

See your nearest Blaw-Knox distributor

C. H. Grant Company, 435 Bryant Street, San Francisco 7, Calif.; Shaw Sales & Service Company, 5100 Anaheim-Telegraph Road, Los Angeles 22, California; Western Machinery Company, 1025 South Central Avenue, P. O. Box 1652, Phoenix, Arizona; Intermountain Equipment Company, Broadway at Myrtle Street, Boise, Idaho; E. M. Ornitz, 215 West Fifth Street, Los Angeles 13, California; Contractors Equipment Corp., 1215 S.E. Grand Avenue, Portland, Oregon; The C. H. Jones Equipment Company, 236 West South Temple Street, Salt Lake City 1, Utah; Lively Equipment Company, P. O. Box 784, Albuquerque, New Mexico.

Bulletin No. 2223 TELLS ALL . . .
Send for it

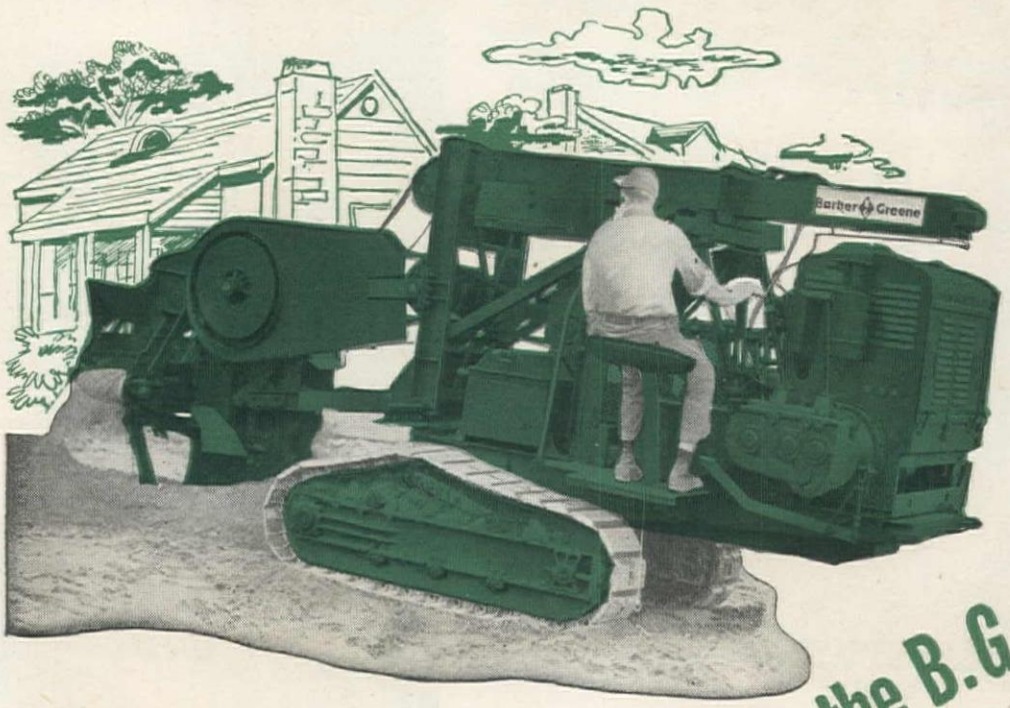




Seven of a fleet of 10 Blaw-Knox Hi-Boy Trukmixers used in pouring precast revetment mats at Greenville, Miss., for U.S. Engineers... Contractor, Kelley Vail Const. Co.

BLAW-KNOX *knows how to build* TRUKMIXERS

Barber-Greene



720 Ditcher

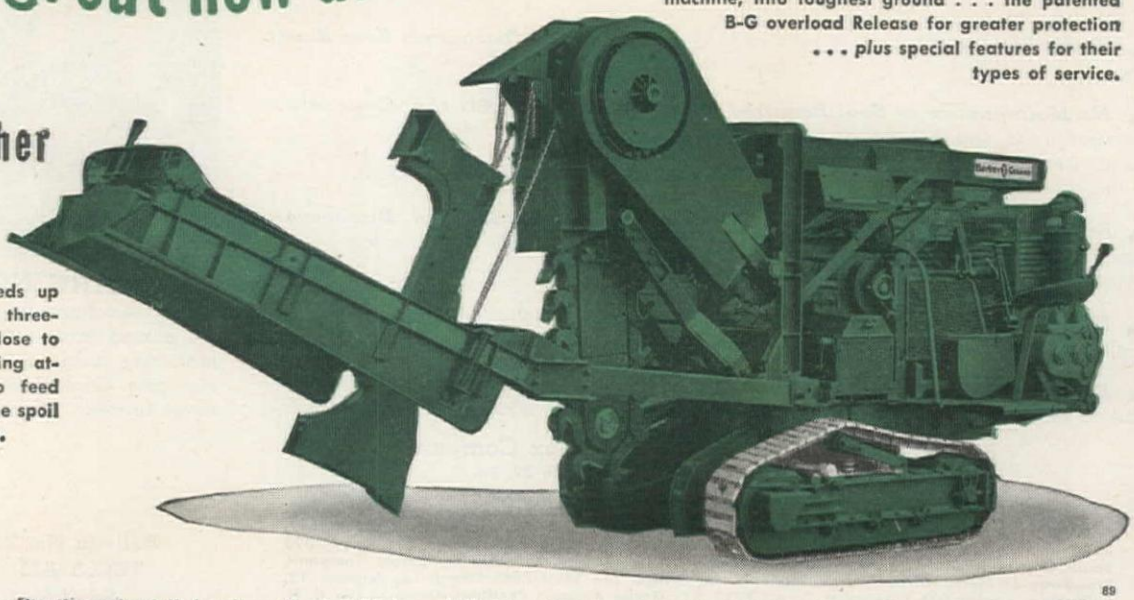
For digging trenches 8" to 11" wide—up to 4 feet in depth. Digging speeds up to 32 F.P.M.; traveling speeds as high as 234 F.P.M. adjustable spoils conveyor discharges on either side. Three-position boom adjustable to dig close to obstructions. Simple B-G controls, easy-steering.

Two great new ditchers in the B.G. line!

These two new ditchers bring exclusive, time-proved B-G advantages . . . the B-G Vertical Boom that digs straight down, leaves no ramp . . . close-spaced, self-cleaning buckets that cut, like a milling machine, into toughest ground . . . the patented B-G overload Release for greater protection . . . *plus* special features for their types of service.

710 Ditcher

Digs trenches 5½" wide up to 42" deep. Digging speeds up to 32 F.P.M.; travel speeds up to 234 F.P.M. Vertical three-position boom digs close to obstructions. Cable-laying attachment available to feed cable and plow over the spoil in one continuous pass.



89

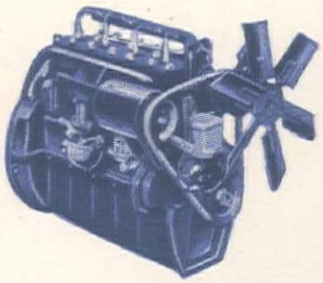
Ask your Barber-Greene distributor for full details on the B-G Ditcher which interests you — or write to Barber-Greene Company, Aurora, Illinois.

BARBER • GREENE COMPANY AURORA, ILLINOIS

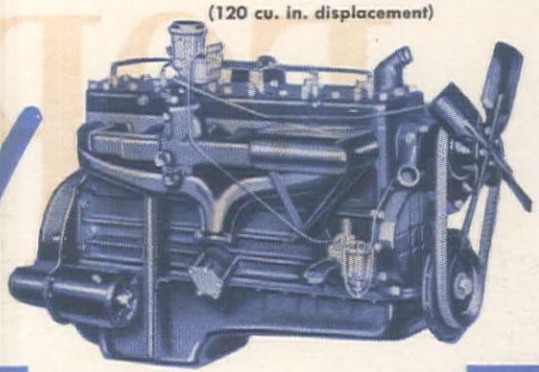
FOR SALE BY:

BROWN-BEVIS EQUIPMENT CO., Los Angeles 11, California; COLUMBIA EQUIPMENT CO., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyoming, Casper, Wyoming; CONTRACTORS EQUIPMENT & SUPPLY CO., Albuquerque, New Mexico; RAY CORSON MACHINERY CO., Denver 9, Colorado; JENISON MACHINERY CO., San Francisco 7, California; WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Montana, Missoula, Montana; KIMBALL EQUIPMENT COMPANY, Salt Lake City 10, Utah; STATE TRACTOR & EQUIPMENT CO., Phoenix, Arizona.

Here's the New FORD Power-Family



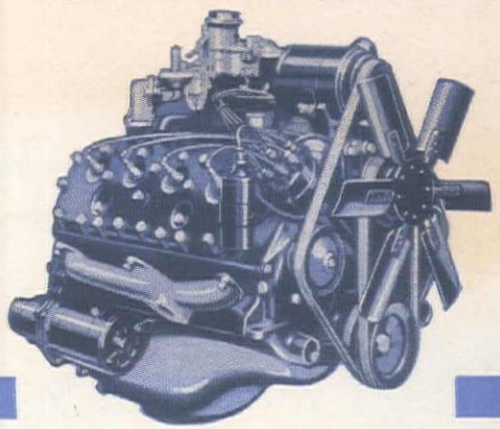
Ford 120 Four Cylinder Industrial Engine
(120 cu. in. displacement)



Ford 226 and 254 Six Cylinder Industrial Engines (226 and 254 cu. in. displacement)

1 "FOUR" . . . 2 "SIXES" . . . 2 "EIGHTS"

Here they are . . . five great, brand-new Industrial Engines built by Ford! Look 'em over—every one the product of Ford experience . . . every one with famous Ford reliability built in . . . every one complete and ready to run! For *new* power, for *right* power, use Ford Industrial Engines, completely new!



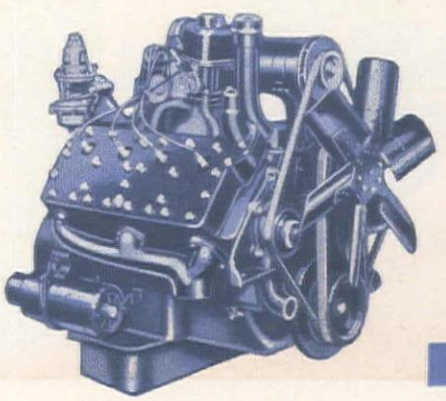
Ford 337 V-8 Industrial Engine
(337 cu. in. displacement)

When It's FORD POWER . . . it's right 3 ways!

RIGHT POWER—A full power range, from the maker that knows power best . . . from Ford!

RIGHT FEATURES—Ford Industrial Engines incorporate the latest advancements of Ford's progressive engineering. You're never outdated when you pick Ford power.

RIGHT SERVICE—Ford Dealers provide complete parts and service facilities around the world. They keep Ford power on the job, save you time and money!



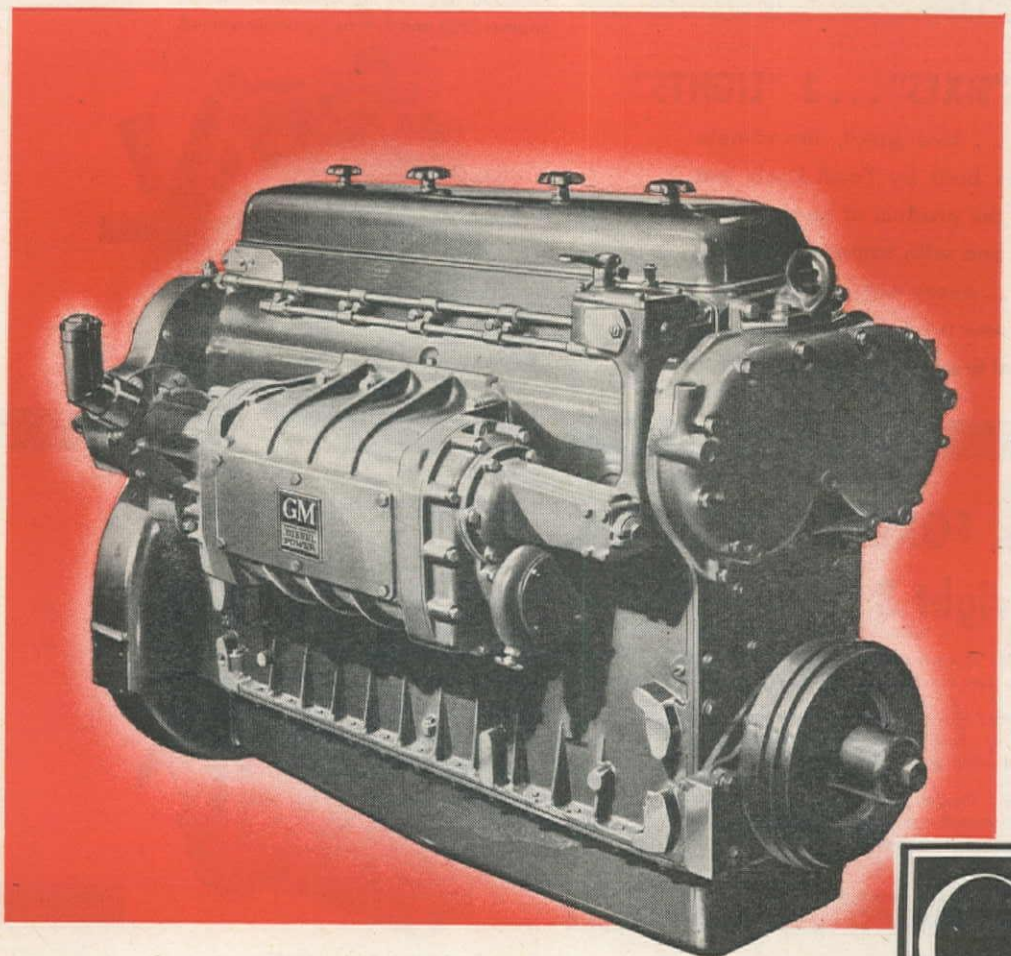
Ford 239 V-8 Industrial Engine
(239 cu. in. displacement)

FORD MOTOR COMPANY
INDUSTRIAL AND MARINE ENGINE SALES DEPARTMENT
3515 Schaefer Road • Dearborn, Michigan

Listen to the Ford Theater, Sunday afternoons, NBC Network. See your newspaper for time and station.

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED

GREAT FOR FINE



HELP AMERICA PRODUCE FOR PEACE
Turn in SCRAP Iron and Steel

Diesel Brawn Without the Bulk

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES.. *Up to 200 H.P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS.. *Up to 800 H.P.*

GENERAL MOTORS

GM
GENERAL MOTORS
DIESEL POWER

Evans Engine & Equipment Co.
SEATTLE 9, WASH.

Fred M. Viles & Company
SPOKANE 8, WASH.

Gunderson Bros. Equipment Corp.
PORTLAND 9, ORE.

Capitol Tractor & Equipment Co.
SACRAMENTO, CALIF.

DIESELS EQUIPMENT

Today the list of manufacturers, who offer their contractors equipment powered with General Motors "71" Diesels, reads like a "Who's Who" of the industry. They know what these powerful, modern 2-cycle Diesels can do.

They know that these engines with all their power are compact and fit in available space—that they do their work easily and fast. Their 2-cycle operation makes them responsive and quick to pick up under load. They step up the work done by any kind of equipment.

GM Diesels have been designed for easy servicing. Pistons, liners, valves, and many other parts, are the same for every size Series 71 engine, so there is the maximum interchangeability of parts.

No wonder, then, that America's finest contractors' equipment is being furnished with the General Motors Series 71 Diesel engine.

LEADING MANUFACTURERS OF THE FOLLOWING EQUIPMENT OFFER GM SERIES 71 DIESEL ENGINES IN THEIR PRODUCTS:

Air Compressors
Arc Welders
Asphalt Plants
Buses
Cableways
Cranes
Distillation Equipment
Ditchers
Draglines
Dredges
Earthmoving Loaders
Evaporation Units
Feed Mills
Fire Pumps
Hoists
Industrial Locomotives
Locomotive Cranes
Logging Loaders
Logging Yarders
Mining Pumps
Motor Graders
Off-The-Road Vehicles
Oil Field Equipment
Pavers
Power Scrapers
Pumps
Road Rollers
Rock Crushers
Rotary Soil Tillers
Saw Mills
Screening Plants
Shovels
Soil Stabilizers
Stave Mills
Tractors
Trucks
Wellpoint Pumps

IT'S WISE FOR YOU TO SPECIFY GM DIESEL

Cate Equipment Co.
SALT LAKE CITY, UTAH

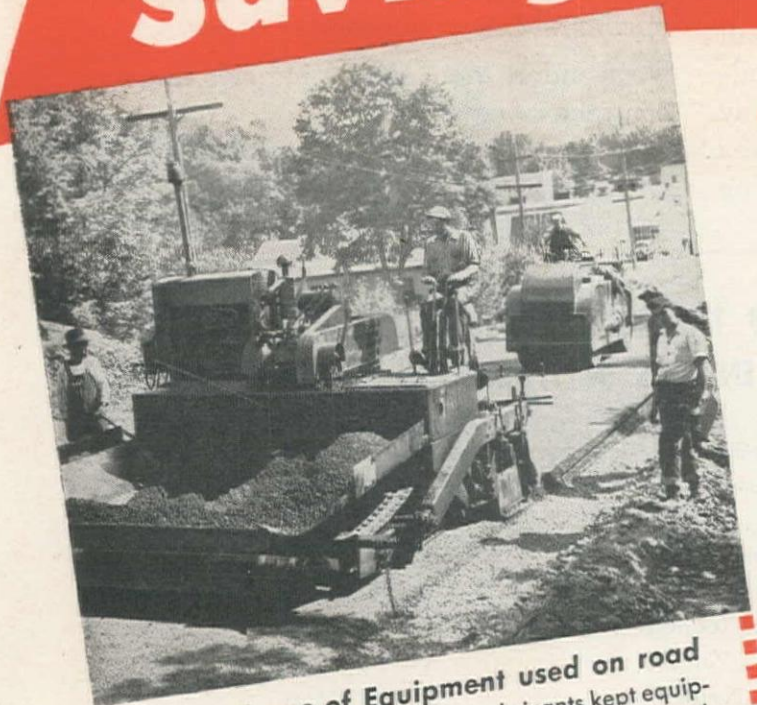
Mountain Tractor Co.
MISSOULA, MONT.

Olson Manufacturing Co.
BOISE, IDAHO

Anderson-O'Brien Co.
LOS ANGELES 21, CALIF.



Saving • under all conditions



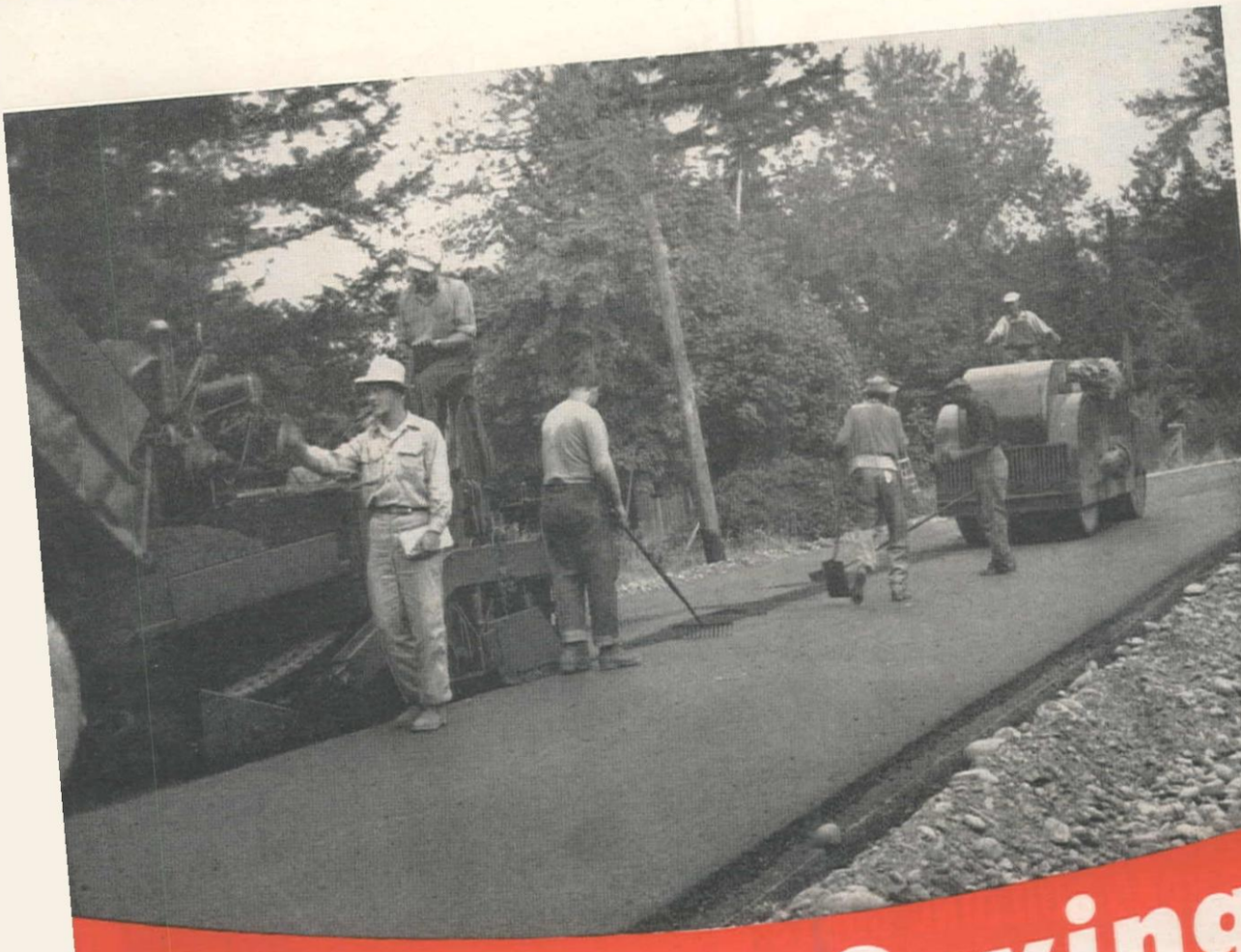
Many Types of Equipment used on road contract. General Petroleum Lubricants kept equipment working efficiently on this recently completed highway job between Milwaukie and Estacada, Oregon. Warren Northwest held the contract for paving and grading and sub-let the grading to J. M. Arenz. Equipment included: trucks, graders, rollers, power shovels, pavers, and crushing and batching plants.

● Saving time and money... on all kinds of jobs... under all possible conditions— that's the fifteen year record of Mobil Lubricants for Warren Northwest, Inc. What has been accomplished by the consistent use of G. P. Lube Engineering service, and Mobil Products, is stated by J. R. Wininger, president:

"We move around a lot, to many jobs, and our equipment is in the hands of many different men. We can't take a chance on using the wrong lubricants, so we depend on G. P. Recommendation Charts and stick by them to the letter.

GENERAL

An Enterprising Member of



for fifteen years • Saving

"By the consistent use of correct G. P. lubricants, we prevent gear and bearing wear that might cause breakdowns. We lengthen the life of our equipment and keep it operating properly under all conditions."

You too, can depend on G. P. Lube Engineering service and Mobil Products to save you money by extending equipment life and reducing breakdowns and maintenance cost. For better performance and greater profits, why not see your General Petroleum representative today?

SAVE MONEY WITH THIS G. P. SERVICE

A simple and effective means of reducing equipment costs and thereby increasing profits . . . that's G. P. Contractors' Service. Under this plan an experienced lubrication engineer works closely with your operating crews — first to make a survey of your equipment and recommend the correct lubricants and service intervals — then to establish inventory control and delivery service to your jobs, so that all machinery is properly lubricated with the smallest number of products necessary. G. P. Contractors' Service is available anywhere in the West.

Mobilgas

SOCONY-VACUUM

PETROLEUM CORPORATION

the Progressive Petroleum Industry

P&H SINGLE PASS SOIL STABILIZERS



CUTS ROAD BUILDING COSTS

$9\frac{1}{20}$ miles of soil cement road in 20 days!

In state after state, wherever P&H Single Pass Soil Stabilizers are on the job, new road-making economy like this results — excellent, all-weather surfaces are made more quickly.

This Iowa highway of over 9 miles was completed in only 20 working days. The road is 24 feet wide and was processed to a depth of 6 inches. Maximum production, even with a green crew, was 1000 sq. yds. per hour.

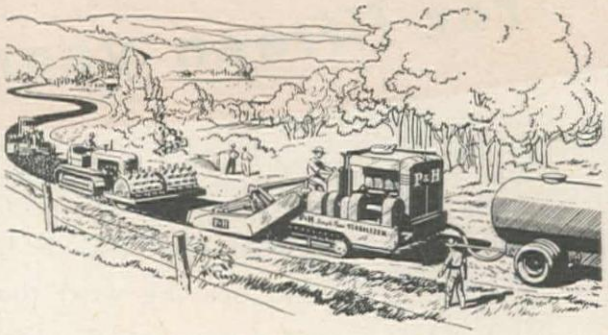
This *one* machine in *one* pass with just *one* operator performed all stabilizing operations — enabling the contractor to meet specifications exactly and produce a road of predetermined load carrying capacity.

Making maximum use of native materials, the P&H Stabilizer shaves and pulverizes these, blends, maintains true sub-grade, applies liquid, final mixes, and spreads to a uniform depth — and does it rapidly.

P&H HARNISCHFEGER CORPORATION

SINGLE PASS STABILIZERS
4490 West National Avenue
Milwaukee 14, Wisconsin

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS



FACTS ABOUT THE JOB

LOCATION OF PROJECT—Highway 37, Monona County, Iowa — from Turin to Soldier.

LENGTH OF PROJECT — 9.053 miles.

WIDTH OF ROADWAY — 24 feet (3 lanes of 8 ft. each).

DEPTH OF TREATMENT — 6 inches, compacted.

TYPE OF SOIL — Silt (Loess)

STABILIZING AGENT — Cement (10% by volume).

RATE OF PRODUCTION — Over 6,300 sq. yds. per working day average.

If you build secondary highways, streets, base courses, airport runways, etc., it will pay you to investigate the performance of the P&H Single Pass Soil Stabilizer under conditions similar to your own. Ask for the facts.

New full-color, sound motion picture on P&H Stabilizer now ready. Write for information.



NOT A BRAND,

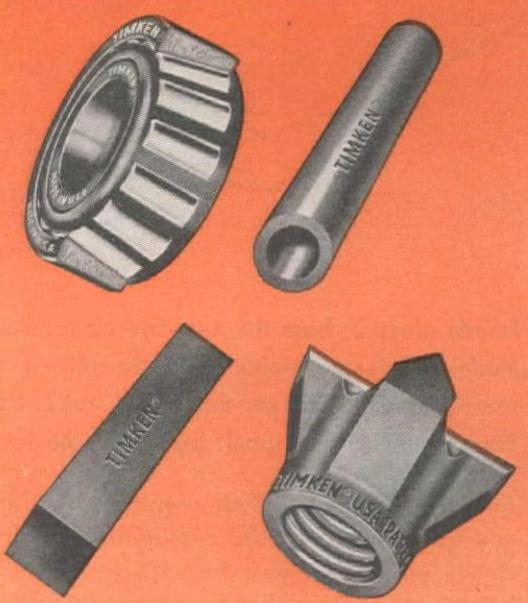
BUT A BRAND PROTECTOR

"CIRCLED R"

TIMKEN®

It tells the world that "TIMKEN" is registered as a trade-mark in the United States Patent Office and cannot lawfully be used to designate products other than those manufactured by The Timken Roller Bearing Company — Timken Tapered Roller Bearings, Timken Alloy Steels, Timken Seamless Steel Tubing and Timken Rock Bits.

The trade-mark "TIMKEN" is the buyer's assurance of the finest products in their respective fields. Look for it. The Timken Roller Bearing Company, Canton 6, Ohio.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▱ BEARING TAKES RADIAL ▯ AND THRUST ⊣▯⊢ LOADS OR ANY COMBINATION ✳

JAEGER ENGINEERED for

Because more air is THERE



Steady pressure from the over-size air receiver of his Model 210 Jaeger enables Ralph Facciolo to complete several hundred feet per day of 30″ cut in New York City pavement (5″ asphalt top on 6″ concrete base).

From 60 to 600 cfm of air requirements, Jaeger engineering gives you the combination of high efficiency compressor unit, big engine and up to 70% larger air receiver that keeps steady full-pressure behind your tools, plus the great economy of Jaeger "Fuel Miser" control which automatically regulates the engine speed to air demands.

It is this "Air Plus" performance that makes Jaeger compressors first choice today with operators who rate results on the basis of daily footage drilled, yards of pavement broken, material excavated or other measures of *actual job production.*

If you're interested in getting more work done for the wages that you pay, see your Jaeger distributor about a new "Air Plus" compressor.

Sold, Rented and Serviced by

EDWARD R. BACON CO......**San Francisco 10, Calif.**
SMITH BOOTH USHER CO......**Los Angeles 54, Calif. and Phoenix, Ariz.**
A. H. COX & CO......**Seattle 4, Wash.**
NELSON EQUIPMENT CO......**Portland 14, Ore., Twin Falls and Nampa, Ida.**

labor-saving mass production

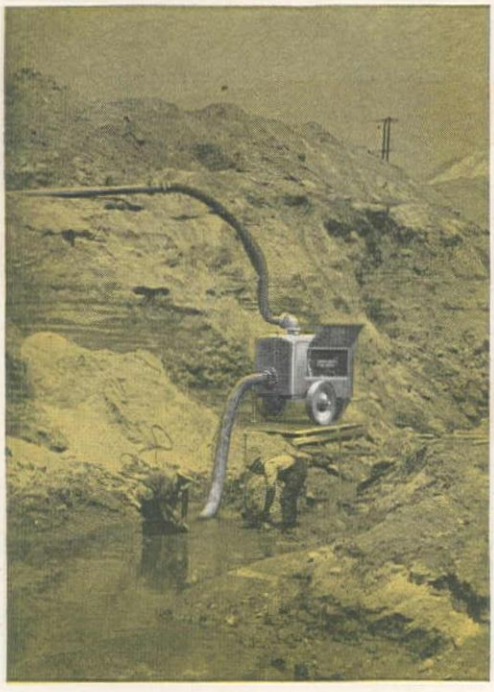
Jaeger DIAGONAL SCREED Finisher does what no other finisher can do:

1. Diagonal rear screed, with angle controlled by operator, automatically carries material to the high side of pitched slab and super-elevated curves and compacts it solidly against the upper form. Eliminates or greatly reduces carry-back — a direct labor saving.

2. Combination of diagonal rear screed and transverse front screed produces a more accurate surface than is possible with any transverse finisher; finishes stiff mixtures faster without tearing; saves extra passes and reduces costly hand work.

3. Faster, more flexible, with its screed speeds fully independent of traction, this revolutionary Type "X" Jaeger gives you the mass-production finisher you need with today's mass-production pavers.





Jaeger Remixing-Compacting Spreader Completes Today's Paving "Team"



Latest improved models, with greater capacity and range of work, mechanically remix, spread, compact and strike off material behind as many as two pavers, ready for precision finishing. Spreading screw, exclusive with Jaeger, positively eliminates segregation and resulting honeycomb, produces denser slab texture than any other method. Core tests prove it. Widths 10-15, 20-25 ft.

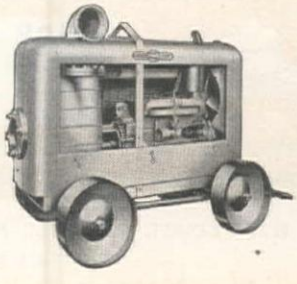
GOODBYE WATER!

The sure way to lick a water problem is to start the engine on a Jaeger "Sure Prime" Pump. It's extra powered, conservatively rated and equipped with two separate, simultaneous priming actions — to prime faster, pump full volume under tough conditions and for thousands of hours longer than ordinary pumps.

More Pump for Your Money: Only Jaeger gives you a factory-tested and certified pump completely enclosed and weather-protected, with both inherent and jet priming, replaceable liners or seal rings, long-life Lubri-Seal, self-cleaning shell design and capacities from 3000 to 240,000 gph to meet any need for drainage or supply work.



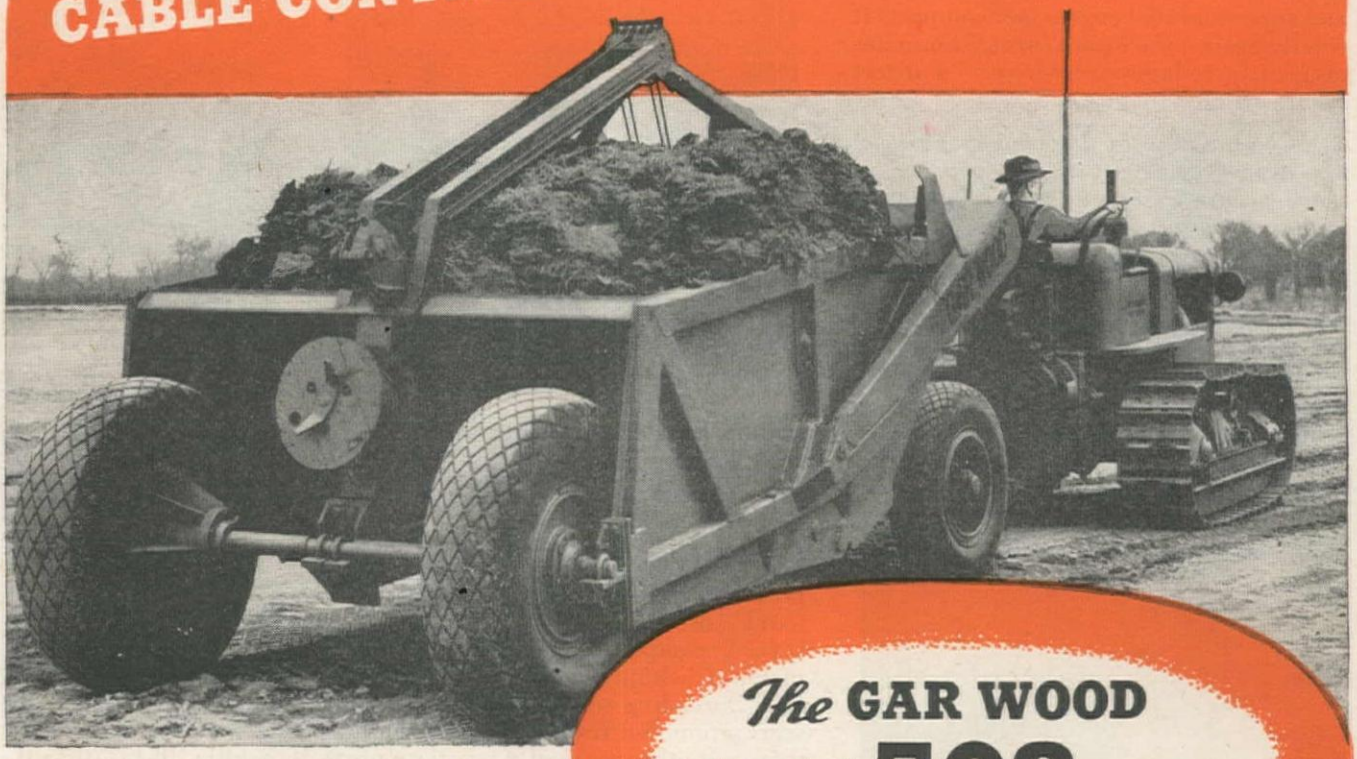
Sold, rented, serviced in 130 cities of U. S. and Canada. See your Jaeger distributor or send for latest catalogs on Pumps, Air Compressors, Finishers, Spreaders, Mixers, Hoists, Bituminous Pavers.



2″ to 10″ heavy duty dewatering pumps . . . 2″ to 8″ pressure pumps for higher heads . . . lift and force diaphragm pumps . . . caisson pumps for depths exceeding 100 ft.

ANDREWS EQUIPMENT SERVICE.....Spokane 9, Wash.
WESTERN MACHINERY COMPANY.....Salt Lake City 13, Utah and Denver 2, Colo.
CENTRAL MACHINERY CO.....Great Falls, Mont.
TRACTOR & EQUIPMENT CO.....Sidney and Miles City, Mont.
WORTHAM MACHINERY COMPANY.....Cheyenne, Wyo., Billings, Mont.
HARDIN & COGGINS.....Albuquerque, N. M.

NOW!! A NEW GAR WOOD CABLE CONTROLLED 4-WHEEL SCRAPER



The GAR WOOD Model 508

Immediate Delivery

Here's a brand new 4-wheel scraper designed from the ground up for use with a single tractor of 55 h.p. and up. 7.6 cu. yds. heaped capacity (6 cu. yds. struck). Hogs out a deep cut down to 12" below tires, and cascades dirt up into the bowl—no belaboring of tractor. Has all the rugged construction and work potential features of the larger Gar Wood scrapers which have long been proven on the toughest jobs. Simple straight line cable reeving saves cable and makes replacements easy. Pivoted type bowl with less friction. Fast, fully-controlled dumping and spreading. High bowl clearance for soft footing. A tailor-made earthmover for township, county, state highway departments, pond or tank, levee and right-of-way work. See your nearest Gar Wood—Allis-Chalmers dealer, listed below, or write for complete information.





GAR WOOD INDUSTRIES, INC.
Findlay Division
FINDLAY, OHIO

GAR WOOD GW INDUSTRIES

Other Products: Buckeye Shovels, Ditchers, Spreaders, Finegraders—Gar Wood Hoists, Dump Bodies, Winches, Cranes, Tanks—St. Paul Hoists, Bodies, Truck Patrols

NEW WEST COAST ASSEMBLY PLANT AT RICHMOND, CALIF.

DEALERS:

Neil B. McGinnis Co., Phoenix, Arizona; Buran Equipment Co., Oakland 3, Calif.; Food Machinery Corp., Fresno, Calif.; J. M. Equipment Co., Modesto, Calif.; Redwine Tractor Co., Mountain View, Calif.; Capitol Tractor & Equipment Co., N. Sacramento, Calif.; E. C. Livingston Co., Paso Robles, Calif.; Shaw Sales & Service Co., Los Angeles 22, Calif.; Moore Equipment Co., Stockton, Calif.; Emil Rossi & Company, Dixon, Calif.; Shannon Tractor & Pump Co., Merced, Calif.; Kern Tractor & Equipment Co., Bakersfield, Calif.; Tulare County Tractor Co., Visalia, Calif.; Power Equipment Co., Denver, Colo.; Olson Mfg. Co., Boise, Idaho; Southern Idaho Equipment Co., Idaho Falls, Idaho; Mountain Tractor Co., Missoula, Mont.; Seitz Machinery Co., Billings, Mont.; Northland Machinery Co., Sidney, Mont.; C. W. Paul Hardware & Machinery Co., Elko, Nev.; Dennison Tractor & Supply Co., Reno, Nev.; Smith Machinery Co., Inc., Roswell, New Mexico; Bud Fisher Co., Albuquerque, New Mexico; Farm & Industrial Equipment Co., Eugene, Ore.; Mid-Columbia Supply & Equipment Co., The Dalles, Ore.; Oregon Tractor Co., La Grande, Ore.; Tractor Sales & Service, Inc., Medford, Ore.; West Hitchcock Corp., Klamath Falls, Ore.; Tri-County Equipment Co., Redmond, Ore.; Wood Tractor Co., Portland, Ore.; Cate Equipment Co., Inc., Salt Lake City 4, Utah; A. H. Cox & Co., Seattle, Wash.; Lomen Equipment, Inc., Seattle, Wash.; Wikstrom Motors, Inc., Yakima, Wash.; Northern Harris, Inc., Walla, Walla, Wash.; Fred M. Viles & Co., Spokane, Wash.; Studer Tractor & Equip. Co., Casper, Wyo.

BETTER ON THE JOB!

LONGER ON THE JOB!

LESS DOWNTIME ON THE JOB!



Firestone
EARTH MOVER TIRES

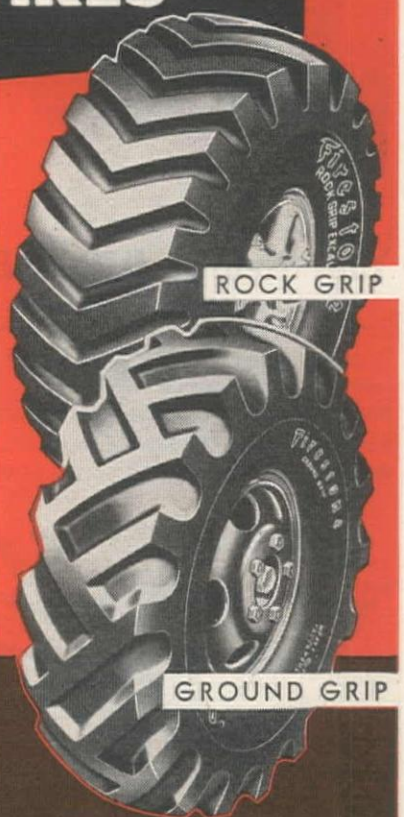
FIRESTONE builds off-the-highway tires for every road, load and condition of service. For big, free-rolling scrapers, tractor and trailer wagons and buggies, that tire is the Firestone Earth Mover.

It provides maximum flotation and minimum rolling resistance. Its extra strength rayon cord body and its extra tough cut-resistant tread are built to stand up on the job . . . to stay on the job. This means more yardage, less downtime . . . more profit.

If you want the greatest possible traction for the drive wheels of your earth moving units, use the Firestone Ground Grip Tire. For stamina and extra traction in quarrying, logging, strip mining . . . use the Rock Grip.

Proven cost-cutters on every job.

Listen to the Voice of Firestone every Monday evening over NBC



Copyright, 1948, The Firestone Tire & Rubber Co.

Firestone OFF-THE-HIGHWAY TIRES

NOW... A Revolutionary New Method of Hauling and Placing AIR-ENTRAINED CONCRETE!



The Hercules Aircreter

Here's the modern method of delivering and placing air-entrained concrete! With the HERCULES AIRCRETER, every load is identical, rejects are eliminated, because the AIRCRETER delivers premium quality, uniform-mix concrete, exactly as it is produced at the central mixing plant, under absolute control. The lightweight construction of the AIRCRETER also permits more direct pours, cutting time and labor costs on every job.

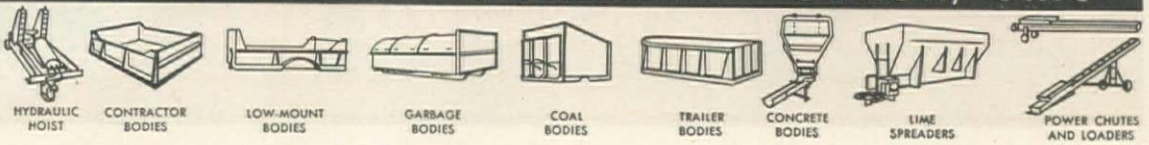
You'll find more and more of these revolutionary HERCULES AIRCRETERS on the big construction projects, simply because alert contractors can't afford to overlook the benefits—and profits—that the HERCULES AIRCRETER provides. Complete details are available, write today for Bulletin 3-48.

Your Nearby HERCULES Distributor Is Ready to Serve You

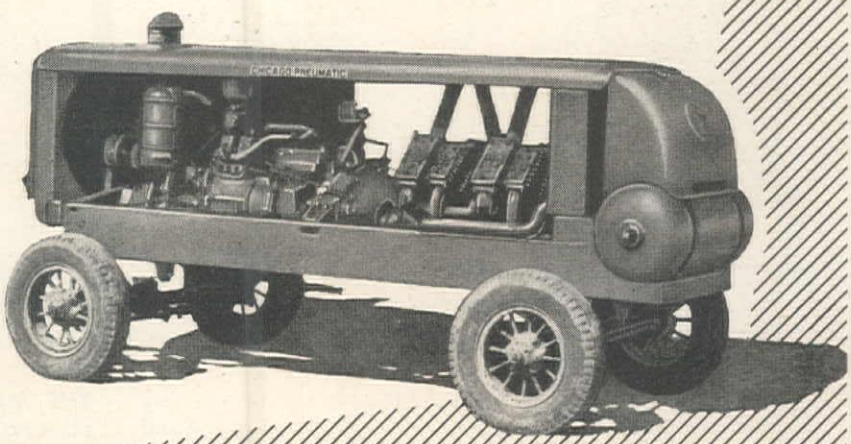
General Truck Equipment Co., 746 South Central, Los Angeles 21, California; A. Pasteris Company, 2200 Wood Street, Oakland 7, California; The Colorado Builders' Supply Co., 324 S. Broadway, Denver 9, Colorado; Twin Falls Equipment Co., 304 Fourth Ave., West, Twin Falls, Idaho; Western Construction Equipment Co., 505 North 24th Street, Billings, Montana; Western Construction Equipment Co., 218 West Pine Street, Missoula, Montana; The Harry Cornelius Company, 1510 N. Second Street, Albuquerque, New Mexico; Newell Truck Equipment Co., 316 N. Russell St., Portland, Oregon; Wagstaff Company, 1755 Beck Street, Salt Lake City 3, Utah; Allied Trailer & Equipment Co., 2434 First Ave. S., Seattle 4, Washington; South Tacoma Welding Equipment Co., 7047 S. Tacoma Way, Tacoma 9, Washington.

Hercules

STEEL PRODUCTS CORPORATION • GALION, OHIO

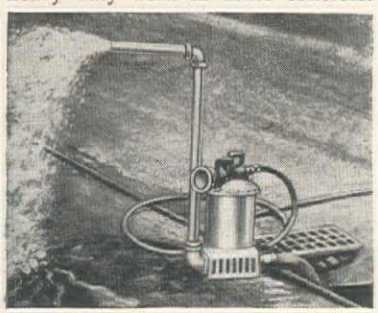


Economical operation at any load





CP-117 Demolition Tool weighs 75 lbs. with spring retainer, 78 with latch. For heavy duty work in dense concrete.



Operating on the ejector principle, CP-7 Portable Sludge Pump will handle 15% solids without excessive wear.



For concretes 3″ and over, walls and columns under 15″ thick, and light floor and roof slabs, CP-219 Pneumatic Vibrator is ideal.

CP Portable Air Compressors are popular with the contractor because he can always count on economical operation, whether the engine is running at full or partial load. Thanks to the CP gradual speed regulator, engine speed keeps exact pace with air demands, holding fuel consumption to a minimum. This and other CP features effect fuel savings of 15% to 35%.

On the CP-500 Diesel-driven compressor illustrated, the six-cylinder Caterpillar D-13000 engine and the V-8 arrangement of compressor cylinders are further features that promote smooth, economical performance.

CP Portable Compressors are available in gasoline-driven models of 60, 105, 160, 210 and 315 c.f.m., actual capacity, and in Diesel-driven models of 105, 160, 210, 315, and 500 c.f.m. Write for full information.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
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THE JOB

THE WILKES-BARRE–SCRANTON AIRPORT



THE EQUIPMENT

THE MASTER TANDEM produced 150,000 tons of aggregate from rock quarried on the airport site for both base course and asphaltic-concrete surface at the rate of 1400 cu. yd. of highly abrasive stone per day.

THE MODEL "E" set-up near the crushing plant averaged 700 tons of black top mix per day for the 305,700 sq. yd. of flexible base and asphalt surface runways and taxiways.

THE CONTRACTOR

C. J. LANGENFELDER & SON, INC.
Baltimore, Maryland

THANKS to the efficiency of Cedarapids equipment and the engineering skill of C. J. Langenfelder & Son, Inc., the people of the two cities, Wilkes-Barre and Scranton, now have a modern three runway airport of which they can well be proud.

Credit for finishing this project on schedule, despite the many difficulties encountered, was due in a large part to the use of Cedarapids Master Tandem crushing and screening plant and a Cedarapids Model "E" bituminous mixing plant.

From coast to coast on all types of construction projects, Cedarapids equipment is used by contractors who know and buy the best in aggregate producing and bituminous mixing equipment. They know that whether they need 50 tons or 250 tons of aggregate per hour or no matter how exacting the specifications for black top . . . there's a Cedarapids plant to meet their requirements.

When buying aggregate producing or bituminous mixing equipment, buy the best, buy Cedarapids.

THE IOWA LINE *of Material Handling Equipment is distributed by:*

HOWARD-COOPER CORP.
Seattle, Washington; Portland, Eugene and Central Point, Oregon

HALL-PERRY MACHINERY CO.
Butte, Great Falls, Missoula and Billings, Montana

INTERMOUNTAIN EQUIPMENT CO.
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BETTER ROADS FOR A BETTER WORLD — 45th Annual Convention and Road Show — SOLDIER FIELD CHICAGO — JULY 16-24, 1948

Cedarapids

Built by IOWA

PRODUCT OF IOWA

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.



CUMMINS *Dependable* DIESEL

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

Big Loads... Fast Work Cycles



Power and *more power* . . . the kind you need to move more material . . . the kind that means faster swings and dumps for your shovels . . . quicker trips for your trucks.

This *plus-power* of the Series NH-600 (200 hp, max.) and NHS-600 Supercharged (275 hp, max.) Cummins *Dependable* Diesels results in big loads, fast work cycles, more work from your heavy-duty equipment.

Ask your Cummins Dealer to study your power problems with you . . . see why "more power" will mean "more profit" on your job.

CUMMINS ENGINE COMPANY, INC.
COLUMBUS, INDIANA

Why YOU should PLAN TO COME TO THE ROAD SHOW

BETTER ROADS FOR A BETTER WORLD

45th Annual Convention and Road Show
SOLDIER FIELD
CHICAGO
JULY 16-24, 1948

Over 5000 pieces of equipment!

Imagine over 30 acres — a small farm—filled with construction machinery... some of it operating . . . some of it never before shown. Here is a practical picture backed with new information, new data, that shows the way to better performance and increased efficiency.

•

IT IS THE MOST DRAMATIC SPECTACLE IN CONSTRUCTION HISTORY — A MUST FOR EVERY CONSTRUCTION MAN.

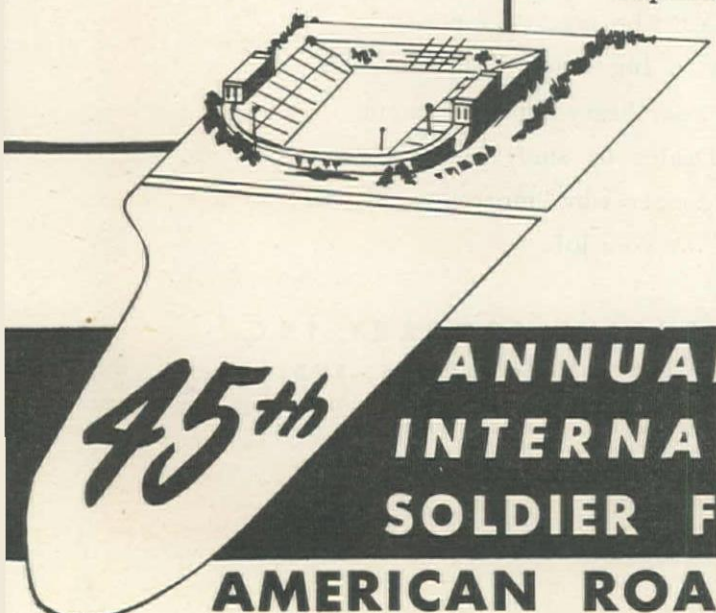
•

THERE is a $1,500,000,000 road program for 1948 — the greatest in construction history. This stupendous figure represents the largest appropriation ever made for construction of highways and airports. By seeing this machinery exhibited at the Road Show you have the opportunity to get ready for your part in this greatest construction program of all time. If for no other reason than this, you should attend the Road Show.

State, county and municipal governments will require approximately $240,000,000 for equipment for maintenance work in 1948. Another $265,000,000 worth of equipment will be needed for new construction. It is conservatively estimated that an additional $150,000,000 for new equipment will be required to bring construction equipment inventories up to normal.

TECHNICAL SESSIONS YOU CAN'T AFFORD TO MISS!

There will be discussions on highway engineering, grade separations, airport construction, concrete and bituminous highway construction, soil compaction, highway terminals, the contract system and day labor, tar soil stabilization, cement soil stabilization, highway safety, control of city pavements, snow removal, highway maintenance, elevated and depressed highways, express highways, radio communications in highway control, weights and sizes of vehicles, bridge construction practice, property assessment for highways, public relations, legal affairs, highway finance, gross weights on highways and on many other topics that are so much a part of your daily work. Bring yourself up-to-date on the latest phases of these important subjects.



EVERY DAY AN OUTSTANDING DAY!

Friday, July 16	Distributors Day
Saturday, July 17	International Day
Sunday, July 18	Educators and ARBA Student Chapters Day
Monday, July 19	Associated General Contractors Day
Tuesday, July 20	ARBA Contractors Day
Wednesday, July 21	County Day
Thursday, July 22	Municipal and Airport Day
Friday, July 23	All States Day
Saturday, July 24	Chicago Day

45th ANNUAL CONVENTION AND INTERNATIONAL ROAD SHOW

SOLDIER FIELD • JULY 16-24, 1948

AMERICAN ROAD BUILDERS ASSOCIATION

International Building, Washington 4, D. C., U. S. A.

EVERY MODEL *Individually Designed*



BUCYRUS ERIE

3/8 TO 2½ YARD EXCAVATORS

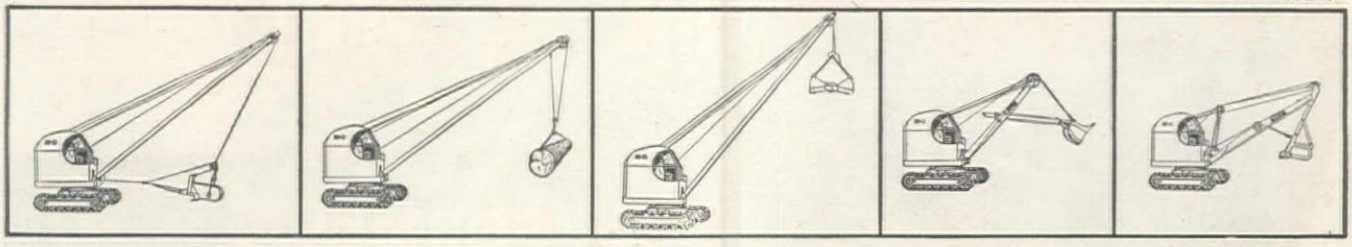
BETTER ROADS FOR A BETTER WORLD · 45th Annual Convention and Road Show · SOLDIER FIELD CHICAGO · JULY 16-24, 1948

Strength without excessive weight, ample power without wasted horsepower, maximum speed, top efficiency — everything that adds up to profit-making output is yours with Bucyrus-Eries because they're right for their work.

Every model is individually designed with just the right combination of power, strength, and weight to do the best job of handling its load. That means low maintenance, too, because there's no overstressing of gears and shafts — none of the excessive wear that comes with makeshift models.

Perfect matching of machine to load is just one of the many advanced Bucyrus-Erie features. Let your Bucyrus-Erie distributor give you the complete story. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

116E47



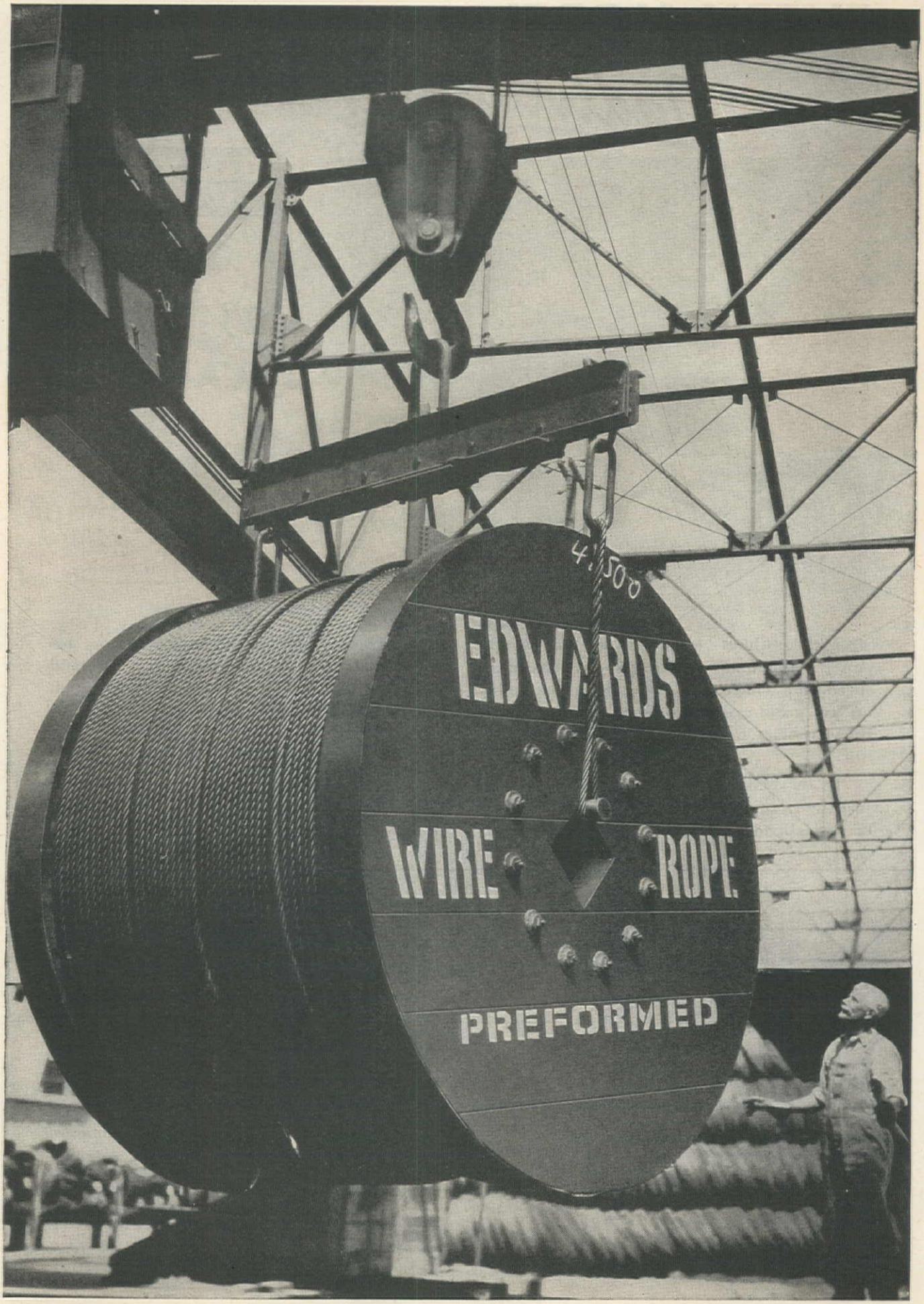
DRAGLINES | CRANES | CLAMSHELLS | SHOVELS | DRAGSHOVELS

SEE YOUR BUCYRUS ERIE DISTRIBUTOR

EXC-2

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CROOK COMPANY	Los Angeles
CLYDE EQUIPMENT COMPANY	Portland — Seattle
INTERMOUNTAIN EQUIPMENT CO.	Boise — Pocatello — Spokane
THE LANG COMPANY	Salt Lake City
THE O. S. STAPLEY COMPANY	Phoenix
R. L. HARRISON COMPANY, INC.	Albuquerque

Shovels · Dragshovels · Draglines · Clamshells · Cranes · ⅜ to 2½-yd.

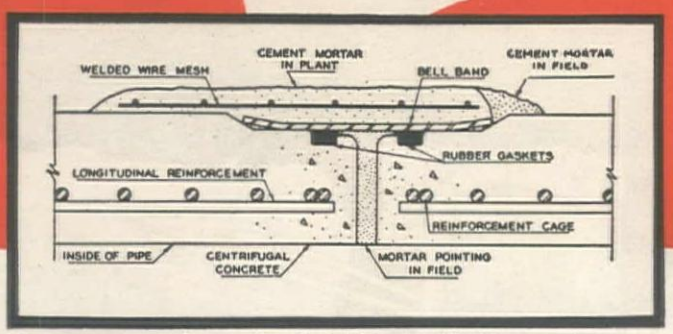


E. H. EDWARDS COMPANY — SEATTLE • PORTLAND • SAN FRANCISCO • LOS ANGELES • HOUSTON

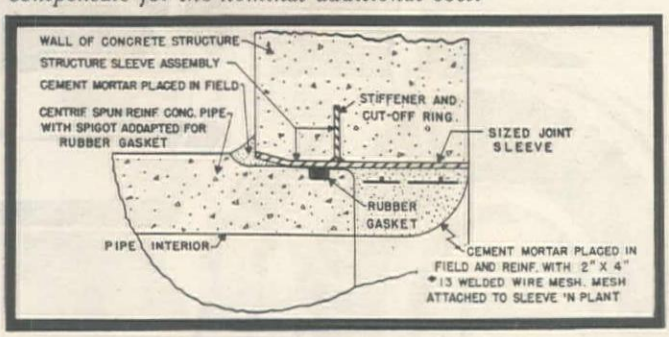
Solution for many Pipeline Closure Problems



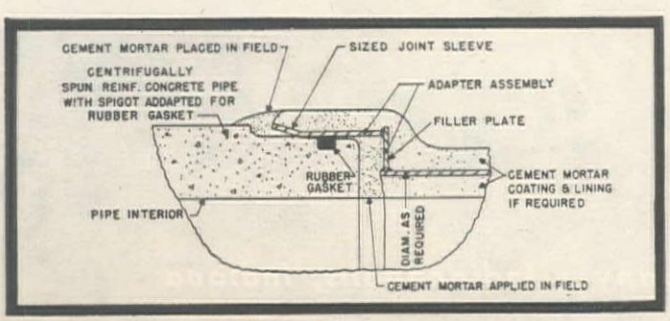
The Double Rubber Gasket Joint for centrifugally spun reinforced concrete pressure pipe is simple, flexible, adaptable. This view of the rubber gasket groove in the spigot end of the pipe illustrates the exacting workmanship involved in its manufacture.



Cross section of completed field joint. Rubber gaskets are compressed into spigot grooves by accurately-sized steel bell band. In reality a bell and spigot rubber sealed joint, it often enables installation savings which alone more than compensate for the nominal additional cost.



Typical connection to a concrete structure—illustrating easy placement with ample flexibility for security against reasonable conditions of expansion, contraction or earth settlement.



Typical connection to a fabricated steel fitting—an example of adaptability to many different situations.

A proven refinement of an already outstanding product . . . developed by American

The advantages of centrifugally spun reinforced concrete pressure pipe for moderate operating heads (generally under 150′) have become well established in this country during the past twenty-five years. High initial and sustained carrying capacity, permanence, and economy are some of the proven characteristics of Hume Centrifugal Concrete Pressure Pipe.

In recent years, development by this company of the Double Rubber Gasket Joint for centrifugally spun pipe has greatly increased its versatility and adaptability. It is proving outstandingly successful in a wide variety of installations throughout the West.

This joint is another example of American's ingenuity and skill in the development of better products for water supply lines. Complete specifications and engineering drawings giving dimension tables are available to engineers upon request.

American PIPE AND CONSTRUCTION CO.

Concrete Pipe for Main Water Supply Lines, Storm and Sanitary Sewers, Subaqueous Pipe Lines

P. O. Box 3428, Terminal Annex, Los Angeles 54, California
District Offices and Plants — Oakland, San Diego, Portland, Oregon

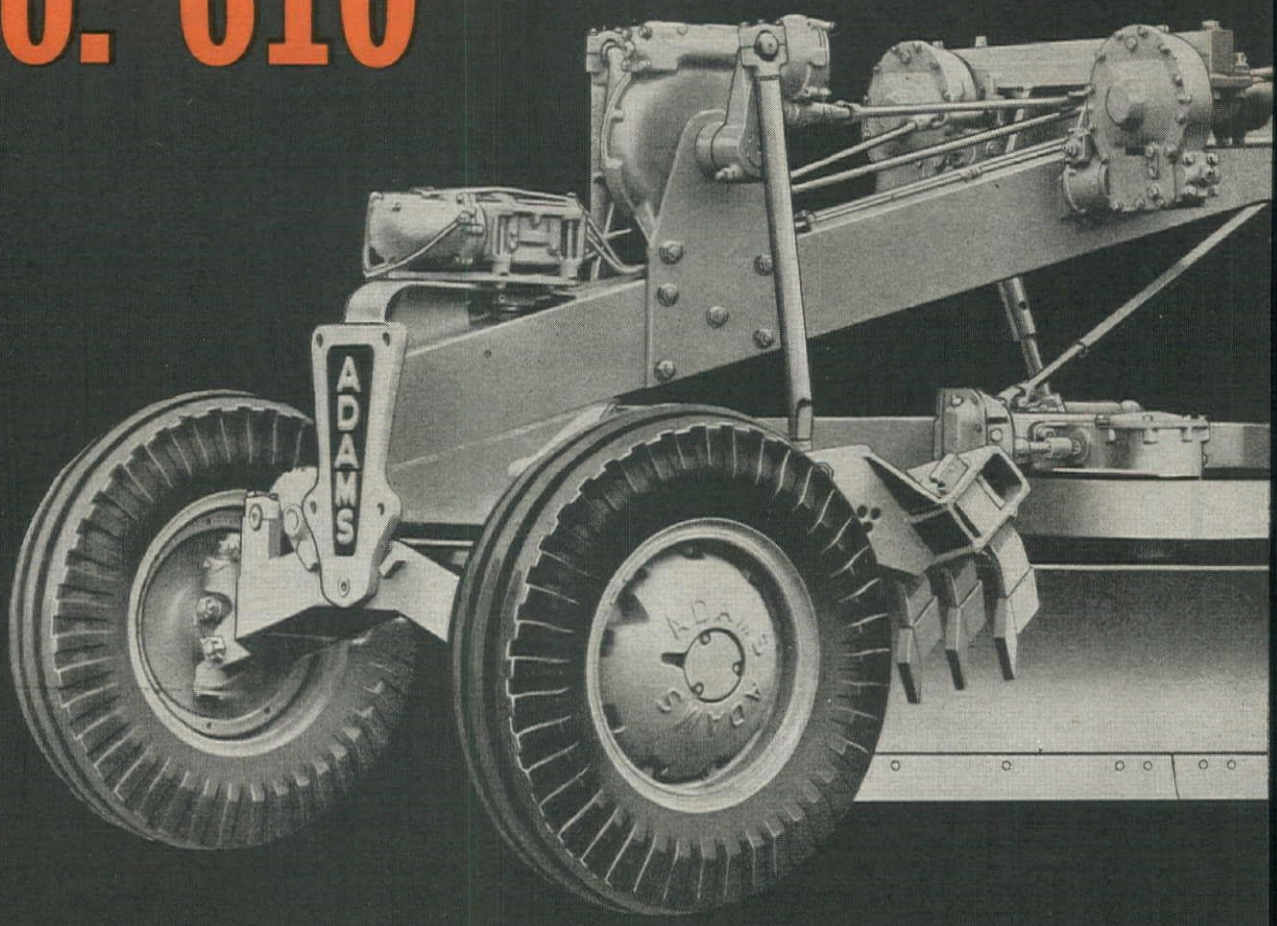
Specializing in the manufacture and installation of American Concrete Cylinder Pipe, Lock-Joint Concrete Cylinder Pipe, Pre-stressed Lock-Joint Concrete Cylinder Pipe, Hume Centrifugal Concrete Pressure Pipe.

Introducing the New

ADAMS

Heavy-Duty Motor Grader

No. 610

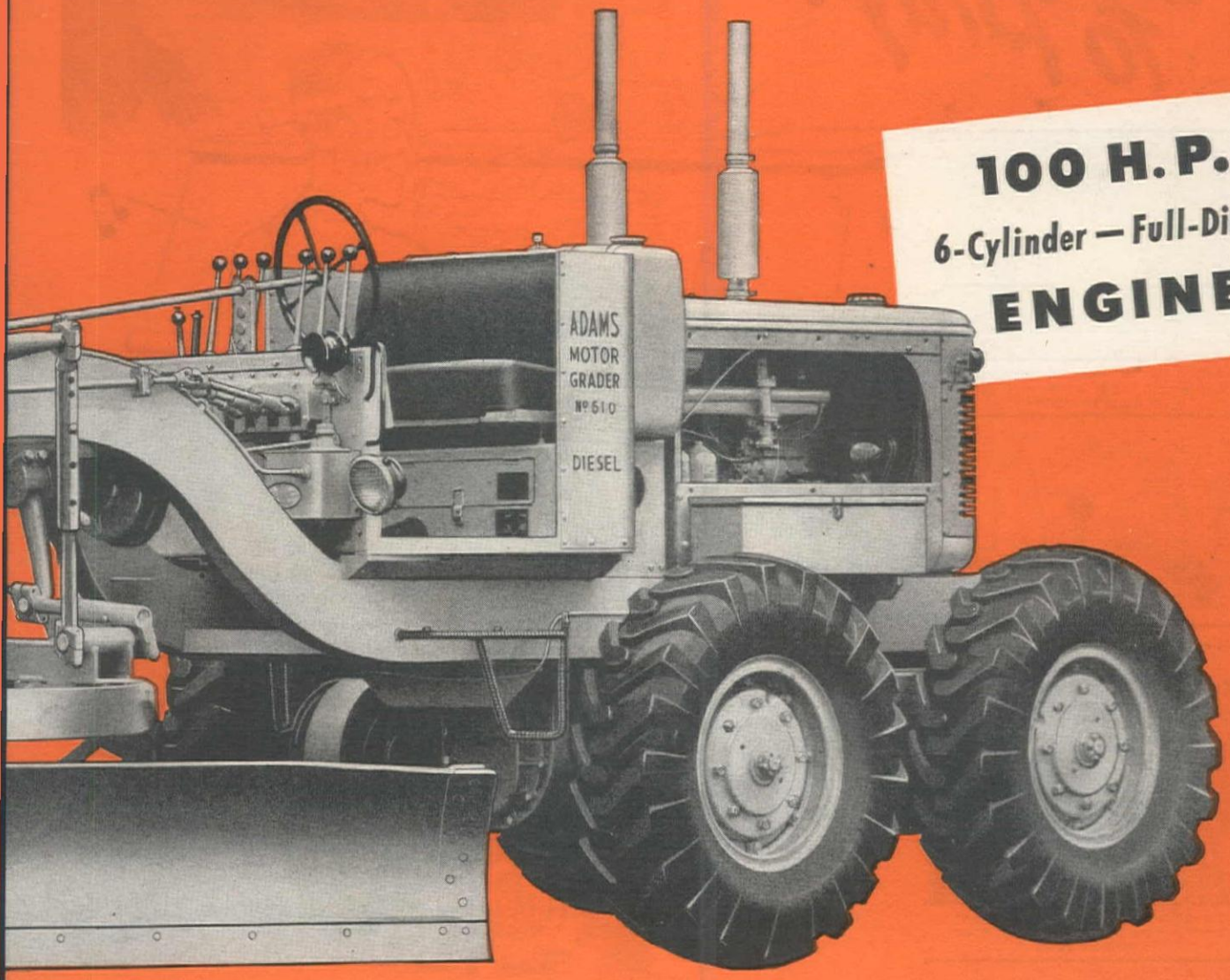


J. D. Adams Manufacturing Company · Indianapolis, Indiana

Motor Graders • Leaning Wheel Graders • Elevating Graders

Look at These Outstanding Advantages

- 100 H.P. Full-Diesel Engine—6-cylinder—powerful, dependable, economical.
- Weight to utilize *all* of the horsepower—in *all* gears.
- Push-Button Starting from the cab—standard equipment.
- Power Steering—standard equipment. Of mechanical-hydraulic type — provides all the "feel" and advantages of mechanical steering, with *power* doing the work.
- Big, Fast-Acting 4-Wheel Hydraulic Brakes on tandem for safe, easy stops.
- Large, Wide-Tread Tires (14.00-24 rear, 11.00-24 front). Adequate traction and flotation is assured for every type of motor grader operation.
- 8 Overlapping Forward Speeds, 2 reverse speeds. High transport speed of 25 mph.
- Exceptionally Wide Blade (31 in.) to utilize the No. 610's great capacity.

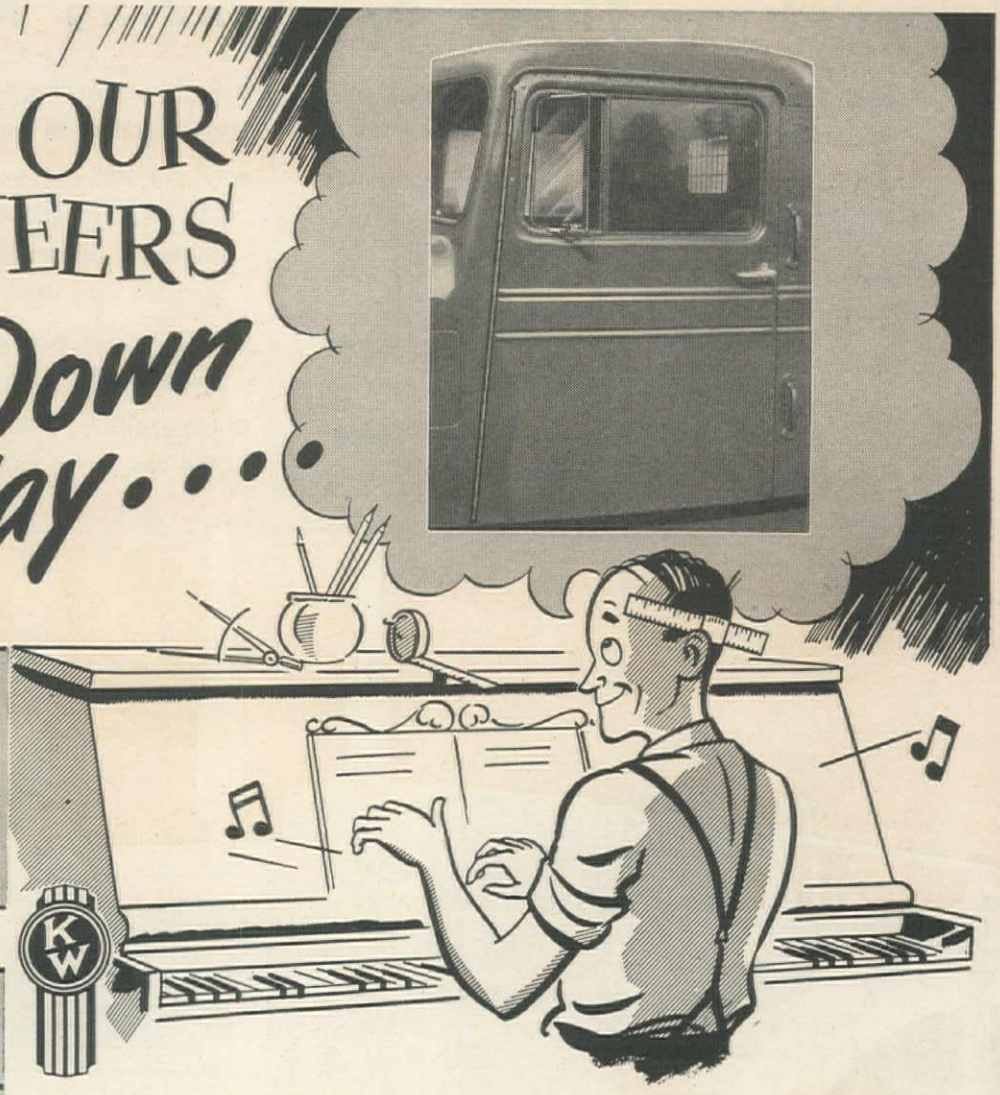


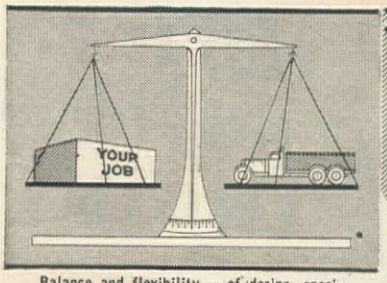
100 H.P.
6-Cylinder — Full-Diesel
ENGINE

LOCAL Adams DEALERS

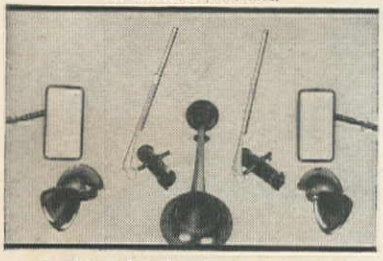
CALIFORNIA—*Western Factory Branch*, J. D. ADAMS MANUFACTURING CO., 230 7th Street, San Francisco 3; Adams Distributors at: San Francisco, Oakland, Los Angeles, Sacramento, Redding, Riverside, San Jose, Fresno, Stockton, Salinas, Santa Rosa, Modesto, Visalia, Merced, Bakersfield, Santa Maria and San Diego • ALASKA—Glenn Carrington & Co., Fairbanks • ARIZONA—The O. S. Stapley Company, Phoenix • COLORADO—McKelvy Machinery Co., Denver • IDAHO—Intermountain Equipment Co., Boise, Pocatello • MONTANA—Industrial Equipment Co., Billings, Missoula; Normont Equipment Co., Great Falls • NEVADA—Brown Motors, Reno; Clark County Whse. Merc. Co., Las Vegas • NEW MEXICO—Hardin & Coggins, Inc., Albuquerque • OREGON—Howard-Cooper Corp., Portland, Eugene • UTAH—The Lang Company, Inc., Salt Lake City • WASHINGTON—Howard-Cooper Corp., Seattle; Intermountain Equipment Co., Spokane • WYOMING—Industrial Equipment Co., Billings, Montana; The Lang Company, Inc., Salt Lake City, Utah.

WHEN OUR ENGINEERS Sat Down to Play . . .





Balance and flexibility — of design, specifications and type of service — are reasons for Kenworth preference.



Supplying of dual equipment is standard production procedure with Kenworth.



Kenworth's exclusive "inside-out dash" permits easy and speedy service of the instrument panel.



Complete illustrated parts and service manuals are provided all Kenworth truck owners.

Whether or not our engineers are virtuosos of the piano may be open to debate—but there is no question whatsoever that the "piano-type" continuous, full length door hinge on Kenworth cabs has proved to be a bright idea. That this exclusive Kenworth feature adds to the ability of Kenworth trucks to withstand heavy duty service on construction projects is recognized throughout the industry. You don't see the doors on Kenworth trucks sagging or practically moulting off the sides of the cabs. The full length, continuous door hinge—standard Kenworth construction—is just one more reason why *there's more* **WORTH** *in* **KENWORTH.**



KENWORTH

TRUCKS **BUSES**

FACTORY AND HOME OFFICE: SEATTLE

DISTRIBUTORS IN PRINCIPAL WESTERN CITIES AND HAWAII

Simplify Your Lubricating with

ALL-PURPOSE UNOBA GREASE

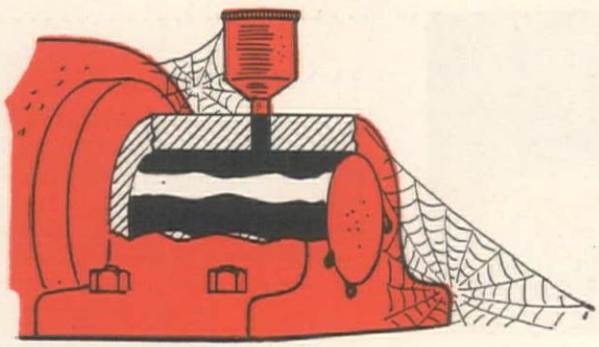
Resists both heat and water!



1. UNOBA is the first all-purpose grease in history that resists *both* heat and water. That's why you can greatly simplify your lubrication with UNOBA—for it performs the jobs that formerly required *many* different types, grades and brands of greases!



2. All-purpose UNOBA is a barium base grease with exceptional heatproof, waterproof qualities. Boiling water or dry heat won't cut its tenacious film. UNOBA will give maximum lubricant protection at temperatures from much below freezing to over 300° F.!



3. Because of UNOBA's unusual adhesiveness to metal, it gives your equipment thorough protection against rust and corrosion. All-purpose UNOBA maintains excellent grease structure under severe mechanical working and does not deteriorate in storage even over long periods.



4. Today UNOBA is performing hundreds of different lubrication jobs in all branches of industry—in factories, mines, mills and on construction jobs. Why not simplify your lubrication with this unique all-purpose grease? UNOBA saves you time and money!

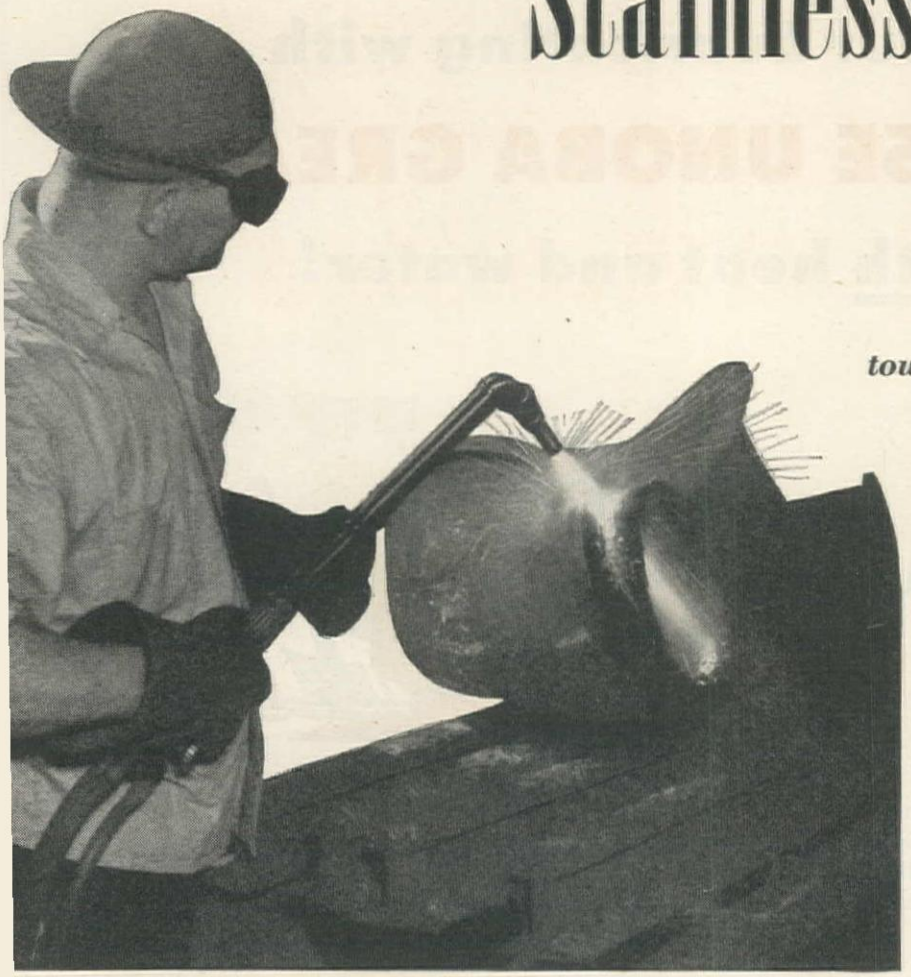
UNOBA



For full information phone your local Union Oil Representative or wire Sales Department, Union Oil Company, Los Angeles 14, Calif.

ANOTHER **UNION OIL** SUCCESS-TESTED PRODUCT

Stainless Steel is TOUGH



tough to cut, too—but LINDE makes the job easier . . . just as easy as cutting carbon steel

LINDE's powder-cutting process overcomes the barrier to fast and economical cutting of stainless or chromium steels.

By means of easily installed attachments for standard oxy-acetylene equipment, powder-cutting can be done without substantial change from carbon steel cutting techniques.

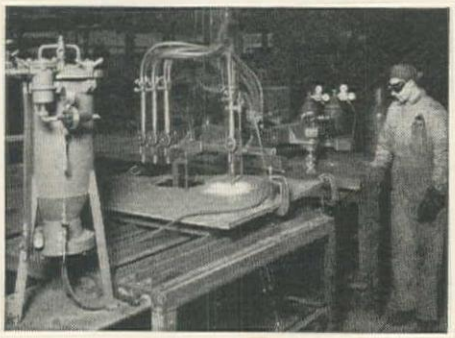
IN FOUNDRIES—

by powder-cutting, risers are removed 20 times faster than by older methods. Removal of riser pads and gouging out defects can be done at considerable savings in cost.



IN STEEL MILLS—

a 12,000-lb. ingot can be powder-scarfed in 4 to 6 hours—about 1/10 the time required for grinding. Sizing of ingots, billets, and slabs, removal of hot tops, scrapping operations, and many other cutting jobs can be done in a fraction of the time previously required.



IN FABRICATING PLANTS—

a stack of twelve 10-ga., type-304 stainless sheets were powder-cut at 8 in. per min. . . . 4-in. I.D. by 8-in. O.D. flanges on ½ in., type 316 plates were made in 2 minutes of cutting time apiece.

If you work with stainless steel you will want to know more about this LINDE process. LINDE can supply the equipment you need, help you to set up, and supply the training help you need.

Linde

The word "Linde" is a registered trade-mark of The Linde Air Products Company.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

200 H.P. TERRA-COBRAS — LEAD THE FIELD





—IN GREATER YARDAGE PRODUCTION

Increased power and performance combine with fully proved operating features to put the 200 H.P. Terra-Cobra out-in-front on job after job—in the high-speed earth-moving field. Faster loading, travel and spreading, trip after trip, means greater hourly production at a lower yardage cost. Larger, wear-compensating clutch, heavier transmission with constant-mesh gears, plus stronger drive chains enclosed in oil tight cases reduces downtime to a minimum. Less operator fatigue contributes to higher yardage averages throughout an entire shift. Ask any experienced operator which equipment he likes best. Investigate, today, the advantages of Terra-Cobras. Write for full details.

WOOLDRIDGE

TERRA COBRA

HIGH-SPEED • SELF-PROPELLED
EARTHMOVERS

WOOLDRIDGE MFG. CO.
SUNNYVALE, CALIFORNIA, U.S.A.

SEE YOUR NEAREST WOOLDRIDGE DEALER

GET THE MOST OUT OF YOUR JOBS WITH WOOLDRIDGE EQUIPMENT


SCRAPERS


BULLDOZERS


RIPPERS


POWER CONTROL UNITS


TRAILBUILDERS

WORLD'S LARGEST DRAGLINE BUCKET

Rated at 30 cu. yds. this new Page AUTOMATIC is actually handling 34 to 35 cu. yds. of overburden per pass cycle time of one minute to one minute and fifteen seconds. Loading time is 6 seconds — dumping time 3 seconds which is good performance for many types of much smaller buckets and peak efficiency for any type of larger dragline buckets.

Whether your requirements are for a 3/8 yd. bucket or 30 yards, a Page AUTOMATIC will move more dirt in less time than any other bucket made. It digs in immediately and gets a full load within one or two bucket lengths. There's little or no spillage with each full load. Page AUTOMATICS are built no heavier than your specific job requires but have all the necessary weight for good digging, sturdiness and minimum maintenance. The new booklet, "How to Get the Most Out of Your Page Automatic Dragline Bucket" will give you complete details. Send for your copy today.

a Page Automatic of Course!



Northern Illinois Coal Corporation gets full loads every time with the world's largest dragline bucket stripping overburden at depths ranging from 30 to 70 feet.



BETTER ROADS FOR A BETTER WORLD — 45th Annual Convention and Road Show — SOLDIER FIELD CHICAGO — JULY 16-24, 1948

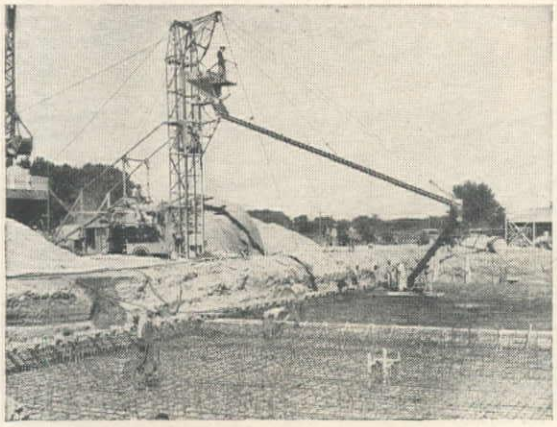
PAGE ENGINEERING COMPANY
Clearing Post Office
Chicago 38, Illinois

PAGE Automatic
DRAGLINE BUCKETS and WALKING DRAGLINES

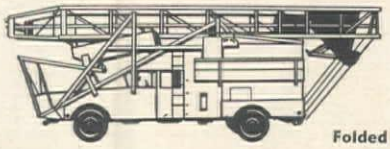


DUAL PURPOSE MACHINES

Making Profits for Contractors

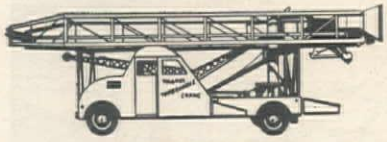


MIXERMOBILE



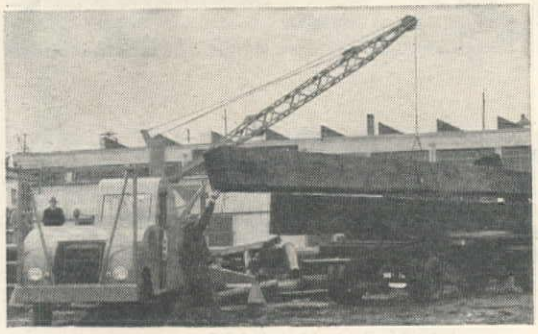
Folded for travel.

A portable concrete mixing and hoisting plant. Here the MIXERMOBILE is using 35 feet of tower and an 80-foot swivelled chute. The pour can be made anywhere within an arc of 270 degrees. *A big time saver when pouring matted slab!*

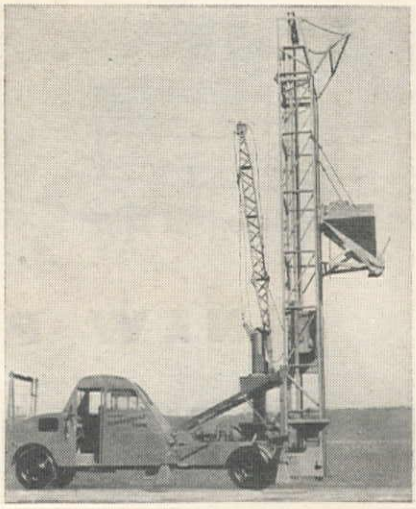


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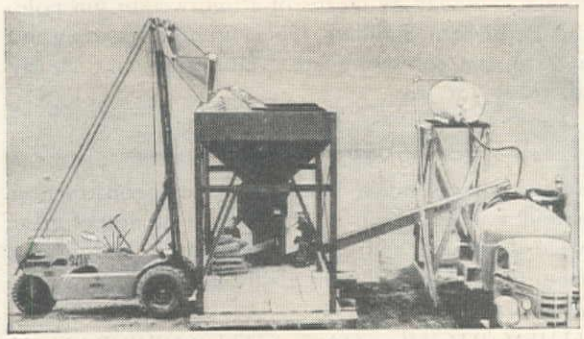
TOWERMOBILE-CRANE



A combination Crane and Tower with the chassis serving as a truck and power unit for the crane boom and the hoisting tower. Attachments include a lifting platform, ½-yard clamshell bucket and ¾-yard concrete hopper. *The TOWER can be installed or removed from the chassis with its own CRANE BOOM!*



SCOOPMOBILE





Can be towed or driven.

The perfect materials handling machine for a wide variety of jobs. Four full speeds forward and reverse, power steering and enclosed cab make it the all-around, all-weather machine. Quick change attachments include buckets, concrete hopper, crane boom, lift forks, fertilizer forks and backfill blade.



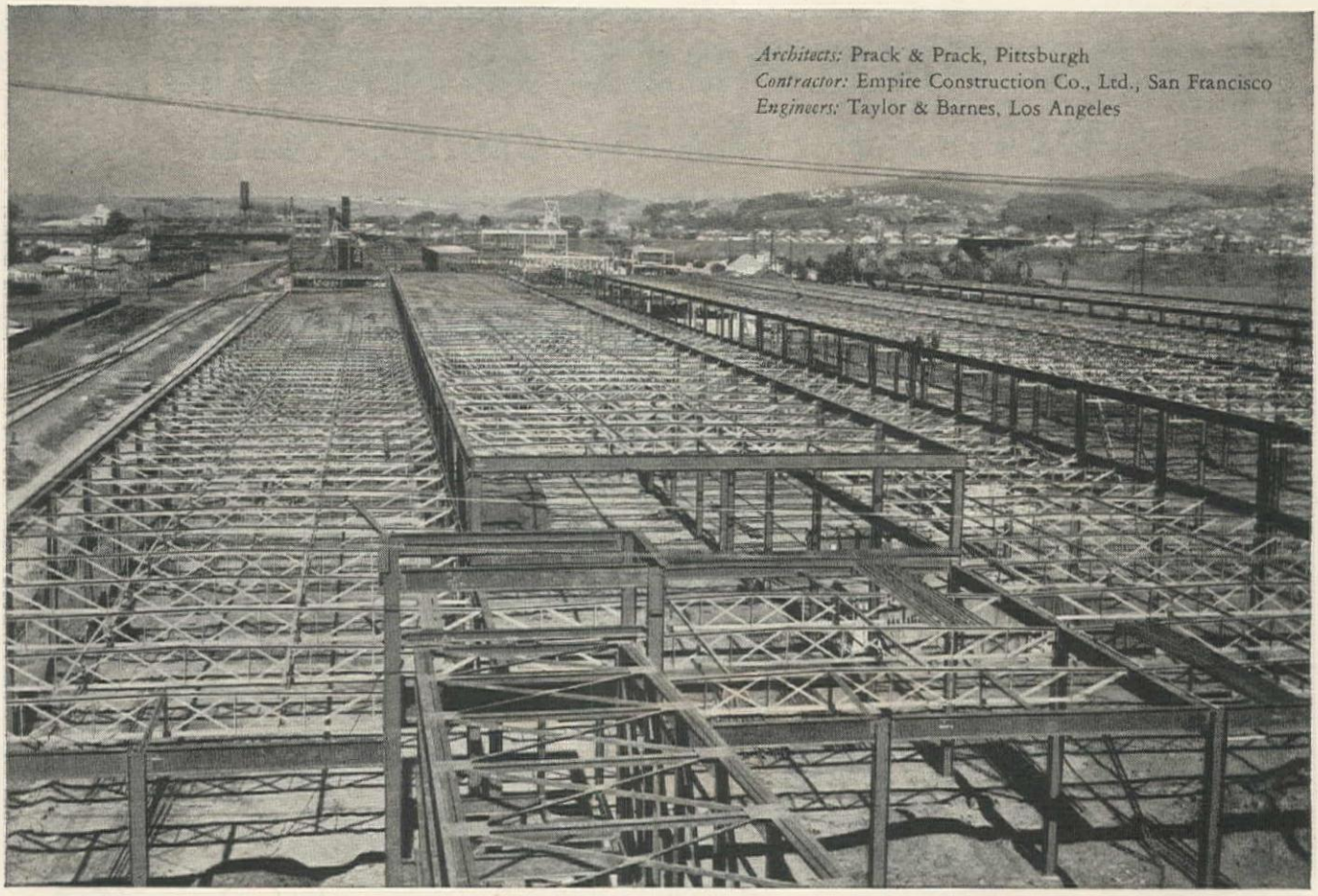
*** Meet your dealer at our exhibit at the Road Builder's Show, Chicago, Ill. July 16-24. Concession 3809 South Concourse.**

MIXERMOBILE DISTRIBUTORS, Inc.

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- Heiner Equipment and Supply Co. 501 West 7th So. St. Salt Lake City, Utah
- Lively Equipment Co. 2601 N. Fourth St. Albuquerque, N. M.
- Neil B. McGinnis Co. P. O. Box 3615 Phoenix, Arizona



Architects: Prack & Prack, Pittsburgh
Contractor: Empire Construction Co., Ltd., San Francisco
Engineers: Taylor & Barnes, Los Angeles

NEW PLANT IN BAY AREA BUILT WITH *OPEN-WEB JOISTS*

Now nearing completion at Richmond, Calif., this one-story manufacturing plant for the American Radiator and Standard Sanitary Corporation has a floor area of more than 211,000 sq ft. To reduce the need for interior columns and thus provide greater clear floor space for manufacturing purposes, 300 tons of Bethlehem Longspan Joists, 40-ft long, were used as roof purlins.

ADVANTAGES OF LONGSPANS

Bethlehem Longspan Joists are excellent for supporting the roofs of factories, warehouses, and similar light-occupancy structures because they can be used to provide column-free floor areas up to 64 ft across. They also help other trades, for pipes, conduits and ducts can be run through the open webs. They accommodate plaster ceilings, too. And when outer walls are of masonry, they reduce the need for pilasters, thus permitting the architect complete freedom in placing doors and windows.

EASY TO INSTALL

Users of Bethlehem Longspan Joists can always count on reduced construction time, for these easy-to-handle joists go into place quickly by means of a lightweight gin pole. Like the Bethlehem Standard Open-Web Joists, they are delivered to the job completely fabricated and clearly marked, ready for use.

36-PAGE CATALOG

Because it contains much factual data and construction information, you'll find our illustrated joist catalog of great help when designing with Open-Web Joists. The nearest Bethlehem Pacific office will gladly mail you a copy.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

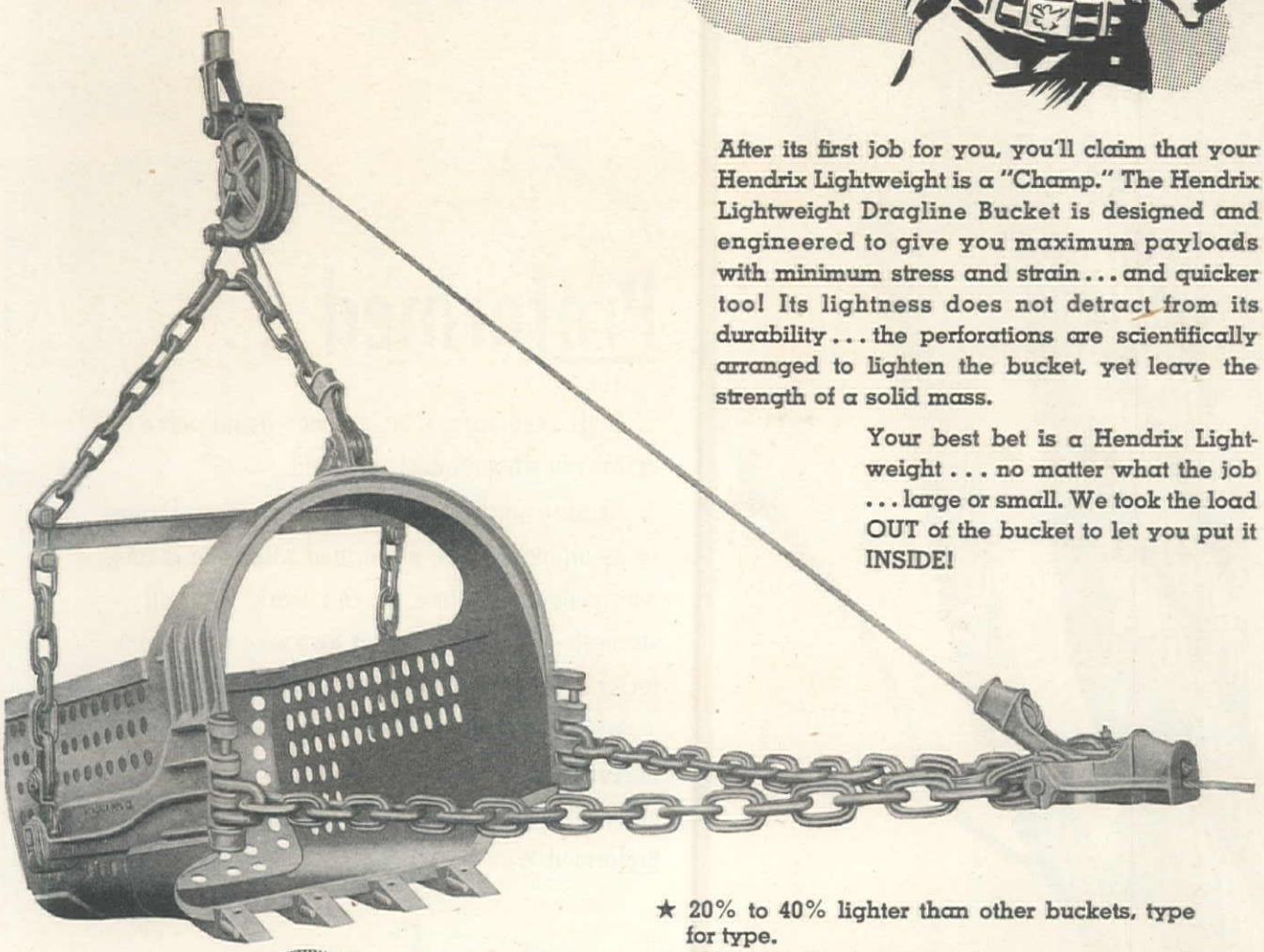
BETHLEHEM PACIFIC



THERE'S A *Lightweight* "CHAMP"

IN DRAGLINE BUCKETS, TOO!





After its first job for you, you'll claim that your Hendrix Lightweight is a "Champ." The Hendrix Lightweight Dragline Bucket is designed and engineered to give you maximum payloads with minimum stress and strain . . . and quicker too! Its lightness does not detract from its durability . . . the perforations are scientifically arranged to lighten the bucket, yet leave the strength of a solid mass.

Your best bet is a Hendrix Lightweight . . . no matter what the job . . . large or small. We took the load OUT of the bucket to let you put it INSIDE!

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

⅜ TO 40 CUBIC YARDS

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ Manganese Steel Chains, fittings and reversible tooth points.
- ★ Full Pay load every trip, even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three types: light, medium, and heavy duty. With or without perforations.

WRITE FOR DESCRIPTIVE LITERATURE OR ASK YOUR DEALER

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA


Preformed . . .
Preformed wire rope extends its influence far across the whole industrial world.
Because each of its components is preformed to its ultimate form, preformed wire rope is comparatively stress-free. It can work with all its strength — longer. Ask your own wire rope manufacturer or distributor for Preformed.
Write to the Preformed Wire Rope Information Bureau, 520 N. Michigan Avenue, Chicago 11, for an illustrated booklet telling the complete story of Preformed Wire Rope.



Standard T-Handle for trench work also available.

Le Roi Announces the 31 Clay Digger

— with new design features that reduce both digging and upkeep costs

Here's a digger that has everything you want. Just take a look at all these design advantages:

● **Short 19-inch length** — is responsible for the fine easy-handling balance of the new 31 clay digger.

● **It weighs only 18 pounds** — A man does more work with the new Le Roi 31, and uses less effort.

● **Exclusive new buffer design saves time and money** — This new buffer consists of molded rubber bonded to hardened split steel rings. There is only one piece to handle. Changing tools requires just a few seconds and no effort at all. Your operator does more digging.

● **Air consumption is low, efficiency high** — The 31's new trouble-free valve design uses air sparingly. The high efficiency — that is, the 31's ability to produce a lot of work — is made possible by a unique arrangement of valve-chest differentials.

● **Only the 31 has an integrally-built lubrication system** — Oil from a large reservoir in the handle is metered into the live air stream and carried to every working part.

● **The 31 is sealed from dirt and grit** — the new rubber buffer keeps destructive foreign matter out of the digger.

● **Cylinder life is greatly increased by the use of renewable spacer and chuck bushings** — Moreover, the handle, cylinder, and retainer are made from sturdy drop forgings. That is why Le Roi 31's serve you efficiently for years.

Give your men a clay digger that they like to use — give them a digger that makes them more productive — give them Le Roi 31's.

Your nearby Le Roi distributor can show you how the 31 Clay Digger design pays off in lower costs. Write us for specifications and latest literature.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

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TULSA • BUTTE • SAN FRANCISCO

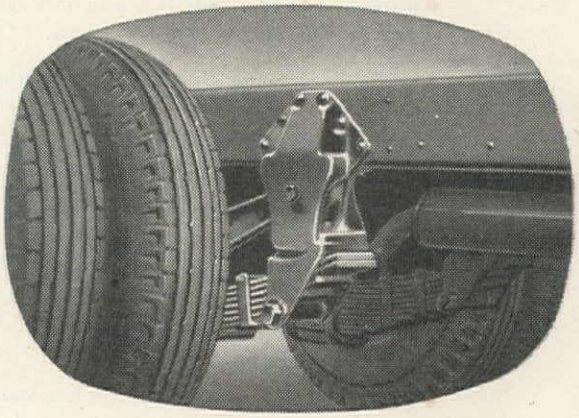
RD-16

Le Roi 31 Clay Diggers give you a good opportunity to reduce your digging costs

What It Takes FOR HEAVY HAULING



When you buy a GMC for heavy hauling you get a truck that's heavy duty and all truck. GMC heavy duties have big, brawny frames . . . with wide, thick-leaved springs to match. They have heavy, husky axles and transmissions that combine to provide as many as 15 forward speeds . . . brakes up to 21 inches diameter . . . heavy disc clutches. Engines are powerful valve-in-heads . . . with extra heavy Tocco-hardened crankshafts and many other durability features. Yes, GMC heavy duties have "what it takes" . . . and many models are now available for quick delivery.



The massive frame, heavy springs and rugged radius rod drive of this dump model typify GMC heavy duty truck design. GMC heavy duties are built in gross weight ratings of 19,000 to 90,000 pounds, for every hauling job. See your GMC dealer.

THE TRUCK OF VALUE

GASOLINE • DIESEL

GMC TRUCKS

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION • PONTIAC, MICHIGAN



This 100-foot railroad span is built entirely of Alcoa 14S-T6 Shapes and Alclad 14S-T6 Plate. Weighs only 53,000 pounds, in contrast to 128,000 pounds for a similar steel span.

The entire supporting structure of this electrical substation is Alcoa 61S-T6 Structural Shapes. The light weight of aluminum permitted erection in only 14 hours by a semi-skilled crew without a crane.



Design it in Alcoa Aluminum right from the start . . .

. . . *you'll save more weight, more money*

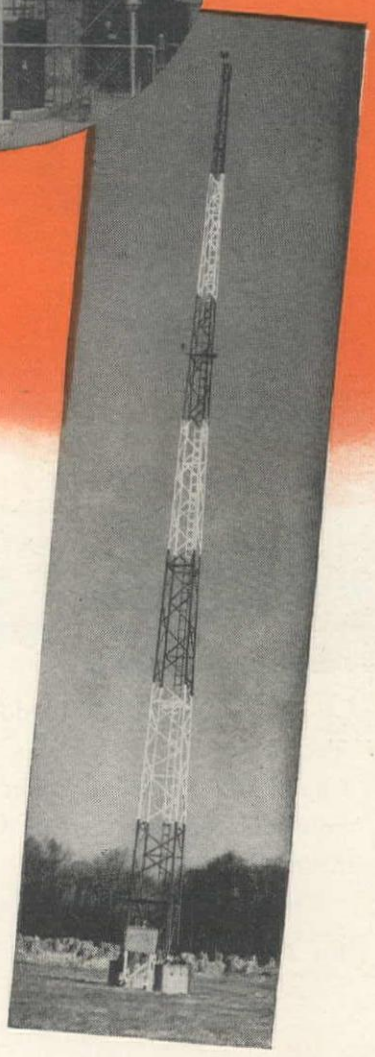
Instead of designing in steel and then switching, think in terms of high-strength Alcoa Aluminum Structural Shapes and Rivets from the very start of your calculations. Then you'll take maximum advantage of aluminum's lighter weight, high strength and lower erection costs.

Alcoa Aluminum Structural Shapes and Plate have high tensile strength . . . and weigh ⅓ as much as steel. For many installations, no protective painting is required.

If you need engineering help, our data and experience are at your service. If you don't have a recent copy of "Alcoa Structural Handbook", ask the nearby Alcoa sales office. Or write to ALUMINUM COMPANY OF AMERICA, 1811 Gulf Bldg., Pittsburgh 19, Penna. Sales offices in Los Angeles, San Francisco, Seattle and Portland.



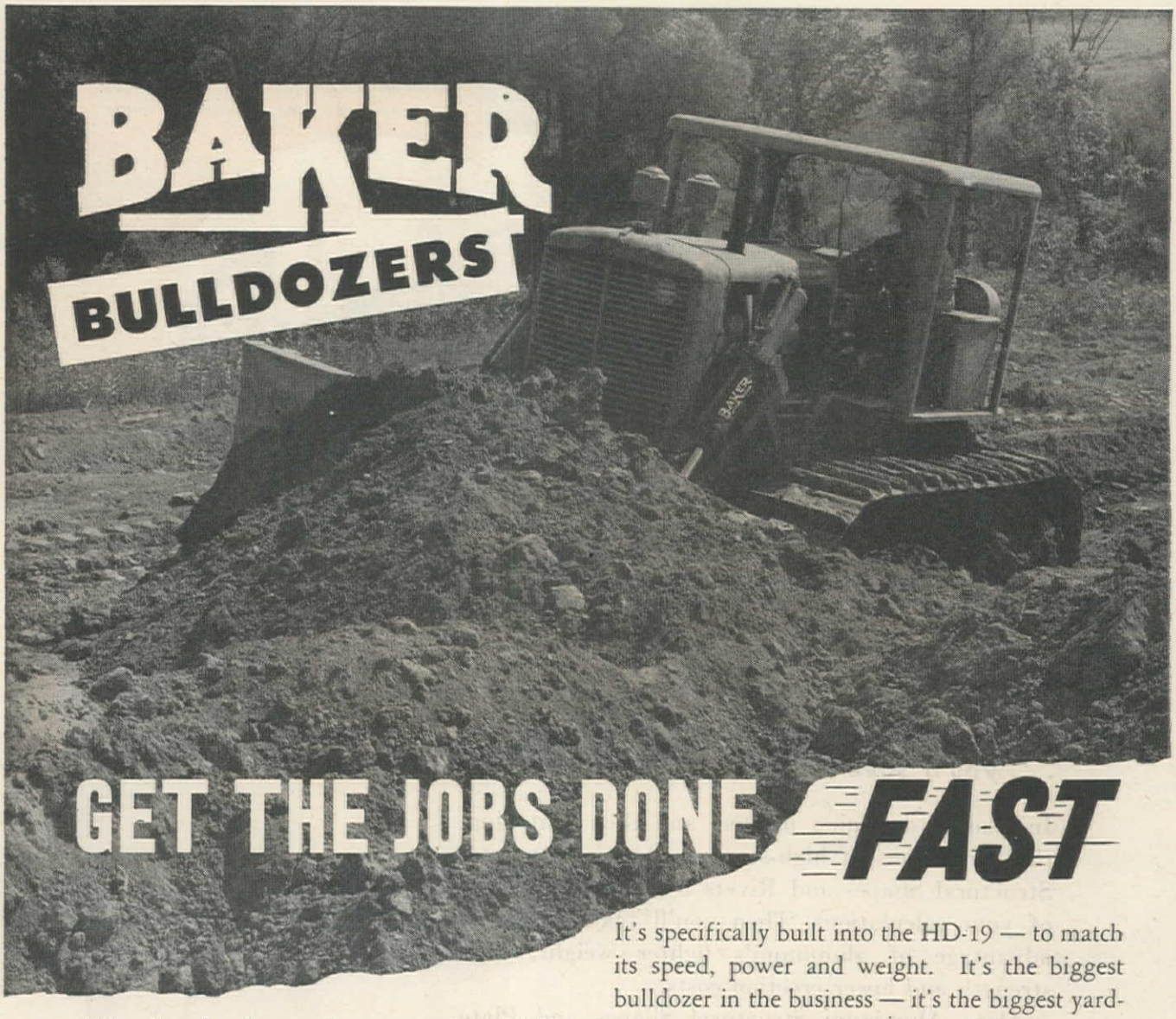
Write on your company letterhead for a copy of "Alcoa Structural Handbook". Full of design data on Alcoa Aluminum.



Shop fabrication moved fast, field erection required only 48 man-hours on this 90-foot all-aluminum radio tower. The shapes are Alcoa 14S-T6, rivets are Alcoa 17S-T4, driven cold.

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM 1888 1948 60 YEARS OF SERVICE



GET THE JOBS DONE *FAST*

Why "send a boy to do a man-sized job?" Tackle your big, tough jobs with the huge Allis-Chalmers HD-19 and Baker 'dozer — the most powerful team on earth. Get your jobs done faster and at lowest cost.

Plenty of heft for heavy duty, plenty of weight for all weather traction, plenty of power for tough going, plenty of speed for faster operating cycles—all add up to plenty of profit on any job.

Before you buy any bulldozer — check Baker.

It's specifically built into the HD-19 — to match its speed, power and weight. It's the biggest bulldozer in the business — it's the biggest yardage producer in the history of earth-moving.

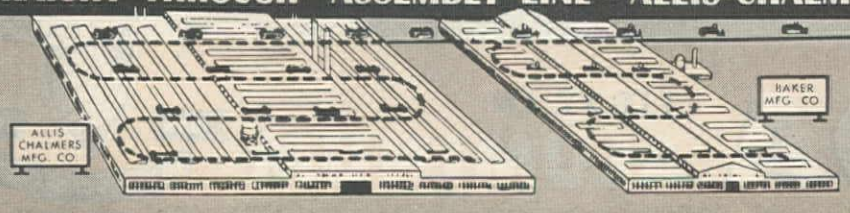
Baker Bulldozers and Gradebuilders are available for the HD-19 with either hydraulic or cable control. See your Allis-Chalmers dealer today.

BAKER MFG. CO., Springfield, Ill.

BAKER

BAKER They Go Together! A-C

"STRAIGHT THROUGH" ASSEMBLY LINE - ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops, adjoins the Allis-Chalmers crawler tractor plant.

When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.











"HERCULES"* (RED STRAND) the DEPENDABLE WIRE ROPE for any TOUGH JOB

* REG. U.S. PAT. OFF.

Wherever or for what purpose Wire Rope is used... regardless of the industry or place... there is a type and construction of "HERCULES" (Red Strand) suited to meet *any* and *every* heavy duty demand—*no matter how tough the job.*

Since 1886 the "Red Strand" has identified a wire rope that has—day in and day out—proved its dependability.

"HERCULES" (Red Strand) Wire Rope is made in Round Strand and Flattened Strand constructions—Preformed or Non-Preformed.

Consult our Engineering Department at any time for specific recommendations to fit your particular need.



A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857

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★ If you are looking for BIGGER PROFITS from your Ready Mixed Concrete Plant, be sure to investigate both SMITH TILTERS for pre-mixing or pre-shrinking concrete and SMITH-MOBILE AGITATORS for delivering the pre-mixed or pre-shrunk concrete to the job. These modern, dependable machines are profit makers with a record of achievement that has never been equaled in the industry. They have many time saving and money saving features . . . enable you to deliver BETTER CONCRETE with speed and certainty, at low cost. Write today for descriptive literature.



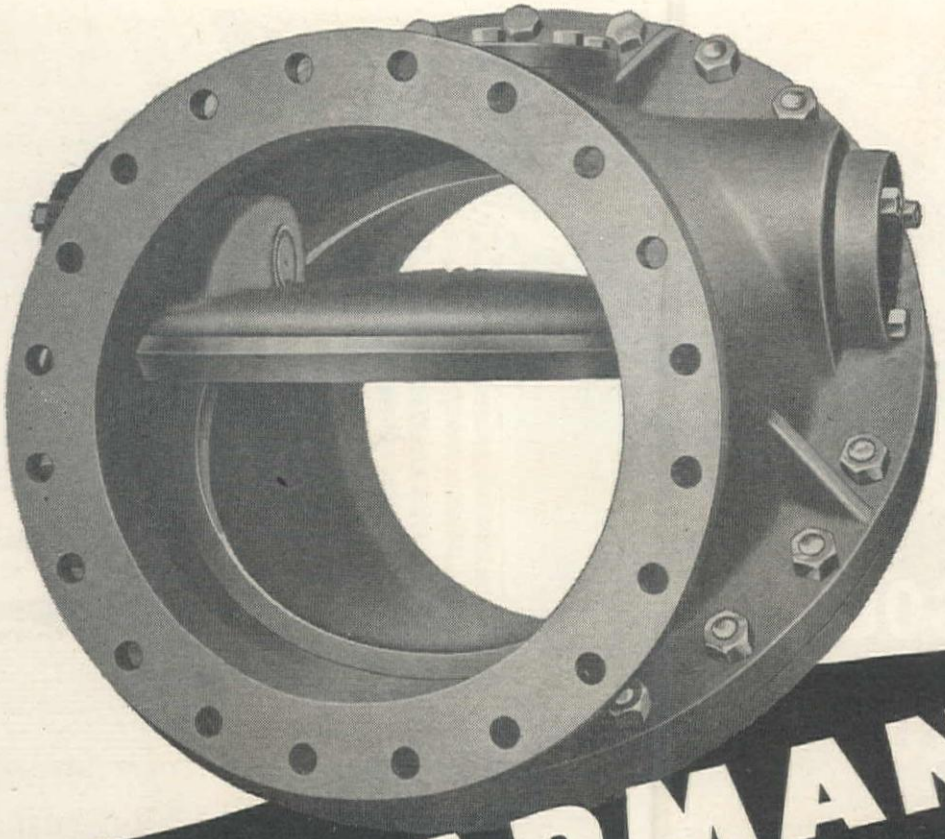
FAST COMPLETE DISCHARGE
Smith-Mobiles discharge ALL the batch, whether it's high or low slump concrete. And the discharge is easily controlled. Fast when you want it fast . . . slow when you want it slow.

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SMITH

CONCRETE MIXER MANUFACTURERS SINCE 1900

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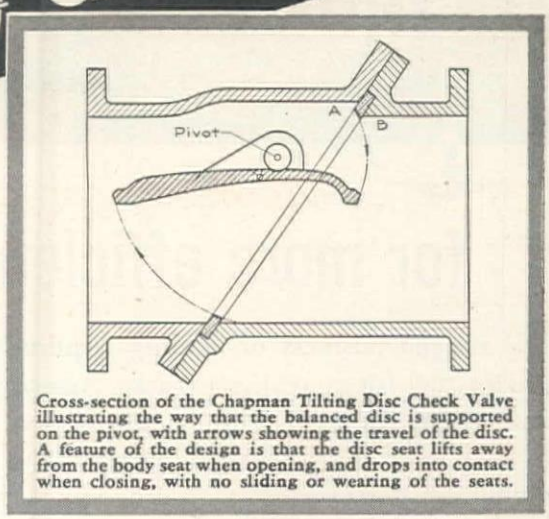




CHAPMAN

Tilting Disc Check Valves

TILTING DISC



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

HAVE A *Cushioned Closing* WHICH MINIMIZES WEAR

The balanced hinge-pinned disc in each Chapman Tilting Disc Check Valve is so designed that it closes without slamming or rubbing . . . cushioned by the effect of the stream against the short flap. This means that wear on seats, bearings, and hinge pins is minimized and pipe-line hammering is prevented.

Head losses are cut to about a quarter of those experienced with conventional types of check valves, and substantial power savings are possible when these valves are installed on pump discharge lines.

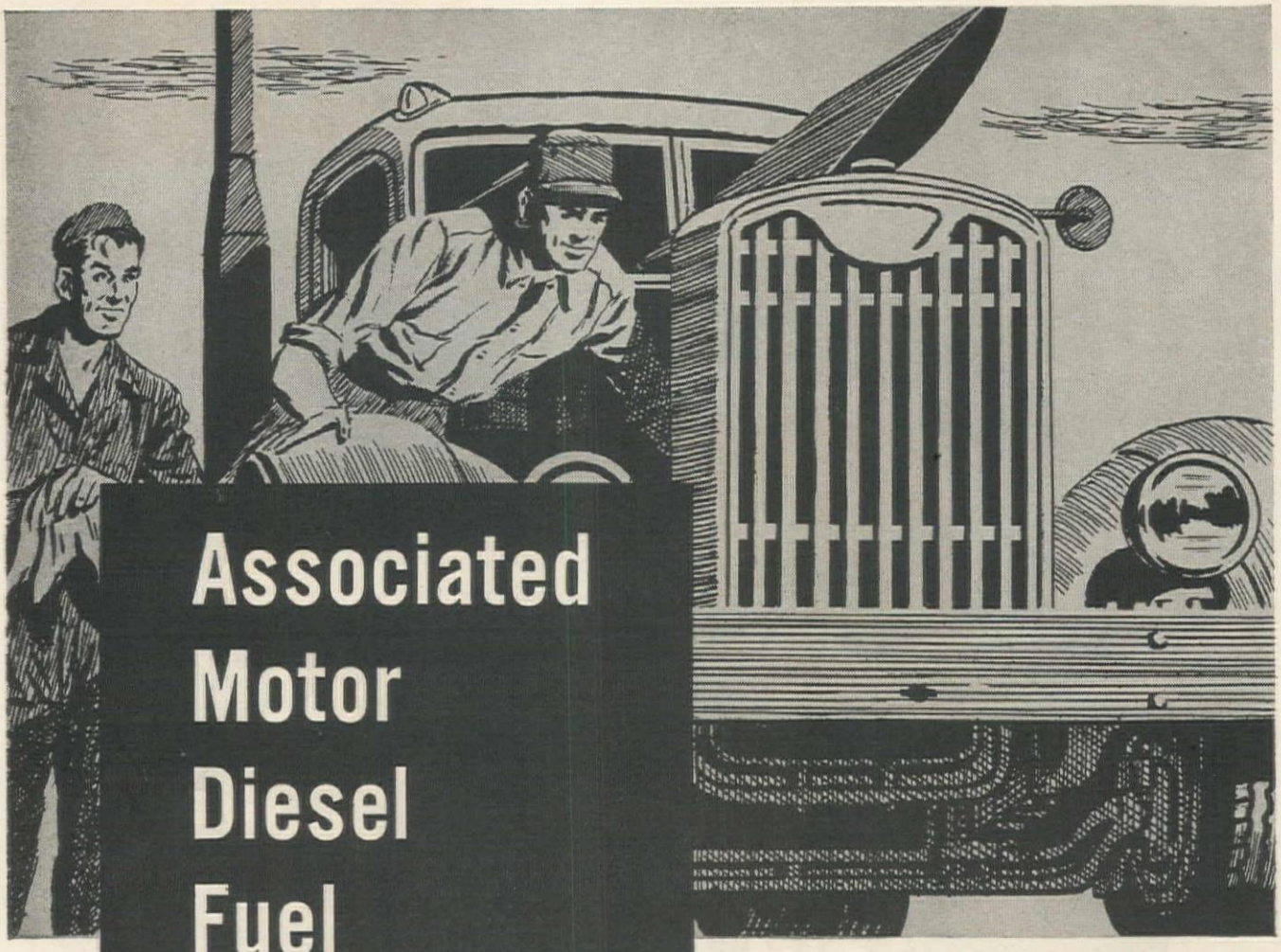


Chapman Tilting Disc Check Valves are available in iron or steel.

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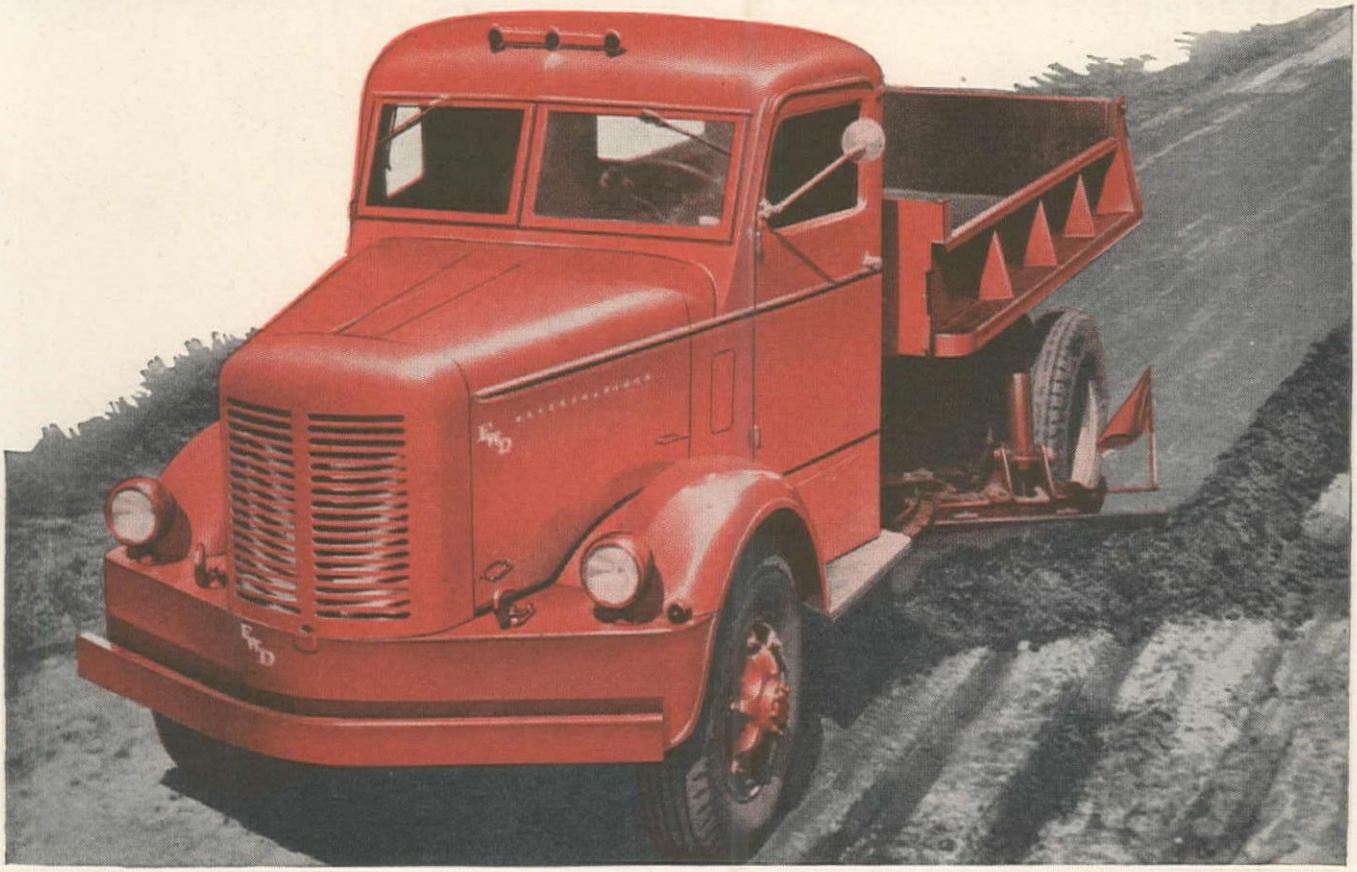


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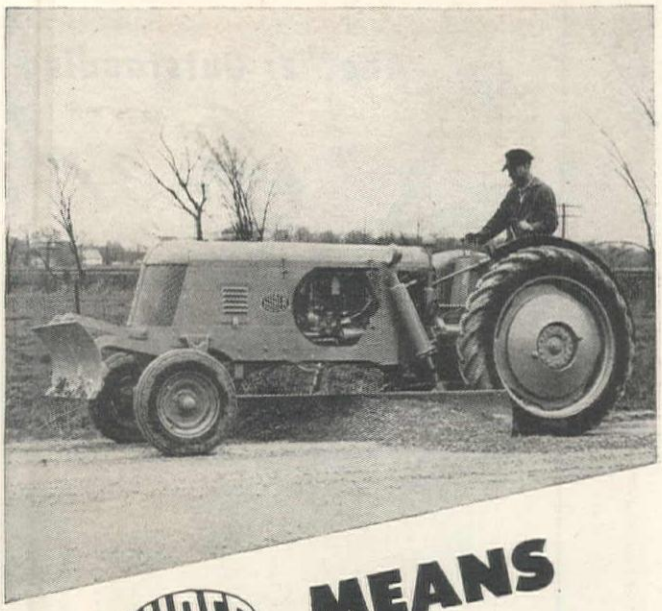
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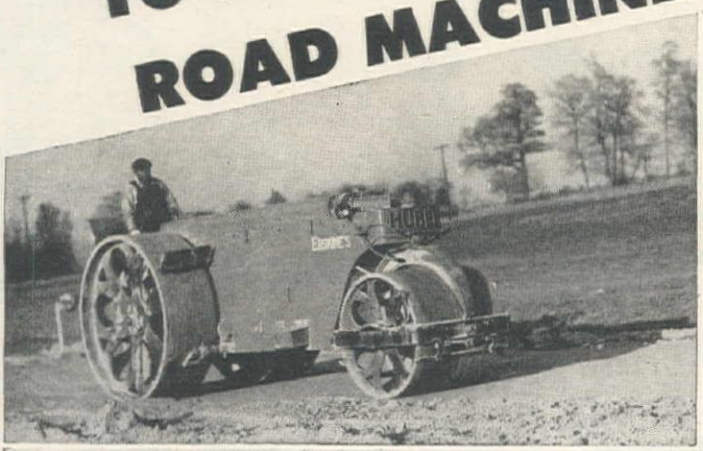
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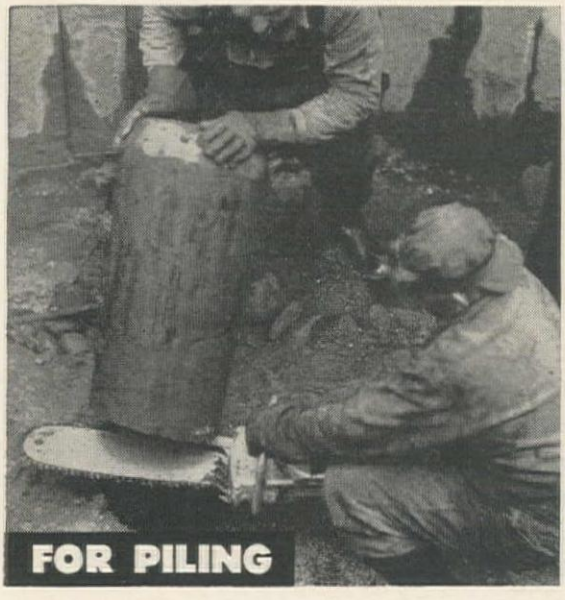
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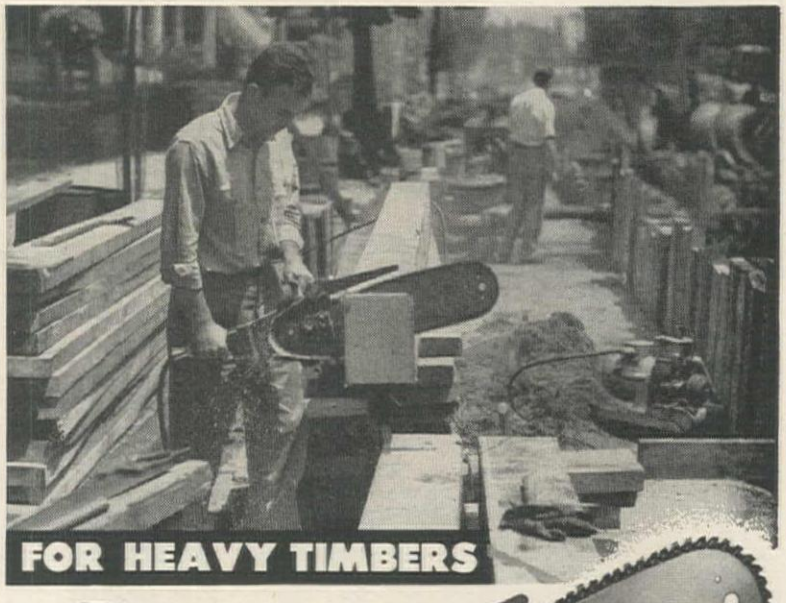
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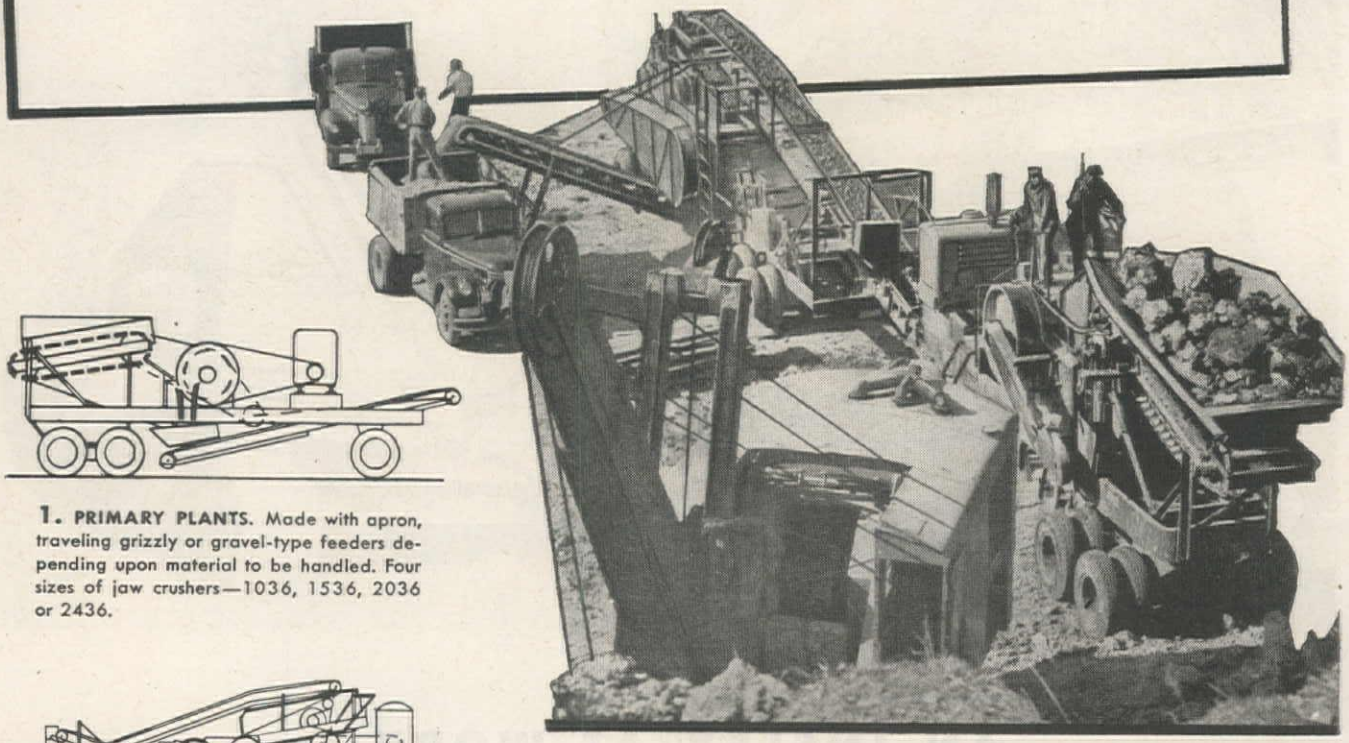
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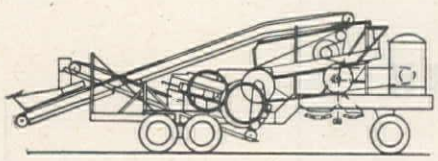
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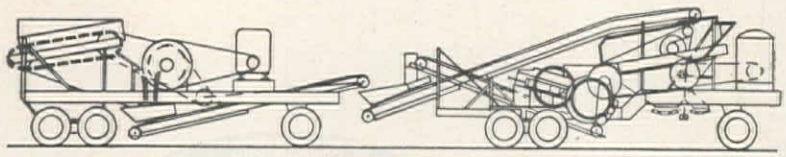
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Thank you, Mister

Master Mechanic

over 2,000 times!

In March our first issue of the publication devoted especially to your interests and problems was mailed out to you.

And did you eat it up!

Since the March issue of MASTER MECHANIC appeared only a few short weeks ago, we have received over 170 letters expressing approval of the new publication, giving us suggestions on new subjects to be covered editorially.

And are you Master Mechanics hungry for information on new equipment and materials!

What a landslide of inquiry cards has come in to us! To date we have received over 650 inquiries about equipment reviewed and described in our March issue. These have been sent to the manufacturers so that they can mail the literature on to you.

And what about new subscribers?

We have been receiving air mail letters from as far away as Guam—from men who want to keep posted on new equipment and materials; new mechanical design; how to service and repair equipment on the job.

What is the reason for this amazing response?

The answer is obvious—until now, there has been no publication in America devoted exclusively to the problems and interests of Master Mechanics and men charged with the responsibility of selecting, specifying, maintaining and repairing construction equipment, whether they be employed by a contractor or a public works department.

If a Master Mechanic is to EARN BIG MONEY, he must be worth it to his employer. And to earn big money, a Master Mechanic must know much more about his job, tools and equipment than the others around him. Many Master Mechanics today are making well over $10,000 per year, because they can save their employers vastly more than this by avoiding costly break-downs.

WE HAVE SPECIAL PLANS FOR OUR NEXT ISSUE IN JUNE—It will tie in with the Giant ROAD SHOW in Chicago-to be held in mid-July.

This June issue of MASTER MECHANIC will carry a great deal of information on the new equipment, accessories and materials that will be displayed in Chicago. Ambitious, intelligent Master Mechanics will want to keep posted on these developments. You'll find a lot of helpful information in our June issue. If you'd like to subscribe, please mail in the coupon below:

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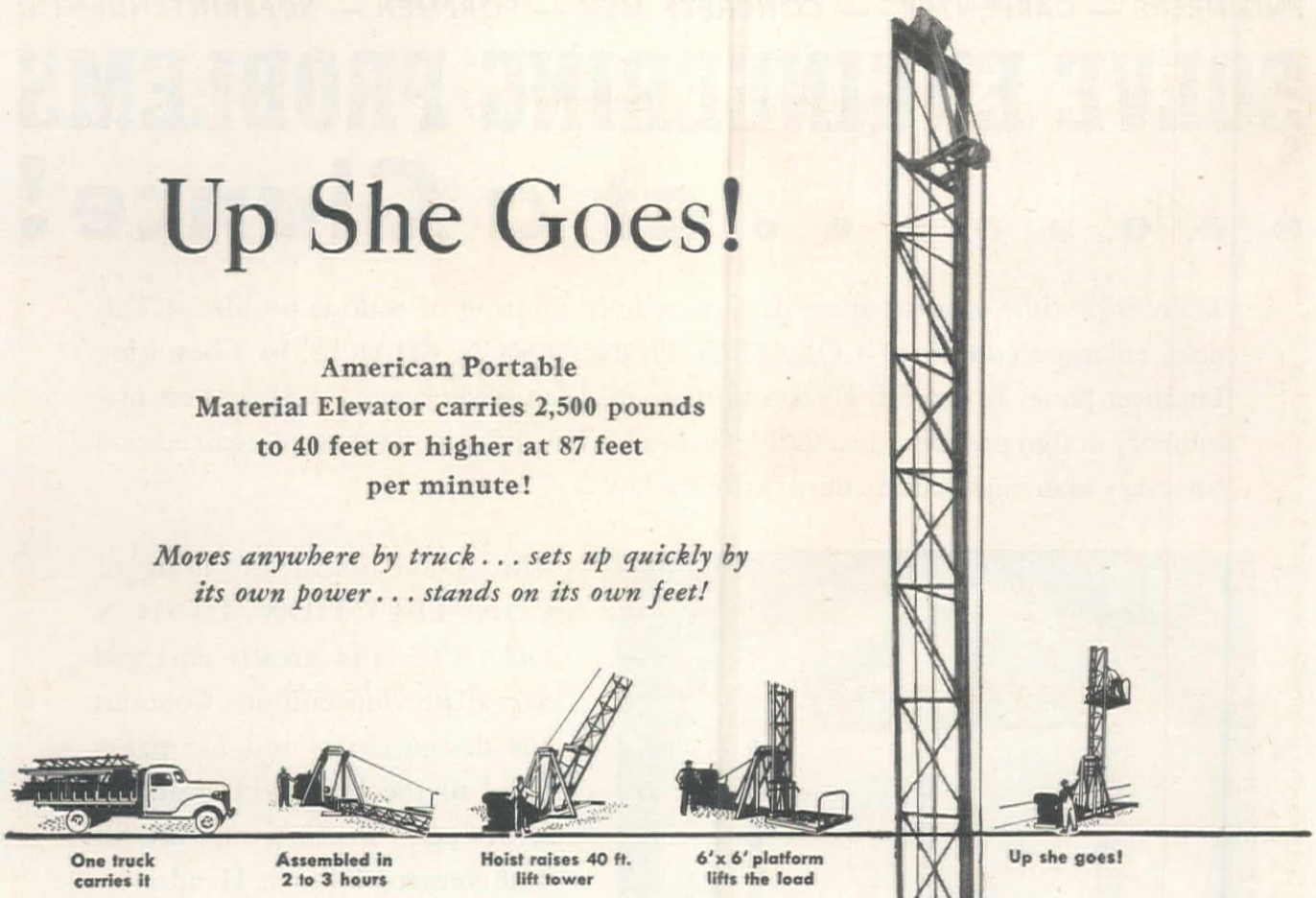
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Forget the hammers and saws. Forget the slow, costly, tiresome job of tearing down your last timber scaffold and building a new one. The American Portable Material Elevator *puts itself up!*

Load it all on one truck, in sections. At the job site, just bolt it together. Start the hoist, and watch it swing that sturdy triangular tower up to vertical. Once it's up, you're ready to go.

The skip platform is 6′ x 6′; holds two wheelbarrows; lifts 2500 lbs. For jobs higher than 40 feet, two 10′ tower extensions can be added.

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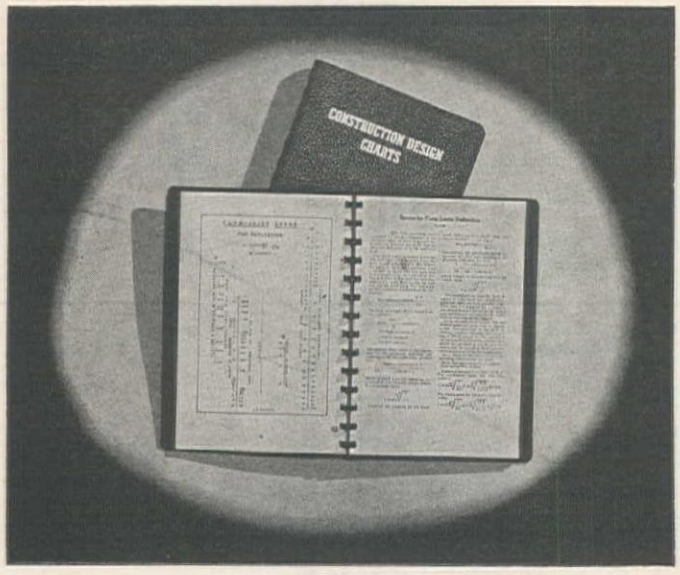
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This mighty Model "LAI" has hydraulic brakes, individually controlled for extra ease in stopping and steering. It has rubber-tired speed you can put to practical use without running up maintenance costs. It has a heritage of ENDURANCE from prior Case tractors, famous for their low upkeep and long life. It handles four-yard dig-and-carry scrapers, one-yard loaders, other units of comparable size. Let your Case industrial dealer show you how it fits your needs. J. I. Case Co., Racine, Wis.

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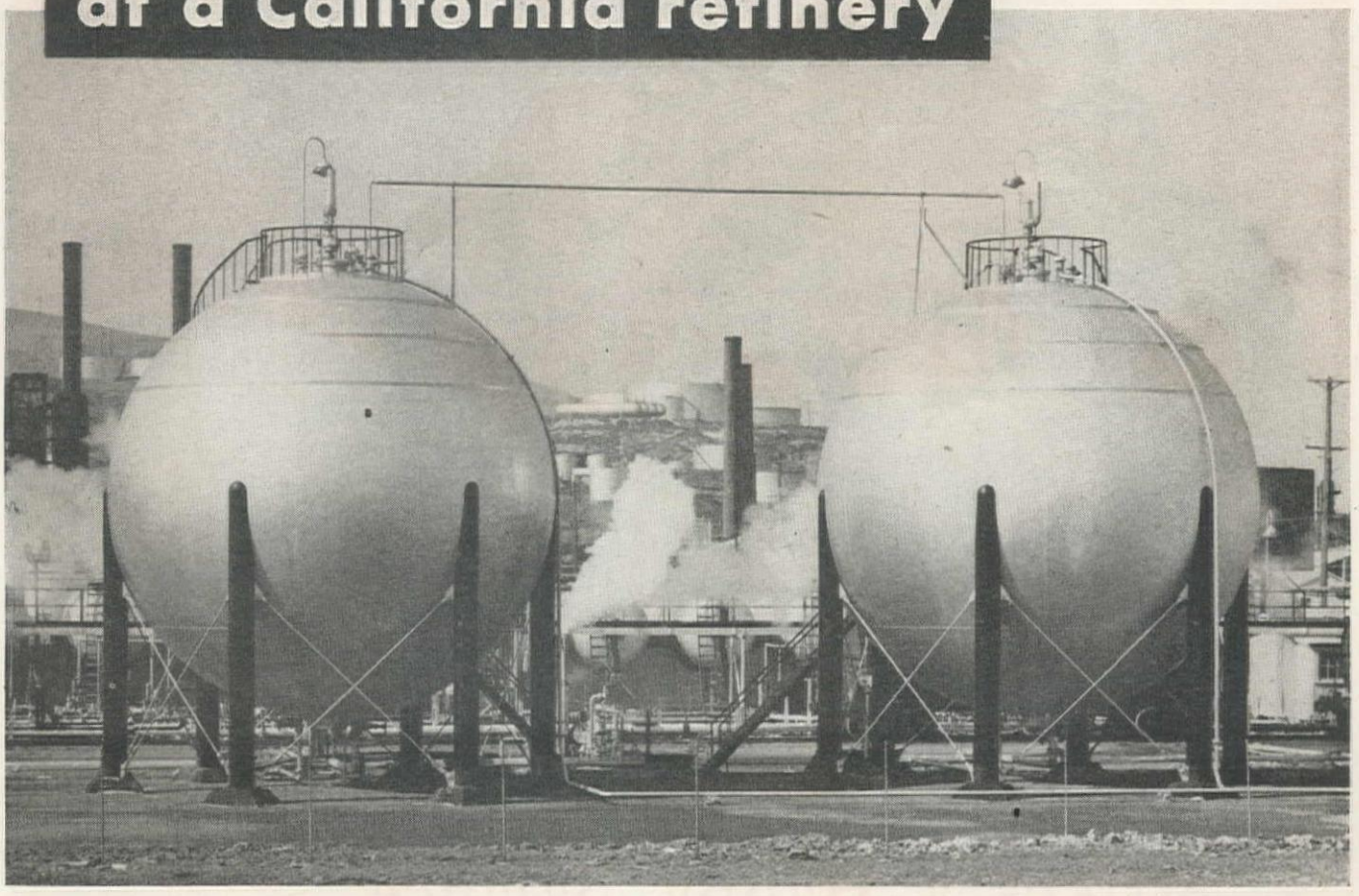
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TWIN HORTONSPHERES provide dual service at a California refinery

The two Hortonspheres shown below are located at a refinery in California. They are 30-ft. 9-in. in diam. and are designed to operate at 55 lbs. per sq. in. pressure.



THE TWO 30-ft. 9-in. diam. Hortonspheres illustrated above are used at a refinery in California for storing volatile products. They provide a two-fold service . . . they protect their contents from evaporation loss and they reduce the danger of fire during the storage period.

Hortonspheres are recommended for products that require storage at a relatively high pressure. They are usually designed to withstand the pressure that builds up during normal operation*. As long as this pressure does not exceed the setting of the relief vent, there will be no evaporation loss. Fire hazard is reduced by simply eliminating the conditions which cause fire or explosion. (The vapor content of air-vapor mixture above the liquid surface in a Hortonsphere is almost always above the ignition range.)

Hortonspheres are recommended for the storage of butane, butane-propane mixtures, volatile grades of natural gasoline and volatile refinery charging stocks. Also for manufactured, natural or industrial gases. They are built in sizes up to 65 ft. diam. for pressures up to 150 lbs. per sq in. in the smaller sizes. Get quotations on the Hortonsphere the next time you must provide storage facilities for volatile liquids.

**HERE IS A FACT to keep in mind when requesting quotations on Hortonspheres. It is often desirable to provide a working pressure somewhat higher than actually required. The cost of building a container to withstand a slightly higher pressure is not great, and the investment may prove highly profitable if it becomes necessary to store a more volatile product in a tank at a later date.*

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WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
May, 1948 Vol. 23, No. 5

J. M. SERVER, JR. . . . . Editor
D. F. STEVENS . . . . . Associate Editor
ARNOLD KRUCKMAN . . . . . Associate Editor

A Worthwhile Meeting

WE HAVE just returned from a meeting of California members of the American Society of Civil Engineers at Fresno, participated in by members of all four California sections, National President Dougherty, National Secretary Carey, and other visitors.

It was a splendid meeting so far as fellowship was concerned, and a very entertaining and instructive day was spent touring the Friant-Kern Canal and the site of Pine Flat Dam. Some interesting papers were delivered and student members from Western colleges engaged in a public speaking contest, delivering six well-prepared and thought-provoking speeches. As always, however, the most valuable discussions took place in the hallways, rather than on the platform.

A. S. C. E. Dues

A dozen or more officers and members, remembering our editorial attitude in opposition to the proposal to raise Society dues when that matter was up for vote last fall, asked us if we intended to adopt the same position again, now that the proposition has once more been brought up for consideration.

Relax, gentlemen, the answer is "No"! We recognize, of course, that all expenses have risen tremendously, and in order to maintain the Society's services more money has to reach the treasury. We are reversing our former position, however, with some reservations:

1. We hope that the added income will not operate to stop the inauguration of every possible economy and the institution of sound fiscal policies, as we suggested last time.

2. We hope that the appeal for votes will not be based on the "professional" activities of the Society, by which, apparently, welfare and paycheck matters are meant, for, as we said last year, activities of the labor union type are beneath both the dignity and the integrity of the Society—other organizations are set up for that purpose (which we regard as quite important) and are much better suited to carry it out.

3. We hope that the unprecedented extra charges which the Society has inaugurated since the earlier dues proposal was defeated will now be relaxed, including the removal of the charge for "Transactions," the return of the traditional allotments to the local sections, and the cessation of the recent suggestions to Life Members that they forego the honor and privileges they have earned through years of faithful adherence and continue to pay their regular dues.

"Yellow Journalism"

We were amused by one man who declared *Western Construction News* had descended to the level of yellow journalism because we so ardently supported the Reber Plan for San Francisco Bay. If the exertion of our sincerest and hardest efforts to secure a full and complete engineering investigation of what appears to be one of the greatest and most advantageous Master Plans ever developed in this country, constitutes "yellow journalism," then we can only start signing our mail with yellow ink.

To anyone living around the shores of San Francisco Bay, the unlimited traffic crossing, the fresh water harbors, the military security, the abundant fresh water, the creation of so much new industrial land, the metropolitan airport, the grand central terminal for all types of passenger transport, and the many other advantages of the Plan, are requirements to be sought after ardently, and those who work to secure them or at least an investigation of them, are not yellow journalists, but active friends.

We were a little concerned about the man's accusation until we recalled that he is very seriously involved in another matter which we have treated editorially in recent months.

The West

We're not absolutely sure of the full purpose of a single state A. S. C. E. meeting (by which we do not mean to criticize it, for it was a fine meeting), but at least one objective suggested in the halls was the opportunity to build up a knowledge of the importance of the West before the national officers. One humorous presentation by R. Robinson Rowe of Sacramento (Prof. N. G. Neare of problem fame) certainly was pointed in that direction. From his remarks, however, we judged that any such efforts were wasted on President Dougherty, nice fellow that he really is, for his New York provincialism is too ingrained to be changed. We believe, however, that Col. Carey has a fine broad view of his national responsibilities and the nation-wide scope of the Society.

Various controversial California subjects of course received a good share of hall gossip, none of which is probably proper to mention here. The Colorado River, the smog, the Central Valley, Commissioner Straus, the American High Dam Committee, the Freeway program, and many other subjects were talked about. All in all, it was a helpful and healthful meeting. Our congratulations to California A. S. C. E.

West Texas Water

ACTING ON a mandate from the November referendum meeting of the West Texas Chamber of Commerce, the Water Resources Development Commission has set in motion a program that will provide both surface and underground water inventories for 104 million acres of semi-arid country that has practically no water benefits from running streams. The Commission will endeavor to halt rainfall where it hits the ground, creating not only a greater form of flood control, but also storing water in the areas where it is most needed.

The program is expected to result in scores of small dams built on the watersheds instead of larger dams that might be built under a flood control and power program. To protect this principle, the Commission adopted the following: "That use of surface water for hydro-electric power purposes be opposed unless wholly conforming with the state's present prior water rights law on surface waters."

Age a Factor in Reclamation

IT HAS BEEN interesting to note at times to what eloquent and oratorical peaks the top spokesmen for the Bureau of Reclamation can ascend in pointing out that the sacredness of the 160-ac. limitation must be defended as an original precept of 1902 Reclamation Law. It has been good for 45 years. There is no valid reason they assert, now to make any change in it.

However, when it comes to a new reclamation concept which the same bureau heads favor, for example the 9-E provision in the Act of 1939 which opens the loophole for selling water as a utility, the hoary virtue of age is not mentioned. The proposal of the bureau to sell water as a utility service, without the purchaser ever attaining a right to this water, or ownership of the project through a repayment privilege, was undreamed of in 1902, and appears to have got into Reclamation Law as a sleeper in the passage of the Reclamation Act of 1939 under the 9-E clause.

—Southern San Joaquin Flood Control Association.

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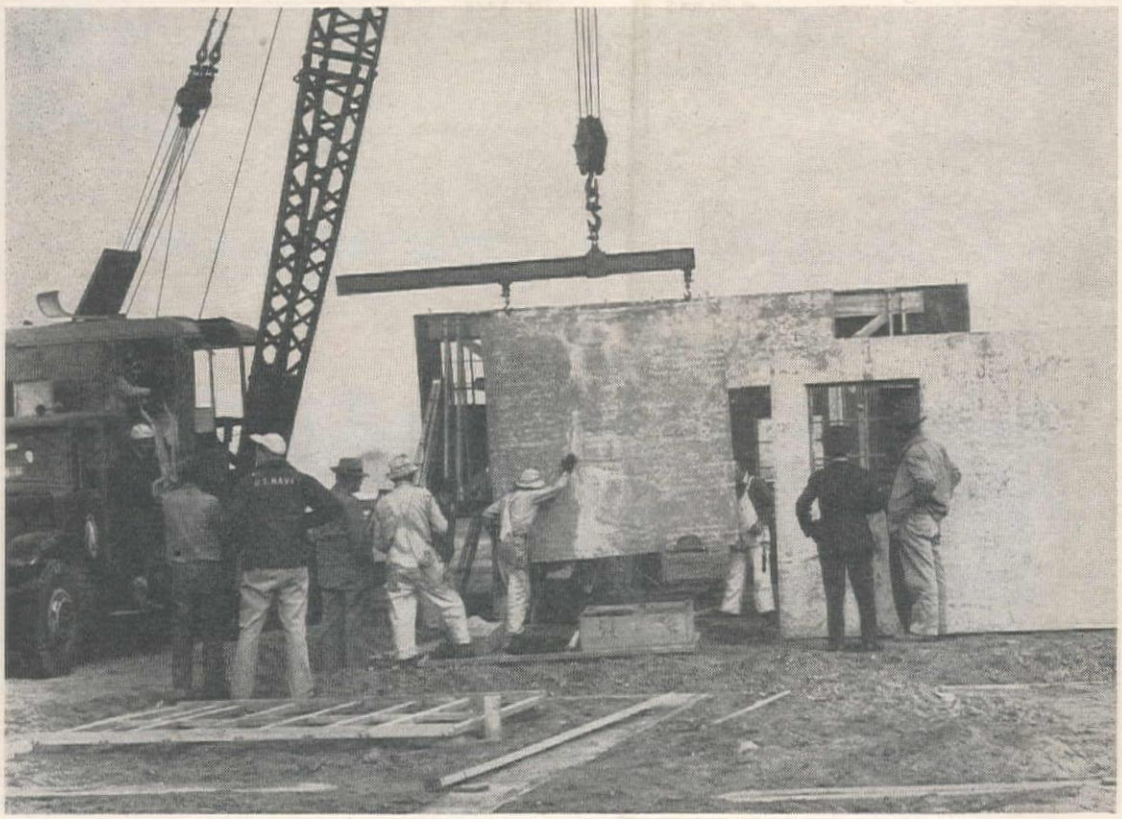
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WESTERN CONSTRUCTION NEWS
MAY • 1948



Concrete Desert Homes— Prefabricated Using Modern Methods

Low cost houses, ideally suited for desert conditions, are being built near Inyokern, Calif., for Navy personnel—Construction features modern material handling methods, assembly line concrete slab production and pumice aggregate

By A. E. NIEDERHOFF
Civil Engineer
Naval Ordnance Test Station
Inyokern, Calif.

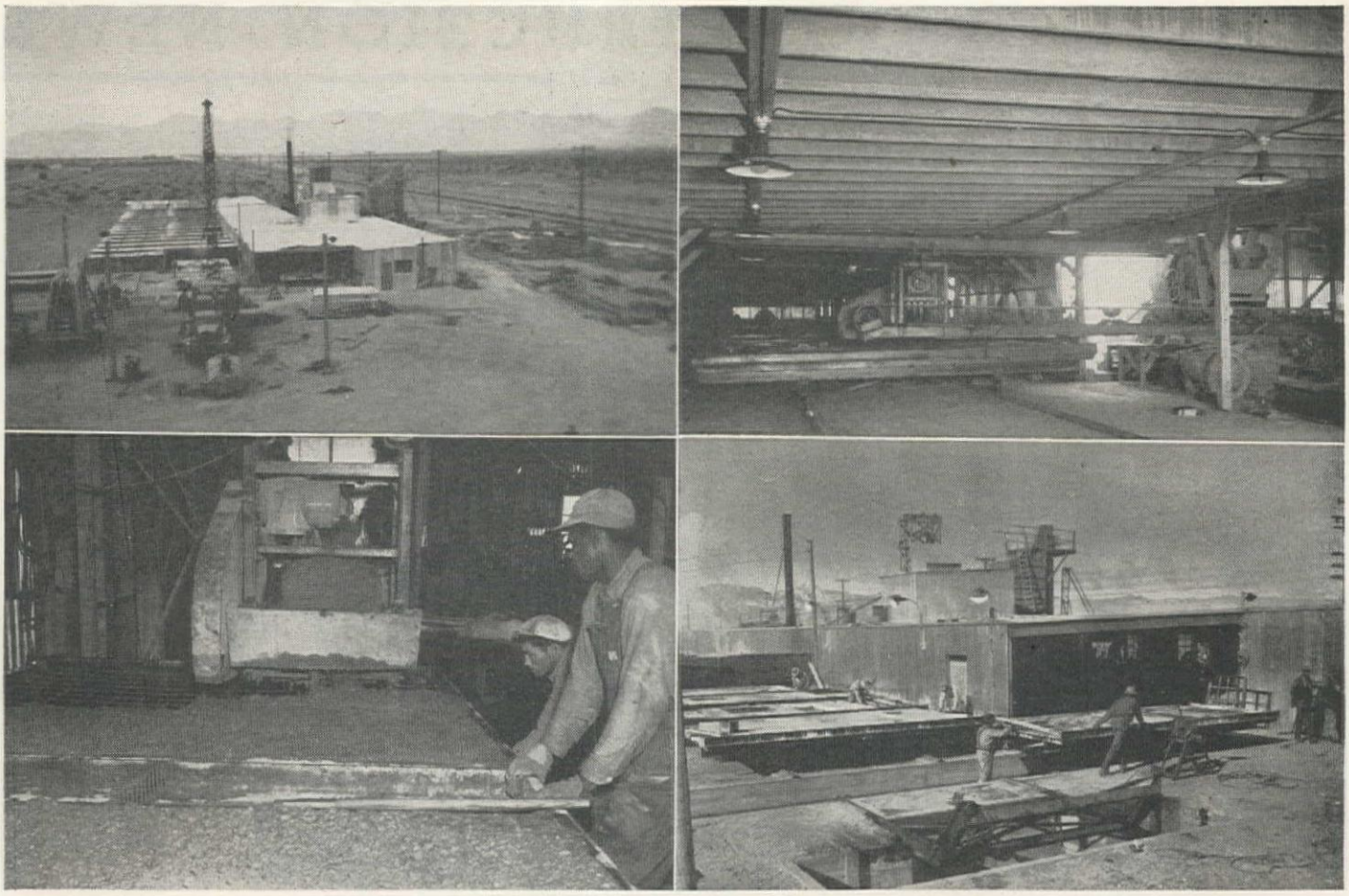
THE E. S. McKITTRICK Company of Los Angeles has built a prefabricated pumice concrete slab plant near Inyokern, California, just outside the gates of the Naval Ordnance Test Station. Under Project Manager R. E. Duba, the company is presently engaged in completing a sub-contract with Haddock-Engineers for 380 concrete dwellings located on the government reservation. Modern methods of material handling; assembly line production of concrete slabs for roofs and walls; and unique and multiple use of embedded steel rods and nuts for lifting, leveling, and final connections between slabs, make this job newsworthy.

Part of the success of this plant in producing low cost, permanent houses, ideally suited for desert conditions, is in the use of pumice as the concrete aggregate. Local deposits in the Coso Mountains, just 30 mi. away, are mined and trucked into the plant by the vendor, Paul R. Splane. Since the pumice only weighs 900 lb. per cu. yd., the hauling of bulk shipments is relatively inexpensive. The price delivered at the plant is $3.00 per cu. yd., or approximately 60 per cent of the cost of hard aggregate shipped in by rail from Los Angeles. Huge bins are provided with concrete slab floors where the 30-cu. yd. specially designed semi-trailers dump their loads in piles covering only a small area, but stacked seven feet high.

The prime mover for these semi-trailers is a Reo truck, model 25, with a six-cylinder, gasoline, Buda engine developing 150 hp. The Industrial Power and Equipment Co. of Bakersfield, Calif., designed the end dump semi-trailer and the special hydraulic, telescope hoist. The 30 cu. yd. of aggregate can be dumped in one minute.

Cement is also received in bulk shipments by truck from Monolith, Calif. At the plant the bottom dump trucks discharge their loads into a recessed hopper. An endless chain bucket conveyor lifts the cement about 25 ft. to an overhead hopper from which weighed batches are drawn. The batching plant was designed by Brown-Bevis Equipment Co. of Los Angeles and makes use of a beam balance Winslow scale. Hoppers are provided for cement, for fine pumice, and for coarse pumice. The trolley-suspended weighing hopper runs under all three batching hoppers and takes a certain number of pounds of each of the dry ingredients that go to make up the concrete mix.

Perhaps dry ingredients is a misnomer because the coarse pumice aggregate is presaturated before it is piled into the batching hopper. In the bins, the coarse material is sprayed with water until it



PREFABRICATION PLANT, upper left, where the pumice concrete slabs are cast and steam cured. Curing ovens are to the left. Inside the plant, right, the trolley suspended belt conveyor is discharging hot concrete onto the casting table and, lower left, a close-up of the discharge from conveyor. Slabs come off assembly line, right. Note tilting device, foreground.

has absorbed about 30 per cent of its weight in moisture.

Lifting the pumice from the bins, which are at the ground level, into the overhead batching hoppers is done with a ⅝-cu. yd. Scoopmobile, which is manually steered, about 14 ft. long, and is equipped with a specially tall elevator having a reach of 16 ft. Lifting speed of the 20-cu. ft. scoop is 1½ ft. per sec. The drive wheels are at the front of the machine to give better traction when loading loose materials. The hoist take-off is at the front of the motor and consists of a four-groove V-belt pulley driving the hoist clutch. This drive is independent of the traction power and permits either selective or concurrent operation of the hoisting and the driving controls.

From the weighing hopper the pumice and the cement are dumped into a ½-cu. yd. vertical lift skip which is hoisted by a steam driven winch to the paddle type mixer located about 15 ft. off the ground. The mixer was specially made for the job by Stephen Flam of Van Nuys after it was proven that the conventional, rotating drum type mixer failed to give a uniform mix. Warm water at 120 deg. F. is added after the other materials have been placed in the mixer and half-yard batches are produced about every three minutes.

The mixer discharges onto an endless rubber belt conveyor which is trolley suspended over the casting tables and is movable in one direction for a range of 16 ft. The steaming concrete, having less than a 2-in. slump, falls off the end of the belt conveyor onto flat casting tables that have been previously prepared and furnished with reinforcing steel, sash, door frames, electrical conduit, outlet boxes, and what not.

Assembly line

The casting tables consist of flat steel plates laid horizontally, having a 16-ft. dimension one way and an 8-ft., 4-in. dimension the other way. The slab to be cast on these tables is delineated by either 5 or 6-in. channels forming the four sides. Wall slabs are 5 in. thick with mesh reinforcement and roof slabs are 6 in. thick with ½-in. steel bars at 9-in. centers as the reinforcement. The channels are dogged down in place and are adjustable so that with a minimum of effort the size of the slab can be changed from a maximum of 16 x 8 ft. to almost any smaller dimension.

The tables are mounted on four grooved casters which run along on angle iron rails set at a 10-ft. gage. The angles have the apex turned upwards and the grooved casters have no trouble staying on these rails. The flat steel forms are sprayed with liquid soap to keep the concrete from sticking. Next, two ⅝-in. round bars, threaded at both ends and with 2¾-in. long nuts screwed half way onto the ends of the bars, are placed in the forms so that the nuts will be at the edge of the concrete slab when the forms are stripped. These bars extend from top to bottom of the wall slabs and are exactly 2½ in. from the outside of the 5-in. slab.

Window sash is then secured on the steel table and any electrical conduit or outlet boxes are wired in place. The movable table is then pushed along the rails to the place where men place precut mesh reinforcing. Using a large hand shears, a workman cuts out the mesh at window and door openings and positions the reinforcing by seating it on small wire chairs.

Placing concrete

When the form is thus made ready to receive concrete, it is pushed manually under the belt conveyor delivering hot concrete from the mixer. As mentioned before, the trolley suspended conveyor has a 16-ft. range of movement along one line and the tables have a limitless range of movement along the rails at 90 deg. to the conveyor. Thus, by working the conveyor belt slowly backward from its extended position and moving the caster mounted tables back and forth along the rails perpendicular to the conveyor, the concrete can be placed in the form with very little additional hand spreading. Window and door openings are blanked out with wood covers but this is just an additional precaution against failure of the workmen to move the conveyor and tables properly. Actually, it is possible to place the concrete on any square foot of the flat form within a tolerance of ½ in.

Again the table is pushed forward along the track to the next position where the concrete is screeded and vibrated with external vibrators. Care has to be taken not to

overvibrate or the lightweight pumice will float to the top of the slab. Ingenuity on the part of the maintenance man on the job, E. C. Greider, has resulted in a combined external vibrator and screeder that does a once-over job in four minutes on the slab that requires only a wood float finish to complete the piece. The vibrator consists of an iron rail about ten feet long suspended from a monorail trolley. On each end of the rail is mounted an electric internal vibrator of the "sausage" type. Power is turned on for the vibrators and two workmen pull the rail across the top of the slab, using the steel channels on the sides for rails. This screeds off all extra concrete above the steel channels and solidifies and compacts the concrete within the forms on the casting table. At the corners of the slab, it is necessary to compact the concrete by hand, tamping with a cut off section of broom stick.

Steam curing

The casting table advances to the next station by being pushed along the angle iron rails and concrete finishers complete the job and make the slabs ready for the "ovens." Wood floats are used and if excess moisture appears on the top of the slab, a dusted-on mixture of sand and cement is spread thinly over the wet spots. The slabs are then allowed to set, awaiting their turn to enter either one of the two curing "ovens." The capacity of the plant for a 16-hour day is 92 slabs, or approximately six slabs per hour.

Across one end of the long assembly line where the casting tables were cleaned, soaped, fitted with nuts, rods, reinforcing steel, sash, and electrical conduit, and filled with concrete and finally finished, is a recessed cross track. The tables are pushed, one at a time, onto a small flat car on this cross track, shuttled to one of two parallel tracks adjacent to the assembly line, and pushed off the flat car into the steam curing ovens. Here they cure for a period of 4 to 6 hours in a temperature of 170 deg. maintained by live steam. Emerging after the curing period, the slabs have gained strength equivalent to "seven-day strength." Test cylinders of concrete showed strengths of 1,400 p.s.i. when broken immediately following the steam curing period. The unit weight of this pumice concrete is only 75 lb. per cu. ft.

Steam supply for the curing ovens comes from a second-hand, oil-fired boiler, developing 75 h.p., and producing saturated steam at pressures varying from 75 to 100 p.s.i. at the header. Within the ovens, the temperature is kept at 172 deg. The sides and tops of the ovens are of pumice concrete slabs with caulked joints. The pumice concrete is such an excellent heat insulator that the outside of the 5-in. thick slabs are not even perceptibly warm while the opposite side has a saturated temperature of 172 deg. F.

Slab erection

From the steam tunnels the tables are drawn by cables pulled by a steam winch. Workmen unbolt the steel channels and remove them from the edges of the slabs. Lifting eye bolts are screwed into the embedded nuts that were previously attached to the ⅝-in. rods extending from top to bottom of the wall slabs. The tables are then run onto a tilting device where table and slab are tilted from a horizontal position to a nearly vertical position. A gasoline-engine-driven, revolving crane, using a lifting beam and slings attached to the eye bolts screwed in the concrete slab, hoists the slab off the table and deposits it in a rack on a flat bed semi-trailer. The eye bolts remain with the slab for erection purposes at the building site.

A load of wall slabs pulled by truck is taken to the poured concrete footings at the building site. The slabs are lifted into place by another crane. Walls are kept plumb and corners are true right angles because of the wood templates which are used in every phase of the erection process. On the bottom of the wall slabs, leveling bolts are screwed into the embedded nuts before the piece is lowered onto the footing. The heads of these bolts rest upon small steel plates cast in the concrete foundation. With the walls plumb and level and in line, the eye bolts used for lifting purposes, are unscrewed from the top of the slab.

Final connections

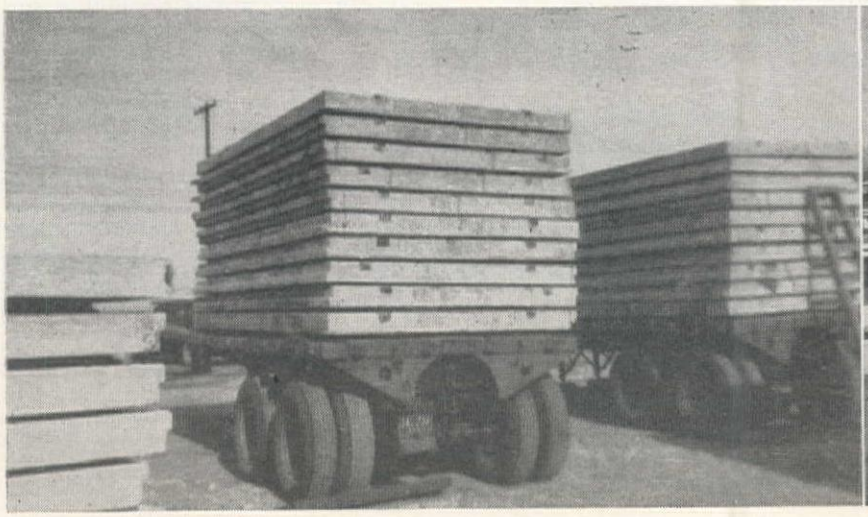
Roof slabs are then placed after the tops of the walls have been given a coating of plastic caulking material. Connection of the roof to the walls is made through holes left in the edge of each roof slab. Bolts are put through these holes into the same embedded nuts in the wall slab that were used for lifting purposes. Abutting roof slabs have small steel plates cast into them at the edges and when erection is completed, these plates are welded together, giving the structural equivalent of a monolithically cast concrete roof. The connecting bolts are grouted in place, thus tying the roof firmly to the wall. At the bottom of the wall, the leveling bolts are welded to the steel bearing plates in the foundation, making a rigidly connected structure of the entire house.

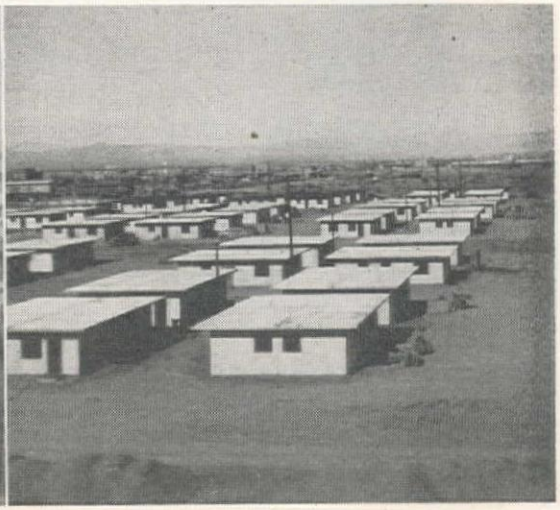
Welding of steel on pumice concrete can be done without fear of spalling or explosion. The thermal characteristics of pumice are such that it can be heated to fusion and still not explode.

The floor is poured as the last part of house construction. This is a conventional concrete slab 4 in. thick except where the load bearing partitions and walls rest on the floor. Under these erected walls the concrete is forced, giving continuous support to the walls by a floor slab approximately 8 in. thick. Pumice concrete is not used for floors because of its poor wearing qualities and because of its tendency to dust.

The E. S. McKittrick Co. house is fireproof and permanent and has such excellent heat insulating qualities that it appears to have a bright future as the proper house for the desert. Where multiple units are specified, this house can be constructed complete with bath, fixtures, heating, and air cooling units for as low as $7.85 per square foot for a house of approximately 800 sq. ft. in area. Larger houses of 1,500 or more square feet can be constructed for an even lower unit cost than that above quoted. The method is economically feasible, however, only where many dwellings are to be constructed and the rental of lifting equipment is spread over the entire group of houses.

McKittrick's former plant superintendent, A. B. Roemisch, is responsible for plant layout and many of the special jigs, fixtures, and mechanical gadgets that are found in this unusual "house factory." Cooperation of labor under the supervision of Bill Gowens, labor foreman, explains the high productivity of the plant.





ROOF SLABS are laid on a semi-trailer horizontally, left, with rubber tires between slabs acting as cushion. Completed homes, right, have excellent heat insulating qualities, are permanent, fireproof.

Columbia Basin—
Central Air Plant on Canal Project

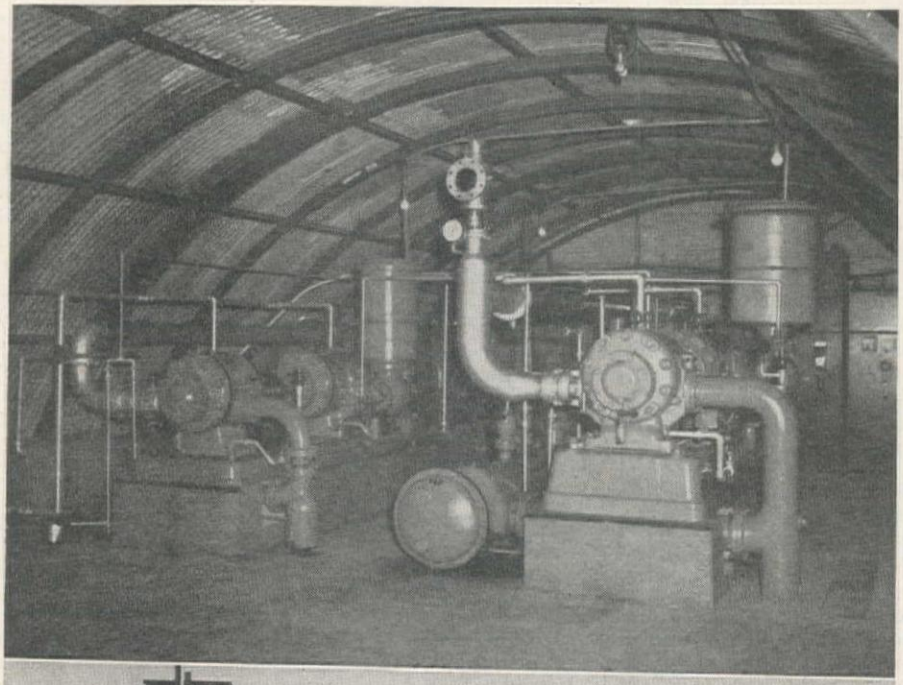
Contractors successfully use a centralized production system for compressed air on construction of 18 mi. of the east low canal of the Columbia Basin irrigation project — Surplus rotary compressors and quick-coupling pipe adapted for use

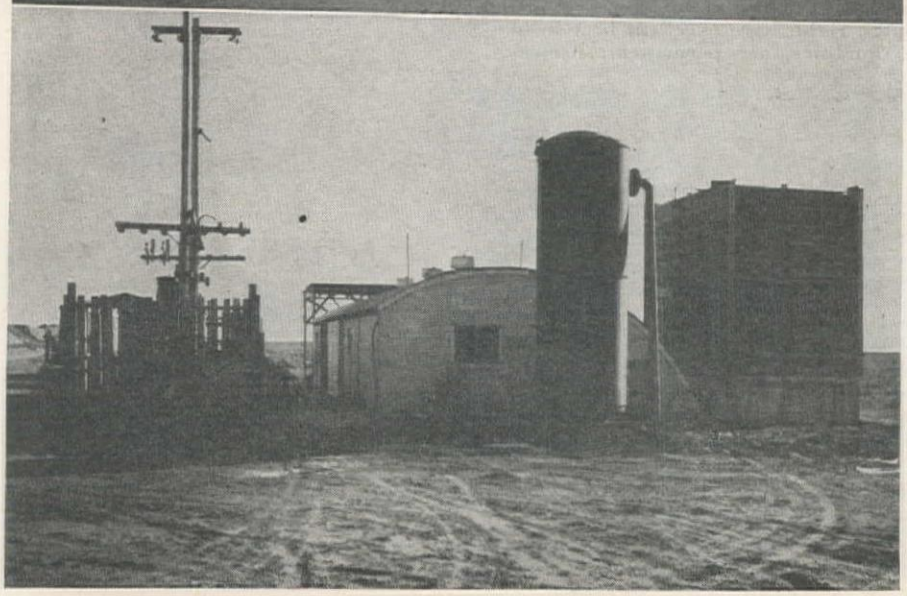
FOR THE PAST YEAR Winston Bros. Co. and the Utah Construction Co. have been using with complete success a centralized production and supply system for compressed air in the construction of about 18 mi. of irrigation canal on the Columbia Basin project in central Washington. Centralized production and supply of compressed air is customary in industrial plants, and has been used on construction projects of a relatively localized nature, but the Columbia Basin job is believed to represent the first use of such a system where the work extends over such a large area.

Several recent developments have made the use of central compressor plant equipment feasible on extended construction jobs. The most important of these is the so-called "invasion pipe" developed for use of the allied armies invading the continent of Europe in the summer of 1944. Availability of rotary compressor equipment from surplus war plants was another factor that led to their adoption in the Columbia Basin a year and a half ago.

First installation of the central compressor plant was made late in 1946 during the early stages of excavation for the first 6.5 mi. of the west canal. As this work neared completion and the contractor began excavation of the first 11 mi. of the east low canal, a second plant was established near the mid-point of that work. Later the two plants were interconnected to increase the flexibility of operations which gave the contractor a total connected line nearly 12 mi. long.

The location of this unusual installation is the Columbia Basin project being constructed in central Washington under the direction of the Bureau of Reclamation. A description of the complete project appeared in the January, 1947, issue of *Western Construction News*. The east low canal is one of four major canals scheduled for construction, and a contract for the first 11 mi. of excavation and concrete lining was awarded to a joint venture group including Winston Bros. Co. and the Utah Construction Co. late in 1946. The same organization had previously been awarded a contract for excavation and concrete lining of the first 6.5 mi. of the west canal. Both projects had a common terminus at the bifurcation works on the main canal.

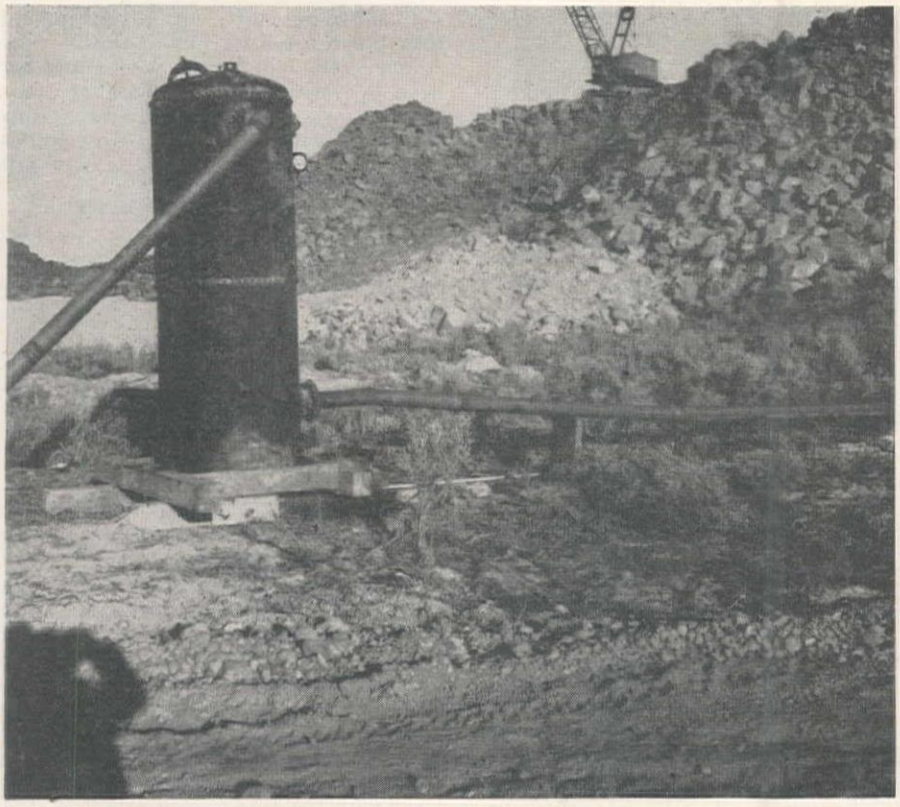




Rock conditions

Rock conditions on the west canal and the east low canal have varied widely between the two lines. On the west canal, excavation was entirely through a soft basalt formation where the wagon drills were able to drill as fast as a foot per minute. Conditions on the east low canal have varied with both soft and hard basalt being encountered. In the hardest formations drilling progress has been as slow as a foot per hour. Overall progress in drilling varies from 100 to 500 ft. per day per wagon drill. The estimated quantities of rock are 893,000 cu. yd. on the east low canal and 760,000 cu. yd. on the west canal.

TWO ROTARY compressors at Plant No. 2 produce 2,630 c.f.s. They are housed in quonset hut with standard timber cooling tower outside. All water cooling systems are interconnected into a single unit. Blow-off valve on the receiver is set to open at 125 p.s.i. Both operate 16 hours per day.



AN AIR RECEIVER at the end of the 6-inch pipeline helps maintain even pressures in the line and guard against irregularities when heavy loads are applied. The tank is located 3 mi. from the compressor and maintains air pressure at 100 p.s.i.

Establishment of the drilling pattern has been largely by rule of thumb. In general, spacing of holes has been set at a half the depth of the cut up to a maximum spacing between holes of 10 ft. The Bureau of Reclamation engineering staff has undertaken a program of detailed plotting of the variations in rock formations in an effort to develop a system whereby conditions on future work may be predicted as to difficulty or ease of drilling.

In setting up the construction plant for the west canal the contractor was able to secure from surplus war supplies three rotary compressors and a large quantity of quick-coupling pipe usually referred to as "invasion" pipe because it was developed for and first used by the allied armies invading France. The fact that the pipe sections can be quickly coupled together made it possible for engineer troops to lay surface lines rapidly enough to keep up with the fast moving motorized forces and keep them supplied with gasoline.

Compressor installation

The same advantage of quick coupling and simplicity of installing these pipe lines was a major factor in the contractor's decision to use a central air supply system. The rotary compressors are of the type commonly used for industrial installations but seldom if ever used on construction projects. These three machines were originally installed in the shell-loading plant at Denver.

One of the compressors is of the 200/200H class of 2-stage rotary compressors with a rated capacity of 1,035 c.f.s., and two are of the 300/300H class of 2-stage rotary compressors with a rated capacity of 1,592 c.f.s. The two larger compressors were installed in the contractor's original shop for the west canal at a point about 1½ mi. west of the east end of the work. A blacksmith shop for sharpening of bits and maintenance of drill steel was also established at this point, as well as equipment repair shops and warehouses.

From this point the air pipe line was extended east and west along the canal line to both ends of the work. When excavation of the east low canal was begun one of the larger compressors and the small compressor were installed in a plant which was set up at about the midpoint of the work. The pipe line was laid north to the end of the project and south 20,000 ft. to the point at which the rock excavation ended, although contract extended some distance further.

Operating experience

At one point in the rock excavation a dense columnar basalt formation was encountered, and the compressed air system was subjected to unusually heavy loads. In some instances the contractor has been able to drill as little as 6 in. per bit. Prior to this the excavation had encountered a soft vesicular basalt in the west canal and the northern portion of the east low canal. In order to provide sufficient air for operation of the drills in the harder formation the contractor decided to interconnect the two compressor plants.

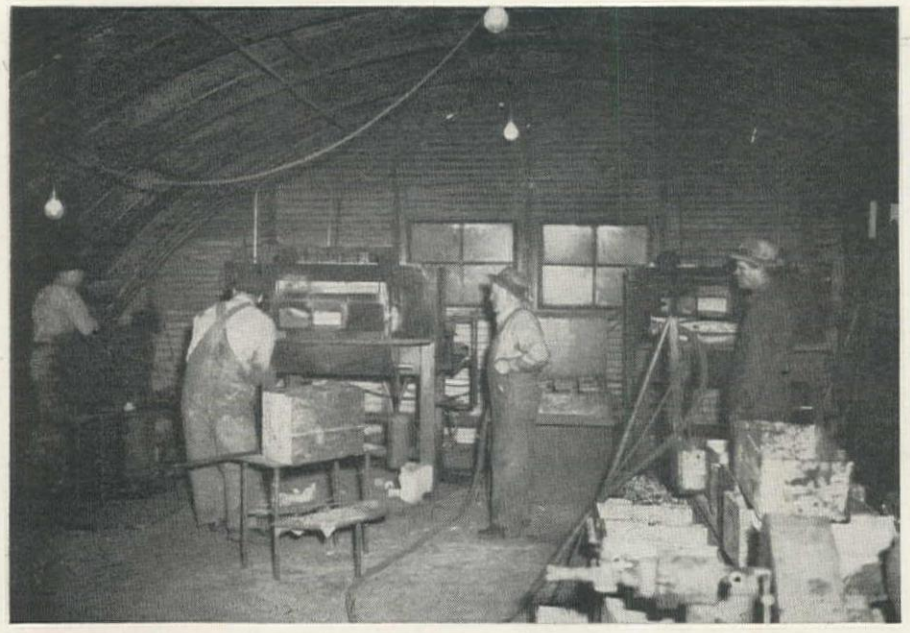
At this time there was little use of air on the west canal except for the operation of the bit sharpening machines and other blacksmith shop equipment, and this did not require the full capacity of the 1,592-c.f.s. compressor. The extra air capacity was added to that provided by the two compressors on the east low canal so that the contractor actually had a total of 4,200 c.f.s. air capacity available on a pipe line more than 11.6 mi. long.

Operating experience with this plant has been quite satisfactory as far as the contractor is concerned. Line losses have been low, and in most instances there has been as much air available as needed for full operation.

The operation of blow pipes in cleaning out drill holes was found to put a rather heavy load on the air supply and had a tendency to slow down the operation of the wagon drills at times. This difficulty was largely overcome by the installation of an auxiliary air receiver tank at the end of the 20,000-ft. pipe line

EIGHT OF FOURTEEN wagon drills used in excavation of the east low canal. A single large hose crosses the right bank from the pipeline to a short section of pipe fitted with numerous hose connections for attachment of individual drill hose lines.





BLACKSMITH SHOP on the west canal is located adjacent to the compressor plant supplying air for its operations. Bit sharpening and drill steel maintenance for both canals is carried out here, using modern machines, furnaces and cooling units.

on the east canal air line. Addition of this auxiliary receiver has balanced the system and materially improved the operation, even though the capacity of the auxiliary receiver is relatively small as compared to the capacity of the receivers at the two compressor plants.

Pipe line maintenance

The principal maintenance activity on the pipe line has been that necessary to prevent freezing. The area of the Columbia Basin is generally subject to below freezing temperatures for three winter months. To reduce the possibility of condensed moisture freezing in the line, Tanner gas is added to the compressed air. An automatic dispensing tank is connected to the line just beyond each receiver tank at the compressor plants.

As a further precaution, the pipe line is equipped with drain valves at all low points. At night the line is bled at each low spot to drain off the accumulated condensed water. Operations during the past winter have been on a 2-shift basis on the east canal. Drilling proceeded on day and swing shifts with all equipment shut down for 8 hr. out of the 24. The compressor plant on the west canal has been operating for only 8 hr. per day, since it is used principally to supply power for the blacksmith shop equipment which is operated on a one-shift schedule.

For the work this coming summer, which will include principally concrete lining of the two canals and construction of various structures, the central air supply system will continue in use. It is planned to use the pipe line to supply air for compacting the fine grade in rock cut sections of the canal, and for vibrating concrete during the pouring of structures on both canals.

Organization

Construction of the irrigation facilities of the Columbia Basin project are being carried out under the direction of the irrigation division of the project. Frank A. Banks is district manager in charge of the entire project, and H. A. Parker is supervising engineer for the irrigation division. Floyd A. Arnold is resident engineer in charge of work on both the west canal and east low canal.

Contract for the west canal was awarded to Winston Bros. Co. and the Utah Construction Co., jointly, on a low bid of $2,871,796 for 6.5 mi. of excavation, lining, and structures. The same organization was awarded the contract for 12.3 mi. of excavation, lining and structures on the east low canal on a low bid of $3,977,000. George Mann is project manager for Utah-Winston in charge of both projects, and J. C. Agnew is project engineer. Roy Harer is general superintendent for the contractor. Ray Wahl is office manager and purchasing agent.

REA Loans Indicate Coming Construction

RECENT LOANS by the Rural Electrification Administration to borrowing agencies in the Western States, to be used to finance construction of transmission and distribution lines, generating facilities and other system improvements include the following:

Arizona

To Graham County Electric Coop., Pima, $26,000 for completion of previously approved construction.

Colorado

To Empire Electric Assn., Cortez, $460,000 for 28.5 mi. of new transmission line, 32.5 mi. of distribution line and completion of previously approved construction.

Kansas

To C. M. S. Electric Coop., Meade, $387,000 for 251 mi. of distribution line and for system improvements.

Montana

To Tongue River Electric Coop., Ashland, $265,000 for 162 mi. of distribution line; to Lower Yellowstone Rural Electric Assn., Sidney, $615,000 for 375 mi. of distribution line and system improvements; to Vigilante Electric Coop., Dillon, $100,000 for system improvements; to Valley County Electric Coop., Glasgow, $200,000 for 129 mi. of line, acquisition of the distribution systems in the towns of Frazer and Oswego, and system improvements.

Nebraska

To Dawson County Public Power Dist., Lexington, $675,000 for 401 mi. of distribution line, system improvements, and completion of previously approved construction.

New Mexico

To Socorro Electric Coop., Socorro, $80,000 for completion of previously approved construction.

North Dakota

To Mor-Gran-Sou Electric Coop., Flasher, $345,000 for 202 mi. of distribution line and completion of earlier construction.

Oklahoma

To Kiwash Electric Coop., Cordell, $100,000 for 12 mi. of transmission line and system improvements.

South Dakota

To Clay-Union Electric Corp., Vermillion, $710,000 for 62 mi. of transmission line, six new sub-stations, and 56 mi. of distribution line.

Texas

To Erath County Electric Coop. Assn., Stephenville, $50,000 for re-lending to members to finance farm wiring and for purchase and installation of plumbing fixtures and electrical appliances; to Cap Rock Electric Coop., Stanton, $135,000 for 99 mi. of distribution line and warehouse facilities; to Pedernales Electric Coop., Johnson City, $265,000 for 146 mi. of line and other improvements.

Washington

To Public Utility District No. 1, Republic, $200,000 for 11 mi. of distribution line and system improvements.

Wyoming

To Shoshone River Power, Cody, $95,000 for 35 mi. of distribution line and for previously completed construction; to Tri-County Electric Assn., Sundance, $300,000 for 26 mi. of transmission line, 56 mi. of distribution line and previously approved construction.

Runoff Forecasts—
1948 Water Supply in Western States



IT'S SNOW today but precious water tomorrow. Surveys of the snowpack lying on each watershed predict assured runoff.

Cooperative snow surveys in the Western States indicate continued short water supplies in the Southwest — March storms have improved the outlook for the Northwest and the Rocky Mountain region — Distribution of runoff is similar to that for 1947

By R. A. WORK
Senior Irrigation Engineer
Oregon Agricultural Experiment Station
Medford, Ore.

and PAUL A. EWING
Senior Irrigation Economist
Soil Conservation Service
Berkeley, Calif.

SHORT WATER SUPPLIES for Arizona, Nevada, and California but plenty for the Northwest and the Rocky Mountain areas is, for the third consecutive year, the prospect seen by the Division of Irrigation and Water Conservation, U. S. Soil Conservation Service.* On the basis of West-wide snow surveys as of April 1, the Division expects, for 1948, a distribution of run-off similar to 1946 and 1947.

A brief analysis of the April records, prepared for *Western Construction News*, resulted in the following forecast. (Similar forecast summaries were published in this magazine in the issues of May 1946 and May 1947):

Arizona

The long-continued water shortage throughout the main irrigated areas still persists. Although snow-stored water on the higher elevations is, in general, equal to any previously recorded high on April 1, it is not enough to overcome the critically low storage in practically all reservoirs. Since available storage is the most important factor in Arizona's irrigation supply, the fact that the total amount of water held in the nine important reservoirs is only 10 per cent of their total capacity has particularly gloomy significance. Apparently another season of heavy pumping from ground storage is in prospect.

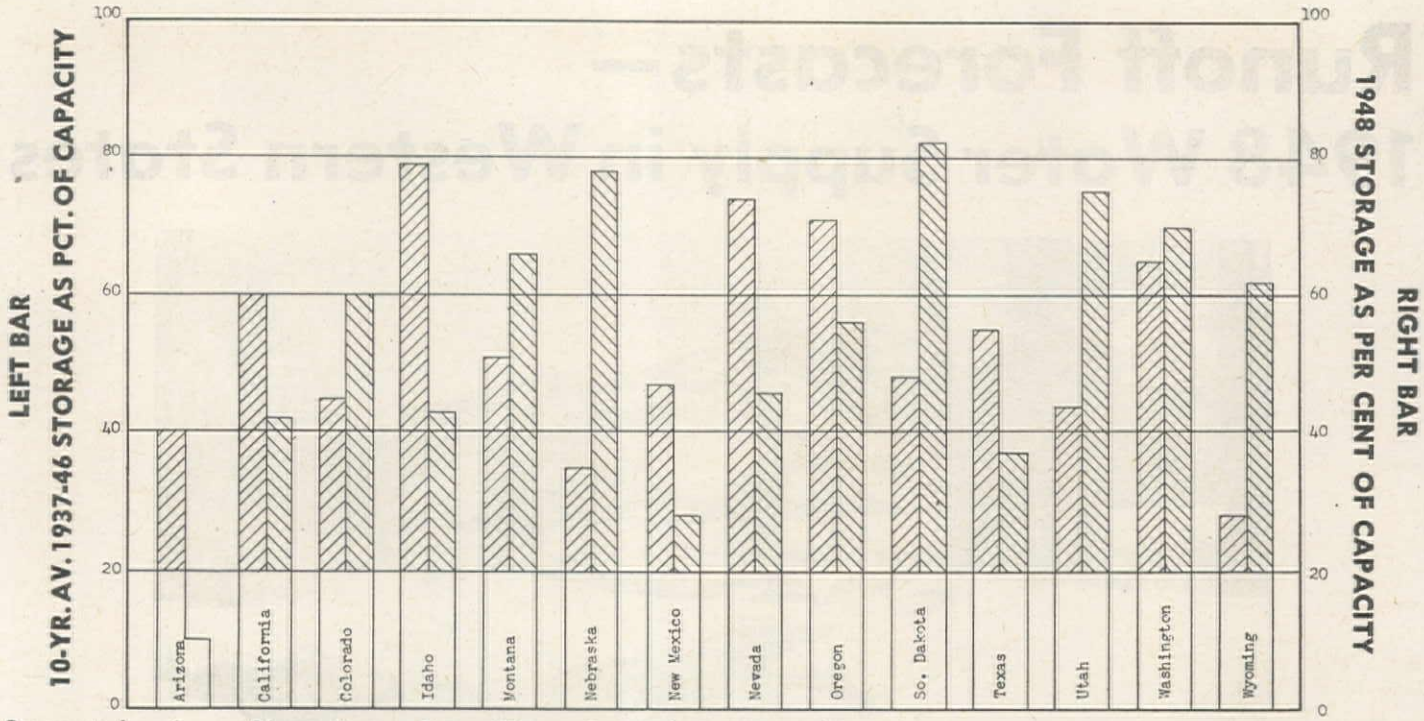
California

Although the State is still faced with a short water year, the outlook improved a lot during March. Snow surveys early in the month showed such a poor pack that the outlook was for a record dry year similar to 1924. However, during March more snow fell than during the three preceding months. Before the end of the month the outlook had improved until a year similar to 1939 could be expected, and by early April, continued improvement had raised the outlook to equal to or better than last year. Many areas received as much snow during the first eight days of April as they normally get during the entire month. Forecasts based on conditions surveyed at the end of March are therefore subject to some additional qualification on the favorable side.

The assured run-off from the combined areas of the Sacramento and San Joaquin Valley watersheds, on the improved basis, is expected to be 51 per cent of normal. Last year the corresponding overall run-off figure was 49 per cent of normal.

Run-off will be relatively better in the Sacramento Valley than in the San Joaquin. For the tributaries of the Sacramento River the average is 56 per cent of normal, while for the San Joaquin River tributaries the average is 49 per

*The Division of Irrigation and Water Conservation is the Federal co-ordinating agency of snow surveys conducted by its staff and many cooperators, including the Forest Service, Bureau of Reclamation, National Park Service, Geological Survey, various departments of the several states (as, for instance, the California Division of Water Resources), irrigation districts, power companies, and others. The Water Rights Branch, Department of Lands and Forests, conducts the snow surveys in British Columbia.



	Arizona	California	Colorado	Idaho	Montana	Nebraska	New Mexico	Nevada	Oregon	So. Dakota	Texas	Utah	Washington	Wyoming
Res. reported	9	24	47	9	17	3	6	7	25	1	2	14	7	8
Capacity of reported res. (1000 ac. ft.)	3396 (b)	2873 (c)	1860	3544	1264 (d)	2241	3658	1375 (e)	2751	198	2844	3350	1082	3013

RESERVOIR STORAGE AS OF APRIL 1, 1948

Not all reservoirs in all States are reported, but enough are reported to give a reliable index of each State's storage supply. Explanation: (b) Most State averages for reported reservoirs are for full ten-year period, but in a few cases reservoirs having shorter records are included. (c) Does not include Narrows (Yuba River), Friant or Shasta reservoirs. April 1 storage in these three reservoirs combined is 3,334,000 ac. ft., which is 78% of their capacity. (d) Does not include Fort Peck reservoir (capacity 19,000,000 ac. ft.); Apr. 1 storage 13,440,000 ac. ft. (e) Does not include Lake Mead (capacity 31,140,000 ac. ft.); Apr. 1 storage approximates 18,620,000 ac. ft.

cent. Last year's comparable figures were 49 per cent for both the Sacramento and San Joaquin Rivers.

Snow surveys from the Kings, Kaweah and Kern watersheds, tributaries of Tulare Lake, indicate 5 per cent less run-off than last year.

With the exception of Shasta and one or two other reservoirs, water stored is less than last year.

Colorado

The outlook is favorable. Summer flow of Colorado River and its tributaries is expected to be from 10 to 30 per cent above normal. Snow cover is well above normal. On most tributaries the snow-water content is slightly above last year but on the San Juan, Animas and Dolores rivers it is substantially greater. Seasonal precipitation over the western slope has been much above average.

On the South Platte drainage, snow cover is slightly less than last year but substantially above the 13-year average. Above-normal flow is expected for all streams in this drainage. Reservoir storage is more than last year; many reservoirs are practically full already. Soil moisture conditions are excellent.

The outlook for the Rio Grande in Colorado is the best in years. Unusually heavy snows during February and March materially improved the outlook in this area. Reservoir storage is in excess of last year and there is a large amount of moisture stored in the soil. Above-normal streamflow is expected but flows will not reach flood proportions unless later weather conditions are abnormal.

Idaho

State-wide prospects are mostly fair, but are slightly better than that for Clearwater River Drainage. An over-all improvement occurred during March, when an unusually heavy fall of snow in the southern mountains overcame the previous deficiency. On all southern drainages having storage facilities the supplies will suffice for irrigation with careful use. In northern areas where the extra heavy pack had previously indicated a possible flood hazard, the danger has been eased by a March snowfall below normal.

SURVEYORS dig into snowbanks too deep for their sampling tubes. Water content tests are made immediately.



Montana

Snow accumulation on the headwaters of Missouri Basin streams continues above average except on the Madison and Milk rivers. Although summer flow of these two streams is expected to be light, in general flows will be from 10 to 20 per cent above normal. Reservoir storage is about the same as last year but substantially above the 10-year average. Precipitation on the plains has been below normal but soil moisture conditions in the irrigated areas range from fair to good.

Nevada

Water for irrigation will be in short supply throughout the State. Run-off from the Sierra will range from 25 to 50 per cent of normal, and from normal to 60 per cent of normal on headwaters of the Humboldt and its main stem. Snow-stored water on the Sierra is generally less than 50 per cent of normal, but a 50 per cent increase in snowfall during March brought the pack on the Humboldt headwater basin nearly up to normal. Reservoir storage is poor, being

only about 45 per cent of last year, and 55 per cent of usable capacity. Lake Mead, however, holds about 115 per cent of last year's storage.

New Mexico

The heavy snows that blanketed southern Colorado late in the winter extended into New Mexico as far south as Santa Fe. Conditions in this area are the best since 1942. Stream flows substantially above normal are expected in the Rio Grande tributaries except Chama River. Snow cover on this watershed is not as good as elsewhere, and storage in El Vado Reservoir is below normal. Elephant Butte storage is also low, but the early run-off will add materially to it. Precipitation has been above normal throughout the area. Soil-moisture conditions are good except in the Carlsbad area and the lower Rio Grande.

Oregon

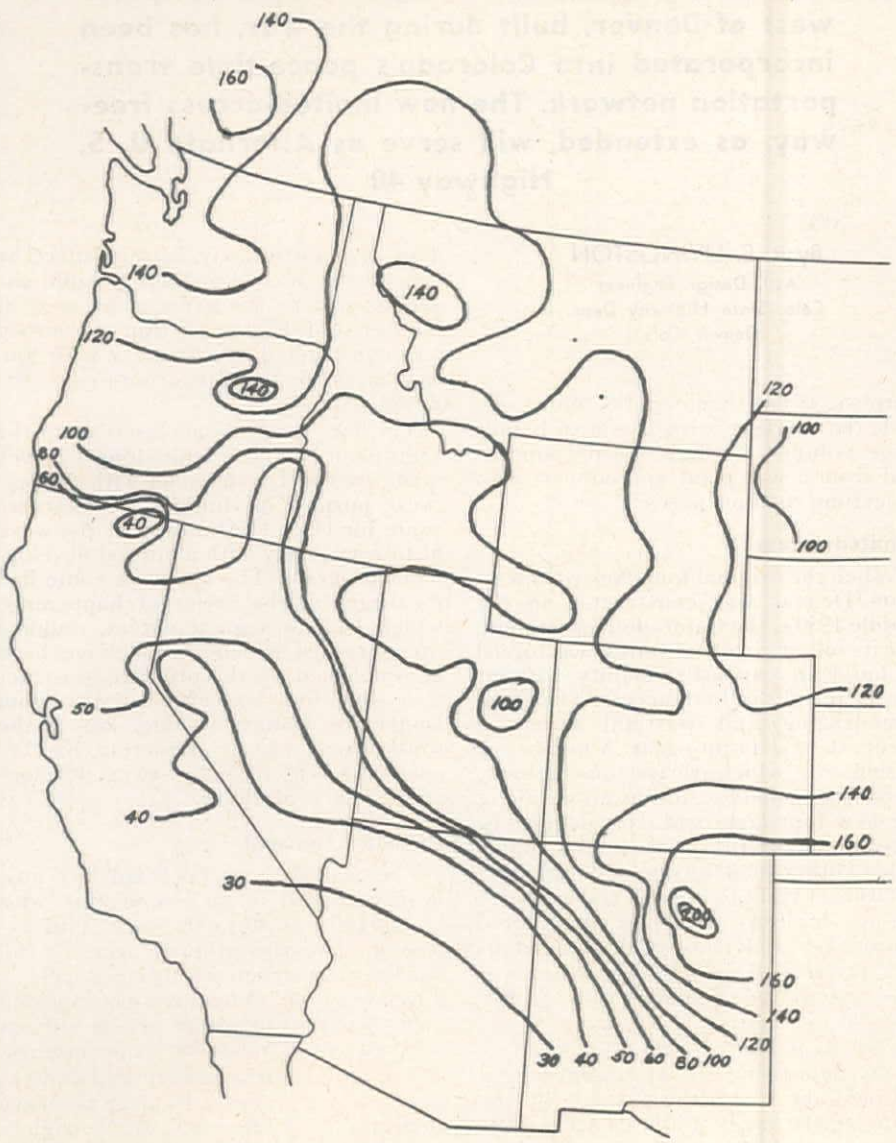
The outlook has improved greatly since mid-winter and 1948 will be comparable to the good water year of 1946 in many areas. All but about three per cent of all irrigated lands have in sight good to fair water supplies with the best supplies provided by storage. Greatly deficient supplies are not expected to be faced by any section although there may be some late-season shortages in some areas. Water stored in all reservoirs is about 20 per cent less than last year, 23 per cent less than in 1946 and 16 per cent less than in 1945. Only 56 per cent of the more important reservoirs are half full or better.

Mountain snow cover is above average on nearly three-fourths of all measured snow courses and is greater than last year at all stations. Watershed soils are much wetter than average, which greatly favors run-off from the snowpack. Cropland soils are generally well wetted, with moisture penetration in the dry wheat lands equalling that of the wet year 1943.

South Dakota

Snow cover on the Black Hills is below average but 10 per cent above last year. Recent precipitation has been deficient and soil moisture conditions are only fair. Storage in Belle Fourche Reservoir is greater than last year by 10,000 acre-feet.

CONTOUR SKETCH of the Western States indicates percentage of the ten-year average stream runoff which may be expected from April to September, 1948. The map is based on snow surveys in all states as tabulated by the Soil Conservation Service.



Utah

Most watersheds will produce run-off sufficient to meet irrigation needs. Practically all streams will discharge at least 80 per cent of the average run-off. Flood discharges of most streams threaten to be enough higher than a year ago to damage some irrigation systems and farm lands during the spring months. Late-season supplies should hold up fairly well. Storage generally is at high levels, with the principal reservoirs at 75 per cent of capacity. Utah Lake and Bear Lake levels are at the highest pre-season points reached in many years, water having spilled from Utah Lake to Great Salt Lake before April 1. Storage users should therefore have adequate supplies through the season and many reservoirs will carry water over to 1949.

Washington

Enough water will be available for all purposes, including hydroelectric power generation at Grand Coulee and Bonneville. The possible flood hazard indicated in February has, however, been eased by lower than usual March snowfall. The April-September flow of Columbia River at The Dalles is forecasted at 94,000,000 acre-feet, which compares with a 10-year maximum of 112,591,000 acre-feet (in 1943) and a minimum of 57,320,000 acre-feet (in 1944).

Wyoming

Flows of all streams east of the Rocky Mountains will be slightly above normal. On the west slope of the Rockies conditions are not so favorable and it is anticipated that the flow of the Green River will be 20 per cent below normal. Snow cover is less than last year but somewhat greater than normal, except on the Green River. Because of the large carryover storage in the North Platte reservoirs an ample supply of stored water is assured. Soil-moisture and crop conditions are generally good.

British Columbia

The 1948 water-supply outlook for southern British Columbia is very good, with above-normal runoff expected from all streams in the Kootenai-Columbia Basin. The probable runoff from the Okanogan watershed will be about normal.

The North Thompson River at Barriere and the inflows to Powell Lake and Stave Lake, will be well above normal.

Owing to a late spring, a flood-potential exists on the Kootenay and North Thompson Rivers, and at Powell Lake.

At all snow courses, the soil beneath the snow pack is moist and unfrozen.

Detailed forecasts available

Reports detailing the results upon which the foregoing summaries are based may be obtained by addressing the Division of Irrigation and Water Conservation, Soil Conservation Service, College Hill, Box D, Logan, Utah. Requests should identify the state or drainage basin about which information is wanted.

Colorado Utilizes War-Born Highway



THE NEW FREEWAY heads directly west from Denver toward the first range of the Rockies. It remained unsurfaced during the winter, serving heavy traffic for 5 months, without harmful results because of a palliative asphaltic treatment.

Access road to the Remington Arms Co. plant west of Denver, built during the war, has been incorporated into Colorado's peace-time transportation network. The new limited-access freeway, as extended, will serve as Alternate U. S. Highway 40

By R. E. LIVINGSTON
Asst. Design Engineer
Colo. State Highway Dept.
Denver, Colo.

WAR, AND ALL THINGS connected with war, are basically wasteful. It is for this reason that many men in the highway construction business feel quite proud of the fact that a number of highways built to serve war establishments have become valued additions to the network serving normal highway traffic. In the understandable haste to forget all things even remotely connected with the war, many are prone to overlook the true value of these war-born roads.

At the onset of the war, the government proposed construction of a plant directly west of Denver to manufacture small arms ammunition. The plant was to be operated by the Remington Arms Co. As was the case in practically all similar instances, it was necessary to find a large, undeveloped area to care for the size of the proposed establishment. Since it is a corollary well known to all highway engineers, that development springs up the minute a new road is under construction, it is not at all surprising that, in order to find an area of the size required for the arms plant, it was necessary to move away from the existing highway network. This naturally left the proposed site without the necessary means of ingress and egress, and necessitated the immediate construction of a new highway. Fortunately, the area selected was adjacent to a location through which the Colorado State Highway Department had contemplated a new development, and surveys were available. The highway was duly constructed and served in a most gratifying manner the purpose for which it was built.

The fact that a facility has served the purpose for which it was constructed does not mean that it has outlived its usefulness. It merely means that a way must be found to put the facility to another use consistent with its original purpose. What then could be more sensible than to take a road built to handle large volumes of high speed traffic to and from a war plant and convert it to peacetime road purposes?

Limited access

When the original four-lane road west from Denver was constructed in the middle 1930's, the Colorado Department, like its fellows in other states, was forced to build an expensive facility without the legal right to limit access. The usual discouraging and wasteful series of events then went into gear. A number of businesses, which thrive on highway traffic, immediately sprang up all along the new four-lane road. Hot dog sands, entertainment enterprises, and a multitude of other small businesses, each with a statutory right to ingress and egress to the new highway, promptly constructed approaches and thus made hazardous and slow a road the intent of which was to accelerate the movement of large volumes of traffic.

The one immediate and salutary effect of the depressing set of circumstances outlined above was the passage, by the State legislature, of a limited access law. This law, fortunately, was in effect by the time it was necessary to build the access road to the arms plant west of Denver, and the new portion of the road was constructed as a freeway with limited access features incorporated in the design.

The fact that this access road to the arms plant had been built along a survey made by the Department with the express purpose of finding an alternate route for U. S. Highway 40 to the west, fit in very nicely with a normal development program. The alternate route had its origin in the series of happenings which had, to a great extent, nullified the purposes which should have been accomplished by the original construction of the four-lane highway west from Denver on Colfax Avenue. This is the route which, after construction, had become the center of the string development described above.

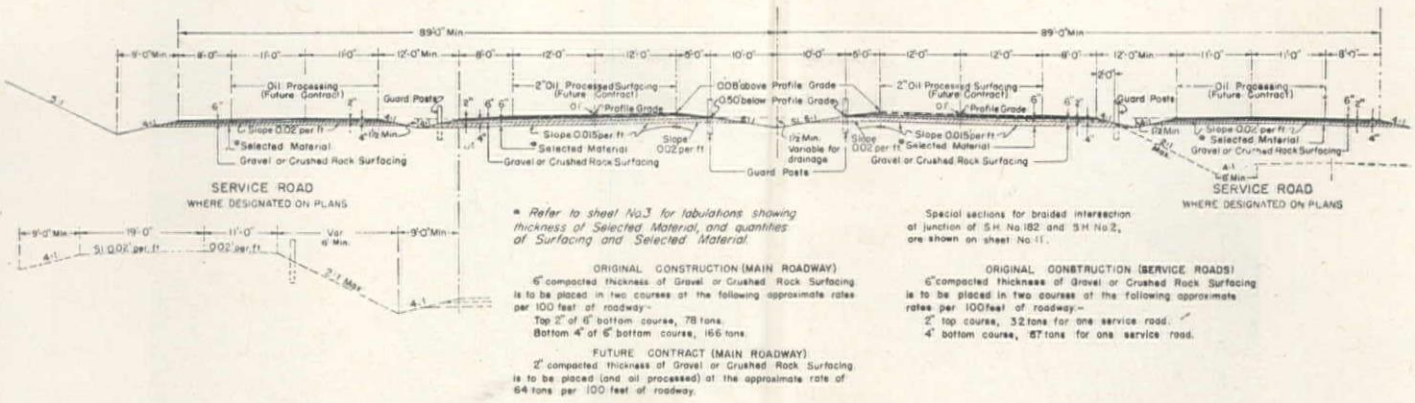
Present extension

The war-born access road has now been extended to an intersection with U. S. Highway 40 to the west. This extension, like the original access road, has been constructed four lanes wide as a freeway with all features incorporated in its building to insure access only at selected points and under proper control.

The extension indicated was built as a project for grading, drainage and base surfacing, by J. H. and N. M. Monaghan

PLATE 2

TYPICAL CROSS SECTION OF IMPROVEMENT



* *Refer to sheet No.3 for tabulations showing thickness of Selected Material, and quantities of Surfacing and Selected Material.*

ORIGINAL CONSTRUCTION (MAIN ROADWAY)
6" compacted thickness of Gravel or Crushed Rock Surfacing is to be placed in two courses at the following approximate rates per 100 feet of roadway:-
Top 2" of 6" bottom course, 78 tons.
Bottom 4" of 6" bottom course, 166 tons.

FUTURE CONTRACT (MAIN ROADWAY)
2" compacted thickness of Gravel or Crushed Rock Surfacing is to be placed (and oil processed) at the approximate rate of 64 tons per 100 feet of roadway.

Special sections for braided intersection at junction of S.H. No.182 and S.H. No.2, are shown on sheet No.11.

ORIGINAL CONSTRUCTION (SERVICE ROADS)
6" compacted thickness of Gravel or Crushed Rock Surfacing is to be placed in two courses at the following approximate rates per 100 feet of roadway:-
2" top course, 32 tons for one service road.
4" bottom course, 67 tons for one service road.

and Associates, and was completed in the fall of 1947, too late to allow construction of the asphaltic wearing course. The typical section employed in the construction of this section is shown on the accompanying plate.

Upon completion of the work required under the original contract for the extension, the Department advertised for bids for placing a two-inch oil mat on the newly constructed project. The Monaghan company was the successful bidder and is at this time preparing to start work as quickly as weather conditions are favorable.

In order to allow the newly finished grading and base course surfacing project to serve traffic during the winter months without harmful results to the base course, a palliative asphaltic treatment was applied to the base. The use of such a palliative treatment to serve rather heavy traffic for a period of months was something new to the Colorado department. The results achieved have been most gratifying. The picture of the highway, looking to the west and the first range of the Rockies, shows the highway in late March, after having been in use for a period of about five months. It will be noted that in spite of the fact that the road has just passed through one of the most severe winters in recent history, it is in first class condition. It is anticipated that the Colorado department will resort to this type of treatment with greater frequency in the future to preserve surfacing projects finished in the late fall, and which must pass through a winter season prior to the time that the wearing course can be placed.

Depressed center strip

The typical section shown indicates a depressed median strip. This particular feature of the new construction is deserving of comment. At the time the original access road was built, a raised median was employed. This raised median was to be defined by a concrete curb and gutter and was to be planted with low shrubs. Because this project was built during the war, the curb and gutter were omitted in order to conserve strategic materials. The omission has proven to be a headache from a maintenance standpoint. Drainage water has collected at the edge of the oil mat adjacent to the raised median strip, resulting in a softening of the subgrade at this point, and progressive destruction of the paved surface. In order to rectify this condition and to bring the road to a consistent design standard, the department has recently awarded a contract to the Latimer Construction Co. of Denver for work which will include curbs and gutters where necessary on the city type section, and for excavation of the median at all other points.

The completion of the two active contracts held by the Monaghan and Latimer companies will provide Denver with a freeway connection to trans-continental U. S. 40 to the west, and a war-born access road will take its place in the peace-time transportation network of the State of Colorado.

Report Adverse to Toll Plan for Boulder Road

AN ENGINEERING study of the proposed multiple-lane, short-route highway between Denver and Boulder, Colo., indicates that it could not be financed on a self-liquidating basis as a toll road. The Kansas City firm of Howard, Needles, Tannen & Bergendorf, Consulting Engineers, have suggested that the highway might be built as a regular project, financed by State and Federal funds.

As a result of the report, the possibility presented itself that the Colorado legislature might move to amend the law which it passed recently calling for construction of the highway as a toll road. The report pointed out that probable net revenues of $259,000 a year to be realized from toll charges would fall $86,000 a year short of the amount necessary to amortize the project over thirty years and pay operating and maintenance costs.

Probable construction cost for the highway was estimated at $5,900,000. During a 30-yr. period, the proposed highway would return an estimated total of $42,800,000 in direct benefits according to the estimate, more than six and one-half times the cost of its construction and maintenance over the period. These savings were estimated as savings in vehicle miles of travel and time for motorists traveling between the two cities and savings from reduced accident rates as the major items.

Mark U. Watrous, Colorado State Highway Engineer, said the study was based on data accumulated over a period of months by the planning division of the department as well as by spot traffic counts by the firm.

Helicopter Used for Mountain Survey Work

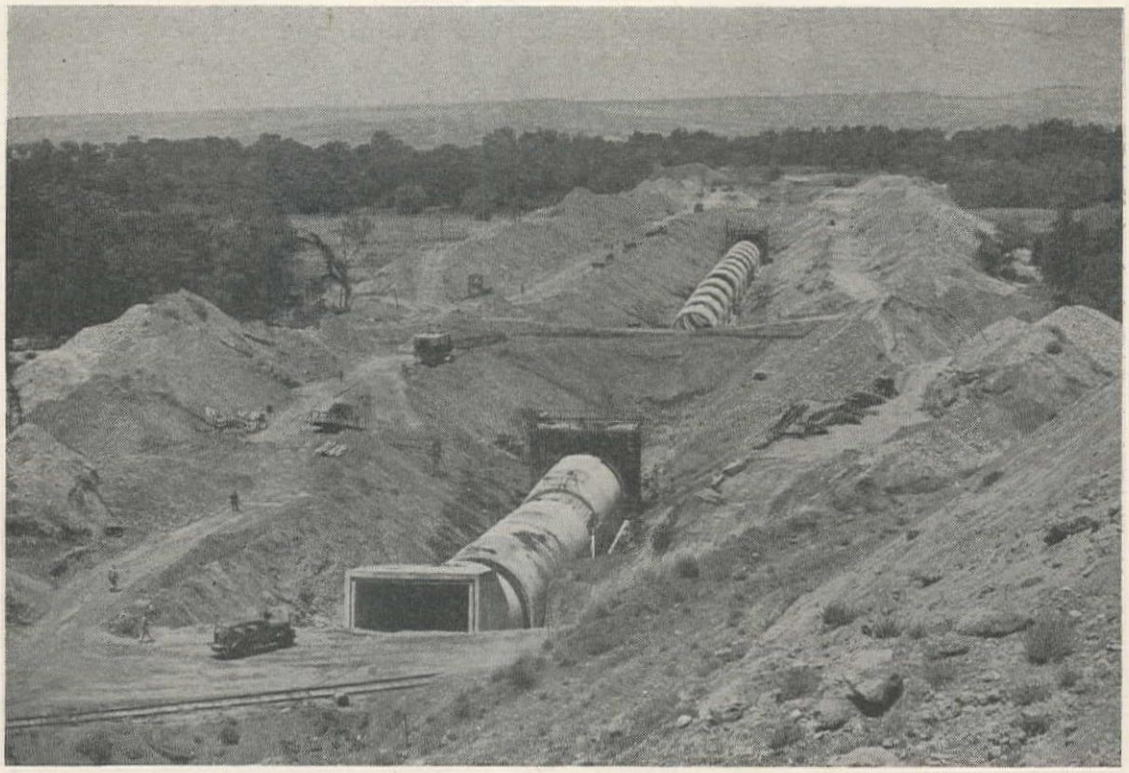
A HELICOPTER is proving to be a satisfactory piece of equipment for the transportation of surveyors and surveying equipment into remote regions of the Colorado Rocky Mountains. The U. S. Geological Survey, with headquarters in Denver, Colo., has a helicopter



under contract from the Fabick Aircraft Co. of St. Louis, Mo. in order to determine the feasibility of using the machine for carrying surveying parties into the rugged and inaccessible country.

Operations at present are confined to triangulation work in the establishment of horizontal control preparatory to topographic map compilations. It has been found that stations can be occupied within a few minutes using the helicopter that otherwise would take many hours of hard walking and climbing to reach. The photo shows the machine resting on the summit of a rocky promontory where a target triangulation signal has been set up.

LATEST REPORT on the status of the proposed Loveland Pass tunnel through Colorado's Continental Divide is that it could be built for $2,700,000, much less than originally estimated. The cost estimate was prepared by the Loveland Tunnel Committee, a group of Eastern and Western Slope backers of the project.



KINGS RIVER SIPHON, biggest structure along the canal's course, siphons the water 3,315 ft. under river and railroad.

Friant-Kern Canal—
Myriad of Huge Structures Involved

The canal, which will be the longest and third largest in California and the main artery to the south in the Central Valley, requires hundreds of appurtenant structures including long siphons, wasteways, cross-drainage facilities and bridges

HUGE SIPHONS, numerous bridges, overchutes, culverts, drainage inlets, wasteways, and heavy excavation are involved in construction of the Friant-Kern Canal, a key feature of the California Central Valley Project. The hundreds of appurtenant structures, chief of which are the long Kings River, Little Dry Creek and Big Dry Creek Siphons, are expertly designed by Bureau of Reclamation engineers to protect the canal from storm water, to by-pass streams, rivers and highways, and to underpass railroads.

The perspective maps accompanying this article show the route of the canal as it skirts the Sierra Nevada foothills southerly from Friant Dam a distance of 156 mi. to a point near Bakersfield, and they serve to locate the principal structures and lankmarks. This huge canal is one of the uncompleted features of the ultimate Central Valley Project plan. It will serve as a main southern artery of the entire C. V. P. system, which is intended as an extensive plan to regulate the waters of the Sacramento and San Joaquin Rivers, this system extending from the headwaters of the Sacramento River in the north to the drainage area of the Kern River in the southern extremities of the San Joaquin Valley.

Central Valley Project

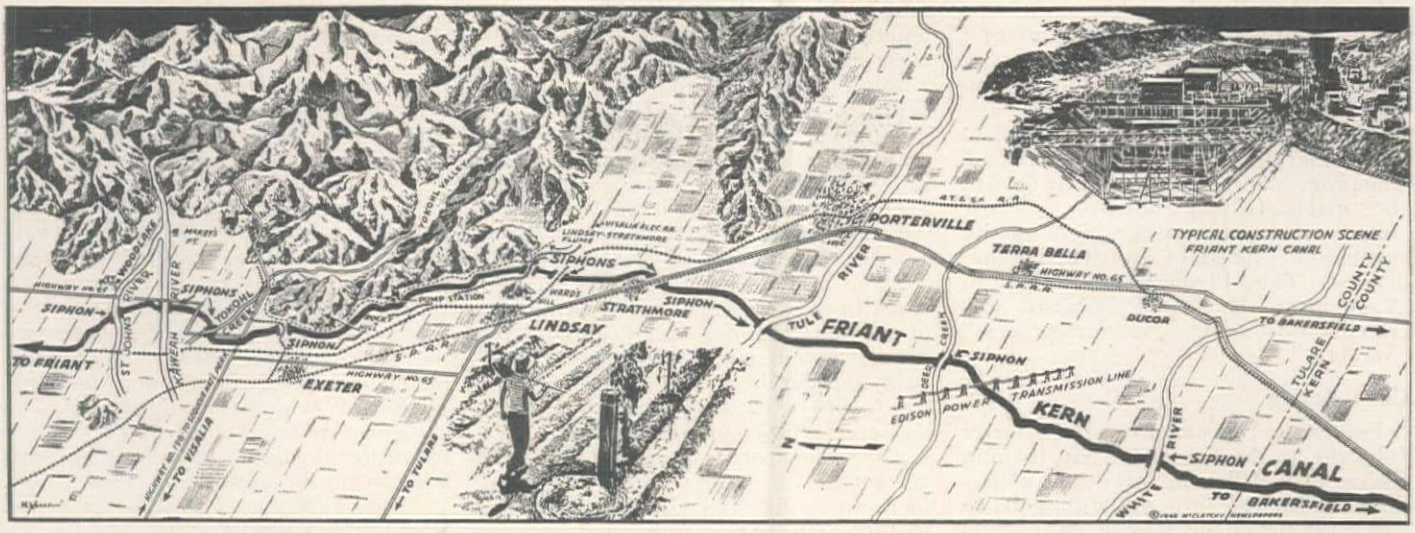
A review of the C. V. P. features indicates the place of the Friant-Kern Canal in the over-all plan. The Sacramento River, flowing from the north, and the San Joaquin River from the south meet in a common delta near Stockton, mingle in a myriad of channels, and issue together into San Francisco Bay. When the Central Valley Project was started, there was plenty of water in the valley, but it was in the wrong places and came at the wrong times. The Sacramento River had too much water and the San Joaquin, too little. The problem was to pour the Sacramento's surplus into the San Joaquin and, at the same time, control both rivers so that they would be at a year around usable depth.

The large reservoir at Shasta Dam, located north of Redding, will check the Sacramento River floods and will store the surplus water for irrigation purposes. The Delta Cross Channel below Sacramento will divert this surplus water to the pumping plants of the Contra Costa and Delta-Mendota Canals. The Contra Costa Canal, starting at Rock Slough, will serve an industrial and agricultural region as far west as Martinez. The Delta-Mendota Canal, starting near Tracy, will bring a new water supply up the San Joaquin Valley as far as Mendota to serve lands which are now irrigated from the San Joaquin River.

This exchange of water will make possible the storage of San Joaquin River water behind Friant Dam near Fresno for diversion into the Friant-Kern and Madera Canals. Madera Canal, already constructed, extends northerly toward the Chowchilla River, and the Friant-Kern Canal will carry water south to the Kern River near Bakersfield.

Canal one of largest

Friant-Kern Canal, which will be the longest and third largest canal in California, is exceeded only in size by the All-American Canal and the Delta-Mendota Canal. About 85 per cent of the canal will be concrete-lined, and the total cost may exceed $50,000,000 at present



PERSPECTIVE MAP shows canal route south from the Kaweah River into highly productive land 120 mi. from Friant Dam. The map was prepared by L. E. Cramer, Bureau of Reclamation Office Engineer at Friant, and Milt Young, artist for the *Fresno Bee*.

day prices for the canal work and the many other structures involved. When completed it will furnish water to lands not now irrigated and supplemental water to lands inadequately supplied for a total irrigable area of 1,000,000 ac. in Fresno, Tulare, and Kern Counties. This is a region famous for its raisins, table grapes, sweet wines and other fruit and nut crops. The first 71.2 mi. of the canal, extending from Friant Dam south to the Kaweah River (see map) is near completion, and an additional 46 mi. to the south will soon be under contract.

Following a unit of water

The design of the Friant-Kern Canal and the many large appurtenant structures along its route can be described by accompanying a hypothetical unit of water from the headwaters of the San Joaquin River as it is impounded and discharged to follow its course down the canal. The river flows out of the high Sierra Nevadas south of Yosemite National Park into Millerton Lake, the impounding reservoir at Friant Dam. Friant Dam, a straight gravity-section concrete structure rising 320 ft. above the foundation and extending 3,430 ft. from end to end on top, ranks among the largest in the world. The dam was completed on June 16, 1942, with placement of the 2,000,000th cu. yd. of concrete. The storage capacity of the reservoir is 518,000 ac. ft.

From Millerton Lake, the unit of water could be diverted into any of three courses—back into the San Joaquin River through outlet pipes or over the spillway in the center of the dam, into the Madera Canal on the north side of the river canyon, or into the Friant-Kern Canal on the south side. The Madera Canal, with a diversion capacity of 1,000 sec. ft., ends at a branch of the Chowchilla River north of Madera.

Work on the spillway section of Friant Dam was suspended at the end of November, 1942, with the embedded metalwork and piping for the three spillway drum gates and control mechanism already installed. Drum gates, 100 by 18 ft., are now placed between the spillway pier faces. The installation of drum gates raised the maximum water surface in Millerton Lake to an elevation of 578 ft. and increased the storage capacity by 83,000 ac. ft.

Stilling basin

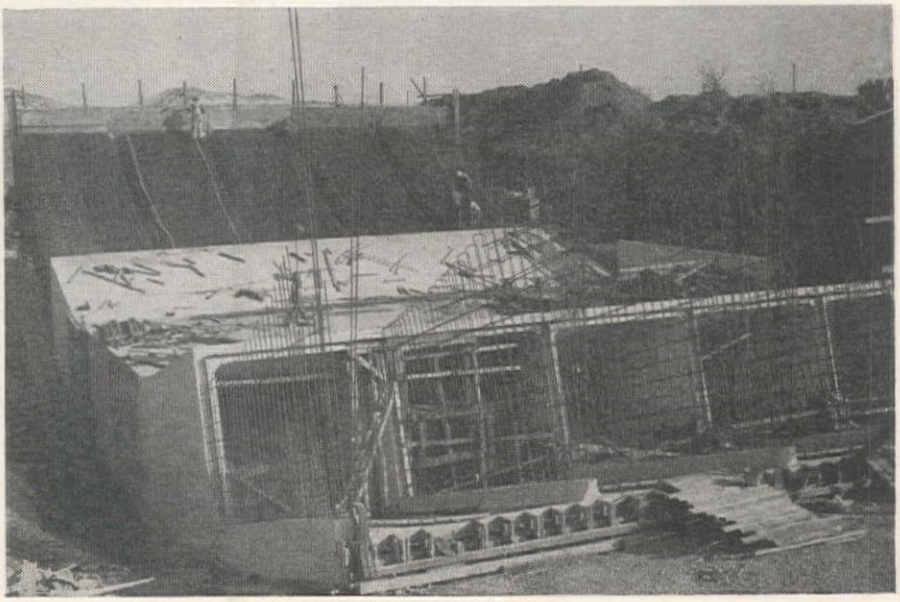
The hypothetical unit of water, designated to be discharged into Friant-Kern Canal, will enter a 600-ft. long stilling basin through four 110-in. inside diameter outlet valves. Flow in the pipes is controlled by 96-in. diameter valves, hydraulically operated. Elevation of the valves is at 114 ft. below the maximum water elevation in the reservoir contrasted with the elevation of the river outlet valves at 220 ft. below this maximum water surface.

The stilling basin consists of a concrete box section 50 ft. wide which narrows the first canal cross section at Sta. 6 + 10 with the side slopes in the transition section varying from vertical to the 1¼:1 side slopes of the canal. The depressed section up to the catch-basin, located at Sta. 3 + 14, terminates in a wall 5½-ft. high. Three 4-ft. by 12-ft. right triangle piers are built across the stilling basin 60 ft. beyond the catch basin to support the walkway across the basin.

"Vacuum-concrete" process used

All of the surfaces of the floor and the inside of the walls of the stilling basin were constructed using the "vacuum-concrete" process in accordance with recommendations of Vacuum Process, Inc., Philadelphia, Pa. This method, which consists of the use of vacuum mats placed over the newly-placed concrete, removes excess moisture from the top ⅛-in. to ½-in. layer, brings the fines closer together in the concrete and could be described as "case-hardening." It was used at the stilling basin area to provide a more durable type of concrete surfacing and help protect it from the wearing action of the discharge from the needle

TYPICAL FIVE BARREL siphon, of which there are many along the canal route ranging from 150 to 400 ft. in length, has barrels approximately 12 ft. square. The siphons will carry canal flow under main highways, railroads, and creeks subject to flooding. Parabolic curve design at inlet headwall reduces hydraulic losses.



valves and turbulence in the basin.

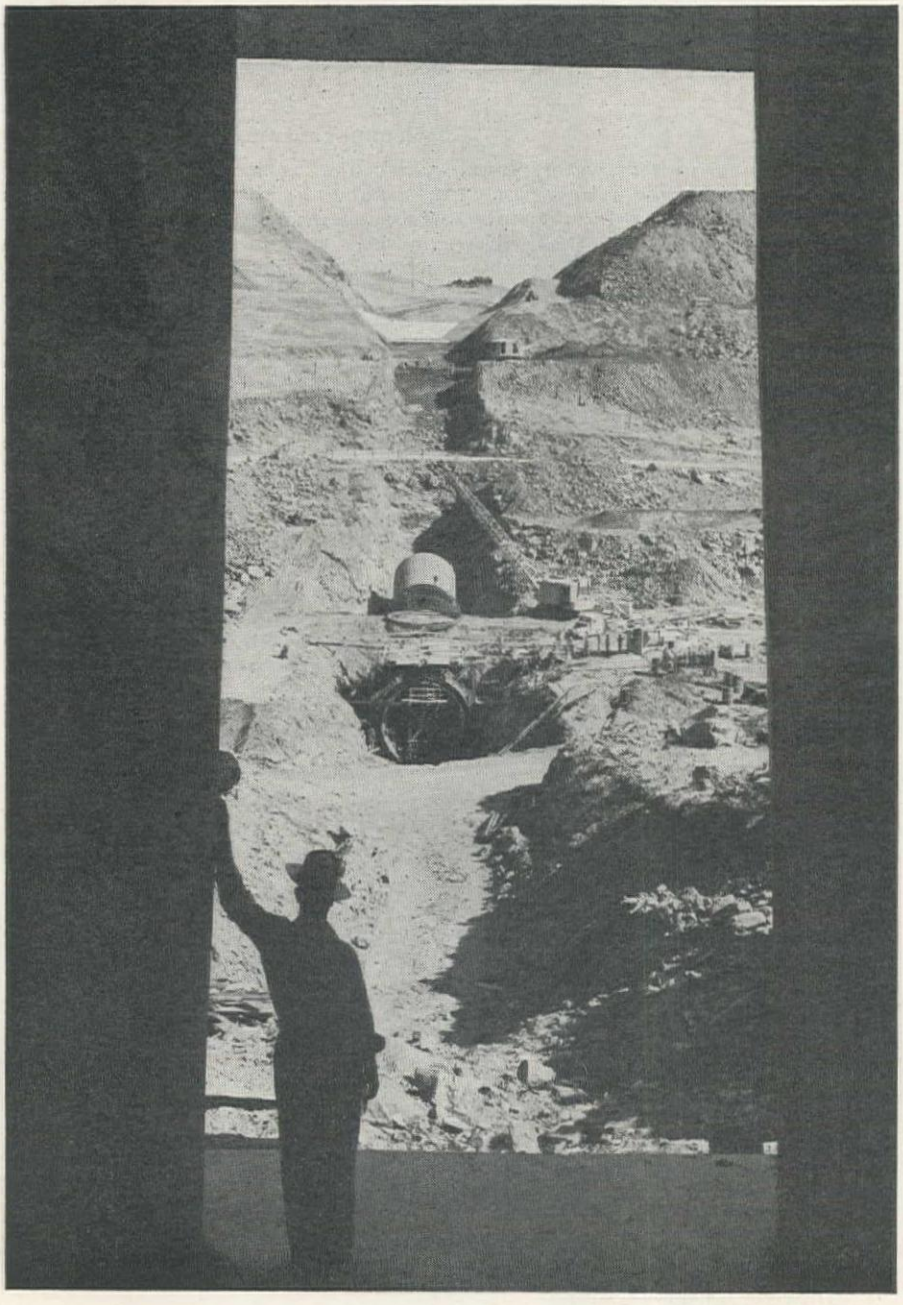
The Bureau of Reclamation first tested the "vacuum process" at Grand Coulee Dam and on the slope and apron of the spillway section of Shasta Dam. At these locations, cores were tested to determine the efficacy of the method. The process has been extensively used in the eastern United States on specially suited jobs where either high quality surfaces or speed of construction are desired. The Pentagon Building in Washington, D. C., for instance, was constructed using "vacuum-process" concrete.

Canal design

Following the unit amount of water from the headwaters of the San Joaquin River into Millerton Lake and subsequent discharge into the stilling basin where the turbulence is reduced, it would now pass through the transition into the first reach of the canal. The greater length of the canal is designed as a concrete-lined section, 80 ft. across the top with a bottom width of 36 ft. and a total depth to freeboard of 17 ft. 6 in. It is designed for a normal capacity of 4000 cu. ft. per sec. and a maximum capacity of 5000 cu. ft. per sec. with a grade of about one foot in 10,000 ft. The 3½-in. concrete lining is being placed on the sides of the canal at a 1¼:1 slope.

Some reaches of the canal will be earth-lined due to the particular nature of the soils encountered. To the south, the canal route passes through soils that have considerable expansive action when wet to the extent that they would heave and crack the concrete lining. In these reaches, the canal is designed 115 ft. across the top with a bottom width of 64 ft. and a depth of 17.32 ft. The grade in the earth-lined sections will be 4 in. per mile.

LITTLE DRY CREEK Siphon construction viewed from inside the transition structure looking downstream shows barrels in place at low point of siphon. The 22-ft. I. D. barrels, 25 ft. long, were constructed in place using collapsible forms.



The original design of the canal lining called for the installation of reinforcing steel with the use of only two longitudinal contraction joints beside the transverse joints placed at intervals of 15 ft. The shortage of steel caused some alteration in this plan. Under the same exigency, part of the Madera Canal had been placed with no reinforcement. This section was given close technical observation. On the basis of these examinations and examination of other smaller canals which had been placed with no reinforcement and had remained in service for better than 25 years, it was determined that canal lining could be made serviceable without reinforcement. The canal is now being constructed with six longitudinal joints, two on either slope and two in the bottom.

Groundwater drains

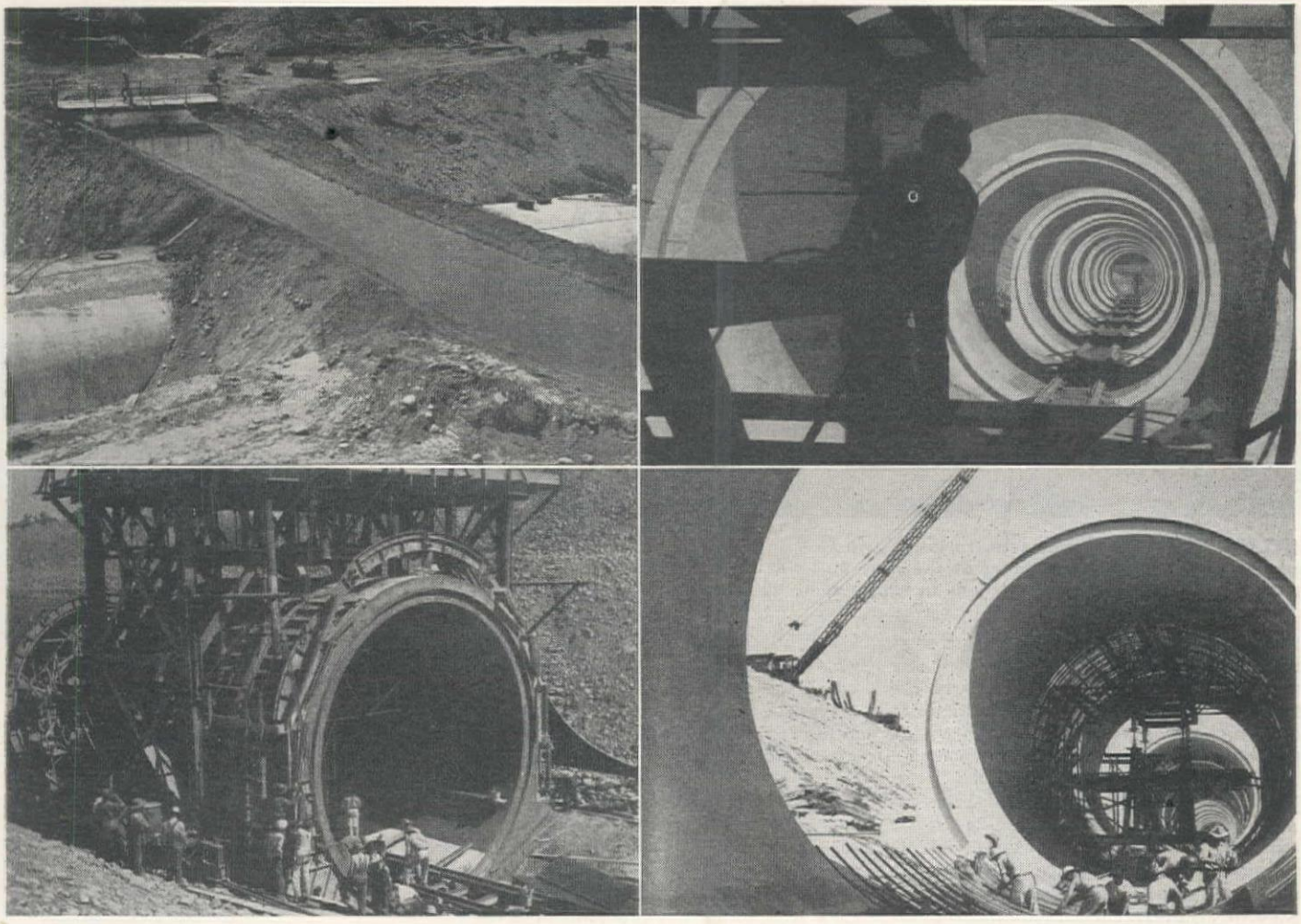
Since the canal is snugged in close to the foothills, groundwater pressure along some sections is high. Cast iron "goose-neck" outlets with flap valves are built into the bottom of the canal to relieve the water pressure in the 6-in. sewer-type drains under the canal lining. An unreinforced concrete bullet-shaped protective hood is placed over the offset outlet bends. These underdrains are specified to be placed with at least one outlet in every 500-ft. length of canal. Where underground water pressures are high, varying numbers of underdrains are placed in proportion to the pressure. A novel method was devised for temporarily checking flow in the drain while freshly cemented joints were hardening in the newly placed goose-neck. An inflated rubber balloon with long stem projecting to where it could be reached held the water back.

Peter Kiewit Sons' Co., Omaha, Neb., were awarded the $1,163,340 contract for the first construction schedule on the canal from Friant Dam to Sta. 301 + 60. This schedule, including farm bridges, a number of typical culverts to carry storm water under the canal and a typical overchute to transport storm water over the canal section, is completed and carried the canal construction up to the first major structure, the 968-ft. long Little Dry Creek Siphon.

Little Dry Creek Siphon

Little Dry Creek, a natural collection drainage channel out of the foothills, has a large flood flow, so a siphon was designed to plunge under the creek and a main county highway as well. The huge siphon is designed as a circular reinforced concrete barrel with an inside diameter of 22 ft. and a shell thickness of 22 in. The loss of head from inlet to outlet is 2.27 ft. Low point in the siphon is near the center directly under the Little Dry Creek channel and is a 109.39-ft. drop from the inlet invert. A total of 28 barrel sections, each about 25 ft. long, and four shorter sections where vertical curves occur, make up the length of the siphon.

Bechtel Bros.-McCone, San Francisco contractors, received the $267,805 contract for construction of the siphon and wasteway just ahead of the siphon inlet. This price was for work only and did



RIVER FLOW was diverted through a temporary channel, upper left, during construction on the Kings River Siphon. Right, track for jumbo templates was left in place until all barrels were placed. Gantry frame supports outside forms, lower left, placement of steel in progress, right.

not include the cost of materials. The company is now putting the final touches on this job. The barrels were constructed in place with the inside form, consisting of a template of timber members covered by thin sheet steel and resting on rails inside the pipe, and the outside forms having two hinges, one at each side, to collapse in moving forward for the next concrete placing. The inside forms were constructed to cover only the arch and sides of the invert, leaving the bottom 60 deg. of the inside circumference to be placed without forming. The heavy hoop reinforcing bars for the siphon were butt-welded at the job site prior to placement.

Wasteway design

Wasteway structures at both the Little Dry Creek and Kings River Siphons are provided just ahead of the inlets as a safety feature in case of canal breaks downstream, and also to divert water into the respective channels for natural irrigation. The wasteways are designed large enough to divert the entire flow in the canal. At Little Dry Creek, the two 16-ft. by 17½-ft. radial gates at the wasteway inlet, which remain closed during normal use of the canal, are to be electrically operated since the job is close to power lines. At the Kings River, 4 by 7-ft. top seal radial gates enclosed in a float well and with a float operated gate hoist are used at the wasteway inlet.

At the Little Dry Creek Siphon, three radial gates of the same size as the wasteway gates are installed at the siphon inlet to close off the canal flow for diversion into the wasteway. The transition from the canal into the siphon is an open trapezoidal section 90 ft. long. An air relief valve, consisting of a 12-in. gate enclosed in a reinforced concrete chamber built into the top of the siphon, is provided at the low point of the siphon under the creek channel.

Peter Kiewit Sons' Co. also received the contract for construction of the canal and a number of structures between Little Dry Creek and Kings River which includes the 356 ft. long Dry Creek Siphon, on a total bid of approximately $5,000,000. It is expected that all of the work on these schedules will be completed by July 1 of this year.

FLAP VALVES in the canal bottom relieve the groundwater pressure in the underground drains. Cast iron "gooseneck" valves connect valves and drains.

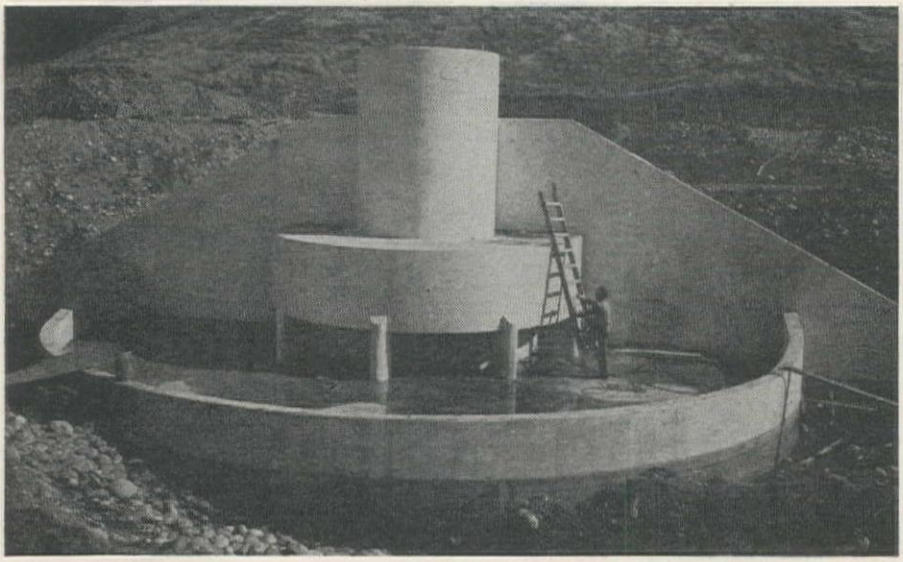


Typical five-barrel siphon

The Dry Creek Siphon is one of the typical five barrel siphons of which there are many along the canal route to carry the flow under railroads, main highways and creeks subject to flooding. The structures vary from 150 ft. to 400 ft. in length depending on the particular need at the site, and have generally the same cross section measurements.

The typical siphons north of Kaweah River consist of five rectangular barrels, 12 ft. wide and 12 ft. 4 in. deep, the interior walls being 9 in. thick and the top slab 12 in. thick. The canal slopes vary from the 1¼:1 slope to vertical in the open-type transitions with a corresponding increase in the floor slab width from the 36 ft. in the canal to 73 ft. in the siphon. The wide mouth of the siphon is designed to reduce hydraulic losses.

An example of the practical value of the research activities at the Bureau of Reclamation's hydraulic laboratories in Denver, Colo. is apparent in the design of the five-barrel siphons. A slight loss of head due to friction, turbulence and other causes is found in any siphon. In the typical siphon under discussion, for instance, the loss of head in the 350 ft. distance is computed as 0.39 ft. Previously, in the design of similar siphons, the inlet headwall at the beginning of the cover slab was designed merely with a straight drop and a right angle turn into



CYLINDER GATE, siphon-type turnout structure on the Kings River Siphon, is placed under the south channel of the river and will be used for release of additional irrigation water downstream to supplement natural flow in the river.

the siphon interior. As the result of tests in the Denver laboratories using plastic models under simulated conditions, the siphons on the Friant-Kern Canal south of Kings River were re-designed with a parabolic curve replacing the right angle turn.

It is estimated that a total accumulated gain of one foot of head was made by using the parabolic curve design. It is impossible to estimate the worth in money of this saving in head, but it is easy to visualize the effect on the overall design of the canal, since it enabled location of the canal closer into the foothills, rendering more land irrigable by gravity.

Cross-drainage structures

Three different types of structures occur in the Kiewit schedules prior to the Kings River which illustrate the varying methods used to accomplish the cross-drainage of flood water and small creeks across the canal. The selection between the different types depended on the topography and amount of flow at the particular location.

At locations where the expected maximum flow in a natural drainage area was small and the high side of the canal was not at the bottom of a steep slope, concrete box culverts passing directly under the canal section were used. Where the high side of the canal was at the bottom of one of the steep foothills, an overchute was used at the point where the natural drainage crossed the canal as the best means for cross-drainage.

These typical wash overchutes consist of a rip-rapped collection basin with wing-walls to concentrate the flood flow leading into an open type reinforced concrete box flume section. The flume is supported on two concrete piers resting on footings set below the canal bottom. The overchutes terminate in a closed section which drops the flow at approximately a 45-deg. angle under the canal berm on the low side with concrete baffles one foot wide placed at the end of the depressed section of the invert and at the beginning of the transition section. Overchutes are used at points where gravity flow across the top of the canal would be natural.

Another type of structure used is exemplified by the Gould Canal Siphon located just north of the Kings River. Gould Canal is an old canal serving the Fresno Irrigation District in the area just north of Kings River. It carries a maximum flow of 700 cu. ft. per sec., and at the point where it would have intersected the Friant-Kern Canal, its elevation was too low to permit use of an overchute. A single barrel siphon with 9-ft. 8-in. square cross section was designed and constructed to bring the Gould Canal back to elevation on the low side of the canal and leave it unimpaired for irrigation purposes with a loss of head of ¾ ft. between outlet and inlet.

Kings River Siphon

The canal meets the biggest obstacle in its course at the Kings River, 31½ mi. from Friant Dam. The Kings River, subject to sudden and large flood flows, is split into two channels where it intersects the canal. A huge 24-ft. 3-in. tube siphon was designed to carry the canal 5 ft. below the river bed and under a branch of the Santa Fe railroad as well for a total distance of 3,315 ft. Included in the design are the wasteway to discharge the full canal flow into the river, gates at both the inlet and outlet to the siphon and a vertical siphon-type turnout into the south channel of the Kings River to be used in releasing water for irrigation downstream.

The siphon was designed as a series of barrel sections 27 ft. 6 in. long with walls 2 ft. thick and contraction joints between each barrel. Under the river channels, thickness of the top 90-deg. sector of the barrel was increased to 2 ft. 6 in. to carry designed loadings.

Construction features

Morrison-Knudsen Co., Inc., Boise, Ida., received the $1,514,975 contract for construction of the siphon, wasteway and turnout and this job may be completed by July 1. Natural division of the river into two channels here proved adaptable for easy diversion during construction. A cofferdam upstream diverted the flow from one channel into the other while the barrel sections were laid in an open cut through the dry channel. Flow was then re-diverted over the completed portion of the siphon while the other half was under construction.

The barrel sections are placed around collapsible steel forms that move on tracks from one placing position to the next. Three different templates are used in the construction. These are the steel erection jumbo, the jumbo to support the inside form moving on the track through the barrels, and the gantry frame to carry the outside forms moving on rails placed on berms half way up the sides of the open cut. Alternate barrels are placed consecutively and the ties and rails are left in place to pour remaining barrels later when bulkheads are not required.

The vertical turnout under the south channel of the river provides a siphon drain 7 ft. in diameter. A cylinder gate hoist assembly driven by an electric motor opens the turnout and will provide for a maximum flow of 500 sec. ft. of additional irrigation water into the Kings River.

Because of the rocky terrain and the large structures involved, considerably more than half of the total cost of the canal is being spent to get from Friant Dam past the Kings River. Along the first 32 mi., the canal meanders along the foothills leveling out somewhat to the south of the Kings River. The first irrigation turnout will be at Orange Cove, midway between the Kings River and the Kaweah River.

Irrigation turnouts

The proposed typical turnouts consist of one, two or three thickwall, precast concrete pipes having diameters of 30, 36 or 42 in. The headwalls will be on a 1⅛:1 slope, and provision is made for future installation of moss screens or other suitable devices intended to prevent moss from entering the distribution system. Regulation will be by means of screw lift gates installed in the face of the headwall.

Two larger turnouts are proposed for service to the Wutchumna Water Co. and the Tulare Irrigation District. These will be of monolithic construction, each discharging into two rectangular barrels. The turnouts will have vertical headwalls, and, in each case, regulation will be by means of twin top-seal radial gates.

One problem in construction of the big canal is that of replacing orchard irrigation facilities destroyed as the canal cuts through valuable farm properties. Many miles of orchard pipe lines have to be replaced to water the fruit-bearing trees that abound along the right-of-way of the lower reaches of the canal.

Another problem has proven to be the settlement of mutually suitable contracts with the various irrigation districts. Upon the solution of the many intricate legal and construction problems rests the future value and use of one of the biggest blessings of nature that can be developed by human effort.

Portrait of an Engineer and General

Brig. General Philip G. Bruton, Retired, has a distinguished engineering career behind him with the U.S. Army but he continues an active interest in river and harbor development and airfield location and expansion—He has been acting as a consulting engineer in these fields since his retirement in 1946

By BETTY THOMPSON
San Francisco, Calif.

RETIREMENT FROM the United States Army, after thirty years in the service, has not ended the distinguished engineering career of Brig. General Philip G. Bruton. On the contrary, he and Mrs. Bruton have returned to his boyhood home in Woodland, California, and the General now is engaged in consulting work on river and harbor development, and airfield location and expansion—two fields in which his past experience has made him an authority.

Philip G. Bruton was born in San Francisco, received his early education in Woodland, and in 1915, was graduated from the Polytechnic College of Engineering with a Civil Engineering degree. In the California tradition, his first job after graduation was with a gold-mining outfit—the Molines Mining Company—but this was quickly interrupted by the entry of the United States into World War I. The now General Bruton entered the service as a Second Lieutenant in the Aviation Section of the Signal Corps, from which he soon was transferred to the Corps of Engineers. He served in this branch of the Army until his retirement, in October, 1946.

Army musts!

No Army career is considered complete until it includes some first-hand experience with the famous Army mule. To General—then Lieutenant—Bruton this experience came early in the '20s, and involved a stretch of land that later made world history—the Bataan Peninsula. This was one of the periods when General McArthur was commanding in the Philippines—and with considerable foresight, in the light of later events, he ordered a detailed survey of the Peninsula to enable the Army to plan defensive positions. Lieutenant Bruton headed the survey party, which included forty mules. The first problem confronting him was the basic one of how to get the party onto the Peninsula. Forty miles of tangled, almost untraversible jungle lay between them and Bataan, and the idea of herding forty stubborn, opinionated mules across that distance was too horrible to contemplate. Finally they hit upon a plan which, although it involved a calculated risk, showed elements of military genius. They loaded the mules onto a couple of big barges, which were towed around the peninsula to the tip of Bataan. There, the mules were pushed overboard—with the fervent hope that they would make for land rather than out to sea. With customary mule savvy, they did exactly that, without the loss of a mule, and the operation was a success.

Another "must" for an Army Engineer is a tour of duty on the Mississippi, a river which is continually presenting new and diverse engineering problems. Lieutenant Bruton returned from the Philippines to receive his Mississippi assignment, involving flood control work on the lower river. Then, after three years as an assistant to the Chief of Engineers in Washington, D. C., he was in 1937, as a Captain of Engineers, detailed to the New York District in charge of operations and maintenance of the New York Harbor, its channel and the channels up the Hudson to Albany. Here, he was directly in charge of numerous projects, with approximately 1,000 skilled men under his supervision.

In 1938, as a Major, he became District Engineer of the Buffalo, New York, District, and was in charge of the construction of Buffalo's outside harbor. He was also the American member of the United States-Canadian Joint Board for the Control of the waters of the Niagara River for power purposes, as well as a member of the Joint Board for Controlling the diversion of waters from the St. Lawrence River.

Special war assignment

By 1940, Bruton was a Lieutenant Colonel—and World War II, no longer the "Phony War," had begun to explode in a crushing series of German victories. Atlantic shipping was being crippled by Nazi submarines. Churchill and Roosevelt were soon to meet to sign the Atlantic Charter. And Lt. Col. Bruton received a secret and highly important assignment.

He was told to select two groups of about twenty men each, including engineers and surveymen. They should be furnished with needed equipment, which could only be guessed at. When the groups were ready, they were to proceed to Norfolk, from which port they would sail on the Navy Survey Ship S.S. Boutich for Newfoundland. The assignment was nothing less than the selection and building of three Newfoundland bases for airfields, for the protection of North Atlantic convoys, as well as two bases on the coast of Labrador. He was given no letters of introduction, no papers of identification. His orders were simply to proceed and land.

On October 7, 1940, they dropped anchor at Adjenchia, Newfoundland, scene of the later Churchill-Roosevelt meeting. The first flurries of winter snow were whipping the little English colony as Bruton landed, to call unannounced on the Governor General, Vice-Admiral Sir Humphrey Walwin, and explain the reasons for this unexpected American invasion.

Admiral Walwin was completely cooperative but Bruton still was faced with a job that would take at least three years in peacetime—and one that presented almost every conceivable difficulty. Working conditions were undesirable and it was difficult to recruit either contractors or men. All supplies had to be shipped in, and 5 cargo ships were lost to submarines, one of them actually being torpedoed at the dock. Since the lists of the supplies and materials on the sunken ships were inaccurate, being loaded in wartime haste, work often was slowed down for lack of needed materials, while guessed-at replacements frequently proved to be duplicates of materials already on hand.

GENERAL BRUTON, a genial man who has achieved honors the hard way.



Nothing but obstacles

Physical conditions also presented obstacles. Much of the ground on which the air fields were to be constructed was peat bog, with a frozen crust four feet thick and depths up to 40 ft. This had to be broken by undercutting and then backfilled with glacial till. Yet, in spite of all difficulties, the first planes started using the runway in Oct., 1941, just one year after the Bruton party landed at Newfoundland. General Bruton always expresses the highest regard for Al Johnson of the Al Johnson Construction Company, who was his closest associate on this job.

Perhaps the most difficult single problem in General Bruton's North Atlantic experience was that of getting an adequate water supply into the Goose Bay Airport in Labrador. Due to high water and distance, the pipe being run from the river could not be installed in sufficient time to meet the deadline. However, one little stream did trickle out from the glacial till sand bank plateau. To utilize

this water, they put in a concrete retaining wall, excavated a trench with a drag line, put in a timber cribbing with a rock fill, then, using a portable rig, sawed planking and put in plank cut-off wall. Only by piping this water from the closer distance were they able to provide the necessary water supply for combined use of all services.

Decorations for merit

For his outstanding services rendered in the North Atlantic, President Roosevelt awarded General Bruton the Legion of Merit. He returned to the United States in January, 1943, as a Colonel of Engineers, and at the request of the Secretary of Agriculture, was assigned to that department, to set up an organization to handle importation of labor, from the Caribbean Area and Mexico, for wartime employment in agriculture, in this country. This was a job that required considerable tact and diplomacy, since—in addition to importing the labor—it also was necessary to arrange for its departure when the emergency period was ended. Bruton served as Director of Labor in charge of the farm labor program of the War Food Administration until April of 1945. In May, 1944, he was promoted to the rank of Brigadier General.

In April 1945, General Bruton was assigned as Division Engineer of the Pacific Division, with headquarters in San Francisco, and for his accomplishments on this assignment, the President awarded General Bruton the Oak Leaf Cluster. He also received the Army Commendation ribbon.

Another medal that General Bruton may wear is that of Distinguished Rifleman, a gold emblem given by the War Department for outstanding achievement in the field of marksmanship. It is noteworthy that he achieved this the hard way. Government rifles are designed to be fired with the right hand. However, General Bruton discovered that his sight was better in his left eye, so he taught himself to shoot left-handed, which involved reaching around the rifle in order to pull the trigger, and even with this handicap, was able to lead the field.

Reber Plan sponsor

General Bruton's previous experience with the river and transit system in Cleveland, Ohio, and the harbor development in Buffalo and New York City, has made him particularly interested in the traffic and harbor problems presented by the San Francisco Bay Area. He feels that in most cities the interurban problem constantly lags ten to fifteen years behind the times. The San Francisco Bay area obviously can look forward to an almost unparalleled expansion, and the present interurban transit system is woefully inadequate, even under present conditions. It is his opinion that the Reber Plan offers the best solution to the Bay Area situation, and he feels that a Board should be appointed to make a fresh study of the various methods of linking the cities around San Francisco Bay. He personally favors the Reber Plan as at least a starting point of discussion. This plan invisages two earthen moles (salt water barriers) or dikes, one between San Francisco and Oakland—the other connecting Marin County with the East Bay in the vicinity of Richmond. An added advantage of the Reber Plan would be the formation of two fresh water lakes, one behind either mole, ensuring a perpetual and ample source of fresh water for an area at present confronted by an alarming water shortage.

Immediately following his retirement, General and Mrs. Bruton spent a year in the Scandinavian countries, particularly in Oslo, Norway where their daughter and three grandchildren are living. The General's son-in-law, Lt. Col. Arthur H. Lahlum, Corps of Engineers, is now serving with the American Embassy as Military Attache at Oslo.

Men who have worked with General Bruton regard him as a friendly, genial man with a great deal of force and the ability to get things done. He is level-headed, with a lot of common sense balanced by considerable personal charm. He has been given more than average responsibility, and "everything that he's done—he has done well." General Bruton is a member of the American Society of Civil Engineers, of the Society of American Military Engineers, the San Francisco Engineers Club, and the Army and Navy Club of Washington, D. C.

With one exception, General Bruton is an outstanding athlete. He is an excellent and daring horseman, and a good tennis and ball player. But a close friend comments, with considerable satisfaction—"He's a rotten golfer"!

Proposal for Subsurface Vehicular Tubes Across Puget Sound Revealed

TENTATIVE PLANS for subsurface concrete vehicular tubes to carry motor traffic across Puget Sound from Seattle to the Olympic Peninsula have been partially revealed by the Washington Department of Highways. Charles E. Andrew, consulting engineer for the Washington Toll Bridge Authority has devoted considerable time during the past two years to a preliminary study of the problem.

Public announcement of the consideration being given to construction of a subsurface vehicular tube was made in connection with a Puget Sound transportation crisis which developed early in March when ferries operated by the Puget Sound Navigation Co. were withdrawn from service in a dispute with the state over rates to be charged ferry users.

Temporarily at least, the transportation of vehicles across the Sound has been solved by the action of King and Kitsap Counties in assuming responsibility for operation of the Black Ball ferries, but the ultimate solution appears to be extremely distant. The Toll Bridge Authority, under direct supervision of Governor Mon C. Wallgren, has ordered the preparation of designs for two types of ferries with the possibility that ten vessels costing some $10,000,000 may be ordered built. If the state should enter the ferry business, the probability of vehicular crossings being built appears to be quite remote.

The proposal for subsurface tubes, as conceived by Andrew, calls for twin tubes cast monolithically of reinforced concrete and placed 50 ft. below the surface of the Sound at either one of two locations which would require structures about 2.6 mi. long. Either crossing would be from the mainland at Seattle to Bainbridge Island and would require the construction of at least one additional bridge to provide a connection with the Peninsula. The estimated cost of the subsurface crossing has been set at about $40,000,000.

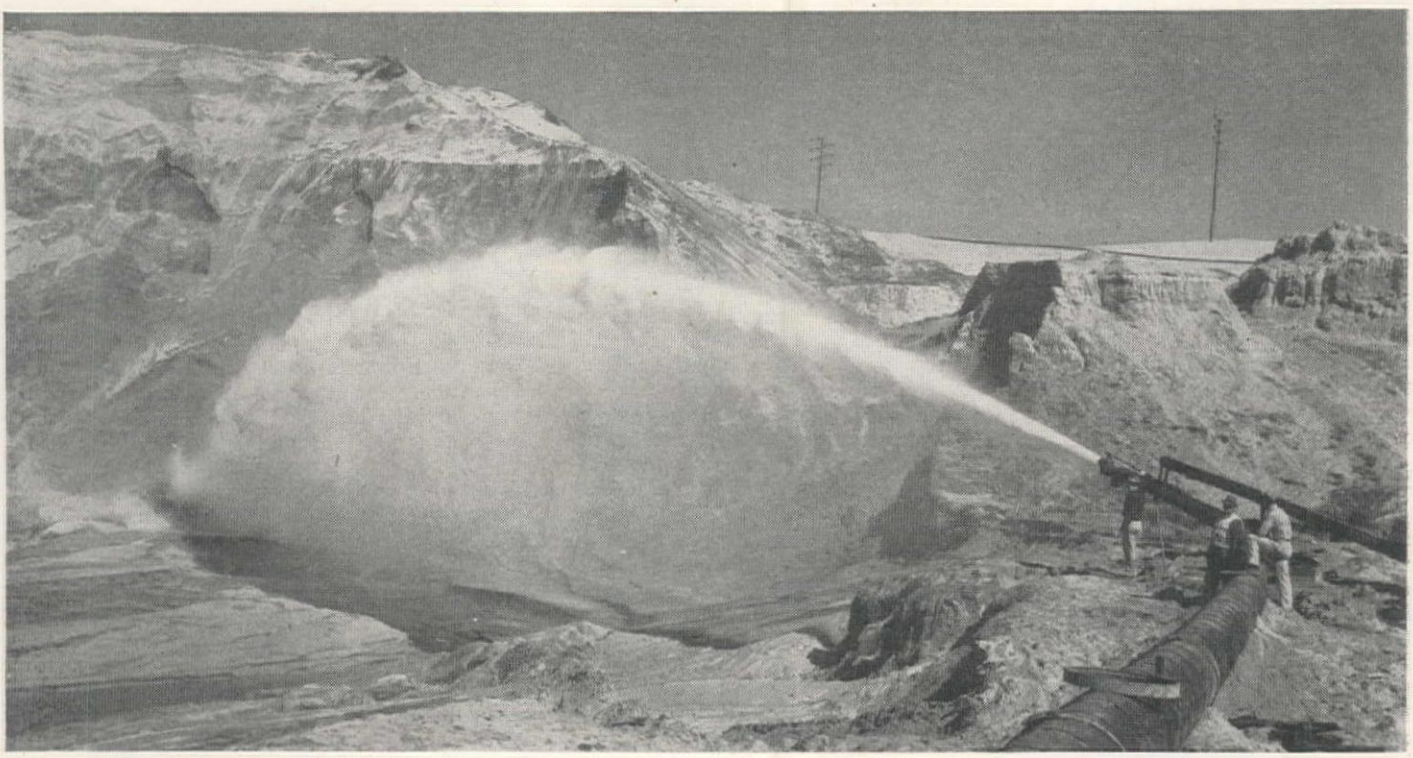
Since Andrew first revealed his plans at a meeting of the Seattle Section of the American Society of Civil Engineers a month ago, the subject has provided a wide field for discussion among engineers of the Puget Sound area. There are admittedly a number of engineering problems which will require considerable investigation. Aside from the economic considerations of present and future traffic, there are questions as to the action of sea water on concrete and anchor cables, tidal action on a structure at a depth of 50 ft. below the surface, and flotation of the relatively large section which must be solved before final designs could be prepared.

However, more orthodox crossings of the Sound would present even more difficult problems. The width of more than 2 mi. at the narrowest point and maximum depth of about 800 ft. with doubtful foundation conditions lend considerable strength to the subsurface tube proposal. A surface crossing would probably be opposed by the Navy Department unless it were made from the southern limits of Seattle to Vashon Island to avoid crossing the entrance to the Navy yard at Bremerton.

Subways Proposed for Downtown Los Angeles

DOWNTOWN SUBWAYS have been proposed in Los Angeles by the Rapid Transit Action Group of the city's Chamber of Commerce. The subways are proposed to be constructed approximately under Hill St. and Broadway, and to have underground loading platforms, pedestrian tunnels to existing Fifth and Hill and Sixth and Main terminals, and connections to other surface lines.

The proposal was a key feature of a detailed $310,000,000 program, which culminated intensive study of commuter transportation needs in Los Angeles by public and private transportation experts. Their report also asked cooperation with state highway officials to procure additional freeway right-of-way to permit construction of separated electric train lanes down the center of the Hollywood, Santa Monica, Olympic, Inglewood, Harbor and Ramona Parkways. It is planned that some of these surface lines would enter the subways at the edge of the downtown district.



Beach Park Growing With Fill From New Los Angeles Sewage Plant Site

Seaward extension of a 13-mile stretch of Los Angeles shore line for new park area is being coordinated with excavation for the Hyperion Sewage Plant—14 million cu. yds. of sand fill are being moved in an all-hydraulic operation—Plant will rank among largest in the world

THE MASTER PLAN of recreational shore-line development adopted by Los Angeles in October, 1945 (*Western Construction News*, Feb., 1945) is being effectively coordinated with excavation for the City's new Hyperion Sewage Plant, destined to be one of the largest in the world. The greater portion of the beach development is an extensive fill extending seaward from the existing beach for distances varying from 300 to 1,200 ft. along a 13-mi. stretch of shore line. Fourteen million cubic yards of the 50,000,000-cu. yd. sand fill called for by the Los Angeles Shoreline Improvement Plan is being supplied by excavation from the site of the sewer plant.

When this monster excavation job is completed, a 200-ac. site for the new sewage plant will be opened and graded for the erection of facilities. These include the headworks building, batteries of aerators, 25 digestors each 100 ft. across, a power plant, an elutriation building, filter and drying plant and fertilizer storage facilities. The site for the 80-ac. high rate activated sludge plant is located in the giant dunes surrounding the old ¼-ac. plant at Hyperion.

Features of the Master Plan

Although the improvement plan was adopted in 1945, city officials are still uncertain when action will be taken on other features of the development. Biggest item in the plan is a pleasure craft harbor, Marina del Rey, which will cost $23,000,000 and have about a capacity of 9000 craft. The remainder of the development will consist of the mammoth recreation beach along 13 mi. of shore line of Santa Monica Bay, from Topanga Canyon to El Segundo, including 3 mi. in the city of Santa Monica, which is located between two districts of Los Angeles. Most of the improvements will be built upon the 50,000,000-cu. yd. fill.

A scenic drive with a double roadway will provide access to the beach parks and to parking areas with a total capacity of 40,000 cars. Between the parking areas will be located picnic and game areas. At each parking area, change rooms will be provided for swimmers.

Along the central portion of the improvement, through Santa Monica and Venice, a boardwalk 50 ft. wide will be constructed seaward of the parking areas. A sand beach with a minimum width of 250 ft. will occupy the outer portion of the entire improvement. When completed, this beach park will be six times as long as the famous Jones Beach on Long Island in New York.

Plans for the ocean fill have a background of 17 years of engineering study and research on beach erosion problems, with particular reference to Santa Monica Bay, coupled with extensive periodic surveys of the beaches and offshore areas. A. G. Johnson is Beach Design Engineer for Los Angeles.

Peter Kiewit Sons' Co. and Construction Aggregates Corp., holders of a $3,494,088 contract for the excavation and disposal of the sand fill along 6 mi. of beach, have already sluiced 10,000,000 cu. yd. to the disposal area in an all-hydraulic operation started March 7, 1947. The sand currently is being discharged more than four miles from the excavation site. Over 16,000,000 sq. ft. of new beach will be provided by using the excavated sand for fills.

Sluicing operations

Six 2,500-h.p. motors built by General Electric Co. for Army use on the Fort Peck Dam project power the pumps on this excavation project. Two of the largest pumps ever used on a project of this kind deliver 60,000 gal. per min. of water to the giant hydraulic nozzles which are washing the dunes away. The pumps are con-

SAND DUNES at the sewage plant site being washed down with 60,000 gal. per. min. of water from hydraulic nozzles, top of page, will be picked up by eductors and pumped two miles or more to be used as sand fill for beach improvement.

nected in series, enabling the contractors to operate three streams against the dunes simultaneously.

The 6-in. nozzles are steel barrels 20 ft. long, counterbalanced on a pivot point. A wooden boom attached to the barrel and weighted down with rock or metal weights acts as a counterweight to keep the elevation of the nozzle steady and direct the stream of water continuously in one spot. Water supply for the sluicing operation is carried from the pump house through two 36-in. intake pipes. Steel sheet piles were driven to enclose the lower portion of the main pumping plant and to make a diaphragm around the surge pit. The intake pipes extend about 1000 ft. out into the ocean.

Eductors pick up sand

Special hoppers, known as venturi eductors, were built to pick up the sand as it washed down. These consist of a steel box frame, open at the top. A jet of water entering the frame from one side passes through a venturi-type steel tube under high pressure, creating a powerful suction. The suction draws the sand and water mixture into the eductor box. The venturi tube develops about 10 in. of vacuum to suck the material in and can pick material up several feet.

After the sand is washed down and picked up by the eductors, it is carried to a surge pit which is equiped with a mixing chamber. In locations near the surge pit, monitors and flumes are used without resorting to the eductors. Here, the sand and water flows down grade to a pool enclosed by dikes where the material then enters a pipeline. All in all, three monitors, three eductors and a flume line are in use.

The sand and water mixture enters the surge pit on trestles. Gates on the inlet pipes, operated by hand winches, regulate the flow to any part of the pit. The mixture then passes through a 4-in. bar screen into the mixing chamber in the center of the surge pit. Here, suction lines from two sand pumps, connected in series, pick up the mixture and force it down the 28-in. discharge line laid along the beach. A booster station with two 28-in. pumps is located two miles from the main pump house to pump material to the extremities of the project.

Discharge of the sand fill

The discharge lines are carrying from 17 to 20 per cent sand at the rate of 1700 cu. yd. per hour. This is believed to be the highest percentage of sand ever moved by pipe line. (Ordinary dredging operations usually pipe a mixture running 10 to 12 per cent sand.) The sand is being placed by the pipelines at the rate of about a million cubic yards per month.

The outlet of the pipes is divided into wyes, with special discharge spoons at the end. The spoons spread the sand out uniformly and dissipate the force of the water as it shoots upward.

Three contracts have been let to date on construction of the new sewer plant, which is being built by units rather than under one over-all contract. Already in operation is a temporary chlorination plant built by Hoagland-Findlay Engineering Co., Long Beach, Calif. A contract is in force now for construction of the $1,232,616 headworks building by the James I. Barnes Construction Co., Santa Monica, Calif. This unit is about 80 per cent completed.

Seven 6000-lb. chlorinators in the temporary plant are dosing the flow of the North outfall sewer with about 20 tons of chlorine per day in an effort to lower pollution which has resulted in a beach quarantine extending five miles on either side of the plant. The temporary plant will operate through the swimming season, May 15 to October 31, until the new plant can be placed in operation.

DISCHARGE END of the line, where water carrying 17 to 20 percent sand pours out fill at the rate of 1700 cu. yds. per hour. The pipe outlets are divided into wyes and equipped with special discharge spoons which spread sand uniformly and dissipate force of water. More than a million cu. yds. per month are being placed.



Submarine outfall

Contract on the submarine outfall was let May 27, 1946 to the Guy F. Atkinson Co., San Francisco, Calif., for $3,517,410. The outfall, 12 ft. in interior diameter throughout, extends one mile offshore. Discharge is through multiple outlets in about 50 ft. of water. (*Western Construction News*, Nov., 1947.)

It is designed in two sections, termed the inshore and offshore. The inshore section extends 200 ft. from shore and is made up of reinforced concrete pipe with standard type joints laid on a reinforced concrete footing supported by 40-ft. H-piling. Sheet steel piling is driven to form a cofferdam which is filled with concrete to a depth of 18 in. above the pipe, thereby completely encasing the section.

The offshore section is made up of 32 pipes in 100-ft. lengths. The bell ends are formed as a cradle and are supported on concrete piers level with ocean bottom and 7 ft. in depth, in turn supported by 12 H-piles with penetration of 40 ft. Operations are conducted from the south side of a timber trestle paralleling the pipe line for the entire mile. Philip N. Fletcher, project engineer on the outfall job, reports that construction is about 85 per cent accomplished.

Design of sewage plant

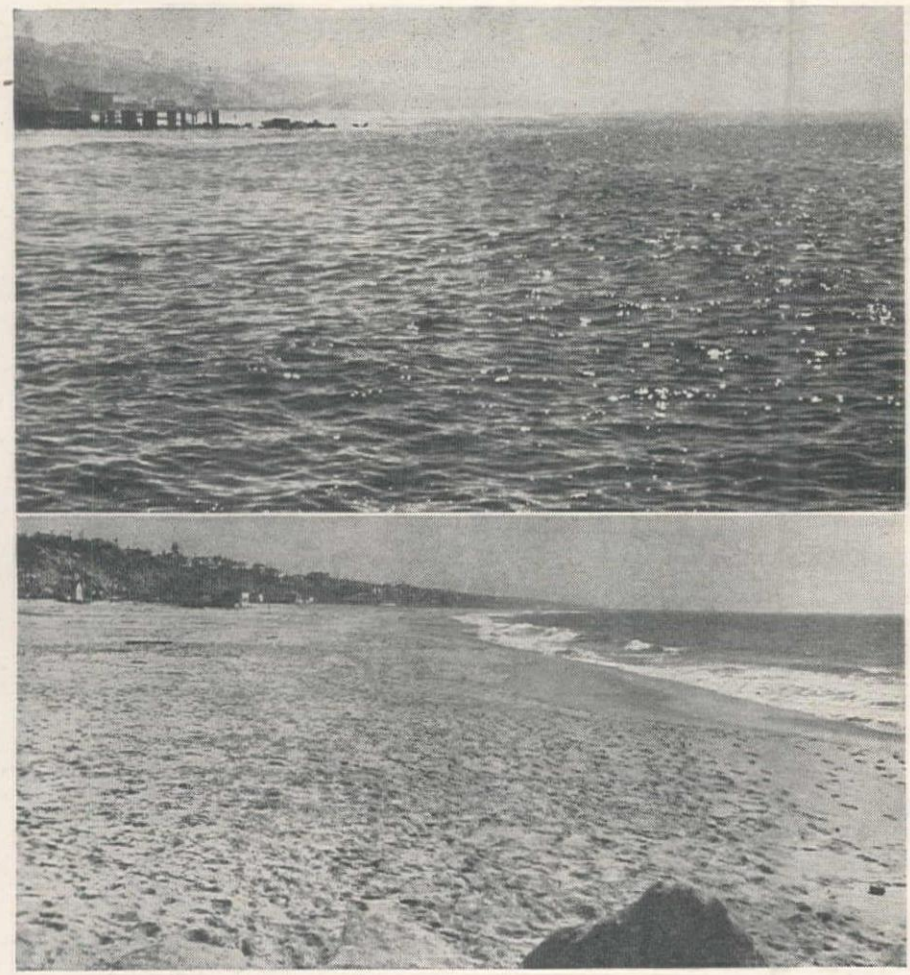
The new Hyperion Sewage Plant will have a normal dry season capacity of 245 m.g.d. with provisions to take care of 420 m.g.d. under wet weather overload conditions. It is designed for a peak flow of 540 cu. ft. per sec. and a storm flow of 650 cu. ft. per sec. The plant will receive the ultimate discharge of two outfall sewers, with capacities of 450 and 90 ft. respectively. Present estimates place the cost of the plant near $40,000,000.

Design of the new plant will make it one of the most modern and extensive systems in the world. Incoming sewage will first enter the Headworks Building, where coarse debris will be removed by four automatically raked bar screens. After being discharged into forebays and removed by three detritors, each 60 ft. square, the sand by-product will be pumped to grit washers and hauled away by trucks to be used as additional fill. The chlorination plant will also be in this building.

From the Headworks Building, the sewage will be metered by two venturis in parallel to enter the Primary Settling Tanks covered by concrete slab. Here, it will receive 30 min. of preaeration prior to distribution to eight covered settling tanks, each 300 ft. long and 56 ft. wide. Four underground sludge pumping plants will pass the sludge to the digestion tanks.

Distribution of effluent

Primary effluent will flow in whole or in part to Plant By-Pass or to Aeration Tanks, where aeration will take place in 32 tanks, 30 x 300 ft. Here the detention period will be 3.21 hr. and the application of air will be up to 0.52 cu. ft. per gallon.



BOTH VIEWS from the same point, these two photos show extent of new beach created by fill operations. The picture at top was taken 400 ft. seaward from the original shore line, and picture below after wide expanse of sand fill was in place.

Mixed liquor will flow to Final Settling Tanks, where it will be distributed into 20 tanks, each 76 x 125 ft. Final effluent will flow to the surge tank at the head of the new submarine outfall to be discharged.

All sludge will be collected in Primary Settling Tank pits connected to the four underground pumping plants, and grease skimmed from the tanks will be passed to four ejectors. This material will be forced to the Digestion Tank System. There, 18 tanks, each 110 ft. in diameter by 35 ft. in height, will be arranged in batteries of 6 tanks each, four primary and two final. The tanks will be maintained at 100 deg. F. by live steam produced by waste engine heat and introduced into the sludge just prior to its entrance into the tanks.

Digested sludge will flow to the Elutriation System, which will be made up of one concentration tank and two wash tanks. This system will include a battery of pumps for distribution of wash water and sludge. Elutriated sludge from this unit will be pumped to the Filter, Drier and Fertilizer Storage System. Here, the sludge will be filtered on 12 vacuum filters, each with an area of 570 sq. ft., and the cake produced will be carried on conveyors to four driers. Each drier unit will either dry the sludge or reduce it to ash.

Two thousand tons of fertilizer produced at the plant will be stored in 10 bins with live bottoms which permit the loading of four truck and trailer combinations at one time. It is estimated that the plant will produce 200 tons of fertilizer a day.

Power plant

The Power Plant for the system will house 9 dual-fuel engines with a rated capacity of 1600 h.p., each to be fueled with oil and digester gas fed through superchargers. The engines will be equipped with vapor phase units to recover heat and exhausts for heating digesters. Five of these engines will be connected to generators and four, through step-up gears, to centrifugal blowers of 40,000 cu. ft. per min. capacity each.

Two contracts for portions of the plant have been held up. No action has been taken on the low bid of $3,989,000 for the Digesting Tank System submitted by the Pacific Bridge Co. of San Francisco last February. Bids on the filter and drier unit were rejected, with Guy F. Atkinson low bidder at $6,295,518. The Los Angeles Board of Public Works called in the bids for construction of the primary tanks which were to have been opened March 24. Before further contracts are awarded, it is believed that the Board will explore the possibilities of escalator clauses and bids on groups of units, or combinations of the two methods.

Bureau of Reclamation Reports on Year's Work

THE BUREAU of Reclamation, during the fiscal year ending June 30, 1947, had under construction 15 dams, 10 power plants, 20 pumping plants, and 304 mi. of canals to bring irrigation water to arid farm lands in the West, the 1947 Annual Report of the Department of the Interior has disclosed. Eleven dams were started during the year. The report has been forwarded to the Congress by Secretary of the Interior J. A. Krug.

Construction slowdowns were imposed both at the start and at the end of the fiscal year, Commissioner of Reclamation Michael W. Straus reported. The first slowdown began August 2, 1946, when a war reconversion regulation banned new work and continued to October 25. After the winter season, construction resumed at an accelerated rate, and continued until late spring of 1947.

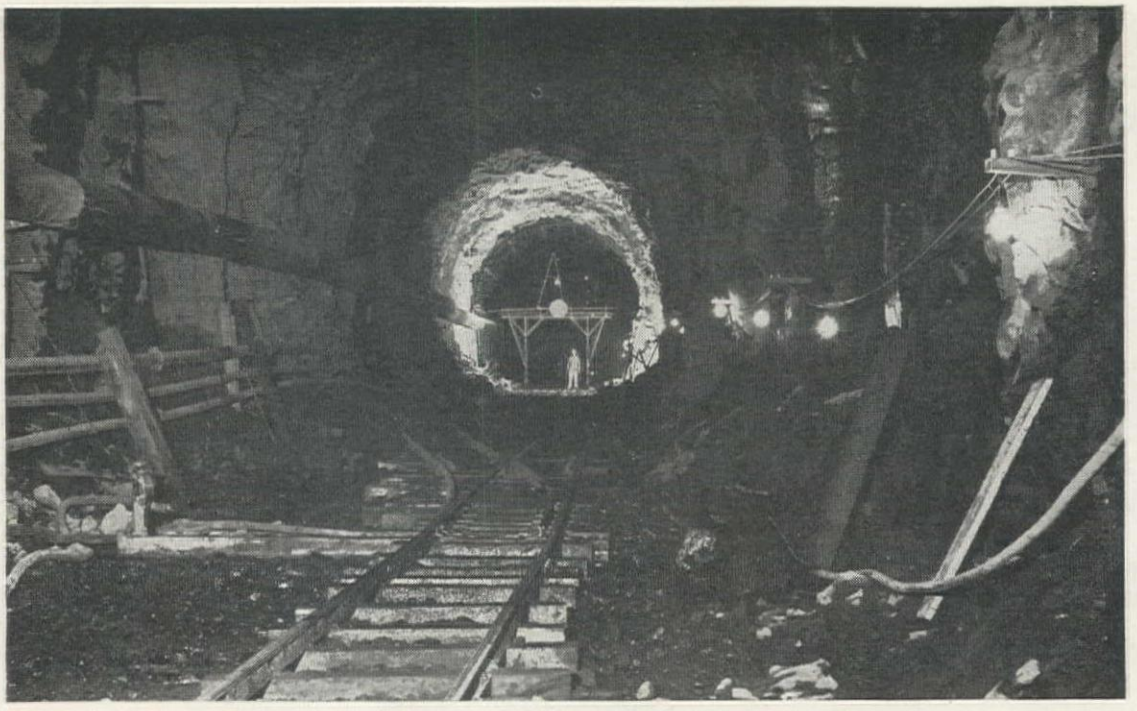
At that time, it became apparent that considerable reductions in the appropriations requested for 1948 fiscal year construction would be made by the Congress, making it necessary to withhold advertisements for bids on a number of projects so as to avoid, insofar as possible, exhaustion of funds on contracts already in existence and requiring progress payments in the 1948 fiscal year on a certain few, but important, projects. Total contracts awarded amounted to more than $100,000,000.

Martinez Dam on the Contra Costa Canal system in the Central Valley of California was completed during the year, and the completed portion of the Colorado-Big Thompson irrigation system was placed in emergency operation on June 23 to provide water from the western slope of the Continental Divide to an important part of the 615,000-acre agricultural area in northeastern Colorado.

The 4,396,581 acres receiving water from Reclamation works in the 1946 crop season returned a gross crop value of $530,623,945 for a new record high. Water service was extended for the first time to 8 new projects and a new division of another project, totaling 31,243 acres.

The electric power load was very heavy during the year due to the rapid increase of peacetime industry. All facilities were extended to their limit but, due to poor water conditions in some areas, the output was less than the demand. Consequently, all standby facilities in most areas, including fuel electric plants, were utilized. Revenues from the sale of power amounted to $21,732,811 as compared to $20,716,398 in fiscal year 1946.

The report concludes that it is feasible to develop irrigation projects by 1970 which will provide a full-water supply for 360,000 acres and supplemental water for 400,000 acres and suggests that hydroelectric projects be developed in conjunction with the large irrigation projects to meet the growing power load and to pay for the investment required for the irrigation projects.



UNLINED SECTION of the tunnel. In evidence at left is the hard columnar basalt formation which required little supporting.

Columbia Basin—
Bacon Tunnel Construction Progress

Driving of the 1.9-mi. tunnel, a major structure of the Main Canal from Grand Coulee Dam, is nearly completed with progress steady at 20 ft. per 24 hr. on full face operations—Gantry jumbo performing as cherry picker, drill jumbo and scaffold proves to be a versatile piece of equipment

A GANTRY JUMBO performing the duties of a cherry picker as well as drill jumbo and in spare moments serving as a scaffold for the erection of steel tunnel supports is probably the most versatile piece of equipment on the Bacon tunnel driving operation south of Coulee City, Wash. The timber frame jumbo being used in the 27-ft. bore was developed and built on the job by the contractor's staff.

Bacon tunnel is a major structure on the main canal of the Columbia Basin project being constructed in central Washington under the direction of the Bureau of Reclamation. T. E. Connolly, Inc., San Francisco, holds a $3,494,420 contract for driving and lining of the 1.9 mi. tunnel, constructing the 1,000-ft. long Bacon siphon, and excavating and lining 1,000 ft. of main canal. A general review of the irrigation features of the Columbia Basin project appeared in the January, 1947, issue of *Western Construction News.*

Construction conditions

The main canal, taking off in a southerly direction from the equalizing reservoir at South dam, enters Bacon siphon about 2 mi. south of Coulee City. The walls of the coulee are quite steep, and the south wall is formed by a high ridge through which the main canal will pass in Bacon tunnel. The siphon will be directly connected to the inlet portal of the tunnel so that the two structures will form a closed conduit over their combined lengths.

Initial design capacity of the main canal at this point is 13,200 cfs., although the ultimate plans call for duplication of both structures. The siphon will be 23¼ ft. inside diameter, and the tunnel will be horse-shoe shaped with a width of 23¼ ft. at the springing line inside the concrete lining, and a height of 23¼ ft. from the invert to the arch. Overall length from the inlet portal to the outlet portal is 10,000 ft. The tunnel line runs approximately due south. Gradient is 18.7 ft. in the total length.

Geologically the formation through which the tunnel passes is largely a dense columnar basalt. Overburden varies from a minimum of 100 ft. to a maximum of 220 ft. It is hard, stands well without support, and tends to break into large blocks following the columnar formation. Very little water has been encountered during the driving and has caused no difficulty. Supports have been required for only short sections. The outlet portal was opened in a sandstone formation with a slight inclination to the south and west. About some 400 ft. in from the outlet portal the tunnel entered the basalt formation.

South portal opened

Construction operations began at the outlet portal where the contractor built his camp and main shops. In the fall of 1946 a crown heading was started 13 ft. high by 16 to 18 ft. wide. As soon as operations at the south portal were well under way, the contractor began work on an access road to the north portal which is located about midway up the steep coulee wall.

Driving of the crown heading continued until Aug. 18, 1947 at which time it was in 4,645 ft. from the outlet portal. In the meantime a second construction plant had been built at the inlet portal, and a crown heading was being driven simultaneously from the north. When driving of the crown heading from the south portal was stopped, the crown heading from the north portal was in 1,900 ft. On Aug. 19 driving of both crown headings was abandoned, and the contractor began excavation of the

bench from the north portal. All work at the south portal was closed down.

By Nov. 8, the 1,900 ft. of bench in from the north portal had been completely removed, and for the first time operations were placed on a full heading basis. All of the remainder of the tunnel will be driven full face from the north portal until holing through at the south portal crown heading. The contractor is planning to complete the excavation of the bench under the south portal crown heading from the south portal. Tunnel concreting will start from the north portal as soon as the tunnel is holed through.

Jumbos used in drilling both crown headings were steel frames mounted on muck car trucks. They were equipped with five drill stations of which three were placed across the arch and two used for lifter holes.

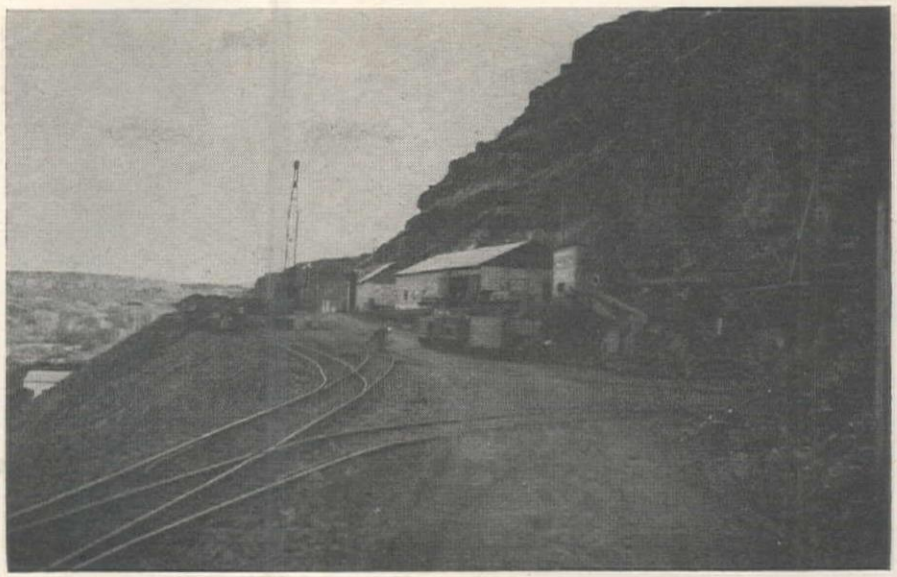
Gantry jumbo

For driving the full face, which requires a rough bore about 27 by 27 ft., the contractor constructed a large timber frame jumbo to operate on 10-ft. gauge tracks. The jumbo is equipped with two main decks and two sets of wing platforms. It mounts ten drill stations of which nine are normally used, and the usual complement of machines in operation is eight.

On the second deck in the forward half of the jumbo an air receiver is mounted with connections to each of the drill stations. The air supply to the receiver comes from three 600-cfm. compressors operating near the inlet portal. Six-inch invasion pipe is used to convey the air from the compressors to the receiver.

The rear portion of the jumbo consists principally of a vertical hoist shaft which is used as a cherry picker. A 10,000-lb. capacity Ingersoll-Rand air hoist is mounted at the top of the shaft to lift the empty muck cars. During the mucking operation, the jumbo is spotted about 150 ft. back of the heading face. While the mucker is loading a car, an empty car is picked up in the jumbo. The loaded car is then pulled back under the jumbo and the empty car placed at the head of the train to be pushed up to the mucker.

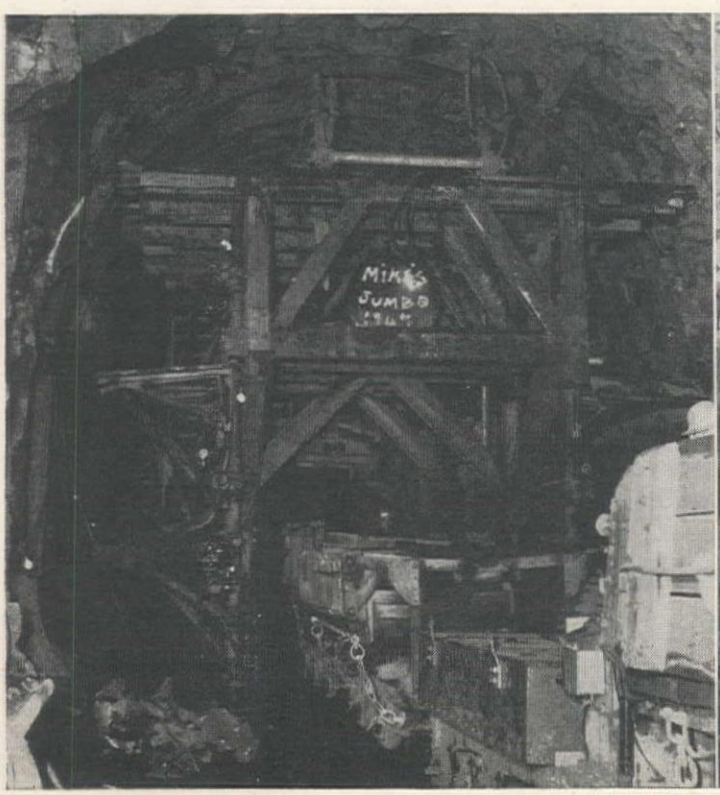
In addition to serving as a drill jumbo and as a cherry picker, the gantry jumbo is also used as a scaffolding for the erection of steel tunnel supports, and for scaling when high points of rock must be removed. In the driving from the inlet portal only a few short sections of tunnel supports have been required. The normal condition is unsupported rock. The columnar formation has a tendency to break to the column lines and horizontal seams. When more than half the width of the column is cut through, the column will generally break to the top of the arch resulting in a square hole. When less than half of the column is cut through the rock arches almost perfectly.



CONTRACTOR'S PLANT at the inlet portal includes fan and compressor houses and repair shop. A 145-ft. well in the coulee north of this portal supplies water for the entire job and it is delivered from a storage tank on the ridge above the portal.

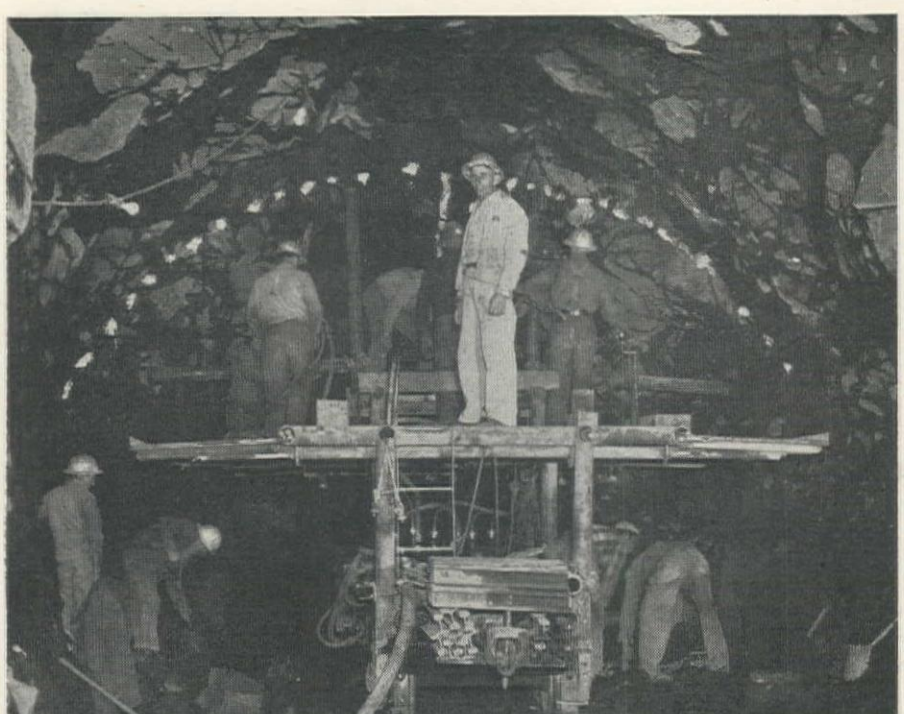
Miscellaneous services

Ventilation of the tunnel is provided by a 10,000-cfs. reversible fan housed just outside the inlet portal. Turned on





COMBINATION drill jumbo and cherry picker, in front and rear views at l. and r., is being used for full heading operations. A 10,000-lb. air hoist lifts the empty muck cars. The jumbo is also used to place steel supports where they are required.



DRILL JUMBO at crown headings consisted of a steel frame on muck car truck with five drill stations, three placed across the arch and two used for lifter holes.

exhaust, the fan can clear the heading in about 20 to 30 min. after a shot. The ventilation line is 22-in. pipe hung on the left tunnel wall about 10 ft. above the invert. Outlet of the line is kept within about 150 ft. of the heading.

To supply water for drills and other construction requirements the contractor drilled a 145-ft. well in the coulee north of the inlet portal. Water is pumped from the well to a storage tank at the top of the ridge above the portal. From there it is piped through the tunnel to the jumbo for the drills, and to the shops for general use.

Other major items of equipment in use include two 60-hp. Conway muckers, three battery-operated haulage units, and about fifteen muck cars. The contractor is using standard drill steel rather than detachable bits, and operates a completely equipped blacksmith shop two shifts per day to keep the steel in good working condition.

Driving procedure

About 65 holes are being drilled per shift in the heading with full face operation. Some adjustment has been made in the depth of the holes to improve the balance between drilling and mucking. Nine-foot rounds take out about 22 cu. yd. of rock per foot of tunnel or a total of 198 cu. yd., which requires some 6 to 8 hr. of mucking time with the mucker working at the rate of 12 to 14 cars per hour. Drilling and loading time averages about 3½ hr. for the 9-ft. round. Forty per cent powder is being used at the rate of 500 to 600 lb. per round.

A 20-man heading crew is employed on three shifts, six days per week. One track maintenance crew is employed on the day shift, and the blacksmith shop operates on day and swing. The total crew is 85 men. Progress has been fairly steady. Shortly after full face operations began driving was averaging 14 to 15 ft. per 24 hr. This has gradually been increased to 20 ft. per day. On April 12, 1,493 ft. of full face driving remained before holing out at the crown heading from the outlet portal.

Organization

Construction of the irrigation facilities of the Columbia Basin project, of which the Bacon tunnel is a part, are being carried out under the direction of the irrigation division of the project. Frank A. Banks is district manager in charge of the entire project, and H. A. Parker is supervising engineer for the irrigation division. E. J. Niemen is resident engineer for Bacon tunnel, siphon, and the first section of the main canal. C. F. Thomas is chief inspector for the tunnel.

W. D. Connolly is project manager in charge of the work on the tunnel and siphon for T. E. Connolly, Inc., San Francisco. Mike Roych is superintendent for the contractor.

Cost Estimated for Missouri Basin Plan

THE HUGE price tag of $2,415,541,831 has been estimated for the six-year plan of development of the Missouri River Basin under the Pick-Sloan Plan at a recent meeting of the Missouri River Inter-agency Committee meeting in the Nebraska statehouse. The group, which represents basin states and federal agencies affected by the river program, sifted mounds of figures to obtain the estimate of how much money will be needed for basin development through 1954.

The breakdown of expenditures for the nine basin states involved is as follows: Missouri, $17,021,712; Kansas, $4,534,550; Iowa, $4,893,700; Nebraska, $25,114,850; Colorado, $3,639,792; South Dakota, $2,920,360; North Dakota, $10,341,370; Wyoming, $1,907,070, and Montana, $22,186,154.

Federal agencies expenditures would be: Army Corps of Engineers, $748,200,750; Department of Interior, $77,864,733; Department of Agriculture, $435,893,000; Federal Power Commission, $939,000, and the Department of Commerce, $5,381,000. The Department of Interior's estimates did not include expenditures for Bureau of Reclamation projects.

Special Repayment Plan Will Finance Utah Work

POSSIBLE COMPLETION of the entire $20,000,000 Deer Creek Project within the next two years to transfer water from the Colorado River Basin into Salt Lake City's water system was promised when President Truman signed a bill to clear the way for financing the remainder of the project. The bill provides a special method of repayment whereby the government will be allowed to charge rent to water users and apply this income against project costs until the sum due equals the amount the Metropolitan Water District of Salt Lake City has contracted to pay over a 40-yr. period.

Principal features of the Deer Creek Project yet to be placed under contract include 3.7 mi. of the 6-mi. Duchesne Tunnel through which water will be transferred from the Colorado River Basin into Deer Creek Reservoir, and a 5.5-mi. section of the aqueduct from the reservoir to Salt Lake.

Fisher Harris, manager of the Water District, explained that the repayment provision was necessary since construction costs have exceeded the amount water users can contract to pay under Utah laws. Plans are already under way to let the Duchesne Tunnel job this spring, and it is believed the aqueduct job may go under contract soon as well.

Mexican Tourist Highway to South May Be Open by 1949

THE HIGHWAY from Mexicali to San Felipe on the Gulf of Lower California probably will not be completed before 1949. An unofficial survey party composed of Brawley, Calif., residents hazarded the route in a jeep and found long portions of the 135-mi. route still unimproved.

The tour was undertaken after President Miguel Aleman of Mexico recently forecast that the new highway would be ready this year to open the gulf area as a commercial and pleasure fishing spot and resort center. After touring the route, the survey party said they were convinced the Mexican President was too optimistic in his prediction.

Tubes Carry Reservoir Outlet Pipes

Outlet works for Horsetooth dam consists partly of an 8.5-ft. heavy concrete pipe and partly of two 72-in. steel pipes carried in a double-barrelled horse-shoe-shaped concrete conduit —Regulation of water flow to be handled by means of slide gates in dome-shaped structure underneath the dam, and by hollow jet valves

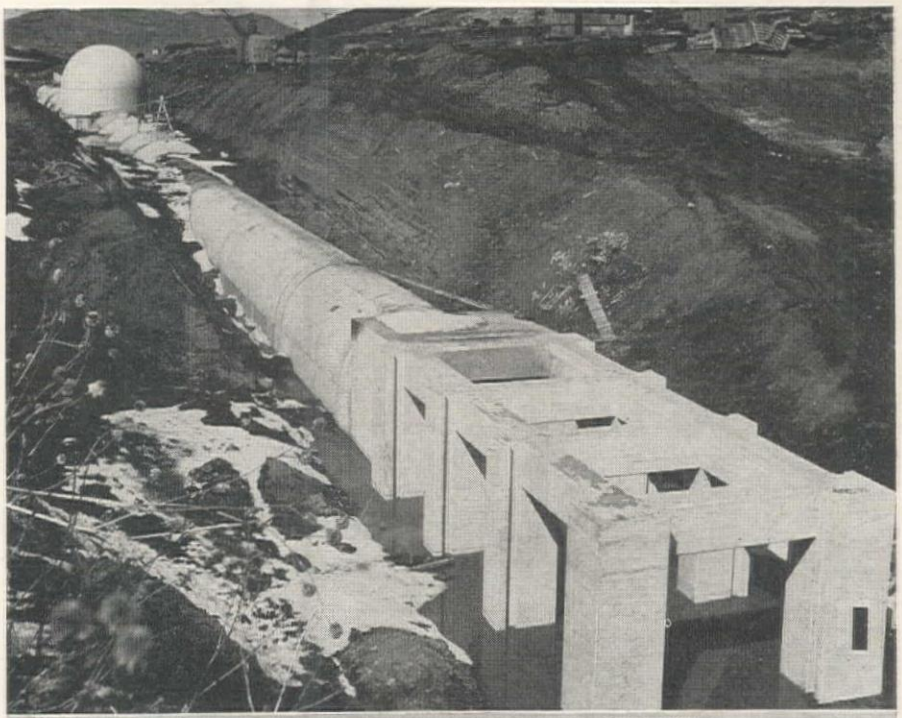
WITH MUCH of the work on ıe west slope construction of the Bu-:au of Reclamation's Colorado-Big hompson Project completed or well ong (Green Mountain dam, WCN Dec.)43; Shadow Mountain dam, WCN ec. 1945; Granby pumping plant, WCN ov. 1947), and with water already pass-ıg through the Alva B. Adams tunnel, WCN Jan. 1946 and July 1947), work now concentrated on the delivery fa-ilities on the east slope. These include ıe Aspen Creek siphon, Ramshorn and rospect Mountain tunnels, Olympus am, Marys Lake and Estes Park pow-rhouses, Horsetooth reservoir (WCN)ct. 1947), Horsetooth feeder canal, and ther units.

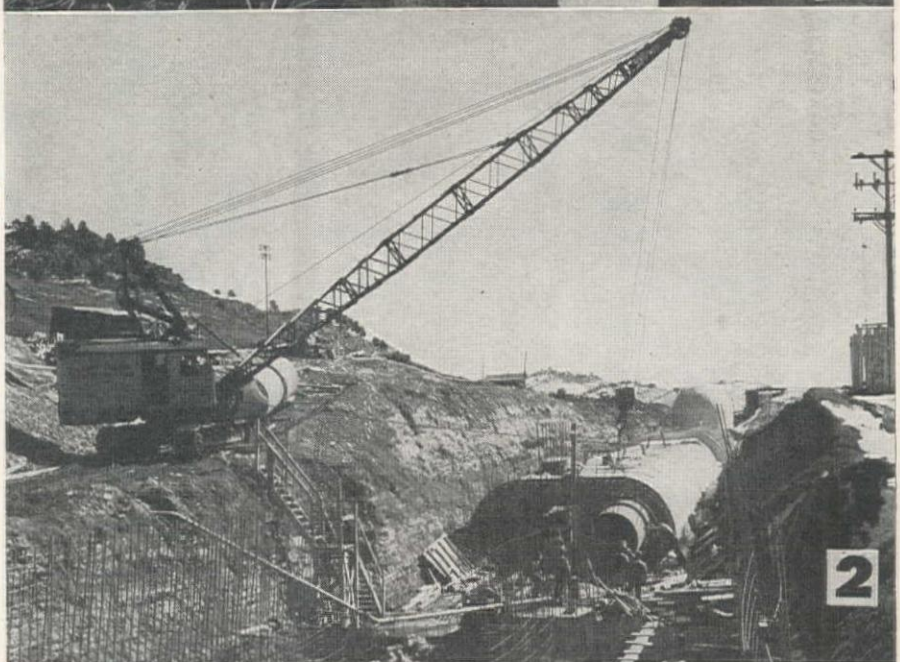
Briefly the overall plan of the project to take water from the Colorado River n the west slope of the Rocky Moun-ains at Granby dam, lift it into Shadow Iountain reservoir, from which it will ow by gravity through the 13.1-mi. Adams tunnel under the Continental Di-ide to the east slope of the mountains, hence it will be delivered through the bove mentioned facilities into Horse-oth reservoir near Fort Collins and ıen distributed into various tributaries f the South Platte River for irrigation urposes.

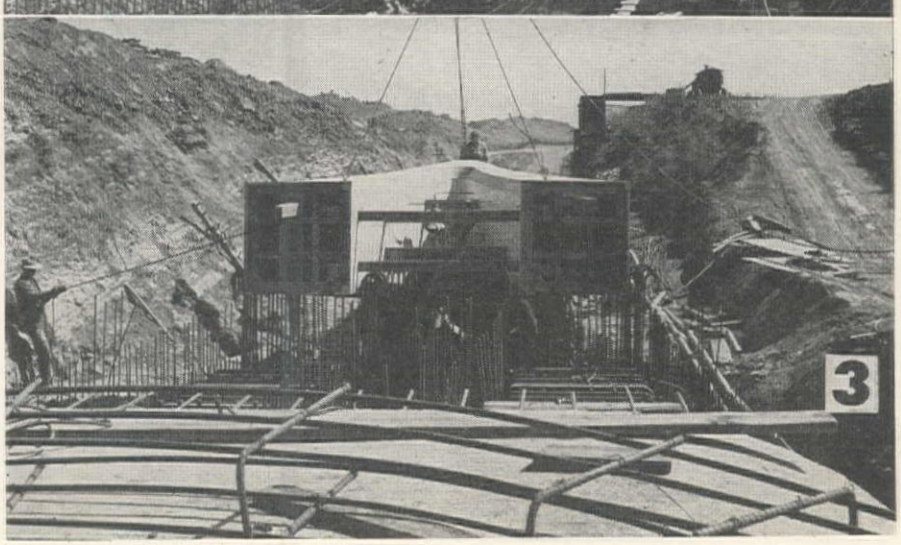
Horsetooth reservoir

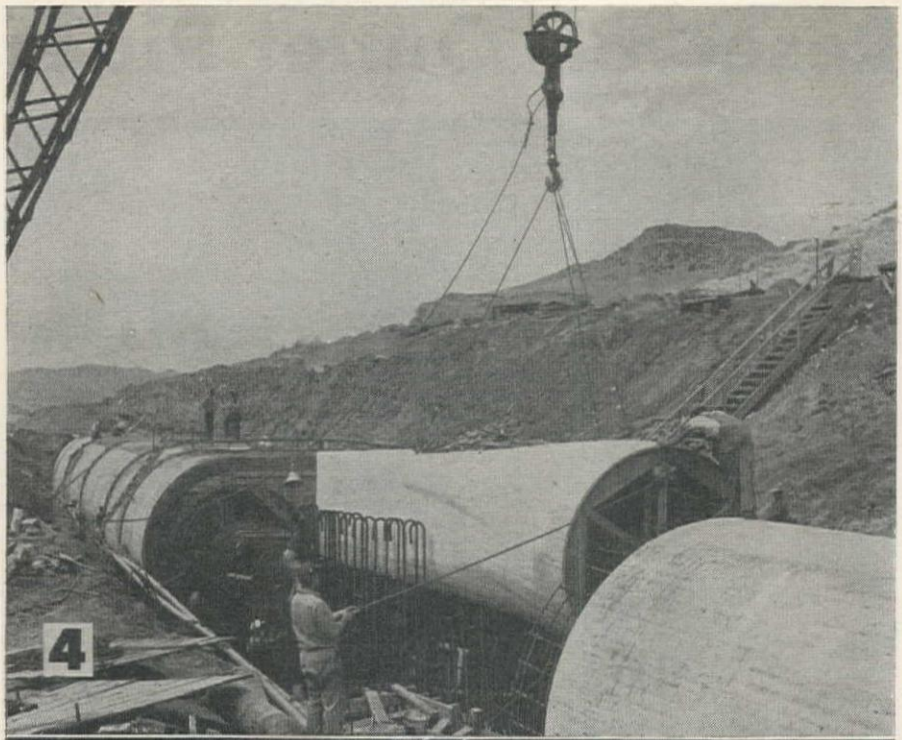
Horsetooth reservoir will be formed y Horsetooth dam, an earthfill struc-ure 125 ft. high, 1,600 ft. long and con-aining 1,850,000 cu. yd. of material, and hree other smaller earthfill dams filling otches in the upturned strata which orm the eastern wall of the reservoir. hese dams are known as Soldier Can-on dam, 205 ft. high, 1,424 ft. long and ontaining 3,272,000 cu. yd. of embank-ıent; Dixon dam, 220 ft. high, 1,200 ft. ong, and containing 3,000,000 cu. yd.; nd Spring Canyon dam, 205 ft. high, ,150 ft. long and involving 2,210,000 cu. d. of fill.

A concrete outlet conduit is being con-tructed through Horsetooth dam. It is bout 1,100 ft. long. About 385 ft. down-tream from the intake is a gate chamber oused in a circular concrete dome 26 ft. n interior diameter. The portion of the utlet conduit upstream from the gate hamber will consist of an 8.5-ft. rein-orced concrete conduit with a 34-in. vall thickness. Below the gate chamber,

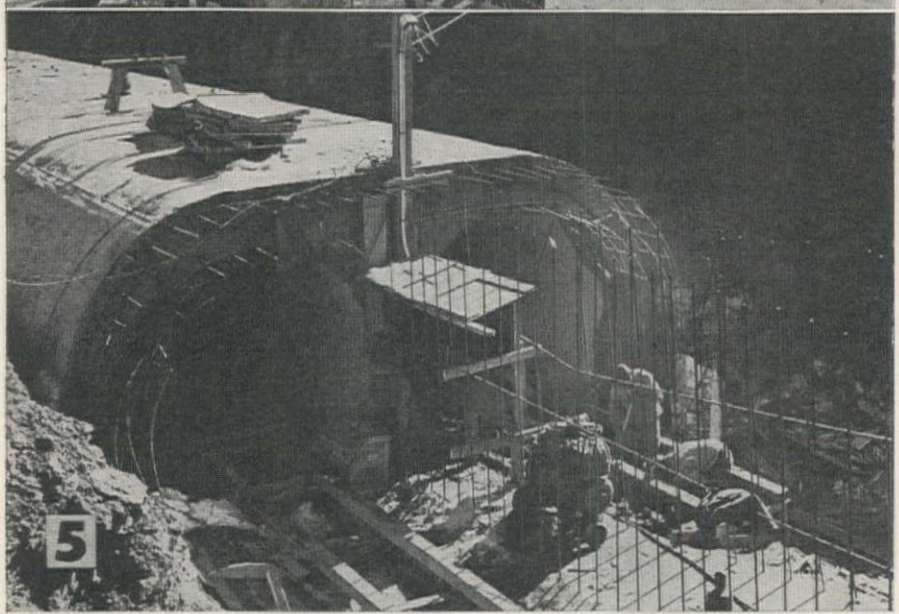








4



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6

two 72-in. steel outlet pipes will be ca ried in twin horseshoe section tunne with each opening 10 ft. in diameter t permit a walkway alongside the pipe

Two 5 x 5-ft. high pressure slide gat will be installed in the gate chamber t regulate flows through the discharg system. At the lower end of the outl pipes, 72-in. hollow jet valves will di charge into a rectangular box sectio stilling basin. At the upstream end o the outlet conduit a reinforced concret intake structure protected by steel tras racks is being built.

Design details

The trash rack is in effect a rectangu lar box with openings on side and to The struts supporting the roof are 2.5 f square reinforced concrete spaced so a to leave openings 9.5 ft. square on th sides. The longitudinal and transvers beams resting on the struts are 2.5 f square and similar 9.5 ft. square open ings result in the top and end of the in take. Slots for the steel trash racks ar left around these openings. At the lowe end of the intake a transition sectio directs the water into the 8.6-ft. circula conduit which was constructed in 27-f lengths cast in place as discussed in th article which appeared in *Western Con struction News*, October, 1946.

Immediately upstream from the gat chamber a concrete structure will sep arate the flow from the 8.6-ft. condui into the two 72-in. steel pipes. On eac of these latter will be installed one o the slide gates operated from within th gate chamber dome.

The walls of this dome vary from 2. in thickness at the level of the operatin floor to 2 ft. at the crest of the dome Access to the chamber will be by mean of a steel ladder from the walkway in th tunnel downstream.

The double-barrelled outlet condui below the gate chamber consists of tw horseshoe shaped openings, 21 in. apar and with the pipe supports offset slightl from the center in each case to permit walkway along one side. A minimum o 27 in. of concrete is placed in the wall of these conduits. The steel pipes ar carried on heavy concrete support placed on 20 ft. centers.

Construction details

In the accompanying photographs de tails of the construction, as carried ou by Grafe-Callahan & Gunther-Shirley Co., contractors on the project, are il lustrated:

1. Trash rack structure at the intak end of the outlet works; the steel grat ings have not yet been placed but th grooves in which they will sit are evi dent. The 8.5-ft. pipe section is seen lead ing off to the left toward the gate cham ber in the background.

2. A section of the 72-in. steel pipe i inserted into one of the horseshoe open ings in the twin conduit downstrean from the gate chamber; in the fore ground the invert for additional section of the conduit has been poured and stee is in place for the walls.

3. Preconstructed forms for the struc ture which will divide the flow in th

6-ft. circular tube into the two square eel conduits which pass through the ate chamber and serve as seats for the ide gates.

4. Another view of this special form, anging from 8-ft. circular to double ft. square as it is being lowered into lace.

5. Downstream end of the double-arrelled conduit; transition into rectan-ular stilling basin will commence at this oint. Timber track in the foreground to accommodate the dolly which will onvey the steel pipe sections into the onduit.

6. Longitudinal view of the stilling asin under construction. The floor of he nearly completed section is at elev. 274 and has interior dimensions of 37 ft. ide and 31 ft. deep. The elevation of the vert of the tubes at the point of dis-harge is 5288 and the drop to the bottom f the stilling basin bucket is accom-lished in 65 ft. longitudinally. A center ividing wall extends from the end of the ubes for a distance of 110 ft. At a point 35 ft. from the tube ends the floor of he stilling basin commences to rise and 57 ft. attains an elevation of 5282, hich is the discharge lip level. At the me time the walls contract to form an pening 18 ft. wide and 16 ft. high. The oncrete floor of the stilling basin varies om 5 to 6 ft. in thickness and is under-id with a drainage system of sewer ipe with open joints laid in a bed of reened gravel. The discharge lip is pro-ected from undercutting by a cutoff wall 2 ft. deep.

7. Also under construction at the pres-nt time is Horsetooth feeder canal, hich will bring the west slope waters nto Horsetooth reservoir. Five tunnels hich form a part of the canal are cur-ently being driven by Tunnel Construc-ors, a firm consisting of Martin Wun-erlich Construction Co., David G. Gor-on and John R. Austin Construction o. Shown here inspecting one of the unnel portals are, r. to l., John R. Austin, ack Woods, engineer, and a tunnel orker.

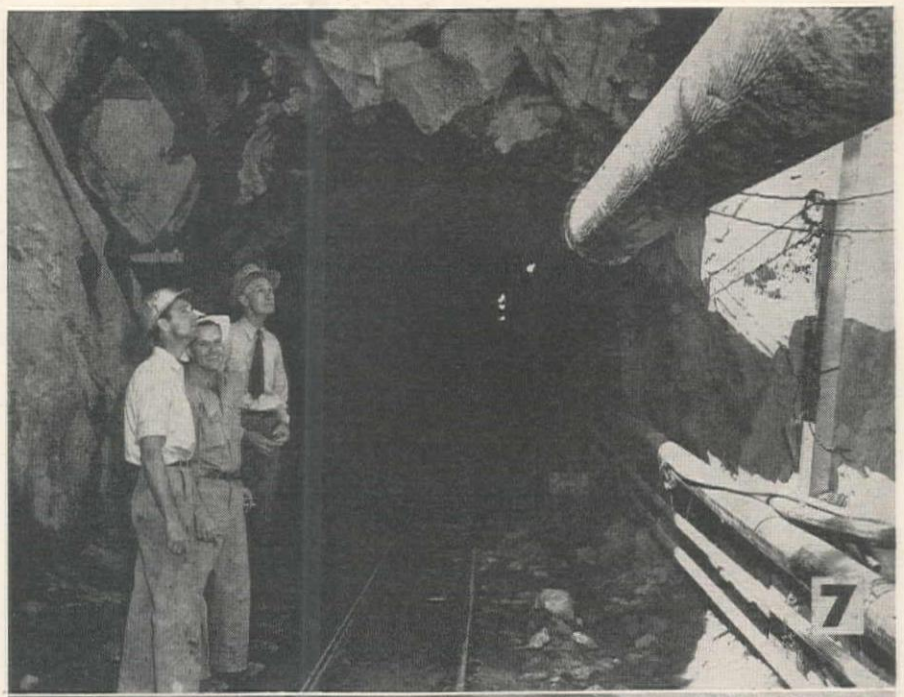
8. Interior view of one of the outlet onduits through Horsetooth dam show-ng the heavy supporting blocks, the imber track upon which the pipe sec-ons are conveyed and the walkway to e used for inspection purposes and for ccess to the gate chamber.

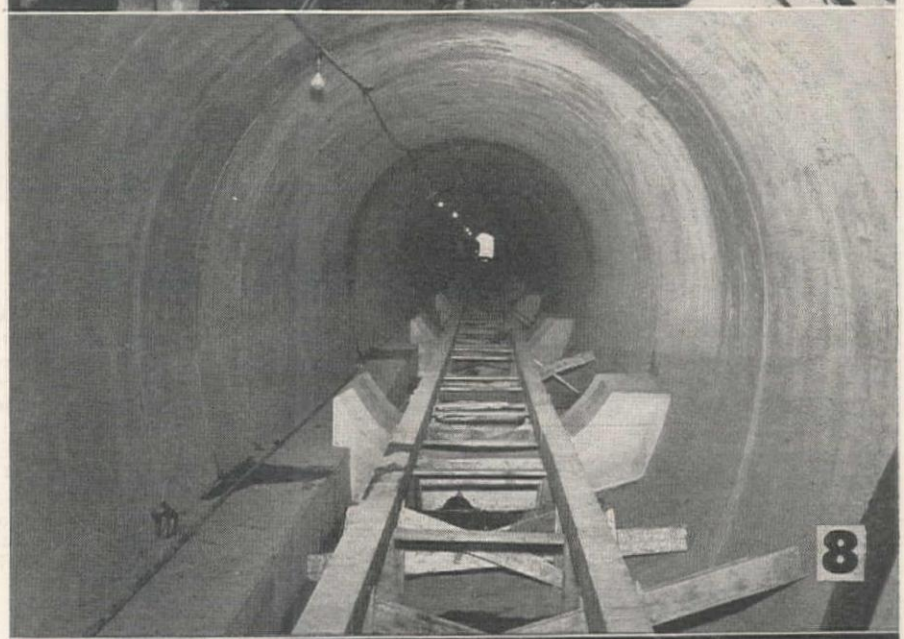
9. Another interior view of the con-uit showing the steel pipe in place, an nspection manhole, and hand holds in he roof of the conduit.

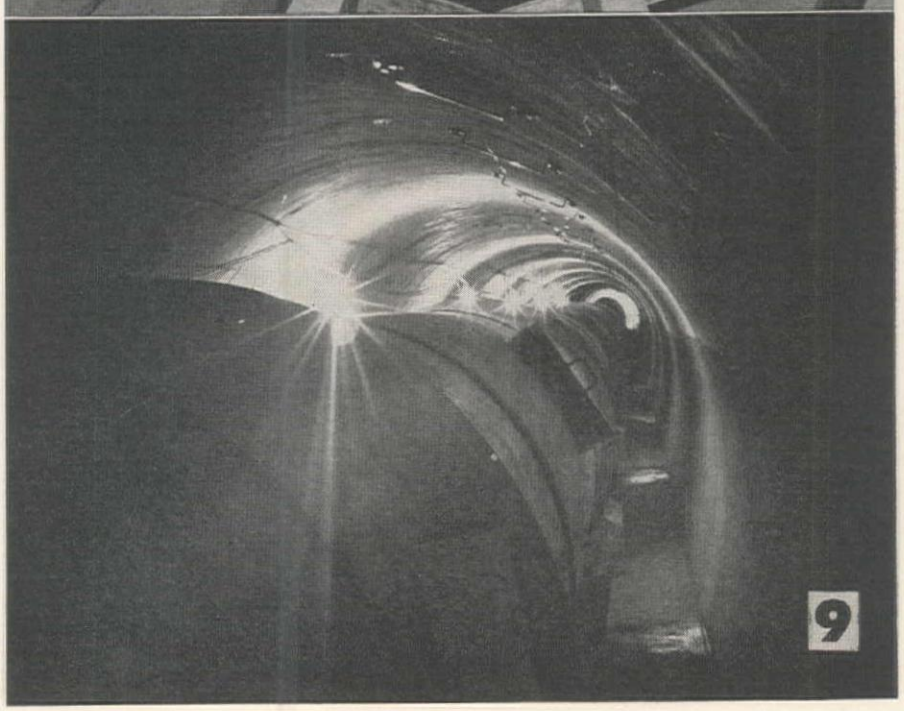
ersonnel

Horsetooth dam and the outlet works escribed above are a part of the Bureau f Reclamation's Colorado-Big Thomp-on Project. Walker R. Young is Chief ngineer of the Bureau and Richard B. Vard is construction engineer on Horse-ooth dam.

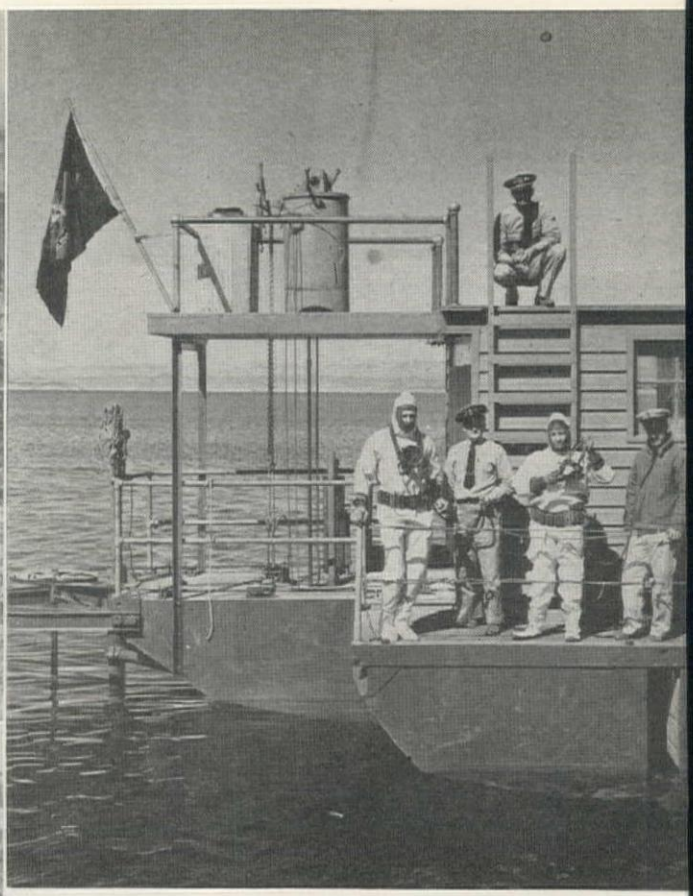
The construction contract for the dam nd appurtenant works is held by Grafe-allahan and Gunther-Shirley Co., Fort ollins, Colo. The amount of the con-act is $5,111,877. J. M. Seabury is gen-ral superintendent for the contractors nd Fred Brandt is job superintendent.


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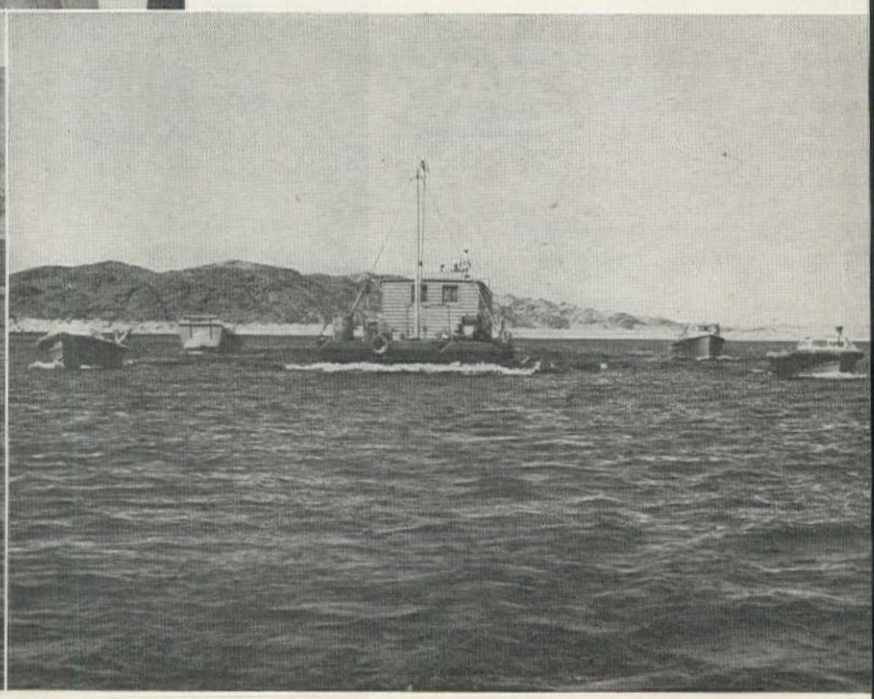


NAVY MEASURES SILT DEPOSIT IN LAKE MEAD

THE BUREAU of Reclamation, Geological Survey, and U. S Navy are cooperating in a sedimentation survey in Lake Mead the 115-mi. reservoir formed by Hoover Dam, top left. Divin operations are being performed by Navy personnel, show above preparing for one of the dives. Navy personnel, left, in clude, l. to r.: A. B. HOLMES, CMN, H. E. KNUDSEN, CMN J. D. M. FRIETAS, CMN, and G. B. LABAGNARA, CBM. On of the fleet of Navy vessels engaged in the survey is the 38-f Diesel engine powered picket boat being used for observatio in the photo at lower left. The Lake Mead Navy consists of barge, or mother ship, two plane personnel boats, an LCV landing craft and the picket boat, below.

Bureau of Reclamation Photo





CONSTRUCTION DESIGN CHART

XCV... Plank and Laminated Floors

By JAMES R. GRIFFITH
Civil Engineer
Seattle, Wash.

A CHART was published in Sept., 1940, to solve plank and laminated floors using an allowable flexural stress of 1200 p.s.i. In the use of this chart, I have found a repeated need for a lower range of values on all scales as well as other stress limits. The accompanying chart is similar to the previous one except for the different stress limits and a lower range of values making it applicable to roof sheathing and sub-flooring. Instead of only one stress limit, this chart is good for either 1,000 or 1,400 p.s.i. In conformity with the Douglas Fir Use Book[1], deflections were taken at 1/16 in. per ft. of span.

While this chart has been prepared on the basis of the table for allowable loads on plank and laminated floors to be found in the Douglas Fir Use Book, it is felt that in many instances it represents ultra-conservative values. The allowable loads in the Use Book were figured on the basis of simple spans wherein $M = \frac{w L^2}{8}$. In the lower span ranges, the flooring or sheathing is usually continuous over several spans. Therefore, the results should be interpreted accordingly.

A single straight line intersecting all scales is necessary for a solution of this chart. A solution line has been drawn on the chart for 2-in. flooring at an allowable flexural stress of 1000 p.s.i., on a 7-ft. span. Thus, on the right hand scale the allowable load will be seen to be 72 p.s.f. The Douglas Fir Use Book gives an allowable load of 71.8 p.s.f. for identical conditions. By formula, we would have

$$M = \frac{w L^2}{8} \quad \text{and} \quad M = sf$$

therefore

$$sf = \frac{w L^2}{8}$$

Since the section modulus for 2-in. lumber dressed to 1⅝ in. is

$$s = 5.28 \text{ in.}^3$$

then

$$w = \frac{8sf}{L^2} = \frac{8 \times 5.28 \times 1{,}000}{7^2 \times 12} = 71.8 \text{ p.s.f.}$$

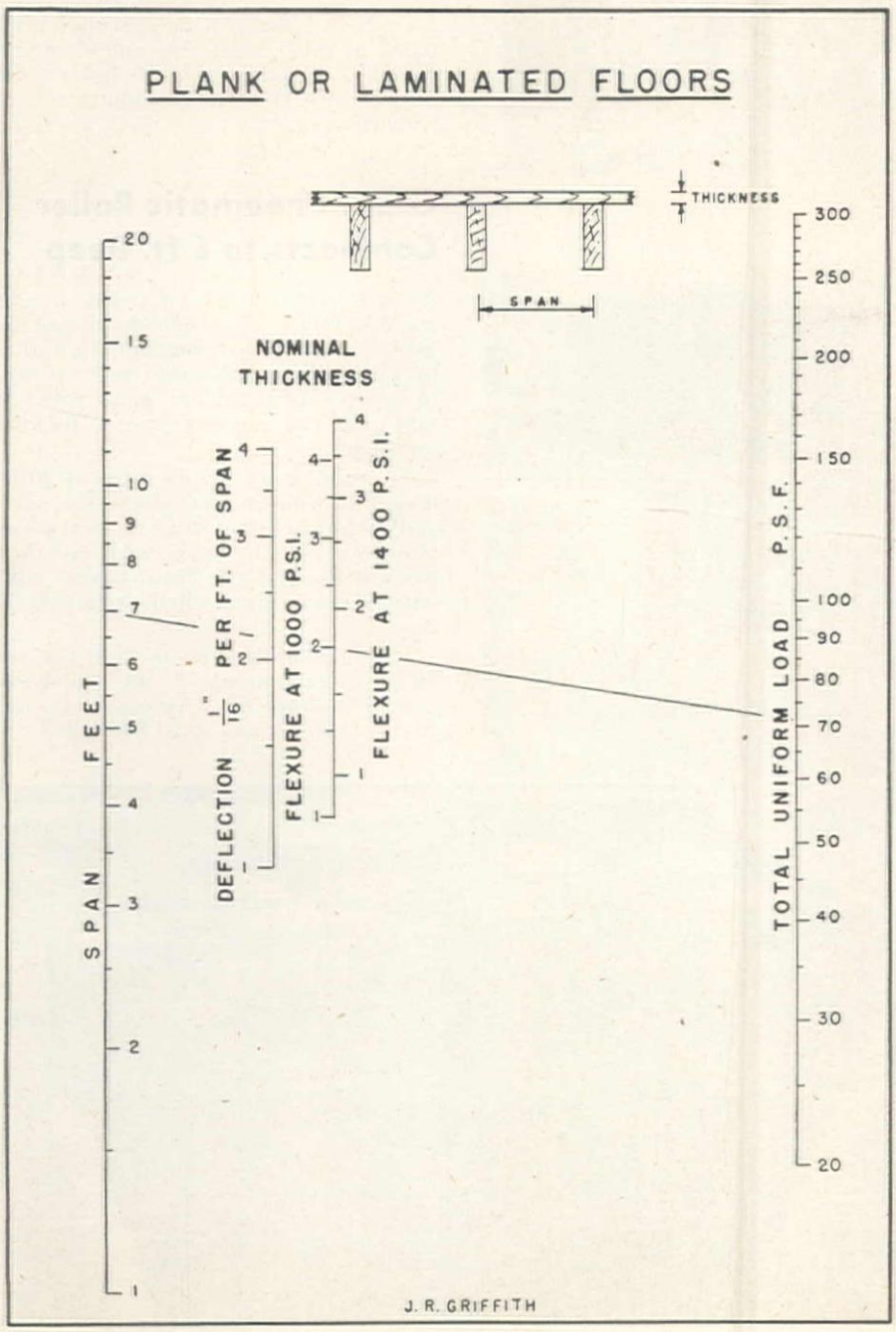
On the chart it will be noted that if deflection is to be limited to 1/16 in. per ft. of span, the allowable load will be less than that obtained for flexure. If a solution line is drawn through the 2-in. thickness on the deflection scale, an allowable load of 55 p.s.f. will be obtained. The Douglas Fir Use Book gives an allowable load of 55.6 p.s.f. for the same conditions.

While the Douglas Fir Use Book does not show lumber thickness values below 2 in., I have indicated values down to 1 in. If a solution line is drawn on the chart for a load of 100 p.s.f. and 1-in. lumber at an allowable stress of 1400 p.s.i., as an example, it will be noted that the allowable span is 3.4 ft. By formula we would have the following:

Section modulus of 1-in. lumber dressed to 25/32 in., $s = 1.22$ in.^{3}

$$L = \sqrt{\frac{8sf}{w}} = \sqrt{\frac{8 \times 1.22 \times 1{,}400}{100 \times 12}} = 3.38 \text{ ft.}$$

[1] West Coast Lumbermen's Association.



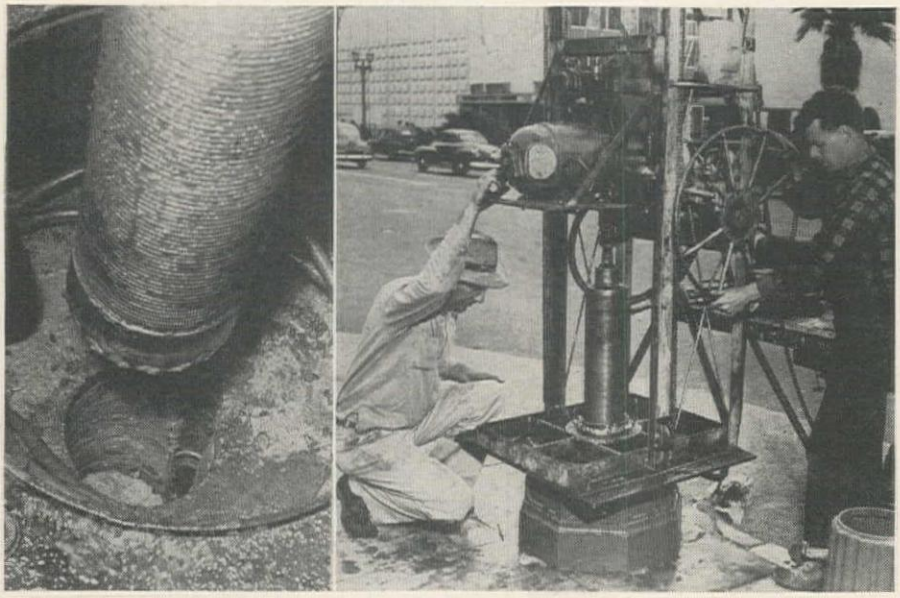
Reconstruction of Tacoma Narrows Bridge Under Way

WORK ON construction of the second Tacoma Narrows bridge began the middle of April with the removal of existing cable anchorages being started by crews of Woodworth and Co., Tacoma, under a subcontract from Bethlehem Pacific Coast Steel Corp. Bids for construction of the 2,800-ft. span to replace the original structure which was destroyed by wind in November, 1940, less than five months after its completion, were opened on Oct. 15, 1947. Actual awarding of the contracts has been delayed by the difficulties encountered in effecting sale of the revenue bonds which will finance construction.

The Washington Toll Bridge Authority has awarded the contract for erection of the towers and bridge proper to Bethlehem Pacific Coast Steel Corp., and the contract for erection of the suspension cables and accessories to John A. Roebling's Sons Co. Preliminary work being done by Woodworth and Co. includes removal of old anchorages and approaches, and construction of new anchorages.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD



Deep Holes in Concrete Made by Rotary Drills

ROTARY CONCRETE DRILLS were used by the Zeibarth Contracting Co., Long Beach, Calif., to drill a series of perfectly round, 6¼-in. diameter holes 3 ft. down into concrete pavement, frequently through abandoned cable and electrical conduit lines. The firm contracted for the job when the City of Los Angeles decided that the lighting along Hollywood's famous "Radio Row" on Sunset Blvd. was inadequate. It was decided to replace the 18-ft. high light standards then in use with 26-ft. high standards. However, the new standards were of a slender design and had to be reinforced. The reinforcing posts needed anchoring, necessitating the holes.

The blunt end of the drill bits, which were manufactured by the Rotary Concrete Drill Co. of Pasadena, Calif., enabled them to drill through gravel or round rocks in concrete rather than being deflected around them. The large size drills are made with a hollow center and have a slot in one side. The bits cut out a small core which breaks up and passes through the slot in one side.

The rotary drills were handmade from cold rolled steel. The cutters were heat treated, then set in and brazed to the end of the bit shaft at a negative angle. The shafts were machined into a worm for about 3 in. up from the cutters. With the cutter set at the negative angle, the action is a powdering one and the worm spiral picks up the powder and brings it out of the hole.

The special drill bits were mounted on a rig which operated at 800 r.p.m. and made the 707-cu. in. cuts in an average time of 25 minutes. On one hole where an upright piece of pipe had to be cut squarely down the middle, the job took an hour.

Three cutters were used on the ¼-in. and 11/16-in. drills and four or more were used on the larger bits. With the powdering action of the cutter, the danger of the drill bit's sticking in the hole was eliminated. The blunt end design also reduced breakage to a minimum. The larger size drills from ⅝ in. up have the hollow center and slot while the smaller sizes are solid. With the slot design, less pressure was required for drilling.

It was necessary to drill through remnants of cable, steel pipe and electrical conduit. As many as 3,000 holes were drilled with the bits without need of resharpening.

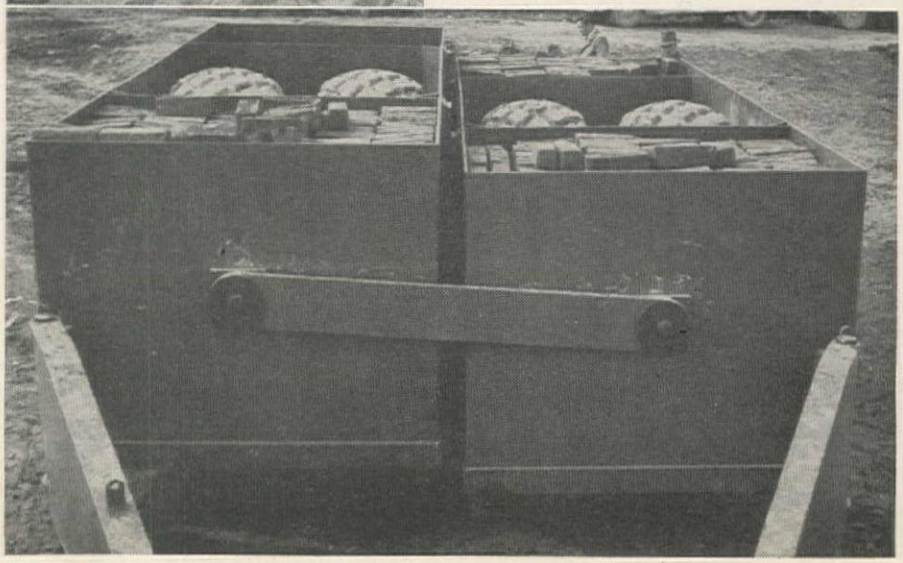
Giant Pneumatic Roller Compacts to 6 ft. Deep



A HUGE PNEUMATIC roller weighing 400,000 lb. has been developed by O. J. Porter & Co., Sacramento, Calif., to give maximum compaction of soil to a depth of 6 ft. The giant roller is said to be the heaviest thing of its kind on wheels.

The steel body of the roller is 20 ft. long, 7 ft. wide and 6 ft. deep. The sides and bottom are built of ¾-in. steel plate, reinforced on the sides with one-inch steel. Ballast for the "load boxes" consists of iron ingots which weigh 80 lb. each.

The mammoth tires used on the vehicle, manufactured by the Goodyear Tire & Rubber Co., Akron, Ohio, are 30.00 - 33 in size and stand 8 ft. tall. They

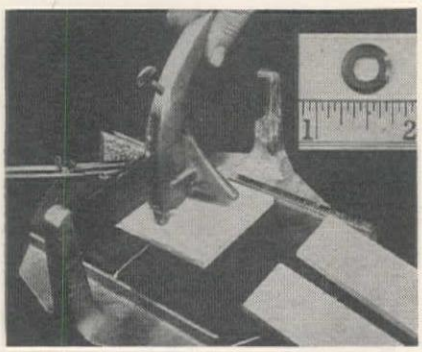


are nearly a yard in width and carry inflation pressures up to 150 p.s.i. The combined weight of tire and tube is close to a ton. The tires are mounted on dual wheels, through the center of which is a steel axle, 12 in. in diameter and weighing 80 lb. each.

Making giant tracks in the earth, the roller eliminates the necessity of extra rock layer under the concrete. It also detects soft spots in the earthen foundation before concrete is laid.

Carbide Wheels Used in Scoring Glass and Tile

DISCS OF SOLID cemented carbide, an extremely hard commercial metal, are being used by the Superior Tile Cutting Co., Los Angeles, Calif., to eliminate the usual large amount of scrap tile resulting from rapid dulling of conventional cutting wheels. The discs, sharpened to a



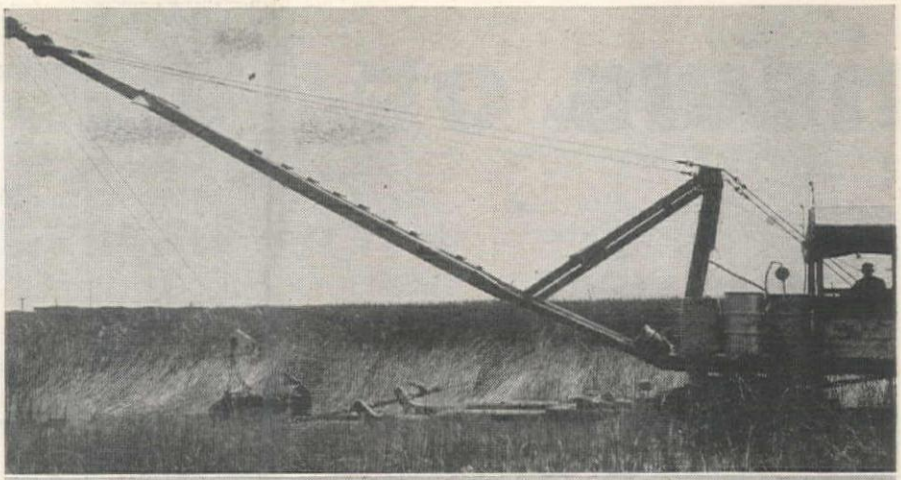
90-deg. angle and installed in portable tile cutters, are reported to be lasting a full year for scoring both glazed and unglazed tile.

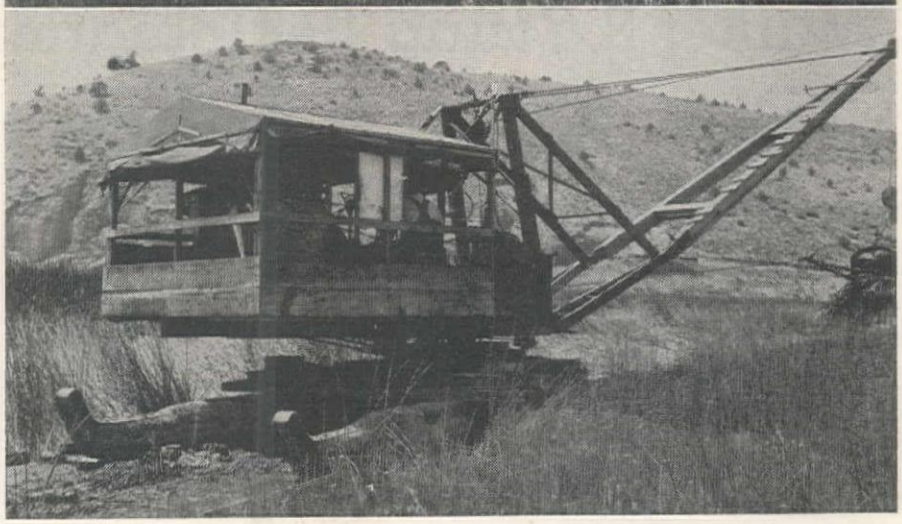
The conventional cutting wheels are composed of six small high speed steel glass cutters mounted on a brass cage and can make 100 cuts on un-glazed tile before replacement is necessary. The solid cemented carbide wheels make 3,000 cuts on 6-in. long un-glazed tile before the cutter becomes slightly dull. The discs shown in the picture are ½-in. O.D. x ¼-in. I.D. x 3/32-in. thick, and were produced through powder metallurgy by Carboloy Co., Inc., Detroit, Mich.

Tests showed that the usual cutting wheels, making cuts 6 in. long on unglazed tile, had to be replaced after from 50 to 100 cuts. As the steel cutter in these wheels dulled, the chances of ruining tile increased rapidly due to the inability to score the material cleanly. The average life of these cutters was found to be about 6 weeks.

After the 3,000 cuts using the cemented carbide wheel, the cutter still could have been satisfactorily used by exerting slightly more pressure on the handle while scoring. Instead, the cutting wheel was removed and sharpened. No tiles were scrapped up to that time.

Cemented carbide is said to be the hardest metal manufactured commercially. Far harder than steel, it approaches the diamond in hardness. It is widely used in industry for cutting tools, dies, and to resist wear in all kinds of products.

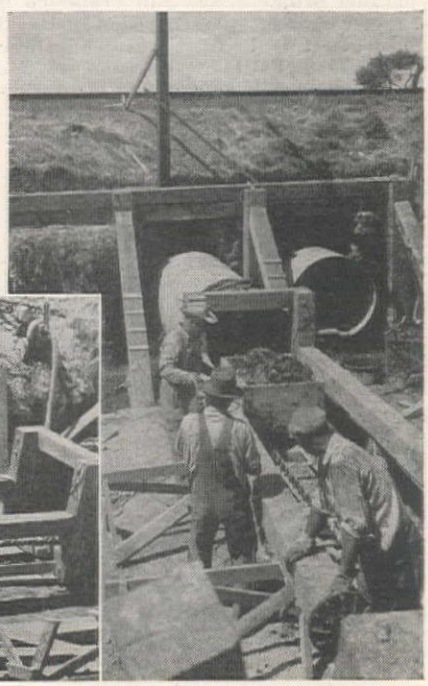




Special Devices Employed to Speed Construction on Klamath Project

SPECIAL PROBLEMS encountered in construction of the Klamath Irrigation Project on the Oregon-California boundary by the Bureau of Reclamation brought about special solutions. The photos above illustrate the movement of an improvised dragline mounted on skids across the mushy, reed-grown bottom land. The bucket is caused to bite deep into the mud, after which a pull on the tagline against it as an anchor slides the machine forward. The bucket is then used to make the preliminary cut for drainage canals through the swamp. Below is illustrated the jacking of large culvert pipe underneath the roadbed of the Southern Pacific Railroad south of Klamath Falls. Hydraulic jacks are employed to keep a steady and equal pressure against the pipe, left. As the pipe advances, earth resistance is lessened by removing the soil core in a small hand-operated car.





NEWS OF WESTERN CONSTRUCTION

MAY, 1948

Walker R. Young, Reclamation Chief Engineer, to Retire

THE RETIREMENT of Walker R. Young, Chief Engineer of the Bureau of Reclamation, effective June 30 upon completion of 37 years of service, and appointment of L. N. McClellan, now assistant chief engineer, to succeed him, has been announced.

Young's Reclamation career began as a young engineer on the construction of Arrowrock Dam in Idaho, then the world's tallest dam. Ever since then, his work has been identified with structures and projects of unprecedented size and difficulty. With less than 10 years of Bureau experience, he was assigned the responsibility of finding a site and of preparing designs and estimates preliminary to the construction of Hoover Dam and Power Plant. Later, under his charge as construction engineer, that structure rose from the rocky bed of Black Canyon on the Colorado River to the 726-ft. height of man's tallest dam.

He served as construction engineer on the Kittitas Division of the Yakima project, Washington, and supervising engineer on California's huge Central Valley project, and became the bureau's assistant chief engineer in Nov., 1940. In Jan., 1945, he was appointed chief engineer. During his term in office, such structures as the 13-mi. Alva B. Adams Tunnel in Colorado; Davis Dam, on the Colorado River; the Tracy Pumping Plant, in California, and many other notable structures have been built. He has the responsibility for the design on construction phases of the Bureau's 22 active projects involving contracts aggregating $260 million in value.

Under his skilled engineering guidance, forces and work procedures organized to carry a construction program of less than $100 million per year have been reshaped to carry, with a high degree of success, a construction pace now exceeding a quarter of a billion dollars per year.



WALKER R. YOUNG, Chief Engineer of the Bureau of Reclamation, who retires June 30 after completing 37 years of service to the West.

In commenting upon his retirement, Young stated:

"The growth of the West will soon require the full development of its water resources to meet its irrigation and power needs. We should plan and build projects at a rate that will keep ahead of the demands, and do so in a way that will assure the widest, most beneficial use of our limited water supply. Today, shortages of water and power demonstrate dramatically in many places that our natural-resource development, retarded by the war, still lags behind requirements. Reclamation is now making marked progress. It has before it the biggest job in its nearly half a century of existence, and one in which I hope to continue to participate."

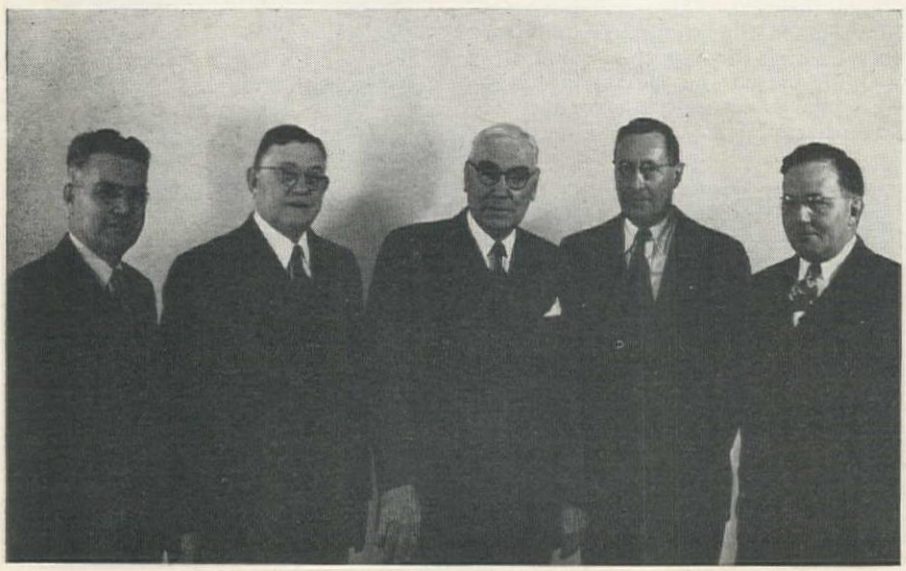
Mr. Young was born at Butler, Indiana, May 7, 1885. He was graduated from the University of Idaho in 1908 with a degree in Mining Engineering. In 1935, his alma mater awarded him an honorary degree of Doctor of Engineering in recognition of his outstanding work at Hoover Dam.

He is a member of the American Society of Civil Engineers and the Colorado Society of Engineers, and of the Phi Delta Theta and Tau Beta Pi fraternities.

McClellan was born in Middletown, Ohio, in 1888. He was graduated from the University of Southern California in 1911

ENGINEERING CONSULTANTS APPOINTED TO STUDY BAY BRIDGE

A CONSULTING BOARD of engineers has been appointed to study the plans for a parallel bridge across San Francisco Bay. They are, l. to r.: RALPH A. TUDOR, Chief Engineer, State Division of Bay Toll Crossings; GEORGE L. FREEMAN, New York; C. H. PURCELL, California Director of Public Works; RALPH SMILLIE, New York; O. J. PORTER, Sacramento. The Board will review only bridge plans, since State agencies have declined to consider the Reber Plan as an alternate to bridges.



with a degree of B.S. in electrical engineering, and in the same year began work for the Bureau of Reclamation on Salt River project in Arizona. Except for service as a lieutenant of tank corps overseas in World War I, and less than a year with the Southern California Edison Company, he has served continuously with the Bureau.

As Assistant Chief Engineer for the past three years, he has been closely associated with Young in directing the design and construction aspects of the broad Reclamation program. McClellan is fellow and past Vice-President of the American Institute of Electrical Engineers, and past chairman of the Denver section of the American Institute of Electrical Engineers. Also, he is a member of the Phi Nu Delta, Sigma Psi and Tau Beta Pi fraternities and of the Colorado Society of Engineers, and of the United States International Conference on Large Electric High-Tension Systems. He was a United States delegate to the World Power Conference in Paris in 1946.

Winter Seasonal Decline Noted in Construction Work

NEW CONSTRUCTION put in place during February was estimated at $959 million, representing a normal overall seasonal decline of 10 per cent from the January level, according to a report released from the Construction Division of the U. S. Department of Commerce. Value of the construction activity was 21 per cent greater than that at February 1947, according to the report.

A slight contra-seasonal gain was registered in private commercial building.

General-Shea-Morrison Combination Wins Contract for Hungry Horse Dam

GENERAL - SHEA - MORRISON has submitted the low bid of $43,431,000 to the Bureau of Reclamation for the construction of Hungry Horse dam on the South Fork of the Flathead River in northwestern Montana. Only one other bid was submitted at the opening on April 6, and that amounted to $51,729,000 which was offered by Allied Dam Contractors, Inc., Los Angeles.

The General - Shea - Morrison combine includes in its organization nine contracting firms in addition to the name companies. The total list includes General Construction Co., Seattle; J. F. Shea Co., Los Angeles; Morrison-Knudsen Co., Inc., Boise; Pacific Bridge Co., San Francisco; Walsh Construction Co., Des Moines, Iowa; Peter Kiewit Sons' Co., Omaha, Nebr.; Henry J. Kaiser Co., Oakland; Gilpin Construction Co., Portland; S. Birch & Sons Co., Great Falls, Mont.; J. L. McLaughlin, Great Falls; F & S Contracting Co., Butte, Mont.; and J. C. Boespflug Construction Co., Seattle.

Allied Dam Contractors was another joint venture group which included in its membership Guy F. Atkinson Co., San Francisco; J. C. Maguire, Los Angeles; D. W. Thurston, Los Angeles; Pacific Constructors, San Francisco; Arundel Corp., Baltimore, Md.; L. E. Dixon, San Gabriel, Calif.; Bressi & Bevanda, Hollywood, Calif.; Western Contracting Co., Sioux City, Iowa; Brown & Root, Houston, Tex.; Ed. Honnen, Colorado Springs, Colo.; A. Teichert & Son, Sacramento, Calif.; Martin Wunderlich, Omaha, Nebr.; Hunkin-Conkey, Cleveland, Ohio; Charles H. Thompkins, Washington, D. C.; S. M. Griffith, Los Angeles; and Shofner, Grafe-Callahan-Gunther & Shirley, Los Angeles.

Hungry Horse dam is designed as the world's fourth largest concrete dam in mass and height. It will be a gravity arch structure 520 ft. high with a crest length of 2,115 ft. Indications at the bid opening were that the low bidder is within the allowable tolerance of the Bureau of Reclamation's estimate, and that the contract will probably be awarded to General-Shea-Morrison by the middle of May.

Bonneville-California Power Line Is Proposed

A TRANSMISSION LINE to transfer excess power from the Bonneville Power System in Oregon and Washington for use in California has been proposed before the U. S. Congress by Rep. Engle of California as part of a program for solving the California power shortage. In projecting the proposal, Engle estimated that 2,000,000 kilowatt hours of electricity goes to waste each year in the Bonneville system, largely because the peak demand for power falls in December and January and coincides with the minimum runoff of the Columbia River. He pointed out that the power potential





PRELIMINARY WORK at Hungry Horse dam site near Columbia Falls, Mont., includes the excavation of a 1,100-ft. diversion tunnel 36 ft. in diameter, which is being carried out by the Guy F. Atkinson Co., and more than 800 ft. of the tunnel have been driven. Photo at left shows Atkinson crews at work on the face. On April 7 bids were opened for construction of the dam. Below, CLYDE H. SPENCER, Reclamation construction engineer, confers with RICHARD JONES, representing contractors.

of the river must be used as it passes the power plants or it goes to waste.

Engle also suggested that, with connecting transmission lines and an integrated system, it would be possible for California's Central Valley facilities to supply power from time to time to consumers on the Bonneville system. He said that California could use the waste Columbia River power and save the Central Valley power at Shasta and Keswick Dams to meet peak demands and periods of short water.

Meanwhile, the Bureau of Reclamation has requested $70,000 to continue its study of the proposed integrated power system. Engle urged that additional money be granted so that actual construction could be started as soon as possible.

Arizona Solons Enact New Groundwater Code

THE ARIZONA legislature has enacted a revised state-wide code to set up controls over groundwater in critical areas below 2,100 ft. in elevation to conserve dwindling groundwater supplies and to comply with the demand of the U. S. Bureau of Reclamation that the State act to prevent new lands from coming under cultivation before it would finally recommend the Central Arizona Project.

The bill will make it possible to curb over-expansion of Arizona's agricultural land below the 2,100-ft. level by prohibiting the drilling of wells in critical areas. It authorizes the State Land Commissioner to prevent withdrawals beyond available supplies from any groundwater basin and for the decrease in supplies to be borne proportionately by all users of water for irrigation in a district. It does not prohibit the drilling of a new well on land under irrigation during the last five years and thus prevents speculation on desert lands not yet irrigated.

The Bureau of Reclamation had requested that Arizona adopt the groundwater code because of the limit on the State's groundwater resources and a limit to the amount of Colorado River water that can be brought into the state.

OBITUARIES . . .

Albert R. Gibson, retired Seattle contractor, died in Everett, Wash., March 18. A native of Ohio he joined the gold rush to Yukon Territory in 1898, returning to Seattle in 1902 to enter the general contracting field. Among the major Seattle projects with which he was identified were the first Denny regrade, first brick paving of First and Second avenues, and removal of the original Washington Hotel.

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Carl L. Wyant, 57, retired general manager of the Montecito Water District, died March 1 at Santa Barbara, Calif. Known as the father of the system which brought water to the dry Montecito Valley, it was his plan, first presented as a graduation thesis at Stanford University, which finally became a reality for the district. He also designed and constructed the General's Highway in Sequoia National Park and two silt dams for the U. S. Forest Service in Los Padres National Forest.

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James Edward Maloney, 84, former Chief Highway Engineer of Colorado, died March 22 after a long illness. He first came to Colorado in 1899 as construction engineer for the Cheesman Dam. He was with the highway department from 1910 until 1938 when he retired.

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Richard Ray Mitchell, 56, retired civil engineer and former Senior Engineer for the Public Roads Administration at Ogden, Utah, died April 15 at his home in Ogden. He had been retired since Jan. 1, 1948.

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Robert D. Caney, retired civil engineer for the Seattle public school system, died at Port Angeles, Wash., March 15. He was born in Buffalo, N. Y., was graduated from the University of Michigan, and came to Seattle in 1915. He retired to live at Port Angeles in 1929.

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Fred T. Adams, Sr., 69, Denver building contractor and principal in the firm of Murphy & Adams, died April 2 after a long illness. He was noted particularly as a moving contractor, and one of his most spectacular jobs was the moving of a 2,000-ton apartment terrace 120 ft. from the present Denver Civic Center area.

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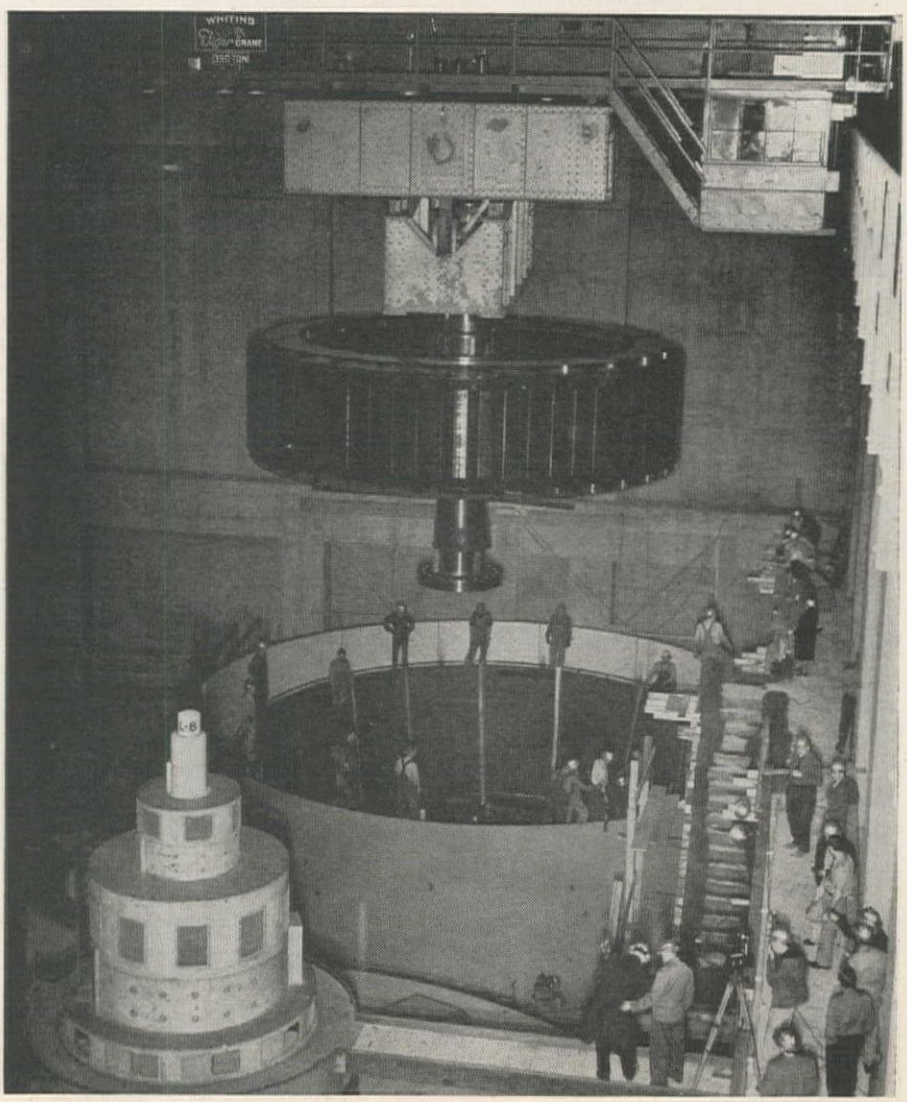
Peter Verhey, building contractor at Prescott, Ariz., died April 16 after a month's illness.

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Leonard Wilson, 73, consulting engineer for many Utah firms, died March 15 in a San Diego, Calif., hospital. He specialized in the design of power plants and facilities.

587-TON ROTOR EASED INTO PLACE AT GRAND COULEE POWERHOUSE

WHILE EMPLOYEES of the Westinghouse Electric Corp. hold spacing sticks, the huge rotor is carefully lowered into its stator in the West Powerhouse at Grand Coulee Dam. This ninth and final unit will give the plant a rated capacity of 972,000 kw., or nearly twice as much as any other plant in the Northwest. The Bureau of Reclamation has already ordered six of the nine equally large generators for the companion East Powerhouse. Each of the units at Coulee Dam ranks among the mightiest in the world.



WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—In May, the principal topic of regional interest to the Pacific slope in all likelihood will be the hearings on the bill concerning the proposed dam at Glen Canyon in Arizona. Construction of this dam would bring into existence the canals and the development of the lands in the Central Valley of Arizona. This project has long been waiting for public consideration and is expected to precipitate bitter and vigorous conflict. The expectations are that the Public Lands Committee of Congress will be swamped with representatives from California as well as from other states in the Colorado Basin. The proceeding is the essence of the issue upon which turns Southern California's aspirations to the Colorado River water which Arizona is determined it shall not have.

It is a sharp and dramatic issue, spelling on one side the future of the area from the Tehachapis to the Mexican border in California, and on the other of a great and presumably fertile area in Arizona. We understand here that practically the whole of California's numerous delegation in Congress is solidly lined up behind Southern California, which, of course, means the state supports the desires of the Los Angeles region.

It is not quite clear to what extent the other states support Arizona. It is fairly patent they do not support California, but at the same time there is confusion about their relation to Arizona. For instance, the states of the Upper Basin are regarded as divided by the purposes of Colorado. The great state which gives its name to the famous stream regards itself as essentially the major owner of the water of the river under the old theory of States' Rights. This contention was advanced by Delph Carpenter, and others, twenty to thirty years ago, when this correspondent first was entangled with the affairs of the Colorado.

Internal dissension in Colorado

As you know, there are some people in Colorado itself who do not see quite eye to eye with some of their fellows in that state about the split on the Gunnison, where various developments are taking part of Colorado's allocation, under the Compact, from the western side of the Rockies, through the mountains, over to the eastern or Atlantic side, and drain the diverted part of the stream into the Arkansas River. The West wants the river kept in the West, but the people of Eastern Colorado want it in the East.

This philosophy naturally does not inspire enthusiasm in the breasts of the people of Wyoming, Montana, Nevada, New Mexico, or any other Western State. It is a precedent that may be fundamentally revolutionizing and dangerous in forming future thought and proceedings. The difficulties of the seven states of the Colorado Basin do not seem by any means to be settled. The tragedy is that the individualistic stiffness behind States' Rights—or what have you—may really in the end find solution only in Federal interference if the dispute is not settled, by appeal to the Supreme Court of the Federal Government.

Columbia water to California?

Obviously this brings to mind the desire of California to go up to Oregon and Washington and to take some of the water of the Columbia. Congressman Walt Horan of Washington very reasonably points out that California has vast volumes of water below the Klamath that it might easily divert before it is wasted in the ocean. He says the Northwest needs every acre foot of the Columbia for its rich farm land, for electric power, for preservation of its salmon industry, and for low cost transportation of raw materials and industrial products.

Meanwhile, politics in Nevada are causing delay in the use of that state's quota of the Colorado River waters for use in developing the potential of the Basic Magnesium Plant at Henderson. War Assets Administration recently contracted to sell the plant to the State of Nevada for $24,000,000, to be paid for over a long term of years out of the net earnings. The present situation seems to be that the Democratic elements of the states are making it difficult to arrange a contract for the use of power from the Colorado River stations because the deal involving the sale of Basic Magnesium resulted from an arrangement by the Republicans.

Plans for Folsom Dam

H.R. 4152 and H.R. 4157, the latest Central Valley of California proposals in Congress, as amended after Truman's message, provide for a larger multi-purpose project with construction of Folsom Dam by Army Engineers, and construction of the 90,000 kw. generating capacity and irrigation features by the Bureau of Reclamation. Reclamation would tie in the project with the Shasta and Keswick dams. The proposals will undoubtedly be defeated despite the President's championship because Chairman Jensen of the Appropriations Subcommittee has served notice he will fight Reclamation until it clears out the people Congress opposes.

Even Congressman Allen, Calif., served notice he is opposed to Reclamation's socialization schemes. Jensen released the report of independent auditors, which he said confirmed his suspicions of the chaos and confusion in the accounting of regional offices in Billings, Grand Coulee, and Sacramento, "inaccurate, inconsistent, and erroneous, confusion (that) may possibly be deliberate in order to confuse Congress." Accounting systems of Bonneville and Southwestern Power Administration were approved as clear and accurate.

Elliott and the Rockwell bill

Representative Alfred J. Elliott of California who retires voluntarily at the close of this session is credited with amending the Rockwell bill, blocking the Straus effort to lengthen time for repayment of reclamation loans. Interior wished to make the period 79 years. Elliott secured acceptance of 38 years as the limit; also his amendment, accepted by Congress, takes from the Secretary of Interior the power to determine the economic feasibility of new projects. Elliott told the house in the debate: "In nine cases out of ten a bill that passes this Congress is written by a Bureau, not by Congress. When you attempt to amend it here you are stopped in your tracks."

Fresh water from the sea

H.R. 577, introduced by Rep. Fletcher of San Diego, provides authority for an appropriation to enable the proper Government agency to investigate and experiment with distillation of sea water to transmute it into sweet water for industrial and domestic purposes. It is hoped the bill may be enacted before this Congress adjourns, which will occur before June 21.

Congress has been informed that the principle of distillation, as applied to the conversion of sea water on the ships of the Navy during the war with signal success, has further been demonstrated satisfactorily in the Bay Region of San Francisco in moderate volume. The cost of producing a water supply in this manner is reported to be materially cheaper than the cost of bringing water from sources at a distance.

The question is now whether or not distillation would be successful when attempted in volume sufficient to relieve such shortages as may be anticipated in Southern California and similar places. The object of the proposed Congressional plan is to discover the answer to this question. In effect it would be a pilot operation not unlike the enterprise which has enabled the Bureau of Mines to demonstrate the feasibility of producing liquid synthetic fuels. There also are several bills awaiting action which would supply authority and funds to enable the Weather Bureau and other agencies to develop rain-making to a practical and commercial status.

Land control bill causes concern

Representative Clifford Hope, Kansas, Chairman of the House Agricultural Committee, introduced H.R. 6054 which gives Westerners much concern. Strangely it has the support of the Republican Strategy Committee. For this reason it may pass. In effect it would roughly do to the land what the various proposed Authorities do to the use of water in the various river basins. It would give Interior the power to veto the construction of reclamation projects and the use of the land; it would enable

various agencies to veto the crops a farmer may propose to raise. It would even take over control of soil conservation. This socialization program has the ardent support of the Farmers' Union.

The present status of the Soil Conservation Service also is uncertain. Bennett's well-articulated and sincere organization has 20,000 districts in which its repute is very high, and its influence could be powerful if the Soil Conservation Service played politics. The politicians in the Department of Agriculture and in the Land Grant College group would earnestly like to capitalize this authority. They have fought to absorb Soil Conservation Service into the Extension unit of the Land Grant College organization, or to swallow it into Agriculture's dominant political unit, the Marketing and Production Administration.

Bennett and his people could not make an active fight on their own behalf since they are a subordinate part of Agriculture, and the head of the Department, Secretary Clinton Anderson, had come out for the absorption. Anderson is a nice guy, but he's an insurance salesman with political trimmings, not a farmer. The National Grange, however, strongly fought the amalgamation, supported by the Farmers' Union. The plot of the politicians is almost certain to fail, but there will be a shift in the integration of Bennett's Soil Conservation Service.

Protest TVA expansion

The Westerners here also are disturbed by the proposal that TVA at New Johnsonville, Tenn., seeks to build a steam plant to make power, for which it asks an appropriation of $4,000,000. It is pointed out that TVA sells power at 3.7 mills per kilowatt (which is lower than the rate it charges municipalities, co-ops and private utilities) and has attracted so many new industries to the Valley that it has caused a shortage of hydroelectric power. It pleads the "emergency" as a reason for the steam plant. The funds for all this naturally come out of the Federal Treasury.

Such emphasis on power production has been called here a perversion of the purposes of Congress. The Salt Lake City Chamber of Commerce has strongly protested the luring of industry into the Tennessee Valley by cheap TVA power rates, subsidized by the taxpayers. It demands TVA pay interest on money, taxes, and submit to Congressional control. Congress is apt to be cautious about the steam plant.

Appropriations

Deficiency appropriation bill reported early in April includes $625,000 for Bonneville; $700,000 for Anderson Ranch; $800,000 for Payette Division; and $485,000 for stream gaging by the Geological Survey. The latest revision of proposed appropriations gives the Boise project an added $950,000; Riverton, Wyo., $1,261,000; All-American Canal, $78,000; Davis Dam, $1,427,000; Central Valley of California, $5,686,000; Columbia Basin, Wash., $2,000,000. Pine River, Colo., loses $60,000.

Up at The Dalles, Ore., the Reclamation Bureau proposes to install a sprinkler system for orchard and specialty crops, covering 4,530 ac. It will cost $2,300,000, to be repaid by the irrigators in forty years. The Tidelands Bill, H.R. 5992, which gives the states title to lands under navigable waters, and control of the lands and their resources up to the 3-mile point, has been favorably reported by both the House and Senate Committees and is expected to become law. If the President vetoes it, as threatened, it may become law over his veto.

The great drought in California was the subject of constant discussion in the 38th annual convention of the Rivers and Harbors Congress held here March 19-20. Over 350 delegates were present. Also there was interested comment on the enterprise of the Navy in placing a fleet of small boats on Lake Mead, above Hoover Dam, manned by scientists from Navy's Electronics and Underwater Laboratories, to determine the effect of sedimentation at Hoover Dam.

The U. S. Army Engineers Civil Functions projects which were cut drastically by the House apparently will be restored. The Senate has taken the ball from the House. It is expected H.R. 5524 will provide not less than $20,000,000 for McNary Dam, and, possibly, as much as $27,000,000.

Federal Aid for highways

H.R. 5888, authorizing $500,000,000 annually for 1950, 1951, 1952, a total of $1,500,000,000, to be spent on Federal Aid for highways, passed the House in mid-April, and is expected quickly to pass the Senate. The bill provides money allocated any one year will be available to the state during the following three years. Also, secondary and feeder roads shall include county and township roads. The carry-over funds are regarded as sufficient for fiscal year 1949, which begins July 1, for which reason no appropriation is made or authorized. The Department of Agriculture bill H.R. 5883, passed by the House, contains an appropriation of $14,750,000 for expenditure by the U. S. Forest Service on forest development roads and forest highways.

Highway expenditures in 1947 are estimated by Public Roads Administration at $1,154,000,000, 63% increase over 1946. The Western Mountain area (Ariz., Colo., Idaho, Mont., Nev., New Mex., Utah, Wyo.), laid down roads valued at $64,400,000. The Pacific Coast States (Calif., Ore., Wash.), placed roads valued at $114,400,000. Arizona's new road asset is estimated at a value of $10,300,000; Colorado, $11,300,000; Idaho, $5,900,000; Montana, $7,300,000; Nevada, $5,400,000; New Mexico, $10,000,000; Utah, $5,700,000; Wyoming, $8,500,000; California, $77,100,000; Oregon, $13,600,000; Washington, $23,700,000.

Bureau of Labor Statistics, reporting city building as representing the highest dollar volume since 1929, states that California leads the nation for the fourth successive year. Steep rises are reported in Denver and in Portland, Ore.

Western Reclamation Projects to Be Advertised for Bid in Coming Weeks

THE CHIEF Engineer's office of the Bureau of Reclamation, Denver, has announced that bids will be asked on numerous large construction projects in the West in the next few weeks.

Particularly mentioned are the following: About May 17, invitation to bid will be issued on 6 mi. of earthwork and structures on the Lost River diversion channel of the Klamath Project, near Klamath Falls, Ore.; on May 20, for construction of the spillway of Newton dam, near Newton, Utah; on May 21, for 30 mi. of 115-kv. wood-pole transmission line and 5 mi. of 69-kv. wood-pole transmission line between Loveland and Greeley, Colo.

About May 24, bids will be invited on 6.6 mi. of the Main Canal of the Columbia Basin Project, near Stratford, Wash., including lining, structures, and headworks; on May 27, for 16,000 ft. of 8-in. water pipe line near Cascade, Ida.; on May 28, for construction of the Soap Lake siphon, a concrete and steel structure 12,900 ft. long on the Columbia Basin Project; also on May 28, for erection of two metal-panel warehouses near Merced, Calif., and construction and equipping of a 10,000-kva. substation at Cochise, Ariz.

Other projects probably to be advertised within the next two months, but for which dates have not been finally set as yet, include Canyon Ferry dam and power plant 15 mi. northeast of Helena, Mont., Bonny dam on the Republican River, west of Hale, Colo., Platon dam on the Conejos River, 30 mi. northwest of Mogate, Colo., Spring Creek dam on East Muddy River, 20 mi. northeast of Paonia, Colo., and the completion of Wickiup dam near Lapine, Ore. Other projects are a diversion dam, 1-mi. tunnel, 12 concrete siphons, 1 steel siphon, canal and other structures on 10 mi. of the Horsetooth feeder canal, near Loveland, Colo., a 300-ft. concrete overflow diversion dam on the Republican River near Glide, Neb., earthwork and structures on 15 mi. of the Delta-Mendota canal near Patterson, Calif., earthwork, lining and structures on 27 mi. of the Friant-Kern canal near Porterville, Calif.

Still other anticipated work for this summer is the earthwork and structures on 8.3 mi. of the Potholes canal of the Columbia Basin Project near Norden, Wash., and 15.3 mi. of the West canal of the same project, near Ephrata, Wash., the Muddy Ridge tunnel and a lateral on the Riverton Project in Wyoming, transmission lines from Casper, Wyo. to Gering, Neb., and from Anderson Ranch dam to Mountain Home, Ida., substations at Alliance, Neb., Savage, Mont., Casper and Pine Bluffs, Wyo. and Elverta, Calif., a gaging station at Davis dam on the Colorado River, and a government camp at Hay Springs, Neb.

NEW BOOKS...

SOIL MECHANICS IN ENGINEERING PRACTICE — by Karl Terzaghi and Ralph B. Peck. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City 16. 566 pages, 6 x 9. Price $5.50.

Within this book is all of the information which the writers consider necessary for the successful application of soil mechanics to the design and construction of foundations, retaining walls and earth structures. They give definite directions by which the engineer can judge the extent to which soil mechanics can profitably be used on a given job and provide the knowledge for its application. The work is divided into three sections which deal with the physical properties of soils; the basic theories of earth pressure, stability and settlement which are needed in dealing with practical problems; and the actual practice of earthwork design and construction.

MODERN TIMBER DESIGN (Second Edition)—by Howard J. Hansen, Professor of Mechanics, University of Florida. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City 16. 312 pages, 6 x 9. Price $4.50.

The second edition of this book has been extensively revised. Starting with fundamentals, it covers the properties of various species of wood, the factors affecting their structure, their assigned working stresses, and the characteristics which progress to a consideration of modern timber design methods, with examples and formulas for use in design. One chapter covers the important 20 per cent increase of working stresses over pre-war specifications. New information has been added on concrete composite, plywood, and the relationship between stresses and strains of wood under load.

MINERALOGICAL DICTIONARY—Published by the Chemical Publishing Co., Inc., 243 King St., Brooklyn 2, N. Y. 50 pp., 5½ x 8. Price $4.75.

Fourteen hundred mineralogical terms are included in the dictionary. It lists the chemical composition, crystal form, physical and chemical properties, occurrences and uses for these minerals. Forty plates show two hundred minerals in their original colors to help the reader in recognizing them. Geologists, mineralogists and chemists should find this volume useful.

FUNDAMENTALS OF CARPENTRY—by Walter E. Durbahn, M.A. Volume I—Tools, Materials and Practice. Volume II—Practical Construction. Published by the American Technical Society, Chicago, Ill. More than 300 pp. in each volume. Size, 5½ x 8½. Price $3.25 and $4.25 respectively.

The two volumes provide an explanation and understandable demonstration of the principles of carpentry construction as applied to both ordinary and special types of modern structures.

Volume I gives information on such important subjects as the selection of the proper tools, identification and choice of woods and materials, the practical use of the steel square, and the reading of blueprints. Comprehensive information on insulation, the carpenter as an advisor to the home builder, builders' hardware, joints and many other subjects are included. Tables and charts to which a carpenter must frequently refer are included for quick reference. There is a fifty-eight page Dictionary of Carpentry Terms.

Volume II gives explanations of building processes with elaborately illustrated text on construction details. The author has carefully set down the reasons for each procedure described.

Letters to the Editor

Miami, Ariz., April 20, 1948

Dear Sir:

I have read with interest your editorial by Orson Buggy on the TVA. He, no doubt, belongs to the days of the same name from the tone of his diatribe. At least they've power down there to run their machinery and furnish a little light, which is more than we have here with our "orson buggy" utility companies.

We depend on our power company for power to run a small factory, every time it thunders, the power will make a faint sigh and fade out all of its 85 volts.

Residential power rates are cheaper than commercial rates.

We'll take TVA and pay our part of the 814 million or was it billion and so will a majority of the other tax payers if they get the chance.

Yours truly,
Harold Maryott.

PERSONALLY SPEAKING

Ralph W. Finke, bridge engineer for the Washington state highway department, has been appointed city engineer of Seattle to succeed **Charles L. Wartelle,** who retired on Jan. 1. Finke has been associated with the Washington highway department since 1931, and has been head of the bridge division since 1939 when **Clark Eldridge,** then bridge engineer, was appointed resident engineer for the Tacoma Narrows bridge.

Harold E. Aldrich has been designated acting district manager of the Upper Missouri District, Region 6, Bureau of Reclamation. This district includes within its borders that part of the Missouri River Basin above and including the Milk River in Montana. Aldrich advanced from the position of assistant district manager. **William P. Price, Jr.,** who held the position as acting district manager since the formation of the district in Sept., 1947, will continue with his duties as construction engineer of the Canyon Ferry Unit near Helena, Mont.

William F. Winters, district engineer in Seattle for the Washington state highway department, **M. O. Anderberg,** engineer for the Seattle Transit system, and **George T. Treadwell,** chief engineer of the Port of Seattle, have been appointed as members of a newly organized planning council which will co-ordinate city planning in Seattle. Representing the city planning commission are Clyde Grainger, chairman, Henry Berg, secretary, and John D. Spaeth, Jr., planning director. Representing King County are Walter Hecker, executive officer, and E. R. Herzog, planning officer of the county planning commission. Other members of the council include representatives of the city school system and the University of Washington.

George D. Wolf has been appointed first watermaster for the Columbia Basin project in central Washington by the Bureau of Reclamation. Wolf will direct the delivery of water to the Pasco unit of the project which is expected to go into operation this spring. He was formerly watermaster on the Lower Yellowstone project in eastern Montana.

Appointment of **L. M. Clayberger** as Assistant to the Chief Engineer has been announced by **Ralph A. Tudor,** Chief Engineer of the Division of San Francisco Bay Toll Crossings, California State Department of Public Works. Clayberger was formerly advertising manager of the Paraffine Cos., Inc. and has many years of experience in public relations as well as an engineering and construction background gained with the U. S. Navy Civil Engineering Corps during the war. The Division is making a detailed study of approaches, costs, traffic, revenue and other problems of the two crossings which have been approved for construction by the Toll Bridge Authority.

Kenneth B. Arkin has been appointed principal assistant engineer for the construction of the Tacoma Narrows Bridge by **Charles E. Andrew,** principal engineer of the Washington Toll Bridge Authority. Arkin was principal inspector during the construction of the first Tacoma Narrows bridge, and lately has been district maintenance engineer for the Washington highway department at Okanogan. **John C. Stacer** has been appointed chief of the survey party for the bridge reconstruction.

After fifty years of service with the Santa Fe Railway, **Guy W. Harris,** Chief Engineer for the system, has announced his retirement from active duty. Harris entered Santa Fe service in Feb., 1898, as a rodman at Winslow, Ariz. He was appointed Assistant Chief Engineer in 1920, and advanced to system Chief Engineer in



GEORGE E. TEUFEL has been made president of Seattle Chapter, AGC, to complete unexpired term of the late J. B. Warrack. He is a charter member, and was president during 1932-33.

1928. **Tom A. Blair,** assistant chief engineer, has been appointed to succeed Harris.

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Stephen M. Batori, formerly consulting industrial engineer of New York, has joined the staff of DeWitt C. Griffin & Associates, consulting engineers of Seattle. Batori served as a colonel in the Army Ordnance Department during the war and was a consultant to the Polish government on transportation, power generation, and industrial engineering.

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G. Perry Steen, member of the University of New Mexico faculty, was re-elected president of the New Mexico Society of Professional Engineers at the concluding session of the society's two-day meeting in Albuquerque. Also re-elected were **Steve Reynolds,** vice-president; **Charles Johnstone,** second vice-president; **Walter K. Ferguson,** secretary-treasurer, and **W. C. Wagner,** who was reappointed to a two-year term as national director.

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Don Akins, civil engineer of Ellensburg, Wash., has sold his interest in the Inland Equipment Co. to devote full time to general contracting. Prior to establishing the Inland Empire Equipment Co. in 1944, Akins served as construction engineer for the Navy on the Bremerton railroad project.

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Jack Joplin has been transferred from the Wenatchee, Wash., district office of the state highway department to the Okanogan district office. He will take over the position of maintenance engineer succeeding **Kenneth B. Arkin,** who has been transferred to the Tacoma Narrows bridge.

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Robert E. McCormick has been appointed city engineer of Great Falls, Mont., succeeding **Ed Henen.** McCormick was for 14 yr. connected with the North Dakota state highway department. He has also served as field engineer with Siems-Drake-Puget Sound Co. at Kodiak, Alaska, and during a part of the war was assistant chief of operations for the Corps of Engineers at the Great Falls army air base. For the past year he has been employed in the city engineer's office in Great Falls.

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S. R. DuBravac of Carson, Nev., has been appointed as assistant to the resident engineer at Hoover Dam. His selection was made some time ago by the Colorado River Commission. In his new post DuBravac, who formerly served as a deputy mine inspector in Nevada, will aid **A. J. Shaver** of Las Vegas.

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Roy H. Gagle has been appointed materials engineer for the Montana highway department, succeeding **Scott P. Hart,** who was appointed state highway engineer several months ago. Gagle has been associated with the state highway department since 1933 and most recently has been research engineer for the materials testing department.

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Claude T. Davis and **William K. Brittain** have been appointed district engineers for the Montana state highway department by **Scott P. Hart,** state highway engineer. Davis has been resident engineer and will succeed **S. B. Sanders** at Miles City. Brittain, who has also been resident engineer, will assume charge of a newly created district with headquarters at Glendive.

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J. H. Redmond, county engineer for Whitman County, Wash., has resigned his position, and will be succeeded by **Wayne Arrasmith.** Redmond has been associated with the Whitman County engineer's office for the past 19 yr., of which he has been county engineer for 13 yr. Arrasmith has been associated with the Whitman County engineer's office since 1939 except for a period of army service during the war when he served as captain in the Corps of Engineers.

* * *

Clinton D. Woods is now second in command of Bureau of Reclamation activities in the state of Utah, most of Nevada, and parts of Colorado, Wyoming, Idaho, New Mexico and Arizona. Since November, 1945, Woods has been assisting **E. O. Larson,** Director of the Bureau's Region 4. Until the present appointment, this was the only one of the Bureau's regions without an assistant director.

CLINTON D. WOODS





DR. V. CALVON McKIM, 1948 president of the Engineers Club of Fresno, Calif., heads the Department of Geography-Geology at Fresno State College.

J. J. Williams has been appointed director of safety for Morrison-Knudsen Co., Inc., and will make his headquarters at the company's home office in Boise. Williams has previously been engaged in safety supervision for General Electric Co. at Richland, Wash., and E. I. du Pont de Nemours & Co.

* * *

The resignation of **Sid Fisher,** city engineer of Flagstaff, Ariz., became effective May 1. Fisher, on the job since July, 1946, plans to become associated with a construction company working in the Flagstaff area.

* * *

Robert S. Nelson has joined the staff of the S. Birch & Sons Construction Co. at Great Falls, Mont. For the past two years Nelson has been employed on the staff of an industrial contracting firm in Denver, Colo.

* * *

John B. Gearhart, superintendent of the Ontario, Ore., water plant, has been appointed city engineer of Ontario succeeding **L. E. Hough,** who resigned on April 15. Hough has been appointed city engineer of Aberdeen, Wash.

* * *

Paul Wise has been elected president of the Southwest Idaho Contractors Association. Membership in the newly formed organization covers nine counties of Southwest Idaho.

* * *

James Kruger, civil engineer of Seattle, has been appointed city engineer for Pasco, Wash. He assumed the position as Pasco's first city engineer on April 12.

* * *

L. F. Harza, consulting engineer of Chicago, has been retained by the city council of Tacoma as an advisor in surveys for the proposed municipal power project now under consideration for construction on the Cowlitz River.

* * *

George Brown, city engineer of Kelso, Wash., has resigned that position. No successor has been named as yet.

SUPERVISING THE JOBS

Pete McHugh is general superintendent for Frederickson Bros., Emeryville, Calif., contractors for construction of a steel girder bridge and 1.5 mi. of grading and surfacing work near Redding, Calif. **Bill Slate** is the bridge superintendent and **A. J. Ingwersen** is general foreman. **Nels Nelson** is carpenter foreman and **Herbert Hoover** is resident engineer for the State of California. **Don Davis** is office manager on the $625,436 project. On Frederickson Bros.' highway job near Shilling, Calif., **Pete McHugh** is also the general superintendent, and **Al Kingwell** is the job superintendent. **Art Ostrom** and **Archie Edwards** are grading foremen and **Imel Swanson** is the blasting superintendent. **Ernest Flint** is master mechanic on the project and **George A. Passmore** is the office manager. **Harry B. Milner** is resident engineer for the state and **G. E. Moss** is chief inspector. **W. R. Borden** is the office engineer. **Al Sanders** is superintending the work of fencing and clearing on the Redding job for R. W. Byers, sub-contractor.

* * *

H. V. "Vic" Colburn is superintendent for A. Soda & Son, Oakland, Calif., on construction of the 23rd Street Overpass, 503-ft. structure which will lift heavy cross-traffic on 23rd St. above the Eastshore Freeway, Oakland's ultra-modern highway. **Ernie Johnson** is foreman on the job, which is being carried out under a $468,000 contract. **J. E. Burke** is resident engineer for the state and **W. C. Names** is assistant resident engineer. **A. A. Alston** is assistant engineer on the project. **Joe Walter** is the master mechanic.

* * *

Fred W. Berg is construction superintendent on construction of roads at the Naval Ordnance Test Station near Inyokern, Calif. **Jack A. Keenan** is project manager on the job for the General Tire & Rubber Co. of California. **Frank A. McCann, Jr.,** is the assistant project manager. General foremen are **Charles E. Traverse, M. E. Brown, W. L. Brunton,** and **R. L. Moore.** Project engineers are **C. F. Coughenour** and **John K. Gossland. William S. Reid** is consulting engineer for the project.

* * *

L. W. Brown and **"Buster" Morrison** are the job superintendents for H. Earl Parker, Marysville, Calif., on the $207,883 project for enlarging the south levee of the American River in Sacramento, Calif. **H. W. Eliason** is the project manager and **Charles de St. Maurice** is the engineer.

* * *

Willis Squires is project manager and **Roy Knapp** is superintendent for L. E. Dixon Co., San Gabriel, Calif., on construction of an addition to the LaVerne Water Softening Plant for the Metropolitan Water District of So. Calif. **H. C. Wehlast** is the job engineer. **L. Payne** is carpenter superintendent and **Ed Johnson** and **Ralph Bowman** are carpenter foremen. **Ed Marlett** is labor foreman and **Pete Schwartz** is office manager. For Offco Construction Co., Long Beach, and Pacific Pipeline & Engineers, Ltd., Los Angeles, subcontractors for the pipe and plumbing work, **M. A. Nishkian** is project manager and **C. B. English** is construction superintendent. **George L. McCain** is the project engineer and **Carl Knoll** is field engineer for the subcontractors, while **John Marcam** is comptroller. **H. J. Mills** is resident engineer for the Water District, **Robert E. Remy** is office engineer and **D. C. Walker** is in charge of field inspection.

* * *

J. S. Clary is supervising excavation and pile driving at the site of the new Edison steam plant at Redondo Beach, Calif. Raymond Concrete Pile Co. has the contract for the work and are placing 1,600 piles. **Fred Miles** and **A. C. Stanley** are the pile driving foremen. **Jack Long** and **George Hieldbrandt** are the hoisting engineers. **Ray Logan, Jr.,** is the office manager.

* * *

Ray Simons is general superintendent for Peter Kiewit Sons' Co., Omaha, Neb., on blasting and excavation work at Warren, Mont., where limestone rock is being processed. **Joe Bartu** is superintending work at the new and modern screening plant at the quarry site.

* * *

Charles Ziegler is general superintendent for the Sound Construction & Engineering Co., Seattle, Wash., on construction of the telephone building in Port Angeles, Wash. **Andy Grounds** is the job superintendent and **George Ellis** is labor foreman.

* * *

J. L. Morris, general superintendent for Robert E. McKee, Los Angeles, has been appointed to supervise construction of the $4,000,000 veterans hospital to be built in Spokane. McKee has been awarded the general construction contract on a total bid of $2,746,300. Other key men on the contractor's staff will include **C. C. Wright,** construction engineer; **T. E. O'Melveny,** engineer, and **H. H. Perkins,** office manager.

For the Corps of Engineers, under whose direction the hospital will be erected, **Lynton R. Newhall** has been appointed resident engineer. Newhall has been transferred to the Seattle district from Air Materiel Command headquarters at Wright Field, Dayton, Ohio.

LYNTON R. NEWHALL



* * *

Guy M. Gault is the building superintendent for Haddock Engineers, Ltd., Oceanside, Calif., contractors for the construction of 380 housing units as an addition to the commissary at the Naval Ordnance Test Station near Inyokern, Calif. Assistant building superintendents are **Don Sands, Bert Foote** and **Earl Miller. Jess Gailbreath** is superintendent of the heavy equipment on the job and **Lloyd Leonard** is his assistant. **George Bronaugh** is the project manager. Carpenter foremen on the job are **Bill Keerwitz, L. J. Spickelmier, G. D. Britt,** and **T. A. Turgeon. Elmer A. Rodeffer** is the shop foreman and **E. D. Sinard** is the labor foreman. **Lou Schroeder** is superintendent for the Newberry Electric Co., subcontractors. **Bill Sasser** and **Kenny McCormick** are superintendents for the E. O. Nay Co., plumbing sub-contractors.

* * *

L. M. Bruce is supervising construction of the addition to Pacific Gas & Electric Co.'s building in San Francisco for the contractors, Cahill Bros., Inc., San Francisco. **C. Kollerer** is the assistant superintendent and **Ed Larkin** is the project manager. **R. F. Tousey** is the general foreman. **Al Tigri** and **Don Masters** are the carpenter foremen. **Nick Ferris** is labor foreman. **Stan Spears** is the field office manager and **A. J. Ricci** is materials manager. The job should be completed before the end of this year.

* * *

Neal Saul is superintendent and **Hank Rollsten** is the assistant superintendent for the Haddock Co., who have the contract for paving work along Olympia Blvd. in Santa Monica, Calif. **Jess Black, Frank King** and **Lloyd Leonard** are grading foremen on the job. **Roy Bennett** is the pipe crew foreman and **Floyd Lorensen** is concrete foreman. **Cliff Wylie** is the carpenter foreman. **Walter McCaslin** is the job engineer and **B. T. Cook** is office manager.

* * *

Jim Jones has been appointed superintendent for Henry George & Sons, Spokane, to take charge of constructing the library building at Washington State College. Jones has been serving as superintendent on the construction of two technology buildings on the campus, and will be replaced in that position by **Hubbard Dunham,** who has been inspector for Whitehouse & Price, project architects.

* * *

G. N. Mercer is supervising construction of the largest U. S. Army general hospital in the world on the island of Oahu in the Hawaiian Islands. The new Tripler General Hospital, Schofield Barracks and Fort Shafter are being constructed by Morrison-Knudsen Co., Inc., Boise, Ida., and Peter Kiewit Sons' Co., Omaha, Neb., in a joint venture. **J. S. Koerner** is field superintendent on construction of the Schofield Barracks and **A. W. Olund** is supervising construction of other facilities at Fort Shafter.

* * *

Charlie Lloyd is superintendent for Rice Bros., general contractors at Marysville, Calif. **Louie J. Rice** is acting as project manager for the company and **Jesse L. Rice** is the general manager. **Louis F. Rice**

is managing work at the Hallwood Rock Plant and **W. A. Rice** is the company's shop foreman.

* * *

William Reynolds is general superintendent and **Al Kays** is job superintendent for the MacDonald Engineering Co., San Francisco, on erecting of an addition to the California Milling Co. building in Los Angeles. **C. E. La Bruyere** is assistant superintendent on the job, and **August A. Senn** is carpenter foreman. **E. C. Daley** is labor foreman and **Gus Wagenseller** is steel foreman. The building is being erected under a $300,000 contract using slip-form construction methods.

* * *

Anthony Maroni is the general superintendent for Parker, Steffens & Pearce, San Francisco contractors, on construction of an apparatus building for the General Electric Realty Corp. in San Jose, Calif. **J. C. Lindsay** is general foreman on the job and **B. Lucchese** is the carpenter foreman. **E. McAllister** is the office manager. **C. A. Shutter** is the resident engineer. **H. C. Westfall** is superintendent for Judson-Pacific-Murphy Corp., Emeryville, Calif., subcontractors on the project.

* * *

Maurice H. Brown has been appointed assistant project manager of Morrison-Knudsen Afghanistan, Inc., and has joined the staff of **James F. Horan,** project manager in Afghanistan. He was formerly general superintendent of railroad operations in Mexico for Morrison-Knudsen Co.

* * *

H. L. Monsille is general superintendent for McGillivray Construction Co., Sacramento, Calif., on the construction of 1.7 mi. of State Highway through the town of Live Oak, Calif., which will have a cement treated base and plantmix bituminous surfacing. **Reeve Parker** is the job superintendent, **Fred Lambert** is the grading work foreman and **E. O. Simpson** is the master mechanic. **G. R. Wood** is office manager on the job. **L. H. Bradley** is resident engineer for the state.

* * *

Charles Mead is the general area superintendent for the American Concrete Pipe Co. on placing a pipe line along Commercial St. in San Diego, Calif. **Clyde E. Grant** is field superintendent on the job and **Mac McKinney** is in charge of trucking operations. **Troy D. Raymond** is foreman on the job.

* * *

Pete Wick is supervising construction of a reinforced concrete high school stadium in Renton, Wash., for Wick & Dahlgren, Seattle contractors. **C. D. West** is the project manager and **Les Rubicam** is resident engineer. **F. Smith** is foreman on the $296,000 project.

* * *

Robert McSorley is superintendent for contractor I. C. Curry of San Diego, Calif., on the construction of a school building in San Diego. **Willard Clint** is the carpenter foreman.

* * *

C. A. Powers is superintendent for the M. H. Golden Construction Co., San Diego, Calif., on construction of a bowling alley for the Pacific Beach Amusement Co. at Pacific Beach near San Diego. **J. F. Burke** is the carpenter foreman and **R. G. Smith** is labor foreman.



J. D. PETERSON, left, plant foreman for E. S. McKittrick Co., Inc., on construction of desert homes at Inyokern, Calif., (see article page 79) chats with T. H. BEAN, job office manager.

E. S. McKittrick Co., Inc., Huntington Park, Calif., have the contract for construction of the dormitories and concrete slab production on construction of new housing facilities for Navy personnel near Inyokern, Calif. **Nicholas Van Dyke** is superintendent for the company, and **Adolph Brandt** is managing this project. **Herbert J. Fassler** is foreman at the slab production plant and erection foremen are **Hardin Lineback** and **Howard Kennedy. S. F. Lindman** is the office manager.

* * *

Carl Jacobson is superintendent for the Fisher Contracting Co., Phoenix, Ariz., on the construction of a $688,536 reinforced concrete bridge at the Queen Creek Viaduct in Phoenix.

* * *

Tom Klyver is the job superintendent for Taylor-Wheeler Commercial, Inc., of Fresno, Calif., for the remodeling of a 4-story building. **Vernon Randau** is the general superintendent. **Jerome Snow** is the project manager for the contractor and **C. H. "Bud" Gorham** is the assistant manager.

* * *

Al Bacon is the superintendent for Prichard & Son, Modesto, Calif., on construction of a concrete and brick building in Stockton. **J. M. Jones** is foreman on the job.

* * *

R. E. Selby is drilling superintendent for the Morrison-Knudsen Co., Boise, Ida., on the excavating and underground construction project for the U. S. Army Engineers near Buckhorn, Wash. **H. L. Leventon** is project manager for the Buckhorn project and also for work at the Dugway and Grand Junction sites.

* * *

Bill Meuting is job superintendent for the Pacific Co., Oakland, Calif., and **Robert Phillips** is the engineer on construction of an elementary school in Albany, Calif., under a $92,595 contract. **O. Lee Burger** is purchasing agent.

* * *

Joe H. Thomas, for many years in a key capacity for Haddock Engineers, Ltd., at Oceanside, Calif., is now general superintendent for the same concern on construction of the Armory Building for the U. S. Navy at San Bernardino, Calif.

* * *

L. Trimlett is the general superintendent on construction of the Pacific Telephone & Telegraph Co. building in San Jose, Calif., by Swinerton & Walberg Co., San Francisco. **R. L. Wye** and **C. D. Westfall** are carpenter foremen and **W. P. Garde** is labor foreman. **S. Ginlino** is the cement finisher foreman, and **W. G. Marr** is job engineer. **R. Armstrong** and **A. B. Johnston** are inspectors for the Pacific Telephone & Telegraph Co.

* * *

Joe Caputo is supervising construction of an overpass structure being built for the State of California at Salinas by contractor Dan Caputo of San Jose, Calif. **Jim Stone** and **Tony Caputo** are carpenter foremen and **Larry Balboa** is the labor foreman. **John Ford** is resident engineer for the State.

* * *

On construction of the power plant and other facilities for the American Potash & Chemical Co. at Trona, Calif., **Leonard Tarran** is resident engineer and project manager in charge of all construction for C. C. Moore & Co., Engineers, Inc., San Francisco, engineers for construction and design. **F. S. Cummings** is acting as chief engineer for the job and **A. V. Saph** is structural design engineer in San Francisco. **H. F. Chapman** is assistant superintendent on building construction and **C. A. Johnson** is the assistant superintendent of electrical and mechanical work. **Phil O'Brien** is boiler maker foreman, **Ed Stoker** is boiler maker rigging foreman, and **Harry Grimwood** is pipe foreman. **Dean Fentress** is timekeeper, **Dancel Brown** is job accountant, and **Frank J. Olson** is field purchasing agent.

* * *

On the construction of the new Republic Supply Building in East Los Angeles, Calif., by the Griffith Co., Los Angeles, **Howard Cole** is carpenter foreman and **Wesley Renfroe** is labor foreman.

* * *

L. M. Stambaugh is supervising construction of a reinforced concrete building in Salinas, Calif., for contractor B. Frank Anderson of Los Angeles. **O. A. Lucas** is foreman on the job.

* * *

A. H. Clauser is superintendent for the Consolidated Steel Corp., Los Angeles, who have the contract for installing the drum gates at Friant Dam. **W. Craemer** is superintending the trestle dismantling work.

* * *

W. M. Prickett, for many years a key man on construction in the San Diego, Calif., area, is now plant engineer for the High Seas Tuna Co. of San Diego.

* * *

Larry A. Light, who has been in construction work in the Southwest for many years, is now in business for himself as a concrete contractor with offices at 115 Pearl St., Balboa Island, Calif.

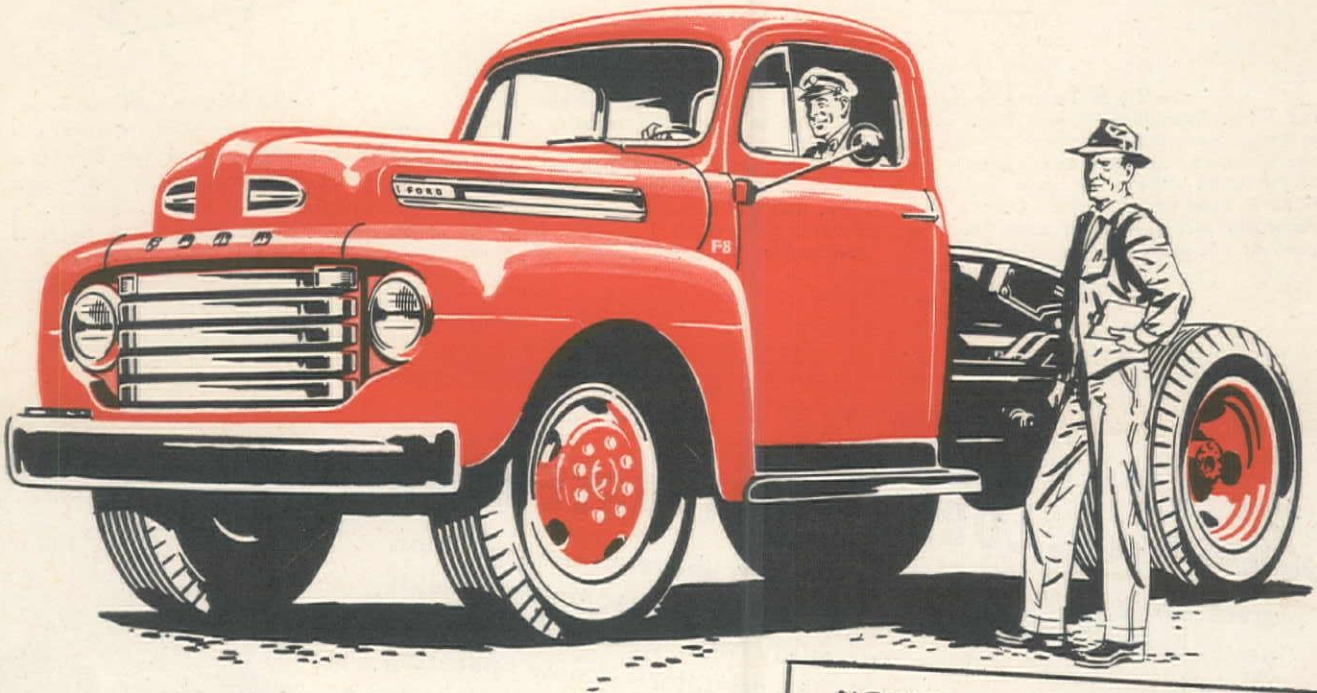
* * *

Fred Vandermeer is the project manager for H. M. Keller Co., Burbank, Calif., on construction of research laboratories for the Federal Government in Pasadena, Calif. **George A. Leverenz** is chief estimator on the job.

* * *

J. M. Reimers is project superintendent for the Bechtel Corp., San Francisco, on construction of all the substations for the Southern California Edison Co. in the Southern California area.

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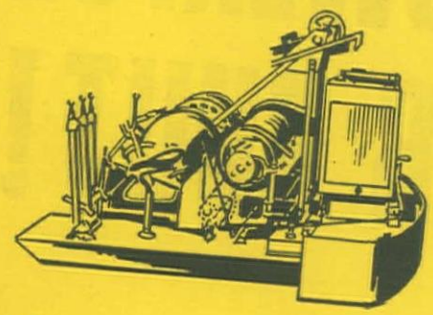
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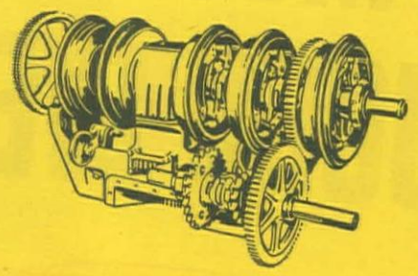
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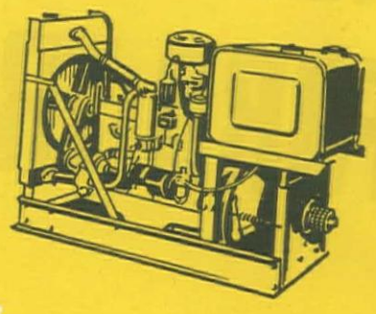
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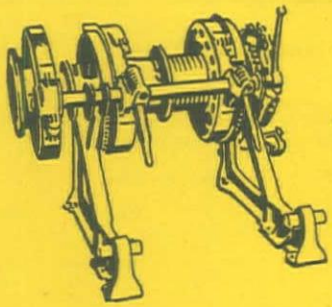
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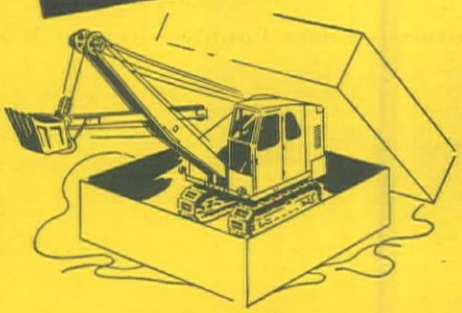
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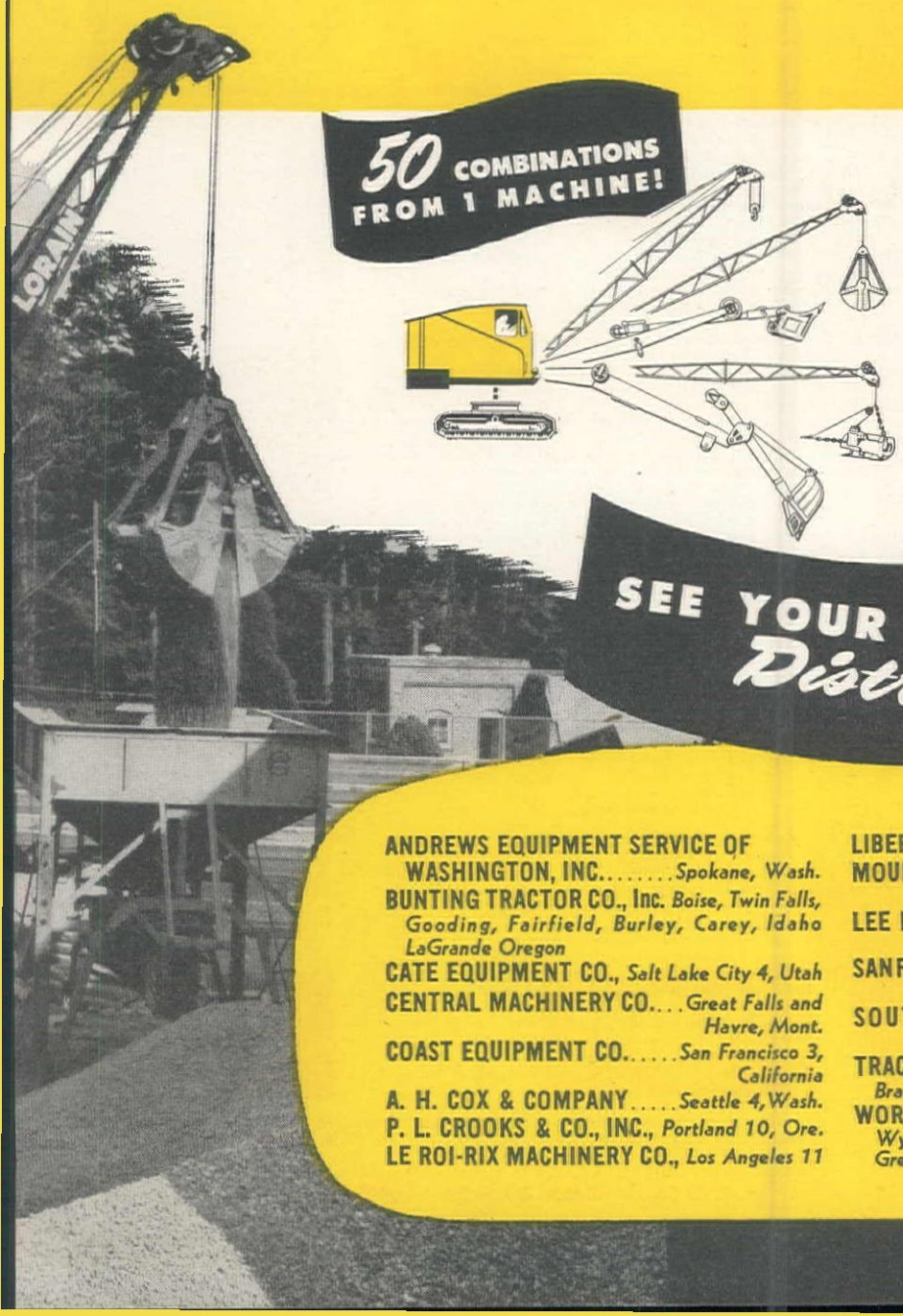




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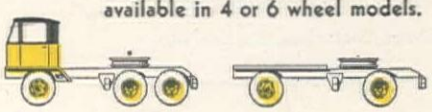
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UNIT BID SUMMARY

Irrigation . . .

California—Tulare County—Bur. of Reclamation—Earthwk. & Structs.

Otto B. Ashbach & Sons, Inc., and Steenberg Construction Co. of St. Paul, Minn., submitted the low bid of $4,826,543 on three schedules, for the construction of earthwork, concrete lining, and structures on approximately 37.4 mi. of the Friant-Kern Canal. The work will begin about 3 mi. south of Woodlake and extend to about 2 mi. east of Lindsay. The Bureau of Reclamation at Denver, Colo., has not to this date made the award. Unit bids are as follows:

	Sched. No. 1	Sched No. 2	Sched. No. 3	Total
(1) Otto B. Ashbach & Sons., Inc., & Steenberg Construction Co.	$ 459,898	$ 365,780	$4,000,865	$4,826,543
(2) Norman L. Fadel	489,804	413,843	.....	903,647
(3) S. G. Giles & Co.	542,013	393,761	.....	935,774
(4) Hubert H. Everist, Sr.	655,638	528,658	4,665,834	5,850,131
(5) Arizona-Nevada Constructors	648,045	507,413	5,121,948	6,368,406
(6) Peter Kiewit Sons Co.	.....	.....	5,454,127	5,454,127

SCHEDULE NO. 1

		(1)	(2)	(3)	(4)	(5)
6,100	cu. yd. excavation, common, for canal	.35	.30	.50	.33	.50
50	cu. yd. excavation, rock, for canal	3.50	2.00	35.00	5.92	5.60
116,000	cu. yd. excavation, common, for drainage channels & dikes	.175	.30	.28	.59	.32
100	cu. yd. excavation, rock, for drainage channels & dikes	3.50	2.00	35.00	5.92	2.50
1,200	cu. yd. compacting embankments	.29	.45	.61	.32	.63
43,600	cu. yd. excavation, common, for structures	.58	.75	.88	2.42	.74
100	cu. yd. excavation, rock, for structures	3.50	2.00	35.00	5.92	5.60
3,020	sq. yd. trimming earth foundation for concrete lining	.45	.60	.61	3.02	.70
50	sq. yd. preparing rock roundation for concrete lining	2.30	1.00	20.00	6.42	2.80
7,000	cu. yd. 24-inch riprap	5.50	5.00	3.80	6.00	4.80
3,250	cu. yd. 36-inch riprap	6.50	5.00	5.00	6.00	3.50
10,000	cu. yd. backfill	.23	.30	.75	.82	.48
50	cu. yd. backfill at top of canal lining	.29	1.00	6.00	.31	2.10
3,400	cu. yd. compacting backfill	2.40	3.00	3.00	3.94	2.25
4,615	cu. yd. concrete in structures	40.00	42.00	50.29	45.35	68.00
120	cu. yd. concrete in paving slabs	26.35	35.00	30.00	45.35	50.00
225	cu. yd. concrete in unreinforced canal lining	30.00	35.00	30.00	45.35	56.00
7,100	bbl. furnishing and handling cement	4.76	4.70	4.82	4.62	4.50
820,000	lb. furnishing and placing reinforcement bars	.095	.11	.09	.115	.14
175	sq. ft. furnishing and placing ½-in. elastic joint filler	1.25	1.00	.61	1.65	2.90
200	sq. ft. furnishing and placing ¾-in. elastic joint filler	1.60	1.25	.74	2.10	3.50
335	sq. ft. furnishing and placing 1-in. elastic joint filler	2.00	1.50	.97	2.40	4.30
485	lin. ft. placing rubber water stops in joints	1.20	1.00	1.00	1.30	2.00
21,600	lb. furn. and placing metal water stops in joints	.18	.15	.94	.40	.25
9	M.b.m. furn. and erecting timber in structs.	366.00	200.00	226.00	332.00	250.00
295	lin. ft. furn. matls. & const. sand or graded sand and gravel drains without sewer pipe	1.50	2.00	2.44	1.23	1.80
890	lin. ft. furn. matls. and const. graded sand & gravel drains with 6-in. sewer pipe	3.00	2.50	4.03	1.75	2.40
660	lin. ft. furn. matls. & const. two-layer sand and graded gravel drain with 6-in. sewer pipe	3.90	2.50	4.27	1.75	4.60
400	lin. ft. furn. matls. & const. two-layer sand and graded gravel drain without sewer pipe	3.30	1.50	2.74	1.23	4.30
165	cu. yd. furn. matls. and const. reverse filter	10.50	10.00	9.76	10.25	20.00
150	lin. ft. furn. and placing 6-in. sewer pipe in reverse filters and auxiliary drain outlets	1.50	1.00	1.88	.80	2.00
130	lin. ft. furn. and laying 12-in. diam. asbestos cement pipe	4.00	5.00	4.88	12.85	7.00
100	lin. ft. furn. and laying 36-in. diam. corrugated metal pipe	8.50	10.00	7.82	10.75	12.00
18,500	lb. installing radial gates	.08	.12	.122	.13	.10
32,200	lb. installing radial gate hoists and oper. and control mech.	.08	.10	.147	.20	.17
6,200	lb. installing miscl. metalwork	.20	.25	.244	.21	.20
125	hundredwt. furn. and placing bitu. matl. in float drums	66.00	7.00	3.66	3.85	8.00
170	lin. ft. furn. and inst. embedded electrical metal conduit 1¼-in. or less in diam.	1.00	3.00	2.13	2.50	3.00
50	lin. ft. furn. and inst. embedded electrical metal conduit 1½-in. or more in diam.	2.00	3.50	2.56	3.00	4.00
40	lb. furn. and inst. embedded electrical ground wires and ground rods	1.20	2.00	2.44	3.00	3.40

SCHEDULE NO. 2

		(1)	(2)	(3)	(4)	(5)
1,000	cu. yd. excav., common, for canal	.35	.50	.50	.33	.50
50	cu. yd. excav, rock, for canal	3.50	2.00	35.00	5.92	5.60
26,000	cu. yd. excav., common, for drainage channels and dikes	.175	.50	.28	.59	.32
100	cu. yd. excav., rock, for drainage channels and dikes	3.50	2.00	35.00	5.92	2.50
500	cu. yd. compacting embankments	.29	.50	.61	.32	.63
35,000	cu. yd. excav., common, for structs.	.58	1.50	.88	3.75	1.30
100	cu. yd. excav., rock, for structs.	3.50	2.00	35.00	5.92	5.60
260	sq. yd. trimming earth foundations for conc. lining	.50	.60	.61	3.02	.70
50	sq. yd. preparing rock foundations for conc. lining	2.30	1.00	20.00	6.42	2.80
2,800	cu. yd. 24-in. riprap	5.50	6.00	3.80	6.00	4.80
2,550	cu. yd. 36-in. riprap	6.50	6.00	5.00	6.00	3.50
3,100	cu. yd. furn. and placing gravel fill	6.00	6.00	8.14	7.69	4.20
15,500	cu. yd. backfill	.23	.30	.75	.82	.48
10	cu. yd. backfill at top of canal lining	.58	1.00	6.00	.31	2.10
3,600	cu. yd. compacting backfill	2.30	3.00	3.00	3.94	2.25
3,525	cu. yd. concrete in structures	46.00	44.00	45.70	45.35	68.00
30	cu. yd. concrete in paving slab	26.35	35.00	30.00	45.35	50.00
25	cu. yd. concrete in unreinforced canal lining	30.00	35.00	30.00	45.35	26.00
5,000	bbl. furn. and handling cement	4.76	4.70	4.82	4.62	4.50
672,000	lb. furn. and placing reinf. bars	.095	.11	.09	.115	.14
125	sq. ft. furn. and placing ½-in. elastic joint filler	1.25	1.00	.61	1.65	2.90
160	sq. ft. furn. and placing ¾-in. elastic joint filler	1.60	1.25	.74	2.10	3.50
3,265	sq. ft. furn. and placing 1-in. elastic joint filler	2.00	1.50	.97	2.40	4.30
1,975	lin. ft. placing rubber water stops in joints	1.20	1.00	1.00	1.30	2.00
6	M.b.m. furn. and erecting timber in structs.	366.00	200.00	226.00	332.00	250.00
80	lin. ft. furn. matls. & const. sand or graded sand and gravel drains without sewer pipe	1.50	2.00	2.44	1.23	1.75
250	lin. ft. furn. matls & const. graded sand and gravel drains with 6-in. sewer pipe	3.00	2.50	4.03	1.75	2.40
90	lin. ft. furn. matls. & const. two-layer sand and graded gravel drains with 6-in. sewer pipe	3.90	2.50	4.27	1.75	4.60
235	cu. yd. furn. matls. and const. reverse filter	10.50	10.00	9.76	10.25	20.00
630	lin. ft. furn. and placing 6-in. sewer pipe filters and auxiliary drain outlets	1.50	1.00	1.88	.80	2.00

(Continued on next page)

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Built-in durability explains the stand-out performance of Mack super-duty trucks on punishing excavation jobs. Mack Model LR, specially engineered for this service, is proving to cost-conscious contractors that a Mack on the job means more work done on the job.

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Mack trucks for off-highway excavation service take the toughest terrain in stride. Whether it's uneven ground, slippery mud or sand, Mack's exclusive Power Divider assures good going by effectively transferring power to the wheel having the best traction.

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Salt Lake City • Factory branches and dealers
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CONCRETE *Cost conclusions*

LOUIS BELLI does a lot of foundation building on Long Island. Probably more than anyone else. Hear what Louis wrote us:

"We are getting a foundation a day with one set of forms. We used them 128 times on one job alone."

WOOD BURNS. Steel doesn't. That's one reason to use Atlas Steel Forms. There may not be too much fire hazard in wood forms but we think it's better not to have a risk hanging over one's head, especially when you think what fire damage can do to a tight schedule.

And when the forms are snowed in and frozen up . . . how are you going to thaw them out quickly without danger of fire? You can't build a bonfire on wood forms but fire will not burn, buckle or blister Atlas Steel Forms.

Have you noticed the little dingbat we use between paragraphs? It's a simplified drawing of a gadget that is just one reason why Atlas Speed Forms are so easy to erect and strip. It's the patented wedge bolt. You can see how easy it is to slip in or knock out even from the sketch. Or better yet, try Atlas Speed Forms on your next poured concrete job.

WE'LL *be happy to send you, without obligation, our 25 page fully illustrated Erection Manual. Just mail a post card to Irvington Form & Tank Corp., Forms Division, Irvington, N. Y.*

50	lin. ft. furn. and laying 24-in. diam. corrugated metal pipe	4.40	8.00	7.00	6.10	9.80
50	lin. ft. furn. and laying 36-in. diam. corrugated metal pipe	8.50	10.00	7.82	10.75	12.00
69,500	lb. installing radial gates	.08	.12	.122	.13	.10
26,000	lb. installing radial gate hoists and oper. and control mech.	.08	.10	.147	.20	.17
3,200	lb. installing miscl. metalwork	.20	.25	.244	.21	.20
320	lin. ft. furn. and installing embedded elec. metal conduit 1¼-in. or less in diam.	1.00	3.00	2.13	2.50	3.00
50	lin. ft. furn. and installing embedded elec. metal conduit 1½-in. or more in diam.	2.00	3.50	2.56	3.00	4.00
60	lb. furn. and installing embedded elec. ground wires and ground rods	1.20	2.00	2.44	3.00	3.40

SCHEDULE NO. 3

		(1)	(4)	(5)	(6)
2,323,000	cu. yd. excavation, common, for canal	.21	.324	.42	.42
140,000	cu. yd. excavation, rock, for canal	1.15	.324	.42	.42
36,000	cu. yd. excavation, common, for drainage, channels and dikes	.175	.32	.32	.44
500	cu. yd. excavation, rock, for drainage channels and dikes	3.45	6.10	2.50	.44
220,000	sta. cu. yd. overhaul	.015	.036	.04	.04
685,000	cu. yd. compacting embankments	.23	.32	.44	.42
209	acre clearing orchards	57.50	275.00	300.00	78.00
140	acre grubbing orchards	57.50	250.00	100.00	40.00
33	acre clearing vineyards	57.50	245.00	150.00	70.00
22	acre grubbing vineyards	57.50	230.00	100.00	40.00
72,000	cu. yd. excav., common, for structs.	.60	3.32	.95	2.00
3,900	cu. yd. excav., rock, for structs.	4.60	9.10	.95	8.00
735,000	sq. yd. trimming earth foundations for conc. lining	.40	.444	.48	.59
41,000	sq. yd. preparing rock foundations for conc. lining	1.75	.65	.48	.59
370	cu. yd. 18-in. riprap	4.50	6.00	4.80	7.00
6,050	cu. yd. 24-in. riprap	5.50	6.00	3.50	7.00
750	cu. yd. 36-in. riprap	6.50	6.00	3.00	6.30
39,000	cu. yd. backfill	.23	.82	.48	.85
15,000	cu. yd. backfill at top of canal lining	.29	.31	.70	1.70
15,000	cu. yd. compacting backfill	2.40	3.94	2.25	4.25
9,185	cu. yd. concrete in structs.	38.03	45.35	59.00	67.00
2,750	cu. yd. concrete in bridges	40.55	71.40	70.00	98.50
765	cu. yd. concrete in paving slabs	26.35	45.35	48.00	49.00
75,500	cu. yd. concrete in unreinforced canal lining	14.55	12.35	17.14	14.00
125,500	bbl. furn. and handling cement	4.76	4.62	4.50	5.00
2,010,000	lb. furn. and placing reinf. bars	.10	.115	.14	.131
1,020	sq. ft. furn. and placing ½-in. elastic joint filler	1.25	1.65	2.90	1.75
1,730	sq. ft. furn. and placing 1-in. elastic joint filler	2.00	2.40	4.30	2.70
2,580	lin. ft. placing rubber water stops in joints	1.20	1.30	2.00	2.00
35,000	lb. furn. and placing metal water stops in joints	.18	.40	.25	.30
312	M.b.m. furn. and erecting timber in structs.	210.00	332.00	245.00	300.00
29	cattle gd. furn. materials and const. cattle guards	282.00	438.00	250.00	500.00
23	mi. furn. matls. and const. barbed wire right-of-way fence	$1,500	$2,300	$1,300	$1,200
6	mi. furn. matls. and const. comb. barbed wire & woven wire right-of-way fence	$1,650	$2,470	$1,500	$1,550
25	gate furn. and installing metal fence gates in right-of-way fence	30.00	85.00	140.00	70.00
14,000	lin. ft. furn. matls. & const. sand or graded sand and gravel drains without sewer pipe	1.50	1.23	1.75	2.65
21,000	lin. ft. furn. matls. & const. graded sand & gravel drains with 6-in. sewer pipe	3.00	1.75	2.40	4.40
20	cu. yd. furn. matls. and const. reverse filter	10.50	10.25	20.00	30.00
120	lin. ft. furn. and placing 6-in. sewer pipe in reverse filter	1.50	.80	2.00	3.00
400	lin. ft. furn. and laying 18-in. diam. corrugated metal pipe	3.00	3.55	6.00	4.00
100	lin. ft. furn. and laying 24-in. diam. corrugated metal pipe	4.40	6.10	9.80	5.75
60	lin. ft. furn. and laying 36-in. diam. corrugated metal pipe	8.50	10.75	12.00	11.00
11,000	lin. ft. removing, salvaging, and stock-piling metal pipe, all sizes	1.00	1.25	1.00	2.45
1,040	lin. ft. laying metal pipe 4-in. diam. and smaller, except 4-in. diam. pipe in turnout vents	.40	.65	2.50	1.50
5,100	lin. ft. laying metal pipe 6-in. to 12-in. diam., inclusive	.60	1.65	3.25	2.30
100	lin. ft. laying metal pipe 14-in. and 16-in. in diam.	.90	5.30	4.00	2.60
300	lin. ft. installing 4-in. diam. metal pipe in turnout vents	.60	.65	4.00	2.00
600	lin. ft. laying 6-in., 8-in., 10-in. and 12-in. diam. precast conc. pipe	1.25	6.00	2.00	1.70
100	lin. ft. laying 14-in., 16-in., 18-in. & 24-in. diam. precast conc. pipe	3.00	10.60	3.50	3.50
160	lin. ft. laying 30-in. diam. precast conc. pipe	3.50	12.00	4.50	4.00
320	lin. ft. laying 36-in. diam. precast conc. pipe	4.00	16.00	5.00	4.50
480	lin. ft. laying 42-in. diam. precast conc. pipe	5.50	22.50	6.50	5.00
25	lin. ft. installing 18-in. diam. precast conc. pipe in standpipes	3.00	13.50	4.50	5.00
17	lin. ft. installing 30-in. diam. precast conc. pipe in standpipes	3.80	18.00	6.50	8.00
Lump sum,	supporting two 48-in. diam. wood-stave pipe lines	$6,000	$20,000	$36,000	$20,000
23,800	lb. installing slide gates in turnouts and irrigation crossings	.10	.33	.14	.46
45,000	lb. installing radial gates	.08	.13	.10	.14
24,000	lb. installing radial gate hoists and operating mechanisms	.08	.20	.17	.20
54,000	lb. installing miscellaneous metalwork	.22	.21	.20	.25
150	lin. ft. furn. and installing embedded elec. metal conduit 1¼-in. or less in diam.	1.00	2.50	3.00	1.50
50	lin. ft. furn. and installing embedded elec. metal conduit 1½-in. and more in diam.	2.00	3.00	4.00	3.00
50	lb. furn. and installing embedded elec. gd. wires and gd. rods	1.20	3.00	3.40	1.00

Dam . . .

Texas—Hill County—Corps of Engineers—Spillway and Embank.

L. P. Reed, Inc., of Meridian, submitted the low bid of $15,995,498 to the District Corps of Engineers at Galveston, for the construction of spillway and completion of embankment of the Whitney Dam and Reservoir. The work includes two cofferdams, clearing, excavation, foundation preparation, pervious fill, rolling, riprap, filter blanket, etc. Unit bids follow:

(1) L. P. Reed, Inc. $15,995,498
(2) Brown & Root, Inc., Wunderlich Contracting Co., Peter Kiewit Sons Co., Morrison-Knudsen Co. Inc. & Macco Corp. 16,269,938
(3) H. B. Zachry Co. & W. S. Bellows Construction Co. $16,997,442
(4) Engineers' Estimate 13,489,597

		(1)	(2)	(3)	(4)
Lump sum,	diversion and care of water	$1,200,000	$1,500,000	$775,000	$433,782
180	acres clearing	$2,500	140.00	200.00	39.50
20	acres grubbing	$3,000	300.00	500.00	60.26
34,100	cu. yd. excav., stripping	1.00	.45	.60	.458
47,800	cu. yd. excav., embank. foundation	1.00	.45	.60	.276
250,000	cu. yd. excav., common	.80	1.50	2.15	.24
1,280,000	cu. yd. excav., borrow	.30	.39	.43	.219
59,800	cu. yd. excav., rock	8.00	7.50	6.10	1.824
400	cu. yd. excav., rock, trenches	10.00	14.00	18.00	4.34
2,990	squares found preparation, rock	10.00	10.00	24.50	1.09
9,120	squares found preparation, earth	3.00	.50	1.15	.23
Lump sum,	filling 30-in. diam. cor. holes	$1,000	$2,500	$2,750	712.00

(Continued on next page)

Shell scientists believe you can profit by knowing about

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developed to be the world's finest heavy duty oil





Figure what oil breakdown can cost you

With sludge, carbon and lacquer come ring-sticking . . . lowered efficiency and engine wear. And your cost is more than repair and replacement. The *time out for overhaul* runs operating costs way up . . . and cuts profits way down.

Nine years work went into Shell Talona Oil



A hundred or more formulas were developed and tested by Shell Research to find ways to strengthen oil . . . help it resist acid, sludge, carbon and lacquer formation. Yes, and *reduce engine wear.*

One oil, now marketed as *Shell Talona Oil,* was in a class by itself. In the most grueling tests, Shell Talona Oil kept sludge to a harmless minimum; kept bearings free from corrosion; kept pistons and rings virtually free of carbon and lacquer deposits. And as for wear —it couldn't be measured by ordinary standards on pistons or cylinder walls.



It pays off to you this way

In high speed Diesel and heavy duty gasoline engines, Shell Talona Oil promises less engine wear . . . longer operation at peak efficiency. Fuel economy should improve. And with proper care of your air cleaners and oil filters, periods between overhauls should lengthen considerably.

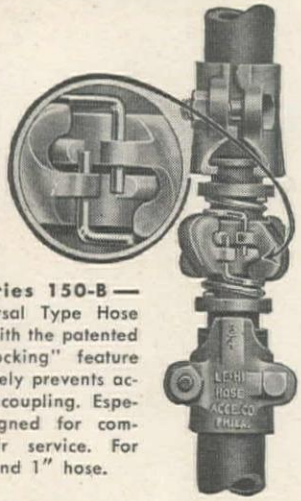
Ask your Shell representative for Shell Talona Oil. It's on sale now—and there's absolutely no other like it.

ARE YOU ABSOLUTELY SURE YOU ARE GETTING ALL THAT'S NEW IN LUBRICATION?

Your Shell Lubrication Engineer can make a complete study and analysis of your plant and machines . . . give you engineering counsel, advice on new lubricants and their application . . . help you set up schedules and controls for each and every machine. For that kind of service, call in your Shell Lubrication Engineer.

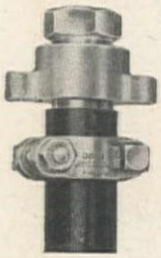
SHELL

LE-HI



LE-HI Series 150-B — The Universal Type Hose Coupling with the patented "Safety-Locking" feature that positively prevents accidental uncoupling. Especially designed for compressed air service. For ½", ¾" and 1" hose.

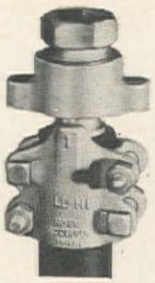
HOSE COUPLINGS



LE-HI Series 200-G or W — "Light Type" Air Hammer Hose Couplings. For *lighter* rock drills, jack hammers, sinkers, tampers, etc. Fast, easy coupling and uncoupling. Fully interchangeable. For ½" and ¾" hose. Available in ground joint and washer types.

ARE TOUGH

LE-HI Series 350-G or W — Heavy Duty Air Hammer Hose Couplings. Designed for the toughest kind of jobs. For *heavy* jack hammers, rock drills, and sinkers; also drifters, stopers, wagon drills, etc. Maximum air flow. Leak-proof seal. For ¾" and 1" hose. Ground joint and washer types available.



LE-HI MAKES A GOOD CONNECTION!

Go to your local distributor for these rugged, economical LE-HI Hose Couplings — NEVER SOLD DIRECT.

LE-HI HIGH and LOW PRESSURE HOSE COUPLINGS

HOSE ACCESSORIES CO.
2756 North 17th Street
Philadelphia 32, Pennsylvania

Branches at Chicago, Houston and Los Angeles

830 sq. yd. protective treatment for shale	3.00	2.00	.75	1.95
17,000 sq. ft. close line drilling	2.50	2.00	3.00	1.15
3,200 lin. ft. drilling 1½-in. "A" holes 0 to 40 ft. (from gallery through pipe)	2.50	2.00	3.00	2.17
220 lin. ft. drilling 1½-in. "B" holes, 0 to 40 ft. (from top of masonry through pipe)	2.50	2.30	3.00	2.43
2,200 lin. ft. drilling 1½-in. "A" holes, 40 to 150 ft.	4.00	2.00	3.00	2.93
220 lin. ft. drill 1½-in. "B" holes, 40 to 150 ft	4.00	2.30	3.00	2.95
11,000 lin. ft. drill 3-in. holes, 0 to 100 ft. (from gallery through pipe)	3.00	3.00	5.50	3.57
5,350 lin. ft. found drain pipe (C M half circle culvert)	4.00	4.60	4.20	2.33
500 lin. ft. core drill, 8-in. holes, 0 to 100 ft.	20.00	22.00	31.00	15.25
19,850 lin. ft. drill for and grout anchor bars in rock	4.00	4.00	1.60	1.77
3,800 lin. ft. pipe, porous concr. half round, at const. joints	3.00	5.00	2.00	1.36
100 sks. cement, pressure grouting	20.00	50.00	28.00	14.35
1,130,000 cu. yd. fill, compacted	.20	.15	.16	.103
12,900 cu. yd. fill, drainage blanket	1.00	1.20	2.50	.10
240 roller hrs. additional compaction	2.00	12.00	12.00	10.01
6,580 cu. yd. backfill, structure	7.00	3.00	2.50	1.25
2,340 cu. yd. stone, crushed	2.50	5.00	2.35	5.00
1,550 cu. yd. stone, derrick	10.00	8.00	8.80	5.00
64,400 cu. yd. riprap, dumped	3.00	4.60	4.00	3.50
4,120 cu. yd. rock spalls	2.50	4.40	3.00	2.00
24,600 cu. yd. gravel, filter blankets	2.50	2.30	2.40	3.00
5,920 cu. yd. flexible base	1.00	4.50	4.00	1.24
4,220 gals. bituminous prime coat	.20	.30	.30	.179
27,400 gal. asphalt	.20	.20	.27	.18
760 cu. yd. aggregate	5.00	10.00	8.70	6.66
24,000 lin. ft. railing, guard, highway	2.00	2.00	1.95	1.95
652,000 bbl. cement	3.30	2.90	3.40	3.48
472,100 cu. yd. concrete, mass	15.40	15.90	17.00	14.681
27,800 cu. yd. concrete, stilling basin	15.40	18.00	21.00	15.757
11,900 cu. yd. concrete, piers	20.00	30.00	48.00	27.16
5,600 cu. yd. concrete, training walls	35.00	23.00	19.70	23.92
2,600 cu. yd. concr., spillway bridge and trash rack structure	40.00	60.00	75.00	86.845
2,100 cu. yd. concr. roadway, sidewalks, etc.	45.00	75.00	75.00	33.826
700 cu. yd. concrete, misc.	55.00	60.00	82.00	11.25
4,900,000 lb. steel reinf.	.11	.14	.135	.096
Lump sum, install slide gates and accessories	$47,000	$87,000	$72,000	$50,515
Lump sum, install sluiceway face, gates, guides	$30,000	$37,000	$32,500	$31,119
Lump sum, install tainter gates and accessories	$135,000	$70,000	$115,000	$166,329
(deleted)				
Lump sum, install tainter gate hoists	$30,000	$20,000	$40,000	$34,386
Lump sum, install intake gates and guides	$10,000	$7,500	$15,000	$12,507
Lump sum, install intake gate hoists	$5,000	$4,000	$7,500	$4,872
(deleted)				
Lump sum, raw water and bypass systems	$2,000	$12,000	$10,000	$10,984
Lump sum, gravity drain system, pipe, valves, fittings	$1,000	$30,000	$35,000	$18,208
Lump sum, compressed air piping system	$1,000	800.00	$1,000	$3,278
50,320 lb. black steel pipe and fittings	.20	.35	.29	.293
Lump sum, pipe, valves, fittings and accessories for slide gates	$30,000	$10,000	$8,750	$14,918
Lump sum, spillway and intake vent pipe, fittings	$30,000	$30,000	$27,000	$26,909
Lump sum, piezometer piping and fittings	$10,000	$5,000	$8,250	$14,397
Lump sum, float well system	$5,000	$3,500	$2,900	$2,387
Lump sum, automatic sump pumps and piping	$6,000	$5,000	$4,750	$2,774
84,000 lb. conduit, fittings, outlet boxes	.50	.85	.65	.442
100 lb. steel frames for elec. work	50.00	.80	.70	4.23
Lump sum, lighting system, fixtures, switches, etc.	$35,000	$20,000	$23,500	$26,829
Lump sum, power, control, tel. cable and wiring	$15,000	$20,000	$27,000	$13,036
Lump sum, power, control, telephone equip.	$9,000	$7,000	$5,000	$6,938
Lump sum, grounding system	$20,000	$14,000	$19,500	$13,831
Lump sum, install lighting beams, trash racks	$5,000	$4,500	$8,250	$1,621
Lump sum, unload and handle elevator	$2,000	800.00	200.00	726.00
Lump sum, install elevator hoistway, embedded inserts	$1,000	300.00	200.00	282.00
Lump sum, install oil pumps, appurtenant parts	$2,000	800.00	$1,500	$1,472
Lump sum, install standby elec. generator unit	$2,000	800.00	$1,500	956.00
903,000 lb. install struc. steel, spillway bridge	.10	.03	.055	.0608
321,000 lb. penstocks and support frames	.24	.25	.27	.241
44,000 lb. trash rack, stop log guides, sills	.30	.30	.24	.161
40,500 lb. steel stairs, landings, stair treads	1.00	.75	.67	.328
56,000 lb. parapet handrailing	.40	.30	.34	.406
9,600 lb. handrail and fittings	1.00	.40	.40	.355
(deleted)				
101,000 lb. misc. metalwork	.40	.45	.30	.348
Lump sum. install emergency generator control and dam power distribution board	$1,000	$1,000	500.00	298.00
Lump sum, furnish and apply paint	$180,000	$22,000	$87,500	$131,191
Lump sum, misc. doors and windows	$3,000	$8,000	$3,750	$4,031
Lump sum, piezometer and settlement gages	$5,000	$20,000	$14,500	$3,465
170 lin. ft. tile gages	20.00	10.00	20.00	19.20
14,000 lin. ft. copper water seals	3.00	2.00	1.45	1.15
(deleted)				
350 lin. ft. vit. channel pipe	3.00	4.50	2.00	.80
Lump sum, gas-elec. generator room vent sys.	$5,000	$2,000	$1,750	$1,718
Lump sum, suspended ceiling	$1,000	300.00	250.00	285.00
Lump sum, partition	$1,000	300.00	600.00	235.00
Lump sum, flagpoles	$1,000	$2,000	$1,575	$2,447
672,000 sq. ft. absorptive form lining	.20	.30	.25	.195
Lump sum, fill 6-in. asphalt seal wells	$1,000	$7,000	$3,750	$12,034

Oklahoma—Osage County—Corps of Engineers—Spillway and Embank.

Mittry Bros. Construction Co., Los Angeles, Calif., was awarded a $5,174,600 contract by the District Corps of Engineers, Tulsa, for the construction of the spillway and completion of embankment at Hulah Dam on the Caney River. Work includes construction of the cofferdam, excavation, embankment topsoil, protection stone, concrete spillway, sluice gates, tainter gates, water treatment facilities, standby electric generator unit, etc. Time allowed for completion is 900 days. The following unit bids were submitted:

(1) Mittry Bros. Construction Co. $5,174,600
(2) W. L. Johnson Construction Co. 6,765,677
(3) Al Johnson Construction Co., Winston Bros. Construction Co., Peter Kiewit Sons Co. $6,786,239
(4) Engineers' Estimate 4,076,890

	(1)	(2)	(3)	(4)
40 acres clearing and grubbing	450.00	550.00	250.00	142.00
Lump sum, care and diversion of water	$180,000	$94,300	$150,000	$16,640
45,000 cu. yd. excav. embankment foundation	.50	1.10	.45	.37
130,000 cu. yd. excav., common	.90	.85	1.80	.45
270,000 cu. yd. excav., rock	.90	1.00	1.80	.90
6,000 cu. yd. excav., special	11.00	11.00	11.00	6.36
7,000 cu. yd. excav., embankment drainage	1.60	1.25	1.50	.37
560,000 cu. yd. excav., Borrow Area I	.32	.55	.50	.31
275,000 cu. yd. excav., Borrow Area II	.32	.50	.53	.35
115,000 cu. yd. excav., Borrow Area III	.32	.45	.53	.34
25,000 cu. yd. excav., B A IV, overburden	.32	.40	.43	.55

(Continued on next page)



Oversize *U·S·S steel structural members form the "bones" for Pacific Telephone's new 15-story building in Oakland, California. Delicate communications gear needs the protection against shock that steel with its extra toughness can give.*

Steel—Framework for the Expanding West

Steel's passing the test in the West. Steel's fabricating speed helps the West build—fast. The strength of steel helps the West build—permanently.

All over the West in jobs large and small, steel by Columbia is being put to profitable use. The great mills of Columbia are turning out record amounts of the steel the West grows on. And, as a member of United States Steel, Columbia serves the West by combining its resources with those of the Industrial Family that Serves the Nation.

For information on any U·S·S steel product, address the Columbia Steel Company office nearest you.

Only STEEL can give you all 7 of these structural advantages

Extra toughness and shock resistance—Incombustibility—High strength-weight ratio—Highest modulus of elasticity—Versatility of application—Great durability —Ultimate economy

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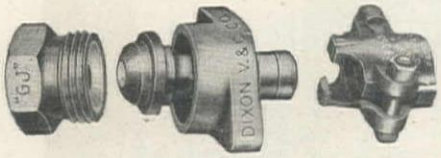
Pacific Coast Distributors for
AMERICAN BRIDGE COMPANY • AMERICAN STEEL & WIRE COMPANY
NATIONAL TUBE COMPANY • CARNEGIE-ILLINOIS STEEL CORPORATION
TENNESSEE COAL, IRON & RAILROAD COMPANY
United States Steel Export Company, New York

USS STEEL UNITED STATES STEEL

UNITED STATES STEEL

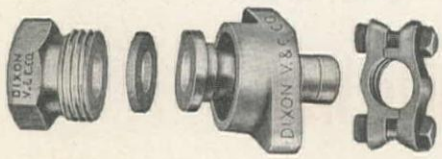
Built to Cut Costs on Heavy Duty Air Tool Operations...

DIXON quality in Air Hammer Couplings assures definite savings on rock drilling and other heavy-duty air tool jobs . . . longer service life through superior strength and durability; greater efficiency through elimination of leaks and pressure losses; lower hose replacement costs through protection to hose ends.



"G J-BOSS"
AIR HAMMER COUPLING

Ground joint construction—no worn or mislaid washers to replace. Built for heavy duty and hard wear. Furnished with strong "Boss" Interlocking Clamp. Large wing nut facilitates connecting and disconnecting. Compact and heavy types. Cadmium plated—rustproof. For washer style, specify "Boss" Air Hammer Couplings.



"DIXON"
AIR HAMMER COUPLING

Washer style. Efficient, durable, inexpensive. Steel stem has deep, smoothly finished corrugations. Rugged malleable iron clamp has dual gripping ridges on inner surface. Compact and heavy types. Cadmium plated—rustproof. Also available in ground joint construction—specify "G J-Dixon" Air Hammer Couplings.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods.

IF IT'S A DIXON BOSS **PRODUCT**

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DIXON
VALVE & COUPLING CO.
Main Office and Factory: **PHILADELPHIA, PA.**
BRANCHES: CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

35,000 cu. yd. excav., B A IV, rock	1.00	1.10	1.75	.73
40,000 sq. ft. line drilling	1.20	1.20	2.25	.82
5,000 lin. ft. drill, grout 3-in. anchor holes	1.50	.80	3.30	2.55
150 lin. ft. drill 6-in. concr. cores	12.00	30.00	7.00	9.15
Lump sum, relocate flagpole	300.00	300.00	150.00	194.00
48 lin. ft. R. C. pipe, 15-in.	4.00	5.30	4.50	3.65
114 lin. ft. R. C. pipe, 24-in.	6.00	6.35	8.00	4.55
66 lin. ft. R. C. pipe, 30-in.	9.00	9.00	12.00	6.05
52 lin. ft. R. C. pipe, 48-in.	20.00	20.00	21.00	12.85
1,050,000 cu. yd. embankment fill	.08	.18	.20	.126
6,000 cu. yd. embankment fill	.40	.30	.30	.28
50,000 cu. yd. roadway fill	.08	.15	.15	.10
10,000 cu. yd. backfill, structure	2.00	2.00	3.50	1.17
23,000 cu. yd. dumped rock fill	1.50	2.60	2.30	.75
8,500 cu. yd. derrick stone	4.00	5.00	3.50	1.50
7,000 cu. yd. rock spalls, 3-in. max.	2.50	1.25	1.50	.58
14,000 cu. yd. rock spalls (excav.), 6-in. max.	2.50	2.90	3.00	1.68
23,000 cu. yd. same (stockpiles), 6-in. max.	1.00	1.25	2.00	1.13
900 cu. yd. hand placed riprap	8.00	22.00	12.00	6.00
45,500 cu. yd. dumped riprap from excav.	2.00	3.00	3.25	1.12
24,500 cu. yd. dumped riprap from stockpiles	1.60	3.00	3.25	2.08
300 cu. yd. rock paving	12.00	25.00	18.00	4.95
90,000 bbl. cement	3.80	3.40	4.00	3.13
50,000 sqs. (100 sq. ft.) roll for each addtl. pass	.04	.06	.03	.028
61,000 cu. yd. concrete, dam	14.50	25.50	22.50	12.25
420 cu. yd. conc., bridge	55.00	60.75	79.00	67.70
1,500 cu. yd. concr., roadway	32.00	28.30	52.00	18.00
16,000 cu. yd. conc., piers, spray walls, training walls and approach walls	24.50	29.00	33.00	16.40
12,000 cu. yd. conc., stilling basin	19.00	21.50	23.00	13.55
740 cu. yd. conc., misc.	75.00	86.50	99.00	60.00
3,600 lin. ft. 12-in. CM pipe, half round	1.50	2.00	2.10	1.10
560,000 lb. structural steel, bridge	.16	.18	.17	.142
1,000,000 lbs. steel, reinf.	.11	.11	.13	.103
2,000 lin. ft. copper water stops	1.50	4.00	2.50	1.70
Lump sum, piezometers and settlement gages in cambankment	$3,500	$1,000	$2,500	505.00
Lump sum, piezometers for sluice	$1,500	$2,500	$1,000	$1,300
210,000 lb. tainter gate embedded metal, struct. steel	.24	.40	.24	.214
33,000 lb. chrome nickel steel (SAE 3140), in tainter gate anchorages	1.10	2.00	1.22	.25
7,300 lb. tainter gate, steel forgings	.50	.60	.34	.45
21,000 lb. tainter gate, seal plates, corrosion resisting steel	1.20	1.50	.70	1.02
670,000 lb. tainter gate, movable parts	.25	.50	.27	.25
Lump sum, tainter gate, operating machy.	$321,500	$350,000	$268,120	$239,870
Lump sum, maintain Osage Co. Hwy. No. 4	$12,000	$57,000	$1,000	$5,880
28,000 lbs. lead	.30	.30	.20	.28
Lump sum, sluice gates, conduit liners and liners and oper. equip.	$375,000	$345,000	$388,011	$330,900
2 each sump pumps	$1,100	$1,200	$1,100	690.00
1 each raw water pump	900.00	$1,300	$1,000	670.00
2 each 24-in. gate valves	$2,000	$2,600	$1,300	$1,285
2 each 24-in. butterfly valves	$3,200	$4,500	$1,300	$3,465
2 each metal bulkhead	$24,500	$30,000	$12,500	$4,056
11,000 cu. yd. compacted gravel base course	4.00	10.00	5.50	3.40
48,500 sq. yd. bituminous surfacing	.50	.40	.35	.37
55,000 lb. misc. metalwork	.35	.60	.45	.25
5,600 lb. misc. brass and bronze	2.00	2.50	.80	.90
11,000 lb. misc. iron castings	.40	.55	.40	.32
58,000 lbs. misc. steel castings	.40	.60	.32	.33
29,000 lb. misc. black steel pipe, fittings	.40	.50	.50	.28
2,400 lb. misc. galv. steel pipe, fittings	.50	1.00	.60	.31
75,000 lb. misc. C. I. pipe, fittings	.30	.40	.30	.21
11 acres seeding and mulching	300.00	400.00	189.00	260.00
2,200 lb. misc. iron body valves	1.00	.70	1.00	1.00
Lump sum, misc. doors and windows	$3,100	$4,030	$4,350	$3,570
Lump sum, roofing, 2 stair towers	800.00	500.00	90.00	78.00
Lump sum, water treat bldg. and facilities	$16,000	$35,000	$23,700	$14,535
1 each gas pressure regulator	500.00	200.00	305.00	26.00
Lump sum, gasoline-elec. generating plant	$9,000	$1,000	$3,580	$1,178
Lump sum, water storage tank	$18,000	$8,700	$12,150	$5,100
5,600 lb. pipe handrail	.50	.80	.90	.39
200,000 sq. ft. absorptive form lining	.30	.18	.30	.18
12,000 lin. ft. guardrail	3.00	1.85	2.40	1.95
1,500 lin. ft. metal handrail, spillway bridge	5.00	16.00	15.00	2.70
300 lin. ft. 6-in. perforated VC pipe	1.50	2.00	1.90	1.47
260 lin. ft. 6-in. VC drain pipe	1.50	3.00	1.80	1.00
3,600 cu. yd. topsoil	1.50	.75	1.20	.94
1 each exhaust fan in generator room	300.00	400.00	205.00	98.00
180 lin. ft. bumper rail	3.00	2.00	4.00	1.10
1 each 6-in. flap valve	150.00	100.00	30.00	24.50
23,000 lb. metal conduit	1.00	1.10	1.00	.91
2,000 lin. ft. 2-in. duct	2.00	1.60	.65	1.17
Lump sum, wiring	$14,000	$15,000	$10,362	$12,812
Lump sum, elec. fixts. and equip.	$26,000	$31,000	$25,040	$29,525
600 lb. grounding system	3.00	3.95	2.80	1.95
Lump sum, aerial elec. supply and substation	$10,000	$11,000	$7,200	$8,674
Lump sum, intercommunication system	$3,500	$3,900	$4,460	$2,935
11 acres sprigging and overseeding	300.00	500.00	200.00	252.00
280 M. gals. water for same	7.00	5.00	5.00	3.65
145,000 cu. yd. excav., shale stockpiles	.25	.40	.50	.33
150 sqs. (100 sq. ft.), found. protect. for sloping surfaces	80.00	150.00	160.00	57.00

Sewerage . . .

California—Kern County—County—Disposal System

The Downer Corp., Stockton, submitted the low bid of $763,966 and was awarded the contract by the County Board of Supervisors, Bakersfield, for the construction of a sewage treatment plant and sanitary sewer lines in East Bakersfield. Unit bids follow:

(1) Downer Corp. ..... $763,966 (2) Burch & Bebeck $1,138,365

	(1)	(2)
24-in., 11,471 lin. ft. unit clay sewer pipe in place	8.51	10.00
24-in. 150 lin. ft. double strength V C sewer pipe in place	9.51	10.00
18-in. 2,110 lin. ft. V C sewer pipe in place	4.87	7.00
10-in. 4,060 lin. ft. V C sewer pipe in place	2.10	3.50
1 each 24-in. x 6-in. V C Y-branches in place	20.00	25.00
10 each 18-in. x 6-in. V C Y-branches in place	8.00	15.00
77 each 10-in. x 6-in. V C Y-branches in place	2.00	5.00
58 each 4-ft. standard manholes complete with rings and covers, in place	160.00	250.00
2 4-ft. drop manholes complete with rings and covers, in place	200.00	300.00
5 concrete inspection boxes complete with covers, each	91.00	1.50

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PMCO

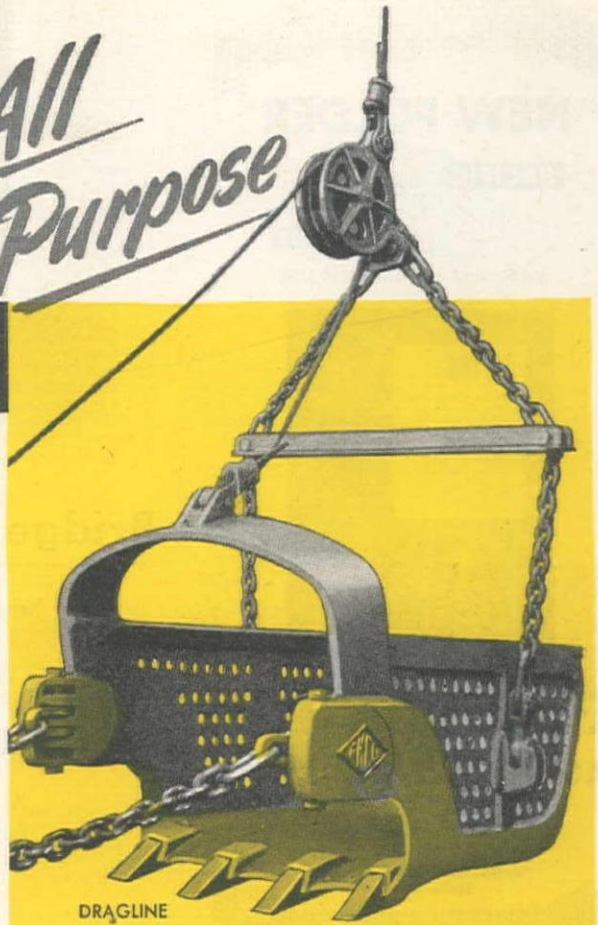
All Purpose

America's Largest Builder of Material Handling Buckets

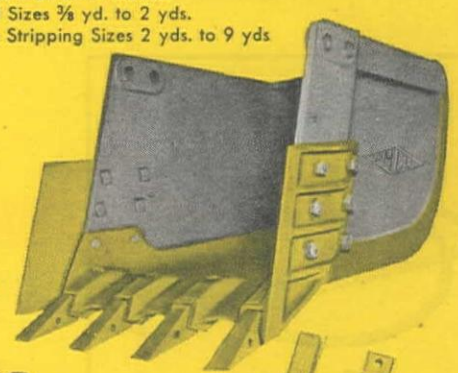
SHOVEL
PULL SHOVEL
DRAGLINE
CLAMSHELL

FRONTS, BOTTOMS, SCOOPS and TEETH shown in color on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

Experience Counts. See your shovel man or equipment dealer about PMCO Buckets and Dippers.



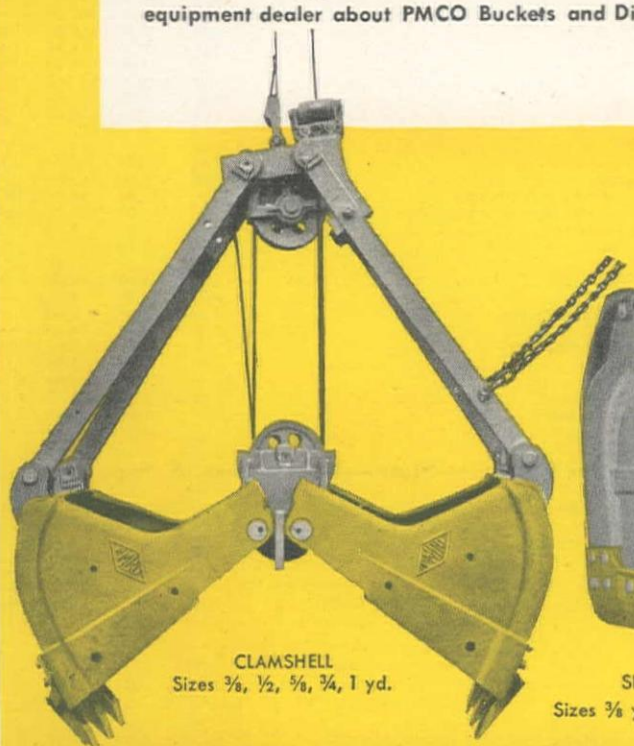
DRAGLINE
Perforated Sizes ⅜ yd. to 2 yds. 20%-40% lighter than other makes.
Solid Sizes ⅜ yd. to 2 yds.
Mine Stripping Sizes 2 yds. to 9 yds.



PULL SHOVEL
Outside Cutter Widths:
21", 26", 31", 36", 39"



On the ½ yd. and ¾ yd. Shovel, Pull Shovel, and Dragline Buckets, all teeth are interchangeable—a great advantage to operators.



CLAMSHELL
Sizes ⅜, ½, ⅝, ¾, 1 yd.



SHOVEL
Sizes ⅜ yd. to 18 yds.

"Quality Since 1880"

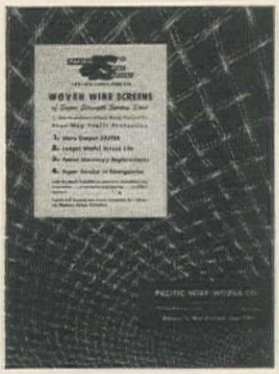
PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES

NEW FOLDER

PACIFIC 4S WIRE SCREENS

*4S–SUPER STRENGTH SPRING STEEL

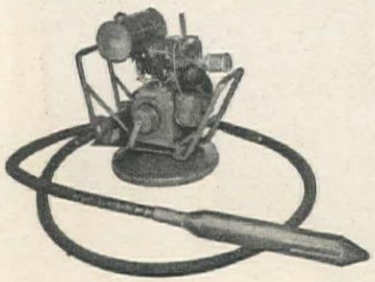


Here's Valuable Information for every user of wire screens to produce sand, gravel, coal, ore. It's Free. Write for your copy today.

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KARL H. KAYE, *President*
Factory and Warehouse
4515 Sixth Ave. South, Seattle 8
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"Artisans in Wire Products Since 1891"



Concrete

VIBRATORS

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OTHER PRODUCTS

FRONT END LOADERS
for Industrial Tractors

HEATING KETTLES
for Asphalt and Tar

AGGREGATE DRYERS
for Stone and Sand

ASPHALT PLANTS
Portable—Stationary

Write for Circulars

White Mfg. Co.

ELKHART INDIANA

Clearing north and south tracts of land (lump sum)	$4,500	$6,000
Leveling north tract of land (lump sum)	$8,000	$15,000
Construction of cattle fence (lump sum)	$6,500	$7,500
Construction of woven wire fence around plant (lump sum)	$2,500	$2,650
Drilling of water well complete with tank, pump, and appurtenances (lump sum)	$4,000	$8,000
Grading and oil surfacing of service road and plant driveways (lump sum)	$3,500	$5,000
Replacing of state highway pavement (lump sum)	500.00	$10,000
Replacing of pavement on city streets (lump sum)	800.00	$1,000
1,300 tons of SC-3 grade road oil (lump sum)	$26,000	$25,000
Construction of irrigation and overflow system including tail ditch (lump sum)	$6,000	$5,000
Construction of underground irrigation system and appurtenances (lump sum)	$4,500	$6,000
Construction of sewage treatment plant complete (lump sum)	$224,500	$365,000
Tank trailer complete (lump sum)	$6,800	$7,500
Farm machinery complete (lump sum)	$4,000	$5,000
FOR CONSTRUCTION OF LATERAL OR COLLECTING LINE SEWERS, HOUSE CONNECTIONS AND INCIDENTAL WORK:		
8-in. 80,600 V C sewer pipe in place per lineal foot	1.60	2.75
39,000 6-in. V C sewer pipe in place per lineal foot	1.60	2.25
2,150 8-in. x 6-in. V C Y-branches in place, each	1.30	4.00
115 6-in. x 6-in. V C Y-branches in place, each	1.25	3.50
850 6-in. V C discs in place, each	.13	.10
2,236 6-in. V C 1/8 bends in place, each	2.60	2.50
19 6-in. tap connections in existing main, each	100.00	25.00
287 4-ft. standard manholes complete with rings and covers, in place, each	160.00	250.00
21 8-in. standard lampholes complete, in place, each	32.50	40.00
1,360 tons of SC-3 grade road oil (lump sum)	$28,000	$25,000
Replacing state highway pavement (lump sum)	$3,300	$8,000

Bridge and Grade Separation . . .

New Mexico—Chaves County—State—Grade & Bridges

J. H. Ryan, Albuquerque, was awarded a $740,274 contract by the State Highway Department at Santa Fe, for approximately 1.1 mi. grading, construction of one concrete and steel bridge 343 ft. in length, one concrete and steel bridge 1195.5 ft. in length, watering and rolling, leveling course, ballast, bituminous top course surfacing, sealing with asphalt and stone chips, and miscellaneous construction. The following unit bids were submitted:

(1) J. H. Ryan $740,274
(2) Armstrong & Armstrong 767,205
(3) Lowdermilk Bros. $808,730
(4) Engineers Estimate 772,808

	(1)	(2)	(3)	(4)
Lump sum, removal of old structs. (conc. dip)	250.00	400.00	500.00	300.00
134,550 cu. yd. excavation—unclassified	.35	.27	.20	.25
5,000 sta. yd. overhaul	.03	.03	.02	.02
464,500 mi. yd. haul	.05	.035	.08	.06
950 hr. rolling—sheepsfoot roller	4.00	4.00	4.00	4.00
27 hr. rolling—steel tired roller	10.00	8.00	10.00	7.00
590 hr. rolling—pneumatic tired roller	4.00	3.50	5.00	4.00
3,070 ton ballast	.80	.90	.90	.80
3,050 ton leveling course	.90	.90	1.00	1.00
3,850 M. gal. watering	2.00	1.25	1.00	2.00
8,350 lin. ft. galvanized barbed wire fence	.15	.15	.20	.15
2 each gates—Texas type	10.00	10.00	10.00	8.00
28 each bracing	8.00	5.00	7.50	4.00
140 each treated timber warning posts(reflect.)	8.00	9.00	8.00	10.00
7 each right-of-way markers	6.00	10.00	10.00	6.00
0.8 mile obliterating old road	300.00	250.00	200.00	300.00
70 bbl. cutback asphalt Type MC-1	8.00	8.00	10.00	8.00
335 bbl. cutback asphalt Type MC-3	8.00	8.00	8.50	8.00
1,085 ton top course surfacing	1.00	1.00	1.50	1.00
0.769 mile mixing asphalt and aggregate	$1,000	$1,000	$1,500	800.00
80 bbl. 120-150 asphalt (for seal coat)	10.00	8.00	10.00	8.00
135 ton aggregate (seal coat)	6.00	5.00	8.00	6.00
BRIDGE ITEMS				
1,309 cu. yd. excavation for structures	17.00	17.25	7.50	6.00
140 hour mechanical tamping	5.00	6.00	5.00	4.00
1299.20 cu. yd. Class "AE" concrete substructure	50.00	42.00	48.50	40.00
1135.00 cu. yd. Class "AE" concrete superstructure	50.00	45.00	60.00	40.00
2,451 sq. yd. waterproofing concrete	.75	.90	1.00	.75
271,698 lb. reinforcing steel	.10	.10	.115	.09
1,815,120 lb. structural steel	.121	.14	.135	.16
1,130 ton dry riprap Class "B"	3.00	4.60	8.00	4.00
14,416 ton derrick stone riprap	4.00	4.50	8.00	4.00
6,456 cu. yd. excav. for embankment protection	1.25	1.15	1.00	.50
18,180 lin. ft. steel bearing piles	4.80	6.07	4.00	5.50
710 lin. ft. drilling holes for bearing piles	15.00	4.00	5.00	3.00
25,968 sq. ft. steel sheet piling	2.50	2.80	3.00	3.00
Lump sum, removing existing bridge	$10,000	$7,000	$5,000	$8,000
38 each cutting off timber piles	5.00	5.00	10.00	5.00
5,175 lin. ft. withdrawing timber piles	1.00	1.00	1.00	1.00

California—Los Angeles County—State—Undercross. & Sep. Structs.

Carlo Bongiovanni, Los Angeles, submitted the low bid of $999,999 before the Division of Highways, Sacramento, and was awarded the contract for the construction of four reinforced concrete undercrossings and two reinforced concrete separation structures on Hollywood Parkway at Figueroa St., Los Angeles. Unit bids are as follows:

(1) Carlo Bongiovanni ..... $ 999,999
(2) Haddock Co. 1,077,761
(3) Peter Kiewit Sons Co. 1,081,558
(4) W. J. Distelli & R. J. Daum 1,094,735
(5) Guy F. Atkinson Co. $1,164,000
(6) Griffith Co. 1,185,375
(7) James I. Barnes Construction Co. 1,313,407

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
830 cu. yd. remov. conc.	3.00	4.00	3.35	4.75	6.00	5.00	5.00
Lump sum, clearing and grubbing	$2,500	$3,450	$5,300	$3,500	$5,000	$4,000	$12,000
29,200 cu. yd. roadway excav.	.75	.37	.40	.53	.75	.50	1.25
7,450 cu. yd. struct. excav. (bridges)	1.00	2.20	.50	.90	2.00	1.50	3.00
3,900 cu. yd. struct. backfill (bridges)	2.00	2.30	2.00	3.50	2.50	2.50	3.00
1,800 cu. yd. struct. excav.	.10	3.00	3.20	3.25	5.00	2.40	7.00
115,000 cu. yd. imported borrow	.66	.83	.70	.93	.95	1.00	1.60
400 cu. yd. imported subgrade matl.	2.40	3.40	3.50	2.75	4.00	5.00	4.00
Lump sum, dev. wat. sup. & furn. wat'g equip.	$1,000	$3,000	$11,200	$4,000	$2,000	$2,000	$3,000
3,000 M. gal. applying water	.20	1.90	1.35	1.60	2.00	1.75	2.00
60 tons asphalt concrete	8.00	9.00	9.80	6.50	12.50	8.00	7.00
127 cu. yd. P.C.C. pavement	15.00	16.00	21.20	24.00	25.00	25.00	40.00
10,809 cu. yd. Class "A" P.C.C.	49.00	53.00	50.70	53.00	56.00	55.00	55.00
293 lin. ft. rubber waterstops	2.50	2.90	2.60	3.00	2.00	3.00	3.00

(Continued on next page)

29,200 lb. misc. iron and steel	.30	.34	.30	.30	.30	.30	.40
8,580 lin. ft. furn 10-in. 42# steel piling	2.07	1.80	2.22	2.00	2.25	2.50	2.20
13,810 lin. ft. furn. 12-in. 53# steel piling	2.61	2.25	2.82	2.40	3.00	3.00	2.80
3,270 lin. ft. furn. 14-in. 73# steel piling	3.65	3.10	3.89	3.65	4.00	4.00	4.00
842 ea. driving piles	22.25	21.00	25.00	23.00	40.00	30.00	30.00
84 ea. steel pile splices	20.00	17.50	22.00	20.00	12.00	25.00	30.00
125 cu. yd. P.C.C. curbs, gutters and sidew.	28.00	35.00	30.00	37.50	40.00	35.00	50.00
86 lin. ft. 15-in. std. str. R.C.R.	15.00	5.50	15.00	4.50	5.00	3.50	10.00
20 lin. ft. 18-in. std. str. R.C.P.	15.00	5.50	8.00	4.75	6.00	4.50	8.00
12 lin. ft. 33-in. std. str. R.C.P.	19.50	8.60	12.00	12.00	10.00	10.00	20.00
42 lin. ft. 42-in. std. str. R.C.P.	21.00	12.50	20.00	15.00	15.00	13.00	25.00
2,297,000 lb. furn. bar reinf. steel	.071	.065	.074	.065	.06	.075	.08
2,297,000 lb. placing bar reinf. steel	.02	.03	.032	.03	.03	.035	.03
3,691 lin. ft. steel railing	7.10	7.85	8.00	7.00	8.00	9.00	9.00
550 lin. ft. 10-in. vitr. clay pipe (ex. str.)	5.00	1.60	6.80	3.25	2.60	2.00	4.00
30 lin. ft. manhole "B"	30.00	21.00	2.10	33.00	30.00	20.00	30.00
Lump sum, electrical equip.	$6,457	$7,600	$9,937	$6,750	$7,654	$9,000	$11,000

Oregon—Multnomah County—State—Steel and Conc.

General Construction Co., Portland, was awarded the $334,260 contract by the State Highway Commission, Salem, for the construction of the structural steel and concrete Sandy River bridge on the Columbia River Hwy., near Troutdale. The following unit bids were submitted:

(1) General Construction Co. $334,260
(2) Lindstrom Bros. 341,000
(3) C. J. Eldon 349,120
(4) Guy F. Atkinson Co. $357,238
(5) C. J. Montag & Son 399,680
(6) Kuckenberg Construction Co. 412,300

	(1)	(2)	(3)	(4)	(5)	(6)
All required shoring, cribbing, etc.	$57,500	$35,000	$38,700	$49,000	$121,000	$75,000
2,400 cu. yd. structural excavation	3.00	15.00	18.00	4.00	4.00	10.00
200 cu. yd. struct. excav. below elev. shown	3.00	15.00	25.00	8.00	4.00	15.00
18,000 lin. ft. furnish foundation piling	.62	.50	.55	.60	.60	1.75
420 only drive piles	20.50	50.00	45.00	35.00	50.00	50.00
190 cu. yd. seal concrete	41.00	60.00	33.00	30.20	42.00	60.00
1,800 cu. yd. Class "A" concrete	66.50	55.00	61.50	74.00	67.00	65.00
270,000 lbs. metal reinforcement	.09	.10	.095	.10	.09	.10
440,000 lbs. structural steel	.185	.19	.17	.20	.15	.20
1,600 lin. ft. metal handrail	10.00	10.00	10.00	11.00	11.00	9.00

Highway and Street . . .

Utah—Tooele County—State—Surf. and Bridges

W. W. Clyde & Co. of Springville, submitted the low bid of $507,255 to the State Road Commission, Salt Lake City, for the construction of a 3-in. plant mixed bituminous surfaced road and two concrete and steel bridges on 13.9 mi. of U. S. Hwy. Nos. 40 and 50, between Low and Timpie. Unit bids follow:

(A) W. W. Clyde & Company $507,255
(B) Reynolds Construction Co. 566,974
(C) Strong Company 578,165
(D) Floyd S. Whiting 582,999
(E) Whiting & Haymond and Young & Smith Constructors $591,824
(F) Carl E. Nelson Company 599,007
(G) A. O. Thorn & Sons and Dean Mendenhall 655,068
(H) Engineers Estimate 510,970

(1) 36,500 ton plant mixed bituminous surfacing.
(2) 392,000 gal. bituminous matl., 200-300 pen.
(3) 160,000 gal. bituminous material, Type MC-1.
(4) 56,000 gal. bituminous material, Type RC-4.
(5) 70,000 ton cr. rock or cr. gravel surf. crse.
(6) 95,000 ton gravel or cr. rock base crse.
(7) 2,800 ton cover matl.
(8) 365,000 cu. yd. unclassified excav.
(9) 3,000 cu. yd. channel excav.
(10) 1,300,000 sta. yd. overhaul, Class "A".
(11) 55,000 yd. mi. overhaul, Class "B".
(12) 8,400 1,000-gal. watering.
(13) 5,700 hr. rolling.
(14) 125 acre clearing and grubbing.
(15) 14,500 lin. ft. surface ditches.
(16) 60 lin. ft. 15-in. concrete pipe.
(17) 927 lin. ft. 18-in. concrete pipe.
(18) 540 lin. ft. 24-in. concrete pipe.
(19) 105 lin. ft. 30-in. concrete pipe.
(20) 492 lin. ft. 36-in. concrete pipe.
(21) 24 lin. ft. relaying 18-in. concrete pipe.
(22) 600 cu. yd. excav. for structs.
(23) 129 cu. yd. concrete, Class "A".
(24) 20,000 lb. reinforcing steel.
(25) 0.5 mile obliteration of old roads.
(26) 3,255 lin. ft. right-of-way fence, Type "A".
(27) 310 each right-of-way markers.

CONCRETE & STEEL BRIDGE
34.67 ft. 0 to 0 Sta. 3756-20

(28) 330 cu. yd. excav. for structs.
(29) 250 cu. yd. concrete, Class "A".
(30) 37,900 lb. structural steel.
(31) 27,500 lb. reinforcing steel.
(32) 1,950 lin. ft. piles (treated).
(33) 176 lin. ft. 8-in. underdrains.
(34) 50 cu. yd. gravel backfill.
(35) 1 each furn. pile driving equip.
(36) 1 each removal of existing struct.

CONCRETE & STEEL BRIDGE
63.17 ft. 0 to 0, Sta. 3850-23

(37) 600 cu. yd. excav. for structs.
(38) 310 cu. yd. concrete, Class "A".
(39) 99,800 lb. structural steel.
(40) 42,700 lb. reinforcing steel.
(41) 2,200 lin. ft. piles (treated).
(42) 180 lin. ft. 8-in. underdrains.
(43) 50 cu. yd. gravel backfill.
(44) 1 each removal of existing struct.
(45) 1 each detour structure.
(46) 1 each furn. pile driving equip.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	2.00	2.50	2.25	2.50	2.60	2.50	2.50	2.00
(2)	.138	.14	.15	.14	.14	.14	.14	.13
(3)	.155	.145	.16	.16	.16	.15	.15	.15
(4)	.16	.145	.16	.16	.16	.15	.16	.15
(5)	.68	.70	.75	.75	.75	.85	.95	.65
(6)	.64	.65	.65	.70	.70	.80	.90	.60
(7)	3.00	3.00	4.00	3.50	3.00	4.00	4.00	2.50
(8)	.22	.20	.22	.25	.26	.23	.30	.20
(9)	.50	2.00	1.00	.40	.50	.60	1.00	1.00
(10)	.01	.015	.015	.015	.02	.015	.015	.01
(11)	.12	.15	.20	.20	.20	.15	.20	.12
(12)	1.40	2.00	2.00	2.00	1.25	1.75	2.00	2.00
(13)	3.50	4.00	5.00	4.00	4.00	5.00	5.00	5.00
(14)	15.00	25.00	35.00	20.00	50.00	25.00	50.00	25.00
(15)	.05	.10	.10	.05	.08	.15	.10	.10
(16)	2.50	2.00	3.75	3.00	2.40	2.50	3.00	2.50
(17)	3.20	3.25	4.25	3.50	3.50	3.50	4.00	3.00
(18)	4.50	4.30	5.80	5.00	5.00	4.00	5.00	4.30
(19)	5.80	6.00	7.25	6.00	7.00	5.25	6.50	6.00
(20)	10.10	9.00	12.00	12.00	11.00	9.50	10.00	9.00
(21)	2.50	1.00	2.00	2.00	1.00	2.00	2.00	.75
(22)	2.00	3.00	1.50	2.00	4.00	4.50	3.00	1.50
(23)	50.00	50.00	50.00	60.00	52.00	55.00	55.00	50.00
(24)	.114	.12	.11	.10	.12	.11	.12	.11
(25)	200.00	200.00	400.00	200.00	500.00	300.00	500.00	150.00
(26)	.25	.25	.25	.25	.28	.25	.30	.30
(27)	5.00	4.00	5.00	6.00	4.00	5.00	5.00	2.50
(28)	3.50	3.00	2.50	5.00	4.00	4.00	5.00	3.00

(Continued on next page)

Peerless



Fire Pumps

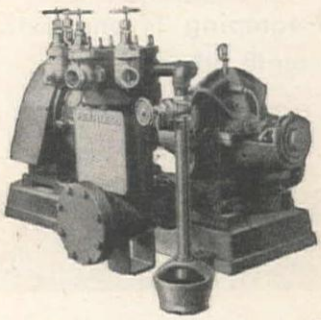
Underwriters' Approved
Horizontal & Vertical Types

For a Permanent and Reliable Water Supply For Fire Protection . . .

What This Approval Means To You:

In specifying Peerless Fire Pumps you're assured of meeting requirements of both your local fire code and the firm which writes your insurance. A Peerless installation may also mean a worthwhile reduction in your fire insurance rates.

HORIZONTAL CENTRIFUGAL TYPE*

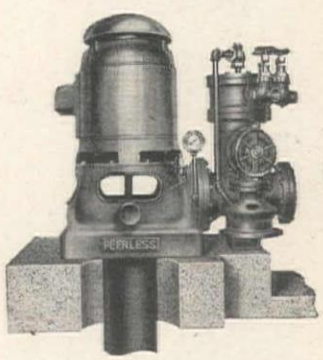


Built for instant, reliable operation. Fully automatic, minimum maintenance required. Made for motor, engine, or steam turbine drives.

Capacities: 500 to 2000 g.p.m.; heads: 40 to 150 lbs.

**Formerly Daylon-Dowd*

VERTICAL TURBINE TYPE



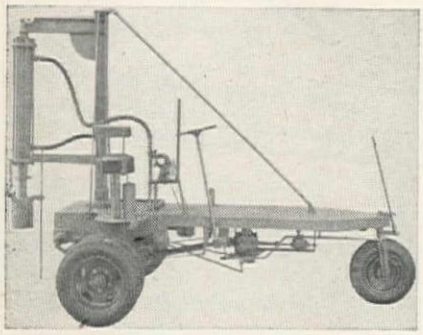
Especially suited to pumping water supply from wells, tanks, lakes, rivers or sumps. Compact design. Choice of oil or water lubrication. Approved types of drive include electric, right angle gear, or steam turbine. Capacities: 500 to 2000 g. p. m.; heads: 240 to 285 ft. or higher.

fmc
PEERLESS PUMPS

Request Descriptive Bulletins

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RAPID PAVEMENT BREAKER

cuts concrete and tamps back fill . . . will break inside floor and vertical walls. Cost of breaking and tamping is one-sixth to one-tenth other methods.

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"The Borg-Warner Line"

SMITH BOOTH USHER COMPANY, Distributor
Los Angeles, Calif. Phoenix, Ariz.
Factory Representative:
John F. Kegley & Son, Los Angeles, Calif.

(29)	45.00	50.00	50.00	60.00	52.00	55.00	55.00	55.00
(30)	.156	.30	.22	.16	.16	.20	.20	.15
(31)	.115	.11	.11	.10	.12	.11	.12	.11
(32)	2.30	2.50	2.00	2.00	2.50	2.50	2.80	2.50
(33)	.80	2.00	2.50	2.00	1.50	1.50	1.50	2.50
(34)	2.00	2.00	1.50	4.00	3.00	2.50	2.00	2.00
(35)	250.00	500.00	$2,500	$1,000	500.00	500.00	$1,000	450.00
(36)	500.00	500.00	$1,000	500.00	500.00	500.00	$1,000	500.00
(37)	3.50	3.00	2.50	6.00	4.00	4.00	7.00	3.00
(38)	45.00	50.00	50.00	60.00	52.00	55.00	55.00	55.00
(39)	.156	.30	.22	.16	.16	.20	.20	.16
(40)	.112	.11	.11	.10	.12	.11	.12	.11
(41)	2.30	2.50	2.00	2.00	2.50	2.50	2.80	2.50
(42)	.80	2.00	2.50	2.00	1.50	1.50	1.50	2.50
(43)	2.00	2.00	1.50	4.00	3.00	2.50	2.00	2.00
(44)	$1,000	500.00	$1,000	500.00	800.00	$1,000	$1,000	500.00
(45)	400.00	$3,000	$1,500	$1,000	$3,000	$3,000	$1,500	$1,500
(46)	250.00	500.00	$2,500	$1,000	500.00	500.00	$1,000	550.00

Arizona—Yuma County—Pub. Roads Adm.—Grade and Structs.

W. J. & J. C. Henson of Prescott, were low before the Public Roads Administration, Division No. 7, San Francisco, Calif., with the bid of $233,825 for 6.7 mi. grading and bridge construction of Federal Lands Hwy. I (3) Ehrenberg-Wickenburg Section. Width of roadbed is to be 40 ft. Unit bids follow:

(A) W. J. & J. C. Henson $233,825
(B) Packard Contracting Co. 251,625
(C) H. L. Royden 253,068
(D) Fisher Contracting Co. 253,848
(E) Bowen & McLaughlin 254,985
(F) A. A. & T. R. Larsen $258,579
(G) Tanner Construction Co. & Heuser & Garnett 277,490
(H) J. E. Skousen 303,436
(I) Vinnell Company, Inc. 349,799

(1) Force account, extra and misc. force acct. wk.
(2) 240,000 cu. yd. unclassified excav.
(3) 3,760 cu. yd. unclassified excav for structs.
(4) 60,400 cu. yd. unclassified excav. for borrow, Case 1.
(5) 880,600 sta. yd. overhaul (500-ft. free haul).
(6) 13,800 cu. yd. mi. spec. overhaul of borrow (500-ft. free haul).
(7) 6,200 lin. ft. furrow ditches.
(8) 7.250 M. gal. watering of embank, Item 29.
(9) Lump sum, providing and maintaining water plant or plants.
(10) 1,760 cu. yd. concrete, Class A.
(11) 198,755 lb. reinforcing steel.
(12) 1,282 lin. ft. 24-in. C.G.S.M. culvert pipe.
(13) 526 lin. ft. 30-in. C.G.S.M. culvert pipe.
(14) 164 lin. ft. 36-in. C.G.S.M. culvert pipe.
(15) 68 lin. ft. 42-in. C.G.S.M. culvert pipe.
(16) 650 lin. ft. 48-in. C.G.S.M. culvert pipe.
(17) 338 lin. ft. 60-in. C.G.S.M. culvert pipe.
(18) 850 lin. ft. beam type metal plate guardrail.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
(2)	.26	.33	.32	.325	.32	.33	.32	.45	.545
(3)	2.00	1.75	2.25	1.45	2.00	1.75	1.33	2.50	3.00
(4)	.26	.35	.31	.30	.35	.33	.47	.45	.50
(5)	.01	.01	.0125	.01	.01	.015	.015	.01	.01
(6)	.20	.20	.30	.22	.25	.30	.26	.40	.25
(7)	.10	.05	.15	.06	.06	.08	.05	.20	.12
(8)	2.00	1.75	1.50	1.57	1.75	1.50	2.70	2.00	1.80
(9)	$1,800	$1,000	$1,000	$2,100	500.00	500.00	700.00	$2,000	$4,000
(10)	42.00	42.50	43.50	45.75	42.50	45.00	42.00	45.00	55.00
(11)	.11	.10	.10	.11	.11	.11	.13	.11	.12
(12)	4.00	4.00	4.00	3.60	4.40	3.50	5.00	4.00	4.00
(13)	5.00	4.90	5.00	4.50	5.00	4.00	6.00	5.50	5.00
(14)	7.00	7.25	7.50	6.80	7.60	6.00	10.00	7.00	8.00
(15)	8.00	9.50	9.00	9.25	9.40	7.00	11.50	9.00	9.50
(16)	9.00	10.50	11.00	10.70	12.00	10.00	13.00	11.00	12.00
(17)	14.00	16.20	17.00	16.80	18.50	16.00	21.00	17.00	18.50
(18)	4.00	2.50	2.00	2.75	2.75	2.50	2.50	3.00	3.00

Montana—Yellowstone County—State—Surf. and Oil

S. J. Groves & Sons Co., Minneapolis, Minn., was awarded a $304,834 contract by the State Highway Commission at Helena, for surfacing and road mix oiling on 26.1 mi. of the Billings-Broadview-Lavina Rd., involving about 100,000 tons base, top and cover surfacing; 440,000 gals. RCS-2 cutback asphalt in mix and seal; 26.1 mi. processing; 2,000 M. gals. watering; and 613 units rolling. Project to be completed by September 15, 1948. The following unit bids were submitted:

(1) S. J. Groves & Sons Co. $304,834
(2) McLaughlin, Inc. 314,392
(3) Stanley H. Arkwright, Inc. $369,015

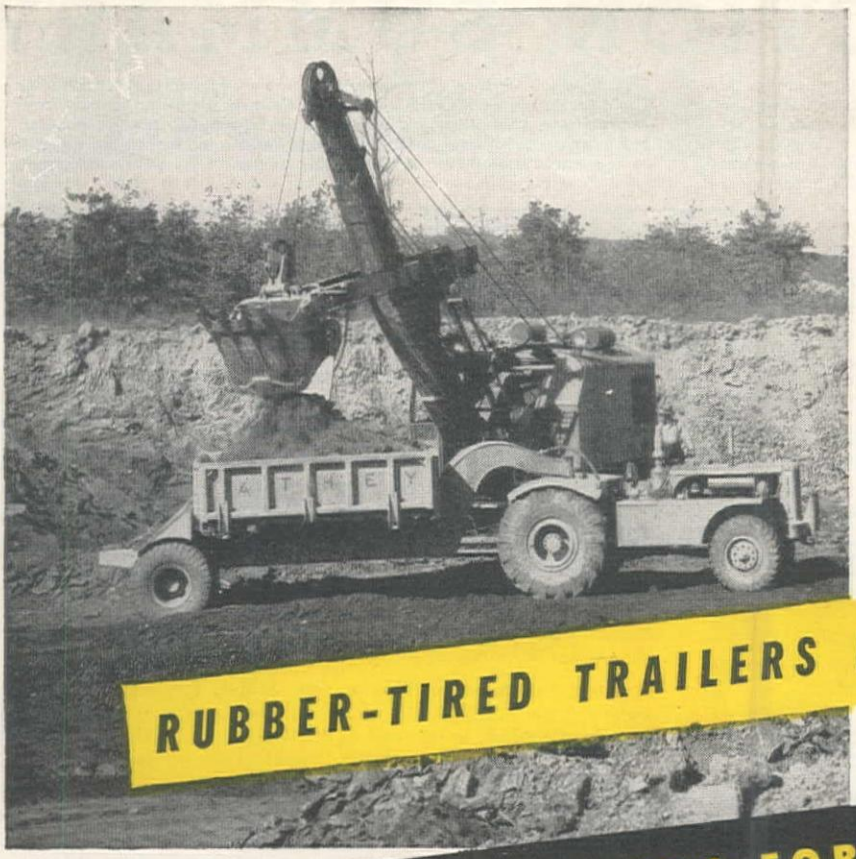
	(1)	(2)	(3)
58,957 ton Type A top coat, ¾-in. gr.	1.95	2.00	2.77
36,085 ton base coat surf., Gr. C-2	1.85	1.80	2.22
3,827 ton cover coat surf., ½-in. gr.	4.00	5.00	4.44
336,581 gal. appl. RCS-2 in road mix	.....	.....	.....
101,893 gal. appl. RCS-2 in seal	.....	.....	.....
26.065 mile processing	$1,200	900.00	888.88
2,000 M. gal. watering	3.00	2.50	2.22
613 unit rolling surf. courses	6.00	6.00	7.77
3 each concrete project markers	20.00	20.00	25.25
2,000 ton stkp. grav. ½-in. grading	2.70	4.00	3.00
336,581 gal. appl. MC-3 in road mix	.14	.16	.16
101,893 gal. appl. MC-4 in seal	.14	.18	.16

California—Plumas County—State—Grading

The Piombo Construction Co., and M. & K. Corp. of San Francisco submitted the low bid of $858,862 to the Division of Highways at Sacramento for approximately 1.9 mi. of grading of Route 21-A, between Rock Creek and Belden. Unit bids are as follows:

(1) Piombo Construction Co., and M. & K. Corp. $858,862
(2) Westbrook & Pope and Paul J. Tyler 997,395
(3) George Pollock Co. $1,065,517
(4) H. Earl Parker, Inc. 1,571,054

	(1)	(2)	(3)	(4)
45 cu. yd. remov. conc.	6.00	10.00	5.00	20.00
39 ac. clearing and grubbing	600.00	$2,500	$1,000	$1,000
382,000 cu. yd. rdwy. excav.	2.02	2.20	2.48	3.85
1,800 cu. yd. struct. excav.	5.00	7.00	12.00	5.00
2,100 cu. yd. ditch and channel excav.	1.75	4.25	3.75	3.50
760,000 sta. yd. overhaul	.015	.01	.02	.01
98 sta. finishing rdwy.	25.00	15.00	25.00	15.00
330 cu. yd. Class "A" P.C.C. (structs.)	80.00	60.00	70.00	75.00
45,500 lb. bar reinf. steel	.15	.10	.12	.13
18 ea. monuments	6.00	15.00	7.50	7.50
414 lin. ft. 18-in. C.M.P. (16-ga.)	3.50	4.00	2.50	4.30
70 lin. ft. 36-in. C.M.P. (12-ga.)	8.50	6.00	7.50	10.00
62 lin. ft. 60-in. C.M.P. (10-ga.)	18.50	12.00	16.00	25.00
70 lin. ft. salv. exist. pipe culvs.	2.00	5.00	4.00	1.50
66 lin. ft. relay. salv'd C.M.P.	5.50	10.00	4.25	1.50



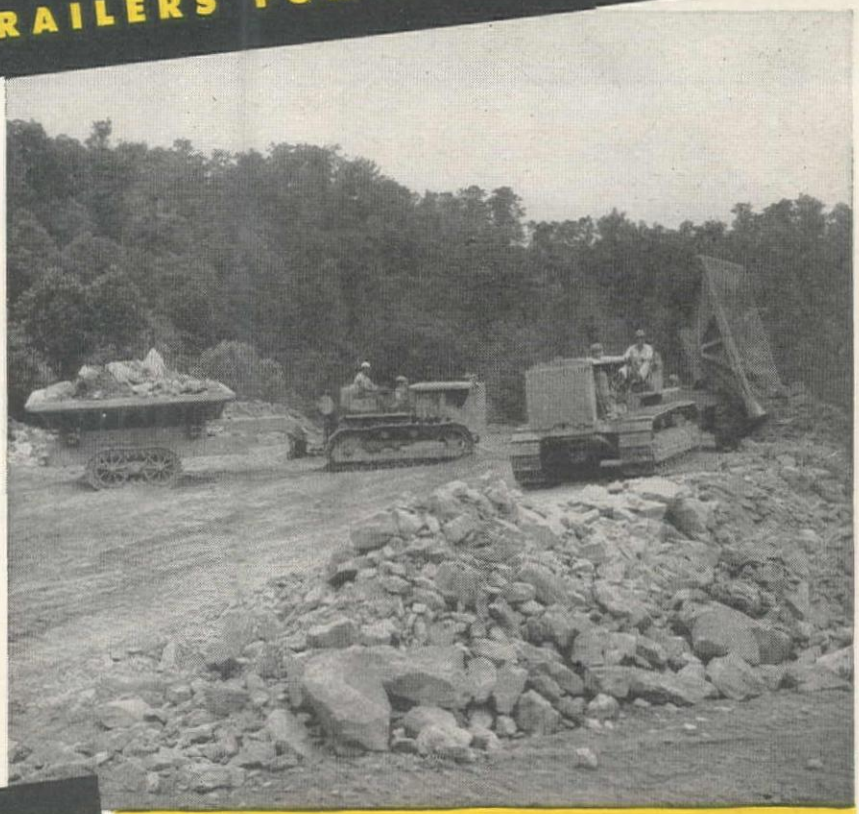
Dumping to either side, the speedy Athey PD-10 Rubber-Tired Trailer cuts cycle time. It dumps over the side of the fill with no turning or backing and frequently without stopping. Greater production . . . greater profits! On highway construction or other earthmoving operations, Athey PD-10 and "Caterpillar" DW-10 units have proved to be the fast moving, cost cutting answer for the long hauls.

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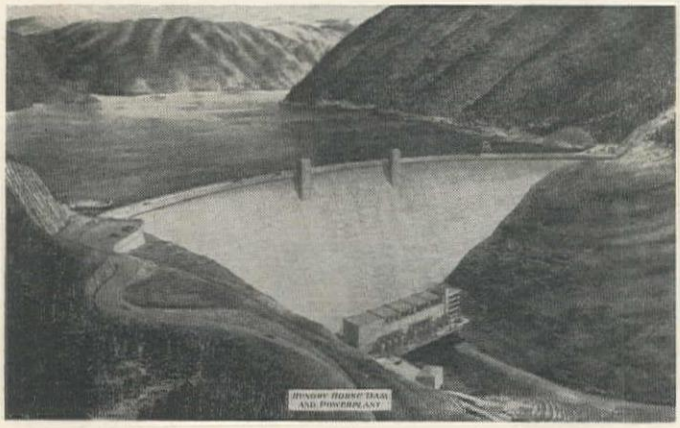
CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $75,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information may be secured concerning employment conditions, wage rates, etc., by writing directly to the contractor. When available, the names of the supervisory personnel will be published in the "Supervising the Jobs" columns.

CONTRACTS AWARDED

Large Western Projects . . .

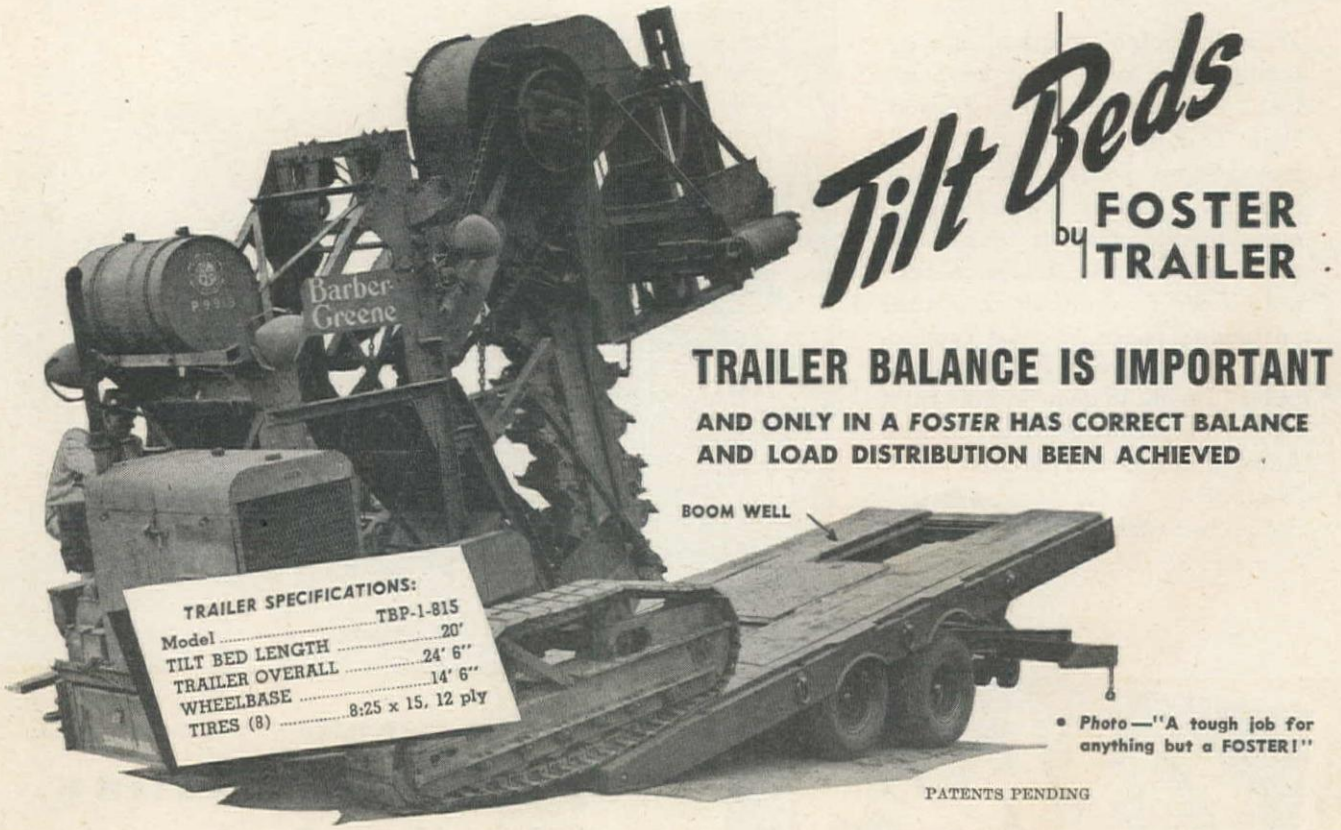
General Construction Co., Seattle, Wash., **J. F. Shea Co.**, Alhambra, Calif., and **Morrison-Knudsen Co., Inc.**, Boise, Ida., have the general contract of $43,431,000, by Bureau of Reclamation, Denver, Colo., for the construction of the second largest dam in the Bureau of Reclamation's history—the Hungry Horse Dam, a 520-ft. high structure on the South Fork of the Flathead River, near Kalispell, Mont. The reservoir will provide storage for 3,500,000 ac. ft. of water, and will contain 2,900,000 cu. yd. of concrete. The length of the Hungry Horse Dam, with its concrete arch, will be 2,100 ft., and 2,500,000 bbl. of cement will be required. The powerhouse to be built will have a generating capacity of 300,000 kw. of hydroelectric energy and beneficiaries of this project will include Grand Coulee, Bonneville, Kerr, Rock Island, and other plants under construction or scheduled to be built, such as Foster Creek and McNary. Hungry Horse will be the fifth highest and fourth largest concrete dam in the world.



Dinwiddie Construction Co., San Francisco, Calif., were awarded a contract for $1,076,937, for the construction of a grain elevator at Islais Channel, San Francisco. The work will include a work house, rail shed, truck shed and storage bins with a 500,000-bu. capacity and other misc. equipment. The award was made by the State Harbor Commissioners, San Francisco, Calif.

Preston Construction Co., WOW Bldg., Omaha, Nebr., were awarded the $2,000,000 contract for the construction of an 8-unit warehouse bldg. betw. Colorado Blvd. and Dahlia St., E. 46th Ave. and Kansas Pacific RR tracks, Denver, by the Safeway Stores, Inc., Denver, Colo.

Peter Kiewit Sons' Co., Omaha, Nebr., and **Morrison-Knudsen Co.**, Seattle, Wash., at $2,789,284, were awarded the contract by Bureau of Reclamation, Denver, for the construction of the East control-bay bldg., new switchyard, parking area, tunnel for control cables, towers to carry power cables across the Columbia River below the dam, and other misc. jobs near the East powerhouse, Coulee Dam, Wash. The largest item, the control-bay



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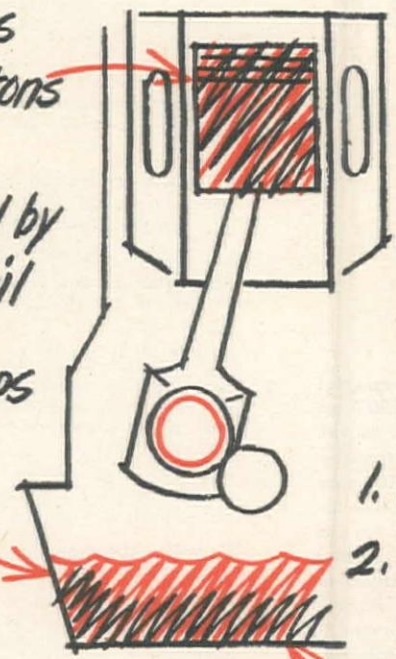
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Hot oil oxidizes fast, gums pistons

Sludge formed by ordinary lube oil insulates crankcase, keeps oil hot



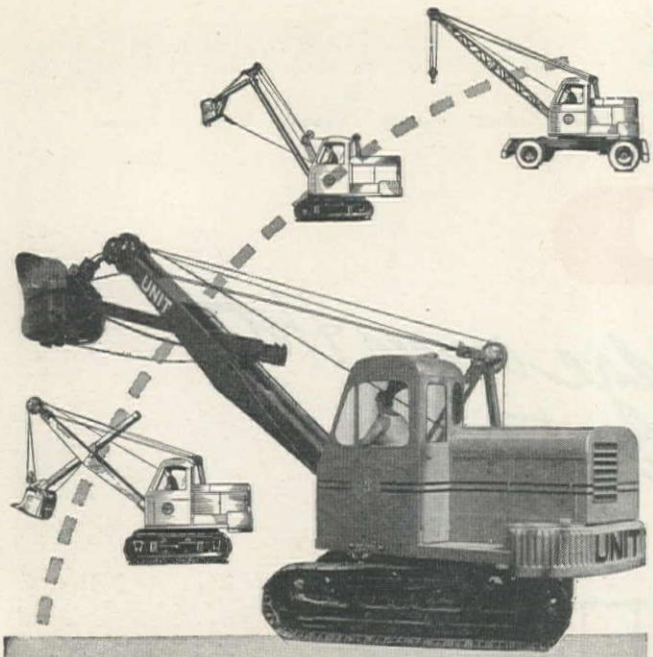
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1. Oil oxidation slowed up
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Tell foreman OK to order RPM DELO Oil

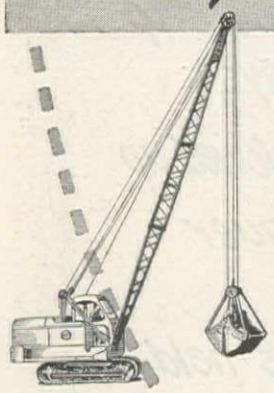


STANDARD OF CALIFORNIA

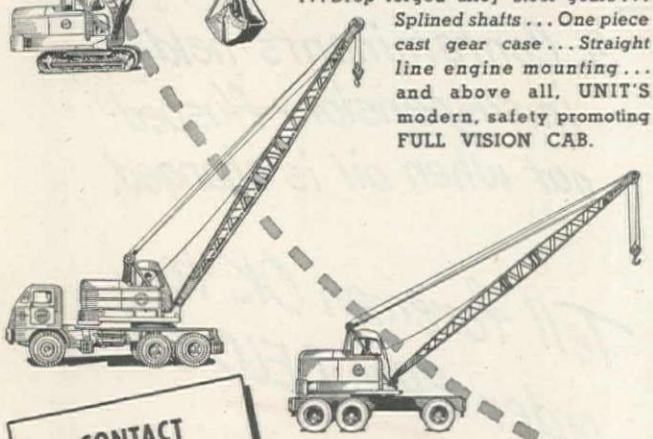


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bldg., will have an equivalent height to an 8-story office bldg.

Starrett Brothers & Eken, New York City, were awarded a $40,000,000 contract, by the Metropolitan Life Insurance Co., Los Angeles, for the construction of the Parklabrea Housing Project on an 85-acre tract bet. 3rd and 6th Sts., east of Fairfax Avenue, Los Angeles.

N. M. Ball Sons, Berkeley, Calif., have received the contract at $1,192,329, by the California Division of Highways, Sacramento, for about 7.7 mi. grading and surfacing on a crusher run base between Rob Roy Jct. and Morrissey Ave. in Santa Cruz, Calif.

Fredrickson and Watson Construction Co., Oakland, Calif., were awarded a contract for $1,373,333, by the California Division of Highways, Sacramento, for about 2.9 mi. grade and pave on crusher run base on Eastshore Freeway betw. 38th Ave. and Oak St., Oakland, Calif.

Utilities Construction Co., Nashville, Tenn., were awarded a $663,252 contract, by the Bureau of Reclamation, Denver, Colo., for the const. of 83 mi. of trans. line, about 45 mi. long, extending from Gering, Nebr., to the vicinity of Alliance, Nebr., and a second trans. line about 38 mi. long, extending from a jct. point with the Cheyenne-Gering line, 6 mi. east of Cheyenne, Wyo., to Pine Bluffs, Nebr.

Sepro Corporation, Los Angeles, Calif., will construct 400 four-room, frame dwellings near Sepulveda Blvd. and Roscoe Blvd. in the City of Van Nuys, Calif. Estimated cost of the project is $2,388,123.

R. E. Bruce, Phoenix, Ariz., was awarded the contract at $1,293,-415, by the Union High School Dist., Phoenix, for the expansion and improvements to the West Phoenix High School, Phoenix, Ariz.

M & K Corporation, San Francisco, Calif., awarded a $1,517,833 contract, by the Regents of the University of California, Berkeley, for the construction of a library annex to Doe Library on the campus at Berkeley, Calif.

Shumaker-Evans, Los Angeles, Calif., received the contract at $1,200,000, by the El Rancho Hotel Company, Reno, Nev., for the construction of a hotel building of masonry and frame to be erected in Reno, Nev.

E. C. Nickel, Arcadia, Calif., received a $1,352,600 contract for a reinf. conc. reservoir with a 57,000,000-gal. capacity, covered with a flat slab roof 275,000 ft. in area. The entire floor of the reservoir is an 8-in. reinforced slab. All construction joints are sealed with a copper water stop. The award was made by the City Council, Glendale, Calif., and the reservoir will be erected on Campbell St., north of Mountain St., Glendale.

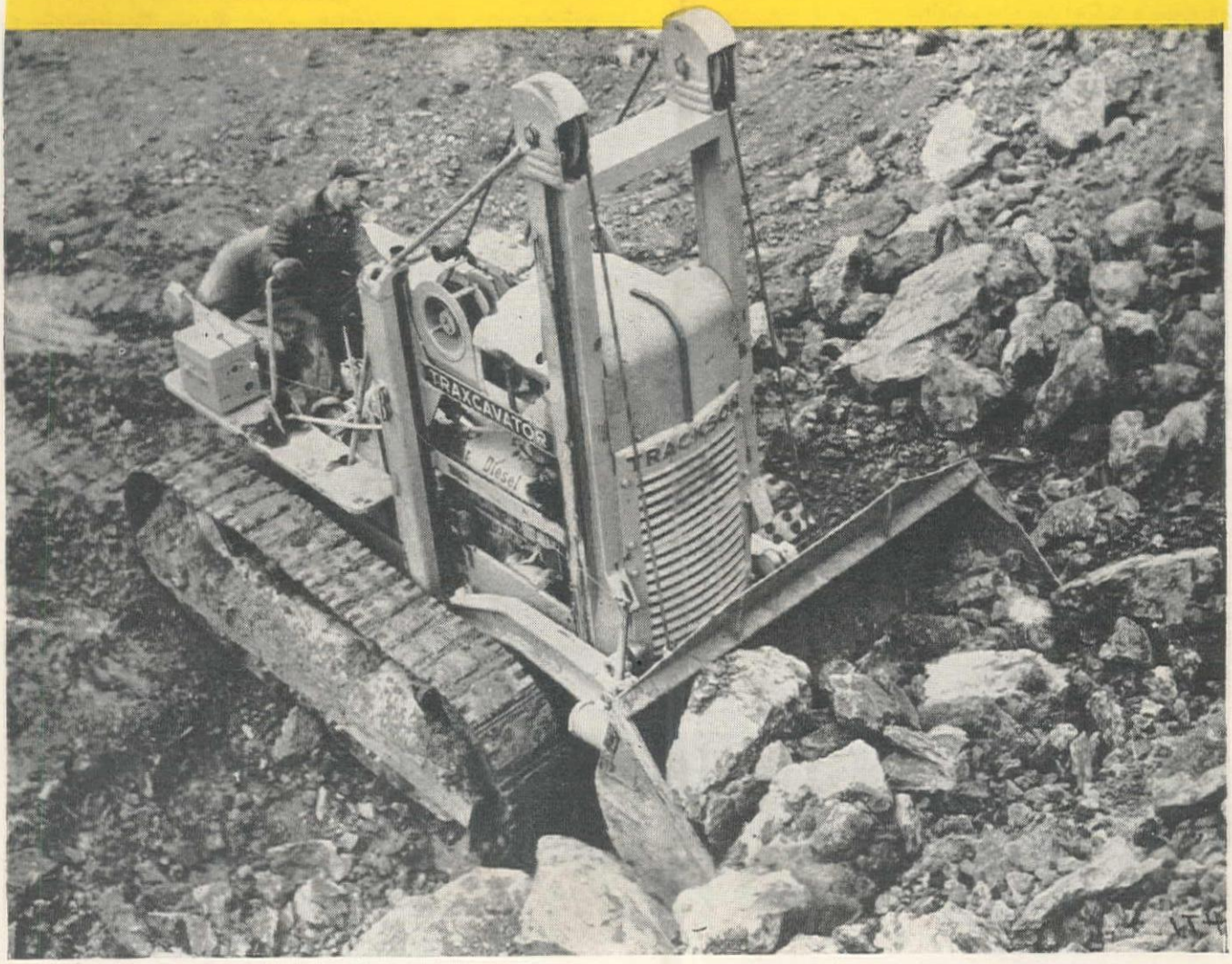
Guy F. Atkinson Co., Long Beach, Calif., has been awarded a contract of $6,295,518 on Alt. II, by the Board of Public Works, Los Angeles, Calif., for construction of the effluent outfall connections and appurtenant works for the Hyperion activated sludge plant at El Segundo, Calif. Work will include furnishing plant equipment, labor and material, and constructing reinforced concrete pipe sewers and related structures.

L. P. Reed, Inc., Meridian, Tex., was awarded contract of $15,995,-498, for the construction of spillway and complete the embankment of the Whitney Dam and Reservoir, by the Corps of Engineers, Galveston, Texas.

American Pipe & Construction Co., Los Angeles, at $1,593,462, were awarded the contract by the Bureau of Reclamation, Coachella, Calif., for the construction of earthwork, pipe lines and

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structures on lat. 97.1, Unit 1, Coachella Valley Distributing System of the All-American Canal System. The work is situated in the vicinity of Mecca, Calif.

Pacific Pipeline and Engineers, Ltd., Los Angeles, were awarded the $5,000,000 contract for about 180 mi. of 10-in. welded steel high pressure crude oil pipe line, from Rangeley, Colo., to Salt Lake City, Utah, by the Standard Oil Company of California, San Francisco.

Mike Radich & Co., Burbank, Calif., were awarded a $2,596,243 contract by the City Council, Arcadia, for the installation of sewer laterals and house connections covering the entire city of Arcadia, Calif. Work includes the installation of about 74 mi. of 8- and 10-in. vitrified clay sewer laterals and 28 mi. of vitrified clay house connections.

Ball Realty Corp., Los Angeles, Calif., will construct six 12-unit, 52-room frame and stucco apt. bldgs., and thirteen 8-unit, 35-room frame and stucco apt. bldgs. on Myrrh and Santa Fe Aves., Compton, Calif., at an estimated cost of $1,000,000.

Carson Construction Co., Helena, Mont., have been awarded a contract for $1,776,900, for the const. of a reinf. conc. 3-story and basement bldg. to house 200 patients for tuberculosis treatment and general hospital use, at Sitka, Alaska, for the Indian Service Sanatorium. The award was made by the Secretary of the Interior, Washington, D. C.

Highway and Street...

Arizona

COCHISE AND GRAHAM COS.—**John E. Iben Construction Co.**, 1829 N. 17th Ave., Phoenix—$163,453 for approx. 9.5 mi. grade, drain, and bitum. surf. treat., etc., on Douglas-Safford Hwy.—by State Highway Commission, Phoenix. 4-20

GILA AND PINAL COS.—**Fisher Contracting Co.**, P. O. Box 4035, Phoenix—$688,536 (Group III, a comb. of Groups I and III) for const. of the Superior-Miami Hwy.—by State Highway Commission, Phoenix. 4-16

SANTA CRUZ AND PIMA COS.—**San Xavier Rock & Sand Co.**, 602 W. 22nd St., Tucson—$151,903 for 2.5 mi. grade and drain., on Tucson-Nogales Hwy.—by State Highway Commission, Phoenix. 4-20

YUMA CO.—**W. J. Henson**, Box 471, 115 S. Grant St., Prescott—$233,826 for const. Proj. Ariz. FLH 1(3), Ehrenburg-Wickenburg Hwys., a length of 6.7 mi.—by the Public Roads Administration, Phoenix. 4-20

California

ALAMEDA CO.—**Fredrickson and Watson Construction Co.**, 873 81st Ave., Oakland—$1,373,333 for about 2.9 mi. grade and pave on crusher run base on Eastshore Freeway bet. 38th Ave. and Oak St., Oakland—by Division of Highways, Sacramento. 4-5

ALAMEDA CO.—**Granite Construction Co.**, Box 900, Watsonville—$104,589 for const. portion of Altamont Pass Rd. from Altamont northwesterly to the connection with the State Hwy. nr. Greenville—by County Clerk, Oakland. 4-27

BUTTE CO.—**McGillivray Construction Co.**, P. O. Box 873, Sacramento—$159,337 for about 15.6 mi. surf. with plant mix, const. shoulders of imported borrow and apply penet. treat. in Chico—by Division of Highways, Sacramento. 4-6

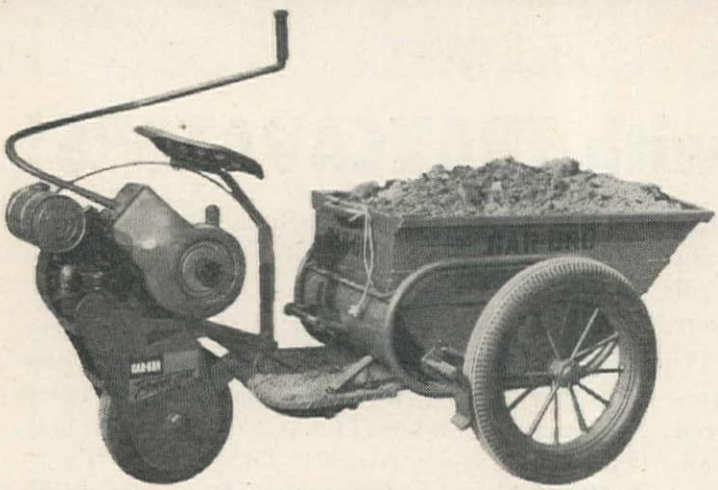
FRESNO CO.—**Guy F. Atkinson Co.**, Box 593, South San Francisco—$237,484 for approx. 1.8 mi. widen exist. pave. by grade and pave with plant mix surf. over cement treat. base, bet. Belmont Circle and Clinton Ave., Fresno—by Division of Highways, Sacramento. 4-20

HUMBOLDT CO.—**Mercer-Fraser Co.**, 2nd and Commercial Sts., Eureka—$169,819 for about 4.8 mi. surf. with plant mix surf. on cement treat. base, loc. bet. 2.8 mi. and 7.6 mi. north of Orick—by Division of Highways, Sacramento. 4-6

IMPERIAL CO.—**MacArthur & Son**, Box 82, Palmdale—$78,685 for about 6.6 mi. improve. with imported base matl. and road mix surf. betw. jct. Rt. 26, E. of Heber and Calipatria and betw. Curlew and Alamorio—by Division of Highways, Sacramento. 4-16

KERN CO.—**Dicco, Inc.**, and **Dix Syl, Inc.**, 2114 2nd St., Bakersfield—$389,245 for approx. 29.8 mi. resurf. and culvs. to be installed bet. Grapevine and Switzer's and on Taft Hwy. betw. Mi. 6.7 and Rt. 4—by Division of Highways, Sacramento. 4-16

HERE IS GAR-BRO'S MONEY-SAVING *Power-Cart*



The facts and figures prove that this new Gar-Bro product helps cut construction job costs and builds up real profits. Designed to carry as much concrete as three ordinary wheelbarrows or two carts, it relieves "concrete men" for less back-breaking jobs. It's simple to operate as the steering and transmission are controlled by one lever—a tiller. Forward and reverse speed is foot-throttle controlled. Power unit is detachable from cart. Tractor-type seat reduces operator fatigue.

Designed in accordance with proven engineering principles, the Power-Cart is designed to LAST. GAR-BRO Mfg. Co., 2416 E. 16th Street, Los Angeles 21, California.



Note the large front wheel where the bulk of the load is carried. Dumping is easy because load is balanced in the tray. Hauls all construction materials. Loads directly from mixer. Specifications: 81½" long; 39½" wide. Maximum load: 1500 lbs., 9 cubic feet of concrete . . . Bulletin #77 tells the full story . . . shows the Power-Cart in use. Write for it, or contact Gar-Bro distributors.

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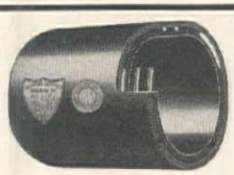
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U. S. GIANT SAND SUCTION HOSE.
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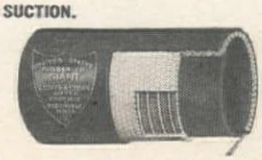
U. S. PEERLESS SUCTION HOSE.
For building construction and trench work. Maximum flexibility without danger of collapse. Smooth bore. 2" to 12" I. D.





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Lightweight hose for diaphragm pumps used in sewer and foundation operations. Rough bore. 1½" to 6" I. D. inclusive.

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LASSEN CO.—**Sheldon Oil Co.,** Box 574, Suisun—$78,156 for 6.3 mi. plant mix sur. and seal coat placed over exist. pave. on portion of hwy. betw. Fredonyer Pass and Susan River—by Division of Highways, Sacramento. 4-16

LOS ANGELES CO.—**Wm. Radkovich Co.,** 4930 E. Washington Blvd., Los Angeles—$112,993 for approx. 3.9 mi. grade and surf. shoulders on Garvey Ave. betw. New Ave. and Mountain View Ave., Los Angeles—by Division of Highways, Sacramento. 4-20

MADERA CO.—**Trewhitt-Shields & Fisher,** 926 Parallel Ave., Fresno—$129,160 for const. underpass under tracks of the A. T. & S. F. Ry., about 1.5 mi. E. of Madera, and approx. 0.6 mi. to be graded and paved—by Division of Highways, Sacramento. 4-2

MARIN CO.—**A. G. Raisch Co.,** 2048 Market St. San Francisco —$199,447 for 9.9 mi. grade and surf. betw. Point Reyes Sta. and jct. with Novato Rd. about 9 mi. west of Novato—by Division of Highways, Sacramento. 4-28

MENDOCINO CO.—**Guy F. Atkinson Co.,** Box 593, South San Francisco—$876,059 for approx. 5.2 mi. grade and surf., const. steel beam bridge betw. 1.5 mi. S. of Forsythe Crk. and 3.5 mi. N. of Forsythe Crk.—by Division of Highways, Sacramento. 4-20

MENDOCINO CO.—**C. M. Syar,** Box 1431, Vallejo—$110,780 for about 3.8 mi. surf. with plant mix surf. on cement treat. base betw. 2.8 mi. south and 1 mi. north of Rattlesnake Summit—by Division of Highways, Sacramento. 4-12

MONTEREY CO.—**Granite Construction Co.,** Box 900, Watsonville—$203,359 for about 3.6 mi. place borrow over exist. roadbed and surf. betw. San Ardo and King City—by Division of Highways, Sacramento. 4-28

PLUMAS CO.—**Piombo Construction Co.,** 1571 Turk St., San Francisco and **M & K Corp.,** 405 Montgomery St., San Francisco—$858,862 for 1.9 mi. grading betw. Rock Crk. and Belden —by Division of Highways, Sacramento. 4-28

RIVERSIDE CO.—**Dimmitt & Taylor** and **K. B. Nicholas,** 128 W. Pomona Ave., Monrovia—$169,994 for about .5 mi. grade and surf. betw. Corona and .5 mi. east—by Division of Highways, Sacramento. 4-5

SACRAMENTO CO.—**A. Teichert & Son, Inc.,** Box 1113,

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Sacramento—$94,850 for improve. Meister Terrace Unit No. 3, Sacramento—by City Clerk, Sacramento. 4-12

SAN BERNARDINO CO.—**Claude Fisher Co.** and **L. A. and R. S. Crow,** 2455 E. 55th St., Los Angeles—$703,144 for about 1.8 mi. grade and surf. betw. 0.7 mi. east of Plunge Crk. and Long Point—by Division of Highways, Sacramento. 4-12

SAN BERNARDINO CO.—**Matich Bros.,** Box 390, Colton—$143,662 for approx. 8 mi. place plant mix surf. over exist. pave. and shoulders and apply seal coat thereto betw. Los Angeles Co. line and San Bernardino—by Division of Highways, Sacramento. 4-20

SAN BERNARDINO CO.—**E. L. Yeager,** 1995 "B" St., West Riverside—$222,371 for approx. 4.5 mi. grade, imported borrow to be placed, surf., and const. steel bridge on E. 5th St. betw. Waterman Ave and 0.2 mi. E. of City Crk., San Bernardino—by Division of Highways, Sacramento. 4-2

SAN FRANCISCO CO.—**Fay Improvement Co.,** 780 Market St., San Francisco—$104,990 for removal of tracks and reconst. pave. on various streets in San Francisco—by City and County of San Francisco. 4-19

SAN LUIS OBISPO CO.—**Madonna Construction Co.,** 581 Higuera St., San Luis Obispo—$125,191 for about 2.8 mi. surf. with plant mix surf. on crusher run base bet. Deleissigues Crk. and Russell Turn, Santa Maria—by Division of Highways, Sacramento. 4-6

SANTA BARBARA CO.—**Dimitt & Taylor,** 815 E. 59th St., Los Angeles, and **T. M. Page,** 145 W. Duarte Rd., Monrovia—$497,287 for about 3.6 mi. grade and surf. crusher run base betw. Santa Ynez Riv. and Jonata Park—by Division of Highways, Sacramento. 4-16

SANTA CRUZ CO.—**N. M. Ball Sons,** Box 430, Berkeley—$1,192,329 for about 7.7 mi. grade and surf. on crusher run base betw. Rob Roy Jct. and Morrissey Ave., Santa Cruz—by Division of Highways, Sacramento. 4-5

SHASTA CO.—**Fredrickson & Watson Construction Co.,** 873 81st Ave., Oakland—$611,709 for 5 mi. grade and surf., and const. reinf. conc. slab bridge betw. Cottonwood and Anderson—by Division of Highways, Sacramento. 4-27

STANISLAUS CO.—**M. J. Ruddy and Son,** 922 "J" St., Modesto—$136,475 for about 6.2 mi. untreat. rock base place over exist. pave. and surf. betw. Newman and San Joaquin Co. line—by Division of Highways, Sacramento. 4-5

Colorado

BOULDER CO.—**Platt Rogers, Inc.,** Pueblo—$242,036 for the const. of Colo. For. Proj. on Boulder-Idaho Sprgs. Rd., a length of 2.4 mi.—by Public Roads Administration, Denver. 4-2

Idaho

JEFFERSON CO.—**Canyon Construction Co.,** Caldwell—$72,859 for 6.8 mi. bitum. surf. on the La Belle Road—by Bureau of Highways, Boise. 3-29

Montana

BROADWATER-MEAGHER COS.—**Kiely Construction Co.,** Butte—$124,768 (recommended) for 10 mi. grade and surf. of Townsend-White Sulphur Sprgs. Rd.—State Highway Commission, Helena. 4-1

CHOUTEAU CO. — **Nilson-Smith Construction Co.,** Great Falls—$144,533 for 14 mi. grade and surf. Ft. Benton-Geraldine Rd.—by State Highway Commission, Helena. 4-1

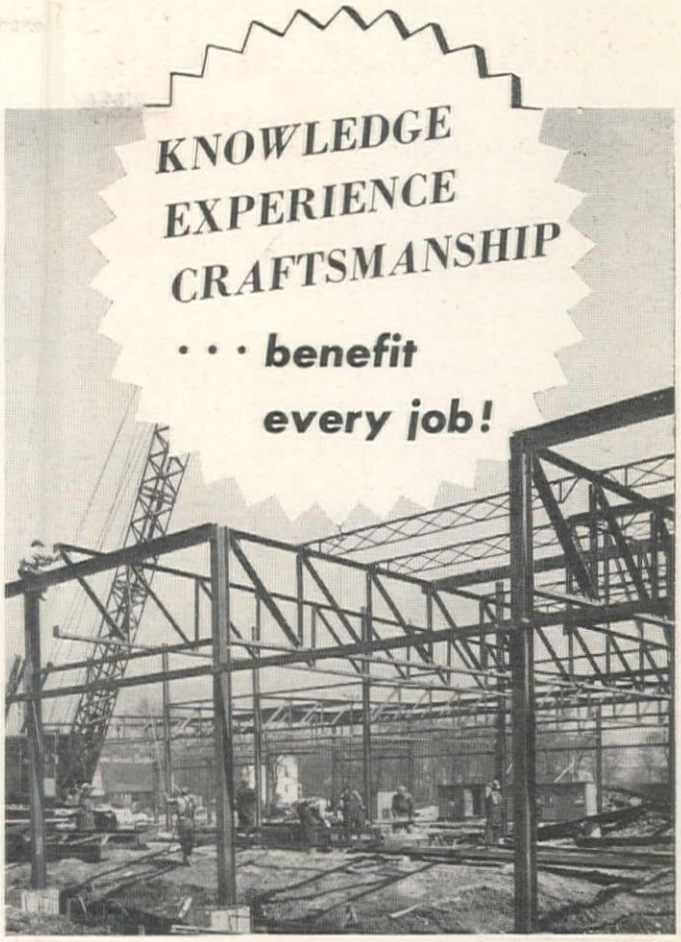
DANIEL AND VALLEY COS.—**Albert Lalonde Co.,** Sidney—$99,809 (recommended) for 8 mi. grade, and surf. Richland east section, Opheim-Scobey Rd.—by State Highway Commission, Helena. 4-1

FERGUS CO.—**Stanley H. Arkwright, Inc.,** Billings—$107,831 for grade, surf. 9 mi. on Fenton-Brooks Sect., Lewiston-Denton Rd.—by State Highway Commission, Helena. 4-1

PHILLIPS CO.—**O'Neil Construction Co.,** Havre—$139,889 (recommended) for 6 mi. grade, surf. and const. timber bridge on Grass Range-Malta Rd.—by State Highway Commission, Helena. 4-1

PONDERA CO.—**E. C. Powell,** Great Falls—$141,890 for surf. 14.6 mi. Valley east rd.—by State Highway Commission, Helena. 4-1

SANDERS CO.—**Max J. Kuney Construction Co.,** Box 4008, Sta. B, Spokane, Wash.—$105,832 (recommended) for const. Clark Fork Forest Hwy. nr. Thompson Falls—by Public Roads Administration, Missoula. 4.9



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VALLEY CO.—**McLaughlin, Inc.,** Great Falls—$229,124 (recommended) for 6 mi. grade, surf., Glasgow Hinsdale Sect., Malta-Glasgow Rd. — by State Highway Commission, Helena. 4-1

WHEATLAND CO. — **Stanley H. Arkwright, Inc.,** Billings—$176,340 for grade, drain 17 mi. on Harlowton-Moore Rd.—by State Highway Commission, Helena. 4-1

YELLOWSTONE CO.—**S. J. Groves & Sons,** 509 Wesley Temple Bldg., Minneapolis, Minn.—$304,833 for 26 mi. surf. on Billings Broadview, Lavina Rd.—by State Highway Commission, Helena. 4-1

Nevada

CHURCHILL CO.—**C. J. Hostetler** and **B. H. Stoutenberg,** Box 87, Carson City—$133,000 for const. of a portion of the State Hwy. 42 from a jct. with U. S. 50 nr. Fallon to a point approx. 5 mi. E. (Stillwater Rd.), a length of 5.1 mi.—by State Highway Department, Carson City. 4-15

ELKO CO.—**Gibbons & Reed,** 259 W. 3rd So. St., Salt Lake City, Utah—$549,007 for const. of a portion of State Hwy. syst. from Pequop Summit to 1 mi. W. of Oasis, Rt. 1, a length of 4.9 mi.—by State Highway Department, Carson City. 4-15

New Mexico

CHAVES CO. — **J. H. Ryan,** Box 513, Albuquerque—$740,274 for 1.06 mi. grade and constr. of one conc. and steel bridge, surf. with bitum. top course, watering, rolling, etc., on U. S. Hwy. 70 betw. Acme and Roswell—by State Highway Department, Santa Fe. 4-2

COLFAX CO.—**E. M. Silver,** Box 1062, Albuquerque — $120,967 for 4.5 mi. grade, drain, two mult. conc. box culverts on Rt. 234, betw. Dawson and Colfax—by State Highway Department, Santa Fe. 4-23

GRANT CO. — **Allison and Haney,** Box 1507, Albuquerque — $56,890 for 7.5 mi. const. bitum. top course, surf. and seal with asphalt betw. Silver City and Bayard—by State Highway Department, Santa Fe. 3-25

HIDALGO CO. — **Brown Construction Co.,** Box 1479, Albuquerque—$301,974 for 7.1 mi. grade, drain and surf., const. drain. struct., two multiple conc. box culverts and misc. const. betw. Road Forks and Lordsburg — by State Highway Department, Santa Fe. 3-25

McKINLEY CO.—**Skousen Construction Co.,** 201 Springer Bldg., Albuquerque — $348,993 for 15.6 mi. surf., water, level course, bitum. course surf., and const. of three multiple conc. box culverts betw. Gallup and Grant—by State Highway Department, Santa Fe. 4-23

QUAY CO. — **Wheeler & Trotz,** Albuquerque—$166,919 for 8.1 mi. grade, drain. structs., and surf. betw. Ragland and Grady —by State Highway Department, Santa Fe. 4-23

UNION CO.—**Armstrong & Armstrong,** Box 873, Roswell — $146,942 for 18 mi. involv. level course, watering and rolling, bitum. top course, surf. and seal with asphalt and stone chips betw. Springer and Clayton—by State Highway Department, Santa Fe. 4-23

North Dakota

BOWMAN CO. — **Inland Construction Co.,** 3867 Leavenworth St., Omaha, Nebr. —$238,083 for 13.7 mi. grade, surf., and const. reinf. conc. culverts on U. S. Hwy. 12, Rhame to Bowman—by State Highway Commission, Bismarck. 3-5

BURLEIGH CO.—**Wm. Collins & Sons, Inc.,** Fargo—$216,737 for 11.3 mi. grade, surf. and cons. reinf. conc. culverts on U. S. Hwy. No. 10, Bismarck east — by State Highway Commission, Bismarck. 3-5

RICHLAND CO.—**Megarry Brothers,** St. Cloud, Minn.—$252,407 for 16 mi. grade, surf. and const. culverts on S. H. No. 11, Hankinson east—by State Highway Commission, Bismarck. 3-5

Oklahoma

CREEK AND TULSA COS.—**Cochrane, Fell, Wheeler, Wood & Craig,** Tulsa—$4,400,000 (est.) for convert. U. S. Hwy. 66 into a 4-lane conc. rd. betw. Tulsa and Sapulpa. Length approx. 15 mi.—by Oklahoma State Highway Commission, Oklahoma City. 4-12

Oregon

COLUMBIA CO.—**Leonard & Slate Oregon Ltd.,** 7805 S.W. 40th Ave., Portland—$673,458 (using asphalt) for 3.7 mi. grade and pave, about 378,000 cu. yds. excav.; 10,000 lbs. metal reinf.; tbr. detour bridge; 65,800 cu. yds. cr. rock, on the Rainier-Goble Sect., Columbia River Hwy.—by State Highway Commission, Salem. 4-20

LAKE CO. — **Inter-City Sand & Gravel Co.,** Eugene—$298,255 for grade and surf. Fremont Jct.-Mud Crk. Sec. of Warner Second. Hwy.—by State Highway Commission, Portland. 4-20

UMATILLA CO. — **Grimstad & Vanderbelda,** Astoria—$118,891 for 1.1 mi. grade and pave. of Old Ore. Trail Hwy., Pendle-



ton — by State Highway Commission, Salem. 3-29

Utah

TOOELE CO. — **W. W. Clyde & Co.,** Springville—$507,255 for 13.9 mi. surf. and const. 2 conc. and steel bridges on U. S. Hwy. 40 and 50, FAP No. FI-51 (9)—by State Road Commission, Salt Lake City. 4-12

Washington

CLARK CO. — **J. W. Hardison,** Rt. 1, Yakima—$99,380 for 3.3 mi. clear, grade, drain and surf. Amboy vicinity, County Rd. Project — by Department of Highways, Olympia. 4-10

CLARK CO.—**D. & H. Paving Co.,** Vancouver—$209,257 for 5 mi. grade and surf. PSH No. 15, Vancouver to Salmon Crk. School — by Department of Highways, Olympia. 4-20

LINCOLN CO. — **Goodfellow Brothers, Inc.,** Wenatchee—$168,548 for grade, drain, surf. and const. reinf. conc. bridge on 2.2 mi. hwy. in Crab Crk. vicinity—by Department of Highways, Olympia. 4-10

PACIFIC CO. — **Heavy Hauling Co.,** Astoria, Ore.—$377,025 for 2.6 mi. clear, grade and surf. P. S. H. No. 12, North Namah Riv.—by Department of Highways, Olympia. 4-20

SNOHOMISH CO. — **Northwest Construction Co.,** 3950 6th Ave., Seattle—$151,532 for 2.4 mi. grade and surf. PSH No. 15, Snohomish to Monroe Sec. 2—by Department of Highways, Olympia. 4-20

SPOKANE CO.—**Chas. A. Power,** Box 1220, Spokane—$101,744 for 3.7 mi. grade, surf. with light bitum. surf. treat. on SSH No. 3-H, Freeman to Darknell Rd.—by Department of Highways, Olympia. 4-20

WAHKIAKUM CO. — **Eland & Blickk,** Vancouver — $85,132 for 1.3 mi. clear, grade, drain and surf., Rosburg bridge and approaches—by Department of Highways, Olympia. 4-10

Bridge & Grade . . .

Arizona

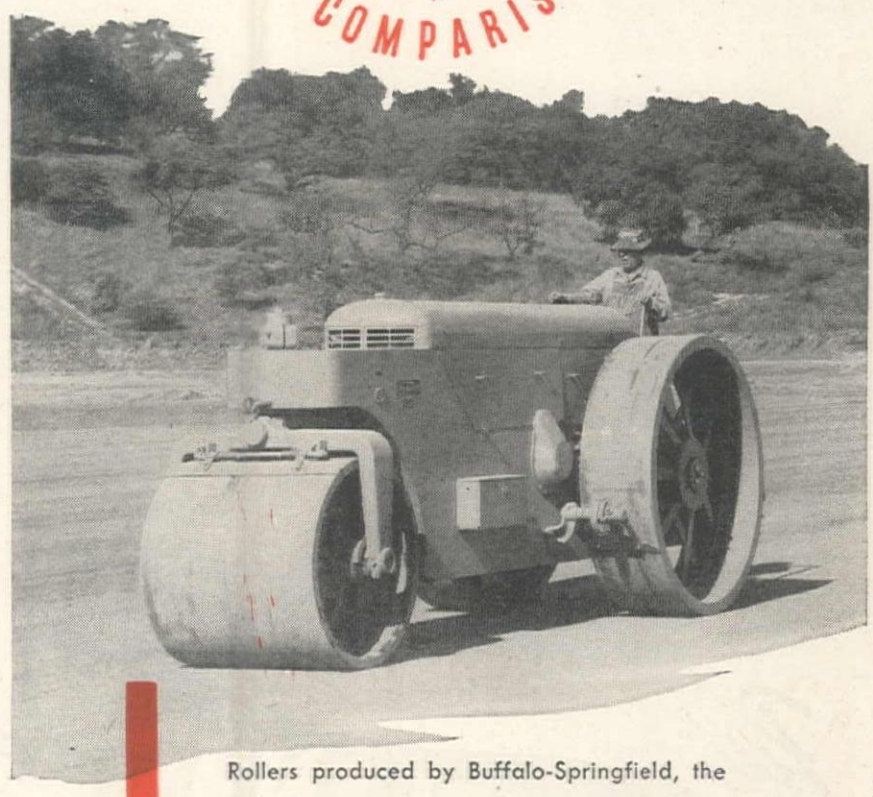
PINAL CO.—**Fisher Contracting Co.,** Box 4035, Phoenix—$688,536 for const. abutments, piers and appr. spans, steel arch and deck of both Queen Crk. Viaduct and Pinto Creek Bridge—by State Highway Commission, Phoenix. 4-16

California

ALAMEDA CO.—**Dan Caputo** and **Edward Kaeble,** 985 Delmas Ave., San Jose—$135,885 for const. new reinf. conc. bridge and appr. and remove exist. Harding Bridge acr. Alameda Crk. and on the Niles Canyon Rd., Washington Township—by County Clerk, Oakland. 4-12

ALAMEDA CO.—**E. H. Peterson & Son,** 5691 Dam Road, Richmond—$248,249 for const. three reinf. conc. high bridges on the Eastshore Freeway across Elmhurst Crk., Damon Slough and East Crk. Slough, Oakland — by Division of Highways, Sacramento. 4-9

LOS ANGELES CO.—**Norman I. Fadel,** 7101 Radford Ave., No. Hollywood—$377,616 for the const. of a struct. steel deck truss bridge across the No. Fork of the San



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INTERMOUNTAIN EQUIPMENT CO.	Pocatello, Idaho
THE SIERRA MACHINERY CO.	Reno, Nevada
STEFFECK EQUIPMENT CO.	Helena, Montana
WORTHAM MACHINERY CO.	Cheyenne, Wyoming (Branches at Sheridan & Greybull)
SPEARS-WELLS MACHINERY CO., INC.	Oakland 7, California
R. L. HARRISON CO., INC.	Albuquerque, New Mexico
O. S. STAPLEY COMPANY	Phoenix, Arizona
J. K. WHEELER MACHINERY CO.	Salt Lake City, Utah

Gabriel Riv. about 15 mi. north of Azusa—by the Division of Highways, Los Angeles. 4-16

SAN BENITO AND SANTA CRUZ COS.—**Dan Caputo** and **Edward Kaeble,** 985 Delmas Ave., San Jose—$186,604 for struct. steel girder bridge and about .9 mi. appr. to grade and surf. about 11 mi. from Watsonville, at Pajaro Riv.—by Division of Highways, Sacramento. 4-12

Montana

DANILES AND VALLEY COS.—**Schye & Sullivan,** White Sulphur Springs—$83,853 for const. tbr. bridges on Richland east Sect. Opheim-Scobey Rd.—by State Highway Commission, Helena. 4-1

Oregon

CLACKAMAS AND MULTNOMAH COS. — **Port Construction Co.,** Box 11, Port Angeles, Wash.—$108,924 for const. Whitewater Bridge and appr., loc. on the Clackamas Riv. Rd. S.E. of Portland—by Public Roads Administration, Portland. 3-26

LINCOLN CO. — **Tom Lillebo,** Reedsport—$95,537 for const. bridge over Salmon Riv. on the Oreg. Coast Hwy. nr. Otis—by State Highway Commission, Salem. 4-20

MARION AND POLK COS. — **Macco Corp.,** 815 Paramount Blvd., Clearwater, Calif.—$845,900 (award pending) for const. bridge about 2,214 ft. in length over the Willamette River at Independence — by State Highway Commission, Salem. 4-20

Washington

LINCOLN CO.—**Goodfellow Bros., Inc.,** Wenatchee—$168,548 for 2.2 mi. grade, drain., surf. and const. reinf. conc. bridge on State Hwy. No. 11F, Crab Crk. vicinity—by the Director of Highways, Olympia. 4-16

Water Supply . . .

California

ALAMEDA CO.—**United Concrete Pipe Corp.,** Box 425, Baldwin Park—$273,198 for cement mortar lined and coated steel pipe for dist. system, Oakland—by East Bay Municipal Utility District, Oakland. 4-12

CONTRA COSTA CO. — **Underground Construction Co.,** 75th Ave. and San Leandro Blvd., Oakland—$77,720 for pipelines from terminal reservoir to filter plant, Martinez—by City Clerk, Martinez. 4-12

CONTRA COSTA CO.—**Ben C. Gerwick,** 112 Market St., San Francisco—$764,615 for const. pile foundations of Unit C, Second Mokelumne Aqueduct — by East Bay Municipal Utility District, Oakland. 4-2

LOS ANGELES CO.—**E. C. Nickel,** 120 Sierra Madre Blvd., Arcadia — $1,352,600 for reinf. conc. reservoir having capacity of 57,000,000 gal. and covered with flat slab roof 275,000 sq. ft. in area on Campbell St., north of Mountain St., Glendale—by City Council, Glendale. 4-28

LOS ANGELES CO.—**H. M. Keller Co.,** 2311 Empire Ave., Burbank—$163,900 for const. 5-mg. water forebay in connection with the municipal water system, Burbank—by City Council, Burbank. 4-2

SAN DIEGO CO.—**M. H. Golden Construction Co.,** 3485 Noell St., San Diego—$469,402 for const. misc. structs. of reinf. conc. and short precast conc. pipelines at the Alvarado Filtration Plant, San Diego—by City Council, San Diego. 4-14

Sewerage . . .

California

LOS ANGELES CO. — **Mike Radich & Co.,** 3000 Empire Ave., Burbank—$2,596,243 for installing sewer laterals and house conn. covering the entire city of Arcadia—by City Council, Arcadia. 4-13

LOS ANGELES CO.—**Hermann Co.,** 417 So. Hill St., Los Angeles—$412,660 for const. sewage disp. works improve. consisting of addns. to and alt. in the exist. municipal sewage treat. plant, Pomona—by City Council, Pomona. 4-28

LOS ANGELES CO. — **George Miller,** 3632 Bandini Blvd., Los Angeles—$143,507 for const. sanitary sewer system at Fairway Blvd., etc., Los Angeles — by County of Los Angeles, Los Angeles. 4-28

LOS ANGELES CO.—**Shannahan, Inc.,** 282 W. Santa Barbara Ave., Los Angeles—$72,145 for const. conc. drainage syst. at the Watson Refinery, Wilmington — by Richfield Oil Company, Los Angeles. 4-16

LOS ANGELES CO.—**Guy F. Atkinson Co.,** 22233 S. Main St., Long Beach—$6,295,518 on Alt. II, for const. of a filter, drier and fertilizer storage syst. of the Hyperion Activated Sludge Plant at El Segundo—by Board of Public Works, Los Angeles. 4-16

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MARIN CO.—**Associated Engineers,** 3606 El Camino Real, Palo Alto—$133,088 for const. sewer lines and appurt., incl. sewage pump. and treat. works, in Sanitary Dist. No. 6, Novato—by Sanitary Dist. No. 6, Novato. 4-23

SACRAMENTO CO. — **A. Teichert & Son, Inc.,** Box 1113, Sacramento—$89,543 for const. of 28,410 ft. of sewer — by Colonial Heights Sewer & Sanitation District, Sacramento. 4-15

SAN DIEGO CO.—**James W. Huntley,** 2020 Hyperion Ave., Los Angeles—$185,493 for const. sewage treat. plant at "J" St., Chula Vista—by City Council, Chula Vista. 4-16

STANISLAUS CO.—**E. E. Lowell,** Box 148, Vallejo—$110,000 for install. industrial trunk sewer line, oxidizing lagoons and domestic sewer clarifier in Patterson—by City Council, Patterson. 4-2

Oregon

MULTNOMAH CO.—**Guy F. Atkinson Co.,** 806 Cascade Bldg., Portland—$671,600 for const. Columbia Blvd. unit of the intercepting sewer for the Portland Sewer Disp. Proj., Portland—by City Council, Portland. 4-2

Washington

WHATCOM CO. — **State Construction Co.,** Seattle—$305,055 for instal. of trunk sewers in the Broadway Unit, Bellingham, and **Wilder & Dawson,** Bellingham—$310,000 (approx.) for install. of the Happy Valley and Silver Bch. Units, Bellingham —by City Council, Bellingham. 3-24

WHATCOM CO.—**Gaasland Const. Co.,** 1161 Ellis St., Bellingham—$325,374 for const. primary treat. plant incl. a 2-stage heated digestion plant powered by sewage gas—by City Council, Bellingham. 4-16

Waterway . . .

California

SACRAMENTO CO.—**H. Earl Parker,** 12th and F Sts., Marysville—$207,883 for enlarg. south levee of American Riv. from 16th St. to Mayhews, Sacramento — by Corps of Engineers, Sacramento. 4-2

SAN FRANCISCO CO. — **Case Gunite Co.,** 850 E. Ocean Blvd., Long Beach—$51,444 to make gunite repairs on beams and gutters, Piers 30, 32 and 17, San Francisco—by Board of Harbor Commission, San Francisco. 4-1

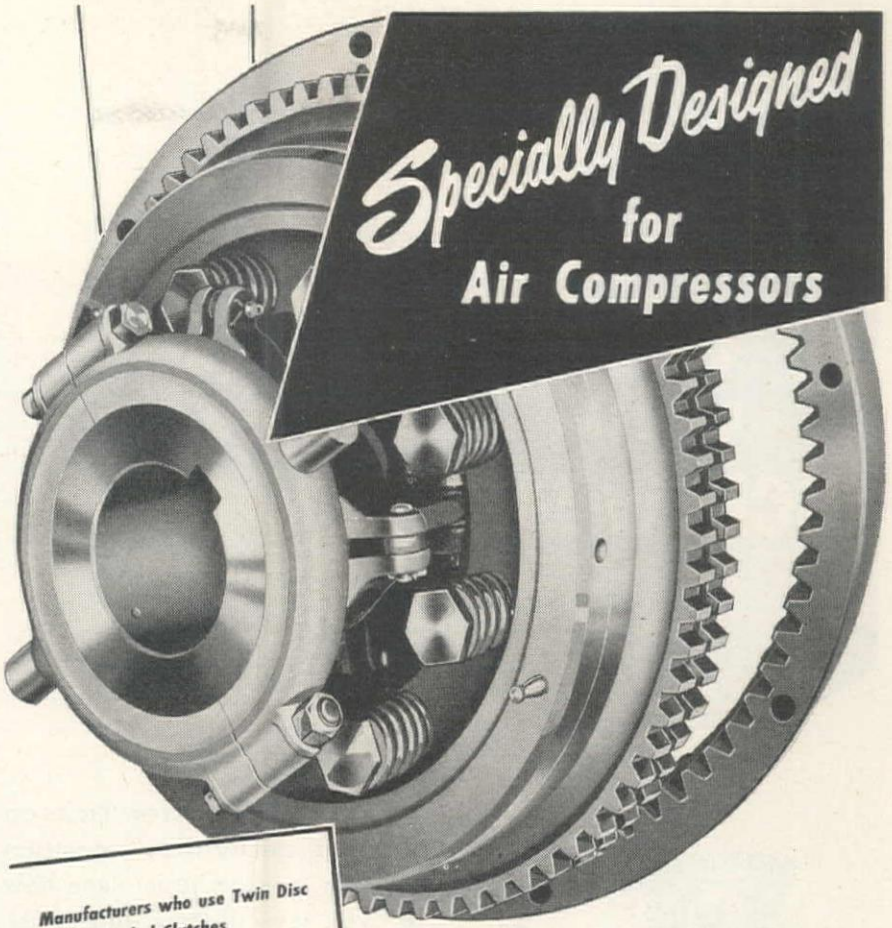
SANTA CRUZ CO.—**W. W. Bird,** 414 E. Miner St., Stockton—$353,934 for const. levees along Pajaro Riv. from its mouth to approx. Riv. Mi. 12, and Corralitos Crk. from its confluence with the Pajaro Riv. to about Crk. Mi. 1—by Corps of Engineers, San Francisco. 4-2

SONOMA CO. — **San Francisco Bridge Co.,** 503 Market St., San Francisco—$88,484 for dredg. channel across flats in north portion of San Pablo Bay to Petaluma Crk. —by Corps of Engineers, San Francisco. 4-2

Oregon

BENTON CO.—**C. J. Eldon & Co.,** Portland—$86,124 for const. bank prot. works and channel rectification along Willamette Riv. at Corvallis—by Corps of Engineers, Portland. 4-2

LINCOLN CO.—**Miller & Strong,** Eugene—$86,191 for const. slough closures



Twin Disc Spring Loaded Clutch

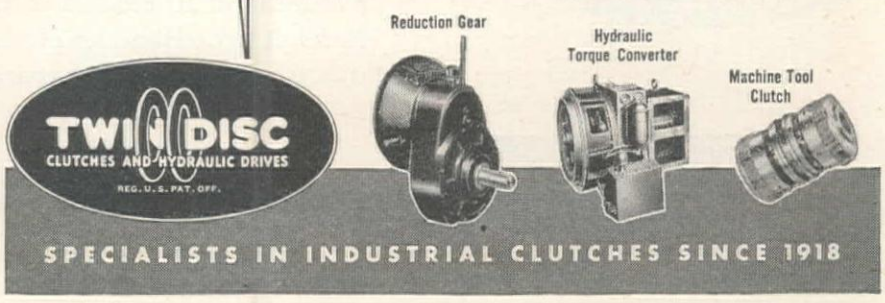
Manufacturers who use Twin Disc Spring Loaded Clutches include:

Chicago Pneumatic Tool Company
Davey Air Compressor Company
Jaeger Machine Company
LeRoi Company
Schramm, Incorporated
Novo Engine Company
Gardner-Denver Company
Sullivan Division of Joy Mfg. Company

To eliminate the need for constant adjustment and to minimize clutch failures, most manufacturers of portable air compressors use Twin Disc Model SLT Spring Loaded Clutches. Specifically designed for air compressors, the Spring Loaded Clutch provides a durable coupling in this exceedingly rugged service.

A positive drive . . . free from burning and slippage . . . is assured by connecting the engine and the compressor through the medium of this Twin Disc hand-operated Clutch. Being spring loaded, the Model SLT Clutch eliminates the need for frequent maintenance. Single point adjustment is incorporated to compensate for wear on the molded asbestos driving plates and to provide for seasonal readjustment.

Write for complete information on how you can apply Twin Disc Spring Loaded Clutches to your air compressor. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



Lift 88% easier WITH SIMPLEX SCREW JACKS



GET FASTER, SAFER JACKING ON ALL CONSTRUCTION JOBS



Put Simplex Screw Jacks on your heavy-duty construction jacking jobs—see how you save in time and effort. These Screw Jacks employ a single chrome-moly ball, nested under the drop forged steel cap, that actually reduces friction 88%! The single ball won't flatten; cap can't slip...even under heaviest loads.

A flared base of tough, malleable iron gives extra stability and protection. The peephole in the base guards against over extension of the screw; insures safety. Colors indicate jack capacities; make selection easy on the job.

Available in 21 models with 4-Way Head—capacities from 10 to 24 tons. Also available in 10 models with Ratchet Type Head for close quarter operation—capacities 20 or 24 tons.

Simplex LEVER - SCREW - HYDRAULIC Jacks

TEMPLETON, KENLY & CO.

1004 South Central Avenue, Chicago 44, Illinois

in Boones and Nutes sloughs, nr. their mouths, Mill Four drain. dist. along Yaquina Riv.—by Corps of Engineers, Portland. 4-2

Utah

SEVIER CO.—**Floyd F. Whiting,** Box 158, Murray — $591,578 for channel improve. on the Sevier Riv. nr. Redmond—by Corps of Engineers, Sacramento, Calif. 4-20

Washington

THURSTON CO.—**M. P. Butler, Inc.,** 3419 34th Ave., S.W., Seattle—$234,270 for const. reinf. conc. pier at Olympia — by Port Commissioner, Olympia. 4-8

Dam . . .

Montana

FLATHEAD CO. — **General-Shea-Morrison-Knudsen,** 3840 Iowa St., Seattle, Wash. — $43,431,000 for genl. const. on Hungry Horse dam and power plant, on the South Fork of Flathead Riv., about 2 mi. S.E. of Columbia Falls—by Bureau of Reclamation, Boise, Idaho. 4-23

Irrigation . . .

California

RIVERSIDE CO. — **American Pipe & Const. Co.,** 4635 Firestone Blvd., Los Angeles—$1,593,462 for const. of earthwork, pipe line and structs., lat. 97.1, Unit 1, Coachella Valley Dist. System of the All-American Canal System. The work is situated in the vic. of Mecca, Calif.—by the U. S. Bureau of Reclamation, Coachella. 4-19

RIVERSIDE CO. — **Macco Corporation,** 815 N. Paramount Blvd., Clearwater — $605,655 (total Scheds. 1 and 2) for const. earthwork, wasteway lining and structs., wasteways Nos. 2 and 3, Coachella Valley flood protection, All-American Canal System. The work is situated nr. Coachella—by Bureau of Reclamation, Coachella. 4-2

Power . . .

Nebraska

SCOTTSBLUFF, MORRILL AND BOX BUTTE COS.—**Utilities Construction Co.,** Nashville, Tenn.—$663,252 for the const. of Gering-Alliance and Cheyenne-Pine Bluffs 115-kv. trans. lines—by Bureau of Reclamation, Denver. 4-28

Washington

GRANT CO. — **Peter Kiewit Sons' Co.,** 1024 Omaha Natl. Bank Bldg., Omaha, Nebr., and **Morrison-Knudsen Co.,** 203 Hoge Bldg., Seattle—$2,789,284 for const. the East control-bay bldg., new switchyard and related facilities at Coulee Dam—by Bureau of Reclamation, Denver. 4-8

Building . . .

Arizona

COCONINO CO.—**W. S. Ford,** Box 928, Kingman—$325,515 for the const. of a Science Bldg. on the State College campus, Flagstaff—by Arizona State College, Flagstaff. 4-16

MARICOPA CO.—**R. E. Bruce,** Rt. 1, Box 16, Phoenix—$1,293,415 for expanding West Phoenix High School, Phoenix—by Union High School District, Phoenix. 4-20

California

ALAMEDA CO. — **M & K Corp.,** 200 Financial Center Bldg., San Francisco—$1,517,833 for const. library annex to Doe Library on the Univ. of Calif. campus, Berkeley—by The Regents of the University of California, Berkeley. 4-20

ALAMEDA CO. — **Valley & Lincoln & Co.,** 1901 Foothill Blvd., San Leandro—$414,800 for const. residences betw. Castro Valley Blvd. and A St., nr. Redwood Rd., Castro Valley—by Vallin Homes, Inc., San Leandro. 4-28

ALAMEDA CO. — **Vezey Construction Co.,** 3760 Ardley Ave., Oakland—$132,000 for const. 1-story bldg. on Stanford Ave., Oakland—by Paramount Built-In Fixture Co., Oakland. 4-6

ALAMEDA CO.—**Louis C. Dunn Co.,** 799 Monadnock Bldg., San Francisco—$150,000 to remodel drug store in Hotel Shattuck Bldg., Berkeley — by Owl-Rexall Drugs, Berkeley. 4-5

BUTTE CO. — **H. W. Robertson, Inc.,** 2917 "T" St., Sacramento — $264,986 for const. hosp., incl. conc. walls, wood floors and roofing, 1-story surgery, maternity wards, etc., for Biggs-Gridley Memorial Hospital, Gridley—by Memorial Hospital Board of Directors, Gridley. 4-23

CONTRA COSTA CO. — **Mark Bristol,** 1973 Oak Crest Drive, Oakland—$191,324 for const. 1-story wood frame school bldg. at Rodeo—by Rodeo School District, Rodeo. 4-2

FRESNO CO. — **Taylor-Wheeler Commercial, Inc.,** 420 Safford Ave., Fresno—$271,353 for remodeling of 4-story bldg. in Fresno—by Anglo California Bank, San Francisco. 4-20

HUMBOLDT CO. — **Mercer-Fraser Co.,** 2nd and Commercial Sts., Eureka—$500,000 for a finishing plant east of NWP Railroad, Eureka—by Hammond Lumber Co., Eureka. 4-20

IMPERIAL CO.—**Alco Construction Co.,** 5423 Flemish Village Lane, Los Angeles—$247,288 general contract for three staff residences, four laborers' cottages, one administration bldg., one machine storage bldg., one seed house, one incinerator, etc., at Imperial Valley Field Station, Meloland —by University of California, Berkeley. 4-1

LOS ANGELES CO. — **Marlow-Burns Development Co.,** Los Angeles—$135,000 (approx.) for const. 1-story, 14-room plaster store and arcade bldg. on W. Slauson Ave., View Park—by self. 4-16

LOS ANGELES CO.—**Howard Hastings, Inc.,** 1135 N. Los Palmas Ave., Los Angeles—$300,000 (approx.) for const. 3-story masonry and conc. office bldg. at 1671 Wilshire Blvd., Los Angeles—by Guarantee Insurance Co., Los Angeles. 4-16

LOS ANGELES CO.—**George Alexander,** 8203 W. Third St., Los Angeles—$125,000 for const. 2-story and basement, 83-rm., 39-unit frame and stucco apt. bldg. at 425 N. Oakhurst Ave., Beverly Hills—by Beverly Oakhurst Building Company, Beverly Hills. 4-16

LOS ANGELES CO. — **Louis C. Dunn Co.,** 743 Subway Terminal Bldg., Los Angeles — $500,000 (approx.) for const. 2-story, hillside, reinf. conc. (gunite) office bldg. on Stocker St., west of Crenshaw Blvd., Los Angeles—by Pacific Telephone & Telegraph Co., Los Angeles. 4-16

LOS ANGELES CO.—**Starrett Bros. & Eken,** 63 Wall St., New York City, N. Y.—$40,000,000 for const. of Parklabrea Housing Project on 85-acre tract bet. 3rd and 6th Sts., east of Fairfax Ave., Los Angeles —by Metropolitan Life Insurance Co., Los Angeles. 4-5

LOS ANGELES CO. — **A-4 Co.,** 1308 Shatto St., Los Angeles—$1,000,000 for 12 frame and stucco apartment bldgs. on Peerless and Ambassador St., near Pico Blvd., Los Angeles—by self. 4-1

LOS ANGELES CO.—**Sepro Corp.,** 9700 W. Pico Blvd., Los Angeles—$2,388,123 for 400 four-room, frame dwellings, near Sepulveda Blvd. and Roscoe Blvd., Van Nuys—by self. 4-1

LOS ANGELES CO. — **Offco Construction Co.,** 2650 Cherry Ave., Long Beach—$482,774 for const. new boiler house incl. new boilers and aux. equip. in Sawtelle—by Veterans Administration, San Francisco. 4-7

LOS ANGELES CO.—**Davies, Kuesdner and Brown,** 4915 Exposition Blvd., Los Angeles—$157,570 for const. one warehouse bldg. at Sawtelle—by Veterans' Administration, San Francisco. 4-7

MENDOCINO CO. — **Chas. G. Haun,** 2116 "K" St., Eureka—$250,000 for const. theater "The Ukiah" at State and Mill Sts., Ukiah—by Trinity Theaters, Ukiah. 4-28

MONTEREY CO. — **Harold C. Geyer,** Box 1190, Monterey—$131,717 for const. 1-story elementary school on Lighthouse Ave. and Ridge Rd., Pacific Grove — by



Pacific Grove United School District, Pacific Grove. 4-7

NAPA CO.—**B & R Construction Co.,** 110 Market St., San Francisco—$161,847 for const. school bldg. on Montecito Blvd., nr. East Ave., Napa — by School District, Napa. 4-27

PLUMAS CO.—**McCoy & Butler,** Teagarden and Sutter Sts., Yuba City—$299,000 for eight-classroom, assembly room, cafeteria, administration bldg., elementary school, Chester—by Board of Education, Chester. 4-1

SAN BERNARDINO CO.—**Pruitt Construction Co.,** 8617 4th Ave., Inglewood—will build 104 five-room frame and stucco dwellings in San Bernardino—by self. 4-1

SAN FRANCISCO CO.—**Dinwiddie Construction Co.,** 210 Crocker Bldg., San Francisco—$1,076,937 for const. grain elevator plant at Islais Crk. reclam. area S. of Islais Channel, San Francisco — by Board of State Harbor Commissioners, San Francisco. 4-2

SAN JOAQUIN CO.—**Moore & Moore Construction Co.,** 644 E. Lindsay St., Stockton—$276,300 for conc. slab and fill warehouse bldg., Charter Way and Fresno Ave., Stockton—by Flotill Products, Inc., Stockton. 4-1

SAN JOAQUIN CO.—**Moore & Moore Construction Co.,** 644 E. Lindsay St., Stockton—$257,500 for const. dormitories at San Joaquin Co. Gen. Hosp., French Camp—by County Board of Supervisors, Stockton. 4-6

SANTA CLARA CO.—**Earl W. Emley,** 2090 Oak St., Saratoga—$130,620 for const. two classroom bldgs. for the Alum Rock Elementary School, Alum Rock—by Alum Rock Union School District, Alum Rock. 4-20

SANTA CLARA CO. — **Wm. Radtke & Son,** Box 671, Gilroy—$100,000 for const. conc. 2-story bldg. on west side of Monterey St., bet. 5th and 6th Sts., Gilroy—by F. W. Woolworth Co., San Francisco. 4-5

SANTA CLARA CO.—**Robert McCarthy Co.,** 1050 Kirkham St., San Francisco—$200,000 (approx.) for const. first unit at the Jesuit College, San Jose—by Bellarmine College Preparatory School, San Jose. 4-6

SHASTA CO.—**Cosentino & Sons,** Dunsmuir—$225,000 for const. 58 cabins (motel type) and facil. incl. swimming pool, etc., at Hotel Casa Blanca, 1 mi. north of Redding on Hwy. 99—by Hotel Casa Blanca, Redding. 4-5

SOLANO CO.—**B. & R. Construction Co.,** 110 Market St., San Francisco—$279,477 for 12-classroom, administrative rooms, frame and stucco elementary school bldg. at Madison and Delaware Sts., Fairfield—by Board of Education, Fairfield. 4-1

VENTURA CO. — **H. Mayson,** 9315 Hooper Ave., Los Angeles—$156,860 for const. reinf. concrete 2-story bldg. at the Camarillo State Hospital, Camarillo—by Division of Architecture, Sacramento. 4-23

Colorado

DENVER CO. — **Preston Construction Co.,** WOW Bldg., Omaha, Nebr.—$2,000,000 (approx.) for const. 8-unit warehouse bldg. betw. Colorado Blvd. and Dahlia St., E. 46th Ave. and Kansas Pacific RR tracks, Denver—by Safeway Stores, Denver. 4-16

Nevada

WASHOE CO.—**Schumaker-Evans,** 6631 E. 26th St., Los Angeles, Calif.—$1,200,000 for const. hotel bldg. of masonry and frame in Reno—by El Rancho Hotel Co., Reno. 4-27

WASHOE CO. — **Walker-Boudwin Co.,** 311 N. Park St., Reno—$360,899 for const. 1-story Veterans Memorial School Bldg., on Kirman and Vassar Sts., Reno — by School District, Reno. 4-5

WASHOE CO. — **Walker-Boudwin Co.,** 311 N. Park St., Reno—$100,000 for const. conc. 1-story bldg. bet. 10th and 11th Sts., Sparks—by First National Bank of Nevada, Sparks. 4-5

Oregon

JOSEPHINE CO.—**The B & R Construction Co.,** Medford — $119,824 for const. newspaper and printing plant at Grants Pass—by Courier Publishing Co., Grants Pass. 4-15

Washington

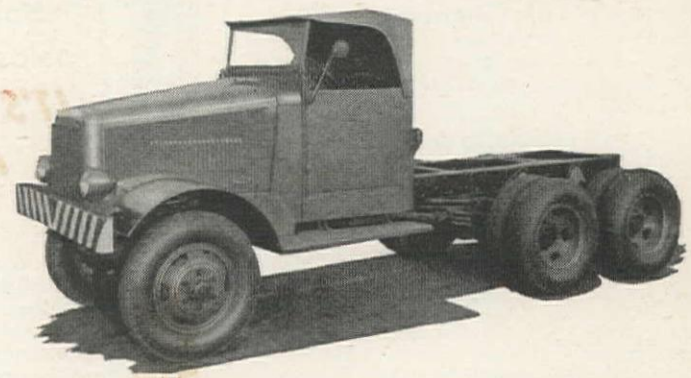
BENTON CO.—**J. A. Terteling & Sons, Inc.,** Boise Ida.—for const. trestle type bridge across the Yakima Riv. betw. Richland and the "Y," and add. to the present water supply system and sewage treatment facilities of Richland and No. Richland—by Atomic Energy Commission, Richland. 4-2

KING CO.—**Henrik Valle Co.,** Box 4096, Interbay Sta., Seattle—$724,357 for genl.

150 HEAVY DUTY TRUCKS 150

INTERNATIONAL 6 x 6 MODEL M-5H-6

CHASSIS
169 INCH WHEEL BASE
ideal for
4 CUBIC YARD TRUCK MIXERS
LOGGING TRUCKS
HEAVY TRACTOR FOR SEMI-TRAILERS





DUMP TRUCKS with New Bodies

7 Cu. Yd. Water Level—8 Cu. Yd. Heaped—Dual 7" Hydraulic-Hoists

New Tires • New Wheels • New Fenders • New Bumper • New Running Boards • New Batteries
All Component Assemblies
Engine • Transmission • Differentials

GUARANTEED EXCELLENT CONDITION

O'KEEFE & MERRITT CO. • HEAVY EQUIPMENT DIVISION • 3700 E. Olympic Blvd., Los Angeles, Calif.

const. of a new University of Washington Student Union Bldg., Seattle—by Board of Regents, University of Washington. 4-27

KING CO.—**Warrack Construction Co.,** Securities Bldg., Seattle — $126,700 for alterations to the Edison Vocational school struct., Seattle—by School Dist. No. 1, Seattle. 4-13

LEWIS CO.—**A. N. King,** Seattle—$223,282 for const. dormitories at the Washington State Training School, Chehalis—Department of Institutions, Olympia. 3-24

PIERCE CO.—**Construction Engineers & Contractors,** 801 Port of Tacoma Rd., Tacoma—$674,206 for const. large cold storage plant addition for Port of Tacoma, Tacoma—by Port Manager, Tacoma. 4-17

PIERCE CO. — **MacDonald Bldg. Co.,** 1517 S. Tacoma Way, Tacoma—$269,240 for const. research center bldg., Western State Hospital, Ft. Steilacoom—by Department of Institutions, Olympia. 4-23

SPOKANE CO. — **MacDonald Building Co.,** 1517 S. Tacoma Way, Tacoma—$351,948 for const. research bldg. at Western State Hospital, Spokane—by Department of Institutions, Olympia. 4-16

Miscellaneous . . .

Utah

VARIOUS COS. — **Pacific Pipeline and Engineers, Ltd.,** 2268 E. Firestone Blvd., Los Angeles, Calif.—$5,000,000 for about 180 mi. of 10-in. welded steel high pressure crude oil pipe line, from Rangeley, Colo., to Salt Lake City, Utah—by Standard Oil Company of California, San Francisco, Calif. 4-27

PROPOSED PROJECTS

Dam . . .

California

MARIN CO.—Bids are being received by the Marin Municipal Water District, San Rafael, for the proposed water storage dam involving moving an estimated 550,000 cu. yds. of earth to erect a structure 90 ft. high, situated at Bon Tempe Meadows, 7 mi. westerly of San Rafael. Estimated cost is $650,000. 4-21

Oregon

UMATILLA CO.—Bids for the const. of McNary Dam, which incl. const. of navigation lock, abut. embank., fishways, port. of the spillway dam and other dam sects. on N. shore of the Columbia River, will be received by the Portland District Corps of Engineers, Portland. 4-20

Water Supply . . .

California

ALAMEDA CO.—Plans are in progress by the City of Hayward for the 13-mi. Hetch Hetchy pipeline from Hayward's water system to the Hetch Hetchy line near Mission San Jose. Cost of the project is about $600,000. 4-27

HIGHWAY ENGINEERS SPECIFY and CONTRACTORS USE

The JACKSON VIBRATORY PAVING TUBE



DON'T BE LATE FOR '48!
GET THESE ADVANTAGES!

Important savings in cement can be made. Finishing progress is much more rapid. Concrete at forms and joints is puddled perfectly. Spreading costs reduced. Complete compaction and excellent finish obtained with less labor.

The JACKSON Paving Tube is perfectly adaptable to slabs 6" to 24" thick, without affecting the efficiency on single or two-course standard plain or reinforced concrete pavement construction and may be quickly adjusted from 10' to 25' widths in the field. Power Plant mounted on the Finisher has ample reserve power through entire frequency range of 3000 to 5000 VPM. Finger tip controls. Quickly and easily attached to any standard finisher — and can be attached to the rear of standard spreaders to advantage for vibrating the first course in thick slab construction. One of the best investments in equipment a paving contractor can make. See your Jackson distributor or write for further information **NOW.**

Manufactured by ELECTRIC TAMPER & EQUIPMENT CO. for
JACKSON VIBRATORS, INC. LUDINGTON, MICH.

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

QUINTON ENGINEERS, LTD., 816 So. Figueroa St., Los Angeles, announce the addition to their staff of **Clay Colley,** member of A.S.M.E., formerly engineer for LINK-BELT COMPANY, Pacific Division. Colley has been with the Link-Belt Company for the last 15 years and is well known throughout the Southwest, and particularly in the mining districts of Arizona and Nevada.

☆ ☆ ☆



Harold N. Propp, Sales Engineer, has been transferred to the San Francisco District office of the NORDBERG MANUFACTURING COMPANY of Milwaukee, Wis. Propp joined Nordberg in 1941 and since 1946 he has been a Sales Engineer serving in the Milwaukee office and the Middle West. He will now assist **T. D. Davis,** Manager of the company's Crusher and Process Machinery Divisions in the San Francisco District.

☆ ☆ ☆

Wilson Davidson, formerly assistant to the Superintendent of the GENERAL ELECTRIC COMPANY'S Apparatus Department Service Shop in Los Angeles, was recently appointed Superintendent of the Shop, which is located at 6900 Stanford Ave., Los Angeles. Davidson has been with the company since 1934.

☆ ☆ ☆

The office of **Edward R. Bacon** is now located at Room 307, 582 Market St., San Francisco. The Mainland business of the EDWARD R. BACON COMPANY OF HAWAII, LTD., will be conducted from this office.

☆ ☆ ☆

MASONITE CORPORATION, Chicago, Ill., is to buy more than 50,000 acres of timber land, known locally as the Albion tract, lying several miles west of Ukiah. This is a preliminary step to building its second plant in this country for the manufacture of wood fiber hardboard. The impending program of expansion to the West Coast will entail a capital investment of several million dollars, but no public financing will be required.

☆ ☆ ☆

R. G. Huntress has been appointed Manager of Wire Rope Sales for THE CALIFORNIA WIRE CLOTH CORP., Oakland, a subsidiary of THE COLORADO FUEL AND IRON CORPORATION. Huntress will serve the Pacific Coast area from the Oakland office.

☆ ☆ ☆

The appointment of **Frank D. Atkins** as Management's Representative for the BETHLEHEM PACIFIC COAST STEEL CORPORATION'S Los Angeles plant was announced recently. Atkins has been with the company for 21 years. He was most recently Management's Representative at Bethlehem Pacific's Seattle, Wash., plant.

☆ ☆ ☆

John M. Garoutte, veteran production man of many H. J. Kaiser enterprises, has been named Works Manager of the cement plant at Permanente, for THE PERMANENTE METALS CORP. **Howard Church** succeeds Garoutte as Works Manager of the company's alumina plant at Baton Rouge, La., where Garoutte has served since 1946.

☆ ☆ ☆

CALVIN D. WOOD & ASSOCIATES, Advertising, have moved to new offices at 525 Market St., San Francisco. They were formerly located at 617 Montgomery St. in San Francisco.

☆ ☆ ☆

CATERPILLAR TRACTOR CO., Peoria, Ill., announces a new merchandising arrangement for the territory of San Benito and Santa Clara Counties, with the naming of DITZ BROS. as distributor for the company. The new corporation, composed of **George Ditz, Jr.,** as President and Sales Manager; **George Ditz, Sr.,** as Vice President; and **Jack Ditz** as Secretary-Treasurer, assumes the territory formerly served by the Rye Tractor & Equipment Co. Ditz Bros. will have main office and service facilities at 1841 So. First St., San Jose and will operate branch stores at 201 Sixth St., Hollister and in Gilroy.

☆ ☆ ☆

DRAKE STEEL SUPPLY COMPANY of Los Angeles, is able to keep local manufacurers and steel fabricators well informed of new developments in steel products through a new traveling display



designed and operated by the company. This traveling display consists of a station wagon with sliding trays that contain samples of all types of steel and wire products and tubing carried by the company. It is also contemplated that this unit will be made available to high schools and trade schools to aid in studies of steel, its properties and applications.

☆ ☆ ☆

The BURAN EQUIPMENT CO., Oakland, Calif., have accepted an exclusive distributorship for the Tilt Bed Trailers being manufactured by FOSTER TRAILER CO., INC., Los Angeles. The INTERSTATE TRUCK AND EQUIPMENT CO., subsidiary of the SEITZ MACHINERY CO., Billings, Mont., have accepted the distributorship for the state of Montana and Northern Wyoming. Both distributors have the trailers on demonstration.

☆ ☆ ☆

The RIVERSIDE CEMENT COMPANY, Los Angeles, annual meeting was held recently. The announcement was made that the capacity of the company's Oro Grande plant has been doubled since 1947 from 1,200,000 to 2,400,000 barrels of finished cement annually. With the installation of new equipment the plant will increase the capacity to 3,500,000 bbls. annually.



OWEN BUCKETS *are popular for* LOW HEADROOM

and thus are more adaptable to various operating conditions.

Owen Bucket heads are one-piece alloy steel castings, light enough to prevent top heaviness and designed for rigid arm connections.

Special head design eliminates wear on upper arm ends. Rack and wobble is prevented.



OWEN BUCKET CO., LTD.
BERKELEY, CALIF.
Dealers: Los Angeles, Spokane, Seattle, Portland, Salt Lake City, Honolulu

PACIFIC NORTHWEST

THE PATENT SCAFFOLDING CO., INC., has purchased property in Seattle for the establishment of a Northwest branch office and warehouse. **Edward A. Rowe** has been transferred from California to take charge of the new branch as district manager.

☆ ☆ ☆



Thomas T. Parker, pressed metal manufacturing engineer, has assumed his new post in that capacity at the Portland plant of the HYSTER COMPANY, manufacturers of lift and straddle trucks and tractor-mounted construction equipment. Parker has a record of 19 years experience in pressed metal manufacturing with the BY-PRODUCTS STEEL CORP., Coatesville, Pa.

☆ ☆ ☆

Walter J. Higgins, consulting engineer of Portland, has been appointed sales manager for SMITHWICK CONCRETE PRODUCTS CO. of Portland. He succeeds **Aubrey M. Baker,** who has been transferred to the position of vice president and sales manager of the INSUL-LITE BLOCK & SUPPLY CO. at Eugene where a new plant is under construction.

☆ ☆ ☆

PRE-MIX CONCRETE, INC., will soon establish a ready-mix concrete business in Kennewick, Wash., to serve the triangle area of Pasco, Kennewick, and Richland. **W. M. Murphy,** president of CENTRAL PRE-MIX CO., Spokane, announced the establishment of the new venture.

☆ ☆ ☆

HOWARD-COOPER CORP., Seattle, has been appointed representative in western Washington for the H. & L. TOOTH CO., manufacturers of teeth for shovels, draglines, scarifiers, and trenching machines. WESTERN EQUIPMENT CO. will represent H & L in eastern Washington and Idaho.

☆ ☆ ☆

LEHIGH PORTLAND CEMENT CO., operating a plant at Metaline Falls, Wash., has announced plans for doubling the capacity of its eastern Washington plant to 4,000 bbl. of cement per day. Installation of new equipment is expected to be completed in order to make the capacity increase available for the 1949 construction season.

☆ ☆ ☆

U. S. PLYWOOD CORP. has begun construction of a branch warehouse in Portland, representing the corporation's twenty-eighth branch. Oregon sales, now handled out of Seattle, will be served from the new distribution unit which will have 25,000 sq. ft. of floor space in the one-story plywood building.

☆ ☆ ☆

Vernon A. Smith, vice president and general sales manager of KENWORTH MOTOR TRUCK CORP., Seattle, Wash., is taking an extensive business trip which will cover most of the United States. He is making a general survey of business conditions and the truck and bus market. Smith, who returned to Kenworth early this year from a tri-continental business trip which carried him to 28 countries in Europe, South Africa, South and Central America and Carribean, will correlate business conditions in the United States with the information he gathered during his foreign travels.

☆ ☆ ☆

UNITED STATES PLYWOOD CORPORATION, New York, N. Y., plans to start construction of its 28th branch warehouse in a few weeks at 3333 NW. Front Ave., Portland, Ore. The new distribution unit will have approximately 25,000 sq. ft. of floor space, will be one story high, and will be constructed of weldwood plywood. The new warehouse will serve the Lower Columbia and upstate Oregon area and most of Idaho. **Albert Frost,** Seattle manager, will be area supervisor with **Jack Graven** of Portland, Ore. as local manager.

☆ ☆ ☆

INTERMOUNTAIN

T. J. Hawthorne was recently appointed District Manager for THE EUCLID ROAD MACHINERY COMPANY of Cleveland, Ohio. Hawthorne will make his headquarters in Denver, Colo. and has been assigned the states of Colorado, New Mexico and Arizona as well as sections of Texas and Wyoming. For the past ten years he has represented LIMA SHOVEL COMPANY in several western states.

these drainage facts...

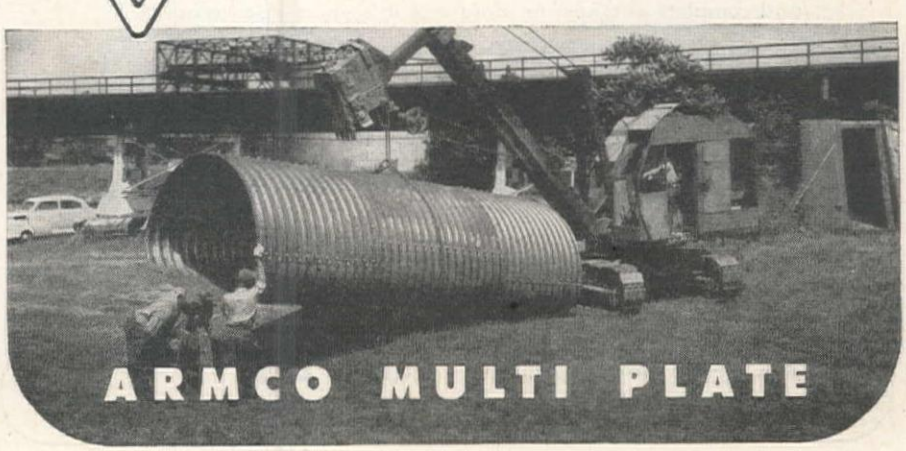
make sense (and dollars)

For drainage economies that make real sense, consider these money-saving facts on easy-to-handle ARMCO MULTI PLATE.

Small bridges, large culverts and similar structures go in fast and economically. A small, unskilled crew easily bolts the pre-curved, corrugated MULTI PLATE sections into sturdy pipe, arches or PIPE-ARCHES. Backfilling follows immediately and traffic can roll. No special tools or equipment are needed. Bad weather is no hindrance.

ARMCO MULTI PLATE cuts handling and hauling costs too. The lightweight plates nest together to save space. Fewer trips and less labor are required. Write for complete data, or talk it over with one of our engineers.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
CALCO—NORTH PACIFIC AND HARDESTY DIVISIONS
Berkeley — Los Angeles — Seattle — Spokane
Portland — Salt Lake City — Denver



INTERNATIONAL HARVESTER COMPANY, Chicago, Ill., is transferring **M. F. Williams,** formerly retail manager at Wichita, Kans., motor truck branch, to the San Antonio, Texas, truck branch as assistant manager. Williams started his career with Harvester in 1935 at Topeka, Kans., and served in various capacities there and in Wichita. He was transferred to Hutchinson as retail truck manager in February, 1946, and in May, 1947, he went to Wichita in the same capacity.

☆ ☆ ☆

THE LINDE AIR PRODUCTS COMPANY, New York, N. Y. is completing plans for the construction of an oxygen filling station and acetylene-producing plant to be located about 2.5 mi. from the center of Billings, Mont. The property has been leased from the Northwestern Improvement Co., a subsidiary of the Northern Pacific Railroad. The main line of the Northern Pacific Railroad and U. S. Hwy. 10 are both adjacent to the new Linde plant site.

☆ ☆ ☆

AMONG THE MANUFACTURERS

Raymond K. Collick has been named Parts Merchandising Manager of the Detroit Diesel Engine Division, GENERAL MOTORS CORPORATION at Detroit, Mich. Collick came to the company from Chevrolet as an engineering draftsman in 1937. During the war he served as a technical analyst in connection with the division's extensive parts distribution program for the Navy. With the return to commercial business in 1945, Collick became Assistant Parts Merchandising Manager and held that position until his present promotion.

☆ ☆ ☆



John M. Palmer sales manager of the LEE CLAY PRODUCT CO., Clearfield, Ky., was elected to the presidency of the NATIONAL CLAY PIPE MANUFACTURERS, INC., at that organization's annual meeting, held in Chicago, Ill. He succeeds G. Lawrence Avery of Sioux City, Iowa. Palmer's election climaxes 30 years in the clay pipe industry.

☆ ☆ ☆

Opening of a new warehouse in Tampa, Florida, by U. S.-Mengel Plywoods, Inc., jointly owned by THE MENGEL COMPANY, Louisville, Ky., and the UNITED STATES PLYWOOD CORP., was announced recently. The building contains 11,200 sq. ft. of concrete floor space and has excellent loading and unloading facilities. The Tampa operation will be under the supervision of **W. S. Green,** Jacksonville branch manager.

☆ ☆ ☆

GARDNER-DENVER COMPANY, Quincy, Ill. in its annual report to the stockholders states that its net profit for the year of 1947, after appropriating $500,000 to cover possible losses due to future price declines in inventories, amounted to $1,967,917 as compared with $1,599,576 for 1946 without any corresponding provision for inventory losses. After preferred dividends, and after appropriation for inventory losses in 1947, net profit on common stock amounted to $2.88 per share in 1947 as compared with $2.42 per share in 1946. Net sales for 1947 were $21,011,251 as compared with $14,797,703 for 1946. Property additions during 1947 totaled $831,174. Total depreciation charged to operations during 1947 amounted to $282,163.

☆ ☆ ☆

AIR REDUCTION SALES COMPANY, New York, N. Y., has merged what was formerly the apparatus sales department and the arc welding sales department into one department to be known as the equipment sales department. **Dale D. Spoor** becomes manager of the equipment sales department. **Ira B. Yates** becomes manager of arc welding and supplies sales and **J. F. Carroll** becomes manager of apparatus sales.

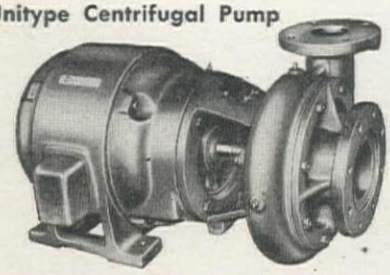
☆ ☆ ☆

The retirement of **J. W. McCoy** as a vice-president and member of the Executive Committee of E. I. DU PONT DE NEMOURS & COMPANY, Wilmington, Del., was announced recently. McCoy will continue to serve as a director. At the same time it was made known that **William H. Ward,** general manager of the company's Explosives Department, had been elected a director, vice-president, and member of the Executive Committee. **Harry F. Brown** succeeds Ward as general manager of the Explosives Department and **Samuel G. Baker** became general manager of the Electro-chemicals Department replacing **F. S. MacGregor,** who retired after more than 30 years with the company. **Donald O. Notman,** who has been director of the Technical Division of the same department



Month in and month out, contractors, engineers, plant superintendents, and other industrial craftsmen are faced with unusual and difficult pumping problems. Pacific Pumping Company who have been building fine, sturdy industrial pumps for nearly a half century have just published a new, up-to-date pumping manual. This booklet contains hydraulic tables and complete engineering data and it is yours upon request.

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ecame assistant general manager. **Dr. E. A. Harding,** formerly director of production, became director of the Technical Division, succeeding Notman. **Russel L. Hardy,** manager of the Niagara Falls, N. Y., plant director of production, and **Dr. N. C. Jones,** assistant manager of the plant succeeds Hardy. **Philip J. Kimball** was named assistant general manager of the Du Pont Company's Explosives Department, succeeding Brown. **Fred R. Wilson** has been appointed as manager of the Explosives Division, replacing Kimball, and **C. R. Carlson** succeeds Wilson as director of production of the division.

☆ ☆ ☆

John W. Pease, Cincinnati, Ohio, was elected president of PREFABRICATED HOME MANUFACTURERS' INSTITUTE, Washington, D. C., at the association's fifth annual meeting at Chicago, Ill. Pease, vice president of the institute during the last year, is treasurer of the PEASE WOODWORK CO. at Cincinnati. He succeeds **Austin Drewry** of New Albany, Ind.

☆ ☆ ☆

G. N. Porter, widely known throughout the road construction industry, has been appointed to the newly-created position of Special Representative of the Sales Department of the HUBER MANUFACTURING COMPANY, Marion, Ohio. A veteran of years of experience in the sales and service divisions of the industry, Porter comes to his new position after 27 years with Huber. As Special Representative, he will be in contact with the company's District Managers and Distributors throughout this country and Canada.

☆ ☆ ☆

Richard M. Stone has been appointed as Industrial Sales Manager for the ALLIS-CHALMERS Tractor Division, Milwaukee, Wis. Stone, who joined Allis-Chalmers in 1928, will succeed **Wm. J. Faulkner** who has resigned to become vice president and part owner of Frantz Tractor Co., Allis-Chalmers New York Representative.

☆ ☆ ☆

The KENNEDY VALVE MANUFACTURING COMPANY of Elmira, New York, has announced the election of **Charles F. Kennedy** as President. Kennedy has been with the company since he was graduated from the University of Michigan in 1937. He was promoted from Assistant Works Manager to Vice-President and Works Manager in June 1947. He is a grandson of the late Daniel Kennedy, who founded the business in 1877. **Matthew E. Kennedy,** who has been president of the Company since 1928, was elected Chairman of the Board of Directors and will retain his position as Treasurer.

☆ ☆ ☆

E. A. Pratt, consulting engineer of New York City, has been appointed as the representative of the INTERNATIONAL ORGANIZATION FOR STANDARDIZATION in its relations with the Economic and Social Council of the United Nations. The ISO is made up of the national standardizing bodies of 26 countries. Through its 67 technical projects it is working toward the coordination of the standard tests, dimensions, definitions, and specifications used in the member countries. It maintains an office in Geneva, Switzerland, with **Henry St. Leger** as secretary-general. The AMERICAN STANDARDS ASSOCIATION, New York City, is the United States member.

NEW EQUIPMENT

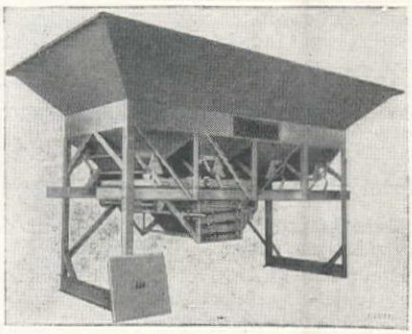
More complete information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, Calif.

Batcher

Manufacturer: C. S. Johnson Co., Champaign, Ill.

Equipment: Batcher with low overall height.

Features claimed: The low height batcher is designed to serve the three standard size portable mixers. The unit has a heaped



storage capacity of 30 tons with extension panels and measures 9½ ft. high. Batcher hopper and scale beam box are suspended from the frame work riding on four steel wheels. Batcher can be installed in either of two directions in the bin. The hopper is cantilevered beyond wheels and end of truck so that it can charge a mixer skip positioned to clear end of track when skip swings up.

Rock Crushing Plant

Manufacturer: Universal Engineering Corp., Cedar Rapids, Iowa.

Equipment: Secondary crushing, screening and loading plant.

Features claimed: The plant consists of a crusher mounted on a truck together with a double deck vibrating screen, conveyors, hoppers and drives necessary for complete and balanced operation. Material from any standard primary crusher goes directly to the screen where finished road rock is screened out. Oversize is delivered back to the crusher. The output of the mill is returned to the main conveyor by means of an under-conveyor back to the screen. Power is applied to the side of the plant through a universal joint to a special roller bearing mounted back shaft.

Wheel Tractor

Manufacturer: M-R-S Manufacturing Co., Flora, Miss.

Equipment: Rubber-tired, towing-type tractor.

Features claimed: The 125-h.p., all purpose, Diesel wheel tractor, weighs 13,700 lb. and develops 109 h.p. at the drawbar. It is powered by an International Harvester 4-cycle, 6-cylinder engine of the valve-in-head type. The tractor has low-pressure drive tires and approx. 70 per cent of its weight on the drive axle. Six optional speed and power ranges are available. Range No. 1 offers speeds up to 37 m.p.h. for hauling under ideal conditions; range No. 6 with a first-gear speed of 2.08 m.p.h., provides up to 19,552 lb. of available tractive effort. Traction can be increased by the addition of special weights. The manufacturer describes the unit as the world's largest and most powerful rubber-tired towing-type tractor.

Drill Steel Key

Manufacturer: Ashman Tool Co., West Sacramento, Calif.

Equipment: Key to remove lodged drill steel.

Features claimed: The key is easy to insert into the steel and is recommended for the removal of broken off jack-bits. The method eliminates the use of the adjustable wrench with sleeve and other methods of steel removal. The tool has a heavy flange for the use of a sledge hammer.

Bulldozer, Scraper and Ripper

Manufacturer: Bucyrus-Erie Co., South Milwaukee, Wis.

Equipment: Complete line of equipment for the new International TD-24 crawler tractor.

Features claimed: The line of cable-controlled equipment makes the most of TD-24 power with minimum stress on tractor or equipment. Full visibility is one of the important features of the bulldozer attachment. With compact radiator guard and sheave support set close to the sides of the tractor and the upper bar close to the engine



hood, the operator can see everything that the blade is doing. The new scraper, called the B-250, has a struck capacity of 22 cu. yd. Differential bowl and apron reeving keeps rope pulls low while giving maximum power at the start of the positive rolling ejection dump. The scraper's apron can easily be converted from the conventional solid type to a hinged type for fast ejection of even the stickiest materials. The ripper attachment has detachable alloy steel standards, angled for natural digging suction. Power for the new TD-24 tractor equipment is controlled by either a front-mounted or rear-mounted power control winch.

Concrete Cutter

Manufacturer: Felker Mfg. Co., Torrance, Calif.

Equipment: Diamond-wheel cutter.

Features claimed: The wheels for the cutter are made of stiff, tempered steel with diamond sections made as inserts. The machine accommodates wheels up to 18-in.

O.D., permitting a 6½ in. maximum depth of cut in pavement for trenches, weakened plane joints, curbs, ramps, etc. Equipped with a 2-cylinder, 10-h.p. gasoline engine, an abundant reserve of power is supplied to the spindle. The spindle is mounted in ball bearings and is double ended, permitting either right or left hand use of the cutting wheel. In order to protect the diamond wheel against sudden shocks when starting cuts, it is gradually eased into the work by a hydraulic down-feed retardant. A large tank on the machine carries water which floods the wheel when in cutting position. Weight of the unit has been so balanced that front wheels or rear can be easily lifted by means of curved handles.

Portable Fire Extinguisher

Manufacturer: General Pacific Corp., Los Angeles, Calif.

Equipment: Extinguisher tank with detachable straps and form-fitting back.



Features claimed: The new type extinguisher permits the operator the use of both hands for more effective fire-fighting. An all brass telescope pump directs a steady stream of water up to 50 ft., and a double nozzle permits either fog or a straight stream of water. The tank has special baffle plates to prevent the water from splashing from side to side and the brass screw top, secured to the tank by a chain, is leakproof. The 4-in. screen opening insures speed in filling and prevents pebbles, brush or other objects from clogging the pump. Shipping weight of the unit is 4½ lb.

Concrete Blanket Taper

Manufacturer: Minnesota Mining & Mfg. Co., St. Paul, Minn.

Equipment: Machine to speed the splicing of concrete curing blankets.

Features claimed: The machine pays out tape as fast as a man can walk. The tape sticks on contact and the machine, weighing 33 lb., presses it tightly in place, securely bonding the paper blankets together. The protective blankets consist of asphalt-impregnated paper, eliminating the handling of sand, sawdust and straw and the need for sprinkling. When the concrete has cured, the tape can be stripped off easily, permitting the full width of the protective paper to be re-used repeatedly.

Material Conveyor

Manufacturer: Material Movement Industries, Inc., Skokie, Ill.

Equipment: Conveyors available with an adjustable chute that removes stray iron.

Features claimed: The special chute, which may be attached or detached as desired, has a powerful magnet built into it. It traps bolts, nails, etc., which may be in the conveyed material to protect the machinery from breakdowns and eliminate the danger of fire caused by friction sparks from tramp iron. The magnet is guaranteed for life. Maximum recommended speed for efficient operation of the magnet is approx. 100 ft. per min. The company's conveyor is available in any length from 6 to 24 ft. with belt widths of 8 and 10 in., powered either by a gasoline engine or electric motor.

Quarry Conveyor

Manufacturer: Pioneer Engineering Works, Inc., Minneapolis, Minn.

Equipment: Factory-built conveyors to meet any requirements.

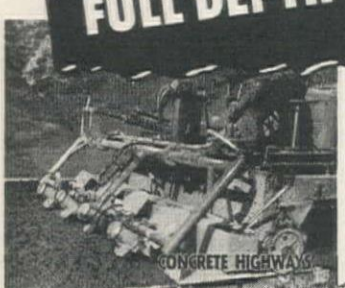
Features claimed: The conveyors, designed in accordance with accepted engineering standards, remove the necessity of designing and detailing a conveyor for each separate job. Each conveyor includes a steel frame, pulleys, shafts, countershaft, gears



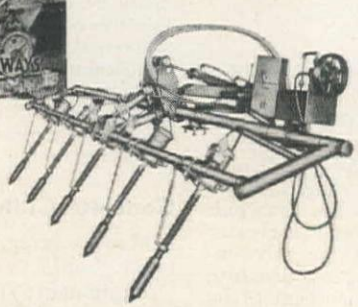
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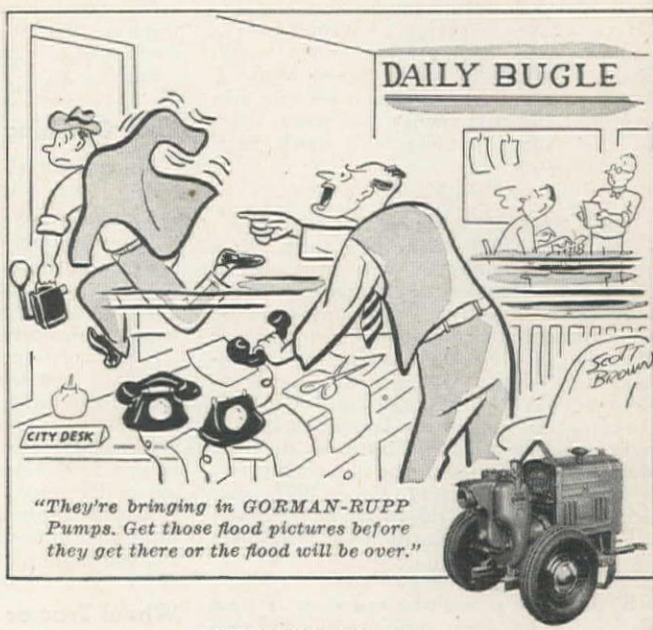
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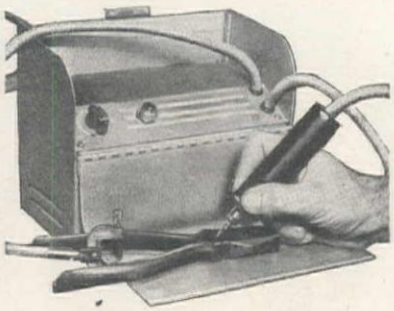
idlers and receiving hopper. When required, lagging on the head pulley, a snub pulley and gravity belt tightener are included automatically. Other desired accessories are available. The conveyors are offered in belt widths of 18, 24 and 30 in. To select any conveyor, it is necessary only to provide specification of the type and amount of material to be handled in a given time and the distance and height to be moved.

Electric Etcher

Manufacturer: Ideal Industries, Inc., Sycamore, Ill.

Equipment: Etcher to burn a permanent mark into any metal.

Features claimed: Regardless of the hardness of the metal, the etcher burns



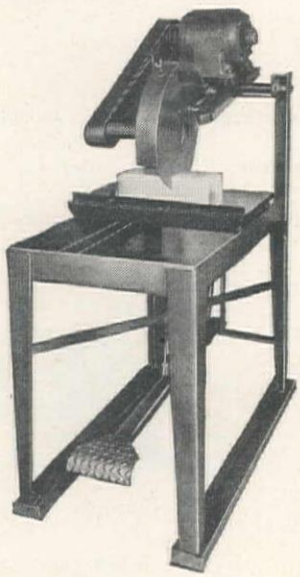
right into the surface. The unit is enclosed in a streamlined, metal case for ready portability. When opened, the cover forms a work plate on which to place the tools and parts for etching. The etcher does not get hot since the point is so mounted in the handle that cooling air can circulate around it. Four etching heats, 120, 240, 420 and 700 watts, suit the model for etching on any tool or instrument.

Masonry Cutting Saw

Manufacturer: Champion Manufacturing Co., St. Louis, Mo.

Equipment: Saw for cutting all types of masonry and ceramic materials.

Features claimed: Either a wet cutting or dry cutting saw can be used. A 1½-h.p.



model, totally enclosed, ball-bearing motor supplies sufficient power for cutting the hardest materials. The cutting head of the machine can be controlled by means of a foot pedal, or the head can be locked down tight for either cutting or scoring. The new model has a self priming centrifugal pump with a self contained water system requiring no outside hose connections. The blade guard is hinged and is easily thrown back for quick installation or removal of the blade.

Truck Maintainer

Manufacturer: Four Wheel Drive Auto Co., Clintonville, Wis.

Equipment: Truck scraper for maintenance of dirt and gravel roads.

Features claimed: The frame height of the maintainer is 45½ in., high enough to accommodate any underbody maintenance blade. The extra frame height is made possible by high arched springs and over-head spring shackle mounting. Design of the truck concentrates the load on the rear axle and, as a result, the blade action is more regular. The truck is a standard model in the company's line with 1948 engineering refinements. It has a gross rating of 20,000 lb. and a chassis weight of 8,000 lb. Standard wheelbase is 154 in. and the frame length back of the cab is 121 in.

Radial Saw

Manufacturer: Porter-Cable Machine Co., Syracuse, N. Y.

Equipment: Saw with high spindle speed.

Features claimed: The spindle speed of 8000 r.p.m. provides speed, and smooth and clean cutting performance. A lightweight motor accommodates a 12-in. saw blade, cutting a full 4 in.; thus a number of 2 x 4's can be laid on the table and cut off in

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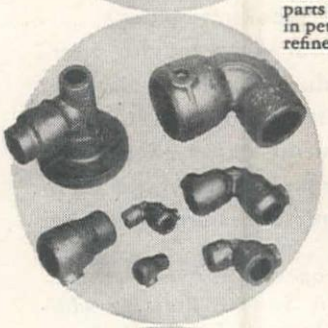


Here are a few samples from a variety of high-alloy acid resistant and heat resistant steel castings we are producing.

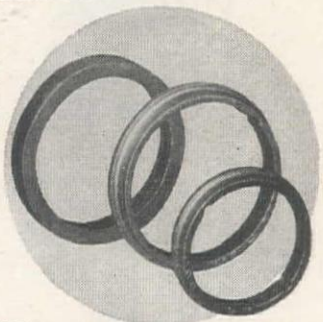
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Miscellaneous acid resistant parts for use in petroleum refinery.

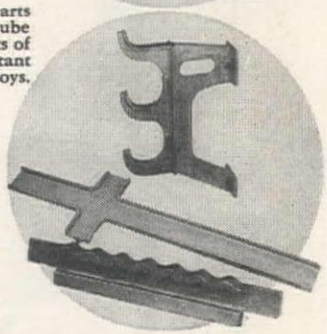


Repair parts for refinery valves requiring acid resistant properties.

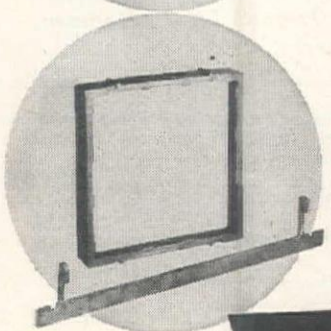


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Parts for a heat treating plant that require the properties of special heat and acid resisting alloys.



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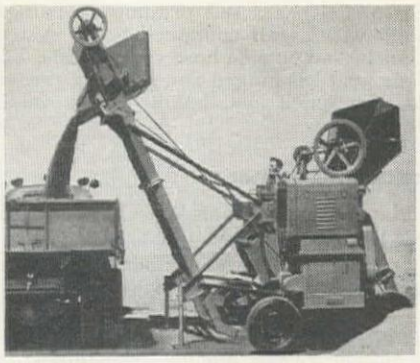
gangs. The model is adaptable for cross cutting, gang cutoff, angle cutoff, bevel cutting, compound 45 deg. cut, dado cutting and ripping operations. The motor unit is set vertically to accommodate cope heads, shaper heads, dado saws and grooovers. The saw can be set at any angle and to any desired depth where it is securely locked to hold that depth.

Tower Attachment for Mixers

Manufacturer: Kwik-Mix Co., Port Washington, Wis.

Equipment: Tower for discharging bituminous mix above ground level.

Features claimed: The tower attachment solves the problem of loading bituminous material from a ground level mixer into trucks or for stockpiling. Discharge height is up to 8¾ ft. Operated by a special hoist, the loader is fully controlled by a single lever



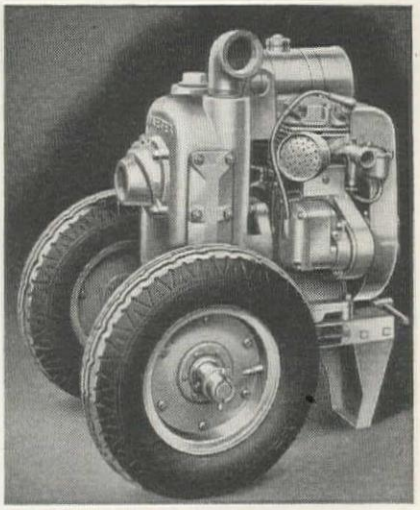
located on the operator's platform. The hoist is mounted within the mixer frame and powered by the mixer motor. The hoist clutch is disengaged automatically when the bucket reaches discharge position. The tower is quickly collapsible and positioned for ample road clearance in moving the machine from one location to another.

High Pressure Pump

Manufacturer: Jaeger Machine Co., Columbus, Ohio.

Equipment: Portable and self-contained 2-in. pump.

Features claimed: The gasoline-engine-driven unit, slightly more than 2-ft. square, weighs 150 lb. including pneumatic tires, mounting frame and telescoping towing



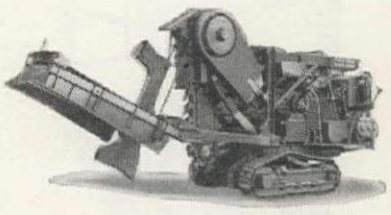
pole. At 10-ft. suction lift, the pump has a range of volumes and pressures from 135 gal. per min. at 10-lb. discharge pressure to 30 gal. per min. at 60 lb. and a maximum shutoff pressure of 70 lb. Construction of the pump is simple and rugged. The open-bladed or trash-type impeller provides the ability to handle large solids. The pump is fitted with a hardened and adjustable liner plate which can be easily removed and replaced after long service. The shell of the pump is an example of modern casting technique, containing no pockets or corners. The impeller discharges upward from the bottom of this shell, violently agitating all sediment and forcing it out with the flow of water.

Ditchers

Manufacturer: Barber-Greene Co., Aurora, Ill.

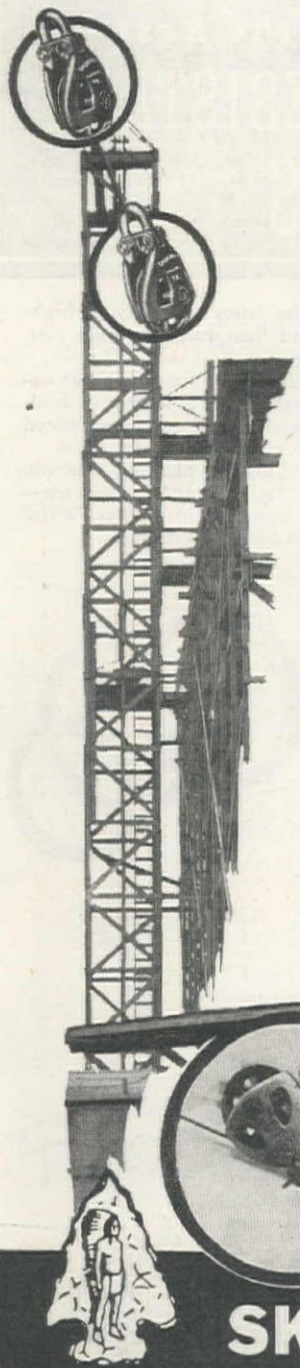
Equipment: Two new ditchers for general service and utility work.

Features claimed: The ditchers feature the patented Three-Position Boom which



710 Ditcher

is quickly adjustable to left, right or center to dig close to obstructions. The model 710 (shown in picture) is designed for digging trenches 5½ in. wide and 42 in. deep and has digging speeds up to 32 ft. per min. A special cable-laying attachment is available for feeding cable and plowing over the spoil in one continuous pass. The



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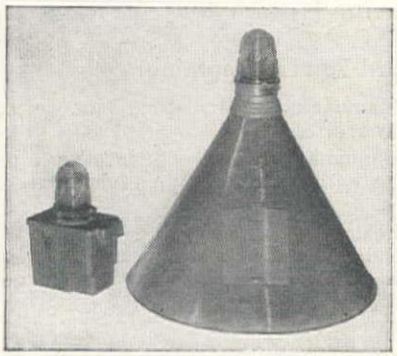
PORTLAND 3, OREGON

model 720 is for digging trenches 8 to 11 in. wide and up to 4 ft. in depth. Both ditchers have self-cleaning, "milling-action" buckets and the patented Overload Release that prevents damage from heavy boulders. Booms are equipped with hydraulic hoists for power lift and controlled gravity lowering.

Portable Marker Lights

Manufacturer: Westinghouse Electric Corp., Pittsburgh, Pa.

Equipment: Flashing aviation or highway marker lights.



Features claimed: Two types of lights are available. One is a portable light for night time use only and the other type has the light source mounted on a large, clearly visible cone and is effective for both day and night use. Coiled neon-type lamps are used in both types of lights powered by a standard, dry-type battery. Flashed at 120 times per minute, the average life of the battery is 150 hr. Red, white, gold, green, or blue flourescent-type lamps are available. Clear glassware is used with all lamps. The battery housing is cast aluminum and the cone is of lead-coated steel. Weight of the combination marker is 34 lb.

Air Entraining Solution

Manufacturer: Autolene Lubricants Co., Denver, Colo.

Equipment: Vinsol Resin air entraining solution and automatic dispenser.

Features claimed: The approved Vinsol Resin solution removes the necessity of saponifying the powder form on the job with sodium hydroxide, eliminating the hazard of this procedure. The commercially made solution has definite laboratory control and has a constant air entrainment value which does not vary from batch to batch. The patented dispenser automatically discharges the predetermined amount of the solution with the mix-water. The dispenser can also be used in batch plant operation in conjunction with solenoid valves for automatic dispensing.

Hidden Arc Welding

Manufacturer: Lincoln Electric Co., Cleveland, Ohio.

Equipment: Manual equipment for semi-automatic hidden arc welding.

Features claimed: The new development, employing high current densities, increases the versatility of the hidden arc process by providing flexible and maneuverable welding equipment that produces the smooth, deeply penetrating, spatter-free welds normally associated only with fully automatic operation. The semi-automatic equipment provides all the necessary welding current and auxiliary power plus the automatic wire feed mechanism and controls. The basic element of the unit is a standard 600 amp. welder which can be used for straight manual welding as well. Mounted on the welder is a compact unit containing the wire reel, feed mechanism, drive motor and voltage controls. A



RAMSEY

3-SPEED ALL-STEEL

HAND WINCH

3-SPEEDS in all models

GEAR RATIOS 25-1, 4-1, 1-1

3 Ton "Junior"—Drum capacity: 150 ft. of ½" cable; wt. 75lbs; $60

5 Ton "Standard"—Drum capacity: 325 ft. of ½" cable; wt. 135 lbs; $85

5 Ton "Heavy Duty"—Drum capacity: 325 ft. of ½" cable; wt. 140 lbs; $90

Power models also available. Write for literature.

Cascade Manufacturing Co.

2439 N. W. 29th Avenue, Portland 10, Oregon

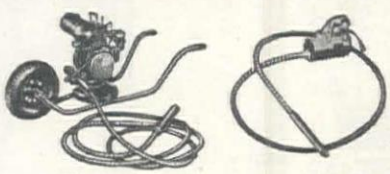
MASTER COST-SAVING EQUIPMENT—FOR IMMEDIATE DELIVERY



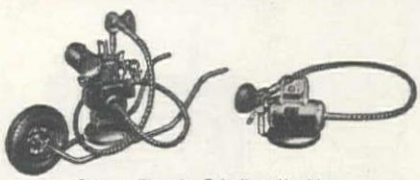
Portable Gas-Electric Generator Plants. Sizes 500 to 17000 Watts (Catalog No. 815-A)



General Purpose Floodlights



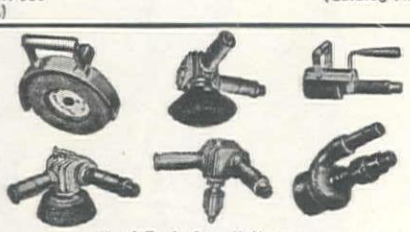
Gas or Electric Concrete Vibrators (Catalog No. 689)



Gas or Electric Grinding Machines and Power Tools (Catalog No. 683)



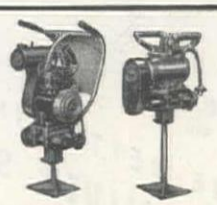
BIG-3 for Generation, Tool Operation and Concrete Vibration (Catalog No. 687)



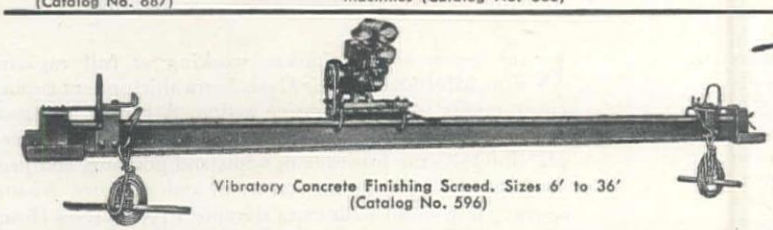
Hand Tools for all Master Vibrators, BIG-3, and Grinding Machines (Catalog No. 683)



"Power-Blow" Electric Hammer and Spade (Catalog No. 688)



Gas or Electric Tampers (Catalog No. 699)



Vibratory Concrete Finishing Screed. Sizes 6' to 36' (Catalog No. 596)



"Turn-A-Trowel" for trowelling concrete Sizes 48" or 34" (Catalog No. 685)



Speedmaster and Cablemaster Hoists; 500 to 6000 lbs. cap. (Export only) (Catalog No. 706-A)

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MASTER VIBRATOR COMPANY

DAYTON 1, OHIO

special cable to which is attached a cone shaped welding gun completes the equipment.

Clevis Grab Hook

Manufacturer: Thomas Laughlin Co., Portland, Maine.

Equipment: Grab hook which can be quickly attached to or detached from a chain.



Features claimed: The clevis grab hook is attached by merely slipping the clevis pin into place and spreading the cotter. This replaces shackling, cold-shutting, bending and re-welding the chain. No additional fittings of any kind are needed. All parts are drop forged and heat treated for maximum strength and safety. A further safety feature is the special housing which covers the end of the clevis pin, preventing the cotter from catching in clothing or scratching the hands. The hook is available in sizes from ¼ to ⅝ in.

Paint Spray Gun

Manufacturer: American Brake Shoe Co., New York City.

Equipment: Gun to apply full range of paint spray materials.

Features claimed: A smooth, high-gloss finish is produced by finer atomization, and even paint distribution is made possible by a more uniform flow of air and paint in the gun. Detrimental effects from air pressure drop and eddy currents have been eliminated by designing ample air passages in the gun body, and by providing for uniform flow and size of air streams from both wing jets and center orifice. The entire head of the gun can be removed as a unit by merely removing the locking screw and lock nut. Only one fluid needle is required for all paint spraying. The needle is a self-aligning cartridge type with full floating motion in all directions to give a tight wear resistant seal. Accurate control of spray width is provided by the angle of the needle. The lightweight gun is balanced to lessen fatigue from wrist strain.

Mobile Tower and Crane

Manufacturer: Mixermobile Manufacturers, Portland, Ore.

Equipment: Truck carrying hoisting tower and crane boom.

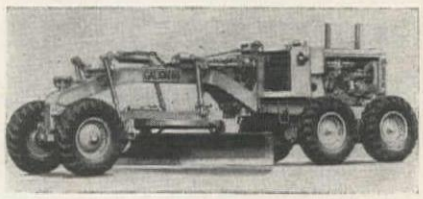
Features claimed: The new machine, called the Towermobile-Crane, is actually a further development of the company's Towermobile which has been manufactured since 1938. The hoisting tower can be completely removed from the chassis if desired and set to one side by the machine's own boom. The 20-ft. crane boom can be increased in length to 40 ft. by the addition of 10-ft. sections. The 20-ft. boom has a lifting capacity of 9,000 lb. on a line 7 ft. to the rear of the truck chassis. The standard tower section is 35 ft. high with one 10-ft. extension included. Lifting capacity of the tower is 6,000 lb. Accessories that can be used with the hoisting tower are a 1½-cu.yd. concrete hopper or a 6 x 6-ft. materials platform.

Road Power Maintainer

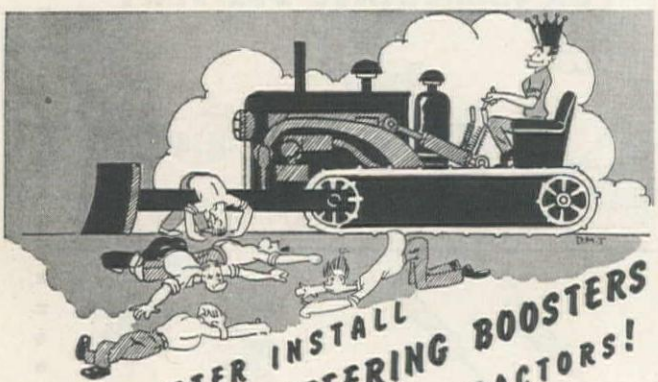
Manufacturer: Meili-Blumberg Corp., New Holstein, Wis.

Equipment: Lightweight grader to perform both construction and maintenance jobs.

Features claimed: The model, built around a modified International "H" power unit of 31.5 h.p., is hydraulically controlled



from the operator's seat and features attachments which include leaning front wheels, power broom, snowplow, bulldozer



WE BETTER INSTALL SILVER STEERING BOOSTERS ON ALL THE TRACTORS!



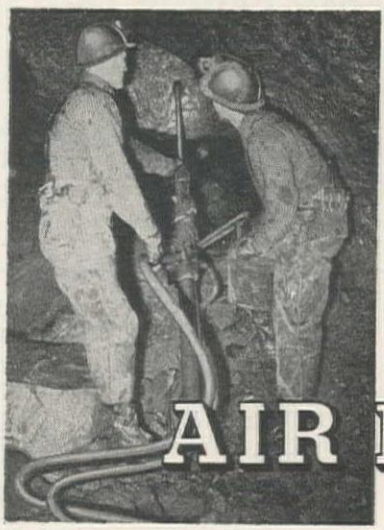
The right to be 'king' of the 'Cat' with the Silver Steering Boosters is really worth fighting for! In fact, it is rumored that skinners have been known to sleep in the seat all night to be sure of S.S.B. steering pleasure* the next day.

Silver Steering Boosters are popular with owners too, because they assure full opening of clutches every time and cut maintenance costs way down.

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- *Very Inexpensive*
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*ONE FINGER OPERATION OF STEERING LEVERS.

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Keep pneumatic equipment working at full capacity with MINE-KING Air Hose. Extra thick pliant rubber cover resists severest abrasive action. A brown oil-proof tube, encased in high quality braided framework, gives MINE-KING the fortitude to withstand gouging, and prevent hose wall separation due to oil and moisture. Assure a steady flow of air with extra durable MINE-KING Hose.

Other Goodall Products: Conveyor belts, Rubber footwear, Waterproof clothing, all types of hose.

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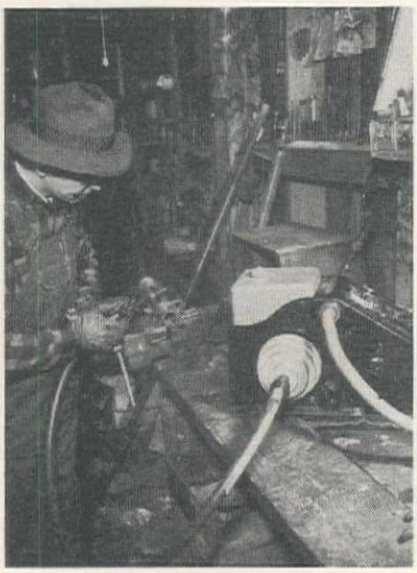
blade, scarifier, and fully enclosed cab and lights. The maintainer operates at five forward speeds ranging from 2.5 to 15.7 m.p.h., and one reverse speed. Its blade clearance is 12 in., and maximum blade pressure is approx. 5000 lb.

Many-Purpose Power Tool

Manufacturer: Continental Motors Corp., Detroit, Mich.

Equipment: Lightweight, portable power source.

Features claimed: The tool is described as a compact 50-lb. unit engineered to the varying demands of dozens of different



jobs. It delivers an output up to 2 h.p. at speeds ranging from 1600 to 2600 r.p.m., selection being made through an accessible speed control dial. Positive built-in control maintains the speed regardless of load. Rounded hand-holes at either end of the tool make it easy to carry from place to place. It can be used with its flexible utility shaft to drill, grind, sand, buff or polish. Mounted on its utility base, it may be set on the floor or ground and belted to any of the various machines in use on the job. It will operate cement mixers, centrifugal pumps, compressors, generators, conveyors or hoists as well as other tools within its power range.

Concrete Cutter

Manufacturer: Backlin Products Corp., Burlington, Wis.

Equipment: Cutter with specially designed diamond saw.

Features claimed: The saw was specially designed for the cutter with continuous rim and in 10 and 12 in. sizes. Depth of the cut with the machine can be regulated from 1 to 3 in. The cutter is driven by a 6 h.p. engine, cuts up to 60 in. per min., and leaves sharp, straight edges. It cuts and scores equally well. The cutter, which can be easily transported from job to job, will prove useful to operators engaged in tearing up and replacing sections of floor surfaces in buildings where a clean-looking finished job is important.

Wheel Tractor

Manufacturer: Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Equipment: Husky 16.3-h.p. unit designed for municipal and industrial maintenance.

Features claimed: The tractor's steel frame provides easy mounting for a wide assortment of useful tools such as mowers, snowplows, hoists and brooms. It is a useful unit for hauling dollies, etc., and, when equipped with a hoist, for loading. The medium speed water-cooled 4-cycle gasoline engine which powers the tractor uses less than one gallon of fuel per hour of average work. The tractor has a wheelbase of 57 in., length of 97 in., and ample ground clearance under the front axle of 8¾ in.

Pressure Vessel Doors

Manufacturer: United Welding & Mfg. Co., Los Angeles, Calif.

Equipment: Quick-opening door on a pressure or vacuum vessel, vertical or horizontal.

Features claimed: The door differs from conventional pressure vessel doors in that the sealing mechanism is a free-moving, rotating, indexing ring mounted on bearings. It requires no special tools, gears or hand wrenches and has no threaded parts. A simple two-step operation, using a breaker bar inserted in a leverage slot, is all that is required to open the door. The bar turns the indexing ring to crack the door and dissipate any remaining pressure or water.

Vibrating Screen

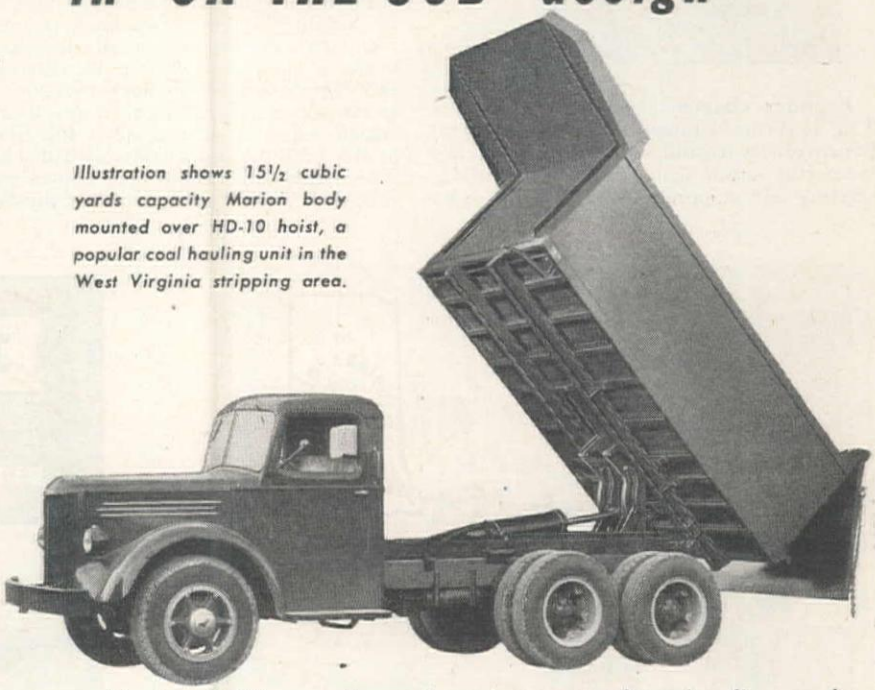
Manufacturer: Lippmann Engineering Works, Milwaukee, Wis.

Equipment: Screen with positive eccentric method of imparting vibration.

Features claimed: A perfect balance of forces is accomplished by the machine with patented eccentric hubs mounted on a straight shaft. Together with the positive vibration equalizer, which transmits equal vibration to every square inch of all decks, this absence of unbalanced forces eliminates transmission of any vibration to the supporting structure without the use of side or end springs or guy cables. The circular

there's field "Know-How" in "ON THE JOB" design

Illustration shows 15½ cubic yards capacity Marion body mounted over HD-10 hoist, a popular coal hauling unit in the West Virginia stripping area.



Marion field-experienced engineers analyze hauling and dumping problems right "on the job" under actual working conditions. This first hand "know-how" is built into every Marion Body and Hoist. This "On The Job" design is your assurance that Marion equipment is built to handle the "toughest" hauling or dumping job. For literature, prices and further information, write direct or to your nearest Marion Distributor.

MARION
DUMP BODIES and HYDRAULIC HOISTS

MARION METAL PRODUCTS CO.
MARION, OHIO

motion permits higher capacities and sharper sizing action. Each particle has greater tumbling and presents all of its faces to the screen cloth more often. The machine is available in single and multi-deck types in all sizes.

Truck Crane

Manufacturer: Harnischfeger Corp., Milwaukee, Wis.

Equipment: Truck crane with remote control.



Features claimed: Feature of the new P & H Truck Cranes is that the operator is provided with full control of the carrier from the crane cab. Steering, shifting, starting and stopping are all controlled by simply pushing buttons. The units have independent power, one engine for travel and another for crane service. Other features of the unit are hydraulic control, independent planetary boom hoist, planetary load lowering and all-welded construction.

Tamping Roller

Manufacturer: Shovel Supply Co., Dallas, Texas.

Equipment: Roller with special wedge-shaped feet.

Features claimed: The roller has feet shaped as solid rectangular prisms tapered smaller at the ends. This design prevents disturbance to surrounding road material during tamping operations. Each foot, hard surfaced for longer life, has a bearing pressure of 320 p.s.i. Empty, the drum has a bearing pressure of 320 p.s.i. The roller comes in one or two drum units. The double unit is attached to a central draw shaft with heavy steel hinges.

Dual Concrete Pouring Bucket

Manufacturer: Blaw-Knox Co., Pittsburgh, Pa.

Equipment: 8 cu. yd. rectangular bucket with air operated roller gates.

Features claimed: The dual unit is formed by coupling together two buckets and this compartmentation permits placing the concrete in two piles without decreasing the rate of production. The bucket was designed to meet U. S. Army Engineer specifications which required vertical sides, full opening at the bottom, and a controlled discharge. The roller gates allow easy control of the discharge so that any portion of the bucket load can be discharged in a given location. The buckets are available in 2, 3, and 4 cu. yd. capacities, and two 3 cu. yd. units combined in dual arrangement to make a 6 cu. yd. unit with two 4 cu. yd. units making the 8 cu. yd. unit.

Winch for Small Tractors

Manufacturer: Pacific Car and Foundry Co., Renton, Wash.

Equipment: Winch for tractors in the 15 to 50 h.p. range.

Features claimed: The winch, with a line pull up to 6500 lb., can perform many pulling, hoisting and skidding jobs if mounted on a small tractor that generally tie up heavier, more expensive equipment. It is compact, small, easily mounted and does not upset tractor balance. It features automotive-type gears, friction cone clutch, a simple energizing brake and oil bath lubrication. One convenient control makes operation easy from the ground or from the tractor seat.

Concrete Form Hardware

Manufacturer: Williams Form Engineering Corp., Grand Rapids, Mich.

Equipment: She-bolt clamps, waler supports and form aligners for wood form construction.

Features claimed: The new combination of form hardware is featured by a new, adjustable form aligner anchored in the footing. This consists of 2 parallel bars clamped onto the protruding end of a pigtail anchor set midway between the forms in the footing. The forms are spaced externally above



"PAID FOR THEMSELVES IN FOUR MONTHS"

The Monroe Corporation bought one Dumpcrete last July and a second in August. These "paid for themselves in 18 weeks." No wonder they bought two more. Their Dumpcretes are hauling air-entrained concrete 3½ miles with no bleeding or segregation. No idle time, either, for Monroe writes, "When it's cold, Dumpcretes haul sand and gravel." You can save too. Write today for booklet.

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MAXON CONSTRUCTION COMPANY, INC.
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* Dumpcrete Concrete is central-mix, air-entrained concrete, hauled in the low-cost Dumpcrete, the tried and tested concrete body.

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The Crook Co. Los Angeles, California
Bay Equipment Co. San Francisco, California
Industrial Equipment Co. Billings, Montana
Hi-Line Equipment Co. Great Falls, Montana

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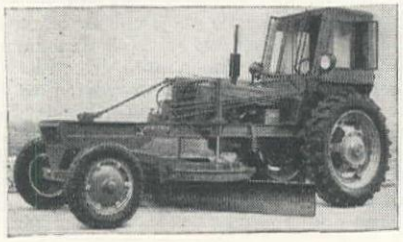
the footing line by driving a nail through the she-bolt at the top of the pigtail anchor stud. Fly nut castings to accomplish the external form pressure do not require a wrench for adjustment or removal. They contain lugs that can be hit with an ordinary hammer to rotate the castings in the desired direction.

Heavy-Duty Motor Grader

Manufacturer: Galion Iron Works & Mfg. Co., Galion, Ohio.

Equipment: Grader with 100 h.p. motor.

Features claimed: The model is designed and constructed to handle the heaviest and



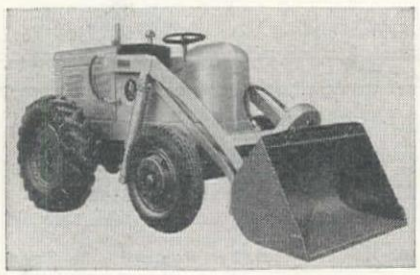
toughest kind of work. Precision controls permit grading to exacting specifications. The unit has complete hydraulic control, manual steering with hydraulic booster, and all-gear tandem drive. Eight forward speeds give a range from 1.5 to 26 m.p.h.

Tractor Shovel

Manufacturer: Frank G. Hough Co., Libertyville, Ill.

Equipment: Tractor with hydraulically controlled bucket.

Features claimed: The bucket on the tractor can be dumped gradually or instan-



taneously and can be closed by the same hydraulic cylinder. This feature increases the speed and ease of operation since the bucket need not be dropped to the ground and tractor reversed to close it. Capacity of the bucket is ¾ cu. yd.

Metal Protective Coating

Manufacturer: The Arco Co., Cleveland, O., and Los Angeles, Calif.

Equipment: Long-life spray coating material.

Features claimed: The new material is designed for the protection of storage vessels, bridges and other metal structures exposed to weather. It provides tough but elastic and pliable coating that effectively seals out measurable vapor, moisture, chemical gases and fumes. It can be used with a minimum of surface preparation on new or uncoated structures and also over previously coated surfaces except those with bituminous-type coatings. The new coating, which can be expected to provide effective weather protection for ten years or more, is being produced in aluminum color.

LITERATURE FROM MANUFACTURERS . . .

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the Western Construction News, 503 Market Street, San Francisco 5, California.

WOOD PRESERVATIVE PAINT—**Speco, Inc.** of Cleveland, Ohio, has just announced publication of a booklet on Woodtrem, new wood preservative paint. It is reputed to prevent rot and decay and to be especially adapted for wood that is to be buried in the ground or laid on an earth surface. Because of its creosote content, it is poisonous to bacteria and repels insects. To mention a few of its uses: it may be applied to piers, railroad ties, poles, timbers, shingles, box cars, tanks, hulls, industrial equipment.

WELD DESIGNER'S GUIDE—**The Lincoln Electric Co.** of Cleveland, Ohio, has published a "Designer's Guide for Welded Construction," due to the growing use of welded design and thus the greatly increased value of properly indicating the welds on drawings. Arc welding symbols, application of dimensions to fillet welding symbols, summary of standard welding symbols, properties of base and weld metals and suggestions for better welded design are described and illustrated in the pamphlet. It is of such form that it can be placed under a desk glass or thumb-tacked to a drawing board for quick reference.

GENERATOR PRODUCTS — **Motor Generator Corp.,** Troy, Ohio, has just released a black and white folder covering a review of the company's products that are now being offered for sale. Included are: motor generator capacities ranging from ½ to 20 kw., metal-plating equipment; metal coloring and finishing and finishing equipment; materials handling equipment; electroplating; railway battery charging equipment; special battery chargers; electropower units; buffers and grinders; air compressors; magnet service generators; modern aviation service equipment; and automotive battery charging equipment. This folder illustrates and describes the complete line of products.

BUCKET LOADER—**The N. P. Nelson Iron Works, Inc.** of Clifton, N. J., has just released a bulletin describing the nimble K-5 Bucket Loader, built heavily enough for pit and road work yet quickly maneuverable in busy yards. The two-color bulletin gives details about the unit which is equipped with a two-strand elevator and four-speed transmission. Separate twin disc clutches control traction and elevator, the latter having an automatic overload release to prevent damage to the machine. Photographs of the loader in action are given as well as specifications.

NICKEL ALLOY STEELS—**The International Nickel Company, Inc.,** New York City, N. Y., has published a newly revised and enlarged booklet of the Bulletin P-1 on the subject of the "Mechanical Properties of Heat Treated Nickel Alloy Steels," first issued some twelve years ago. This revised, 30-page booklet contains much new data, largely in the form of charts, on the properties of the more commonly used engineering steels containing up to 5% nickel. Detailed information on heat treatment methods, both for carburizing and direct-hardening compositions, is given along with suggested applications.

WIRE ROPE—**The Wire Rope Institute** located in Washington, D. C., a national organization with a membership representing most of the country's wire rope manufacturers, has recently published an attractive, two-color combination catalog and handbook for general distribution to wire rope users. The new 119-page publication, "Wire Rope," prepared and edited by the Institute's Technical Committee, contains a wealth of useful information in the selecting, buying and using of wire rope, along with data on fittings, attachments, splicing and other related subjects.

SEALING LEAKS AGAINST PRESSURE — **Sika Chemical Corporation** of Passaic, N. J. has published a new folder on their quick-setting compounds, Sika #2 and Sika 4A. These compounds are liquids that are mixed with cement. The initial set of the resulting mortar can be adjusted to be as low as 20 seconds and the final set as low at 30 seconds. Pictures in the pamphlet show the sequence of application. Detailed instructions for use under various conditions are given. An outline is given on maintenance problems necessitating the use of the quick-setting Sika compounds and other Sika products.

PORTABLE ENGINE DRIVEN COMPRESSORS—**Schramm Inc.,** West Chester, Penna., have recently released Bulletin #4801, which describes the complete line of Schramm Portable Engine Driven Compressors. These compressors are built in sizes ranging from 105 to 420 cu. ft. of actual air and include both gasoline and Diesel engine driven units featuring the In-Line construction which brings all the points of production and maintenance to the outside within easy reach of the operator. Photographs, blueprints and compressor and engine specifications are given for the various units. Schramm live hose reels and tools are also pictured and described.

TRAINED MEN AND COLLEGE GRADUATES—**Caterpillar Tractor Co.,** Peoria, Ill., have published two training pamphlets, "Trained Men" and "College Graduate Where Now," to acquaint employees and prospective employees with the various training courses available at the Peoria plant. Trained Men points to the four year machinist, foundryman and patternmaker apprentice courses, the two year machine shop, welding, sheet metal and business training courses, the engineering cooperative training course in which trainees alternate study at "Caterpillar" and at an engineering college and the college graduate course. The college graduate training, shaped into a 50 week period, is outlined at greater length in the College Graduate Where Now.

WOVEN WIRE SCREENS — **Pacific Wire Works Company,** Seattle, Wash., has just prepared and published a 4-page folder on the 4-S (super strength spring steel) Woven Wire Screens. Of timely interest to sand and gravel executives, coal and ore producers, and other modern users of screening equipment, the attractively presented and illustrated folder stresses the built-in values of screens that are made complete for vibrators, shakers, cones, and cylinders. It features a postwar approach to the problem of faster and more economical output, longer useful screen life, fewer necessary replacements, and super service in the emergencies which the producers of sand, gravel, coal, and ore face in the early years of the postwar period.

AIR-ENTRAINMENT OF CONCRETE—**Autolene Lubricants Co.,** Denver, Colo., has published a 34-page book entitled "Facts on Modern Placement of Concrete through Air Entrainment." This

book completely covers the field of air entrainment and gives accurate answers, in a simple and concise way, to any and all difficulties encountered in the placement of concrete with air entrainment solution. The five general headings that follow will give an idea of the completeness of the Modern Placement of Concrete through Air Entrainment book: What it is, What it does for the contractor, What it costs, What it does for the concrete, and How it is used. Fourteen photographs amplify the text. A folder, describing the Protex Air Entraining Solution Dispenser, which automatically discharges the predetermined amount of AEA solution with the mix-water, has also been released.

NEW LIGHTWEIGHT CONSTRUCTION MATERIAL—**AleXitE Engineering Co.**, Colorado Springs, Colo., has released a new folder dealing with the mining and processing of perlite. The newly discovered rock, trade-named "PerAleX," is of volcanic origin, contains entrapped water, which turns to steam in a furnace and pops the ore to a snow-white light weight aggregate containing insulating air cells, and is used to replace sand and gravel in plaster and many masonry products, such as bricks, blocks, insulated floors and roof decks. The end products are strong enough to support construction loads. The savings made possible in construction dead loads are bringing about some radical recalculations in architectural design. Photographs of PerAleX and its various uses complete the editorial content of the folder.

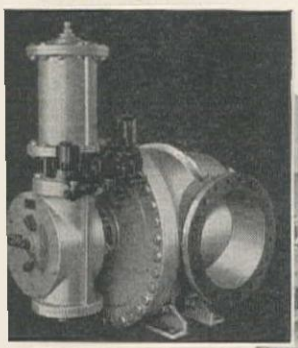
CLIPPER POWER SHOVEL — **The Gar Wood Industries, Inc.**, Findlay, Ohio, has just released Bulletin No. 846-R on the Buckeye Model 70 Clipper Power Shovel. All the improvements that have been effected since V-J Day in this Mevac-controlled shovel are shown in the bulletin. The improved design of the shovel boom, the entirely new revolving frame and the redesigned trench hoe are just a few of the subjects covered and illustrated in this interesting 30-page bulletin.

MACK TRUCKS—**Mack Trucks, Inc.**, New York City, N. Y., has just sent off the press a new booklet, "Mack in the Mines and in the Quarries." Its 16 pages are packed with action pictures of Mack trucks at work in mines and quarries in every part of the nation. Covering trucks and tractors, four- and six-wheel vehicles, powered by gasoline, Diesel and butane fueled engines, the booklet describes practically every type of truck and dump body design used in the specialized hauling of ore, coal, rock and earth. It contains the complete postwar line of Mack trucks specifically designed and produced for these industries.

NOVEL ARC METAL-CUTTING TOOL — **Eutectic Welding Alloys Corp.**, New York, N. Y., has released an 8-page bulletin describing applications of the novel low-cost surface and underwater metal-cutting tool that employs electric arc vapor, known as "CutTrode." Complete information, technical diagrams, instructions for using CutTrode for large industries and smaller shops are given in detail. Operating hints outlined will aid all metal working men, whether for repair or production metal-cutting. For construction welders, maintenance men, riggers, specialists in implement repairs, rescue workers, salvage operations, shipbuilders, etc., this bulletin will prove especially interesting. Illustrations show CutTrode at work piercing, cutting, gouging, chamfering on cast iron, stainless steel, aluminum and other metals considered difficult to cut by conventional methods.

STEAM-DETERGENT CLEANING —**Oakite Products, Inc.**, New York City, N. Y., is presenting a thorough-going review of the theory and applications of industrial Steam-Detergent Cleaning, in the illustrated Service Report recently published. The Report defines Steam Detergent Cleaning and the simultaneous application of its three different actions. Much interesting data is supplied on types of steam-cleaning equipment available, on specific detergents designed for use with such equipment, on the preparation of efficient working solutions, and on the use of steam-cleaning units for stripping oil-base paint, lacquer, enamel and other organic finishes from various surfaces. Typical instances where the application of the Steam-Detergent cleaning has been used effectively in the construction field are reported to be: heavy-duty cleaning of steam hoists, derrick gears, motors, tractors, compressors, concrete mixers, concrete-carrying trucks, gas engines, road graders, Diesel cranes, and other types of earthmoving, pit and quarry equipment.

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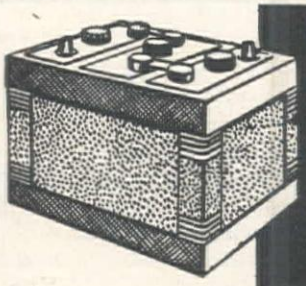
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Travels on Dollies Over Desert

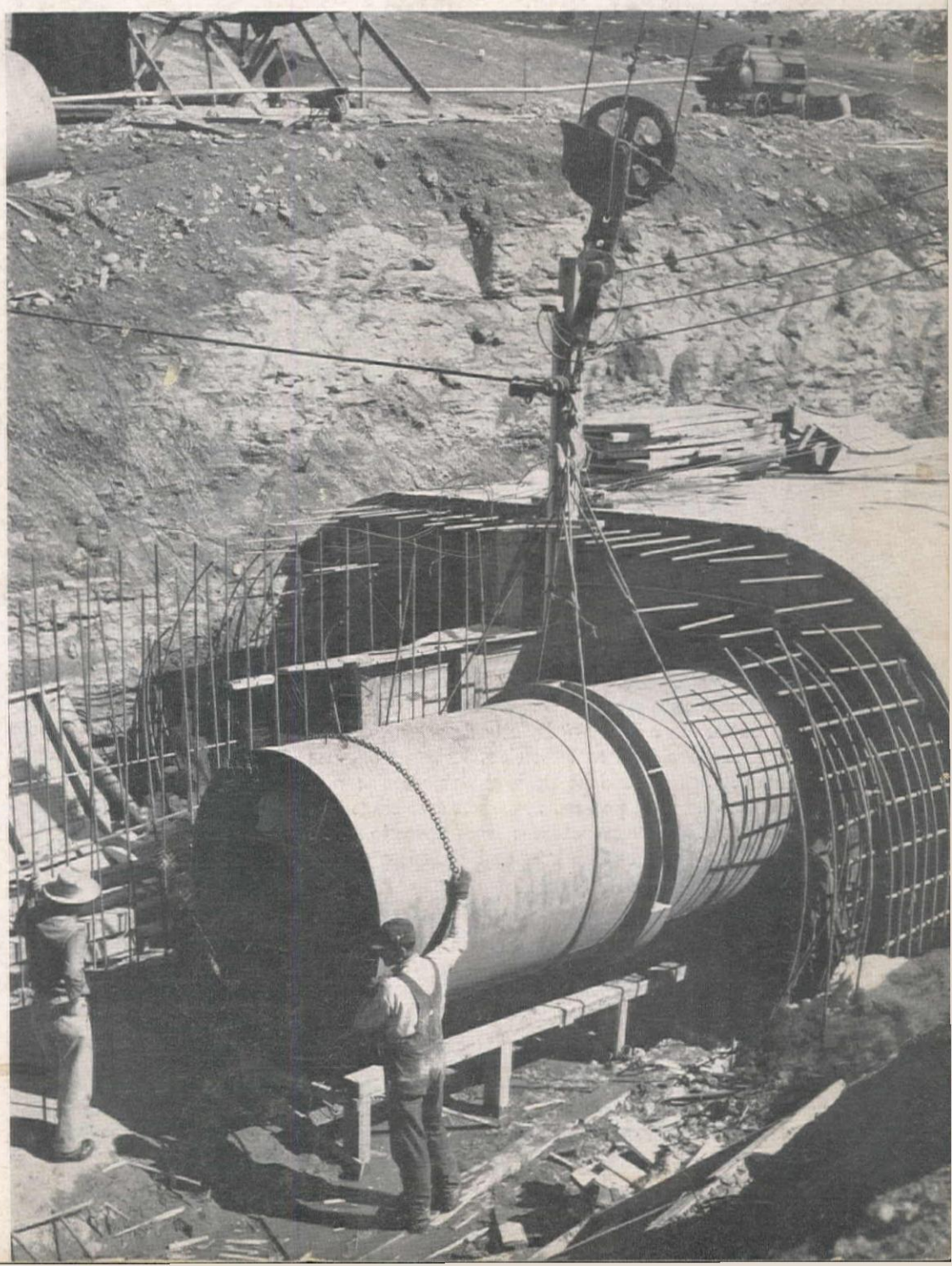
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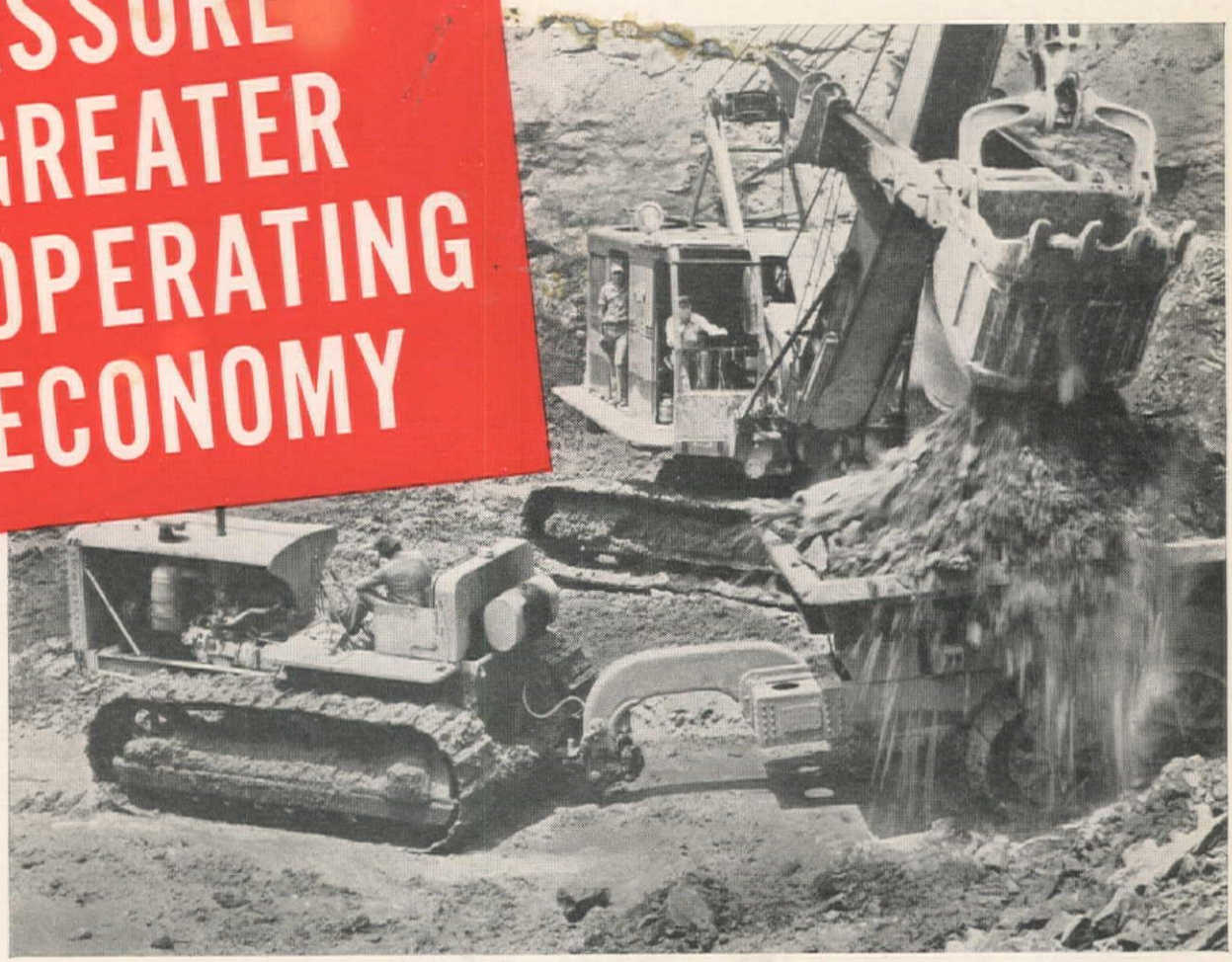
McNary Dam
Construction Schedule Illustrated



STEEL TUBE to carry water of the Horsetooth feeder canal of the Colorado-Big Thompson project, under construction by the Bureau of Reclamation, is carried through a mountain in a concrete-lined tunnel. Here a section of the tube is being lowered into place at the portal.

Photo by R. G. Zellers

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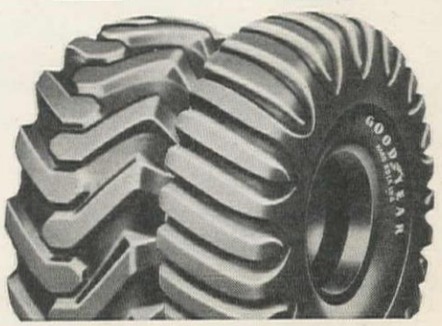
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WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Volume 23 | APRIL • 1948 | Number 4

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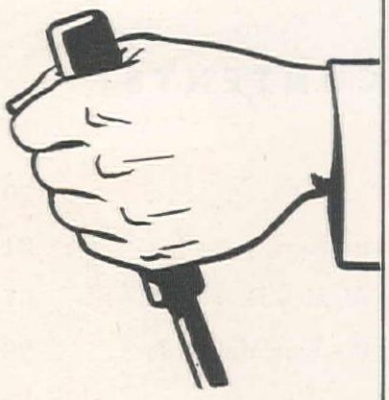
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Save this lost time

Everytime you shift gears with old style dozers you have to . . .

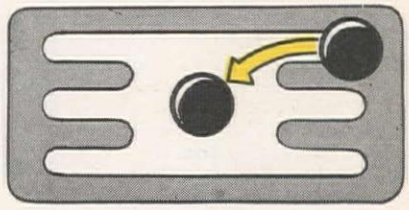
1 **Release clutch**



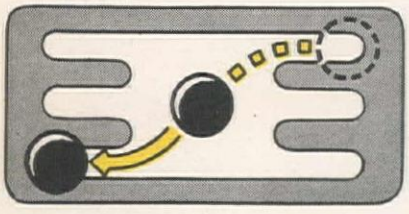
2 **Apply brakes**



3 **Shift— forward to neutral**



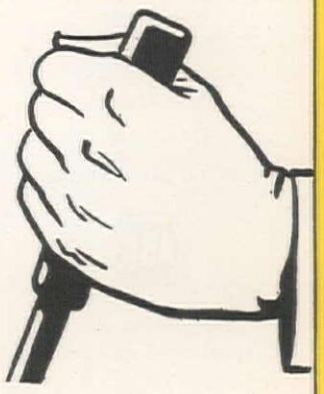
4 **Shift— neutral to reverse**



5 **Release brakes**



6 **Engage clutch**



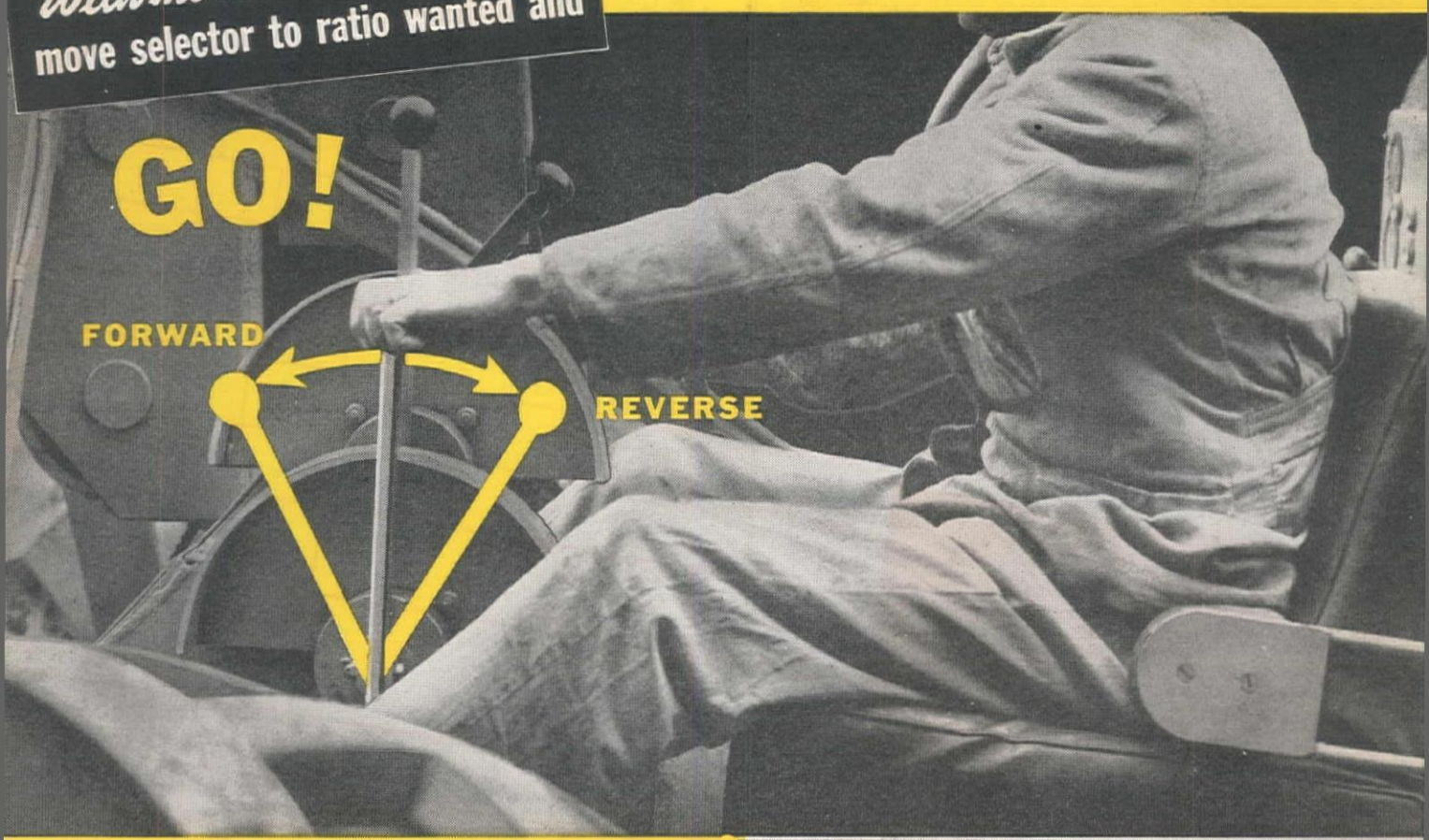
(Although many operators shift gears without stopping, this is not a recommended practice.)

LETOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

with a TOURNADOZER

With modern TOURNADOZERS move selector to ratio wanted and



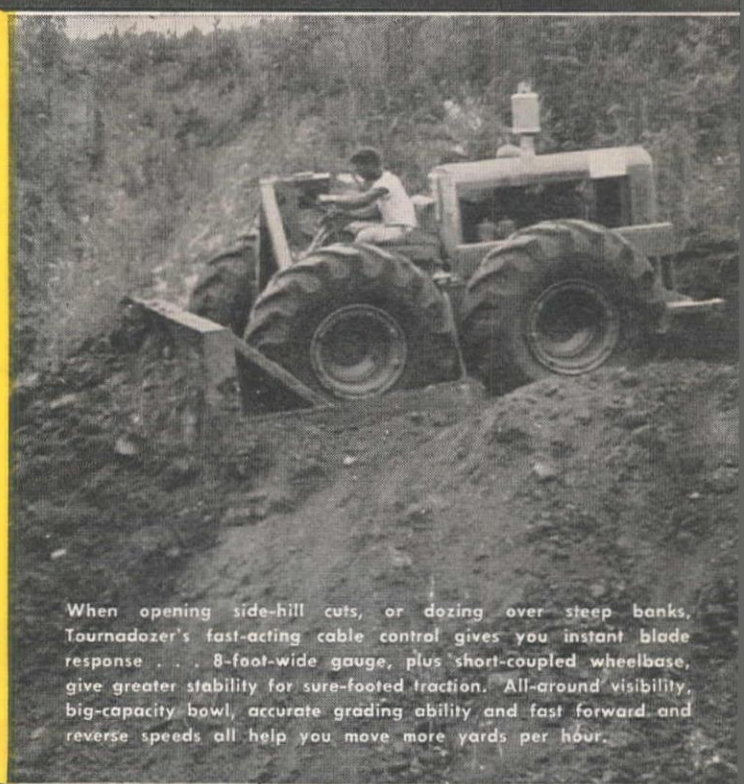
TOURNADOZER'S constant-mesh Tournamatic Transmission gives you instantaneous selection of any one of four speeds up to 15 m.p.h., forward or reverse . . . no foot clutching . . . no gear shifting. Air-actuated clutches instantly give you the right gear combination. One movement of the hand speed selector . . . and you are in gear and moving right now!

There is no "let-up" or pause to change gears when moving forward or backward . . . no loss of momentum . . . no jockeying for gears . . . nor travel in lower gears on grades or in tough going because you can't get under way in the higher ratio. With a Tournadozer, there is no danger of stripping gears because operator took a chance on double-clutching and didn't make it. There's no trick in following your load and keeping it rolling, nor in synchronizing your speed with that of the scraper in pusher loading.

Because it's so easy to operate, "skinners" like this new dozer . . . keep it hitting the ball *all day.*

Ask your LeTourneau Distributor to show you the Tournadozer in action . . . time study and compare its operation with your old style dozers.

Tournamatic, Tournadozer—Trademark—CDS



When opening side-hill cuts, or dozing over steep banks, Tournadozer's fast-acting cable control gives you instant blade response . . . 8-foot-wide gauge, plus short-coupled wheelbase, give greater stability for sure-footed traction. All-around visibility, big-capacity bowl, accurate grading ability and fast forward and reverse speeds all help you move more yards per hour.

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

TOURNADOZERS

Check your present scraper

LaPLANT-CHOATE



BETTER ROADS FOR A BETTER WORLD — 45th Annual Convention and Road Show — SOLDIER FIELD CHICAGO — JULY 18-24, 1948

Here's an easy way to see if you are getting all possible profit from your earth-moving jobs. Maybe you're losing money with obsolete equipment using a good tractor to haul ten yards when it can handle fourteen.

Modernize now with LaPlant-Choate scrapers! Their profit-earning capacity is unmatched! They get bigger loads faster and easier in all kinds of material. They will carry a smooth, even spread in high gear. Savings in tractor and scraper maintenance also add to your profit. Your nearest LPC distributor can give you complete details. Ask for Bulletin A-1143-A. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, California.

SCRAPER EVALUATION CHART

Design features which affect production ability—loadability—haulability—spreadability—of scrapers.

		Points	LPC	Score Your Scraper
1.	a. Curved Bowl Bottom	10	10	
	b. Flat Bowl Bottom	5		
2.	a. Offset Cutting Edge	10	10	
	b. Straight Cutting Edge	5		
3.	a. Low Center of Gravity	10	10	
	b. High Center of Gravity	5		
4.	a. Open Top Bowl	10	10	
	b. Obstructed Bowl Top	5		
5.	a. Weight Distribution 45% front 55% rear	10	10	
	b. Weight Distribution Otherwise	5		
*6.	Weight empty			
	a. Under 5% variation	10	10	
	b. 5% to 15% variation	6		
	c. Over 15% variation	2		
7.	a. Interchangeable Tires—Front & Rear	10	10	
	b. Non-interchangeable Tires	5		
8.	a. Positive Forced Ejection	10	10	
	b. Gravity Dump	5		
**9.	a. High Apron Lift	10	10	
	b. Medium Apron Lift	7		
	c. Low Apron Lift	2		
10.	General Maintenance & Serviceability Characteristics			
	a. Superior	10	10	
	b. Average	6		
	c. Inferior	2		
	Total	100		

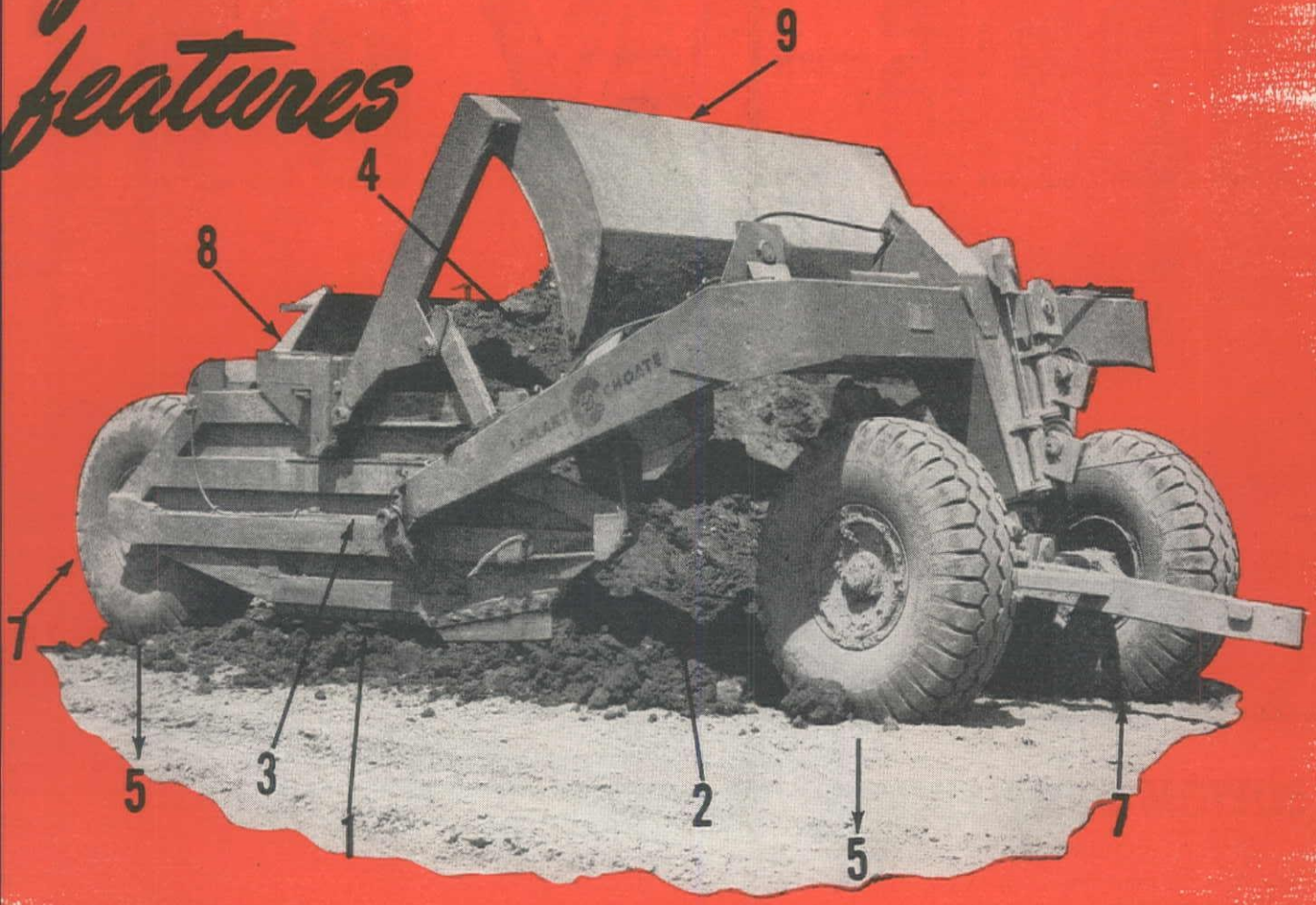
Capacity Struck Yards	*Average Weight 8 Manufacturers	**Height of Apron Lift High	Medium	Low
12 — 15	21,950	100" & up	70" — 100"	Under 7
7 — 9	15,143	90" & up	60" — 90"	Under 6
5 — 7	11,020	80" & up	50" — 80"	Under 5

LaPLANT-CHOATE

HIGH SPEED EARTHMOVING EQUIPMENT

FOR LOWEST POSSIBLE COST PER YARD...PER JOB...PER YEAR

against these modern features



ENGINEERING SALES SERVICE, INC.
410 Capitol Boulevard
BOISE, IDAHO

GENERAL EQUIPMENT COMPANY
1201 East 2nd Street
RENO, NEVADA

HEINER EQUIPMENT & SUPPLY CO.
501 W. Seventh Street South
SALT LAKE CITY, UTAH

INDUSTRIAL EQUIPMENT COMPANY OF SOUTHERN CALIFORNIA
4441 Santa Fe Avenue
LOS ANGELES 11, CALIFORNIA

N. C. RIBBLE CO.
1304 N. Fourth Street
ALBUQUERQUE, NEW MEXICO

WESTERN MACHINERY COMPANY
1004 Speer Boulevard
DENVER, COLORADO

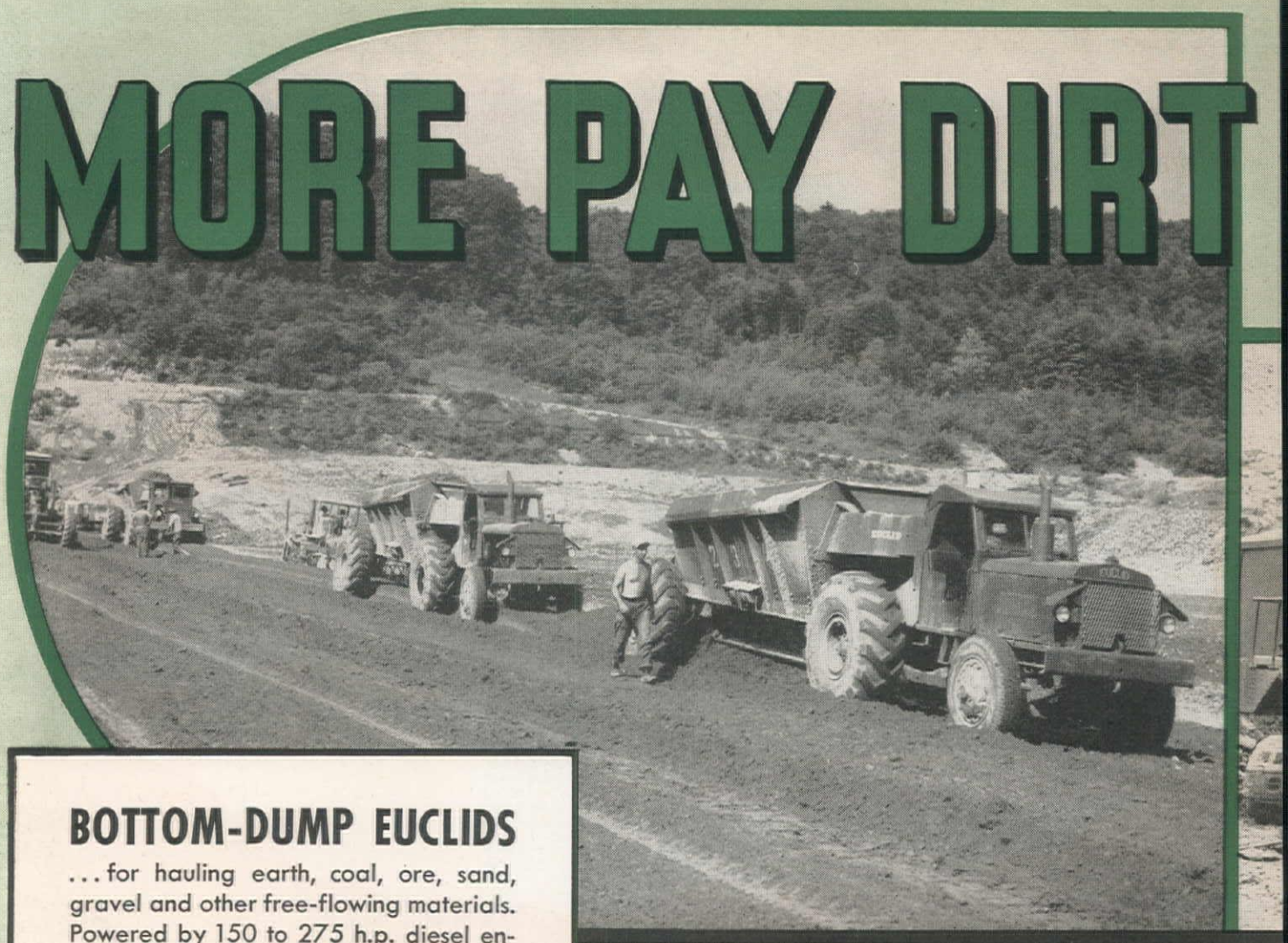
WESTERN MACHINERY COMPANY
760-762 Folsom Street
SAN FRANCISCO, CALIFORNIA

WESTERN CONSTRUCTION EQUIPMENT CO.
505 N. 24th Street
BILLINGS, MONTANA

218 W. Pine Street
MISSOULA, MONTANA

INDUSTRIAL EQUIPMENT COMPANY OF ARIZONA
720 S. 19th Avenue
PHOENIX, ARIZONA

MORE PAY DIRT



BOTTOM-DUMP EUCLIDS

. . . for hauling earth, coal, ore, sand, gravel and other free-flowing materials. Powered by 150 to 275 h.p. diesel engines . . . top speeds loaded up to 32.6 m.p.h. . . . capacities of 13 to 50 cu. yds. — 20 to 40 ton payloads . . . fast, clean dumping . . . easy handling . . . large tires and excellent weight distribution for good traction and flotation . . . double reduction, planetary type drive axle.

Euclid earth moving equipment is engineered and built to move more dirt at lowest cost. Simple but rugged construction, combined with speed and economy of operation, result in more pay dirt and more profit.

Easy loading . . . large capacity . . . a wide range of usefulness . . . speed on the haul road and dump . . . long life in heavy duty service . . . these are but a few of the Euclid features that cut hauling costs. More yards moved more profitably and more pay in every payload—that's the Euclid story.

Don't Pass up the Opportunity to see the many new EUCLID Developments at the

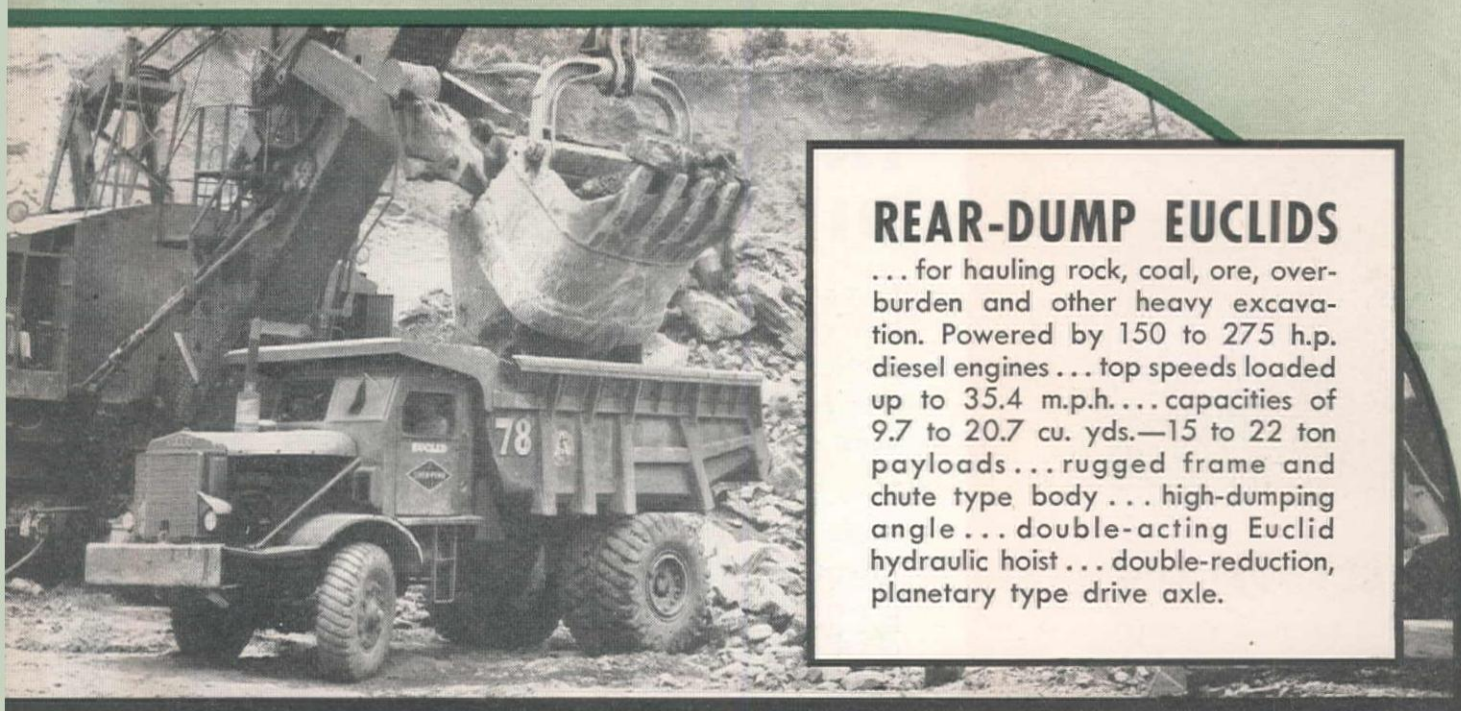
CHICAGO ROAD SHOW

JULY 16-24

EUCLID
THE PIONEER

EUCLIDS

Means MORE PROFIT



REAR-DUMP EUCLIDS

... for hauling rock, coal, ore, overburden and other heavy excavation. Powered by 150 to 275 h.p. diesel engines ... top speeds loaded up to 35.4 m.p.h. ... capacities of 9.7 to 20.7 cu. yds.—15 to 22 ton payloads ... rugged frame and chute type body ... high-dumping angle ... double-acting Euclid hydraulic hoist ... double-reduction, planetary type drive axle.



EUCLID LOADER

... for fast mobile loading of large capacity hauling units. Powered by 150 or 190 h.p. diesel engine mounted in rear. Loads practically any material in short travel distance ... all loader operations controlled by tractor operator ... three handy control levers start and stop belt and adjust cutting blade for angle and depth of cut ... maximum cutting depth 24" ... grading cuts can be made up to 9'6" in width.

Ask your Euclid distributor or representative to show you how you can do a wider range of jobs with Euclids at less cost per ton or yard moved.

The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohio

Move the Earth

Announcing

INCREASED POWER







INTERNATIONAL DIESEL CRAWLERS

Increased-horsepower engines now give these heavy-duty Diesel crawlers new power and performance values. Smoother, cooler operation and greater lugging ability step up their work capacity to a new high!

New illustrated folders, in color, describing these tractors are now available. Write to International Harvester for *Form No. A-92-LL* describing the TD-14 or if you want the facts on the International TD-18 ask for *Form No. A-93-LL.*

The 4-cylinder TD-14 now provides 57 drawbar horsepower at 1400 r.p.m.

The 6-cylinder TD-18 delivers 80½ drawbar horsepower at 1300 r.p.m.

Now is the time to see your International Industrial Power Distributor for your tractor, power unit and equipment needs. More and more, each year, you will find it *good business* to *standardize* on *International.*

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

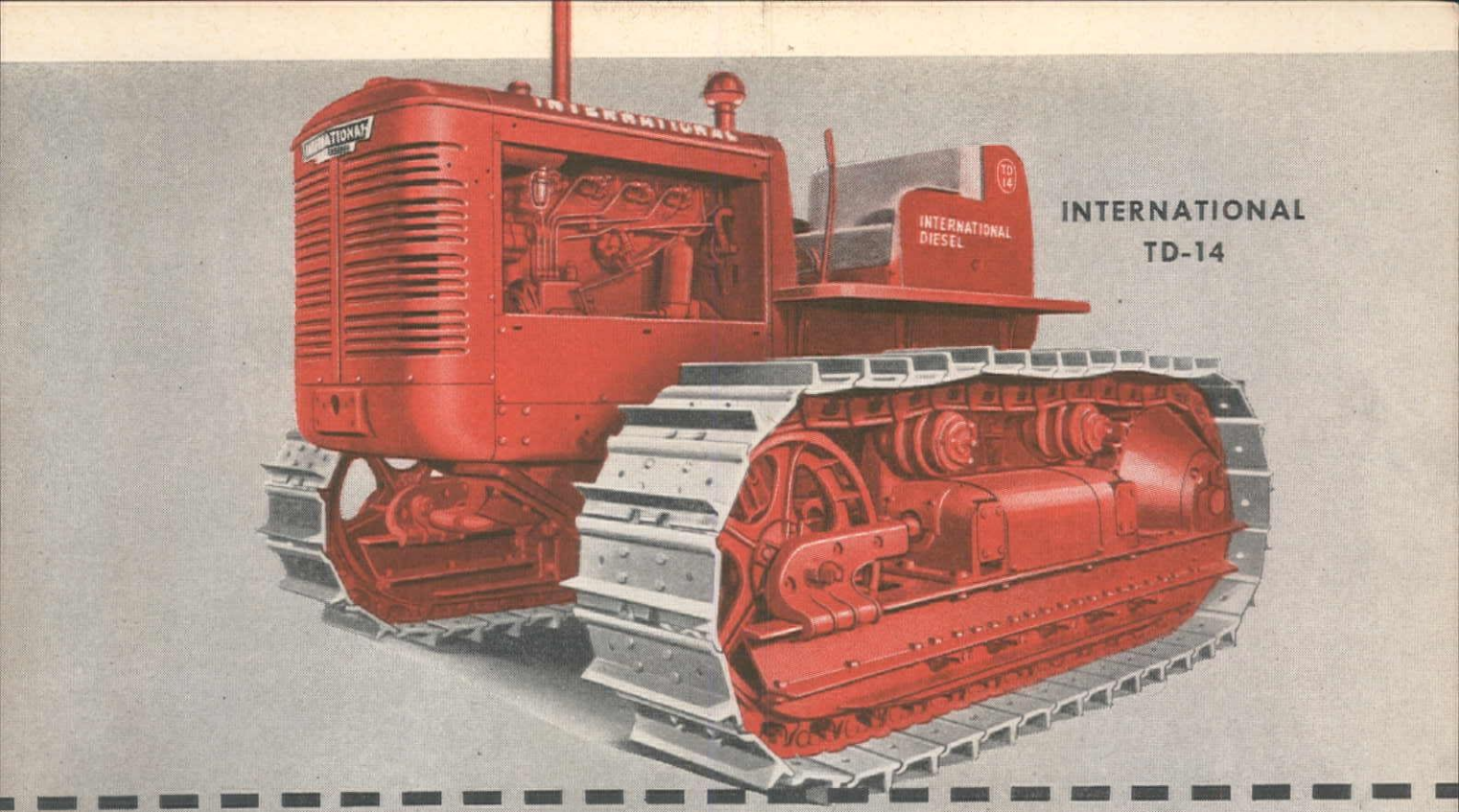
180 North Michigan Avenue • Chicago 1, Illinois

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

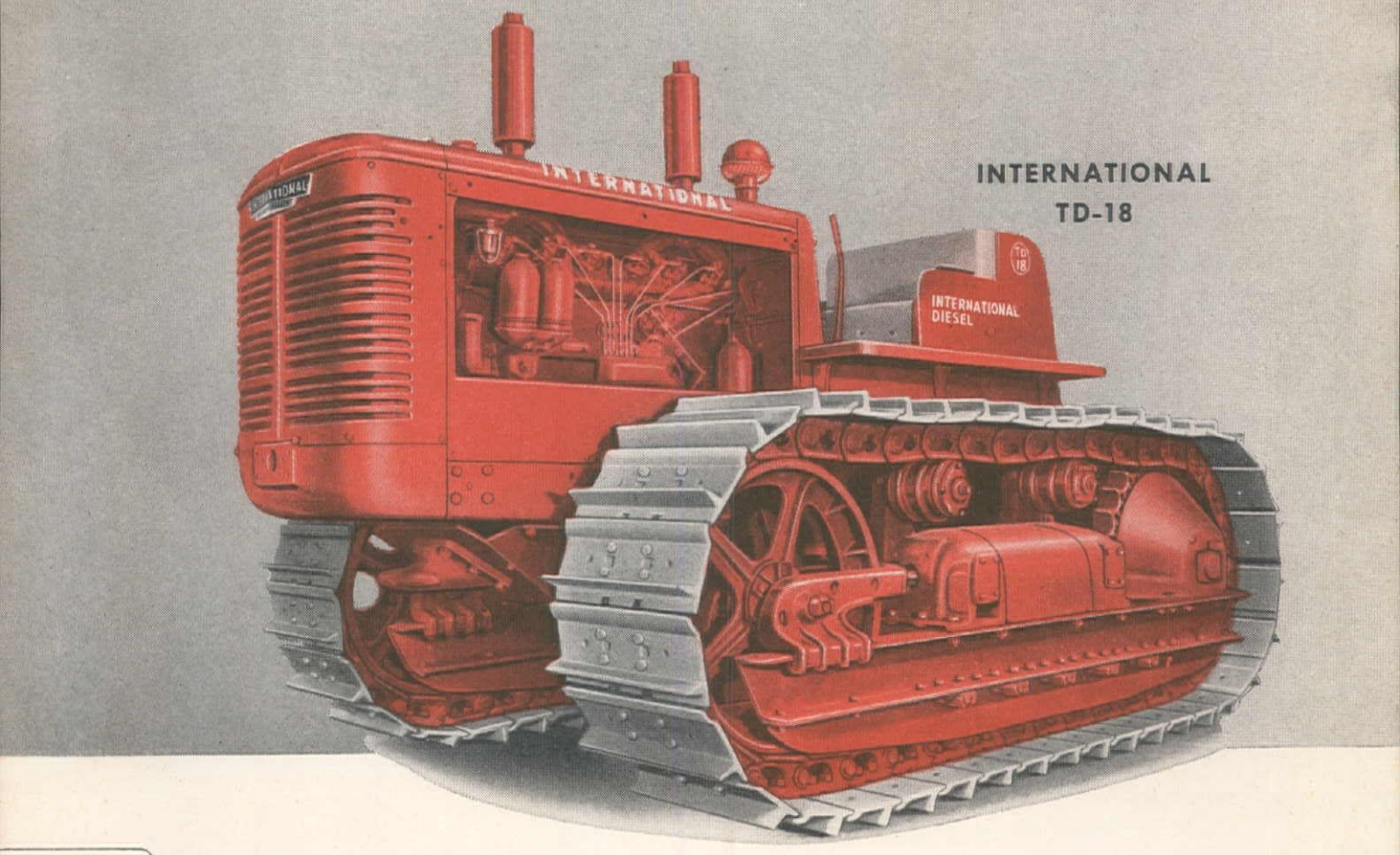
INTERNATIONAL







INTERNATIONAL
TD-14



INTERNATIONAL
TD-18

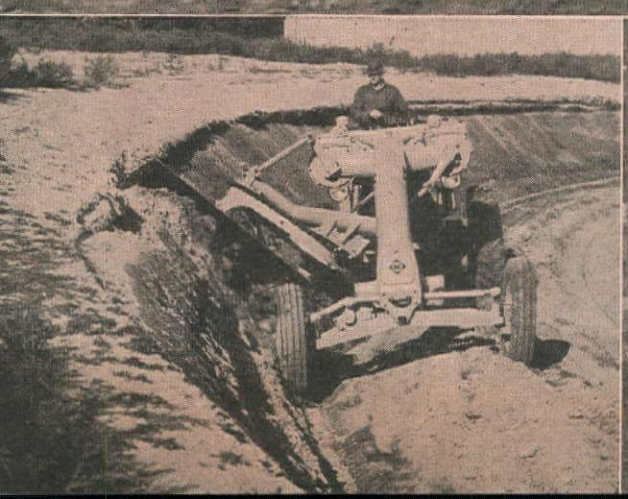
INTERNATIONAL HARVESTER

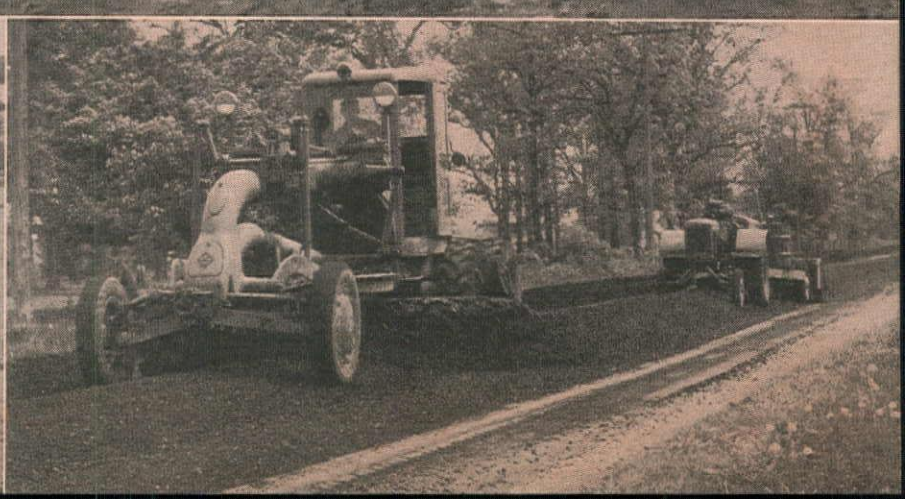
Industrial Power





MORE





WORK-POWER

With owners and operators, it's Performance that Counts! The capacity of a Motor Grader is measured by the work it accomplishes.

Here's why the Allis-Chalmers A-D Motor Grader more than meets their requirements:

TRAVEL SPEEDS smoothly synchronized with OPERATOR CONTROLS . . . All the needed power applied as required.

BIG WORKING CLEARANCE. More than 30" throat clearance for handling bigger windrows without interference.

"ROLL-AWAY" MOLDBOARD. Requires less power to handle bigger loads at faster speeds. Material is *rolled,* not pushed.

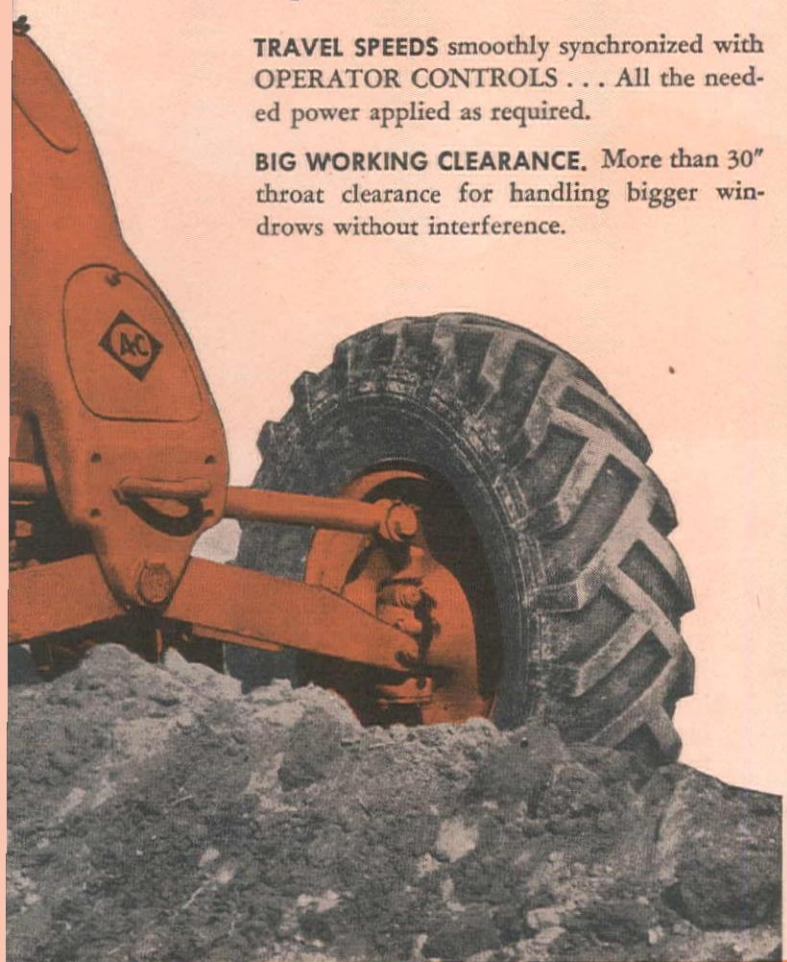
21,500 LBS. EFFECTIVE WEIGHT. Balanced for maximum traction and control.

FULL CIRCLE REVOLVING BLADE. Swings *ahead* of platform with plenty of end clearance.

EXCLUSIVE TUBULAR FRAME. Strong, shock-absorbing, protects control rods inside frame.

ELECTRIC BRAKES. Control positive, operate with less effort than auto brakes.

FAMOUS GENERAL MOTORS 2-CYCLE DIESEL POWER. Dependable, economical, instant-starting.



2 SIZES

MODEL A-D3 . . . . 76 BRAKE H.P.

MODEL A-D4 . . . . 104 BRAKE H.P.

FREEDOM IS EVERYBODY'S JOB!

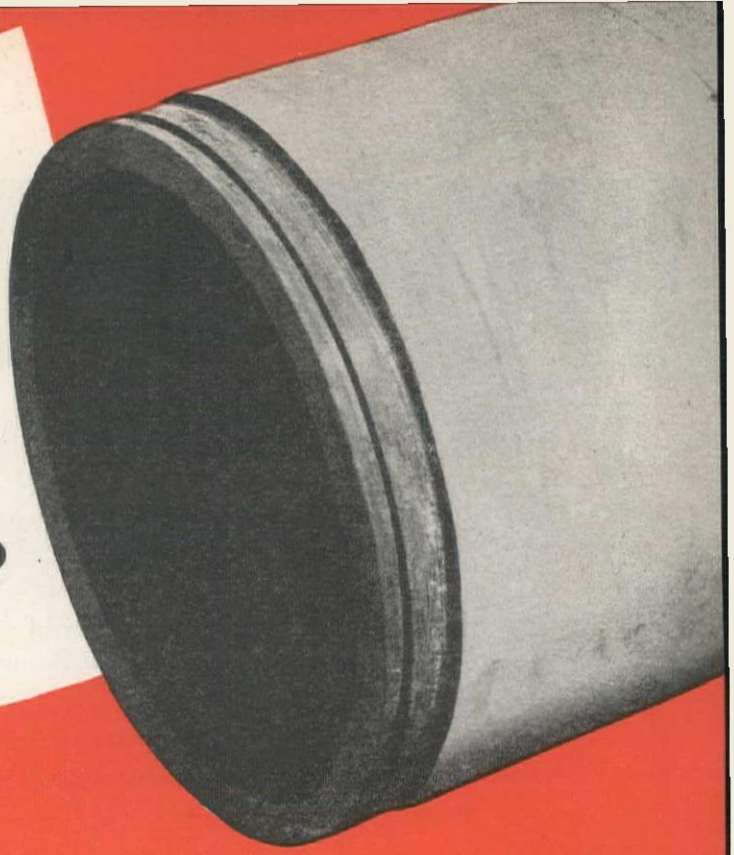
ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

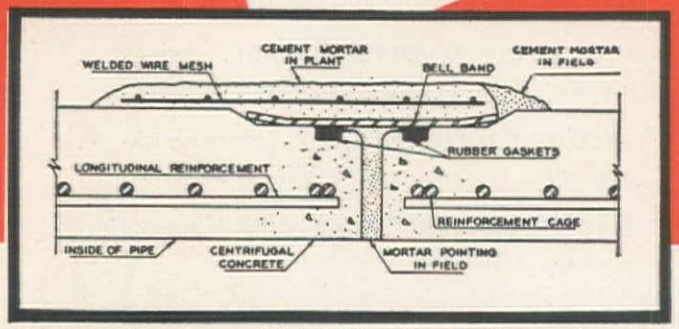




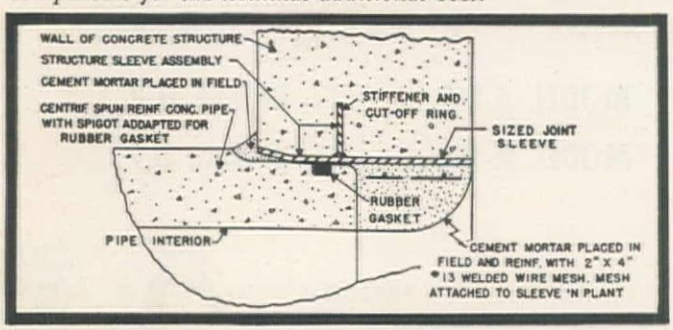
Solution for many Pipeline Closure Problems



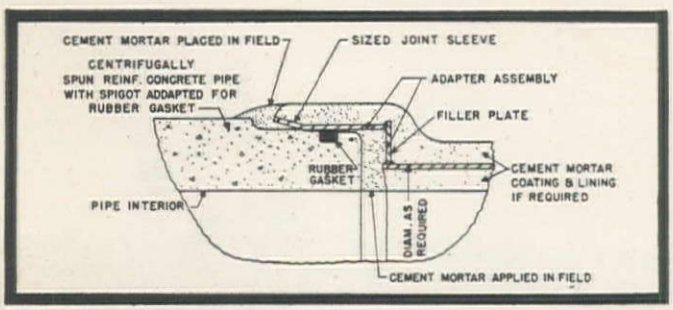
The Double Rubber Gasket Joint for centrifugally spun reinforced concrete pressure pipe is simple, flexible, adaptable. This view of the rubber gasket groove in the spigot end of the pipe illustrates the exacting workmanship involved in its manufacture.



Cross section of completed field joint. Rubber gaskets are compressed into spigot grooves by accurately-sized steel bell band. In reality a bell and spigot rubber sealed joint, it often enables installation savings which alone more than compensate for the nominal additional cost.



Typical connection to a concrete structure—illustrating easy placement with ample flexibility for security against reasonable conditions of expansion, contraction or earth settlement.



Typical connection to a fabricated steel fitting—an example of adaptability to many different situations.

A proven refinement of an already outstanding product . . . developed by American

The advantages of centrifugally spun reinforced concrete pressure pipe for moderate operating heads (generally under 150′) have become well established in this country during the past twenty-five years. High initial and sustained carrying capacity, permanence, and economy are some of the proven characteristics of Hume Centrifugal Concrete Pressure Pipe.

In recent years, development by this company of the Double Rubber Gasket Joint for centrifugally spun pipe has greatly increased its versatility and adaptability. It is proving outstandingly successful in a wide variety of installations throughout the West.

This joint is another example of American's ingenuity and skill in the development of better products for water supply lines. Complete specifications and engineering drawings giving dimension tables are available to engineers upon request.

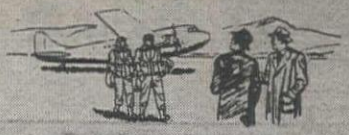
American PIPE AND CONSTRUCTION CO.

Concrete Pipe for Main Water Supply Lines, Storm and Sanitary Sewers, Subaqueous Pipe Lines

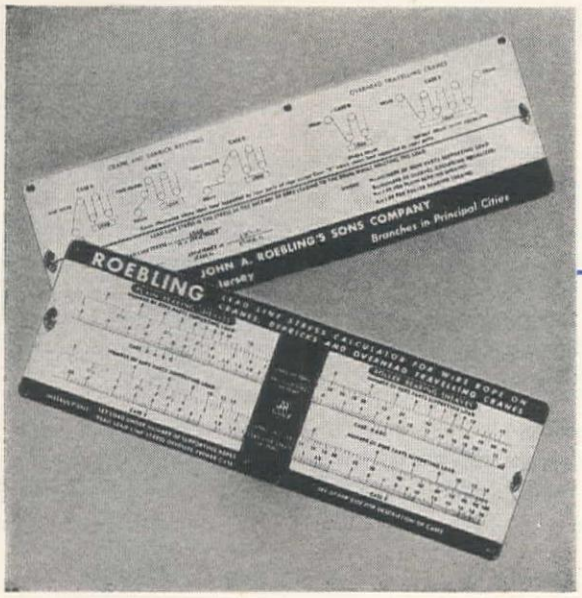
P. O. Box 3428, Terminal Annex, Los Angeles 54, California
District Offices and Plants — Oakland, San Diego, Portland, Oregon

Specializing in the manufacture and installation of American Concrete Cylinder Pipe, Lock-Joint Concrete Cylinder Pipe, Pre-stressed Lock-Joint Concrete Cylinder Pipe, Hume Centrifugal Concrete Pressure Pipe.

Confidence- WITH ITS SLEEVES ROLLED UP!







YEAR BY YEAR, planes grow bigger . . . faster and safer. Man has unbounded confidence in his ability to build better and better planes. Never satisfied, he experiments and tests tirelessly, and aviation progresses.

With similar vision and confidence, Roebling has been pacemaker in the development and manufacture of products essential to the transportation and other industries. The active, widespread confidence it has won among technical men and operators throughout industry is Roebling's proudest asset. Look to Roebling for continued leadership . . . continual improvement in its products and engineering . . . continual progress.

WHAT SIZE OF ROPE? HERE'S YOUR ANSWER—FREE

DATA used by Roebling engineers themselves are embodied in this unique "slide rule". It's the Roebling Lead Line Stress Calculator for wire rope . . . tells you in a moment the safe and economical size of rope for every load . . . gives the right answer for all types of crane, derrick, and overhead traveling crane installations.

Here's information you can accept and act upon with complete confidence . . . just as you can specify Roebling "Blue Center" Steel Wire Rope for unsurpassed toughness, dependable reserve strength and the reduction of costly replacement shut-downs. Roebling was America's first wire rope maker, and "Blue Center" Steel Wire Rope is the finest that Roebling knows how to make.

Write for a Roebling Lead Line Stress Calculator — it's free. And let your Roebling Field Man tell you about installation and maintenance practices that prolong wire rope life. Call him at your nearest Roebling branch office.

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA

San Francisco Los Angeles Seattle Portland

A CENTURY OF CONFIDENCE ROEBLING

JAR ROEBLING

★ *WIRE ROPE AND STRAND* ★ *FITTINGS* ★ *SLINGS* ★ *SUSPENSION BRIDGES AND CABLES* ★ *AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS* ★ *AERIAL WIRE ROPE SYSTEMS* ★ *ELECTRICAL WIRE AND CABLE* ★ *SKI LIFTS* ★ *HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL* ★ *SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH* ★ *LAWN MOWERS*

JAEGER ENGINEERED for

Steady 90-100 lbs. pressure, in up to 70% larger air receivers, means full production from air tools.

more air is THERE

more air is THERE



2 heavy duty wagon drills, under the full pressure of 600 cu. ft. of air per minute from a Jaeger Model 600, drill 20% to 30% more daily footage than you can get with any 500 ft. compressor.

Companies that watch their costs are using Jaeger "AIR PLUS" Compressors in all sizes from 60 to 600 cfm — for faster production, for the economy of Jaeger's "Fuel Miser" speed control, for the simple, rugged Jaeger design that requires less attention on the job and minimum expense of upkeep.

On thousands of jobs, contractors are finding that they get faster production with a Jaeger "AIR PLUS" than with other compressors *of the same rated capacity.*

That's because Jaeger engineers designed to give you steadier air pressure, with a high efficiency compressor and fuel tank recessed to make room for a much larger air receiver.

Steady full pressure means top-speed operation of your drills — faster, full-powered blows with pavement breakers, spades and tampers — more production per tool and handler every hour they work.

Jaeger insures you against "down time", too. "AIR PLUS" Compressors are built to the same precision as their engines. Their parts, power plants and performance are individually tested in a $250,000 laboratory. And leading distributors in 130 cities throughout the U. S. and Canada provide on-the-spot service wherever your jobs may be.

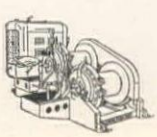
"SURE PRIME" PUMPS
1½" to 10" sizes



"SPEEDLINE" MIXERS
3½S to 16S trailers



2-SPEED "HYDRO-HOISTS"
25 to 100 h.p., 1 to 3 drums



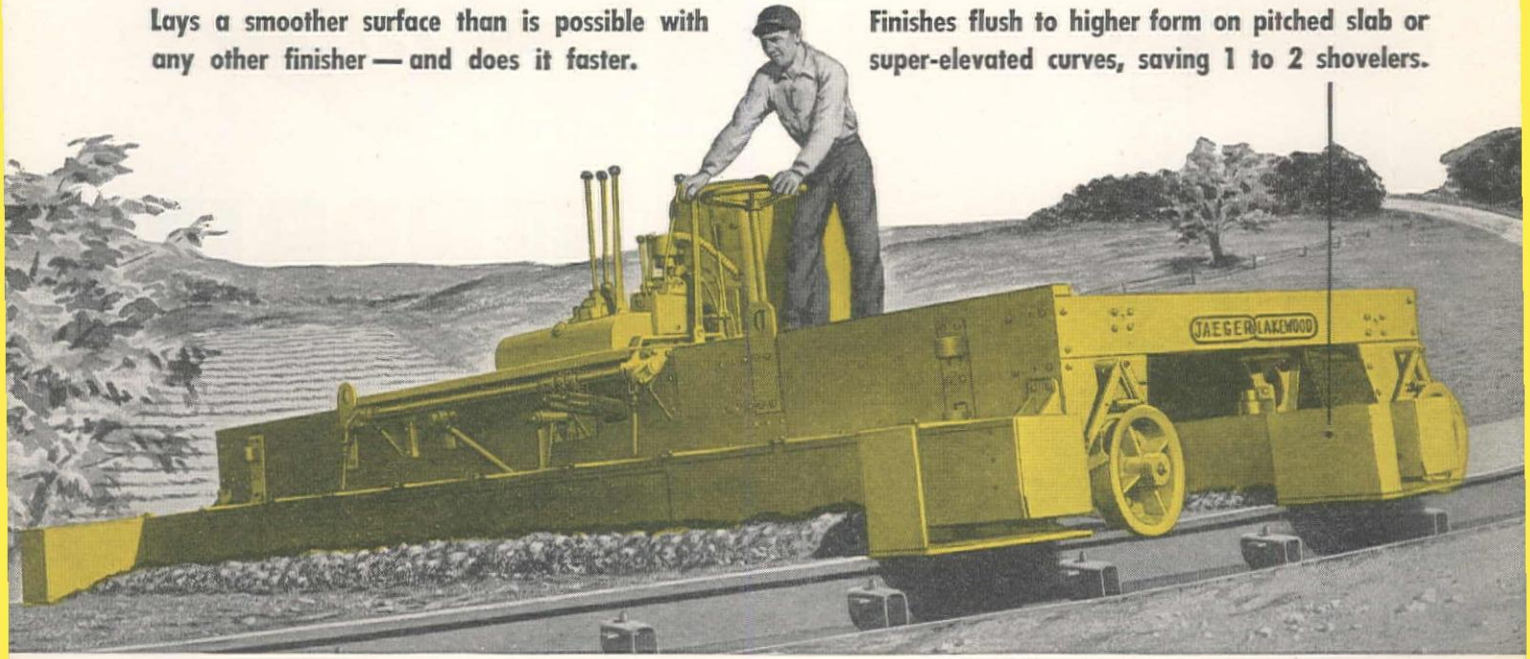
BITUMINOUS PAVERS
Latest type with quick 8-12½ ft. adjustability

labor-saving mass production

DIAGONAL SCREED FINISHING — the modern method behind mass-production pavers

Lays a smoother surface than is possible with any other finisher — and does it faster.

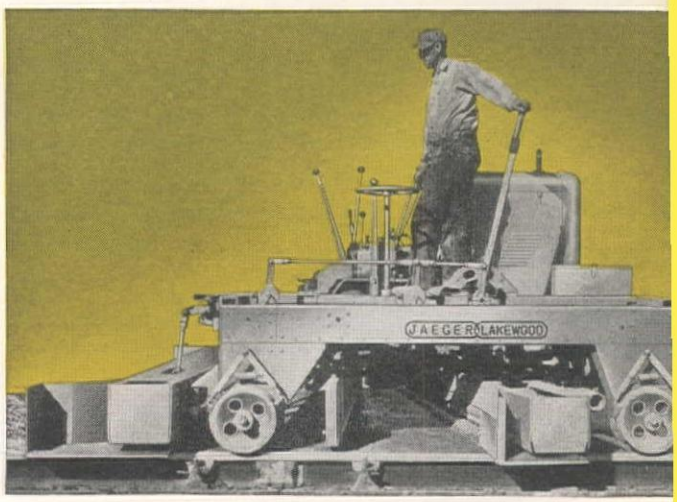
Finishes flush to higher form on pitched slab or super-elevated curves, saving 1 to 2 shovelers.



The Type "X" Diagonal Screed Finisher, designed and patented by Jaeger, provides a basic improvement in finishing concrete pavements.

Where slab is pitched or super-elevated, you simply set the rear screed at whatever angle is needed to carry material uphill and compact it solidly against the higher form. No other finisher can do this.

Because the rear screed operates diagonally to the transverse front screed, it acts to average out irregularities left by the front screed, insuring a smoother surface and reducing hand work and equipment behind the finisher. Stiff mixes, worked at an angle by the final screed, can be finished faster without tearing. A wide range of screed speeds, *all independent of traction*, provides flexibility and finishing capacity to match the biggest dual drum pavers built today.

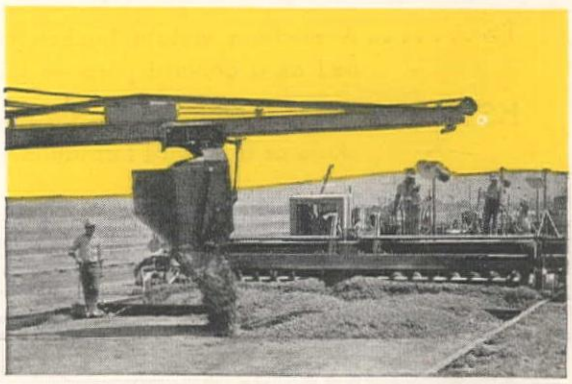


Re-mixing, compacting spreader gives you a mass-production "team"

Important new improvements in Jaeger 1948 model Concrete Spreaders provide capacity and flexibility never before available to work with the Type "X" Diagonal Screed Finisher. One Spreader and one Finisher operator can spread, strike-off and smoothly finish the enormous output of two 34E dual drum pavers. Makes today's road builder an efficient mass-producer of square yards of pavement, at lower and more accurately pre-determined cost per yard.

No other spreading method provides the re-mixing and compacting action of the Jaeger spreading screw which positively eliminates segregation and resulting honeycomb and produces a denser, more uniform pavement as proved by numerous core tests.

Wide, oscillating strike-off can be furnished if desired, for striking off concrete or for spreading and finishing bituminous material.



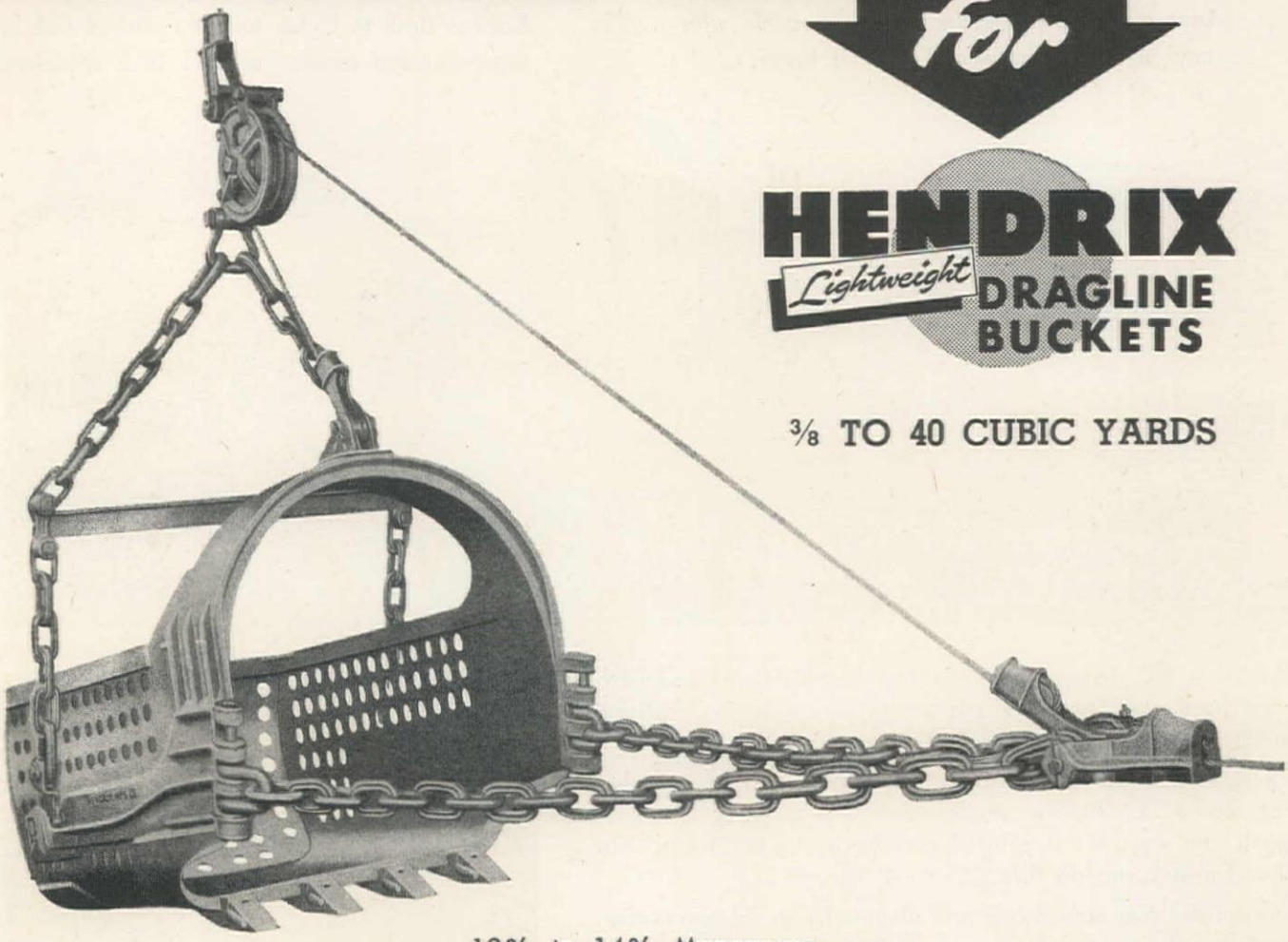
Sold, Rented and Serviced by

EDWARD R. BACON CO. ..... San Francisco 10, Calif.
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NO JOB TOO SMALL
NO JOB TOO LARGE
for

HENDRIX
Lightweight DRAGLINE BUCKETS

3/8 TO 40 CUBIC YARDS



10% to 14% Manganese
Chains and fittings are standard
on all types and sizes.

3 TYPES DESIGNED FOR EVERY DIGGING CONDITION

LS ..... A lighter weight bucket designed for levee and drainage work.

TS ..... A medium weight bucket, classified as a general purpose bucket.

HS ..... A heavy duty bucket for moving shale or any hard formation.

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durablity.
- ★ Manganese Steel Chains, Fittings, and Reversible Tooth Points.
- ★ Full Pay Load every trip, even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.

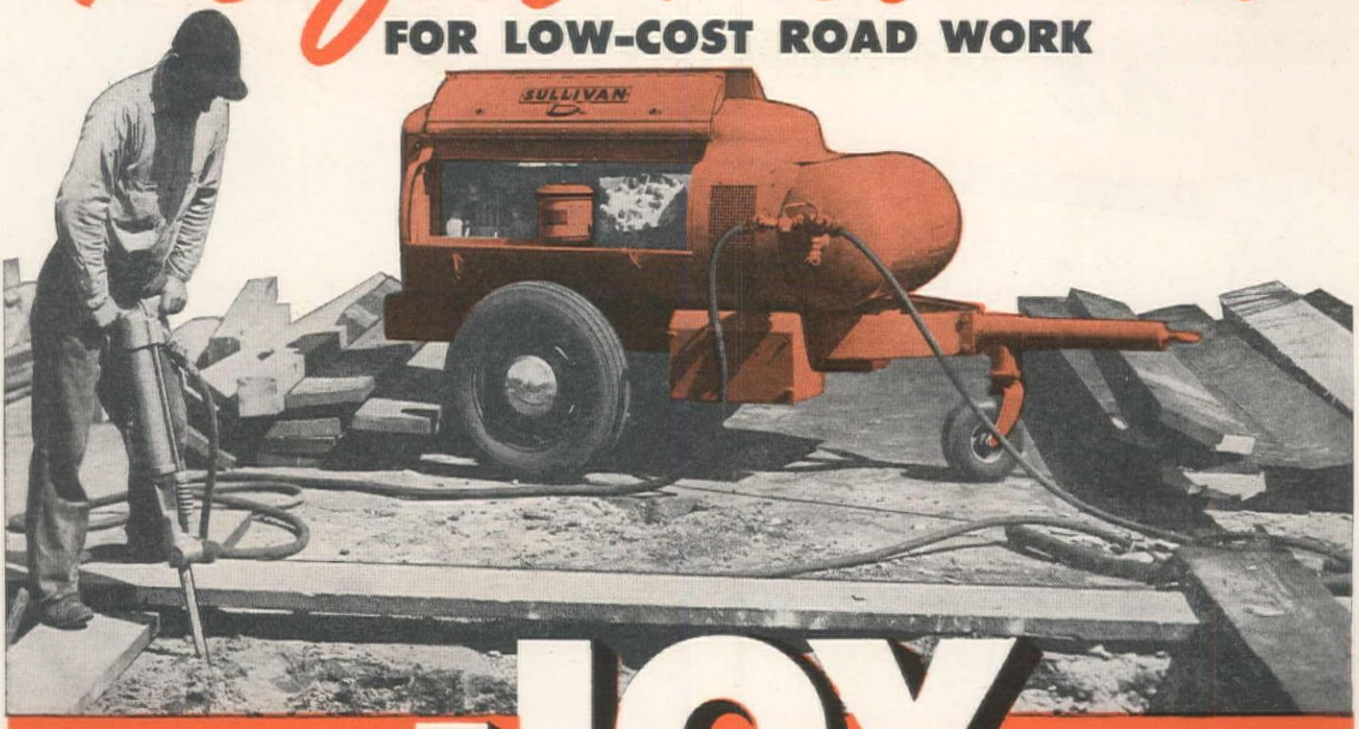
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WRITE FOR DESCRIPTIVE LITERATURE OR ASK YOUR DEALER

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA

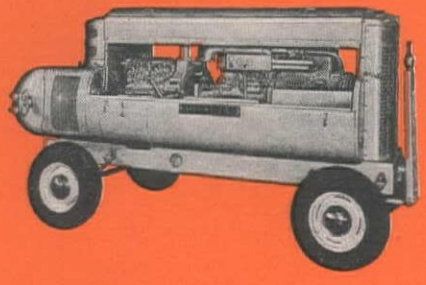
Perfect Partners

FOR LOW-COST ROAD WORK



JOY

DIESEL DRIVEN
630 c. f. m.



SERIES 80 AIR COMPRESSORS
from 68 to 630 c. f. m.

Two stage, air cooled compressed air plants—gasoline or diesel driven—with size and weight kept to a minimum to make them really portable, yet delivering air more efficiently than ever before.

Econo-Miser Load Control regulates air supply to meet the demand of the job.



Consult a Joy Engineer or write for bulletins



JOY SILVER STREAK
Cadmium Plated Rock Drills

Cadmium plating not only protects your Sullivan drills from rusting, but, the lubricating properties of cadmium prevents scoring should lubrication temporarily fail.

W&D C1308

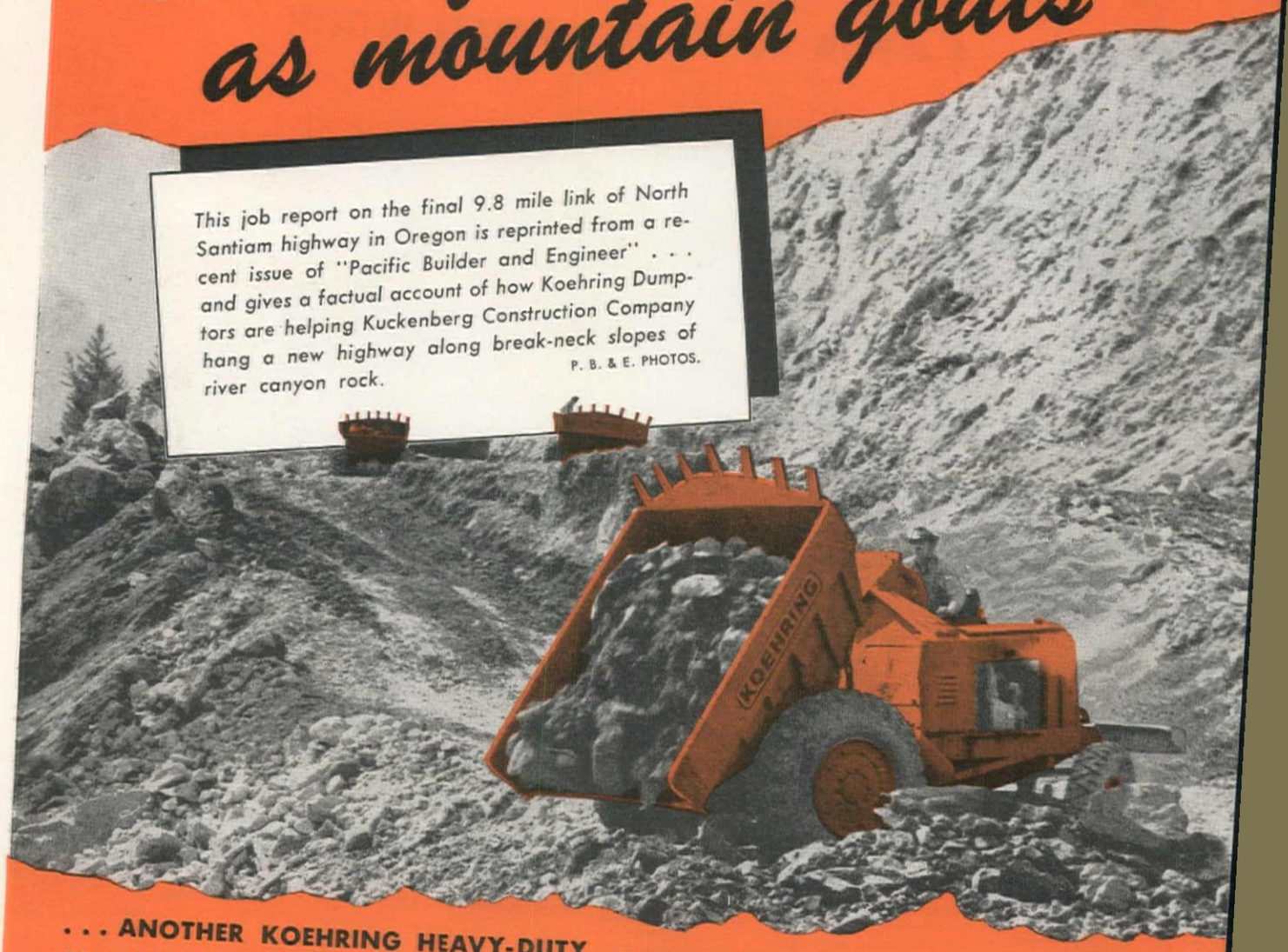
SULLIVAN DIVISION
JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

"Sure-footed... as mountain goats"

This job report on the final 9.8 mile link of North Santiam highway in Oregon is reprinted from a recent issue of "Pacific Builder and Engineer" . . . and gives a factual account of how Koehring Dumptors are helping Kuckenberg Construction Company hang a new highway along break-neck slopes of river canyon rock.

P. B. & E. PHOTOS.



. . . ANOTHER KOEHRING HEAVY-DUTY PERFORMER FOR TOUGH ROCK JOBS . . .

For balanced, high-production teamwork on both your excavating and hauling operations, team up Dumptors with the Koehring heavy-duty 605 Rock Shovel. Its fast operating speeds . . . big 1½-yard dipper capacity . . . rugged, extra-strong boom, with shock-absorber mount . . . and big power-operated clutches, all keep production high, costs low. Other Koehring heavy-duty excavators also available in the ½-yard and ¾-yard sizes.



KOEHRING HEAVY DUTY

Pacific Hoist & Derrick Co.
Seattle, Wash.
Western Machinery Co.
Spokane, Wash.
Columbia Equipment Co.
Portland, Ore.; Boise, Idaho

Harron, Rickard & McCone Co.
of Southern Calif., Los Angeles, Calif.
Kimball Equip. Co., Salt Lake City, Utah
McKelvy Mach. Co., Denver, Colo.
Moore Equip. Co., Stockton, Calif.

Bay Cities Equip., Inc.
Oakland, Calif.
The Harry Cornelius Co.
Albuquerque, N. M.
Neil B. McGinnis Co.
Phoenix, Arizona

9 DUMPTORS shuttle along break-neck slopes...help haul over 1,000,000 cu. yds. rock for KUCKENBERG Construction Co.

Probably the toughest construction job in the Pacific Northwest is the new North Santiam highway in Oregon. On approximately 10 miles through mountainous terrain, more than a million cubic yards of rock will be excavated by shovels, loading to a fleet of Koehring Dumptors. An overhaul of more than 15,000,000 station yards along precipitous mountain haul roads is involved.

"There are fills in the 250,000 c.y. class . . . cuts average 50,000 and 60,000 c.y., with some up to 100,000 c.y. — all in rock. From top of one cut to bottom of adjoining fill is a vertical distance of 600'! Hill Lind, veteran Kuckenberg superintendent, says it's the toughest job he's seen in the Pacific Northwest.

Close-Hitched Dumptors Prove Maneuverability

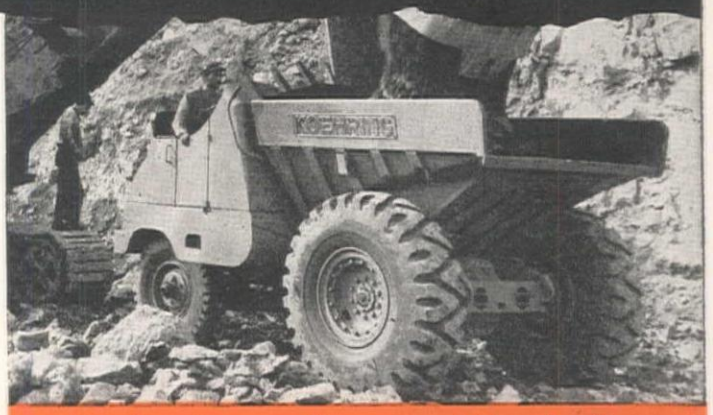
"Real darlings of the fill foreman are the nine 6-yd. Koehring Dumptors. These fast-moving Dumptors shuttle along the precipitous and narrow haul roads from cut to fill, sure-footed as mountain goats. The large rear wheels give remarkable traction in deep, slippery ruts. Because of limited possibilities for maneuvering, the Dumptors were great time-savers, traveling in reverse as fast as in forward gear.

Three Dumptors Haul 434 Loads in 8 Hours

"Speed of unloading is truly amazing, with the drivers spotting the load, dumping and shifting into the return trip all in an instant. Production figures vary greatly on this type of job, but among the better shifts three Dumptors hauled 434 loads in 8 hours.

"Koehring Dumptors proved to be the perfect hauling units for this rugged, mountainside construction."

This job-proved ability to meet the tests of toughest materials and hauling conditions is the reason why scores of leading contractors, like Kuckenberg Construction Company, use Koehring heavy-duty Dumptors. It will pay you to let your Koehring distributor show you how Dumptors cut costs, speed production on your off-highway hauling. See him TODAY.



"Steel teeth protruding upward from loading edge of the Dumptor body provide protection from spilling rock for the driver, and afford better visibiity for the shovel operator in loading."

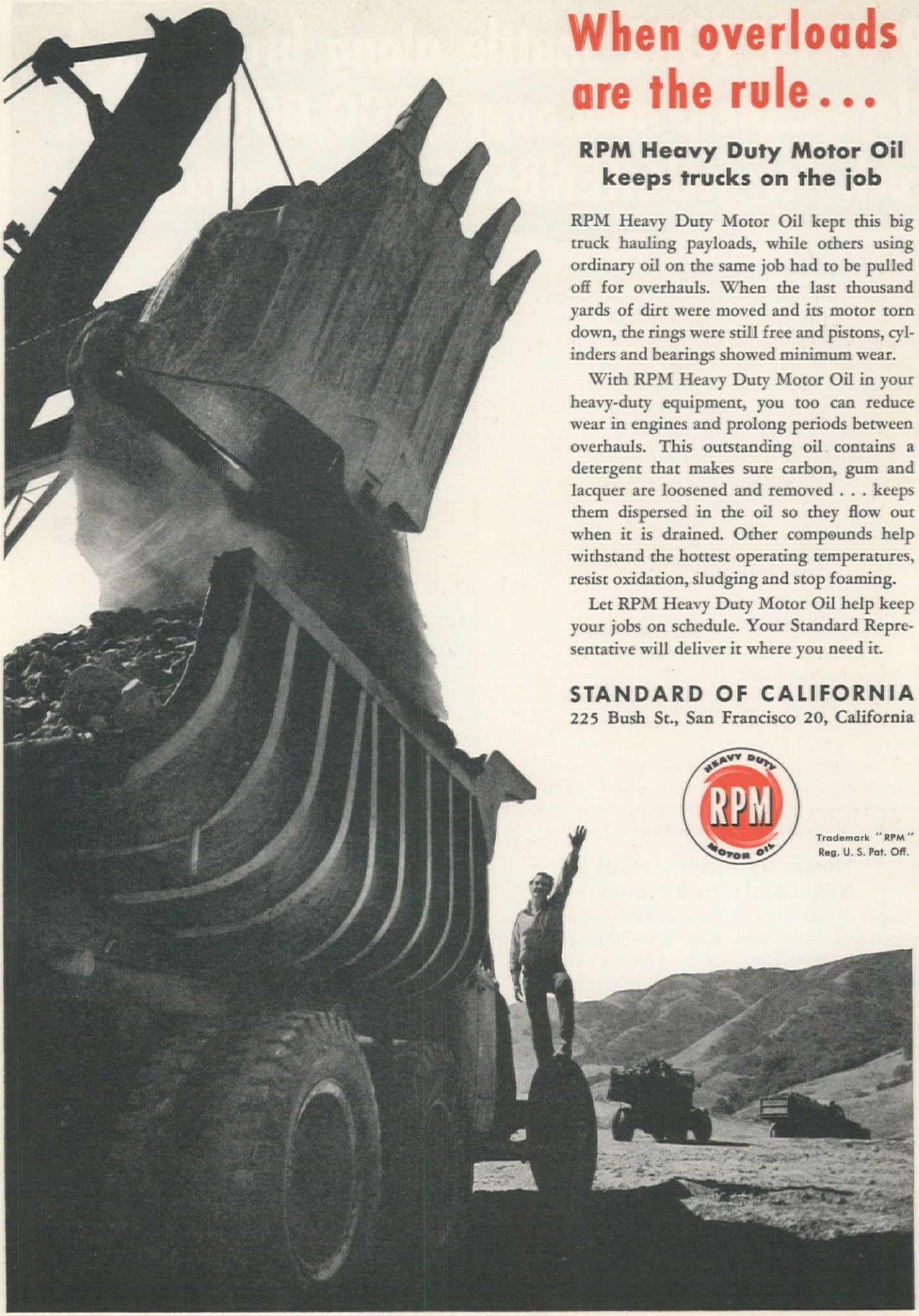


"The Dumptors race backward and forward at equal speed . . . prove to be great time-savers. Air cushions soften the drivers' seats for rough going on the narrow mountainside haul roads."



"Dumping in characteristic, fast operation . . . hitting the spot, dumping and pulling away . . . all in an instant. Steel cake (kick-out) pan breaks suction . . . keeps mud from sticking."

Dumptor — Trademark Reg. U. S. Pat. Off. K858.



When overloads are the rule...

RPM Heavy Duty Motor Oil keeps trucks on the job

RPM Heavy Duty Motor Oil kept this big truck hauling payloads, while others using ordinary oil on the same job had to be pulled off for overhauls. When the last thousand yards of dirt were moved and its motor torn down, the rings were still free and pistons, cylinders and bearings showed minimum wear.

With RPM Heavy Duty Motor Oil in your heavy-duty equipment, you too can reduce wear in engines and prolong periods between overhauls. This outstanding oil contains a detergent that makes sure carbon, gum and lacquer are loosened and removed . . . keeps them dispersed in the oil so they flow out when it is drained. Other compounds help withstand the hottest operating temperatures, resist oxidation, sludging and stop foaming.

Let RPM Heavy Duty Motor Oil help keep your jobs on schedule. Your Standard Representative will deliver it where you need it.

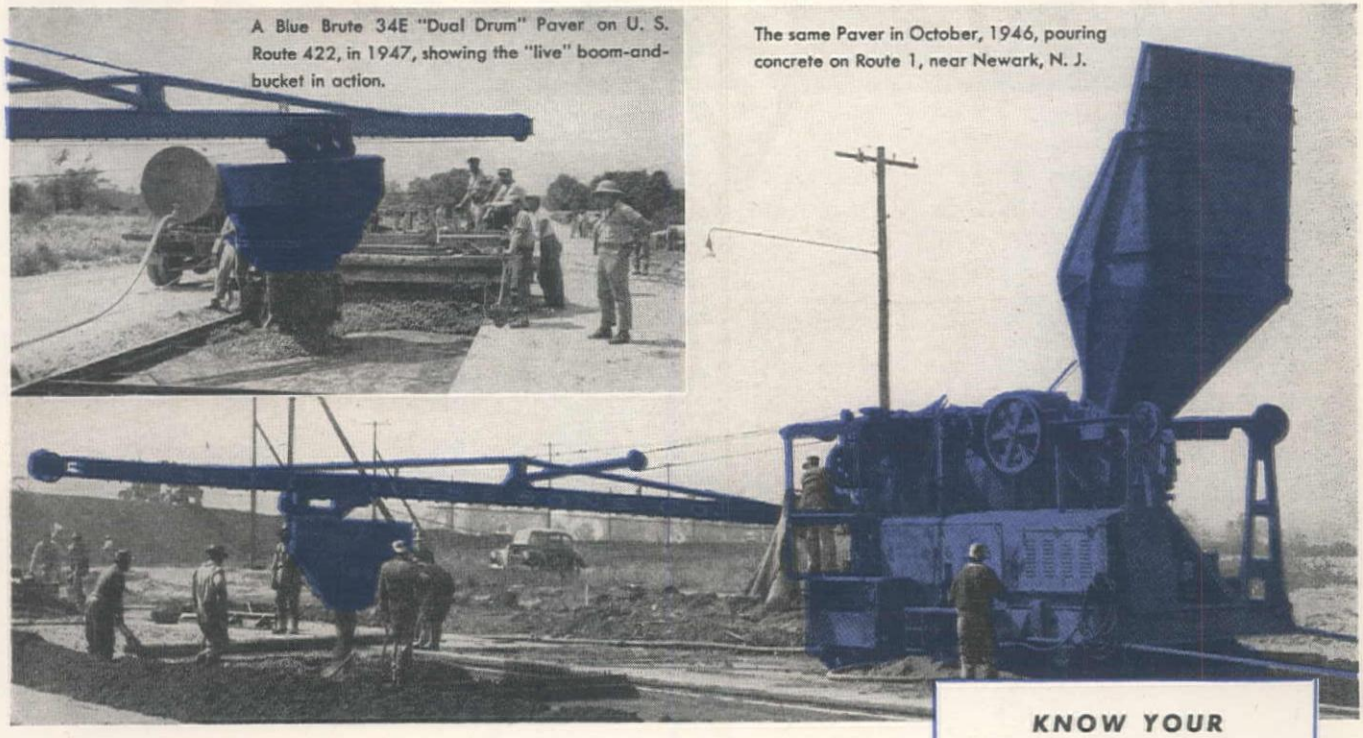
STANDARD OF CALIFORNIA
225 Bush St., San Francisco 20, California

HEAVY DUTY RPM MOTOR OIL

Trademark "RPM"
Reg. U. S. Pat. Off.

WHEN A BLUE BRUTE PAVER SET THE PACE...

A Blue Brute 34E "Dual Drum" Paver on U. S. Route 422, in 1947, showing the "live" boom-and-bucket in action.



The same Paver in October, 1946, pouring concrete on Route 1, near Newark, N. J.

No paving job moves faster than the pace set by its paver. That's why S. J. Groves & Sons Co. selected Ransome Blue Brute 34E Dual Drum Pavers for jobs where fast performance was a "must".

Speed counted on the new 3-lane U.S. 422 between New Castle, Pa., and Youngstown, Ohio, delayed by abnormally heavy rains and lack of skilled manpower. Here a Ransome Blue Brute 34E Dual Drum Paver set the remarkable pace of ½ mile per day. This was the very same Blue Brute, incidentally, that performed a rush job the year before on U. S. 1 near the Newark, N. J. Airport. Here, fast-growing traffic demanded a tremendous widening project in a hurry.

That's where the 34E's many advanced features proved themselves. For example: *the fool-proof, self-cleaning, fast-charging skip . . . mechanically operated batchmeter for all-weather accuracy . . . precision water-measuring . . . and the exclusive, hydraulically operated "live" boom-and-bucket combination that spreads as it swings, cutting down costly hand shovelling.*

Geared to the output of the Blue Brute Paver, these large-scale paving operations were carried out smoothly . . . economically . . . on time! And that's why a Ransome 34E, Single or Dual Drum, on your own construction jobs will lay more yardage . . . more accurately and with less manpower ...than any other paver. For full details, see your nearby Worthington-Ransome Distributor, or write for Bulletin 208.

R8-5

BUY BLUE BRUTES

KNOW YOUR

BLUE BRUTES

Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your jobs on a profitable basis.

RANSOME EQUIPMENT

Pavers, Portable and Stationary Mixers, Truck Mixers, Pneumatic Placing and Grouting Equipment and Accessories.

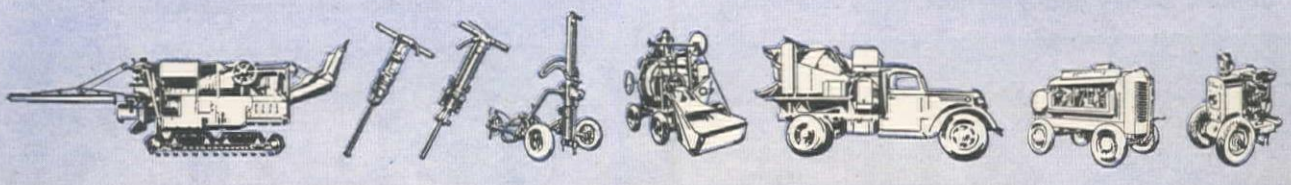
WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

WORTHINGTON

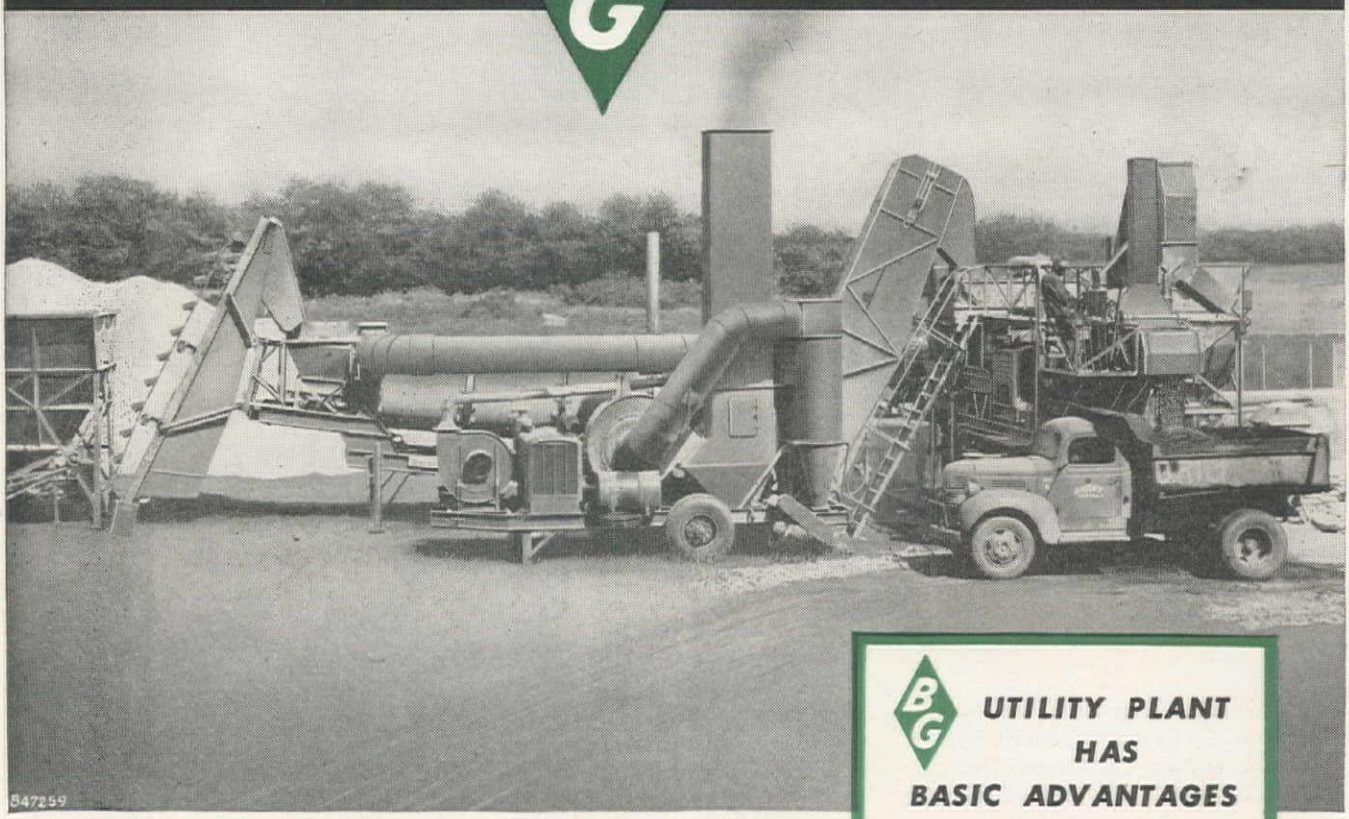
Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

Distributors in all principal cities



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

NEW BG UTILITY



Completely Portable Plant Has Capacity in 60 t. p. h. Range . . . . . Produces All Types of Mixes

Here is the industry's most advanced Bituminous Mixing Plant . . . completely portable, built for maximum simplicity in erection and operation, and precise control of measurement and proportioning of aggregate and bitumen. The new Utility Mixing Plant minimizes the time required for setting up or dismantling; its three basic units tow behind ordinary trucks or tractors—and it has the versatility to produce all types of mixes, including the highest types.

Many new basic improvements in design include the unique 845 Mixer with two-bin Gradation Control Unit combined on a single chassis. An auxiliary two-bin Gradation Unit is optional where three or four-aggregate mixes are required . . . you can get the exact plant your mix requires—with a capacity that meets the broadest range of your jobs. In every way the 845 Utility Plant climaxes years of achievement by Barber-Greene engineers in the development of Bituminous Mixing Equipment that makes the most of men, money and materials.

BG UTILITY PLANT HAS BASIC ADVANTAGES

- ★ *True portability*
- ★ *Faster erection—no cribbing necessary*
- ★ *Wide adaptability*
- ★ *Built-in Gradation Control*
- ★ *Built-in Elevators on Dryer and Mixer*
- ★ *High Discharge Dryer eliminates hot elevator pit*
- ★ *Two, three or four-bin aggregate gradation*
- ★ *Only two power units*
- ★ *Four-cyclone Dust Collector*
- ★ *Lowest maintenance cost per yard produced*
- ★ **Ask your Barber-Greene distributor or write for full information.**

Barber-Greene

AURORA, ILLINOIS

FOR SALE BY: Brown-Bevis Equipment Co., Los Angeles 11, California; Columbia Equipment Co., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; Wilson Equipment & Supply Co., Cheyenne, Wyoming, Casper, Wyoming; Contractors Equip. & Supply Co., Albuquer-

BITUMINOUS PLANT

NEW ALL-UNIT PORTABILITY! ... NEW EASE IN ERECTION!

BETTER ROADS FOR A BETTER WORLD

45th Annual Convention and Road Show
SOLDIER FIELD
CHICAGO
JULY 16-24, 1948



NEW PORTABLE 845 MIXER-GRADATION UNIT

. . . For precision volumetric measuring, proportioning and mixing of aggregate and bitumen.

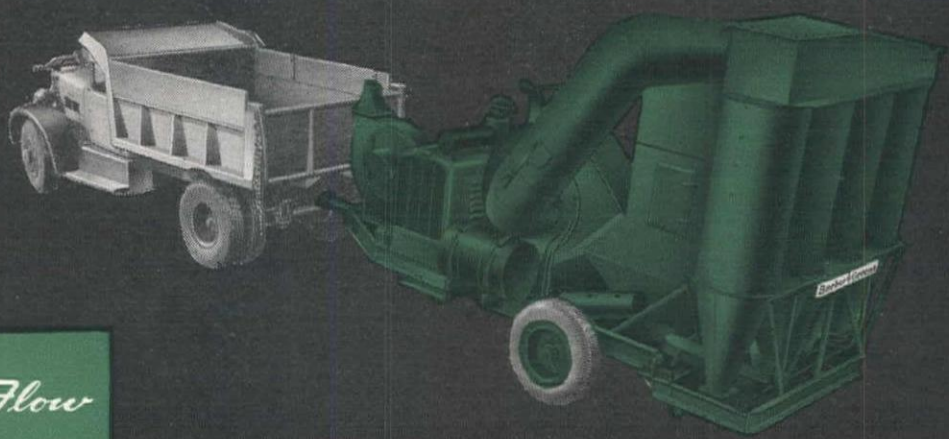


NEW PORTABLE 835 DRYER

. . . With built-in Reciprocating Feeder and High Discharge Elevator which eliminates the need for a hot elevator pit.

NEW PORTABLE 852 DUST COLLECTOR

. . . Four-cyclone type: contains power unit for Dryer, Cold Elevator, Feeder, Hot Elevator, Screens, Dust Collector, Exhaust Fan and Low-pressure Blower.



B G *Constant Flow Equipment*

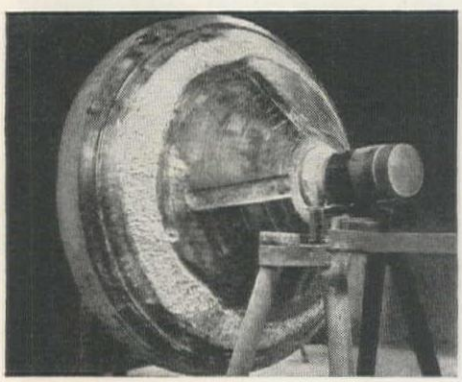
que, New Mexico; Ray Corson Machinery Co., Denver 9, Colorado; Jenison Machy. Co., San Francisco 7, California; Western Construction Equipment Co., Billings, Montana, Missoula, Montana; Kimball Equipment Co., Salt Lake City 10, Utah; State Tractor & Equipment Co., Phoenix, Arizona.



Replacement of this $1,400 ring gear would have taken from six months to a year. The badly worn teeth were built-up by bronze-welding and the gear returned to service in just a few days at half the cost of a new one.

Keeping the "wheels" going 'round

The repair of vast quantities of equipment by oxy-acetylene methods is of course routine for plant maintenance crews. It is for the special job, however, that the LINDE serviceman's supervision and work proves so valuable and gives assurance of success. This skilled, specialized assistance is always available to LINDE customers. Just phone the nearest LINDE office.



Bronze-welding this cast steel cone crusher head saved $1,000. The crack, which ran completely around the head for a distance of 9½ ft., extended through the thickness of the casting in several places. It was veed out by flame-gouging.



This cast iron steam hammer cylinder weighs 4,000 lb. Two large cracks, one on each side of the cylinder wall, were bronze-welded in only 14 hours. A new casting would have taken 16 weeks to obtain and would have cost more than 10 times as much.



Flanges are quickly joined to cast iron pipe sections by bronze-welding. LINDE supplies several bronze rods to meet varying service requirements.



Bronze-welding effected a considerable saving of cost and time when four spokes of this huge cast iron pulp-chipper wheel was cracked at the hub.

Linde

The word "Linde" is a registered trade-mark of The Linde Air Products Company.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto



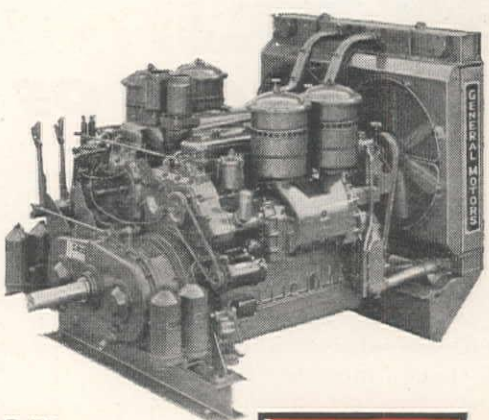
Marion 111-M 3½ cu. yard shovel strip mining for Yamulla Trucking and Excavating Company of Hazelton, Pennsylvania.

JUST CRAMMED WITH POWER

TAKE the case of the Marion 111-M 3½ cu. yard shovel. Here's equipment that calls for plenty of power fitted in a compact cab. This is where a General Motors "Twin" does a masterful job, because it makes available 330 husky, dependable horsepower.

Of course, the Yamulla Trucking and Excavating Company like their new shovel. The smooth electric swing, the snappy mechanical scoop, the economy of fuel and the dependability of its GM Diesels would please any shovel operator.

Discover what GM Diesel power can do for you as a prime mover or in fine contractor's equipment. Get the story from your local GM Diesel dealer or write direct to us.



DETROIT DIESEL ENGINE DIVISION

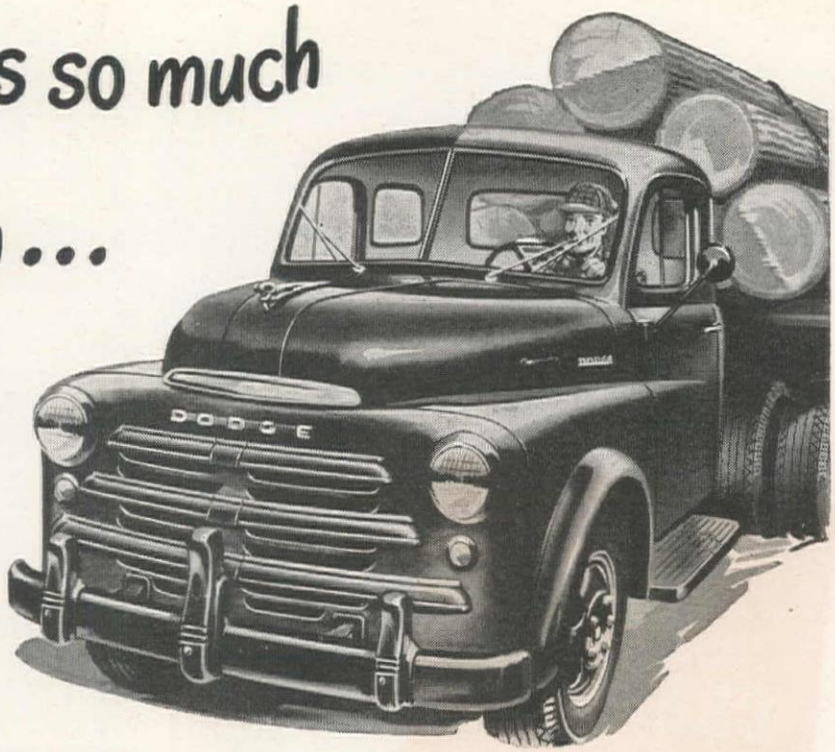
SINGLE ENGINES Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS.. Up to 800 H.P.

GENERAL MOTORS

GM
GENERAL MOTORS
DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

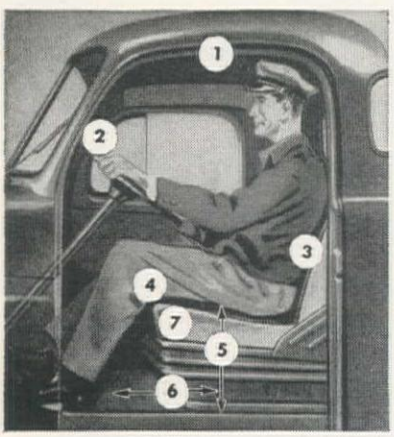
Only Dodge gives so much



VISION...

New Dodge "Pilot-House" cabs give you nearly 200 square inches more windshield area than other standard truck cabs! You get tremendously increased vision . . . in *all* directions. Windshields and windows are higher and wider. Available are new rear quarter windows that add still more to vision, and to safety . . . and vent wings on the door windows for controlled ventilation.

COMFORT...



Comfort? Riding is believing! New and *better* weight distribution, wider tread axles and longer springs give a marvelous new "cushioned ride." "Air-O-Ride" seats give the kind of seat cushion you want—"soft," "medium," or "firm," controlled by a convenient lever. Seven full inches of seat adjustment provide exactly the right legroom. *All-season* comfort is yours, too, with "All-Weather Ventilation," an ingenious combination of truck heater, defroster vents, vent wings, and fresh air intake.

1 **PLENTY OF HEADROOM**

2 **STEERING WHEEL** right in the driver's lap.

3 **NATURAL BACK SUPPORT** . . . adjustable for maximum comfort.

4 **PROPER LEG SUPPORT** . . . under the knees where you need it.

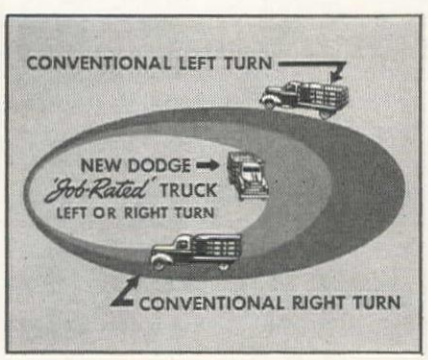
5 **CHAIR-HEIGHT SEATS** . . . just like you have at home.

6 **7-INCH SEAT ADJUSTMENT** . . . with safe, convenient hand control.

7 **"AIR-O-RIDE" CUSHIONS** . . . adjustable to weight of driver and road conditions.

EASE OF HANDLING

You can turn these new "*Job-Rated*" trucks in much smaller circles. You can park, back into alleys or up to loading platforms with much greater ease. This is due to a new type of steering design, with shorter wheelbases, that accommodate full-size bodies. You get much better weight distribution, too. Front axles have been moved back and engines forward, placing more weight on the front axle.



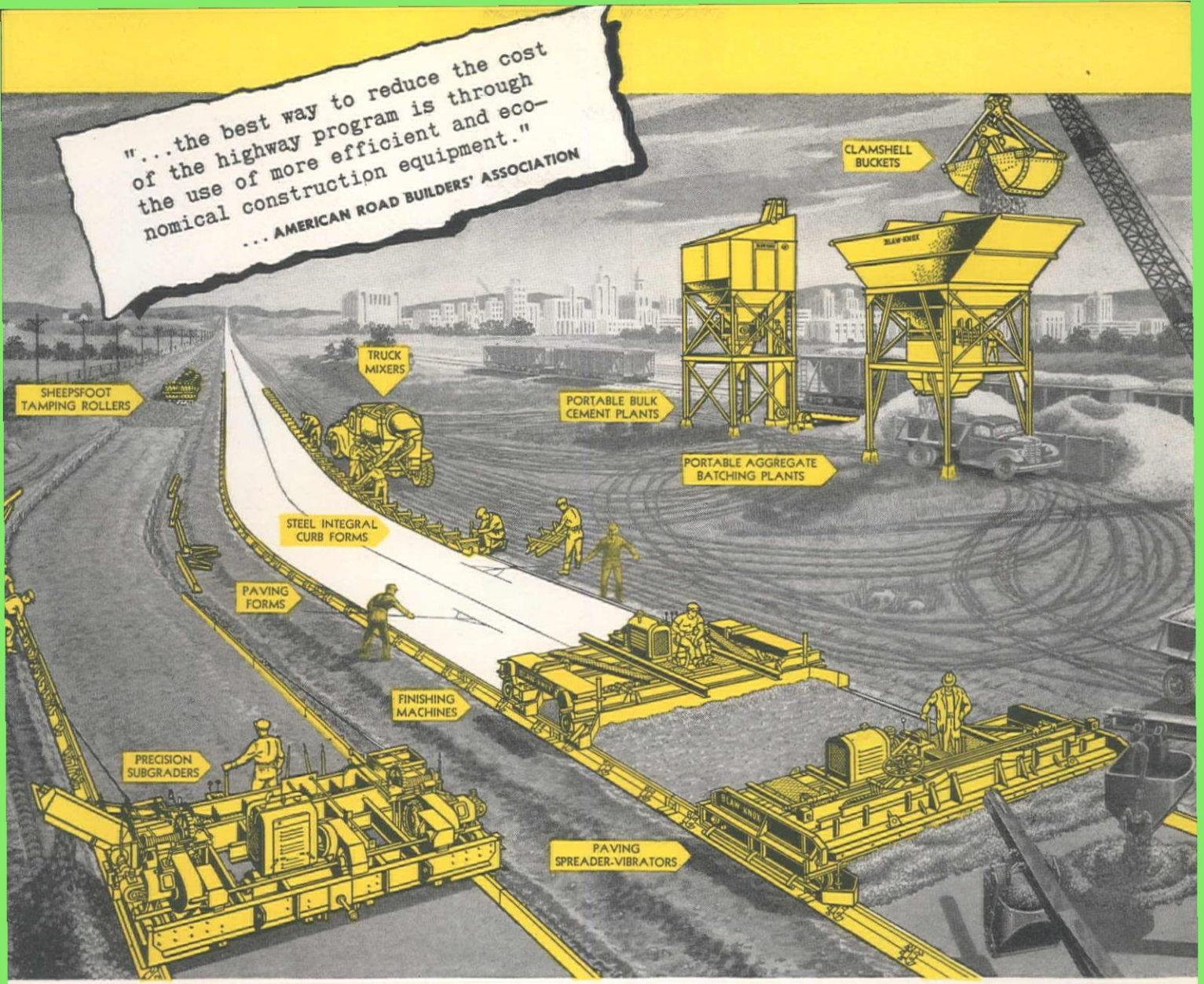
You get a truck that fits *your* job—saves *you* money . . . because every unit of every Dodge truck, from engine to rear axle, is "*Job-Rated*" for economy, dependability, performance, and long life. And remember . . .

only Dodge builds "Job-Rated" trucks!

NEW DODGE "Job-Rated" TRUCKS

FIT THE JOB... LAST LONGER

"...the best way to reduce the cost of the highway program is through the use of more efficient and economical construction equipment."
...AMERICAN ROAD BUILDERS' ASSOCIATION



Contractors who have mechanized with BLAW-KNOX Construction Equipment agree with A.R.B.A.

See Your Nearest BLAW-KNOX Distributor

C. H. Grant Company, 435 Bryant Street, San Francisco 7, Calif.; Shaw Sales & Service Company, 5100 Anaheim-Telegraph Road, Los Angeles 22, Calif.; Western Machinery Company, 1025 South Central Avenue, P. O. Box 1652, Phoenix, Arizona; Intermountain Equipment Company, Broadway at Myrtle Street, Boise, Idaho; E. M. Ornitz, 215 West Fifth Street, Los Angeles 13, Calif.; Contractors Equipment Corp., 1215 S. E. Grand Avenue, Portland, Oregon; The C. H. Jones Equipment Company, 236 West South Temple Street, Salt Lake City 1, Utah; Lively Equipment Company, P O. Box 784, Albuquerque, New Mexico.


TRUCK MIXER LOADING PLANTS


STEEL STREET FORMS


CONCRETE BUCKETS


HEAVY STEEL FORMS

Blaw-Knox has brought America's famous "mass production" methods to the construction of highways, airports, roads and streets. The tried and true machines and equipment illustrated make possible *better concrete paving, with the fewest men, at lowest cost, in the quickest time*... If performance like that interests you why not see the nearest Blaw-Knox distributor or write direct for complete data on the latest developments in Mechanized Paving.

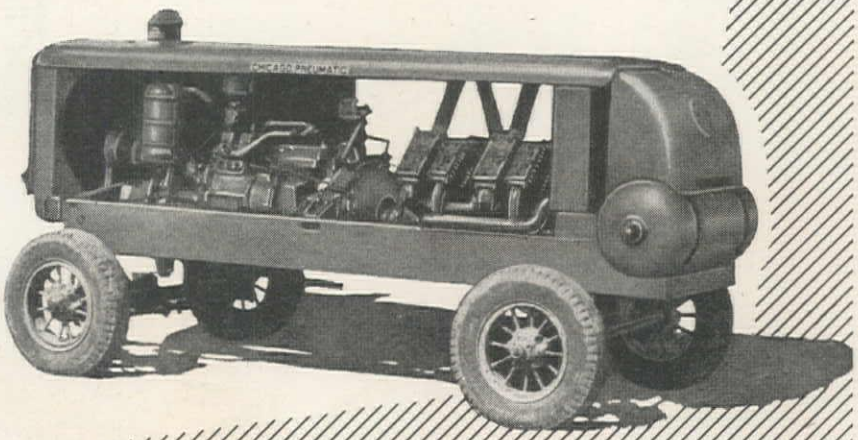
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Visit BLAW-KNOX at the ROAD SHOW
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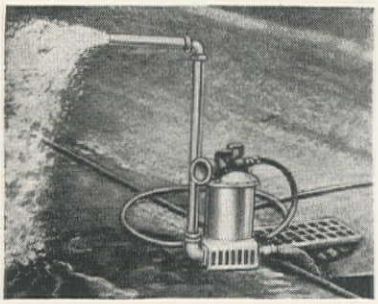
Time and Labor Saving CONSTRUCTION EQUIPMENT

Economical operation at any load

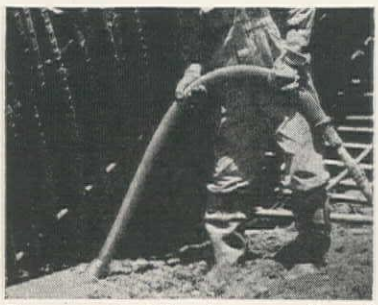




CP-117 Demolition Tool weighs 75 lbs. with spring retainer, 78 with latch. For heavy duty work in dense concrete.



Operating on the ejector principle, CP-7 Portable Sludge Pump will handle 15% solids without excessive wear.



For concretes 3″ and over, walls and columns under 15″ thick, and light floor and roof slabs, CP-219 Pneumatic Vibrator is ideal.

CP Portable Air Compressors are popular with the contractor because he can always count on economical operation, whether the engine is running at full or partial load. Thanks to the CP gradual speed regulator, engine speed keeps exact pace with air demands, holding fuel consumption to a minimum. This and other CP features effect fuel savings of 15% to 35%.

On the CP-500 Diesel-driven compressor illustrated, the six-cylinder Caterpillar D-13000 engine and the V-8 arrangement of compressor cylinders are further features that promote smooth, economical performance.

CP Portable Compressors are available in gasoline-driven models of 60, 105, 160, 210 and 315 c.f.m., actual capacity, and in Diesel-driven models of 105, 160, 210, 315, and 500 c.f.m. Write for full information.

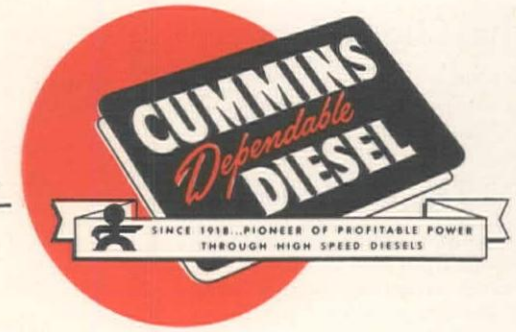
CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

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WESTERN MACHINERY CO., 760 Folsom St., San Francisco, Calif., Phone: EXbrook 4167; WESTERN MACHINERY CO., 500 North 16th St., Sacramento, Calif., Phone: 2-1211; WESTERN MACHINERY CO., 5722 So. Santa Fe Ave., Los Angeles, Calif., Phone: LOgan 3371; BALZER MACHINERY COMPANY, 2136 S.E. Eighth Ave., Portland, Oregon; WESTERN MACHINERY CO., N. 808 Division St., Spokane, Washington; HALL-PERRY MACHINERY CO., 812 E. Iron St., Butte, Montana; Lomen Equipment Co., Inc., Seattle-Alaska.



See for Yourself...

how Cummins *Dependable* Diesels perform profitably on the toughest kind of jobs. Your Cummins dealer—a specialist in power application—will take you to jobs in your vicinity . . . can show you:

- Equipment of the 101 leading manufacturers who satisfy customer demand with Cummins Diesels as standard or optional power.
- The wide range of jobs on which Cummins Diesels are doing more work at less cost.
- Operation records of Cummins Diesels on jobs like yours.

Acceptance by manufacturers and owners . . . on a wide variety of applications . . . is the strongest evidence that Cummins Diesels offer dependable, economical power for jobs requiring single engines up to 275 hp . . . multiples up to 1440 hp.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA



The Scene

Pueblo, Colorado

The Characters

Gas Company — Steel Mill

Know-how Contractors with "Caterpillar" Diesels

The Plot

Gas Company supplies gas to Steel Mill. Seepage from Steel Mill at underground creek crossing is eating away pipeline. Raising pipeline to overhead crossing is imperative. But—

Interruption means no gas supply. No gas supply means Steel Mill can't operate. Know-how Contractors have solution, to wit:*

*Selecting a non-working holiday (July 4th), Contractors get organized. Spot "Caterpillar" Diesels on the job — a D7 and a D8 Tractor equipped with pipe-layers; a D6 equipped with winch and bulldozer. Action! Within twenty-four hours the job is done — the 20-inch, 90-pound-foot line is raised — Steel Mill keeps to working schedule without missing a beat.

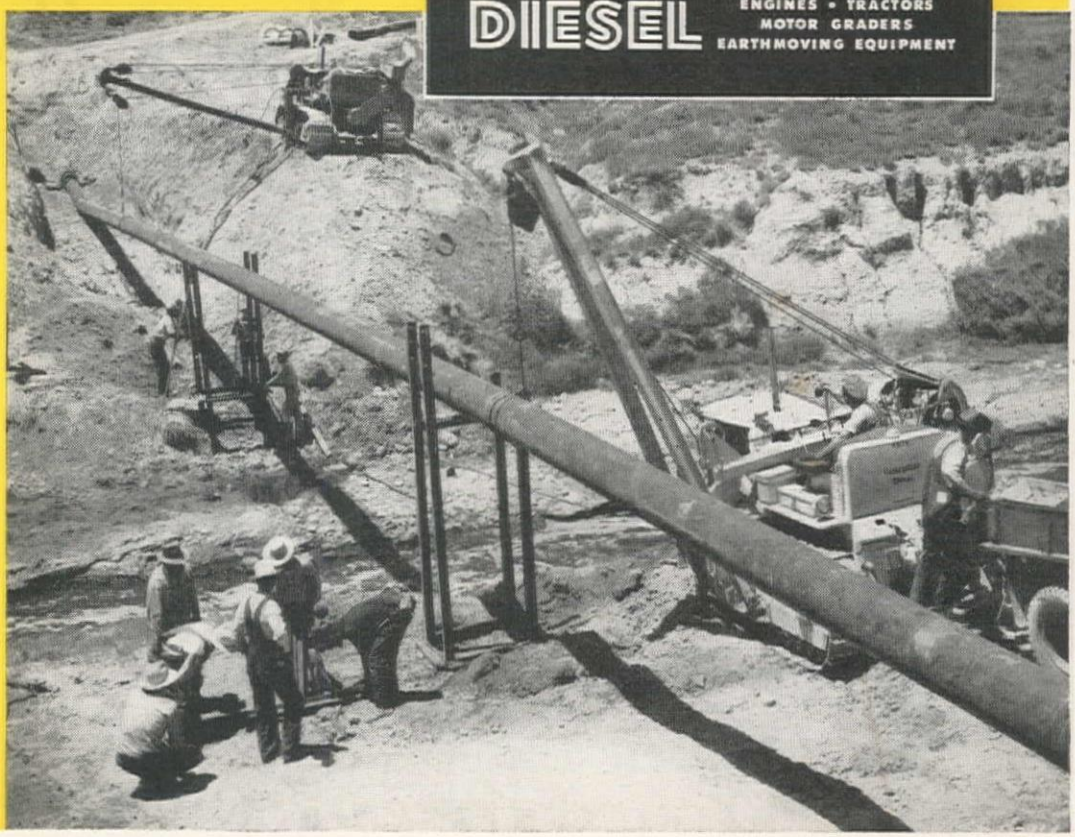
In every part of the world, in every industry —especially in the oil and contracting fields— "Caterpillar" Diesel power and equipment find, and *meet,* such emergency tasks. On set projects — pipeline laying, oil drilling, well and line pumping—they're piling up records of performance, time saving, and almost unbelievable thousands of hours of serviceable life.

CATERPILLAR TRACTOR CO., San Leandro, Calif.; Peoria, Ill.

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACTORS MOTOR GRADERS EARTHMOVING EQUIPMENT



New Tanker — Uses Trailmobile Semi-Trailer



In the Pacific Coast States more petroleum products are hauled over longer distances than in any other section of the United States. In this area all types of terrain must be traversed—long straightaways across desert areas, tortuous mountain roads, high mountain passes, crowded main highways between metropolitan centers.

To handle this tremendous gallonage economically truck tank equipment used by petroleum transporters is designed for larger capacities than is necessary in more densely populated areas. Many petroleum transporters and marketers have found TRAILMOBILES especially adaptable to this type of heavy hauling, and TRAILMOBILES are well represented in the tanker fleets.

In addition to tanker trailers, TRAILMOBILE also serves other branches of the petroleum industry with flat racks for hauling packaged products; flat beds for hauling well casing and oil field supplies; low beds far hauling drilling equipment, refinery machinery and supplies. For any hauling need in the petroleum industry—consult with TRAILMOBILE.

THE TRAILMOBILE COMPANY
BERKELEY, CALIFORNIA

TRAILMOBILE

LOS ANGELES • BERKELEY • SACRAMENTO • SANTA ROSA • FRESNO • SAN JOSE • BAKERSFIELD • STOCKTON • OGDEN • SEATTLE
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How P&H PLANETARIES Pep Up Production

This is the planetary transmission used so effectively on P & H Excavators. Through the use of this simple, proved principle, P & H provides operating characteristics which are unmatched for speed, smoothness and accuracy of control.

Where frequent reversals are required, such as for shovels or for the main drum in crane service, the planetary provides remarkable flexibility, yet delivers full power as positively as a gear.

P & H originated and patented the application of the planetary transmission on excavators and has always led in its development. Its various uses, explained here and on the following page, constitute another important P & H Added Value.



PLANETARY CHAIN CROWD provides full power for crowd and rapid reversal, with dipper return twice that of crowding speed. It's smooth, positive, and accurate enough to dig within an inch of grade.



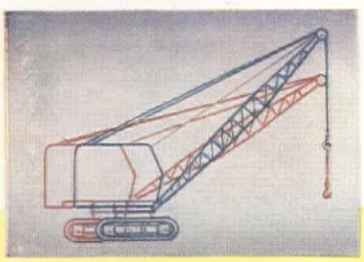
PLANETARY BOOM HOIST is independent—triple safe. Safety lowering against engine compression makes it impossible for the boom to drop suddenly.

...and in crane service...

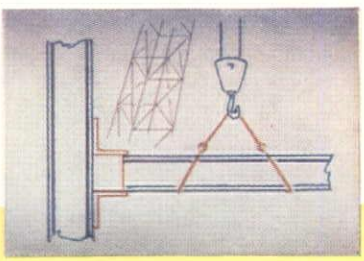
PLANETARY CONTROL

means safer, faster, more accurate load handling

Here's an operating feature you'll find on no other crane—planetary raising of both boom and load, together or independently. It is quick, easy and safe. And with load lowering against engine power, there's greater accuracy for "inching" heavy loads where utmost precision is required.



HERE'S A BIG ADVANTAGE in work such as steel erection. Operator can raise boom and load as machine moves forward, without forward motion of the boom point.



BOOM AND LOAD can be lowered smoothly, steadily, without jerking. This permits more precise handling of heavy members such as in fitting up structural steels.



COMPLETE SAFETY. Holding brakes are supplemented by ratchet mechanism which automatically prevents lowering boom faster than engine speed. Like coasting your car downhill in low gear.



EASY OPERATION is provided through simple, positive hydraulic control; more responsive. The operator reacts naturally with direct "feel" of the load at all times.

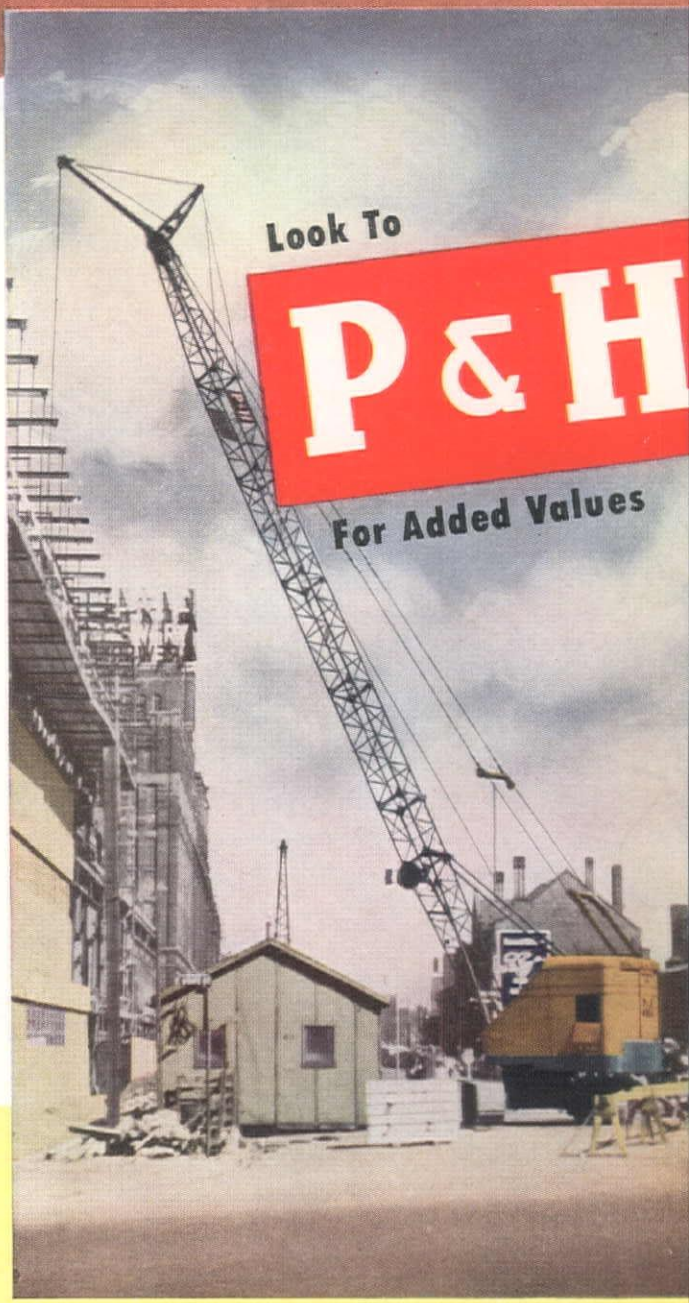
EXCAVATORS

P&H

HARNISCHFEGER CORPORATION

4490 W. National Avenue
Milwaukee 14, Wisconsin

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS



The P & H planetary transmission is the simplest, most compact mechanism for these Crane functions. There are no exposed gears, no stub shafts, no extra clutches.

P & H design and construction offer many other important added values to the excavator buyer. Ask your nearest P & H dealer about them or write us for complete information.

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SALT LAKE CITY 1, Utah	National Equipment Co.
BOISE, Idaho	Olson Manufacturing Company
EN CENTRO, California	Faure Tractor & Equipment Company
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SAN DIEGO, California	Southern Equipment & Supply Co.
SPOKANE 8, Washington	F. M. Viles & Co., Inc.
RENO, Nevada	Dennison Tractor & Supply Company
SEATTLE 4, Washington	Glenn Carrington & Co.

THE PIPE USERS ANSWER THEIR OWN $64 QUESTION!

Based on actual survival and retirement experience, what do we really know about the useful life of water works facilities? That was the $64 question water works men asked themselves. Here is how they came up with the answer.

A committee was formed by 3 water works organizations to direct a survey of the recorded experience of 25 cities, large and small, from Canada to Florida. These cities were selected as comprising a cross-section of various water service conditions. The facts were obtained by and from water works men. The survey has been completed and the findings published by the American Water Works Association.

In the 25 cities surveyed, 50 million feet of cast iron water mains, sizes 6-inch and over, had been laid in the 128 years since 1817. The survey revealed, as the chart opposite shows, that 96% of all cast iron water mains ever laid in these 25 cities, sizes 6-inch and over, *are still in service!* An official record that speaks for itself.

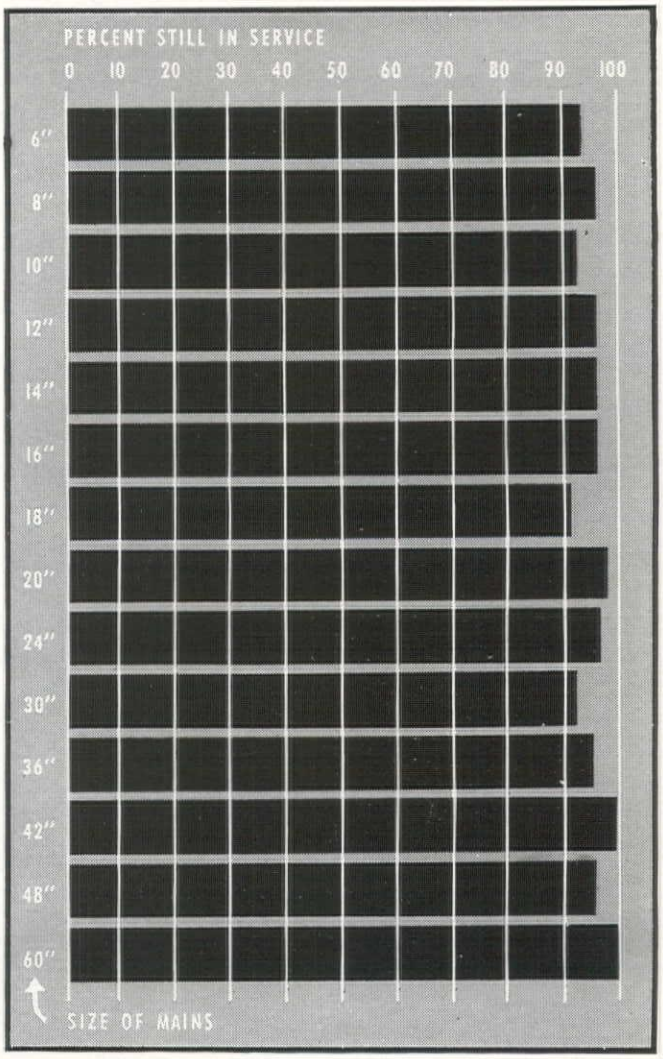
The cast iron pressure pipe industry, in spite of raw material shortages, achieved in 1947 one of the biggest production years in footage in the history of the industry, and has recently installed additional footage capacity. Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, 122 South Michigan Avenue, Chicago 3, Ill.

96% of all cast iron water mains* laid in these 25 cities over a period of 128 years is still in service.

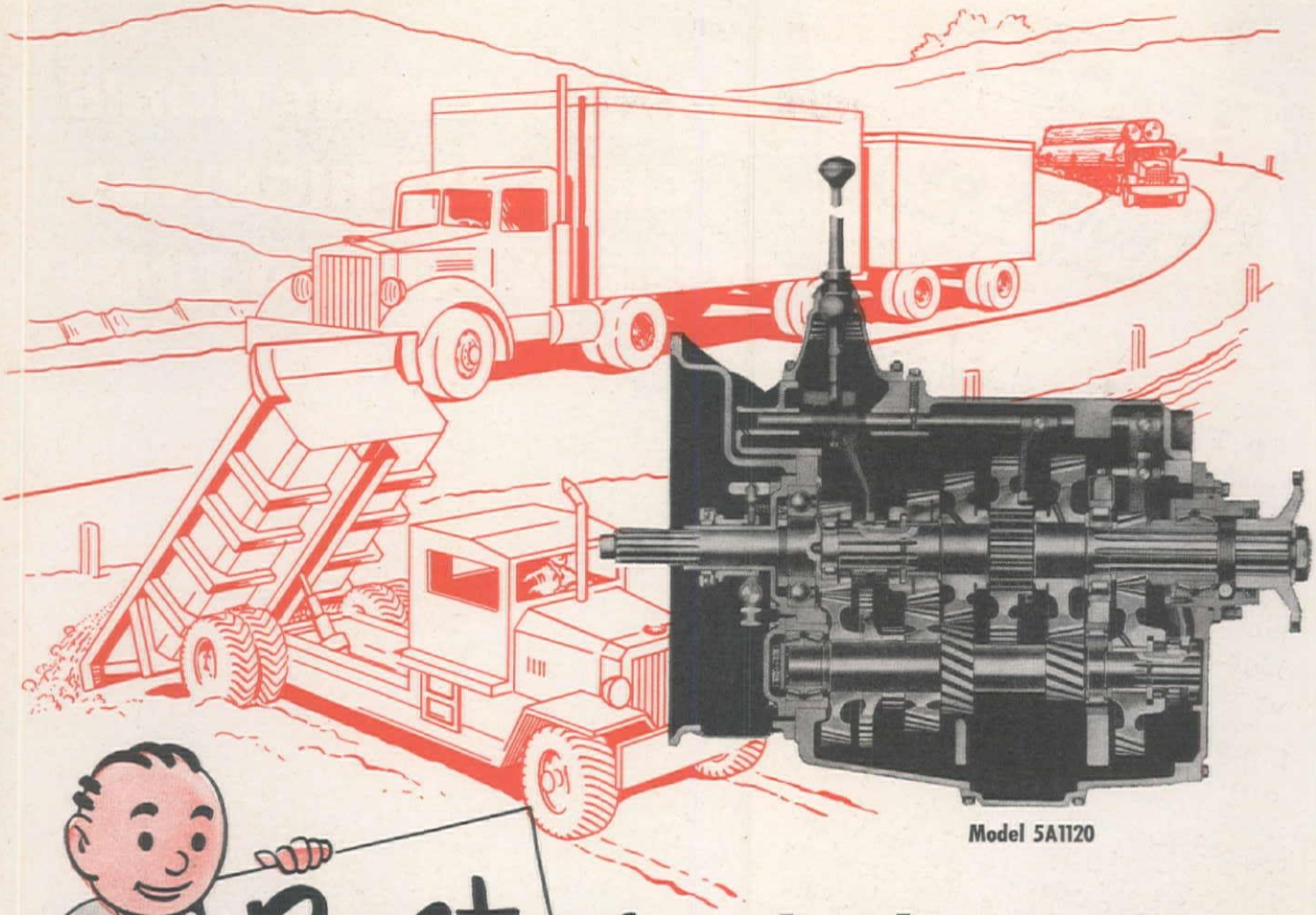
Alexandria, Virginia
Babylon, New York
Clinton, Iowa
Clyde, New York
Denver, Colorado
Des Moines, Iowa
Detroit, Michigan
Huntington, West Virginia
Jamaica, New York
Merrick, New York
Norwich, New York
Ottawa, Ontario
Philadelphia, Pennsylvania
Portland, Maine
Rochester (Suburban), N. Y.
St. Mary's, Pennsylvania
St. Paul, Minnesota
Sag Harbor, New York
Scranton, Pennsylvania
Springfield, Massachusetts
Summit, New Jersey
Syracuse (Suburban), N. Y.
Utica, New York
West Palm Beach, Florida
Winnipeg, Manitoba

*Sizes from 6 to 60 inches.





CAST IRON PIPE SERVES FOR CENTURIES



Model 5A1120



for the biggest

The Fuller Manufacturing Company introduces its newest transmission—Model 5A1120—capable of handling the newest, biggest engines in both on and off-the-highway service.

The Model 5A1120 Fuller Transmission is similar in construction to the popular and proved Model 5A920 and provides the same ratios, but is even greater in capacity—built for engines up to 1120 cu. in. Model 5A1120 features all-helical gearing in the forward speeds, three-point bearing suspension for the main shaft and extra-heavy bearings to meet the most rugged operating requirements.

Short, easy shifts are an inbuilt characteristic of the new Model 5A1120, as of all Fuller Transmissions. A transmission capable of top performance at high speed or low speed . . . under high gross or low gross loads . . . Model 5A1120 is the *best* for the *biggest* engines and *biggest* trucks.

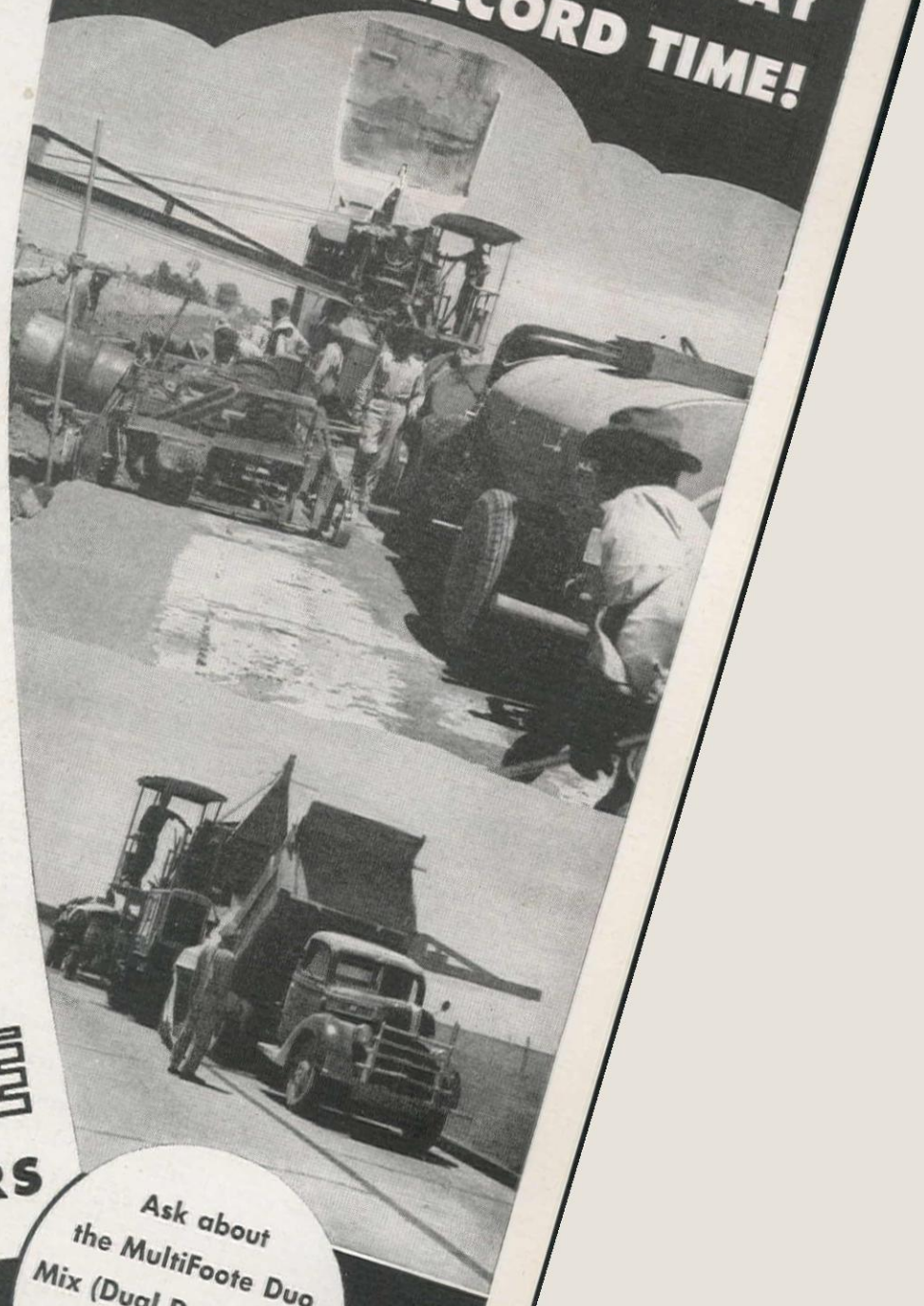
FULLER MANUFACTURING COMPANY, TRANSMISSION DIVISION
KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wisconsin
Western District Office (Both Divisions): 1060 East 11th Street, Oakland 6, California

Fuller TRANSMISSIONS

TEXAS
U.S.
ROUTE 66

MAKING THE NATION'S GREATEST HIGHWAY SAFER IN RECORD TIME!



● The day this picture was made the Austin Road Company of Dallas, Texas laid 8,220 ft. of 3 ft. shoulder to widen Route 66 east of Amarillo. In spite of the fact that traffic was maintained, high daily output placements ran up to 8,500 ft.

Simple equipment, a well co-ordinated organization and a MultiFoote 34-E Paver made this record possible!

One of the outstanding things about MultiFoote Pavers is their dependability. They are built to keep a' running. Simplicity of design makes upkeep and adjustment easy. Smooth control from the high operating platform, the wide skip, the split-second discharge and the fast acting bucket get material on the road in a hurry. These are the things that make records.

You can have this same MultiFoote performance on your jobs too. Let us send you the details on MultiFoote design and construction. You will be interested in MultiFoote advantages.

THE FOOTE COMPANY, INC.
1940 State Street, Nunda, New York

MULTIFOOTE
CONCRETE PAVERS

Ask about the MultiFoote Duo Mix (Dual Drum Paver) and the Adnun Black Top Paver

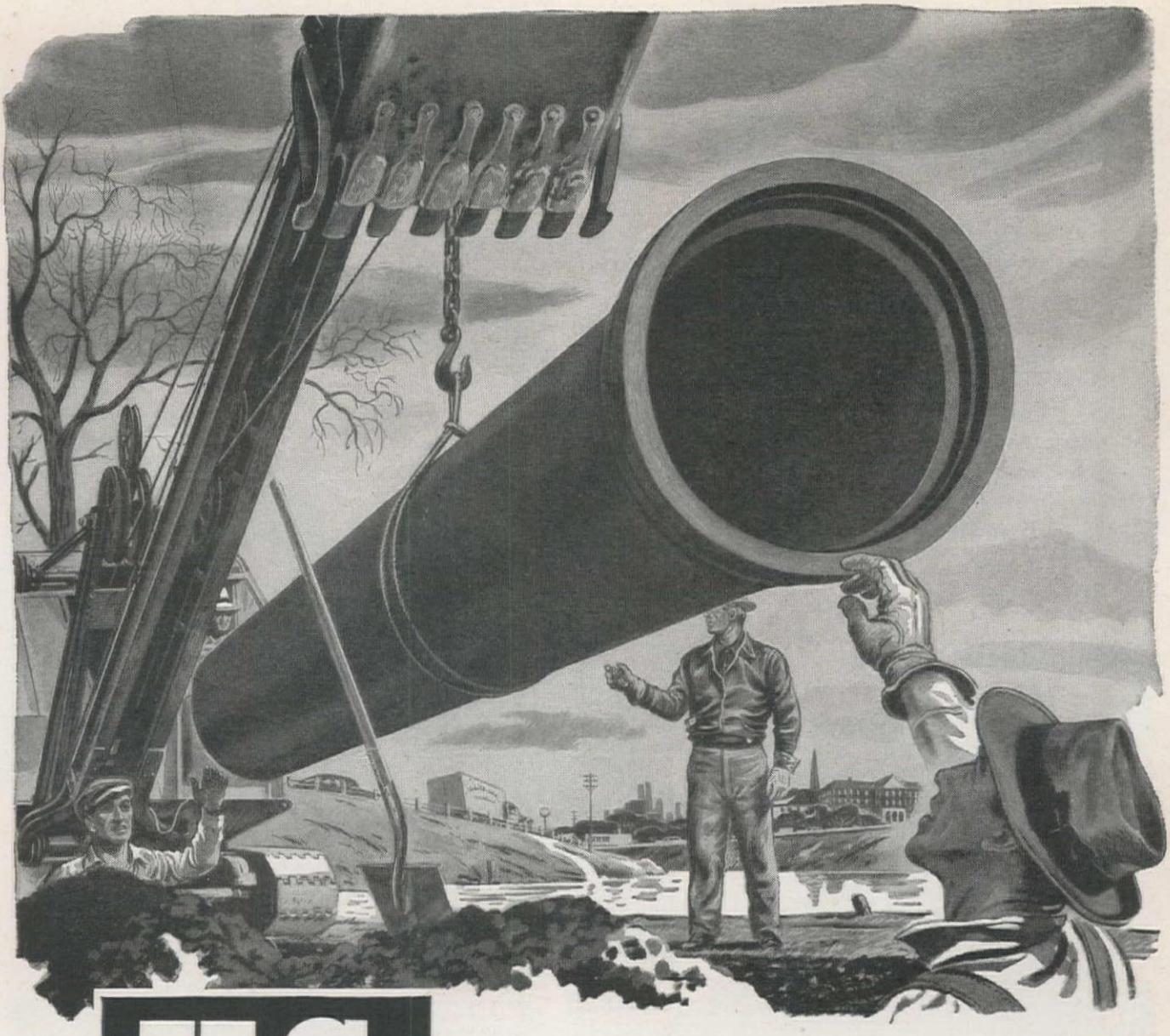
Smith Booth Usher Co., Phoenix, Arizona; Western Equipment Co., Boise, Idaho, Spokane, Washington; The Colorado Builders Supply Co., Denver 2, Colorado; Lively Equipment Co., Albuquerque, N. M.; The Lang Company, Inc., Salt Lake City, Utah; Howard-Cooper Corporation, Portland 14, Albany, Eugene, Central Point, Roseburg, Oregon, Seattle, Washington.

DIESEL POWER *at Its Best*

On every count a GMC Diesel truck is your best Diesel buy. Take the engine, for example. It's of famous GM 2-cycle design . . . basically the same as the GM Diesels which power the locomotives of the nation's leading railroads. It is an efficient, dependable, *proved* Diesel that gives you lighter engine weight for greater pay load, outstanding smoothness, flexibility and lugging ability. And with this great engine, in a GMC Diesel, you get a specialized Diesel chassis that's exclusively designed and engineered for heavy duty Diesel work. GMC Diesels are available in eight basic models . . . two engine sizes . . . in gross weight ratings of 30,000 to 90,000 pounds. Many are now ready for quick delivery. Get GMC Diesels for your construction operations . . . and get Diesel power at its best.



GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION



Painted for U. S. Pipe & Foundry Co. by Paul Laune

U.S. cast iron PIPE

FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE

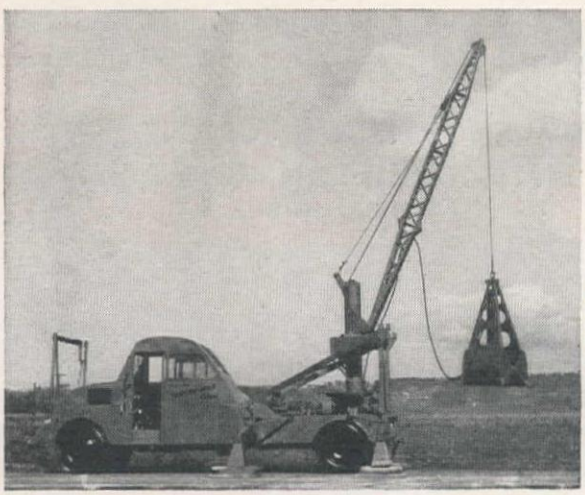
THE quality of U. S. Cast Iron Pipe is controlled to a degree undreamed of by pipe founders a generation ago. Before the molten metal is poured into the mold of a Super-deLavaud centrifugal casting machine the important characteristics of the iron have been determined by our metallurgists. After the pipe has been cast our plant and research laboratories conduct numerous tests, in addition to acceptance tests, to assure the maintenance of quality in U. S. Pipe. This routine procedure at our several plants is enforced so that *we* may be confident that *your* confidence in our product continues to be justified. **United States Pipe and Foundry Co., General Offices: Burlington, New Jersey, Plants and Sales Offices Throughout U. S. A.**

Versatile

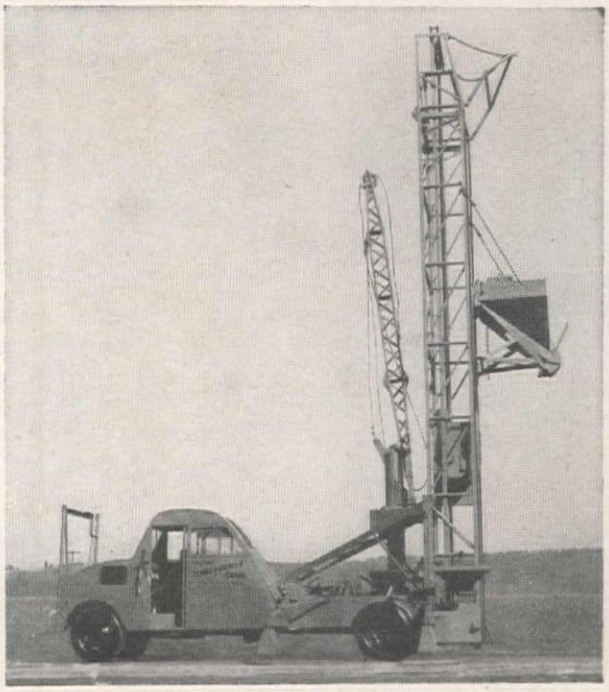
THE New TOWERMOBILE-CRANE

A COMBINATION CRANE & TOWER

Here's a chance for the construction contractor to get MORE WORKING HOURS out of his equipment. The same chassis serves as a truck and power unit for crane boom or a hoisting tower. A ½-yard clamshell bucket and a ¾-yard concrete hopper are available for use with the crane. Concrete bucket or lifting platform may be used with the hoisting tower.



The standard TOWERMOBILE-CRANE with a 20-ft. boom has a lifting capacity of 9000 Ibs. with the line 7 feet to the rear of the truck body. Boom lengths can be increased in increments of 10 feet to a maximum of 40 feet.



TOWERMOBILE eliminates erection of costly elevating towers. TOWER-MOBILE can be driven to a job and set up ready for operation in 10 minutes by ONE MAN. When hoisting job is completed, tower folds down across cab and unit can be moved to next job.

ITS OWN CRANE CAN BE USED TO INSTALL OR REMOVE THE TOWER FROM THE CHASSIS

There's a dealer near you who handles TOWERMOBILE-CRANE, SCOOPMOBILE, MIXERMOBILE and WAGNERMOBILE LIFT. See him for a demonstration, or write for full information.

MIXERMOBILE DISTRIBUTORS, Inc.

6855 N.E. HALSEY ★ PORTLAND, OREGON

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- Studer Tractor & Equipment Co. P. O. Box 779 Casper, Wyoming

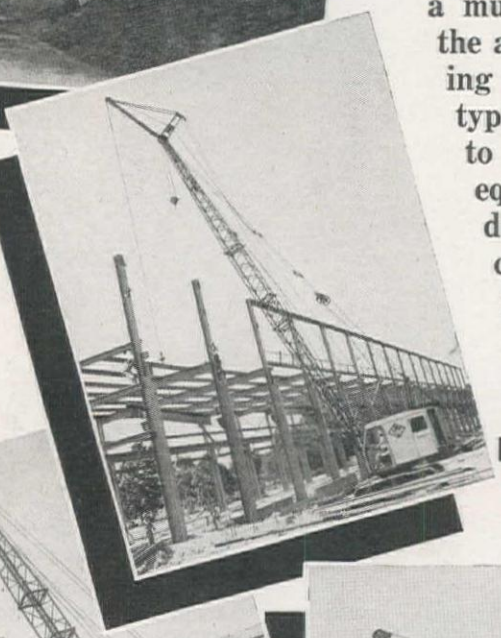


LIMA Paymaster 3/4 Yd.

6 Machines all in One—

LIMA HAMILTON CORPORATION

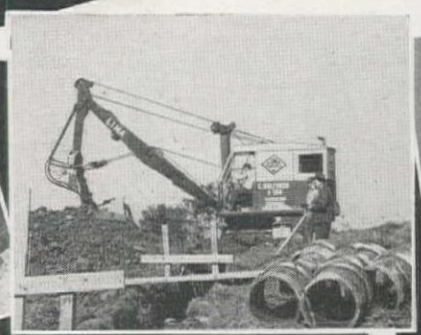




The LIMA PAYMASTER is designed and built as a multiple purpose machine. It gives its owner the advantage of six (6) machines in one. Realizing the fact that most contractors bid various types of work, LIMA has gone to great lengths to give its users a machine that will work equally well as a shovel, crane, clamshell, dragline, pile driver or pull-shovel. Ease of covertibility is one of the many LIMA features that will enable you to handle more work with greater profit. Get the facts today on LIMA all-purpose machines. Write for bulletins.

LIMA SHOVEL AND CRANE DIVISION
LIMA-HAMILTON CORPORATION
LIMA, OHIO, U. S. A.







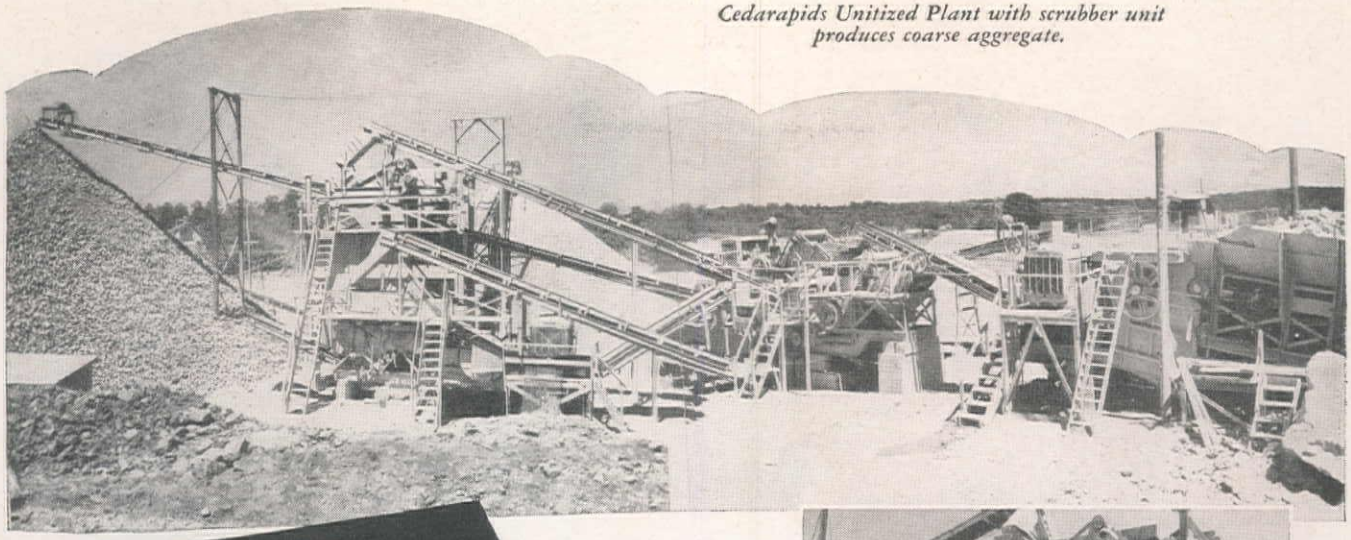
LIMA

SHOVELS . . .
CRANES . .
DRAGLINES

Capacities . . . SHOVELS ¾ YARD TO 5½ YARDS • CRANES 13 TONS TO 100 TONS • DRAGLINES VARIABLE

Our Seattle Office: 1932 First Avenue South, Seattle 4, Washington. Our San Francisco Office: 1315 Howard Street, San Francisco 3, California.
Sales Agents: Feenaughty Machinery Company, 112 S.E. Belmont Street, Portland 14, Oregon; 600 Front Street, Boise, Idaho; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles 54, California; Held-McCoy Machinery Company, 3201 Brighton Boulevard, Denver 5, Colorado; Smith Booth Usher Company, 1756 Grand Avenue, Phoenix, Arizona; Contractors' Equipment & Supply Company, Springer Building, Albuquerque, New Mexico; Modern Machinery Company, Inc., 4412 Trent Avenue, Spokane 2, Washington; Jameson Engineering Sales, Fairbanks, Alaska; Foulger Equipment Company, Inc., 1361 South Second West, Salt Lake City 8, Utah; Thompson-Sage, Incorporated, 400 South Wilson Way, Stockton, Calif.

Cedarapids Unitized Plant with scrubber unit produces coarse aggregate.



THE JOB

Producing Aggregates for FT. GIBSON DAM

Twin hammermill installation produces sand with fineness modulus of not less than 2.40 or more than 2.90 with not more than 0.10 variation.



THE EQUIPMENT

2 CEDARAPIDS UNITIZED PLANTS

BETTER ROADS FOR A BETTER WORLD · 45th Annual Convention and Road Show · SOLDIER FIELD CHICAGO · JULY 16-24, 1948

THE CONTRACTOR

M. O. WEAVER, Inc.
Des Moines, Iowa

When M. O. Weaver, Inc. of Des Moines, received the contract for producing 600,000 tons of aggregate and 250,000 tons of manufactured sand for the Ft. Gibson Dam near Muskogee, Oklahoma, they selected Cedarapids equipment as best able to meet the specifications. Two Unitized Plants and twin hammermills were set up to produce the five finished sizes: manufactured sand, No. 4 to ¾", ¾" to 1½", 1½" to 3" and 3" to 6", all from limestone. The production of 250 tons per hour enabled M. O. Weaver, Inc. to fulfill their contract for aggregates specified *on time* profitably.

Whether your aggregate production requirements call for a few thousand yards or several hundred thousand, it will pay you to follow the lead of contractors who know construction equipment best and buy Cedarapids.

Cedarapids

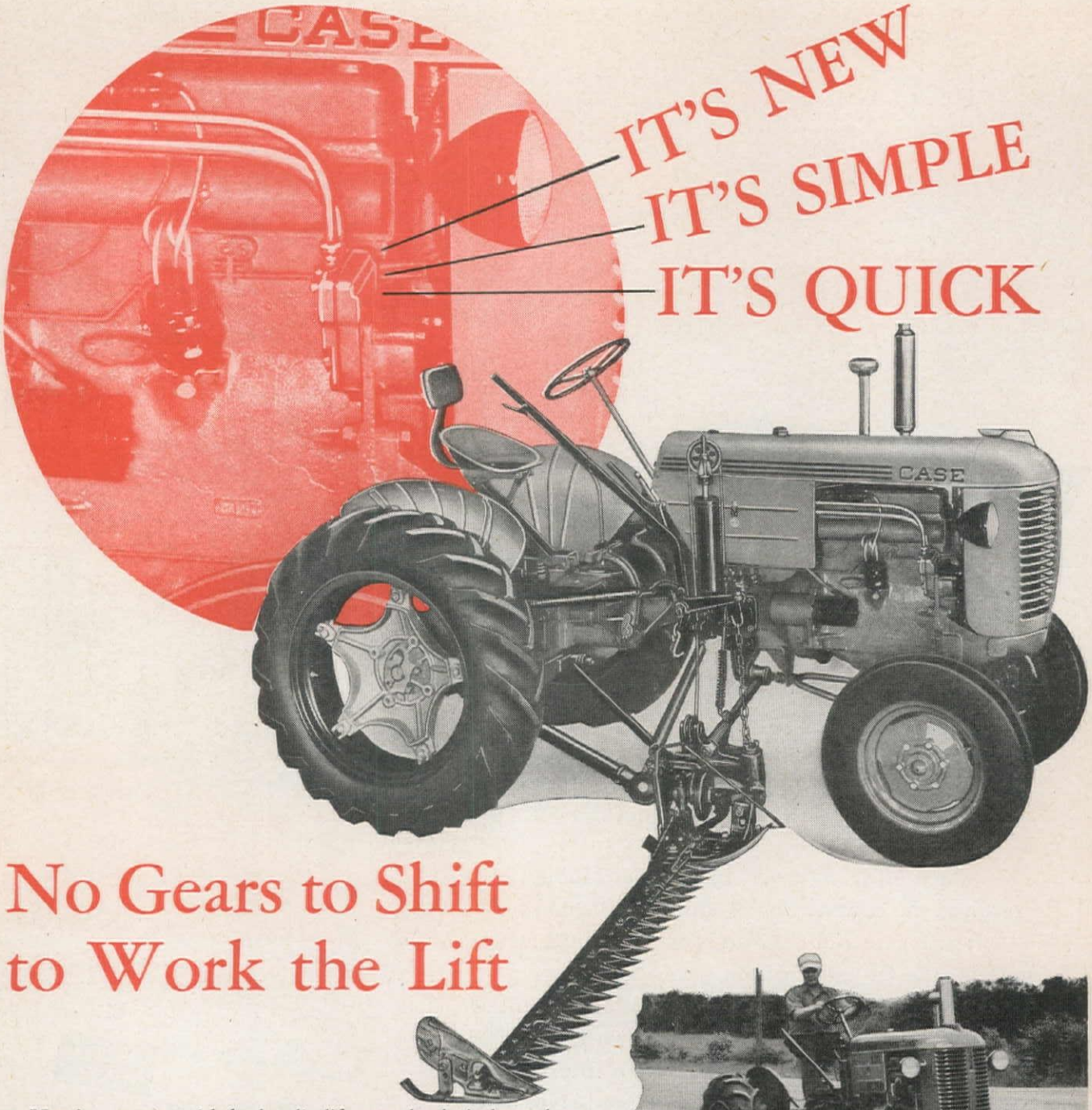
Built by IOWA

THE IOWA LINE
of Material Handling Equipment is distributed by

HOWARD-COOPER CORP., Seattle, Washington; Portland, Eugene and Central Point, Oregon; HALL-PERRY MACHINERY CO., Butte, Great Falls, Missoula and Billings, Montana; INTER-MOUNTAIN EQUIPMENT CO., Boise and Pocatello, Idaho, and Spokane, Washington; WORTHAM MACHINERY CO., Cheyenne, Wyoming; KIMBALL EQUIPMENT CO., Salt Lake City, Utah; BROWN-BEVIS EQUIPMENT CO., Los Angeles, California; H. W. MOORE EQUIPMENT CO., Denver, Colorado; EDWARD F. HALE CO., Hayward and Redding, California; ARIZONA CEDAR RAPIDS CO., Phoenix, Arizona; R. L. HARRISON CO., INC., Albuquerque, New Mexico; SIERRA MACHINERY CO., Reno Nevada.

PRODUCT OF IOWA

IOWA MANUFACTURING CO. CEDAR RAPIDS, IOWA U. S. A.



No Gears to Shift to Work the Lift

● Here's a mower with hydraulic lift completely independent of tractor gears and clutch. You can raise the cutterbar, let it down, or hold it at any height at the touch of a single valve. You can work it "on the go," or you can stop and lift, lower and go on, without gear shifting.

Heart of this hydraulic control is the engine-driven pump indicated in the circle. It is rigidly connected with heavy seamless tubing—no hoses to deteriorate or loosen. Automatic valve throw-out at top of ram travel affords safety.

This new Case Highway Mower has a sickle that stays in perfect register at any angle of cutterbar from straight up to 45 degrees down. It has double V-belt drive, long-lived automotive-type universal joints, automatic re-lock after break-back. J. I. Case Co., Racine, Wis.

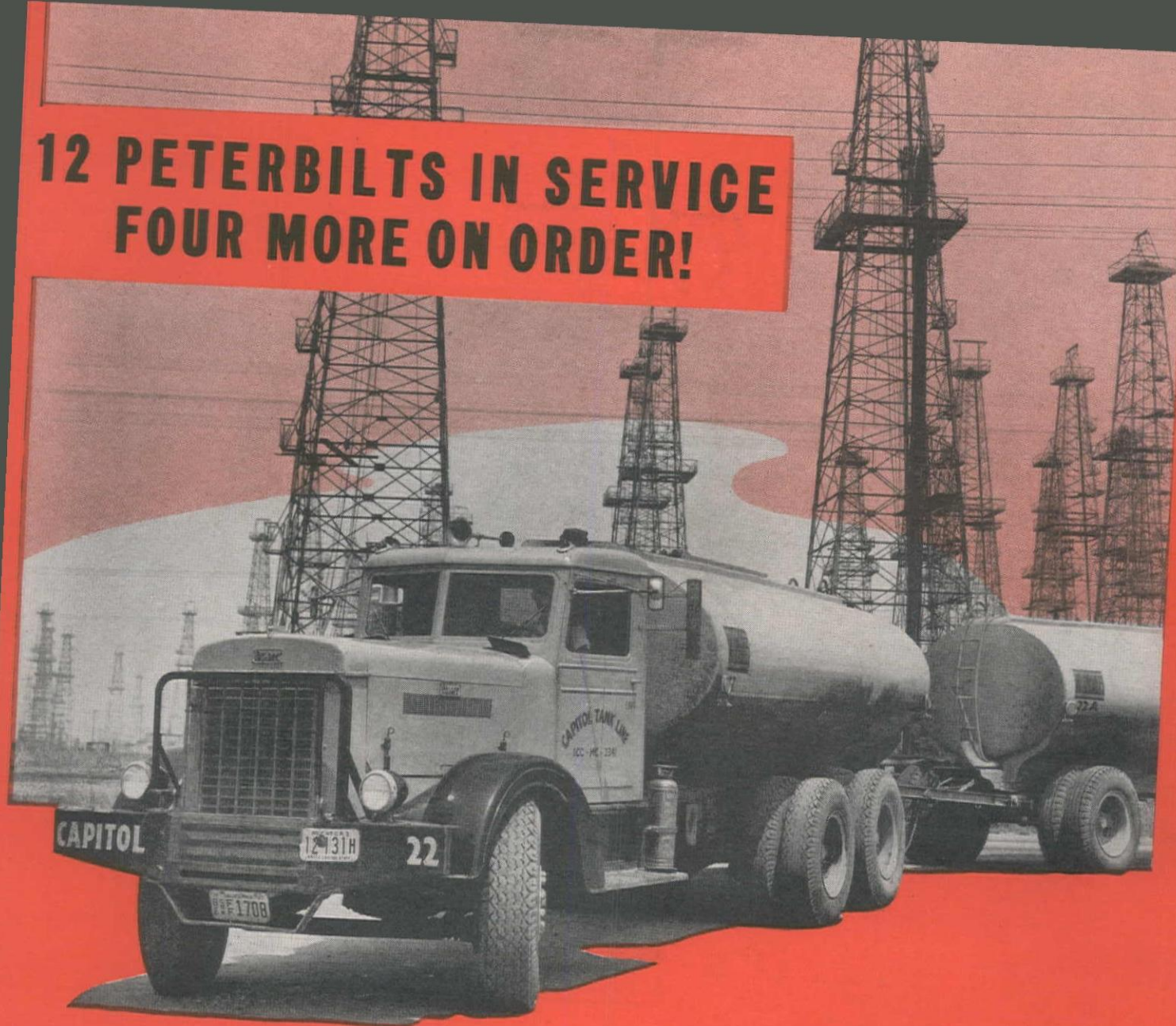


Teamed with the Case "VAI" tractor the new Case hydraulically controlled mower provides exceptionally good visibility, permitting fast work in tall growth where hidden obstacles may be lurking.

CASE

State Tractor & Equipment Co.	Phoenix, Arizona
Brown-Bevis Equipment Co.	Los Angeles, California
Coast Equipment Co.	San Francisco, California
Liberty Truck & Parts Co.	Denver, Colorado
Western Equipment Co.	Boise, Idaho
Hall-Perry Machinery Co.	Butte, Montana
Las Vegas Truck & Equipment Co.	Las Vegas, New Mexico
Nelson Equipment Co.	Portland, Oregon—Seattle, Washington
Robison Machinery Co.	Salt Lake City, Utah
Wortham Machinery Co.	Cheyenne, Sheridan & Greybull, Wyo.

12 PETERBILTS IN SERVICE FOUR MORE ON ORDER!



The Capitol Tank Line of Bell, California, began using PETERBILT tankers back in 1940, and today have an even dozen on the road delivering gasoline to all parts of California. They also render an excellent over-night service to points in Arizona, making five round trips each week of over 1000 miles, and delivering 7400 gallons each trip. With twelve PETERBILTS on the highways, their average monthly mileage is always well over 180,000 miles.

In the territory in which CAPITOL operates they encounter all types of transportation conditions from sea level to high mountains, from fertile valleys to hot arid deserts, from tortuous mountain roads to level straightaways as far as the eye can see. They have found PETERBILTS to be the kind of trucks that they can put onto any load and be sure that it will go through under any conditions in which wheels can turn.

If you have a hauling job that you think is tough, look into the many advantages of PETERBILTS in heavy duty hauling.

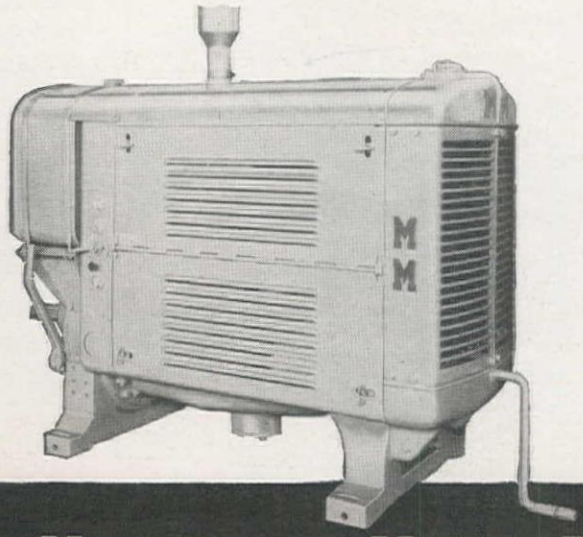
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107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORNIA



. . . it's MM all the way

MM Industrial Tractors and Attachments provide economical and dependable power for material handling, maintenance, and perform a wide variety of highway and construction jobs with *ease and economy!*



Engineered high capacity front axle, wheels, and tires for front-end loader application of MM Industrial Tractors, and the heavy-duty Ross steering gear; anti-friction bearings make them *easiest to handle!* High speed reverse, wide range of forward speeds and short turning radius give added maneuverability that cut costs on all material handling jobs. Scrapers, brooms, winches, cranes, loaders with material buckets and forks, and dozer blade equip MM Industrial Tractors for efficient, low-cost construction work.

MM Power Units in eight sizes from 25 H. P. to 242 H. P. provide steady, dependable power for operating generators, pumps, conveyors, crushers, compressors, hoists, winches, and cranes.

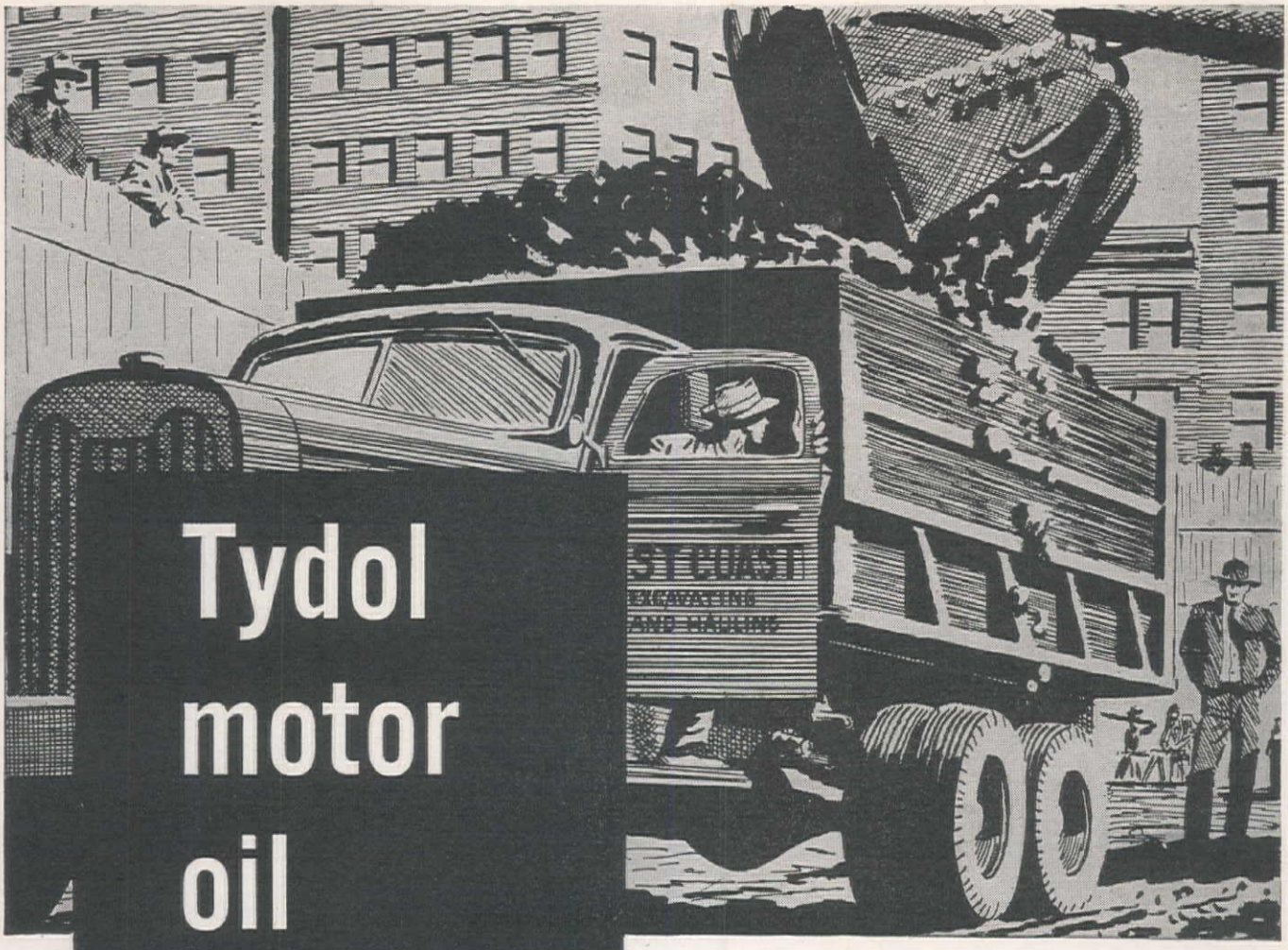
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gives safe lubrication at low cost

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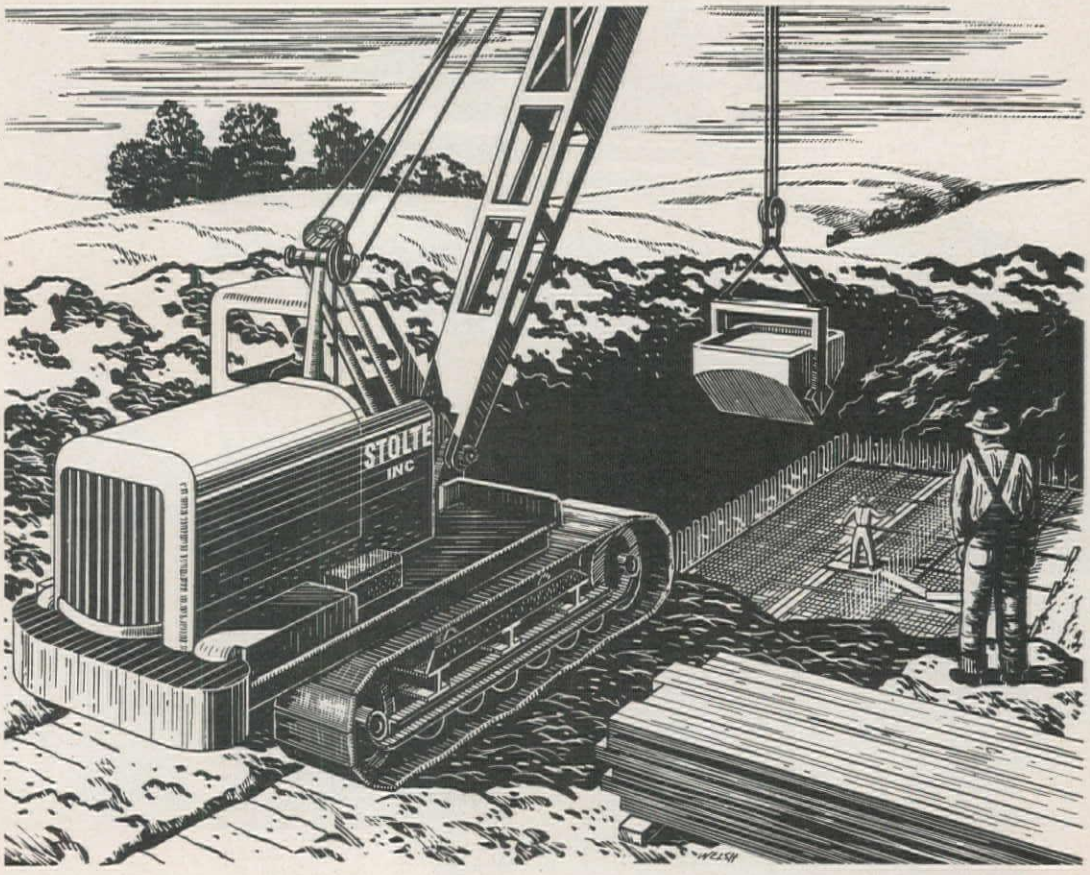
PRONTO



PLASTIC



HIGH-EARLY STRENGTH



Permanente *STANDARD PORTLAND* was the answer.

The Mill Valley Municipal Sewage Pumping plant, at Mill Valley, California, posed a very difficult problem in concrete construction. Unfavorable terrain, with blue mud clear to bed rock, made it necessary to excavate 20 feet below high tide level to obtain a steady foundation. This raised the additional problems of high water pressure (10 lbs. per square inch), danger of the unit "floating" and the need for water-tight concrete walls, in order that seepage would not enter the motor room, ruining the delicate electrical installation.

STOLTE, INC., General Contractors, and JOHN S. BATES, Engineers in charge of construction, chose Permanente STANDARD PORTLAND CEMENT as the cement best suited to make concrete that would solve these multiple problems.

PERMANENTE CEMENTS are specially engineered to meet any ordinary or unusual requirements in concrete construction such as high pressures, acid or alkaline soils, corrosive sulphate reactions, canal linings and underground structures.

Write for Permanente booklet "TYPES AND USES OF CEMENT," which recommends the type of Permanente Cement most suitable for each concrete construction problem.

PERMANENTE CEMENT COMPANY

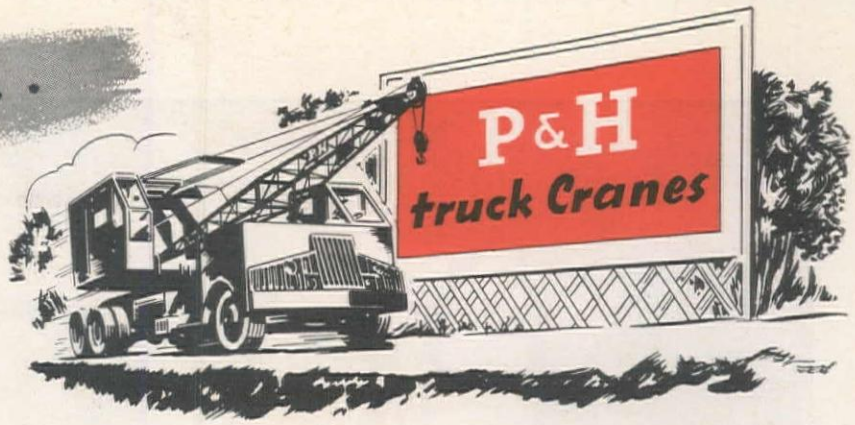
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P&H Truck Cranes are dual powered — with one engine *built* for travel and the other built for *work*. Therefore you get better performance both ways — faster moves from job to job at regular highway traffic speeds. Quicker completion of the jobs.

And where the job demands, you can change over to shovel, dragline, clamshell, hoe or pile-driver. P&H Truck Cranes are profit makers everywhere. Send for literature now.

P&H Added Values

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Size for size no P&H Truck Crane has ever been outlifted

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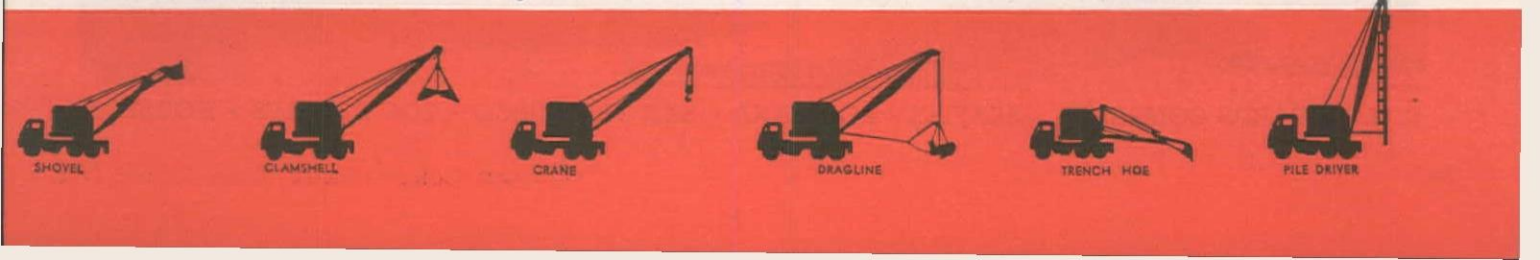
P&H REMOTE CONTROL AVAILABLE

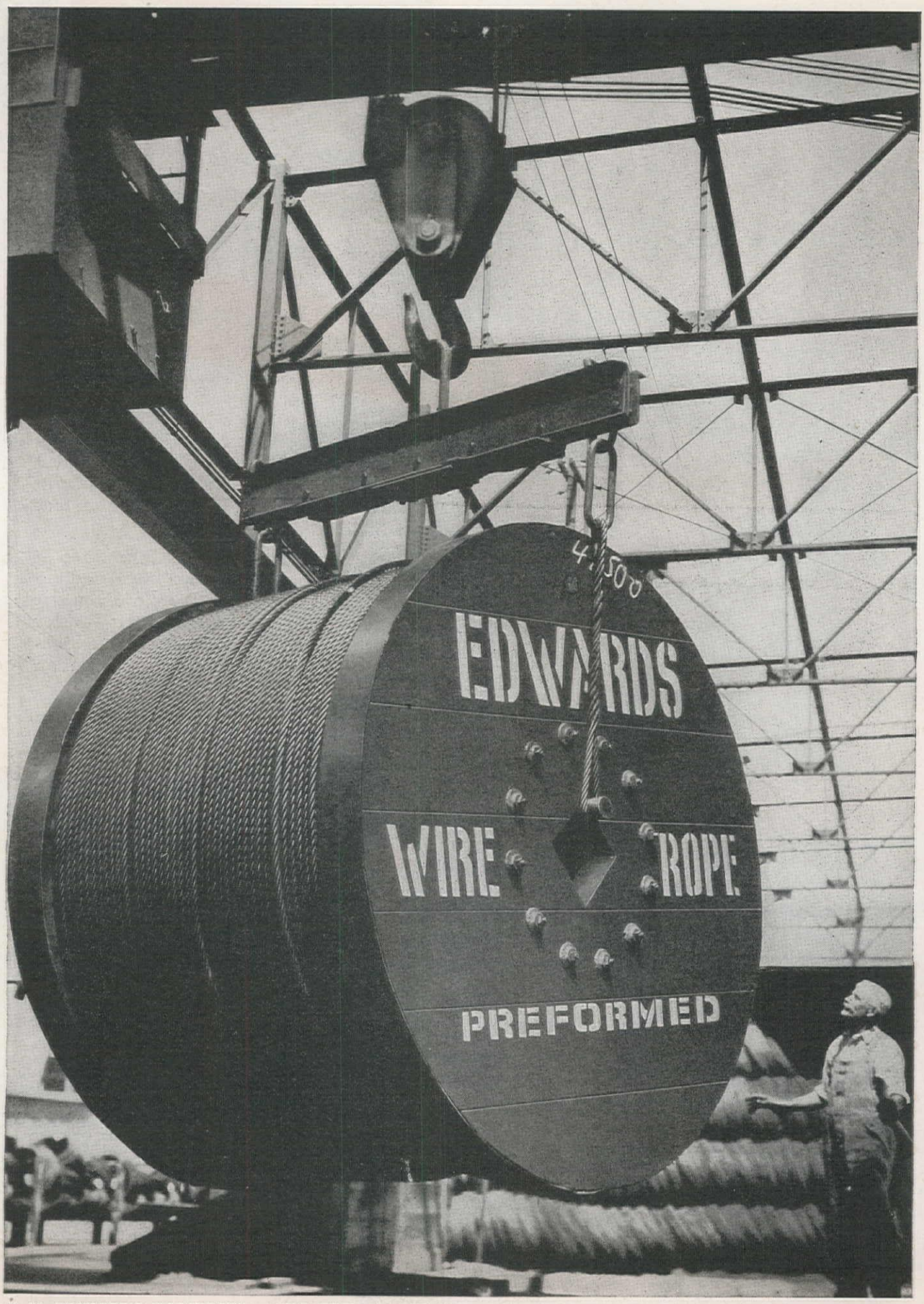
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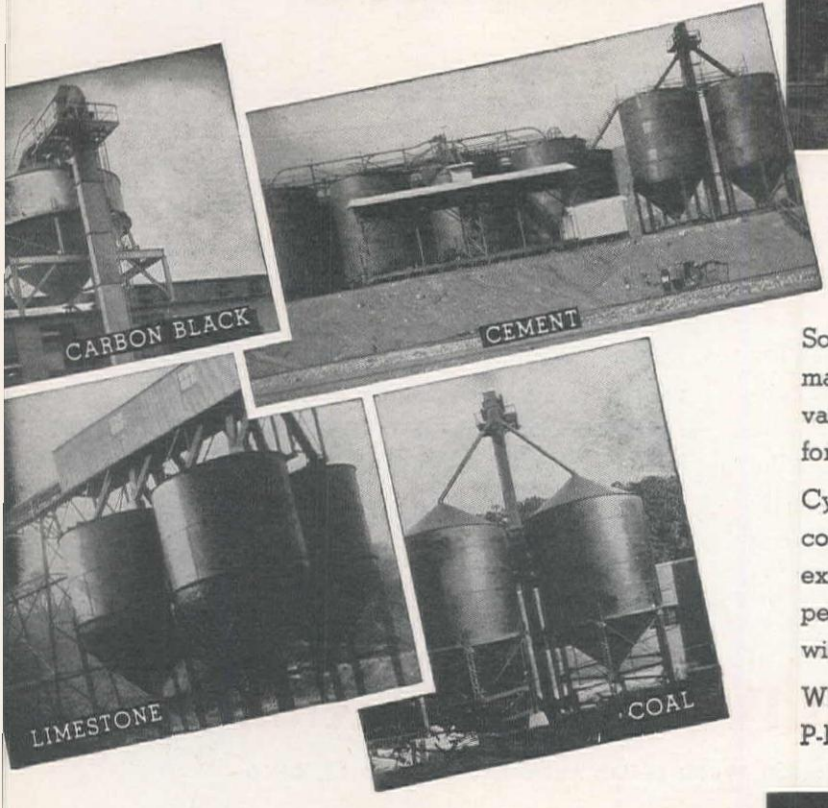
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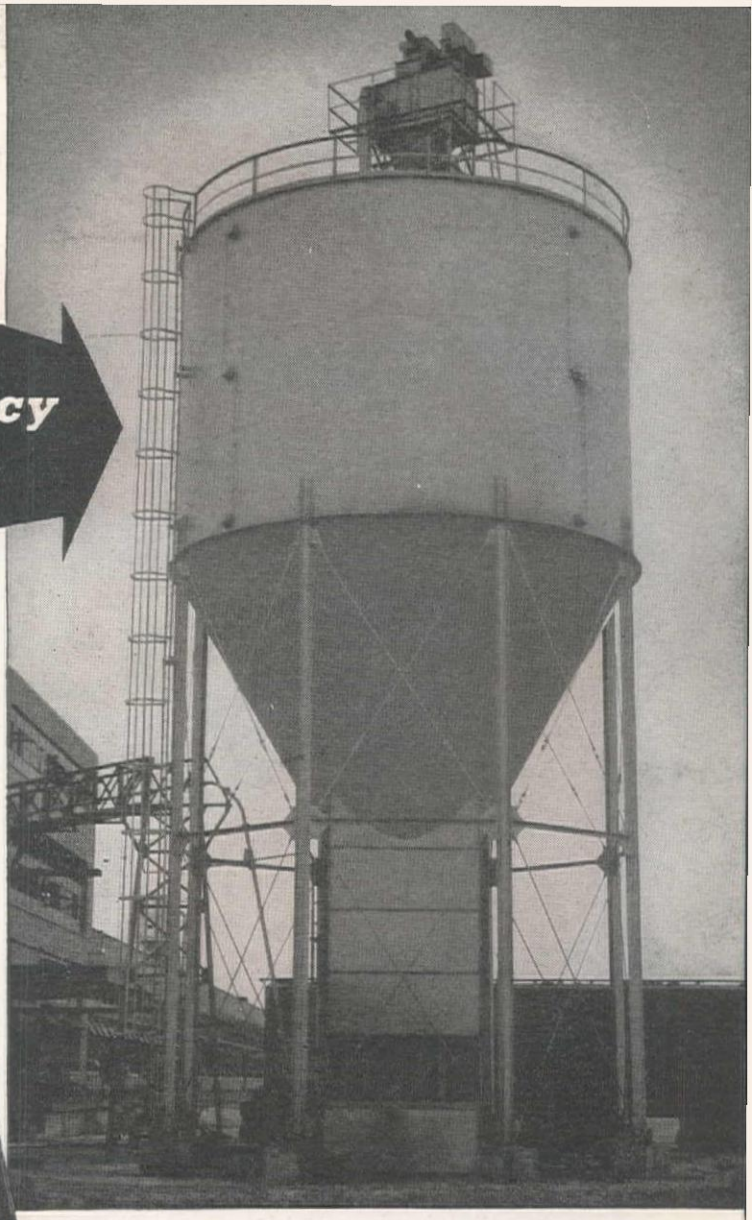
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The Oliver "Maintainer" is designed for unusual ease of operation. Hydraulic controls respond to the flip of a finger. The blade angle can be easily adjusted from the driver's seat. And the entire unit is easily accessible for service. All wearing parts can be inexpensively replaced if necessary.

There's plenty of husky power in this new "Maintainer." Famous Oliver "Fuel-Miser" engine with variable speed governor assures minimum fuel consumption . . . power enough to handle the toughest jobs.

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The better the tool the more places you'll find it. That's the secret of the amazing acceptance of the Thor "28"—its exceptionally powerful rotation for such a small and compact drill (30 pounds in 18-¼") have carried its popularity from secondary drilling in the mine and quarry to the general construction field . . . to industries for general maintenance and drilling anchor holes for machinery installations. Try the champion . . . *first.* Call a Thor dealer for a demonstration.

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FULL CUSHIONED AUTOMATIC VALVE

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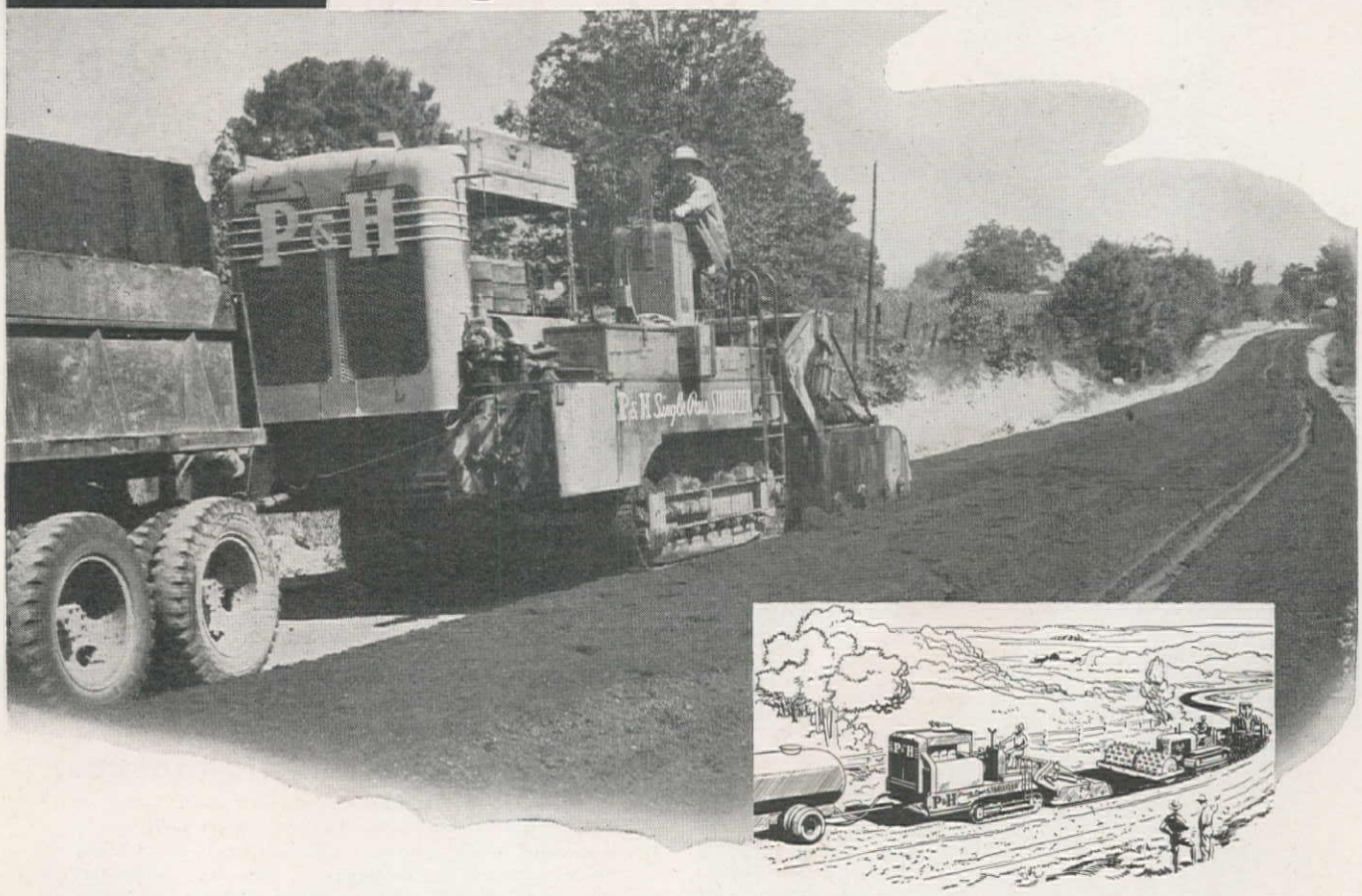
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FAST BLOWS

Thor **PORTABLE POWER TOOLS**

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

P&H Single Pass Soil Stabilizer



PROCESSING 3,000 LINEAR FEET PER DAY

Cuts the cost of road building!

Here in Mississippi, as in many other states, the P&H Single Pass Soil Stabilizer is setting up new standards for producing good, all-weather roads more quickly and at lower cost.

This 10½ mile stretch of road, 22 feet wide and processed to a depth of 6 inches, was completed in only 21 working days.

Accurate control of all elements such as uniform processing depth, thorough pulverization, accurate proportioning and blending, including liquid, etc., made it possible to meet specifications exactly and produce a road of predetermined load carrying capacity.

HERE ARE THE FACTS:

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Length of project — 10.48 miles.
Width of roadway — 22 feet.
Depth of treatment — 6 inches, compacted.

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Stabilizing agent — Asphalt — R.C.2 (4.32 gallons per square yard equal to 7% by weight of dry soil).

Local Traffic was maintained during construction.

The P&H Single Pass Stabilizer is capable of handling any type of admixture. If you are considering the construction of base courses, secondary roads, airport runways, etc., investigate the performance of the P&H Stabilizer under conditions similar to your own. Write us for facts.

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NOBLE BATCHING PLANTS Give You Custom-Built Design At Stock-Model Prices

You Have Choice of 4 Series:

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CA 104: 100-Ton
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PLANT LAYOUT HELP

Our engineering department will gladly assist you plan your plant layout, and furnish quotations and specifications on the Noble equipment best fitted to your needs. No obligation. Wire, write or phone . . .

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Ground Storage—Noble design enables you to stockpile large quantities of aggregate on the ground, thus you eliminate costly overhead structures.

See for yourself why so many leading contractors, ready-mix operators, concrete products manufacturers and oil-well cementers use Noble Batching Plants. Write now for descriptive folders showing job installations.

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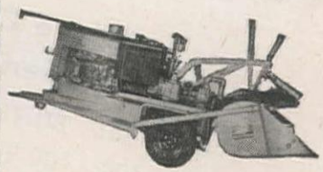
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YOUR ROAD-BUILDING DOLLAR



with the SEAMAN MIXER

Faced with present day costs in road building, highway authorities and contractors are searching for methods and equipment which will let them get the last possible yard of construction for every dollar invested. And that's why the SEAMAN MIXER is playing an ever-increasing part in all road mix operations. Low in investment (starting for example, at $869.00) lower in operating cost and maintenance, ready immediately for the job, more versatile in its many applications, the SEAMAN requires less man-power and yet produces a thorough, intimate, homogeneous mix, with excellent control of voids, — and with higher hour by hour, day by day output. That's why experienced contractors agree. The SEAMAN means plant mix quality at road mix cost. And we mean the SEAMAN represents maximum economy in every type of road mix construction! — Bituminous, soil-cement, sand-clay, clay-gravel or calcium chloride,— the SEAMAN MIXER gives you more miles of road for your dollar.



POSITIVE CONTROL OF OIL OR WATER

Equip your SEAMAN with the Auxiliary Spray Bar and Pump. Sprays oil or water directly into mix just ahead of rotor. Avoids migration or evaporation losses. Spray bar available with or without pump.

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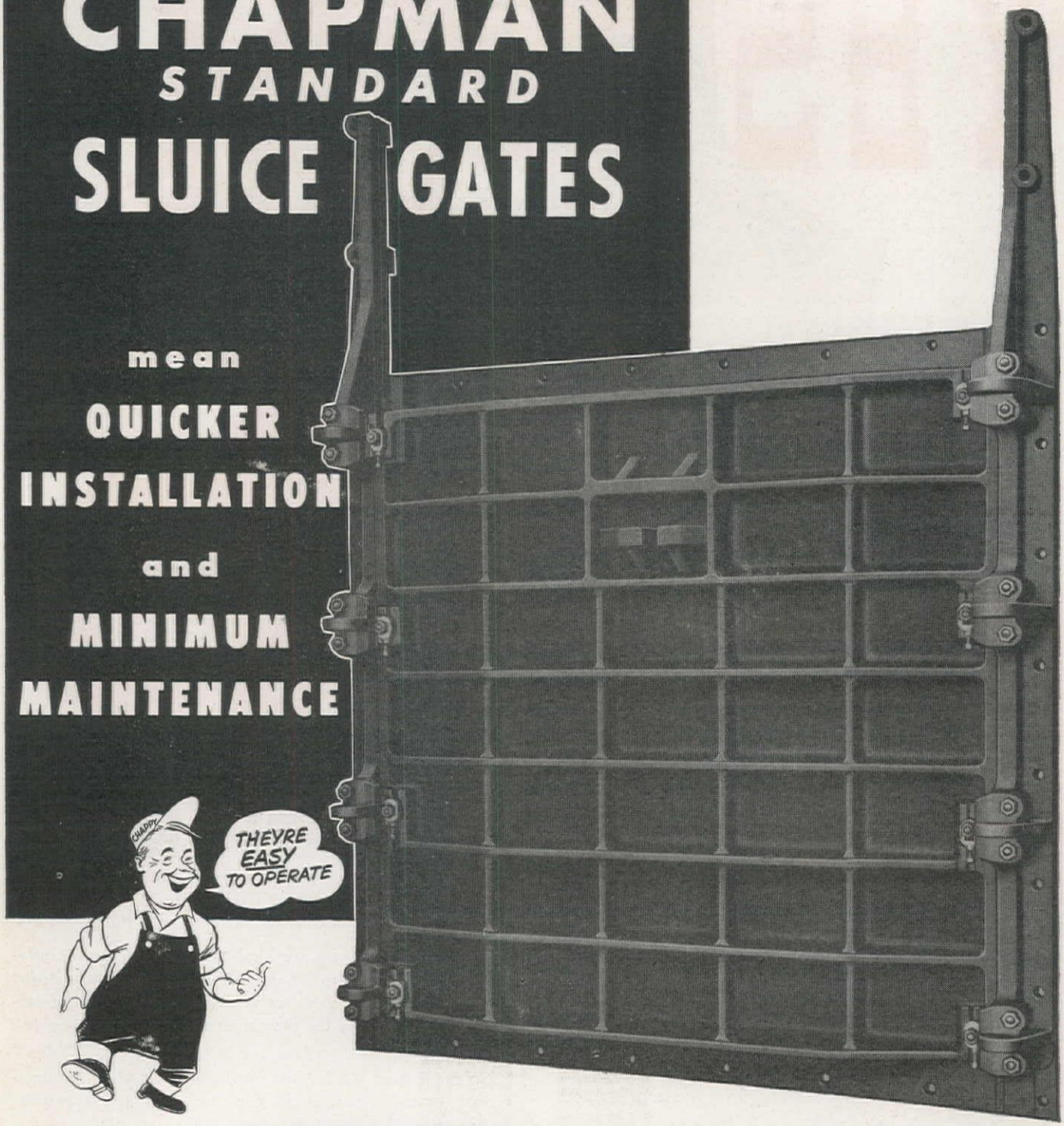
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One Gradall does 3 operations—dug the trench, neatly chamfering the loose edges, laid the pipe, and is shown back-filling to complete the job.

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THE MULTI-PURPOSE MACHINE THAT MULTIPLIES PROFITS!

● Gradall, with its powerful hydraulic "Arm-Action", brings new versatility and precision to the construction field. It multiplies profits by doing the work of several, one-purpose machines, by cutting down costly manual labor, by speeding up in-transit time.

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Gradall excavates foundations with walls sheer and clean enough to permit pouring foundations often without exterior forms.



Gradall travels from job to job in truck time; negotiates traffic, bridges, driveways and narrow roads with ease.

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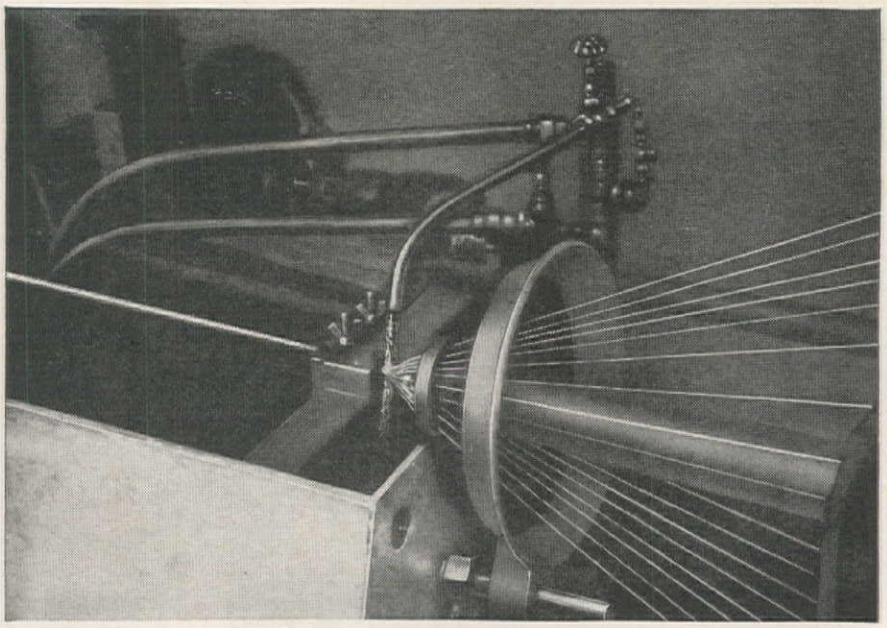
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Hot Oil Treatment for Steel Muscles

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Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.



Field lubrication of wire rope does much to prevent friction and corrosion, but it is only a surface treatment. To provide proper *internal* lubrication, every strand of Wickwire Rope is actually formed in a stream of hot lubricant. This quick-setting lubricant packs the many spaces between the wires of the strand.

Fiber cores, too, are saturated with a compound that lubricates the strands during the service life of the rope. This built-in protection is the result of years of study to develop a lubrication system that would protect ropes against friction, corrosion and other factors which bind ropes and result in loss of strength and rope life.

Thorough lubrication is only one step in the quality control of Wickwire Rope manufacture—but we at Wickwire believe that *every* step is important to assure finished rope that will provide the utmost in performance, safety and long life.

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PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

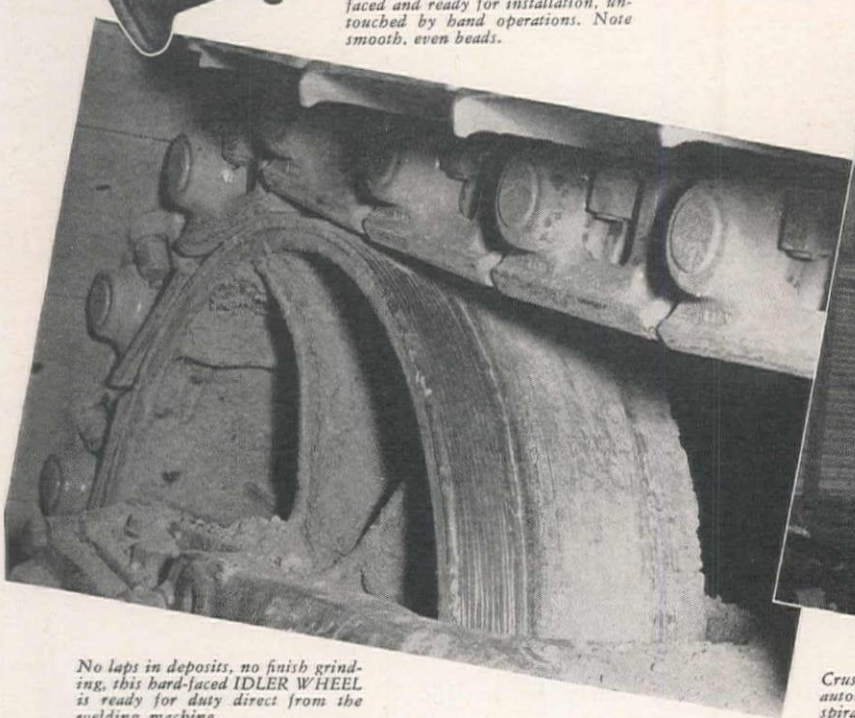
Faster hard-facing... smoother jobs

because they're welded AUTOMATICALLY!

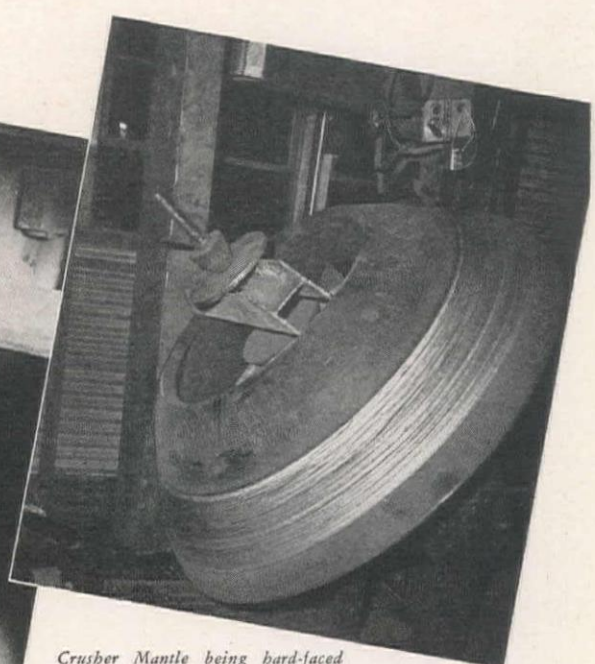
The new STOODY Wires are adapted to all processes where suitable flat or cylindrical work is hard-faced.



Tractor Rollers automatically hard-faced and ready for installation, untouched by hand operations. Note smooth, even beads.



No laps in deposits, no finish grinding, this hard-faced IDLER WHEEL is ready for duty direct from the welding machine.



Crusher Mantle being hard-faced automatically with one continuous, spiraling bead. Feed and rotational speed are adjusted to lap beads uniformly.

7 NEW STOODY Hard-Facing Wires

bring lower maintenance costs, faster completion on heavy equipment

There's 3 times more speed... there's almost perfect uniformity of deposits... finish grinding is seldom required when you hard-face AUTOMATICALLY with the new STOODY Fabricated HARD-FACING WIRES. Available in a wide range of analyses, these alloys are *made in coils* instead of the usual electrodes. As a result, they may be fed continuously to an Automatic Electric Welding Head... no unnecessary starts and stops, no human variation, no lost time for electrode replacement. Result? A *new* low in application costs, with a tremendous improvement in speed, uniformity and appearance.

Why not investigate automatic hard-facing of your equipment to clip maintenance costs... to get equipment back on the job quicker, easier and better than ever? There's a bulletin waiting for you on the new STOODY WIRES FOR AUTOMATIC APPLICATION. Write today!

STOODY COMPANY

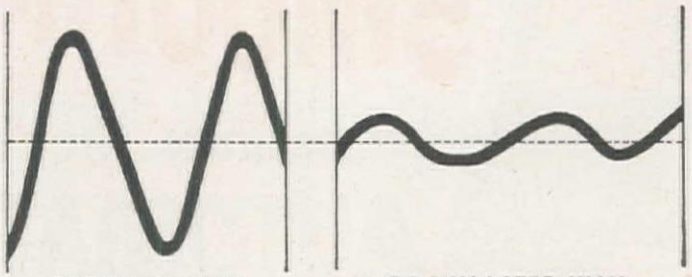
1156 W. SLAUSON AVE., WHITTIER, CALIF.

For maximum weldability in building up equipment before hard-facing, try STOODY MANGANESE. Fabricated in both electrodes and coils, it provides full Hadfield Manganese Steel properties.

Through Better Use of Energy

ROCKMASTER

Stopped Objectionable Vibration on This Job



ORDINARY WAY

An 11 hole blast using 3300 lbs. of dynamite fired by ordinary methods produced this reading on a seismograph used to record the vibration.

ROCKMASTER WAY

This ROCKMASTER blast used 12 holes and 3575 lbs. of dynamite, yet the seismograph reading showed only one-third the amount of vibration.

The vibration record of two comparable blasts, one fired by the Rockmaster blasting system and one by ordinary methods, is shown above. It is easy to see how important this reduction in vibration is to quarries, construction jobs and coal stripping pits that operate near residential communities.

and **ROCKMASTER** cuts costs, too!

The Rockmaster system splits up a big blast into smaller ones, staggered milliseconds apart. That's how it controls vibration. And that's why it also achieves these other important money-saving results!

1. ***More rock ready for the shovel.***
2. ***Better fragmentation***—less secondary blasting.
3. ***Far less "back-break"*** in quarries. Less pulverizing of coal in strip pits.
4. ***Wider spacing of drill holes*** can frequently be used, saving drilling costs and explosives costs.
5. ***Better control of "throw."***

Call in the Atlas representative today. He will be glad to give you the benefit of Atlas pioneering in milli-second delay blasting.



"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

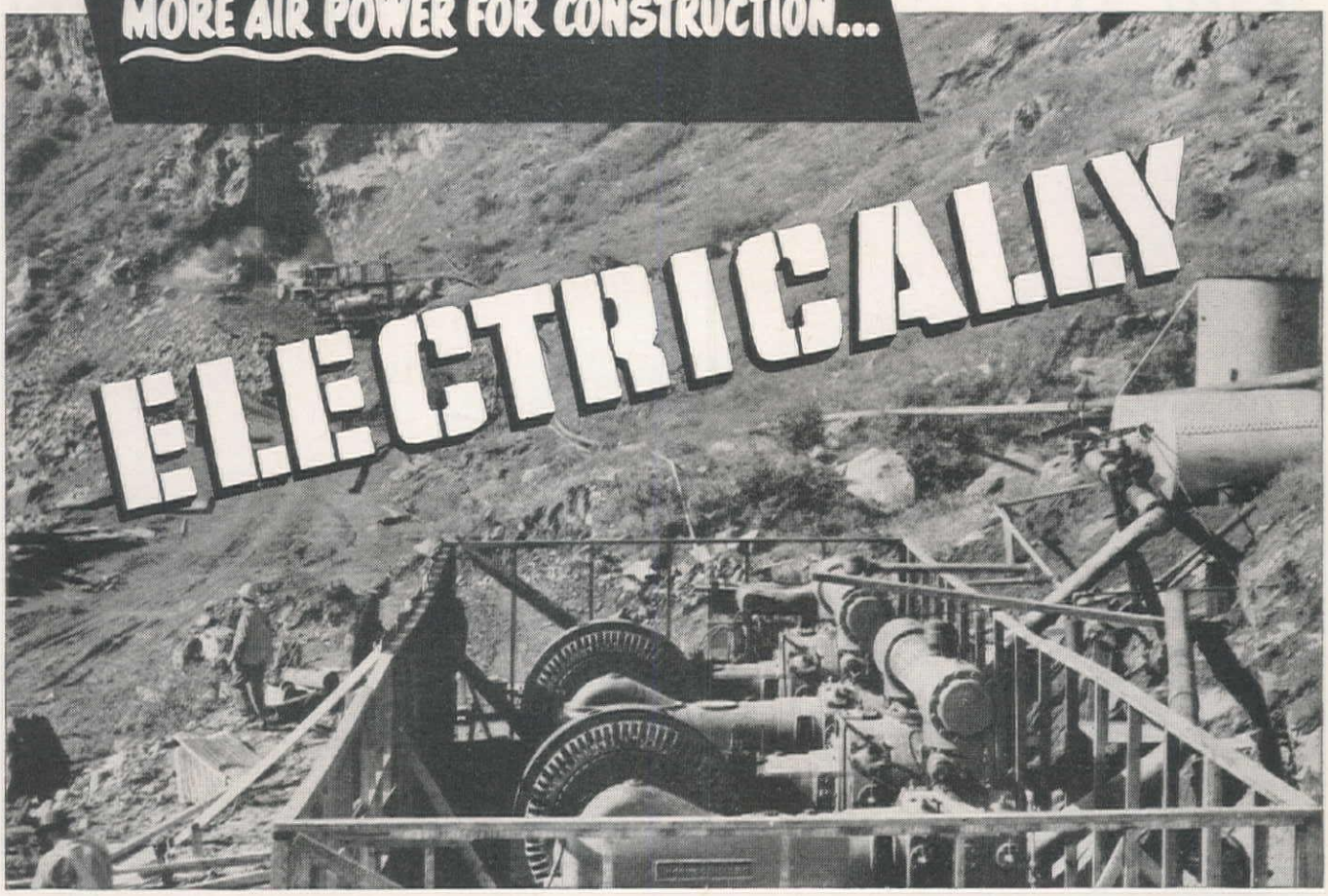
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ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

SAN FRANCISCO 4, CAL. ATLAS POWDER COMPANY SEATTLE 1, WASH.

MORE AIR POWER FOR CONSTRUCTION...



Compressor With Electric Drive: A High-Efficiency Tool For Progressive Contractors

Compressed air . . . electricity; each has its own field of application in construction operations. And when combined they form an unbeatable team for supplying continuous compressed air at the lowest possible operating cost. The electric drive requires little maintenance, yet affords maximum reliability. If the compressor power requirement is 75 horsepower or more, synchronous motors can be applied which give the additional advantage of power-factor improvement on the line, thereby making possible further savings in operating costs.

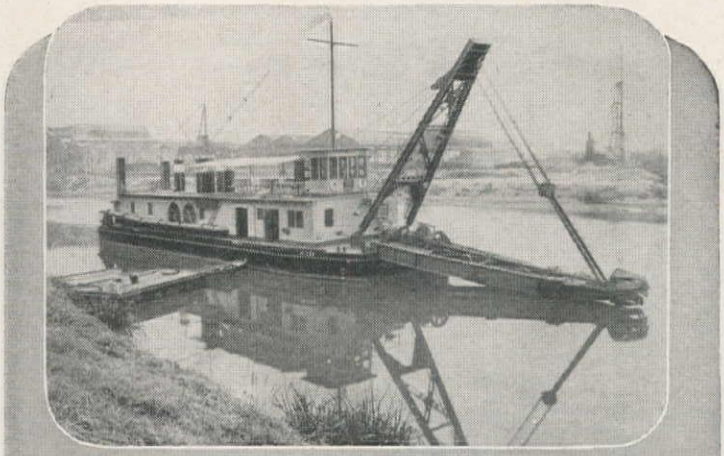
The electrically driven compressor is just one of many electrified construction tools which are helping contractors build more for less . . . faster. Whether you buy or build contractors' equipment, ask your General Electric representative to show you the inherent advantages of electric drive. *Apparatus Dept., General Electric Co., Schenectady, N. Y.*

ELECTRIFIED CONSTRUCTION
BETTER PRODUCT
LOWER COST

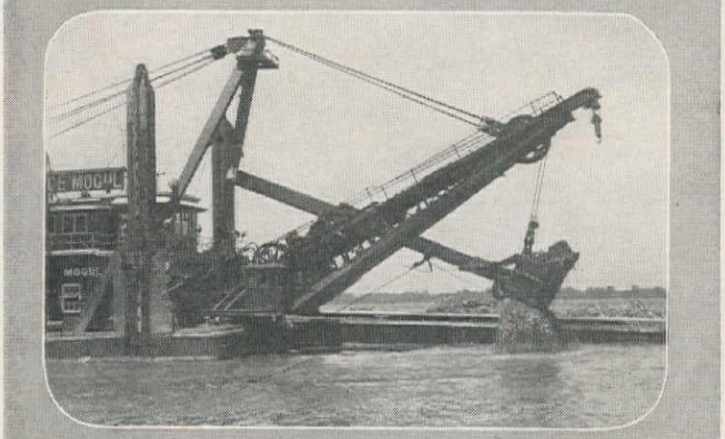
GENERAL ELECTRIC
655-65

You Can Depend On Experience

To Build A Fine Dredge



The "Riachuelo", a 15-inch hydraulic dredge, used in river-dredging operations in Argentina.



The 8- to 12-yard dipper dredge "Mogul" at work for the Great Lakes Dredge & Dock Co., in Lake Erie.



An 8-foot placer dredge mining gold in the Yankee Fork of the Salmon River, Idaho.

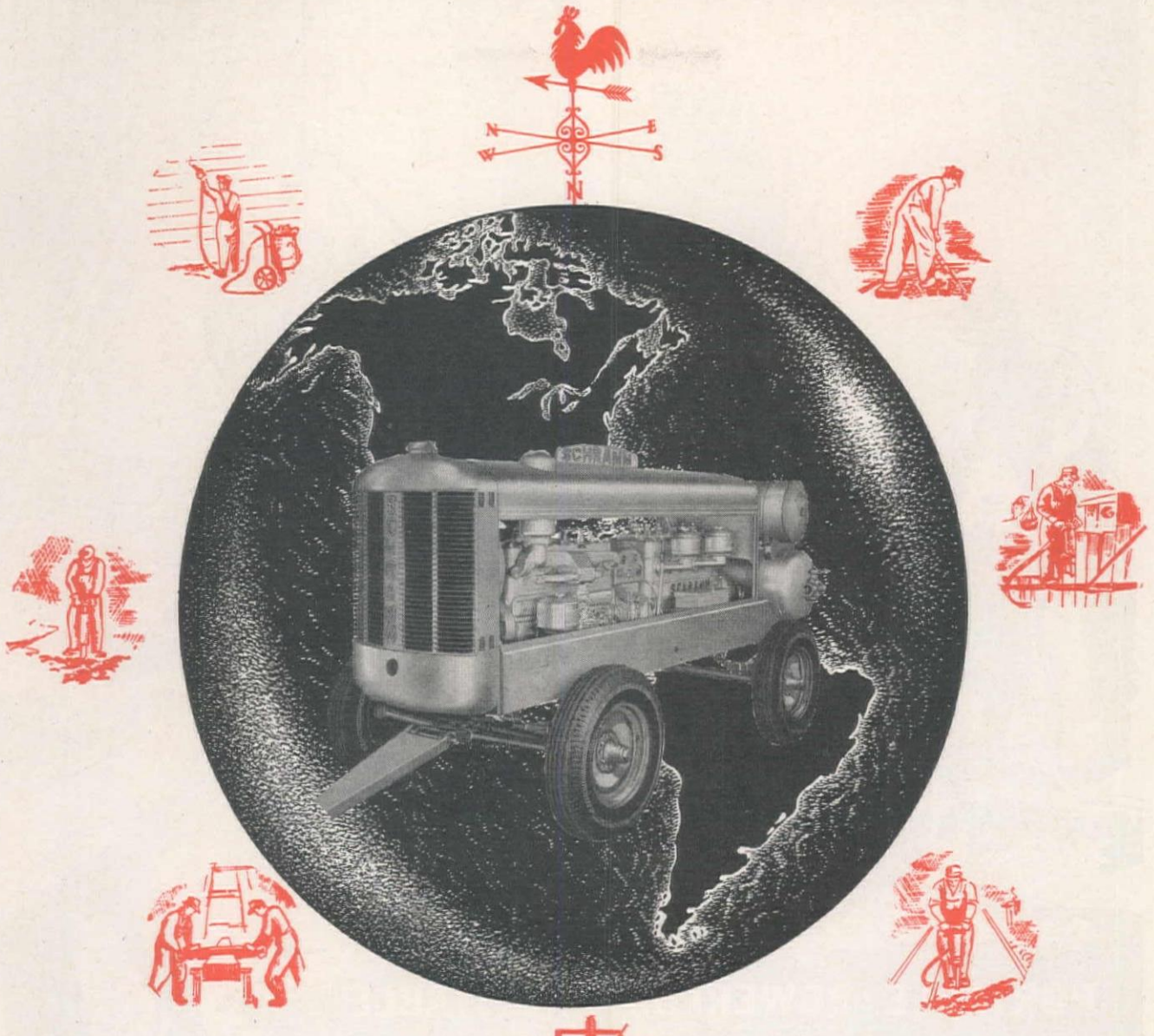
THAT'S ONE REASON WHY Bucyrus-Erie is best qualified to design and build a dredge for you, for Bucyrus-Erie's outstanding record of achievement extends over more than 60 years, during which it has been responsible for most of the important developments in hydraulic, placer and dipper dredge design, and has built over 74,000 machines for dry-land and underwater excavation. Added to this background of experience are the most complete manufacturing facilities in the industry and skilled craftsmen working with modern tools and methods to produce "years ahead" machines that will give you efficient, economical production throughout their long years of service.

16D47

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DOING JOBS LIKE THESE . . . *throughout the Construction Field!*

Rock Drilling	Trench Digging	Spray Painting	Tie Tamping
Concrete Breaking	Driving Sheet-Pile	Sand Blasting	Timber Sawing
Demolition	Backfill Tamping	Spraying Cement	Riveting

At almost every turn you need compressed air!

The above check list indicates some of the many compressed air jobs to be done, all of which are accomplished easily, quickly and economically with Schramm Air Compressors.

Here's *why* you profit, as others have, by using Schramm: they're compact, lightweight, easy to start; built for rugged jobs, to provide a continuous flow of air.

Important features include 100% water cooled; mechanical intake valve; forced feed lubrication and easy, electric push-button starting.

Performance everywhere has proved Schramm Air Compressors can do any compressed air job you require. Write today for list of models and sizes.

TOOLS for the JOB

Schramm Inc. also has a complete line of Pneumatic Tools to offer and recommend for operation by their Compressors.

These include Rock Drills, Paving Breakers, Trench Diggers, Clay Spades, Backfill Tampers, Tie Tampers, Sheeting Drivers, Demolition Tools, Chain and Circular Saws.

Write for bulletins and prices.

SCHRAMM INC.

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PORTABLE · POWERFUL · PROFITABLE

The portability of Barco Gasoline Hammers means easier handling, plus the ability to do jobs in difficult or hard-to-reach spots. Barco is packed full of power, deals a smashing, battering attack that never slackens no matter how tough the going. And as for profit, Barco's mechanized muscles do *better* work, at lower cost. Barco is faster and stronger than ever before, yet weighs the same. Other new improvements include a more easily-opened carburetor valve, and an arrangement for holding the cable which prolongs the life of the cable where it comes out of the handle.

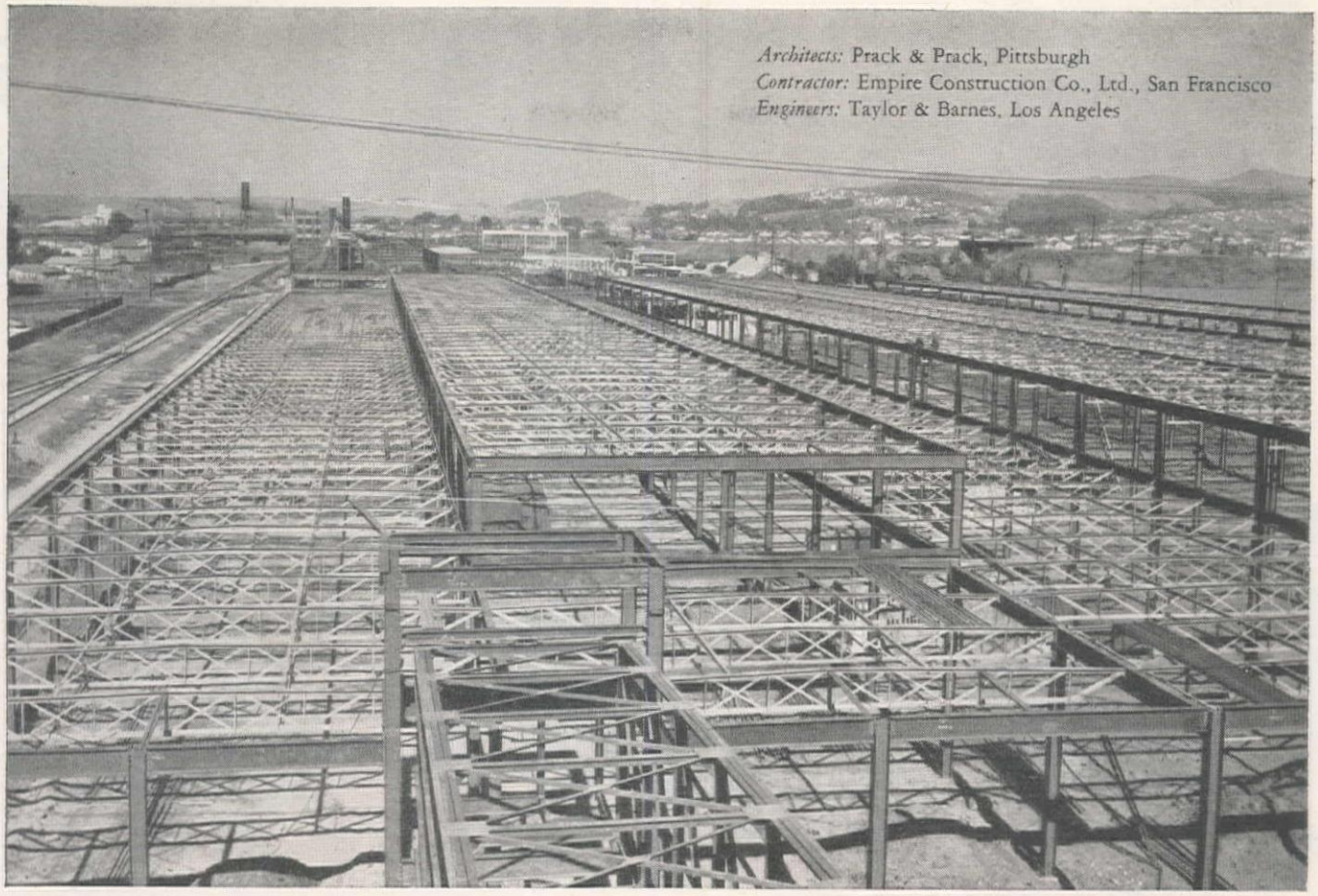
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THE CORNERSTONE OF
AMERICAN PROSPERITY
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BREAKING · DRILLING · DRIVING · TAMPING

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IN CANADA: THE HOLDEN CO., LTD., MONTREAL, CANADA



Architects: Prack & Prack, Pittsburgh
Contractor: Empire Construction Co., Ltd., San Francisco
Engineers: Taylor & Barnes, Los Angeles

NEW PLANT IN BAY AREA BUILT WITH *OPEN-WEB JOISTS*

Now nearing completion at Richmond, Calif., this one-story manufacturing plant for the American Radiator and Standard Sanitary Corporation has a floor area of more than 211,000 sq ft. To reduce the need for interior columns and thus provide greater clear floor space for manufacturing purposes, 300 tons of Bethlehem Longspan Joists, 40-ft long, were used as roof purlins.

ADVANTAGES OF LONGSPANS

Bethlehem Longspan Joists are excellent for supporting the roofs of factories, warehouses, and similar light-occupancy structures because they can be used to provide column-free floor areas up to 64 ft across. They also help other trades, for pipes, conduits and ducts can be run through the open webs. They accommodate plaster ceilings, too. And when outer walls are of masonry, they reduce the need for pilasters, thus permitting the architect complete freedom in placing doors and windows.

EASY TO INSTALL

Users of Bethlehem Longspan Joists can always count on reduced construction time, for these easy-to-handle joists go into place quickly by means of a lightweight gin pole. Like the Bethlehem Standard Open-Web Joists, they are delivered to the job completely fabricated and clearly marked, ready for use.

36-PAGE CATALOG

Because it contains much factual data and construction information, you'll find our illustrated joist catalog of great help when designing with Open-Web Joists. The nearest Bethlehem Pacific office will gladly mail you a copy.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM PACIFIC

BETHLEHEM STEEL

SEE OUR CATALOG IN SWEETS FILE

YOU can't afford to miss the *Road Show!*



BETTER ROADS FOR A BETTER WORLD · 45th Annual Convention and Road Show · SOLDIER FIELD CHICAGO · JULY 16-24, 1948 · AMERICAN ROAD BUILDERS' ASSOCIATION

No matter how busy you are . . . it will pay you to drop everything — July 16 to 24 — and ride, drive, or fly to the big 1948 Road Show in Chicago.

Here — *in one place, at one time* — you'll have an opportunity to see and compare all the latest developments in roadbuilding equipment and methods. You'll also have a chance to pick up vital information on planning, organization and costs . . . *facts you must have to keep pace with changing conditions in the construction industry.* But remember, this is the first Road Show in 8 years . . . everybody's going to be there . . . so don't put it off! Make *your* plans and reservations NOW!

QUICK FACTS

- A 9-day opportunity to "catch up" on all that's new in road-building.
- 30 football fields of latest post-war equipment — displayed AND OPERATED out-of-doors.
- Down-to-earth discussions by world-famous roadbuilding authorities.
- A chance to meet old friends . . . make new contacts.

45th ANNUAL CONVENTION and INTERNATIONAL ROAD SHOW . . . .

SOLDIER FIELD, CHICAGO, JULY 16-24, 1948

AMERICAN ROAD BUILDERS ASSOCIATION

International Building, Washington 4, D. C., U.S.A.

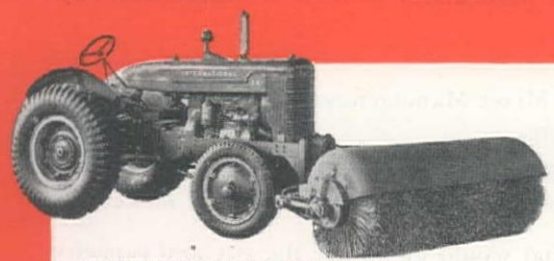
HOUGH

SAY "HUFF"

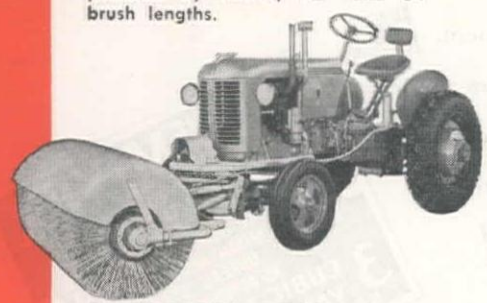
SWEEPER HEADQUARTERS



MODEL B UNIVERSAL ROAD SWEEPER: engine driven; sweeps to right or left; 78" path; selective brush speeds.



TRACTOR SWEEPERS are available for Case and International tractors — powered by tractor; 72" and 84" brush lengths.



ENGINE-DRIVEN SWEEPER-BLOWER — A complete sweeper-blower combination with its own engine drive — can be towed by light car, truck or tractor. Powerful blower insures removal of dust and fines from pockets and crevices.

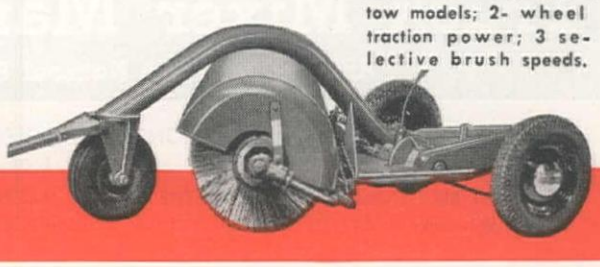


There's a Hough machine for every sweeping job. Sizes and types are available to remove snow, dust, debris, etc. from streets, alleys, highways, airport runways and aprons . . . . . to clean pavement for black top and other resurfacing, to clean tops of strip pit coal seams. Every unit is built to do a fast, complete job of sweeping . . . is the product of 27 years of sweeper-building experience. So, come to "sweeper headquarters" with your sweeper problems . . . . . write for full information and the name of the nearest Hough distributor.

THE FRANK G. HOUGH CO.

707 Sunnyside Ave. Libertyville, Illinois

TRACTION DRIVEN SWEEPERS — one or two-way tow models; 2- wheel traction power; 3 selective brush speeds.



"pig in a poke, or..."

Many of you will remember way back when the buying of concrete mixing and placing equipment was a "pig in a poke" proposition. No two units were similar in size or capacity. It was a virtually impossible task for the owner to accurately estimate the capacity of his machines or to bid accurately on jobs. And not only did this confusion hamper the user, but the manufacturers were also badly handicapped in their manufacturing and sales policies and particularly in their relations with customers.

The founding of the Truck Mixer Manufacturers Bureau was a direct result of this early confusion. The manufacturers of this equipment realized early that it would be of maximum benefit to user and maker if a set of standards were adopted that would guarantee the size and capacity of the mixer. It would protect the user against "outlaw sizes" . . . protect the maker against buyer resentment.

Today, a truck mixer must conform to these standards and as evidence of successful conformance, a Bureau rating plate is prominently displayed on the truck mixer. Look for it! It is your guarantee of accuracy!



Truck Mixer Manufacturers Bureau

Affiliated with The National Ready Mixed Concrete Association

BLAW-KNOX DIVISION
Pittsburgh, Pa.

CHAIN BELT COMPANY
Milwaukee, Wis.

CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.

THE JAEGER MACHINE COMPANY
Columbus, Ohio

RANSOME MACHINERY COMPANY
Dunellen, N. J.

THE T. L. SMITH COMPANY
Milwaukee, Wis.

These DU PONT Products make an efficient team on trench blasting job



1. Drilling holes 12 feet deep in soft-shooting rock at Aspen Creek Siphon job site of Colorado-Big Thompson Project near Estes Park, north of Denver.



2. Loading Du Pont "Red Cross" Blasting #4 (Free Running) Dynamite from 12½-pound bags. Contractor Horner & Switzer, Denver, used Du Pont Explosives.



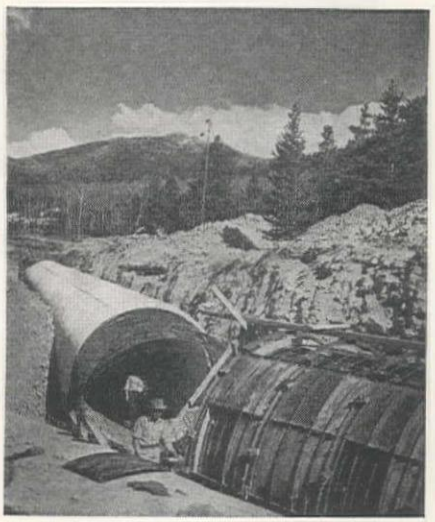
3. Priming with Du Pont "Gelex" No. 2, 45%, in perforated cartridges. Job required a total of 23,400 Du Pont Electric Blasting Caps.



4. Firing a typical blast in constructing the siphon trench. Shots were successfully pulled with a Du Pont No. 100 Blasting Machine.



5. Excellent breakage facilitated removal of stone. "Red Cross" Blasting and "Gelex" made a team that enabled contractor to keep ahead of schedule.



6. Completed section of siphon showing huge reinforced concrete pipe in clean-cut trench efficiently and economically blasted with Du Pont Explosives.

Ask any Du Pont Explosive representative for complete information about these and other dependable products for efficient blasting. E. I. du Pont de Nemours & Co. (Inc.), Hoge Bldg., Seattle, Wash. —Old National Bank Bldg., Spokane, Wash.—Midland Savings Bldg., Denver, Colo.—111 Sutter Street, San Francisco, Calif.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

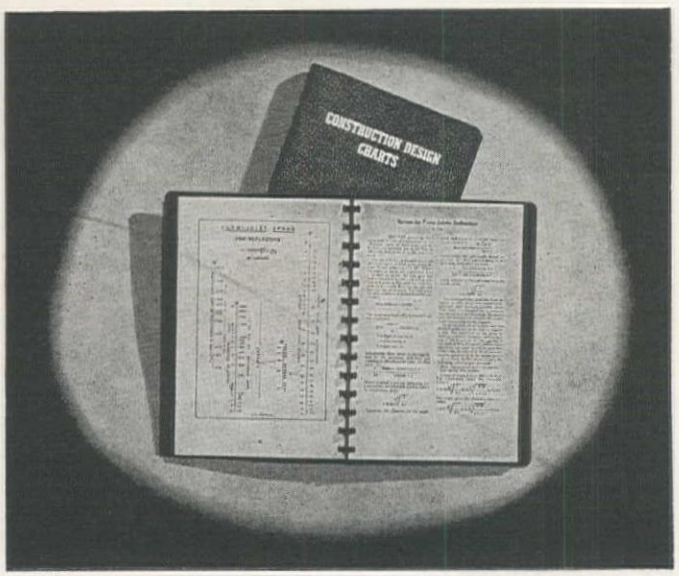
DU PONT EXPLOSIVES

Blasting Supplies and Accessories

ENGINEERS — CARPENTERS — CONCRETE MEN — FOREMEN — SUPERINTENDENTS:

SOLVE ENGINEERING PROBLEMS . . . . . at a Glance!

There is no time to waste these days on tedious figuring of routine problems! This new, enlarged edition of CONSTRUCTION DESIGN CHARTS, by Consulting Engineer James R. Griffith gives countless engineering shortcuts—and answers preliminary design problems in a flash! There's a whale of value in this enlarged edition for every man engaged in construction today!



This is the fourth reprinting of CONSTRUCTION DESIGN CHARTS, and greatly enlarged over all previous editions. Contains 100 design charts and 215 pages filled to the brim with valuable information that is a sure-fire hit with construction men. Handsomely bound in sturdy black Fabrikoid with gold stamped letters. A special metal binding allows each page to lie flat for easy reference.

THIS NEW EDITION IS LIMITED — ORDER TODAY!

The earlier editions of CONSTRUCTION DESIGN CHARTS disappeared like magic, so there's no time to lose in getting your copy. The supply is definitely limited, so we suggest placing your order immediately.

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City..... State.....

Position..... Company.....



More Payload per Pass

How much payload will it move? How long will it last? These are the yardsticks to use for judging a dragline bucket . . . and here's how *ESCO* dragline buckets measure up.

Engineered for Oversize Loads

Operators frequently use larger size *ESCO* buckets than would be possible with other makes. This is due to the *ESCO* engineering principle of maximum strength without excessive weight.

Wearing parts need not be made excessively heavy to allow for wear. They are made of wear resisting *ESCO* Manganese Steel which polishes in use, minimizes friction, becomes harder and tougher the more it works. Hollow arch construction further reduces weight and actually increases strength.

Built for Long Life

ESCO places weight where strength is essential. Result: *ESCO* buckets outlast other makes, operate with less maintenance work and expense.

Designed for Efficient Digging

The clean cutting lip of *ESCO* dragline buckets contains integrally cast streamlined tooth horns. Long, sharp teeth are placed for maximum efficiency, with outside teeth placed near edges to make the bite wider and digging easier.

An *ESCO* Bucket for Every Job

ESCO dragline buckets are made in four types: medium, stripping, standard and heavy duty, in sizes from 3/8 to 18 yards. Special buckets are made for unusual jobs. A call to your nearest *ESCO* representative or a letter to us will bring full particulars. Catalogs on dragline and dipper buckets free upon request. Use coupon below.

ESCO *Manganese Steel* FOR ULTIMATE ECONOMY

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ELECTRIC STEEL FOUNDRY
2163 N.W. 25th Avenue, Portland 10, Oregon

Please send catalogs on:
☐ medium dragline; ☐ stripping dragline; ☐ standard dragline; ☐ heavy duty dragline; ☐ Cast-welded dipper; ☐ All-Cast Manganese steel dipper.

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. . . increasing reservoir capacity



. . . Number 1 on Burbank's program to improve water service

The Horton welded-steel reservoir shown above holds 380,000 gallons. It was erected at Burbank, Calif. to increase reservoir capacity in the water distribution system.

THE RAPID industrial and residential development during the war made it impossible for the water distribution system at Burbank, Calif. to keep pace with demands. At the close of the war, a comprehensive study of the water system was made for the purpose of bringing water service in this wonder city at the south end of the San Fernando Valley up to its high pre-war level of reliability. This study revealed the most critical deficiency in the system to be reservoir capacity. The 380,000-gallon Horton steel reservoir shown above was installed to help remedy this situation.

Burbank's water supply comes from eight wells varying in depth from 160 feet to 765 feet. The wells are equipped with turbine-type, multi-stage, electrically-driven deep well pumps.

Prior to the installation of the new reservoir, total storage capacity was 9½ mg. . . . equal to only a five-hour supply at the peak demand rate. There are actually three separate pressure systems serving consumers at various elevations from 500 feet to 1,400 feet. The new steel reservoir augments the storage capacity in System No. 3.

ADVANTAGES OF HORTON WELDED STEEL RESERVOIRS

Horton welded steel reservoirs are a superior type of construction. Steel will not crack and develop leaks if there should be uneven settlement. The welded joints are *made* tight and stay water tight. Maintenance costs are low, since regular painting inside and outside will keep the steel in good condition.

We design, fabricate and erect Horton steel reservoirs and Horton elevated steel water tanks in a wide range of capacities to meet the governing specifications for municipal or industrial service. When figuring on jobs needing this kind of equipment, write our nearest office for quotations.

CHICAGO BRIDGE & IRON COMPANY

Los Angeles 14.....1444 Wm. Fox Bldg.
San Francisco 11....1213-22 Battery Street Bldg.
Chicago 4.....McCormick Bldg.
New York 6.....165 Broadway Bldg.
Cleveland 15.....Guildhall Bldg.
Detroit 26.....Lafayette Bldg.
Philadelphia 3.....1700 Walnut Street Bldg.
Tulsa 3.....Hunt Bldg.
Birmingham 1.....1598 North Fiftieth St.
Atlanta 3.....2183 Healey Bldg.
Havana.....402 Abreu Bldg.
Houston 2.....National Standard Bldg.

Plants in BIRMINGHAM, CHICAGO, and GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

April, 1948

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 23, No. 4

J. M. SERVER, JR. . . . . Editor
D. F. STEVENS . . . . . Associate Editor
ARNOLD KRUCKMAN . . . . . Associate Editor

Krug Denies Power

IF THERE WAS ever any thought that Julius A. Krug belongs in the office he now holds as Secretary of Interior, it must surely have been completely dissipated by his actions in connection with the drought and electric power shortage in California at the present time.

The Bureau of Reclamation power plant at Shasta Dam has most fortuitously just completed installation of its third generator, a 75,000-kw. machine, so that it was ready to come on the line April 1. The output of the two previously-installed generators is sold under contract to Pacific Gas & Electric Co. for distribution all over northern California. The utility company is the only agency equipped to take the power and distribute it.

Yet at a time when every sort of "brown-out" procedure is being carried out to conserve power, and Californians are praying for additional power, this Washington bureaucrat has refused to deliver the new energy to the company, basing his position on an obscure legal interpretation. Krug, who you will remember is a devotee of the party which, in speeches at least, puts "human rights above property rights," denies to the citizens of California adequate lighting, heating and other services, because he will not extend the present contract which he approved several years ago, but wants to make a new one which will be in conformity, not with the law necessarily, but with the biased opinion of the Interior Department's solicitor. As we write this, the situation, which may be changed any day, is simply this:

Californians desperately need power;
Shasta Dam is manufacturing power;
Krug will not let Californians have Shasta power.

It's time now—today, not next January—that Krug go. His interests are **not** the best interests of the people.

You Who Favor TVA...

SOMEBODY named Orson Buggy, of whom we have never heard before, submitted a letter to the editor of the New York Sun which that paper published in its February 7 issue, and which has been reprinted by the Pacific Northwest Development Association, the Southern San Joaquin Flood Control Association and other organizations. In view of its important contribution to the fight to keep the Authority type of governmental agency out of Western United States, *Western Construction News* is pleased to present the letter to its readers:

Sir: Comes now the TVA with its "Annual Report of Tennessee Valley Authority, 1947." As an involuntary investor in the undertaking, you should find the document interesting. Also you will find it disillusioning, especially if you have been reading those Horatio Alger stories which are constantly being ground out by the Authority's propaganda mill. The performance fails rather pitifully to live up to its advance billings, albeit you will discover that only at the expense of considerable effort required to assemble the disjointed fragments of the report, and thus find out what really goes on. If you accept the report as is, you will have been fooled again because, like all TVA propaganda, the job is very cleverly done.

If you are prepared to wade through some seventy-three pages of self-glorification, you will eventually encounter what TVA calls its "Financial Statements," and here the fun will begin. Naturally, you will look first for the profit and loss statement, which is the meat of all annual reports to investors; you won't find any because TVA follows what may be called the "progressive system of bookkeeping."

What's not disclosed

What you will find is a series of uncoordinated tabulations which are chiefly remarkable for what they do not disclose about the condition of the undertaking. In fact, if any business enterprise so befuddled its investors it would deservedly bring down on its head the collective wrath of the investors themselves; the Securities and Exchange Commission; the Department of Justice; the Federal Trade Commission; the Better Business Bureau; the truth-in-advertising contingent, and the full-disclosure boys.

By the same token, if TVA and other government bureaus were required honestly and fairly to disclose the true results of political management they, in turn, would bring down on their heads the collective wrath of us good burghers who foot the bill, and we should no longer find ourselves struggling with Federal, State and local tax budgets, which extort $1 of every $3 we earn.

According to its report, 1947 was the most successful year in TVA history. Let us see how successful it was from the standpoint of the taxpayer, who also holds the mortgage—not to mention the bag!

Up to June 15, 1947, the Federal government had turned over to TVA more than $814,000,000. The interest on that sum at 2½ per cent, which is the rate on long-term government borrowing, was $20,350,000 for 1947. TVA, on the other hand, had only $6,900,000 available from its operations to meet this interest obligation, or one-third of the amount required.

Who paid interest

Thus, with all of the subsidies it enjoys, TVA was shy $13,450,000 of earning the interest properly chargeable to it in 1947. The Authority has now been in existence for fourteen years; if the year 1947 was its most successful, you can imagine, generally, what the other thirteen years look like.

But, believe it or not, the Federal government didn't even get the $6,900,000 of interest. On more than three-quarters of a billion dollars of its capital TVA paid no interest whatever. On the remaining $56,500,000, represented by 1¾-2½ per cent bonds, it paid token interest at 1 per cent, making its total interest payment for the year $565,000. Thus, while it managed to earn one-third of its interest costs, it actually paid less than 3 per cent of those costs. The Federal taxpayer was forced to dig up the other 97 per cent, totaling some $19,800,000.

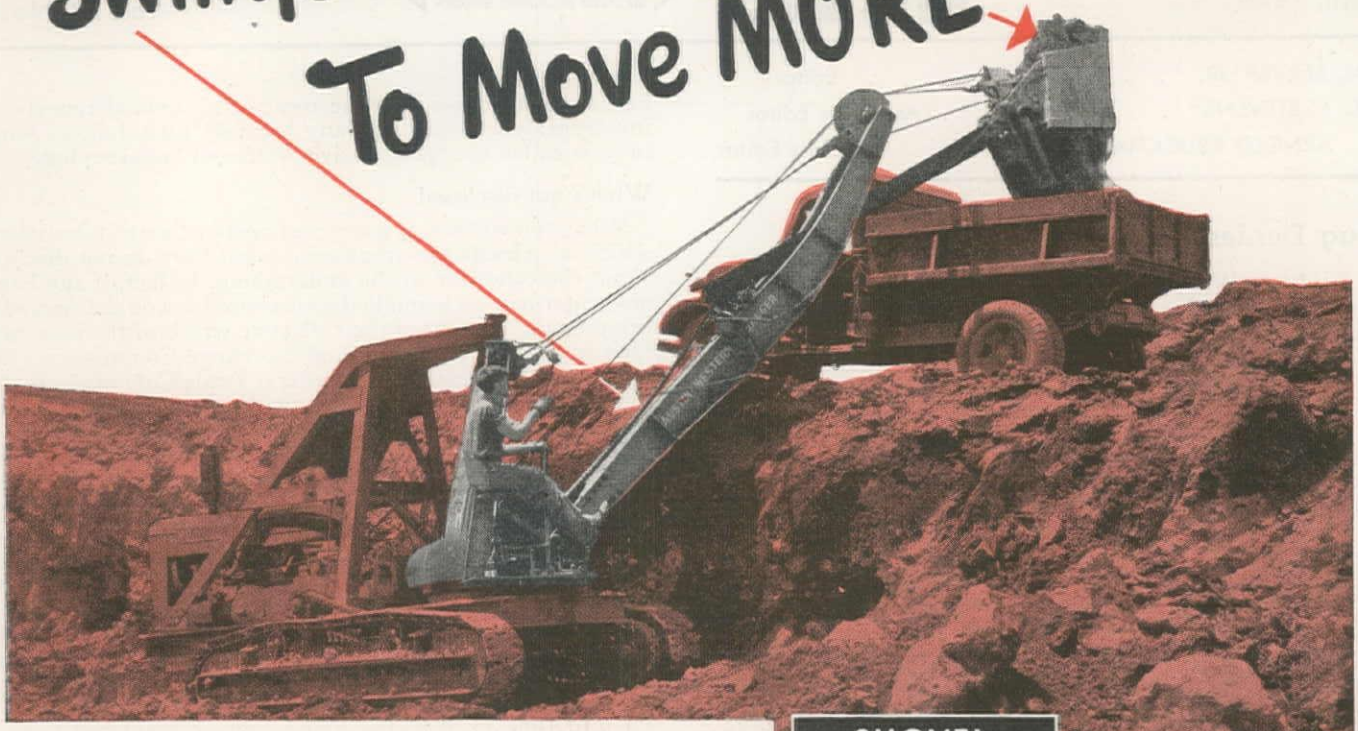
Let us, however, give credit where credit is due; any scheme under which the mortgage holder also pays the mortgage interest and has been doing so for fourteen years is, to say the least, original. In the business world that predicament is politely known as bankruptcy.

TVA claims that its electric power rates provide a yardstick for those of the non-subsidized power companies. Actually, if that theory were applied, and TVA was thus deprived of all of the subsidies it enjoys, its financial results for 1947 would have been even less favorable than shown in its report. However, we need not go into that subject here because in a recent report the government's own General Accounting Office has pointed out that no comparison can properly be made of the cost of TVA's power operations with those of a non-subsidized power company.

The most obvious of TVA's subsidies is the item of taxes. The Authority does not pay and never has paid a dollar of Federal income, Federal excise, or other similar taxes such as are paid by business. On the contrary, to make up its annual deficits it uses, as we have seen, part of the taxes

(Continued on page 96)

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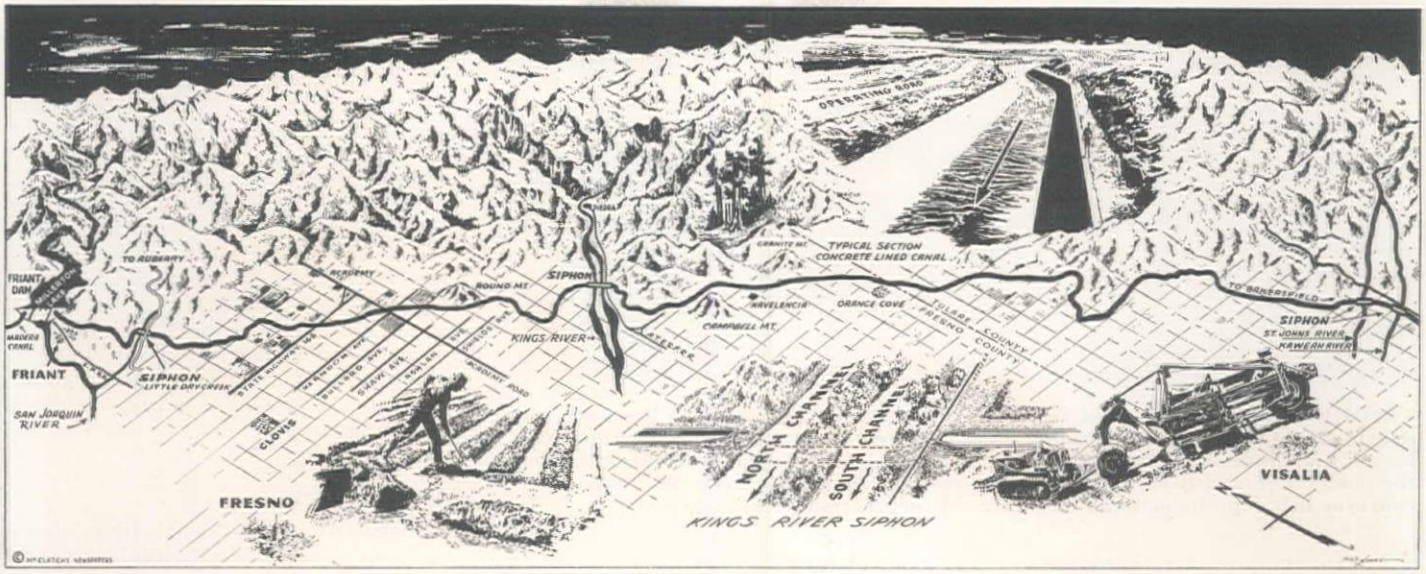
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WASHINGTON—COLUMBIA EQUIPMENT COMPANY.....*Seattle*
WYOMING—WILSON EQUIPMENT & SUPPLY COMPANY.....*Cheyenne*



PERSPECTIVE MAP shows first 72 mi. of the canal as it skirts the Sierra Nevada foothills south to Kaweah River.
Drawing Courtesy Fresno Bee.

Friant-Kern Canal—
Trimmed and Lined by Huge Jumbos

Huge canal, key feature of the Central Valley Project, is one of the largest ever to be concrete-lined in one continuous operation using specially designed mechanical equipment — Average of 800 ft. is being lined in one 8-hr. shift

SPECIAL TRIMMING, lining and finishing jumbos, built to conform to the canal cross section and to entirely complete the canal in one continuous operation, are being used on construction of the Friant-Kern Canal, a key feature of the California Central Valley Project. The mechanical lining equipment, built for the job by the Guntert & Zimmerman Machinery Co. of Stockton, Calif., and altered to remove the "bugs" of the original design, has enabled contractors to place and line as much as 1,000 ft. of the huge canal in one 8-hr. shift.

Friant-Kern Canal, when completed under the supervision of the United States Bureau of Reclamation, will extend from Millerton Lake, the reservoir created by Friant Dam, beyond the Kern River to an area south of Bakersfield, Calif., a distance of 156 miles. Designed for a maximum capacity of 5,000 cu. ft. per sec. flow, it will convey precious irrigation water to 358,000 ac. of new irrigable lands in the highly productive San Joaquin Valley and supplemental water for an additional 374,000 ac. threatened by shortages.

Friant Dam and reservoir

Friant Dam was completed on June 16, 1942. (For design and construction details on Friant Dam, consult *Western Construction News*, July 1939, August 1939, October and July 1941.) Millerton Lake reached its full capacity and overflowed the spillway section of the dam for the first time on June 30, 1945. The storage capacity of the reservoir is 425,000 ac. ft., and this has now been increased by 83,000 ac. ft. with the installation of three drum gates and other control facilities on the spillway section. The maximum annual discharge from the reservoir is 3,592,000 ac. ft., with a minimum of 507,000 ac. ft., or an average of 2,000,000 ac. ft. per year.

Although a completed canal may not appear to involve many difficult problems, construction on the Friant-Kern Canal presents a Herculean task as the canal skirts the foothills of the Sierra Nevada range, gouging through solid rock at places and plunging under rivers and main highways through huge siphons at other places enroute. Construction of the Little Dry Creek, Dry Creek and Kings River Siphons, major appurtenant structures of the many occurring along the route of the canal, will be discussed in *Western Construction News* for May, 1948, along with design and additional construction features. This article deals with the canal excavation and lining work, and the huge machines which have accomplished this work in record time.

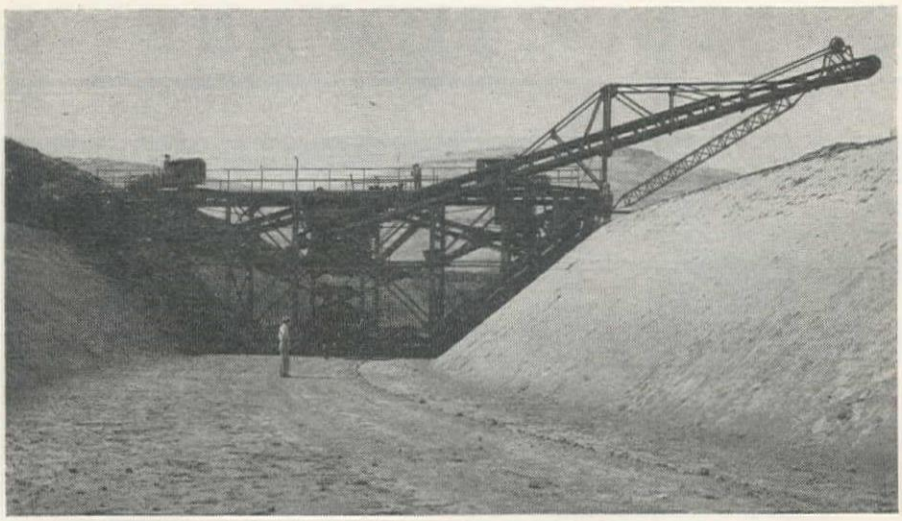
Canal design

The canal is one of the largest ever to be concrete-lined in one operation. It is designed with a bottom width of 36 ft., 80 ft. across the top, and a depth of 17 ft., 6 in. Sides and bottom are being lined with 3½ in. of Class A concrete, with a side slope of 1¼ to 1. Designed for capacity flow of 5,000 cu. ft. per sec., the canal has a grade of one foot on 10,000 ft., or approximately ½-ft. drop per mile.

It is natural that special equipment should be developed, and also made workable, to line the canal in one continuous operation. The Guntert & Zimmerman-manufactured machines were originally developed by engineers of Peter Kiewit Sons' Co., contractors for the first section of the canal work, in conjunction with the structural manufacturing concern.

Parade of equipment

This equipment comprises four jumbos which follow one another closely in a slow parade at the rate of one foot per minute or better. The machines span the canal and travel on 70-lb. railroad rails set along the canal berms. They consecutively trim the canal section to



TRIMMING MACHINE, viewed from the center line of the canal as it moves upstream. The 136-ton machine, riding on rails placed 85 ft. center-to-center on canal berms, fine-grades bottom and slopes with two lines of digging buckets turning from the center line and delivering excavated material to rubber conveyor belts. Main conveyor belt deposits material on either side or in front of the machine.

the exact shape and size, place the concrete lining in the bottom and sides all in one operation, cut the longitudinal and transverse grooves, and finish the concrete. Men stationed in the final jumbo in the line-up fill the grooves with a mastic filler and spray the curing compound on the finished concrete.

All of the machines are wheel-mounted and constructed to ride along the single rail on either side of the canal. The largest part of the canal is excavated before the huge equipment goes into action.

Trimming machine

The first machine in the line-up is the trimmer, used for fine-grading the canal cross-section which has previously been roughly excavated and left 6 in. full in order to give the trimmer a solid face on which to work. This machine consists of a structural steel gantry frame unit which, in general conforms to the true section of the canal prism. It has a total weight of 136 tons, and is supported by two sets of trucks on each side of the machine which have a wheel base of 30 ft. The machine is propelled forward along the rails which are placed on the canal berms, 85 ft. from center to center.

In principle, the fine-grader is a composite arrangement of endless belts. Two lines of digging buckets turn from the center line of the canal, begin the digging cycle at the center line and continue up the slope to the top where they discharge excavated material to rubber conveyor belts.

The buckets are fitted with detachable teeth on the cutting side. The steel teeth are set on the vertical lip of each bucket, leaving the smooth side down, to guarantee a smooth, clean cut. Each bucket line contains 13 buckets, with each bucket having a capacity of 8 cu. ft.

The digging bucket lines are direct driven through the drive sprockets of Caterpillar D-7 tractors mounted on each side of the trimmer. The buckets themselves are mounted on the track chain of a Caterpillar D-4. Rollers for the bucket lines are Caterpillar D-7 rollers split and bushed with bronze bearings.

Conveyor belts

Excavated materials are carried by the two 24-in. belts on each side of the machine to the main conveyor belt, 36 in. in width, which dumps the excess earth in the clear on the low side of the canal. The bucket lines are followed by a steel strike-off board which trims the canal section to specified lines and grades.

The main conveyor or stacker belt, operating at a speed of 180 ft. per min., was constructed so that material could be deposited on either side of the canal or in front of the trimming machine. In places of large cut where the stacking belt could not deposit material on the sides of the canal, trucks were used to remove the material from in front of the trimmer.

In the first few miles of the canal, it was necessary to trim through hard schist and decomposed granite. Here, the teeth on the bucket lines averaged only 30 hours use. This not only required changing the teeth often, but resulted in an expensive item for trimming operations. Heavy-duty scarifier teeth were installed between every other bucket in the line to root out most of the harder materials and prolong the use of the detachable teeth. A labor crew follows the trimmer in such sections with hand shovels and a pneumatically-operated tamper to backfill the holes and dress any uneven places.

TRUCK FAILED to make turn and rolled into canal during editor's visit. Cab was demolished but driver lived. Comparison illustrates the canal's size.



Propelling power

The trimming machine is propelled mechanically by a system of sprocket gears attached to each side of the power take-off of a Caterpillar D-2 tractor which is mounted on the front center of the machine. By means of drive shafts from the sprocket gears and with Braden reduction gears, power is supplied to each wheel of the four truck assemblies.

The forward speed of the trimmer is adjusted to travel at the speed normally obtained by the tractor unit operating in second gear. Using the second gear as the basis for the travel speed provides a wide range of gears for increased or decreased speeds.

Hydraulic jacks

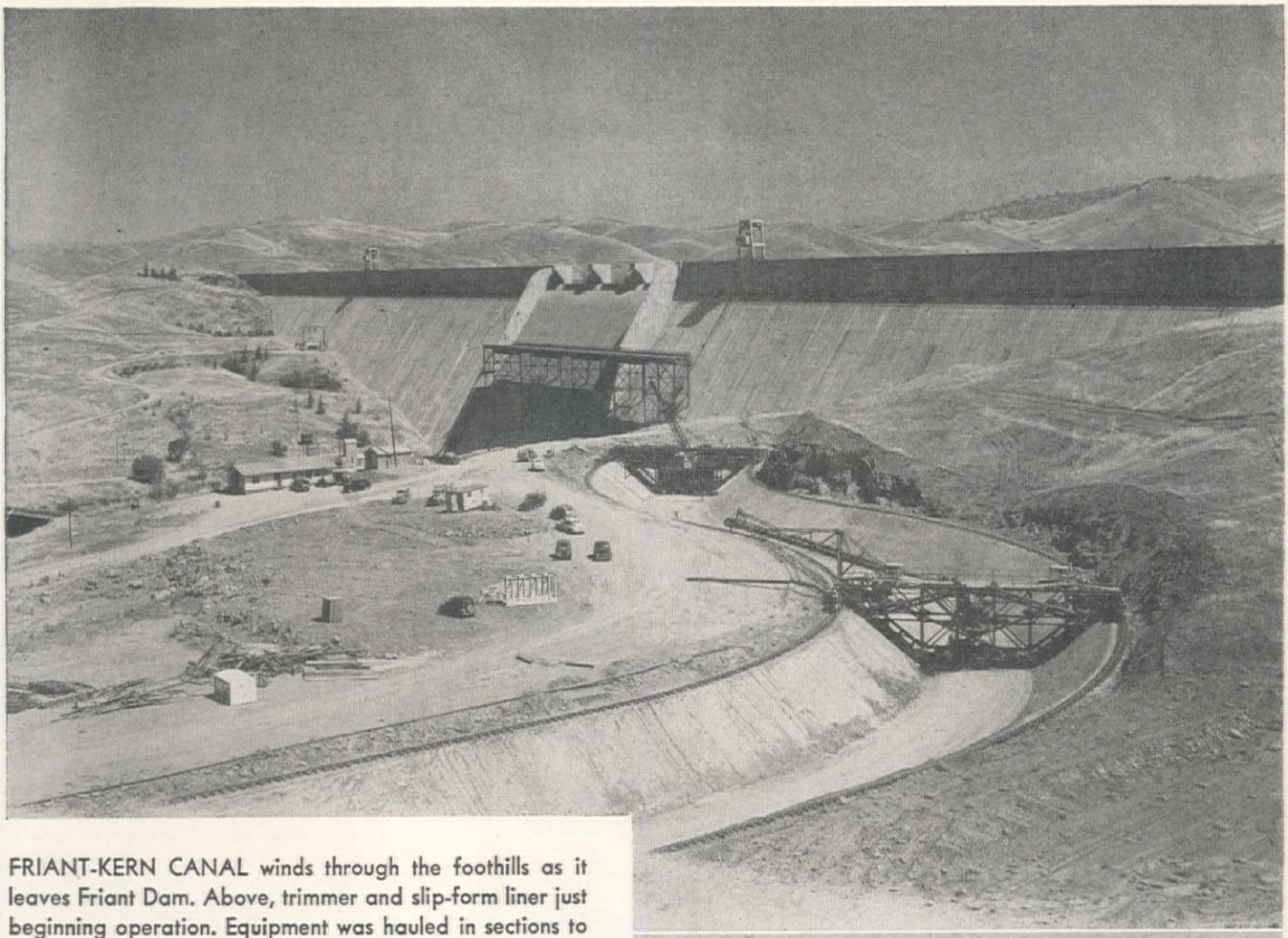
In order to keep the machine "floating" and trimming absolutely true to grade, hydraulic jacks are installed above each assembly of wheel trucks so that sections of the machine can be raised or lowered by small increments. One man on each side tends these jacks constantly. The grade is maintained by a system of hubs set on each side of the canal ahead of the trimming operations, with a piano wire strung between the hubs from which the exact elevation can be determined at any station. An outrigger level, mounted on the trimmer, is swung out to check against the piano wire.

Many difficulties were encountered at first in propelling the heavy machine around sharp curves. The long wheel base created the natural tendency for it to push or bear against the outside arc of the curve. This was eliminated to some extent by the installation of large bolsters located in the center and on each side of the machine. The bolsters acted on the principle of a differential gear and by a swivel rotation action, reduced the power ordinarily required in traveling around a curve. The driveshaft of the trimming machine is split in the center, so that either the left or right wheels can be made to turn faster or slower in rounding curves.

"Bugs" removed

Many of the "bugs," commonly encountered in the design of any special and complex equipment, had to be righted before this machine was entirely adapted to the job. For instance, the weight of the machine caused some deflection in the center which had to be adjusted at times to prevent over-trimming. Some structural cross members were added to give extra strength to the supporting frame.

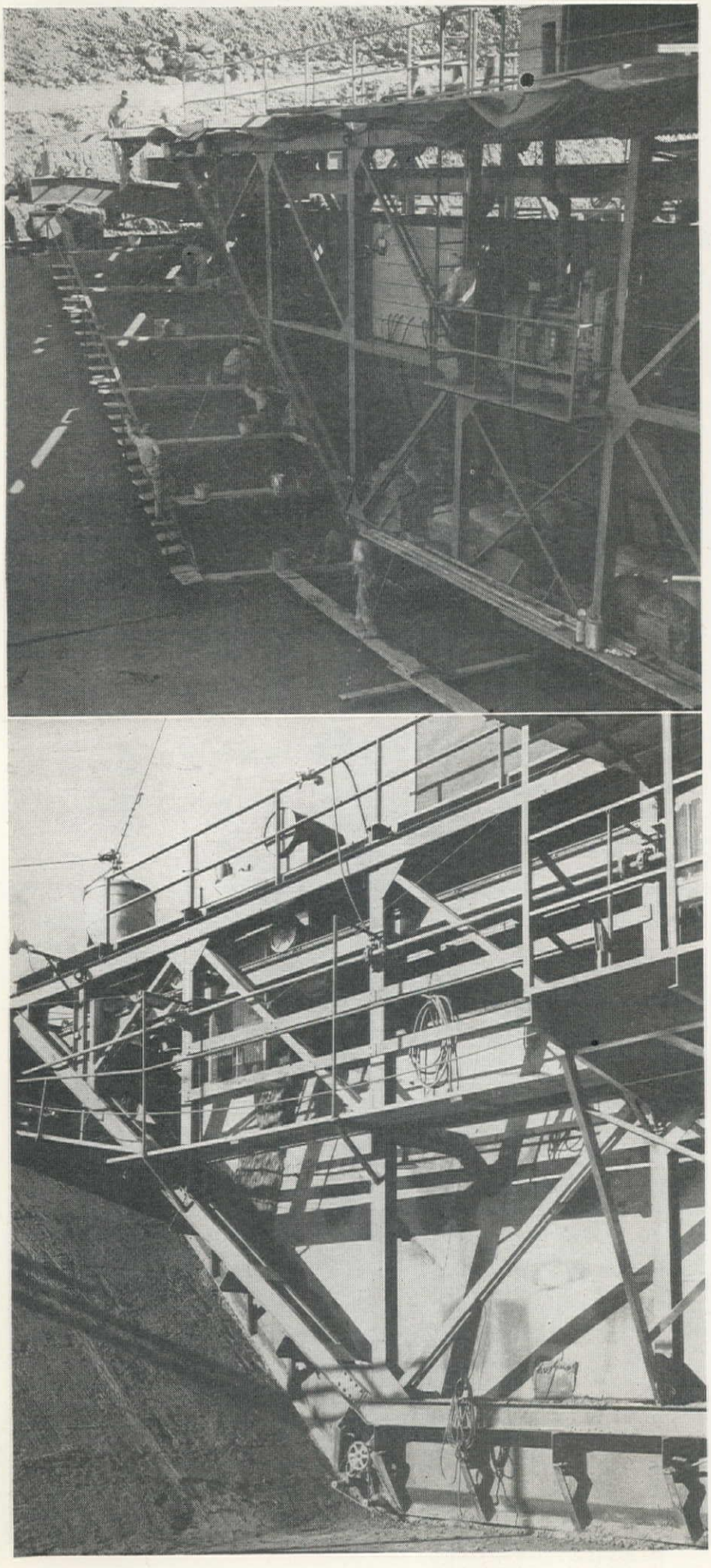
Also, different types of bronze bushings were installed in the digging belt pulleys to eliminate bearing shaft troubles. And an electric welding machine was installed as an integral part of the trimming machine to make emergency repairs, saving valuable operating time. The trimming machine is actually



FRIANT-KERN CANAL winds through the foothills as it leaves Friant Dam. Above, trimmer and slip-form liner just beginning operation. Equipment was hauled in sections to job site and constructed in place. Below, the parade of jumbo rigs with trimmer in the lead followed closely by lining machine, groover, and jumboes from which mastic filler is applied to construction joints and curing compound is sprayed.

Bureau of Reclamation Photos.





the most important jumbo in the line-up, since its breakdown would naturally slow down the remainder of the lining operations.

Lining machine

The Peter Kiewit Sons Co. and Guntert & Zimmerman also jointly developed the special concrete placing and vibrating machine, familiarly called the "slip-form." Briefly, this machine was designed to receive concrete direct from a mixer, distribute and vibrate the mix, and move slowly forward depositing the thin slab of concrete lining on both the sides and bottom.

The "slip-form," constructed of structural steel members, conforms to the exact desired position of the canal lining. First estimates indicated that 50 ft. per hour would satisfy the designer's expectations. More than double this amount is being lined now with the machine vastly improved.

An electric dump car receives the concrete from a double-barreled mixer, which constantly moves along the low side of the canal accompanying the lining machine. The traveling car with its operator moves transversely on rails and dumps concrete down a steel bulkhead into hopper bins along both slopes and floor of the canal.

The concrete is held in the hoppers until it is discharged to the canal subgrade. There, it is consolidated by 6 built-in electric vibrators and smoothed over by a 4-ft. skin plate or tail plate which presses the concrete down flat to leave it semi-finished at the proper grade. Cement finishers work the concrete by hand from staging installed at the back side of the slip-form with steel trowels until the concrete is smooth and sealed.

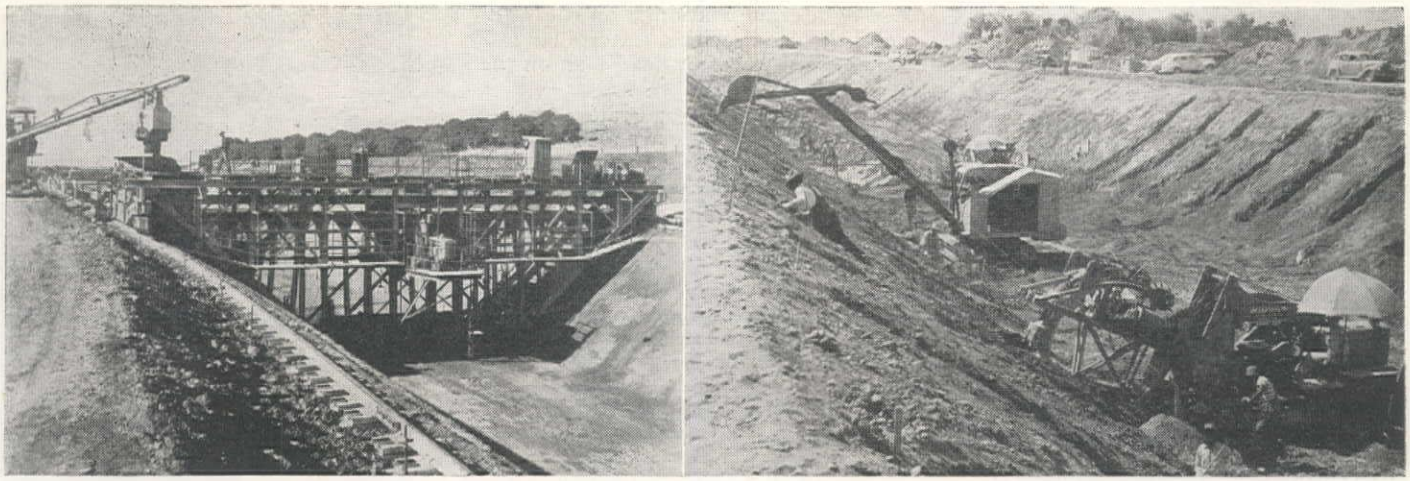
Driving system

This machine is also propelled by a Caterpillar D-7 tractor unit. The drive sprocket, shaft and reduction gear system is arranged to furnish power to each wheel. In addition, the lining machine is equipped with a Diesel generating set to operate the 2-cu. yd. electric concrete car and also the 6 electric built-in internal vibrators. As in the case of the trimming machine, the forward speed of the slip-form is adjusted with the tractor engine operating in second gear.

One of the first problems encountered when the machine first began operation was that its manufactured weight of 75 tons was too light to provide sufficient traction. An additional ballast consisting of 25 tons of sand bags supplied the necessary weight, and traction difficulties were not encountered even on the shorter curves of 300 and 350 ft. radii.

The slip-form was constructed with the same wheel base as the trimming

SLIP-FORM lining machine, rear and front views. Top, labor crew on scaffolding is hand finishing the canal surface after the slip-form has placed the 3½-in. concrete layer. Bottom, close-up of the front. At the upper left, the bucket which travels the transverse length is just starting across and is dumping concrete down the bulkhead into hopper bins along bottom and slopes.



LINING MACHINE used on a later portion of the canal, left, had elephant trunks instead of solid bulkhead to carry concrete mix from dump-car into hoppers. Right, trench liner and backhoe team up to excavate cuts for side-drains in the canal bank.

machine, 30 ft. at each end, and was also equipped with hydraulic jacks for raising or lowering the tail-plate to the established grade. The same piano wire is used for reference as on the trimming machine.

Slip-form innovations

Bolsters were also installed in the center and on each side of the machine to aid in maintaining alignment around curves. The machine was originally equipped with cable winches to assist the forward movement in the event the wheels did not have sufficient traction, but the 25 tons of ballast made use of the winches unnecessary.

Another innovation was made on a machine built for the Arizona-Nevada Constructors, contractors for a portion of the canal south from the Kiewit schedule. Elephant trunks were substituted for the solid steel bulkhead plate to carry and guide the concrete mix into the hopper bins. The row of 20 elephant trunks extending the transverse length of the machine with square mouths 48 in. across, allowed visibility in both directions, a feature not obtained by use of the bulkhead on the original machine.

Finishing machine

The third machine, known as the finishing and grooving machine, was also furnished by the Guntert & Zimmerman Co. As far as it is known, this is the first machine of its kind constructed whereby mechanical finishing was attempted. This attempt was not entirely successful, so the method was abandoned, and hand labor was again used.

Originally, three finishing machines were installed on this jumbo, one to travel up and down each slope and one to finish the bottom concrete. These machines traveled up and down on steel tracks, and were fitted with a steel knife to cut the transverse joints at every 20-ft. interval. Even though the concrete was at a low slump of 1¾ to 2 in., it sagged under the action of these machines. Now, finishing is done by a labor crew with hand trowels on scaffolding behind the lining machine.

The finishing machine is propelled by a Caterpillar-4400 Diesel unit with a generating set which operates the 5 h.p. motors on each side of the machine. The speed of the machine is regulated by a standard transmission unit with 3 forward speeds and one reverse speed.

End of the parade

The fourth jumbo in the line-up is used for applying the mastic filler and the curing compound. It is constructed of light structural steel members and provides means for men to work over the fresh concrete without impairing it prior to the final set.

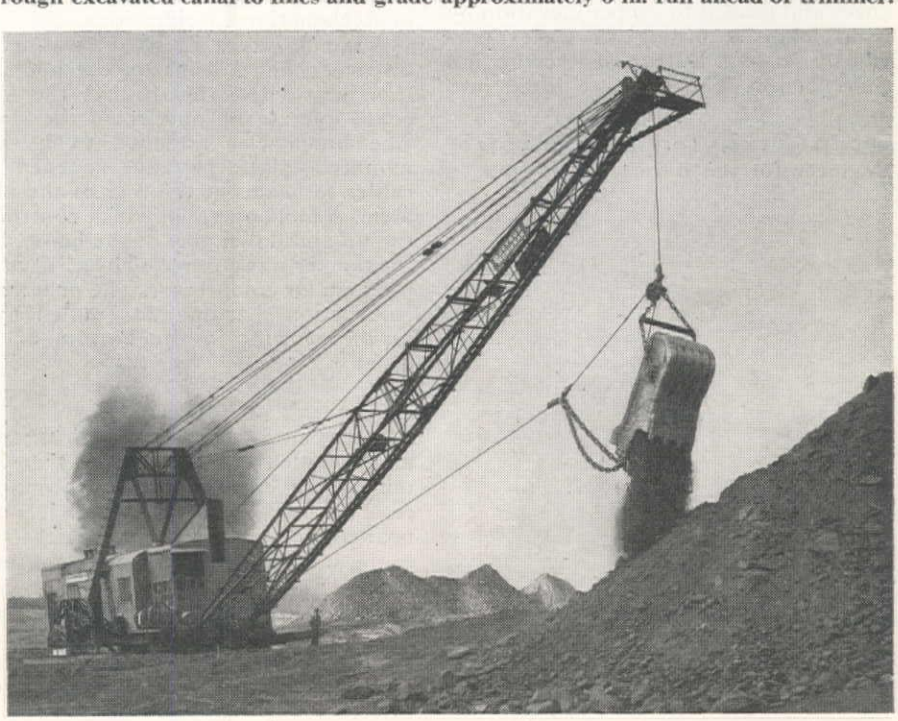
This machine is driven by a 2½-h.p. motor with a planetary or conventional transmission. Another 2½-h.p. motor is used for agitating the mastic filler, which consists of a powdered asphalt, short fibre asbestos, diatomaceous earth and powdered limestone. The liquid ingredients consist of an asphalt flux oil and a plasticizer.

A 7½-hp. motor drives a 28 cu. ft.-capacity air compressor that supplies air for extruding the filler material. A special tube was designed for this purpose. It was made 2½ in. in outer diameter by 4 ft. with a special nozzle equipped with a snap-on or quick coupling which immediately shuts off the air when it is disconnected. The joint filler is mixed in a mixing drum and extruded by 120 lb. of air pressure.

Concrete curing

The concrete is cured with light-reflecting white pigmented curing compound, applied at 120 p.s.i. pressure from a 150-gal. reservoir tank. This compound is pumped through three sets of nozzles by two one-inch pumps driven by gasoline engines. The curing compound, in reality a white paint, helps dissipate the heat formed by setting of the concrete and does away with the expensive cooling pipe installations or the wetting down of the surface that is usually necessary to dissipate the heat.

GIANT Bucyrus-Monighan dragline dumps earth along the right-of-way of the canal. Note figure of man for comparative size. Draglines, bulldozers and carrier scrapers rough excavated canal to lines and grade approximately 6 in. full ahead of trimmer.





R. K. DURANT is Construction Engineer in charge of the Friant-Kern Canal work for the U. S. Bureau of Reclamation.

It requires about 8 men to operate the trimming machine, 22 men on the lining machine, and 6 men to apply the curing compound and mastic filler.

Batch plant

Concrete aggregates are batched in a central mixing plant about one mile south of Friant, and transported in dump trucks equipped with 4 or 6 compartments, each compartment containing 1.4 cu. yd. of properly proportioned concrete. The batch plant has a capacity of 900 cu. yd. in one 8-hr. shift.

The concrete batch is delivered by the trucks to the double-barrelled mixer alongside the lining machine. There, each batch is mixed for 1½ minutes and discharged by a bucket and skip rig into the electric car. The concrete, mixed for a slump of less than 2 in., is mixed with a 3 and 5 per cent air-entraining agent on the mixer to cut down "bleeding."

The rails upon which the machines travel are lifted behind the machines and re-laid ahead of the procession on the Kiewit company's lining operations. The berms are semi-finished by a bulldozer and graded to proper elevation by hand labor according to stakes previously set by a Bureau of Reclamation survey crew. The rails are lifted into place by a crane stationed on the right side of the canal, with a Caterpillar D-7 used as a tail-tower or dead-man on the left side.

Seventy pound railroad rails are used for the track and these are placed in 30-ft. sections on 6 x 8 x 32-in. ties, with the rails screwed to the ties by means of ¾-in. bolts. Sections are joined together by a splice flange. The ties are spaced on 12-in. centers, the close spacing being essential to provide sufficient bearing for the concentrated wheel loading of the heavy trimmer and slip-form, especially on the narrower berms.

SPEED S. LEONARD, below, is Field Engineer for the Bureau on the job.



Excavating equipment

On the Kiewit portion of the canal constructon, a large part of the canal is excavated before the mechanical equipment goes into action. The main excavation was accomplished by drag-lines, tractors, bulldozers, and scrapers. Two of the largest machines employed by this company were a 5-W Bucyrus Monighan and a 7200 Marion dragline, each of which is a walking type machine of 5 cu. yd. capacity with booms of over 100 ft.

The Morrison-Knudsen & M. H. Hasler Co. used a 9-W Bucyrus Monighan for the large cut on their schedule at the Kings River Siphon. Arizona-Nevada Constructors are using a Bucyrus Monighan on the heavy excavation south of the Kaweah River which has been equipped with both a 17 and 13 cu. yd. bucket. This huge machine, with a 230-ft. boom, could not squeeze under power lines en route so it had to dig itself under and backfill its own "tunnel" work.

Tamping machine

The Kiewit company developed a special tamping machine to tamp selected earth backfill to neat line where blasting and rock breakage had gouged beyond the desired line. The contractor was faced with the necessity of replacing and compacting the earth on the 1¼ to 1 slope at a density to conform to Bureau of Reclamation specifications.

A tamping shoe 12 x 28 in. was set up on two channel irons on the boom of this improvised rig so that the shoe could operate up and down the slope. The boom was attached to a skid-mounted platform and fastened by cables to beams at the rear of the platform. A hand operated winch controlled the up-and-down play of the boom, and the tamper was controlled by a 310 cu. ft. per min. air compressor. The pneumatic compaction machine was pulled by a crawler tractor in the bottom of the canal.

Construction progress

A resume of completed construction and awarded contracts show that 71.2 mi. of the canal, extending from the reservoir south to the Kaweah River, are near completion and an additional 46 mi. to the south will soon be under contract. Peter Kiewit Sons Co., Omaha, Neb., received the contracts for three initial schedules at a total bid price of more than $7,000,000 for approximately 35 mi. of earthwork, canal lining and structures.



KEITH WASSON, Project Manager for Peter Kiewit Sons Co., played major role in developing lining equipment.

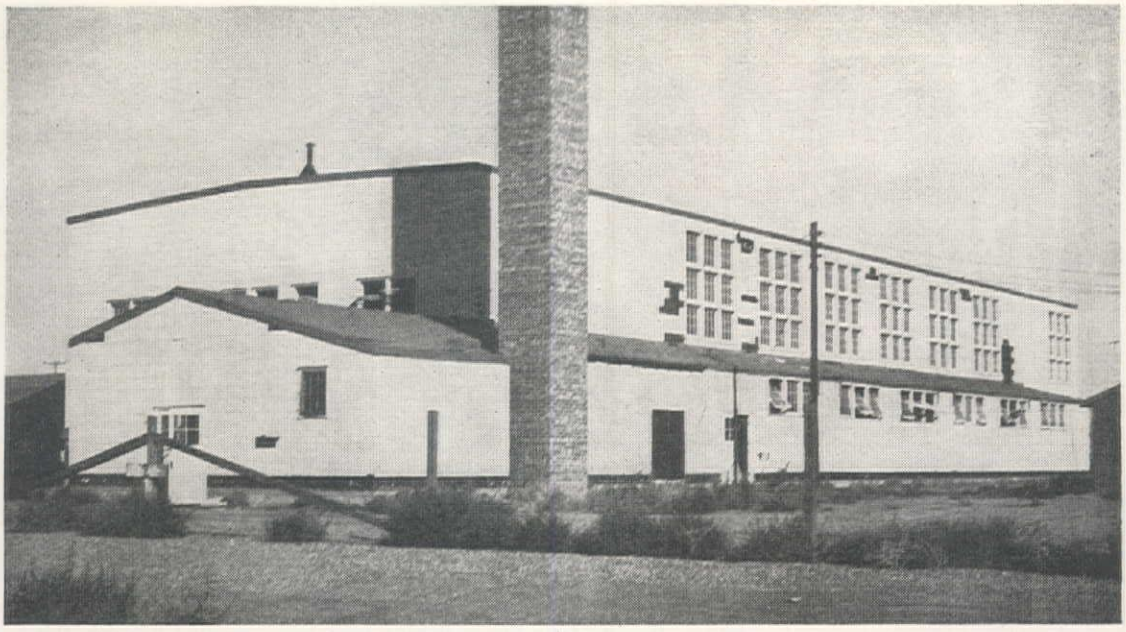
A 19 mi. reach of the canal, which includes both lined and unlined sections as well as the large Kings River Siphon, is under contract to the Morrison-Knudsen & M. H. Hasler Co., of Boise, Idaho, at a contract price of $829,547. The remaining work in the canal to date is under contract to the Arizona-Nevada Constructors, a joint venture of six contractors with headquarters at Dinuba, Calif. Their schedules, which also include lined and unlined sections, is at a contract price of approximately $5,600,000. All of these schedules should be completed before July 1 of this year. A complete listing of contractor's personnel appears in the Supervising the Jobs section of this issue.

Personnel

Keith Wasson, project manager for the Kiewit company, deserves a great deal of credit for the development of the special canal lining equipment. M. E. Broan is general superintendent and M. H. Hasler is non-resident project manager for Morrison-Knudsen & M. H. Hasler, and E. S. "Chuck" Davis is project manager for the Arizona-Nevada Constructors.

In charge for the Bureau of Reclamation are R. K. Durant, Construction Engineer; Speed S. Leonard, Field Engineer, and L. E. Cramer, office engineer.

A BID of $4,648,925 by the Otto B. Asbach Corp. and the Steenburg Co. of St. Paul, Minn., was the lowest of six opened March 4 for construction of an additional 37.4 mi. of the Friant-Kern Canal. Next lowest bidder was Peter Kiewit Sons Co., Omaha, Neb., at a figure of $5,453,523. The contract for the construction of the new canal section and installation of two large siphons has not yet been awarded. Bids will be asked on a section to the Kern County line in June.



THIS WAS the gymnasium at the Fort Sumner, N. M., Army Air Base before it was moved 68 mi. across desert country to the campus of the Eastern New Mexico Normal School at Portales. The building, with a 12,760-sq. ft. floor area, weighs 184 tons.

Huge Gym Moved Intact Across Desert

Nine trucks pulling dollies moved 184-ton gym 68 mi. to site on campus of New Mexico college — Trusses, beams and bracing balanced the load and connected main beams to the rolling platforms

MORE THAN 7,000 war surplus structures have been assigned to the Federal Works Agency by the War Assets Administration for reuse at some 1,600 colleges and schools to meet problems set up by the record-breaking enrollment of veterans under the G. I. Bill of Rights.

Most of these surplus buildings have been dismantled, transported from military installations, and re-erected on campuses in all parts of the country as classrooms, laboratories, study halls, student unions, faculty offices, vocational shops and studios, cafeterias, gymnasiums, field houses and infirmaries. The top ingenuity of educators, Federal engineers and contractors has gone into this Veterans' Educational Facilities program. New methods of transportation have been devised and contrived as the surplus structures were moved in sections and panels, on trucks, sledges, barges and lighters, and highway rules have been suspended temporarily in some localities to get the big loads through to campus sites.

A 68-mi. journey

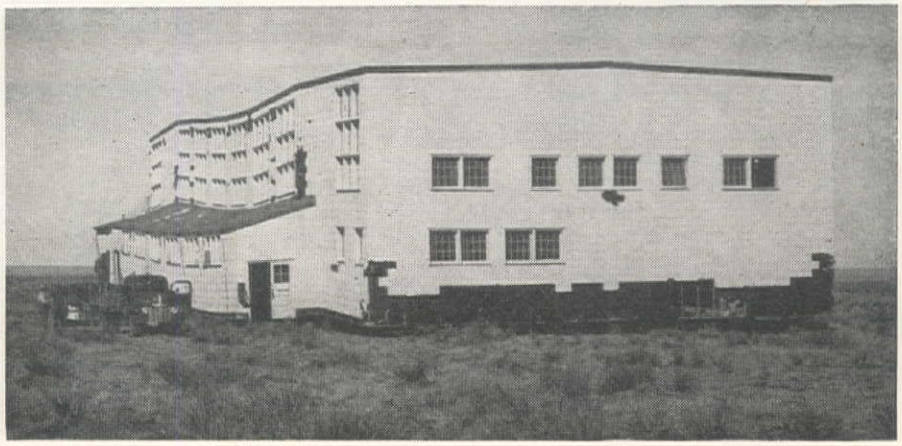
The most unusual moving project developed so far, however, is that in which a Santa Fe contractor rolled on surplus B-24 bomber tires an Army-type standard gymnasium, weighing with its reinforcements an estimated 215 tons, from the Army Air Base at Fort Sumner, N. Mex., to its prepared site on the campus of Eastern New Mexico Normal College at Portales. The gym was warped onto its new foundations on Feb. 14; contract work started on Aug. 27, last year. The journey covered 68 mi. of rugged New Mexico terrain.

All of these Veterans' educational facilities projects are handled by FWA's constituent, the Bureau of Community Facilities, George H. Field, Commissioner, and in its records the big gym, now converted into vocational work shops, is known as "VEF T-12." The engineers were Virgil M. Davis, representing Bob Richardson & Co., the contractor, and Ray M. Howard, for BCF. They walked backwards most of the 68 mi. as they directed the drivers of the nine trucks inside the building which pushed the dollies carrying the rolling structure.

A report from the Denver divisional BCF office to Major General Philip B. Fleming, Federal Works Administrator, tells the story of moving the building "T-12," and it reads in part:

"Building T-12 is a standard army-type gymnasium with main structure 60 ft. wide, 160 ft. long, 28 ft. to the eaves, with a lean-to wing on each side paralleling the longitudinal axis 10 ft. in width and approximately 160 ft. long. The building contains 12,760 sq. ft., has an estimated weight of 184 tons, is of frame construction with timber columns and trusses, fixed window lights along the

THE BUILDING IN TRANSIT. The 10-ft. lean-tos are hung by cables which are tied to the building itself at each building truss. The desert country at this spot is sufficiently rough to make 5 m.p.h. in an automobile top comfortable speed.



longitudinal walls of the main section, flat-pitch roof covered with rolled roofing and wood floor system. Exterior walls are covered with gypsum board sheathing and cement asbestos shingle, and the building was heated with steam from an attached heating plant."

Contract

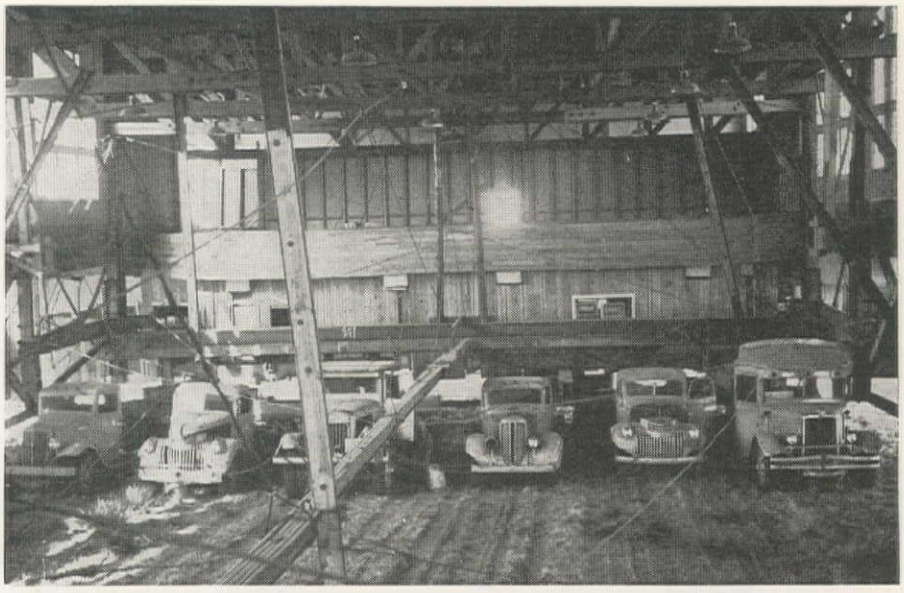
A contract for moving this and other buildings was awarded Aug. 14, 1947 to Bob Richardson & Company. The contractor's estimated cost for this one building was $17,625 for dismantling and transportation. The option was with the contractor as to whether he would dismantle, panelize, transport the building in sections or transport intact. He elected to attempt transportation of all, except the heater room, in one piece. His estimated cost for intact moving was less than the estimate for any other method and the saving was reflected in the contract.

Work started Aug. 27, 1947 and until the first week of November the contractor's efforts were directed to the removal of the oak flooring, the interior partitions, cutting the boiler room from the building, removal of the heating and plumbing, and the bracing of the interior preparatory to transportation.

Interior bracing

Transverse needle beams were placed through the building at points on the longitudinal axis 30 ft. from each end. Each needle beam was made of two steel box beams formerly used as building skids, spot-welded together to double the depth. The front beam and the rear beam were tied together with a built up wooden stiffener or strut designed to maintain the relative position of the beams with respect to each other.

At the center point of the beams, struts were erected to carry the ridge of the roof. At the outer ends of each transverse beam and 8 ft. in from the exterior wall of the main building a bastard type inverted king post truss was erected to carry the building trusses at the eaves. The balance of the interior bracing was done with struts made of 4- and 6-in.



THE REAR SYSTEM, where six trucks supplied motive power for a double row of dollies. Bastard-type inverted king post truss, erected to carry the building trusses at the eaves, rear beam, stiffener and steel cable bracing can be seen.

well casing and cable. The trusses, beams, and bracing including the articulated members connecting the main beams to the rolling platforms of the dollies, contain an estimated 30 tons of steel and 20,000 ft. of ½ and ¾-in. steel cable.

Raising the building

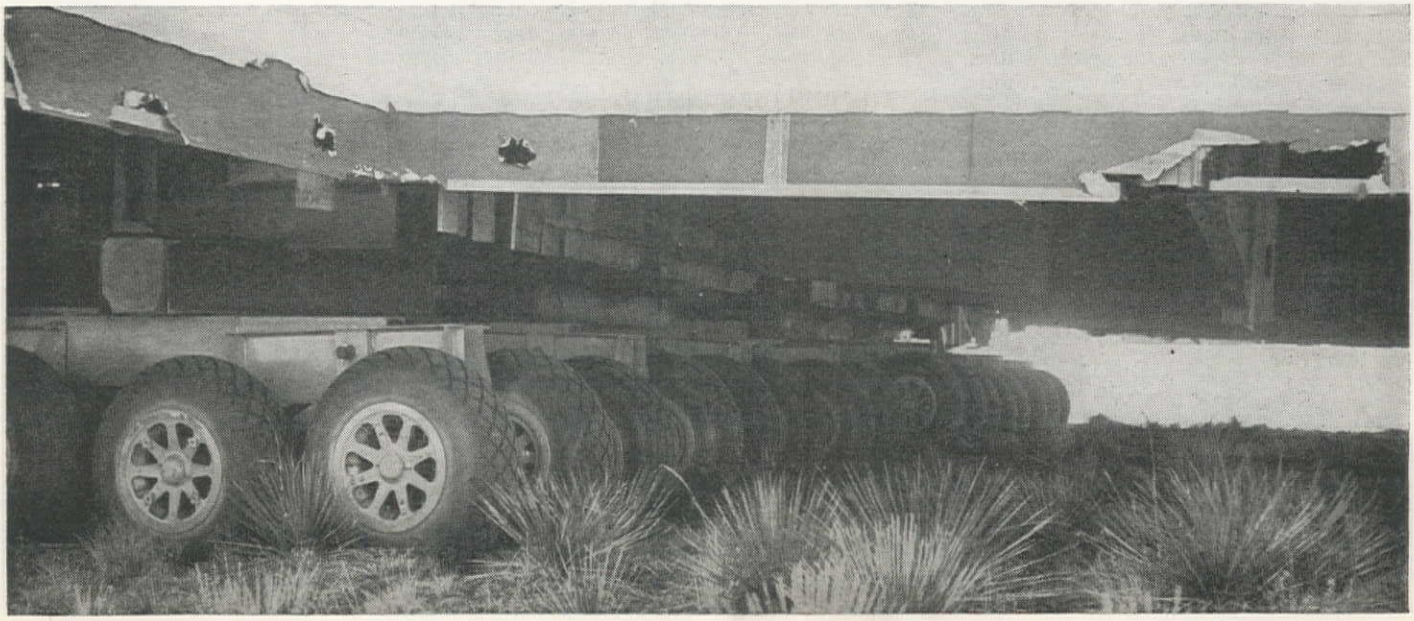
The building, after being cut loose from the foundation, was raised by alternately jacking the front and rear beams with batteries of hydraulic jacks. Jacking commenced during the first week in November and by Nov. 21 one end of the building had been raised to a height of 5 ft. and the rolling equipment was being placed thereunder. The other end was raised and rolling equipment similarly placed during the last week in November.

The building was rolled off the foundation and started traveling Dec. 1, however the center strut between the two beams proved inadequate, probably because of imbalance between the rear motive power and the front. This necessitated a halt and further bracing.

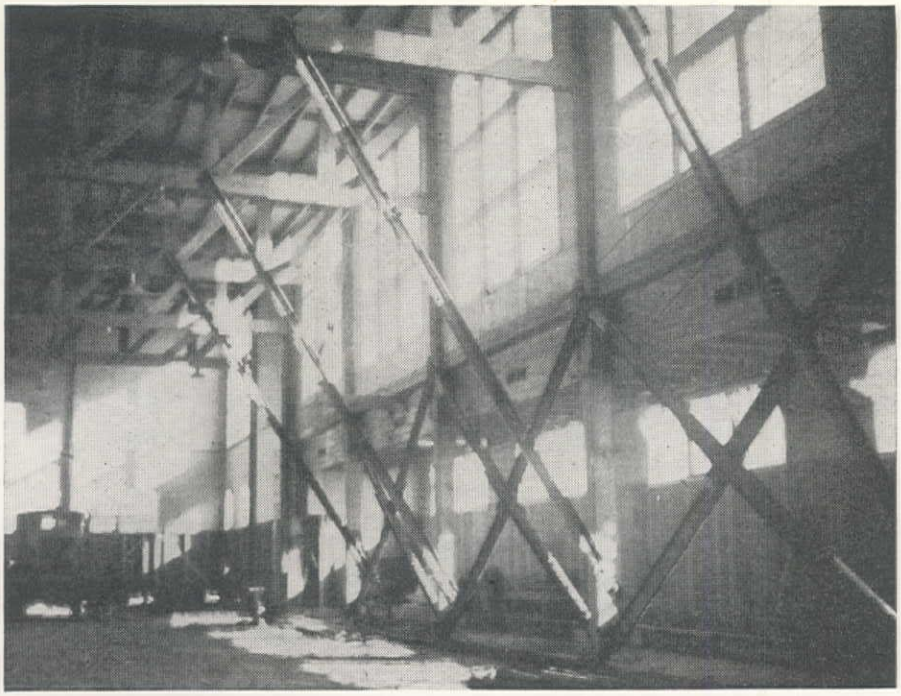
Transportation

The front and rear main bearing beams bore through articulated or walking beam systems on 22 rubber-tired dollies, each of which was made up of a platform with four rubber-tired wheels. Motive power was supplied by nine trucks, three pulling on the front system composed of a single line of dollies and six trucks pulling on the rear system composed of a double row of dollies.

All trucks had dual rear tires with special gears and carried approximately one-third of the load on their frames.



TRANSVERSE VIEW of the rear dollies. Note the pins which allowed longitudinal flexibility and cared for irregularities. Channels connected longitudinal articulated members with the pins. Airplane landing mats were planned as roadway, but use of the dollies made this unnecessary.



INTERIOR VIEW of the gymnasium before it was loaded on the dollies showing the built-up truss running longitudinally along the walls and the strut type sway bracing. Interior bracing contained an estimated 30 tons of steel and 20,000 ft. of cable.

There were 146 pneumatic tires under the building of which 58 were mounted on the trucks. The 88 dolly tires were former B-24 bomber tires, a 56-in. tire on roller-bearing axles with a load capacity varying from 20,000 lb. per tire at 59 p.s.i. air pressure to 35,000 lb. at 104 p.s.i.

The rate of progress when moving in soft ground and on grades was approximately one-fourth mile per hour. On level and fairly hard ground, a maximum of three-fourths mile per hour was attained without wracking of the structure. During December the building traveled a total of only seven miles due to shutdowns for adjustments.

Route followed

Referring to a map of New Mexico, the building went due east from Fort Sumner, parallel to and at a distance of about two miles north of U. S. Highway 60-84. The main line of the Santa Fe Railway parallels this highway on the south. At the railroad station of La Lande, the building was turned to the south and crossed the highway and the main line and passing track of the railroad during the second week in January. By arrangement with the railroad two hours were allowed between trains for the crossing of the transcontinental line. Planking was laid between the tracks and across the roadbed and drainage ditches were filled by a bulldozer. Telegraph wires were cut and replaced. The entire crossing was made and the line cleared in seven minutes.

The building was turned then in a southeasterly direction, crossing Taiban Creek, and proceeded easterly to the top of the mesa which lies south and east of the town of Tolar. On Jan. 21 at noon, the building was seven miles south of the highway and headed south across country.

Unusual difficulties

Aside from the ordinary difficulties of stress, load and power to be solved in an operation of this type, the fact that the building was being hauled across the open country presented some difficulties. It was planned originally to lay airplane landing mats to make roadways but this plan was abandoned when the floating power of the dollies was demonstrated. Creeks and arroyos were usually filled with bulldozers to provide a crossing of 80 ft. or more in width.

RAY M. HOWARD, F.W.A. Project Engineer, left, and VIRGIL DAVIS, superintendent for Bob Richardson & Co., walked backwards for the 68-mi. trek.



Motive power was supplied entirely by trucks since available crawler tractors were found to be geared too high to maintain the slow speed provided by the special gearing in the trucks. Turning of the building, however, was accomplished by two tractors connected to each other by cable through a 12-in. single sheave pulley which was, in turn, tied to the building with a bridle to each front corner.

The operation seems to have been successful. Even though photographs taken of the building in transit show some sagging in walls, eaves and ridge, the structure was not seriously wracked and inspection revealed that no building members had been seriously strained, sheared or broken. Unbroken window frames, sash and glass support the observation that distortion has been minor and not particularly harmful.

Arizona Concerned Over Colorado River Change

CONTROVERSY between Arizona and California continued last month on another front as Arizona concern was voiced against the proposed dredging of a new channel for the Colorado River at Needles and Ehrenburg on the border between the two states. A contract already has been awarded by the Bureau of Reclamation for a huge suction-type dredge designed especially for the job, which should be delivered by next year and begin operation immediately at Needles (*Western Construction News*, Dec., 1947).

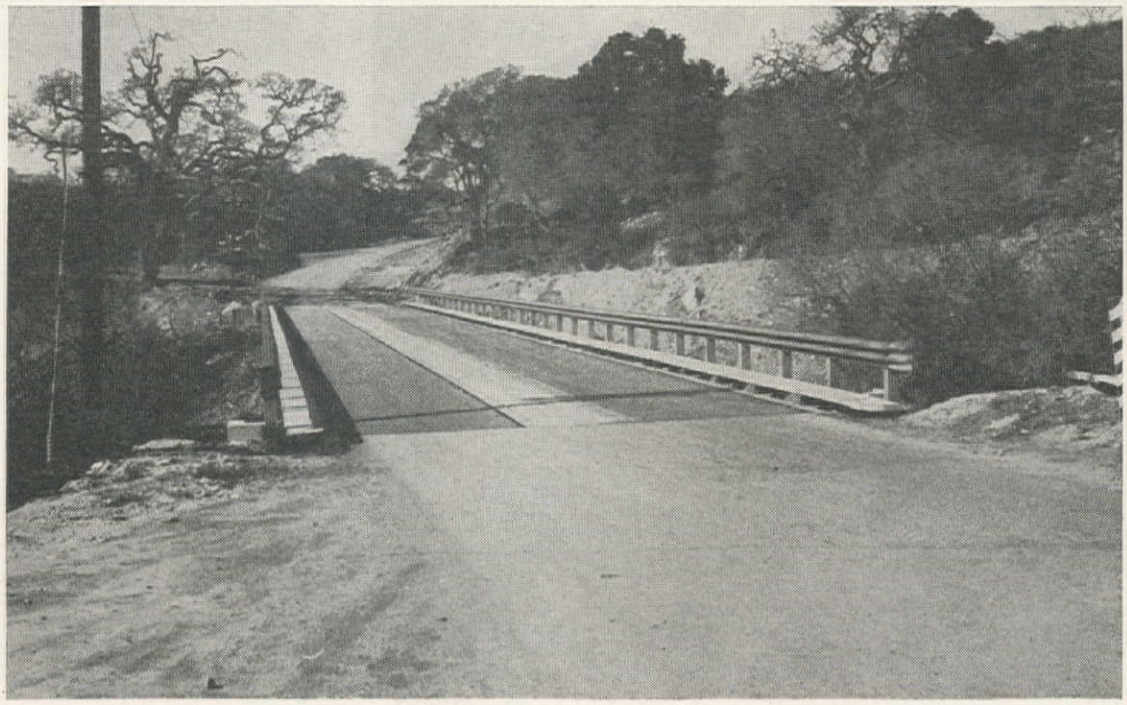
Realigning the river channel by the dredging may result in the loss of as much as 200 sq. mi. of valuable territory to California from Arizona if the legal complications are not resolved, according to H. L. Reid, director of the Arizona Game and Fish Commission, who pointed out that "the area which would be dredged 'out of Arizona' constitutes some of the best hunting and fishing area in the state."

Two schools of thought prevail concerning alteration of river channels where the river has been designated as a state line. One is that the line is established along the route followed by the channel at the time of the boundary designation and does not change even though the river does. The other is that the boundary changes as the river changes, and this has been followed in the past.

E. A. Moritz, Boulder City, Nev., Director of Region 3 of the Bureau of Reclamation, said surveys for the proposed channel have not been completed but that they are in progress. He admitted there might be legal complications but said they would have to be settled by the courts or worked out between the two states.

The question of realigning the river channel has bobbed up from time to time for many years. Arizona lost a large area of agricultural land near Yuma around the turn of the century when the river itself went on a rampage and switched channels.

County Uses War Surplus in Bridges



Monterey County, California, in serious need of new county road bridges to replace ones which became obsolete during the war, has ingeniously combined surplus materials to produce suitable structures—Superstructures, hatch covers, decking and other ship parts have been used

By CHESTER B. DUDLEY
Bridge Engineer, County of Monterey
Salinas, Calif.

AN ECONOMICAL combination of war surplus material, arc welding and precast slabs is materially helping Monterey County, Calif. to replace numerous bridges which became obsolete during the war years.

For foundations 6 x 6 x ½-in. angles fabricated originally for Navy Seabee pontoon barges, are welded into Z-shaped piles, with all stiffeners remaining in place. These are incorporated into pile bents, thin web piers or under larger piers.

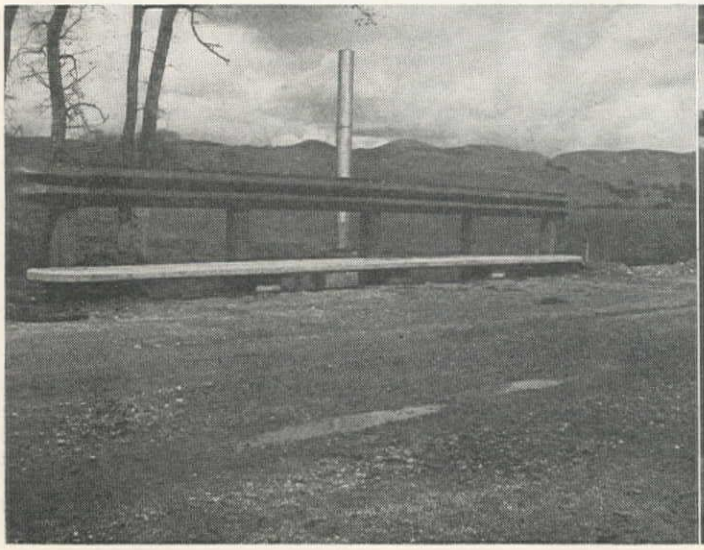
A continuous beam type superstructure is assembled from sections originally fabricated for Navy LSD's (floating dry docks). Each section consists of two 21-in. Carnegie beams 26 ft., 9 in. long on 9-ft. centers, connected with 6-in. floor beams at 18-in. centers, which support a two and one-half-inch steel grating deck flush with the top of the girders.

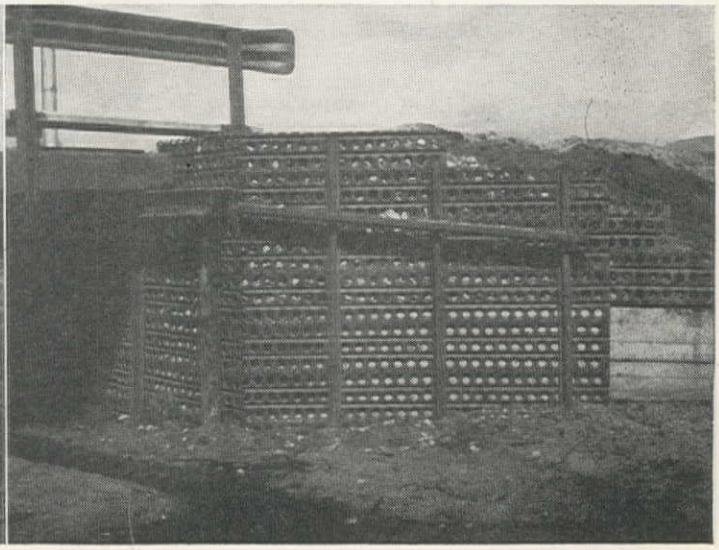
For a 22-ft. roadway two sections are used side by side with a 3-ft., 2-in. precast concrete strip separating them.

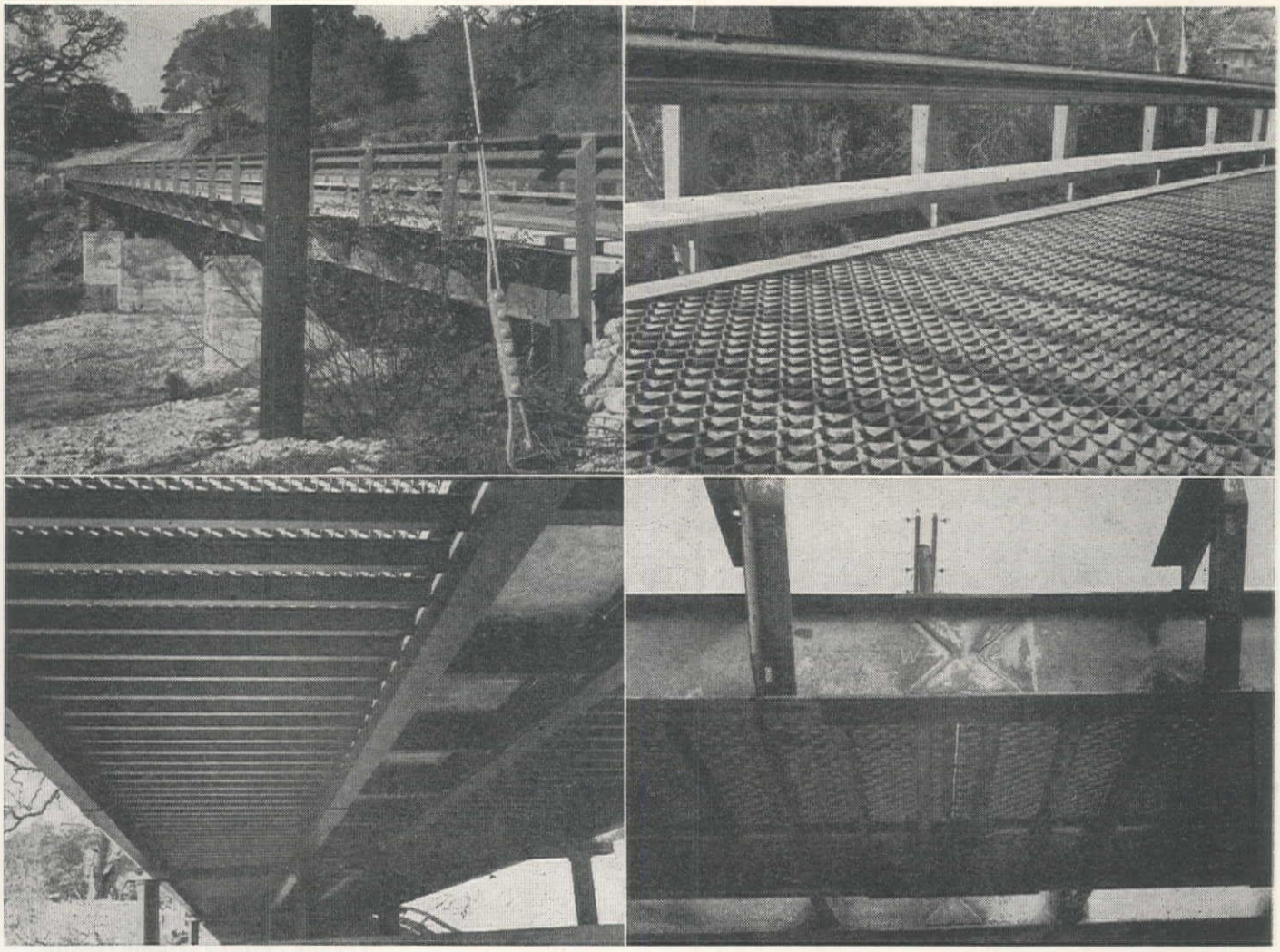
Arc welded throughout

Main girder splices as well as all other connections are arc welded. Ends of girders are squared and beveled in the shop. Splice plates are welded on one

BRIDGE DECK made of surplus Victory ship hatch cover, left, with precast safety curb in place. Bulkhead made of pierced steel plank, originally intended for plane landing strip paving, right. Picture top of page is the completed Carmel River Bridge at Robles del Rio in Monterey County.







CONSTRUCTION details of Monterey County bridges: upper right, precast safety curbs and railing posts, with steel grating roadway surfacing; upper left, the completed Carmel River Bridge at Robles del Rio; lower left, an under view of the steel framing and pier supports; lower right, main girder splices and angles to support posts. All material is surplus except posts, curbs, railing and poured-in-place concrete.

side underneath the top and bottom flanges and on the inside of the web. Brackets for supporting the curb and railing are constructed by bending and welding surplus 6 x 6-in. angles. These too, are shop welded to the main girders as are cover plates when required. Angles are welded to the inside of the interior girders to connect floor beams which support a center concrete deck section.

Rocker bearings are made by pressing three-quarter-inch plates to an 8-in. radius and welding them to a top shoe plate.

At the abutments, steel piles support a conventional type concrete cap. The wings and section below the cap are bulkheaded with surplus steel pierced plank landing mat.

Concrete deck strips are precast, usually in sections 3 ft., 2 in. x 20 ft., which are a convenient size for handling. Steel bars 6 x ⅜ x 10 in., are bonded to the concrete and exposed on the bottom of the slabs for field welding to floor beams. This center strip adds width and also keeps equestrians happy.

Curb strips 4 x 18 in., are similarly precast for attachment to the angle brackets to form an open type safety curb. Here the surplus ceases, with the addition of a flex beam guard rail.

A 451-ft. bridge

The Pajaro River Bridge at Aromas, now nearing completion by the Granite Construction Co., of Watsonville, is typical of the general layout used. It consists of two end spans of 40 ft. each (1½ sections) and seven intermediate spans of 53 ft., 6 in. each (2 sections) supported by 20-deg. skewed piers. During field welding, sections are supported to line and grade by light falsework under the splices which fall on the quarter points of the spans.

Victory ship superstructure

Another type of superstructure currently being used on short spans was originally fabricated for hatch covers on Victory ships. They are a precision made, all-welded steel section, either 20 ft., 9 in., or 24 ft., 6 in. long, by either 8 or 12 in. deep, and varying in width between 4 and 6 ft. At the edges and ends the 3/16-in. deck plate is bent down to form a supporting channel.

Longitudinal cover plated "T" sections and cross diaphragms add stiffness to the section.

Precast curbs and posts are shop welded to two outside sections. In the field it is only necessary to weld the desired number of sections to steel bent or abutment caps.

A flexible non-skid surfacing is required on the hatch covers.

After considerable research, a light coating of Indaco Elastic Joint Sealer covered with pea gravel has been adopted. This surface is inexpensive, simple to apply and appears to be quite satisfactory.

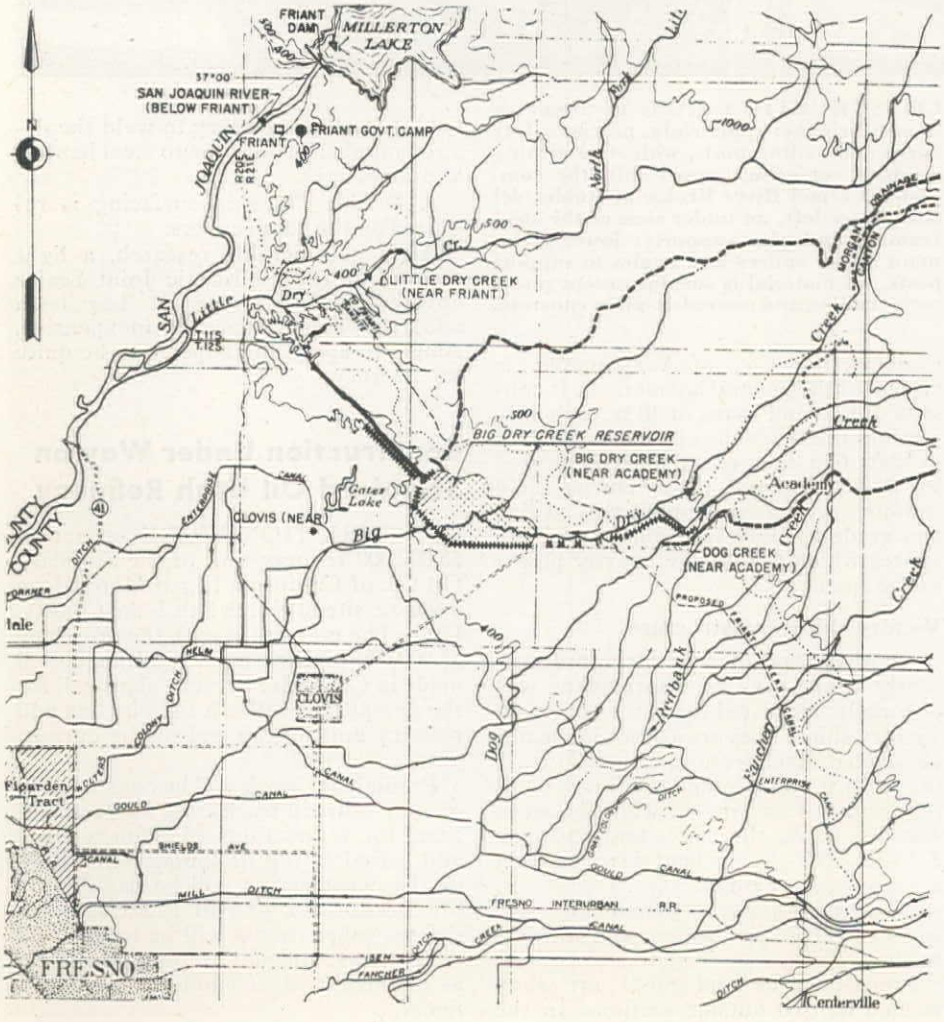
Construction Under Way on Standard Oil Utah Refinery

CONSTRUCTION WORK on a new $5,000,000 refinery unit of the Standard Oil Co. of California began March 1 on a 600-ac. site in North Salt Lake County, Utah. The unit ties in with the projected $5,000,000 pipeline from the Rangely oil fields in Colorado. Present plans call for the completion of both the pipeline and refinery unit by the end of the current year.

Preliminary work will be construction of spur railroad tracks and fills, excavations for foundations of refinery units and actual laying of foundations. Bulk of the construction will be handled by the Bechtel Co. of San Francisco, but several subcontracts will be let to local contractors. Officials are not yet certain as to the extent of buildings at the refinery.



Earth Embankment Reservoir Built To End Big Dry Creek Flood Menace



Large earth dam and dikes will intercept excessive run-off of "Fresno County Stream Group" watersheds in California—Impounded waters will be released through three control structures to preclude flood damage

WITH COMPLETION of the Big Dry Creek flood control dam by H. Earl Parker, contractor of Marysville, Calif., last month, the flood menace to the city of Clovis, Calif., the Figarden district of Fresno and a considerable farming community has been eliminated. The dam, an earthfill structure, will restrain the waters of the so-called "Fresno County Stream Group" including Big Dry, Dog, Redbank, and Fancher creeks, which drain that portion of the Sierra Nevada foothill area lying between the Kings and San Joaquin rivers.

The flow of these streams normally follows shallow, winding channels and the water is dissipated into a network of irrigation canals and ditches in the lower reaches of the streams. Without any retaining reservoirs to regulate the heavy flow of a flood, this network could not dissipate the waters fast enough and de-

LITTLE DRY CREEK tower and outlet structure, at top of page, will discharge water through a rectangular concrete conduit under the embankment into a stilling basin. Map shows reservoir location.

structive floods, similar to that of March, 1938, which caused $500,000 worth of loss, were periodically experienced.

Engineering studies showed that if the flow of Big Dry and Dog Creeks was controlled, the two smaller channels could safely be allowed to discharge into the ditch area without causing damage. The purpose, then, of Big Dry Creek dam is to effectuate these engineering studies.

Structure design

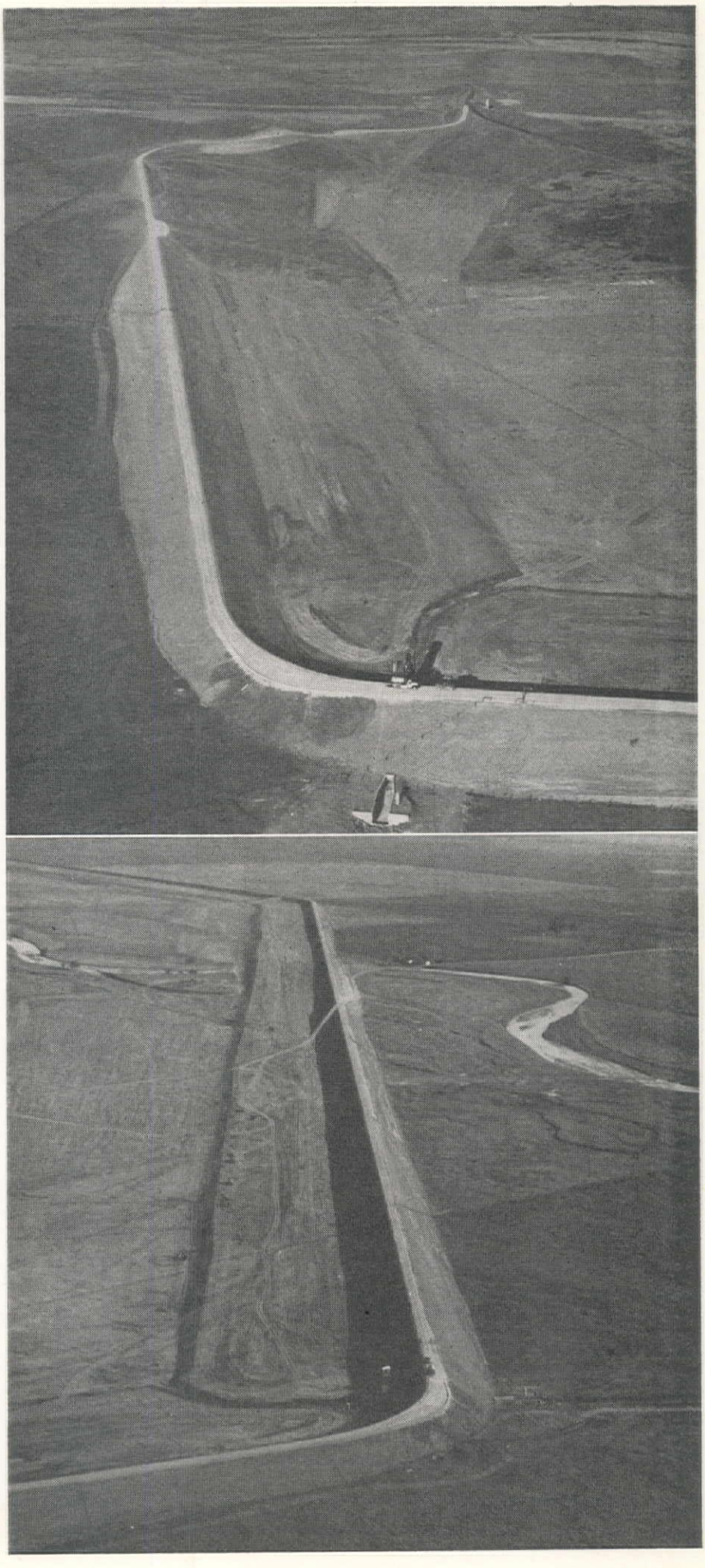
The project is located about 12 mi. northeast of Fresno and consists of a gated earth structure 9.4 mi. long, including a control and diversion structure on Dog Creek, diverting the water of that stream into Big Dry Creek; a detention reservoir on Big Dry Creek to control the combined flows with an outlet to pass ordinary flows down Big Dry Creek, together with another outlet into a diversion channel leading to Little Dry Creek, a tributary of the San Joaquin River; and a spillway in a natural saddle at the northwest extremity of the reservoir of sufficient capacity to prevent impounded waters from overtopping the earth dam.

The project was constructed for the Corps of Engineers under an authorization in the 1941 Flood Control Act and with funds appropriated by the Federal Government and the State since 1945. Work was started in May, 1947, and completed in nine months. Federal costs on the project approximate $1,300,000. The State has paid for rights-of-way, utility relocations and operation and maintenance costs. Assisting in these latter charges are local interests, including the county of Fresno, the city of Clovis and the Fresno Irrigation District.

Reservoir storage may be used for conservation purposes, according to the Corps of Engineers' plan, from May to October, providing a minimum of 5,000 ac. ft. of storage is left available for flood control at all times. From November to April the reservoir will be completely emptied and the entire storage space of 15,500 ac. ft. will be available for flood control. The maximum historical flood (March, 1938) had an estimated reservoir peak inflow of 2,650 cu. ft. per sec., and an estimated volume of 14,400 ac. ft. The reservoir design flood has an estimated volume of 22,800 ac. ft. and the spillway design flood has an estimated volume of 66,800 ac. ft.

Earthfill embankments

Embankments are constructed of earth, compacted within a range of moisture contents and to densities determined from field and laboratory tests of the various types of borrow material. Only a small amount of stripping was



OVERALL AERIAL view of the lower end of the reservoir, top, with the Big Dry Creek outlet structure in foreground. Tower near upper limits is Little Dry Creek outlet. Bottom view is at right angle to the top view and shows a portion of the impounding works. Big Dry Creek, the visible streambed, comes down to the outlet in lower center and is diverted into channel.

necessary in order to reach suitable foundation material. Conduits were designed to carry low water flows under open channel conditions and high flows under pressure conditions. Flows can be controlled when necessary by manually operated slide gates located at the upstream end of the conduits.

The Dog Creek diversion consists of an embankment across Dog Creek, having a crest width of 15 ft., side slopes of 1 on 2, a maximum height above natural ground of 19 ft., and a freeboard of 5.5 ft. The dike connects with the Big Dry Creek dike to prevent diverted flows from re-entering Dog Creek. Rock paving on a 6-in. gravel blanket protects the dike area bordering the conduit intake.

A shallow diversion channel 340 ft. wide, with side slopes of 1 on 2 will convey discharges from Dog Creek into Big Dry Creek when the Dog Creek outlet gate is closed. The channel invert was set at 7.5 ft. above the elevation of the conduit intake, so that ordinary flows will pass through the conduit without being diverted into the main reservoir.



SPILLWAY at lower end of reservoir is a safety factor to prevent over-topping of earth fills. Overflow follows natural low ground to Little Dry Creek diversion.

Main dam

Big Dry Creek dam has a maximum height of 42 ft. above natural ground, a crest width of 15 ft., side slopes of 1 on 2 except for the lower 30 ft. on the upstream side, where the slope is 1 on 2.5, and a freeboard of 5 ft., made necessary by the possibility of strong winds blowing toward the dam and producing waves of an estimated maximum height of 4.1 ft. The entire top width of the dam is gravel surfaced to provide a roadway for maintenance and inspection. Gravel surfaced earth ramps provide access to the reservoir area.

No provision has been made for toe drains, except where the dam crosses the Big Dry Creek streambed, since tests of soil samples indicated that the possibility of complete saturation of the embankment is remote. A dumped rock toe 4 ft. high is provided across the existing creek channel. Riprap protection of the upstream slope of the dam was not considered necessary since high water stages will occur only infrequently and for but short periods of time. However, both upstream and downstream slopes of the dam will be seeded with native grasses to prevent erosion.

DOG CREEK OUTLET structure, top, viewed from the upstream side during construction. The gate-controlled circular concrete conduits will permit normal flow in Dog Creek channel. Bottom view was taken during the time when H. Earl Parker, Marysville, Calif., contractor, was moving dirt with tractors and carrying scrapers.





Spillway and incidentals

The spillway is located in a saddle north of Big Dry Creek Dam and consists of an unlined channel 450 ft. wide excavated in decomposed schist alluvium. A concrete slab with cut-off set into the schist and protected from erosion by grouted riprap extending 10 ft. upstream and 20 ft. downstream will provide a permanent channel control. The top of the slab is set at the normal pool elevation 425. The spillway is designed to pass a flow of 13,300 cu. ft. per sec. with a depth of 3 ft. over the crest.

In connection with the project it was necessary to relocate one 70-kv. electric transmission line and to remove service light and power lines lying within the reservoir. The Friant-Kern Canal of the Central Valley project will be located north of the reservoir but will cross Big Dry Creek within the project limits by means of a concrete inverted siphon.

The dam was designed by the Sacramento office of the Corps of Engineers. At the initiation of construction Colonel Lester F. Rhodes was District Engineer, but was succeeded by Colonel Joseph S. Gorlinski before the dam was completed. J. L. Newman is area engineer for the Corps of Engineers and J. R. Morton was construction engineer of this project. For H. Earl Parker, contractor, H. W. Eliason was project manager and E. S. Alt was superintendent.

Portrait of A. E. D. President Elect

A. F. Garlinghouse, of Garlinghouse Brothers, Los Angeles, recently elected president of Associated Equipment Distributors, has followed his chosen profession tenaciously since college days—He is ever on the alert for ways to improve the design of construction equipment

By VANE STROTHER
Los Angeles, Calif.

FORTUNATE indeed is the young man who early in life can make a definite decision as to his life's work, and then will make the necessary effort and sacrifice to attain that end. Such a man is A. F. Garlinghouse, of Garlinghouse Brothers, Los Angeles, who was recently elected president of Associated Equipment Distributors at their annual meeting held in Chicago. Elevated from the office of executive vice-president, Garlinghouse had also been on the Board of Directors four years as representative of Region 11 (California, Arizona, Nevada and Territory of Hawaii). Other posts he has held in the distributors organization include chairmanship of the National Joint AGC-AED Committee and the Committee on Veterans Employment and membership on the National Affairs and Finance Committees.

Native of Colorado

Born in Leadville, Colorado, it was in that state that Al Garlinghouse spent his early years, including two years at the University of Colorado as an engineering student. While enrolled at the mountain school, he helped himself financially by working as a reporter for the Boulder Herald and Denver Post. At the university he was initiated into Sigma Alpha Epsilon fraternity, an organization in which he still maintains an active and participating interest.

In 1912 Al transferred to Stanford University. By close application to his studies, and because of his high scholastic standing, his college work was in such shape that when an opportunity to go with the California State Highway Commission was offered in March, 1914, he was able to accept, although it was May before the college year ended and he received his degree of A.B. in C.E.

Early construction work

Assignment was to Division VI with headquarters in Fresno. Al was employed as resident engineer on construction of what is now Highway 99 from Grapevine Pass to Fresno. It was during this period that he made the beginning of a friendship with members of the Atkinson family, of contracting fame, which has endured through the years.

In August, 1915, while located at Bakersfield, Garlinghouse was married to Ferne Armstrong, with whom he had gone through high school. They have a daughter, Peggy Lee, who has followed family tradition by going to the University of Colorado, where she is a sophomore, and a son, Albert Jr., who is a sophomore in South Pasadena High School.

Garlinghouse left the Highway Commission in July, 1917 to go into the Army. However, he was refused for Army service and for one year thereafter was engaged in plane table survey work in the San Joaquin Valley for the American Engineering Corp. under the late C. E. Grunsky.

From July, 1918 to November, 1919, Al was superintendent of highway construction in the Sacramento Valley and it was during this time an idea crystallized in his mind. The commercial side of engineering had long appealed to him, and at that time he determined to put his ideas into execution. He was particularly interested in the development and sale of construction equipment, which was at that time feeling the first stir of motorization and subsequent change.

To machinery selling

Certain that the sale of construction equipment on the West Coast was his goal, Al believed the best way to learn the business was to be in it. Consequently, he left construction work in California to take a job with Beckwith Machinery Co. in Pittsburgh, Pa., at a fraction of his salary on construction work. Proving that his confidence in himself was not misplaced, Al advanced to the position of Sales Manager of Highway Sales, covering the states of Pennsylvania, Ohio, and West Virginia.

A. F. GARLINGHOUSE, specialist in developing construction equipment.



Many construction practices of the West Coast were introduced in the East by Garlinghouse. Up to that time, such a western commonplace as a fresno scraper had not been used in the East. At Al's suggestion, Beckwith Machinery became the first distributor of Best crawler-type tractors east of the Mississippi. Tandem lines of wheel scrapers pulled by Best tractors were soon in common use—the forerunner of modern earth-moving practices.

Ever on the alert for better ways of doing old things or new ways of overcoming old problems, Al, in conjunction with his brother, L. H. Garlinghouse, who is an engineering graduate of Rensselaer Polytechnic Institute, developed several aids to construction men. The brothers invented a gravity actuated truck turntable, an item manufactured by Blaw-Knox and of great convenience in the days when highway specifications permitted dumping of concrete aggregates on the subgrade. They also developed and patented the first volumetric batcher, the first big advance in proportioning concrete aggregates. Patent rights on the batcher were sold to Blaw-Knox Co.

Their own business

With the money secured from this sale, the two brothers felt the time was right to consummate the long standing dream. Believing the Los Angeles territory offered the greatest promise, they opened their doors at 2026 Santa Fe Ave. in January, 1924, as Garlinghouse Brothers, Construction Equipment.

Through the past 24 years the name Garlinghouse has been closely associated with major construction projects, particularly those involving the production and placing of concrete. Al has been retained in a consulting capacity by many of the large construction firms on plant layout and methods, both before and after bidding. He has aided in design of aggregate plants, proportioning and mixing plants, and, in particular, concrete placing methods and equipment used by contractors on most of the tunnels, dams, and other major construction projects in the West in recent years.

President of A. E. D.

The AED, to which Al has given much time in recent years culminating in his recent election as president, is an international construction equipment distributors and manufacturers trade association and is now in its 30th year. The basic principle of the association is to promote and maintain cooperative spirit between the legitimate distributors of construction equipment and the manufacturers whom they represent, to disseminate information among its members, and to exchange ideas for the benefit of the users of construction equipment. A close and working contact is maintained not only with all federal de-

partments and agencies, but with associations of related industries.

The membership of the AED is composed of over 750 active distributors in the United States, Canada, Mexico, and England, and approximately 250 manufacturers as allied members, which represents about 80 per cent of the distributors and manufacturers of construction equipment in the United States.

The association has rendered outstanding service to the government in times of emergency as well as to the industry in times of peace. To better serve its members in readjusting back to the free enterprise system the association has recently moved its executive offices from Washington, D. C., to Chicago.

Affiliations

Mr. Garlinghouse is an associate member of the American Society of Civil Engineers, the University Club of Los Angeles, and is a registered Civil Engineer in the State of California. His main interest of recent years, aside from business and affairs of AED, has been in the Boy Scout movement in which his son holds the two most coveted awards—the Order of the Arrow and badge of Eagle Scout.

Later this year Garlinghouse Brothers, including Gar-Bro Manufacturing Co., makers of concrete placing and industrial equipment, and Gar-Bro Wheel Co., manufacturers of industrial wheels for pneumatic tires, will move to new buildings on Sheila Street near the intersection of Atlantic and Washington Blvds.

The courage to leave a well-paying job for a place at the bottom of the ladder in the field of his choice has paid off for Al Garlinghouse. The success he has attained in business and the esteem with which he is held by his business associates and competitors are proof the man is fortunate indeed who knows early in life his ultimate goal and then makes the necessary sacrifice to attain it.

Under-Water Survey by Navy Of Lake Mead Sedimentation

A SCIENTIFIC survey combining the technical resources of the Departments of the Interior and the Navy has been started at Lake Mead to find out what sedimentation is doing to the world's largest artificial lake, created over areas of Arizona and Nevada by Hoover Dam on the Colorado River.

A miniature fleet has been transported by the Navy overland 300 mi. to the middle of the desert. The "fleet" is being manned by a lieutenant and six chief petty officers who have been assigned to the survey by the Navy Bureau of Ordnance. Especially trained scientific technicians are being made available from the Navy's Electronics Laboratory and its Underwater Sound Laboratory. Engineers and geologists of the Geological Survey and Bureau of Reclamation have general technical responsibility for the investigation on the reservoir.

When work is completed, the Bureau of Reclamation expects to have answers to many of the operating questions posed by the steady accumulation of sediment in the 32,000,000-ac. ft. reservoir. On the basis of these answers, the Bureau will know the volume of water available for power production at various reservoir levels and for water releases for irrigation and flood control.

The Hoover Dam plant, of 1,034,800-kw. capacity, is the largest hydroelectric power producer on reclamation projects, and supplies large blocks of power to Los Angeles and other Southwest areas. Control of the Colorado River, once wild and unruly, safeguards the irrigation farming of the richly productive Imperial Valley of California, and the Yuma and Gila projects in Arizona.

A considerable reduction in costs of making the survey will be effected through the cooperative arrangement with the Navy. The personnel assigned to the project by the Bureau of Ordnance have installed special equipment for taking the under-water photographs which will assist in getting the answer to the sedimentation problem. To qualify for this work, the men must also be expert divers. They operate the "fleet" from a self-propelled 107 x 21-ft. barge, which has been transported overland in sections to the lake, and which serves as a mother ship for the sounding boat and other small craft furnished.

In order to determine what changes in the bottom have occurred since the start of storage in the reservoir, the under-water topography will be obtained through the use of depth sounding equipment similar to that used on naval and commercial vessels, coupled with surveying methods. Underwater photographs will be taken to assist in determining this topography and to obtain further information needed in the survey. Certain new techniques of "underwater television" may be employed by the Navy. Samples will be obtained of the materials deposited on the bottom of the reservoir at various points. These operations are expected to require 10 months to complete.

The Geological Survey is providing the necessary technical and laboratory facilities and personnel for the compilation and analysis of the data, and will be responsible for the overall technical supervision of the work. The Survey will prepare the final maps and reports.

As was anticipated at the time Hoover Dam was built, the Colorado now drops virtually all of its heavy load of silt and sand when it enters the quiet waters of the lake. Other material held in colloidal suspension is deposited on the bottom of the lake, immediately behind the dam.

Editorial Comment

. . . . . continued from page 79

which you and I pay. Nor does TVA pay any ad valorem or other taxes in the local areas in which it owns property. Instead it gives those areas a token handout, which may be discontinued at will, and which bears no relationship whatever to the value of its taxable property.

For example, TVA reports that it added some $30,000,000 of new property in 1947; nevertheless its handout to the local areas "in lieu of taxes" was actually less, by more than $300,000, than it was in 1946 before the new property was added.

In an obvious effort to remove some of the stigma resulting from its own failure to pay taxes, TVA has just released a statement alleging that Federal tax payments by individuals in its area have recently increased at a somewhat faster rate than for the country as a whole. No doubt there are many other local areas which would show similar results. In any event, no business has ever yet been excused from paying its taxes merely because the individuals residing in its particular area pay more taxes than do those in some other area.

The statement goes on to allege that relatively, the income of the people in the Tennessee Valley was $680,000,000 more in 1945, a war-boom year, than in 1933, a depression year. And right here we have the germ of an idea; if the direct beneficiaries have profited from TVA largess to the extent alleged, would it not be a gracious act on their part to reciprocate by assuming TVA's annual deficits, and thereby relieve the rest of us, who live outside the valley, of that burden?

Having looked at TVA's 1947 results, let us glance at the record it has compiled in the fourteen years since it began operation. Needless to say, it has acquired a deficit in each of those years, and, cumulatively, the results are staggering.

The interest default alone for the fourteen-year period totals not less than $120,000,000. To meet this accumulated interest charge TVA had earnings during this same period of $69,618—an average of less than $5,000 a year! Again, all of this default has been made good by the taxpayers.

Despite the pie-in-the-sky propaganda which TVA is constantly feeding us, it seems high time that we recognize, at least, a few of the facts. Added confusion might result were we to refer to TVA as "Operation Rathole" because that term already has been pretty well pre-empted to describe so many of our other politically-managed activities.

However, according to its annual report, TVA is doing a terrific job at killing off the mosquitoes that once despoiled the sylvan shores and bosky dells of its empire. That being the case, why not "Operation Gnathole"?

New York. Orson Buggy.



Action and Effect of Waves

Wave characteristics and their effects on engineering structures summarized by University of California research engineers—Storms thousands of miles distant found to have important relation to shore installations—Wave forecasting methods valuable in planning construction

By J. W. JOHNSON
Associate Professor of Mechanical Engineering
and
J. D. ISAACS
Reserach Engineer
University of California, Berkeley

IN MOST engineering problems involving coastal works the engineer is interested primarily in the characteristics of the waves that may exist at a certain locality. If construction operations or movement of equipment are contemplated, the engineer probably is interested in the wave conditions that will exist at some specific time; however, if the design of a structure is involved, then statistical data on wave characteristic must be known. It is the purpose of this paper to indicate how such basic information may be derived and assembled in a form convenient for the use of the engineer. It should be noted that the present discussion is limited to a consideration of waves caused by the wind. These include waves called sea and swell or ground swell. Other waves, such as surging in harbors or waves due to earthquakes and other causes, are relatively less important in most engineering investigations.

Definitions

The description of ocean wind waves requires the use of several terms that may not be familiar to all engineers. Thus, the wave **height** is the difference in elevation between the trough and crest of a wave; wave **length** is the distance between successive crests; wave **period** is the time between the passage of two consecutive crests past a fixed point, and the wave **velocity** is the rate of travel of an individual crest. The term wave **steepness** is defined as the ratio of wave height to wave length.

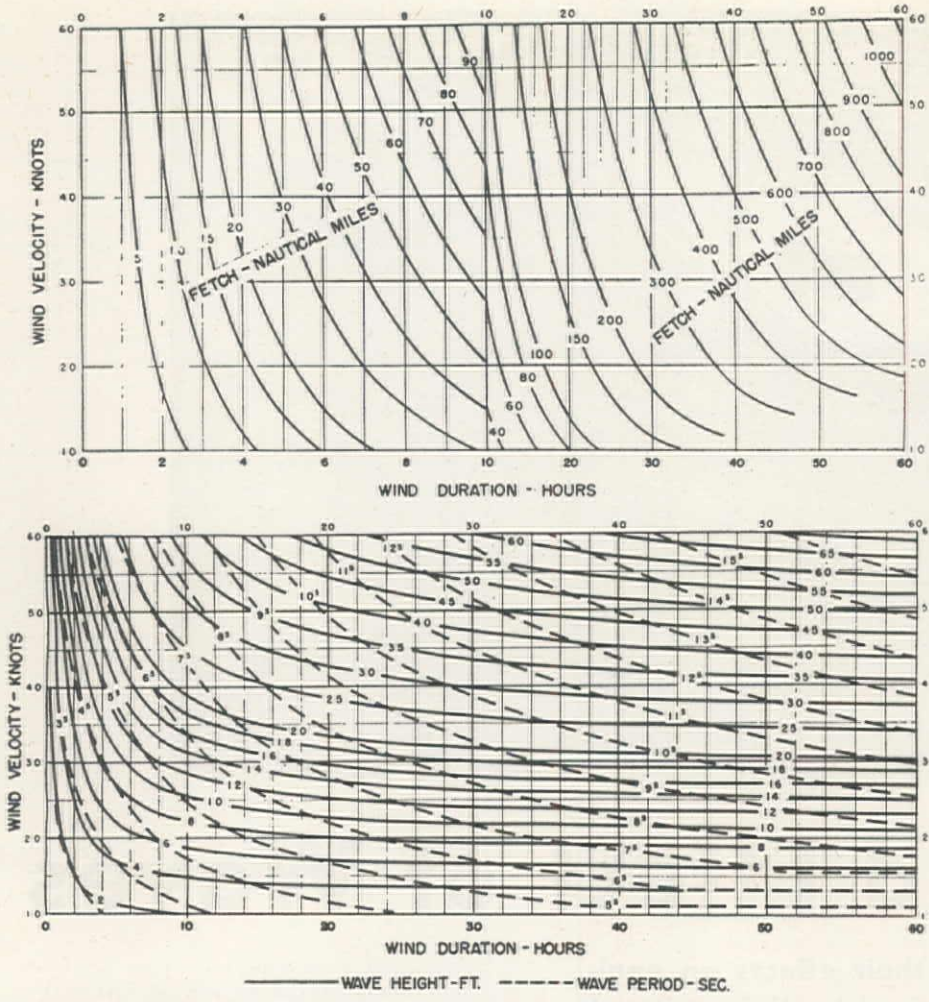
Since there is considerable variability in wave height and wave length in the waves leaving a generating area, it is necessary to define statistically the significance of the waves. Actually the higher waves are the most important from an operations standpoint; hence, in stating the mean height of the waves that exist over a period of an hour or two it is advisable to consider only the higher of the waves that are present. Obviously, every ripple need not enter into forming an average. As a consequence of these considerations the present practice in stating the average wave height is to give the average height of the higher one-third of all observed waves. Where the observation is precise, as in analyzing the records of wave recorders, the average of the higher one-third of the major train of waves is used. This average is called the **significant wave height.** Waves are classed as either **deep-water** or **shallow-water** waves. Waves begin to "feel the bottom" when they reach depths equal to half of their wave length. For all depths less than this their motion is influenced by the depth and they are known as shallow-water waves.

In addition to these terms which describe the waves themselves there are a group of terms used in describing the conditions under which the waves are originally formed. Thus, the **fetch** is the area over which the generating wind blows; the **decay distance** is the expanse of relatively calm water through which the waves must pass to reach shore; and **wind duration** is the length of time that the generating wind has been blowing over the fetch.

SANTA MONICA waterfront, above, showing local wind waves and simultaneous long, low swell. Interference with wave action by the breakwater results in heavy deposit of sand, center, starving of beach to south, right.

Wave generation and propagation

The waves under consideration are generated by the action of wind on the water surface. Through the mechanism of wind and waves the energy represented by an atmospheric pressure unbalance is directed against some shore-

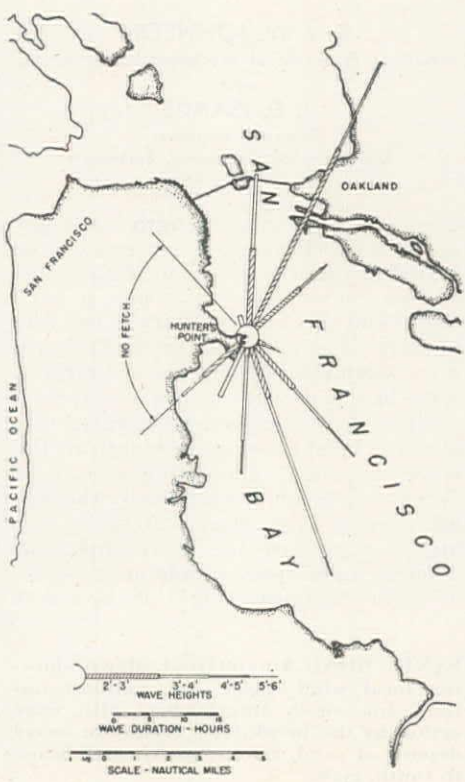


CURVES showing the relationship of deep-water waves and their generating winds, as developed by Scripps Institute of Oceanography. The upper chart shows the minimum time that a wind of specified velocity must blow over a fetch to give waves of maximum period and height. From the lower chart, wave height and period can be determined for a given wind velocity and duration. The height as determined is the significant height, or average height of the highest one-third of all waves present. Below, wave rose for Hunters Point, San Francisco Bay, made from study of all available regional wind records.

line, structure, or ship, at some distance in a series of packages of wave energy delivered by the individual waves. It is, of course, the periodicy of this delivery which results in the unusual effectiveness of wave attack. Each wave represents energy accumulated from the wind over a considerable time and it is released more or less instantaneously, depending on the nature of the eventual obstacle to its progress. Thus extremely high power output may exist at the instant of energy release.

The essentials of energy input into the wave mechanism are therefore the velocity of the wind, its duration and the fetch. The wind direction determines the locality of eventual wave attack. The important characteristic of the transporting mechanism is the distance of decay. These factors determine the characteristics of the waves arriving at some point. The nature of their attack depends upon their direction and their period and upon the shoreline configuration. The degree of attack and overall rate of energy output is a function of their height and period.

In general, the longer the fetch, the higher the wind velocity and the longer the wind duration, the higher will be the waves and the greater their period,



length, and velocity. For a particular fetch and wind velocity, however, there is a maximum wave height and period that can be developed regardless of the duration of the wind. In a generating area the waves are steep and shore-crested with many of them breaking as whitecaps. After leaving a generating area the wave length, period and velocity gradually increase. The shorter waves possess relatively little energy and soon disappear, but the longer waves become more regular the farther they travel and, in the case of some ocean waves, may travel thousands of miles from the generating area before breaking on a distant shore.

There have been many times when waves generated at a distance of over 3,500 mi. have reached a coast with sufficient size to give breakers up to about 10 ft. in height. On the Southern California coast waves from storms in the southern hemisphere, almost 5,000 mi. away, have been observed on numerous occasions. A qualitative method of determining the wave characteristics resulting from a given set of conditions has been developed.

Forecasting and statistical wave data

In the early part of the war an investigation was made of all available observations on wind generated waves in an attempt to determine the relationship between the characteristics of deep-water waves and the generating wind. This analysis was made at the Scripps Institution of Oceanography, La Jolla, Calif., and showed the minimum time that a wind of specified velocity must blow over a fetch to give waves of the maximum height and period. Should the wind blow over the given fetch for a greater time than this minimum duration, the height and period of the waves would not continue to increase. For the given wind velocity and the duration, the value of the wave height and period is determined. If the duration of the wind should be less than the minimum value, then the wave characteristics corresponding to the particular wind can be determined directly by using the actual wind duration. It is noted that this wave height is the significant wave height as defined above; that is, it is the average height of the highest one-third of all waves that would be present.

Occasionally, there will occur single waves which are about 1.5 times the average value. The height of Pacific Coast swell is normally limited by the wind duration. In these major generating areas, the fetches are so large and wind velocity so high that a great duration would be required for the waves to reach the limiting height. Such durations do not frequently occur.

The use of weather maps in estimating wave conditions at a particular locality can be used to advantage in two ways. Forecasts of wave heights and periods and the time of arrival of the waves would be of considerable value to shippers, fishermen, and towboat operators, and to engineers who are involved in the construction of coastal works. Of more interest to the designing engineer, however, would be a statistical summary

of the wave conditions that might be expected to occur at a particular locality. Such a summary can be prepared by an analysis of past daily weather maps.

The character of the significant waves in a generating area can be obtained from the accompanying charts provided the variables of wind velocity, fetch, and duration are known. In lakes or protected bays local wind records are suitable for estimating the wave conditions that can exist at any particular locality. In fact, all past wind records of velocity, direction, and duration can be used in conjunction with the charts and a statistical compilation then made of the anticipated wave conditions at a selected point. For example, in connection with proposed structures in the vicinity of Hunters Point in San Francisco Bay such an analysis of all available regional wind records was made and the number of days that waves of various heights probably existed was determined and diagrammed in the form of a wave "rose." It is obvious from this diagram that relatively large waves can occur only in the sectors from SSE to SE and from N to NNE. It is only in these sectors that the combination of wind velocity and fetch is sufficient to give significantly large waves. Information of this type is of considerable value to the designing engineer, as it not only gives the wave characteristics which structures must be designed to withstand, but it also permits an investigation to be made as to whether structures are economically justified in view of the frequency of occurrence of waves of a damaging character. (For the details of the Hunters Point analysis, see "Estimating Storm-Wave Conditions in San Francisco Bay," by J. A. Putnam, Trans. American Geophysical Union, April, 1947, p. 271.)

Forecasting for an exposed coast

For a locality on an exposed coast, where critical wave conditions result from swell which is generated by storms occurring at considerable distance from the coast, local wind records are of relatively small value in the compilation of significant wave characteristics. Thus where large scale wind patterns are involved there are seldom sufficient weather reports to determine these patterns directly from ship or island observations. However, there is a very close relationship between the wind speed and direction and the atmospheric pressure gradient, which can be determined from a weather map. The pressure field is not difficult to determine, even from only widely scattered reports. The winds, therefore, are computed from the pressure gradient scaled from a weather map, and whatever wind observations are available are used to check the computed values. A consideration of the orientation of the isobars on a weather map also permits an estimate to be made of the extent of the generating area and, consequently, the value of the fetch, and the direction of wave propagation.

An example of a typical Pacific Ocean storm is illustrated by the weather map herewith. The wind velocity and fetch have been indicated. Once these factors have been determined from a weather map an estimate of the resulting swell at the end of a generating area can be made following the procedures outlined in the U. S. Navy Hydrographic Office Misc. Report No. 11,275, "Wind Waves and Swell, Principles in Forecasting," and using the relationships presented in the charts. The above publication also presents a method of estimating the wave height and period at the end of a decay distance and the travel time from the end of the fetch to the end of the decay distance. In conjunction with this weather map it is of interest to examine the aerial view of the surf near Oceano, Calif. This photo shows the swell, generated by the storm represented on the weather map as it reached the coast a few days after being generated.

By these methods of forecasting, a statistical study can be made of the waves reaching a region of the coast. Such an analysis has been made by The Scripps Institution of Oceanography in cooperation with the U. S. Engineer Office at Los Angeles for Pacific Coast Stations. The results of the studies have been compiled into wave "roses," much as was done for San Francisco Bay, except that the roses are available for five stations located along the Pacific Coast at approximately 150-mi. intervals from San Diego to Cape Blanco, Ore. These statistical summaries are basic data in the design of all future works on this portion of the coast.

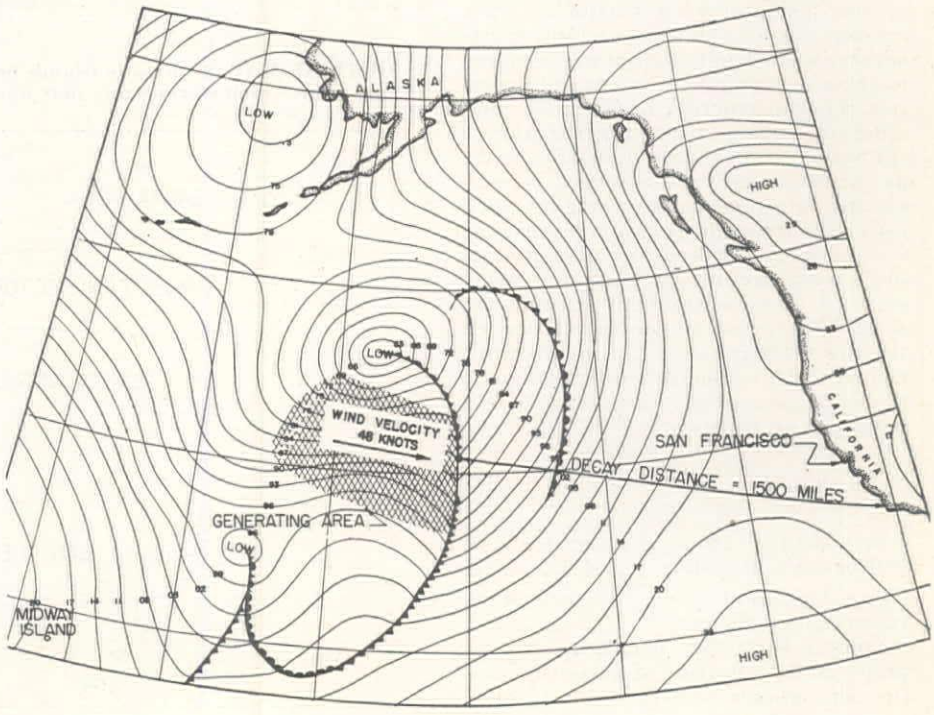
Swell from great distances

A consideration of the above discussion confirms the previous statement that the local winds at a coastal point may be relatively unimportant in contributing to operations where wave action is a problem. Although engineers, shippers, and fishermen religiously watch the local weather reports in planning their operations, in many cases it is the storms several hundred to a thousand miles away that actually affect operations. A striking illustration of the effect of swell coming from a distant storm is shown in the two photographs showing the entrance of Coquille River, Ore. The second shows large swell breaking over the entrance bar, with the result that no craft, regardless of size, could enter or leave the harbor. In such an instance a forecast of the possible arrival of swell that would close this entrance would be of unquestioned value.

Such swell may or may not accompany a local weather disturbance. It may arrive before, during, or after a storm. A weather forecast gives no information on the probable state of the sea, yet this information is vital for marine operators who must shape their course to arrive at havens before dangerous offshore and bar conditions arise. It is no less important to engineers engaged in jetty construction, harbor dredging, etc., who must protect their works, equipment and personnel from the sudden onslaught of heavy seas. The following is from a recent letter from the senior bar pilot of a major harbor on the North Pacific Coast, under whose guidance many millions of dollars worth of shipping yearly are brought across a hazardous entrance:

> "I . . . have learned for the first time that such studies are being made. A weather forecast that could state, in addition to present conditions, the arrival of swell, etc., ought to be extremely important, as you will know from your experience around here. Our bar is so "touchy" these days: A very little swell, rolling in from offshore, can make a tremendous break. More so in the last three years than

WEATHER MAP of a typical Pacific Ocean storm, with velocity, fetch, and decay distance indicated. For a view of waves when they reached California shore, see page 102.



you can imagine. We notice that sometimes there may not have been a cap-full of wind for two weeks, yet we go down and find the bar impassable. All stuff from offshore-swells that come rolling in from far-off storms."

The Department of Engineering at the University of California has had wave recorders in operation for almost a year at Point Sur, Calif., and Heceta Head, Ore. A comparison of the height and period of the recorded waves with those estimated from weather maps, following the procedure briefly described above, shows a remarkable degree of accuracy in the forecasting method. Within the next few months it is planned to install additional wave recorders at two localities in California and at one station in Washington. The records from these recorders will be summarized in the form of wave roses by seasons so that engineers will have adequate design data for any point on the Pacific Coast.

Refraction and refraction diagrams

The wave summaries discussed above are for deep-water conditions. When waves move into shallow water, certain important transformations take place. As the waves move shoreward from deep water and approach a shoreline at an angle, the wave crests are bent because the inshore portion of the wave travels at a lower velocity than the portion in deep water; consequently, the crests tend to conform to the bottom contours. The first photo shows the bending, or what is called "refraction" of waves near a shoreline. The result of refraction is a change in the height and direction of travel of the waves. These factors may be vastly changed at closely adjacent points on a coast, solely due to the underwater configuration.

The magnitude of these changes is best estimated by use of a "refraction diagram." A refraction diagram may be considered to be a map showing the wave crests at a given time, or the successive position of a particular wave crest as it moves shoreward. Only crests several wave lengths apart are required to show the bending of waves and to permit the construction of a set of lines which are everywhere perpendicular to the wave crests. These lines are known as "orthogonals" and are used in estimating variations in wave heights. Such estimates are made by assuming that the wave energy between any two orthogonals remains constant; then, in a steady state of wave motion the same power should flow past all positions between the two orthogonals. From a consideration of the fundamental equation for the power of a wave the ratio of wave height between two points is

$$\frac{H_1}{H_2} = \sqrt{\frac{b_2}{b_1}}$$

where b_2 and b_1 are the distance between orthogonals at points 2 and 1, respectively. The quantity $\sqrt{b_2/b_1}$ is termed the refraction coefficient.

Once a refraction diagram has been prepared for a portion of a coastline and the orthogonals constructed, refraction coefficients can be computed from measurements made directly from the diagrams. Such coefficients afford a convenient method of comparing wave heights at various localities. It is of interest to note that a convergence of orthogonals indicates a concentration of wave energy (large wave heights); whereas, a divergence of orthogonals indicates a spreading out of energy (low wave heights). Thus, swell coming over a submarine canyon usually experiences a decrease in height, and swell passing over a submarine ridge usually will be increased in height. Often the submarine topography is a reflection of the shoreline and a submarine ridge frequently extends seaward at a point or headland. Similarly, a submarine valley often exists offshore of a bight or indentation in the coastline. This relationship observed by navigators has given rise to the expression "the points draw the waves," as they have noted that waves frequently are higher off a point. Similarly, seamen also have observed that the sea usually is relatively calm at the head of a submarine canyon, and advantageously anchor there in times of heavy weather.

A refraction diagram might be prepared entirely from aerial photographs, but, generally, they are constructed graphically. For details of the method, see "Graphical Construction of Wave Refraction Diagrams," U. S. Navy Hydrographic Office Pub. No. 605.

Wave refraction analyses are rapidly approaching the status of a standard component of shoreline investigations. Results obtained from these analyses are frequently of only a qualitative character but, even so, they provide a rational basis for planning shore protection and improvement. The following example of a wave refraction problem is not wholly representative of the great majority of refraction problems but is chosen to illustrate the typical technique and the manner in which it can be used to supplement and explain fragmentary observation. It incidentally demonstrates the extent of weather information which eventually must be available for a complete knowledge of wave attack.

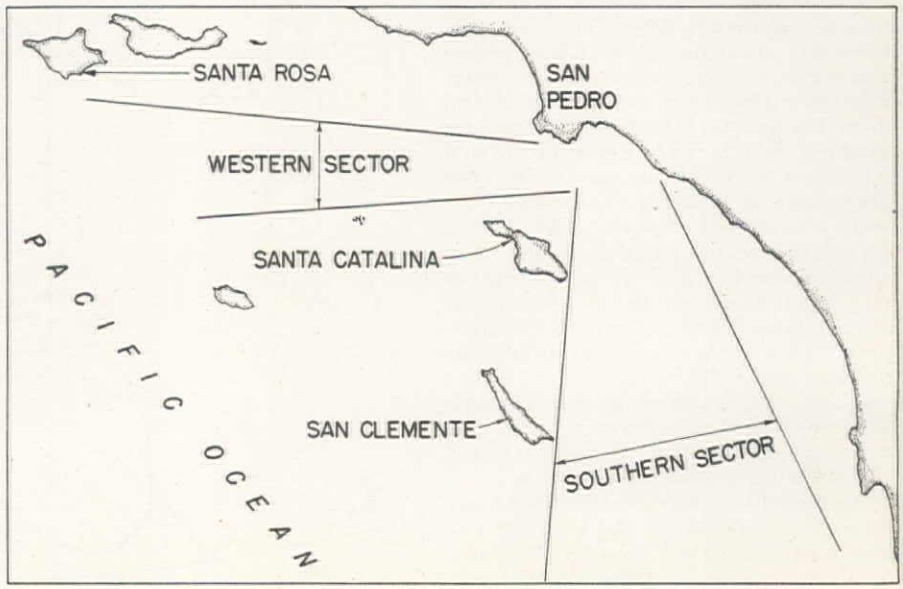
Wave attack at Long Beach

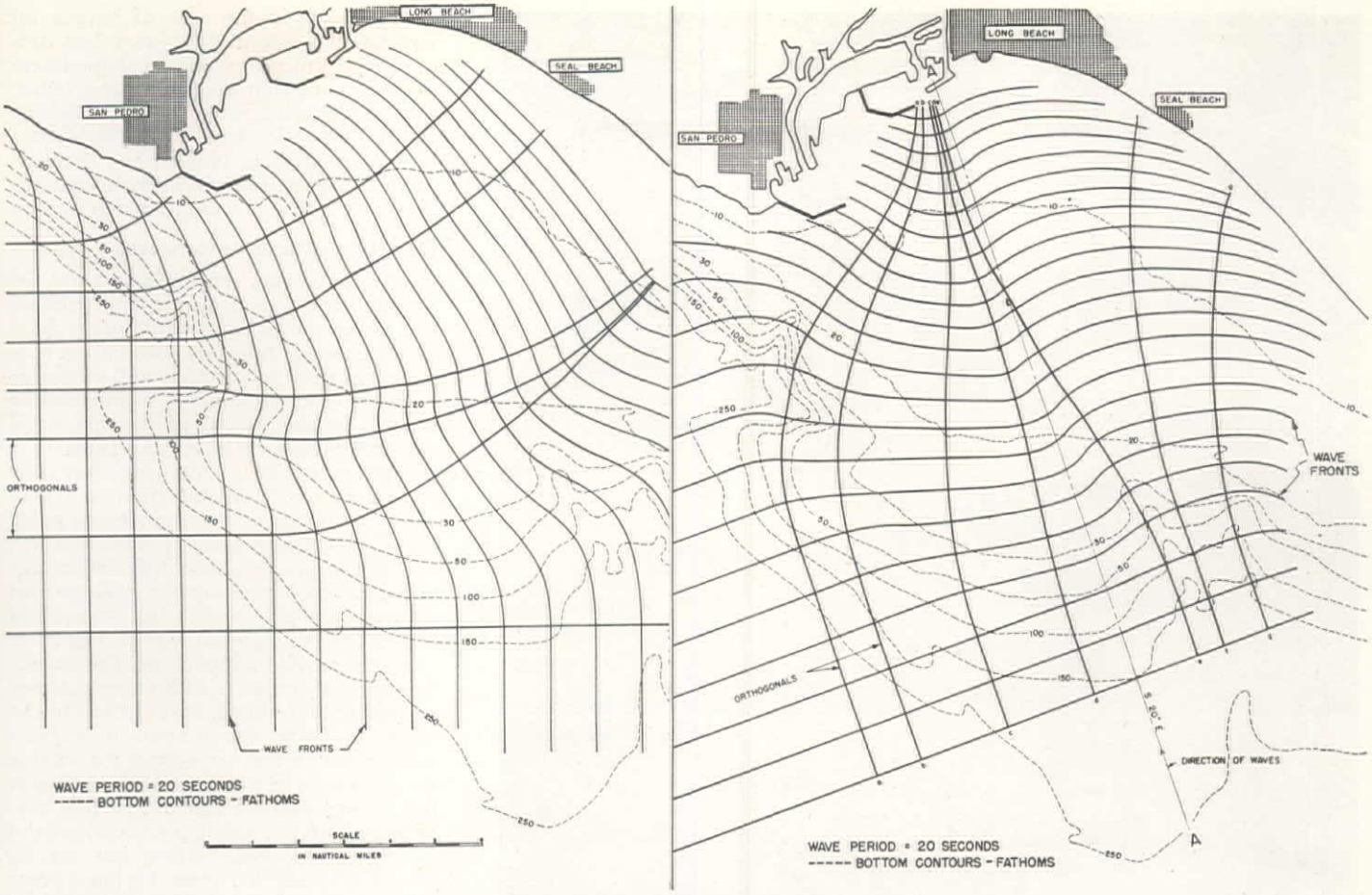
During the period April 20 to 24, 1930, large breakers damaged the outer portion of the Long Beach harbor breakwater. Damage to breakwaters by heavy wave action is not noteworthy but the circumstances at Long Beach were unusual because it was only at and near the end of the breakwater that large breakers were observed. There was only a light wind and the sea offshore was calm. At the San Pedro breakwater, only a few miles away there were no breakers and along the shore downcoast from the Long Beach breakwater, life guards noticed no wave action of unusual intensity. The swells broke against the breakwater and dislodged stones ranging in weight from 4 to 20 tons. In the Long Beach channel, just off the end of the breakwater, the swells peaked up but apparently did not break.

These circumstances indicate that, during this period, waves must have approached this shoreline from such direction, and with such period, that they were focused on the end of the Long Beach breakwater but were elsewhere of negligible size. The period was not measured but from the statements of eyewitnesses, it is believed to have been between 20 and 30 sec.

In 1930, the Los Angeles-Long Beach outer breakwater had not been constructed and the Long Beach harbor breakwater was exposed to ocean swells over limited sectors from south and west. In order to locate the possible sources of waves during this interval, the Northern Hemisphere Historical Weather Maps were examined and it was found that there existed two storm centers capable of producing long-period waves, one to the northwest and the other approximately west. The characteristics of the waves to be expected from these storms were "hind-

OUTLINE MAP of offshore islands near San Pedro, Calif., showing the only two sectors from which storm waves may approach shore. Opposite page shows wave action.





DESTRUCTIVE WAVES at Long Beach breakwater could not have resulted from storm to the west, left; but came from a storm thousands of miles to the south, as shown at right, which indicates how all orthogonal lines concentrate at one point.

cast" following the procedures outlined in Hydrographic Office Report No. 11,275. Waves from one of these storms would have to have undergone refraction and diffraction around Santa Rosa Island before approaching the Long Beach breakwater through the westerly sector, but waves from the second storm could approach the breakwater directly through this sector.

In order to analyze the possible effect of these storms, a refraction diagram was drawn for waves of 20-sec. period approaching from due west. It appeared that refraction of these waves did not produce the observed effect, namely, concentration of wave energy at the Long Beach breakwater and inappreciable wave action at adjacent points. It seemed safe to conclude on this basis that neither of these storms generated the waves which damaged the breakwater and that their source must have been outside of the area covered by the weather maps.

Almost due south of Long Beach there is a submerged ridge which might concentrate waves from this direction on the breakwater. Being deeply submerged, it would effect only waves of unusually long period and thus would, in this respect at least, satisfy the requirement that the phenomenon be of rare occurrence.

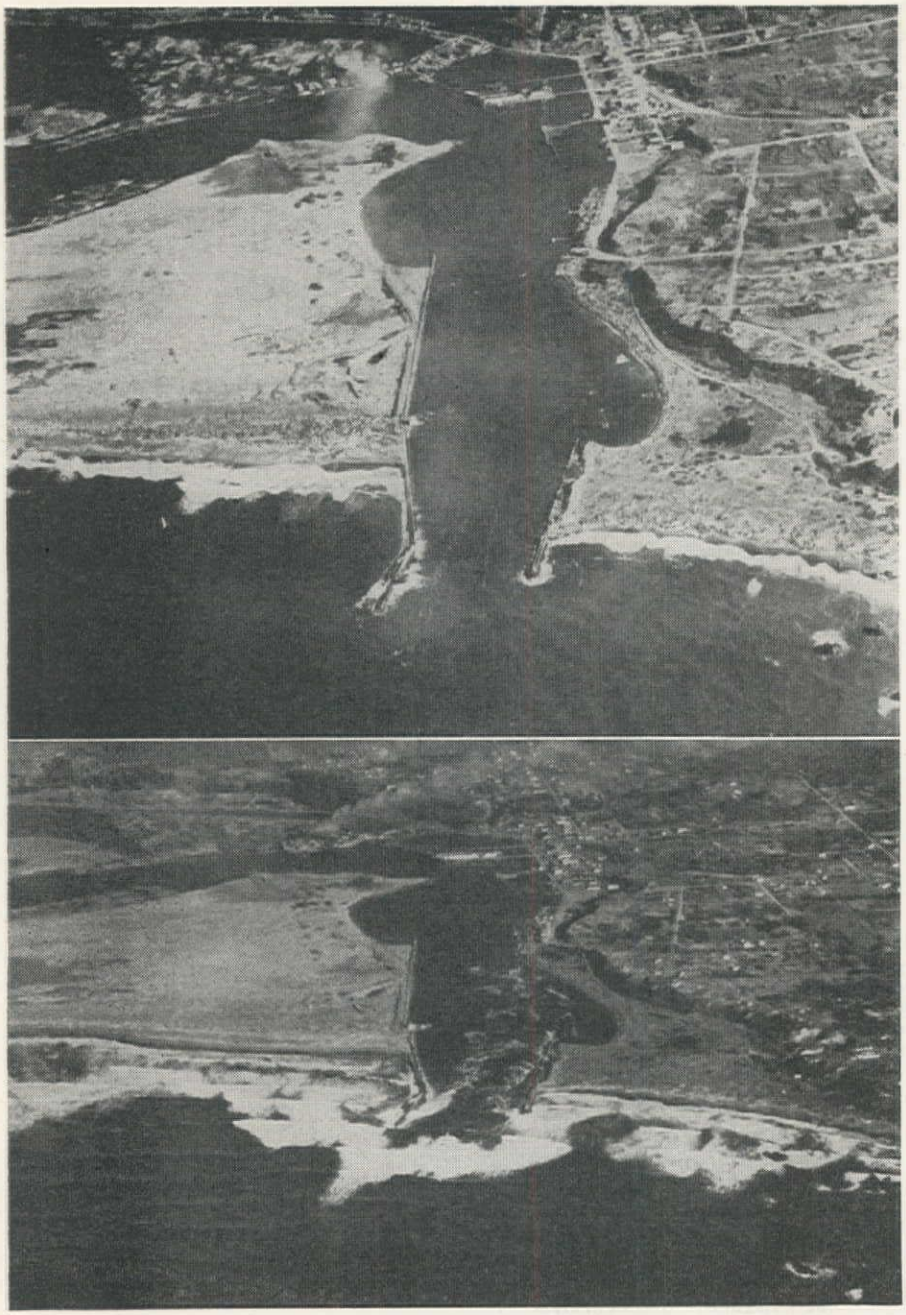
On the refraction diagram for waves of 20-sec. period approaching along the axis of the ridge (line A-A), the convergence of the orthogonals a-a and e-e shows that the energy of these waves would be focused on the breakwater, the multiplying factor for height being approximately three, exclusive of the effect of the shoaling bottom on height. At all adjacent points along the shoreline and at the San Pedro breakwater, refraction would reduce rather than increase wave height. The wave period was not measured but it was certainly greater than 20 sec., the period used for the refraction diagram. A longer period would not change the character of the refraction diagram but would have produced slightly greater focusing by refraction. Thus, it appears probable, but not certain, that the larger breakers which damaged the Long Beach breakwater during the interval Apr. 20 to 24, 1930, were generated by a storm almost due south of Long Beach, in the south tropical area not covered by available weather maps.

The above treatment of the problem is typical of the application of refraction diagrams, that is, in the determination of the critical direction and wave period from which damage will ensue, whether supported by observations or not. In addition to the evaluation of the relative degree of exposure of coastal points to wave action, these diagrams also can be used to determine prevailing directions of littoral currents and other factors which are of great importance in the transport of beach materials and wave damage and attack.

The nature of wave attack

The general problem of wave attack on a shoreline, ship or coastal works is a very complex problem which best can be evaluated by the use of models or correlative histories of prior installations. However, a theoretical attack is rapidly becoming more important. As the knowledge of the mechanics of shallow water waves and breakers become more nearly complete, the theoretical approach becomes feasible. Such an approach has been made in the case of damage to torpedo nets anchored in a seaway. This combined theoretical and model study led to a determination of the critical stressing factors, the type of waves which gave rise to critical stresses, and the design changes which would obviate or palliate these critical conditions.

The design of each structure which must survive the attack of ocean waves imposes its particular problems. A general statement of the important considerations can be made. The design of floating structures (dredges, pontoons, etc.) is a problem of the complex response of the structure to the waves. It rarely would be possible to design the structure so that it would not respond to ocean waves, but floating equipment in harbors and lakes can be designed to remain steady under the anticipated wave conditions. A floating structure normally will have modes of oscillation which include all periods between its period of roll and its period of pitch. That is, at some angle of attack it will respond strongly to waves of the periods from its shortest to its longest period of oscillation about an axis. Its vertical response (heave) must also be considered.



NORMAL CONDITIONS at mouth of harbor at Oceano, Calif., top. Impassable surf conditions caused by waves generated several days previously in the ocean 1,500 mi. distant, which was forecast by the heavy storm indicated on the weather map, page 99.

These modes of oscillation can be approached theoretically from the general principles of vibration, (i.e., the inertia and the forces of restoration). If these critical periods equal to those of the significant waves can be avoided in the design, no exaggerated motion will ensue under the installation conditions. If all the free periods of oscillation of the structure are short in comparison with the periods of the anticipated significant waves the structure will follow the water surface with the plane of the normal water line always essentially tangential to the wave surface. The structure is thus subject to inertia forces and to overall motion, equal to the wave height and changes in slope. This motion must be provided for in the moorings of the structure, and in the case of a series of connected units as pontoon pipelines allowance for the motion becomes especially critical. If all of the periods of oscillation of the structure are long in comparison with the periods of the anticipated waves the structure will not respond fully to the waves. It thus is someways equivalent to an installation founded on the bottom.

The problem is then one of a continuous structure with complex supports represented by the several wave crests. Differential pressures due to the different water levels at points in the structure, drag loads from the variable water velocity at different points in the wave, and impact loading from the suddenly applied forces on the weather side are all design factors and can be approached from a knowledge of the nature of the anticipated waves. The shape of the weather surface should be such as to avoid large areas being loaded instantaneously by the approaching waves. For instance in the case of barges for floating equipment the square bow frequently is cut under and so shaped near the waterline that its surface is a reflection of the surface of the approaching wave. The entire bow is thus subjected to sudden loading, impact, and damage. Such configuration can be avoided from a knowledge of the character of waves.

Design of structures for waves

The above may serve to point out the possibilities of a dynamic approach to the design of floating equipment. Such methods only now are becoming possible, but their importance will undoubtedly increase. It probably is not feasible to subject the design of floating engineering equipment and structures to a complete dynamic analysis but the statement of the factors involved may serve to enhance the "engineering judgment" when such design is undertaken.

Wave attack on shore installations involves many of the same considerations as the problem of floating structures with added complexities resulting from the structure's influence on the shoreline and the presence of breakers. A pier or jetty, for instance, is subjected to the same pressure differences at various points and to the same drag forces due to variations in water velocity throughout the structure. These drag forces may be very high in a piling pier and load not only the individual piling but set up heavy stresses between various bents due to the opposing direction of drag forces at the crest and trough of the waves.

The impact forces become critical in a shore installation, for any structure that spans the region from shore to deep water must pass through the region of breakers. Here the actual water velocities are very large and the wave front essentially vertical or even overhanging so that large surfaces of the structure are very readily subjected to instantaneous loading and high impact stresses. The rigidity and mass of the structure determine the intensity of local stress under these circumstances and extremely high stresses can occur. The best solution is to span the surf zone so that no piling or foundations are placed within the actual breaker zone. This normally is feasible only on a steep shore, but the point of breaking at all stages of water and for the conditions of the larger waves can be determined.

When unaffected by currents waves break in a depth of water of about 1.3 times their height, this depth being measured from the mean water surface. Thus, foundations at the breaking point of larger waves can sometimes be avoided, or specially designed. Jetties or breakwaters are always subject to the effect of breakers at some point, and instances of damage are numerous. The exact mechanism by which the great "hydraulic quarrying" forces are set up are not fully understood, but they are associated in some way with the high impact forces existing when breaking waves strike large surfaces tangentially and the presence of blind fissures. Flat fill slopes tend to avoid these and steep

(Continued on page 116)

CONSTRUCTION DESIGN CHART

XCIV ... Vertical Stirrup Spacing in Beams

By JAMES R. GRIFFITH
Civil Engineer
Seattle, Wash.

A CHART was presented in the Nov., 1939, issue, to determine vertical stirrup spacing in concrete beams where the allowable tension in the stirrups was $f_v = 18{,}000$ p.s.i. The accompanying chart is identical except that it has been prepared on the basis of an allowable tensile stress in the stirrups of $f_v = 20{,}000$ p.s.i.

As pointed out previously, the allowable stress in the web reinforcement is a controversial subject. Many building codes still do not mention a specific value, under which conditions the assumption is usually made that it is no different from the stress allowed in the regular tensile reinforcement. The Joint Committee Report of 1940 allows a maximum stress in the web reinforcement of only 16,000 p.s.i. On the other hand, the A. C. I. Building Code of 1936 allows a value of $f_v = 20{,}000$ p.s.i., as does the Uniform Building Code, and the Seattle Building Code of 1946. Therefore we see that a wide difference of opinion exists even among recognized authorities on the subject.

After using a formula for any appreciable time, engineers are prone to think of it as giving exact values, forgetting basic assumptions made in its derivation. Concrete is relatively weak in resisting tension. A deflected beam develops diagonal stresses in its web. In the case of a structural steel beam having a relatively thin web, the diagonal compression may produce web buckling. This buckling is prevented by web stiffeners in a built up girder. In the case of the reinforced concrete beam, it is the diagonal tension which must be taken care of. The actual numerical value of the diagonal tension is difficult to compute. Therefore, for ease in computations, the vertical shear is conventionally taken as a measure of the diagonal tension. The formula used to determine the required spacing of stirrups utilizes the vertical shear, and is strictly an approximation.

The Uniform Building Code, similarly to most codes, specifies that the required area of vertical stirrups shall be computed by the formula

$$A_v = \frac{V' s}{f_v jd}$$

in which

A_v = Total sectional area of the web reinforcement.

V' = Excess of the total shear over that permitted in the concrete.

s = Spacing of the stirrups.

f_v = Tensile unit stress in web reinforcement.

Since the unit shear is determined by $v = \frac{V}{bjd}$, the value of the unit shear to be carried by the web reinforcing may be written

$$v - v_1 = \frac{V'}{bjd}$$

As a consequence, the formula specified for the determination of the stirrup spacing may be written

$$s = \frac{A_v f_v}{(v - v_1) b}$$

This last formula is the form which has been used in the construction of the accompanying chart wherein $f_v = 20{,}000$ p.s.i.

Two lines are necessary for a solution of this chart, each intersecting the "SUPPORT" at the same point. One line must be drawn between values on the two (A) scales, and the other between values on the (B) scales. Conditions were assumed in order to illustrate the use of the original chart wherein $f_v = 18{,}000$ p.s.i., as follows:

$b = 8$ in.

$v - v_1 = 88 - 40 = 48$ p.s.i.

¼ in. "U" stirrups.

The required spacing of the stirrups was found to be

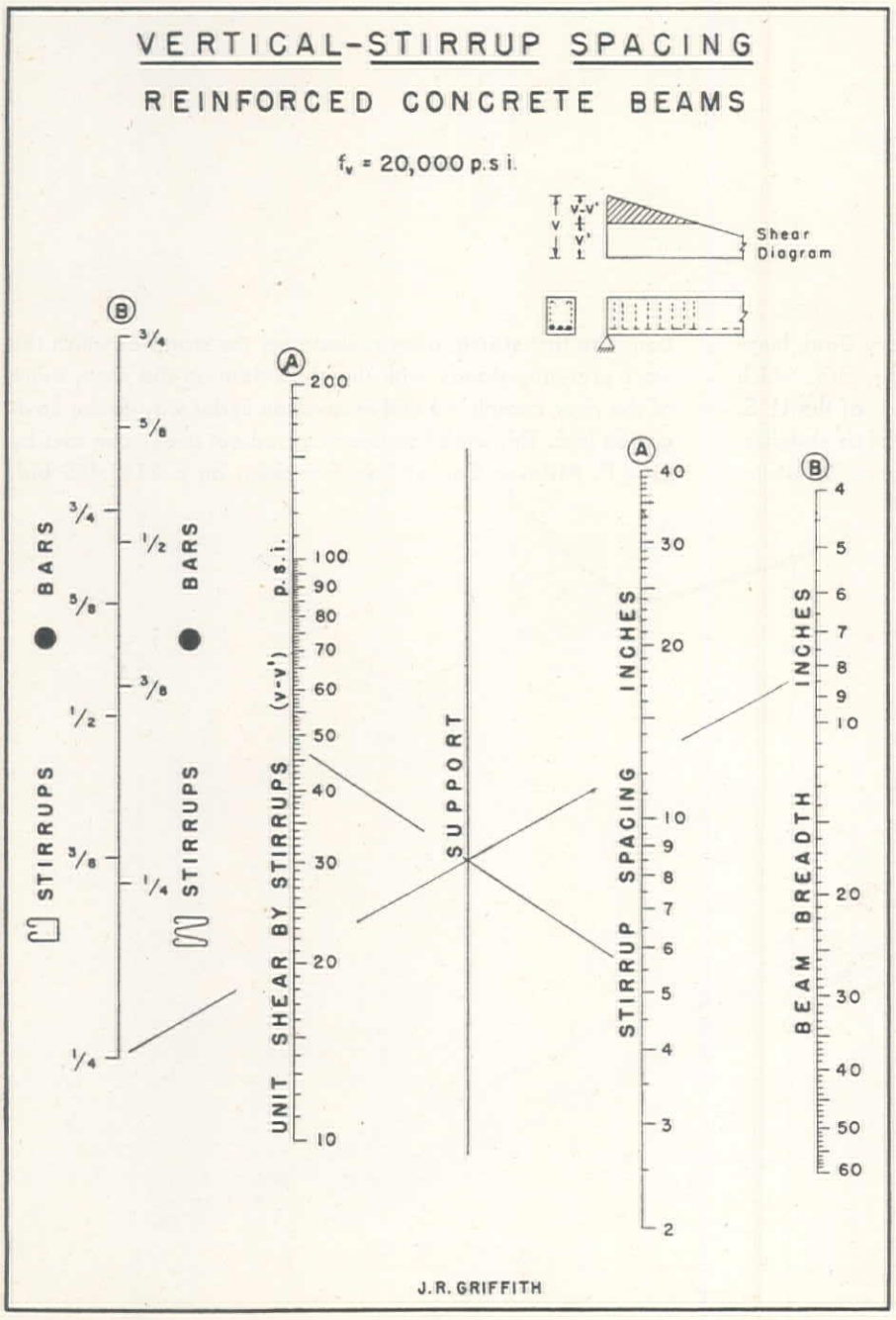
$s = 4.7$ in.

The same assumptions were made for illustrating the use of the accompanying chart wherein $f_v = 20{,}000$ p.s.i. It will be noted that in this case the required spacing of the stirrups is

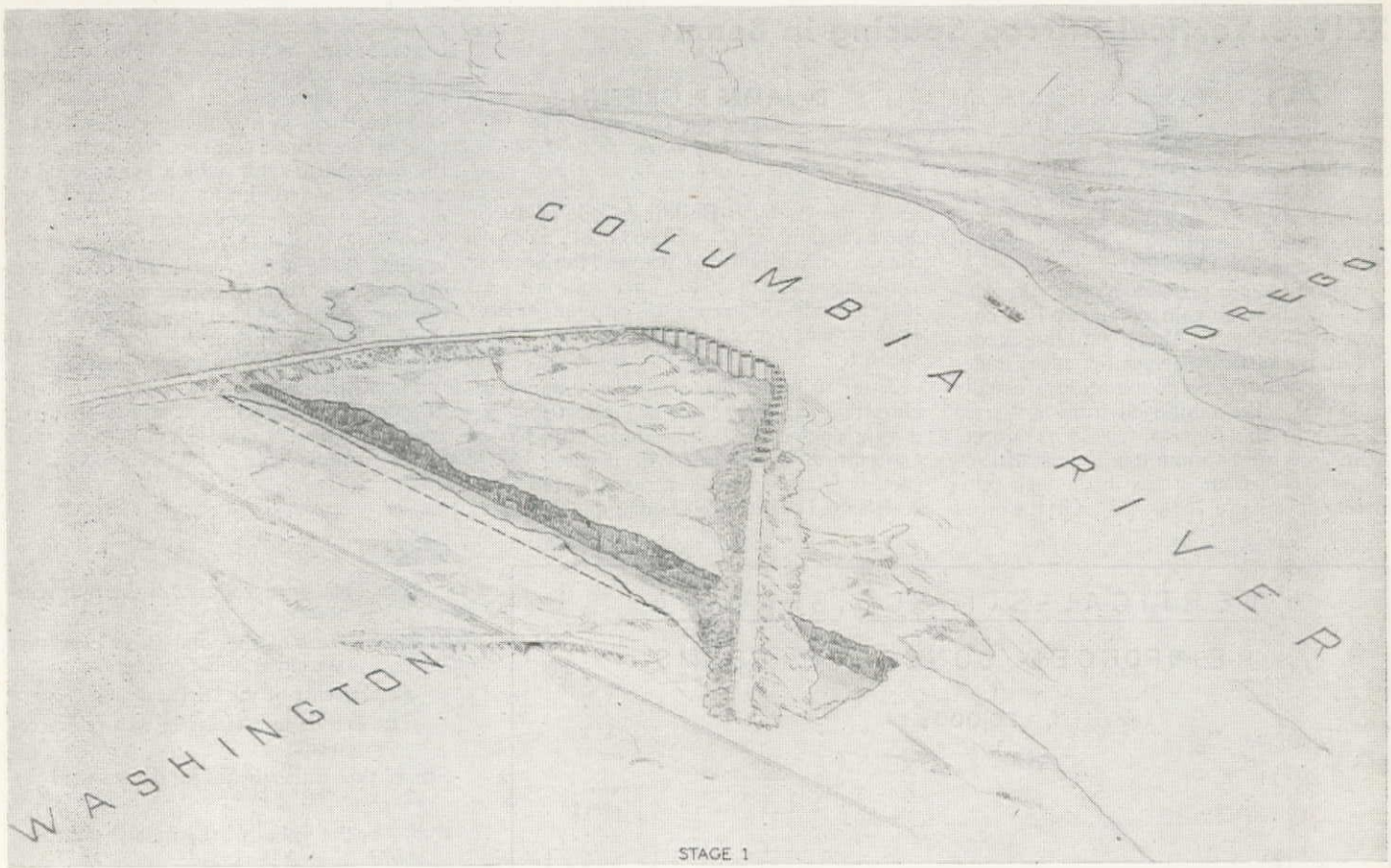
$s = 5.3$ in.

By formula we would have

$$s = \frac{A_v f_v}{(v - v_1) b} = \frac{2(0.049) \times 20{,}000}{48 \times 8} = 5.12 \text{ in.}$$

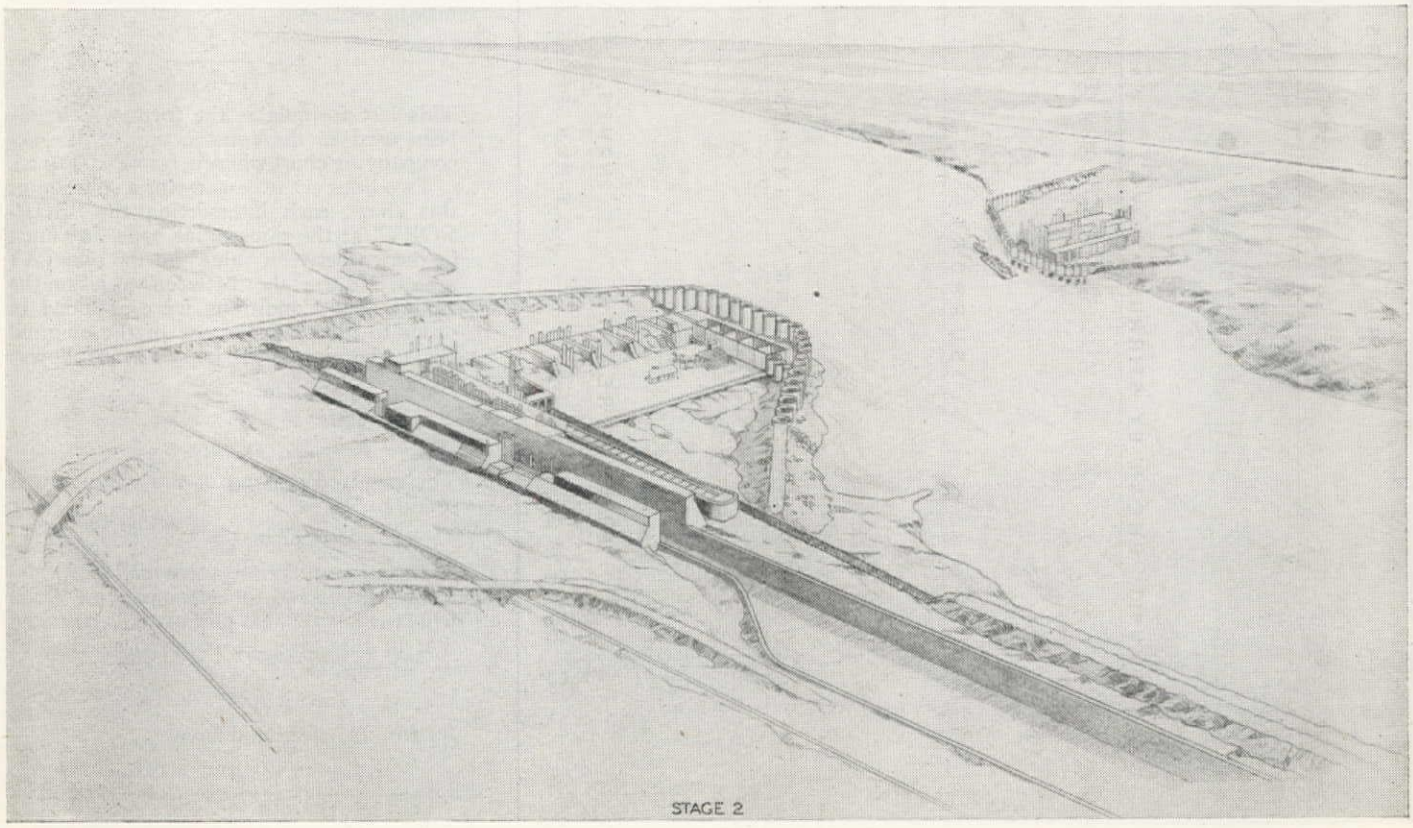


McNary Dam Construction Schedule

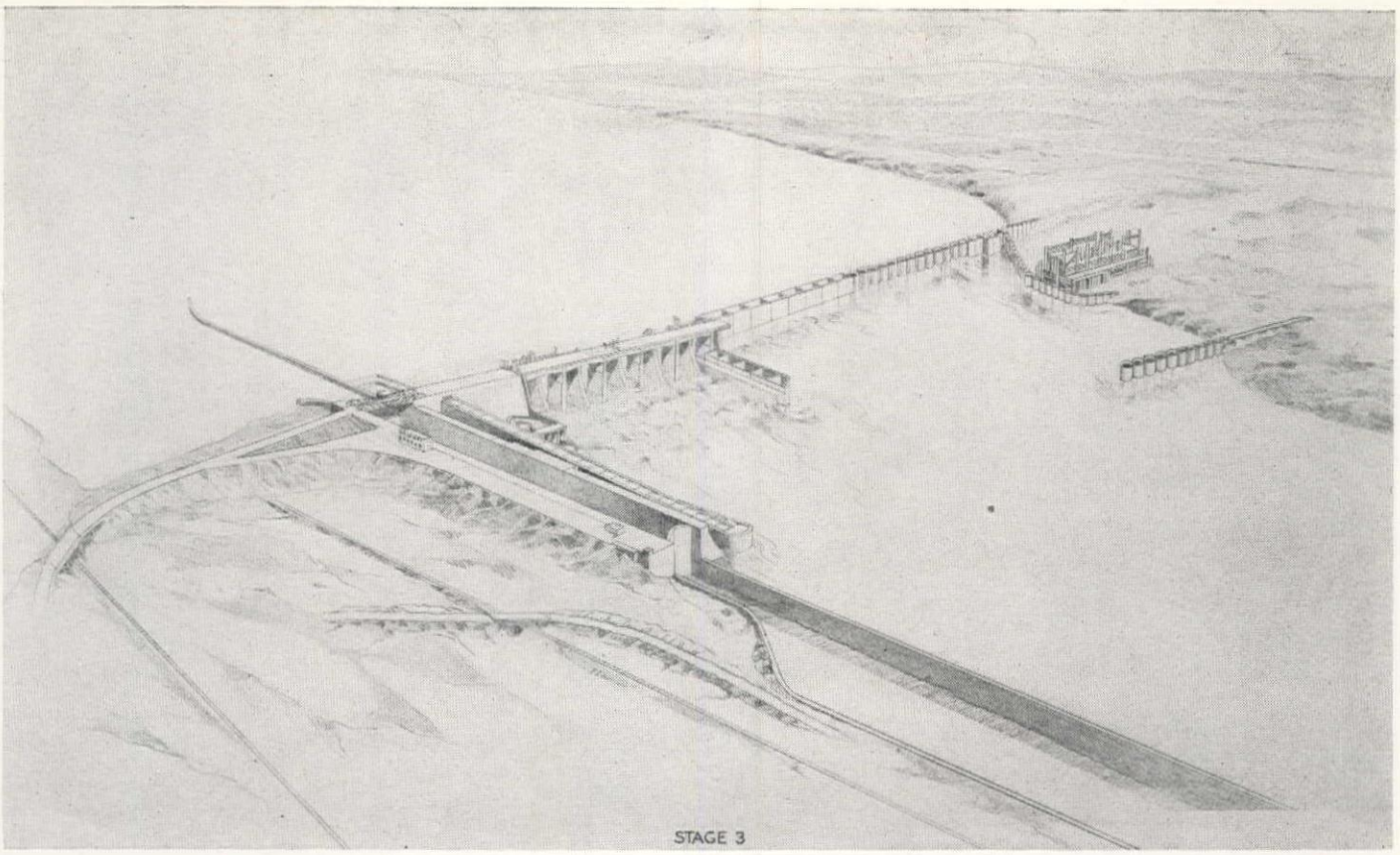


STAGE 1

TO OUTLINE construction procedure on McNary Dam, huge power dam on the Columbia River near Umatilla, Ore., which will cost about $220,000,000, Carl A. Seastrand, of the U. S. Engineer Office in Portland, has drawn a series of six sketches, presented herewith, showing the proposed stages of construction. The first sketch, above, illustrates the stage at which the work presently stands, with the cofferdam on the north shore of the river completed and excavation under way at the navigation lock. This work has been carried out under contract by Guy F. Atkinson Co., of San Francisco, on a $743,485 bid.

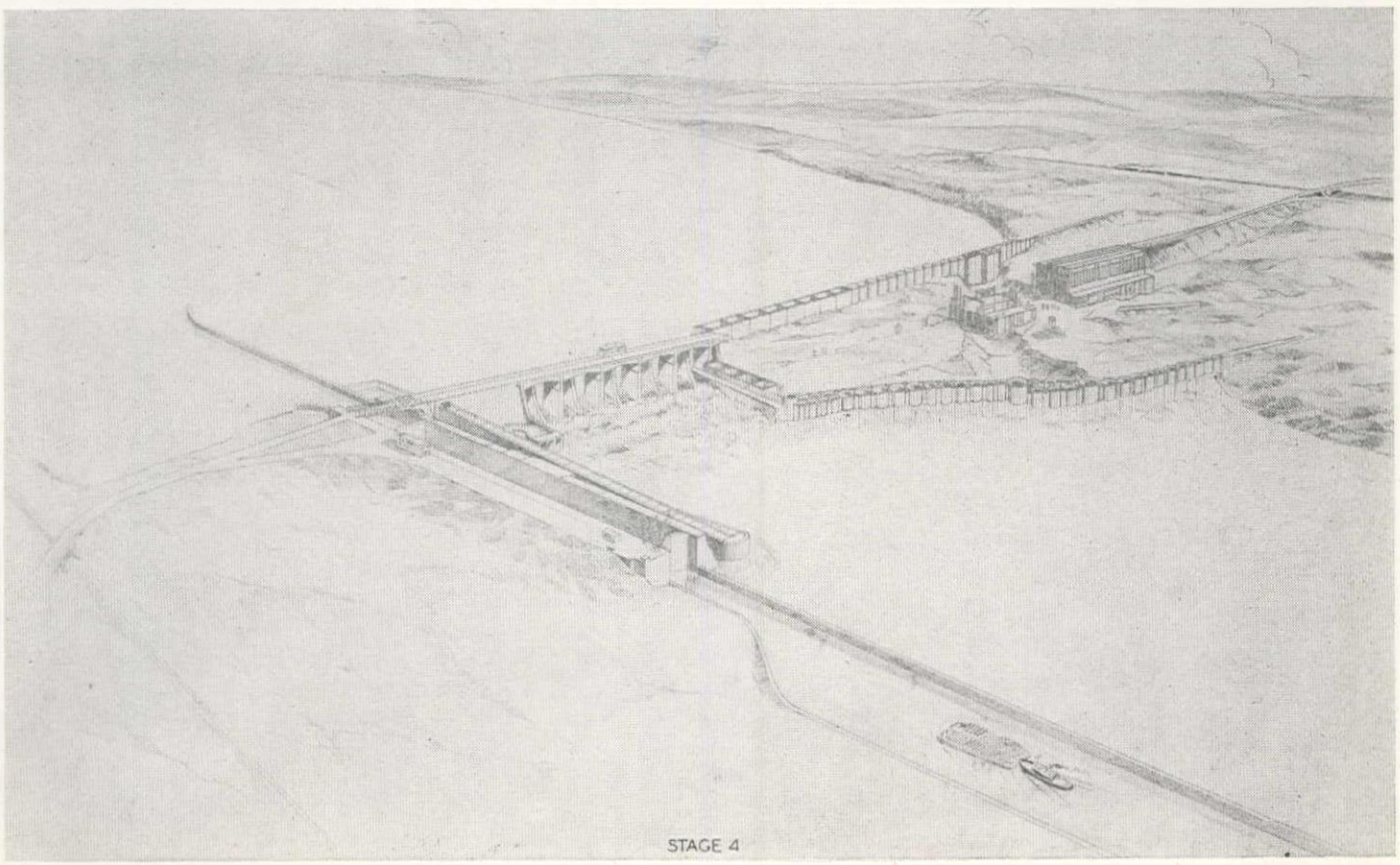


STAGE 2

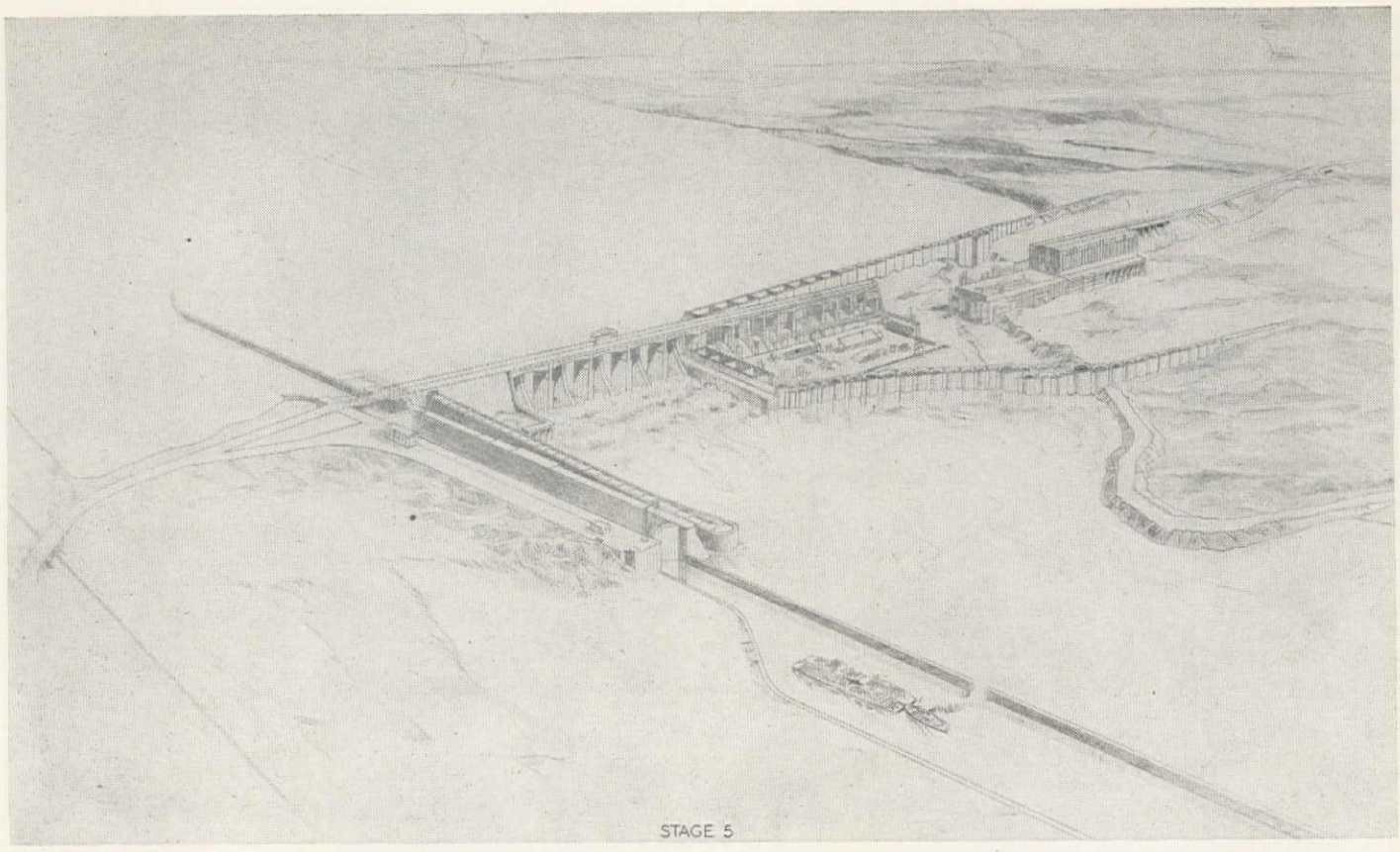


STAGE 3

Other work now under way includes construction of a construction town with all facilities. Stage 2 illustrates the condition anticipated on July 1, 1949, with the navigation lock completed on the Washington side, part of the spillway dam in, and work started on the Oregon shore auxiliary cofferdam. Construction of the powerhouse and main fishway on the Washington side is also commenced. In the stage 3 drawing, the main fishway is completed, and the spillway structure is partially completed, with openings left about 40 ft. low to permit diversion of the river during Stage 3 work. The Washington shore abutment is almost completed and the Oregon shore cofferdam partially so. The Washington cofferdam is still in place. Stage 4 shows the Oregon cofferdam complete, as is the Oregon abutment. Additional units of the powerhouse are un-

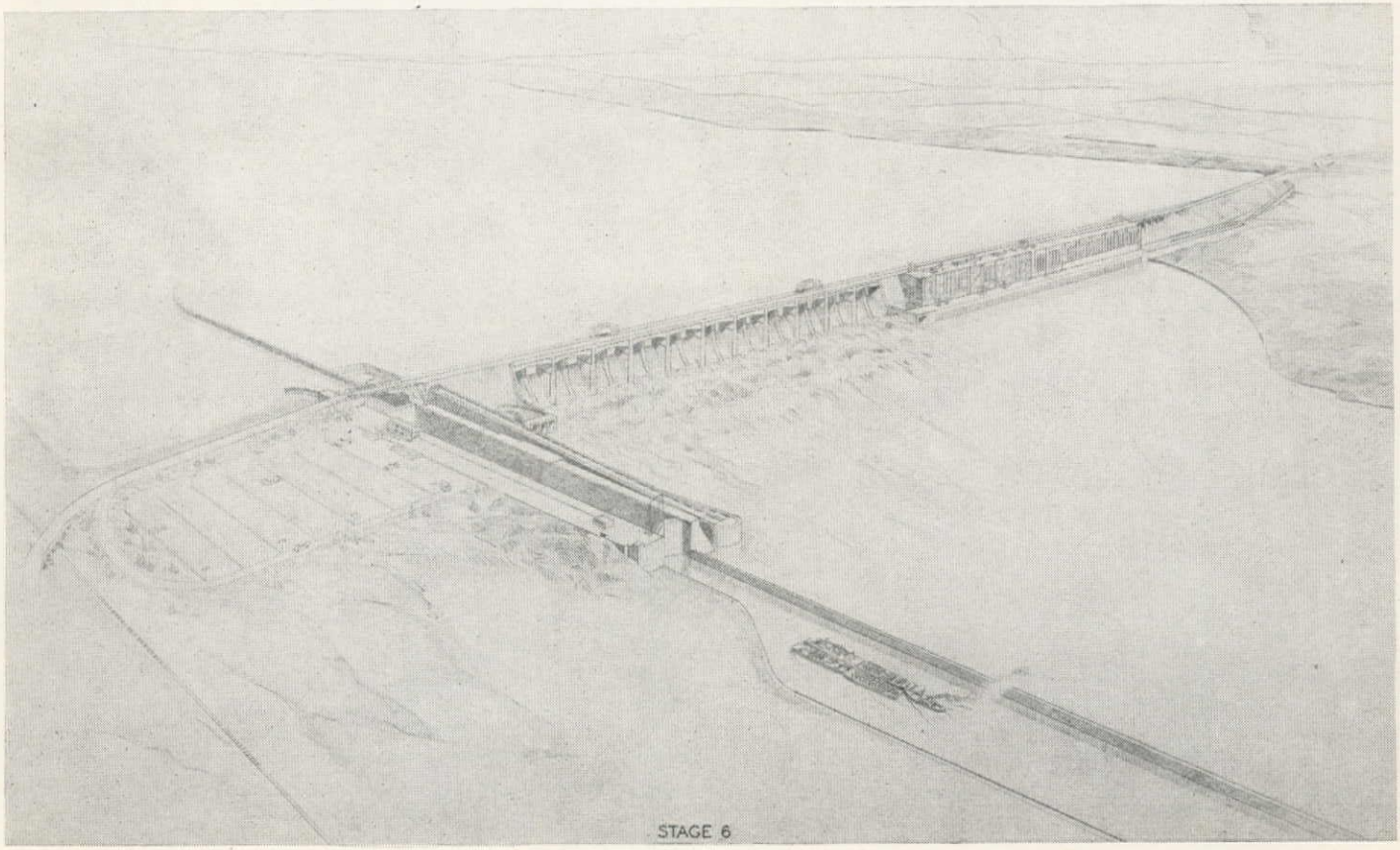


STAGE 4



STAGE 5

der construction. This is the probable appearance on July 1, 1951. Stage 5 shows the work on July 1, 1952, with a fill on the Oregon side completed, extending the cofferdam to include the area where powerhouse tailrace excavation is required. The remainder of the spillway dam and powerhouse is under construction. By July 1, 1953, McNary Dam should look like Stage 6, the spillway dam completed and the powerhouse nearly so. Roadway across the top will be in service, and only completion of the powerhouse and installation of generators remains. This schedule will be maintained if appropriations amount to 40 million dollars annually. If less, naturally construction will be slowed. The potential power output of McNary Dam is 1,380,000 kw. The dam is 7,600 ft. long, and the pool will be backed up 60 mi. to Pasco, and into the Snake River.



STAGE 6



AERIAL VIEW of the completed Cabrillo Freeway, looking south through Balboa Park to the waterfront and downtown San Diego. Historic Cabrillo bridge is in the foreground. The Freeway is 7.1 mi. long, consists of four lanes, divided with parkway.

San Diego Opens New Freeway

Cabrillo Freeway, connecting downtown San Diego with cities to east and northeast completed in 2 years — Heavy earthmoving, extensive landscaping involved in project

By HAROLD L. CURTISS
Assistant Superintendent of Parks
City of San Diego, Calif.

THE $3,500,000 Cabrillo Freeway—a dream of San Diegans for nearly fifteen years, became a reality on Feb. 28 when state, city, military and civic leaders officially opened the highway to traffic.

Within a few minutes after Arthur Marston, assisted by C. Aubrey Smith, State Highway Commissioner for San Diego County opened the Cabrillo Freeway by cutting a blue ribbon strung across it, a steady stream of cars poured over the 7.1 mi. of the divided four lane highway.

City's first freeway

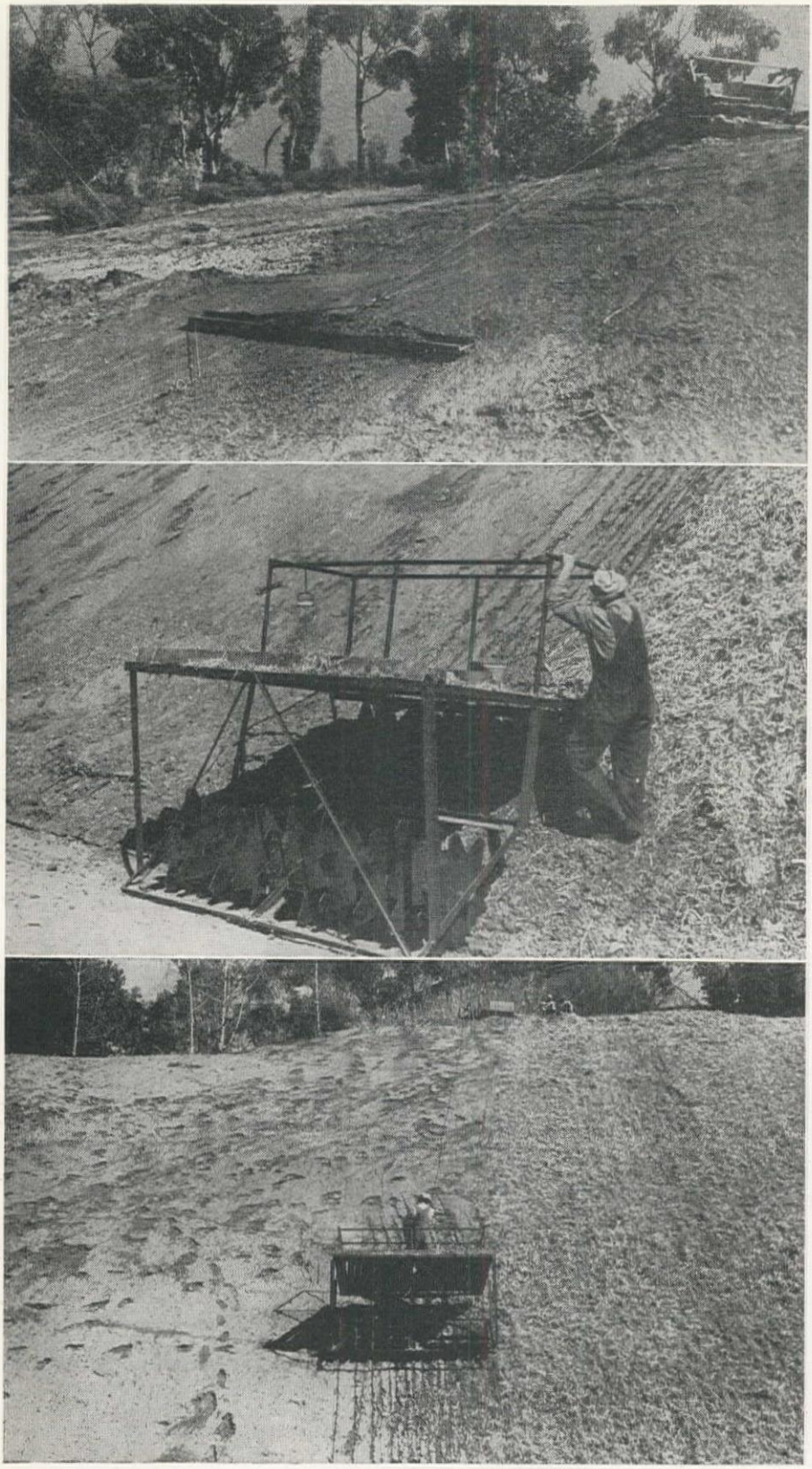
Hailed as one of the most beautiful stretches of parkway in the state, much of its attractiveness lies in the fact that for a good part of the way it passes through the towering groves of trees in Balboa Park, San Diego's eighty-year-old 1,400-ac. municipal park.

The city's first freeway connects downtown San Diego with the residential sections and also serves as a more direct route or connection with the inland communities to the north via U. S. Highway 395. The Cabrillo Freeway got its official start in 1941, when San Diegans by an overwhelming majority (8 to 1) voted to set aside a 200-ft. right of way through Balboa Park for highway purposes. Engineering work was started in 1938 with local, state and federal agencies cooperating. World War II held up plans for immediate construction of the freeway, which now extends from Eleventh and "A" Streets in the downtown area, through the Eleventh Avenue canyon and northward down into and across Mission Valley to its northern connection with U. S. 395 just north of Linda Vista.

In 1941 plans were complete enough so that the program could be presented to the State Highway Commission as one of the first postwar projects. With approval of the State Division of Highways officials in Sacramento the first contract for one of the bridges in the system was let in Dec., 1945. Ground breaking ceremonies took place Feb. 6, 1946.

Since that time the route has undergone remarkable changes. At the Mission Valley crossing a vast and complex traffic interchange was constructed. Almost two years were spent in the development of this freeway with the cost of $3,500,000 spread over twelve separate contracts.

With the opening of the Cabrillo Freeway, traffic from Riverside and San Bernardino counties and from the northern sections of San Diego county entering the city on U. S. 395 is no longer subjected to normal cross-town traffic, but is now able to enter the downtown area directly with a considerable saving of time and resultant decrease in traffic accidents brought about by the reduction in grade crossings.



CUT SLOPE preparation, prior to landscaping. Top, I-beam used to float even layer of topsoil; center, special disc harrow and operator's platform for breaking soil, distributing hay and seed; bottom, the disc harrow being pulled up slope by tractor with winch at top of cut.

Counting previously constructed bridges there are 13 grade separation structures which are a part of the project. There are two underpasses.

55-mile speed prevails

Except for approaches, where limited speeds must be observed, a 55 m.p.h. limit prevails. State Division of Highways engineers declare that speed, safety, and convenience were the paramount considerations in designing the highway. Curves and turn-offs were planned to permit the 55-mi. speed and the divided lanes eliminate cross traffic.

The first unit of the roadway and slope stabilization contracts covering construction from "A" Street to a point 0.4 mi. south of Mission Valley was awarded to Mittry Bros. of Los Angeles, on a bid of $1,338,000. This involved 2.9 mi. of grading and paving with Portland cement concrete.

The typical section through Balboa Park consists of two 24-ft. roadways, paved with 8 in. of Portland cement concrete, comprising a four-lane divided highway with 36-ft. center dividing strip planted with trees, shrubs and lawn. A part of the roadway contract is a complete sprinkler system using more than 24,000 ft. of pipe, including the 4-in. main supply line. These have been installed to aid in the landscaping and roadside treatment which was done by the State to blend the roadway with the natural surroundings.

Heavy earth-moving

Over 1,600,000 cu. yd. of dirt was moved, with cuts as deep as 150 ft. and fills as high as 60 ft., and more than thirty million yards of station overhaul were involved in the 7-mi. length. One cut contained approximately 300,000 cu. yd. in less than one-quarter mile of length. Heavy road building equipment up to 30-cu. yd. capacity was utilized to move this tremendous yardage. In some cases earth was moved a distance of 4,000 ft. economically by means of 32-cu. yd. scrapers.

The Freeway project was financed from gas tax funds, appropriated by the California Highway Commission, together with $500,000 supplied from ¼-cent gas tax funds for State Highways through cities and matched with Federal funds for postwar highway construction.

Within a few days after the Cabrillo Freeway was opened, State Highway Engineers estimated that 30,000 cars traveled the new thoroughfare daily, about the same number as use the Pacific Highway (U. S. 101) entering San Diego from the northern coastal communities and Los Angeles.

Unique among Freeway bridges is the Upas St. equestrian overpass, a narrow bridge 184 ft. long and 18 ft. wide, for the exclusive use of horseback riders and pedestrians. One of the major overpasses, the Date St. bridge, provides a separate "fenced in" lane for horses only. From here the main bridle trail of Balboa Park meanders through groves of trees just outside the Freeway fence, and recrosses on the Upas St. overpass more than a mile to the north.

Landscaping program

To insure that the highway would not mar the park view, a landscaping project was provided so that the vistas from the roadside would blend with the park's natural beauty.

This extensive landscaping program resulted in the removal of many tons of topsoil from the bed of the canyon and placing it on bare slopes created by the large cuts. The manner in which these slopes are stabilized forms one of the most interesting parts of the erosion control project on this Freeway.

The first step in the landscape de-

velopment of the Cabrillo Freeway began in the design of the project when the high cuts were flattened to a 1½-to-1 backslope. Next came the placing of the topsoil on the face of the cuts with a clamshell. These bare slopes had previously been harrowed in order to provide a bond for the loose topsoil. The piles of topsoil placed by the clamshell on the slope were then floated to a uniform depth by means of an I-beam, which "raked" the topsoil up and down the face of the slope as a tractor and winch at the top of the cut pulled the float up the slope. The float was pulled down and across on a bias through its attachment by cable to the boom of the clamshell at the bottom of the cut.

Actual stabilization of the face of these large cut slopes started when an ingenious combination disc harrow and seeding platform was put into operation. After the topsoil had been spread on the cuts to a depth of 6 in., the first of the winter rains fell and crusted the top-soil layer. Before seeding the slope it was therefore necessary to cultivate the soil to break up the crust so that it would receive the seed and commercial fertilizer. This preparation of the seed bed was done with the aid of the platform disc harrow which traversed the slope from bottom to top and back again. It also was pulled up the slope by a tractor-operated winch placed at the top of high cuts, and descended by its own weight.

Sowing and irrigation

Following this initial preparation of the seed bed, a sower riding the platform disc broadcast a commercial fertilizer. On the way back down he broadcast the barley and rye that were to form the cover crop or "nurse" crop, to hold the loose top soil during the first winter's rains.

In this part of Southern California most of the rain falls during the period December to April. Thus it became necessary to hold the top soil, seed and fertilizer in place by discing into the surface a sufficient quantity of binder material to reduce to a minimum the possibility of loss through erosion. This was accomplished by scattering straw over the surface of the high cuts as well as on the fills.

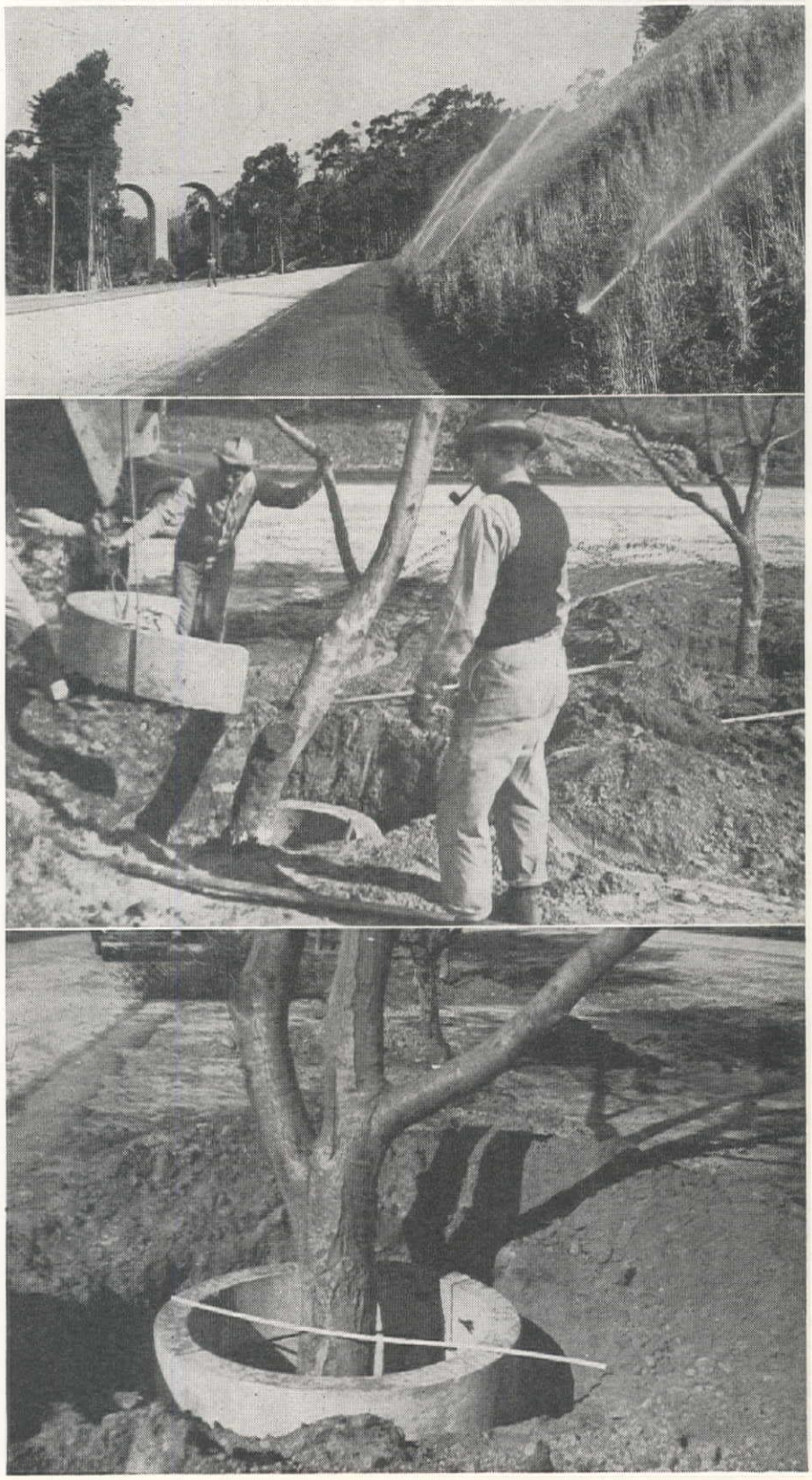
Breaking apart one bale after another, the straw is scattered on the slope to a depth of 3 to 4 in. in front of the disc harrow as the machine progresses up the slope. By means of the scalloped edges into which each disc is cut the straw is literally "punched" into the surface of the cut slope.

During the long dry summer and fall characteristic of San Diego county the artificial irrigation of all grass slopes is an absolute necessity. Invaluable to the success of this slope stabilization has been the use of the quick-coupling part-circle sprinklers manufactured by the Buckner Manufacturing Co. of Fresno. On the higher cuts these quick coupling valves were placed on the top of the cuts as well as along the bottom. With fifty pounds pressure these are designed to have a radial coverage of 60 ft., and a 67-ft. radius with 60-lb. water pressure. On this type of sprinkler there is a lever which allows the revolving head to rotate through approximately 180 deg., and after completion of the half circle the lever trips the revolving head and the nozzle returns to its original position. Thus no water is sprinkled on the adjacent roadbed.

Description of the landscaping work

The landscaping work on the Cabrillo Freeway consisted in general of cultivating portions of the areas that were to be planted; furnishing a commercial fertilizer (rated at 6-8-6) applying it at the rate of 20 lb. per 1,000 sq. ft.; furnishing and applying oat, barley or rice

(Continued on page 116)



OATS AND BARLEY covered slopes for the first winter, but lantana was planted as permanent cover, top; tree well of precast concrete rings for preservation of live oak trees, lower pictures.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD

Sending and Receiving Radio Sets Save Time and Travel on Canal Job





"Davis to Shop 2! Davis to Office! Over!" No, it isn't a policeman calling in from off the beat, or two GI's making contact with walkie-talkies. It's "Chuck" Davis, project manager for the Arizona-Nevada contractors on the Friant-Kern Canal project in California, calling in an order and checking to see if there are any important phone calls which should be answered over the radio-receiving and sending set installed in his automobile.

E. S. "Chuck" Davis, who also acted as field technician and engineer under General Pick on construction of the Ledo Road in India and China, says that he became used to the walkie-talkie method of maintaining contact with the important offices and personages on a construction job while on that project. He saw at first hand what savings in time and what an increase in organization efficiency resulted from this constant contact.

The Nevada-Arizona Contractors have the contract for a long portion of the Friant-Kern canal south of the Kaweah River. If a part needed ordering or a superintendent somewhere along the canal had to be consulted, it would normally involve a long drive over the rough road along the canal. Now, the contractors have installed a sending and receiving radio in the main office, in each of the two shops, in superintendent's cars, and in the cars of the project manager and his assistant.

The microphone and receiver are mounted handily in the middle of the dashboards of the cars, and the power plant is housed in the trunk of the car and takes up only a one foot by two foot space at one side. Individual cars can make contact at 15 mi. or up, and contact between the office and shops and the cars can be maintained at a distance of more than 100 mi.

Small Trailer Used for Inspecting Water Mains

A BUGGY TRAILER, with wheels less than six inches in diameter and which can be used inside pipes from sizes ranging from the largest down to those 16 in. in diameter, is being used for inspection of joints in the new 30-in. water line being installed in Phoenix, Ariz. Lying on the buggy or sitting up in the larger-sized pipes, workers can get through the dark underground tunnels with ease.

Engaged in installing the pipe lines for the City of Phoenix is the Fisher Contracting Co. of that city. The 30-ft. long sections of the pipe are laid in place, fit together, and a rubber washer installed at each joint to prevent leakage. The steel pipes are lined on the inside and coated on the outside with concrete. Small cracks usually remain inside and out, and these are filled with concrete as part of the "pointing up" process, according to Foy Pickering, job superintendent.

After sections of the job are completed, the work is inspected by W. A. Yoder, resident engineer for the firm of Johannesen and Girand, consulting engineers for the city on the project.

Yoder and the others working inside the pipes might find getting from place to place a slow and tiresome process if it were not for the buggy. The buggy is equipped with a trailer big enough for one man and a smaller attachment for carrying the cement used in filling cracks at the joints. It is driven by an electric motor powered by two batteries.

The buggy can be put into the water line only where construction is under way, but openings have been left at some intersections, partly to allow installation of valves but also to provide an exit for those working inside should the buggy motor happen to stop.

Emergency Snow Drags Built To Fit Standard Dump Trucks

By H. S. WALLACE
Shop Foreman, Texas Highway Dept.
Pecos, Texas

EMERGENCY SNOW DRAGS, built to fit on standard dump trucks, were used by the Texas Highway Department to relieve the situation along the Southern Route during the unprecedented snows of 1947 in Texas. During January of 1947, heavy snow through Colorado and the middle western states caused the greater part of the cross-country traffic to take the Southern Route.

Normally the snow-fall for Western Texas is very light, but in a period of three days near the end of January it totaled eight inches, covering the Trans-Pecos area eastward to Fort Worth. The snow was too deep and the pavement too slippery for traffic. All of the hotels and tourist courts were filled to capacity along the route and many people tried to weather the storm in their cars despite the sub-zero weather.

Since West Texas usually has only a light snowfall, the Texas Highway Department does not maintain elaborate snow fighting equipment for this section of the state. During the crisis, the Department built twenty-six emergency snow drags to fit standard dump trucks. The drags proved very efficient in clearing some 600 mi. of U. S. Highway 80 and U. S. Highway 290.

The material requirement for each unit was as follows:

1 8-ft. moldboard.
2 ¾ x 3 machine bolts.
1 8-ft. grader blade.
6 grader blade bolts.
12 ft. of 4/4 angle iron.
4 ft. of ⅜-in. chain.
2 lb. of 3/16-in. electrodes.

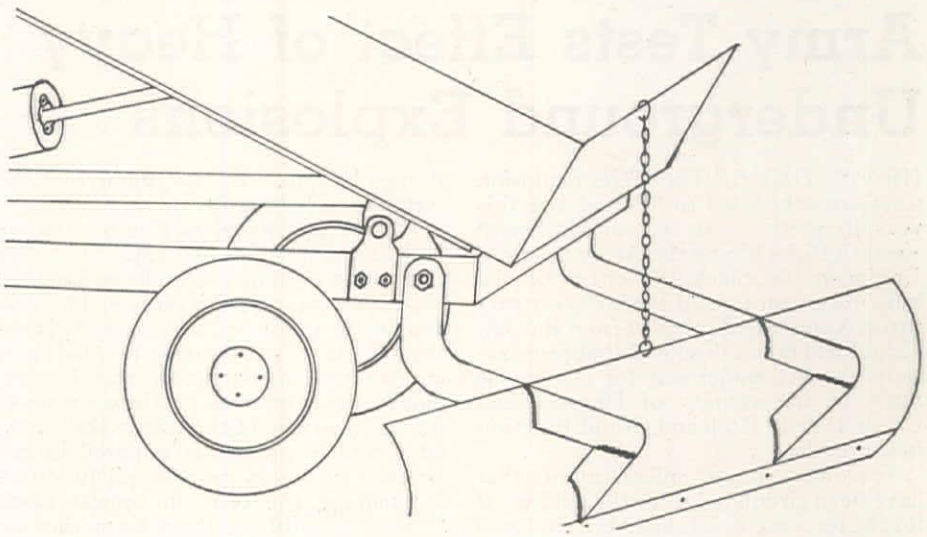
The cost per unit is as follows:

Salvaged moldboard @ $1.50 per lin. ft.	$12.00
12 ft., 4/4 angle iron @ $0.38 per ft.	4.56
2 lb. of electrode @ $0.12	.24
4 ft. of ⅜ chain @ $0.18 per ft.	.72
2 ¾ x 3 machine bolts @ $0.09	.18
1 8-ft. grader blade @ $0.44 per ft.	3.52
6 grader blade bolts @ $0.08	.48
3 man hours labor @ $1.22	3.66
1 hr. for arc weld. mach. @ $1.00	1.00
Total cost for each snow drag	$26.36

As shown on the drawing, the snow drag is in contact with the pavement with the dump bed partially raised. With the dump bed lowered, the snow drag is raised to transport position. This is accomplished by use of a short chain, properly adjusted from the tail gate of the truck to the snow drag.

The fabrication of moldboards proved simple using arc welding. The moldboards, salvaged from obsolete graders and old maintainers, were of high carbon steel and quite hard to drill for bolts. Acetylene welding was not satisfactory since the mild steel and the hard carbon steel would be hard to weld together. Arc welding was the best considering the time element and unlike metals.

Cut slots, ¾ in. wide and 5 in. deep, engage the channel iron which is bent up and bolted at the rear of the truck chassis. Another one-ft. section of 4 x 4-in. channel iron, welded into place, supports the scraping edge of the 8-ft. moldboard. The channel iron arms are left free to rotate on the machine bolts in the truck chassis, and the chain connects rings inserted in the centers of the dump body and moldboard.



Data and illustrations in this article are from a study submitted to The James F. Lincoln Arc Welding Foundation in its recent $200,000 Design-For-Progress Award Program for reports and advances and improvements made by the applications of arc welding in design, fabrication, construction and maintenance.

Loans Advanced to Western States For Rural Electrification Purposes

LOANS HAVE been made for the purpose of construction of transmission lines, generating facilities, acquisition of property and other purposes, by the Rural Electrification Administration to Western borrowers during recent weeks as follows:

Colorado

To San Isabel Electric Assn., Pueblo, $85,000 for 22 mi. of distribution line and for system improvements.

Kansas

To the Pioneer Coop. Assn., Ulysses, $680,000 for the purchase and rehabilitation of generating plant and 29 mi. of line in the villages of Elkhart, Wilburton and Rolla, from the Southwestern Public Service Co., and for the construction of 188 mi. of distribution line.

Montana

To Northern Electric Coop., Opheim, $700,000 for 30 mi. of transmission line, 415 mi. of distribution lines and system improvements.

South Dakota

To Black Hills Electric Assn., Custer, $325,000 for 156 mi. of line and completion of previously approved construction; and to Cam-Wal Electric Coop., Selby, $500,000 for 248 mi. of line and completion of previously approved construction.

Texas

To Medina Electric Coop., Hondo, $470,000 for 86 mi. of distribution line, 24 mi. of transmission line and for the acquisition and rehabilitation of 92 mi. of line presently owned by the city of San Antonio; to Magic Valley Electric Coop., Mercedes, $150,000 for 136 mi. of distribution line; to Bandera Electric Coop., Bandera, $535,000 for 40 mi. of transmission line, 131 mi. of distribution line and acquisition and rehabilitation of 78 mi. of line now owned by the City of San Antonio; and to Guadalupe Valley Electric Coop., Cost, $1,430,000 for 23 mi. of transmission line, 546 mi. of distribution line and the acquisition of 160 mi. of line from the city of San Antonio.

Utah

To Flowell Electric Assn., Fillmore, $3,000 for the construction of 3 mi. of distribution line.

Wyoming

To Wyrulec Company, Lingle, $330,000 for system improvements, 168 mi. of line and completion of previously approved construction.

NEWS OF WESTERN CONSTRUCTION

APRIL, 1948

Army Tests Effect of Heavy Underground Explosions

HEAVY UNDERGROUND explosion tests are scheduled to be fired late this year in sections of central Utah and western Colorado by the Army Corps of Engineers to check the effect of the huge blasts on typical subsurface structures. A statement released from the Salt Lake Field Office disclosed that preparations are well under way for tests to be made in the vicinity of Dugway and Castle Dale in Utah and Grand Junction in Colorado.

The official report spikes rumors that have been circulated since the field work for the tests started. It had been rumored that underground factories and other facilities were to be built, but the report points out that all work is purely experimental. Soil and rock investigation activities had fostered the rumor that the Army was drilling for oil.

H. O. Plath, Resident Engineer of the Salt Lake City office explained "The only things we are putting underground are the explosives and the targets. The reason these test sites are located where they are, is that at these points, the right combination of conditions exist. For example, the sandstone strata we want is near the surface in the Castle Dale area, and suitable granite is exposed in the Unaweep Canyon near Grand Junction. By making the tests in typical earth strata, we will have the information we want."

The report pointed out that the Corps of Engineers is charged with all types of military construction and planning. So, even though the Corps is identified with river, harbor, and flood control work in times of peace, the underground experiments are being carried out to supplement knowledge gained during the war.

Tests will be run in both soil and rock. The soil sites, including sand and clay types, are located in the Dugway Proving Ground area. Limestone is also to be tested in this area. Rock sites, including shale and sandstone are near Castle Dale, and granite at Grand Junction.

Explosive agent will consist of T.N.T. charges ranging from a few hundred pounds to 320,000 pounds. Desired results can be obtained with these pressures and without the use of atomic energy. Because of the speculation in the Grand Junction area, the Engineers stated atomic bombs will not be used, and there are none on the site.

In some cases, the tests will be simply measurements by instruments, in others, the effect on subsurface targets will be studied. These targets will resemble typical types of reinforced concrete construction, both full dimension and scale sizes. There will also be tunnels of varied sizes and linings.

Work up to this time has consisted of surveying the sites and in making geologic investigations. While these soil and rock investigations will continue, the work is sufficiently advanced to permit a start on construction features.

The contractor is presently moving into the Dugway and Castle Dale locations. Because of the isolation of the experiments, small temporary camps will be established.

Under Corps of Engineer supervision, Sacramento District, contracts have been let by the Government to Morrison-Knudsen Co., Inc., of Boise, Idaho for construction; to Engineering Research Associates, Inc., of St. Paul, Minnesota for instrumentation work and studies; and to the Colorado School of Mines for preliminary small scale tests and other consulting service.

On March 15th a party of 25 military and civilian experts concluded a tour of the sites and met for consultation in Salt Lake City. On hand for the closing session was Colonel Joseph S. Gorlinski, District Engineer of the Sacramento District. Henderson McGee, his assistant for the work, escorted the party.

Other representatives from the Office of District Engineer at Sacramento,

NORTHERN CALIFORNIA CHAPTER WINS A. G. C.'s CASHMAN TROPHY

CONGRATULATIONS were extended to officials of the Northern California Chapter of Associated General Contractors by MAYOR ELMER E. ROBINSON of San Francisco, when it was announced that the chapter had won the national association's Cashman Trophy for outstanding achievement during 1947. Viewing the cup are l. to r.: WINFIELD H. ARATA, chapter manager; AL BIASOTTI, chapter president for 1948; H. C. MAGINN, San Francisco police commissioner; and Mayor Robinson.



Calif., who were participants in the party included W. B. Grimes, Field Representative; J. C. Coombs, special assistant; J. R. Morton, Construction Division; H. O. Plath, Field Section Engineer; P. M. Johnston, Geologist and S. A. Blomquist, Chief of the Seismograph Party. J. H. Lensch and G. D. Roberts, of the Engineering Division of the South Pacific Division with headquarters at Oakland, Calif., also were on the tour. Contractor's representatives were J. N. Wells and Mr. Leavington for Morrison-Knudsen Co. and Royal C. Bryant for Engineering Research Associates, Inc.

The group of experts had as its mission the job of reviewing the plans on the ground for the coming explosion tests. Their duty was to explore and discuss the geologic exploration and mapping features, to consider details of the instrumentation that will record the tests, and to go over construction details of the targets.

Desert Homes Will Be Built by Arizona Firm

OFFICIALS of the Del E. Webb Construction Co. in Phoenix, Ariz., have announced that they will construct 350 homes on a 1,000 ac. undeveloped desert tract between South Tucson in Arizona and Davis-Monthan Army Air Base. The homes are planned as the first unit of a contemplated 3,000-dwelling development such as that recently urged by President Truman.

The project will have its own shopping center, parks, playgrounds, schools, churches and a community center, and ultimately will represent a $20,000,000 development, according to L. C. Jacobson, Webb Company executive vice-president and general manager. The 3,000 homes will comprise a community in itself with a population of about 10,000.

The project has already been approved by the Federal Housing Administration, and it is the largest since the inception of FHA in 1935.

Once the sagebrush-studded site is cleared, survey crews will start laying out roads and building sites. A deep-well water system will be developed and work on sewers, water mains, and paving will coincide with construction of homes. Natural gas will be piped to the tract.

Roy Drachman, Tucson realtor, has been named a director of the company Webb and Jacobson formed to construct the project. Other directors are Joe Ashton and Robert A. Becker, Webb company executives.

Two New Records for Arizona

TWO RECORDS were set March 19 when the Arizona State Highway Commission opened bids for construction on the Tucson-Nogales Highway. The San Xavier Contracting Co., Tucson, submitted a low offer of $151,903.65, only 2.95 lower than second bidder, the Johnson Construction Co. of Tucson. And seventeen different firms submitted bids, the largest number ever received for a single job.

West Coast Engineer Groups Join to Secure Professional Employee Rights

DELEGATES from five West Coast engineer employee groups met in Portland on March 18-20, to hold the first annual convention of the National Professional Association of Engineers, Architects, and Scientists. Some 1,200 employee engineers in Los Angeles, San Francisco, Sacramento, Portland, and Seattle were represented by delegates at the convention which was the culmination of more than 2 yr. of work toward the formation of a federation of the local professional employee groups.

Formation of such a federation was discussed tentatively at a meeting in Spokane during July, 1946, and this led to the holding of a second meeting by an exploratory committee which included representatives from groups in Spokane and Olympia, Wash., as well as the five represented at the Portland convention. Since the meeting of the exploratory committee in San Francisco in Oct., 1946, major activity of the groups has consisted of preparing, revising and securing approval of a constitution.

By February of this year five groups had ratified the constitution and the first convention was held to discuss further details of the national organization. The five local groups which have ratified the constitution to date include: the Southern California Professional Engineering Association; the San Francisco Area Group of Professional Employees; the Sacramento Group of Professional Engineering Employees; the Engineers Guild of Oregon; and the Seattle Professional Engineering Employees Association.

In addition to delegates representing these organizations there were present at the convention session, as observers, representatives of the Association of Industrial Scientists, Emeryville, Calif., and the Society of Professional Chemists and Engineers, Baytown, Texas. The sessions of the convention were rather remarkable in that there were no formal speeches made. All business was conducted in roundtable discussions, presided over by Sterling S. Green, temporary president of the association.

In order to stimulate growth of the association and encourage other professional employee groups to join in the federation delegates adopted a resolution outlining the association policy in this regard. The resolution follows:

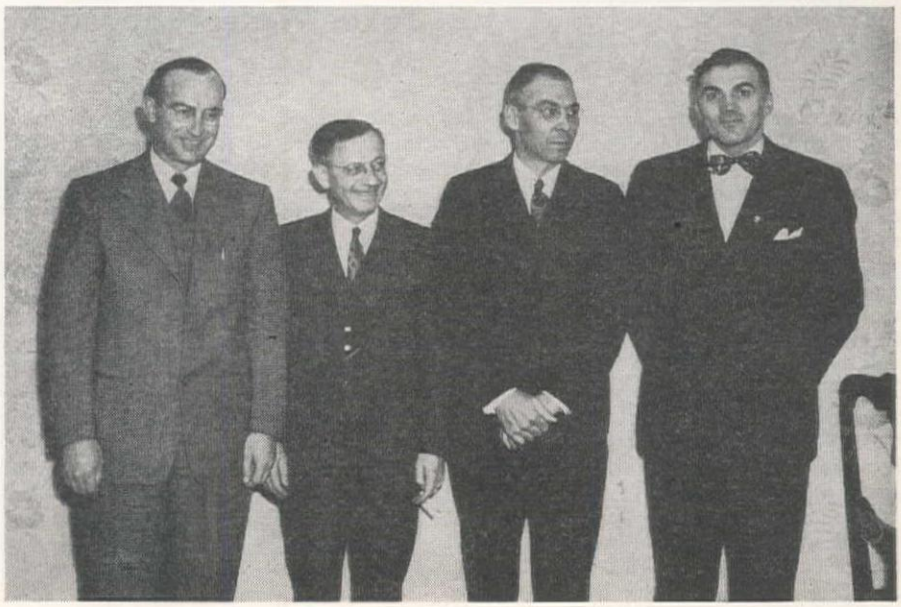
"Whereas the National Association is a completely democratic body specifically designed to afford all present and future members a medium of expression for their thought and action in promoting and protecting the economic welfare and professional status of employees who are engineers, architects, and scientists, and,

"Whereas a single strong and active association, national in character, fully representative of such professional employees in these United States is considered essential to the welfare of these employees, and in fact to the country, and,

"Whereas the delegates to this first national convention have neither the intent nor desire to promulgate their present authority to any future convention in disproportion to the membership which they may represent, and,

"Whereas these delegates do desire to have the benefit of this association with as many professional groups as possible throughout the entire United States having similar ideals and purposes; and do desire to afford an opportunity for applicant groups to affiliate with this

STERLING S. GREEN, left, Materials Engineer for the Department of Water and Power, Los Angeles, Calif., is first president of the new organization. Other officers are left to right, O. G. GOLDMAN, San Francisco, vice-president; D. B. SLAWSON, Portland, Ore., secretary-treasurer, and R. A. HENNING, Sacramento, Calif., director. R. W. HUTCHINSON, Sacramento, Calif., director was not present for the picture.



association with the least possible difficulty and within the shortest possible time; and,

"Whereas the character of these applicant groups will be such that they will approach this association for purposes of affiliation with all of the facts:

"Therefore be it resolved that it shall be the policy of this association to exercise the greatest practicable leniency in interpreting the phraseology of the constitution in so far as it pertains to organizational and geographical details; to encourage interested organizations having like purposes and standards to affiliate with the national association; and further to expedite to the maximum extent possible the necessary review of all applications for membership."

Another point considered at some length by the delegates was the question as to what services the association might be able to render professional employees of public bodies. It was pointed out by various delegates that the association can take action in cases of upgrading and downgrading, and in the improvement of working conditions. It was also pointed out that raising of salaries in public employment is accomplished by raising of the prevailing salaries in private employment and then presenting the information to civil service commissions and other wage setting bodies. The policy of the association with respect to publicly employed professionals was stated in the following resolution:

"Whereas public employees do not have the guarantee by law to bargain collectively with government agencies or legislative bodies which determine their economic welfare and professional status, and,

"Whereas it is the policy of this association to promote the economic welfare and professional status of all professional employees, and,

"Whereas the economic welfare and professional status of the public employees are affected by the economic welfare and professional status of the professional employees in private employment;

"Therefore be it resolved that it shall be the policy of this association to assist to the fullest extent possible the professional employees in public employment in securing all the rights and benefits which may be obtained for the professional employees in private employment."

New officers to serve until the next annual convention were elected as follows: President, Sterling S. Green, Los Angeles; vice-president, Oscar G. Goldman, San Francisco; secretary-treasurer, Donald B. Slawson, Portland; and directors, Ralph W. Hutchinson, Sacramento, and Richard A. Henning, Seattle.

Conferees Tentatively Agree on Plan For Floodgates Across Horseshoe Dam

INSTALLATION of floodgates across the spillway of Horseshoe Dam on the Verde River in Arizona to raise the potential water level of the reservoir by 35 ft. and provide Phoenix with an additional 20,000 ac. ft. of water annually, has been tentatively agreed upon by representatives of the city and the U. S. Bureau of Reclamation. The agreement was reached after a recent two-day conference involving the representatives and officials of the Salt River Valley Water Users Association, operator of the dam.

Contract copies of the agreement will be prepared and presented to E. A. Moritz, Bureau of Reclamation Regional Director at Boulder City, Nev. Phoenix and Water Users officials will then study the agreement, and if no major disputes develop, it will be forwarded to Washington for approval by the Department of Interior. Following this approval, the contract will then be presented to O. C. Williams, Arizona Land and Water Commissioner, whose approval is necessary before work can be started.

Upon final approval by Williams, Phoenix will be free to make available $800,000 to the Water Users Association. This money was provided for in a bond issue approved by the city's voters in the 1946 elections.

The 35-ft. increase in water level would increase the storage capacity of the reservoir by 75,000 ac. ft. to 140,000 ac. ft. The biggest obstacle to be overcome in reaching a final understanding was determination of the project's place in the contemplated Central Arizona Project. Under this project, the dam itself would be raised another 40 ft., increasing its storage capacity to 300,000 ac. ft., at an estimated cost of $7,000,000.

A description of Horseshoe Dam construction was presented in *Western Construction News* for Sept., 1945.

New Mexico Objects to Texas Water Proposals

TEXAS REPRESENTATIVES have asked for delivery of 293,400 ac. ft. of water per year from the Pecos River as the basis of a compact between Texas and New Mexico on division of the river's water. The proposal came at the close of a recent meeting of the Pecos River Compact Commission and elicited immediate objections from John Bliss, New Mexico State Engineer.

The Texas proposal was submitted on the basis of a report of an engineering advisory committee headed by R. J. Tipton, Denver, Colo., consulting engineer. This report indicated that the major improvement which could be made to increase the amount of usable water would be the by-passing of salt cedars at the head of Lake McMillan north of Carlsbad, N. M., which consume annually about 55,000 ac. ft. of water from the river.

Bliss stated that the proposal was based on the condition that this would be done, placing the full burden of river conditions on the State of New Mexico. He further stated that New Mexico could not take upon itself the obligation of assuring the amount of water requested by Texas.

The compact commission meeting was called in an attempt to resolve a 35-year old controversy between the two states over equitable division of the waters of the river. Berkley Johnson, Federal Compact Chairman, presided over the meetings.

Agree on New Site for Whittier Narrows Dam

A 15-YEAR CONTROVERSY over location of the proposed Whittier Narrows Dam in Los Angeles County has ended in compromise. The compromise represents a victory for the community of El Monte in its long fight against adoption of the plan to locate the $40,000,000 flood control dam at a site recommended by the Army Corps of Engineers and supported by the County and City of Los Angeles and Long Beach.

Agreement on a new site, described as located about 1¼ mi. downstream on the Rio Hondo Channel from the originally proposed site, paved the way for the beginning of negotiations to obtain an appropriation for construction of the dam, despite the fact that it is not provided for in the President's budget estimate or in the civil functions appropriation bill as passed by the House of Representatives. The compromisers have agreed to join in a request to the Senate Appropriations Subcommittee on Army civil functions for funds to start the dam in the year beginning July 1.

Advantages of the new plan are that about 700 fewer homes will be flooded out, and the Temple school and Texaco oil refinery as well will be excluded from the retarding basin. Also the Army has agreed that the dam will not be used for water conservation storage, and has agreed to deepen the channels of the Rio Hondo and San Gabriel River immediately above the dam to reduce the high ground water level. The Army will also help El Monte in working out a recreational development in the dam basin.

Wyoming Officials Ask Early Completion of Big Sandy Dam

RENEWAL OF WORK and early completion of the Big Sandy Dam, 40 mi. north of Rock Springs, Wyo., is being urged by Senator J. C. O'Mahoney of Wyoming and by state officials. Work on the dam was started in 1940 but was abandoned at the start of World War II. Original estimates called for an expenditure of $2,445,000.

The dam would store about 35,000 ac. ft. of water from Big Sandy Creek, enough to irrigate an additional 9,000 ac. of land. Sixteen per cent of the actual work on the dam, including cut-off trenches and outlet conduits, was completed before work was stopped in 1940.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—To be perfectly frank, neither the military, the statesmen nor the politicians—nor even the ubiquitous persons who garner the news—are quite sure that what they may say about Mr. Stalin and his gestures have any basis in fact. This is written a week after the President's mobilization speech, and while we are waiting to see if Stalin will launch the attack on Greece by way of those three Yugoslav divisions poised on the borders. The grapevine word is that they are to invade Greece before Apr. 1. Also the Bulgarians are assumed to be ready to attack the Turks, both the Turks and the Bulgarians having recalled their respective diplomatic officials. Should all, or any of this, come to pass, our military friends define the situation as this being "It."

We, of course, have no troops over there that would get into the fracas. Our troops are in Germany. But those troops are occupation soldiers, not fighting troops. There are 40,000 of them. How many civilians we have scattered around troublous Europe only a few people in the State Department probably know.

Signs of preparation

The possibility, not probability, of hostilities, has been reflected in various activities here besides Mr. Truman's measured speech. The U. S. Maritime Commission, for instance, has found it impossible to induce the Russians to return the ships they agreed to send back. The Russians simply say they can't, because the ships are on high seas, in service. The ships apparently never make port. The Maritime Commission lately has set to work to expand its organization again. It is significant that when you go to the Navy Building, you are politely but firmly stopped by a guard who tells you only those who have business and can identify themselves will be admitted. Over in the Pentagon the Military Intelligence Division—G2—works completely around the clock, and no one is permitted to visit in the large section of the building in which it is housed unless he or she carries a badge with an identifying photograph.

The general idea seems to be that we are getting ready for things rather than that we expect an immediate conflict. What is happening in Europe, and what may happen in Asia, is assumed to be calculated to make us dwindle in international esteem, rather than actual war. We are told we are not ready for anything like war, that the Russians probably have the atom bomb, or its essence; that they have a substance called death powder, and that they have 100 divisions of highly trained troops where we have two or three. They are said to outnumber us in the jet plane by 7 to 2. They even are reported to have a jet bomber, while we have none.

Censorship

This is common talk in Washington, so it is not harmful to the national security to discuss it in print, even though the National Defense people wish to establish a censorship now. They have had conferences with the newspaper, the periodical, the radio and photographic news correspondents to arrange what would euphoniously be called a voluntary censorship. They think too much technical information has leaked into print. Someone in the Pentagon group said the other day that often when the military wish to learn the latest news about the most obscure technical and scientific developments they read the science news of the highly efficient N. Y. Times. You even hear that it is not improbable the friendly observers of foreign nations, whom in time of war we call spies, usually get the real facts about the things we wish to keep deep under wraps even before some of the brass of the armed forces get them.

There is no remote doubt that every interest and every person who is American, and who has common sense, will use judgment in retailing the news, and will cooperate in every way in suppressing vital facts whose revelation would harm our cause. It is the ineptness of bureaucratic control over the release of information that raises the hackles of those whose business it is to bring you information.

Russia's status

The Russians are presumed to think that we might not actually engage in hostilities if no hostilities are offered to us directly. Our military have urged the President's mobilization fervently with the argument that we are not capable of opposing the Russians properly in Europe or elsewhere with ground or air troops. It is assumed the intent is to push us out of Europe, and to make us look futile.

Those who know tell us that Russia, like China, is permanently a starvation land. They tell us its population is primarily Asiatic, and that its technical and mechanical economy is weakened by the fundamental inability of Asiatic manpower to handle tools and machinery efficiently. It is denied Russia has unlimited natural wealth despite her vast expanse. They say she lags behind us at least 30 years in oil; is at least 35 years back of us in coal. They say she is very deficient in rubber, does not have the overseas transportation to be certain of its supply, and is woefully inadequate in all transport. The roads are few and very poor. She has not developed inland waterways; over 90% of her freight must go by rail, but she has less than 25% of the total railroad mileage we have, and is capable of building very limited new rail facilities.

Her automobiles are reported to be at least 9 years behind us. It is typical that she employs 480 persons to do a job which is done by 50 over here. She still digs coal by hand, while we cut at least 90% of our bituminous supply by machines. She has the hugest bureaucracy in the world, yet her production in industry and agriculture is estimated to be less than half as great as ours per man.

It has been estimated in this rich country of ours we could do without 50% of the things we buy. The Russians, as a mass, need everything they buy when they can buy it.

The Russians are strong in troops, ground forces, navy, air forces, and other military man—and woman—power. She is known to have 4,500,000 trained troops, and in addition a huge mass of irregular or guerilla groups, well trained. She has a vast reservoir of fighting units, constituting the toughest of "all major races of Asia and Europe." But she has not yet created the economy to back up her human machine. Presumably her ordnance is good. Military men, present as well as past, are convinced it is almost impossible successfully to invade her. Her Asiatic psychology enables her to create and persist in keeping the world in an upheaval by propaganda, by pressures, and by power politics and territorial grabs, that keep the disturbances alive perpetually. There are many in Washington who are convinced she does not actually intend to fight us. They think she would like us to lick ourselves by our own turmoils, our hysteria, our self-waste.

But all this does not mean we should refrain from making ourselves strong, and keeping ourselves strong. The President probably has done the one thing that may cause Russia to slow up, if she feels we are utterly in earnest in backing the President. There is always, as the President himself said, a risk in what we must do. If you play with explosives they may annihilate you. These elements are sometimes uncontrollable as well as unpredictable. But we can't forego what we must do to say it in the only way the Russians really understand. That is why the mobilization appears to us here in Washington unavoidable and imperative. The faster the better. That, for what it is worth, in the rough manner it has been presented, is how the situation appears to this correspondent near the end of March. It may look different, superficially, or otherwise, by the time this is published.

Power mobilization

Behind the scenes there are mobilization steps under discussion that involve more than manpower. The Munitions Board, a part of the Department of National Defense, is determined we shall have a larger margin of electric power, fuel oil, gas fuel, transport, and communications facilities. The Board is especially worried about power and fuel reserves, and it does not believe, very frankly, that any part of the problem should be left for solution to those who have established themselves in the National Power Policy Board. This latter Board is composed of Secretary of In-

terior Julius A. Krug; Federal Power Commission Chairman Nelson Lee Smith; Federal Works Administrator Philip B. Fleming; Chairman James J. Caffrey, Securities and Exchange Commission; Secretary of the Army Kenneth C. Royall; Chairman Gordon C. Clapp, Tennessee Valley Authority; Administrator Paul J. Raver, Bonneville Power Administration; Chairman John D. Goodloe, RFC ; Administrator Claude R. Wickard, REA. The Munitions Board is not in agreement with either the political or social ideas of the majority who make the policies of the Power Board. The Munitions Board apparently hopes the President will favor its plan to ignore the Power Board, and apply the principles of practical power needs rather than the so-called altruistic objectives of the men who dominate power programs in the Department of Interior. The Board is apt very shortly to go direct to Congress and ask for prompt and decisive steps to increase the nation's power reserves and for restoration and expansion of wartime regional electric power pools, as well as other plans.

The National Security Resources Board also has stepped out of its Defense Department obscurity and is proceeding to the organization of the machinery to speed up mobilization of the major segments of the national economy. It is the specific function of this Board to assemble data and information about all the resources, human and material, tangible and intangible, which may be needful for the national defense. It has already set up a busy section which will deal directly with power and utilities; communications; transportation, the latter to cover railroads, busses, trucking, taxicabs. A division will be set up to function upon problems of heavy construction, as well as engineering, and technical and professional services.

The Board was created by the National Security Act of 1947 "to advise the President concerning the coordination of military, industrial and civilian mobilization." It will eventually have 24 divisions. It consists of the Secretaries of State, Defense, Treasury, Interior, Agriculture, Commerce, and Labor. Arthur M. Hill, Chairman of the Board of the Greyhound Bus Lines, is the chairman.

Construction funds

The House Public Works Committee has approved the bill authorizing the expenditure of $500,000,000 a year for three years to be spent as Federal Aid funds for highway construction. An amendment includes country roads in the farm-to-market program. States will have until July 1, 1955, to qualify. Federal highways get $225,000,000, farm-to-market roads $150,000,000, and city highways $125,000,000, each per year.

At a Senate appropriations subcommittee meeting last month, Kenneth Markwell, Assistant Commissioner of Reclamation, announced that the Bureau had asked the Budget Bureau to approve requests for supplemental funds on four Western reclamation projects, on two of which additional appropriations were made only last January. The projects are: Colorado Big-Thompson, Boise Anderson Ranch Division, Boise Payette Division and Central Valley. Colorado-Big T and Central Valley received emergency appropriations earlier this year. In addition Markwell hinted that seven other projects, including the Missouri Basin, would use up virtually all their funds by the end of the fiscal year. Markwell attributed the increased spending to the fact that contractors are working faster than anticipated since both labor and materials are easier to obtain. Budget did submit the two requests on the Boise project, but declined to do so on the other two.

San Diego Freeway

(Continued from page 109)

straw as a cover at the rate of 4-tons per ac.; furnishing and planting trees, shrubs, vines and ground cover, and furnishing all labor, material, tools and equipment and doing all work necessary to the proper landscape development of the highway.

Planting preparation except in areas where grass seed was to be sown was in the following order: (1) installation of sprinkling system; (2) cultivation of the ground; (3) application of commercial fertilizer; (4) application of straw mulch; (5) planting.

Planting

The specifications provided that all ground cover was to be planted through the straw and into the top soil on 18-in. centers. These included such well known varieties as periwinkle, Hall's honeysuckle, English ivy, trailing lantana, ivy geranium and ice plant (Mesembryanthemum edule).

After the soil had been cultivated and fertilized it was evenly seeded at the rate of 5 lb. per 1,000 sq. ft. Seed consisted of a mixture conforming to the following percentages by weight: perennial rye grass seed, 60%; redtop, 10%; poa trivialis, 30%. After sowing, the seeded area was given a top dressing of clean screened manure, spread at the rate of 0.75 cu. yd. per 1,000 sq. ft. The surface was then lightly rolled to compact it, water applied and the area kept wet until the grass was ready for its first cutting. The areas were then rolled with a 200-lb. water weight roller. The grass was then mowed the next day following rolling operations.

Flowering trees and shrubs add color

In the landscaping of the Freeway ten varieties of trees were used including five kinds of eucalypti, the blue flowering jacaranda, sweetgum, weeping willow, queen palm and native sycamore. Seven varieties of flowering and native shrubs used included the Australian tea tree, San Diego ceanothus, sumac, acacia longifolia and jasmine. Boston ivy vine was planted on the piers and abutments of the overpasses.

The choice, slow growing California live oaks growing in the floor of the canyon in Balboa Park through which the freeway was placed were left in the center dividing strip where possible. Where the plans called for several feet of fill being placed above the natural ground level in which the trees were growing, tree wells had to be constructed to permit air and light to reach the crown of the tree, or base of the tree trunk. The freeway contractors evolved a novel method of reducing the time and cost on this. After excavating a hole around the tree trunk back to the original ground level, pre-cast sectional reinforced concrete rings 4 in. thick and four feet inside diameter were placed one on top of the other. The earth was then backfilled around the outside of the ring to the finished grade called for on the plans and the lawns were then planted up to the edge of the tree well.

Wave Action

(Continued from page 102)

fill slopes or large vertical surfaces induce them. A statistical summary of wave heights and directions for a given locality will indicate the most desirable orientation of the structure to avoid broadside attack by breakers.

The most insidious manner in which waves attack a structure, results from the beach changes initiated by the presence of the installation. This is a subject which is entirely too lengthy for full discussion at this time. The failure of the structure may ensue from scour about its foundation or its function be entirely destroyed by the accumulation of beach material around it. This problem best can be handled by means of models, but it should be pointed out that any structure which alters the wave action reaching a beach, alters currents, or produces areas of still or quiet water will undoubtedly initiate changes in the surrounding bottom which must be considered. Where the waves are commonly at some angle to the local shoreline these changes are likely to be rapid and large.

Acknowledgements

The various developments described above resulted from a Bureau of Ships sponsored investigation by the University of California at The Scripps Institution of Oceanography, La Jolla, and at the Department of Engineering, Berkeley.

Utah Iron Mine to Construct Three-Generator Power Plant

PLANS FOR the construction of a new power plant at an approximate cost of $400,000 to provide for the electric power requirements of Columbia Iron Mining Company's operations near Cedar City, Utah have been announced by company officials. Geneva Steel Company's Geneva and Ironton plants obtain iron ore from these mining operations.

Construction and acquisition of equipment is expected to require a year's time. The power plant will have three generating units, each with a capacity of 750 kw. The generators will be Diesel driven. All electric power generated will be utilized by Columbia Iron Mining Co.

One-way Tunnel at Loveland Pass Is Best All-around Plan Say the Experts

A SINGLE BORE one-way tunnel under the continental divide at Loveland Pass in Colorado has been recommended in a preliminary report by a group of ten engineers who inspected the pioneer bore through the mountain. The engineers have told Governor Knous and Mark U. Watrous, Colorado State Highway Engineer, that such a tunnel would present relatively simple engineering problems and would be far more economical than a large-size two-way bore.

The mining engineers, geologists and tunnel experts who made the inspection agreed that a single bore tunnel 18 ft. wide was preferable to a 32-ft. two-way tunnel, and that recent estimates of 6 and 7 million dollars for the work were "fantastic." The group are preparing a thorough report of their findings which will be completed before the end of April.

Among the preliminary findings of the engineers were the facts that there is no water problem evident, the rock structure is excellent in the major portion of the pioneer bore, there is no active fault in the geological structure and no danger of rock slides, and adverse ground conditions have been greatly exaggerated.

Watrous announced that construction may start this year, assuming approval of the project by the Federal Public Roads Administration and availability of state and federal funds for the construction period. He said that he agreed in every respect with the committee's findings since he had already proposed a similar plan many months ago.

San Diego Will Issue Sewage Plant Bid Call

THE CITY OF SAN DIEGO will receive bids on May 25 for the enlargement of its sewage treatment plant. The present plant, constructed in 1942, is entirely inadequate to care for the existing population of more than 365,000, which has nearly doubled since the plant was built. The new plant will utilize most of the structures of the old plant, some of them in new capacities. Sewage will be pumped by gas engines operating on digestor gas, pre-aerated for odor control, and clarified for disposal in San Diego Bay through an existing outfall, with separate sludge digestion and flash drying for the production of fertilizer. The plant will have a capacity of 40 million gallons per day average flow, and 70 million gallons per day maximum flow.

Major items of new construction include two 180-ft. diameter clarifiers with 30-ft. aeration tanks around the clarifiers, three 100-ft. diameter digestors, elutriation tanks, main building to house pumps, engines, blowers, filters and sludge drying equipment, and an administration building, together with installation of equipment. The city has purchased those items of equipment and materials involving long delivery schedules and will furnish them to the contractor. Delivery schedule on these items is such that the contractor can start construction immediately upon award of the contract. Plans and specifications can be obtained from the Purchasing Agent, Room 274 Civic Center, San Diego 1, Calif. A deposit of $30.00 per set of plans and specifications is required.

LOS ANGELES FIRM WINS FOURTH CONSECUTIVE SAFETY AWARD

GLEN E. ARBOGAST, left, president of Newberry Electric Co. of Los Angeles, Calif., receives the Swenson Trophy, Associated General Contractors of America Accident Prevention Award for 1947, from W. D. SHAW, manager of the Southern California Chapter of A.G.C. The firm has received the trophy each year since 1944.



Air Labs to Make Rain for Arizona

AN AIRPLANE RAINMAKING enterprise, Weath-Air Incorporated, has been organized by Northern Arizona ranchers and businessmen. The new company is using a Navy torpedo bomber in test runs on the clouds in the Kingman and Flagstaff area and soon will put into operation a converted B-25 Mitchell bomber.

The dry-ice, silver iodide and water methods of precipitating clouds are being used by the firm. The airplanes are equipped as flying laboratories. In addition to the pilot, each flight will be made with a navigator-radioman aboard. The second man will coordinate the flight with ground watchers and operate the rainmaking equipment. Ground radio fan markers are used to identify the site on which the rain should fall. The airplanes being used are powerful enough to operate at altitudes of 35,000 ft., enough to reach the tops of summer strato cumulus clouds.

The corporation announced it has an agreement with O. L. Norman, general manager of the Salt River Valley Water Users Association, to use part of a $20,000 fund raised for rain-making experimental use.

Stanley Thompson, chief pilot of the corporation, has spent considerable time at the General Electric experimental laboratories in Schenectady, N. Y. On suggestion of the General Electric Co. experts, the Weath-Air planes will carry all three types of agents known to make a moisture bearing cloud formation drop rain. In addition to the dry ice dispensers, the concern is using tanks holding 250 gal. of water which can be dropped in large amounts, and a silver idodide machine which scatters an invisible nuclei over the tops of clouds.

Paul Mantz of Los Angeles, famous racing flyer, is president of the corporation and is providing equipment for the enterprise.

Oklahoma Begins Huge Road Building Program

WITH A PROGRAM calling for an expenditure of $44,925,103 Oklahoma is on the threshold of its most pretentious road building program in 1948, State Highway Director H. E. Bailey says.

The program ratified by the Oklahoma Highway Commission involves $25,537,338.47 state and $19,267,765.34 federal funds. Never in the history of Oklahoma has so much work been incorporated in a year's road program, according to Director Bailey.

A majority of the improvements spearhead from the commission's public meetings held in each of the state's eight congressional districts last autumn to determine the most pressing needs. At these meetings citizens expressed their preference for roads in their counties. In most instances these preferences linked with roads in adjoining counties.

Bailey emphasized that the program did not include any farm-to-market road projects that originate with county commissioners and are filed with the commission for contract letting at the discretion of the commissioners.

The federal aid construction program contemplates 742.99 mi. of road and bridges costing $15,009,600. The state aid program consists of 488.65 mi. of road and bridges. Estimated cost is $2,762,880. Combined federal and state aid mileage totals 1,231.64.

Postwar construction projects under contract or completed this year are tabbed at $11,775,619. Postwar construction projects programmed and not under contract are set at $4,413,857. The sum of $7,259,784 is contemplated for urban improvements in 23 municipalities.

Bituminous road maintenance covers 917.22 mi. at an estimated cost of $2,145,854. Gravel maintenance covers 221.42 mi. at a cost of $997,962. Concrete maintenance totals 203.40 mi., estimated cost $349,547. Total maintenance covers 1,342.04 mi. and total estimated cost $3,613,363.

Majority of A. G. C. Chapters Sponsor Construction Units

THE ASSOCIATED General Contractors of America is at the three-quarter mark in its current campaign to obtain chapter sponsorship of 100 affiliated engineer construction units under the Organized Reserve Corps, Lieutenant General R. A. Wheeler, Chief of Engineers, has announced.

To date, 71 branches and chapters of the Association have signed agreements to sponsor 72 units. Two of the chapters —Northern California Chapter and Southern California Chapter — have sponsored two units each.

Progress is also reported by the Association in obtaining sponsor agreements for the 28 units yet to be lined up to achieve the 100-unit objective. The Colorado Contractors Association has voted to sponsor a unit but has not as yet signed an agreement. Four other chapters have appointed special committees or have reported other active interest.

OBITUARIES . . .

August Miller, superintendent of the reservoir work on construction of the pumping station and reservoir at McAllister Springs, Olympia, Wash., for Scheuman & Johnson, contractors, died recently. He had worked in a supervisory capacity on many projects throughout the West, including the Cordova break-water and air-base job at Sitka, Alaska and breakwaters at Los Angeles with Rohl-Connolly Co. He was also employed by the Puget Sound Bridge & Dredging Co. before his connection with Scheuman & Johnson. He was 66 years old at the time of his death.

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Andrew B. Larson, 75, Assistant City Engineer of Salt Lake City, Utah, died March 9 after a lingering illness. He had worked on various irrigation projects throughout the state of Utah, and was employed by the city in 1932.

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Leslie B. Denny, 58, construction worker at Grand Coulee dam from the earliest days of the project, died at Coulee Dam, Wash., on March 7. He was engaged in construction of buildings on the townsite of Grand Coulee in 1933 and was successively employed by MWAK and Consolidated Builders during construction of the dam. Since 1942 he had been employed by the Bureau of Reclamation as locomotive engineer, driving the visitors' train which carries sight-seers between the vista house and the west powerhouse.

PERSONALLY SPEAKING

The Colorado State Highway Department has appointed three men to the newly created position of District Engineer as a part of the general program of streamlining the Department to bring about closer supervision and integration of construction and maintenance work in the field. **Charles E. Shumate,** present assistant maintenance superintendent, will have charge of the district which will include Southern Colorado, and will remain in Pueblo. **George E. Miles,** division engineer, will take over the Northwestern Colorado District, and will transfer from Pueblo to Grand Junction. **William J. Walsh,** construction engineer, will become district engineer for Northeastern Colorado, and will have headquarters in Denver. Thus, each of the district engineers will supervise all highway work in an area comprising approximately one-third of the state. The District Engineers and Maintenance Superintendent **Douglas N. Stewart** will operate under the direct supervision of **Mark U. Watrous,** State Highway Engineer, and Assistant Highway Engineer, **James D. Bell.**

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All regional vice-presidents of the Airport Division of the American Road Builder's Association, Washington, D. C., have been re-elected for 1948. **O. J. Porter** of Sacramento, Calif., is vice-president for Region 6, and **Jess E. Buchanan,** of Moscow, Idaho, is vice-president for Region 7. Directors of the Division with terms ending in 1951 include the following Westerners: **W. J. Bain,** Denver; **Col. Warren J. Carey,** Los Angeles, Calif.; and **J. P. Adams,** Seattle, Wash. **T. E. Stanton,** Materials and Research Engineer, Department of Public Works, Sacramento, Calif., is the new vice-president of the entire Western District of ARBA succeeding **Robert A. Allen,** State Highway Engineer, Carson City, Nev.

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W. E. Ross, division engineer for the C.M.St.P&P. railroad in Spokane, has resigned that position to join the engineering staff of Morrison-Knudsen Co. in Arabia. Ross has been succeeded at Spokane by **A. J. Anderson** who has been transferred from the post of assistant division engineer at La Crosse, Wis. Prior to the war Anderson served in the Coast engineering division of the railroad, but since his relief from active duty as a lieutenant commander in the Navy has been at La Crosse.

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The complete roster of officers for the New Mexico Section of the American Society of Civil Engineers shows that **George J. Johnston,** District Highway Engineer, is 1948 president; **C. S. Howard,** Albuquerque, is first vice-president; **R. Elton Cook,** Santa Fe, is second vice-president; **C. S. Conover,** Albuquerque, is secretary-treasurer and **Ernest B. Ball,** Albuquerque, is new director.

Scott P. Hart has been appointed Montana State Highway Engineer to succeed Howard W. Holmes. Hart has served some 25 years in the department, and held the position of Materials Engineer until the present appointment. Holmes was relieved of the post at his own request after seven years of duty, and has been appointed Bridge Engineer.

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C. Glenn Smith, county engineer for King County, Wash., for the past year, resigned that position as a result of the commissioners' decision to abandon the unified road district in favor of the former 2-district road system. **Phil W. Myers,** who began his service with the county road department as a chainman in 1929, has been appointed acting county engineer. District engineers are to be **Lowell V. Anderson,** north district, and **Harry Gillis,** south district.

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Howard E. Robbins, who has served for the last seven months as acting director of Bureau of Reclamation Region No. 5, has been named director of the region, which includes Texas, Oklahoma, most of New Mexico, and parts of Kansas and Colorado. His headquarters will be at Amarillo, Texas. Robbins succeeds **Wesley R. Nelson** who was appointed Assistant Commissioner of Reclamation and assigned to Washington.



HAROLD J. McCOY, Spokane, Wash., engineer, is the elected 1948 president for the Spokane Section of the American Society of Civil Engineers.

A Department of Research has been created in the national office of the Associated General Contractors of America, and **Harry J. Kirk,** former manager of the Highway Contractor's Division, has been named the department's first manager. Principal purpose of the department will be to study and correlate information on contract documents and specifications; uses and costs of owning construction equipment and construction statistics. New manager of the Highway Contractor's Division will be **Archie N. Carter,** associate editor of *Engineering News Record* and *Construction Methods* and Washington editor of the publications since 1945.

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George E. Teufel, general contractor of Seattle, has been appointed by the executive committee of the chapter to the presidency of the Seattle Chapter of the Associated General Contractors. He succeeds the late **James B. Warrack,** who died Feb. 18. **O. B. Daniels** has been appointed as a member of the chapter's executive committee to replace Teufel.

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Roy Anderson and **R. W. Millensifer,** Great Falls, Mont., have formed a partnership to engage in engineering construction. Anderson was a partner in the Dudley-Anderson Construction Co. of Great Falls until the dissolution of that organization two years ago. Millensifer has been Great Falls representative for the Johns-Manville Sales Corp. for the past four years.

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William Q. Reeves has been appointed as Construction Engineer to direct completion of the Tucumcari Irrigation District's water distribution system in New Mexico. Reeves is being transferred from the W. C. Austin Project in Oklahoma, although he has been in Tucumcari since Feb. 2 as acting construction Engineer.

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V. Calvon McKim is the elected president of the Engineers Club of Fresno, Calif., for 1948. **Ashton Shields** is vice-president, and **Elmer Kaprielian** is secretary-treasurer. The board of directors includes **Carl Bonter, Burt Muyzer, Jack McCardle, Al Stocks,** and **H. M. Patton,** past president.

Theodore M. Kuss, San Francisco Consulting Engineer, has opened new offices as consultant on general civil engineering problems at 1045 Sansome St. in San Francisco. Kuss is former Chief Engineer for the Pacific Bridge Co. and also former vice-president of Admiral F. R. Harris, Inc., Consulting Engineers, New York City.

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Grover C. Gaier, civil engineer of Seattle, has been appointed executive secretary for the Washington State Society of Professional Engineers. He has established a headquarters for the state society in Seattle and will devote full time to society business.

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Walter W. Harfst, formerly general superintendent for the Sound Construction & Engineering Co., Seattle, has opened his own offices for general contracting in Seattle. **Horace Tevis,** formerly associated with Pacific Wood Specialties Co., is office manager for the new contracting firm.

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Ellis L. Armstrong, formerly Engineer in the Earth Dams Section of the Bureau of Reclamation in Denver, has transferred to Trenton, Neb., as Construction Engineer in charge of Culbertson Dam and Reservoir on the Republican River, 22 mi. west of McCook, Neb. The dam is part of the Missouri Basin Project, and will be 90 ft. high, 1½ mi. long and contain 8,000,000 cu. yd. of rolled embankment.

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George Nilson, recently elected vice-president of the Montana Contractor's Association, Inc., Chapter of the A. G. C., is now a National Director of the organization under the Highway Classification. He was installed at the recent national convention held in Dallas, Texas.

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J. A. Woodworth, of Woodwoart & Co., Inc., Tacoma, Wash., is the 1948 president of the Tacoma Chapter of the Associated General Contractors of America. **J. A. Harrison,** secretary of Harrison Bros. Co., is vice-president, and **M. L. Larson,** of O. F. Larson & Sons, is treasurer. Also elected to the Board of Trustees were **P. F. Finnegan** of National Blower and Sheet Metal Co., and **Cornell Meek** of Electric Construction Co. Members of the advisory board for 1948 will be Past Presidents **Roy Earley, Sam Bergesen** and **A. S. MacDonald.**

J. A. WOODWORTH





GEORGE J. JOHNSTON, District Engineer for the New Mexico Highway Dept., is 1948 New Mexico A.S.C.E. president.

J. S. McMahon has been appointed superintendent of the project engineering department of the Hanford Works at Richland, Wash. McMahon was formerly assistant superintendent of the service department in charge of the realty division. The project engineering department has been newly created by the General Electric Co., prime contractor to the Atomic Energy Commission. In his new position McMahon will continue in charge of design and construction of Richland housing projects.

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Robert M. Officer, formerly associated with the Southwest Engineering Co. of Albuquerque, N. M., and more recently with **Wm. E. Burk, Jr.,** Albuquerque architect, is now Associate Engineer, Plant Construction Section, of the Sandia Division on the University of California Scientific Project. The work involves mechanical and facilities engineering in connection with the building program currently in progress at Sandia Base.

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Carl Erickson, secretary-treasurer of the Erickson Paving Co., has been appointed as a member of the national advisory board of the Associated General Contractors. He served as a national director of the association from the Pacific Northwest last year.

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Melbourne Russel has been selected as Assistant to the Chapter Manager for the Intermountain Branch of the Associated General Contractors of America. He is now working with the manager, and, with this new arrangement, the Chapter anticipates better service for all of its members.

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Arthur L. Atherton, general contractor of Seattle, was unanimously elected chairman of the Building Division of the Associated General Contractors at the annual meeting of the association held in Dallas, Tex., in February. Atherton was also elected a member of the executive committee of the Association.

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Dr. J. E. Hobson, director of the Armour Research Foundation of the Illinois Institute of Technology and author of several technical papers, is the new director of the Research Institute at the Stanford University in California. The Research Institute

is an independent, non-profit organization which serves the entire Western area. Dr. Hobson succeeds **Dr. William F. Talbot,** resigned.

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James B. Warrack, Jr., will continue the general contracting operations of the Warrack Construction Co., Seattle, which was headed by the late J. B. Warrack, Sr., until his death several months ago. Continuing in association with the Warrack Construction Co. will be **Arthur M. Strandberg,** chief engineer; **Fred H. Ramhorst,** estimator; and **Newman Shepherd,** auditor.

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Benjamin G. Hume is the new Engineer of Steam Design for the Los Angeles Department of Water and Power, according to an announcement made by **Grant E. Benkesser,** head of the Design and Construction division. Hume fills the vacancy created by the retirement of **William C. Rowse.**

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James R. Robertson, Jr., street maintenance engineer for Seattle, is currently serving as acting city engineer for the city. No successor to **Charles L. Wartelle,** former city engineer who retired on Jan. 1, has been appointed; and **C. G. Will,** assistant city engineer is on an extended sick leave.

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John B. Keir has been appointed to the position of Chief Engineer of Fruehauf Trailer Co. of America, and will headquarter at the company's Western manufacturing plant in Los Angeles. During the war, Keir worked on the engineering of trailers of special design for the armed forces.

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W. D. Hagenstein, Northwest forester, has been named Forest Engineer on the forestry staff of the Joint Committee on Forest Conservation. In this position, Hagenstein will head the forestry departments of both the West Coast Lumbermen's Association and the Pacific Northwest Loggers Association. He will make his headquarters at the Portland offices of the West Coast Lumbermen's Association.

W. D. HAGENSTEIN



W. A. Bugge has been named as Managing Engineer of the Pacific Coast Division of the Asphalt Institute, to be headquartered in the Russ Building, San Francisco. He was formerly District Engineer in the Pacific Northwest, maintaining offices at Portland, Ore., and Seattle, Wash. **J. M. Lackey,** District Engineer at Los Angeles, will continue to direct Institute activities in Southern California and Arizona. All of these offices are well equipped to extend the engineering and research facilities of the Institute to highway engineers and officials of federal, state, county and municipal agencies.

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R. W. Humphreys has been appointed division engineer at Missoula, Mont., for the Northern Pacific railroad. Humphreys has served the N.P. since 1943 and last year was assistant supervisor of bridges and buildings on the Rocky Mountain division.

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I. E. Burks, formerly engineer for Haddock Engineer, Limited, Oceanside, Calif., contractors, has received an appointment to the West Point Military Academy and is now located at West Point, N. Y.

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The Raymond J. Briggs Engineering Co. of Boise, Idaho, has moved into its own building, the Briggs Engineer Building at 61 Grane St., Boise.

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Sidney E. Doyle, planning engineer of Seattle, has been retained by Walla Walla County, Wash., to make several zoning and planning studies for the county planning board.

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Frank McCormick, supervisor of bridges and buildings for the Southern Pacific Railroad at Portland, retired from active service after 43 yr. of association with the Southern Pacific Co.

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Starling M. Morse, registered professional engineer at Phoenix, Ariz., has been appointed County Engineer of Gila County in Arizona. He has changed his residence from Phoenix to Globe in Gila County.

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Alex Sonnichsen has been appointed assistant city engineer for Walla Walla, Wash. **Grova C. Cookerly** is city engineer. Sonnichsen has been associated with the Washington state highway department for the past 1½ yr.

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Jack Y. Long, of the J. Y. Long Engineers, Oakland, Calif., is the new head of the Construction Industries Committee of the Oakland Chamber of Commerce. He succeeds **W. E. McGrath,** McGrath Steel Works, who served two terms as chairman.

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David Erickson, road engineer at the Colville Indian Agency, Nespelem, Wash., since 1935, has been transferred to Oklahoma City, Okla. Since 1940, and except for a period of war service in the Navy, Erickson has also served as reservation superintendent.

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Richard H. Smith has submitted his resignation as city manager at Ventura, Calif. The resignation became effective Feb. 15. Smith has held the post since May, 1943, coming to Ventura from Phoenix, Ariz.



OTTO HOEFLER

Otto Hoefler, formerly Engineer with the Civil Engineering Corps of the U. S. Navy, is now Engineer with the American Bitumuls Co. in Fresno, Calif. He will act as field representative for the company, and will cover the territory from Stockton to Bakersfield giving engineering assistance on all types of projects where emulsified asphalt products are used.

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Leo L. Coulter, field engineer for Thurston County, Wash., has been appointed assistant county engineer to succeed the late **Otis G. Murray.**

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Harold L. Gangath, Seattle, has been appointed to the combination position of city engineer and city recorder for Junction City, Ore.

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C. L. Patterson, who recently resigned as chief engineer for the Colorado State Water Conservation Board for reasons of ill health, has accepted a job with California's River Board.

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Dimmitt & Taylor, general contractors, have announced the relocation of their equipment and general yards from Los Angeles, Calif., to 128 West Pomona Ave., Monrovia, Calif.

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A. F. Liebscher, formerly with the Basalt Rock Co. of Napa, Calif., is now with the State Division of Architecture at Sacramento, Calif.

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William E. Broadwell, formerly with the Bureau of Reclamation at Denver, is now in Guam, where he is employed by Robert & Co., Engineers.

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Henrik Valle, building contractor of Seattle, has been appointed as a member of the Seattle Board of Building Appeals to succeed the late James B. Warrack.

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John H. Ferns is leaving the Department of Finance at Sacramento, Calif., to take over as City Manager of Woodland, Calif.

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W. D. Vealey has been appointed city engineer of Missoula, Mont., succeeding **Charles E. Riggs,** who recently resigned.

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S. B. Morgan has been reappointed county engineer for Union County, Oregon.

SUPERVISING THE JOBS

B. E. Eatherton is superintending construction of a new plant for the Peterson Tractor & Equipment Co. in Oakland, Calif. Indenco Engineers & Builders, Oakland, are constructing the five new buildings at an approximate cost of $650,000. **O. K. Osborn** is the assistant superintendent, and **H. A. Murphy** is the engineer. **C. W. Boren, H. O. Nelson** and **Fred L. Wayne** are carpenter foremen and **John Tate** is concrete foreman. **Earl Banta** is labor foreman, and **Lou Pagan** is the steel foreman. **Ev. Horton** is accountant on the project and **Lou Inscho** is timekeeper.

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Construction on the first 75 mi. of the Friant-Kern Canal, major feature of California's Central Valley Project, is moving towards completion. Six contractor companies have a number of schedules under contract, and have nearly full crews on the job after a year-end shutdown because of tardy Congressional appropriations to continue the U. S. Bureau of Reclamation project.

H. S. McElderry is general superintendent for Fred J. Maurer & Son, Eureka, Calif,. on construction of the Stilling Basin at the foot of Friant Dam, the Cottonwood Creek Bridge, and the landscape area improvements around the dam.

E. S. "Chuck" Davis, a veteran constructor of Ledo-road fame, is project manager for the Arizona-Nevada Constructors, who have the contract on three different schedules totaling approximately $5,600,000. **W. J. Green** is the assistant project manager, and superintendents are **Donald N. Anderson,** structures, **Charles Ptacek,** grading, and **Don F. Anderson,** equipment. **Donovan Hughes** is superintending the trimming and lining operations. **M. J. Wooley** is office engineer and **S. A. Melquist** is office manager. Danalton Steel Co., Sacramento, are subcontractors for the reinforcing steel.

Tom Paul is district manager and **Keith Wasson** is the general superintendent for Peter Kiewit Sons' Co., Omaha, Neb., on construction of the major portion of the first half of the Canal. **W. O. Tilford** is superintendent and **J. Lester Brown** is assistant superintendent. Brown is leaving the job at its completion to go into contracting for himself. **W. W. White** is structural superintendent and **D. P. Mosley** is master mechanic. The master mechanic on this job has a big order keeping the huge trimming and lining machines in operating order. Drilling and shooting superintendent is **C. B. Schmidt** and **J. M. Lowe, Jr.,** is the office engineer. **C. M. Lowry** is office manager.

M. E. Broan is general superintendent and **F. Partain** is construction superintendent for Morrison-Knudsen, Inc., & M. H. Hasler, who are building the 3,315-ft. long King's River Siphon and a section of the Canal. Hosler is an expert concrete man, and devised a combination of slipforms and jumbos to speed the work of fabricating the 24 ft., 3 in. I.D. barrels. Broan is an M-K veteran of many operations including Pacific island jobs, and he was formerly in charge of coal stripping in the southern states. He is being assisted on the job by **F. R. Hoffman** and **O. Hoffman,**



M. E. BROAN

assistant superintendents, and **S. Engman,** master mechanic. **C. K. Lewis** is the office engineer and **T. J. Hopper** is the office manager. Sub-contractors on this portion of the Canal work are M. C. Clingan, San Francisco, reinforcing steel; George Patterson Co., Los Angeles, compacted earth lining, and Bos Construction Co., San Francisco, structural steel. This schedule is under a $1,829,457 contract.

John Shea is general superintendent and **A. J. Orselli** is construction manager for Bechtel Corporation, San Francisco, on construction of the Little Dry Creek Siphon and Wasteway. **G. W. Saul** is assistant superintendent and **W. J. Gould** is general foreman. **A. J. Carmen** is the office manager for the contractor.

JOHN SHEA, right, superintendent for Bechtel Corp. on the Little Dry Creek Siphon job, jokes with J. M. VAN SANT, U.S.B.R. Safety Engineer. Completed portion of siphon is in the background.



B. Poluski is the general superintendent on construction of hotel sanitation facilities at Inyokern, Kern County, Calif., for **Paul Everley,** contractor. The project is being constructed for **C. H. Harbeson** and **C. F. Ives. T. E. Smiley** of San Diego is the resident engineer, and **M. L. Harbeson** is the project manager. **G. E. Williams** is the job foreman and **T. J. Fowler** is the finisher foreman. The job is a preliminary improvement to the over-all Inyokern Sewage Disposal District.

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Richard Weske is the general superintendent and **Joseph Hoff** is assistant superintendent on construction of a laboratory at the Naval Ordnance Test Station near Inyokern, Calif. Johnson, Drake & Piper, Inc., with western offices in Oakland, Calif., are the contractors. **George F. Aichele** is the structural steel work foreman and **Barrett M. "Shorty" Nelson** is the concrete work foreman. **William Donohue** is labor foreman and **A. B. Cook** is the shop foreman. Steel foremen are **H. G. Hauge Jordan** and **E. C. Thompson.** The structure is now nearly completed.

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Joseph Muscolo is superintendent for Bressi & Bevanda Constructors, Inc., Los Angeles, on improvement of the Los Angeles River under a $3,381,174 contract from the Corps of Engineers. **Curly Noble** is the carpenter superintendent and **H. R. Harmon** is carpenter foreman. **J. K. Halloran** is the job engineer and **O. F. Siler** is shop foreman. **George B. Lewis** is grading foreman and **Dominic Bressi** is equipment foreman. **E. S. Pulley** is office manager, **H. C. Christensen** is timekeeper and **Hugh Clark** is accountant. Completion time is November, 1948.

* * *

R. C. Sorenson is project manager for Beebe & Powers, contractors for the sewage disposal and trunk sewer line alterations at the Naval Ordnance Test Station near Inyokern, Calif. **Capt. Matthews** is the Officer in Charge of Construction and **Leland S. Rathbone** is engineer on the job. **Gus L. Hargrove** is pipeline foreman, **Lloyd G. Leonard** is the grading foreman, **Earl O. Eckroat** is the carpenter foreman, and **Claude T. Tapp** is the reinforcing steel foreman. **Mary Frankovich** is the office clerk.

* * *

Charles V. Clayton is general superintendent for Chas. L. Harney, Inc., San Francisco, contractor for the widening and paving of Seventh St. in San Francisco. **James Lewis** and **Bill Harvey** are the grading work foremen and **Gordon Johnson** is directing the laying of asphalt. **George James** is the master mechanic, and **Anton Schad** is mechanic in the field. The job is now about two-thirds completed.

* * *

The Great Western Welding Works, Lynwood, Calif., are overhauling 926 units of Army surplus trucks in Los Angeles. The work is being performed under the direct supervision of the owner, **Elwood W. Fritz,** who was welding superintendent for the California Shipbuilding Co. during the last war.

* * *

Tom Paine is district manager with headquarters at Arcadia, **H. C. Studer** is general area superintendent, and **J. K. McMullme** is job superintendent for Peter Kiewit Sons Co., Omaha, Neb., on improvement work for the Los Angeles River channel. **Bob Shandley** is assistant superin-

tendent and **William T. Collings** is the job engineer. **Fred Welch** is the grade and equipment foreman. **C. A. "Chuck" Mahon** is bridge superintendent for the underpass structure included in the schedule, and carpenter foremen are **Bert De May** and **Glen Guy.**

* * *

John T. Ellis, construction superintendent for the American Bridge Co., Pittsburgh, Pa., is supervising the erection of a steel barge and steam crane at Grand Coulee dam. **Harry Campbell,** Pittsburg, Calif., is resident engineer for the contractor. The $78,000 job is being done for the Bureau of Reclamation for use in spillway repair work on the dam. It is expected to be complete about the middle of May.

* * *

C. D. Arrasmith is superintendent for the Industrial Engineering Co., Oakland, Calif., on construction of a building for the California Shade Cloth Co., in San Leandro. **Elmer Olsen** is general foreman on the job and carpenter foremen are **Frank Rhodes** and **Gordon Waldron. Joe Ebbs** is the chief clerk and **A. Compher** is office manager. The L. B. Duffin Concrete Co. has the subcontract for the concrete, and Hugh Taylor has the sub-contract for the heating and plumbing.

* * *

Construction of a power plant and other facilities for the American Potash & Chemical Co. at Trona, Calif., is proceeding under a number of contracts. The work includes construction of a power plant with 2 boilers and two 7,500-kw. steam electric turbines, a great deal of electrical work, a soda recovery plant, and dormitories at an approximate cost of $2,250,000.

W. H. Allen is plant advisory engineer for American Potash & Chemical Co. on all of the jobs, and **Frank H. Mant** is inspector in charge of all the company's work.

The Fluor Corp., Ltd., Los Angeles, have the contract for the soda plant. **J. C. Winn** is general superintendent, **T. D. Kinniken** is job superintendent, and **John Prospal** and **N. L. Edson** are assistant superintendents. **C. D. De Remer** is the project manager. **Lamarr Oslin** is the office manager. **R. J. Hodson** is chief timekeeper, and **D. Allen** and **G. Finney** are civil engineers on the project. Other superintendents on the job are **C. Cozad** for the piping work, **J. Rose** for millwright work, and **A. Sanders,** erection superintendent. **E. D. Anderson** is electrical engineer on the job. **F. P. Bledsoe** is general foreman, and labor foremen are **Walter Barrigar, Phillip Nicilino** and **James Patrick.** Carpenter foremen are **J. Leo Cain** and **Hiram Johnson** and **Atelyo Stellon** is cement finishing foreman. **John Spraker** is general foreman for the electrical work and electrical foremen are **J. H. Brown** and **"Bud" Ireland. Marshall Sanders** is the structural iron work general foreman and foremen are **L. J. McCarey, Jack Sims, Harry A. Enos, Sam Lewis** and **Amos Reece.** Boiler-maker foremen are **George Brown, Dan Hickey** and **Ray W. Riggs. C. G. Ronsheimer** is general foreman for the pipe fitters, and pipe fitting foremen are **M. O. Caberry, William Thurm, Marshall Henry, Herschel Powers, Roy Shaward, Curtis See** and **H. S. Williams.**

On construction of the power plant and the soda recovery plant, **H. F. Chapman** is general superintendent. **Leonard Tarran** is the resident engineer and is acting as project manager as well. C. C. Moore & Co., design and construction engineers of Los Angeles, have the contract for this work.



LEONARD TARRAN

Ed Thislle is steel foreman on the job, and **C. A. Johnson** is the electrical work superintendent. **Frank Pompa** is concrete foreman and **Ed Stoker** is the boilermakers foreman. Carpenter foremen are **Art Huett** and **W. B. "Bill" Jenkins. Frank J. Olson** is in charge of supplies, and **Frank Manning** is the timekeeper and job accountant.

* * *

Adolph Brandt and **M. R. Scott** are superintendent and assistant, respectively, for contractor, the E. S. McKittrick Co., Inc., Huntington Park, Calif., on construction of pre-cast housing units at the Naval Ordnance Test Station near Inyokern, Calif. Captain Matthews is the Officer in Charge of Construction for the U. S. Navy, **Joe E. Brown** is the concrete superintendent, and **D. O. Burbank** is the operating engineers foreman. **J. D. Peterson** and **J. A. Mathisen** are plant foremen, and **W. H. "Bill" Gowens** is labor foreman. Carpenter foremen are **A. C. Williamson** and **J. B. Zilkey,** and **Roy Ives** is the cement finishing foreman. Other foremen are **E. C. Greider, R. A. Mathisen, H. Lineback, E. J. Ross** and **C. C. Becker. Paul Strider** is the welder foreman and **L. B. Dean** is superintendent of transportation on the project. **R. E. Duba** is the project manager. The outfit is casting and erecting houses at the rate of 4 units per day.

MILES R. SCOTT has been advanced to superintendent of production for E. S. McKittrick Co., Inc., at Inyokern, Calif. See item above for details of the job.



W. R. "Bill" Southworth is general superintendent on construction of 3.4 mi. of the Contra Costa Canal, part of the Central Valley Project in California. Parish Bros., general contractors of Benicia, Calif., have the $600,000 contract for the job, which also includes a dam and siphons. **Stanley Carlson** is in charge of the siphons and concrete work, and **Paul Lukasko** is the repair shop foreman. **Red Hansen** is carpenter shop foreman and **V. Soucie** is carpenter foreman. **L. X. Carroll** is office manager, and **Kay Spencer** is the bookkeeper. **Hal J. Sams** is the office engineer. The job is now completed.

* * *

Supervising canal and lateral construction work on the Deschutes Project in the vicinity of Madras, Oregon, for the Adler Construction Co., general contractors of Seattle, Wash., are the following men: **Earl Sparks,** general excavation foreman; **W. H. "Sandy" Patterson,** general structure foreman; **Oscar Mitchell,** excavation foreman; **Hans Schilling,** equipment maintenance foreman; **Nolan Wallace,** field carpenter foreman; **K. F. Gipson,** field carpenter foreman; **Hubert Malone,** pre-fabrication foreman; **Glenn Ennon,** concrete foreman; **John J. Schonneker,** back-fill foreman; **Clifford Moore,** steel foreman; **Hubert Dayhoff,** labor foreman and **Mac Kinzel,** expeditor.

Earl Sparks and **John Schonneker** are supervising construction of the Cove diversion dam under a contract amounting to $24,420 from the U. S. Bureau of Reclamation. Office manager for all of the projects of the Adler Construction Co. is **Chip Bremer** and the project engineer is **George Osborn.** Both **H. J. Adler** and **Harold C. Adler** are actively supervising the projects, the latter acting as project manager.

* * *

Paul W. Baker is manager for the western division of Midland Constructors, Inc., whose home offices are in Chicago, Ill. The concern is now engaged in transmission line and distribution work construction for the Southern California Edison Co. and the San Diego Light and Power Co. Western offices, shops and yards are in Huntington Park, Calif.

* * *

Carl Nardell is superintending the construction of 115 homes in Castro Valley, Calif., for Stanley M. Davis. **Claude W. Treat** is the general foreman on the job and **Paul Keiffer** is the finish foreman. **Charlie Chesmey** is the carpenter foreman and **J. C. Mitchell** is foreman for the foundations work. Mattson & Lilja, Oakland, have the sub-contract for the concrete construction. **Harold Greer** is the architect for the housing project.

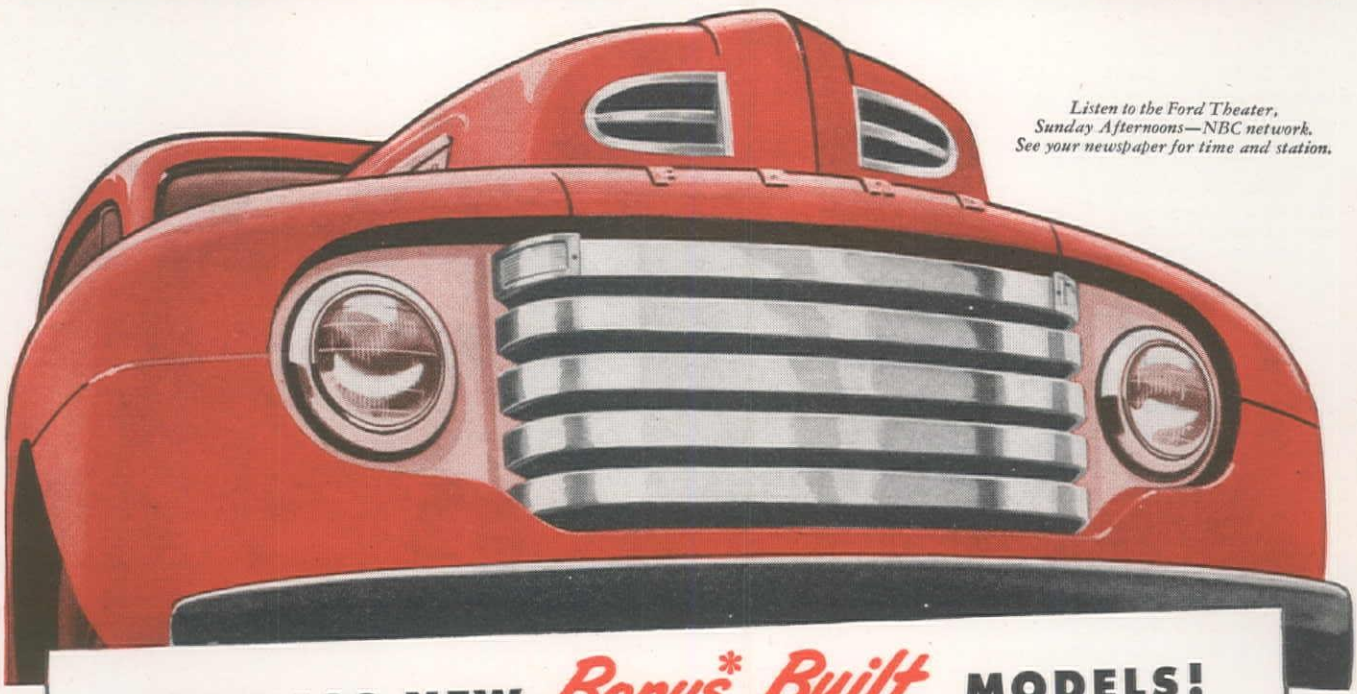
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William Yarnell, Jr., is superintendent for the Fred J. Early, Jr., Co., Inc., San Francisco, on construction of the sewage disposal plant at San Leandro, Calif. **J. E. Sheehy** is the project manager and **J. G. Brown** is general foreman for the contractor. **Bob Purdie** is resident engineer on the project for the City of San Leandro. The job should be completed before November of this year.

* * *

Walter Raucher is superintending construction of the Florence Ave. Bridge over the Los Angeles River in Los Angeles County for contractor H. B. Nicholson of Pasadena. **S. M. Fisher** is the office manager on the project, which is being constructed at a contract price of $419,000 and a completion time of 350 days. **N. E. Vas-**

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F-2—5,700 lbs. GVW. 7½′ Platform or Stake, 8′ Express. 122″ w.b. V-8 or Six engine.



F-3—6,800 lbs. GVW. 7½′ Platform or Stake, 8′ Express. 122″ w.b. V-8 or Six engine.



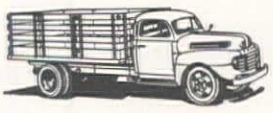
F-4—7,500 lbs. GVW. (singles), 10,000 lbs. (duals). 9′ Platform or Stake. 134″ w.b. V-8 or 6.



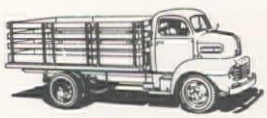
F-5—14,000 lbs. GVW. 9′ & 12′ Platforms or Stakes. 134″ w.b. & 158″ w.b. V-8 or Six engine.



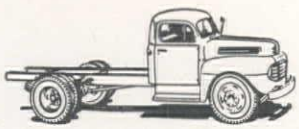
F-5 C.O.E.—14,000 lbs. GVW. 9′ & 12′ Platforms or Stakes. 110″-134″-158″ w.b. V-8 or Six.



F-6—15,500 lbs. GVW. 9′ & 12′ Platforms or Stakes. 134″ w.b. & 158″ w.b. V-8 or Six engine.



F-6 C.O.E.—16,000 lbs. GVW. 9′ & 12′ Platforms or Stakes. 110″-134″-158″ w.b. V-8 or Six.



F-7—19,000 lbs. GVW. 135″-159″-195″ w.b. 9.00-20 maximum tires. 145 h.p. V-8 engine.



F-8—21,500 lbs. GVW. 135″-159″-195″ w.b. 10.00-20 tires. 2-speed axle. 145 h.p. engine.

NEW! Three new truck engines . . . a new Six and two new V-8's developing up to 145 horsepower!

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NEW! Two new BIG JOBS rated to carry gross vehicle weights up to 21,500 lbs.!

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LIFE INSURANCE EXPERTS PROVE AND CERTIFY . . . FORD TRUCKS LAST UP TO 19.6% LONGER!

quez and **Fred Hokin** are resident engineers on the job for the Los Angeles County Bridge Department, and they have as assistants **W. M. Snedeker** and **Ray Hegwer.**

* * *

H. R. Bolton is project manager for Edward Green, Los Angeles contractor, on construction of the San Jacinto-San Vincente Aqueduct between Rainbow and Fallbrook. **E. J. Mitchell** is the assistant project manager and **D. R. Woodall** is the office manager. The contract price is $287,359 for the 16-in. water line into San Diego.

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Paul F. Cook is general superintendent for S. J. Cook, contractor, on construction of an elementary school building and auditorium in North Hollywood, Calif. **J. T. Peninger** is foreman on the job, which should be completed by June.

* * *

Roy Peglau is superintending the construction of a Coca-Cola Bottling Plant at Hayward, Calif., for the Austin Co., Oakland, Calif. **Nels Lindahl** is the carpenter foreman and **Bill Burke** is the labor foreman. **R. L. McDonald** is chief clerk in the office.

* * *

Don Weirick is superintendent for Haas & Rothschild, San Francisco contractors, on construction of a plant for the Western Waxed Paper Co. at San Leandro, Calif. **Clyde Adams** is the assistant superintendent and **John Kero** is office manager.

* * *

Ted Williams is superintendent for R. A. Erwin and Cee-Tee Construction Corp., Puente, Calif., on construction of 15 mi. of highway north of Westmoreland in California. **Vern Story** is the assistant superintendent, and **Clyde Robinson** is the resident engineer for the state.

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Ed Pennewell is superintending construction of the Dr. Boyd Medical Building at Long Beach, Calif., for Albert Reingardt, Long Beach contractor.

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C. F. Griggs, consulting engineer of Spokane, has been retained by the Bonners Ferry, Ida., board of trustees to supervise construction of the Moyie River power dam. The structure will replace a smaller dam downstream and will more than double the existing power generating capacity. It will be constructed on a day labor basis, and is estimated to cost about $200,000.

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Kenneth M. Moorhead is superintendent for Jackson Brothers, Los Angeles, contractors for the construction of an office building at Trona, Calif., for the Trona Railway Co. **John Rice** is the carpenter foreman on the job.

* * *

Charles Stafford is supervising the construction of a Sears Roebuck expansion at Long Beach, Calif., which is being built at a reported expenditure of $1,300,000. **Bob Ball** is labor foreman on the project and **Howard Ross** is the office manager.

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Francis T. Hayden is now superintendent for John W. Galbreath & Co., Gary, Ind., on the construction of 38—1½ story domitories to house single employees of the Carnegie-Illinois Steel Co. at their Gary, Ind., plant.

UNIT BID SUMMARY

Airports . . .

Nevada—Clark County—County—Runways, etc.

Morrison-Knudsen Co., Inc., Los Angeles, Calif., was low before the County Commission at Las Vegas, with a bid of $825,999 for the construction of runways, taxiways, parking aprons, roads, drainage, etc., at the Clark County Airport, adjacent to Hwy. 91 approximately six miles south of the heart of Las Vegas. Time allowed for completion is 100 days. Alternate bids were taken on 130 working days for completion. The following unit bids were submitted:

		Alternate
(A) Morrison-Knudsen Co., Inc.	$ 825,999	.....
(B) Gibbons & Reed	837,184	.....
(C) Dodge Construction Co.	878,400	$ 875,400
(D) Vinnell Co.	877,772	.....
(E) Westbrook & Pope	922,897	.....
(F) Carl E. Nelson	.....	952,359
(G) Olof Nelson Construction Co.	970,619	965,311
(H) Clifford C. Bong	1,064,821	1,061,821
(I) N. M. Ball Sons Co. and Madonna Construction Co.	1,087,662	1,083,339
(J) Dimmitt & Taylor	1,129,182	.....
(K) J. E. Haddock, Ltd.	1,174,192	1,171,192

(1) Lump sum, clear and grub approx. 265 ac. of airport site.
(2) 352,700 cu. yd. common excav.
(3) 40,000 cu. yd. rooter excav.
(4) 40,000 cu. yd. borrow excav.
(5) 165,550 cu. yd. selected aggr. base crse. in pl.
(6) 371 tons grade MC-1 bitum. prime coat appl.
(7) 45,050 tons of types I, II and III bitum. surf. crse.
(8) 2500 tons of type IV bitum. surf. crse.
(9) 3600 tons type IV bitum. ditch pave.
(10) 318 tons grade RC-2 bitum. seal coat appl.
(11) 2635 tons seal coat aggr.
(12) 3652 cu. yd. 13½-9-13½ P.C.C. pave.
(13) 108 cu. yd. struct. conc. in drain. struct.
(14) 8200 lb. furn. and install reinf. steel.
(15) 23,220 lbs. furn. and erect miscl. steel.
(16) 90 lin. ft. furn. and install 12-in. 16 gauge, corr. met. drain. pipe.
(17) 870 lin. ft. furn. and install 18-in. 14 gauge corr. met. drain. pipe.
(18) 988 lin. ft. furn. and install 21-in. 14 gauge corr. met. drain. pipe.
(19) 1190 lin. ft. furn. and install 24-in. 12 gauge corr. met. drain. pipe.
(20) 936 lin. ft. furn. and install 24-in. 14 gauge corr. met. drain. pipe.
(21) 1500 lin. ft. furn. and install 30-in. 12 gauge corr. met. drain. pipe.
(22) 720 lin. ft. furn. and install 36-in. 10 gauge corr. met. drain. pipe.
(23) 90 lin. ft. furn. and install 50x31-in. 12 gauge corr. met. arch culv. pipe.
(24) 201 squares paint runway numerals and symbols.
(25) 616 sta. painting 6-in. wide traffic stripes.
(26) 10,300 lin. ft. furn. and pl. conc. encasement for 3-in. fibre duct.
(27) 90 furn. and pl. conc. cable and duct markers.
(28) 405 furn. and pl. conc. runway marker light pads.
(29) 24 cu. yd. struct. conc. in segmented circ. pads.
(30) 0.5 cu. yd. struct. conc. in controllable landing dir. indicator and wind cone fdtns.
(31) Lump sum, furn., pl. and erect pattern and closed field markers.
(32) Lump sum, compl. erect. and install. of rotating beacon tower furn. by others.
(33) Lump sum, constr. of transformer vault.
(34) 25,100 lin. ft. type B fence (matl. furn. by others).
(35) 1350 lin. ft. type E fence.
(36) 2 6-ft. single gates in type E fence.
(37) 2 20-ft. double gates in type E fence.

Note: The additional items may be included in the contract at any time prior to date of completion by order of the contracting agency.

(38) 35,100 lin. ft. type B fence.
(39) Lump sum, 1 rotating beacon tower.
(40) 222 sq. yd. sidewalk.
(41) 3690 lin. ft. conc. curb.
(42) 320 lin. ft. wood guard rail.
(43) Approx. 1000 cu. yd. furn. spread and rake top soil.
(44) 21 tons grade MC-1 bitum. penetration coat applied.
(45) 8750 sq. yd. rock palliative for engine blast area.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	$3,500	$2,915	$29,500	$3,500	200.00	.....	$18,500	$13,250	$10,600	$45,000	$8,000
Alt.	.....	.....	$26,500	.....	.....	$8,000	$13,250	$10,250	.....	.....	$5,000
(2)	.39	.43	.42	.44	.50	.54	.60	.76	.61	.65	.65
Alt.	.....	.....	.....	.....	.....	.....	.....	.....	.60	.....	.....
(3)	.10	.55	.42	.44	.50	.54	.60	.96	.62	.65	.90
Alt.	.....	.....	.....	.....	.....	.....	.....	.....	.60	.....	.....
(4)	.10	.47	.42	.44	.20	.51	.60	.76	.30	.75	.65
(5)	1.75	1.32	1.25	1.25	1.50	1.40	1.10	1.42	1.75	1.60	2.20
(6)	26.50	34.35	32.50	35.00	31.00	34.00	30.00	34.50	40.00	44.00	37.50
(7)	3.90	4.16	4.35	4.75	4.00	4.40	5.00	5.05	4.50	5.40	4.85
(8)	4.00	4.85	5.25	5.75	4.50	6.00	6.00	6.00	4.90	5.80	5.15
(9)	4.60	5.60	5.25	5.75	4.75	8.00	7.00	7.00	5.20	6.20	6.75
(10)	27.50	34.00	32.50	35.00	31.00	34.00	35.00	34.50	40.00	41.00	37.50
(11)	3.50	4.25	4.00	6.00	5.00	4.50	5.00	4.50	4.75	8.00	4.50
(12)	19.00	19.00	26.00	23.00	20.00	25.00	25.00	21.23	27.50	23.00	25.60
(13)	60.00	83.00	88.00	100.00	70.00	60.00	60.00	65.00	70.00	80.00	97.50
(14)	.15	.13	.15	.15	.12	.15	.12	.12	.15	.10	.15
(15)	.25	.28	.30	.40	.25	.40	.30	.24	.45	.32	.25
(16)	2.60	3.10	3.50	3.20	3.00	2.50	2.75	2.00	4.00	3.35	3.60
(17)	4.00	4.85	4.50	4.60	3.30	3.50	4.20	4.00	6.50	5.95	6.70
(18)	4.80	5.15	5.50	5.20	4.30	4.00	4.85	5.00	8.00	7.15	7.20
(19)	6.20	6.85	7.50	6.80	5.70	4.75	6.75	7.00	9.00	9.00	8.55
(20)	5.30	5.90	6.50	5.80	4.80	4.50	5.50	6.00	8.40	8.35	8.50
(21)	7.70	7.45	9.00	8.20	8.40	6.00	8.35	9.00	10.50	10.50	9.90
(22)	10.00	9.85	11.00	12.00	11.00	8.75	12.00	13.50	14.00	16.00	12.50
(23)	12.00	12.00	12.50	12.00	11.50	9.00	14.00	13.00	12.50	12.80	14.40
(24)	5.00	9.90	6.50	5.50	10.00	15.00	15.00	12.00	12.50	13.00	6.25
(25)	5.00	6.45	7.00	5.80	6.00	10.00	10.00	7.00	7.75	7.75	6.50
(26)	.70	.86	.75	.75	1.75	2.00	1.50	1.10	2.00	.90	1.05
(27)	4.80	3.20	5.00	15.00	5.00	5.00	4.00	8.00	9.50	4.35	12.50
(28)	18.00	16.80	12.00	25.00	20.00	20.00	25.00	8.00	24.00	17.25	19.00
(29)	48.00	61.00	100.00	100.00	70.00	60.00	200.00	25.00	57.00	55.00	88.00
(30)	60.00	51.35	100.00	100.00	100.00	60.00	100.00	60.00	100.00	200.00	250.00
(31)	$1,600	970.00	$1,000	500.00	600.00	$1,200	$1,000	$1,075	100.00	$1,100	750.00
(32)	$1,000	$1,435	$1,000	$1,500	$1,000	$1,000	$1,000	$1,320	$1,100	$1,100	$1,500
(33)	$5,000	$3,970	$5,000	$4,000	$4,000	$4,000	$5,000	$5,000	$8,400	$4,365	$8,500
(34)	.10	.19	.20	.08	.15	.20	.20	.16	.18	.215	.25
(35)	1.60	2.50	3.00	1.80	1.25	5.00	4.00	1.90	2.00	2.15	2.25
(36)	55.00	65.00	62.50	100.00	30.00	100.00	50.00	60.00	60.00	65.00	55.00
(37)	120.00	175.00	158.00	100.00	60.00	200.00	100.00	125.00	135.00	110.00	120.00
(38)	.22	.19	.20	.12	.10	.15	.30	.30	.21	.325	.18
(39)	$1,100	990.00	$1,000	$1,200	$10,000	$1,200	$2,000	$2,100	$1,100	$1,000	$1,000
(40)	4.70	4.20	5.00	3.00	3.00	3.50	4.00	2.25	3.00	3.80	5.00
(41)	1.60	1.50	1.50	1.50	2.00	1.00	1.50	1.10	1.50	1.60	1.25
(42)	2.40	2.60	2.50	4.00	5.00	3.50	3.00	2.50	5.00	2.70	2.80
(43)	1.50	1.40	1.50	1.00	5.00	4.00	2.00	4.00	2.50	4.00	1.25
(44)	60.00	37.00	32.50	35.00	40.00	34.00	35.00	35.00	35.00	48.00	50.00
(45)	.45	.23	.40	.40	2.00	.30	.25	.35	.50	.15	.50

LORAINS *Lead with the* LATEST FEATURES



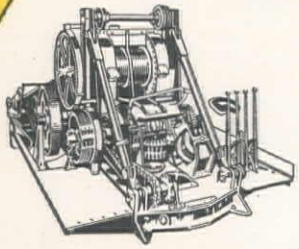
LORAIN-820 FEATURES

Shock-Absorbing

HYDRAULIC CLUTCH FOR HEAVY-DUTY DIGGING

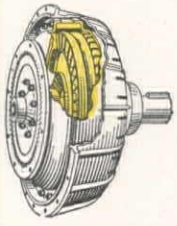
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Concentrates power where and when you need it . . . Simultaneous hoist, swing and travel with each controlled independently.

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Absorbs and relieves machinery and cables of digging impacts and shocks . . . Improves engine "hang-on" . . . Prevents engine stalling.

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All-welded, all-steel Shovel Boom with positive independent Chain Crowd. Interchangeable Crane, Dragline, Clamshell and Hoe Booms also available.

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A. H. COX & COMPANY..... *Seattle 4, Wash.*
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Operation speeds of many production machines have reached an all time high. Speeds above 25,000 R.P.M. are common today. There are LUBRIPLATE lubricants especially well adapted for high speed use. They reduce friction to a minimum, arrest progressive wear and protect against rust and corrosion. There is a LUBRIPLATE lubricant for every need regardless of operating conditions. Write for particulars.

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Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

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Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

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Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.



LUBRIPLATE

FISKE BROTHERS REFINING CO.

NEWARK 5, N. J. TOLEDO 3, OHIO



Waterway . . .

California—Ventura County—Corps of Engineers—Levee

A. Teichert & Son, Inc., Sacramento, submitted the low bid of $984,640 (Alternate 3) and was recommended for the award by the District Corps of Engineers, Los Angeles, for the construction of 14,070 lin. ft. of levee, clearing of channel and track work, Ventura River Channel, between the Pacific Ocean and Canada De-San Joaquin. Unit bids are as follows:

	Base Bid	Alternate No. 1	Alternate No. 2	Alternate No. 3
(A) A. Teichert & Son, Inc.	$1,144,645	$1,089,375	$1,013,920	$ 984,640
(B) United Concrete Pipe Corp. & R. A. Bell	1,176,216	1,071,966	1,093,301	1,034,691
(C) Dimmit & Taylor & T. M. Page	.....	1,122,634	.....	1,030,084
(D) Guy F. Atkinson Co. & W. E. Kier Construction Co.	1,248,748	1,162,378	1,147,328	1,088,833
(E) Clyde W. Wood, Inc.	1,417,760	1,202,775	1,267,765	1,115,330
(F) Macco Corp.	.....	1,301,526	.....	1,122,376
(G) Geo. Pollock Co.	1,546,091	1,313,126	1,391,391	1,220,531
(H) Engineer's Estimate	1,308,218	1,171,633	1,169,153	1,091,138

(1) Lump sum clearing.
(2) 26 ac. grubbing.
(3) 20,000 cu. yd. stripping for levee.
(4) 60,000 cu. yd. stripping borrow areas.
(5) 255,000 cu. yd. excav., common.
(6) 450,000 cu. yd. excav., borrow.
(7) 1,000 cu. yd. excav., struct.
(8) 2,500 cu. yd. excav., culvert
(9) 360,000 cu. yd. levee fill.
(10) 235,000 cu. yd. backfill, uncompacted.
(11) 2,000 cu. yd. backfill, structure.
(12) 2,000 cu. yd. embankment, compacted for ry. roadbed.
(13) 14,000 cu. yd. filter zone matl.
(14) 50,100 cu. yd. quarrystone for 18- to 24-in. grouted stone blanket.
(15) 27,500 ton quarrystone blanket, 3-ton max. size.
(16) 17,800 ton quarrystone blanket, 6-ton max. size.
(18) 30 lin. ft. 12-in. C.M.P., dipped and paved.
(19) 247 lin. ft. 24-in. C.M.P., dipped and paved
(20) 73 lin. ft. 30-in. C.M.P. dipped and paved.
(21) 38 lin. ft. 36-in. C.M.P.
(22) 88 lin. ft. 42-in. C.M.P., dipped and paved.
(23) 399 lin. ft. 48-in. C.M.P., dipped and paved.
(24) 3 ea. 24-in. automatic drainage gate.
(25) 1 ea. 30-in. automatic drainage gate.
(26) 1 ea. 42-in. automatic drainage gate.
(27) 6 ea. 48-in. automatic drainage gate.
(28) 1 ea. 12-in. corrugated metal end section with toe plate.
(29) 100 cu. yd. concrete, stop log structure.
(30) 235 cu. yd. concrete, miscel. structs.
(31) 20,000 cu. yd. grouting 18- to 24-in. stone blanket.
(32) 38,000 bbl. Portland cement.
(33) 32,700 lb. steel reinforcement.
(34) 1,315 lin. ft. removal and salvage of track.
(35) 1,015 lin. ft. const. of shoofly track.
(36) 300 lin. ft. reconst. of line track.
(37) 3 ton plant-mixed bitum. matl.
(38) 2,070 lb. aluminum H-beams.
(39) 670 lb. miscl. metals.
(40) Lump sum, remov. exist. conc. wall.
(41) Lump sum, remov. exist. headwall and pipe.

ALTERNATE 1

ALTERNATES FOR ITEMS No. 6 and 14

(42) 500,000 cu. yd. excav., borrow (incl. cobblestones).
(43) 50,100 cu. yd. cobblestone for 18- to 24-in. grouted stone blanket.

Total amount, including Items (42) and (43), in lieu of Items (6) and (14).

ALTERNATE 2

12- TO 18-IN. GROUTED ROCK BLANKET

Alternates for Items Nos. (6), (9), (10), (14), (31) and (32).

(44) 466,000 cu. yd. excav., borrow.
(45) 368,000 cu. yd. levee fill.
(46) 241,000 cu. yd. backfill, uncompacted.
(47) 36,100 cu. yd. quarrystone for 12- to 18-in. grouted stone blanket.
(48) 14,500 cu. yd. grouting 12- to 18-in. stone blanket.
(49) 27,500 bbl. Portland cement.

Total amount, including Items Nos. (44) to (49), Inclusive, in lieu of Items Nos. (6), (9), (10), (14), (31) and (32).

ALTERNATE 3

Alternates for Items Nos. (44) and (47).

(50) 500,000 cu. yd. excav., borrow (including cobblestones).
(51) 36,100 cu. yd. cobblestones for 12- to 18-in. grouted stone blanket.

Total amount, including Items Nos. (45), (46), (48), (49), (50) and (51), in lieu of Items Nos. (6), (9), (10), (14), (31) and (32).

	(A)	(B)	(C)	(D)	(E)	(F)	(F)	(H)
(1)	$73,000	$30,000	$50,000	$40,000	$50,000	$60,000	$35,000	$29,500
(2)	250.00	240.00	200.00	200.00	200.00	400.00	500.00	160.00
(3)	.40	.50	.60	.60	.50	.40	.75	.50
(4)	.30	.30	.30	.40	.50	.40	.50	.40
(5)	.25	.30	.40	.25	.28	.40	.25	.26
(6)	.20	.42	....	.48	.56	....	.30	.33
(7)	2.00	2.00	4.00	1.50	3.00	3.00	2.00	5.35
(8)	1.00	2.00	3.00	1.00	3.00	3.00	1.00	1.55
(9)	.20	.15	.30	.15	.24	.30	.90	.25
(10)	.20	.15	.05	.15	.15	.20	.30	.18
(11)	1.00	1.00	3.00	2.00	1.50	3.00	1.00	.75
(12)	.30	1.00	.25	.60	.30	2.00	2.00	.45
(13)	.60	1.00	1.50	1.25	1.00	1.00	.90	.70
(14)	4.25	3.70	....	4.50	6.00	....	5.50	7.50
(15)	4.00	4.00	4.50	4.50	4.00	3.50	4.00	4.50
(16)	4.00	4.00	4.50	4.75	4.00	3.50	4.00	3.95
(18)	2.00	6.00	3.00	3.25	3.30	3.00	3.00	5.00
(19)	4.00	8.00	11.00	5.50	6.85	6.00	6.00	8.25
(20)	8.00	12.00	12.00	10.00	11.30	12.00	11.00	14.00
(21)	9.00	14.00	13.00	11.00	12.00	13.00	14.00	18.00
(22)	11.00	15.00	18.00	15.00	16.50	15.00	16.00	20.75
(23)	14.00	16.00	20.00	17.50	18.50	17.00	19.00	22.00
(24)	100.00	200.00	125.00	125.00	125.00	100.00	100.00	160.00
(25)	150.00	300.00	150.00	175.00	200.00	150.00	150.00	225.00
(26)	250.00	500.00	350.00	350.00	350.00	400.00	325.00	430.00
(27)	425.00	500.00	425.00	425.00	450.00	450.00	400.00	480.00
(28)	20.00	25.00	15.00	25.00	50.00	30.00	25.00	34.00
(29)	50.00	60.00	55.00	50.00	65.00	50.00	50.00	48.00
(30)	55.00	70.00	60.00	50.00	75.00	50.00	60.00	48.00
(31)	9.00	8.00	6.50	8.00	9.00	8.00	9.00	7.70
(32)	3.50	4.00	4.00	3.50	3.30	3.50	4.00	3.00
(33)	.10	. 10	.10	.10	.15	.12	.10	.10
(34)	1.50	2.00	2.00	1.25	4.00	1.50	2.00	.75
(35)	5.00	6.00	6.00	5.00	7.00	5.00	3.00	3.60
(36)	5.00	5.00	6.00	6.00	8.00	5.00	3.00	3.60
(37)	20.00	20.00	6.00	25.00	10.00	20.00	15.00	19.00
(38)	.50	.40	.50	.50	1.00	.50	1.00	.55
(39)	.50	.50	.50	.40	.50	.50	.50	.65
(40)	500.00	500.00	$1,000	500.00	200.00	300.00	$1,000	$1,000
(41)	300.00	300.00	250.00	300.00	200.00	200.00	500.00	350.00
(42)	.34	.42	.35	.63	.56	.52	.27	.61
(43)	1.55	1.20	1.25	.80	1.15	3.00	.85	1.65
(44)	.20	.43	....	.48	.56	....	.30	.33
(45)	.20	.15	.30	.15	.24	.30	.90	.25
(46)	.20	.15	.05	.15	.15	.20	.30	.18
(47)	4.50	4.50	....	5.00	6.00	....	5.50	8.25
(48)	9.00	8.85	6.50	9.00	9.25	8.00	9.00	8.00
(49)	3.50	4.00	4.00	3.50	3.40	3.50	4.00	3.00
(50)	.33	.45	.35	.63	.56	.40	.27	.61
(51)	1.70	2.20	1.25	.85	1.25	3.00	.90	1.90

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IN 1947, C.I.T. financed OVER FIFTY MILLION DOLLARS worth of construction equipment. Almost every standard make and type of machinery used by contractors is represented in this total.

Alert contractors from coast-to-coast use C.I.T. funds to help them buy the equipment needed to handle their work to best advantage. Our simple, efficient finance plan enables them to conserve their operating capital by spreading payment of their purchases over periods suited to their business needs.

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The RATTLER



One of 4 Poisonous Snakes, including 41 species, some of which are found in every state



Every Outdoor Workman needs this protection!

McDonald SNAKE BITE KIT

A handy kit with all the materials for instant, safe treatment of snake bites. Powerful suction pump with two adaptors — operates with one hand. Real surgical lancet, tourniquet, antiseptic, adhesive compress, shock treatment. Full directions on inside cover of kit. Fits pocket or standard unit kits.

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Highway and Street . . .

Wyoming—Platte County—State—Grade and Surf.

S. Birch & Sons Construction Co., Great Falls, Mont., was awarded a $567,896 contract by the State Highway Commission of Cheyenne, for approximately 10 mi. of grading, draining, construction of one 3 span I-beam bridge over Rock Creek, 12 reinforced concrete culverts and miscellaneous work on the Wheatland-Cheyenne road and 1.7 mi. of the Wheatland-Bosler road. Unit bids are as follows:

(A) S. Birch & Sons Construction Co. $567,896
(B) Leach Brothers 578,469
(C) Sharrock & Pursel 589,740
(D) H. W. Read 591,307
(E) Lowdermilk Bros. 597,179
(F) Kinsely-Moore Co. 606,274
(G) Taggart Construction Co. $610,683
(H) Peter Kiewit Sons Co. 622,786
(I) J. H. & N. M. Monaghan 632,114
(J) Northwestern Engineering Co. 643,267
(K) Blanchard Bros. 692,087
(L) Engineers' Estimate 597,913

(1) 1,009,000 cu. yd. excavation.
(2) 21,500 cu. yd. selected matl. surf. Type II.
(3) 205,000 cu. yd. mi. haul.
(4) 3,300 hr. sheep's foot roller operation.
(5) 125 hr. pneumatic tired roller operation.
(6) 180 hr. roller operation (smooth steel type).
(7) 19,150 M. gal. watering (emb.).
(8) 857 cu. yd. structure excav.
(9) 2,750 cu. yd. excav. for pipe culverts.
(10) 1,380 hr. mechanical tamping.
(11) 160 cu. yd. Class 1 riprap.
(12) 60 cu. yd. grouted riprap.
(13) 1,171 lin. ft. 12-in. siphon R.C.P.
(14) 155 lin. ft. 18-in. siphon R.C.P.
(15) 136.7 lin. ft. 30-in. siphon R.C.P.
(16) 2,180 lin ft. 12-in. standard R.C.P.
(17) 994 lin. ft. 18-in. standard R.C.P.
(18) 1,174 lin. ft. 24-in. standard R.C.P.
(19) 184 lin. ft. 30-in. standard R.C.P.
(20) 600 lin. ft. 36-in. standard R.C.P.
(21) 392 lin. ft. 48-in. standard R.C.P.
(22) 100 lin. ft. 72-in. standard R.C.P.
(23) 60 lin. ft. 24-in. extra strength R.C.P.
(24) 44 lin. ft. 30-in. extra strength R.C.P.
(25) 100 lin. ft. 36-in. extra strength R.C.P.
(26) 120 lin. ft. 48-in. extra strength R.C.P.
(27) 56 lin. ft. 72-in. extra strength R.C.P.
(28) 196 lin. ft. relaying pipe.
(29) .518 M.B.M. untreated timber.
(30) 2 each drop inlets.
(31) 129,000 lin. ft. standard r/w fence.
(32) 125 each end panels.
(22) 230 each brace panels.
(34) 1,300 lin. ft. Type "A" r/w fence.
(35) 72 each r/w markers.
(36) 3 each R.C. project markers.
(37) 1,268.8 cu. yd. Class A concrete.
(38) 98.4 cu. yd. Class AA concrete.
(39) 136,854 lb. reinforcing steel.
(40) 63,720 lb. structural steel.
(41) 70 cu. yd. dry excav. for bridges.
(42) 350 cu. yd. wet excav. for bridges.
(43) 5,520 lin. ft. portable snow fence.
(44) 1 each cattleguard.

	(A)	(B)	(C)	(E)	(G)	(H)	(J)	(K)	(L)
(1)	.20	.25	.265	.26	.26	.28	.30	.28	.28
(2)	.40	.50	.30	.26	.20	.40	.38	.69	.35
(3)	.20	.20	.18	.20	.15	.20	.18	.20	.20
(4)	10.50	9.00	10.00	8.00	10.00	9.00	10.00	14.00	10.00
(5)	7.50	6.00	6.00	8.00	10.00	6.00	7.00	6.25	6.00
(6)	7.00	6.00	10.00	8.00	8.00	10.00	7.00	7.50	6.00
(7)	1.40	1.75	1.50	1.00	3.00	2.00	2.00	2.00	1.75
(8)	3.00	3.00	3.00	3.50	2.50	3.00	3.00	3.50	2.00
(9)	1.50	2.25	2.00	2.00	3.50	2.00	2.00	3.50	2.00
(10)	5.00	7.00	6.00	5.00	10.00	6.00	5.75	7.25	6.00
(11)	9.00	12.00	10.00	12.00	12.50	8.00	8.00	15.00	6.00
(12)	13.00	17.00	20.00	20.00	15.00	15.00	15.00	20.00	10.00
(13)	5.00	3.50	4.00	4.00	2.90	4.00	3.15	6.75	3.50
(14)	9.00	7.00	6.00	6.75	6.00	8.00	6.70	7.70	5.50
(15)	18.00	14.00	13.00	13.50	12.50	15.00	13.50	14.00	10.00
(16)	3.00	3.00	3.00	3.50	2.50	3.00	2.85	5.75	3.00
(17)	5.00	4.50	5.00	5.10	4.50	5.00	5.00	6.50	4.50
(18)	7.00	6.50	6.00	6.75	6.00	7.00	6.75	8.55	6.00
(19)	10.00	9.50	8.00	9.00	9.00	10.00	10.00	11.40	8.00
(20)	14.00	11.50	10.50	12.00	11.50	13.00	12.50	15.00	10.50
(21)	22.00	19.00	16.70	18.00	19.00	21.00	20.00	24.00	18.00
(22)	50.00	50.00	40.00	40.00	43.00	48.00	46.00	50.00	34.00
(23)	8.00	7.00	6.50	7.00	6.70	8.00	7.25	9.10	6.50
(24)	11.00	10.00	9.00	10.00	9.50	11.00	10.50	12.00	8.50
(25)	16.00	13.00	12.00	13.75	13.50	15.00	14.50	17.00	11.50
(26)	26.00	21.50	18.70	21.00	22.50	24.00	23.00	27.00	19.00
(27)	56.00	50.00	45.00	42.50	47.50	53.00	50.00	60.00	36.00
(28)	1.50	2.00	2.00	2.00	1.25	2.00	2.00	2.50	2.00
(29)	330.00	200.00	300.00	300.00	250.00	350.00	250.00	375.00	250.00
(30)	175.00	150.00	100.00	250.00	150.00	200.00	250.00	250.00	200.00
(31)	.32	.22	.21	.25	.25	.23	.23	.30	.18
(32)	27.00	20.00	20.00	20.00	25.00	22.00	20.00	25.00	20.00
(33)	20.00	16.00	20.00	17.50	22.50	20.00	16.00	21.25	15.00
(34)	.43	.30	.30	.40	.32	.28	.35	.37	.30
(35)	9.00	10.00	10.00	12.00	10.00	17.00	10.00	12.50	10.00
(36)	15.00	15.00	25.00	60.00	50.00	27.00	15.00	95.00	20.00
(37)	54.50	44.00	48.00	55.00	45.00	46.00	50.00	54.50	45.00
(38)	56.50	45.00	48.00	60.00	45.00	46.00	51.00	57.00	47.00
(39)	.13	.105	.11	.11	.105	.10	.12	.1125	.11
(40)	.17	.1625	.18	.16	.16	.18	.16	.175	.15
(41)	6.00	4.50	5.00	5.00	4.50	5.00	4.00	5.00	5.00
(42)	15.00	5.00	10.00	10.00	5.00	10.00	13.00	10.00	10.00
(43)	2.50	1.80	2.20	3.50	1.80	2.00	1.85	1.75	2.00
(44)	200.00	200.00	300.00	$1,000	250.00	300.00	300.00	660.00	175.00

Washington—Whitman County—State—Grade & Surf.

Roy L. Bair & Co., Spokane, submitted the low bid of $438,685 before the Department of Highways at Olympia, and was awarded the contract for grading, draining and surfacing on 13.7 mi. of Primary State Hwy. No. 3, between Colton and Pullman. Time allowed for completion is 270 calendar days. Unit bids follow:

(1) Roy L. Bair & Co. $438,685
(2) Carbon Bros. 464,974
(3) Max J. Kuney Co. 479,865
(4) Curtis Gravel Co. 485,382
(5) F. R. Hewett Co. $491,130
(6) J. D. Shotwell 499,956
(7) Peter Kiewit Sons Co. 707,060

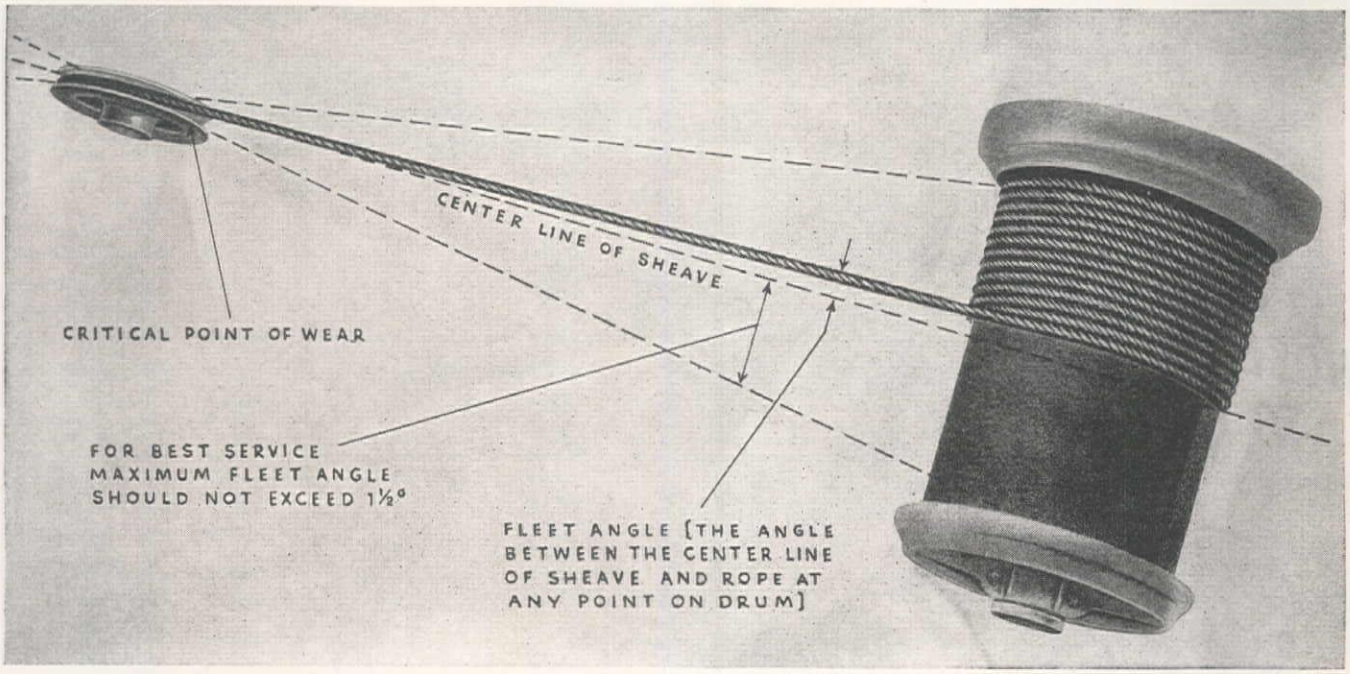
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
300,400	cu. yd. common excav. inc. haul of 600 ft.	.30	.28	.30	.29	.27	.35	.39
7,900	cu. yd. solid rk. excav., inc. haul of 600 ft.	1.40	1.75	1.50	2.00	1.45	1.50	1.60
520	cu. yd. com. tr. excav., incl. haul, 600 ft.	1.25	1.00	1.25	3.00	.75	1.00	1.50
20	cu. yd. sol. rk. tr. excv., incl. haul, 600 ft.	4.00	2.00	5.00	7.50	5.00	4.00	25.00
249,470	cu. yd. stas. overhaul on above matls.	.01	.02	.02	.02	.02	.02	.02
1,186.82	M. cu. yd. stas. overhaul on above matls.	7.00	6.00	6.00	5.00	6.00	5.00	10.00
1,270	cu. yd. structure excav.	2.00	2.00	2.20	3.00	2.50	2.25	5.00
41,170	lin. ft. slope treatment	.08	.10	.10	.15	.08	.15	.15
726.1	stas. (100) finishing roadway	8.00	10.00	10.00	10.00	8.00	6.00	15.00
150	days tamping roller	64.00	40.00	50.00	40.00	75.00	48.00	80.00
20	cu. yd. gravel backfill in place	4.00	4.00	3.50	6.00	2.00	3.00	10.00
13.7	mi. scarifying exist. bit. surf.	50.00	150.00	200.00	400.00	200.00	400.00	125.00
66,210	cu. yd. ballast in place	1.50	1.80	1.80	1.50	1.90	1.60	2.95
48,480	cu. yd. cr. stone surf. top crse. in pl. on rdwy.	1.70	1.90	1.95	2.00	2.15	2.00	2.95
28,500	cu. yd. cr. stone surf. base crse. in pl. on rdwy.	1.70	1.85	1.85	1.70	2.00	1.90	2.95

(Continued on next page)

Proper fleet angle stops sheave-wear on wire rope

A Columbia wear-saving tip

The fleet angle is the side angle at which the rope approaches the sheave from the drum. Too great an angle will result in wear on the rope by the flanges of the sheave. The maximum safe fleet angle is generally considered to be 1½ degrees—equivalent to forty feet of lead for each foot of traverse travel on the drum on either side of the center line of the sheave. For example... a drum with a two-foot traverse should be placed forty feet from the sheave.



On any job... on any equipment... American TIGER BRAND Wire Rope has the stamina to stand up under long, tough usage. It's produced by Columbia here in the West under United States Steel's exacting specifications and is available preformed and non-preformed. Some users select preformed because this construction makes each strand carry its share of the load... gives maximum handling ease... resists bending fatigue and, because it's free of torsional stresses, travels smooth and true in the groove.

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AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
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United States Steel Export Company, New York



Don't get caught with your lines down! Keep an extra line on hand and be sure it's TIGER BRAND

UNITED STATES STEEL

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LE-HI Series 400
The ideal "all-purpose" coupling for heavy-duty, high-pressure service. For air, water, steam, etc. Extra heavy construction for maximum safety, efficiency and service life.

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LE-HI Series 150-B
The only Universal Type Hose Coupling with the patented "Safety - Locking" feature that positively prevents accidental uncoupling. Especially designed for compressed air service.

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Go to your local distributor for these rugged, economical LE-HI Hose Couplings—NEVER SOLD DIRECT!

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2756 N. 17th Street
Philadelphia 32, Pa.

LE-HI HIGH and LOW PRESSURE HOSE COUPLINGS

Branches In Chicago, Houston and Los Angeles

2,670 cu. yd. cr. stone filler in pl. on rdwy.	1.70	1.90	1.95	2.00	2.50	2.00	2.95
5,526 M. gal. water	2.50	2.00	2.25	3.00	3.00	2.90	3.00
4,600 cu. yd. cr. cover stone in stkpl.	1.40	1.90	1.80	2.00	1.70	2.55	2.50
IN AGG. FOR NON-SKID SINGLE SEAL TREAT. SCH. A IN STKPL.							
2,560 cu. yd. crse. cr. screen ⅝-in. - ¼-in. in stkpl.	2.00	2.50	1.80	2.00	1.80	3.00	3.45
780 cu. yd. fine cr. screen ¼-in. - 0-in. in stkpl.	2.00	2.50	1.80	2.00	1.80	3.00	3.45
MISCELLANEOUS ITEMS							
72.6 cu. yd. conc. Class A, in place	85.00	65.00	60.00	100.00	70.00	70.00	95.00
11,130 lb. steel reinf. bars	.10	.10	.10	.15	.12	.12	.15
1,431 cu. yd. loose riprap Class A, in place	4.00	2.00	2.50	5.00	2.00	4.00	5.00
5,050 lin. ft. BM. gd. rail Type 1 or 2, des. 6 comp. in pl.	2.50	2.00	2.25	3.70	1.80	3.00	3.00
90 only, timber spot posts in place	4.00	5.00	6.00	8.00	3.50	3.00	5.00
303 only, reinf. conc. r/w markers in place	4.00	4.00	5.50	4.50	4.00	6.00	5.00
3 only, spec. conc. catch basin comp. in pl.	200.00	75.00	200.00	200.00	150.00	90.00	125.00
1 only, manhole comp. in place	200.00	175.00	250.00	450.00	200.00	150.00	500.00
1 only, adjust. exist. manhole to grade	100.00	30.00	100.00	150.00	50.00	50.00	100.00
4,778 lin. ft. remove exist. cable guard rail	.35	.25	.40	.75	.35	.10	.25
6 only, remove exist. conc. pipe headers	10.00	20.00	10.00	20.00	20.00	4.50	75.00
Lump sum, remove conc. steps							
88 lin. ft. relay water pipe ¾-in. diam.	1.00	1.00	1.00	1.50	.50	1.50	.75
90 lin. ft. relay corr. met. culv. pipe 12-in. diam.	1.50	1.00	1.50	2.00	.75	1.00	1.75
53 lin. ft. relay corr. met. culv. pipe 18-in. diam.	1.50	2.00	2.00	1.25	1.00	1.00	2.25
24 lin. ft. relay corr. met. culv. pipe 24-in. diam.	2.00	3.00	2.50	1.50	1.50	1.00	3.25
543 lin. ft. relay conc. culv. pipe 12-in. diam.	1.50	1.00	1.50	1.50	1.00	1.00	2.00
68 lin. ft. relay conc. culv. pipe 18-in. diam.	2.00	2.00	2.00	1.50	1.50	1.50	3.50
6 lin. ft. relay conc. culv. pipe 24-in. diam.	2.00	3.00	2.50	5.00	2.00	2.00	4.75
40 lin. ft. relay conc. culv. pipe 36-in. diam.	4.00	4.00	5.50	5.75	3.00	4.00	8.00
718 lin. ft. pl. conc. or V.C. sewer pipe 12-in. diam. in pl.	1.60	2.00	2.50	3.00	2.00	3.00	2.00
225 lin. ft. pl. conc. or V.C. culv. pipe 12-in. diam. in pl.	2.00	2.50	2.50	3.00	2.00	3.00	2.25
1,308 lin. ft. std. reinf. conc. culv. pipe 18-in. diam. in pl.	3.00	3.50	4.25	4.00	3.50	4.00	4.25
366 lin. ft. std. reinf. conc. culv. pipe 24-in. diam. in pl.	4.50	5.00	6.50	5.00	5.00	5.00	6.00
354 lin. ft. std. reinf. conc. culv. pipe 36-in. diam. in pl.	10.00	8.50	12.50	12.50	10.00	10.00	12.00
20 lin. ft. pl. corr. met. culv. pipe 12 ga. 48-in. diam. in pl.	12.00	12.00	15.00	15.00	15.00	10.00	14.00

New Mexico—Chaves County—State—Grade and Culverts

D. D. Skousen, Albuquerque, was awarded the $469,587 contract by the State Highway Department at Santa Fe, for the construction of Federal Aid Project No. F-57(3), on U. S. Hwy. Rt. No. 70 between Acme and Roswell. The approximate length is 13.1 mi. The proposed construction consists of grading, minor drainage structures, two multiple concrete box culverts each over 20-ft. span, watering and rolling, levelling course, ballast, bituminous top course surfacing, sealing with asphalt and stone chips, and miscellaneous construction. The contract must be completed in 400 working days. The following unit bids were submitted:

(A) D. D. Skousen $469,587
(B) Brown Contracting Co. 492,228
(C) Lee Moor Contractors 507,301
(D) Armstrong & Armstrong 511,882
(E) G. I. Martin & J. H. Ryan 514,556
(F) Lowdermilk Bros. $534,559
(G) Skousen Construction Co. 535,714
(H) Allison & Haney 547,934
(I) Engineers' Estimate 541,602

(1a) Lump sum, removal of old structures.
(2) 331,000 cu. yd. excav.—unclassified.
(3) 2,095 cu. yd. excav. for structs.
(4) 1,155 cu. yd. excav. for pipe culverts.
(8a) 740,000 sta. yd. overhaul.
(8b) 204,700 ¼-mi. yd. haul.
(10) 1,035 hr. mechanical tamping.
(13a) 2,720 hr. rolling—sheepsfoot roller.
(13b) 520 hr. rolling—steel tired roller.
(13c) 2,350 hr. rolling—pneumatic tired roller.
(20) 71,700 ton ballast.
(21) 53,100 ton leveling course.
(29) 13,000 M. gal. watering.
(34a) 2,109 cu. yd. Class "AE" concrete.
(35c) 10,511 sq. yd. waterproofing concrete.
(36) 275,244 lb. reinforcing steel.
(39a) 1,732 lin. ft. stand. reinf. conc. culv. pipe—24-in. diam.
(39b) 996 lin. ft. stand. reinf. conc. culv. pipe—30-in. diam.
(39c) 1,028 lin. ft. stand. reinf. conc. culv. pipe—36-in. diam.
(39e) 360 lin. ft. stand. reinf. conc. culv. pipe—48-in. diam.
(49a) 2 each cattleguard—18-ft. roadway.
(49b) 1 each cattleguard—30-ft. roadway.
(52) 4 each monument and markers.
(56a) 139,300 lin. ft. galvanized barbed wire fence.
(56b) 13 each gates (Texas type).
(56c) 181 each bracing.
(60) 154 each treated timber warning posts (reflect.)
(61) 80 each right-of-way markers.
(64) 2.9 mi. obliterating old road.
(65) 33,800 lin. ft. contour ditches.
(66) 100 cu. yd. rock and wire check dams.
(70) 1,213 bbl. cutback asphalt—Type MC-1.
(71) 5,817 bbl. cutback asphalt—Type MC-3
(72) 18,800 ton top course surfacing.
(73) 13.461 mile mixing asphalt and aggregate.
(74) 1,343 bbl. 120-150 asphalt (for seal coat).
(75) 2,350 ton aggregate (seal coat).
(100) 10,370 cu. yd. granular backfill.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1a)	$1,000	$1,000	$2,500	$1,750	$1,500	$1,500	$1,000	$1,750	$1,800
(2)	.21	.23	.24	.30	.28	.26	.25	.35	.25
(3)	1.50	2.00	2.00	2.50	2.00	2.00	2.00	3.00	2.00
(4)	1.50	2.00	2.00	2.25	1.00	1.50	2.00	2.00	2.00
(8a)	.01	.01	.02	.015	.02	.02	.02	.015	.02
(8b)	.06	.07	.06	.05	.055	.07	.07	.055	.06
(10)	3.50	4.00	3.00	3.00	4.00	4.50	5.00	3.00	4.00
(13a)	4.25	2.50	3.50	2.50	4.00	4.00	5.00	4.50	3.50
(13b)	4.00	7.00	5.00	4.50	6.00	5.00	5.00	4.50	6.00
(13c)	3.50	3.00	3.50	3.00	3.00	4.50	4.00	4.00	4.00
(20)	.55	.65	.69	.50	.60	.50	.60	.60	.65
(21)	.70	.75	.79	.77	.80	.85	.85	.74	.80
(29)	1.25	1.00	2.00	1.70	1.50	1.00	2.00	1.75	2.00
(34a)	33.00	31.00	34.00	34.00	35.00	36.00	34.00	34.50	35.00
(35c)	.50	.50	.65	.60	.75	.60	.60	.40	.60
(36)	.09	.09	.085	.10	.09	.11	.09	.10	.09
(39a)	7.00	7.00	6.40	6.25	5.50	6.75	5.40	5.25	6.50
(39b)	8.50	8.00	8.18	8.00	7.10	8.25	7.95	7.25	8.00
(39c)	11.00	12.00	10.63	10.60	9.00	10.50	10.90	9.50	11.00
(39e)	17.00	17.00	16.58	16.70	16.00	16.50	16.10	15.50	15.00
(49a)	$1,600	$1,500	$1,500	$1,100	$1,400	$1,100	$1,500	$1,300	$1,400
(49b)	$2,400	$2,400	$2,350	$1,700	$2,000	$2,000	$3,000	$2,300	$2,500
(52)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
(56a)	.13	.15	.12	.12	.14	.16	.13	.12	.15
(56b)	10.00	10.00	3.50	7.00	10.00	10.00	10.00	9.00	8.00
(56c)	6.00	3.00	3.00	4.00	6.00	6.00	5.00	3.00	4.00
(60)	8.00	8.00	8.00	8.00	10.00	7.50	9.00	8.50	8.00
(61)	6.00	6.00	5.50	5.50	6.00	8.00	6.00	5.00	6.00
(64)	100.00	100.00	100.00	200.00	250.00	300.00	100.00	150.00	300.00
(65)	.05	.07	.06	.04	.05	.15	.07	.06	.10

(Continued on next page)

MACK *Dimensional Control*

what is it?

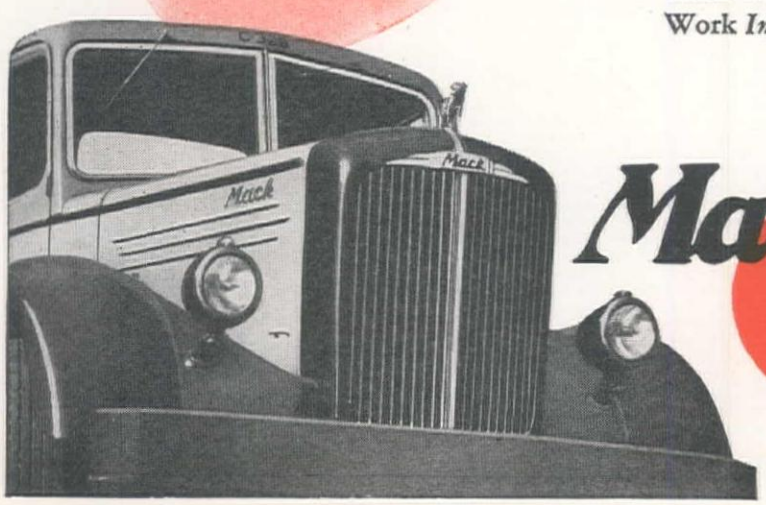
how does it benefit a truck operator?



Simply described, Mack Dimensional Control is the planning and fabricating of every part in a Mack truck for perfect fit and uniform interchange. It calls for uncompromising adherence to exact clearances and rigid tolerances without equal in the truck industry.

How does Dimensional Control benefit you as a truck operator? It gives you trucks that are truly precision-engineered . . . trucks whose parts fit and work together in perfect co-ordination. It explains why you get uniformly thrifty performance and enduring reliability from every Mack truck you operate. And it saves you time and money on repairs because it makes possible easy re-assembly without need for prefitting of parts.

Mack Dimensional Control is one more example of the thorough planning and advanced thinking that goes into every Mack truck. It all adds up to this: You Get More Work *Out* of a Mack Truck — Because We Put More Work *Into* a Mack.



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FOSTER
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RAILS—New and Relaying
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Foster's New Interlocking Light Weight
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315 Montgomery St.
SAN FRANCISCO 4, CAL.
PITTSBURGH 30 CHICAGO 4
HOUSTON 2 NEW YORK 7
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(66)	13.00	16.00	15.00	12.00	20.00	20.00	15.00	18.50	20.00
(70)	6.50	6.40	5.80	6.75	6.50	6.65	7.00	6.80	6.50
(71)	6.00	6.40	5.80	7.00	6.15	6.65	6.50	6.70	6.50
(72)	.75	.75	.82	.80	.75	1.00	.85	.75	.80
(73)	500.00	600.00	500.00	550.00	500.00	600.00	700.00	500.00	700.00
(74)	6.50	6.40	5.80	7.00	6.00	6.75	7.00	7.00	6.50
(75)	3.75	4.00	3.00	4.00	3.50	4.00	6.00	4.50	5.00
(100)	.70	1.50	.65	.55	.75	1.00	.75	1.50	1.50

Arizona—Pinal County—State—Grade and Surf.

Vinnell Co., Inc., Alhambra, Calif., was awarded a contract in the amount of $339,301, for about one mile of grading and draining the roadway over a new alignment on the Superior-Miami Hwy. The work, which begins in Superior extends northeasterly. Completion date, October 31, 1948. The following units bids were submitted:

(A) Vinnell Co., Inc. $339,301
(B) Fisher Contracting Co. 342,983
(C) J. E. Skousen 382,592
(D) Tanner Construction Co., and Heuser and Garnett 389,635
(E) Orr & Orr Construction Co. $390,307
(F) Bowen & McLaughlin 429,167
(G) Packard Contracting Co. 437,988
(H) Phoenix-Tempe Stone Co. 447,971

(1) 221,400 cu. yd. roadway excav.
(2) 21,000 cu. yd. overbreakage (for 75% of unit price bid for Item No. 1).
(3) 8,400 cu. yd. slides (for 50% of unit price bid for Item No. 1).
(4) 1,050 cu. yd. drainage excavation.
(5) 1,500 cu. yd. structural excavation.
(6) 47 cu. yd. removal of old concrete.
(7) 205,000 sta. yd. station yard overhaul.
(8) 38,900 cu. yd. mi. cubic yd. mile haul.
(9) 3,000 cu. yd. imported borrow.
(10) 800 cu. yd. selected material (for bed under drainage structs. at Stas. 46+20, 52+54, 59+23 and 85+17) (CIP).
(11) 20 hour rolling.
(12) 40 hour mechanical tamping.
(13) 304 cu. yd. Class A conc. (inc. cement).
(14) 38,750 lb. reinforcing steel.
(15) 18 tons liq. asph. SC-2 prime coat.
(16) 128 each placing dowels.
(17) 250 lin. ft. road guard.
(18) 360 lin. ft. 24-in. bituminous coated corrugated metal pipe.
(19) 140 lin. ft. 30-in. bituminous coated corrugated metal pipe.
(20) 120 lin. ft. 36-in. bituminous coated corrugated metal pipe.
(21) 232 lin. ft. 48-in. bituminous coated corrugated metal pipe (8 gauge).
(22) 512 lin. ft. 60-in. bituminous coated corrugated metal pipe (8 gauge).
(23) 1 lump sum, 72-in. bituminous coated multi plate corrugated metal pipe.
(24) 350 lin. ft. resetting 4-in. water pipe line (sta. 26+60 to 28+60).

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	1.04	1.06	1.20	1.25	1.25	1.40	1.40	1.50
(2)	.78	.795	.90	.9375	.9375	1.05	1.05	1.125
(3)	.52	.53	.60	.625	.625	.70	.70	.75
(4)	1.50	1.50	1.50	1.75	1.10	3.00	1.50	5.50
(5)	4.00	3.15	5.00	2.80	3.00	3.50	4.00	5.50
(6)	15.00	19.00	20.00	20.00	20.00	20.00	20.00	20.00
(7)	.015	.02	.03	.02	.02	.02	.02	.01
(8)	.30	.25	.40	.50	.50	.35	.40	.28
(9)	.90	.64	1.50	1.00	.60	.50	1.00	.67
(10)	1.70	3.20	1.50	1.25	2.00	1.50	1.50	2.10
(11)	10.00	12.70	7.00	10.00	5.00	10.00	15.00	7.00
(12)	6.00	6.35	5.00	5.00	5.00	5.00	5.00	5.50
(13)	50.00	62.00	55.00	48.00	50.00	65.00	75.00	55.00
(14)	.12	.11	.11	.11	.13	.12	.12	.12
(15)	12.00	15.00	15.00	12.00	13.00	12.00	15.00	16.50
(16)	2.00	1.90	2.00	2.00	2.00	2.00	1.50	2.80
(17)	3.00	2.70	2.50	2.30	3.00	3.50	3.00	2.50
(18)	5.00	5.00	5.00	4.50	5.40	5.00	5.50	4.50
(19)	5.50	6.40	6.50	5.50	6.50	6.00	7.00	5.50
(20)	9.00	9.50	9.00	8.50	9.50	9.00	11.00	8.00
(21)	21.50	19.00	16.00	17.00	18.60	17.00	21.60	15.00
(22)	28.00	26.50	21.00	22.00	22.00	25.00	28.25	21.00
(23)	$14,000	$11,400	$11,500	$11,250	$10,800	$12,000	$11,311	$10,000
(24)	1.00	1.90	1.00	2.50	1.00	1.50	1.50	1.40

Sewerage . . .

California—Los Angeles County—City—Drier and Storage Sys.

Guy F. Atkinson Co., Long Beach, submitted the low bid to the City Board of Public Works, Los Angeles, on Alternate I at $6,298,523 and Alternate II at $6,295,518 for the construction of reinforced concrete Class A filtration and drier building, 333 by 160 ft. in area and 60 ft. high, also a fertilizer storage building 133 by 146 ft. in area, County Hyperion Activated Sludge Plant, El Segundo. 450 days are allowed for completion. No bids were received on Schedules III and IV. Unit bids follow:

	Alternate I	Alternate II
(1) Guy F. Atkinson Co.	$6,298,523	$6,295,518
(2) W. E. Kier Construction Co., Trepte Construction Co., and M. H. Golden Construction Co.	7,024,109	7,020,916
(3) James I. Barnes Construction Co.	7,309,023	7,293,477
(4) Engineer's estimate	5,716,566	5,712,431

	(1)	(2)	(3)	(4)
36,000 cu. yd. excavation	1.50	2.00	4.00	2.70
4,400 cu. yd. earth fill	1.50	1.00	5.00	5.00
1,330 cu. yd. cement and sand fill	10.00	5.00	7.00	8.00
5,426 cu. yd. earth backfill	1.25	1.00	3.00	1.00
65 cu. yd. integrally colored lightweight concrete	100.00	81.00	90.00	55.00
65 cu. yd. plain lightweight concrete	95.00	79.00	82.00	50.00
635 cu. yd. plain lightweight concrete	100.00	100.00	95.00	50.00
2,987 cu. yd. integrally colored Class "F" concrete	80.00	100.00	77.00	70.00
2,987 cu. yd. plain Class "F" concrete	77.00	97.00	69.00	65.00
9,028 cu. yd. plain Class "F" concrete	65.00	82.00	75.00	65.00
8,464 sq. yd. integral monolithic slab finish	1.25	1.50	1.20	1.10
3,186 sq. yd. applied cement topping	5.00	6.50	5.00	3.35
853 sq. yd. non-slip abrasives applied to finish surfaces	.45	.50	.50	.50
260 sq. yd. acid-proof floor finish	4.00	5.00	4.00	2.00
1,275,080 lbs. steel reinforcement, including steel mesh	.12	.13	.13	.10
12 cu. yd. cast stone	350.00	250.00	250.00	85.00
40 cu. ft. brickwork	2.50	10.00	3.00	1.35
2,112 cu. ft. brickwork, acid-proof	10.00	10.00	10.00	6.50
1,320,000 lb. structural steel	.12	.15	.13	.30
Lump sum, metal stairs, railings and walkways	$72,000	$100,000	$143,400	$87,650
Lump sum, miscel. metal work	$71,000	$75,000	$41,600	$22,800
Lump sum, extension of power and light service	$2,500	$1,500	$2,100	$3,500
Lump sum, ornamental metal work	$10,600	$30,000	$10,400	$2,800
Lump sum, metal windows and screens	$68,800	$75,000	$52,600	$33,430
Lump sum, hollow metal work	$20,000	$25,000	$20,900	$23,620
580 squares roofing	35.00	50.00	30.00	25.00

(Continued on next page)

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CONCRETE *Cost conclusions*

HERE'S SOMETHING we're going to tell you over and over again: "In poured concrete construction, form costs represent 60% of total costs. Atlas Speed Forms will reduce cost of forms 50% . . . cost of form labor 50% . . . form erection and stripping time 50%." (*In the average job.*)

HOW MANY carpenters do you use to set up the forms for an average house foundation? A contractor friend of ours who uses Atlas Speed Forms (naturally) says a carpenter and one helper set up and strip *a foundation a day!* Two men do it, which is darn good going. And another told us:

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I don't think we need add anything to that. You should understand that the Atlas Speed Form is scientifically designed and engineered with your—and every other builder's—practical requirements specifically taken care of. You can get a form layout from us, instruction, and supervision . . . if you need them. Why the way the thing works out, pouring concrete with Atlas Speed Forms becomes almost a mechanical routine . . . erect, pour, strip . . . erect, pour, strip.

If you have work for a truck, you don't use a wheelbarrow. If you are building more than 10 homes, or a comparable operation, you need Atlas Speed Forms.

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Lump sum sheet metal work, except that required for ventilating and conveyor systems	$14,500	$1,200	$14,400	$10,500
Lump sum, carpentry work	$3,000	$5,000	$10,000	$2,500
33,448 lb. metal studs, furring and channels, not classified as structural steel	.38	.45	.40	.30
200 sq. yd. Portland cement plaster applied to conc. surfaces	2.25	2.75	2.50	2.25
70 sq. yd. metal lath and Portland cement plaster	3.00	3.50	4.00	4.00
274 sq. yd. Keene's cement plaster applied to conc. surfaces	2.25	3.00	2.50	3.00
3,300 sq. yd. metal lath and Keene's cement plaster	3.00	3.25	4.50	4.25
67 sq. yd. plaster backing applied to conc. surfaces to receive tile work	2.00	2.00	2.50	2.25
102 sq. yd. metal lath and plaster backing to receive tile wk.	2.50	2.75	3.00	3.00
117 sq. yd. acid-resisting plaster applied to conc. surfaces	2.50	5.00	5.00	3.25
1,423 sq. ft. acoustic tile	.80	1.00	1.00	.60
3,257 sq. yd. sprayed acoustic insulation	4.25	4.00	4.30	5.00
624 sq. ft. ceramic tile	2.00	2.50	2.00	3.50
20 sq. yd. vitreous floor tile	2.00	2.25	2.00	2.00
9 sq. ft. vitreous floor tile for shower stalls	2.00	2.25	2.00	2.10
7,800 sq. ft. ceramic veneer wall tile	3.50	3.50	4.00	4.25
3,370 sq. ft. quarry floor tile	1.80	2.25	2.00	1.50
Lump sum, modeled terra cotta relief panel	$1,350	$1,500	$1,500	500.00
Lump sum, marble work	450.00	500.00	500.00	400.00
Lump sum, lead pans in showers stalls	125.00	200.00	200.00	100.00
200 sq. yd. terrazzo floor	10.00	12.00	10.00	16.00
115 sq. yd. asphalt tile floor	2.80	.50	4.00	5.00
134 sq. ft. 3/16-inch Type "A" clear glass	1.00	.75	.75	1.00
235 sq. ft. ¼-in. clear plate glass	2.00	1.50	1.60	2.00
254 sq. ft. ¼-in. clear wire plate glass	2.50	2.25	2.30	4.50
14,642 sq. ft. ¼-in. plain obscure glass	1.20	1.70	1.00	1.00
120 sq. ft. ¼-in. obscure wire glass	1.50	2.00	1.35	1.25
400 sq. ft. ¼-in. heat absorbing plate glass	2.00	2.00	1.75	3.00
47 sq. ft. ¼-in. plate glass mirrors	5.00	3.00	6.00	6.00
76,778 sq. ft. cement paint applied to exterior concrete surf.	.035	.03	.05	.07
8,623 sq. ft. aluminum paint applied to exterior metal surf.	.05	.05	.055	.08
289,087 sq. ft. aluminum paint applied to interior metal surfaces	.05	.05	.055	.08
3,800 sq. ft. aluminum paint applied to wood surfaces	.05	.05	.055	.08
71,884 sq. ft. oil paint applied to int. conc. surf. of ext. walls	.05	.05	.07	.08
183,917 sq. ft. oil paint appl. to int. conc. surf. other than those covered under Item 60	.05	.05	.07	.08
370 sq. ft. acid-resisting paint appl. to int. conc. surf.	.10	.12	.11	.15
7,536 sq. ft. enamel paint appl. to Keene's cem. plaster surf.	.06	.07	.07	.09
28,273 sq. ft. oil paint applied to plaster surfaces	.045	.06	.06	.10
600 sq. ft. oil paint applied to int. wood surf.	.05	.06	.06	.08
30,200 sq. ft. bitum. paint applied to metal surf.	.07	.07	.08	.11
Lump sum, acid-resisting paint appl. to peg board in laboratory	35.00	40.00	30.00	25.00
Lump sum, installing finish hardware supplied by City	$3,500	700.00	$2,500	$1,230
Lump sum, furn. and install finish hdw. not supplied by City	393.00	75.00	500.00	100.00
Lump sum, metal toilet partitions	$1,200	$1,500	$1,100	$1,200
Lump sum, metal lockers	$1,500	$2,000	$1,500	$2,500
Lump sum, metal cabinets	$4,800	$4,500	$5,400	$3,000
Lump sum, rolling metal doors	$7,500	$7,500	$7,500	$7,500
Lump sum, plumbing and piping system shown on drawing H-321 to H-327 inclusive	$25,000	$22,000	$40,000	$42,500
Lump sum, plumbing and piping systems not incl. in item No. 74	$465,000	$390,000	$432,000	$208,500
Lump sum, elect. work, except that specified as part of other work	$360,000	$315,000	$345,000	$352,462
Lump sum, vacuum cleaning system	$15,000	$13,000	$28,000	$6,580
Lump sum, scales and weighing devices, except truck scales and sacking and weighing machine	$20,000	$14,000	$16,000	$9,075
Lump sum, excess sludge flushing system	$1,600	$1,500	$7,000	750.00
Lump sum, electrode wells and related equipment	$3,000	$1,000	$6,000	300.00
Lump sum, gauges described in Sec. 14, Part IV	900.00	$1,400	$4,000	$1,306
Lump sum, backflow protective devices	$1,500	$1,300	$3,500	920.00
Lump sum, sacking and weighing machine	$6,500	$5,500	$6,600	$1,500
2 each horizontal sump pump unit	$2,500	$1,800	$3,000	$1,356
2 each vertical sump pump unit	$1,500	$1,500	$6,000	$1,255
2 each ferric chloride storage pump unit	$1,500	800.00	$3,000	$2,000
2 each constant head ferric chloride pump unit	$1,500	$1,800	$3,500	$2,000
2 each water seal pumping unit	750.00	$1,100	$1,000	710.00
2 each agitator pump unit	800.00	850.00	$1,500	632.00
Lump sum, air compressors	$1,500	$1,400	$4,000	$1,660
Lump sum, heating and ventilating systems	$75,000	$66,000	$70,000	$61,600
Lump sum, Raymond driers and related equipment	$2,365,000	$3,120,000	$2,977,770	$1,750,000
Lump sum, dried equipment alternate to Raymond driers	.....	.....	.....	$1,750,000
Lump sum, vacuum filters and related equipment	$495,000	$460,000	$654,000	$765,775
Lump sum, jib crane	$1,800	850.00	$1,800	$2,500
Lump sum, bridge cranes	$58,000	$33,600	$46,000	$70,000
Lump sum, monorail and trolley system	$1,200	$1,200	$1,100	$1,200
Lump sum, window washing equipment	$25,000	$17,500	$21,000	$10,000
Lump sum, elevator system	$17,500	$14,700	$17,800	$23,000
Lump sum, conveyor systems	$430,000	$290,000	$347,000	$396,165
Lump sum, pneumatic cylinders	$3,000	$4,200	$14,000	$3,800
4 each sludge conditioning tank unit	$18,000	$15,125	$24,000	$7,365
2 each ferric chloride mixing tank equipment	$1,250	$1,500	$3,000	$3,872
Lump sum, ferric chloride constant head tank unit	$2,000	$1,800	$4,000	$1,350
4 each fuel oil storage tank unit	$5,000	$4,250	$7,000	$25,520
Lump sum, instruments and controls	$22,500	$22,700	$40,000	$17,300
Lump sum, truck scale	$16,000	$7,000	$24,000	$10,000
60 days duration of services of representative of manuf. of sludge dry'g and incin. equip. for train'g of oprs. only	45.00	45.00	50.00	60.00
60 days duration of serv. of repr. of manuf. of vacuum filters and related equip. for train'g of oprs. only	45.00	45.00	50.00	60.00

ALTERNATE I—Total bid for Items 1 to 5, both inclusive, 7, 8, 10 to 55, both inclusive, 57, 58, 59, 61 to 92, both inclusive, 94 to 109, both inclusive.

ALTERNATE II—Total bid for Items 1 to 4, both inclusive, 6, 7, 9 to 92, both inclusive, 94 to 109, both inclusive.

ALTERNATE III—Total bid for Items 1 to 5, both inclusive, 7, 8, 10 to 55, both inclusive, 57, 58, 59, 61 to 91, both inclusive, 93 to 109, both inclusive.

ALTERNATE IV—Total bid for Items 1 to 4, both inclusive, 6, 7, 9 to 91, both inclusive, 93 to 109, both inclusive.

Irrigation . . .

California—Alameda County—Bur. of Recl.—Discharge Pipes

Stolte, Inc., Oakland; The Duncanson-Harrelson Co., San Francisco; United Concrete Corp., Baldwin Park and Ralph A. Bell, Monrovia, were low before the Bureau of Reclamation at Denver, Colo., at $2,552,302 (Schedule No. 1, Steel and Precast Concrete Pipe), and $2,696,900 (Schedule No. 2, Steel and Steel-lined Monolithic Concrete Pipe). The contractors are to furnish labor and materials for construction of steel and concrete discharge pipes for the Tracy Pumping Plant, Central Valley Project. The work is located approximately nine miles northwest of Tracy. Time allowed for completion is 500 calendar days. The following unit bids were submitted:

(Continued on next page)

New All-Welded Studding Cuts Construction Costs $16,000

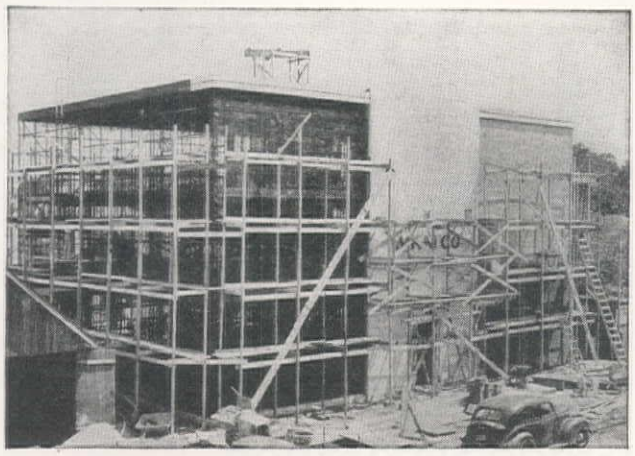


Fig. 1. The new WKM Valve Co. three-story office building. The Matthews Construction Co. and the Brown Construction Co., contractors.

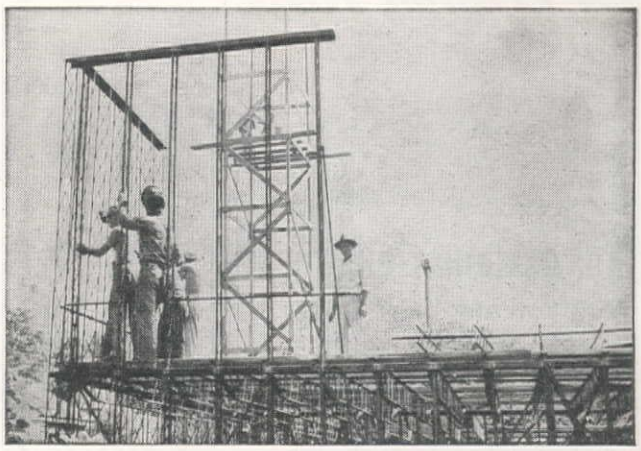


Fig. 3. Second floor panel section being held in place for tack welding.

By Richard P. Matthews
The Matthews Construction Co.
Houston, Texas

A REDUCTION in the construction time of a three-story office building from an estimated seven weeks to three weeks has been accomplished through a new development using prefabricated sectional panels of steel studding. With conventional methods of construction, this building framework would have cost $2.65 per square foot. With our prefabricated method the cost was $1.07 per square foot, which meant an overall saving to the builder of approximately $16,000. Erected without the use of scaffolding, the new arc welded three-story office building of the WKM Valve Co. at Houston, Texas, is fireproof, shrinkproof and free from warpage (Fig. 1).

The office building when completed will be windowless and will be finished with a stucco exterior and a plaster and veneer interior. The panel-type construction has an additional advantage to the builder because of the ease in which plumbing, wiring and insulation can be installed.

The on-the-ground method developed by our company for prefabricating the sectional panels makes use of light weight, lattice web, single piece Bethlehem stretched I beam studs of $\frac{1}{8}$" minimum steel thickness, having a $1\frac{1}{4}$" flange, and cut to specified length. The studs, when braced, support a safe load of 6700 pounds.

Two assembly jigs, welded from pipe and angle iron, hold the ten-foot panel assemblies and are made to swing to allow downhand welding for the welder's convenience (Fig. 2). In building up the studding panel, the channel girth is held in place with "C" clamps and the vertical studding welded first to the channel girth. The cross bracing is then welded into place and the panel removed from the jig ready for assembly onto the building framework.

The sectional panels for the first floor have a girth welded both top and bottom. The second and third floor panels have a panel girth at the top only and also have additional angle braces to keep the panel unit in square for later assembly to the building framework.

The prefabricated panels can be carried easily by four men who also hold the panels in place while the panels are being tack welded into their position on the building framework. (See Fig. 3). Although no scaffolding is needed in the assembly of the building framework, a jig pole is used to hoist the panel sections into place on the third floor level. The total erection time on the building framework is 21 days including all set-up preparation and using Lincoln 200 and 300 ampere "Shield-Arc" Welders with "Fleetweld 5" and "Fleetweld 7" electrodes.

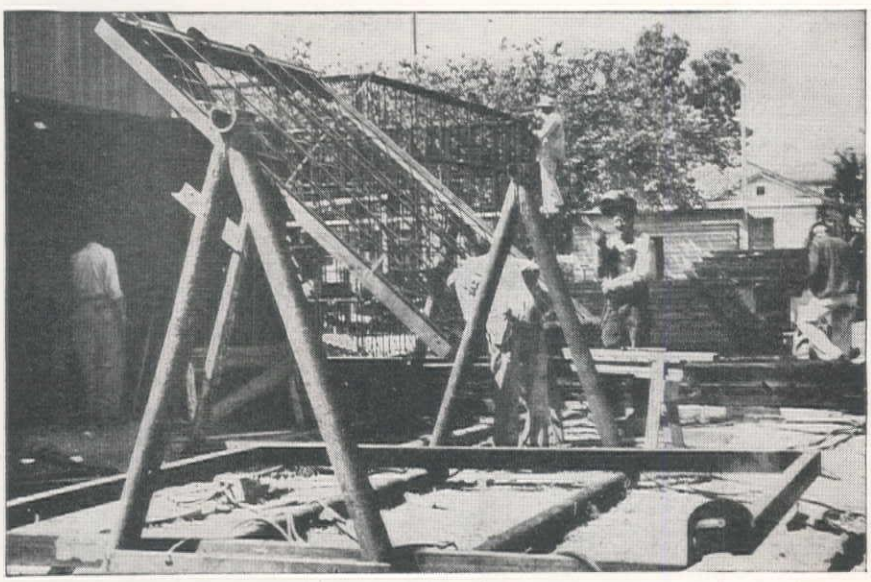


Fig. 2. On-the-ground prefabrication of ten-foot panel sections.

The above is published by LINCOLN ELECTRIC in the interests of progress. Studies in Structural Arc Welding available to architects and engineers. Write The Lincoln Electric Company, Dept. 143, Cleveland 1, Ohio. **Advertisement**

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"KING" COMBINATION NIPPLE

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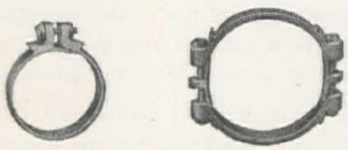
Fits straight end hose of same I.P.T. size; easier to attach because of smoothly rounded spiralled end; holds tighter under clamp pressure because zig-zag corrugations provide two-way gripping surface. Sizes ½" to 10".



"KING" SHANK COUPLING

For Suction and Water Hose

A reliable coupling that is absolutely uniform in quality, threading and dimensions. Quickly connected and disconnected. Made in all malleable iron; malleable iron with brass nut; or all brass. Shanks have deep, clean corrugations. Sizes 1¼" to 8".



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Single Bolt Double Bolt

Strong, convenient, economical. Made of malleable iron, cadmium plated. Easily attached and can be used over and over again. Tightening provides evenly distributed all-'round pressure on hose. Double bolt has exclusive quadruple take-up. All sizes.

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		Schedule No. 1	Schedule No. 2
(1)	Stolte, Inc., Duncanson-Harrelson Co., United Concrete Corp. & Ralph A. Bell	$2,552,302	$2,696,900
(2)	American Pipe & Construction Co.	2,765,952	.....
(3)	Morrison-Knudsen Co., Inc. and M. H. Hasler	.....	2,953,770

SCHEDULE NO. 1		(1)	(2)	(3)
Lump sum, furn. and inst. three (3) sets of steel discharge pipe sections with all accessories, including manholes and covers, stiffener, struct.-steel supports, and test plates		$350,000	$350,000	.....
2,900	cu. yd. trim. pipe trench	4.00	5.00	.....
8,700	lin. ft. Sand base	1.00	5.00	.....
9,200	cu. yd. conc. bedding	10.00	10.00	.....
274	lin. ft. precast-conc. pipe, symbol P 220	275.00	278.60	.....
288	lin. ft. precast-conc. pipe, symbol P 190	250.00	265.40	.....
144	lin. ft. precast-conc. pipe, symbol P 180	230.00	252.50	.....
1,320	lin. ft. precast-conc. pipe, symbol P 170	227.00	258.60	.....
216	lin. ft. precast-conc. pipe, symbol P 170A	250.00	250.30	.....
1,260	lin. ft. precast-conc. pipe, symbol P 160	223.00	248.80	.....
1,728	lin. ft. precast-conc. pipe, symbol P 150	222.00	247.10	.....
1,728	lin. ft. precast-conc. pipe, symbol P 140	220.00	245.00	.....
1,296	lin. ft. precast-conc. pipe, symbol P 130	218.00	243.40	.....
384	lin. ft. precast-conc. pipe, symbol P 120	212.00	241.20	.....
6	manholes, furn. and constr. manholes	$1,000	600.00	.....
35,300	bbl. furn. and handle cement	4.00	3.00	.....

SCHEDULE No. 2				
Lump sum, furn. and inst. three (3) sets of steel discharge pipe sections with all accessories, including manholes and covers, stiffener, struct.-steel supports, and test plates		$350,000	.....	$450,000
7,500	cu. yd. trim pipe trench	6.00	.....	7.50
3,200,000	lb. fab. and inst. plate-steel liner	.26	.....	.30
6,100,000	lb. furn. and pl. reinf. in pipe and manholes	.10	.....	.093
33,000	lb. furn. and inst. misc. metalwork	.60	.....	.34
21,200	cu. yd. conc. in pipes and manholes	32.50	.....	35.00
30	joint, furn. and inst. contraction joints	770.00	.....	$1,300
32,000	bbl. furn. and handle cement	4.00	.....	4.00

Bridge and Grade Separation . . .

California—Los Angeles County—State—Undercrossings

Spencer Webb Company, Inglewood, was awarded the contract by the Division of Highways in Sacramento for the construction of two undercrossings and one overcrossing on Hollywood Parkway at Virgil Ave., Hoover St. and Rosemont Ave., respectively, in Los Angeles. The amount of the award is $594,498. The following unit bids were submitted:

(A)	Spencer Webb Co.	$594,498
(B)	Haddock Co.	597,774
(C)	Carlo Bongiovanni	604,444
(D)	Winston Bros. Co.	625,574
(E)	Byerts & Dunn	625,846
(F)	Oberg Bros.	656,057
(G)	W. J. Disteli & R. J. Daum	$658,020
(H)	Guy F. Atkinson Co.	658,875
(I)	Peter Kiewit Sons Co.	676,830
(J)	Griffith Co.	693,039
(K)	Mittry Bros. Construction Co.	722,542

(1) 1,130 cu. yd. remov. conc.
(2) 21 sta. clearing and grubbing
(3) 120,500 cu. yd. rdwy., excav.
(4) 4,200 cu. yd. struc. excav. (type "I")
(5) 3,500 cu. yd. struc. excav. (type "II"
(6) 5,000 cu. yd. struc. backfill
(7) 300 cu. yd. imported borrow
(8) Lump sum, dev. wat. sup. & furn. wat. equip.
(9) 2,500 M. gal. applying water
(10) 170 tons asphalt conc.
(11) 25 cu. yd. Class "B" P.C.C. (appr. slabs)
(12) 6,202 cu. yd. Class "A" P.C.C. (structs.)
(13) 8 cu. yd. Class "C" P.C.C. (pipe reinf.)
(14) 252 lin. ft. rubber waterstops
(15) 6,360 lin. ft. furn. conc. piling
(16) 235 ea. driving conc. piles
(17) 6,050 lin. ft. furn. steel piling
(18) 249 ea. driving steel piles
(19) 25 ea. steel pile splices
(20) 220 sq. yd. membrane waterproofing
(21) 62 cu. yd. Class "A" P.C.C. (curbs, gutters and sidewalks)
(22) 20 lin. ft. 18-in. R.C.P. (std. str.)
(23) 90 lin. ft. 39-in. R.C.P. (3000 D)
(24) 60 lin. ft. 42-in. R.C.P. (1600 D)
(25) 160 lin. ft. 42-in. R.C.P. (3000 D)
(26) 35 lin. ft. 6-in. vit. clay pipe (std. str.)
(27) 230 lin. ft. 8-in. vit. clay pipe (std. str.)
(28) 70 lin. ft. 8-in. vit. clay pipe (extra str.)
(29) 1,239,000 lbs. furn. bar reinf. steel
(30) 1,239,000 lbs. plac. bar reinf. steel
(31) 320 lin. ft. 8-in. cast iron pipe, Class 150
(32) 45 lin. ft. manholes "B"
(33) 54 lin. ft. drop manholes "S"
(34) 2,100 lin. ft. chain link fence
(35) 2 ea. walk gates
(36) 8,100 lbs. miscl. iron and steel
(37) 1,844 lin. ft. steel railing
(38) Lump sum, elec. equip.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	4.00	2.90	3.40	6.00	3.00	4.00	4.00	4.00	3.85	7.00	6.50
(2)	150.00	100.00	200.00	100.00	125.00	200.00	400.00	200.00	340.00	90.00	500.00
(3)	.80	.62	.74	.70	.85	.70	.75	.90	.85	1.05	.80
(4)	1.50	2.10	1.50	2.50	2.00	2.50	1.30	1.50	1.10	1.30	3.00
(5)	2.50	3.30	.10	2.50	2.00	2.50	4.00	2.25	2.75	3.30	5.50
(6)	2.00	2.50	2.00	1.50	1.75	3.00	2.55	1.75	2.25	1.80	2.50
(7)	2.50	4.00	2.00	3.00	3.00	3.00	2.00	3.50	3.55	4.60	6.00
(8)	$2,500	$1,350	$2,500	$1,000	$2,000	$1,000	$1,100	$2,000	$2,000	$1,000	$2,500
(9)	2.00	2.20	.35	2.00	1.60	2.00	1.40	2.50	1.55	2.00	3.00
(10)	6.00	7.00	6.00	8.00	6.00	7.00	6.50	12.00	8.00	7.00	8.00
(11)	12.00	15.00	20.00	15.00	20.00	30.00	27.00	30.00	18.50	30.00	25.00
(12)	43.00	48.50	48.85	48.00	45.00	54.00	51.50	50.00	53.00	51.00	57.00
(13)	12.00	13.80	30.00	15.00	20.00	20.00	25.00	25.00	23.50	30.00	40.00
(14)	2.50	2.90	2.50	2.00	3.00	3.00	3.00	2.50	2.50	2.60	3.00
(15)	1.90	1.90	2.05	2.10	2.00	2.00	2.10	2.75	2.50	2.30	3.00
(16)	30.00	33.50	35.50	40.00	35.00	35.00	37.00	35.00	30.00	41.00	40.00
(17)	2.00	2.10	2.07	2.30	2.25	2.10	2.05	2.00	2.00	2.50	2.00
(18)	25.00	28.00	25.00	32.00	35.00	30.00	30.00	25.00	25.00	30.00	40.00
(19)	25.00	35.00	20.00	40.00	25.00	20.00	35.00	10.00	25.00	25.00	25.00
(20)	2.00	2.60	2.50	3.00	7.00	3.00	3.00	3.00	3.00	2.20	3.50
(21)	30.00	30.00	35.00	23.00	35.00	50.00	40.00	35.00	48.00	38.00	35.00
(22)	4.00	4.25	4.00	6.00	5.00	5.00	6.50	5.00	5.65	4.00	4.50
(23)	12.00	11.25	13.00	15.00	15.00	12.00	17.75	12.00	12.50	13.00	14.00
(24)	11.00	10.35	12.22	12.00	13.00	11.00	17.75	12.00	12.15	12.00	13.50
(25)	13.00	12.50	14.00	15.00	18.00	13.00	18.75	14.00	14.50	14.00	15.50
(26)	1.50	1.40	3.00	1.20	5.00	2.00	2.50	2.00	1.70	4.00	4.00
(27)	2.00	1.75	1.50	1.50	5.00	2.00	3.50	2.50	1.75	2.00	5.00
(28)	2.10	1.80	11.00	2.50	5.50	2.50	4.00	3.00	3.75	2.00	5.50
(29)	.065	.0525	.06	.06	.06	.06	.06	.06	.07	.07	.05
(30)	.02	.0225	.017	.03	.03	.02	.025	.03	.02	.02	.03
(31)	15.00	4.70	11.60	3.50	12.00	16.00	8.00	4.00	4.80	7.00	5.20
(32)	15.00	21.00	30.00	30.00	30.00	30.00	40.00	30.00	28.80	20.00	30.00
(33)	20.00	28.75	50.00	35.00	45.00	35.00	45.00	30.00	31.25	20.00	35.00
(34)	1.80	1.50	1.65	1.40	1.35	1.50	2.10	1.25	1.40	1.80	1.50
(35)	30.00	57.50	60.00	60.00	50.00	50.00	60.00	60.00	75.00	30.00	60.00
(36)	.35	.31	.30	.27	.30	.30	.30	.30	.32	.32	.50
(37)	7.00	7.85	7.10	7.40	7.00	7.00	7.00	7.00	7.75	8.00	7.00
(38)	$12,000	$9,150	$10,185	$11,000	$13,000	$8,000	$10,300	$9,802	$12,583	$12,500	$10,900

What is BARRETT'S PROTECTION SYSTEM?



Corrosion-proof pipelines can only be obtained through the adoption of a Protection System which will be effective on lines subject to all types of soil and climatic conditions.

Barrett's Protection System consists of priming and coating with Barrett* coal-tar enamel, and wrapping to resist soil stresses—all of which permits economy in the use of cathodic protection.

Pipelines efficiently protected with Barrett* coal-tar enamels do not require a robot, or any especially designed equipment, to vary automatically the amount of electrical current required with the change in moisture content of soils to make cathodic protection function efficiently.

The stability of electrical resistance of Barrett* coal-tar enamels saves money and reduces the cost of installing cathodic protection equipment. Barrett* coal-tar enamels have demonstrated their effectiveness through years of service in all types of soils and climatic conditions. Applied by modern methods in the field or mill, and electrically inspected, they are your assurance of sound economy.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

*Reg. U. S. Pat. Off.

Barrett*

FIELD SERVICE: The Barrett Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett* Enamel.

FP 2-26-48 V-J

P.O. 1038 Ad. 217

CONSTRUCTION SUMMARY

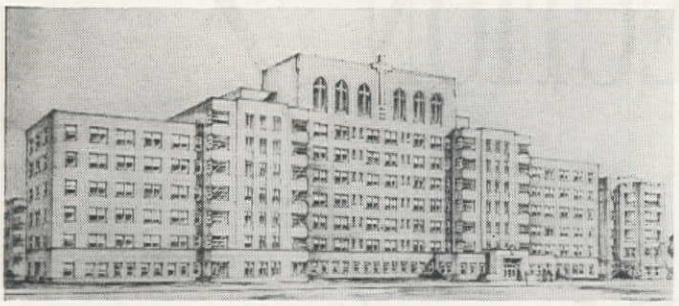
The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $75,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information:

County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information may be secured concerning employment conditions, wage rates, etc., by writing directly to the contractor. When available, the names of the supervisory personnel will be published in the "Supervising the Jobs" columns.

CONTRACTS AWARDED

Large Western Projects . . .

J. C. Boespflug Construction Co., Seattle, Wash., has the general contract for the construction of the $2,000,000 hospital at Missoula, Mont. The 200-bed hospital is being constructed for the Sisters of Charity of Providence. The new building will cover a



large city block facing on W. Broadway and is to be called St. Patrick's Hospital. Work is expected to be completed in the spring of 1949. Award of a contract for installation of seven elevators and other equipment has been made to the **Otis Elevator Co.**, San Francisco, Calif.

Swinerton & Walberg Co. of San Francisco, Calif., was awarded a contract by Hunt Foods, Inc. of Los Angeles, for the construction of a 274,000-sq. ft. warehouse at Hayward, Calif. This is part of Hunt's $2,750,000 expansion program scheduled for the first half of 1948. Completion is planned for July. The new building will occupy 9.5 acres near B and Winton Sts., adjoining on the north and east the present Hunt plant.

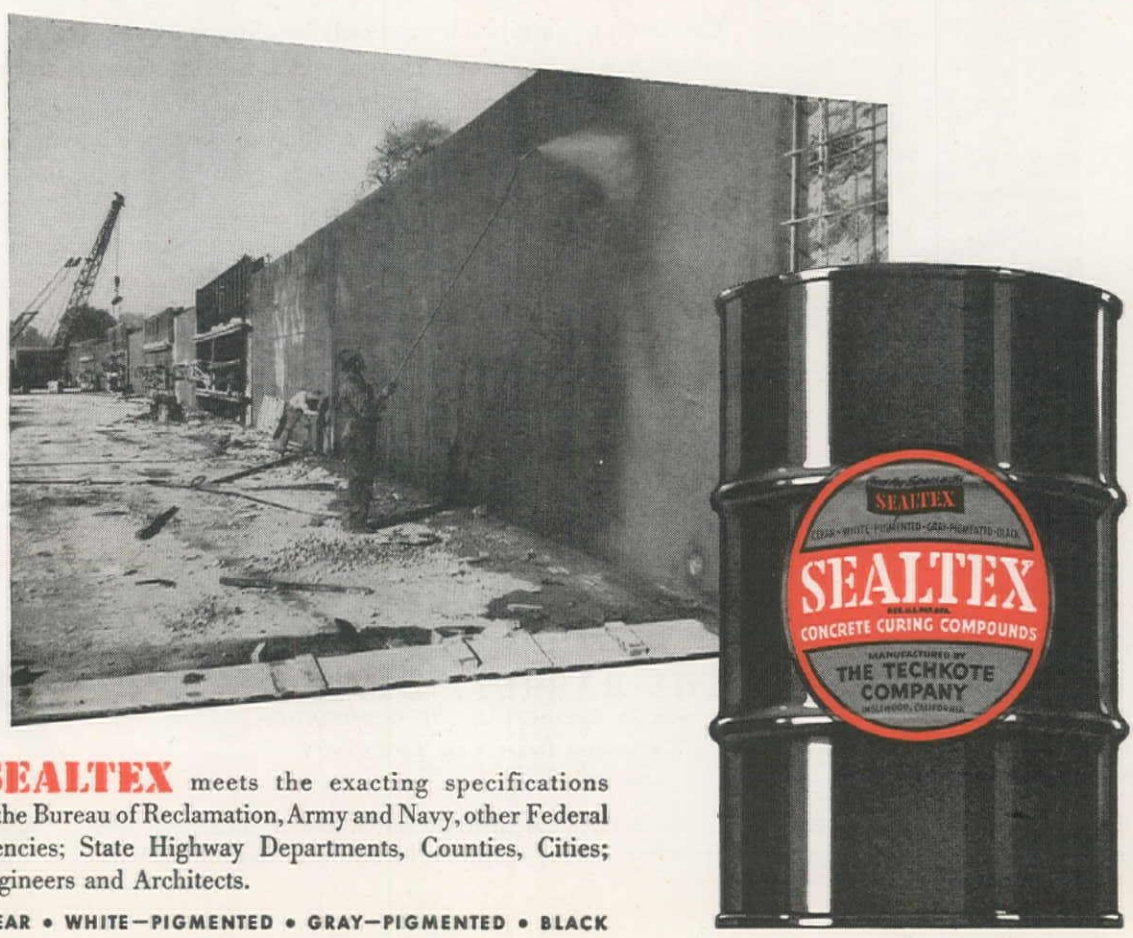
N. P. Van Valkenburgh of South Gate, Calif., has been awarded a $511,057 contract by the Bureau of Reclamation at Denver, Colo., for the construction of a supplemental water supply line for Boulder City, Clark County, Nev. The work is located about 30 mi. southeast of Las Vegas and is part of the Arizona-California-Nevada Boulder Canyon Project. 270 days are allowed for completion.

W. C. Smith, Inc., Portland, Ore., was awarded the $1,049,442 general contract for the construction of a dormitory to house 333 women at the University of Oregon, Eugene, Ore. Work is to get under way shortly and the general construction is expected to take more than a year to complete.

Erbentraut & Summers, 696 Pennsylvania St., San Francisco, Calif., awarded $2,270,000 general contract by the Board of Regents of the University of California at Berkeley, for the construction of a concrete Veterinary Science Building at the university campus in Davis, Calif. **R. M. Carpenter**, Sacramento, Calif., received a contract in the amount of $679,430 for heating, ventilating, air conditioning and plumbing. **Collins Electric Co.** of Oakland and **Manuel Joseph**, Sacramento, were awarded $239,847 contract for the electrical work on the new building.

Stolte, Inc., Oakland, Calif., awarded a contract by the Bureau of Reclamation at Denver, Colo., in the sum of $2,552,302 to install steel and precast concrete discharge pipes for the Tracy Pumping Plant, about 9 mi. northwest of Tracy in Alameda County, Calif. 500 days are allowed for completion.

SEALTEX curing concreted Flood Control Project
CORPS OF ENGINEERS



SEALTEX meets the exacting specifications of the Bureau of Reclamation, Army and Navy, other Federal agencies; State Highway Departments, Counties, Cities; Engineers and Architects.

CLEAR • WHITE—PIGMENTED • GRAY—PIGMENTED • BLACK

J. A. Terteling & Sons, Inc., Boise, Idaho, have been awarded a $2,500,000 contract by the Bureau of Reclamation at Boise for the construction of a powerhouse and the spillway at Anderson Ranch Dam on the south fork of the Boise River in Elmore County, Idaho. This construction will complete the dam and open the way for storage of 700,000 acre feet of water to supplement the existing supply for Boise valley.

Elmer J. Freethy of El Cerrito, Calif., was awarded a $1,560,000 contract by the City Council, Richmond, Calif., for the construction of a new City Hall bldg. and a Hall of Justice bldg. in Richmond. The buildings will be three-stories and basement of reinforced concrete construction with brick facing exterior.

Bethlehem Pacific Coast Steel Corp., San Francisco, Calif., was awarded the contract at $8,263,903 on Schedule I, for the construction of the Tacoma Narrows bridge structure by the Department of Highways at Olympia, Wash. **John A. Roebling's Sons Co.**, San Francisco, received the award on Schedule II for the cable work with the bid of $2,932,681. The bridge is to be a 4-lane suspension type having a 2,800-ft. central span and two 1,110-ft. side spans, and is to State Hwy. No. 14. The existing piers, anchorages and approaches are to be modified or reconstructed while the superstructure will be completely new. 830 days are allowed for completion. (Unit Bid in December 1947 issue of *Western Construction News.*)

Walsh Construction Co., San Francisco, Calif., awarded a contract by the Pacific Gas & Electric Company of San Francisco, for the construction of about 6,000 lin. ft. of main tunnel, surge tank and penstock tunnel at Rock Creek Power House, approximately 38 mi. northeast of Oroville in Butte County, Calif.

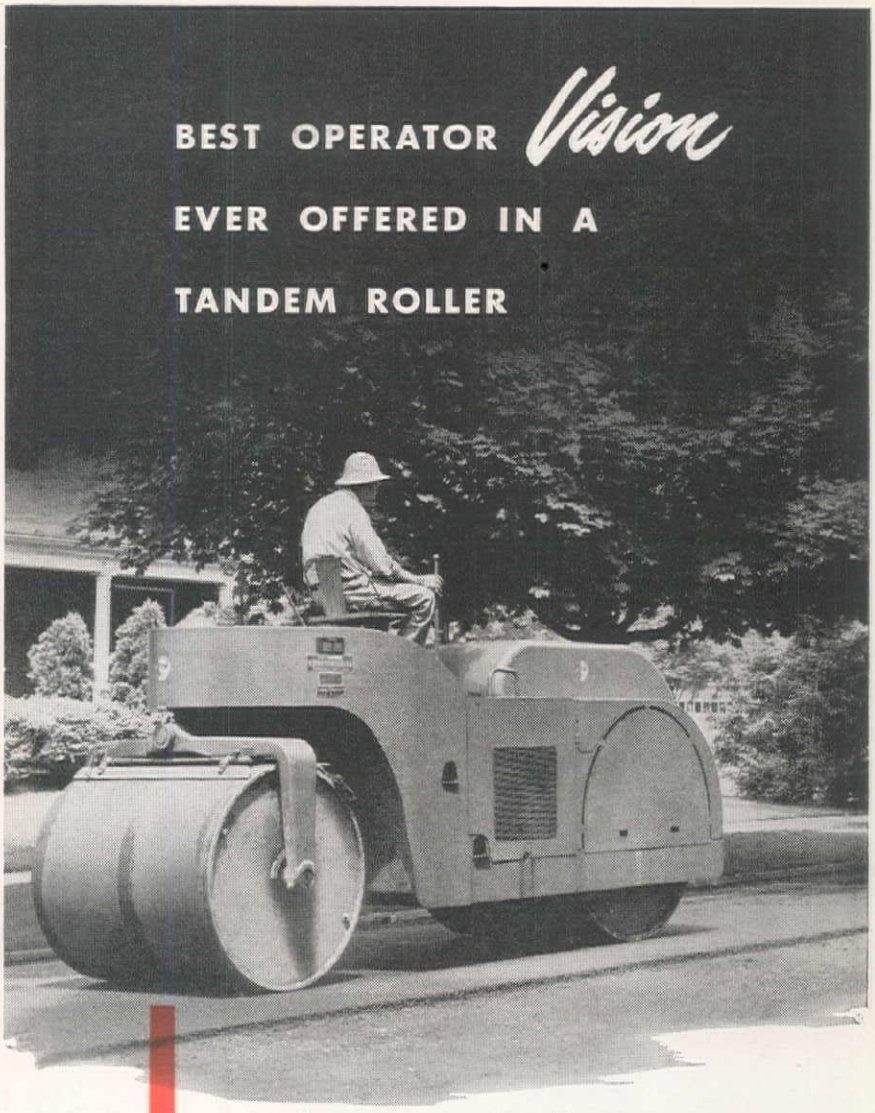
Mittry Bros. Construction Co. of Los Angeles, Calif., was awarded a contract by the District Corps of Engineers at Tulsa, Oklahoma, at $5,174,600 for construction of cofferdam, excavation, embankment topsoil, stone protection, concrete spillway, sluice and tainter gates, water treatment facilities, etc. at Hulah Dam, Caney River, Osage County, Oklahoma. Time for completion 900 days.

Morrison-Knudsen Co., Inc., San Francisco,Calif., will construct a diversion dam and an intake structure for the Pacific Gas & Electric Co. of San Francisco for the Cresta Power Plant located on the north fork of the Feather River about 40 mi. north of Oroville, Butte County, Calif. At the same time, Morrison-Knudsen is constructing a diversion dam, intake structure and 4000 ft. of tunnel for the company's Rock Creek Power Plant, located about 11 mi. upstream from the Cresta dam site.

The **Del E. Webb Construction Co.** of Phoenix, Ariz., is starting construction of 350 homes as the first unit of a contemplated 3,000 dwelling development with its own shopping center, schools, parks, community center and churches. The entire project ultimately will cost $20,000,000. The site is a 1,000-acre undeveloped desert tract between the southeast edge of Tucson and the Davis-Monthan Army Air Base, Arizona. After the site has been cleared, survey crews will start locating curviliner roads and building sites. A deep-well water system is to be developed, and paving and construction of sewer and water systems will coincide with the home construction.

Henry George & Sons, Spokane, Wash., received the general construction contract from the Board of Directors of the Washington State College at Pullman, with the bid of $2,160,185 for the four-story brick

BEST OPERATOR *Vision* EVER OFFERED IN A TANDEM ROLLER



A roller operator must be able to see where he is working at all times without difficulty. That's why the new Buffalo-Springfield tandem rollers, with the sides of their drive roll hoods relieved and their final drive placed on the side opposite the operator, present the most complete vision ever offered in tandem rollers.

THE STANDARD OF COMPARISON

BUFFALO SPRINGFIELD

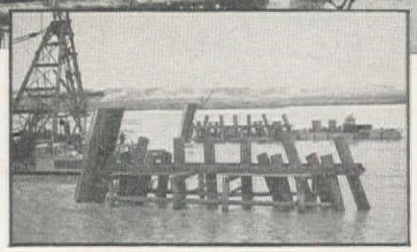
SPRINGFIELD, OHIO

CLYDE EQUIPMENT CO. ..... Seattle, Washington
CONSTRUCTION EQUIPMENT CO. ..... Spokane, Washington
RAY CORSON MACHINERY CO. ..... Denver 2, Colorado
CRAMER MACHINERY CO. ..... Portland, Oregon
CROOK COMPANY ..... Los Angeles, California
INTERMOUNTAIN EQUIPMENT CO. ..... Boise, Idaho
INTERMOUNTAIN EQUIPMENT CO. ..... Pocatello, Idaho
THE SIERRA MACHINERY CO. ..... Reno, Nevada
STEFFECK EQUIPMENT CO. ..... Helena, Montana
WORTHAM MACHINERY CO. ..... Cheyenne, Wyoming
(Branches at Sheridan & Greybull)
SPEARS-WELLS MACHINERY CO., INC. ..... Oakland 7, California
R. L. HARRISON CO., INC. ..... Albuquerque, New Mexico
O. S. STAPLEY COMPANY ..... Phoenix, Arizona
J. K. WHEELER MACHINERY CO. ..... Salt Lake City, Utah

PRECISION DRIVING
OF BIG STEEL PILES



McKiernan-Terry Single-Acting Pile Hammer, operated from ingeniously contrived floating rig, used in constructing the new Garrison Dam bridge. *Missouri Valley Constructors, Inc.* and *Winston Brothers Co., joint contractors.*



One of the eight piers that support the Garrison Dam bridge, showing complicated positioning of batter piles.

IN SELECTING EQUIPMENT for building the 1350-foot rail and highway bridge across the Missouri River at Garrison Dam, North Dakota, the contractors made the wise choice of a No. S-10 McKiernan-Terry Single-Acting Pile Hammer

This difficult job involved driving 24-inch tubular steel piles, 100 feet long, into the glacial till of the river bed at six different angles, to insure stability against scour, ice and floods. In each of the six deeper water piers three downstream piles were driven to the unusual bearing load of 180 tons. All other piles were driven to 150 tons bearing.

The successful handling of this complex pile-driving job is added evidence of the dependability of McKiernan-Terry hammers . . . however complex or difficult the job, contractors always find the correct hammer to handle it in the McKiernan-Terry standardized line of five SINGLE-ACTING hammers, ten DOUBLE-ACTING hammers and two DOUBLE-ACTING extractors. For full information, write for free Bulletins No. 55 and No. 57.

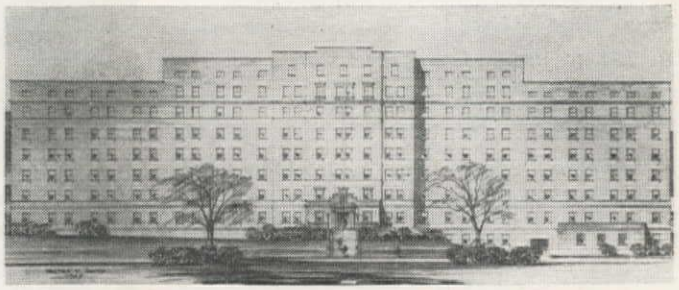


McKiernan-Terry
CORPORATION
Manufacturing Engineers
16 PARK ROW NEW YORK 7, N. Y.

and limestone structure which will have space for 1,200,000 volumes and study room for 2,200 students. The library is to be known as the Ernest O. Holland Library and will be located on the college grounds at Pullman, Wash. Contract for Mechanical construction went to **Detweiler & Detweiler,** Twin Falls, Idaho, at $388,207; electrical work to **Electric Lighthouse Co.,** Pullman, at $73,354.

Nettleton-Baldwin-Anderson, Inc., Seattle and **Sound Construction & Engineering Co.,** Seattle, Wash., were awarded a $9,500,000 contract by the U. S. Atomic Energy Commission, Hanford, Wash., for the construction of 1000 dwellings at Richland, Benton County, Wash.

Del E. Webb Construction Co., Los Angeles, Calif., was awarded a $2,562,952 contract by the Veterans Administration at Wash-



ington, D. C., for the construction of a 150-bed, 7-story, reinf. conc. addition to the Veterans Administration tuberculosis hospital in Portland, Ore.

Christiansen Bros., Salt Lake City, Utah, has a negotiated contract from the Board of Trustees of Brigham Young University at Provo, Utah, for the construction of the new Physical Science Building to be erected on the campus of the University. Cost is estimated to be about $1,500,000.

Westinghouse Electric Corp., East Pittsburgh, Pa., has been awarded $6,466,740 in contracts by the Bureau of Reclamation at Denver, Colo., for three big generators and nine transformers



since the boss installed
SILVER STEERING BOOSTERS

O'Riley wasn't ever one to shy away from work but—"What's the sense of doing things the hard way," he reasoned.

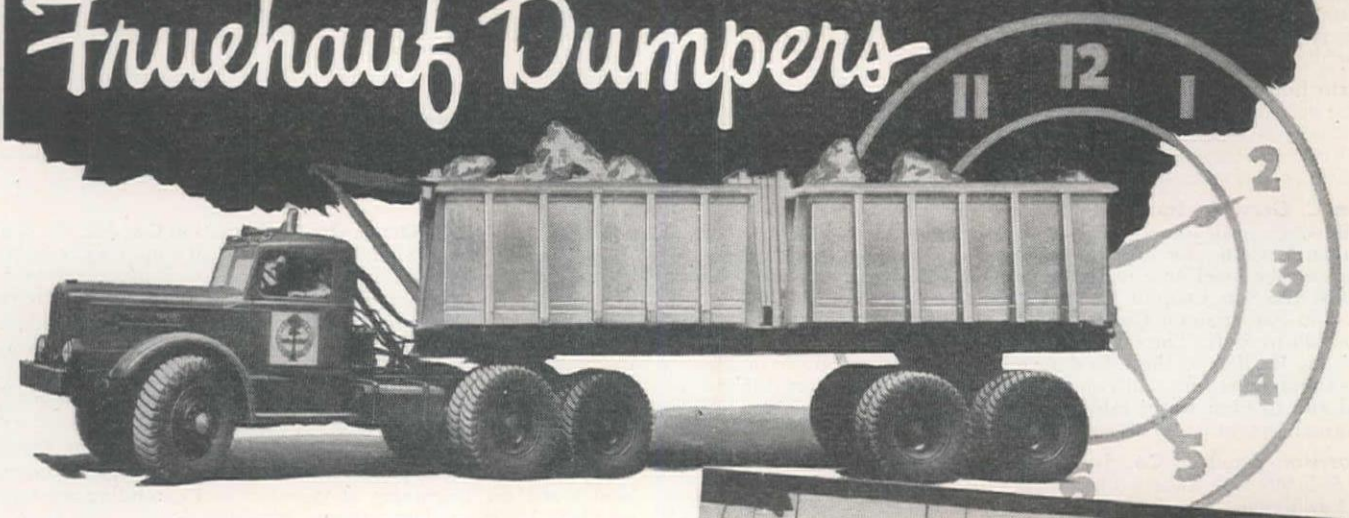
He asked the Boss if he still remembered ***his*** cat skinning days and steering lever struggles. He explained how Silver Steering Boosters permit ONE-FINGER OPERATION OF STEERING LEVERS and showed that the opening of clutches full travel every time would cut maintenance costs to a minimum, too.

The Boss appreciated O'Riley's progressiveness ..... as you can see!

- 30-minute installation
- very inexpensive
- immediate delivery!
- Write for complete literature.

SILVER BOOSTER Mfg. Co.
1406 S. Grand Ave., Los Angeles 15, Calif.

ROCK 'ROUND THE CLOCK by Fruehauf Dumpers





TRAILERS KEEP PLANT GOING FOR CALAVERAS CEMENT CO.

'ROUND AND 'ROUND they go, a 10-mile trip every 40 to 50 minutes hauling 35-45 tons of rock from quarry to mill. It's a 24-hour day for seven Fruehauf side dump Trailers owned and operated by the Calaveras Cement Co. at its San Andreas, California, plant.

The continuous quarry haul is not the only service for which Calaveras depends on Fruehauf Trailers. *In addition,* it delivers bulk cement by hopper dump units and sacked cement by platform units. The quarry Trailers operate off-highway, the others on-highway north into Oregon, east into Nevada and south to Bakersfield. Here is a completely rounded Trailer hauling operation —raw material from quarry to mill and finished product from mill to consumer—both by Fruehaufs and both at a substantial saving in costs.

Calaveras Cement Co., along with other cement companies throughout the West, have found it pays to standardize on Fruehauf equipment. Their records show the advantages in bigger tonnage moved with more trouble-free miles and at lower maintenance cost. Fruehauf Factory Branch Service facilities, with good stocks of Trailer parts always available, likewise mean much to keep equipment working and earning.

Fruehauf builds all types of Trailers for use in the construction industry. Dumpers, Flat-Beds, Tilt-Decks, Low-Beds, Carryalls—in capacities as desired.

Call your nearest Branch for descriptive details.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant, Los Angeles

Sales and Service: LOS ANGELES • SAN FRANCISCO • SACRAMENTO • PORTLAND • SEATTLE • EL PASO
PHOENIX • SAN DIEGO • FRESNO • SPOKANE • BILLINGS • SALT LAKE CITY • DENVER



"ENGINEERED TRANSPORTATION" Fruehauf Trailers

at the Grand Coulee Dam, Wash. The generators R-4, R-5 and R-6 will have a rating of 108,000 kilowatts each and are scheduled for operation in the East power house in April, July and October, 1950. Contract price for the generators is $5,410,931 and for the nine transformers to serve them the price is $1,055,809.

Standard Dredging Co., Los Angeles, Calif., awarded a $907,535 contract by the Corps of Engineers, Los Angeles, for the dredging of the Los Angeles and Long Beach Harbors in Los Angeles County, Calif.

Carlo Bongiovanni, Los Angeles, Calif., received a $999,999 contract award from the Division of Highways at Sacramento, Calif., for the construction of four reinforced concrete undercrossings and two reinforced concrete separation structures on Hollywood Parkway at Figueroa St., Los Angeles, Calif.

Ben C. Gerwick, Inc., San Francisco, Calif., has been awarded a $764,615 contract by the East Bay Municipal Utility District, Oakland, Calif., for driving 4,780 reinforced concrete piles to support the steel pipe of the second Mokelumne Aqueduct line across the San Joaquin River delta between Indian Slough and Holt in San Joaquin County, Calif. The depths of the piles vary from 20 to 55 ft. The contract includes the driving of test piles and the loading of these to determine the bearing power of the piles under varying soil conditions. Owing to the nature of the soil and to high water tables, the second aqueduct line like the original one, must be carried above ground.

Morrison-Knudsen Co., Inc., Los Angeles, Calif., with its bid of $825,999 was awarded a contract by the County Commission of Las Vegas, Nevada, for the construction of runways, taxiways, parking aprons, road drainage and miscellaneous work at the Clark County Airport located about 6 mi. south of Las Vegas. Completion time 100 days.

Walsh Construction Co., Davenport, Iowa, awarded contract by Geneva Steel Company, Geneva, Utah, for the conversion of a plate mill to hot rolled coil mill at Geneva, Utah County. Included in the work is foundation work for plate mill extension, electrical work and installing machinery. Cost is estimated to amount to $3,000,000.

Award of a contract for $1,076,450 to the **Dinwiddie Construction Company, Inc.**, San Francisco, Calif., by the Board of Education, Berkeley, Calif. is the first step toward the completion of the Berkeley High School auditorium. The work will enclose the present steel frame, constructed before Pearl Harbor, and will convert the old auditorium into a little theater. Completion date is 300 days.

Morrison-Knudsen Co., Inc. and **Olson Manufacturing Co.**, both Boise, Idaho, firms were awarded a $600,000 contract by the Utah Power & Light Company, Provo, Utah, for the removal of the old flume known as the Olmsted Flowline and the replacing of it with 8½-ft. diameter steel pipe. The work is to be completed in 90 days.

Highway and Street...

Arizona

GREENLEE CO.—**Orr & Orr Construction Co.**, 302 W. Monte Vista Rd., Phoenix—$112,848 for approx. 0.6 mi. hwy. constr. of Clifton-Morenci Hwy., beginning approx. 7 mi. northwest of Clifton extending westerly toward Morenci—by State Highway Department, Phoenix. 3-5

MARICOPA CO.—**Tanner Construction Co.**, 713 N. 19th Ave., Phoenix, and **Chas. U. Heuser**, 816 Allen Ave., Glendale—$126,979 for improvement of certain sts. in northwest portion of Glendale—by City Council, Glendale. 3-19

NAVAJO CO.—**Phoenix-Tempe Stone Co.**, Box 1670, Phoenix—$424,918 for 8.8 mi. grade, drain, and bitum. surf. of Flagstaff-Winslow Hwy. beginning at Winslow and extending westerly—by State Highway Department, Phoenix. 3-3

YAVAPAI CO.—**Orr & Orr Construction Co.**, 302 W. Monte Vista, Phoenix—$417,471 for constr. of 3.5 mi. sector of new Black Canyon Hwy., beginning approx. 48 mi. north of Phoenix and ending atop Black Mesa—by State Highway Department, Phoenix. 3-3

YUMA CO.—**Tiffany Construction Co.**, Box 846, Phoenix—$132,759 for 4.6 mi. grade and base of San Luis-Yuma Hwy., beginning about one mi. north of Yuma and extending northerly—by State Highway Department, Phoenix. 3-5

California

KERN CO.—**Munn, Perkins, & Mathew Jorgenson**, Rt. 4, Box

PENTAERYTHRITETETRANITRATE

Hard to say—easy to use for MODERN BLASTING

For safety, economy and time saving just say

PRIMACORD—BICKFORD

Detonating Fuse

1. Improves powder efficiency
2. One cap shoots unlimited charges
3. Practically instantaneous
4. Simple to hook-up—simple to check
5. Always safe to handle
6. No caps required in holes

Established Eighty-One Years Ago—1867

COAST MANUFACTURING & SUPPLY COMPANY — MANUFACTURERS OF ALL KINDS —OF— SAFETY FUSE — LIVERMORE CALIFORNIA

Spittercord Safety Fuse

Celakap

Hot Wire Fuse Lighters

Consult your powder company representative or write to us for helpful, descriptive literature.

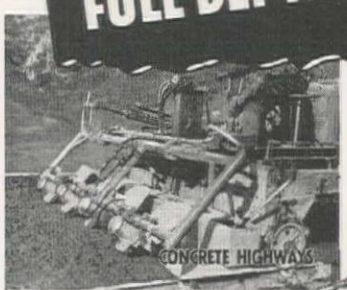
COAST MANUFACTURING & SUPPLY CO.

Livermore, Calif.

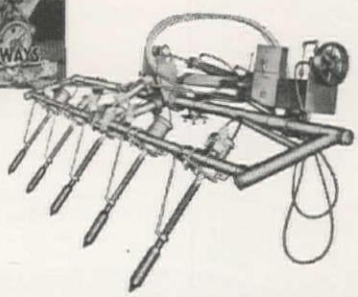
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1930, Modesto—$147,949 for 2 mi. grade, bitum. surface and a steel beam span approx. 2 mi. south of Isabella—by Division of Highways, Sacramento. 3-25

SAN BERNARDINO CO.—**George Herz & Co.,** Box 191, San Bernardino—$774,189 for 7.2 mi. grade, widen and surf., betw. south E St. and State St., Redlands—by Division of Highways, Sacramento. 3-1

SANTA BARBARA CO.—**Madonna Construction Co.,** 581 Higuera St., San Luis Obispo—$237,252 for 5.5 mi. grade, base and surf., and constr. of struct. steel beam span overhead crossing, betw. Black Road and Point Sal Road—by Division of Highways, Sacramento. 3-26

VENTURA CO.—**Jesse A. Smith & A. A. Edmondson,** Grand View Ave. & Glenoaks Blvd., Glendale—$179,056 for 1.3 mi. grade, pave and surf. four-lane, divided hwy. at junction of State Hwy. Rt. No. 2 and Rt. No. 60, near El Rio—by Division of Highways, Sacramento. 3-1

Idaho

ADA CO.—**Tony Marrazzo,** Box 876, Boise—$267,372 for 5.1 mi. of U. S. Hwy. No. 30, betw. Oasis and Regina, to constr. roadbed and oil—by Bureau of Highways, Boise. 3-19

BONNER CO.—**McAtee & Heathe,** Box 2188, Spokane, Wash.—$130,767 to pave a portion of sts. of Sandpoint—by City Council, Sandpoint. 3-18

CANYON CO.—**Canyon Construction Co.,** Caldwell—$79,861 for 9.1 mi. oil of State Hwy. No. 20 from the junction of U. S. Hwy. No. 30 westerly—by Bureau of Highways, Boise. 3-19

CANYON CO.—**Stanley & Ehlen,** Box 1605, Boise—$88,386 for 7.7 mi. oiling of U. S. Hwy. No. 20, betw. Parma and Nyssa—by Bureau of Highways, Boise. 3-19

CLEARWATER CO.—**F. H. DeAtley,** Lewiston—$102,770 for 6.7 mi. surf. of Pierce-Headquarters Rd. and 7.7 mi. surf. of State Hwy. No. 11, Greer Hill Section—by Bureau of Highways, Boise. 3-6

Kansas

GRANT CO.—**San-Ore Construction Co.,** McPherson—$152,432 for approx. 12 mi. subgrade modification and dense graded surf. course—by State Highway Commission, Topeka. 3-1

Montana

DAWSON CO.—**Barry O'Leary,** Billings—$157,238 for 10 mi. grade and surf. of Glendive-Richey hwy.—by State Highway Commission, Helena. 3-1

STILLWATER CO.—**Stanley H. Arkwright, Inc.,** Securities Bldg., Billings—$105,074 for 7 mi. grade and surf. of Columbus-Rapelje rd.—by State Highway Commission, Helena. 3-1

Oklahoma

BECKHAM CO.—**James Brothers Construction Co.,** Shawnee—$168,764 for 15.1 mi. grade, drain, stabilized surf. and five bridges, near Elk City, Erick and through Delhi to U. S. Hwy. No. 283—by State Highway Commission, Oklahoma City. 3-16

VARIOUS COS.—**Broce Construction Co.,** Braniff Bldg., Oklahoma City—$198,118 for 124.3 mi. bitum. surf. in Cimarron, Texas, Beaver, Harper and Ellis Cos.—by State Highway Commission, Oklahoma City. 3-16

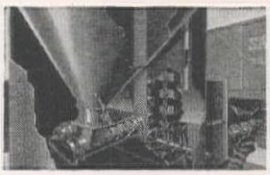
VARIOUS COS.—**Oklahoma Bituminous Co.,** Chickasha—$135,192 for 85.9 mi. bitum.

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surf. in Grady, Caddo, Comanche, Carter and Murray Cos.—by State Highway Commission, Oklahoma City. 3-16

Oregon

CLACKAMAS CO.—**Warren Northwest, Inc.,** Box 5072, Portland—$657,071 for 5.3 mi. major hwy. constr. of portion of Oregon City-New Era section of Pacific Hwy.—by State Highway Commission, Salem. 3-20

DOUGLAS CO.—**C. J. Eldon,** Portland—$355,492 for 7.3 mi. grade, oil and surf. of Yellow Creek-Calipooya Creek section of Elkton-Sutherlin Hwy.—by State Highway Commission, Salem. 3-18

GRANT CO.—**A. H. Saxton & Sons,** Rt. 2, Corvallis—$156,286 for 8.2 mi. of grade, surf., and oil of Monument-Hamilton Section of Kimberly-Long Creek Secondary Hwy.—by State Highway Commission, Salem. 3-12

LAKE CO.—**Inter City Sand & Gravel Co.,** Eugene — $298,255 combination bids: (1) 4.9 mi. grade and 12.7 mi. rock or gravel surf. of Fremont Junction-Mud Creek Section of Warner Secondary Hwy.; (2) 8.4 mi. grade and rock surf. of Mud Creek-Drake Creek Section of Warner Secondary Hwy. — by State Highway Commission, Salem. 3-12

UMATILLA CO.—**Grimstad & Vanderveldt,** Astoria—$118,981 for 1.1 mi. grade and pave of Pendleton (18th St. - 1st St.) Section of Old Oregon Trail—by State Highway Commission, Salem. 3-12

UMATILLA CO.—**T. W. Thomas,** Portland—$185,051 for 9.2 mi. grade, surf. and oil, Campbell Ranch-Gerking School Section of Athena-Holdman Secondary Hwy.—by State Highway Commission, Salem. 3-11

WALLOWA CO. — **E. H. Itchner Co.,** Molalla—$164,679 for 9.4 mi. surf. and oil of Washington State Line-Flora Junction Section of Enterprise-Lewiston Hwy.—by State Highway Commission, Salem. 3-11

Washington

KING CO.—**Northwest Construction Co.,** 3950 6th Ave. N.W., Seattle—$198,755 to pave 38th Ave. W., Seattle—by City Board of Public Works, Seattle. 3-1

KING CO.—**Northwest Construction Co.,** 3950 6th Ave. N.W., Seattle—$185,489 to pave 34th Ave. W., Seattle—by City Council, Seattle. 3-12

OKANOGAN CO.—**Sather & Sons,** Box 197, Spokane—$216,038 for 7.5 mi. grade, drain, surf. and constr. bridges over Antoin and Siwash creeks, Primary State Hwy. No. 10, Tonasket to Oroville—by Department of Highways, Olympia. 3-1

PACIFIC CO. — **Pacific Sand & Gravel Co.,** Box 628, Centralia—$157,452 for 4.5 mi. clear, grub, grade, surf. and asph. conc. pave. of Primary State Hwy. No. 13, Grays Harbor Co. Line to Smith Creek—by Department of Highways, Olympia. 3-12

PEND OREILLE CO. — **H. Halvorson Construction Co.,** Salem, Ore. — $104,836 for 5.5 mi. clear, grade, drain and surf. of Deer Valley rd.—by Department of Highways, Olympia. 3-1

Bridge & Grade . . .

Arizona

COCONINO CO. — **Fisher Contracting Co.,** Box 4035, Phoenix—$362,705 for steel girder bridge and overpass struct. and appro. on Ashfork-Flagstaff Hwy., approx. five mi. west of Flagstaff—by State Highway Department, Phoenix. 3-5

California

DEL NORTE CO.—**Underground Construction Co.,** 75th Ave. and San Leandro Blvd., Oakland— $75,950 for struct. steel arch bridge and appro., across south fork of Smith River about 12 mi. northeast of Crescent City—by Division of Highways, Sacramento. 3-26

LAKE CO.—**Harold Smith,** Box 232, St. Helena—$66,935 for reinf. conc. bridge and approaches approx. 6 mi. north of Middletown at Coyote Creek — by Division of Highways, Sacramento. 3-12

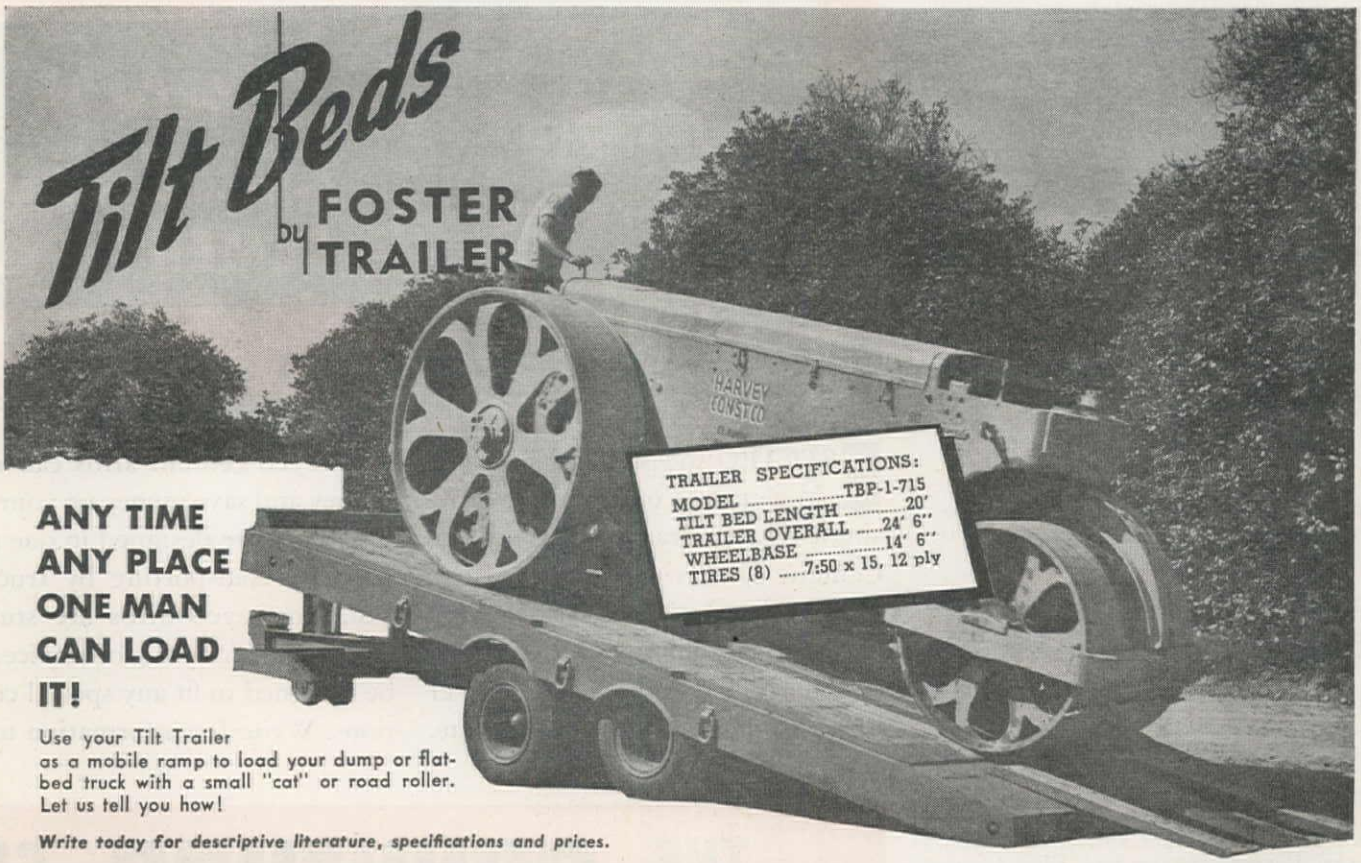
LOS ANGELES CO.—**Carlo Bongiovanni,** 2561 Canyon Dr., Los Angeles—$999,999 for constr. of four reinf. conc. undercrossings and two reinf. conc. separation structs. on Hollywood Parkway at Figueroa St., Los Angeles—by Division of Highways, Sacramento. 3-5

LOS ANGELES CO. — **Byerts & Dunn,** 1131 N. Orange Grove Ave., Los Angeles —$104,401 for reinf. conc. bridge on Slauson Ave. over La Cienega Blvd., near Inglewood—by County Commission, Los Angeles. 3-5

LOS ANGELES CO.—**Oberg Bros.,** Box 640, Inglewood—$140,019 for reinf. conc. hollow girder bridge, wing walls and appro. of Tujunga Ave. bridge, over Los Angeles River—by County Commission, Los Angeles. 3-5

Idaho

BANNOCK CO.—**Henry L. Horn,** 216 E. Logan St., Caldwell—$130,918 for overhead



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pass on McCammon-Lava Hot Springs Hwy.—by Bureau of Highways, Boise. 3-1

Montana

BIG HORN CO.—**Peter Kiewit Sons' Co.,** Box 875, Sheridan, Wyo.—$360,561 for two steel and conc. bridges, and grade and surf., Wyola section of Crow agency-Wyoming border rd.—by State Highway Commission, Helena. 3-1

Oregon

KLAMATH CO. — **Rogers Construction Co.,** Rt. 15, Box 231, Portland—$361,108 for 1.8 mi. grade bitum. macadam surf., and constr. of two reinf. conc. bridges, Klamath Falls (1st Ave.-Esplanade St.) Section of Klamath Falls-Malin Hwy.—by State Highway Commission, Salem. 3-12

LANE CO.—**R. & M. Construction Co.,** Central Point—$72,110 for 372 lin. ft. reinf. conc. viaduct, Pleasant Hill Overcrossing on Willamette Hwy.—by State Highway Commission, Salem. 3-12

MULTNOMAH CO.—**Port Construction Co.,** Box 11, Port Angeles, Wash.—$108,-924 for steel and conc. bridge over Clackamas river, southeast of Portland, to be called Whitewater Bridge — by Public Roads Administration, Portland. 3-18

Washington

PIERCE CO.—**American Pile Driving Co.,** Everett—$53,671 for steel girder span with conc. deck over Mashel River on Primary State Hwy. No. 5—by Department of Highways, Olympia. 3-1

PIERCE CO.—**Bethlehem Pacific Coast Steel Corp.,** 20th & Illinois Sts., San Francisco, Calif.—$8,263,903 for modifications and reconstr. of existing piers, anchorages, appro. and new superstruct., 4-lane suspension type on Primary State Hwy. No. 14, over Puget Sound, Tacoma—by Department of Highways, Olympia. 3-23

PIERCE CO.—**John A. Roebling's Sons Co.,** 1740 17th St., San Francisco, Calif.—$2,932,681 for cable work on suspension type Tacoma Narrows bridge, Tacoma, on Primary State Hwy. No. 14 over Puget Sound — by Department of Highways, Olympia. 3-23

Airport . . .

Nevada

CLARK CO. — **Morrison-Knudsen Co., Inc.,** Title Guarantee Bldg., Los Angeles, Calif. — $825,999 for runways, taxiways, parking aprons, roadways, etc. at Clark County Public Airport, Las Vegas — by County Commission, Las Vegas. 3-5

Water Supply . . .

California

LOS ANGELES CO.—**United Concrete Pipe Corp.,** Box 425, Baldwin Park—$1,-396,654 for river supply conduit extension, Los Angeles—by County Commission, Los Angeles. 3-19

SAN JOAQUIN CO.—**Ben C. Gerwick, Inc.,** 112 Market St., San Francisco—$764,-615 for 10.5 mi. driving of piles to support steel pipe of second Mokelumne Aqueduct line across San Joaquin River delta betw. Indian slough and Holt—by East Bay Municipal Utility District, Oakland. 3-25

VENTURA CO.—**Green-Mears Construction Co.,** 936½ N. Mariposa Ave., Los Angeles—$83,706 to replace portion of existing raw water pipe line, Ventura — by City Council, Ventura. 3-16

Colorado

DENVER CO.—**Elder Construction Co.,** Denver—$139,110 for 5,500,000-gal. reservoir at Moffat filter plant 3.5 mi. west of Sheridan Blvd., Denver—by City Council, Denver. 3-2

Montana

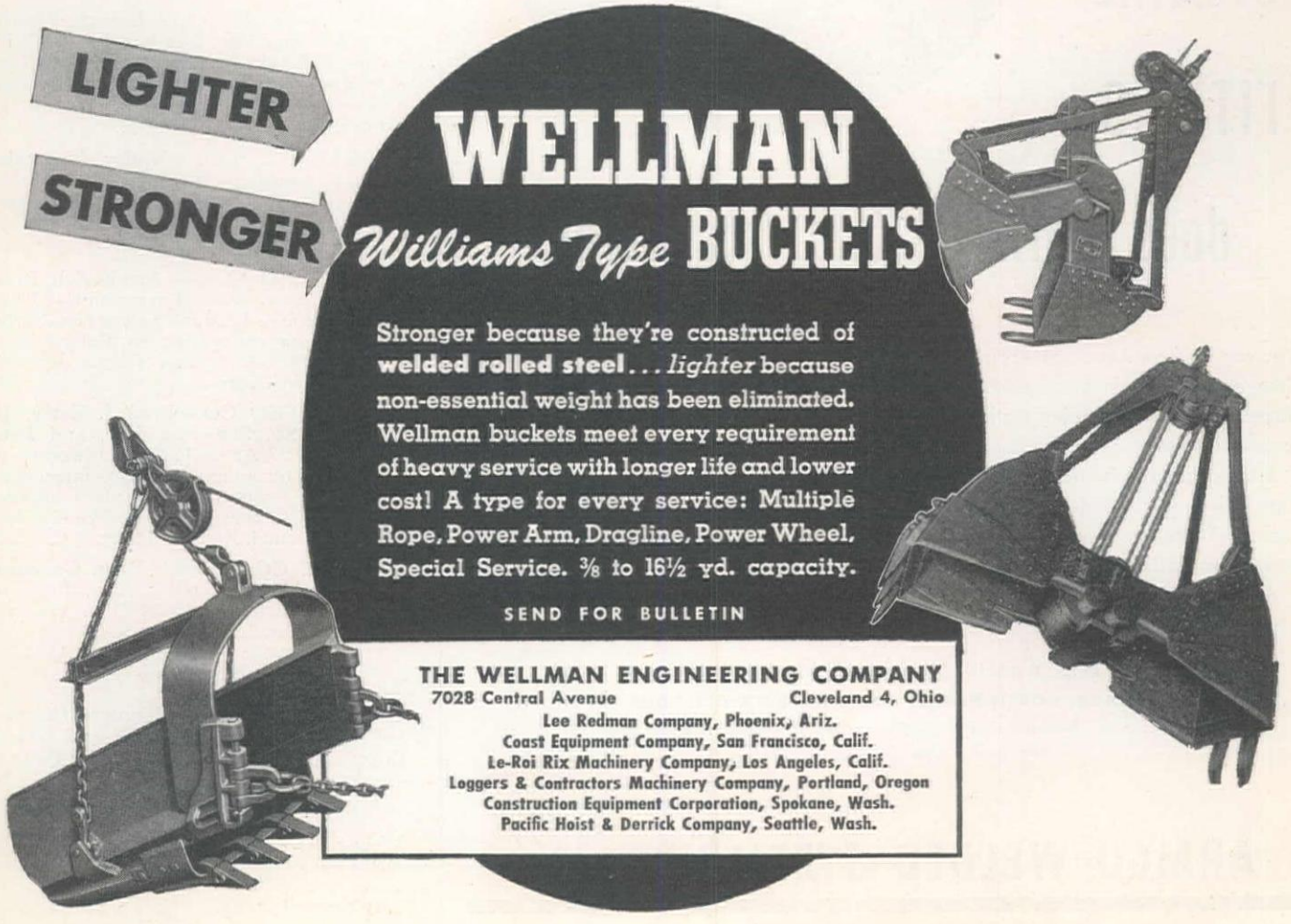
TREASURE CO.—**D. M. Manning,** Hysham—$240,890 for constr. of pumping plant at Hysham. This project is expected to provide irrigation for 76,000 acres—by State Water Board, Helena. 3-13

Nevada

CLARK CO.—**N. P. Van Valkenburgh,** 8609 San Vincente St., South Gate, Calif.—$511,057 for supplemental water supply line for Boulder City—by Bureau of Reclamation, Denver, Colo. 3-12

Utah

SALT LAKE CO.—**Neils Fugal,** Pleasant Grove—$354,000 for complete C.I. water distribution system, well collection system, conc. cistern, pump house and 300,000-gal. elevated steel tank for South Salt Lake City—by City Council, Salt Lake City. 3-6



UTAH CO.—**Morrison-Knudsen Co., Inc.,** Box 450, Boise, Idaho and **Olson Manufacturing Co.,** Boise, Idaho—$600,000 to remove old Olmsted Flowline from diversion point on Provo River and install steel pipe to replace flume—by Utah Power & Light Company, Provo. 3-5

WASHINGTON CO. — **Thatcher Construction Co.,** 17th and Jackson, Ogden—$85,140 for 1,000,000-gal. reinf. conc. reservoir and additions to water piping system, St. George—by City Council, St. George. 3-5

Washington

KITSAP CO. — **Stateside Construction Co.,** Seattle—$90,000 for water distribution system at Bremerton—by City Council, Bremerton. 3-2

Sewerage . . .

California

ALAMEDA CO.—**McGuire & Hester,** 796 66th Ave., Oakland—$65,925 for sewers in West Ave., 13th St. betw. Orpheus St. and Washington Ave., San Leandro—by City Council, San Leandro. 3-8

ALAMEDA CO.—**Paris Bros.,** 2415 Oregon St., Berkeley—$148,821 to install pipe conduit in portions of Dover, 59th Sts., Telegraph Ave. and Alcatraz, Oakland—by City Council, Oakland. 3-2

CONTRA COSTA CO. — **MacDonald-Young & Nelson, Inc.,** 351 California St., San Francisco—$559,000 for sewage treatment plant and appurt., near Arnold Industrial Hwy., northeast of Pacheco—by Central Contra Costa Sanitary District, Walnut Creek. 3-8

FRESNO CO.—**P. & J. Artukovich,** 13305 S. San Pedro St., Los Angeles—$184,767 to install vit. clay pipe sewer and appurt. in Sanger—by City Council, Sanger. 3-23

KERN CO.—**Pipe Line Constructors,** Box 97, Bakersfield—$61,534 to furn. and install vit. clay pipe outfall and sewer, within and adjacent to Shafter Public Utility District, Shafter—by City Council, Shafter. 3-15

KERN CO.—**Trewhitt, Shields & Fisher,** 926 Parallel St., Fresno—$128,900 for alterations and additions to existing sewage treatment plant located approx. 2 mi. south of Shafter—by City Public Utility District, Shafter. 3-12

LOS ANGELES CO.—**Bebek & Brkich,** 5025 E. Slauson Ave., Los Angeles—$214,028 for sanitary sewer and appurtenances in Laurel Canyon Blvd., betw. Sherman Way and Chandler Blvd., Los Angeles—by City Board of Public Works, Los Angeles. 3-12

LOS ANGELES SO.—**Bebek & Brkich,** 5025 E. Slauson Ave., Los Angeles—$175,882 to install sanitary sewers in 68th St., Lawndale—by County Commission, Los Angeles. 3-19

LOS ANGELES CO. — **Bob Bosnyak, Inc.,** 3014 Worthen Ave., Los Angeles—$81,731 to install 3.4 mi. of sanitary sewer in Compton Blvd., Los Angeles—by City Board of Supervisors, Los Angeles. 3-19

LOS ANGELES CO. — **Pacific Bridge Co.,** 333 Kearney St., San Francisco—$3-989,000 for digestion units for construction of digestion system of Hyperion Activated Sludge Plant, El Segundo—by City Board of Public Works, Los Angeles. 3-25

LOS ANGELES CO.—**Robert Vlacich,** 2901 Worthen Ave., Los Angeles—$133,554 to install sanitary sewers in Belle Porte Ave. and 260th St. Sewer District, Los Angeles—by City Board of Public Works, Los Angeles. 3-5

MONTEREY CO. — **Valley Trenching Co.,** 215 Broadway, Fresno—$31,299 to install collection sewer system extension, King City—by City Council, King City. 3-31

SAN DIEGO CO. — **Artukovich Bros.,** 7320 Atlantic Ave., Paramount—$94,966 for section No. 1, Trunk Sewer No. 2, from Linda Vista connection to Balboa Ave., approx. 2.4 mi. in San Diego—by City Council, San Diego. 3-19

SAN MATEO CO.—**Fred J. Early, Jr.,** 369 Pine St., San Francisco, and **Peter Sorenson,** 927 Arguello St., Redwood City—$608,640 for pumping plant, interceptor sewer and main treatment plant at Bayshore and Steinberger St., Redwood City—by City Council, Redwood City. 3-29

TULARE CO.—**Kovick Bros. Construction Co.,** 145 W. Sheilds Ave., Fresno—$52,158 to install sewer system, Visalia—by City Council, Visalia. 3-2

Montana

BLAINE CO.—**Elmer Johnson,** Glasgow—$134,592 for sewer system and sewage disposal plant at Harlem—by City Council, Harlem. 3-6

Nevada

WASHOE CO.—**Geo. E. Miller,** Box 1728, Reno—$88,700 for pumping plant on new sewer outfall line southeast of Reno—by City Council, Reno. 3-23



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Oregon

MULTNOMAH CO.—**Geo. W. Lind,** 5000 N.E. Killingsworth Ave., Portland—$387,849 for trunk sewer approx. 5 mi. in length, including 1,700 ft. of conc. tunnel and in addition about 1 mi. of laterals, St. Johns unit of Portland sewer system—by City Council, Portland. 3-6

Washington

CHELAN CO.—**B. E. Knowles Co.,** Wenatchee—$211,222 to install 36-in. and 24-in. interceptor sewers in Peachey and Second Sts., betw. Columbia River and Miller St., Wenatchee—by City Council, Wenatchee. 3-4

SPOKANE CO.—**Charles A. Power,** Box 1220, Spokane—$105,902 for division H outfall section of Spokane intercepting sewer project. First unit of multi-million dollar sewage disposal program at Spokane—by City Council, Spokane. 3-1

WHATCOM CO.—**C. V. Wilder & Clint Dawson,** Bellingham—$616,813 to install sewer lines in Bellingham—by City Council, Bellingham. 3-16

WHITMAN CO. — **Lundberg Construction Co.,** Seattle—$185,320 for reinf. conc. sewage disposal plant at Pullman—by City Council and Washington State College Board, Pullman. 3-18

Waterway . . .

California

LOS ANGELES CO.—**Standard Dredging Co.,** Central Bldg., Los Angeles—$907,535 for dredging of Los Angeles and Long Beach Harbors—by Corps of Engineers, Los Angeles. 3-12

SANTA CRUZ CO.—**Bird Development Co.,** 414 E. Miner Ave., Stockton—$352,939 for clearing, grub., levee constr., drainage work, bank protection of Pajaro River from its mouth to approx. River Mile 12, and on its tributary, Corralitos Creek — by Corps of Engineers, San Francisco. 3-25

Oregon

CLATSOP CO.—**Kaiser Company, Inc.,** Portland—$174,955 to reconstr. jetty A at mouth of Columbia River, approx. 30,480 tons of stone is to be placed in hole smashed through jetty by ocean storms—by Corps of Engineers, Portland. 3-21

LINCOLN CO.—**McKinnon Construction Co.,** Sandy—$229,184 for pile, timber and stone breakwater and shore wing for small boat basin in Yaquina Bay, Newport—by Corps of Engineers, Portland. 3-12

Dam . . .

California

BUTTE CO. — **Morrison-Knudsen Co., Inc.,** 1 Montgomery St., San Francisco—to constr. diversion dam, intake struct. and tunnel, north fork of Feather River, near Elephant Butte Tunnel, approx. 40 mi. north of Oroville—by Pacific Gas & Electric Co., San Francisco. 3-5

Idaho

BOUNDARY CO.—**Bonners Ferry Board of Trustees,** under force labor will constr. power dam on Moyle River, near Bonners Ferry. Estimated cost $300,000. 3-1

ELMORE CO.—**J. A. Terteling & Sons, Inc.,** Box 1428, Boise — $2,500,000 for powerhouse and spillway at Anderson Ranch Dam—by Bureau of Reclamation, Boise. 3-12

Oklahoma

OSAGE CO.—**Mittry Bros. Construction Co.,** 4801 San Fernando Rd. W., Los Angeles—$5,174,600 for spillway and completion of embankment at Hulah Dam, Caney River—by Corps of Engineers, Tulsa. 3-1

Tunnel . . .

California

BUTTE CO. — **Walsh Construction Co.,** 785 Market St., San Francisco—will construct approx. 6,000 lin. ft. of main tunnel, surge tank and penstock tunnel, Rock Creek Power House, 38 mi. northeast of Oroville on Feather River Hwy.—by Pacific Gas & Electric Co., San Francisco. 3-19

Irrigation . . .

California

ALAMEDA CO.—**Stolte, Inc.,** 8451 San Leandro St., Oakland—$2,552,302 to install steel and precast conc. pipe for Tracy Pumping Plant, approx. 9 mi. northwest of Tracy—by Bureau of Reclamation, Denver, Colo. 3-26

Montana

MUSSELSHELL AND ROSEBUD COS. — **McLaughlin, Inc.,** Great Falls —

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$165,638, two contracts for dirt work on Lower Musselshell River irrigation project —by State Board of Examiners, Helena. 3-11

Building . . .

Arizona

MARICOPA CO.—**Del E. Webb Construction Co.,** Box 4066, Phoenix — will build a five-story, steel and conc. annex to hotel at 618 N. Central Ave., Phoenix—by Westward Ho Hotel Co., Phoenix. 3-12

PIMA CO. — **Del E. Webb Construction Co.,** Box 4066, Phoenix—$20,000,000 ultimate cost of 3,000 dwelling units and shopping district, 350 two and three bedroom homes to be constructed as first unit of development on the 1,000 ac. site located between southeast Tucson and Davis-Monthan Army Air Base. 3-12

PIMA CO. — **Womack Construction Co.,** Box 2414, Phoenix—$400,000 for 75 additional houses at Ajo—by Phelps-Dodge Corp., Phoenix.

California

ALAMEDA CO.—**John E. Branagh,** 105 Sheridan Ave., Piedmont — $495,000 for boys' conc. gymnasium bldg., Union High School, Hayward—by Board of Education, Hayward. 3-12

ALAMEDA CO. — **Dinwiddie Construction Co., Inc.,** Crocker Bldg., San Francisco—$1,076,450 for partial completion of high school auditorium, Berkeley — by Board of Education, Berkeley. 3-23

ALAMEDA CO.—**Larsen & Larsen,** 629 Bryant St., San Francisco—$525,000, general work to remodel hospital and constr. 12 new garages, Decoto—by Directors of Masonic Home, Decoto. 3-24

ALAMEDA CO.—**Willis F. Lynn,** 1040 Folger Ave., Berkeley—$500,000 for brick, frame and stucco shopping center betw. 49th and 51st Sts., and Telegraph and Shattuck Aves., Oakland—by F. F. Porter Co., Oakland. 3-5

ALAMEDA CO.—**Willis F. Lynn,** 1040 Folger Ave., Berkeley—$158,450 for one-story shop bldg., San Leandro—by Board of Education, Oakland. 3-25

ALAMEDA CO. — **Stokeley-Van Camp Foods, Inc.,** 5601 E. 14th St., Oakland—$250,000 for one-story, steel and corr. iron warehouse, 1551-61-71 Buena Vista Ave., Alameda—by self. 3-16

ALAMEDA CO.—**Swinerton & Walberg,** 225 Bush St., San Francisco—for 274,000-sq. ft. warehouse at Hayward, as part of a $2,750,000 expansion program—by Hunt Foods, Inc., Los Angeles. 3-5

CONTRA COSTA CO.—**B. & R. Construction Co.,** 110 Market St., San Francisco—$129,777 for three-classroom addition to senior high school and four-classroom addition to junior high school, Pittsburg—by Board of Education, Pittsburg. 3-25

CONTRA COSTA CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$250,000 for conc. and wood bottling and storage bldg., Solari and Central Aves., Pittsburg —by Coca Cola Company of Calif., Pittsburg. 3-23

CONTRA COSTA CO.—**Elmer J. Freethy,** 1432 Kearney St., El Cerrito—$1,560,000 for three-story, reinf. conc. and brick City Hall and Hall of Justice bldgs., Richmond—by City Council, Richmond. 3-17

CONTRA COSTA CO.—**Haas & Rothschild,** Merchants Exchange Bldg., San Francisco—$300,000 for two-story, reinf. conc. office bldg. east of Railroad Ave., betw. Central Ave. and 12th St., Pittsburg —by Pacific Telephone & Telegraph Co., San Francisco. 3-12

CONTRA COSTA CO. — **Swinerton & Walberg,** 225 Bush St., San Francisco—will constr. a steel and conc. main factory bldg. two mi. east of Antioch on San Joaquin River—by Fibreboard Products Co., San Francisco. 3-12

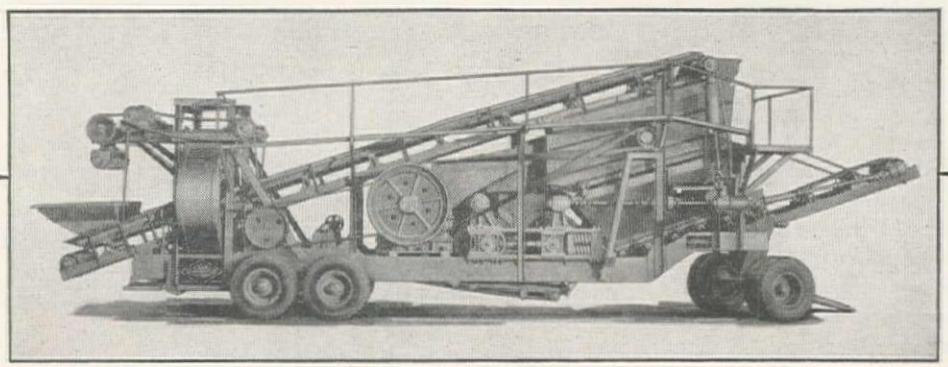
FRESNO CO.—**O. J. Sherer Co.,** Las Vegas, Nev.—$100,000 for truck service station at Hwy. No. 99 and Chestnut St., Fresno—by Richfield Oil Co., San Francisco. 3-2

KERN CO. — **Haddock Engineers, Ltd.,** Box 479, Oceanside—$249,500 for 12-classroom primary school bldg., Naval Ordnance Test Station, Inyokern—by Bureau of Yards & Docks, Washington, D. C. 3-12

KERN CO.—**O. D. Williams, Jr.,** 406 G St., Bakersfield—$202,400 for school bldgs. additions, Fruitvale Elementary School—by Fruitvale Elementary School Dist. 3-22

LOS ANGELES CO.—**Alla Corp.,** 5960 Crenshaw Blvd., Los Angeles—$291,900 for 40 five-room, frame and stucco dwellings on Beethoven St., Lyceum Ave., and Alla Rd., Venice District—by self. 3-5

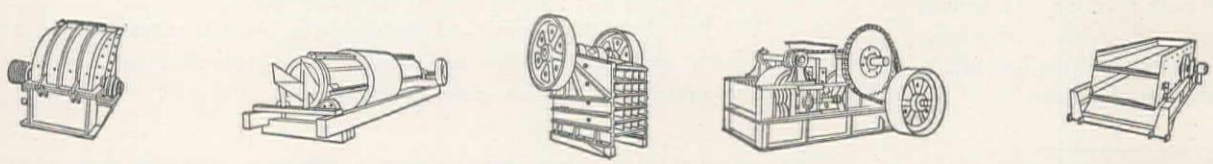
LOS ANGELES CO. — **Bechtel Corp.,** 3780 Wilshire Blvd., Los Angeles—$450,000 for one-story, steel frame and corr. iron



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DIAMOND

DIAMOND IRON WORKS, INC.
AND THE MAHR MANUFACTURING COMPANY DIVISION
MINNEAPOLIS 11, MINNESOTA

factory bldg. on Slauson Ave., East Los Angeles—by Revere Copper & Brass Corp., Los Angeles. 3-5

LOS ANGELES CO.—**Castle Park, Inc.,** 6030 Wilshire Blvd., Los Angeles—$328,000 for four, 16-unit, 60-room, frame and stucco apartment bldgs., Castle Heights Ave., West Los Angeles—by self. 3-5

LOS ANGELES CO. — **Jackson Bros.,** 3475 W. 8th St., Los Angeles—$300,000 for one-story and basement, masonry department store bldg. at 1223 S. Baldwin Ave., W. Arcadia—by J. C. Penney Co., Los Angeles. 3-5

LOS ANGELES CO.—**McLennan-Moore,** 9665 Vena Ave., Pacoima—$286,200 for 44, four-room, frame dwellings on Covello St., Forbes, Whitaker, McLennon and Balboa Aves., Van Nuys—by self. 3-5

LOS ANGELES CO.—**Oppert & Forsberg,** 1446 W. 186th St., Gardena—$302,000 for assembly and administration bldg., and remodel science and health dept. at George W. Crozier School, Inglewood—by Board of Education, Inglewood. 3-5

LOS ANGELES CO.—**C. L. Peck,** 816 W. 5th St., Los Angeles—$400,000 for two-story and basement, reinf. conc. store bldg. at Santa Barbara Ave. and Marelton St., Los Angeles—by Barker Bros., Los Angeles. 3-5

LOS ANGELES CO.—**L. P. Scherer,** Box 590, Redlands—$250,000 for one-story and part basement, steel and conc. publishing plant north of E. Broadway, betw. Isabel and Jackson Sts., Glendale—by Glendale News-Press, Glendale. 3-5

ORANGE CO.—**Alamo Development Co.,** Box 172, Los Alamitos—$187,400 for 3 two-story, 10-unit, frame and stucco apartment bldgs., 807-09-11 W. 15th St., Santa Ana—by Sancisco Inc., Los Angeles. 3-5

SACRAMENTO CO. — **Holdener Construction Co.,** 2608 R St., Sacramento — $321,940 for frame and stucco additions to elementary school, 59th St. and Fifth Ave., Sacramento—by Board of Education, Sacramento. 3-10

SAN JOAQUIN CO. — **Dan Nomellini Construction Co.,** Rt. 5, Box 392-F, Stockton—$387,239 for juvenile detention home on 100-ac. site, French Camp — by County Commission, Stockton. 3-26

SANTA BARBARA CO.—**R. J. Daum Construction Co.,** 6803 West Blvd., Inglewood—$256,000 for 11-classroom and administration bldg. at Alvin School, Santa Maria—by Board of Education, Santa Maria. 3-5

SANTA BARBARA CO. — **Parkhill-Wade,** 2017 Anaheim-Telegraph Rd., Los Angeles—$450,000 for plant to extract carbon dioxide from natural gas, on Battles Lease site, approx. 1.5 mi. south of Santa Maria—by Union Oil Co., Los Angeles. 3-5

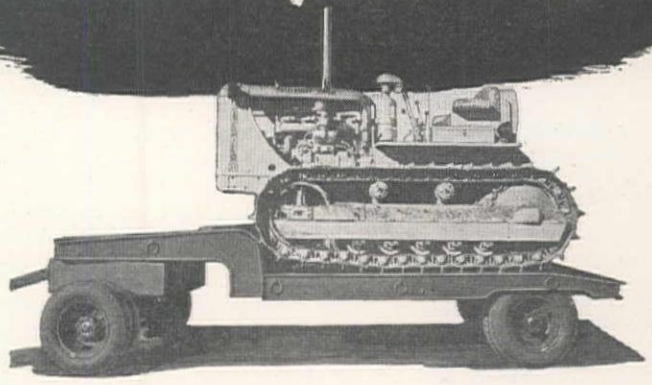
SANTA CLARA CO.—**Wilfred H. May,** R.F.D. 140B, San Mateo — $326,043 for reinf. conc., one-story school bldg., Maud Ave., betw. Sunnyvale and N. Bayview Aves., Sunnyvale—by Board of Education, Sunnyvale. 3-2

YOLO CO.—**Erbentraut & Sommers,** 696 Pennsylvania St., San Francisco—$2,270,000 general contract for veterinary science bldg., University, Davis—by Board of Regents, University of California, Berkeley. 3-29

Idaho

ADA CO. — **Jacobsen Construction Co.,** 724 S. 3rd E., Salt Lake City, Utah—$350,000 for store bldg. at 12th and 13th Sts.,

LOW COST hauling
of loads up to 15 ton



Light, versatile, easily maneuverable, this W-W 10-15 ton lowbed is available in either semi or full models. Oversize axles, scientifically designed frame, heavy duty pressed steel wheels, extra heavy brakes and other features contribute to the dependability and low cost operation of this light lowbed.

4 sizes available. The 10-15 tonner is available in four standard sizes. Bed widths are 8′ or 8′6″ with optional loading deck lengths of 8′ or 10′. Overall length of the semi trailer is 19′6″ and 27′3″ for the full trailer.

Strong unitized construction includes a gooseneck which is an integral part of the frame. Electrically welded into one solid unit, the scientifically engineered frame distributes the load over all frame members—reduces center point strain—assures a lowbed which can take reasonable overloads without weakening.

Dual purpose trailer. Full trailer can be converted to a semi by elimination of the front dolly assembly. Rugged 5th wheel plate with heat treated alloy steel king pin works equally well in semi or full trailer operation.

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Coupon brings pictures, specifications on any type lowbed desired. Simply attach to your letter head and mail today.

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Gentlemen: Please send illustrated catalog on W-W lowbeds. We are particularly interested in a _____ ton model with loading deck length of _____ feet between gooseneck and rear tires.

Firm Name _____

Address _____

City _____ Zone _____ State _____

By _____ Title _____

betw. State and Jefferson in Boise — by Sears Roebuck Co., Boise. 3-1

Montana

MISSOULA CO.—**J. C. Boespflug Construction Co.**, Securities Bldg., Seattle, Wash.—$2,000,000 general contract for 200-bed hospital at Missoula—by Sisters of Charity of Providence. 3-1

Nevada

WASHOE CO. — **Walker-Boudwin Co.**, 311 N. Park St., Reno—$435,194 for police headquarters and jail bldg., N.W. corner of E. 2nd and High Sts., Reno—by City Council, Reno. 3-9

WASHOE CO. — **Walker-Boudwin Co.**, 311 N. Park St., Reno—$360,399 for one-story, reinf. conc. Veterans Memorial school bldg. at Kirman and Vassar Sts., Reno—by Board of Education, Reno. 3-2

Oregon

LANE CO.—**W. C. Smith, Inc.**, Board of Trade Bldg., Portland—$1,049,442, general contract for construction of women's dormitory at University of Oregon, Eugene—by State Board of Higher Education, Portland. 3-17

MULTNOMAH CO.—**Del E. Webb Construction Co.**, 5101 San Fernando Rd. W., Los Angeles, Calif.—$2,562,952 for 150-bed, 7-story, reinf. conc. addition to hospital, Portland — by Veterans Administration, Washington, D. C. 3-11

Utah

UTAH CO.—**Christiansen Bros.**, Templeton Bldg., Salt Lake City—Estimated cost $1,500,000 of negotiated contract for new Physical Science Bldg., Brigham Young University, Provo—by Board of Trustees, Brigham Young University, Provo. 3-1

UTAH CO. — **Walsh Construction Co.**, Davenport, Iowa—$3,000,000 for conversion of plate mill to hot rolled coil mill, Geneva—by Geneva Steel Co., Geneva. 3-5

Washington

BENTON CO. — **Nettleton-Baldwin-Anderson Inc.**, 1109 N. 36th St., Seattle, and **Sound Construction & Engineering Co.**, 1403 W. 45th St., Seattle—$9,500,000 for 1,000 dwellings at Richland — by U. S. Atomic Energy Commission, Hanford. 3-12

SPOKANE CO.—**Henry George & Sons**, and **McInnis & Roberts**, Hutton Bldg., Spokane—$1,049,813 for reinf. conc., 500-bed, senile ward bldg., Eastern State Hospital, Medical Lake—by Board of Public Institutions, Olympia. 3-8

SPOKANE CO.—**Robert E. McKee**, Box 350, Glendale, Calif.—$2,467,000 for main hospital, power house and laundry, and garage and maintenance bldgs., Veterans Hospital, Spokane—by Corps of Engineers, Seattle. 3-26

WHITMAN CO.—**Henry George & Sons**, Hutton Bldg., Spokane — $2,160,185 general contract for four-story brick and limestone library bldg. at State College, Pullman—by Board of Directors, Washington State College, Pullman. 3-12

Canada

BRITISH COLUMBIA—**British Columbia Bridge & Dredging Co. Ltd.**, 544 Howe St., Vancouver—$297,845 for addition to Begbie elementary school, Kitchener and Lillooet Sts., Vancouver — by Board of School Trustees, Vancouver. 3-5

BRITISH COLUMBIA—**Commonwealth Construction Co., Ltd.**, 700 Taylor St., Vancouver—$1,111,980 for part two and part four story, reinf. conc., technical vocational school bldg. on Central School site, Pender St., Vancouver — by Board of School Trustees, Vancouver. 3-16

BRITISH COLUMBIA—**Commonwealth Construction Co., Ltd.**, 700 Taylor St., Vancouver—will construct 100 homes at Vernon—by Central Mortgage & Housing Corp., Vancouver. 3-5

Miscellaneous . . .

Washington

DOUGLAS CO.—**Westinghouse Electric Corp.**, East Pittsburgh, Pa.—$5,410,931 for three new generators to be manufactured and installed at East power house of Grand Coulee Power Plant, Columbia Basin Project—by Bureau of Reclamation, Denver, Colo. 3-1

DOUGLAS CO.—**Westinghouse Electric Corp.**, East Pittsburgh, Pa.—$1,055,809 for nine transformers for generator units R-4, R-5 and R-6, for Grand Coulee Power Plant, Columbia River Basin Project—by Bureau of Reclamation, Denver, Colo. 3-1

SPOKANE CO.—**Warren, Little & Lund**, Spokane—$891,494 for mechanical work consisting of plumbing, heating, ventilation, air cond., power plant and refrigeration at Veterans Hospital, Spokane — by Corps of Engineers, Seattle. 3-26

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240 S.E. CLAY STREET
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TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Ernest E. Brayshaw, a steel production engineer widely known in Eastern steel circles, has been named Works Manager of the SOUTHWEST STEEL ROLLING MILLS, 9901 So. Alameda St., Los Angeles. Formerly Assistant Division Superintendent of the Carnegie Illinois Steel Corp., Clariton Works, Pittsburgh, Pa., Brayshaw entered the steel business as a Roll Designer for the Bethlehem Steel Co., Bethlehem, Pa. Southwest is the only steel rolling mill west of the Mississippi River producing a full line of reinforcing bars, shapes, angles and other bars from high strength rail steel.

☆ ☆ ☆

John Calvert, prominently identified with commercial motor transport in the San Joaquin Valley area for many years, has been appointed manager of the FRUEHAUF TRAILER COMPANY branch at Fresno. Calvert joined the organization in 1939. In 1944, he was assigned the post of sales manager from which he was promoted to branch manager.

☆ ☆ ☆

THE TWIN DISC CLUTCH COMPANY, Racine, Wisconsin, recently opened a new branch office at 2950 Leonis Blvd., Los Angeles. The Twin Disc activities on the West Coast are under the general supervision of **A. E. Young,** District Manager; **Pierce Tyrrell,** Assistant West Coast District Manager. **Preston Olney,** formerly field service engineer at Dallas, Texas, is now manager of the Los Angeles office.

☆ ☆ ☆

E. P. McElhany has been appointed as Assistant to the Vice President in charge of sales for BETHLEHEM PACIFIC COAST STEEL CORPORATION, San Francisco. McElhaney started his career at Bethlehem's Seattle Plant in 1939. In 1945 he came to the San Francisco Plant as Chief Clerk in the Sales Department.

☆ ☆ ☆

Recently authorized plans of the CALIFORNIA REDWOOD ASSOCIATION, San Francisco, call for an expanded program in 1948. The enlarged activities include immediate resumption of important consumer and distributor services that were suspended during the war. **Philip T. Farnsworth** will resume his position as advertising manager. **John R. Freeman** will call on dealers, architects and consumers in Northern California from the San Francisco office, and **E. R. Wuori** will do similar work in Southern California, working out of the Los Angeles office.

☆ ☆ ☆

MACK TRUCKS, INC., of New York City, N. Y., have new Western Headquarters located at Nos. 2001 to 2099 S. Alameda St., Los Angeles. In these premises is also housed the Los Angeles Branch, as well as the Division Headquarters covering all Mack's West Coast operations, extending from Western Canada to Mexico, including British Columbia, and as far east as the Rocky Mountains. The company's business in the Hawaiian Islands is also covered through the Division Headquarters at Los Angeles.

☆ ☆ ☆

JOSEPH T. RYERSON & SON, INC., Chicago, Ill., has completed the construction of a new steel service plant in the San Francisco Bay area. The plant is in Emeryville. **Wayne D. Dukette** is the Manager and **Ray C. Page** is Sales Manager. Opening date has not been announced but it is expected that the plant will be ready for business in the near future.

☆ ☆ ☆

Daniel S. Dinsmoor, Consulting Engineer of Reading, Mass., who has been identified with chemical manufacturing in the United States for more than 30 years, has been appointed Director of Development for AMERICAN POTASH & CHEMICAL CORP. Dinsmoor will head the company's new Development Department and will work in the Los Angeles office.

☆ ☆ ☆

E. J. Sheldon has been appointed as Assistant to the Auditor of the BETHLEHEM PACIFIC COAST STEEL CORP., San Francisco. Sheldon's headquarters will be at the company's general offices in San Francisco.

☆ ☆ ☆

INTERNATIONAL HARVESTER COMPANY, Chicago, Ill., has opened a new sales and service branch at 2855 Cypress St., Oakland. The new building provides headquarters for the company's western region sales and service executives as well as supplying a modern base of operations for the Oakland sales district (Northern California, Western Nevada, and Hawaii). **E. H. Watkins** and **L. E. Hall** are the company's motor truck and general line western region managers.

☆ ☆ ☆

William J. Kern, formerly of San Francisco, Calif., has been appointed assistant supervisor of the field service section of GENERAL ELECTRIC's Product Service Division, Bridgeport, Conn. Kern's position as Pacific District Service Supervisor with headquarters in San Francisco, has been taken by **J. R. Davis,** formerly manager of the Appliance Service Center, in San Francisco.

☆ ☆ ☆

H. F. Hazel, a veteran of 40 years' experience in West Coast steel mills, has been named superintendent of the SOUTHWEST STEEL ROLLING MILLS in Los Angeles. Starting in roll shops, Hazel has served in various capacities, including that of technical advisor for new plants in the Mid-West, and as general superintendent of a Portland, Ore., mill before accepting the Southwest appointment.

☆ ☆ ☆

GAR WOOD INDUSTRIES, INC., Wayne, Mich., is expanding its West Coast operations, locating its activities in larger quarters at the PARR-RICHMOND TERMINAL COMPANY property, Richmond. The new quarters will be the West Coast center for assembly and distribution of Gar Wood Products. **Fred D. Parr** of San Francisco is to be credited with an important part in locating this operation in California.

☆ ☆ ☆

Allen A. Olson has been appointed Pacific District Representative for GENERAL ELECTRIC COMPANY wire and cable. He will work from the San Francisco office. Olson joined the company at Schenectady, N. Y., in 1935 and was later transferred to Bridgeport, Conn.

☆ ☆ ☆

X. J. Pindall has been appointed factory sales representative to the NOBLE CO. of Oakland. Pindall enters the concrete batching equipment business with experience gained on the Canol and Alaska Highway projects and as a Los Angeles contractor.

☆ ☆ ☆

Since 1943, UTILITY TRAILER SALES COMPANY of Los Angeles, Calif., has represented the HEIL COMPANY of Milwaukee in the Southern Cali-

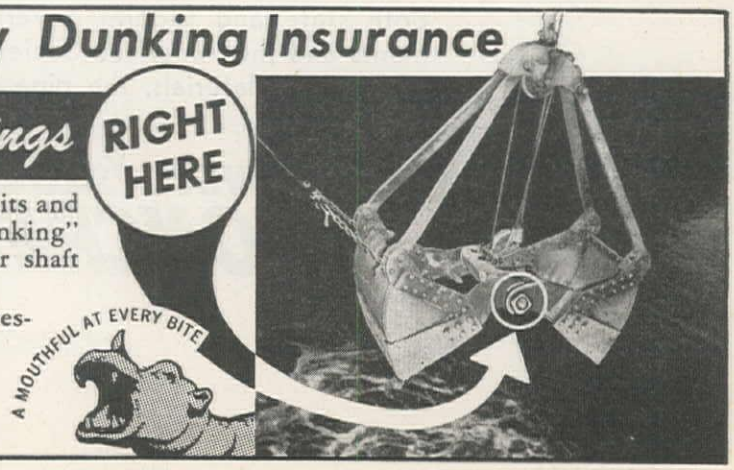
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Sealed Grit-Proof Bearings

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Abrasive materials are prevented from causing excessive wear and longer bucket life is assured.



OWEN BUCKET CO., LTD.
BERKELEY, CALIFORNIA
Dealers: Los Angeles, Spokane, Seattle, Portland, Salt Lake City, Honolulu

fornia-Arizona territory as distributors of Heil products. To keep pace with the demand, a new building has been erected at Alameda and 41st Sts., Los Angeles. It consists of sales and engineering offices, parts department, and a modern shop. **Stephen R. Faatz** is manager of the Heil Division.

☆ ☆ ☆

FOOD MACHINERY CORP., San Jose, Calif., has been awarded the Navy Certificate of Merit for outstanding wartime production of tracked amphibian vehicles. **Paul L. Davies,** president of the company, received the award at a ceremony in the Navy Dept., Washington, D. C. Well over 10,000 amphibian tractors were built by the company. These LVT's, better known as Water Buffaloes, were used to spearhead landing assaults at Pacific invasions.

☆ ☆ ☆

Former employees of INDUSTRIAL EQUIPMENT COMPANY recently became the owners of the INDUSTRIAL EQUIPMENT COMPANY OF SOUTHERN CALIFORNIA and will continue the business at the same address, 4441 So. Santa Fe Ave., Los Angeles, with the same staff. Industrial Equipment Company was founded in 1935 by Bechtel & Kaiser, who operated it up to about three years ago. It was then taken over by the Bechtel interests who in turn have sold the southern division to former employees.

☆ ☆ ☆

Hans Bohuslav, widely known gasoline and Diesel engine authority, has joined the staff of ENGINEERING CONTROLS, INC., with home office and plant at 2835 E. Eleventh St., Los Angeles.

Charles G. Robinson has been appointed as District Manager with offices at 605 Market St., San Francisco, for the MURTAUGH ENGINEERING & EQUIPMENT CO., Glendale. The company is the distributor of Pettibone Mulliken products.

☆ ☆ ☆

SOULE' EQUIPMENT COMPANY, Oakland, has been appointed Northern California distributor for Tampo Rollers. The rollers are made by TAMPO MANUFACTURING CO., San Antonio, Texas, and include sheepsfoot, pneumatic-tired, and 3-wheel variable weight rollers.

☆ ☆ ☆

J. F. SHEA CO., INC., THE SHEA COMPANY, GENERAL - SHEA - PACIFIC are now located at 2801 West Mission Road, Alhambra.

☆ ☆ ☆

ANACONDA WIRE AND CABLE COMPANY has announced the appointment of TRI-STATE SUPPLY CORP. as West Coast Distributors for Anaconda Magnet Wire to serve Western Mine and Industrial Maintenance Departments and Motor Repair Shops. Tri-State warehouses are located in Los Angeles and San Francisco, Calif., and in Seattle, Wash.

☆ ☆ ☆

Clarence S. Beesemyer and **Philip S. Magruder** have been elected as executive vice-presidents of the GENERAL PETROLEUM CORPORATION, Los Angeles, Calif. Both men have been vice-presidents and directors of the company, with Beesemyer serving as director of marketing and Magruder as manager of the manufacturing department. **John C. Sample,** former general sales manager, became a vice-president as did **Arthur J. Donnelly,** industrial relations manager. **Gale L. Adams,** manager of the manufacturing department was named a vice president and director; and **Carroll M. Wagner,** manager of the geological department, also was chosen a director.

☆ ☆ ☆

WESTERN MACHINERY CO. of San Francisco is now the exclusive distributor for the LA PLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Iowa. Western Machinery's territory will cover that part of California north of and including the counties of Monterey, Fresno and Mono. The San Francisco office was established in 1919 and is preparing to move into new quarters adjacent to existing facilities. In 1933 a branch office was opened in Sacramento. In addition to the LaPlant-Choate line, Western Machinery also represents CHICAGO PNEUMATIC TOOL CO., WIRE ROPE CORPORATION OF AMERICA, RALPH B. CARTER CO. and STOW MANUFACTURING CO.

☆ ☆ ☆

BETHLEHEM PACIFIC COAST STEEL CORPORATION has established an all-time high in the release of total shipments of finished steel products from the company's steel plants in South San Francisco, Calif., Seattle, Wash., and Los Angeles, Calif., during 1947. The 454,578 tons of rolled steel products produced at the mills in 1947 also represents an increase of more than 30 per cent over 1946, due in a large part to improved labor conditions in steel and related industries. 1947 production of rolled steel products from



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RIDGEWOOD, NEW JERSEY

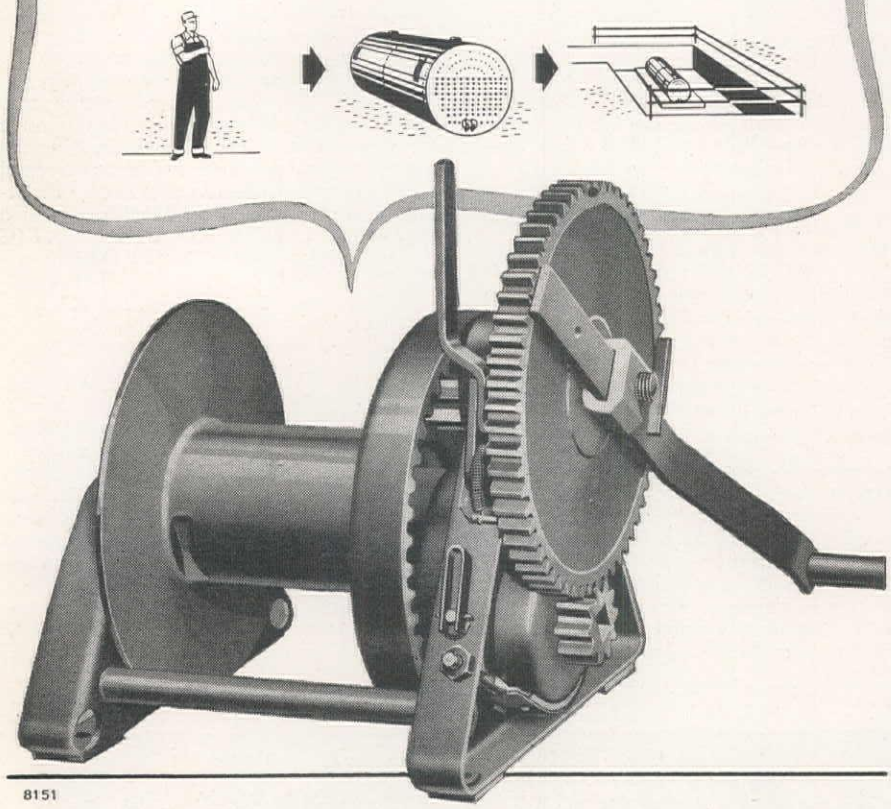
Warehoused for West by George M. Philpott Co., 1160 Bryant Street, San Francisco, Calif. *Warehoused in Mid-West by* Stentz Equipment Co., 226 East 4th Street, Tulsa 3, Okla. *Distributed by*—Austin, Texas: R. G. Studer Machinery Co.; Dallas, Texas: Davis, Hancock & Koster, Southern Engine & Pump Co.; Denver, Colorado: A. J. Philpott Company; El Paso, Texas: Burdick & Burdick; Helena, Montana: Montana Powder & Equipment Co.; Houston, Texas: Boehck Engineering Co., Inc., Southern Engine & Pump Co.; Kilgore, Texas: Southern Engine & Pump Co.; Los Angeles, Calif.: Le Roi-Rix Machinery Co.; Phoenix, Arizona: Equipment Sales Company; Portland, Oregon: Clyde Equipment Company; San Antonio, Texas: Southern Engine & Pump Co.; Seattle, Washington: Clyde Equipment Company, Glenn Carrington (For Alaska); Spokane, Washington: General Machinery Company.

Would you believe . . .

that one man, with no power equipment . . .

can haul this heavy boiler . . .

out of this deep pit?



8151

The job's a cinch . . . with

HANDIWINCH

● It's easy as **ABC** . . . here's how he'd do it . . .

(A) Carries HANDIWINCH to the job. (B) Sets it up on any firm support. (C) Anchors it. (D) Using planks for a ramp, he fastens rope to boiler and hauls it up and out.

Stoutest, most ingenious small winch ever built, HANDIWINCH and *one man* can handle any lifting or pulling job up to 10,000 lbs. All steel construction . . . cut gears . . . two power ratios . . . powerful hand brake . . . many "big hoist" features.

Ask your distributor . . . or write direct for folder HW-15, showing many typical HANDIWINCH set-ups.

American Hoist

and DERRICK COMPANY

St. Paul 1, Minnesota

Plant No. 2: So. Kearny, N.J.

Sales Offices:

CHICAGO • PITTSBURGH • SAN FRANCISCO • NEW ORLEANS • NEW YORK



For Armored Construction . . . specify

AMERICAN BLOCKS AND SHEAVES

A wide line of wire rope blocks—many types, all sizes, in capacities from 1½ to 250 tons. Thick steel side plates, heavy pins and axles. Ask for American equipment when ordering.

For fastening wire rope, use genuine

CROSBY CLIPS



Hot dip galvanized—high wings—grooved saddle—precision cut threads. To make sure you get *genuine* CROSBY CLIPS, look for the famous Red U-Bolt. All sizes—⅛ to 3 inches. Distributors everywhere.

the South San Francisco mills was 181,570 tons. The Seattle Plant produced 177,507 tons and 95,501 tons were rolled at the company's Los Angeles plant. Steel production capacity at Los Angeles plant has just been doubled with the recent completion of the coast's largest electric furnace there. This increased capacity will be utilized by a new high speed bar and rod mill and a new wire mill, both to be completed this year.

☆ ☆ ☆

UNITED STATES STEEL SUPPLY COMPANY, which maintains headquarters in Chicago, Ill., has purchased the warehouse and facilities at 1940 Harrison St., San Francisco, from the COLUMBIA STEEL COMPANY. This is the first move by U. S. Steel Supply to effectively serve steel users in San Francisco and Northern California.

☆ ☆ ☆

THE PARAFFINE COMPANIES, INC., Emeryville, announces the completion of its new Asbestos-Cement Building Materials plant at Redwood City. The plant is the first of its kind to be built in the West.

☆ ☆ ☆

PACIFIC NORTHWEST

Frank W. Cooper has succeeded **L. W. Gardner** as president of the HOWARD-COOPER CORP., equipment distributors with headquarters in Portland and branches throughout Oregon, Washington and Idaho. Cooper is the son of one of the founders of the corporation and has been manager of the Seattle office for the past 2 yr. Gardner plans to retire to his ranch in southwest Oregon. **William Wylie,** formerly general sales manager, has been promoted to vice-president, and **Frank Parker,** formerly manager of the Eugene, Ore., branch, has been appointed general sales manager and a member of the board of directors. **Gordon Yerby** remains as vice-president, and **Edith Lundquist** as secretary-treasurer.

☆ ☆ ☆

INDEPENDENT PNEUMATIC TOOL CO., manufacturers of Thor portable power tools, have established a new branch office with sales and service facilities in Seattle under the direction of **R. H. Weigel,** branch manager. The company's offices had been formerly maintained in connection with the Star Machinery Co., which will continue to handle service repairs.

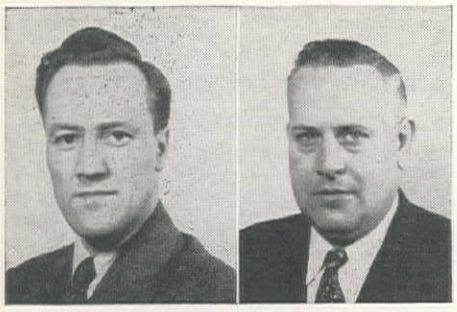
☆ ☆ ☆

FERGUSON SUPPLY ALBERTA LTD. of Calgary has been appointed exclusive distributor for THE EUCLID ROAD MACHINERY CO., Cleveland, Ohio, covering the entire Province of Alberta. The appointment of this new distributor will provide improved service and parts facilities to contractor and industrial owners of Euclid equipment in Alberta.

☆ ☆ ☆

WESTLAND EQUIPMENT CO., Portland, has been appointed local distributor for the Thor line of pneumatic tools manufactured by the INDEPENDENT PNEUMATIC TOOL CO., and the Wayne Crane manufactured by the AMERICAN STEEL DREDGE CO., INC. The Thor line includes rock drills, paving breakers, clay spades, sump pumps and other air tools. The Wayne Crane is a ½-yd. machine mounted on pneumatic tires and adaptable as crane, shovel, dragline, and backhoe.

Fay Brainard has recently assumed the newly created position of special assistant to the HYSTER COMPANY, Portland, Ore. His new duties include expediting



EIKREM **BRAINARD**

projects in methods, inventory control, and similar fields. He has been the company's plant engineer since 1942. **Svante Eikrem** now becomes plant engineer. He joined the company in 1943. Eikrem received his mechanical engineering degree from Oregon State college in 1941.

☆ ☆ ☆

INTERSTATE TRACTOR & EQUIPMENT CO. plans to start the construction of a new $50,000 branch at Astoria, Wash., about the middle of April. The display room, service shop, and warehouse is expected to be in use by the end of this year.

☆ ☆ ☆

INTERSTATE TRACTOR AND EQUIPMENT CO. of Portland, Ore., has opened its new industrial and farm store at The Dalles, Ore. This firm is distributor of Caterpillar Tractor Co., John Deere Plow Co., Hyster Co., Skagit Steel & Iron Works, and allied lines, through its stores in Portland, Astoria, McMinnville, Salem, Eugene, Roseburg and now The Dalles. **T. A. Rhoades,** formerly outside service supervisor with the Portland store, has been appointed to the firm's sales staff. Rhoades has been with the organization since its formation in January, 1941.

☆ ☆ ☆

WILSON WELDER AND METALS COMPANY, INC. of New York, has appointed the INDUSTRIAL AIR PRODUCTS COMPANY as its exclusive electrode distributor in the state of Oregon. The main office of this new distributor is located at 3200 N.W. Yeon Ave., Portland.

☆ ☆ ☆

INTERMOUNTAIN

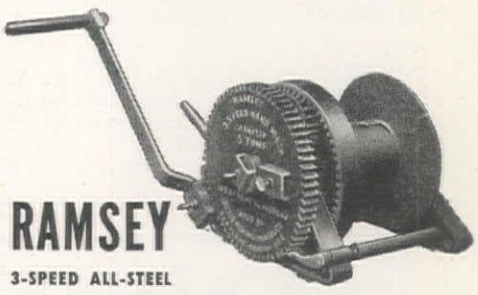
C. B. Vernooy has been appointed as Comptroller of the GENEVA STEEL COMPANY, Salt Lake City, Utah. Vernooy succeeds **James E. Butler,** who has been serving as comptroller of both Geneva Steel Company and COLUMBIA STEEL COMPANY in San Francisco, Calif. Butler will continue as comptroller of the Columbia Steel Company.

☆ ☆ ☆

GENEVA STEEL COMPANY, subsidiary of U. S. STEEL, at Geneva, Utah, has construction work under way at the Geneva plate mill conversion project; this will provide facilities for the manufacture of light gauge flat rolled steel in hot rolled coils. The hot rolled coils will be further converted into cold rolled sheets and tin plate in new cold reduction mills of COLUMBIA STEEL COMPANY, West Coast subsidiary of U. S. Steel. The mill at Pittsburg, Calif. is nearing completion and the Los Angeles, Calif. mill is about to be built. These plants will eventually use 686,000 tons of the coils annually from Geneva.

☆ ☆ ☆

The MOUNTAIN TRACTOR COMPANY, Missoula, Mont., announces the opening of a branch at 273 No. Main St., Kalispell, Mont. **George E. Martin,** Vice-



RAMSEY
3-SPEED ALL-STEEL
HAND WINCH

3-SPEEDS in all models
GEAR RATIOS 25-1, 4-1, 1-1

3 Ton "Junior"—Drum capacity: 150 ft. of ½" cable; wt. 75lbs; $60
5 Ton "Standard"—Drum capacity: 325 ft. of ½" cable; wt. 135 lbs; $85
5 Ton "Heavy Duty"—Drum capacity: 325 ft. of ½" cable; wt. 140 lbs; $90
Power models also available. Write for literature.

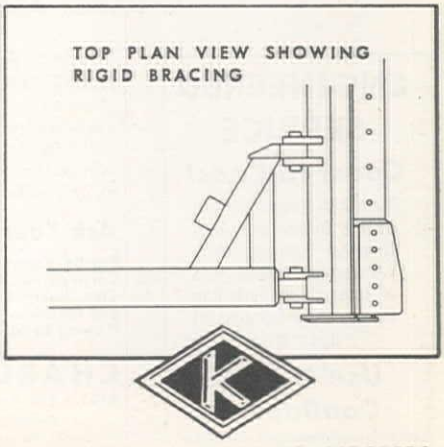
Cascade Manufacturing Co.
2439 N. W. 29th Avenue, Portland 10, Oregon

NEW!
KAY-BRUNNER
"Knock-Down" Tilting
BULLDOZER



Fast, Easy Assembly... Fits all Track-type Tractors

Now you can get the K-B "blade that really rolls the dirt" in this new knock-down model which can be completely dismantled for transporting. No shims or difficult adjustments—anyone can do it. Husky attaching pins hold it as rigid as solid types. Blade is easily tilted by merely turning adjustable braces. Made for cable or hydraulic controls. A product of over 20 years' experience in meeting western earth-moving problems, the new K-B "Knock-down" Tilting 'Dozer is easier to get to the job, *is built to get the job done!*



KAY-BRUNNER STEEL PRODUCTS, INC.
2721 ELM STREET, LOS ANGELES 41, CALIFORNIA

BULLDOZERS • TRAILBUILDERS • RIPPERS • POWER CONTROL UNITS • TAMPING ROLLERS • CARRYING SCRAPERS

President of the company, will manage the Kalispell Branch. **George Brock** is to be field representative and **Lincoln Engel** will be parts manager. **Robert Schweitzer** is the service manager there.

☆ ☆ ☆

George Morlock, general foreman of KAISER COMPANY, INC. Steel's By-Products, Benzol and Tar Plant at Fontana, Calif., has been promoted to superintendent of the company-operated Coke Plant at Sunnyside, Utah. Morlock has been with the company since 1942.

☆ ☆ ☆

MARION POWER SHOVEL COMPANY of Marion, Ohio, is announcing the appointment of **R. W. Head** as its district sales manager with headquarters at 4534 Travis St., Dallas 5, Tex. His territory will include Texas, New Mexico, Oklahoma and part of Arkansas. Head succeeds **I. D. Lumby** who represented the company in the Texas district for the past ten years.

☆ ☆ ☆

W. H. Scherer, formerly assistant to the vice-president in charge of manufacturing, WORTHINGTON PUMP AND MACHINERY CORP., has been appointed General Manager and elected a Director of the RANSOME MACHINERY CO., Dunellen, N. J. Scherer has served as acting manager of Ransome, a subsidiary of Worthington, since June, 1947.

☆ ☆ ☆

Appointment of GENERAL EQUIPMENT CO., of Reno, Nev., as exclusive distributors of LaPlant-Choate products for the state of Nevada was announced recently. **M. A. Scherupp** is the owner and general manager of the company. In addition to LaPlant-Choate, General Equipment also represents Autocar, Galion, Buckeye Traction Ditcher, Marmon-Herrington and Le Roi.

☆ ☆ ☆

AMONG THE MANUFACTURERS

R. G. LeTOURNEAU, INC., Peoria, Ill. have announced an expanded marketing program under which a new group of specialized distributors will handle the firm's new products, which include heavy construction, material handling and house building equipment. New products which the distributors will handle include the mobile, electrically-operated Tournacranes; Tournamixers, large capacity, electrically-operated transit mixers; Tournahaulers, a line of self-powered hauling units with capacities up to 100 tons and the Tournalayers, mobile house-building machines that mass-produce houses monolithically-cast of concrete. Appointment and administration of the new distributor organization will be handled from the headquarters in Longview, Texas. Present LeTourneau distributors will continue to market the firm's earthmoving products.

☆ ☆ ☆

G. F. Clipsham has been appointed to the position of Assistant to the President of THE LINCOLN ELECTRIC COMPANY, Cleveland, Ohio. From 1935 until his recent return to the United States Clipsham was the President of The Lincoln Electric Company, Welwyn Garden City, Herts, England. Through his work he has been an important influence in the development and extension of the use of arc welding in the British Isles. He joined the company in 1929.

☆ ☆ ☆

Merle J. Graham has been appointed as manager of the West Leechburg, Pa., plant of ALLEGHENY LUDLUM STEEL CORPORATION. **Frank G. Benford** is the new assistant plant manager. He is a metallurgical engineer and has been with the company since 1945. Graham joined the company in 1933. He was named acting plant manager early in 1947.

☆ ☆ ☆

L. E. Lee was appointed sales manager of the DUFF-NORTON MANUFACTURING COMPANY, Pittsburgh, Pa. He has been engaged in industrial and railroad sales for the past 20 years, and for the last nine years has served with the JOHNS-MANVILLE SALES CORP. of New York with that company's transportation department in Cleveland, Ohio.

☆ ☆ ☆

Election of **A. N. Morton** and **A. C. Fetzer** as vice-presidents of MACK TRUCKS, INC., New York, N. Y., has been announced recently. Both Morton, who is in charge of the company's manufacturing operations, and Fetzer, General Sales Manager, will continue to make their headquarters in the home offices, Empire State Bldg., New York City.

☆ ☆ ☆

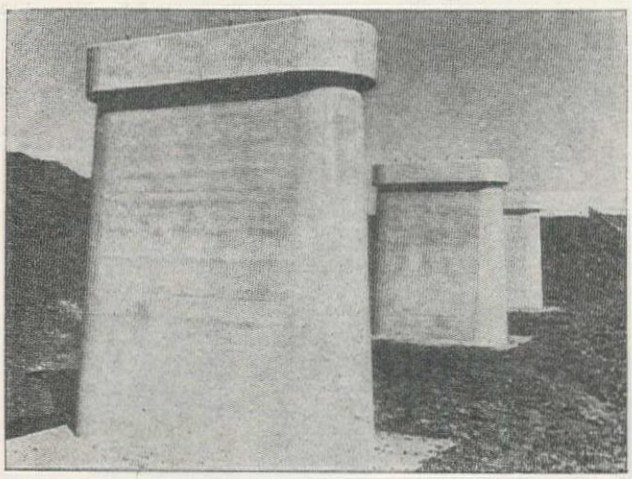
Crawford H. Greenewalt, formerly a Vice President and Chairman of the Executive Committee, has recently become the tenth President of E. I. DU PONT DE NEMOURS & CO., Wilmington, Del., while **Walter S. Carpenter, Jr.** was elected chairman of the Board. Carpenter's resignation as president, a position he has held since 1940, and his designation as chairman of the Board, followed the retirement of

DAREX AEA

AIR-ENTRAINING AGENT FOR CONCRETE

TM. Reg. Pat. Off.

ESTABLISHES A NEW RECORD



A NEW RECORD FOR SUCCESSFULLY HAULING PREMIXED CONCRETE LONG DISTANCES OVER ROUGH ROADS IN OPEN DUMP TRUCKS WAS ESTABLISHED DURING CONSTRUCTION OF THE BRIDGE PIERS ABOVE. HERE ARE THE FACTS:

1. Terteling and Sons, Contractor
2. 13½ Mile Haul on Bureau Reclamation Project
3. No Segregation or Bleeding
4. Concrete Mix Easily Placed
5. DAREX AEA GIVEN CREDIT.

ENGINEERED SERVICE

Coast to Coast

Darex AEA is manufactured by the Dewey and Almy Chemical Company which has devoted sixteen years of research to perfecting the use of Air Entrainment in Concrete.

Use It With Confidence

MIXING PLANT OPERATORS, BLOCK AND PIPE PLANT OPERATORS, CONTRACTORS: DAREX AEA gives easier placement through greater workability, reduced segregation, less shrinkage and bleeding, quicker finishing, greater durability, increased production, savings in time and labor costs. All these benefits at a cost of only a few cents per cubic yard of concrete.

Ask Your Nearest Dealer About Darex:

Pacific Coast Aggregates, San Francisco; Blue Diamond Corporation, Los Angeles; Denver Fire Clay Co., Salt Lake City; Baker-Thomas Lime & Cement Co., Phoenix; Ray Corson Machinery Co., Denver; Mason's Supply Co., Portland; Hawaii Builders Supply Co., Honolulu.

CHARLES R. WATTS & CO.

4121 - 6th Avenue, N. W. Seattle 7, Washington

Distributors for Dewey & Almy Chemical Co. In 11 Western States, Alaska and Hawaiian Islands.

Lammot du Pont from the latter post. Mr. du Pont's action brings to a conclusion a career in the company that began in 1902, and one that played a large part in the expansion and diversification of the company's activities. At the same time it was announced that **Walter J. Beadle,** a vice president and member of the Board, had resigned as treasurer of the company and had been elected to membership on the Executive Committee. **T. C. Davis,** formerly first assistant treasurer, was elected treasurer to replace Beadle. **H. C. Peinert** has been made production manager of the High Explosives Section of the Company's Explosives Department. **W. D. Garwood,** production superintendent at the Repauno Plant, Gibbstown, N. J., is now production manager of the Special Products and Black Powder Section, succeeding Peinert.

☆ ☆ ☆

Charles S. Munson, formerly president of AIR REDUCTION COMPANY, INC., New York, N. Y., has been elected chairman of the executive committee. He is succeeded by **John A. Hill,** who becomes the company's fifth president. **William C. Keeley,** formerly vice president, was elected chairman of the newly created finance committee.

☆ ☆ ☆

THE HEIL COMPANY, Milwaukee, Wis., announces the appointment of **Wm. E. Simons** as General Sales Manager of the company. Other executive appointments include: **Harry F. Pugh,** Vice-President in Charge of Sales and Advertising; **Arnold F. Meyer,** Vice-President in Charge of Engineering; and **Joseph J. Rosecky,** Vice-President in Charge of Manufacturing.

☆ ☆ ☆

George C. McMullen, who has been with the TYSON BEARING CORP. of Massillon, Ohio, for the past sixteen years, has recently been made Vice-President in Charge of Sales for the company. **W. H. Oexle** joins Tyson in the capacity of General Sales Manager. He was formerly with the L. S. STARRETT CO., Athol, Mass. **Herschel J. Deal,** Vice-President, is in charge of the midwest territory and will establish himself in Chicago. **Ivan C. Mann,** formerly Manager of Replacement Sales, is now Assistant Sales Manager.

☆ ☆ ☆

Election of **Carl D. Franks** as Vice-President for Promotion, of the PORTLAND CEMENT ASSOCIATION, Chicago, Ill., was announced recently. Franks has been a member of the Association's staff since 1916 when he became District Engineer in charge of the Indianapolis office. In 1924 he was made Midwestern Regional Manager and has been in charge of the work of seven district offices covering field promotion in 10 states.

☆ ☆ ☆

The CATERPILLAR TRACTOR COMPANY, Peoria, Ill., annual report has been published. Profit for 1947 was $9,956,912 or $5.29 per share on sales of $189,119,626 as compared with profit of $6,111,591 or $3.25 per share on sales of $128,437,494 for 1946. Expenditures of $968,724 for land, $10,640,556 for machinery and equipment were made during the year.

☆ ☆ ☆

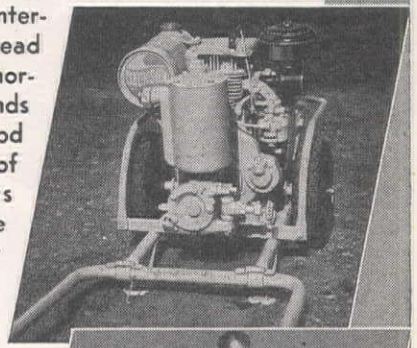
THE OLIVER CORPORATION, Chicago, Ill., states in its annual report to the stockholders that net sales of the company's products for the year ending October 31, 1947, were $73,782,568, an increase of $22,941,654 over the preceding year. Net earnings for the fiscal year 1947, after provision of $3,583,000 for Federal and other

The JACKSON Hydraulic



THE INDEPENDENT CONCRETE VIBRATORY UNIT Contractors SWEAR BY (Never at)!

For downright reliability and trouble-free service, as well as the ability to do a perfect job of vibrating concrete on a wide range of construction, the JACKSON HYDRAULIC is tops. There are no troublesome parts to break, and as all moving parts run in oil there is no lubrication problem. Amplitude and frequency, the factors so important to proper vibration of concrete, have been correctly balanced with careful regard to the diameter of the vibrator head. Frequency is adjustable from 4000 to 7000 V.P.M. through throttle of the highly dependable 5 H.P. Wisconsin engine. 34 ft. flexible handle gives a satisfactory operating range for all jobs. Wheelbarrow mounting makes the entire assembly easily portable. An interchangeable grinding and drilling head is available and easily attached. Thoroughly proved in the hands of thousands of contractors, this machine has stood the test of time and represents one of the very best equipment investments any general contractor can make. Write for the complete facts or see your JACKSON distributor.

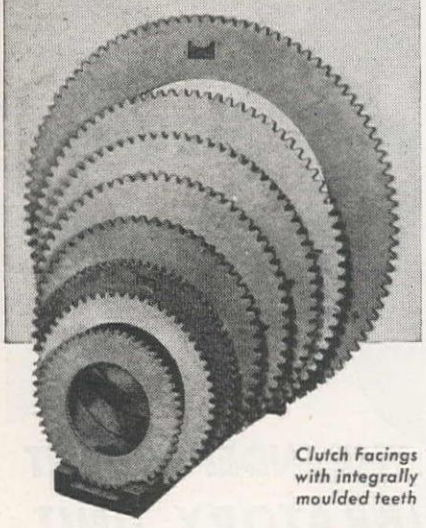




FOR EACH AND EVERY TYPE OF CONCRETE CONSTRUCTION the JACKSON line contains a vibrator that will give you the best possible job at the minimum of labor and maintenance cost — electric, engine-driven flexible shaft and Hydraulic models; internal and external types. Drop us a line for the best solution to any vibrating problem.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

Clutch Facings for all Requirements



Clutch Facings with integrally moulded teeth

Whatever the application—LARGE or small—GATKE has the materials, facilities and understanding of service requirements to do the job as it should be done. For Brake and Clutch Materials that give improved results send application details for the GATKE Recommendation.

GATKE CORPORATION
234 N. La Salle St., Chicago 1, Ill.

Shunk

Superior Quality

BLADES AND CUTTING EDGES

For any make of machine Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

50 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

ALLIED EQUIPMENT MANUFACTURERS ASSOCIATED MEMBER

Shunk

MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO,

income taxes, were $4,072,385 as compared with $2,003,099 for the preceding year. Earnings on the outstanding common stock were equivalent to $4.61 per share, compared with $2.04 per share for 1946.

☆ ☆ ☆

In its annual report to the stockholders, FAIRBANKS, MORSE & CO., Chicago, Ill., reports 1947 net sales of $89,564,599.98. Net profit for the year after taxes was $4,224,777.07 or $7.05 per common share as compared with $5.14 per share in 1946.

☆ ☆ ☆

William M. Lehmkuhl has been appointed as assistant vice-president of MASONITE CORPORATION. Lehmkuhl's duties with Masonite will be in the production division and he will be stationed in the company's general offices in Chicago. He was formerly manufacturing manager of the Flintkote Company, East Rutherford, N. J. He had been employed by that company for 17 years.

☆ ☆ ☆

Thomas B. Hasler, formerly president of the WILSON WELDER & METALS CO., INC. of New York City, N. Y., a wholly owned subsidiary of AIR REDUCTION COMPANY, INC., was elected chairman of the board of directors succeeding **C. E. Adams,** who resigned as chairman and director; and **F. B. Adams, Jr.,** was elected president and a director. Hasler has been president of the Wilson Welder & Metals Co., Inc. for twenty-nine years and is a director of the Airco Export Corp., and Arcrods Corp., and vice-president of G. D. Peters & Co. of Canada, Ltd. Adams, Jr. holds the position of Director of Apparatus Research and Production of Air Reduction Co., Inc.

☆ ☆ ☆

CHAIN BELT COMPANY of Milwaukee, Wis., announces the election by the Board of Directors of three new vice-presidents. **B. F. Devine,** elected vice-president, joined the company in 1909. He has served as sales manager and later manager of the Construction Machinery Division. Devine will continue his duties as manager of that division. **L. B. McKnight,** who started with the company in 1927, has been elected vice-president with executive responsibility for the two heavy machinery divisions, Conveyor and Process Equipment and the Construction Machinery. McKnight was executive assistant to the president of the company and previously was manager of the Conveyor and Process Equipment Division. The third vice-president to be elected is **O. W. Carpenter,** who will be in charge of finance. He was formerly secretary-treasurer and a director of the Kearney and Trecker Company, and came to Chain Belt Company in 1943.

☆ ☆ ☆

R. Conrad Cooper has been appointed as Vice-President, Industrial Engineering, for the UNITED STATES STEEL CORPORATION of Delaware. Cooper, who has been Assistant Vice-President, Industrial Relations, since 1945, assumed this newly created position at the first of this year. **Richard F. Sentner** has been made Assistant Vice-President, Sales, for the corporation. He began his business career with the Wheeling Steel Corp. in 1926. In 1942, Sentner joined the War Production Board and later was appointed Deputy Director of the Steel Division. He returned in 1945 to the Wheeling Steel Corp. as Assistant Manager of Sales. **M. W. Reed** was appointed as Chief Engineer of the United States Steel Corp., effective as of Jan. 1, 1948. Reed, who has served with subsidiaries of the Corporation continuously since 1916, has been Vice-President, Engineering, Carnegie-Illinois Steel Corp., since April, 1947. The appointment of **Ray E. Estes, Jr.** as Director of Commercial Research of the Delaware Corp. has been announced. He succeeds **Kemp G. Fuller,** who has resigned. In 1939 Estes joined the Commercial Research Division of the Delaware Corp. He was made Assistant Manager of the division in 1943, the position he held at the time of his present appointment.

☆ ☆ ☆



Harvey W. Rockwell has been appointed to the position of Chief Engineer of the LA PLANT-CHOATE MANUFACTURING CO., INC., of Cedar Rapids, Iowa. Rockwell has been with the company since 1937. After a period of practical shop experience, he was assigned to duties in the engineering department and has progressively served that department as Assistant Chief Engineer, Chief Engineer, Hydraulic Division, and Chief Engineer in charge of all development and patent activities.

☆ ☆ ☆

Arthur Crane Lewis, formerly vice-president in charge of sales for TEMPLETON, KENLY & COMPANY, Chicago, Ill., died at Toronto, Ont., February 23. He had been with Templeton, Kenly's Simplex Jacks division since January 1944. Prior to that time he was a special sales representative with the Railway Power and Engineering Corp. of Toronto, Ont., where he specialized in sales of Simplex Jacks for 25 years.

☆ ☆ ☆

L. W. Smith, for many years Sales Manager for THE SISALKRAFT CO., Chicago, Ill., passed away on February 16, after a long illness. Mr. Smith started in the lumber and building material industry in the lumber mills of the Northwest. He came to The Sisalkraft Company 18 years ago and worked in a sales capacity until recently. **W. L. Kennedy,** former manager of the New York branch office, has taken over the duties of Sales Manager, with headquarters at Chicago.

☆ ☆ ☆

O. B. Wilson has been named industrial manager for the eastern sales region of the Brown Instrument division of MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, New York. Wilson's promotion will make him regional manager of the territory extending from northern Virginia, through eastern Pennsylvania, to the Canadian border, west to Rochester, N. Y., and in New England. He has been with the company for the past 25 years and has served as sales engineer and industrial manager in various parts of the country.

☆ ☆ ☆

Theodore I. Leston has been appointed as vice-president in charge of production of the EUTECTIC WELDING ALLOYS CORPORATION of New York. The company manufactures and distributes special gas and arc welding rods, fluxes, and welding equipment. Leston has specialized in the industrial development of high alloy steels, nonferrous metals, silver alloys, and other metallurgical products. He became director of production in the late summer of 1947, and now assumes full charge of

manufacturing approximately 100 types of gas and arc welding rods at 110 Duane St., New York, N. Y.

☆ ☆ ☆

Dr. G. V. Slottman received the appointment of Technical Assistant to the Vice President of the AIR REDUCTION SALES CO. of New York. He was formerly Manager of the Technical Sales Division. **Scott D. Baumer,** formerly assistant manager, Technical Sales Division was appointed manager of that division and **Edward H. Roper** has been made assistant manager. Roper joined Air Reduction in 1936.

☆ ☆ ☆

William J. Priestley has been elected as a Director of the UNION CARBIDE AND CARBON CORPORATION of New York. Priestley has been with the organization since May 1, 1923, and has been a Vice President of the company in charge of the Alloys and Metals Division since Nov. 27, 1945.

☆ ☆ ☆

GOODMAN MANUFACTURING COMPANY of Chicago, Ill., is enlarging its factory space through the acquisition of a nearby plant, and the construction of an addition to the main plant. This double expansion adds over 100,000 sq. ft. of floor space. Production of mining machinery is already under way on the acquired property.

☆ ☆ ☆

AIR REDUCTION SALES COMPANY, New York, N. Y., announces two sales department promotions. **Dale D. Spoor,** formerly Dealer Sales Manager, now becomes Sales Promotion Manager. **Russell S. Schmidt** succeeds Spoor as Dealer Sales Manager. He came to Air Reduction in 1941.

☆ ☆ ☆

The appointment of **John E. Heuser** as assistant sales manager of the LE ROI COMPANY of Milwaukee, Wis., has recently been announced. Heuser is a graduate engineer from the University of Wisconsin with over nine years of sales experience. During the past three years he has handled much of the sales administration for both Le Roi engine and compressor products.

☆ ☆ ☆

FLEXIBLE TUBING CORPORATION, organized late in 1947, has announced its entry into the flexible tubing field. Laboratory, design engineering and manufacturing facilities will all be centered in Branford, Connecticut. President and Treasurer of the company is **Frederick K. Daggett,** former Sales and Engineering Manager of Spiratube Division of Warner Bros. Co., Bridgeport, Conn. Secretary is **Joseph B. Morse,** New Haven attorney; Assistant Treasurer is **Alexander K. Murphy,** formerly of the New Haven Clock Company.

☆ ☆ ☆

The ALLIED STEEL PRODUCTS, INC., Cleveland, Ohio, has under construction a large addition to its Cleveland warehouse. The building will be one story, of brick and steel construction. Approximately $125,000 will be spent for construction and machinery.

☆ ☆ ☆

THE OLIVER CORPORATION, Chicago, Ill., manufacturers of farm implements, has released the Annual Report to stockholders. Net earnings for the fiscal year ended Oct. 31, 1947, of $4,072,385 on net sales of $73,782,568 were announced in the report. After provision of $3,583,000 for



The Twin Disc Clutch Company makes doubly certain that replacement parts will be available when and where you need them.

* Throughout the United States and Canada, eight factory branches and 54 Twin Disc Repair Parts Stations carry complete stocks of replacement parts, ready for installation in any emergency.

* To assure a constant flow of parts to these stations, Twin Disc plants in Racine, Wis., and Rockford, Ill., manufacture replacement parts on an equal production basis with the manufacture of new equipment. Twin Disc's *twin services*—adequate parts stocks, conveniently located—mean quick repairs, less down-time, and more profitable work hours from Twin Disc Clutches and Hydraulic Drives. It is another reason for counting on reliable performance from Twin Disc units, no matter where you operate your equipment. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



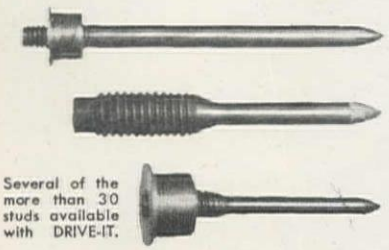
Write your nearest Parts Station or directly to the Twin Disc Clutch Company at Racine, Wisconsin, or Rockford, Illinois, for your copy of the new "Sales and Service Issue" of *Production Road.*



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

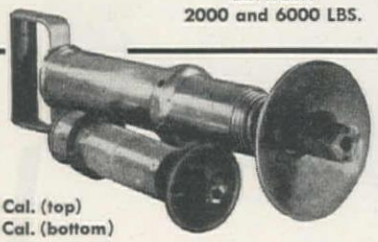
POWDER OPERATED CONSTRUCTION TOOL

Drives Threaded Studs 3 Inches Into Concrete *Instantly!*



Several of the more than 30 studs available with DRIVE-IT.

STUD HOLDING POWER BETWEEN 2000 and 6000 LBS.



.38 Cal. (top)
.22 Cal. (bottom)

Thousands of DRIVE-IT Powder Power Tools are now in constant use from coast to coast.

3000 PERCENT FASTER

DRIVE-IT does in seconds what used to require hours. Eliminates drilling, hammering, compressors, electricity, cords, expansion bolts. Anchors anything to concrete, masonry or steel in a split second.

HOW IT WORKS

DRIVE-IT derives its power up to 25 tons from a small powder charge encased in a standard .38 or .22 cal. cartridge. The desired anchor stud and cartridge are placed in the tool. The DRIVE-IT muzzle is forced vigorously against the work and at the same time the safety catch is released. This detonates the charge, and drives the stud with pile-driver force into steel or concrete. DRIVE-IT studs in ordinary concrete will hold the weight of the heaviest automobile.

ABSOLUTELY SAFE

DRIVE-IT is the orginal power-operated tool. It functions without recoil shock . . . is as safe as an ordinary carpenter's hammer.

UNLIMITED APPLICATION

Thousands of contractors, sub-contractors, and maintenance departments use DRIVE-IT tools to anchor wood sleepers to concrete; to "bolt" machinery; to hang metal lath, pipe, switch boxes, etc. See DRIVE-IT for yourself. Write for name and address of your nearest distributor, and full information.

POWDER POWER
TOOL CORPORATION

P. O. BOX 1610 (DEPT. C)
PORTLAND 7, OREGON

Federal and other income taxes, and dividends of $369,000 on the 4½ per cent convertible preferred stock, earnings were equivalent to $4.60 per share of outstanding common stock, compared with $2.04 per share of common earned on sales of $50,840,914 during the previous year.

☆ ☆ ☆

L. B. McKnight and **O. W. Carpenter** were elected directors of CHAIN BELT COMPANY, Milwaukee, Wis., at the annual stockholders' meeting held in January. McKnight was recently elected a vice-president of the company with executive responsibility for the two heavy machinery divisions of the company. Carpenter was also recently elected a vice-president of the company in charge of finance.

☆ ☆ ☆

ALLEGHENY LUDLUM STEEL CORPORATION, Pittsburgh, Pa., announces the appointment of **R. J. Bryan** as Plant Manager of the Buffalo Foundry, **Dr. P. K. Koh** as Associate Director of Research in charge of Tool and Die Steel and Allied Products, **George I. Bottcher** as Assistant Chief Engineer, and **C. M. Binney** as Assistant District Manager of the New York Sales District.

☆ ☆ ☆

William N. Kelley has been appointed Technical Director of the H. WENZEL TENT & DUCK CO. of St. Louis, Mo., as of April 15. Kelley will be in charge of expanded laboratory facilities to further the development of recently introduced improvements in waterproofing and canvas processing.

☆ ☆ ☆

Louis S. Graham, 68 years old, widely known in the heavy-duty equipment industry for his development of a national distribution system for D-A LUBRICANT COMPANY, INC., Indianapolis, Ind., died February 29 at St. Vincent's Hospital, Indianapolis. A pioneer in the field of heavy-duty lubrication, Mr. Graham entered the sales department of D-A more than 22 years ago and rose to the position of dealer sales manager in charge of public relations. Due to ill health during the last three years he served the company in an advisory capacity until the time of his death.

☆ ☆ ☆

THE TIMKEN ROLLER BEARING CO., Canton, Ohio, has leased 50,000 sq. ft. of manufacturing space at 2300 Linden Ave., Zanesville, Ohio, in which to consolidate all operations of the company in Zanesville. Operations in that city are now divided among three plants. Shortly after May 1 the new quarters will be available for occupancy. The Shawnee Pottery Company owns and now occupies the plant.

☆ ☆ ☆

Four new appointments in the GENERAL ELECTRIC COMPANY's Apparatus Department have been made recently. **W. V. O'Brien** has been named assistant general manager of sales; **R. M. Darrin** of New York, manager of Central Station Division, succeeding O'Brien; **J. C. Miller,** assistant to the manager of sales; and **H. P. Bish,** manager of Aircraft, Federal and Marine Divisions.

☆ ☆ ☆

HERCULES POWDER COMPANY of Wilmington, Delaware, issued its 1947 annual report to the stockholders recently. The report showed a net income after all charges of $12,934,430. After payment of $437,440 dividends on preferred stock, net income applicable to the common stock was equal to $4.75 a share on 2,633,420 shares outstanding. In 1946 the net income of the company was $8,409,843. These earnings were equal after preferred dividends to $3.03 a share on the common stock.

☆ ☆ ☆

Ralph H. Wise, widely known aircraft and automotive engineer designer, has been appointed as Director of Engineering for LUSTRON CORPORATION, Columbus, Ohio. Wise comes to Lustron with a long and successful career in engineering behind him.

☆ ☆ ☆



John S. Boyd, a Vice President and Director of THE GALION IRON WORKS & MFG. CO., Galion, Ohio, died at his home in Galion on January 13, 1948. The widely-known industrialist and philanthropist was born in 1889 in Clarks Mills, Pa. He came to Galion in 1907 with his family when his late father founded the road machinery plant there. Mr. Boyd graduated from Winona School of Technology, Indianapolis, Indiana. He was a Director of the First National Bank at Galion.

☆ ☆ ☆

Carroll M. Baumgardner, executive vice president of UNITED STATES RADIATOR CORP., Detroit, Mich., has been re-elected chairman of the Institute of Boiler and Radiator Manufacturers. Baumgardner, who has figured in a nation-wide educational campaign for heating homes, also was elected a director in the Plumbing & Heating Industries Bureau. Both positions were tendered him at the annual meeting of the Institute recently at the Westchester Country Club, Rye, N. Y.

☆ ☆ ☆

The appointments of **Howard J. Scaife** as manager of market development and **William F. Ogden** as manager of product planning, have been announced by **L. C. Truesdale,** vice-president of marketing of HOTPOINT, INC., Chicago, Ill. Ogden will be responsible for the coordination of product planning with marketing and merchandising plans, and the development of products from the marketing department phase. Scaife was formerly western regional sales manager for the products of Hotpoint.

☆ ☆ ☆

Roy H. Warmee has been appointed sales manager of the Moduflow division of the MINNEAPOLIS-HONEYWELL REGULATOR CO., Minneapolis, Minn. He had been sales promotion manager for the company since 1940. Sales promotion activities will henceforth be managed by **John A. Young,** who has been serving as assistant in the department. **John Randall,** who has been serving as temporary manager of the Moduflow division, has resigned to take a position with another company.

☆ ☆ ☆

JOHNS-MANVILLE CORPORATION, New York City, N. Y., consolidated net earnings in 1947 were $9,486,633 or $3.23 per share of common stock, compared with $5,836,613 or $2.01 per share in 1946, according to the annual report recently released to stockholders. One of the company's 1947 projects included installation of rock wool batt equipment and additional Transite pipe equipment at Watson, Calif.

NEW EQUIPMENT

More complete information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, Calif.

Motorized Wheelbarrow

Manufacturer: Gar-Bro Manufacturing Co., Los Angeles, Calif.

Equipment: Powered cart for hauling any construction material.

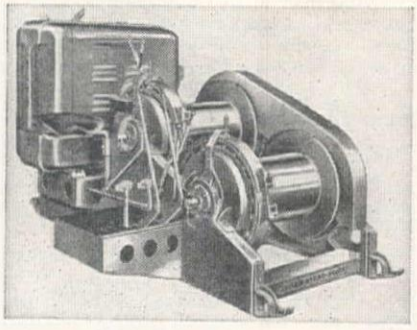
Features claimed: The unit will carry 1,500 lb. or 9 cu. ft. of concrete, more than three hand wheelbarrows can handle. The entire unit weighs 600 lb. It is light enough for scaffolds and runways. It is 81 in. long and loading height is 31 in. Dumping is easy because the load is balanced in the tray. Dumping can be effected with the operator in either a standing or sitting position. The power unit is 2½ h.p. air-cooled gasoline engine with V-belt and chain drive. Speeds are foot-throttle controlled.

Hydraulic Hoists

Manufacturer: The Jaeger Machine Co., Columbus, Ohio.

Equipment: Hoists with built-in, two-speed transmissions.

Features claimed: The transmission offers the operator instant choice of "low gear" for slower line speeds in heavy hoisting, or "high gear" for handling lighter



loads. Hydraulic control of clutching and braking gives the operator the "feel" of the load, and is made up of standard automotive parts. The hoists are available with either electric, gasoline or Diesel power as original equipment, and direct drive from transmission to drum gears eliminates chain drives and their maintenance.

Bridge Jack

Manufacturer: Templeton, Kenly & Co., Chicago, Ill.

Equipment: Jack and bolt puller for lining, shimming and replacing timber decks on railroad bridges.

Features claimed: The jack operates vertically, horizontally and at an angle when its base locking pawl is released. It lifts full capacity on toe, cap and at any intermediate point by using the chain as a sling. The jack pivots on its base when the base hook is disengaged. This feature is useful when lining or pulling piles or posts. This permits angular shoving as well as vertical lifting. The bolt puller attachment on the end of the chain easily handles its appointed job, pulling bolts whose heads are sized ½ to ⅞ in. The jack is available with base width either 3¾ or 5 in. to permit operation between ties.

Paving Finisher

Manufacturer: Blaw-Knox Co., Pittsburgh, Pa.

Equipment: Improved concrete paving finisher with independent control of traction and screed speeds.

Features claimed: The independent control is provided by a new automotive type transmission, which also simplifies the controls. Now available to the operator are 16 combinations of screed and traction speeds as against four combinations on the old model. This provides more flexibility in selecting combinations of speeds to handle all types and textures of concrete. The finisher is also equipped with a larger engine, which generates 32.5 h.p. at 1620 r.p.m. with the vibratory paving attachment. Another new feature is a V-belt drive with automatic take-up to absorb the shock of starting and stopping.

Rubber Sealing Compound

Manufacturer: United States Rubber Co., Los Angeles, Calif.

Equipment: Joint sealer for concrete highways and airfield runways.

Features claimed: The rubber compound inserted in the joints between concrete sec-

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For sheer ruggedness, speed and all-around dependability, you just can't beat a UNIT Excavator. UNIT is nimble, sturdy, fast . . . Famous UNIT one-piece cast case provides perfect alignment of all working parts. Other exclusive UNIT features include: Automatic traction brakes . . . Straight line engine mounting . . . Drop forged alloy steel gears . . . Splined shafts . . . Disc type clutches. Convertible.

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tions stretches in the winter and compresses in the summer heat without breaking and without separating from the concrete. Acting as a sealant it prevents water seepage, and its resilience provides an elasticity that prevents over-expanded concrete from buckling and breaking. Annual refilling of pavement joints is thus eliminated and the surface life is increased many years.

Dozer Blades

Manufacturer: Pacific Car and Foundry Co., Renton, Wash.

Equipment: Straight and angle dozer blades to fit the largest crawler tractors.

Features claimed: The units feature a front mounted, closed type, hydraulic system with pump, control valve and reservoir in one unit. A new push-pull cable control eliminates control rods and linkage and makes a handier control from the operator's standpoint. Moldboard adjustment is made to a maximum tilt of 18 in. by resetting a single pin in back of each corner of the moldboard. The moldboard has a three-piece cutting edge whose center-piece of tough alloy steel is reversible and whose end bits are of heavy manganese steel.

Open Top Scrapers

Manufacturer: The Heil Co., Milwaukee, Wis.

Equipment: New line of four-wheel scrapers with no restricting overhead mechanism.

Features claimed: Improved operator's vision for loading and spreading permits maximum heaped loads and makes it possible to load with a shovel or dragline bucket for straight hauling operations. Down pressure, applied through mechanical leverage, drives the cutting blade into the ground and speeds up digging and loading action. In tough going, the entire weight of the scraper bowl rests on the cutting edge, with the rear wheels lifted off the ground. The tilting floor of the scrapers is hinged just back of the cutting blade and raises to discharge the load cleanly by sweeping the sides and back of the bowl.

New Wagon Drill

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey.

Equipment: Light weight, portable wagon drill.



Features claimed: Light-weight construction, centralized controls, and ball bearing, pneumatic-tired wheels allow the machine to be transported, set up and operated by only one man. The unit features a chain feed which is driven by a van-type air motor. Adjustable anchors permit tak-

FIR-TEX *Absorptive Form Liner*

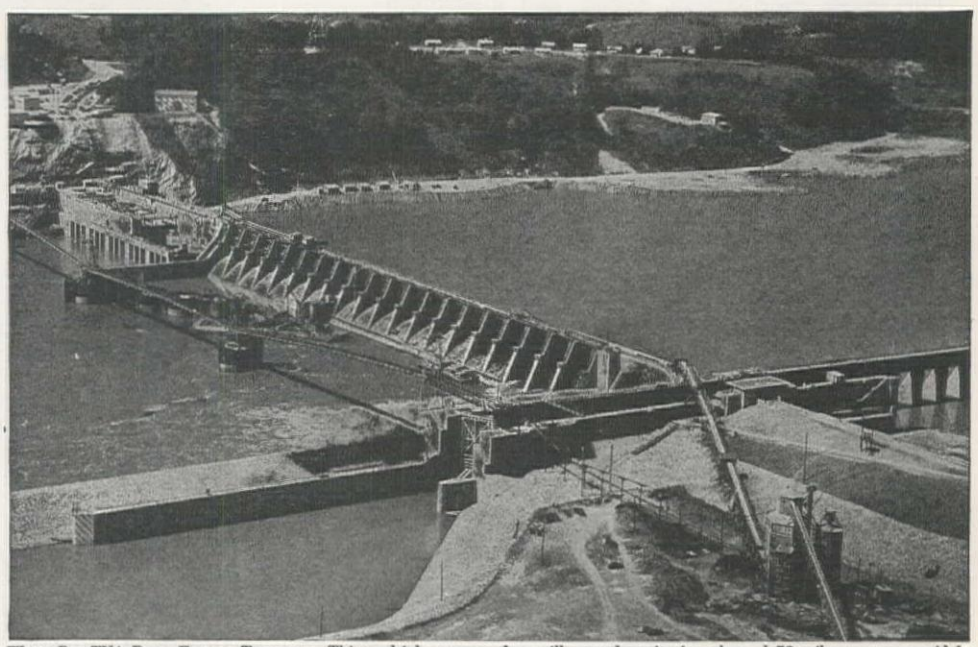
Produces Smoother, Harder Denser Concrete on

WATTS BAR TVA DAM

FIR-TEX Absorptive Concrete Form Liner is a highly absorptive felted board, with a chemically treated surface which resists bonding.

The mechanical vibration of concrete increases the tendency of air and water bubbles to float to the surface and to the face of the mass. When a non-absorptive form liner is employed, these bubbles have no avenue of escape and consequently remain to become voids in the face of the concrete.

The action of the Fir-Tex Liner is like that of a vacuum cleaner. It absorbs all excess air and water adjacent to surface. The removal of bubbles permits the cement to flow into those spaces so that this surface sets solidly into a smooth attractively textured mass of extreme density and resistance to moisture. This structural change in the concrete extends to a depth of about 1¼ inches from the face. Not only has the structure been given architectural beauty, but its weather resistance has been so greatly increased that eminent engineers have referred to its surface as "case hardened".



Watts Bar TVA Dam, Eastern Tennessee. This multiple purpose dam will extend navigation channel 72 miles upstream, aid in controlling floods, and generate power vitally needed for the Victory Program.

SEE OUR CATALOG IN SWEET'S

See section 3

FIR-TEX

SEND FOR TECHNICAL BULLETIN

Mail for free copy of technical bulletin giving full data on the Fir-Tex Absorptive Form Liner. Mail to:
FIR-TEX, Porter Building, Portland, Oregon.

*Name*_____

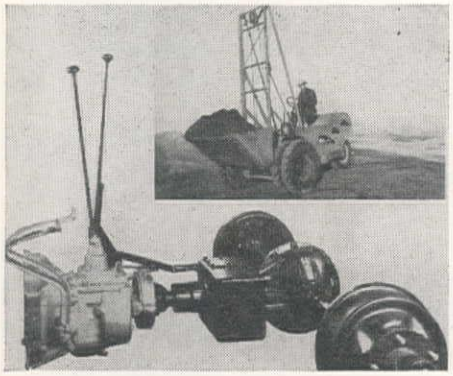
*Address*_____ (use margin)

ing up slack in the chain. A self-locking worm gear prevents the drill from jumping forward when a soft spot is encountered. Stop bolts equipped with buffer springs prevent overtravel of the drill at the back end of the tower, and the steel-centralizer bracket performs the same function at the front end. Control handles for both the drill and the air motor are grouped on the air motor mounting, which may be raised or lowered on the tower to suit the operator.

Bucket Hauling Unit

Manufacturer: Mixermobile Distributors, Inc., Portland, Ore.

Equipment: Scoopmobile with new reversing and reduction gear box.



Features claimed: The new gear box improves the machine's performance by providing additional gear reductions of 3.01 to 1 forward and 2.5 to 1 reverse. The gear box permits the preselection of four operating speeds in either direction, and the reduction of forward speed to less than 100 ft. per min. Preselecting speeds by means of the new gear box, inexperienced operators learn to handle capacity loads after a few trial runs. Operators also are able to select the speed at which it is most practical to manipulate the Scoopmobile.

Voltage Tester

Manufacturer: Ideal Industries, Inc., Sycamore, Ill.

Equipment: Safe voltage tester with many added uses.



Features claimed: Indications by the new tester are by a solenoid indicator and a neon test lamp operating independently of each-other, eliminating possibility of error and danger. Securely anchored 2 ft. leads are brought out through the top of the case, which makes it easy to handle and easy to read. Easy-to-read scale is calibrated from 110 to 600 volts. Added uses of the new tester are for testing continuity of circuits (AC or DC), blown fuses, grounded side of line, grounded side of motor or appliance and excessive leakage to ground.

Vibratory Subgrader

Manufacturer: Blaw-Knox Co., Pittsburgh, Pa.

Equipment: Machine for cutting through earth or shaving subgrade material to a given grade and crown.

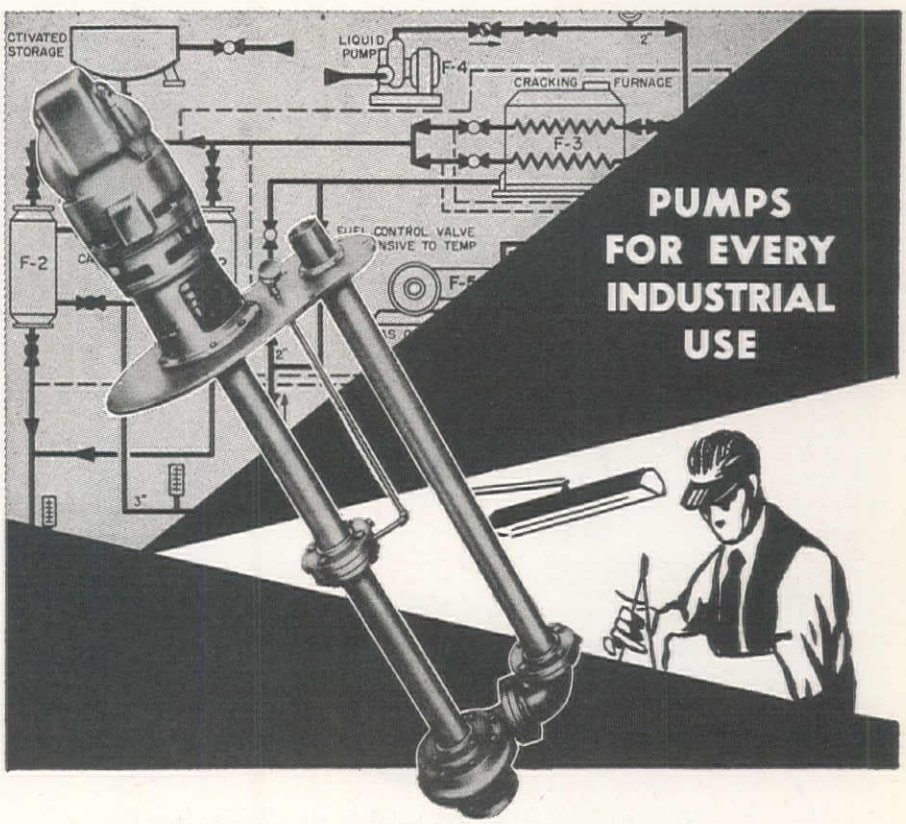
Features claimed: The new subgrader reduces power consumption and lowers the cost per sq. yd. of preparing the subgrade. The vibratory cutting edge will penetrate through the hardest material without transmitting shock or movement into the road forms. The new unit will produce accurate grade, true to crown and cross section, and the crown can be adjusted as paving conditions require without stopping the subgrading operation. To give final shape to the subgrade, the machine has a two-wheel strike-off, which is adjustable for crown and width and is equipped with a control lever for raising or lowering the blades. This is towed behind at a distance of 6 ft. to expose the excavated subgrade and provide space to complete minor corrections to the subgrade.

Pipe Air Cushion

Manufacturer: Air Cushion Sales Co., Inc., Glendale, Calif.

Equipment: One unit arrestor to stop water hammer.

Features claimed: The installation of one new air cushion arrestor eliminates the necessity of using straight pipe air cushions in home construction. Only one arrestor in the main pipe line of the average six-room house is necessary. The arrestor has a patented slotted baffle which separates air



Behind the scenes in every industrial plant, pumps of all kinds play a very major role in the overall operation. It is extremely important therefore to make sure that the pumps which are used are engineered to give years of unfailing service. Every pump bearing the trademark of Pacific Pumping Company is unconditionally guaranteed. Over forty years of experience in pump engineering is your assurance that when you choose a Pacific Pumping Company pump you will receive a pump that is correctly engineered for the job that it is designed to do. We invite you to talk your pumping requirements over with our pumping engineers.

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from water and prevents surge and displacement of air cushion on larger pipe. It is designed to permit the cushion to be bled in case any air is lost. There are no moving parts and the attachment places no restriction on the flow of water.

Insulation Compound

Manufacturer: Stephenson Air Brush Paint Co., Oakland, Calif.

Equipment: New compound for insulation, acoustical treatment and anti-sweat protection.

Features claimed: The compound is composed of heat processed aluminum silicate blended with high-strength binder. It can be applied by brush or spray, and bonds firmly to metal, wood, concrete, masonry and similar surfaces. One coat provides full coverage; for increased insulation values, the coating can be built up to ¾-in. thickness by successive applications.

Aluminum Roof Glazing

Manufacturer: J. Royden Estey & Sons, Los Angeles, Calif.

Equipment: Revolutionary extruded aluminum roof glazing construction.

Features claimed: The high tensile aluminum alloy skylight construction insures maximum strength in skylights together with high resistance to corrosion and provides a method of retaining the glass in a weathertight manner without recourse to putty, storm clips, pads, bolts or any other expedients. Suitable flashings, designed to meet standard and special conditions, combine in one product a complete system of puttyless, non-ferrous roof glazing, having dual condensation gutters integral with the bars. Aluminum bars, shoes, brackets and glazing strips are supplied for any desired type of skylight construction.

Compact Fire Extinguisher

Manufacturer: The General Pacific Corp., Los Angeles, Calif.

Equipment: Single extinguisher set in a 6 x 27 in. cabinet.

Features claimed: The cabinet and extinguisher can be handily placed no matter how limited the available wall area. The cabinet, simple to install and modern in design, holds the 2½-gal. Soda-Acid fire extinguisher. The unit is designed to insure quick and ready use during emergencies even by inexperienced persons acting under emotional stress. The interior of the copper extinguisher is protected by a corrosion resisting alloy, a patented tight seal and double-strength wheel cap. A special feature of the cabinet is the natural squeeze handle, which automatically opens the door.

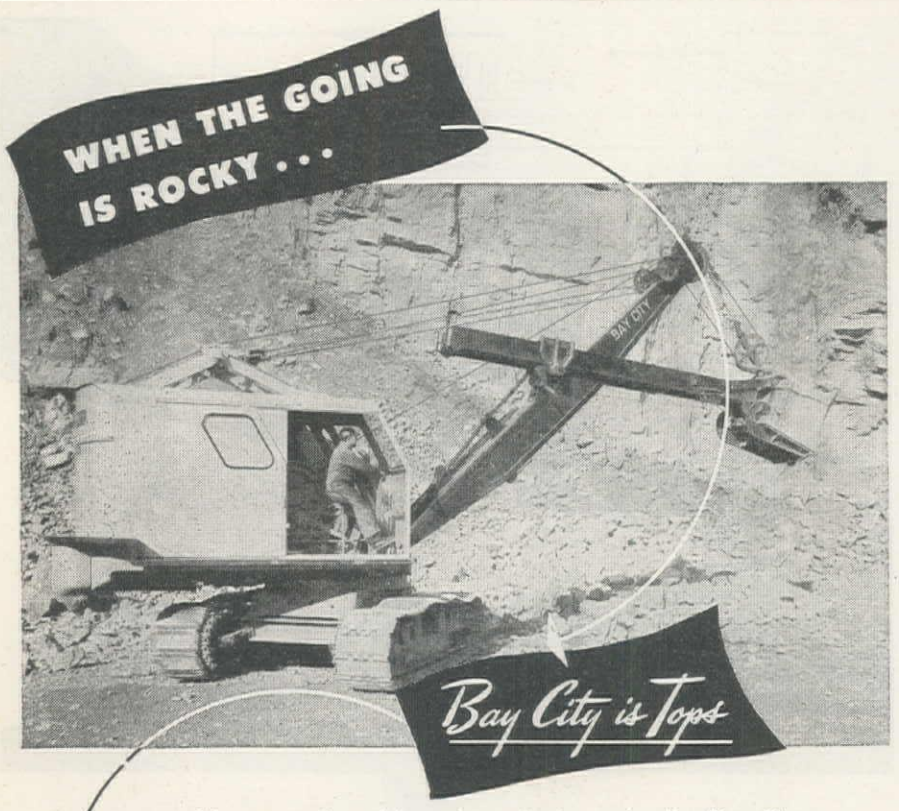


New Wall Construction Method

Manufacturer: Modern-Wall Co., Osborn, Ohio.

Equipment: Method providing highly simplified means of pouring, at the site, a concrete wall skeleton of interlocking, cement-filled metal forms.

Features claimed: Using interlocking metal members, to which the side panels are secured by means of special metal clips, the new process enables workers to erect walls of the steel-encased concrete framework in accordance with any architectural plan. The process lends itself equally well to interior walls or partitions. The metal members forming the basic elements consist of a preformed angle which is bent double to form a 14-in. long square tube that becomes a vertical member, an 8-ft. long horizontal channel, and small metal clips with which the panel boards are secured to the channel. The horizontal channels have squares punched out at 18-in. intervals into which the tube-like vertical forms are inserted. Both the vertical and horizontal members may be easily cut to meet any dimensional requirements.



No matter how big and tough the rock pile, Bay City performance is always just enough *bigger and tougher to clean up the job . . . fast!* Illustrated is the Bay City Model 65, 20-ton crane, equipped with 1¼ yard shovel, 21′ boom, 16′ handle, and powered by a Cummins HB I-600 Diesel. For complete particulars and assistance on determining the material handling equipment best suited to your requirements, *see your nearest Bay City dealer or write direct.*



BAY CITY SHOVELS CRANES
HOES • DRAGLINES • CLAMSHELLS
BAY CITY SHOVELS, INC., Bay City, Michigan

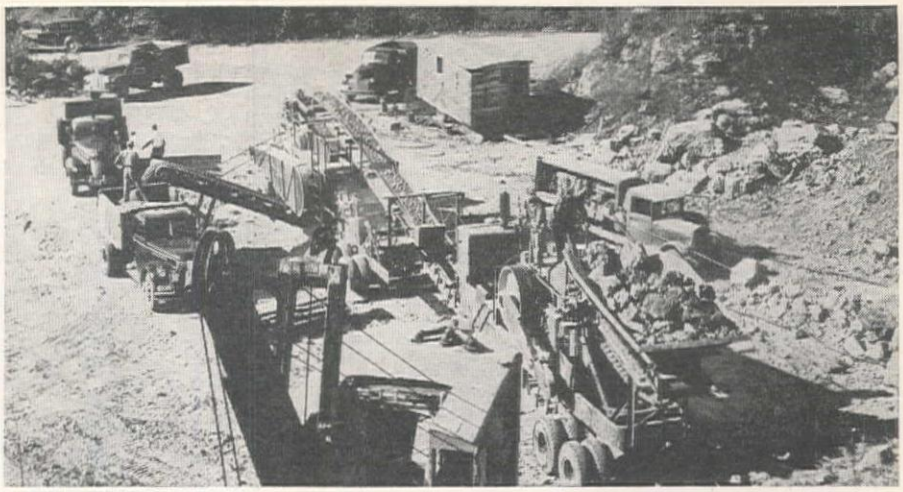
LOS ANGELES 11, Calif.—Brown-Bevis Equipment Co., Box 174 Vernon Sta.
SAN FRANCISCO 3, CALIF.—Garfield & Company, 1232 Hearst Bldg.
PORTLAND 14, ORE.—Feenaughty Machinery Co., 112 S.E. Belmont St.
SEATTLE 4, WASH.—1028 Sixth Ave., S.
BOISE IDAHO—600 Front St.
SPOKANE, WASH.—N. 715 Division St.
BUTTE, Mont.—B. M. Fletcher, 219 E. Park St.
SALT LAKE CITY 1, UTAH—C. H. Jones Equipment Co., 236 W. South Temple St.
CASPER, WYO.—Studer Tractor & Equipment Co., E. Yellowstone Highway
DENVER 17, COLO.—Held & McCoy Machinery Co., 3201 Brighton Blvd.

Portable Aggregate Plant

Manufacturer: Pioneer Engineering Works, Inc., Minneapolis, Minn.

Equipment: Portable plants for production of road aggregate from quarry rock.

Features claimed: The plant consists of two units. The primary unit has a 36 in. by 12-ft. apron feeder and 2436 jaw crusher. The secondary unit, with 40 x 22 roll crusher and 4 x 10 ft., 3½ deck vibrating screen, has a split feed arrangement which provides 80 sq. ft. of effective screening area. The portable plant is shown in operation at right at a quarry where trucks to carry crushed aggregate have easy access.



Alloy Electrode

Manufacturer: Hobart Brothers Co., Troy, Ohio.

Equipment: Electrode for making machine welds on cast iron.

Features claimed: The copper-nickel alloy electrode has mineral flux for metallic arc welding. The weld deposits are nonferrous, light grey in color, malleable, easily machinable and have a tensile strength equal to good cast iron. It is easily adapted to the welding of cast iron where the weld area must be machined, drilled or tapped anywhere in the weld zone.

Automatic Spray Machine

Manufacturer: Flex-Plane Co., Warren, Ohio.

Equipment: Machine for applying membrane curing material to concrete roads and airports.

Features claimed: The single nozzle machine, riding on forms, is fully equipped to apply material uniformly and without waste. Features of the machine are the remote control start and stop attachment, its method of double spraying each square foot of concrete, external-mix type spray gun, a 60-gal., constantly agitated tank, and the forced feed system of refilling the pressure tank.

Arc Welder

Manufacturer: Wilson Welder and Metals Co., Inc., New York, N. Y.

Equipment: Heavy duty arc welding machine.

Features claimed: The machine is designed to furnish a smooth steady current for every conceivable industrial welding job under the most adverse conditions, because of its weather resistant totally enclosed drip proof construction and special moisture proof insulation. It is of compact design and available in 200, 300 and 400 amp. models. It is designed for either 220 or 440 volts with no change in relays or additional wires being required for voltage reconnection.

Hydraulically Controlled Bulldozer

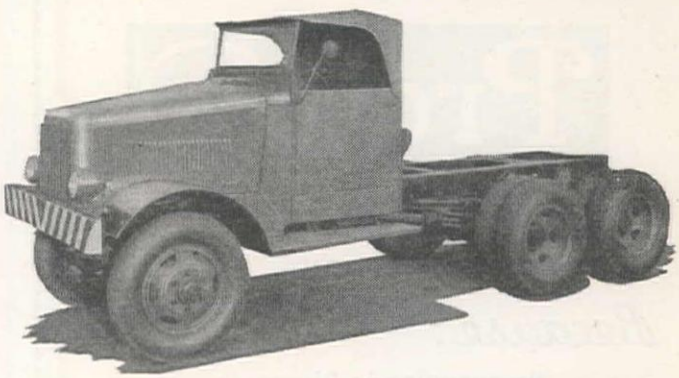
Manufacturer: Kay-Brunner Steel Products, Inc., Los Angeles, Calif.

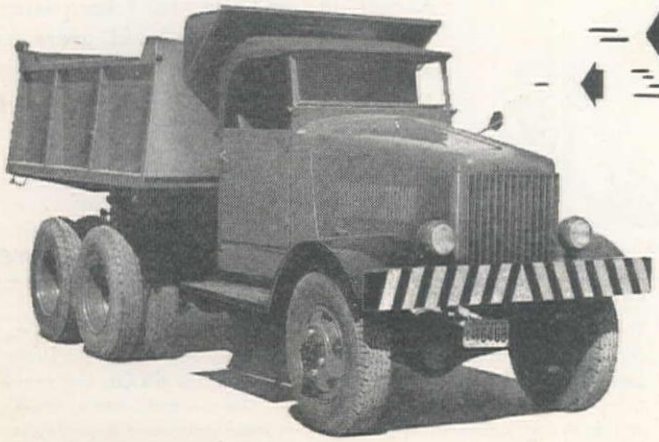
Equipment: Bulldozer with a positive hydraulic control unit of the double ram type.

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INTERNATIONAL 6 x 6 MODEL M-5H-6

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Features claimed: The moldboard of the Type G Bulldozer can be maintained at any desired position, reducing bucking of pressure, overheating of oil and excessive strain on working parts. The design of the moldboard provides increased load capacity. Equipment includes pump, controls, hose and complete accessories for easy mounting on "Caterpillar" D-2 and R-2 tractors.

New Electrode

Manufacturer: Hobart Brothers Co., Troy, Ohio.

Equipment: Electrode for downhand welding of high tensile low alloy steels.

Features claimed: The shielded arc welding electrode is designed for such downhand positions as deep groove, positioned and horizontal fillet welds. The forceful spray type makes it easy to handle and the spatter loss is low, resulting in a high rate of metal deposit. Slag is easily removed and cleaning time is reduced to a minimum. The electrodes are available in 5/32 and 1/4-in. diameters, and can use either DC or AC current.

Radial Arm Saw

Manufacturer: Red Star Products Inc., Cleveland, Ohio.

Equipment: Lightweight saw rotatable through 360 deg. allowing saw cuts at any angle.

Features claimed: Center pivot track makes possible the 360 deg. rotation. With the 100 per cent range, left hand miters can be cut with as much ease as the conventional right hand miters. Difficult saw cuts are made with the saw blade practically in the center of the table. The model has carefully calibrated, eye-level scales permitting quick set-ups for any operation. All controls are in front of the machine for easy access. The 8-in. saw blade is directly connected to the ½ hp. motor saving power that might otherwise be lost through gear friction.



Roof Ventilator

Manufacturer: Warner Ventilator Co., La Grange, Ind.

Equipment: Spinner type ventilator.

Features claimed: The ventilators are now equipped with step type ball bearings. The vertical, machined shaft on which the revolving head or blades are mounted is inserted in a tube, filled with weather-resistant lubricant, and rests on this bearing assuring easy propulsion of the unit from the slightest breath of air. The blades are shaped and spaced so as to emit contaminated air without permitting the entrance of rain or snow. Spinner unit is mounted on a square base which can be readily cut to fit roofs of any pitch. Units with circular base for mounting on stacks are also available.

Synthetic Paint for Concrete

Manufacturer: Lowebco, Inc., Chicago, Ill.

Equipment: Abrasion-resisting coating for concrete surfaces.

Features claimed: The paint contains practically no drying oils to react with the alkali in concrete since it dries by evaporation. It dries to a hard, glossy finish in about three hours, sealing concrete surfaces from moisture above or below. It expands and contracts easily with the surface covered and resists alkalis, acids, and extreme degrees of heat or cold. The coating, born of wartime research in the synthetics field, does not check or "dust."

Dozer Blades

Manufacturer: The Heil Co., Milwaukee, Wis.

Equipment: Bulldozer blades to match the huge TD-24 crawler tractor.

Features claimed: The straight-ahead blades are curved to roll the earth ahead of them. They are 10 ft. wide, 4 ft. high, and weigh over three tons. Cable controls drop the blade to unlimited digging depth and raise it up to four feet above ground. The

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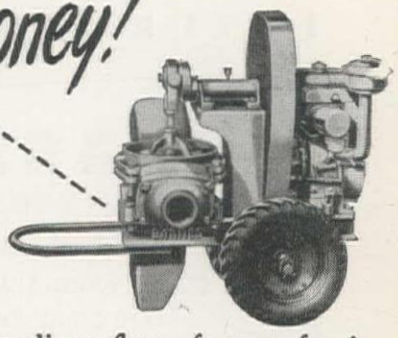
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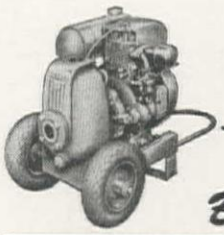
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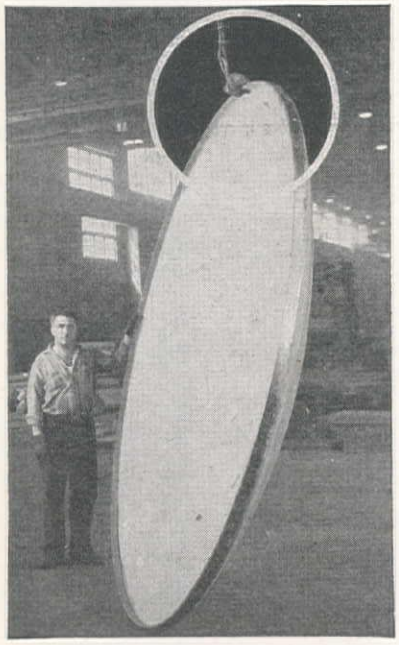
angle dozers may be adjusted to provide slanted pushing drive and rolling action for side banking and grading. They are 14 ft. wide, 44 in. high, and weigh over 4 tons. Down action of the blades is unlimited and cable control units lift them 50 in. above the ground.

Lifting Clamp

Manufacturer: Merrill Brothers, Maspeth, N. Y.

Equipment: Grip clamp for easy handling of awkward shaped articles.

Features claimed: The clamp will lift anything that has sufficient flat surface for



its jaws to grip. When it gets hold, no amount of pulling can make it loosen its grip, even if the surface is oiled or greasy. Articles which are usually difficult to get securely attached, such as large tanks and flanged heads, can be rapidly and safely lifted.

Mortar Sealant

Manufacturer: American Fluresit Co., Cincinnati, Ohio.

Equipment: Plastic sealant to waterproof mortar between glass block.

Features claimed: The sealant adheres to the mortar and forms a tight flexible bond to the glass, expanding and contracting with the mortar as well as the glass without rupturing the film. It is of plastic-like consistency and can be readily applied with a caulking gun, or thinned down with suitable solvents for brushing consistency. The product remains rubbery, and bonds tightly to mortar, glass, tile brick, metal and wood.

Hydraulic Jack

Manufacturer: Curtis Jack Co., Seattle, Wash.

Equipment: New type jack designed to meet the needs of house moving operations.

Features claimed: The jack is designed for operations where minimum clearance and maximum stability are essential. Principal characteristics are a wide base, shaped like a pyramid, with the hydraulic cylinder extending below the cribbing which supports the jack. In the 25-ton model, working clearance is 6¾ in., while lifting range is 16 in. Two oil pressure pumps, operated by a removable steel handle, provide high speed action with partial load plus maximum lift with full load, and the jack operates either vertically or horizontally.

Tilt Trailer

Manufacturer: C. R. Jahn Co., Chicago and Savanna, Ill.

Equipment: Trailers for transporting construction equipment.

Features claimed: The models are perfectly balanced so one man can raise or lower the platform. No jacks or loading ramps are required. The entire load can be carried on the trailer but the platform is so designed that the load may be shifted to transfer any desired weight to rear of the truck when greater traction is required. Positive automatic safety lock holds platform in position when loaded or empty. Rubber-mounted drawbar absorbs road shocks to protect both truck and trailer. Capacity of the two models is 5 and 8 tons.

Highspeed Earthmover

Manufacturer: Wooldridge Manufacturing Co., Sunnyvale, Calif.

Equipment: New 200 h.p. self-propelled earthmover.

Features claimed: Increased power enables the manufacturer's new Terra-Cobra model to climb steeper grades and traverse soft mud, sticky clay and loose sand under heavily loaded conditions with ample tractive pull and minimum gear shifting. A larger clutch and heavier duty transmission deliver maximum power on the drive wheels. High-capacity constant-mesh helical gears in the transmission insure faster shifting and smoother performance.



Smooth, effortless steering—without stopping the forward motion of the machine—with the cab in any position—that's OSGOOD Air-Controlled Steering! Independent air cylinders, actuated by a small lever in the cab, disengage and set steering brakes on the driving sprockets instantly, eliminating the need to hunt for a point where a steering lock can be engaged.

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DIESEL, GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES



Motor Grader

Manufacturer: J. D. Adams Manufacturing Co., Indianapolis, Ind.

Equipment: Powerful grader with 100 h.p. motor.

Features claimed: The grader weighs over 25,000 lb. without accessories, and the 18,000 lb. on the rear wheels supplies ample traction to make full use of the 100 h.p. engine. A combination mechanical-hydraulic steering mechanism gives the advantages of mechanical steering with power doing all the work. Push-button cab controlled electrical starting is furnished as standard equipment. The machine has a full-floating rear axle which drives only and carries no weight. Eight forward speeds range from 2.6 to 25.2 m.p.h. and hydraulic brakes are provided for all four tandem drive wheels. Other features of the grader include the 12-ft. blade 31-in. wide and a new two-piece cab that provides 6 ft. 3½ in. inside cab height and improved power controls that greatly increase the blade lifting speed.

New Line of Trucks

Manufacturer: Ford Motor Co., Dearborn, Mich.

Equipment: Streamlined 1948 range of models.

Features claimed: Two new series, the F-7 and F-8, are the largest ever manufactured by Ford. They have maximum gross vehicle weight of 19,000 and 21,500 lb. Another new series is the 6-cylinder cab-over-engine model. Three new power plants are available for the new trucks; a 95-h.p. 6-cylinder engine, a 100 h.p. V-8, and a 145 h.p. V-8. Greater front end strength has been achieved through improved sheet-metal suspension and heavier construction. Fenders are heavier and wider and of a new design which provides greater tire clearance. Advanced cab design provides living room comfort with more space and better ventilation. A one-piece windshield provides greater visibility and the rear window has been enlarged. The steering ratio has been increased to provide easier handling. Two-ton and heavier models are equipped with vacuum power brakes.

Transparent Waterproofing Formula

Manufacturer: Ranetite Waterproofing Corp., St. Louis, Mo.

Equipment: Waterproofing for outside walls of brick, stone, stucco and kindred surfaces.

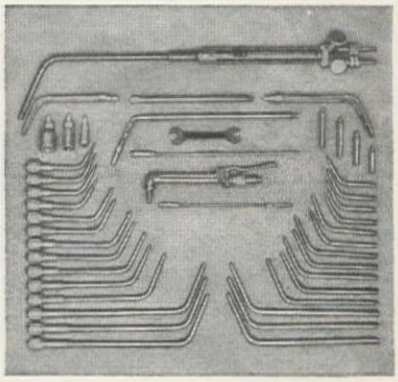
Features claimed: The improved formula seals out wall-weakening dampness and destroys the alkali deposits found on outside wall surfaces. It is crystal clear and will not change or discolor the texture of the surface. The improvement consists of the discovery of a new way to incorporate calcium and aluminum stearate as a base. This adds to the insolubility of the matter in water. A new fire proof feature has been accomplished by the addition of a solvent together with a solution of carbon tetrachloride.

Welding Torch

Manufacturer: Air Reduction Sales Co., New York City.

Equipment: New oxyacetylene torch.

Features claimed: The torch has a conventional weight of 1½ lb., and is only 11½ in. long. It has a capacity for operating



single flame welding tips from Nos. 0-13 inclusive as well as multiflame tips up to No. 15. Each welding tip is assembled with an individual mixer drilled for that particular size tip for better flame control and weld results. The torch head is of long-wearing monel metal.

Angling Type Bulldozer

Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Equipment: Hydraulically controlled bulldozer for use with the company's D4 track-type tractor.

Features claimed: The new tool gives increased earthmoving characteristics to the D4 tractor. The angled blade has a 31 in. lift above the ground with the blade straight while, with the blade angled but not tilted, the front point will lift 37½ in. The maximum blade pitch adjustment is 25 deg. and the maximum tilting adjustment is 6 in. The complete bulldozer assembly consists of the blade, C-frame, trunnions, hydraulic mechanism and heavy-duty radiator guard which protects the front-mounted hydraulic pump. The tool is fitted to the earth-moving tasks of the small contractor and to the "cleaning up" chores of the larger contractor.



***Keep the Job Moving with* WISCONSIN ENGINE POWER**

The tough, dirty jobs are made to order for Wisconsin Heavy-Duty Air-Cooled Engines . . . regardless of weather, season or geographical location. Equipped with weather-sealed high tension magneto with impulse coupling, these engines start fast and run steadily . . . protected against bearing failure on the long grinds by Timken tapered roller bearings at BOTH ends of the drop-forged, dynamically balanced crankshaft.

You get the most for your money in terms of increased productive capacity from both equipment and labor when you specify "Wisconsin Power". These 4-cycle engines are available in a full range of types and sizes from 2 to 30 hp.



WISCONSIN MOTOR CORPORATION

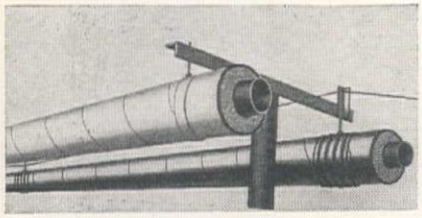
World's Largest Builders of Heavy-Duty Air-Cooled Engines

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Insulated Piping Units

Manufacturer: The Ric-wiL Co., Cleveland, Ohio.

Equipment: Pipe units for overhead distribution of oil, process liquids and steam.



Features claimed: The units are prefabricated at the factory with the asbestos, cork or other insulation machine coated with high temperature asphalt and tension wrapped with asphalt-saturated asbestos felt. A second coating of asphalt is followed by a tension wrapping of aluminum or copper foil which forms a perfect bond with the asphalt. The result is an efficient unit completely waterproof and weather protected. The units are shipped in 21-ft. sections, ready for installation with only one handling required at the job site.

Diesel Fuel Additive

Manufacturer: Industrial Chemical Corp., Los Angeles, Calif.

Equipment. Additive to produce more power and economy, and to reduce oil sludging.

Features claimed: When the additive is combined with Diesel fuel, it takes immediate chemical action against the ever-present sulphur, rosin, gum and tar content of the average fuel oil, turns these into substances that will ignite efficiently upon injection. This makes it possible to reduce the volume of injection to a point where perfect combustion is attained, thus increasing horsepower and fuel economy and providing longer periods of trouble-free engine operation. Other desirable results are cleaner screens and injectors and longer oil and compression ring life.

New Vinyl Resin Coating

Manufacturer: American Pipe and Construction Co., Los Angeles, Calif.

Equipment: Waterproof and weatherproof protective coating.

Features claimed: The coating is a pigmented resin dispersed in water. Because of this, it has no unpleasant odor either during or after application. It can be applied over concrete, masonry or wood surfaces and will not soften or lift old paint. The high solids content produces a thicker film with fewer coats to give greater coverage and better sealing action. The coating is available in white, selected pastel shades, and solid colors.

Bottom-Dump Earthmover

Manufacturer: The Euclid Road Machinery Co., Cleveland, Ohio.

Equipment: Bottom-Dump Euclid powered by a 274 h.p. Diesel Engine.

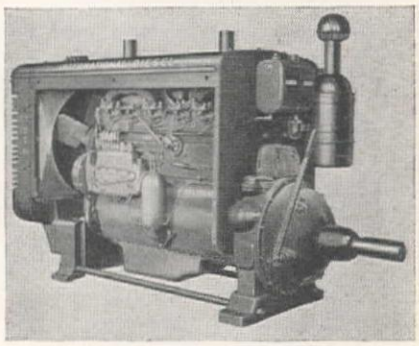
Features claimed: The earthmover hauls a payload of 25 cu. yd., struck measure, at a top speed of 24 m.p.h. The unit is designed for operations requiring big yardage production such as airports and earthfill dams. The low loading height of 8 ft., 10 in. to 10 ft., 6 in. maximum, and wide hopper, facilitate loading with large shovels, draglines and overhead hoppers. The short wheel base of the tractor and universal hitch permit short turns. Hydraulic power steering contributes to easy handling.

Six-cylinder Diesel Engine

Manufacturer: International Harvester Co., Chicago, Ill.

Equipment: Engine designed for heavy-duty operations.

Features claimed: The engine develops 191 h.p. at 1,375 rpm. Its four-cycle design



contributes to simplicity of engine operation and maintenance. It incorporates a twin-plunger fuel injection pump, especially designed to give smooth engine operation, governed speed regulation and minimum fuel consumption. The location of exhaust and intake manifolds on opposite sides of the engine assures maximum power and long valve and piston life by



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The Monroe Corporation bought one Dumpcrete last July and a second in August. These "paid for themselves in 18 weeks." No wonder they bought two more. Their Dumpcretes are hauling air-entrained concrete 3½ miles with no bleeding or segregation. No idle time, either, for Monroe writes, "When it's cold, Dumpcretes haul sand and gravel." You can save too. Write today for booklet.

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Salt Lake City—C. H. Jones Equipment Co.
San Francisco—Standard Machinery Co.
Seattle—Columbia Equipment Co.

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Lift heavier loads for longer periods with Goodall Elevator Belting. Built to handle largest buckets, withstand wear at bolt holes and remain flexible. For stronger, longer lasting elevator belts, specify Goodall.

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providing free flow of cool air into the engine and free flow of exhaust gases. The engine operates on ordinary lubricating oil without the need of oil coolers.

Pressure Valve

Manufacturer: Hannifin Corp., Chicago, Ill.

Equipment: Automatic pressure regulating valve designed specifically for service on compressed air supply lines.

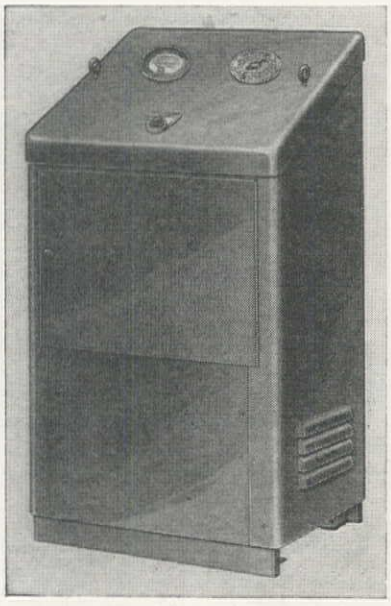
Features claimed: The new development embodies a number of construction and operating features heretofore unavailable in a small size, moderately priced valve. Through the use of an ingenious "free-floating" valve stem, it is possible to back-off or reduce the delivered pressure under dead end conditions merely by turning the adjusting screw. Pressure reduction through use of the screw provides high precision control. Steel insert in the valve body provides permanency and accuracy of thread engagement with the screw. An adjusting screw locknut is used for making permanent pressure settings. The regulator is for use on primary air pressures up to 150 p.s.i., and can be set to maintain reduced pressures ranging from 125 down to 5 p.s.i.

Battery Charger

Manufacturer: General Electric Co., Schenectady, N. Y.

Equipment: New motor-driven battery-charging unit.

Features claimed: The unit is designed for charging 6-cell lead-acid and 10-cell



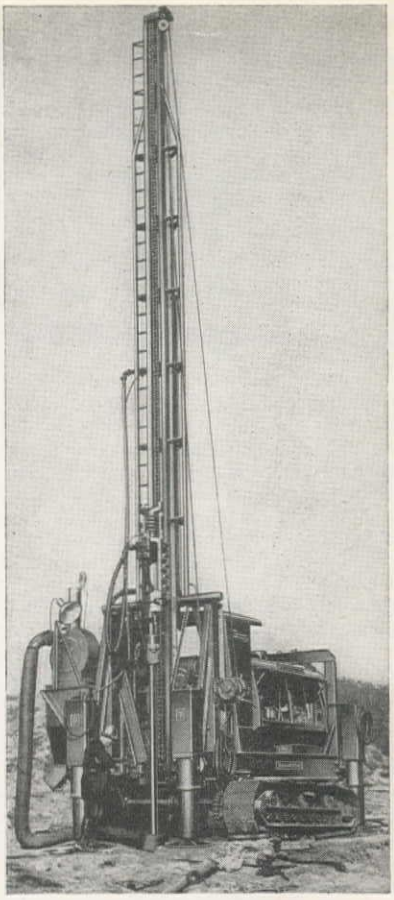
Edison batteries. Starting, charging, and shut-down are performed automatically. The motor-generator set and all controls are contained in a cabinet 34 x 24 x 12 in. Timer, ammeter, and control switch are mounted on a sloping top for manual or automatic operation. A door in the front opens into a storage cabinet. The unit can be used on 220- or 440-volts, 3-phase, 60-cycle power supply.

Blast Hole Drill

Manufacturer: Ingersoll-Rand Co., Phillipsburg, N. J.

Equipment: New self-propelled rock drill designed for strip, open pit mining and quarry work.

Features claimed: The machine is a completely self-contained unit, consisting of a drill, compressor plant, propulsion equipment, and accessories. It collars a hole with ease and drills up to 6 in. in diameter and up to 70 ft. in depth. The rock drill is an air-operated, piston-type drill that strikes more than 200 blows per minute. The unit, mounted on generously-sized crawlers, is easily moved and can be spotted in an exact position and the entire unit can move up a 30 per cent grade. Four independently controlled hydraulic jacks are used in leveling up the machine.



Protective Coating

Manufacturer: Kay-Tite Co., West Orange, New Jersey.

Equipment: Membrane coating now available in additional colors.

Features claimed: The Portland Cement based membrane coating for porous masonry is made in seven colors beside white and gray. It supplies a scientific coating for the control of water seepage and is composed of exactly balanced, properly processed inorganic elements. The cement base secures a natural affinity for mortar, concrete and stucco. The coating closes the pores of concrete with a durable as well as a decorative protective coat.

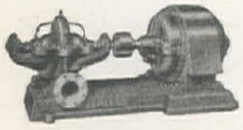
New Electrode

Manufacturer: Lincoln Electric Co., Cleveland, Ohio.

Equipment: Electrode for simplified hard surfacing of tools and dies.

Features claimed: Working surfaces or edges of cold-working metal cutting and forming tools are given high strength for resisting wear and impact in all applications where high temperatures are not encountered. When deposited on either ordinary carbon steel or on any one of the hundreds of alloy steels, the electrode produces a surface whose properties will match those of the best tool and die steels. The electrode will operate on either AC or DC current.

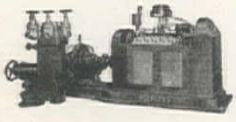
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Single Stage Pump

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Capacities: Up to 70,000 G. P. M.
Heads: Up to 300 feet
1 to 1000 H. P. • All Types Drive



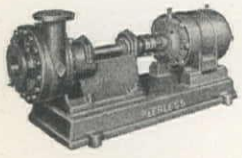
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Pressure: Up to 150 lbs.
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PEERLESS TYPE C PUMPS

Capacities: 10 to 1200 G. P. M.
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LITERATURE FROM MANUFACTURERS . . .

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the Western Construction News, 503 Market Street, San Francisco 5, California.

WELDING APPARATUS — **Tweco Products Company,** Wichita, Kan., has published two new bulletins. The new two-page bulletin entitled "Causes and Cures for Hot-Running Welding Cables and Connections" simplifies for easy understanding the arc welding process. Individuals charged with operating and maintaining welding cables will find many helpful hints to every-day problems. The second release is a 12-page "Twecolog" which fully describes the complete line of Tweco Welding Electrode Holders, Ground Clamps, Cable Connectors, Machine Terminals, Cable Splicers, Lugs and Carbon Holders. Quantity price and parts information is included. The bulletin shows new models.

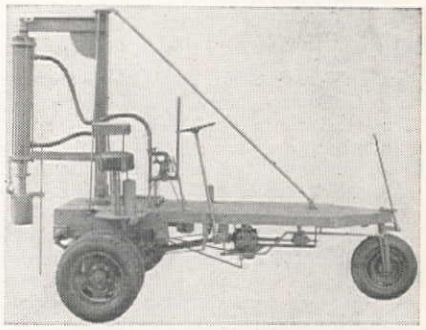
INDUSTRY ENGINEERED HOMES—**The Structural Clay Products Institute** of Washington, D. C., has published a new 28 page plan book showing six industry engineered homes designed for masonry construction. The plan book shows floor plans for a two-bedroom one-story home, a two-bedroom two-story home, three-bedroom homes of one and two stories, and two homes with three bedrooms on the second floor and an additional bedroom or study on the first floor. The book points out that adoption of the principles of the engineered housing program results in lower building costs, greater structural perfection arising from the fact that the homes are planned to fit the dimensions of standard materials, the benefit of modern design, and earlier occupancy made possible by the fact that the plans call for standard materials which dealers customarily keep continuously on hand.

GAS WELDING WIRE—**Page Steel & Wire Division, American Chain & Cable Company, Inc.,** Monessen, Pa., has just released the new Page Gas Welding Rods Catalog, believed to be the first of its kind ever printed. This attractive, 3-color, 24-page brochure is devoted exclusively to Gas Welding Wire and its use. Easy-to-find index plus orderly, clean-cut layout, makes this catalog easy to use. It covers the complete Page line; gives the application—procedure—proper torch adjustment—physical properties, etc., of each gas welding rod. On the back cover, there's a convenient reference chart, "Page Welding Electrodes and Gas Welding Rods." Numerous application photographs are shown throughout the booklet.

3M ADHESIVES — **Minnesota Mining and Manufacturing Co.** of St. Paul, Minn., is offering a new brochure entitled "3M Adhesives in Industry." Research help for industrial customers in the choosing of the right adhesives, sealers and coatings is given in the 28-page brochure. It also contains 40 pictures, cites 18 case histories, and lists 26 of the more than 1,000 formulae offered by the company's adhesives and coatings division in Detroit.

TUBE CLEANERS—**Thomas C. Wilson, Inc.,** Long Island City, N. Y., has announced the release of a new catalog of tube cleaners. The catalog No. 76 contains

BREAK PAVEMENT
the low cost way!



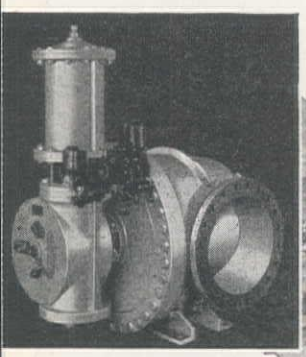
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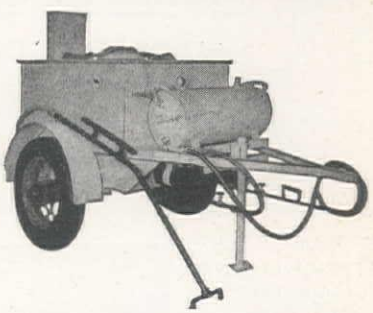


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48 pages, printed in three colors, and is replete with illustrations and conveniently arranged tables. It covers the complete Wilson line of tube cleaners for use in refineries, power plants, marine boiler rooms, locomotives, and chemical process plants. All listings are organized for easy reference, and include application data as well as technical information, operating hints, and other pertinent data.

LIGHTWEIGHT PUMPS — **Gorman-Rupp Company,** Mansfield, Ohio, has just released Bulletin No. 7LW-13, "Gorman-Rupp Self-Priming Centrifugal Lightweight Pumps," the first of what is to be a complete series of bulletins describing the entire new line of centrifugal pumps. Pictures of the three new lightweight pumps, the Midget 1½ in., the Hawk 2 in., and the Eagle 3 in., together with their descriptions, performance dates and performance graphs are given. Lists and illustrations of some of the many uses for the pumps in municipalities, utilities and on farms are covered.

STOPPING BACK-RUN — **The Falk Corp.** of Milwaukee, Wis., has available a four-page, illustrated bulletin on the improved Backstop, providing complete, easy-to-read information on the construction and operating advantages of the Falk Backstop. Information on sizes, capacities and dimensions is given.

CRAWLER TRACTOR—**International Harvester Co.,** Chicago, Ill., has available now a colorful, pictorial book on the new TD-24 crawler tractor. The book has a four-color cover featuring both the TD-24 and "Planet Power Steering," the latter being a new design development in the crawler tractor field. This book uses the "picture story" techniques employed in modern magazine layout. Over 50 sectional views, line drawings and photographs—many in two colors—give a clear portrayal of the working functions of all important parts in the TD-24 and the hydraulically controlled steering system.

HOOKS, TONGS, GRIPS & SLINGS —**Downs Crane & Hoist Co.,** Los Angeles, Calif., has published a 16-page booklet illustrating hooks, tongs, grips and slings for safe fast handling of heavy loads, offering catalogued information and photographs on this type equipment. Construction features, capacity ratings, safety factors and specifications are shown.

SPEEDY CURB AND GUTTER PAVER—**Dotmar Industries, Inc.,** Kalamazoo, Mich., has just released a two-color bulletin containing comprehensive information and interesting operating views on the recently developed Dotmar Curb and Gutter Paver. This self-propelled paver lays conventional curb and gutter of any shape or cross-section specified; and roll over or lip curb and gutter and dividing curb of any cross-section. It also lays highway concrete gutter designed to prevent erosion or provide drainage, and separate curb formed after street or highway slab is already paved. The bulletin contains full specifications.

INDUSTRIAL WELD REPAIR—**Eutectic Welding Alloys Corp.,** New York, N. Y., has recently issued a new four-page bulletin setting forth simplified welding technique for maintenance and repair of a wide variety of metals, forms, castings, shapes, and heavy machinery components. Specialized methods are described in considerable detail. Photographs and diagrams illustrate typical step-by-step operation. Brief case histories reflect maintenance problems of heavy, rather than light industry. Various ferrous and nonferrous-base alloys for arc and gas welding applications are identified and their main properties made clear.

WAYSIDE POWER — **Caterpillar Tractor Co.** of Peoria, Ill., recently published "Caterpillar Diesel Wayside Power," an eight-page booklet directing the attention of "wayside inn" owners to the comforts and conveniences of electric power. The three-color booklet describes in pictures, testimonials and explanatory copy the satisfaction found by tourist court and service station owners in operating Diesel electric sets. The booklet covers the work done by the equipment from the Redwood Highway in California to Babb's Amusement Park in Southwick, Mass.

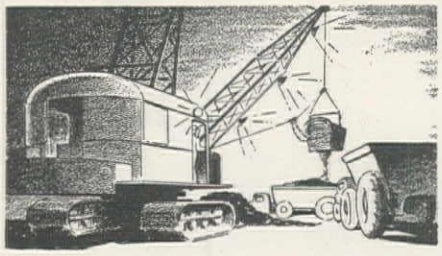
SPEEDY TILTING MIXER — **The Edward R. Bacon Co.** of San Francisco, Calif., has just released a booklet that will be of special interest to all small job contractors. The Jaeger 3½ Speedy End-Discharge Tilting Mixer, an improved trailer-type mixer, is the subject of the two-color booklet. Its speedy mixing, towing, spotting and its ruggedness are described editorially and illustrated by action photographs. General specifications are given.

SILASTIC FACTS NO. 5—**Dow Corning Corp.,** Midland, Mich., has published a 16-page book giving new and more complete data on all commercially available types of Silastic, the Dow Corning Silicon Rubber. Several new types of Silastic are included among the six pastes and the six molding and extruding stocks for which typical physical properties including hard-

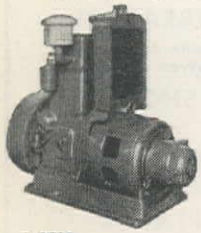


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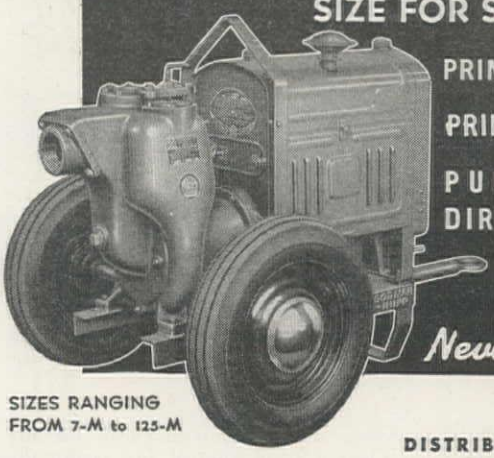
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ness, tensile strength and elongation are given. Data include graphs which show changes in physical properties, changes in hardness, brittle points, compression set values and changes in dielectric constant and power factor. Its usefulness as gasketing material is indicated in tables showing resistance to various chemicals, refrigerants and to high and low swell lubricating oil. Use of Silastic as an electrical insulating material is indicated in tables of dielectric properties.

INTERMEDIATE CONE CRUSHERS—**Nordberg Manufacturing Company,** Milwaukee, Wis., announces publication of Bulletin 151 on Symons Intermediate Cone Crushers for rock, gravel and ore reduction. This two-color pamphlet is illustrated and gives specification data and operating information. One page is devoted to the recently introduced Packaged Unit Crusher.

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MacDonald Co. Reno
Mahl Steel & Supply Co. Los Angeles