WCW-12-1946

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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DECEMBER • 1946

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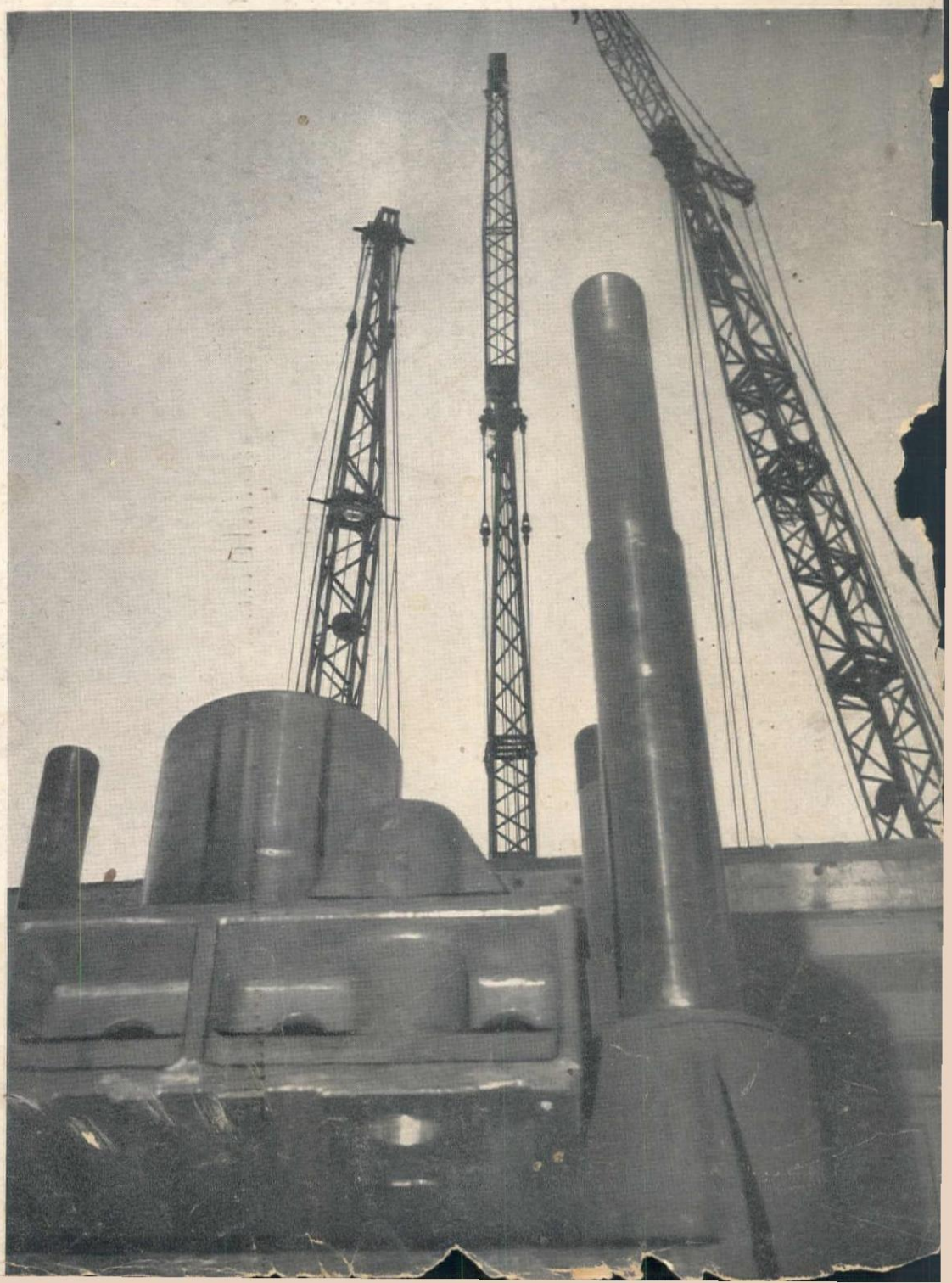
IN THIS ISSUE



Solar Aircraft Co. lowers a gigantic hydraulic press through a hole in the roof of the hammer building at it San Diego plant, using cranes of the R. E. Hazard Co., San Diego contractor. The press weighs 131 tons as it now stands. The main ram exerts a pressure of 750 tons and the smaller ram 250 tons. The cushion is rated at 150 tons, pushing upwards.

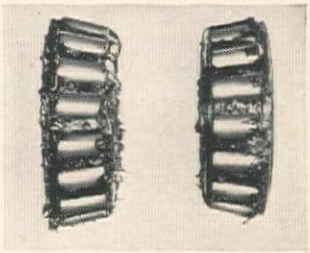
Lower Maintenance Costs Assured

Use a lubricant that protects chassis longer — TEXACO MARFAK. The pictures tell why *Marfak* protection lasts longer. *Marfak* won't splatter under the heaviest blows of a hammer — won't squeeze or jar out of bearings under hammering road shocks, either. It cushions the parts, adds miles to their life.

"Hammer Test" proves Marfak protects parts longer

"Stretch Test" proves Marfak seals out dirt and moisture

And see how *Marfak* s-t-r-e-t-c-h-e-s. Ordinary grease won't do that. But *Marfak* is cohesive. It holds together. That means it seals out dirt and moisture — protects chassis parts for extra thousands of miles.



Marfak Heavy Duty makes wheel bearings last longer

Use a lubricant that adds life to wheel bearings — TEXACO MARFAK HEAVY DUTY. Despite heavy loads and high speeds, *Marfak Heavy Duty* stays in the bearings. It provides fluid lubrication inside, but retains its original consistency at the edges — thus sealing out dirt and moisture, sealing itself in, assuring safer braking. No seasonal change is required.

More than 250 million pounds of Marfak have been used!

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO REG. T.M.

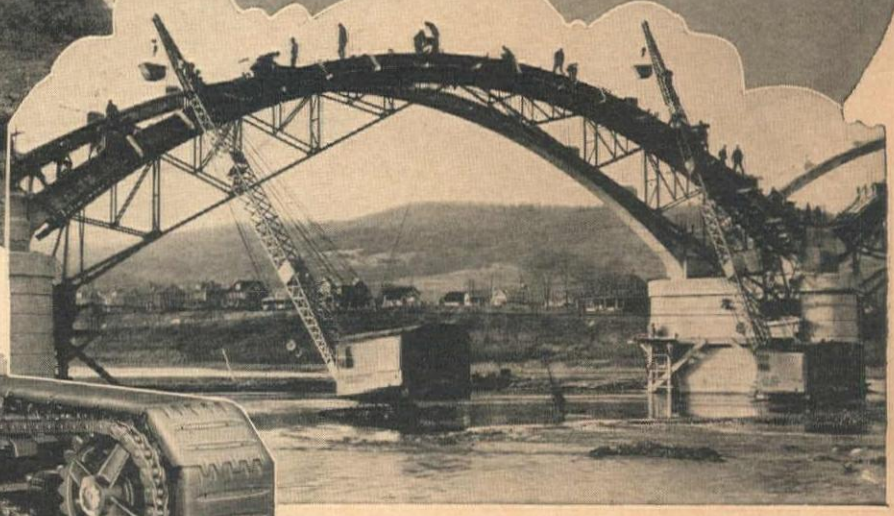
TEXACO Lubricants and Fuels

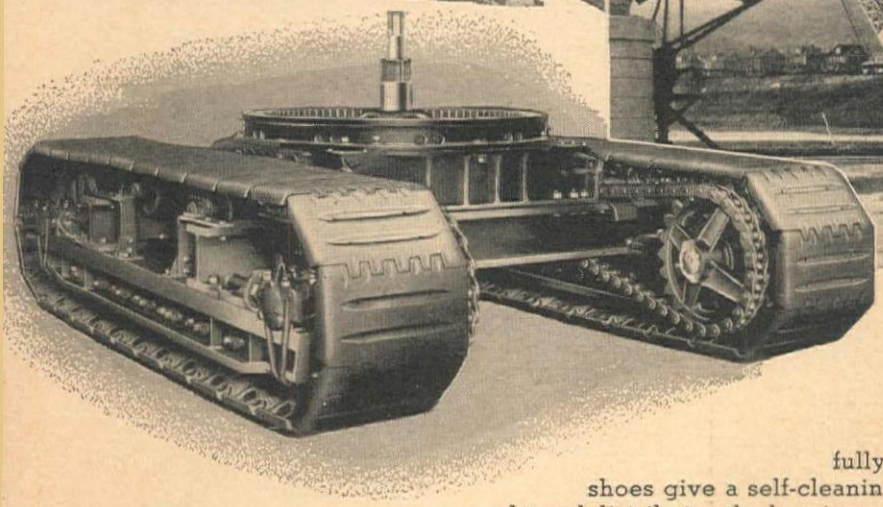
FOR ALL CONTRACTORS' EQUIPMENT

Tune in . . . TEXACO STAR THEATRE presents the NEW EDDIE BRACKEN SHOW every Sunday night. Metropolitan Opera broadcasts every Saturday afternoon.

When you buy a SHOVEL CRANE or DRAGLINE

LOOK at these crawlers!





THERE *is* no other crawler like this! The crawler base is a heavy annealed steel casting proved in years of service. All travel gears are fully enclosed and run in oil. Alternate lugs on tread shoes give a self-cleaning action. A ball and socket action between roller and tread distributes the bearing pressure more evenly. The idler sprocket is without teeth, eliminating the jerky action common to ordinary crawler drives. Joints between treads are closed and smooth, eliminating the "nut cracker action" that chips tread shoes.

Half-length floating pins simply locked in, reduce wear and replacement in tread shoes. And most important of all—positive traction on both crawler belts while turning as well as when going straight ahead, on all the larger Northwests, assures full traction when you need it most, enabling Northwests to go where others have difficulty.

Plan well ahead for your Northwest. Let us send you details on the size that interests you.

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A HEAPING LOAD *Every* 30 SECONDS

TOP—Three hydraulic control levers within convenient reach of operator provide coordinated control of crawler tractor and Loader.

ABOVE—Loaded Bottom-Dump Euclid on ramp approaching fill.

★

● On this 300-acre reservoir job at Lima, Ohio, A. J. Baltes, Inc., used a Euclid Loader and Bottom-Dump Euclids in moving most of the 1,200,000 cu. yds. from the reservoir site. This excavation went into the earth dam, varying from 15 to 40 feet high, around the perimeter of the reservoir.

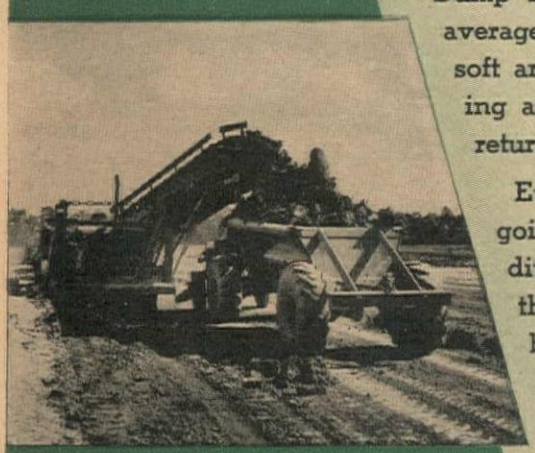
The Euclid Loader delivered payloads of 12 bank yards of heavy, wet soil in an average of only 30 seconds, in a travel distance of 62 feet. Bottom-Dump Euclids carrying the material to the fill averaged 5.6 m.p.h., at time of observation, despite soft areas caused by heavy rain. The fast dumping and quick turning of Euclids saved time in returning to the Loader.

Euclid Loader and Bottom-Dump fleet kept going day after day under varying operating conditions. This dependable performance reaffirmed the contractor's confidence in "Eucs"— for he has been using Euclid equipment for nine years.

Your Euclid Distributor will be glad to discuss your requirements and supply helpful information.

★

BELOW—Loader easily handled heavy, wet material. Soil weighed about 2,800 lbs. per cu. yd.



The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

Brown, Fraser & Co., Ltd., Vancouver, B. C.; A. H. Cox & Co., Seattle, Wash.; Hall-Perry Machinery Co., Butte, Mont.; Lively Equipment Co., Albuquerque, New Mexico; Constructors Equipment Co., Denver, Colorado; Pacific Coast Branch: 3710 San Pablo Ave., Emeryville, Calif.; Intermountain Equipment Co., Boise, Idaho, and Spokane, Washington; Lang Company, Salt Lake City, Utah. REPRESENTATIVE: M. H. Johnson, W. 2411 Crown Avenue, Spokane, Washington.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for December, 1946

J. M. SERVER, JR.
Editor

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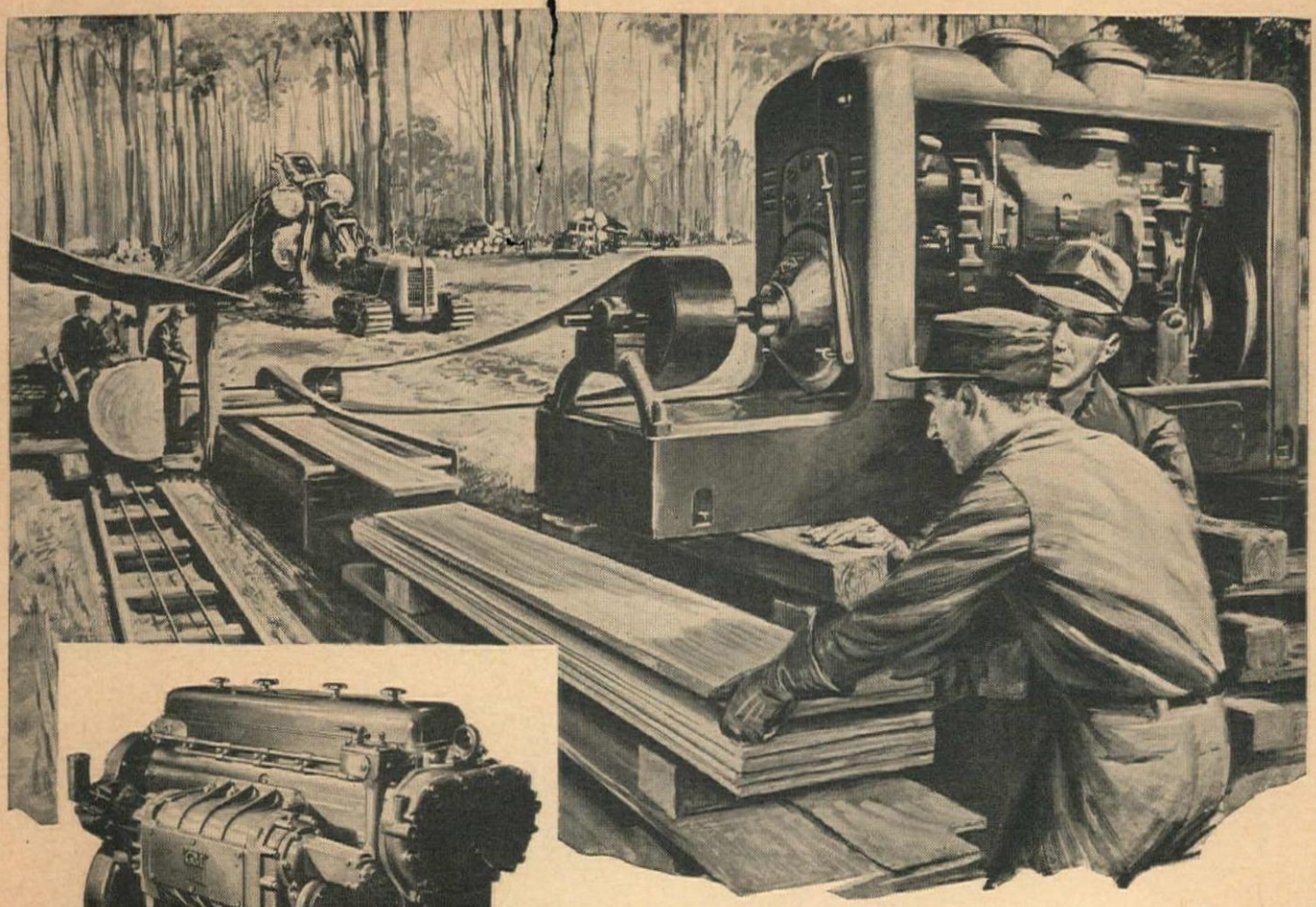

CONTRACTORS—
For Great Diesel Power
take a look at Lumbering

THROUGHOUT the lumber industry a new kind of power is taking over. It is flexible power that can operate the whole mill—can drive pond drag, head saw, edger, trimmer, cut-off saw, conveyor and what-have-you. It is economical power—makes fuel costs next to negligible. It is sturdy power—responds immediately to increased loads. It is portable power—moveable to the next job with little fuss.

In short it is Series 71 General Motors Diesel power.

GM Diesels are 2-cycle. That makes them compact as well as powerful. They have clean design, unit injectors and Uniflow scavenging—making them clean-burning, efficient and easy to take care of.

These features make GM Diesels important to any industry.

* * *

So whatever needs for power you may have in road-making machinery, crushers, shovels or any other construction equipment—look to GM Diesels.

Features of GM Diesels Important to Every User of Power

- ***QUICK TO START*** on their own fuel
- ***ECONOMICAL***—run on low cost fuel
- ***EASY TO MAINTAIN***—clean design plus accessibility
- ***LESS FIRE HAZARD***—no volatile explosive fuel
- ***COMPACT***—readily adaptable to any installation
- ***SMOOTH OPERATION***—rotating and reciprocating forces completely balanced
- ***QUICK ACCELERATION***—2-cycle principle produces power with every downward piston stroke

DETROIT DIESEL ENGINE DIVISION
DETROIT 23, MICH. • { SINGLE ENGINES . . Up to 200 H.P. / MULTIPLE UNITS . . Up to 800 H.P.
GENERAL MOTORS

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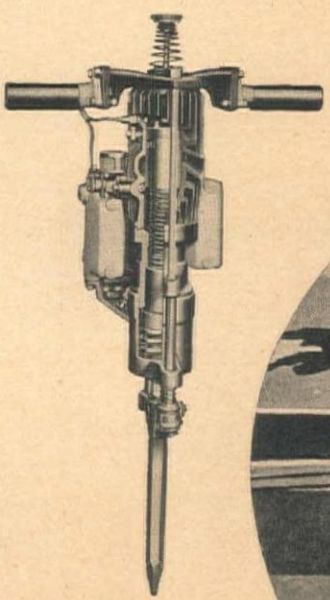
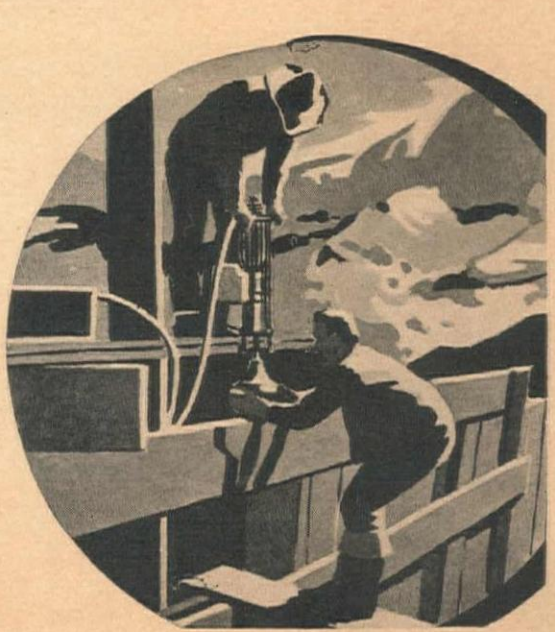
MEETING CRITICAL NEEDS

...Winning a Still Greater Following

Thousands of jobs are moving faster because Barco Hammers are at work, hitting hard and tirelessly. On construction, repair, demolition and expansion projects, big or small — this compact, portable unit is increasing the output, cutting down on time and cost. Breaking, driving, drilling, tamping—in use singly or in a crew — Barco Hammers have never been more valuable, never more praised by owners and operators alike. Eleven special tool attachments, quickly interchangeable. Send for complete particulars. Barco Manufacturing Co., Not Inc., 1819 Winnemac Avenue, Chicago 40, Illinois.

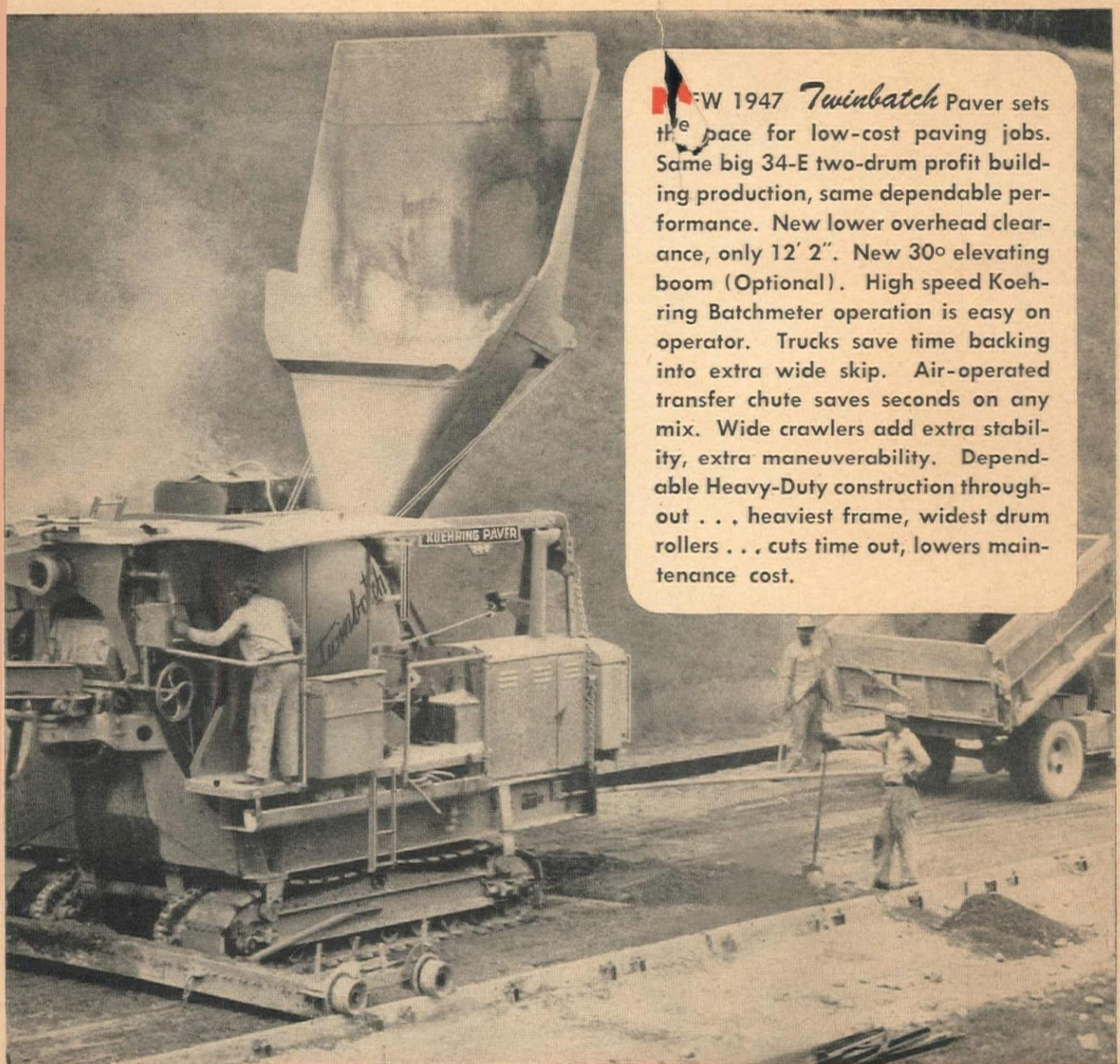




BARCO

Portable Gasoline HAMMERS

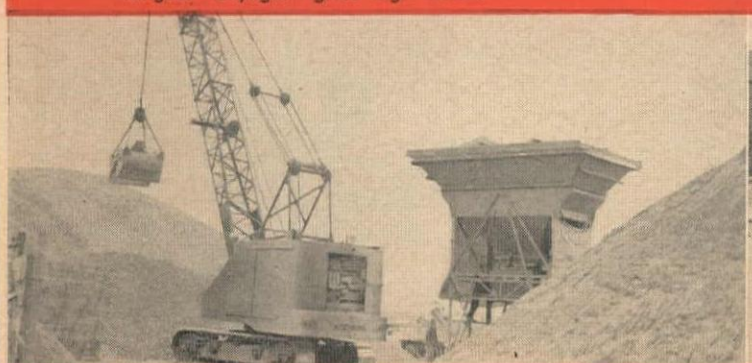
Free Enterprise—The Cornerstone of American Prosperity

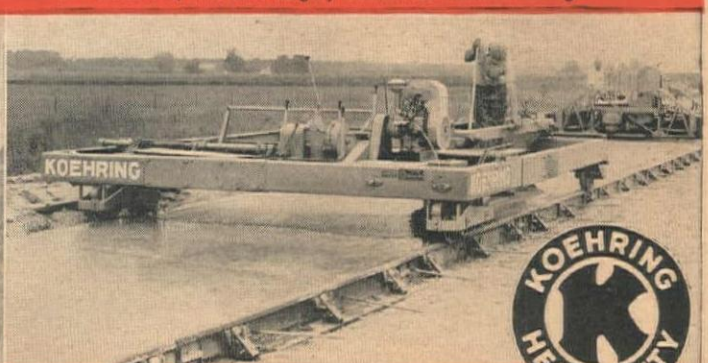


NEW 1947 *Twinbatch* Paver sets the pace for low-cost paving jobs. Same big 34-E two-drum profit building production, same dependable performance. New lower overhead clearance, only 12′ 2″. New 30° elevating boom (Optional). High speed Koehring Batchmeter operation is easy on operator. Trucks save time backing into extra wide skip. Air-operated transfer chute saves seconds on any mix. Wide crawlers add extra stability, extra maneuverability. Dependable Heavy-Duty construction throughout . . . heaviest frame, widest drum rollers . . . cuts time out, lowers maintenance cost.

With 2-yard clamshell bucket, this Koehring 605 keeps batch plant humming. Power clutch eliminates operator fatigue. "Skylight" gives high vision.

Slab contours are always finished to exact specifications with a Koehring Longitudinal Finisher on slab. A Koehring exclusive, this unit largely eliminates hand finishing.





KOEHRING HEAVY DUTY

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Rolling again!

The Mack family—the finest bunch of truck craftsmen you can find anywhere—is back on the job . . . working together again to produce the nation's outstanding trucks.

To our employees: *"Welcome back."*

To our customers: *"Thanks for waiting."*

Naturally, it will take some time to reach full-scale production again. Many materials good enough to maintain the 46-year standard of quality of Mack trucks still aren't plentiful—but our lines are moving. We'll do our level best to get new Mack trucks and parts to you as soon as possible.

Mack MANUFACTURING CORPORATION

In behalf of its 67 Direct Factory Branches and 600 Dealers

KNOW YOUR LAST COST FIRST

"Caterpillar" Diesel D8 Tractors move earth on Peter Kiewit Sons' Friant Dam canal contract, in the upper San Joaquin Valley, Calif.

"CATERPILLAR" Diesels have had to be good to get where they are—at the top in earthmoving.

It isn't their purchase price, for "Caterpillar" equipment doesn't come cheap. It's their rugged stamina, high earning power and low *last* cost that make experienced owners demand nothing but "Caterpillar" Diesels.

Peter Kiewit Sons have a national reputation as big earthmovers. On their 8-mile canal contract below Friant Dam, in the upper San Joaquin Valley, a fleet of Diesel D8 Tractors pulls the rippers and scrapers. Additional "Caterpillar" Diesels on the job include a D7 Tractor, a D4 Tractor, a No. 12 Motor Grader and two "Caterpillar" Diesel Engines, powering Gardner-Denver compressors.

Like other good contractors, Peter Kiewit Sons know that "Caterpillar" Diesel equipment is built for long, dependable working life, and that its low final cost is backed by dealer service without a parallel in the business.

CATERPILLAR TRACTOR CO., SAN LEANDRO, CALIF.; PEORIA, ILL.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT—*for lowest costs on earth*

Don't Just SA[illegible] SkilSaw It!

GET A SKILSAW

Time is too precious to use anything but a SkilSaw on every cut on every construction job. Ask your distributor today about a demonstration.

PORTABLE ELECTRIC

SkilTools

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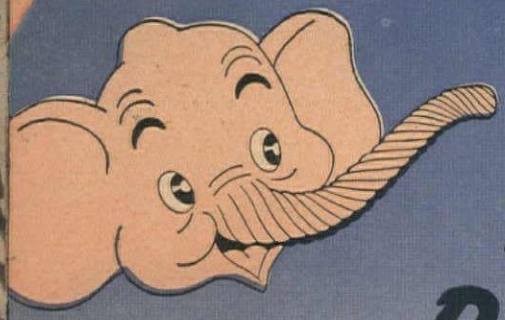
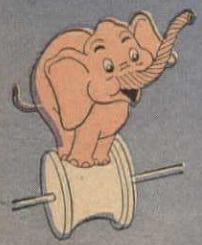
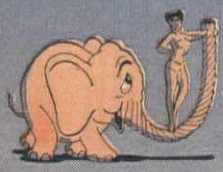


union-formed *For Long Lived* PERFORMANCE

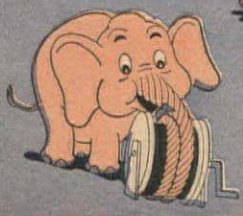


UNION-FORMED SPOOLS BETTER . . . even with a light load it winds evenly and tightly.



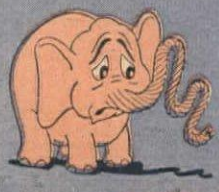
UNION-FORMED RESISTS KINKING . . . because wires and strands are free of internal stress, they do not fight to get out of their preformed positions.

UNION-FORMED HAS GREATER RESISTANCE TO BENDING FATIGUE . . . withstands more bends, even reverse bends, because it is more stress-free internally.



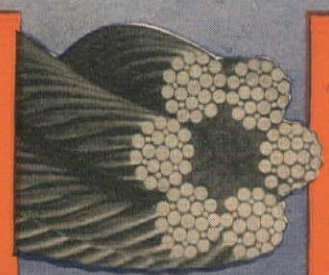
UNION-FORMED RIDES BETTER ON GROOVES . . . does not spin over sheaves or grind through blocks.

UNION-FORMED IS SAFER TO HANDLE . . . worn, broken wires do not spring out and porcupine but continue to lie close to the rope.



UNION-FORMED IS FLEXIBLE and RELAXED . . . bends in any direction, yet has "toughness" to withstand jerking and other punishing strain.

union-formed
(Preformed)



THE ULTIMATE LOW COST
WIRE ROPE

Union Wire Rope

Union's Specialists Cover the Map to Give You Unmatched WIRE ROPE SERVICE

Union's is an organization of specialists which devotes its whole time to bettering wire rope.

Here pictured is an important part — the link between user and Union's laboratory and factory. This staff of field specialists man Union's branch warehouses and offices. It works in the field with strategically located distributors.

This not only provides wire rope users with an S. O. S. (service on schedule) source of supply close at hand — it also equips each outlet with the extra "know-how" for proper wire rope application. The end result is better service from better wire rope better fitted to the individual machine and job.

You are urged to make full use of Union's staff of factory-trained field specialists and Union's library of books on wire rope usage.

UNION WIRE ROPE CORPORATION 2146 MANCHESTER AVE. KANSAS CITY 3, MISSOURI

Send wire rope books as checked:

- ☐ Rope Dope No. 1
- ☐ Splicing Wire Rope
- ☐ Socketing Wire Rope
- ☐ Steel Tendons of Industry
- ☐ Wire Rope Lubrication
- ☐ Correct Handling of Wire Rope
- ☐ Mining Rope Special
- ☐ Slusher Rope Special
- ☐ Choker Rope Special

Firm Name _____

Address _____

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Always Your

INTERNATIONAL

DIESEL CRAWLERS

for Dirt Moving

WHERE real dirt-moving records are being made, there's a Diesel crawler tractor doing the heavy work. If it isn't doing the whole job of powering the digging, carrying and spreading, it pushes other rigs through the loading zone to get capacity loads rolling quickly.

Whether hauls are long or short, Diesel Crawlers are in there to make the job move along on schedule. Without them, many a vaunted record would not have materialized.

Because International Diesel Crawlers are geared to the earth with maximum ground contact, their power to push or pull is totally effective, even on soft footing. And because International Diesels have great hang-on, they go through where many another prime mover would stall.

Yes, your best bet is International Diesel Crawlers for all earth-moving power. Advanced engineering gives them long life, smooth performance, unit construction for easy and time-saving service and a positive instant starting system. Their rugged build assures true alignment of all moving parts and an unusual ability to absorb punishment. Their full-Diesel engines assure matchless operating economy. Their excellent balance and maneuverability give them sure-footed safety and quick response to all performance demands.

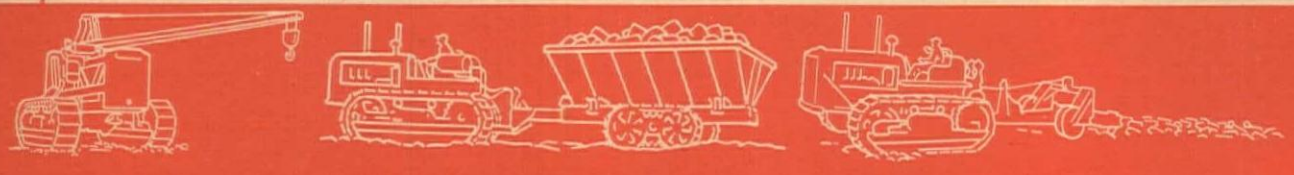
Call on the International Industrial Power Distributor near you for facts and figures on International Diesel Tractors, Power Units and matched equipment. He'll be a valuable friend to have when competitive days require closer study of costs and performance.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL *Industrial Power*



Best Bet...

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CRAWLER TRACTORS

POWER UNITS

WHEEL TRACTORS

IT'S HERE!..

NOW!..A *NEW* SMALLER TRACTOR *with* BIG TRACTOR DESIGN, BALANCE AND STAMINA

- Engineered Completely New Throughout
- 37.4 Drawbar hp.
- Five Speeds—1.46 to 5.47 m.p.h.
- Weight: 44-inch Tread 10,750 lbs.
  60-inch Tread 11,250 lbs.
- 1,000 Hour Lubrication — Truck Wheels, Idlers, Support Rollers
- 2-Cycle Diesel Power
- Full Visibility; Comfortable Seat; Readily Accessible Controls
- Simplified Maintenance
- More Traction, More Ground Contact, Better Balance

ALLIS-CHALMERS

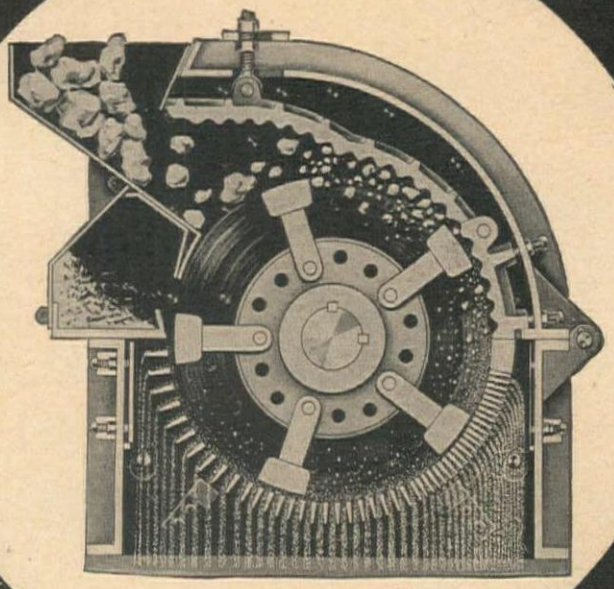
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

THE MOST ADVANCED TRACTOR IN ITS POWER CLASS

HD-5

IT'S RUGGED!
IT'S TOUGH!
IT'S DEPENDABLE!

It's the DIAMOND HEAVY DUTY HIGH TONNAGE *Self-Cleaning*



HAMMERMILL

Put this DIAMOND Hammermill up against your toughest jobs — compare it with any other hammermill you have ever used — and we're willing to abide by your verdict.

THE "CONTINUOUS" IMPACT principle of the DIAMOND Hammermill is obtained by the design of the top feed opening. All material as it is fed is engaged at once by the fast revolving hammers and repeatedly crushed against the extra long corrugated anvil. The result is extremely fast and uniform reduction.

THE "SELF-CLEANING" feature saves 2 or 3 hours' time if for any reason there is a power stoppage with feed continuing. The grates are mounted on a cam and can quickly be lowered from the outside (without opening cover) and the extra clearance permits centrifugal force to clean the machine in a few minutes.

DIAMOND ENGINEERS will gladly consult with you as to type and size of mill and production arrangement best suited for any material you need to reduce.

WIRE, PHONE or WRITE for Bulletin No. D-44-L on DIAMOND Hammermills or contact any DIAMOND Dealer.

"THERE'S NOTHING TOUGHER THAN A DIAMOND"

Look at This List of Features----

- Extra long adjustable anvil.
- Continuous crushing impact.
- Oversize balanced rotor shaft.
- Discs double keyed to shaft.
- Extra take-up holes for wear.
- Adjustable hammer arms.
- Interchangeable hammers.
- Hardened hammer retaining pins.
- Grates and anvil adjustable from outside.
- Self-cleaning feature.
- Structural steel, electric welded throughout.
- Accessible design.
- Heavy duty shock load roller bearings.
- Trap for uncrushable material.

DIAMOND DEALERS

Oakland	SOULÉ EQUIP. CO.
Los Angeles	GARLINGHOUSE BROS.
Seattle	A. H. COX & CO.
Portland	LOGGERS & CONTRACT'S MACH. CO.
Boise	WESTERN EQUIP. CO.
Salt Lake City	FOULGER EQUIP. CO.
Phoenix	O. S. STAPLEY CO.
Albuquerque	CONTRACTORS' EQUIP. & SUP. CO.
Missoula	MOUNTAIN TRACTOR CO.

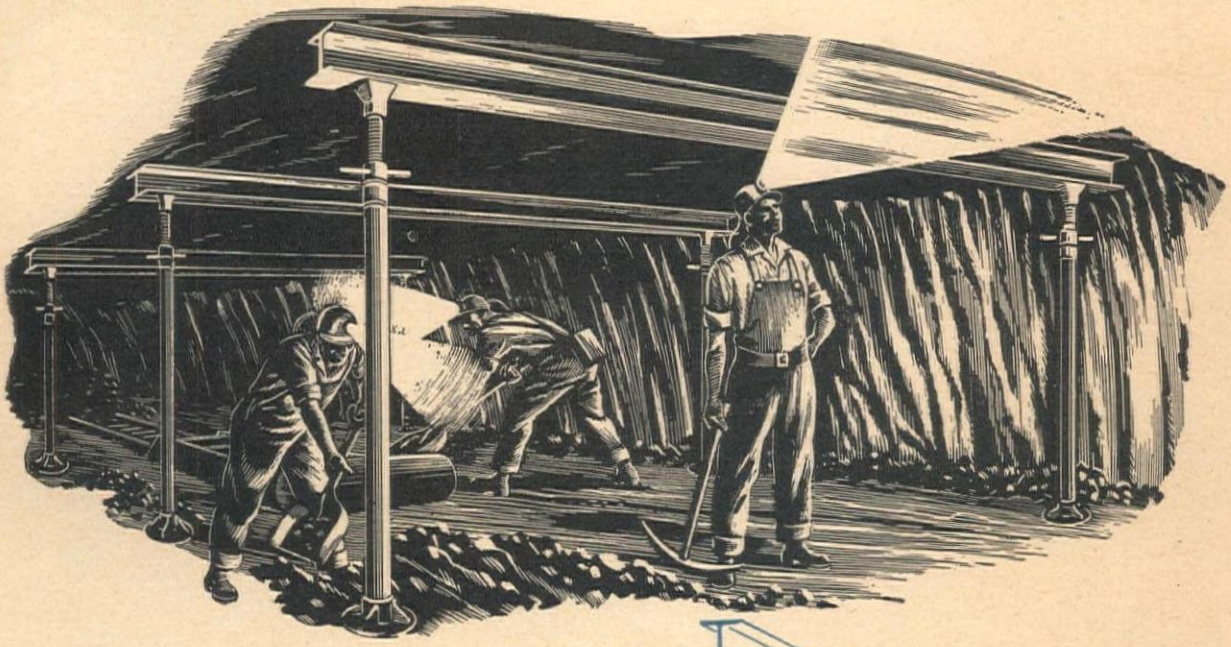
DIAMOND

DIAMOND IRON WORKS, INC.

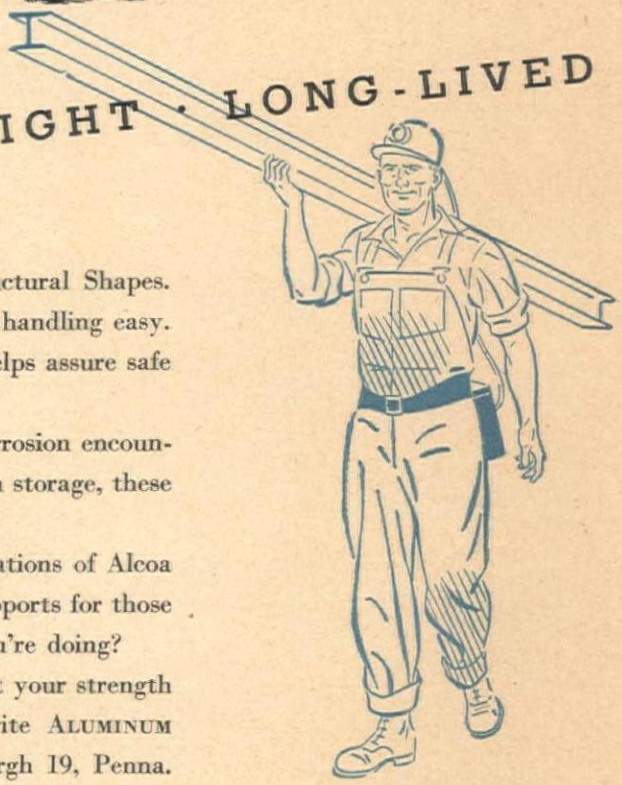
AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINNESOTA

Support the roof at your working faces with *Alcoa Aluminum Beams*



STRONG · LIGHT IN WEIGHT · LONG-LIVED



Miners will like working with Alcoa Aluminum Structural Shapes. The light weight of these beams makes hauling and handling easy. They can be set in place fast. Their high strength helps assure safe working conditions.

Alcoa Aluminum is highly resistant to the acid corrosion encountered in coal mines. This means that, on the job or in storage, these beams are long-lived.

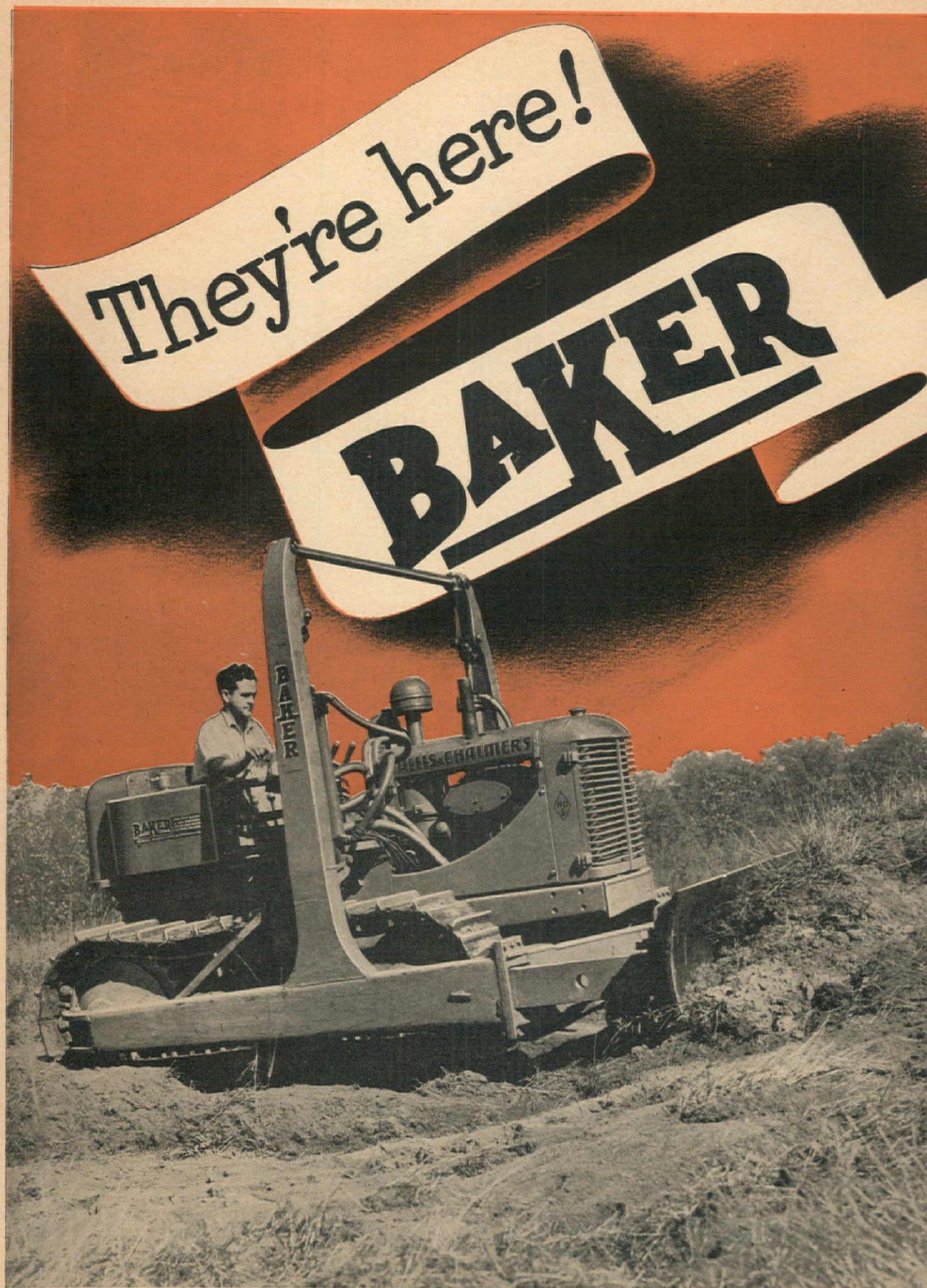
Don't these coal mine beams suggest other applications of Alcoa Aluminum Structural Shapes to you? How about supports for those tunnels, excavations or similar construction work you're doing?

Our engineers will help you select shapes that meet your strength requirements. Call the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 1811 Gulf Building, Pittsburgh 19, Penna.

ALCOA FIRST IN ALUMINUM

REG. T. M.

IN EVERY COMMERCIAL FORM


They're here!
BAKER
BAKER
BAKER
ALLIS-CHALMERS

bulldozers · gradebuilders

for the NEW ALLIS-CHALMERS HD-5

THEY GO TOGETHER — Baker bulldozers and the sensational new Allis-Chalmers HD-5—*because they're built together!* Starting from tractor blueprints Baker 'dozers were designed into the HD-5, to match tractor power, size and speed — built to maintain tractor balance, stability and traction — mounted to save tractor wear, tear and maintenance.

Men who know earthmoving equipment will recognize and appreciate the extra values, the extra features built into every Baker — direct down pressure; fast, sensitive blade control; low pressure hydraulic system; sturdy contruction; rolling blade action; less linkage; simplicity of design and construction — plus the Allis-Chalmers-Baker co-operative engineering that assures dependable, on-the-job performance.

That is why there are more Baker 'dozers mounted on Allis-Chalmers tractors than all other makes *combined*.

Baker Mfg. Co., Springfield, Illinois

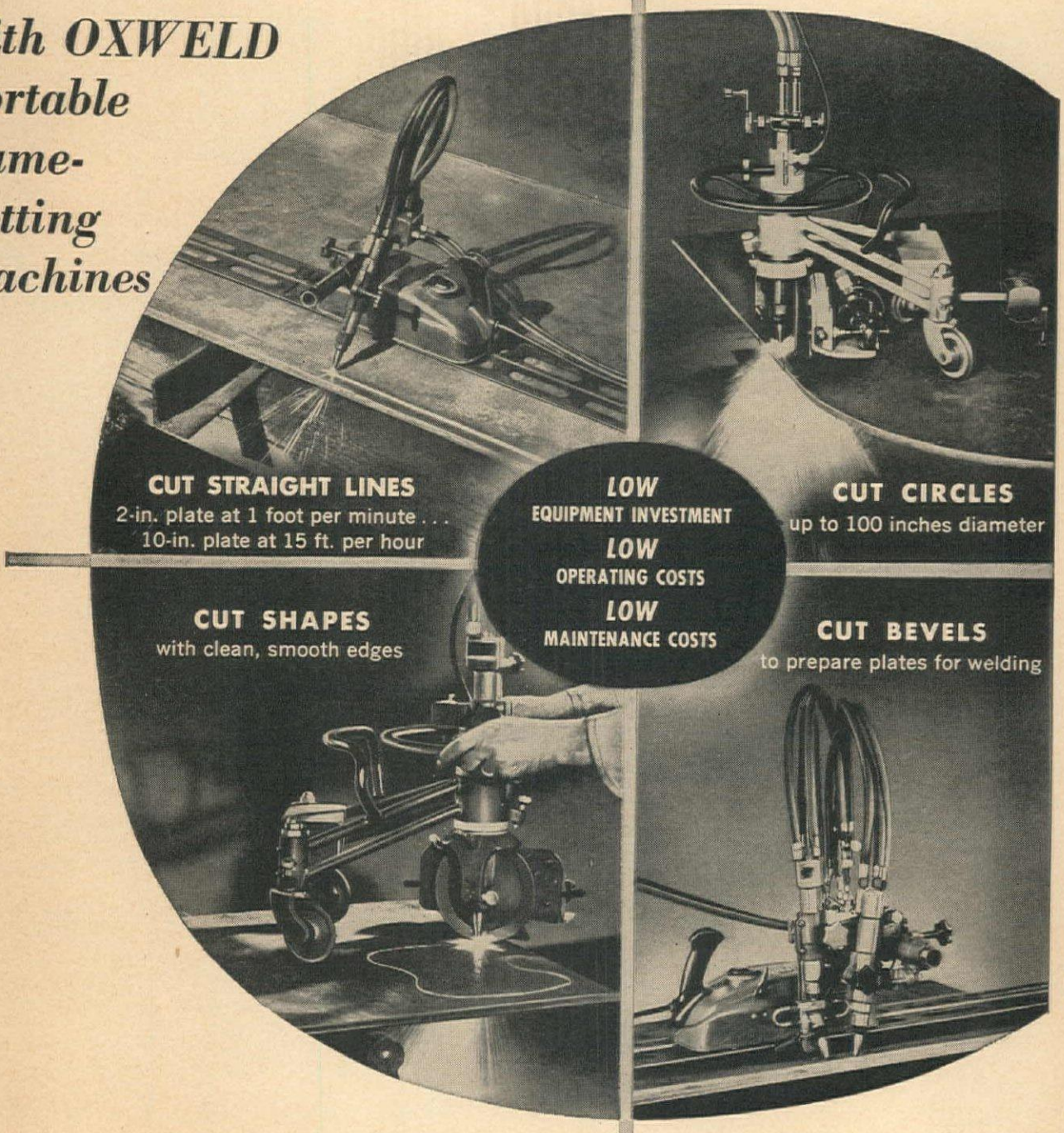
BAKER

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

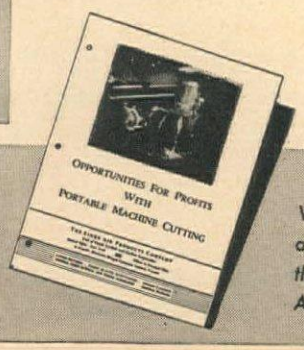
The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

Here's What You Can Do

with OXWELD portable flame-cutting machines



Call or write any Linde office for a catalog and prices



THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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

In Canada: Dominion Oxygen Company, Limited, Toronto

Write for a copy of this booklet. Ask for Form 4062

The world "Oxweld" is a registered trade-mark of Union Carbide and Carbon Corporation.

THIS NEW KIND OF HYDRAULIC RAM CAN SAVE YOU MONEY

These small, compact, high pressure hydraulic rams have replaced a cumbersome hand-operated mechanical system.

HYDRODYNE POWER DOME

Whenever you need to exert tremendous force—simply—easily—cheaply—this Bendix Pacific Hydraulic Pump supplies instant energy for the job. Produces 5000 pounds per square inch pressure. This means a few strokes of the handle will energize the ram shown above, producing a working force of 20,000 foot-pounds. Write for details now.

. . . AND DO MORE WORK

Bendix Pacific has streamlined the design and construction of hydraulic cylinders and rams, giving you a better, more efficient product to *fit your specific requirements at reduced cost.*

This is not so-called "shelf merchandise" made in arbitrary sizes – which usually means you have to engineer *your product* to fit. With Bendix Pacific cylinders you eliminate this entire expense and get a *better* product with *better* performance.

Bendix Pacific Hydrodyne cylinders and rams are custom designed to meet *your* specifications. They are compact, highly efficient and easily serviced for field maintenance. Whether you utilize hydraulic power on your equipment now – or plan to – Bendix Pacific cylinders can do the work better and give your product an important new sales feature.

Engineers are available to assist you with your problem. Your inquiry is invited.

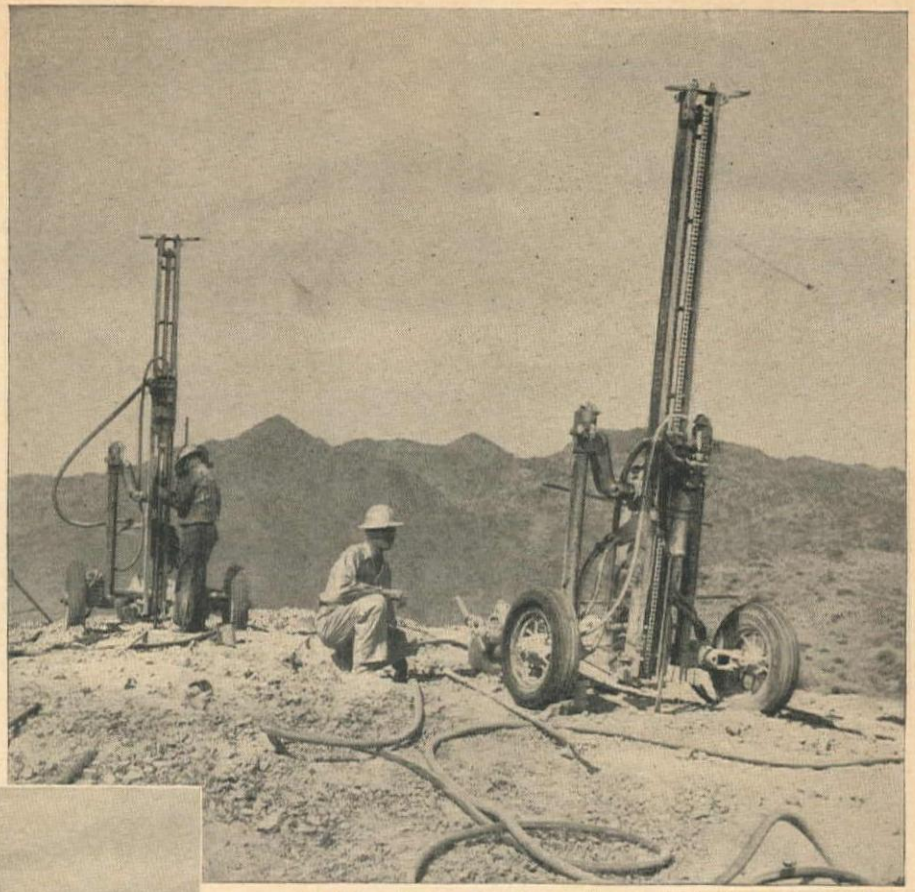
Hydrodyne* – POWER AT YOUR FINGERTIP

Pacific Division
Bendix Aviation Corporation
NORTH HOLLYWOOD 7, CALIF.

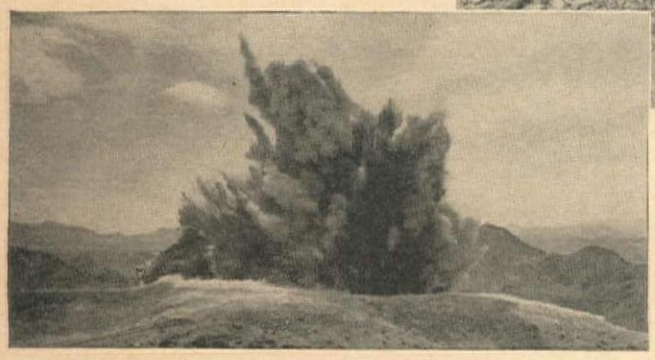
PRODUCT OF Bendix AVIATION CORPORATION

* Reg U S Pat Off.

DRILLING 38 MILES of LOW-COST LINE HOLES for DAVIS DAM



Bethlehem Hollow Drill Steel making the line holes for the initial blast on Davis Dam. On the Colorado River 67 miles below Boulder Dam, this hydroelectric project will produce one billion K-W hours annually.



24,000 lbs. of dynamite making the initial blast. Davis Dam will be an earth-and-rock-filled structure, creating a reservoir of 2,000,000 acre-feet.

Construction of the 21-million dollar Davis Dam and power plant will require approximately 200,000 linear feet of line holes for rock excavation. Drilling that distance economically at high speed is a job for experienced men teamed up with rugged tools.

Utah Construction Company, the contractor, employs drill runners who know their business and drill steel long favored for tough assignments—Bethlehem Hollow Drill Steel.

Here is why Bethlehem Hollow Drill Steel is the choice of so many Western constructors.

- The hole is well centered, true and smooth, which means higher fatigue-resistance and longer life.
- The tough shank readily withstands the heavy battering of the drill piston.
- The size is always true and uniform.
- The steel has a wide quenching range, which results in easier heat-treatment and better hardness.

And Bethlehem Hollow works equally well for either forged-on bits or detachable bits.

When the going is tough and the bid allows only a close margin of profit—then it's more important than ever to switch over to Bethlehem Hollow!

BETHLEHEM PACIFIC COAST STEEL CORPORATION
General Offices: San Francisco

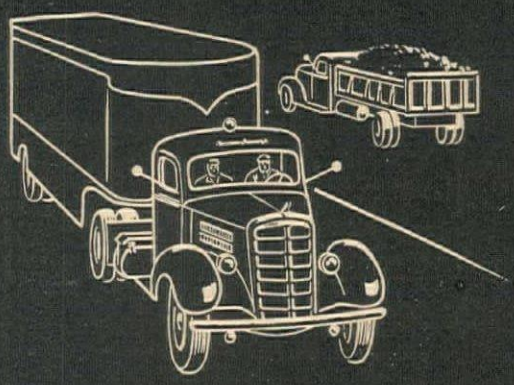
District Offices: Seattle, Portland, Los Angeles, Salt Lake City, Honolulu

BETHLEHEM PACIFIC

★ BETHLEHEM STEEL ★

★ BETHLEHEM HOLLOW DRILL STEEL ★

a motor oil that cleans



Cadel A. P. Heavy Duty Lubricant

Heavy equipment—both gasoline and diesel—cannot find a better friend than Cadel A. P. (all-purpose) Heavy Duty Lubricant. This additive-treated motor oil lasts longer, washes motors clean, protects engines as it lubricates.

• • •

"Cadel A. P. Heavy Duty Lubricant gives you (1) Clean Valves, because gummy substances remain suspended in the oil—(2) Longer Bearing Life, because of superior lubrication plus an inhibiting agent that works against the formation of damaging acids—(3) Clean Oil Lines, due to the action of detergent and dispersive additives—(4) Longer Oil Life, because of Cadel's outstandingly fine base stock.

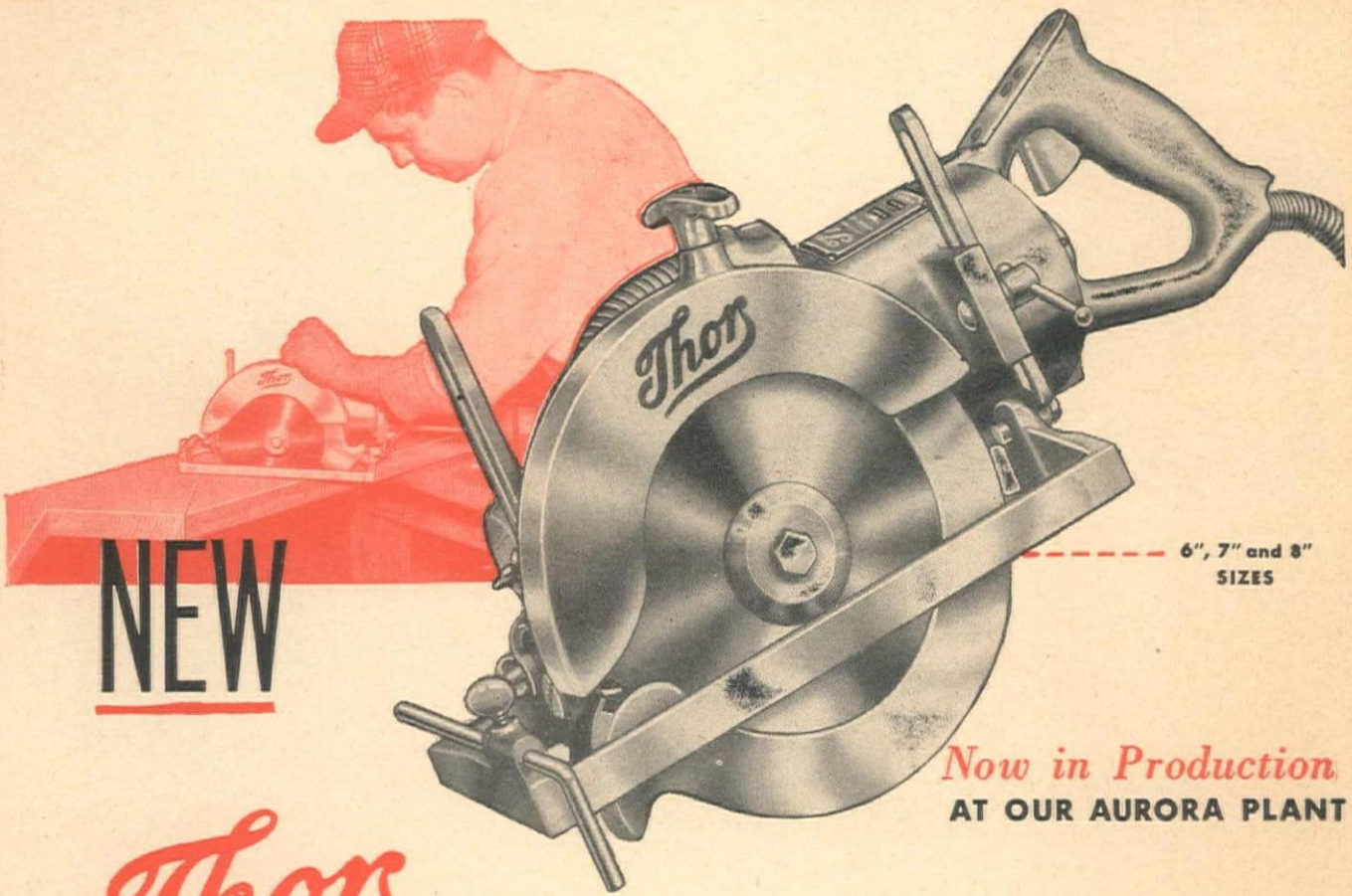
Get the *complete* Cadel A. P. story from your nearby Associated Representative. He has stocks on hand in warehouses near you—ready for immediate shipment—and in proper SAE grades for your equipment.

Tell Your Associated Dealer You Want a Credit Card

Correct Lubrication is Machinery's Most Vital Need

TIDE WATER ASSOCIATED OIL COMPANY

EASY CUTTING!



NEW

6", 7" and 8" SIZES

Now in Production
AT OUR AURORA PLANT

Thor

PORTABLE ELECTRIC SAWS
DO BETTER WORK . . . EASIER and FASTER

You get plenty of speed and power—*plus smooth operation*—in Thor's new Portable Universal Electric Saws. For industrial maintenance work or hundreds of other types of carpentry—they are real time and labor savers. All-ball-bearing design assures long, satisfactory service. Automatic telescopic guard gives full protection to operator. Natural, firm hand hold provides complete control.

Demonstrate this handy, efficient tool to your own satisfaction—ask for one now.

INDEPENDENT PNEUMATIC TOOL CO.
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Philadelphia Pittsburgh St. Louis Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

TESTED AND PROVED IN THE FIELD!

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.

3/8 to 30 Cubic Yds.

HENDRIX *Lightweight* DRAGLINE BUCKETS

Write for descriptive literature—
or ask your dealer.

You automatically step up the YARDAGE of your dragline by hooking up a Hendrix Lightweight Bucket! It's 20% to 40% lighter than other buckets, type for type! Can be used on a machine designed for small operations and still maintain the allowable loaded weight. You'll get bigger payloads on operations requiring a long boom, and in wet digging you'll increase your payloads by leaving the water in the pit. We took the load ***out of the bucket...*** to let you put it ***inside!***

- ★ 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 diggings.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three Types; light, medium, and heavy duty. With or without perforations.

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA

FORMERLY DESOTO FOUNDRY, INC.

A fleet of TERRA-COBRAS widening *Ignacio-Santa Rosa Highway* north of San Francisco for Harms Bros., contractors

Full loads of 18 cu. yds. on this 1800 ft. round-trip haul, trip after trip, are the rule rather than the exception, with Wooldridge Terra-Cobras. Steep climbs to the top of the cut—fast downhill loading—fast break-away and rapid acceleration to top speed contribute to maximum yardage efficiency. Power and speed combined with positive steering control make possible the handling of tons of earth in less time at a lower cost—and with greater safety to operators and equipment. Easier all-around handling of the Terra-Cobra results in less operator fatigue and higher hourly averages. Why not plan to key your earth-moving operations to Wooldridge Terra-Cobras? Get full details, today.

WOOLDRIDGE
MANUFACTURING COMPANY
SUNNYVALE, CALIFORNIA · U.S.A.

TERRA COBRA
Hi-Speed Self-Propelled ***EARTHMOVERS***

WOOLDRIDGE
EARTHMOVING EQUIPMENT
Includes

★ **SCRAPERS**
Tractor-drawn for handling heaping yardages from 6 to 28 cu. yards.

★ **POWER CONTROL UNITS**
Single and multiple drum with universal or roller fairleads.

★ **BULLDOZERS**
Tough and rugged design for standard makes of tractors.

★ **TRAILBUILDERS**
Adjustable angle-blades for standard tractor mounting.

★ **RIPPERS**
Available in light, medium and heavy duty models with two sizes to each model.

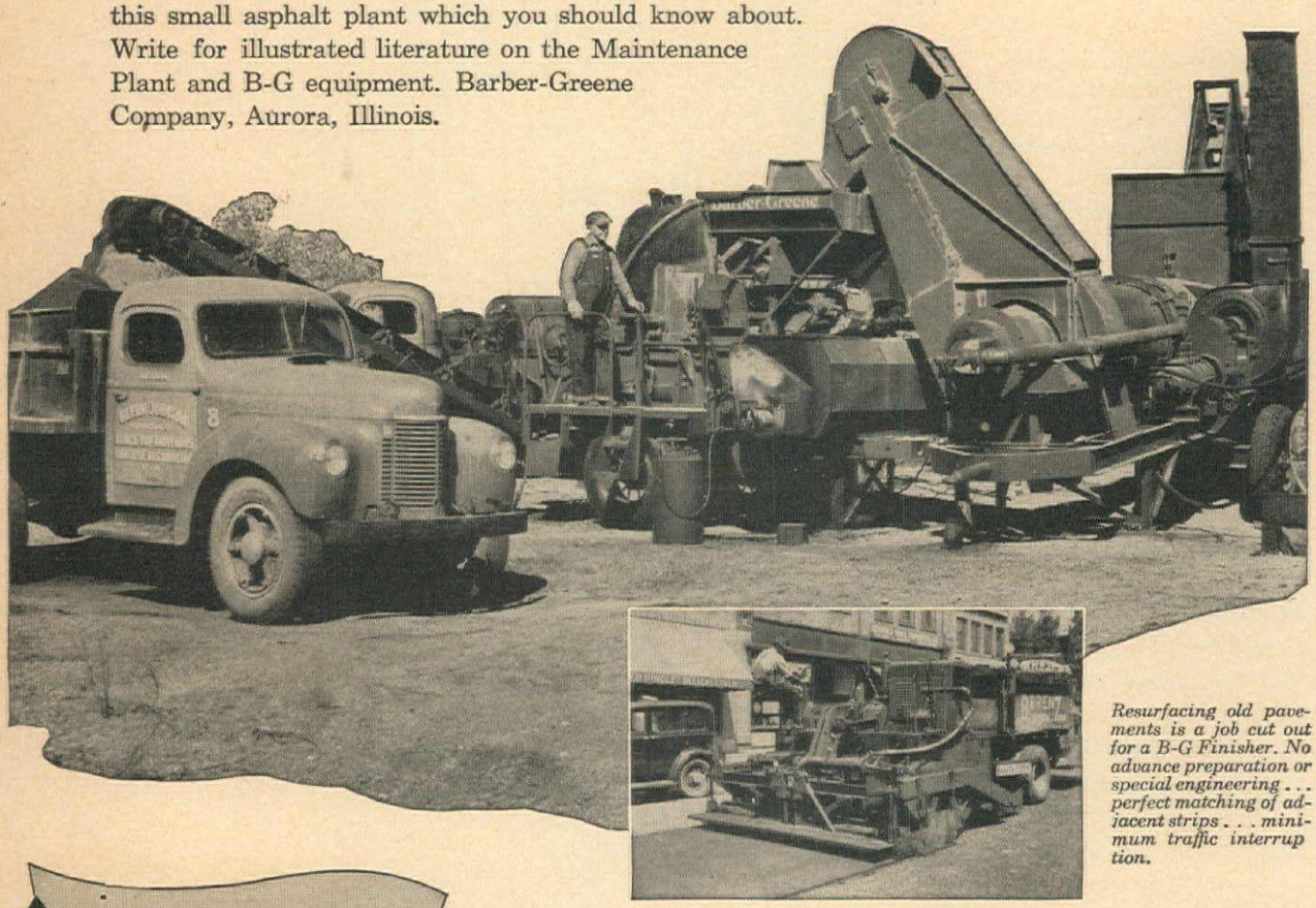
DISTRIBUTOR SALES & SERVICE FACILITIES IN ALL PRINCIPAL AREAS & FOREIGN TERRITORIES

Why a B-G *Maintenance Plant* Can Prepare Any Mix

• Although designed for maintenance work where capacities of 25 tons per hour and less are normal requirements, the B-G Maintenance Plant is fully capable of preparing any mix required. It will do anything its "big brother" mixers will do—it just takes a little longer!

The B-G Maintenance Plant has the same volumetric interlocked proportioning as the larger Barber-Greene Mixers. Calibrated gates—with bitumen pump interlocked to the aggregate feeder—assure a constant, accurate percentage of all ingredients. Steam jacketed pugmill and heating coils in bitumen tank permit mixing all types of mixes including those using asphalt cements.

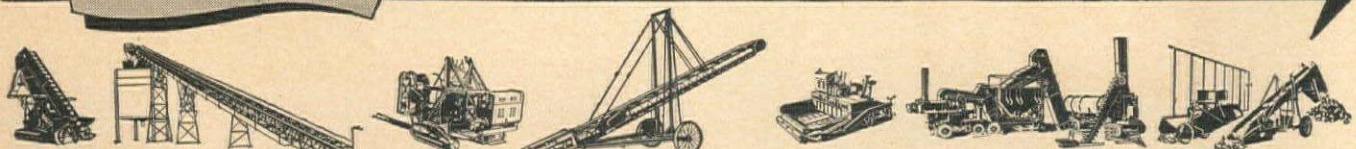
There are many mechanical features and advantages on this small asphalt plant which you should know about. Write for illustrated literature on the Maintenance Plant and B-G equipment. Barber-Greene Company, Aurora, Illinois.



Resurfacing old pavements is a job cut out for a B-G Finisher. No advance preparation or special engineering . . . perfect matching of adjacent strips . . . minimum traffic interruption.

46-11

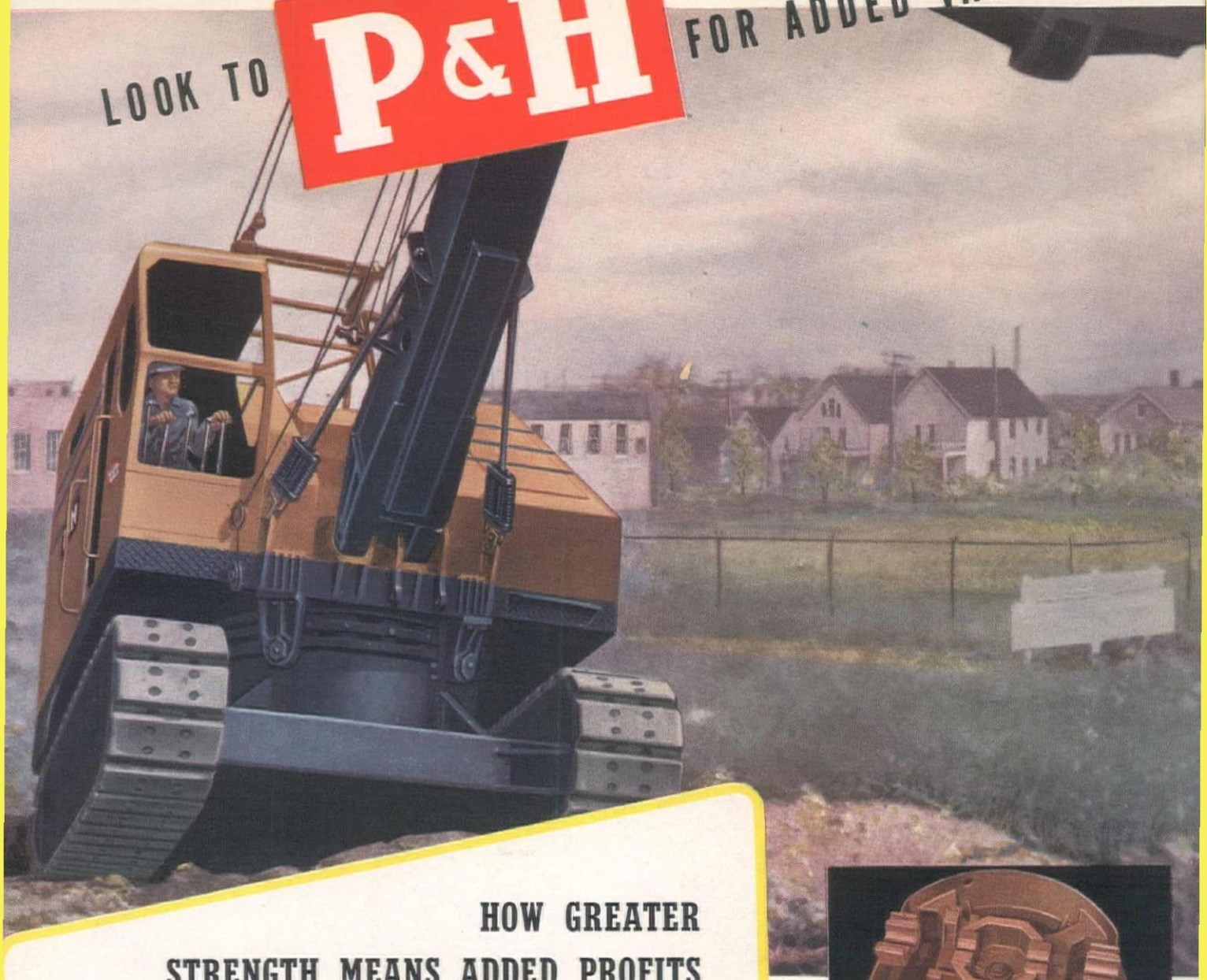
B-G Barber-Greene CONSTANT FLOW EQUIPMENT



LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES

Brown-Bevis Equipment Co., Los Angeles 11, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Columbia Equipment Co., Spokane, Washington; Columbia Equipment Co., Seattle, Washington; Columbia Equipment Co., Boise, Idaho; Columbia Equipment Co., Portland 14, Oregon; Contractors Equipment & Supply Co., Albuquerque, New Mexico; Ray Corson Machinery Co., Denver 2, Colorado; Jenison Machinery Co., San Francisco 7, California; Western Construction Equipment Co., Billings, Montana; Western Construction Equipment Co., Missoula, Montana; Kimball Equipment Company, Salt Lake City 10, Utah.

LOOK TO P&H FOR ADDED VALUES



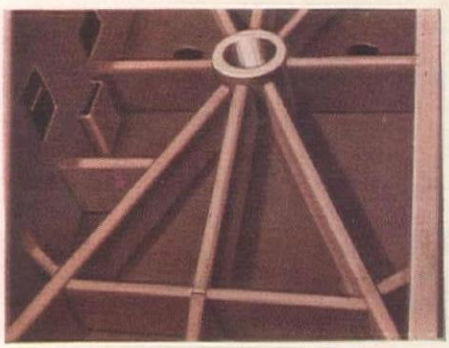
HOW GREATER STRENGTH MEANS ADDED PROFITS

As the originators of all-welded power shovels and cranes, P&H does not limit the advantages of welded construction to a few parts such as booms, etc.

P&H equipment is designed and built — from crawlers to boom point — to gain the full benefits of welded, rolled steel construction. The added rigidity and strength mean better all-around service for years to come.

You'll find a whale of a saving in yardage costs — an upswing in your job profits.

Here's the strongest carbody construction known. Axles are welded integral with turret — and crawler frames with axles. Here's one piece, trouble-free construction.



Here you see the interior web-work of strengthening members in the P&H all-welded revolving frame. Sidestands are welded integral. There are no bolted joints — alignment of machinery is permanent.

P&H EXCAVATORS
4490 W. National Avenue
Milwaukee 14, Wisconsin

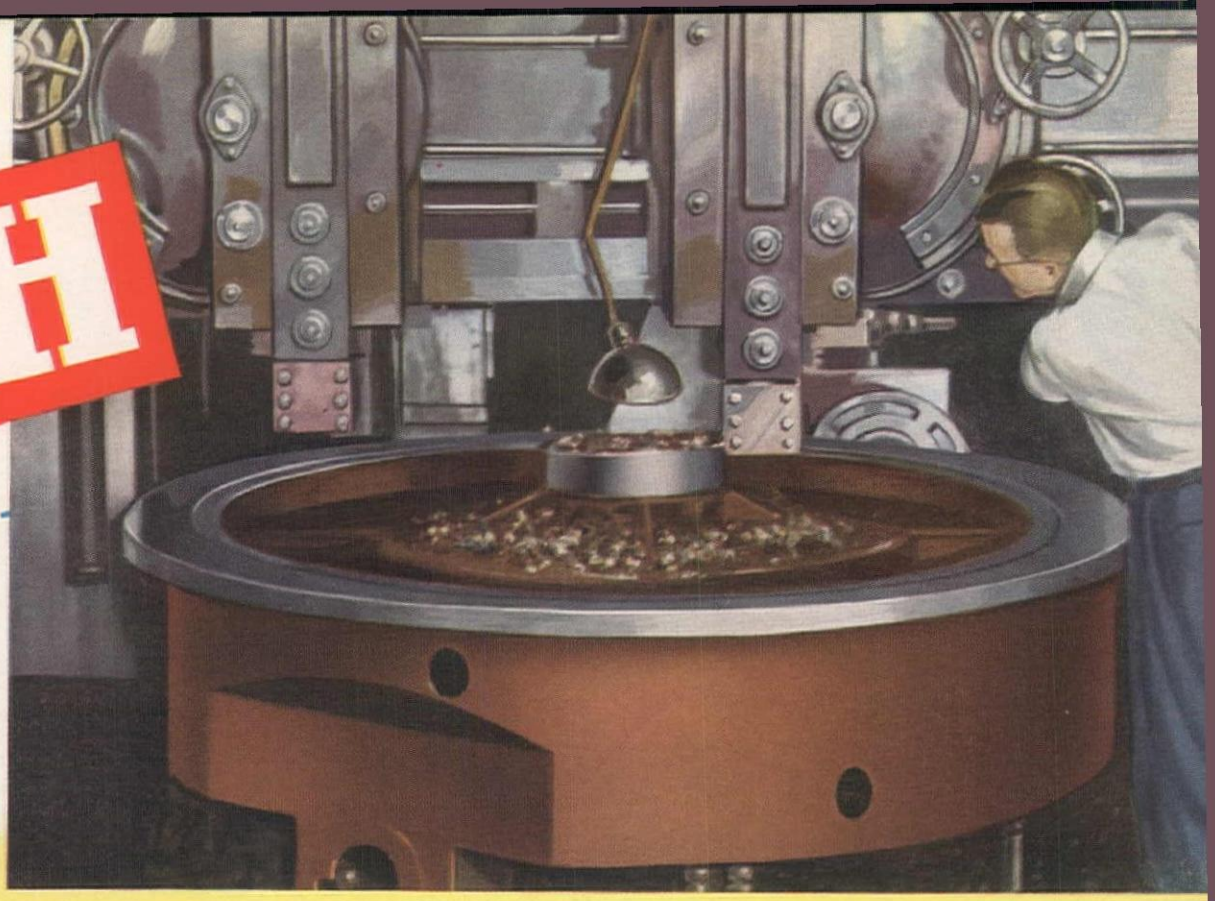
HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

Another

P&H

added value



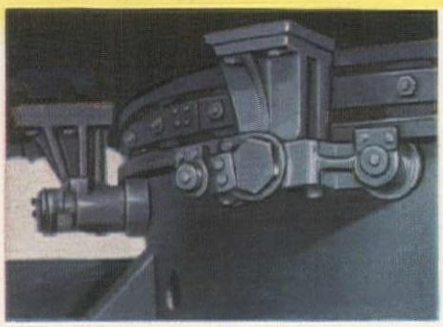
PRECISION MACHINING

As in the case of this carbody turret, each P&H welded assembly is machined, then jig-drilled or bored as a unit to insure exact alignment for shafts, bearings, etc. Since alignment does not depend on bolted joints, it is maintained throughout the life of a P&H Excavator.

Machining the roller path on a P&H 1½ yd. excavator.

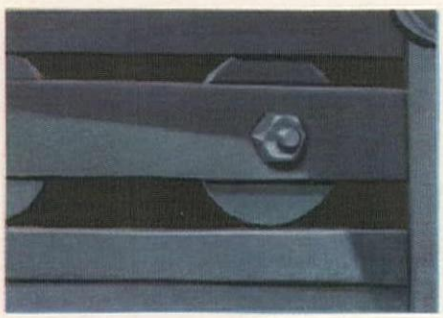
No rocking horse action between lower and upper

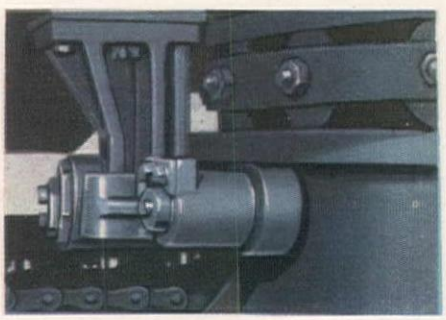
Hook rollers eliminate all stresses and strains on center gudgeon by anchoring the revolving deck, or upper, to the carbody. There's no "rocking" of the upper when dipper bites into the bank.



Live Roller Circle acts as a huge multiple roller bearing; transmits weight between upper and lower, evenly, over the entire path. There's free movement with a minimum of friction.

All weight is carried on rollers. Since no weight is carried on pins or bushings, a costly source of wear and replacement is eliminated. Another P&H added value that saves you money.





Smooth Swinging and faster operation are assured by precision-built, upper and lower structures, adjustable hook rollers and live rollers and live roller circle.

P&H's exacting all welded construction is complete — from crawler frames to boom tip — assuring greater strength and rigidity for years to come. Yet this is but one important added value which P&H offers you. Learn about all of them. Call your nearest P&H dealer, or write us.

HARNISCHFEGER CORPORATION

4490 West National Avenue, Milwaukee 14, Wisconsin

MILWAUKEE, Wis., 4490 W. National Avenue — SAN FRANCISCO, Calif., 82 Beale Street

SEATTLE, LOS ANGELES, SAN FRANCISCO

PORTLAND, OREGON . . . Loggers & Contractors Machinery Co.
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NAPA, CALIFORNIA . . . . . Berglund Tractor & Equipment Co.
SALT LAKE CITY, UTAH . . . . . National Equipment Co.
BOISE, IDAHO . . . . . Olson Manufacturing Company
EL CENTRO, CALIFORNIA . . . . . Faure Tractor & Equipment Co.
SANTA BARBARA, CALIF. . . . . A. C. Dinsmore
FRESNO, CALIFORNIA . . . . . Brown Tractor Co.
SAN DIEGO, CALIF. . . . . Southern Equipment & Supply Co.
SPOKANE, WASHINGTON . . . . . F. M. Viles & Co.
SACRAMENTO, CALIF. . . . . Capitol Tractor & Equip. Co.
RENO, NEVADA . . . . . Dennison Tractor & Supply Company
SEATTLE, WASHINGTON . . . . . Glenn Carrington & Co.

6 TOURNAPULLS handle 90% of 700,000 yd. California bypass

Tournapulls got heaped loads fast . . . averaged 10 pay yards in high void clay.

DIMMITT & TAYLOR move 630,000 yards with Tournapulls on both long and short hauls

Changing 9 miles of U. S. 101 to bypass Goleta, California, involved moving 700,000 yards of adobe and fine light clay. To handle yardage fast and at lowest cost, Dimmitt & Taylor, Los Angeles, used 6 high-speed Tournapulls . . . with them moved 630,000 yards . . . 90% of the job.

Hauls from 200 to 3,000'

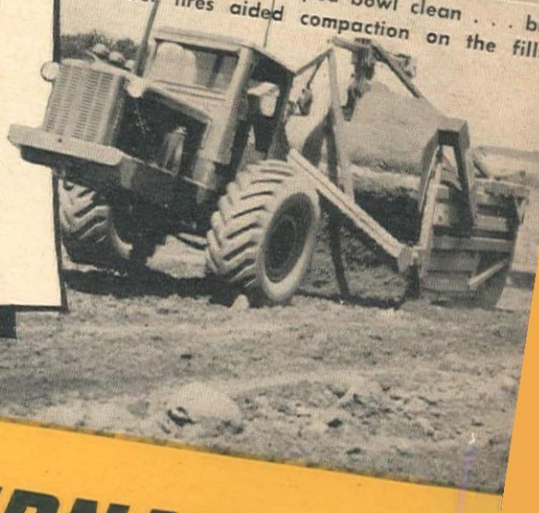
Work ranged from a big 150,000-yard cut requiring long hauls, to light cuts and fills for drainage ditches and culverts. Hauls varied from 200 to 3,000' one way . . . grades in some places ran to 15%. Dimmitt & Taylor's Tournapulls got heaped loads fast in clay previously broken by LeTourneau Rooter for easier loading . . . got into high gear fast . . . delivered dirt to fill at lowest-net-cost-per-yard over both long and short hauls.

Like these alert contractors who have been Tournapull owners since '39, you'll find that Tournapull all around job versatility and ability to move dirt at substantial savings can make more money for you. Ask your LeTourneau Distributor for job-proved facts and figures.

Tournapull — Trade Mark Reg. U. S. Pat. Off. R90

High hauling speed plus quick acceleration meant low cost dirt on hauls as short as 200'.

Patented tailgate wiped bowl clean . . . big rubber tires aided compaction on the fills.



LE TOURNEAU
PEORIA, ILLINOIS

JOB-PROVED
Over 4650 Built and Shipped

TOURNAPULLS

Saving money—Day

The indisputable fact that cast iron pipe, under normal conditions, offers a century or more of useful life, might lead to a false conclusion.

Namely, that taxpayers do not benefit from the economies of cast iron pipe until it has served for a century or more. Nothing could be farther from the truth.

The fact is that cast iron pipe saves money day by day as well as century by century. And here's why.

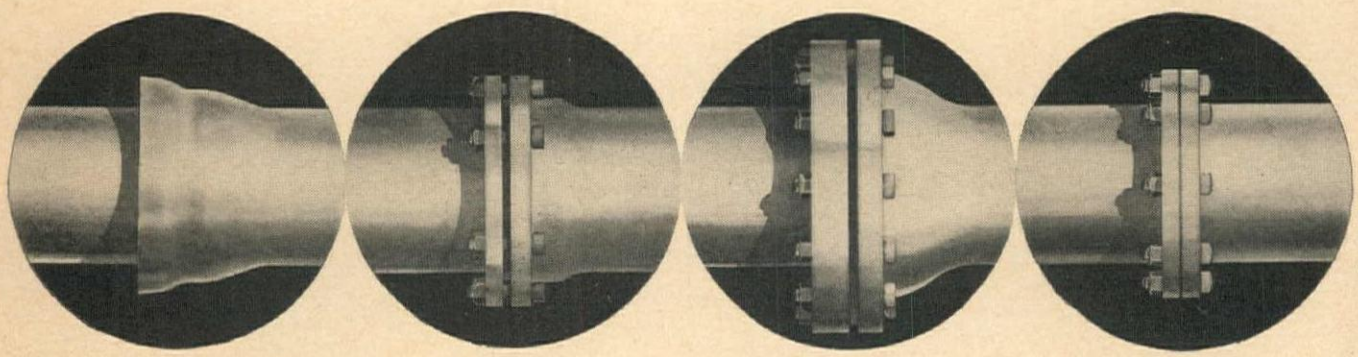
The *maintenance cost* of cast iron water distribution mains is far below that of other pipe materials—proved by reports from nearly 200 water works superintendents.

The cost of cast iron pipe *per service year* (investment cost plus maintenance) is far below that of other pipe materials—proved by the records of 200 of America's largest cities.

Yes, today's taxpayers get the benefit of these economies, through lower cost of maintenance, fewer street openings for repairs, and avoided replacements, otherwise necessary, if shorter-lived pipe were used.

The *known* useful life of cast iron pipe is at least double the *estimated* life of other pipe materials used for water distribution mains. Cast Iron Pipe Research Association, T. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3.

Because of its all-purpose adaptability for service under ground or under water, cast iron pipe is available with joints for every requirement, as shown below.



Bell-and-Spigot Joint—the time-tried and standard for water and sewerage service.

Mechanical Joint—now standardized with interchangeable parts.

Flexible Joint—for river crossings and other sub-aqueous installations.

Flanged Joint—for water steam, oil or gas lines, generally used above ground.

CAST IRON PIPE

by Day—Century by Century!

Serves for Centuries

"My Vote Goes to The Truck I Drove In The Army"

Returning veterans, working on jobs where motor trucks are purchased or used, just naturally go for GMC. For wherever they served ... Africa or the Aleutians, Europe or the Pacific ... their number one source of truck transport was the GMC "six-by-six." And whatever their branch of the Army ... ground or air forces, combat or supply... GMC "Army Workhorse" power proved its ability on the toughest jobs.

Civilian GMCs benefit by the same manufacturing facilities, incorporate the same all-truck construction and feature engines of the same basic design as their military brothers ... nearly 600,000 strong. Offered in a wide range of models, chassis types and sizes, ½ to 20 tons, new GMC trucks provide war-proved performance for all kinds of peacetime hauling.

GMC "ARMY WORKHORSE" POWER

GMC TRUCKS

THE TRUCK OF VALUE

GASOLINE • DIESEL

Traffic accidents have increased at an alarming rate since the war. Careless driving, jaywalking and neglect of needed repairs are mainly responsible. Do your part to prevent accidents by obeying all traffic laws ... by driving safely and walking carefully ... by having your car or truck inspected regularly, repaired promptly and properly.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

What 63 Years of Dredge Building Means to You

The wealth of experience gained in designing and building dredges since 1883 qualifies Bucyrus-Erie to build the best machine for **your** job — one which will give the highest overall efficiency under **your** particular operating conditions.

Thoroughly experienced Bucyrus-Erie engineers study in detail every aspect of your job, and they design a dredge to best satisfy operating requirements. Skilled personnel, working with unequalled facilities, then build your dredge to highest manufacturing standards.

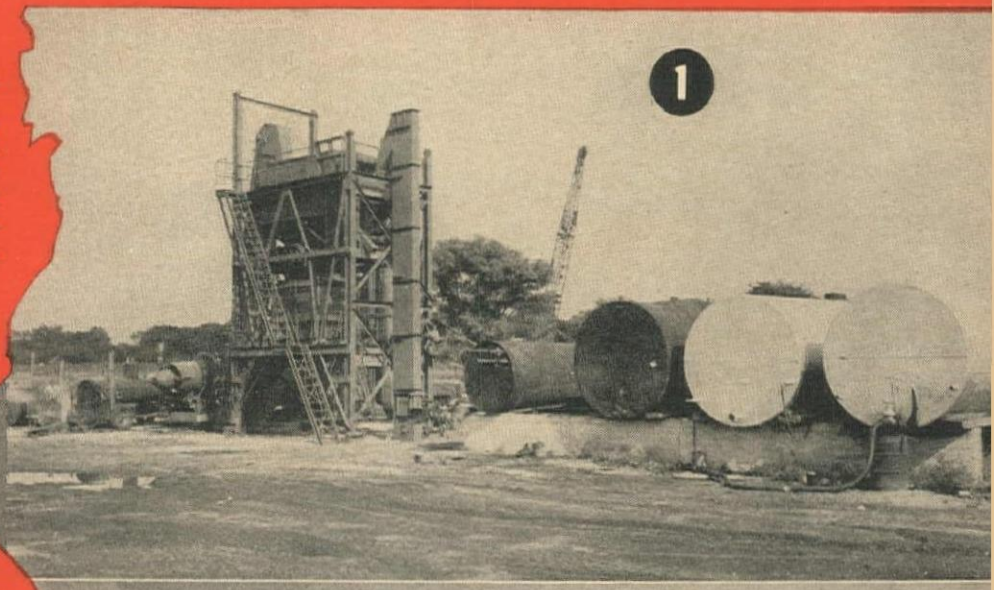
At every step, through design, manufacture and erection, you benefit from Bucyrus-Erie experience. This is your assurance of getting the machine that will give you the biggest output—the best operating economy possible to obtain.

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

11046

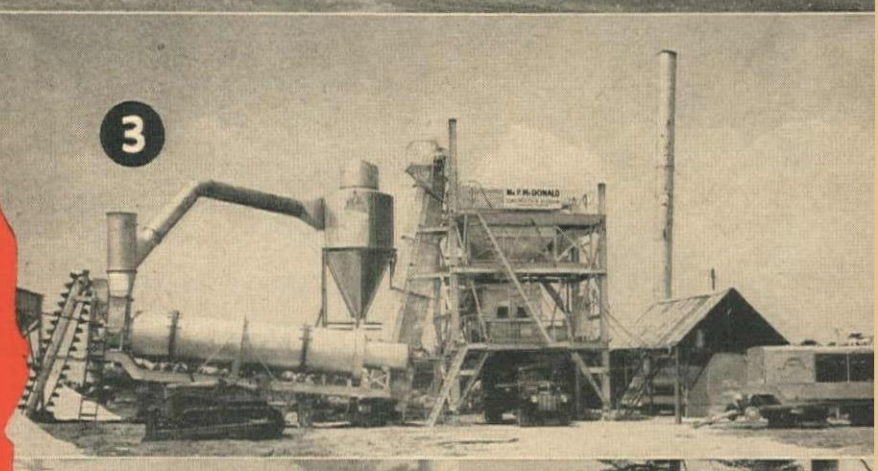
when you buy an asphalt



1 The Cedarapids Model "A" — is a knock-down type, hot-mix, 1,000-lb. batch, portable asphalt plant built to handle medium-sized black top jobs at a profit. 2' x 6' Cedarapids-Symons screen, 1,000-lb. capacity pug mill, 4' x 16' drier.

2 The Cedarapids Patchmaster—is the handiest, low-cost, portable, continuous-mix type asphalt plant you ever saw for handling small quantity runs of patching aggregate. Capacity up to 30 tons an hour. Bulletin PM.

3 The Cedarapids Model "E" —is a big capacity, portable asphalt mixing plant that, combines accurate batching, thorough mixing, portability and quick assembly. 3,000 or 4,000-lb. pug mill capacity. Ask for Bulletin AP-11.



4 Cedarapids Driers—are available in all standard diameters and lengths to fit every drier need. Gasoline, diesel or electric powered. Portable or on skids. With or without fuel oil heater sets. With or without dust collectors. Ask for Bulletin AP-5.

5 The Cedarapids Model "FA"—is our most portable, high capacity batch-type asphalt mixing plant. Can be set up ready for operation in a matter of a few hours. 25 cu. ft. capacity. Gasoline, electric or diesel power. Bulletin AP-F1.

6 The Cedarapids Pug Mills — are offered in 1,000, 2,000, 3,000 and 4,000 lb. capacities. "Nihard" paddle tips are reversible and replaceable. Steam, air or manually-operated gates. Available with or without steam jackets. Bul. AP-4.

IOWA DEALERS

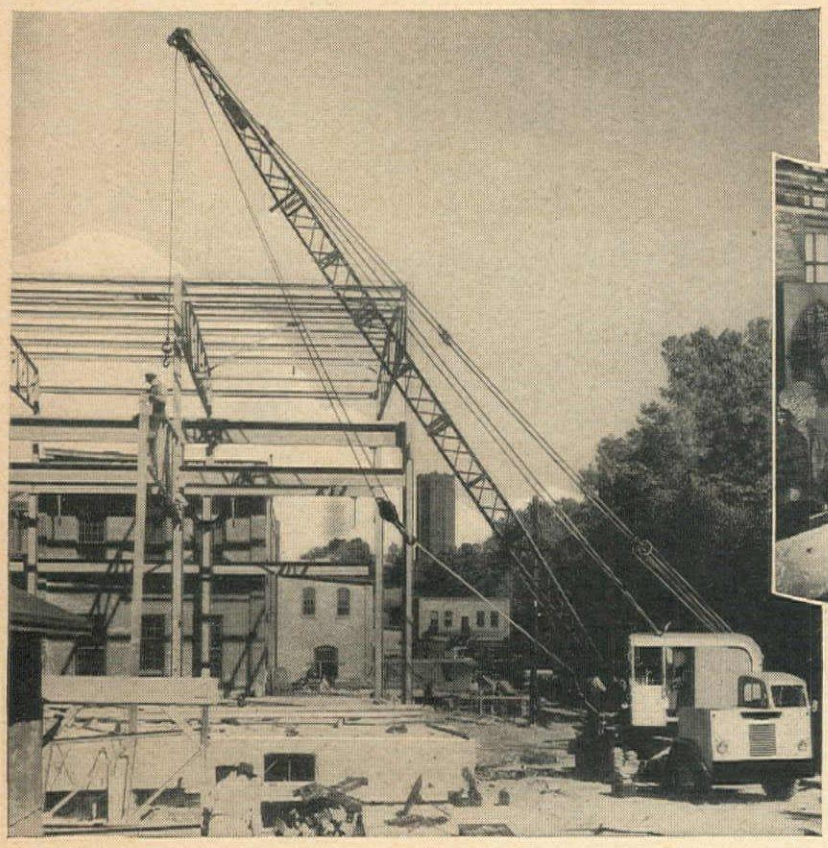
Iowa Dealers are qualified by training and experience to help you get real low-cost production in your crushing, screening and asphalt mixing operation — to recommend and sell equipment that will enable you to meet the strictest specifications at a good profit — and service your equipment to assure the minimum of lost time.. There's a Cedarapids dealer in almost every important city ready for your call.

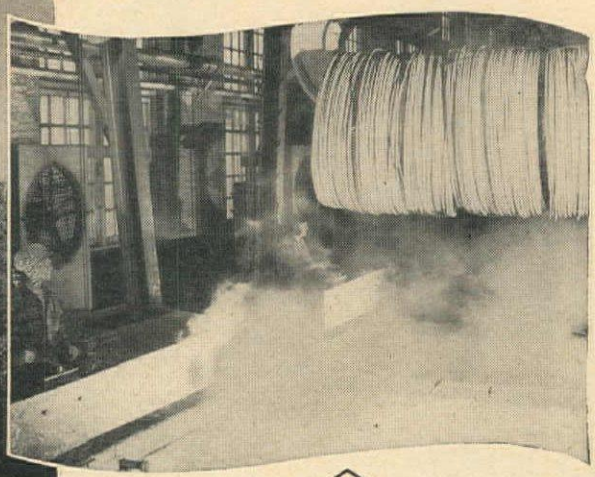
IOWA MANUFACTURING

CEDAR RAPIDS, IOWA, U. S. A.

GET MORE SERVICE PER DOLLAR...

with the *RIGHT* wire rope!





Straight line wire cleaning—cleaning and lubricating wire for further drawing—is only one of many special methods used in the Roebling mills to insure longest rope service on the job.

You can find the right rope . . . the correct balance of strength and flexibility plus peak fatigue and abrasion resistance . . . by choosing a Roebling "Blue Center" Steel Wire Rope.

There's only one wire rope that is right for any one job. Of all the wire ropes manufactured only one is the right size, the right material, the right construction. And whether it proves to be preformed or non-preformed, you'll find the *right* rope for your job in Roebling's complete line.

FOR EXAMPLE:

Roebling "Blue Center" Steel Wire Rope alone can be supplied in literally hundreds of sizes and constructions... either preformed or non-preformed.

EXPERT ADVICE

Get the right rope working for you. A Roebling Field Engineer will be glad to help you choose it. Call him at our nearby branch office or through one of our distributors... and get more service for your wire rope dollars.

Manufacturers of 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

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

San Francisco • Los Angeles • Seattle • Portland

JR ROEBLING

PREFORMED • NON-PREFORMED

ROEBLING

PACEMAKER IN WIRE PRODUCTS

WHEN IT'S CRUSHING TIME

the GRAVELMASTER "880" *will pulverize your costs*

Modern road building techniques require modern machinery. That's why Universal surveyed the entire field before attempting to bring out one unit that would combine all features of basic and portable plants. As a result, the Gravelmaster is completely engineered to produce your aggregates faster, more uniformly and with lower overall expense than previously thought possible.

The Gravelmaster will deliver one finished size of material and reject sand. It can be fed by shovel, dragline, power scraper or trucks. Primarily a gravel plant, the "880" also rates tops as a secondary plant for quarry work or as a sizing plant in connection with a screening unit for producing washed or dry aggregates for concrete, black top roads, etc.

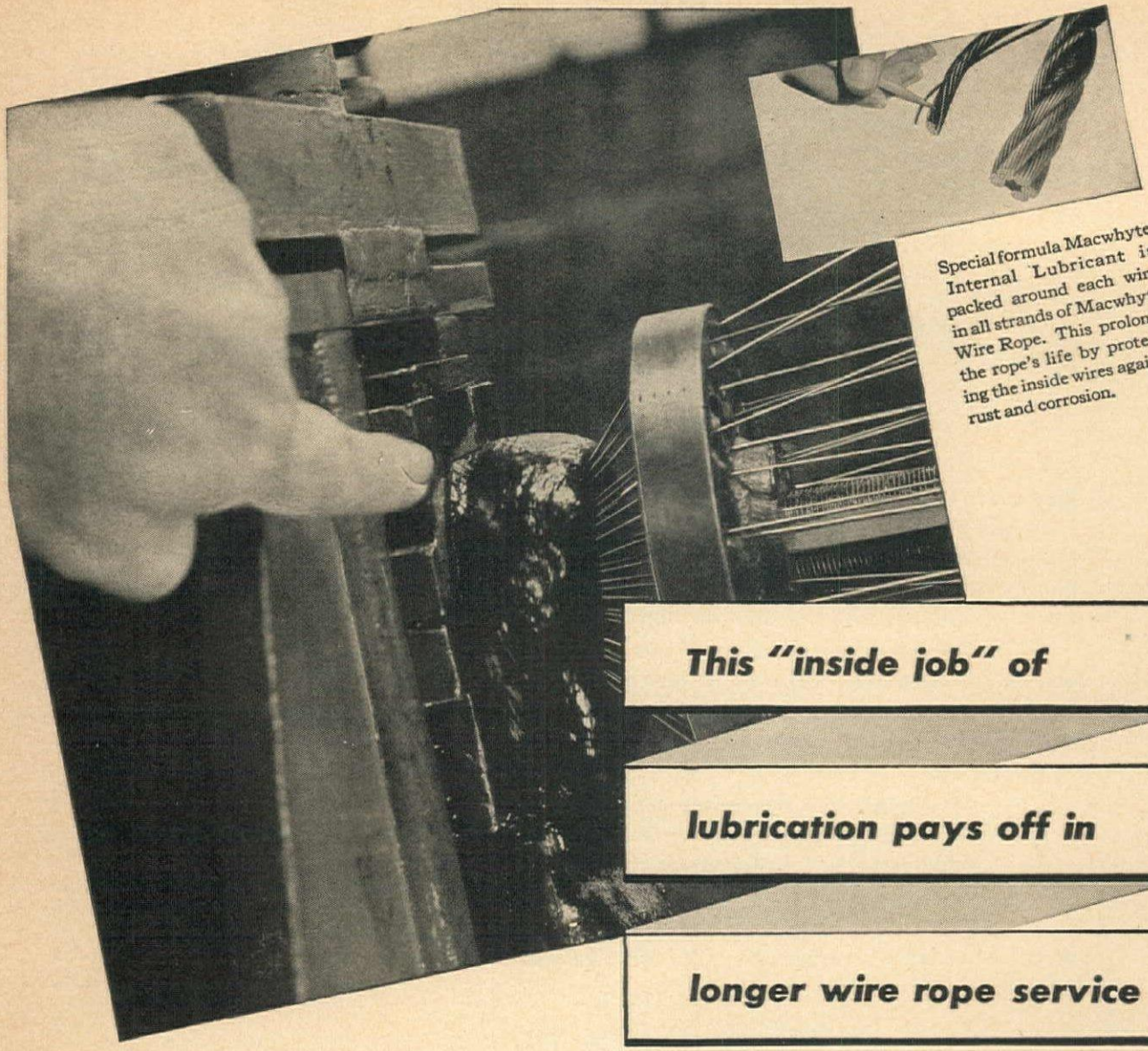
> ***Rotovator,*** **the revolving drum elevator that replaces bucket elevators and overhanging return conveyors, is but one of the Gravelmaster's many unique features that we could talk to you about at great length. But space won't even permit mentioning them.**

So call or visit our nearest office. We can give you all the facts there. Facts that add up to greater profits "when it's crushing time."

INDUSTRIAL EQUIPMENT COMPANY

10911 RUSSET ST., OAKLAND 3, CALIF. • 4441 SANTA FE AVE., LOS ANGELES 11, CALIF.

SAN DIEGO • FRESNO • SACRAMENTO • RENO • SAN FRANCISCO



Special formula Macwhyte Internal Lubricant is packed around each wire in all strands of Macwhyte Wire Rope. This prolongs the rope's life by protecting the inside wires against rust and corrosion.

This "inside job" of lubrication pays off in longer wire rope service

Because it's thoroughly lubricated *on the inside,* Macwhyte Wire Rope lasts longer on your equipment. Our heavy, tenacious, special formula lubricant gives long-lasting protection. It is force-fed to wires as they are being closed into the strand. All wires, both inside and outside, are thoroughly encased in lubricant.

Macwhyte Internal Lubricant improves the sliding action of the wires as they move in bending around sheaves and drums. It gives outside protection—but even more important, it protects the unseen inside wires which constitute the reserve strength and safety of the rope.

Extra life, assured by superior internal lubrication, quality materials and precision manufacture, makes Macwhyte Wire Rope your best buy.

MACWHYTE COMPANY 50th Year 1896 – 1946

MACWHYTE WIRE ROPE

Manufactured by Macwhyte Company

2909 Fourteenth Avenue, Kenosha, Wisconsin

Mill Depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth
Portland • Seattle • San Francisco • Los Angeles
Distributors throughout the U. S. A. and other countries

★ ★ ★ ★

MACWHYTE PREformed and Non-PREformed Internally Lubricated Wire Ropes . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . ATLAS Braided Wire Rope SLINGS . . . Hi-Fatigue Aircraft Cables, Assemblies, Tie-Rods . . . Stainless Steel Wire Rope . . . Monel Metal Wire Rope, Galvanized Wire Rope.

Send for Macwhyte Wire Rope Catalog. Contains 170 pages of valuable information; lists Macwhyte's complete line. Ask any Macwhyte representative or write Macwhyte Company.

Make MACWHYTE your headquarters for WIRE ROPE AND SLINGS

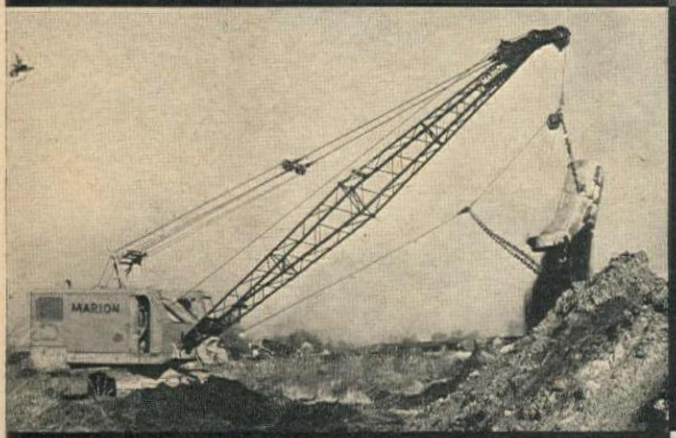
PETERBILTS HAUL SAND FOR BAYSHORE FREEWAY

● The above pictures show the job which ***Peterbilt*** Trucks are doing in building the 6 lane Bayshore Freeway. Piombo Brothers, San Francisco contractors, have a $270,000 job involving the placement of 235,000 cu. yds. of Type A borrow material in holes from 18" to 22" in diameter and from 15' to 60' deep, spaced on 10' centers. The purpose of these sand filled drains is to facilitate compaction and drainage of the embankment across the salt marsh where there is from 15' to 60' of mud above firm material. Before drilling, Piombo Brothers place a 2' layer of sandy material over the marsh as a working table, then drill and fill the drain holes, after which they place a 12" layer of pea gravel over the original 2' sandy layer. The result is that 90% of the final subsidence takes place in 3 to 4 weeks. It is just another of those history making jobs on which the Piombo Brothers have used ***Peterbilt*** Trucks advantageously.

Peterbilt Motors Company

107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORNIA

FOR HANDLING FULL-RATED LOADS UNDER ALL DIGGING CONDITIONS



FOR MAXIMUM STABILITY ON EVERY JOB

YOU NEED A MARION

A MARION stands on its record of proven performance in any kind of digging. This ability to do a better job, in less time, and at lower cost is yours when you have a MARION on the job.

WHAT IS YOUR MATERIAL HANDLING PROBLEM?

SEE YOUR MARION DISTRIBUTOR

Edward R. Daley, Marion Power Shovel Company, 571 Howard St., San Francisco 5, Calif.; Joseph O. Reed, Marion Power Shovel Company, 2504 N. E. Hoyt St., Portland 12, Ore.; Star Machinery Co., 1741 First Ave., South, Seattle 4, Wash.; Shaw Sales & Service Co., 5100 Anaheim Telegraph Road, Los Angeles, Calif.; H. H. Nielson, 541 W. 2nd South St., Salt Lake City, Utah.

from ¾ cu. yd. MARION POWER SHOVEL COMPANY SINCE 1884 to 40 cu. yds.

MARION

POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

Offices and Warehouses in all Principal Cities

REGISTRATIONS *SHOW* IT—OPERATORS *KNOW* IT!

"FORD TRUCKS LAST LONGER!"

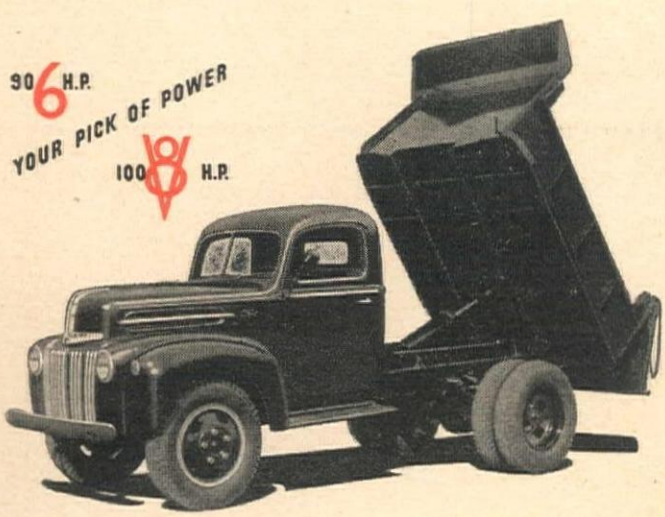
ONE big reason—

FORD ALL-WEATHER FAST WARM-UP

Ford trigger-fast engine starting often amazes first-time owners. It's mighty satisfying, but not nearly so important as Ford *fast warm-up!* Water does not circulate through the radiator until the engine is well warmed. This speeds the heating of water, cylinder block and oil. Hot exhaust gases are used to heat the intake manifold, speeding vaporization of fuel and minimizing crankcase oil dilution. Both these features reduce wear on cylinder walls, pistons, rings, bearings and valve mechanism. Yes, winter is tough on any truck, but Ford Trucks are engineered to take it.

Ford

Ford Heavy-Duty 2-ton, with dual-range rear axle and 6 x 8-foot Hydraulic Hoist Dump Body by Gar Wood Industries, Inc., Detroit.



ONLY Ford Trucks offer you *ALL* these long-life features: your choice of two great engines, the 100-H.P. V-8 or 90-H.P. Six—Flightlight aluminum alloy 4-ring oil-saving pistons—weatherproofed, Hi-Volt ignition—full pressure lubrication—axle shafts free of weight-load, even in light duty units—heavy channel section frames, *doubled* between springs in heavy duty models—big brakes, with non-warping, score-resistant cast drum faces—all told, *more than fifty* such examples of Ford endurance-engineering.

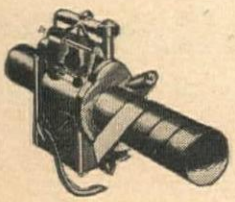
No wonder that Ford Trucks Last Longer! No wonder that 7 out of 11 of all Ford Trucks built since 1928 are still at work! No wonder the average age of all Ford Trucks on the job is nearly 9 years! And no wonder your Ford Dealer is calling for ever-increasing truck production schedules in Ford factories! See him now and get *YOUR* order in!

FORD TRUCKS

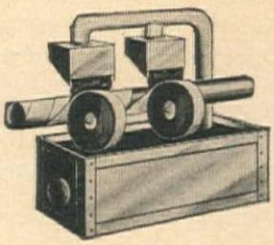
MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

The economics of cathodic protection

require the use of stable pipe protection plus modern methods of application and electrical inspection

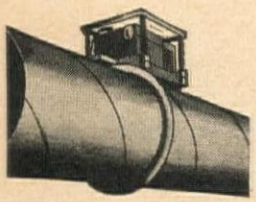


BARRETT Coal-tar Enamels, because of their low moisture absorption under varying conditions of the soils, provide a constant, uniform and long-lasting stable underground insulation.



Mechanically applied by modern methods, these coal-tar enamels assure the proper continuity of the insulation.

Electrical inspection improves the quality of application and the handling of pipe during construction and, together with a pipe protection of stable dielectric strength, makes cathodic protection economical. This combination permits the use of a minimum number of cathodic protection units, spaced the maximum distance, and a minimum investment in the complementary electrical protection. A dependable procedure when designing corrosion-proof pipelines.



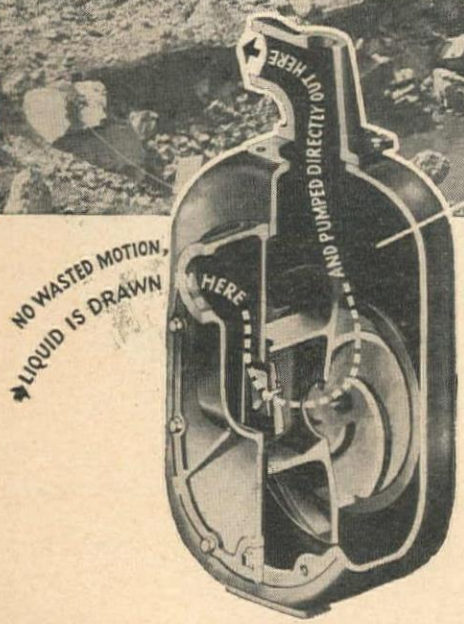
FIELD SERVICE: *The Barrett Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett Enamel.*

Barrett COAL-TAR ENAMEL

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

MARLOW PUMPS HELP MEN WHO BUILD

EFFICIENT MARLOW pumps help speed work in vast Peter Cooper Village and Stuyvesant Town projects, N Y C. Starrett Brothers & Eken, Inc. are the general contractors.

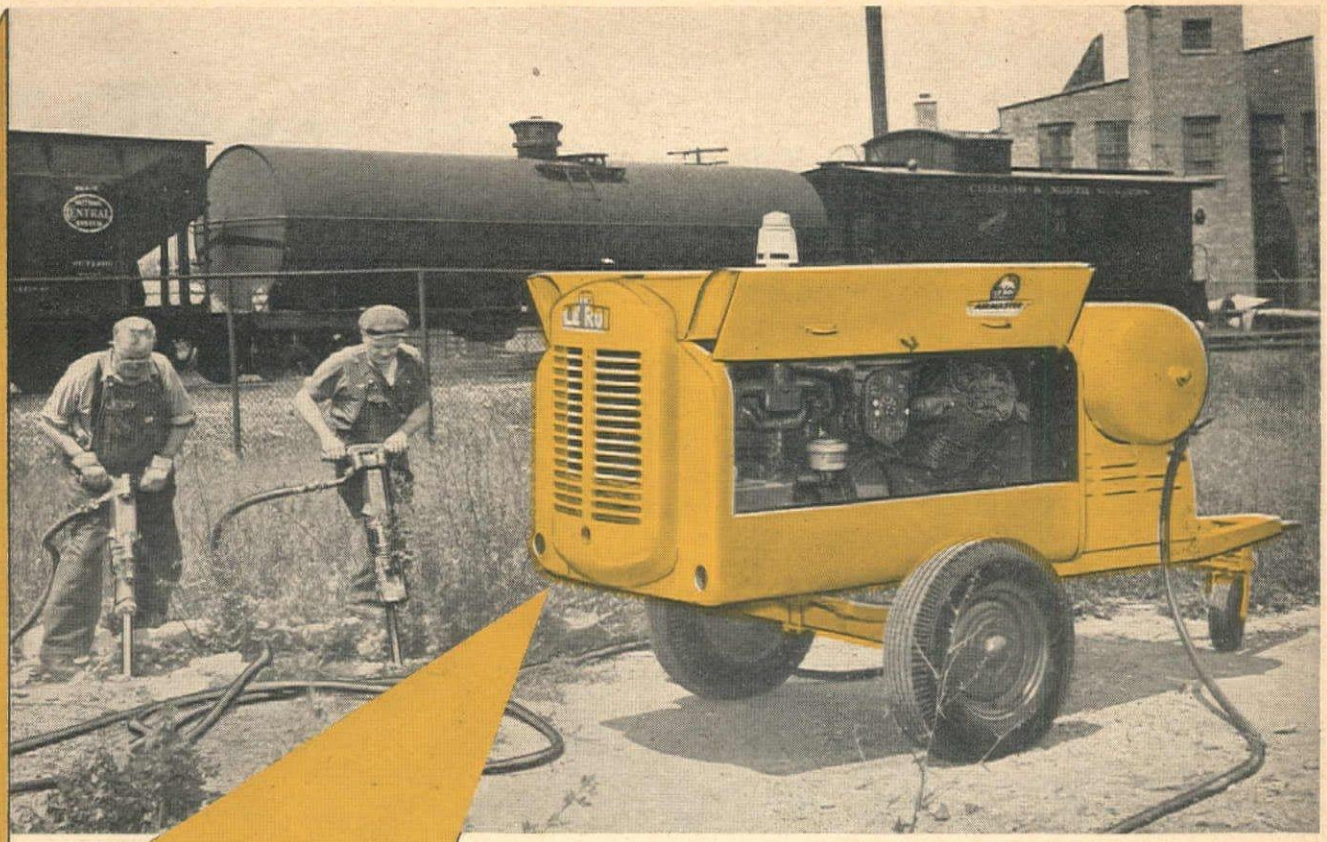


The simple trouble-free construction of a Marlow Self-Priming Centrifugal Pump enables it to prime and reprime positively and automatically. A Marlow has no ports, by-passes or other auxiliary priming devices that reduce pumping efficiency; it is soundly engineered and ruggedly made. For fast, dependable, thrifty pumping, you can't beat a Marlow.

Marlow literature is interesting and will be forwarded promptly on request.

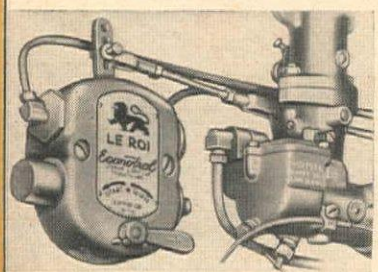
MARLOW PUMPS · RIDGEWOOD, N. J.

WAREHOUSED FOR WEST BY George M. Philpott Co., San Francisco, Calif. DISTRIBUTED BY: Glenn Carrington Co., Seattle, Wash. (For Interior Alaska); Alaska-Pacific Supply Co., Seattle, Wash. (For Alaska Coastal Regions); General Machinery Co., Spokane, Wash.; Clyde Equipment Co., Portland, Oregon, and Seattle, Wash.; Montana Powder and Equipment Co., Helena, Mont.; Nickerson Machinery Co., Salt Lake City, Utah; Le Roi-Rix Machinery Co., Los Angeles, Calif.; Burdick & Burdick, El Paso, Texas.

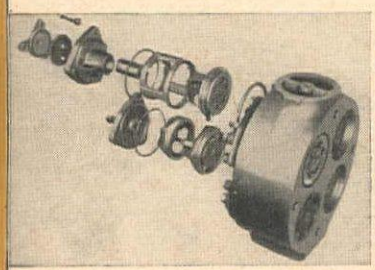


Portable Air Power AT ITS BEST

that's what users say about dependable, economical LE ROI AIRMASTER



Here it is in one handy unit — the Econotrol's simplicity makes it foolproof and trouble-free. There are no complicated adjustments to be made. Dependable regulation plus slower piston speeds provide unusual economy, as well as long and faithful performance.



A micron — one millionth of a meter — that's the kind of accuracy that goes into AIRMASTER valves. The direct, vertical, low-lift, cushioned action of these unique valves further assures long life.

*Reg. U. S. Pat. Off.

Sure, we've tested AIRMASTERS and tested them thoroughly. The results prove that they are unexcelled — that they produce air at low cost and with little trouble. But, despite our 30 years of compressor-engineering experience, we didn't stop there. We didn't want our own pride in doing a swell job of designing to influence our final decisions. That is why we shipped AIRMASTERS to all parts of the country.

Here's what happened — orders were received in greater quantities than ever before (except during the war years when we built over 6,500,000 cfm of portable air power for the armed forces). Dependability and economy were given as the basic reasons for buying AIRMASTERS. Here are just two of the many features that are partly responsible for the money-saving performance of these outstanding portable compressors:

The patented, fuel-saving Econotrol adjusts engine speed to the job-air requirements — acceleration and deceleration are gradual; fuel economy greater; engine and compressor life longer. Furthermore, the Econotrol maintains higher average working pressures so that air tools do more work.

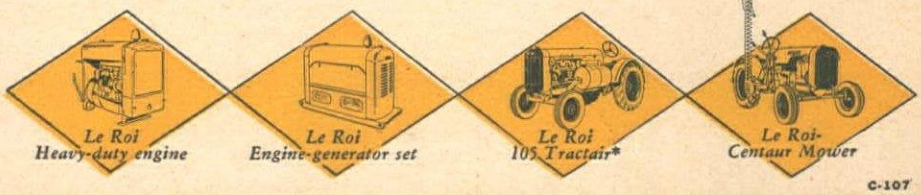
Cushioned, Super-finished AIRMASTER Valves provide the most efficient, trouble-free means of *delivering* air. All the valves; i.e., intake, discharge, high and low pressure are 100% interchangeable. They are individually magnafluxed, and the accuracy of their seating surfaces is measured in microns. This accounts for their long life and high efficiency.

AIRMASTER sizes range from 60 to 500 cfm. All styles of mountings are available, and you can have your choice of gasoline or diesel-engine power. Get the most out of your equipment dollar — get portable air power at its best — get an AIRMASTER*. See your nearest Le Roi distributor or write for bulletins giving complete details.

LE ROI COMPANY, Milwaukee 14, Wisconsin

New York • Washington • Birmingham • Tulsa • San Francisco

LE ROI MILWAUKEE



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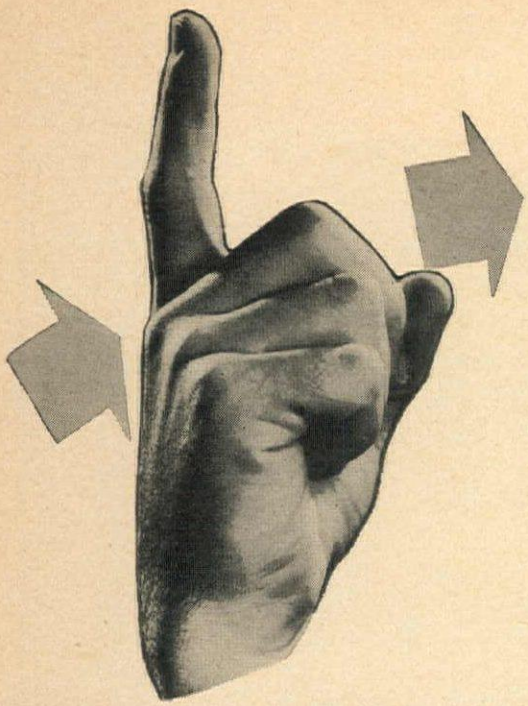
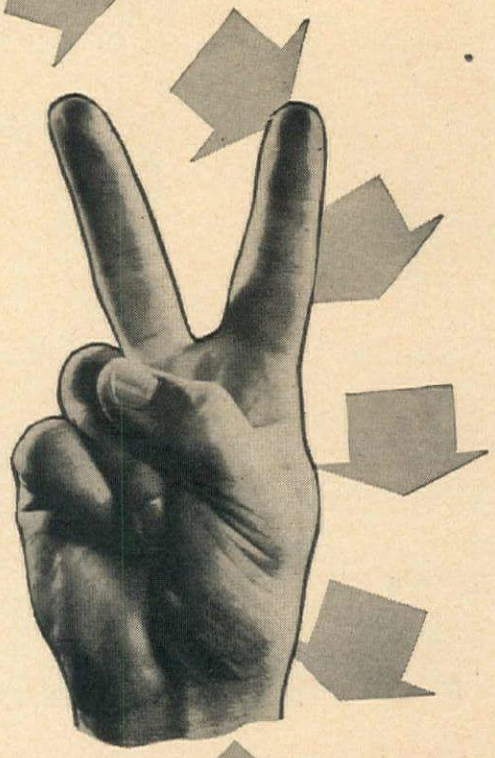
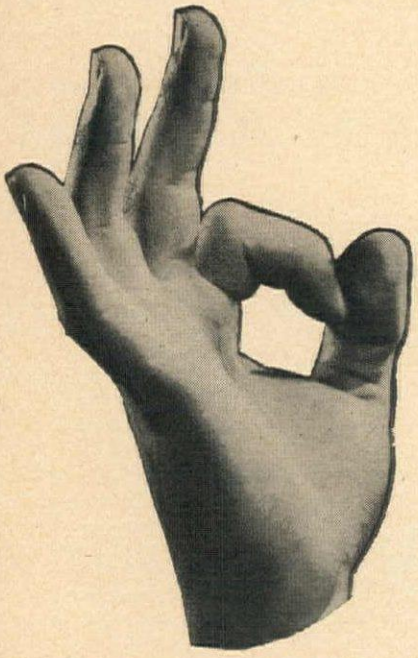


ONE GREAT GEAR OIL
(Richfield)



FOR TWO TOUGH JOBS
(Transmission and Differential)



WITH PERFECT RESULTS
(on every job)

RICHFIELD GEAR OIL

Richfield Gear Oil is an all-purpose gear lubricant designed to perform with complete satisfaction and safety in all hypoid, spiral-bevel, dual reduction, herringbone and worm gear rear axles. Richfield Gear Oil is also specified for over-drive units, helical, stub and constant mesh gears in transmissions.
For reliable and dependable service, with maximum protection at minimum cost, specify RICHFIELD GEAR OILS in SAE Grades 80, 90, 140 or 250.

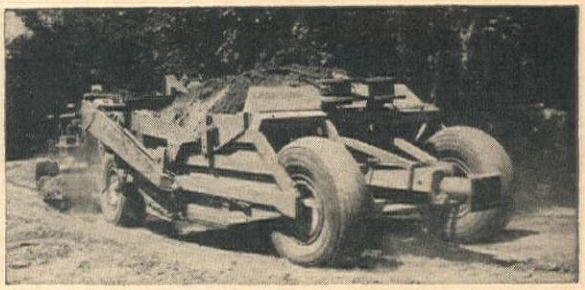
RICHFIELD

Yards ahead in Performance

. . . because they are years ahead in practical engineering features . . .

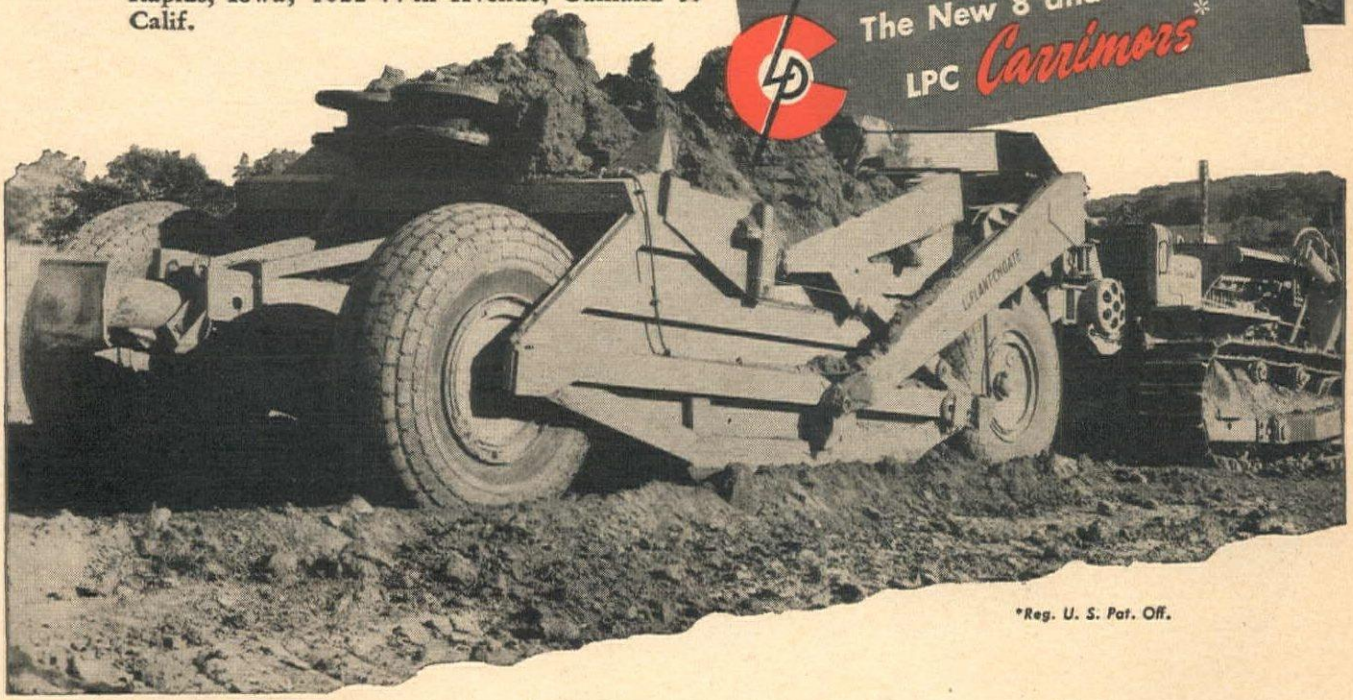
On job after job, you'll find the new LPC "Carrimors" outperforming other scrapers by a wide margin. They're getting bigger loads faster and with less power because every LPC feature — cutting edge, heel clearance, bowl design, hoist sheaves and apron operation — has been scientifically engineered to insure easy loading.

Regardless of the kind or condition of material, LaPlant-Choate's *exclusive* positive forced ejection gets the load out quickly and completely. Even rocks, stumps and sticky gumbo can't ever jam between the gate and apron. Moreover, the rear gate is positively returned *the full distance* every time by the weight of the apron, plus a special spring arrangement. So for lowest possible costs tomorrow, get complete facts today on the new LPC "Carrimors." LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Avenue, Oakland 3, Calif.



● *Low center of gravity, low over-all height and freedom from unnecessary dead weight also contribute to LPC's record of "lowest possible cost per yard."*

The New 8 and 14 Yard LPC *Carrimors**



*Reg. U. S. Pat. Off.

See Your LaPlant-Choate Distributor Today

INDUSTRIAL EQUIPMENT COMPANY
San Francisco, Oakland, Los Angeles, Reno, Sacramento, Fresno, San Diego, Phoenix.

COLUMBIA EQUIPMENT CO.
Portland Seattle
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WESTERN CONSTRUCTION EQUIPMENT CO.
505 N. 24th Street, Billings, Montana
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WESTERN STATES WELDING & PRESS CO.
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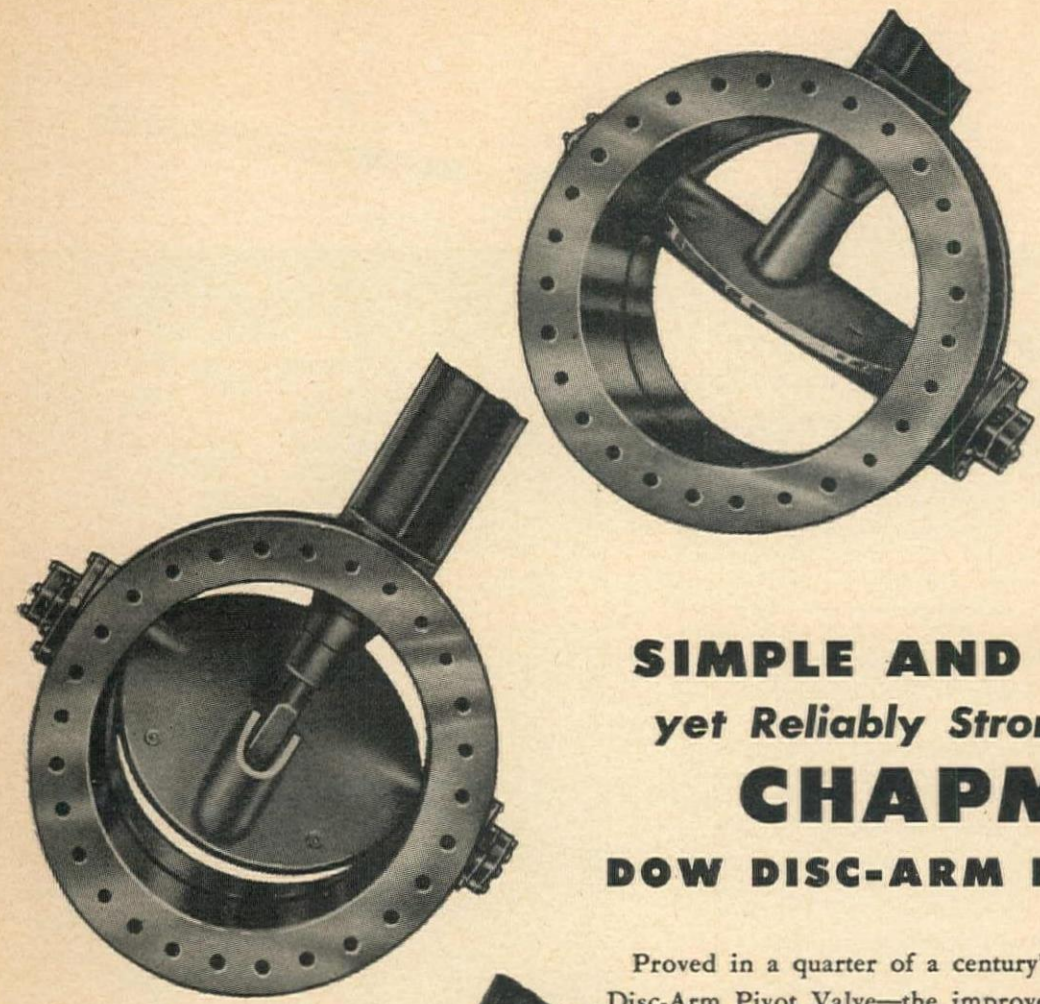


SIMPLE AND COMPACT

yet Reliably Strong and Tight

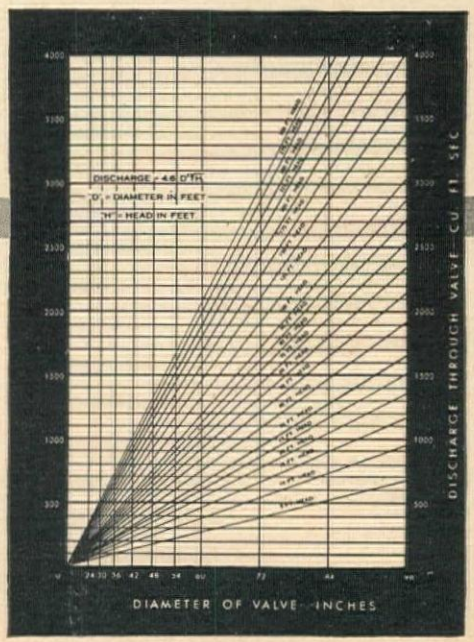
CHAPMAN

DOW DISC-ARM PIVOT VALVE

Proved in a quarter of a century's service, Chapman's Dow Disc-Arm Pivot Valve—the improved type of butterfly valve—stands out for its reliable strength and tightness. Note how, by applying the operating force to the proper point, the deflection is taken out of the lower half of the disc.

Send for Bulletin No. 40 which contains complete engineering data and recommendations.

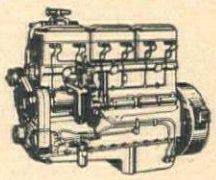
THE CHAPMAN VALVE MANUFACTURING COMPANY
INDIAN ORCHARD, MASSACHUSETTS



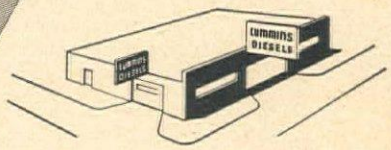
Approximate discharge to be anticipated through a pivot valve under the head available at valve inlet.

dependable

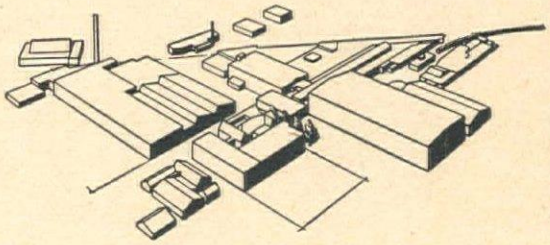
THE ENGINE



THE DEALER



THE MANUFACTURER



CUMMINS *Dependable* DIESELS

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

a dependable engine . . . proven dependable and economical on jobs such as yours.

a dependable dealer . . . near you . . . on call 24 hours a day with adequate parts and dependable mechanics.

a dependable manufacturer . . . who puts quality ahead of quantity . . . who recognizes that service comes ahead of sales.

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Precisionbilt FOR LONGER SERVICE

J&L WIRE ROPE

PERMASET PRE-FORMED

For dependability of loading shovels in rock quarries and open-pit coal mines specify J&L Precisionbilt Wire Rope. Many operators have reduced down-time, kept their crushing plants and washing plants working at capacity by using only J&L wire rope. They find, too, that if it is J&L Permaset Preformed they get even longer service. Permaset spools better, handles easier, increases their profits by reducing maintenance. For more information write today for J&L Precisionbilt Wire Rope Catalog.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

NOVO NEWS

DECEMBER, 1946

Contractors Praise Novo Independent Pump Feature

Self-Priming Centrifugal Pump Proves Its Value

According to contractors, one of the most important of the many features of the "Pronto-Prime"—the new Novo self-priming centrifugal pump — is that pump and engine are separate units. This arrangement permits the use of various types of power and makes it possible to service pump and engine independently. Another advantage—the engine is relieved of end thrust ordinarily imposed by the impeller.

Field Service Operations Greatly Simplified

On the "Pronto-Prime" vital parts—impeller, wear plate, seal, shaft and bearings—are reached by removing the front cover plate. The recirculating priming valve is accessible through a large cleanout in the lower part of this same plate. Clearance between impeller and wear plate can be checked by removing the hand hole plate on the side of the pump. The cutoff is replaceable and provides a ready means of maintaining clearance at the cut-off point with the periphery of the impeller. The replaceable suction valve is readily accessible.

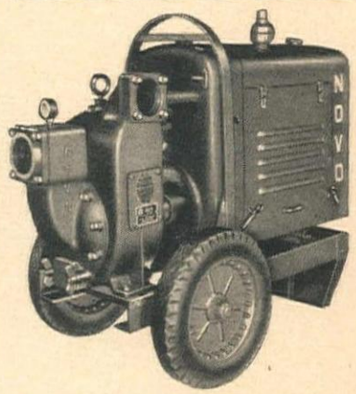
Complete Line

The "Pronto-Prime" is available in models ranging from 1½ to 8 inches and in capacities from 3,000 to 125,000 gallons per hour.

Super Speed Priming

Super speed, positive priming is certain on the "Pronto-Prime." The design and location of the priming valve assure delivery of the right amount of priming water at the proper time and place.

"Pronto-Prime"



The new "Pronto-Prime" was designed to specifications which hundreds of you contractors suggested as necessary to efficient, trouble-free operation.

Stout-Hearted Seal Is Extra Long-Lived

The long-lived, self-aligning, self-adjusting, rotating Neoprene seal is encased in brass. An external corrosion resistant spring maintains constant and correct pressure between the rotating and stationary steel plates. Oil, instead of grease, assures lubrication at all temperatures.

Self-Cleaning

Large, streamlined passages permit a natural flow of water to prevent settling and clogging.

Meets AGC Specifications

"Pronto-Prime" pumps meet AGC standards in all respects.

DISTRIBUTORS

ALABAMA
Birmingham—YOUNG & VANN SUPPLY CO.
ARIZONA
Phoenix—MINE & SMELTER EQUIP. CO.
ARKANSAS
North Little Rock—STANDARD EQUIP. and SUPPLY CO.
CALIFORNIA
Oakland and Eureka—BURAN EQUIP. CO.
Los Angeles—GARLINGHOUSE BROTHERS
COLORADO
Denver—GUNDERSON-KRINGEL CO.
CONNECTICUT
Stamford—M. F. TAYLOR CO.
FLORIDA
Jacksonville—FARQUHAR MACHINERY CO.
Miami—GENERAL EQUIP. & SUPPLY CO.
Tampa—EPPERSON & CO.
GEORGIA
Atlanta—GILL EQUIPMENT CO.
ILLINOIS
Chicago—CENTRAL CONTRACTORS SERVICE
Rock Island—WESTERN EQUIP. & SUPPLY CO.
INDIANA
Indianapolis—BOCK EQUIPMENT CO.
Rochester—DEEDS EQUIPMENT CO.
IOWA
Cedar Rapids and Des Moines—GLOBE MACHINERY & SUPPLY CO.
KENTUCKY
Louisville—NATIONAL EQUIPMENT CO.
Paducah—HENRY A. PETTER SUPPLY CO.
LOUISIANA
Baton Rouge, Monroe and New Orleans—DUNHAM-PUGH CO., INC.
MAINE
Portland—EASTERN TRACTOR & EQUIP. CO.
Presque Isle—ROY C. THOMPSON CO.
MARYLAND
Baltimore—MARYLAND SUPPLY & EQUIP. CO.
MASSACHUSETTS
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MICHIGAN
Detroit—W. H. ANDERSON COMPANY, INC.
Grand Rapids—E. K. S. EQUIPMENT CO.
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MINNESOTA
St. Paul—BORCHERT-INGERSOLL, INC.
MISSISSIPPI
Jackson—WATKINS-ALDRIDGE EQUIP. CO., LTD.
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Kansas City—CONTRACTORS SUPPLY CO.
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MONTANA
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NEVADA
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NEW JERSEY
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NEW MEXICO
Albuquerque—HARRY CORNELIUS CO.
NEW YORK
Albany—VAN NOUHUYS PUMP & SUPPLY CO.
Buffalo—WHEELER EQUIPMENT CO.
New York—H. O. PENN MACHINERY CO.
Rochester—HAVERSTICK & CO.
Utica—CREDLE EQUIPMENT CO.
NORTH CAROLINA
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Fargo—MYHRA EQUIPMENT CO.
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Cincinnati—THE FINN EQUIPMENT CO.
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Waco—CONTRACTORS EQUIPMENT SALES & SERVICE, INC.
UTAH
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CONTRACTOR'S EQUIPMENT
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ENGINES

18 Years Hauling with TRAILMOBILES

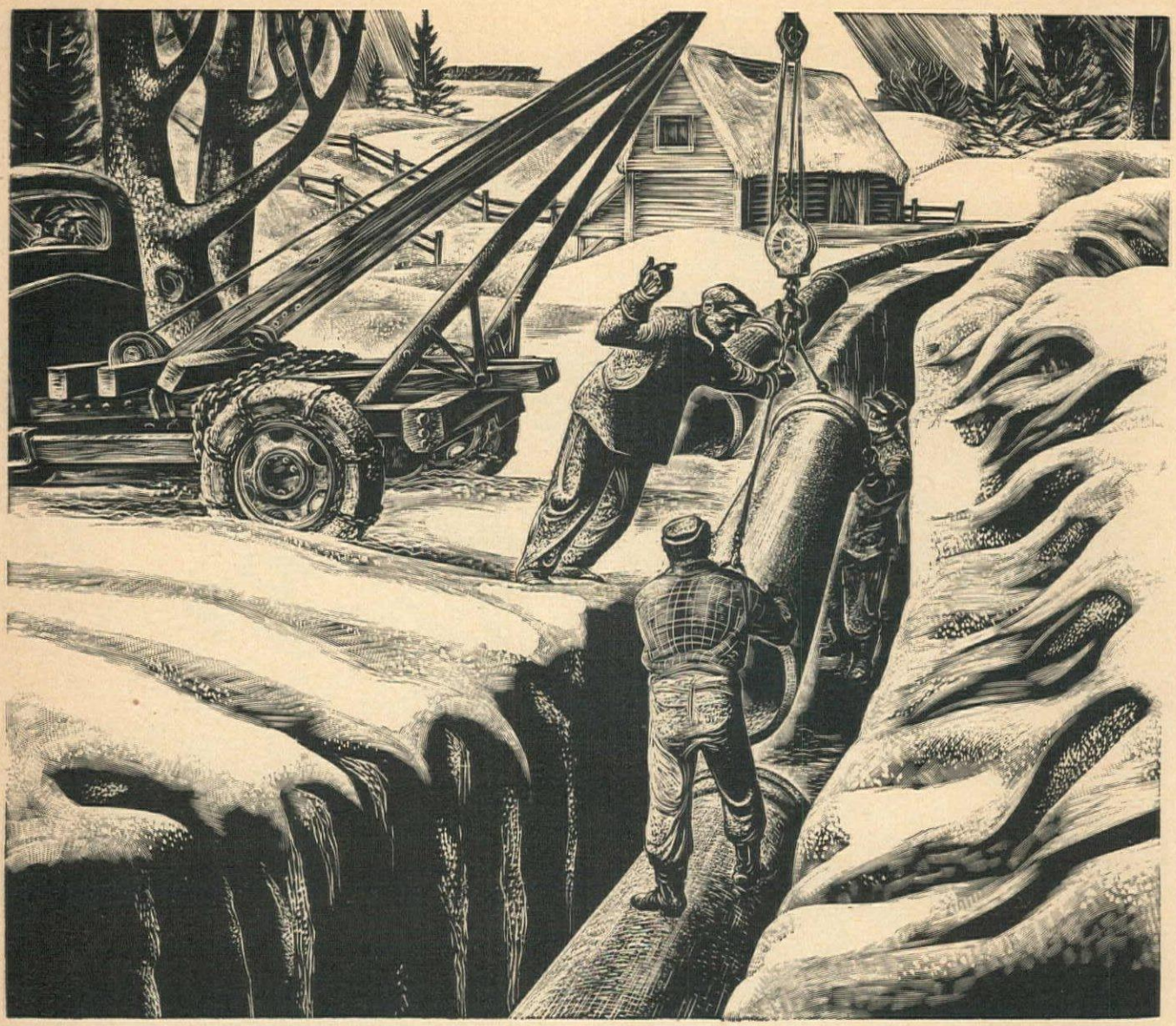
The Security Truck Line of San Jose, California, is engaged in hauling General Petroleum Products throughout Northern California. A glance at a map will quickly tell you that this is a very large area, with miles upon miles over the level straightaway of valley floors. But loads must also travel over rolling hills and through high mountain passes. No matter what the terrain, the nature of the cargo demands SAFE TRANSPORTATION over the public highways.

TRAILMOBILES are specifically designed and ruggedly constructed to transport this valuable and inflammable cargo with maximum speed consistent with a wide margin of safety for the driver, the cargo, the equipment, and the traveling public. So successful have TRAILMOBILES proven in operation, that Security Truck Line has used them consistently since 1928. There is no better evidence of continued satisfaction than consistent repeat orders.

THE TRAILMOBILE COMPANY • BERKELEY, CALIFORNIA

TRAILMOBILE

Los Angeles • Berkeley • Sacramento • Santa Rosa • Fresno • San Jose • Bakersfield • Stockton • Ogden • Seattle • Honolulu • Santa Barbara • Portland • Spokane



Original Woodcut by Lynd Ward

It is probably cold comfort to a construction crew, on a winter morning, to realize that the cast iron supply line they are installing will bring needed protection to the safety and health of a community.

Long range planning for adequate water supply logically includes long-lived cast iron mains. Their reliability and low annual cost are proved by century-old pipe, still in service, even though made without benefit of the improved methods by which U. S. Cast Iron Pipe is produced in our modern plants.

U.S.
cast iron
PIPE

U. S. PIPE & FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices throughout the U. S. A.

Why

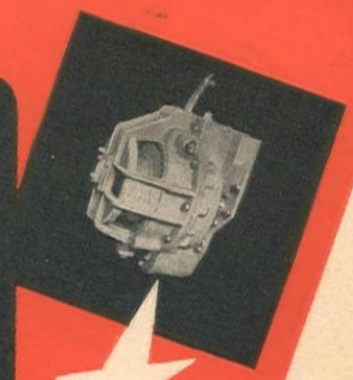
Construction Methods Demand

ISAACSON KABLE TRAC-DOZERS

Speed necessitated by today's demands for increased production, is responsible for many new, improved methods of operation. Short cuts introduced in the construction field demand the help of fast, positive controlled dozers.

They speed up work on cuts and fills. They roll big loads, uproot stumps and dig out boulders. They level, back-fill and grade as well as do lots of other time-saving jobs.

Isaacson Kable Trac-Dozers do all this because they give fast, positive control and smooth, powerful operation so necessary for all-out dozer performance.



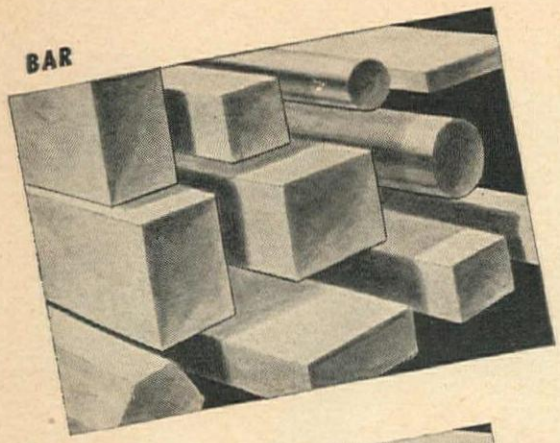
Heart of successful cable operation is the versatile Isaacson Power Unit. It's simple, dependable and easy to adjust. For short cuts that mean speed and profits, use a Kable Trac-Dozer.

See your INTERNATIONAL DEALER or write for full details

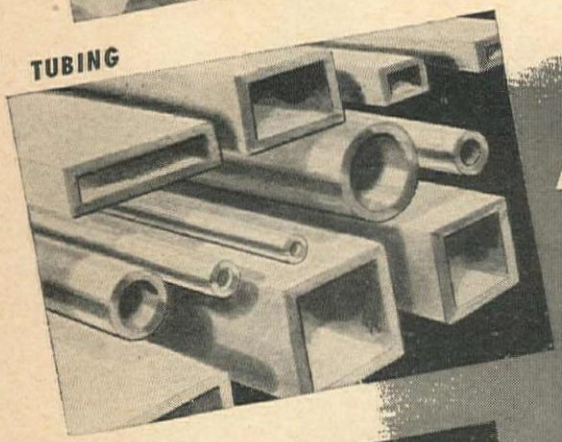
ISAACSON

Tractor Equipment

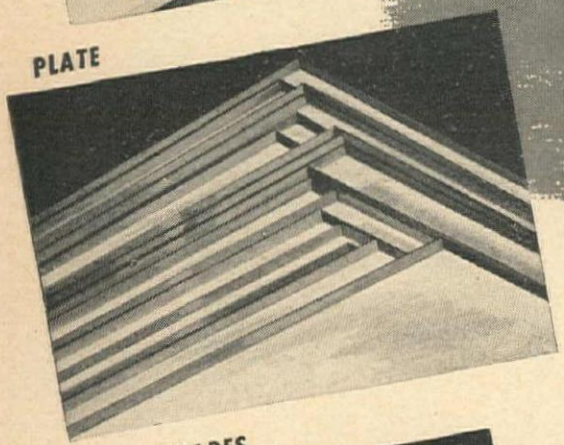
A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

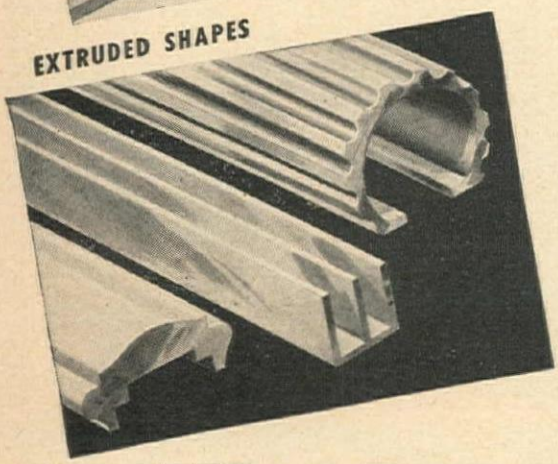


ALUMINUM MILL PRODUCTS



AVAILABLE TO FABRICATORS right now!





Consider your aluminum needs—then get in touch with your nearest War Assets Administration Regional Office to see if we can fill your requirements. Even your highly specialized requirements might be filled from WAA surplus stocks. It costs nothing to find out. Orders are filled quickly and without fuss.

All metals are sold under existing priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area, and then to purchase the materials offered herein.

Exporters are considered as wholesalers in the purchase of surplus property. Any question on export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta · Birmingham · Boston · Charlotte · Chicago · Cincinnati · Cleveland · Dallas · Denver · Detroit · Fort Worth · Helena · Houston · Jacksonville · Kansas City, Mo. · Little Rock · Los Angeles · Louisville · Minneapolis · Nashville · New Orleans · New York · Omaha · Philadelphia · Portland, Ore. · Richmond · St. Louis · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane · Tulsa

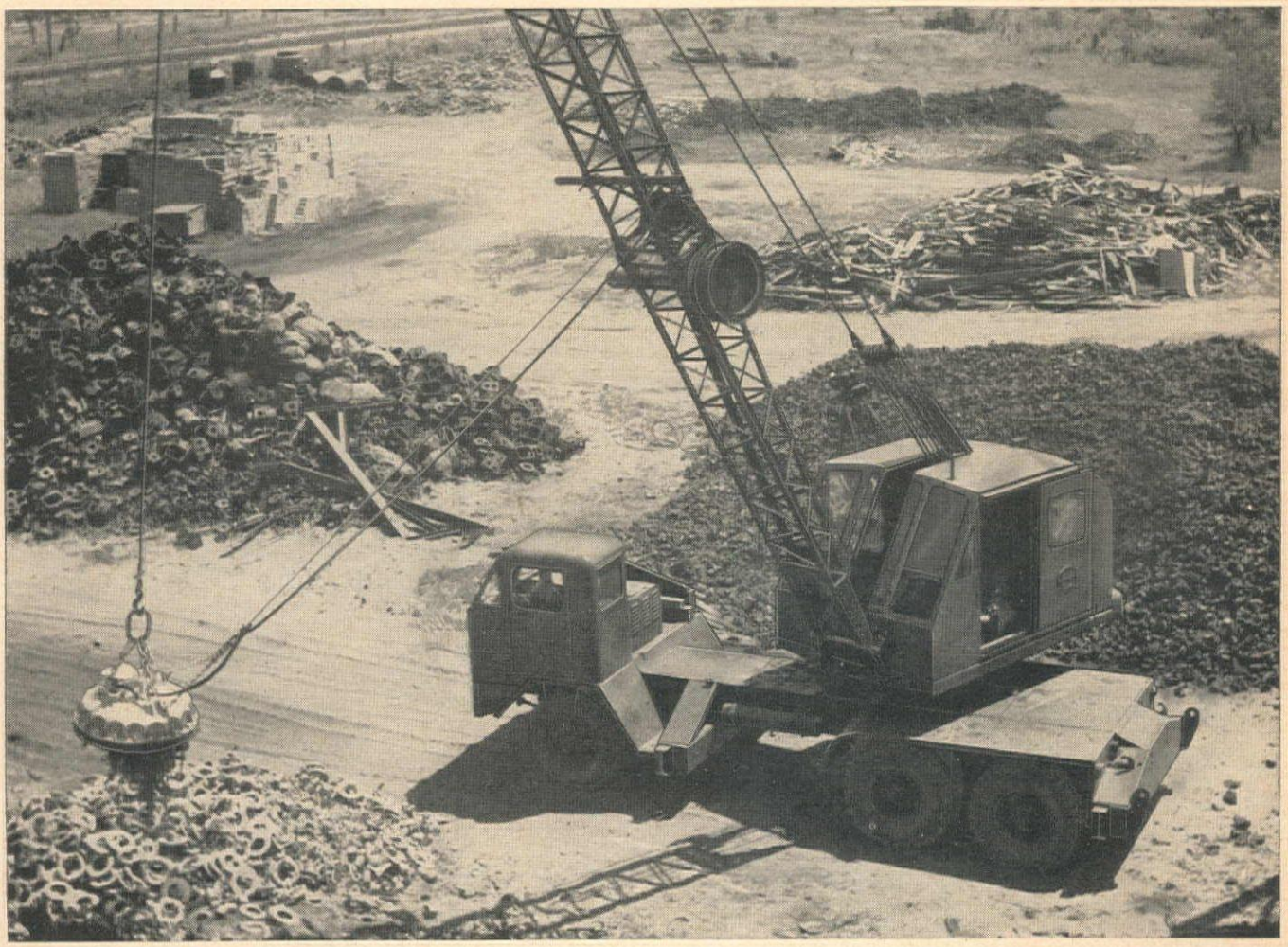
157-9

SPEED and ECONOMY on Wheels!

FINGERTIP AIR CONTROLS
ONE-MAN OPERATION
3/8 YD. and 1/2 YD. SHOVELS
6 to 12 TON CRANES

No waiting — no delays! Out on the job or around the yard MICHIGAN Mobile CRANE'S time-saving, cost-cutting operating speed, economy and truck mobility pays off on every lifting and excavating job. Long-time MICHIGAN owners will tell you that for crane, clamshell, dragline, trench hoe and shovel work the fully convertible MICHIGAN Mobile SHOVEL-CRANE is truly "speed and economy on wheels"!

Get all the facts — send for Bulletin W-126



MODEL TLDT-20 CRANE 12-ton capacity. Power lowering as well as lifting. Large heavy duty hoist drum for precision crane work. Timken tandem dual drive axle. Total reduction in low gear 72.88-1. Four Timken-Westinghouse Air Brakes. 30 MPH travel speed.

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

WOULD YOU WANT TO PAY THIS PENALTY?

THE PROBLEM— A recent CAA airport job called for clearing and grading 350 acres and installing drainage structures and electrical conduits. It involved handling 4,000,000 cu. yds. of material which ran from 60 to 90% rock. This work had to be done within a 300-day time limit.

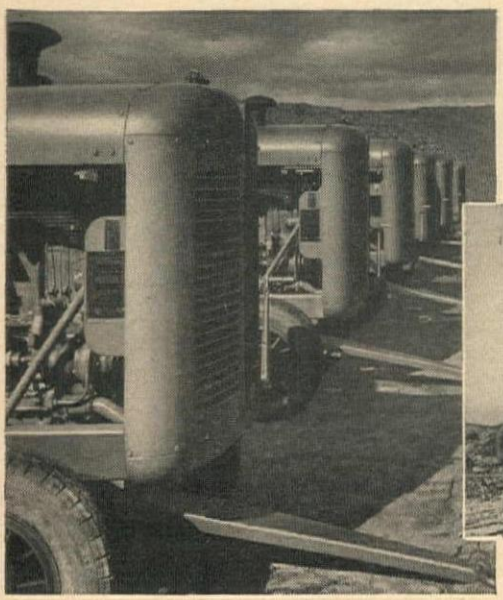
THE PENALTY— $3500.00 for each day that the work exceeded the 300-day limit.

THE SOLUTION— The contractor, to protect himself against this penalty, used I-R rock drilling equipment.

Forty-six FM-2 wagon mountings equipped with X-71WD deep hole machines did the bulk of the drilling. Small outcroppings that occurred outside the main drilling areas were removed by 18 easy-holding, fast-drilling, I-R Jackhamers.

Thirteen K-500 Mobil-Air Compressors supplied most of the air. These were selected because the patented Drill-More Regulator on the K-500 provides up to 15% faster drilling and uses up to 40% less fuel to do an average drilling job. The drilling ability of the FM-2 Wagon Drills and the Jackhamers, teamed with the efficiency of the K-500 Mobil-Airs, enabled the contractors to move more than 45,000 cu. yds. of material a day. This kept him well ahead of schedule.

MORAL— Put the high standard of performance and the dependability of I-R rock-drilling equipment to work on your new jobs. You'll get them done faster and at lower cost.



Left—Low-cost air was provided by K-500 Mobil-Air Compressors equipped with the patented, fuel saving Drill-More Regulator.

Above—Small, out-of-the-way areas were drilled quickly and efficiently with I-R Jackhamers.

Left—The deep-hole drilling power of FM-2 Wagon Drills kept the big shovels and dirt-moving equipment constantly at work.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 5-875

SEVENTY-FIFTH IR ANNIVERSARY

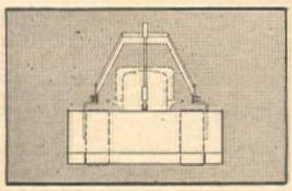
COMPRESSORS · AIR TOOLS · ROCK DRILLS
TURBO BLOWERS · CONDENSERS
CENTRIFUGAL PUMPS · OIL AND GAS ENGINES

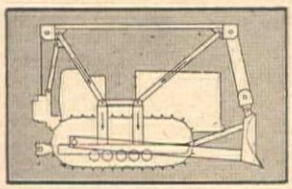
NOW-THE SOUTHWEST LOADOZER

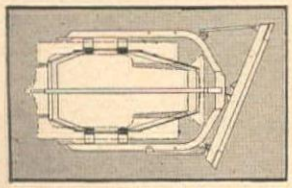
All this

SAVES ONE TRACTOR
30 MINUTE CHANGE-OVER
EASY OPERATION

Balance
Economy
Ruggedness
Speed
Versatility







"Over Center Track Mounted" design gives perfect balance

All these features are "built-in" qualities of the new SOUTHWEST "LOADOZER"—Extra values that mean greater efficiency and economy in Loader and Bulldozer operations. Remember—you SAVE ONE TRACTOR—it takes only 30 MINUTES TO CHANGE OVER this combination Loader-Bulldozer unit.

ANOTHER EXAMPLE OF *Southwest's* LEADERSHIP

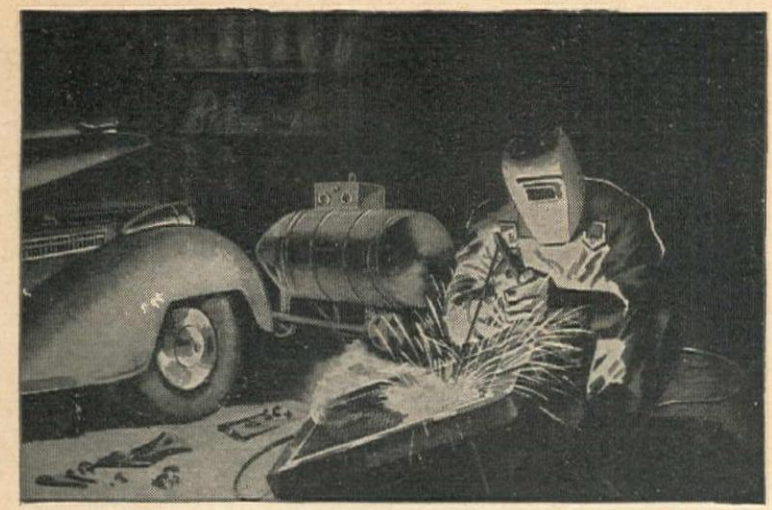
- Built for all four makes of track type tractors.
- See your equipment dealer about the complete line of SOUTHWEST CONSTRUCTION EQUIPMENT.
- For complete specifications on this Loader-Bulldozer combination unit—WRITE FOR BULLETIN CM-11.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

SCOOPS BULLDOZERS CRANES WINCHES DUMP WAGONS RIPPERS TAMPERS SCRAPERS



HOW TO GET ARC WELDERS IN A HURRY!

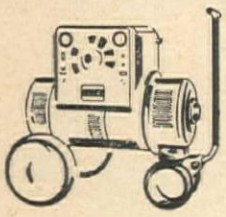
IT'S EASY FOR THE SMALL BUSINESSMAN TO GET THEM AT A SAVING.

Hundreds of arc welders are available to small businesses for immediate delivery. Some are unused. Some are used. All were made by well known manufacturers.

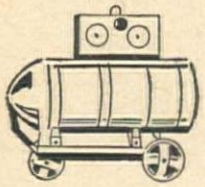
Now they are offered for sale at real bargain prices.

These are the type welders needed by garages, repair shops and maintenance shops. The large inventory includes welders of 200, 300 and 400 Ampere Rating, either DC or AC. They are located at various points throughout the country and may be inspected before purchase.

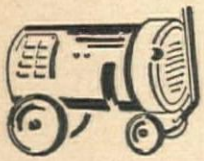
To obtain complete information on availability, location and condition of the equipment you want, fill out the coupon and send it to your nearest War Assets Administration Regional Office.



Hobart—Standard models of this make available in large quantities and most ratings.



Lincoln—In all models and most ratings. Many in the popular 300—400 Ampere size.



Westinghouse—Portable models available in limited quantities.

Electrodes and Welding Rods—Millions of pounds available in all types and sizes.

For full information clip and mail this coupon to:

War Assets Administration:
Please send me complete information on the availability, condition and location of the following types of equipment.

....Hobart Arc Welders ....Westinghouse Arc Welders
....Lincoln Arc Welders ....Electrodes and Welding Rods
Arc Welding Equipment AC.... DC....
Electric Motor Driven: Volts....Phase....Cycles....
Transformer Type: Volts....Phase....Cycles....

Name.....

Firm.....

Address.....State.....

City.....

All Arc Welders are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

EXPORTERS

The War Assets Administration solicits your inquiries. Communicate with your foreign clients promptly.

WAR ASSETS ADMINISTRATION

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Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

649-3

PACIFIC WIRE ROPE COMPANY
LOS ANGELES 21, CALIF., U.S.A. *BRANCHES:*
SAN FRANCISCO HOUSTON PORTLAND

water
when you want it!

A *gravity* water supply in an elevated steel tank—above the property it protects—will make your automatic sprinkler system effective *at all times.*

Horton welded elevated water storage tanks are also built for general water supply and municipal service in capacities from 5,000 to 2,000,000 gals.

THE Norris Stamping and Manufacturing Co., California producer of a wide variety of metal stampings and metal products, has had an automatic sprinkler system in its plant since it first started operations in 1930. Water for the sprinkler system is supplied from the mains of the City of Vernon, California. The 100,000-gal. Horton elevated water storage tank, shown above, was installed recently to provide water for the sprinkler system in the event of failure of the city water supply. The entire sprinkler system is connected to the elevated tank in such a manner that it will function when there is insufficient pressure in the city mains to take care of the required load. Thus there is an adequate supply of water immediately available at all times.

Horton elevated storage tanks for automatic sprinkler systems are built in capacities from 50,000 to 250,000 gals. They can be designed to harmonize with modern styles of architecture. In addition to protecting property from fire, an elevated tank and an automatic sprinkler system will usually reduce the insurance premium rate, on the property they protect, enough to repay their cost in a short time.

CHICAGO BRIDGE & IRON COMPANY

SAN FRANCISCO • ATLANTA • BIRMINGHAM • PHILADELPHIA • DETROIT • WASHINGTON
CHICAGO • HOUSTON • NEW YORK • CLEVELAND • TULSA • LOS ANGELES

Plants in BIRMINGHAM, CHICAGO, and GREENVILLE, PENNSYLVANIA

WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
December, 1946 Vol. 21, No. 12

Don't Go "Hog-Wild"!

THE REPUBLICANS WON! For the first time since 1930, they hold control of both Houses of Congress.

They were elected (1) because of dissatisfaction among both employers and labor with the government's labor policy, which encourages unions to run wild and uncontrolled, while sternly restricting the actions of employers, thus producing widespread unemployment and fantastically high prices; (2) because the housewife has been unable to buy adequate supplies of food and other necessities, except at black market prices; (3) because admittedly proper wartime controls on every phase of life have been mercilessly extended over peace-time living; (4) because bureaucracy-gone-wild and government waste have raised taxes to a fantastic and stifling level; and (5) because citizens wanted to protest against a hundred and one bungling acts by their New Deal overlords, including such things as Authorities, housing, veterans' policies, surplus disposal, farm dictation, and a host of others.

BUT THE REPUBLICANS WERE NOT GIVEN A MANDATE. They were put in power as a protest, and as a trial. This editor has consistently called for a return to sound business management of the American government, and the innate good sense of the American voter has brought him to see that the coalition of Communists, foreign sympathizers, Southern reactionary Democrats, and unthinking rubber stamps which has masqueraded under the name "New Deal," can never deliver anything but confusion, taxes, and eventually, anarchy. The Republicans have talked about good and honest government, the voters are giving them a two-year trial to test their words. They'll deliver, OR ELSE—

We're strong for 'em, and want to see them make good. We're just warning them that plain obstructionist policies; that pampering of any special group, be it labor, farmers, veterans, bankers, internationalists, or any other special interest; that maintenance of non-essential bureaus, or on the other hand, curtailment of essential services; that allowing politics to slow reconversion and full production; that failure to make sensible, fair modifications to the Wagner Act and other lop-sided laws; that, in short, if they regard their elevation to power as an invitation to run as wild to the right as their predecessors did to the left, they'll lose the 1948 elections, they'll lose all the respect of the voters for generations to come, and the Nation will probably go openly Communist. THEY WERE ELECTED NOT TO DESTROY, BUT TO BALANCE.

We note with satisfaction that they propose to curtail spending and taxes. Bravo! Sen. Byrd (and let them not be too partisan to seek his counsel) can point out a hundred bureaus that can with good reason be utterly wiped out, but many others are worthy and should be supported; they should purge the federal payroll of all those who put the interests of foreign governments before our own, but appointments of the President should not be turned down for politics' sake, if the nominee is capable, qualified, and honest; they should halt huge gifts of money and supplies to nations which hate us, but they should attempt by straightforward means to build friendly relations with other nations.

Their tax program includes the words, "curtail unnecessary construction," a worthy objection certainly. We think of the Florida Ship Canal, Passamaquoddy, and paralleling power transmission lines. BUT THAT MUST NOT MEAN ALL CONSTRUCTION.

Will the withholding of a hundred million dollars of construction money compensate for the destruction by floods of property worth thousands of millions, and hundreds of lives in the Missouri, Mississippi, Columbia, or Sacramento Valleys? Will the failure to appropriate half a billion dollars for highways or airports, compensate for the time lost and the mounting accident rates along our surface and air transportation routes? Will denying funds to authorized reclamation projects, which are in full or in part self-liquidating, compensate for the homes and opportunities lost to veterans and others, or for the food so badly needed by the world?

Think well, Republican victors! We voted for you. We want you to make good. You are on trial—your positions, and the future of the whole Nation depend on your conservative, sensible acts. DON'T GO "HOG-WILD"!

One to Reject

THE REPUBLICANS in the Senate should consider carefully, and without political malice, every Presidential appointment placed before them for confirmation. As stated before, they should confirm or reject strictly on the basis of merit.

A fine opportunity to reject, purely on that basis, a Presidential appointment, will confront them soon after the 80th Congress convenes, when David Lillienthal is proposed for chairman of the atomic energy commission. It is simply not safe to entrust this most valuable of all secrets to a man who champions such un-American and fascist doctrines as the regional Authority. What the American people think of these non-representative forms of government was vigorously demonstrated in Washington, where after Interior Secretary Julius Krug, who speaks of himself as "not a politician, but a government administrator," went far out of his way to make a purely political speech favoring Sen. Mitchell, originator of the Columbia Valley Authority bill. Mitchell properly was snowed under.

Lillienthal should be also.

UN May Be Here After All

SAN FRANCISCO perhaps smiled too soon. A year ago it appeared certain that headquarters of the United Nations would be established in the vicinity of New York, which would be the most suitable site in the United States, if it has to be in this country, since that is the most foreign section of the nation.

But lately, alas, even the people of New York resisted, and the UN committee has made another round of entertainment spots in various cities, to search further for a site. And as this is written, it appears that there is a better-than-even fear that the Presidio of San Francisco may be chosen.

At first blush, the thought pops up, "Well, at least there will be a lot of expensive building construction for our contractors." It is not to be taken as a sure thing, however, for the foreign managers of the group know nothing of the American free competitive system, and might undertake it either by force account, or by importing cheap foreign labor. This latter is not an impossible situation, either, since this parcel of land will no longer be under American control with respect to immigration, civil obedience, building inspection, or anything else.

After all, the world already has two slightly used peace headquarters, one at The Hague and another at Geneva. Why not shoo the moths out and use one of those for UN?

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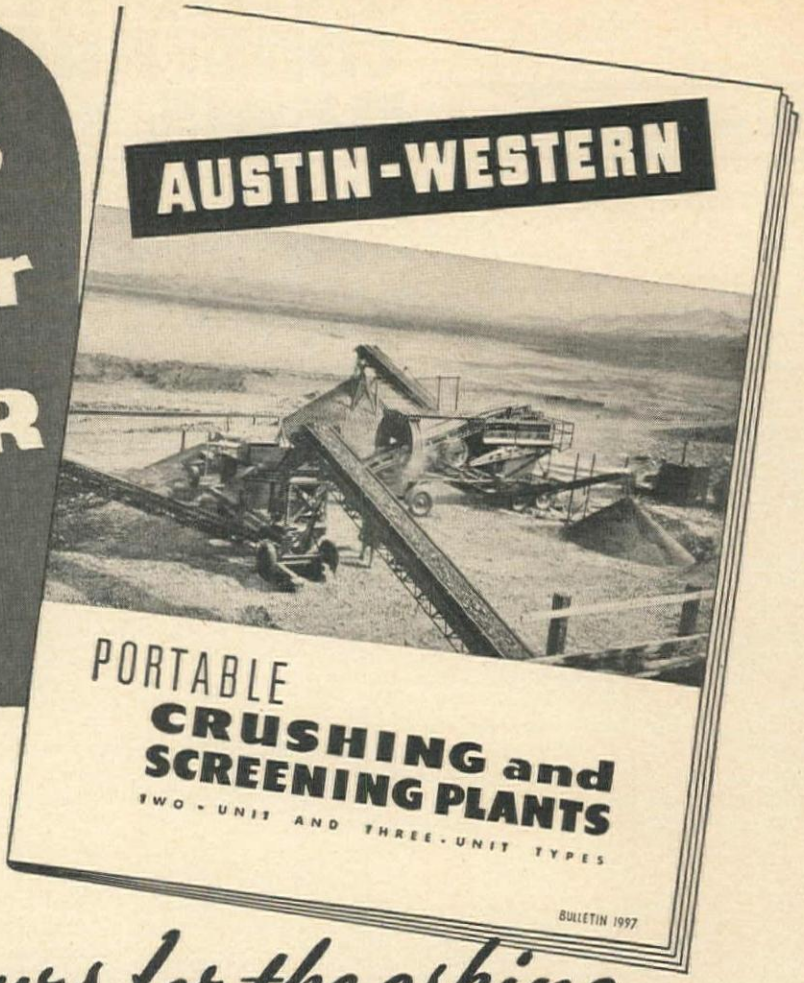

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Coachella Canal—
Excavation and Lining 141-mi. Canal

Extension of All-American canal system around Salton Sea will irrigate 80,000 acres of rich farm land—Flash flood characteristics of the region make necessary wasteway and stream bypass structures, and also construction of a high embankment along upstream bank

By C. S. HALE
Construction Engineer, Bureau of Reclamation
Yuma, Ariz.

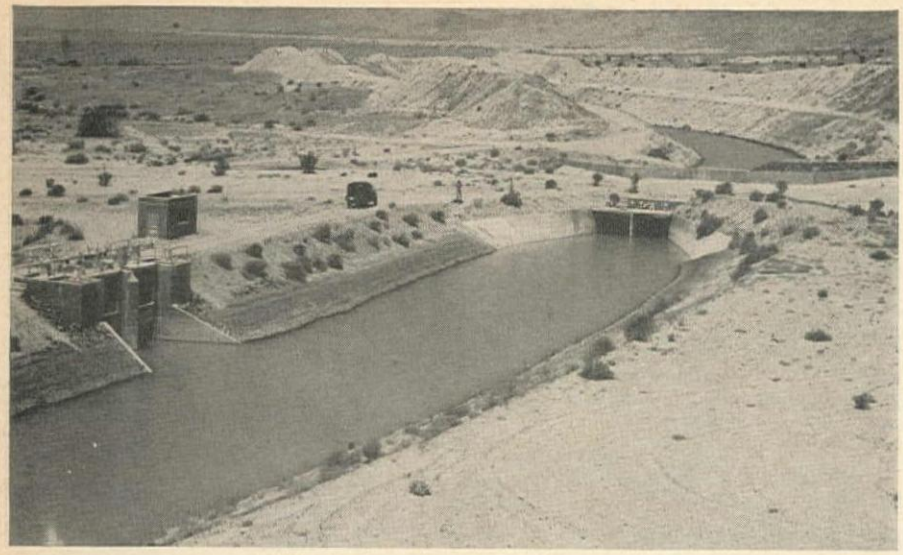
THE COACHELLA Canal is the main branch of the All-American Canal System which is one of the three construction features authorized under the Boulder Canyon Project Act, approved Dec. 21, 1928. The purpose of the Coachella Canal is to provide an adequate supply of irrigation water from the Colorado River for parts of the East Mesa area in the Imperial Valley and for between 75,000 and 80,000 ac. of irrigable land in the Coachella Valley, some 18,000 ac. of which are now provided with an irrigation supply from wells. Water for the All-American Canal System is diverted from the Colorado River by the Imperial Dam at a point 18 mi. northeast of Yuma, Ariz.

General location

The point of bifurcation of the Coachella Canal and the main All-American Canal is at the west edge of the sand dunes approximately 18 mi. west of Yuma. From this point the Coachella Branch follows the eastern edge of Imperial Valley, and passes along the eastern side of the Salton Sea to Coachella Valley. The canal then extends along the eastern edge of that valley to a point three miles northwest of the town of Indio. Here, the canal makes a right angle turn to the left and crosses the valley in a southwesterly direction to the foothills of the Santa Rosa mountains. It then follows back along the western edge of the valley toward the Salton Sea as far as the Riverside-Imperial county line, a total distance of 141 mi.

The Coachella Valley is situated in the south-central part of Riverside County, in the southern part of California. The principal town and railroad division point, Indio, near the center of the valley, is 130 mi. southeast of Los Angeles and about 90 mi. northwest of Calexico on the Mexican boundary. The elevation of the valley floor ranges from about 220 ft. above sea level to 241 ft. below. From the latter elevation to a low point of about 280 ft. below sea level the area is submerged by the Salton Sea.

The drainage of the entire valley is toward this body of water. There are no perennial streams on the floor of the valley, the water from ordinary rains being absorbed by the porous sands without flowing over the surface of the agricultural lands. However, the area is



SIPHON DROP on the Coachella Canal, siphoning under a wide desert dry wash. Water passes through these wash channels only on the occasion of desert cloudbursts. The gate structure at left is the outlet of a wasteway to discharge surplus water not needed for irrigation. Small building houses electric equipment to operate gate.

subject to cloudburst storms which produce destructive runoff. The White Water River Stormwater channel bordered by levees traverses the main axis of the valley and conducts all surface drainage and flood waters through the lower part of the valley to the Salton Sea.

Design features

(1) Main Canal

The main Coachella Canal is designed as a gravity system using a trapezoidal section with an operation and maintenance roadway on the left berm. The first 86-mi. reach is of earth section with a discharge capacity varying from 2,500 to 1,300 cu. ft. per sec. The bottom width varies from 60 to 40 ft. with side slopes of 2:1. The average designed slope in this section provides a drop of approximately .62 ft. per mi., which creates velocities varying from 3 to 2.75 ft. per sec. The remaining 55 mi. of the canal circling Coachella Valley is concrete lined and is designed for a maximum capacity of 1,300 cu. ft. per sec., diminishing progressively in size as the water is diverted for irrigation purposes. The maximum canal section in this reach has a 12-ft. bottom width, with side slopes of 1.5:1. The average drop is .70 ft. per mi., with velocities varying from 4.27 to 3.89 feet per second. In order to decrease seepage losses in the first 86-mi. earth section, all porous areas within the wetted perimeter were lined with a one foot blanket of impervious clay material.

(2) Storm Water Protective Works

Even though the average annual rainfall in the Coachella Valley is less than four inches, thunder storms of cloudburst proportions frequently occur throughout the bordering mountain ranges that create devastating flows from the canyon washes entering the valley floor. The control of this storm water runoff has been provided for under two plans. The first plan, covering the 86 mi. of earth canal, provides for its protection by the construction of a number of dikes, V-shape in plan, above the canal, concentrating the storm water flows through channel overpasses. Canal water passes under these major crossings in 32 two-barrel, rectangular, inverted siphons, totaling 5,142 lin. ft. Smaller washes are carried across the canal in overchutes or diverted directly into the canal through drainage inlets. The storm waters directed into the canal are controlled by four checks and automatic spillways spaced along the canal system. At these structures the depth of water and volume flowing in the canal can be regulated to the design capacity of the canal and any excess wasted through the automatic spillways.

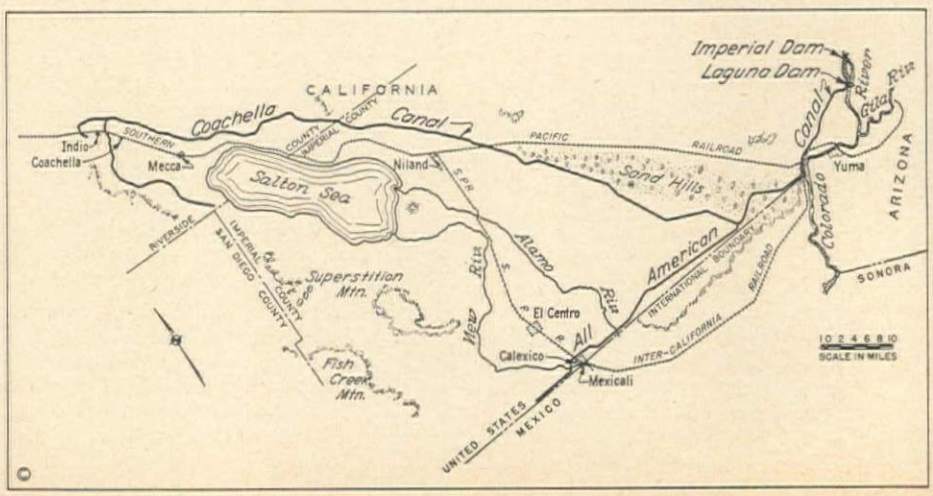
The second plan, covering the remaining 55 mi. of canal circling the irrigable lands of the Coachella Valley, provides for the control of storm water runoff by means of a series of continuous dikes forming detention basins. Dikes No. 1 and 2 extend along the east side of the valley to a point approximately six miles north of Indio. Dikes 3, 4 and 5 are designed to protect the western side of the valley to the District boundaries. In general the dikes are located adjacent to and along the upper bank of the canal. These dikes are designed to provide equalizing basins of sufficient capacity to store the flash flows and divert them to one or more of seven wasteway channels that lead either directly to the Salton Sea or to the White Water Storm Channel. Storm water flows on the east side of the valley that are controlled by dikes Nos. 1 and 2 occur mainly from seven principal washes where the maximum probable discharges, based on the worst meteorological and ground conditions, vary from 16,000 cu. ft. per sec. for the smallest drainage area (Painted Canyon) to 45,000 cu. ft. per sec. for the largest drainage area (Box Canyon). Dikes Nos. 1 and 2 provide a storage capacity of 21,000 ac. ft. and 18,000 ac. ft. respectively. The wasteways or evacuation channels have a maximum discharge capacity of 3,000 cu. ft. per sec.

Construction

The 86-mi. reach of unlined canal was completed prior to 1943. The first 11 mi. of the lined section is now nearing completion by the J. F. Shea Co., Inc., of Los Angeles, under Specifications 1065. This contract also includes the construction of approximately 9 mi. of detention dike No. 1, which contains 5,000,000 cu. yd. of uncompacted earth embankment. The J. F. Shea and Morrison-Knudsen Co. in joint venture have under contract the next two contiguous reaches of canal covered by Specifications Nos. 1113 and 1195. These contracts, scheduled for completion by June 30, 1947, will extend the main canal and lining an additional 18 mi. to the White Water Storm Channel crossing at a point one and one-half miles west of Indio.

In general the materials in the bottom portion of the detention dike are exca-

PLAN OF the 141-mi. Coachella Canal, which is the principal branch of the All-American Canal system. The 86-mi. stretch from the All-American to near Indio is earth-lined, with capacity varying from 2,500 to 1,300 cu. ft. per sec.; the 55 mi. southeast from Indio carries 1,300 cu. ft. per sec., and is concrete lined. The Salton Sea, principal geographic feature and drainage sink of the area, is 280 ft. below sea level.



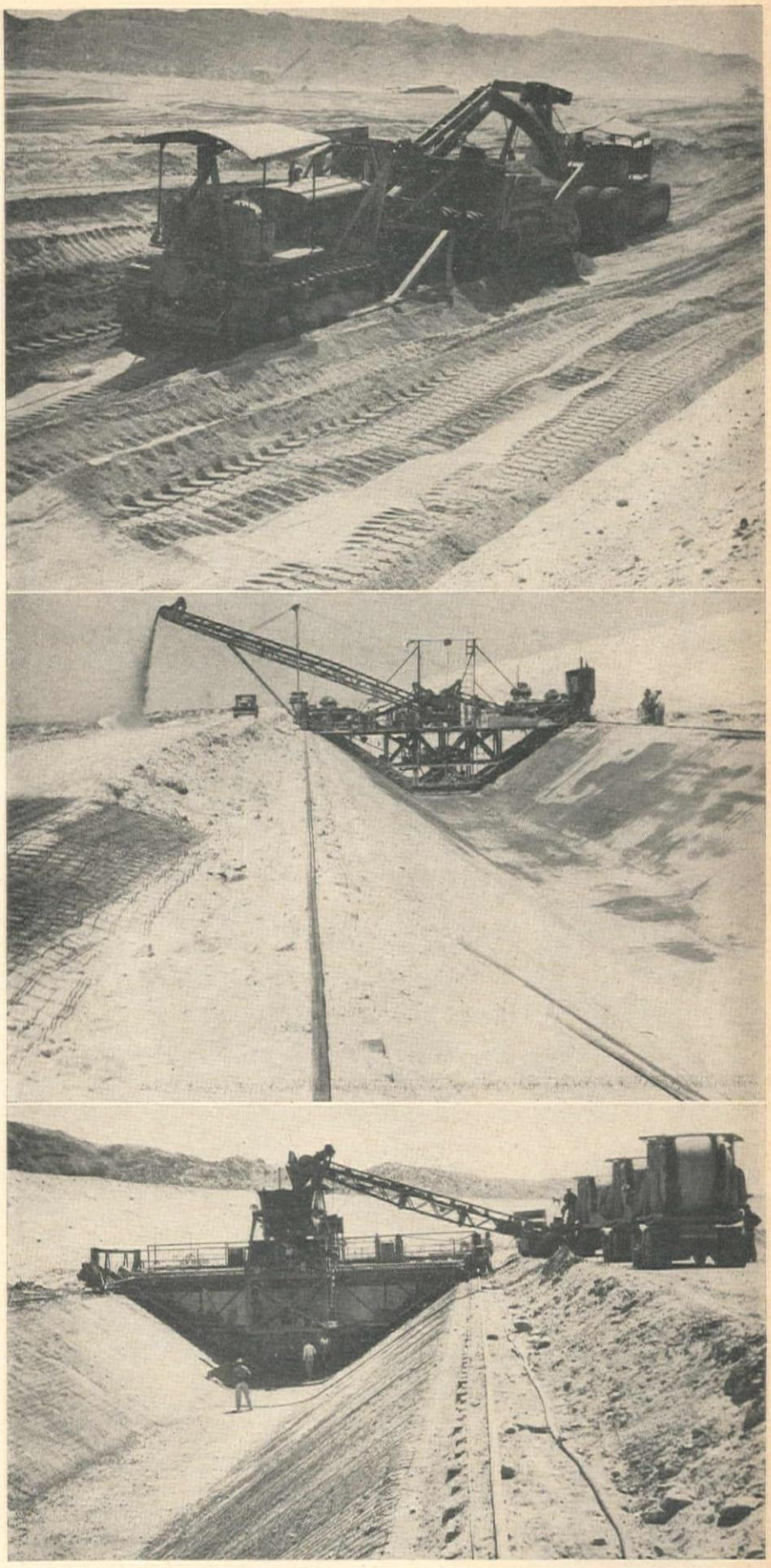
vated and placed with carryalls and dozers. Two and one-half cubic yard capacity shovels and bottom dump Euclid trucks are used for the construction of the upper half of this structure. No special compaction is required except that resulting from distribution of equipment travel. All materials are obtained from the flood channel adjacent to the upstream toe of the dike.

The canal section is rough-shaped by regular excavating and filling equipment, such as Carryalls, bottom dump trucks and dozers. Where the top of the concrete canal lining will extend above the original ground surface, compacted embankment foundations are constructed for the support of the lining. The sheepsfoot roller method of compaction is used in building these banks. Fine grading is not attempted with the regular excavating equipment. Instead, the canal prism is under-excavated in cut and overfilled in compacted banks so as to leave sufficient trimming depth for the specially constructed fine grade trimmer. This procedure also serves the purpose of assuring compaction at subgrade since a sheepsfoot roller is not effective along the edge of the fill.

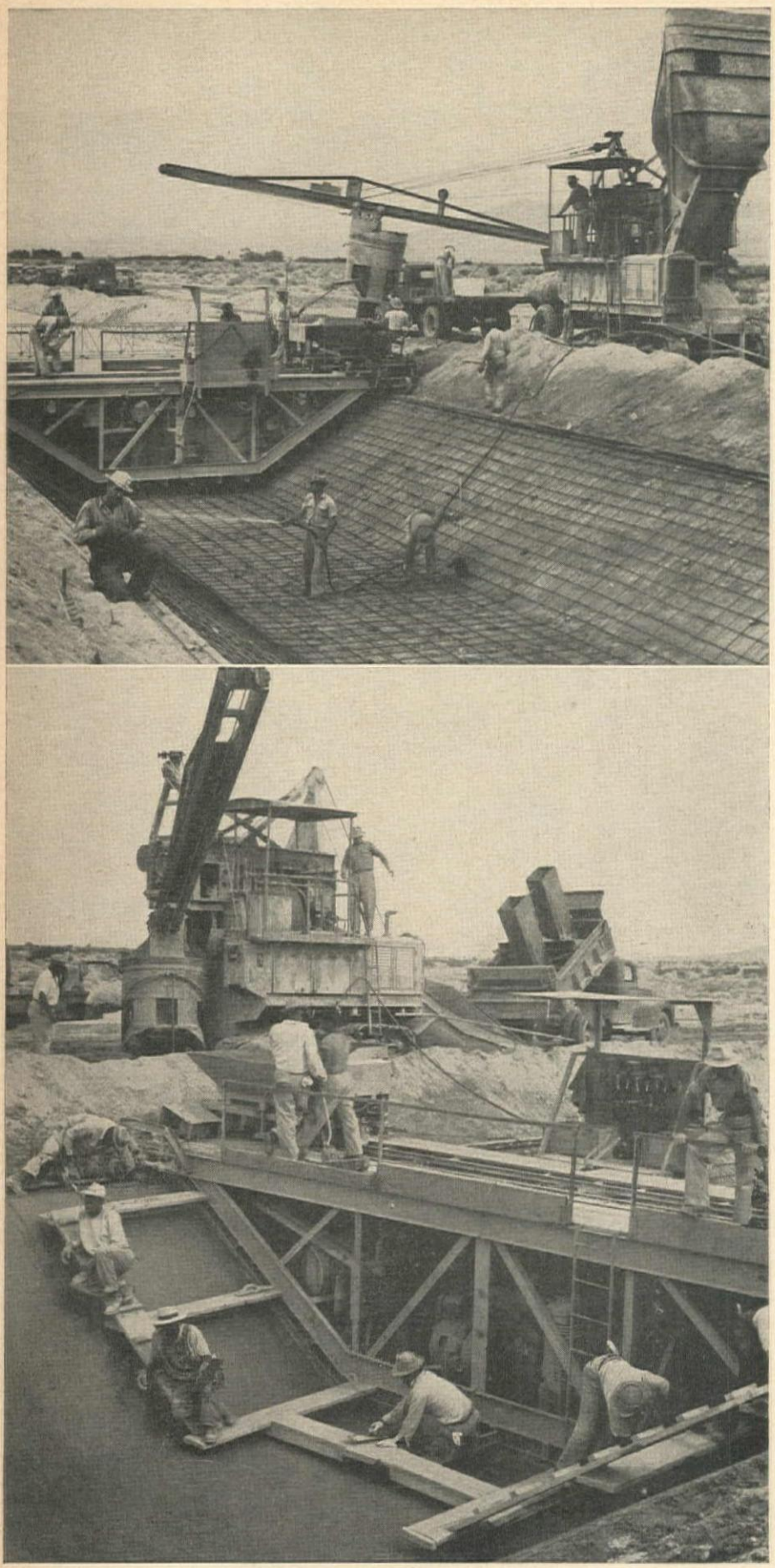
The trimmer is of the bucket excavator type. Two conveyor bucket systems, one on each side, excavate the canal prism to the neat lines of the canal subgrade. The buckets discharge the excavated material into a system of belt conveyors that carry the material to the outside slope of the left canal bank. This type of trimmer is well suited to work in materials free from boulders, shale, or sandstone. The first two-mile reach of the lined canal, however, was in soft sandstone and shale formations which caused mechanical failures in the equipment. An improvement found necessary and made in the field was a change from a single wheel support at each post to two-wheel supports. The trimmer is all-electric operated, being powered by a diesel electric unit, and is self propelled. Hydraulic jacks at each of the four supporting members controlled by the operator adjust the machine for depth of cut. An added feature over the old type of trimmer is the conveyor belt that carries the excavated material to one side only. This was a necessity due to the construction of the 25-ft. high stormwater protective dike adjacent to and along the right bank of the canal.

Concrete placing

Concrete is placed in the canal lining with a conventional type lining machine which has several added features. It also is electrically operated and capable of self propulsion, as well as being hydraulically raised or lowered. One radical change is in the arrangement making it possible to use transit mixers. A receiving hopper capable of holding about 6 cu. yd. of concrete is centrally located on top of the liner. This hopper is fed by a belt conveyor which receives the discharge from 4-cu. yd. mixers operating on the left berm of the canal. A concrete distributing car traveling the full length of the liner beneath the receiving hopper



CONSTRUCTION steps on the Coachella Canal: top, unconsolidated sand is excavated by carrier scraper and tractors for rough shaping of channel; center, rolling on railroad rails placed along top of final channel, trimmer machine completes shaping to required excavation limits; bottom, rolling on same rails, concrete placing machine lines the canal with concrete delivered from batching plant in mixing trucks.



CONCRETE PLACING on a wasteway from the Coachella Canal. Top, front view of the lining machine, showing reinforcement mesh in place. For this part of the job, aggregates are delivered by truck already batched, but are mixed in a paver on the berm of the canal. Bottom, rear view of the liner, showing extension platform from which finishers apply the final hand finish to the lining. Rails keep machine on line.

distributes the concrete to compartments at the base of the line along the perimeter of the canal. From the compartments the concrete is vibrated into place by tubular vibrators which are installed under the compartments.

The greatest difficulty encountered in the lining operation was maintaining the wire mesh reinforcement at the specified depth in the 3½-in. concrete slab. A method was finally adopted that in principle was previously used on the Gila Canal in Arizona. Changes were necessary due to the larger canal section involved here. A 2½-in. pipe template the shape of the canal section was made to travel with and forward of the liner by using special attachments on the ends fastened to the side carriage frames. This pipe was cut at both radius points on the canal bottom and a cable threaded through the resulting three segments. Since the center segment depended entirely on the cable for support, the cable was fastened on both ends to coffin hoists thus making it possible by varying the tension to shift the position of the template. This template is the lower part of the spacing arrangement.

The mesh reinforcement is furnished in sheets which are laid on the subgrade ahead of the lining machine and wired together to form a continuous mat. As the machine advances the template just described is pushed along under this mat and raises the reinforcement off the subgrade. Two ¾-in. pull bars fastened to the pipe segments are required on the slopes to assure a 1 to 2-ft. lead for the template so that the concrete that normally flows ahead of the liner will not cover it. The upper part of the spacing arrangement is a 4-in. pipe also the shape of the canal section and welded to the concrete compartments. This pipe is placed at about wire mesh grade and serves the purpose of keeping the reinforcement from rising above the specified grade as well as being a baffle restraining the flow of concrete forward of the liner.

The lining machine was fabricated originally with 3/16-in. sheet steel finishing plates. The contractor is replacing these with ¾-in. plates for longer wear and also to eliminate the slight bulging that was sometimes apparent with the thinner plate.

Concrete finishing

It was found that the best location for hand finishing the placed lining is in the immediate rear of the liner. Accordingly the contractor abandoned the use of a finishing jumbo and arranged platforms on the liner so that the finishers could immediately touch up the concrete surface with the progress of this machine. Dummy joints or grooves are formed in the side slopes and bottom of the canal lining by a grooving jumbo which is a hydraulically raised and lowered frame. The bottom edge of this frame cuts a 5/16 by 1¼-in. groove at right angles to the canal center line at 15-ft. intervals. In order to obtain clean cut grooves the liner is required to leave a near perfect canal section. Vibrators attached to the member carrying the grooving tool work the tool into the concrete.

Clyde W. Wood of Los Angeles fabricated and assembled the trimmer, liner, and grooving jumbo for the J. F. Shea Construction Co. The designs are based on their joint efforts. The three machines use the same track rail which is laid on the canal berms to very accurate line and grade.

Concrete curing is accomplished by coating the surfaces with one spray coat of white pigmented sealing compound at a coverage rate of 150 sq. ft. per gal. For this operation, sub-contractor S. P. Lyons fabricated a light frame traveler that utilizes the same track mentioned above.

The concrete mix used on the canal lining is one embodying a total aggregate parts of 6.70 with 42 per cent sand. The gravel supplied to the job consists of 3 sizes, #4-½ in., ½-1 in., 1-1½ in., and the proportions used in the mix are 34-43-23. The design strength is 3,000 p.s.i. concrete.

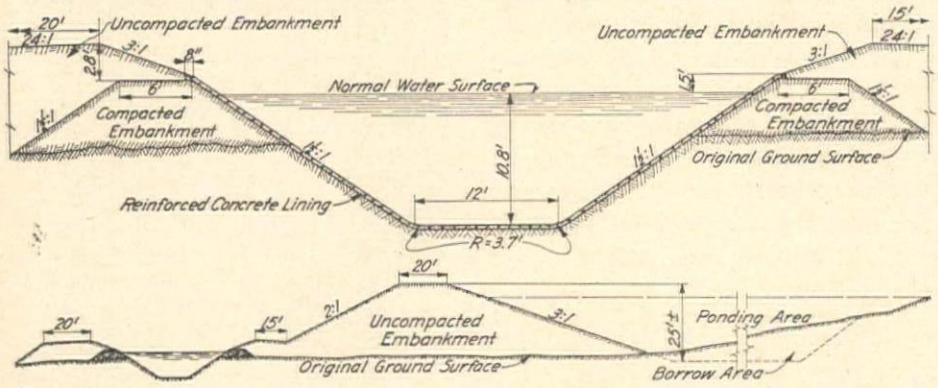
The average run for the lining equipment during a nine hour shift is 575 lin. ft. of lining completed in every respect representing a batch plant quantity of 455 cu. yd. The maximum run was 720 lin. ft., accomplished in about 10 hours.

INTEGRATED OPERATION on the Coachella Canal Wasteway; foreground, clamshell owned by Fisher Contracting Co., Phoenix, Ariz., performs rough excavation; center, trimmer finishes excavation, here casting spoil on each bank; next, reinforcement net is laid; finally, paver and lining machine place concrete lining for the canal.

Organization

The Coachella Canal work is under the direction of the Bureau of Reclamation, headed by Commissioner Michael W. Straus in Washington, D. C.; Walker R. Young is chief engineer with headquarters at Denver, Colo.; and E. A. Moritz is Regional Director of Region III, in which the project is located, with headquarters in Boulder City, Nev. As Construction Engineer the author is in immediate charge of the work for the Bureau of Reclamation and W. F. Rennebohn is the job superintendent for the contractor, J. F. Shea Construction Co.

TYPICAL CROSS-SECTION of Coachella Canal, with detailed dimensions, top, and upstream embankment to form ponding area where flash floods threaten canal, lower.



Morrison-Knudsen Co., Inc., Forms New Company to Handle Afghanistan Work

MORRISON-KNUDSEN Co., Inc.'s headquarters for the contracting firm's projects in Afghanistan has been located in New York City under the direction of Vice-President G. L. Youmans.

Construction in Afghanistan of dams, powerhouses, canals, highways and bridges has been under way since June. Project manager is James F. Horan, with resident headquarters at the capital city of Kabul.

Engineering designs and plans for the Afghanistan work are executed by International Engineering Company, Inc., of Denver, a subsidiary of M-K. C. P. Dunn, vice-president and chief engineer of M-K and president of International, is general supervisor of the construction program.

A separate M-K corporation was organized to sponsor this program—Morrison-Knudsen Afghanistan, Inc. Office manager under Youmans at the New York headquarters is C. E. Elliott.

A purchasing and transshipping office was established at Karachi, India, through which country equipment and materials must be transported.

Scrap Shortage Still Shorts Steel Supply

WESTERN CONSUMERS of steel products face an increasing steel famine unless scrap, a basic raw material, becomes available to the steel mills, William A. Ross, president of Columbia Steel Co., said a few days ago.

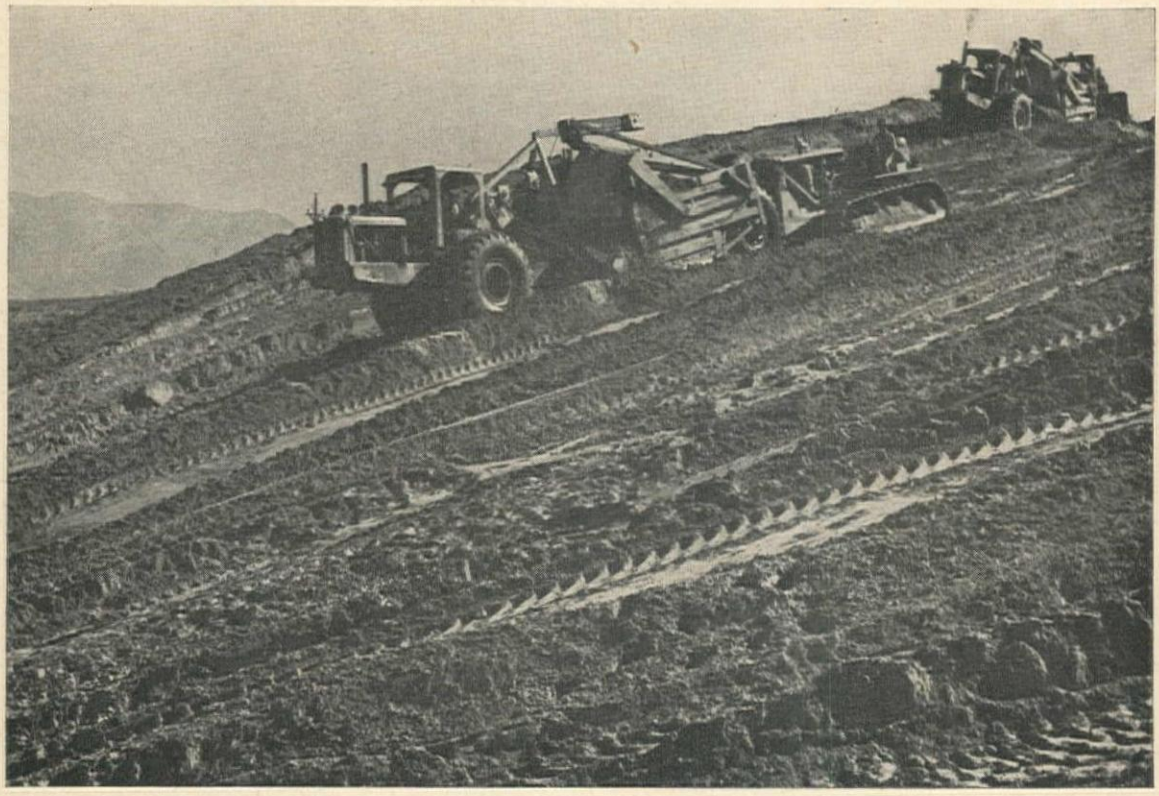
Ross, who heads the Pacific Coast subsidiary of United States Steel Corp., pointed out that the current crisis facing Western steel mills is the gravest in the experience of the industry.

"The steel industry depends largely on an ample supply of scrap as a basic raw material," Ross said. "In order to meet the tremendous demand for steel products produced right here, and to keep our steel mills and foundries operating at or near capacity, requires approximately 1,380,000 tons of purchased scrap annually, or about 115,000 tons each month. It is estimated present receipts of scrap at steel mills and foundries are now, on the average, only 60 per cent of current consumption. Furthermore, a canvass of the scrap inventory of leading consumers indicates an average supply on hand of about 15 days, the lowest in many years.

"Unfortunately, this grave situation has been aggravated by the necessity of shutting down one of our Utah blast furnaces for a long overdue relining," Ross added. "This furnace has been an important source of supply of pig iron for the entire Western iron and steel industry, and loss of its production will cause the current scrap crisis to become more acute."

Some relief for the situation is in sight provided the current ship-breaking program is speeded up. Under this program, obsolete vessels of the Navy and Merchant Marine are being turned over to salvage operators to be broken up into scrap.

Open Utah Traffic Bottleneck



River bridge and railroad overpass project on U. S. 91, south of Ogden, will relieve last and most serious traffic bottleneck in state highway system—Special feature is contractor's method of obtaining and moving embankment fill from high river bank borrow area, using entirely rubber-tired earth-moving equipment

By F. D. MILES
Resident Engineer
Utah State Road Commission,
Ogden, Utah

A SPECTACULAR BRIDGE construction job is now in progress in Utah to relieve the worst traffic bottleneck in the state's entire highway system. The project, known as Riverdale Bridge and Approaches, really embraces two concrete bridges and a tremendous quantity of fill material, which is being secured from the riverbank nearby and conveyed over specially constructed haul roads to the point of placement entirely by rubber-tired vehicles.

The new project will complete a four-lane connection between Salt Lake City and Ogden, the two largest cities in the state. The connection has been contemplated for a long time, but completion was delayed by the war, which at the same time brought about the extremely critical traffic situation at the point.

History of the project

Shortly after Brigham Young and his Mormon followers settled in Salt Lake Valley in 1847, communication became necessary with a settlement located at the junction of the Weber and Ogden Rivers, 36 mi. to the north, now known as Ogden. A wagon trail was built following the shore line of Great Salt Lake. As time passed small communities sprang up along this trail and slight improvements were made in the alignment and surface. Gradually, as traffic increased, some of the sections were hard-surfaced with concrete and by 1920 this was completed, but the alignment was practically the same as that followed by the pioneers. Under the Federal Highway Act, this road was incorporated in U. S. Highway 91, and with the establishment of U. S. 30, Ogden became the junction of two transcontinental highways.

In 1932, the Utah State Road Commission commenced a major reconstruction of U. S. 91 between Payson, 63 mi. to the south of Salt Lake City, and Brigham City, 59 mi. to the north, intending to construct a 4-lane highway for the entire distance. A good start on this program was completed by the beginning of World War II, when all highway construction, with the exception of access roads to war installations was suspended.

At the beginning of the war, Ogden, because of its favorable geographic location, became the center of great war supply activities. Hill Field airbase, Ogden Arsenal, and the Utah Navy Supply Depot were constructed along U. S. 91 within a radius of 14 mi. of the city. Thousands of persons were employed in these activities, increasing the traffic over this highway far beyond its capacity. The State Road Commission immediately programmed a four-lane roadway to accommodate this traffic. It was approved and completed except for a distance of a little more than one-half mile just south of Ogden, where the highway crosses the Weber River and the double-track main line of the Union Pacific Railroad.

The two structures serving this section have but 20-ft. curb width, with steep grades, limited clearance, and crooked alignment. Plans were prepared to replace them with modern structures on new alignment and easy grades. However by the time the contracts were ready to let the steel shortage had become so acute that the War Production Board refused to grant the necessary priorities. This one-half mile section became the worst transportation bottleneck in Utah. During the winter storms thousands of man hours were lost in the war plants affected. The traffic rose from approximately 3,000 cars daily in 1940 to 8,300 in 1942, with daily peaks of over 10,000. The present daily average is 6,800 cars.

Contract finally awarded

With the relaxing of controls over highway construction and enlarged federal appropriations, a contract was awarded on June 18, 1946 to Gibbons & Reed Co., Salt Lake City, to build the remaining unfinished link in this section of U. S. 91. The bid price was $442,702,

with $31,366 for engineering, inspection and contingencies, and $3,400 for right-of-way, making the total cost of the project $477,468.

The project is known as Federal Aid Project UI 31 (4) and UGI 31 (5) Riverdale Bridges and Approaches. The following are the major quantities with the unit bids:

Common excavation	169,000 cu. yd.	$0.33
Overhaul, Class "A"	1,169,000 sta. yd.	.01
Overhaul, Class "B"	126,800 yd. mi.	.05
Concrete pavement	6,525 cu. yd.	2.75
Bituminous plantmix	2,370 tons	2.50
Bitum. 200-300 pen.	22,400 gal.	.09
Concrete, Class "A"	4,156 cu. yd.	38.00
Structural excavation	3,260 cu. yd.	4.00
Reinforcing steel	978,150 lb.	.06
Structural steel	145,556 lb.	1.09
Watering	2,900 M gal.	1.50
Rolling	2,250 hr.	5.00
Cast-in-place conc. pile	1,452 lin. ft.	6.00
Removal of old structures		12,000.00

The roadway is 75 ft. wide, containing four 11-ft. traffic lanes, a 4-ft. neutral zone, and a 5-ft. sidewalk. The two outside traffic lanes are paved with Portland cement concrete, the two inner lanes with plantmix with a half-inch cover coat. The neutral zone is outlined with a precast white Portland cement reflectorizing curb manufactured by the Otto Buchner Co., Salt Lake City. This curb has been used on several channelization projects in the state and has proven very satisfactory. A 2-ft. gutter with outlet boxes extends along the left side of the roadway. The shoulders between the pavement and gutters are paved with plantmix without cover material.

The total length of the project is 0.619 mi., one-half of which, including the two structures, is located on a 2-deg. curve, with a central angle of 26 deg., 15 min. The curve is joined to the tangents at each end by a spiral curve of ten 48-ft. chords, making a total length of curve of 1,792.5 ft. The roadway on the curve is super-elevated for a traffic speed of 60 m.p.h.

Weber River bridge

The Weber River bridge, a reinforced concrete continuous T-beam design, 222 ft. in length and 54 ft. between curbs, with a 5-ft. sidewalk on each side, consists of two abutments and three piers. The abutment spans are 45 ft. long and the pier spans 63 ft. long, measured along the center line. There are seven beams anchored at the lower or Salt Lake end, resting on 12-in. steel roller bearings on each pier and a hinged bearing at the upper or Ogden abutment. The foundation is on coarse gravel resting on a firm clay. Fifty-seven 12-in. by 30-ft. untreated timber piles were driven under each pier and fifty-one 14-in. by 40-ft. creosote treated piles were driven under each abutment. These latter were driven through the compacted fill to below the stream bed. All piling was driven by an air hammer.

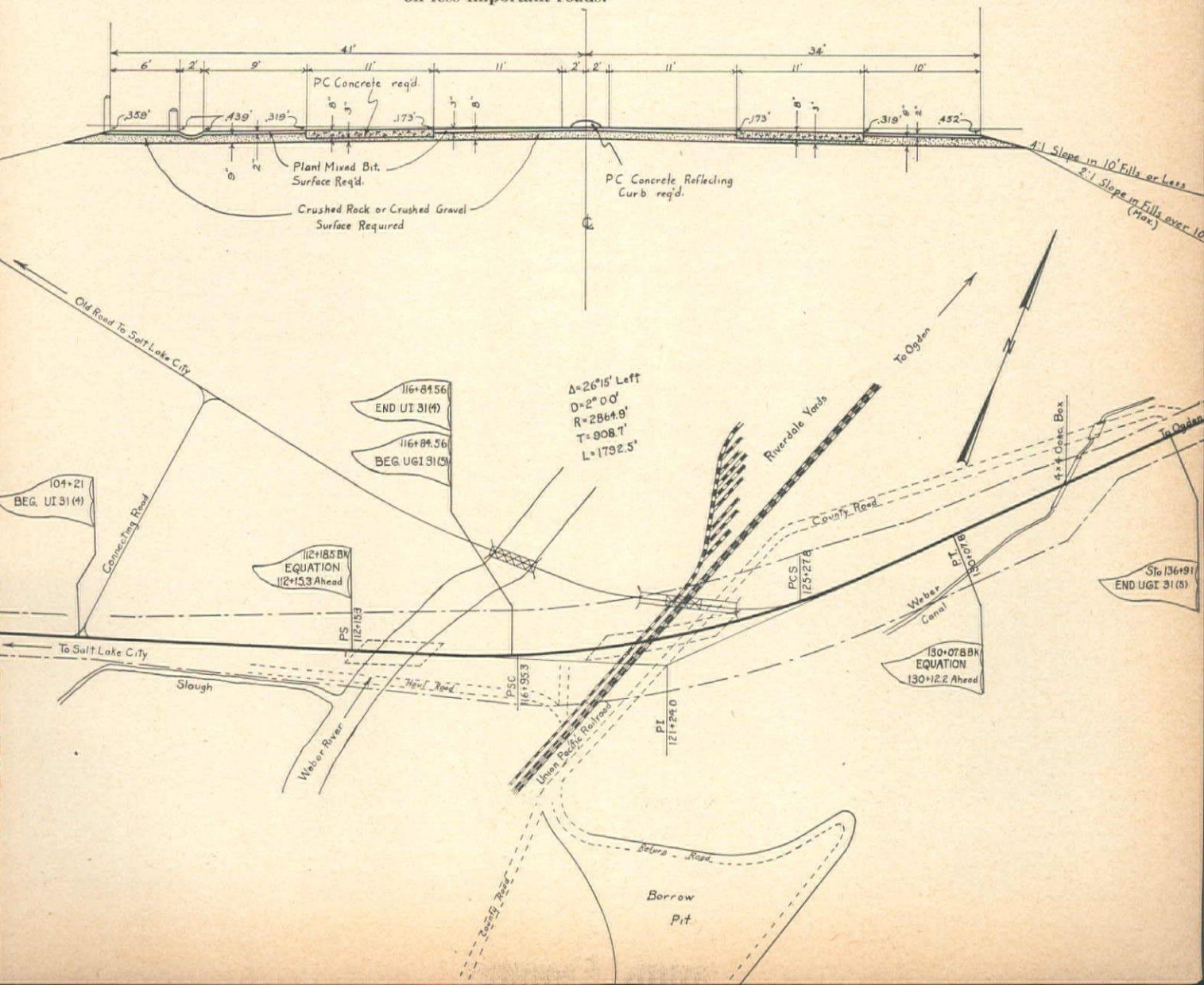
Due to the fact that the bridge is built on a long spiral curve, it was necessary to construct the sub-structure and continuous T-beams on the long chord and the superstructure on the arc of the spiral. This, together with the fact that the bridge is built on a 4 per cent grade, a skew of 45 deg. with the streambed, and super-elevation, made necessary a tremendous amount of calculation in the design of the structure.

Railroad overpass

The overpass was designed to fit the existing and future railroad tracks and a county road. There are at present two main tracks and one lead-in track to the Ogden yard.

The structure consists of four clear spans and two abutment spans. All are 65 ft. long except that crossing the main line tracks, which is 56 ft. in length. This particular span is a structural and concrete T-beam design, composed of 12 I-beams 33¼ x 12 in., weighing 138.5 lb.

PLAN and cross-section of Riverdale Overpass project, showing relation of borrow area and haul roads to the fill being constructed at ends and between structures. Old bridges will be dismantled and used on less important roads.



per ft. The remaining spans of the bridge are designed as reinforced concrete T-beams.

The substructure consists of twelve square columns 24 in. at the top, battered ⅛ in. to the foot, with an artistically designed capital head. The columns rest on a concrete footing which measures 8 ft. square, and is 2 ft. deep, the surface being 7 ft. below ground level. The firm condition of the soil beneath this structure makes piling unnecessary.

As this structure is built on a 2-deg. curve, the T-beams are not continuous, each span's beams resting on one fixed bearing and one free bearing. While the engineering design of the two structures is somewhat different, the architectural design is the same. The columnar design, while not so pronounced in the river bridge, is carried out in both structures. The decks of the two bridges are identical.

Concrete aggregate is being furnished from a commercial plant at Brigham City, 26 mi. north of the project. The plant is owned and operated by the firm of Parsons and Fyfe, general contractors. The aggregate is batched at the plant and hauled to the project in batch trucks. It is clean, white, hard angular natural gravel, with a high silica content. It requires little crushing and no washing.

Concrete specifications

The concrete mix is designed by the absolute volume of the material so that the yield will equal one cu. yd. of concrete in place to 6.3 bags of cement. The following is the specification for Class "A" concrete as used in these structures:

Fine Aggregate

	Per cent by weight
Passing ⅜-in. sieve	100
Passing No. 4 sieve	95 to 100
Passing No. 16 sieve	45 to 80
Passing No. 50 sieve	10 to 30
Passing No. 100 sieve	0 to 8

Coarse Aggregate

Sieve sizes	Per cent by weight Small	Large
2-in.		100
1½-in.		90 to 100
1-in.	100	20 to 55
¾-in.	90 to 100	
⅜-in.	25 to 60	
No. 4	0 to 10	

W. E. SWANSON, left, superintendent for Gibbons & Reed Co., contractors, and F. D. MILES, resident engineer for the Road Commission.

The small and large sizes are combined to give a Fineness Modulus of 7.5. With Brigham City material, using 35 per cent fine and 65 per cent coarse aggregate, it is possible to obtain a workable mix with a compression strength of 3,500 lb. per sq. in. at 7 days, and 5,000 lb. at 28 days.

The specifications call for the use of an air-entraining agent that will produce concrete containing between 3 and 5 per cent entrained air. The contractor is using Pozzolith at a rate of 0.9 lb. of dry powder per bag of cement to achieve this requirement. This reduces the weight of the concrete from 151 lb. per cu. ft. to 146 lb. per cu. ft. The Pozzolith not only acts as an air entraining agent but diffuses the cement and lubricates the concrete, making placing easier. The dry powder is placed in the aggregate in the hopper of the mixer.

Concrete is mixed in a double drum Rex paving mixer and deposited in the forms in a 1-cu. yd. bucket hoisted by a dragline. The concrete is machine-vibrated with either a gas engine driven or electric vibrator. As soon as the forms are stripped, the concrete is rubbed with a carborundum stone to remove the form marks. There are comparatively few such marks, however, as the forms are constructed of ⅝-in. plywood on 2x6 walers, fastened with Burke form clamps.

ARCHITECT'S drawing of the completed structure showing the railroad overpass which was designed to fit existing and future tracks, and the 222-ft. bridge over the Weber River.

Earthwork

One of the problems involved in construction of the overpass is the excavation for the footings of the piers adjoining the railroad tracks. The outside edge of the footing is 30 in. from the end of the tie and 9 ft. below the base of the rail. This required sheet piling around the entire footing excavation, and it was held in place by 12 x 12-in. timber walers. Driving the sheet piling was extremely difficult because of the heavy railroad traffic. Because of insufficient clearance, driving could not be carried on while trains were passing, and it was therefore necessary to disassemble the equipment for the passage of each train, and reassemble it again when the train had passed by. Since there is a daily average of 85 train movements per day at the site, there was a great deal of delay both in excavating and placing the footings. To add to the difficulties, cemented gravel was encountered at a depth of 5 ft. below base of rail, which required water jetting. An air hammer was used in driving the 10-gauge Corr-Plate sheet piling.

Due to the height of the fill, it was necessary that care be exercised in selecting suitable embankment material. Fortunately it was possible to obtain suitable dirt a short distance from the project. The right bank of the Weber River at the project site is approximately 150 ft. high, and at a point a few hundred feet south of the project, the bank is covered to a depth of from ten to thirty feet with a 10 per cent clay-bearing sand. This material proved excellent for embankment purposes.

The Proctor test showed a requirement of 12 per cent moisture to obtain optimum compaction. With enough added water to bring the moisture to the required amount and 0.012 hr. rolling per cu. yd., 99 to 105 per cent compaction was obtained. The water was pumped to the borrow area, a lift of 150 ft., with a centrifugal pump and sprayed on the area with a fire hose. Additional water was hauled onto the fill with a water tank mounted on a "6 by 6" surplus army truck. A sheepsfoot roller, containing eight 6-ft. units, and drawn by a tractor, is used for the compaction.

As the subsoil below the sand in the borrow area is a heavy clay with large springs seeping out at the contact with the sand, all of the borrow had to come from the upper strata.

Earthmoving

When the Gibbons & Reed Co. were awarded the contract, they were confronted with the problem of selecting the type of equipment best fitted for excavating and hauling the borrow material. The borrow area being 150 ft. above the ground level of the project above a nearly perpendicular cliff, the use of shovels and trucks would have been uneconomical due to the steepness of any haul road that might be built. Having had previous satisfactory experience with Tournapulls, it was decided to use them for this project. However, the width of the carriage on this equipment precluded the use of the existing highway structures as a haulway, and it was necessary to construct a new haul road over the Union Pacific tracks and the Weber River. Because of the heavy rail traffic, it was necessary to construct a first-class crossing, and to have it protected at all times. It was built by the railroad company of 6 x 12-in. timbers, with filling between the rails of plant-mix bituminous surfacing. The company also furnishes flagmen for protection. The crossing is used only during daylight hours. The crossing of the river was accomplished with seven 36-in. metal pipes covered with fill material and river gravel.

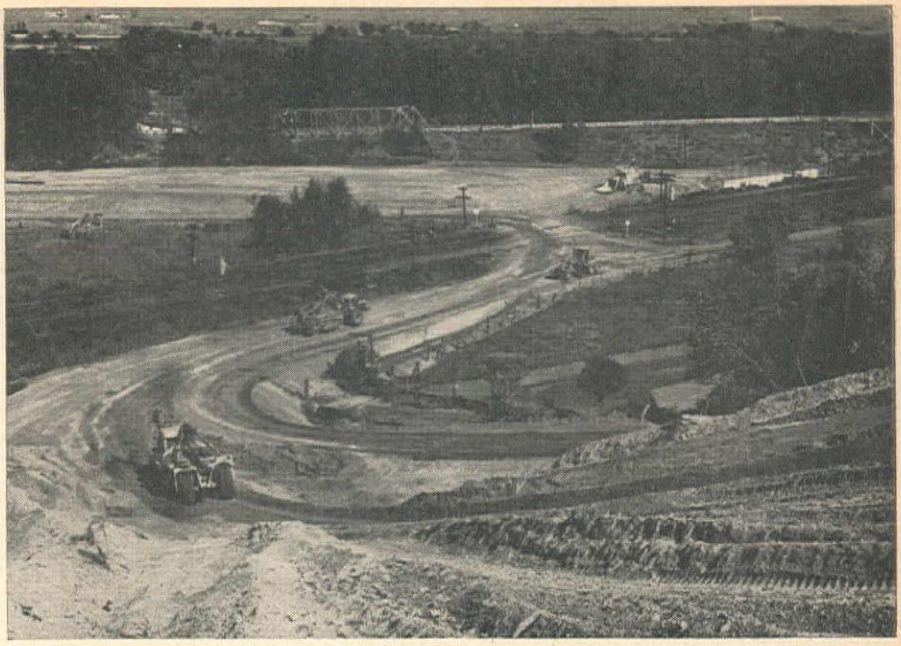
A back haul road was built from a point on the county road, a distance of 700 ft. south of the railroad structure to the top of the borrow area. The road is about 1,600 ft. long, 30 ft. wide, gravel surfaced, and built on an 18 per cent grade. The borrow area is about 10 ac. in extent and is on a slope varying from 5 to 30 deg.

Six Tournapulls are used in hauling the borrow, three of 8-cu. yd. capacity and three of 12-cu. yd. capacity. The haul road has grades up to minus 32 per cent in the borrow area, and on occasion the machines have descended grades as steep as 70 per cent, fully loaded. During a thirty day period they have each moved 80 cu. yd. of material per working hour on a half-mile haul. Ramps are located along the fill for access to the dumping area. After dumping, the loads are levelled with a Caterpillar Road Patrol and compacted with the sheepsfoot roller.

Additional work

The two 11-ft. concrete traffic lanes are to be constructed using the same mix as in the structures. The embankment slopes are to be covered with top soil and seeded so that the vegetation will check erosion.

The Weber River being a mountain stream subject to flash floods, the abutments are to be riprapped with broken concrete from the abandoned road and structures. In addition, some river control work will have to be done upstream from the bridge to keep the stream in its proper channel. This work is not included in the present contract.



TOURNAPULLS have been employed to transport dirt down a steep grade from the borrow pit to the new bridge fill (in the background) where it is used for embankment purposes. The pit is only a few hundred feet from the project.

The present road will be obliterated. The two steel structures will be dismantled, and since they are in good condition, will be removed to some secondary or county road where their capacity will suffice for the traffic. The earth approaches between the two old structures, some 14,000 cu. yd., will be used in the embankment at the Ogden end of the new construction. As no adequate space is available for a detour to be used while this section is under construction, it is planned to complete the two structures and bring the Salt Lake end up to grade with a gravel surface. Traffic will then be handled over the new road while the fill at the Ogden end and paving is carried out under traffic conditions. This can be easily accomplished by using half of the new wider road at a time.

Progress and organization

Labor for the job has been relatively short, but not to the point where progress has been unduly delayed. Additional carpenters and Tournapull operators could have been employed at any time.

Completion time of the project will depend on the delivery of structural steel. This has been promised for the end of February. The present program is to complete the earth borrow with the exception of the Ogden end by the end of the year. It is planned to have the panel forms for the superstructures constructed during the winter, and erection will start as soon as the bearing plates and other structural steel is delivered. If this schedule operates, the project should be completed about next June 1.

A safety program has been carried out by the contractor with the result that no major injury has occurred to date, and time lost from minor injuries has been very small.

The work is being done by the Utah State Road Commission, Ray H. Leavitt, chairman; Roy W. McLeese, chief engineer; W. L. Anderson, assistant chief engineer; Maurice Houscroft, chief bridge engineer; and C. M. Fonnesbeck, district engineer. The Commission is represented on the job by the writer as resident engineer and C. M. Taylor, assistant.

For the contractors, J. P. (Pat) Gibbons is general manager. On the job, their supervisory personnel includes W. E. Swanson, superintendent; Dougal Young, assistant superintendent in charge of structures; Seth Atkinson, carpenter foreman; Willis A. Moody, grade foreman; Dean W. Straw, equipment foreman; A. W. Beebe, office manager; and John J. Nazark, chief mechanic.

F. W. Smith is district engineer for the Public Roads Administration.

Geneva Is Basing Point For Structural Shapes

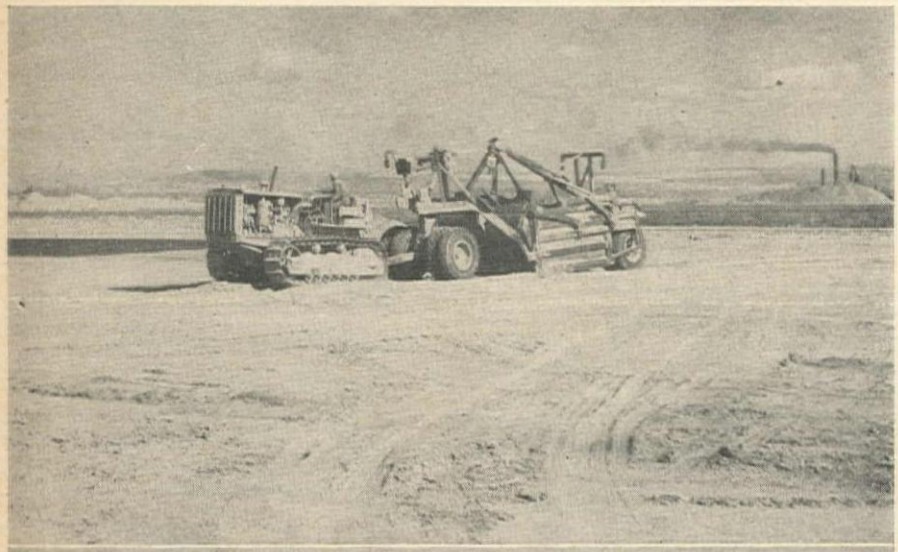
GENEVA STEEL COMPANY announced that effective Nov. 12, 1946, it established Geneva, Utah, as a basing point applying to its sales of standard structural shapes within the range of sizes, grades, finishes, and specifications currently produced at Geneva.

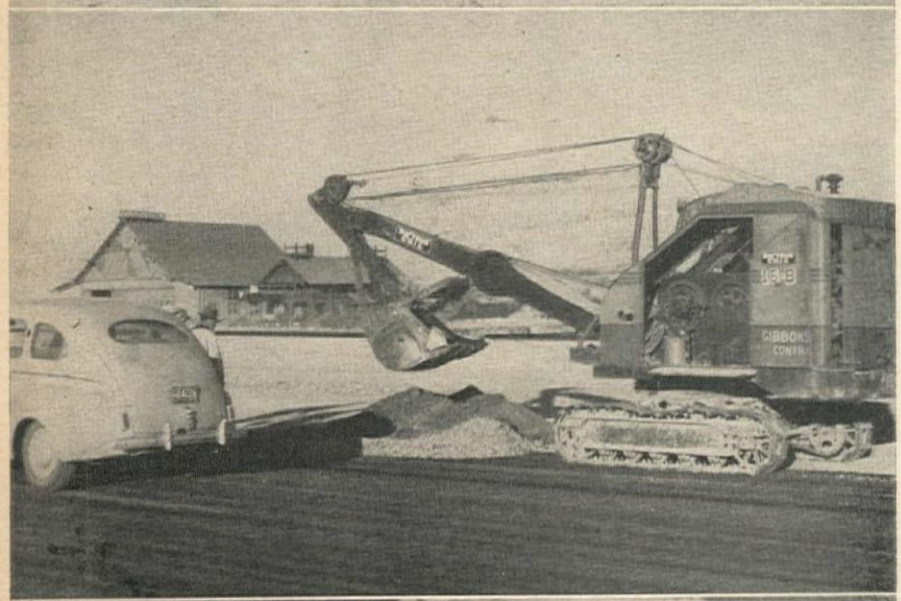
The delivered price at Geneva, Utah, for standard structural shapes will be $2.525 per hundred pounds in carload lots. Delivered price to other destinations will be quoted upon request.

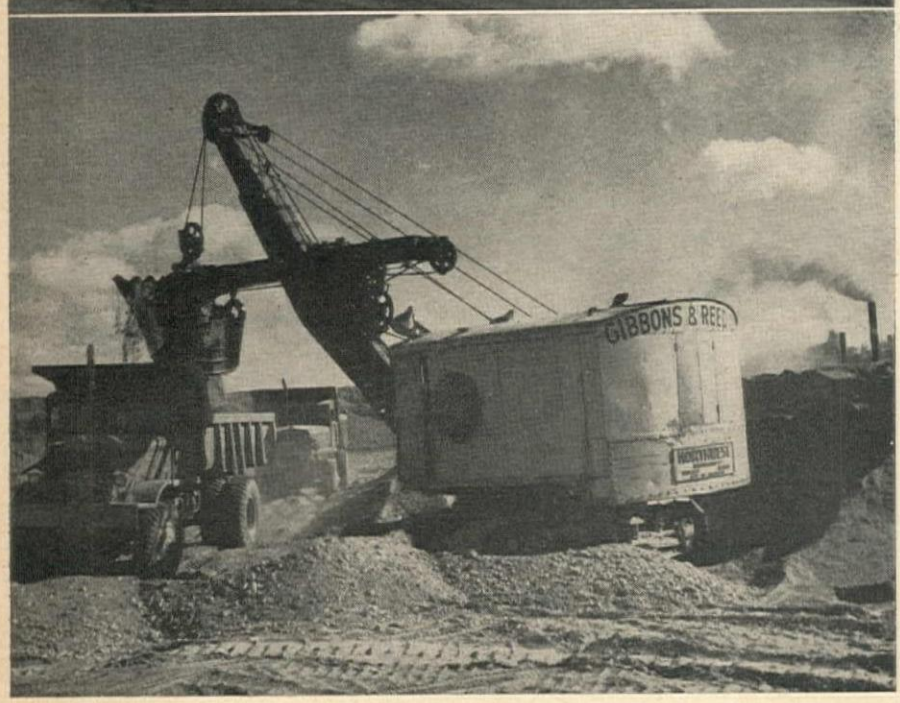
Prices are subject to the seller's current list of extras, standard conditions of sale, and are subject to change without notice. Shipments will be invoiced at prices and extras in effect at time of shipment.

This is the second Geneva basing point to be established. On Oct. 15 announcement was made to the effect that the delivered price at Geneva, Utah, for sheared plates is $2.675 per hundred pounds in carload lots.

Idaho Falls Completes Its Airport







City, WPA, CAA, ERA, and contractors team up to finally complete a modern airport for Idaho city

By CARL E. HAYDEN
Idaho Falls, Idaho

AFTER YEARS of delay, and as a result of the combined efforts of many different agencies, the airport for the city of Idaho Falls, Idaho, was recently completed. The first heavy work was carried out by the Works Progress Administration, which spent approximately $500,000 on construction of a 5,150-ft. north-south runway, paving it with lean dry-mixed concrete; grading of a 5,400-ft. northeast-southwest runway; grading of the intermediate area between the runways; and placing of a majority of the drain tile. This Works Progress Administration project was terminated by Government order in February, 1942.

Prior to the above paving project preliminary grading had been done by the city of Idaho Falls and the Idaho Emergency Relief Authority. This cooperative work also included construction of a hangar, administration building and caretaker's cottage, all built of peeled lodge pole pine. It is estimated that $150,000 was spent by these agencies.

Postwar contract

No further progress was made on the port until after the close of the war, a contract being awarded on July 31, 1945, to Gibbons & Reed Construction Co., Salt Lake City, Utah, in the amount of $292,109. The principal items of work included in this contract were 60,000 cu. yd. of excavation, 75,000 cu. yd. of crushed gravel base, and 24,000 tons of asphaltic concrete surfacing. This was a Civil Aeronautics Administration contract and the same agency subsequently contracted night lighting of the air field. The same construction company also received a contract from the city for $10,925 to install aprons and taxiways for two hangars. The next and final step in construction of the airport is the erection of two 6-plane metal hangars adjacent to these aprons. The total cost of all facilities for the completed airport will amount to slightly over one million dollars.

The Gibbons & Reed Co. was unable to carry on construction work on the CAA contract during the winter months of 1945-6 due to inclement weather, but construction was resumed in the spring and completed a few weeks ago.

In carrying out this contract, which included installation of a taxiway connecting the two main runways and seal-

GIBBONS & REED equipment at work on the airport. Top, grading; center, backhoe on drainage excavation; and bottom, aggregate handling for asphaltic surface.

coating the existing runways, the contractor employed tractors and 20-cu. yd. carrier scrapers in the excavation work and two portable gravel plants for preparation of the crushed gravel base. These two plants, one a Cedar Rapids, the other a Pioneer, produced a combined output of from 250 to 300 cu. yd. per hr., which was trucked to the runways and deposited in windrows. Here the gravel was processed through a Wood roadmix machine and was laid in place by a Caterpillar road patrol.

The asphaltic concrete material was mixed in a 4,000-lb. Madsen asphalt plant and was laid by a Barber-Greene finishing machine. In excavating for necessary drainage work, the bulk of the work was done by a back hoe.

Construction work was under the supervision of Claude R. Black, city engineer, representing the city, and Kenneth Williams, representing the Civil Aeronautics Administration. For the contractor A. V. Toolson was job superintendent, W. W. Taylor was office manager, John Leg was excavation foreman, Sam Warner was asphalt plant foreman and Tom Varley was engineer.

KENNETH WILLIAMS, resident engineer for the Civil Aeronautics Administration on construction of the Idaho Falls Airport, surveys the field in snow.

Broken Ship to Serve Alaska City as Added Power Plant

ANCHORAGE, ALASKA, has literal proof that "it's an ill wind that blows no one good," for the Aleutian gales and pounding waves that broke in two the hull of S. S. Sackett's Harbor made it possible for Anchorage to supplement its inadequate electric power supply.

The forward section of the battered vessel is being prepared for conversion into a power plant that will turn out 5,400 kw. for the Alaskan city.

The ship broke in two aft of a watertight bulkhead last March, and the forward section, part of the crew aboard, floated out of control without power or rudder, whereas the stern portion stayed awkwardly navigable. Marooned crewmen on the forward section were rescued and the stern section limped into port at Adak Island, with a flat bulkhead where her prow should be and with jagged edges of her broken shell projecting. Naval gunners sank the forward section as a menace to shipping but, since the stern remnant still had its 6,000 hp. steam engine that spun the turbines, it proved a "godsend."

The city of Anchorage, having outgrown its power facilities, applied to the Maritime Commission for acquisition of the half-ship. And the commission agreed to lease the craft to the city until other sources of power could be developed. Accordingly, the vessel was towed from Adak, 1,000 mi. away, into Cook Inlet and anchored at Knik Arm.

As the first step of converting the crippled ship into a useful power plant, a contract was awarded to Morrison-Knudsen Co., Inc., to provide a mooring basin in the tide flats.

The project required 45,000 cu. yd. of excavation. Since the normal tidal range is around 30 ft. from high to low, the mooring plan calls for a basin about 30 ft. deep in which the vessel will be at rest at low tide upon a thin coating of tidal mud, underlaid with a compacted silt and gravel. After mooring, the ship is expected to be made solid gradually by the washing in of silt.

Next step, also under contract to M-K, is the building of two transformer stations and the installing of a system for providing fresh water to the ship's condensers. Next will come erection of a transmission line.

Years ago Anchorage built a concrete hydroelectric dam at nearby Eklutna, from which the city's needs were met until the prewar boom swelled its population. Meanwhile it was discovered that the power dam could not be enlarged due to foundation weakness. Since then two supplementary diesel electric plants were built, but they also were outgrown by the demand, and the 5,400 kw. to come from the S. S. Sackett's Harbor is expected to be sufficient to meet the shortage for the time being.

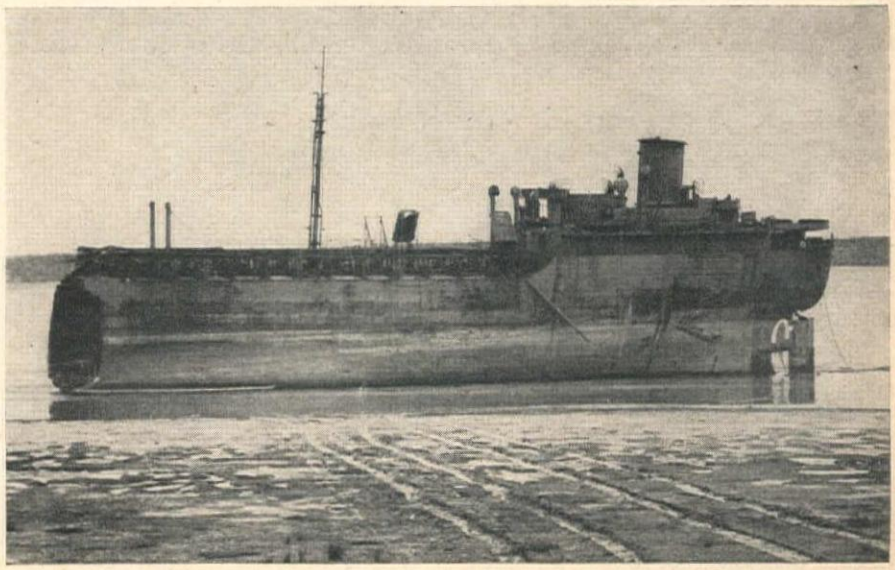
Construction Machinery Prices Continue Upward

PRICES OF construction machinery and equipment rose slightly less than 1 per cent in the third quarter of 1946 as compared to increases of 1.2 per cent in the first quarter, and 6.3 per cent in the second quarter of the year according to the Bureau of Labor Statistics. In September, prices for this type of machinery averaged approximately 11 per cent above their peak of August, 1945.

Prices of portable air compressors which in June had been below their August 1939 level, rose about 14 per cent between July and September, 1946. Other significant changes during the quarter included increases of approximately 5 per cent in quotations for material processing equipment, and from 1 to 2 per cent in prices of specialized construction machinery, and scrapers, maintainers and graders. Fractional decreases were reported in prices of track type tractors and construction material mixers, pavers and spreaders.

All types of construction machinery are now selling above their August, 1939 levels. The largest increase has been in prices of material processing equipment (33.6 per cent), track type tractors (31.2 per cent), and specialized construction machinery — rippers, ditchers, rollers, contractor's wagons and dewatering pumps—(22.3 per cent). Prices of portable air compressors and drilling and boring machines have shown the smallest advances (11 to 12 per cent).

AFTER PORTION of S. S. Sackett's Harbor, wrecked in Aleutian gale, at rest near Anchorage, Alaska, where it will serve as supplemental municipal power source.



Kingsley Dam Reblanketed

Original concrete block surface of Nebraska dam failed to afford adequate protection during severe storm—Fill material was washed out and block system collapsed into cavities—Dam has been resurfaced above lake line with complete new riprap blanket of quarry stone for $3,165,000 by Tobin Quarries

A NEW-TYPE concrete block surfacing blanket for the upstream face of a large hydraulic filled earth dam, was proven unsatisfactory when high winds caused 8-ft. waves on Lake McConaughy, the reservoir impounded by Kingsley Dam in central Nebraska. To preserve the structure, it was necessary to remove the concrete blocks and dump a blanket of rock riprap over the entire upstream face.

The dam was built by the Central Nebraska Public Power and Irrigation District and forms the key water control unit for the irrigation system of that district and several smaller canals utilizing water from the Platte River, and for the integrated power generation system of the above district, the Platte Valley Public Power and Irrigation District, and the generating plant of the Loup River Public Power District at Columbus.

Kingsley Dam was started in 1938 and completed in 1941. It is located on the North Platte River, about 5 mi. north of Ogalalla, Neb. The structure is 3 mi. long on the crest, and has a maximum height of 162 ft. It was constructed by the hydraulic fill method, using native loess soil for the impervious central core. This material will readily pass through a 200-mesh screen, and when the water had completely drained off produced a core virtually absolutely impervious.

The core was restrained by outer shells of sand and gravel obtained from the streambed. At the maximum section, the total width of the base of the dam is 1,100 ft., of which the gravel shells compose about 500 ft. each. A steel sheet piling cutoff wall was driven along the axis of the dam to depths varying from 30 to 160 ft., so that it passes entirely through the streambed gravels and into the impervious Brule clay.

The crest of the dam is 28 ft. wide, and is crossed by a state highway. The upstream edge of the roadway is protected by a 5-ft. wave wall. The upstream surface of the embankment is on a 1 :3 slope.

In the original plan, a system of precast reinforced concrete block riprap was placed over the entire surface. These blocks were cast in several sizes, 4½ x 12 in., 6 x 15 in., and 6 x 18 in., all 4½ ft. long. They were placed on the surface of the dam with their smallest dimension parallel to the slope of the fill, and their longest dimension parallel to the axis of the structure. The blocks were slotted so that they could be fastened in place by wrought iron rods which extended up the full length of the face of the fill, and were attached to the toe wall at the bottom and the wave wall at the top. Between each line of concrete blocks, a 1-in. continuous opening was allowed.

Contract for the concrete block riprap was let soon after completion of the embankment, and it was completed late in 1941. This particular type of riprap was adopted because no stone was available closer than 185 mi., and it was believed it would furnish a satisfactory preventive blanket against the action of ice and waves. It was anticipated that the surface presented to the waves would be flexible enough to protect any minor cavitation, and also the corrugated surface would break up the wave force.

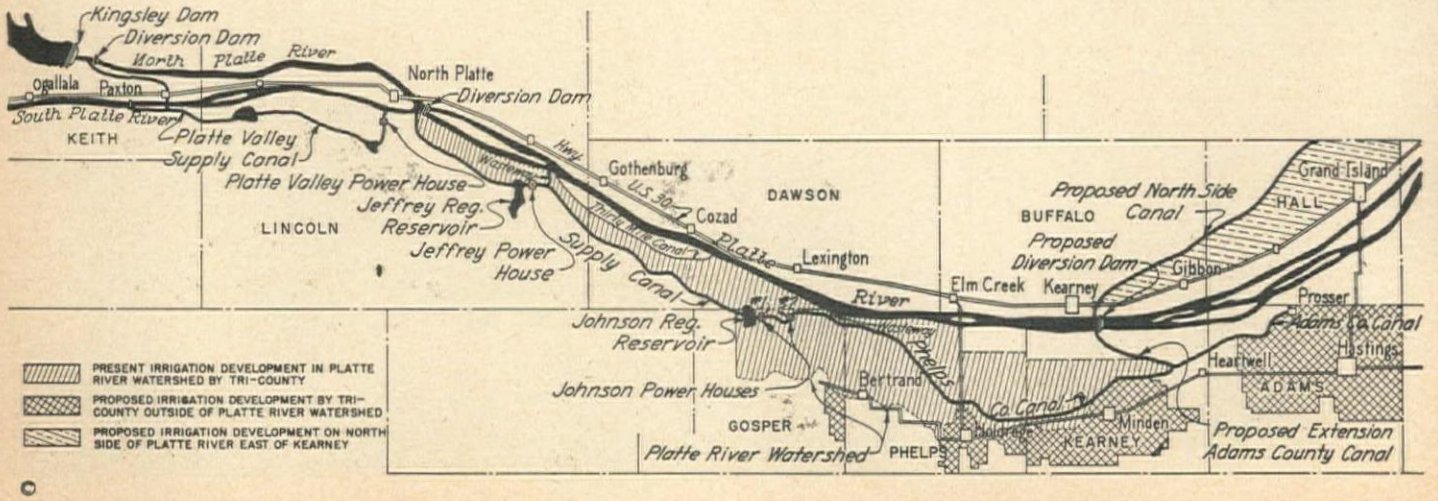
However, in the spring of 1942, a severe storm with high winds from the northwest, roughly normal to the face of the dam, caused high waves, which surged as much as 60 ft. up on the face of the riprapped surface, and the suction of their back surge pulled the fill material from between and underneath the concrete blocks. This soon caused serious undermining and the block system collapsed into the cavities.

After emergency repairs, it was determined that the only satisfactory remedy was a complete new riprap blanket of quarry stone. In September, 1944, a new contract was let to Tobin Quarries, Kansas City, Mo., for placing the new blanket. The work was completed and accepted in October, 1946. The contract cost for the new riprap was $3,165,000, which included about $1,145,000 for freight charges involved in transporting the material 220 mi. from Guernsey, Wyo., the nearest source of satisfactory rock.

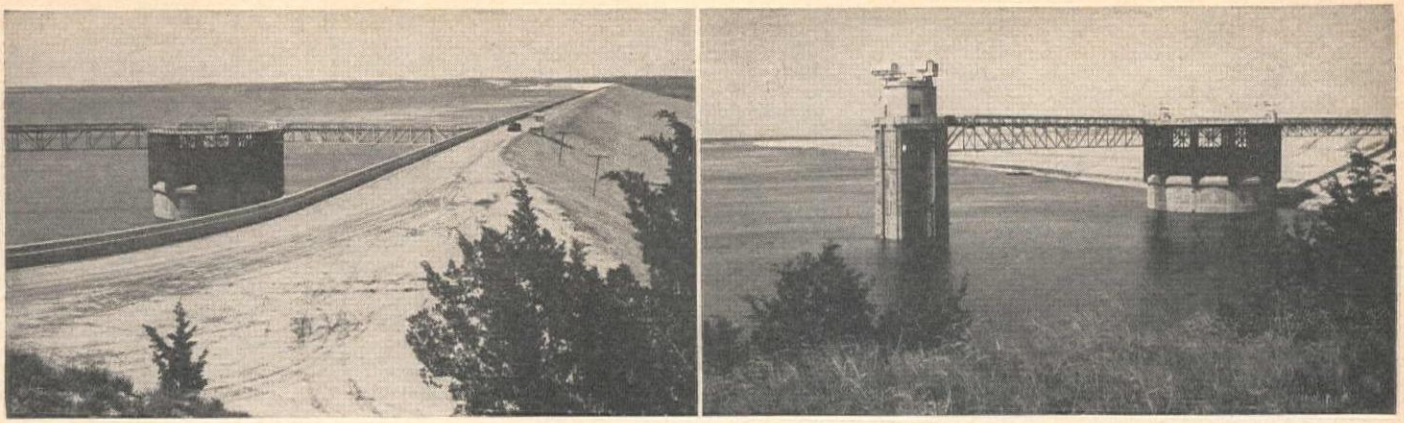
As the old concrete blocks were removed, they were broken up into three pieces each, and mixed with the quarry rock to form a part of the new riprap blanket.

The placing of the new surfacing material by Tobin Quarries involved some interesting operations. By specification, after removal of the concrete blocks, a 15-in. filter layer of gravel, graded from ¼ to 2 in. in diameter, was placed over the embankment. Topping this is a 3-ft. layer of quarry stone blocks having a maximum volume of 6 cu. ft. At least 5 per cent of the riprap is required to weigh 500 lb. or more and 50 per cent must exceed 100 lb. in weight.

The rock was delivered from the quarry by railroad to the north end of the dam, where it was unloaded, partly by an orange-peel bucket, which discharged directly into 3-ton trucks for conveyance to the point of placement, and partly through bottom dump openings into a bunker beneath the track,



MAP OF the Central Nebraska Power and Irrigation District showing diversion dams, powerhouses, and canal system, including proposed North Side Canal.



KINGSLEY DAM after completion showing the wave wall and state highway (left), morning glory spillway and outlet control tower (right).

from which it was placed in the trucks by a mobile shovel.

The material, both the gravel (produced from local gravel pits) and the stone, was trucked along the crest and discharged over the wave wall onto the concrete block riprap. From here it was moved to its final position by bulldozer. In order to shorten the distance the bulldozers would have to move the material, the contractor developed a steel chute which was mounted on steel wheels at the lower end and rubber-tired wheels at the upper end. The upper wheels moved along the inside of the wave-wall, thus projecting the upper lip of the chute over the wall, and the steel wheels moved along the concrete blocks. The chute was approximately 50 ft. long, and the piles of material were thus deposited well down the surface of the embankment.

The lake was not drained for the resurfacing operation, and none of the old concrete riprap below the lake level was removed. The 15-in. layer of gravel and the 3 ft. of riprap rock was placed directly on top of the concrete, being dumped into place from a floating barge.

Kingsley Dam is the key structure in the operations of the entire power and irrigation system of the Central Nebraska area.

From the reservoir, water discharges into the North Platte River by means of a 20-ft. concrete outlet pipe which passes through the dam and into a stilling basin at its toe. Electrically-operated steel slide gates on four sides of a vertical control tower regulate the amount of this discharge.

About a mile below the dam, a diversion dam, about 1,170 ft. long, of reinforced concrete ogee design, diverts the regulated discharge from Kingsley into the main supply canal of the Platte Valley Public Power and Irrigation District. This canal has a capacity of 1,750 cu. ft. per sec. and transports the water 32.3 mi. to Sutherland Reservoir of the Platte Valley district, passing en route through a siphon underneath the South Platte River. This siphon is 14 ft. in diameter and 7,400 ft. in length. It is a reinforced concrete structure, with a maximum head of 11 ft.

Below Sutherland reservoir, the water is transported 19.2 mi. through a canal with a capacity of 1,400 cu. ft. per sec. to a regulating reservoir above the Platte Valley district's generating plant. This hydro plant is composed of two vertical shaft turbines, direct-connected to generators with an installed capacity of 13,050 kw. each. Operating head at the plant is 204 ft.

The tailrace of this plant discharges into the South Platte River. A few miles below the point of discharge, at the junction of the North and South Platte Rivers, the diversion dam of the Central Nebraska Public Power and Irrigation District again picks up the water, permitting only enough to pass down the river to provide for the needs of certain small irrigation districts holding prior water rights. The main supply canal of this district is designed for a capacity of 2,500 cu. ft. per sec.

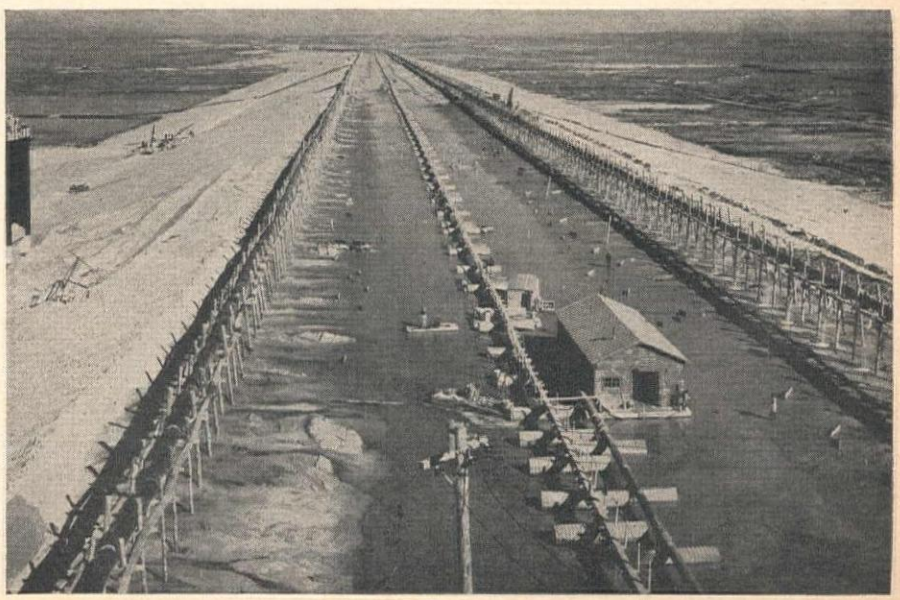
A unique feature of this canal is the utilization of 28 canyons as part of the canal. As the canal rises from the streambed onto the plateau to the south of the river, it crosses numerous canyons made by tributary streams and washes. Instead of snaking the canal along the contour lines around these canyons, the district has built small rolled earth dams across their mouths, forming small lakes which become an integral part of the canal, neither inlet nor outlet structures being required.

The loess soil of which the plateau is composed is similar to that used in construction of Kingsley Dam, and is particularly interesting in the excavation of the canals. In some places, the canals have been dug to a very considerable depth, a maximum cut of 140 ft. having been made at one point, yet the material in the canal banks above water stands firmly at a ¼:1 slope without lining of any kind. The underwater portion on the canals is excavated on a 2:1 slope.

The largest of the canyon lakes is the Jeffrey regulating reservoir, having a capacity of 5,000 ac. ft. Immediately below this lake is the first power drop of the district's system. Jeffrey powerhouse, which has two 10,000-kw. generators, operating at a head of 116.6 ft.

Below Jeffrey powerhouse, the supply canal again climbs the plateau, and conveys the water 40 mi. to Johnson Reservoir, a 50,000-ac. ft. body of water formed by a rolled earth dam a mile long, 45 ft. high, and protected with 24 in. of rock riprap on its 3:1 upstream face. As were all the smaller canyon reservoir dams, this structure was compacted in 6-in. layers, of the native earth, wetted to an 18 per cent moisture content. Johnson Lake has become one

KINGSLEY DAM during construction showing core pool and material feed pipes (center) shell material pipes on trestles at each side, and feeder pipes from the river bed borrow pits on the slopes. Steel sheet piling wall runs full length of dam.



SAME SOIL, same seed, same cultivation—but the corn in the background has been irrigated (irrigation ditch, upper right). Corn in the foreground has not been irrigated because it is above the grade of the Central Nebraska District ditch.

of Nebraska's outstanding recreational areas.

Below Johnson Lake are two more power plants, Johnson No. 1, an exact duplicate of the Jeffrey plant, with two 10,000-kw. generators and a head of 116.6 ft., and Johnson No. 2, which operates a single generator with a capacity of 20,000 kw., at a head of 146 ft.

The irrigation system of the district covers parts of three counties, Gosper, Phelps, and Kearney. The land in Gosper County is irrigated from a main canal known as E-65, which leaves the supply canal above Johnson No. 1 powerhouse. The balance of the district is irrigated from the Phelps County canal which originates below Johnson No. 2 powerhouse. Irrigation first began in 1941. An area of 70,000 ac. was served with irrigation water by the district in 1946. Ultimate development will provide irrigation to 200,000 ac. or more.

The supply system of the district is capable of irrigating a large additional area which lies within the drainage area of the Republican River, but because of technicalities in Nebraska water law is prohibited from doing so at the present time. In addition, a considerable area north of the Platte River, lying east of Kearney, is capable of irrigation by the system, and this extension will probably be undertaken as a future development.

All power generated by the four powerhouses mentioned above, and the 54,000-kw. installation of the Loup River Columbus plant, is controlled by a central dispatching office at Hastings. Of the five plants, the Columbus plant carries the base load and operates at full capacity at all times, inasmuch as no water storage is available at that site. Additional demand is apportioned over the other plants in such a manner as will furnish the most advantageous movement of the water for irrigation purposes. At periods of peak demand, all five plants operate at full capacity.

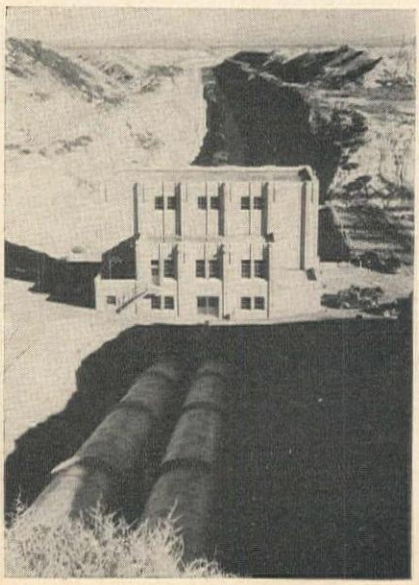
Most of the power is sold at wholesale to the Consumers Power District, Nebraska public power marketing agency. Profits from the sale of power are distributed to the three integrated producing districts in proportion to their respective construction investments. Funds for construction of the projects were advanced by the Federal Works Agency on the basis of a 45 per cent grant and a 55 per cent loan, which is now being regularly amortized.

Organization

The Central Nebraska district system was constructed under the direction of George E. Johnson, chief engineer and general manager, and R. O. Green, assistant chief engineer. A. C. Tilley is now chief engineer and assistant general manager, MacAndrew McCall is assistant chief engineer and John Manion is now resident engineer, superintendent of power plants and supply canal.

For the rock riprap work just completed at Kingsley Dam, E. J. Mecke was resident engineer. Harry S. Mahood was project engineer for Federal Works Agency on the job. For Tobin Quarries, the contractor, Ralph Saathoff was superintendent and Herbert Peterson was general foreman.

JEFFREY POWERHOUSE, the first power drop below Kingsley Dam.



Contract Let for Fourth Missouri Basin Unit

THE AWARD of a $4,109,927 contract for construction of Enders Dam and Reservoir on Frenchman Creek near Enders, Nebr., was announced in November by the Bureau of Reclamation. The contract has been awarded to the low bidder, Wunderlich Contracting Corp., of Jefferson City, Mo.

Clearance of Enders Dam and Reservoir for construction under provisions of the Office of War Mobilization and Reconversion Directive No. 128 has been granted by Director John R. Steelman. Although bids were opened on Sept. 4, the contract could not be awarded under provisions of the construction moratorium, enforced Aug. 5.

Enders Dam and Reservoir of the Frenchman-Cambridge unit is the fourth of the 29 authorized initial stage units of the Missouri Basin project to go under construction. Kortes and Boysen Dams in Wyoming, and Angostura Dam and Reservoir in South Dakota, were under way before the construction limitation was effected.

Enders Dam will be a rolled earth structure approximately 2,570 ft. long across Frenchman Creek. It will be about 100 ft. high at the center. A 6,420-ft. dike of maximum height of 26 ft. across a channel of the east rim of the reservoir is included in the contract.

Dissension May Reopen Truckee Water Decree

LITIGATION between the States of Nevada and California over distribution of the waters of the Truckee River, as well as Lake Tahoe, may result from a recent decision handed down by Judge John C. Bowen of the Federal District of the State of Washington, sitting in Sacramento.

In a recent case before Judge Bowen, the Federal Government sought an injunction on behalf of the Pyramid Lake Indians and the Truckee-Carson Irrigation District and against the Sierra Valley Water Co., in an effort to prevent the water company from diverting the waters of the Little Truckee River.

Judge Bowen denied the injunction which sought to halt the officials of the Sierra Valley concern from reconstructing a dam on the Little Truckee, which flows into the Truckee River.

The decision may result in the reopening of litigation surrounding the entire Truckee River water decree which was believed to have settled water rights pertaining to the river, because the Sierra Valley Water Co. was not a party to the original decree.

Walter Bell, watermaster of the Truckee River and George Devore, water engineer for the Sierra Pacific Power Co., testified for the government.

Officers of the Sierra Valley Water Co. testified in their own behalf and were supported by an engineer from the Division of Water Resources of the State of California.

Asphalt Sub-Seal Technique

Sub-sealing of airport and highway pavements will stop slab movement and rocking, drive out excess moisture in whole or in part, and fill voids under the pavement, thus providing uniform support and longer useful life

By N. H. TRUAX
Major, Corps of Engineers
Chief, Maintenance & Repair Branch
Ninth Service Command,
Fort Douglas, Utah

THE MAINTENANCE of physical structures built by man is the determining factor in the continued existence and usefulness of such structures. The slow disintegration of a mountain of solid rock through the action of nature, points out the futility of man's attempting to build something permanent. The statement is often made that the only permanent characteristic of any man-made structure is its need of maintenance, since when that is discontinued, the structure soon ceases to function.

The maintenance of paved surfaces, whether used as roads, runways, or hardstandings, is an essential phase of military engineering. Roads and paved surfaces at army installations in the eight Western states of the Ninth Service Command are equivalent to those of a highway system composed of approximately 20,000 lin. mi. of 20-ft. pavement. Only four state highway systems in the United States have a total mileage in excess of this figure, and three of these systems include roads which would normally be considered township and county roads.

The construction of these pavements varies from skin-treated gravel roads to airfield pavements planned to carry gross loads of 300,000 lb. These latter pavements are designed for use by military airplanes of the B-36 and C-99 type and weight.

Sub-sealing for prolonging life

In order to prolong the useful life of rigid pavements, Ninth Service Command headquarters has adopted methods originally developed by S. O. Linzell of the Ohio Department of Highways for sub-sealing. This technique provides for the introduction under rigid pavements of a membrane of hot asphaltic material, of relatively high softening point, by means of a nozzle. The specific purpose of sub-sealing is to stop slab movement and rocking, to drive out excessive moisture in whole or in part, and to fill voids under the pavement, thus providing uniform support under the entire pavement slab.

It is believed by headquarters that where the deflection of the slab end amounts to 1/32 of an inch or greater under transfer of load from one pavement slab to the next, the need for providing support for the slab ends by the introduction of "mud" or asphalt is indicated. In too many cases, however, the symptoms of impending failure are not observed and necessary corrective action is not taken until after characteristic "diamond cracking," accompanied by longitudinal cracking, has occurred. These cracks generally appear approximately three or four feet away from, and parallel to, the longitudinal pavement joint. Unless cracking has progressed to such an extent that a majority of the individual solid pieces of pavement remaining are smaller than six square yards in area, and providing the pavement is of sufficient thickness and strength, it is believed that the application of asphalt sub-sealing procedures will be of material benefit in prolonging the useful life of the pavement.

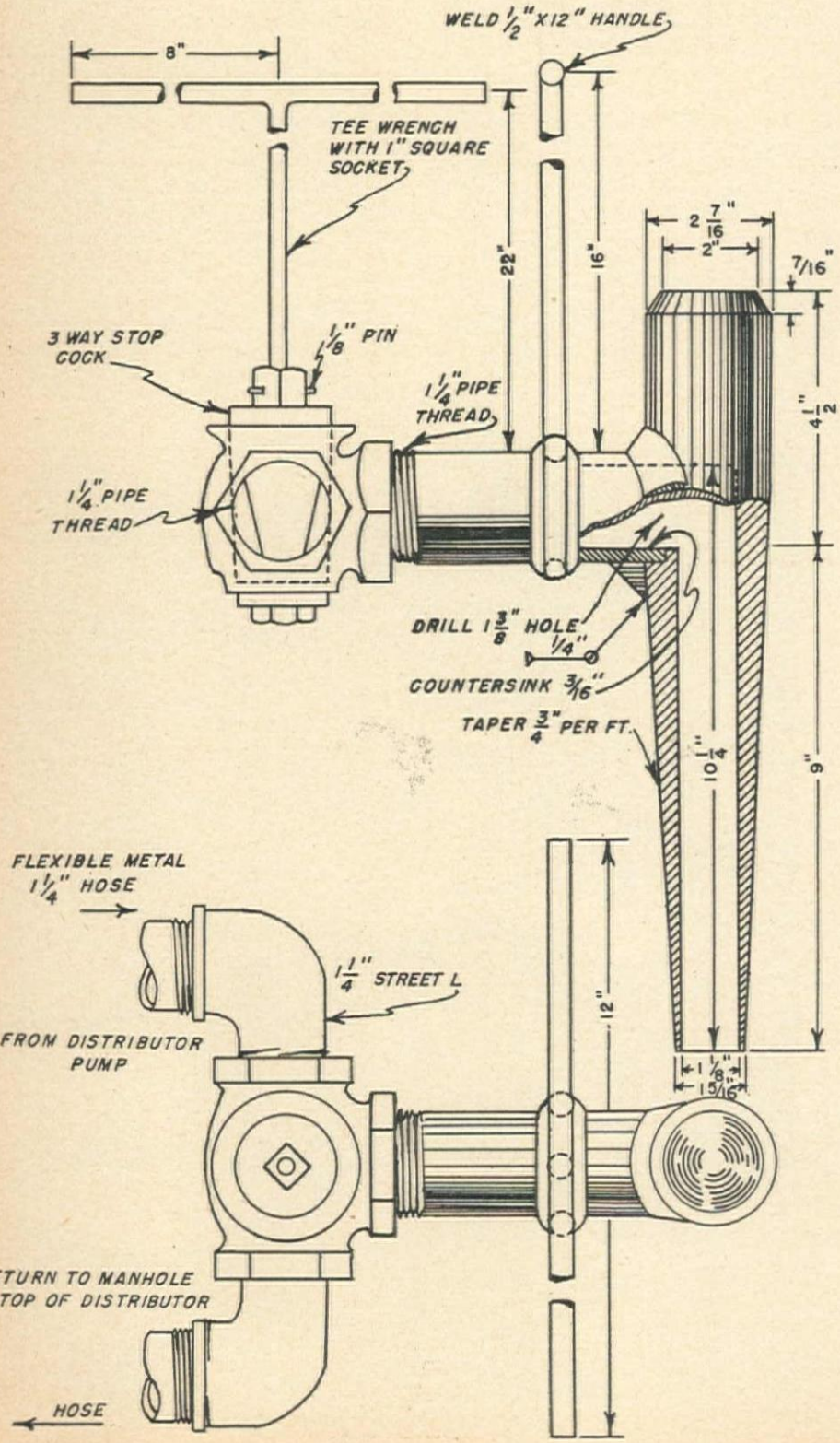
Preventive maintenance

The sub-sealing of rigid type pavements or slabs to prevent water from seeping through the joints and cracks in the pavements, or accumulating under the slabs from the sub-grade, should be performed at the first indication of such condition. Water accumulating under a rigid type pavement, either from the surface or sub-grade, will reduce the bearing capacity of the sub-grade, thus permitting excessive deflection. Cracking and breaking up of the pavement may be expected to result from this condition. This condition is particularly prevalent at edges and corners of slabs where repeated loadings tend to pro-

MARKING pavement and drilling holes, top. Lower, sub-sealing operation; asphalt is pumped from distributor and applied through special nozzle. Note that pavement has been moistened to prevent sticking to it. Men are equipped with safety suits.

duce compaction of the sub-grade in excess of that attained during construction, leaving cavities in which surface and sub-grade water can accumulate, thereby softening and weakening the sub-grade. Effective sub-sealing of the joints and edges of the pavement before this condition becomes detrimental or destructive is highly desirable as a preventive maintenance measure.

Detection of deficiencies or cavities in their early stages is ofttimes difficult and requires the experienced eye of a trained maintenance engineer, plus a reasonable amount of field investigation. The ideal time to observe a tendency towards slab movement is immediately following a heavy rain or as soon thereafter as the surface of the pavement becomes dry. Water seeping or being pumped up through the joints or out from underneath the pavement at the edges of the slab under traffic conditions is a definite indication of need for sub-sealing. Other symptoms of need for pavement support include hollow rumbling noises produced by cars traveling over a pavement which is unsupported, the settlement of a slab adjacent to a joint, cracking, and/or deflection in slabs of 1/32 of an inch or more when loads are transferred from one slab to the next.



DIAGRAMMATIC sketch of the continuous flow asphalt nozzle found most satisfactory for sub-sealing by Army Service Force engineers. Hot fluid either flows into nozzle, or returns to distributor.

Specifications for work

Based on experience in the Ninth Service Command area, headquarters has drawn up a tentative procedure for performing this type of work, as follows:

The asphalt used shall be an oxidized material having a melting point in excess of 180 deg. F., with a penetration range at 77 deg. F., of 25 to 40 and with a maximum penetration at 115 deg. F. of 65. Asphaltic material specified in A.A.S.H.O. Specifications Oil Asphalt Filler Grade A—Designation: M 18-42, and Unsurfaced Steep Roofing Asphalt, A.S.T.M. Specification D-312-44, will meet these requirements, with slight modifications.

Prior to use, samples of all materials proposed to be employed shall be submitted to the Engineer in charge for test and analysis, and no material shall be used until it has been approved by the supervising Engineer, either by plant or laboratory inspection, or upon the producers' certified analysis.

Methods of testing shall be the latest revisions of the following:

- Flash Point, A.S.T.M. Method of Test D-92.
- Softening Point, A.S.T.M. Method of Test D-36.
- Penetration, A.S.T.M. Method of Test D-5.
- Loss on Heating at 325 deg. F., A.S.T.M. Method of Test D-6.
- Ductility, A.S.T.M. Method of Test D-113.
- Solubility in Carbon Tetrachloride, A.S.T.M. Method of Test D-4 except that carbon tetrachloride shall be used instead of carbon disulphide as solvent, Method No. 1.

The usual specifications with respect to the requirements for pressure distributors such as independently powered asphalt pump, and supply of the necessary valves, burners, gauges, and reversible pump or suckback arrangement, shall be used.

The engineer in charge will make a detailed inspection of the pavement and lay out the work, indicating where sub-sealing only will be accomplished, and where slab lifting in addition to sub-sealing is to be accomplished. He will mark the exact locations of the holes to be drilled in the pavement, using a cross mark on slabs which are to be raised, and a small circle on slabs which are to be sub-sealed only.

Heated asphalt will be shipped in insulated tank cars, where rail shipment is used. Asphalt in tank cars will be heated when necessary with a tank car heater to the point where the material

can be pumped into the pumping-storage-booster, where it will be given sufficient additional heat, without burning the material, so that further heating in the distributor will generally be unnecessary. The arrangement of the booster hoses and allied operations will be such as to permit contents of the tank car to be heated when required by circulation through the booster.

Drilling and spacing of holes

Holes, 1½ in. in diameter, shall be drilled at spacing varied to suit local conditions and requirements. In general, holes should be drilled 8 to 10 in. from the expansion joint. Since the expansion joint is the point of greatest slab movement, and the point of greatest possibility of infiltration of water under the slab, sealing and support at this location may be expected to do the most good. A hole drilled at a much greater distance from the joints may be expected to cause, at some later date, a crack to appear through the weakened plane of the pavement created by the drilling of the hole. Where the distance from the hole to the joint is minor, the lever arm is short, and loadings applied between the joint and the hole may not be expected to create a crack in the pavement through the weakened plane created by the hole.

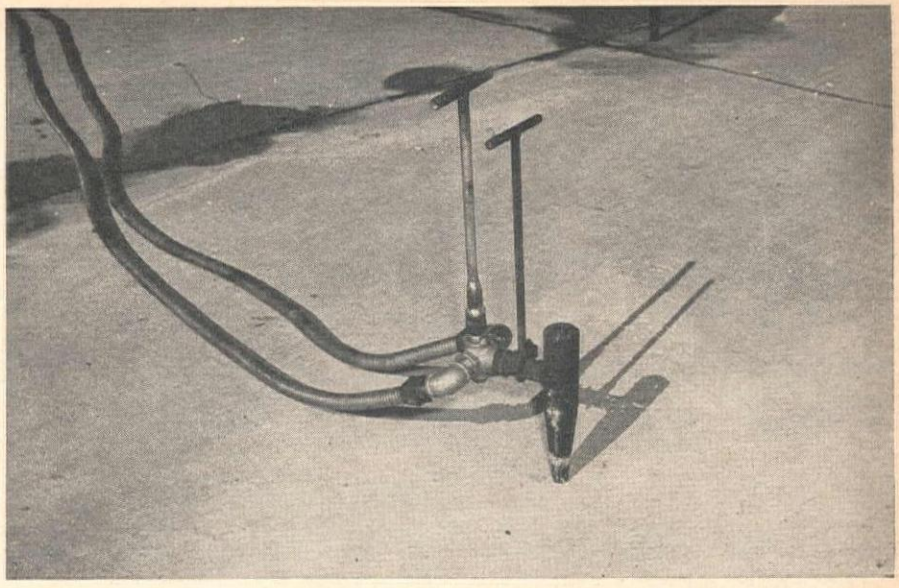
Experience has led to the conclusion that asphalt may be expected to flow 10 to 12 ft. in all directions from the hole or point of introduction. It is recommended that each particular pavement and sub-grade be tested for coverage characteristics to determine the most economical spacing of the holes. A common fault in doing work of this kind is to drill too many holes and to drill them in locations where maximum benefit will not be secured. For this reason it is believed that only an experienced pavement engineer should be placed in charge of this operation and that he, from his observations, knowledge, and experience, should personally mark the location of all holes to be drilled.

Drilling must not proceed too far in advance of pumping as each pavement presents its own problem and the exact pattern to follow will vary, depending on the conditions encountered. No more holes should be drilled during a day's operation than can be filled or temporarily plugged during the same day.

To assure round holes, a guide should be used for starting the drill. The guide may be a short piece of 2 x 8-in. lumber, with a hole in the center slightly larger than the bit. The drill is placed in the guide hole and the jack-hammer operator stands on the templet to hold it in position. Holes should be as round as possible. A dull bit produces a smoother, more uniform hole than a newly sharpened bit.

A light jack-hammer, weighing not over 55 lb., should be used, in order to minimize spalling when the bit nears the bottom of the slab.

After the hole is drilled, mud and water, if present under the slab, should be thoroughly blown out with compressed air, using a second air hose from the compressor for this purpose. This hose will be fitted with a nozzle conforming to the diameter of the hole in the pavement, with a ⅜-in. orifice, using air at approximately 90-lb. pressure.



CLOSE-UP of nozzle showing three-way valve and feed and return line to distributor. The three-way valve keeps asphalt circulating in hoses until it is needed at the nozzle, thus preventing cooling and hardening and consequent plugging of line.

Sub-sealing operations

Before the start of pavement sealing, the nozzle will be placed in the manhole on top of the distributor and the valve opened to assure that the pump and nozzle are operating properly.

The pavement will be wetted with a sprinkling can for a radius of about 4 ft. around the hole to be pumped.

After the pavement is wetted and assurance is had that the pump and nozzle are functioning properly, the nozzle will be "set" firmly in the pavement hole with two or three blows of a 2-lb. hammer. When the nozzle is firm, the valve at the nozzle will be opened slowly.

The asphalt is allowed to flow until smoke or steam begins to form in the next adjacent hole or the slab begins to lift, at which time the valve is closed. The nozzle is left in position several seconds (30 to 60) after the valve is closed, in order to permit the built-up pressure to dissipate and the material to cool slightly.

The nozzle is then loosened by tapping lightly with the hammer. The nozzle is then removed and a hardwood plug is inserted in the hole to prevent back pressure from forcing asphalt out of the hole.

This operation is then repeated at the next hole.

Asphalt temperature control

Within a specified range the engineer shall adjust the temperature of the asphalt in accordance with the type of work being accomplished. In general, small or particularly wet cavities require higher temperatures for the asphalt than do the large dry cavities. The temperature of the asphalt for subsealing, where voids and cavities are small, should be 400 to 450 deg. F.

In order to keep flexible metal hoses open at all times, the distributor asphalt pump will operate continuously, pumping hot asphalt into the holes if the valve is open, or back through the hoses to the distributor, if closed. This procedure also insures the immediate availability of a supply of asphalt at the nozzle at the proper pressure and temperature. The pump pressure during pumping operations should ordinarily not exceed 40 p.s.i., otherwise pavement slabs may be over-stressed, or the nozzle may blow out of the hole, thus causing serious burns to operating personnel.

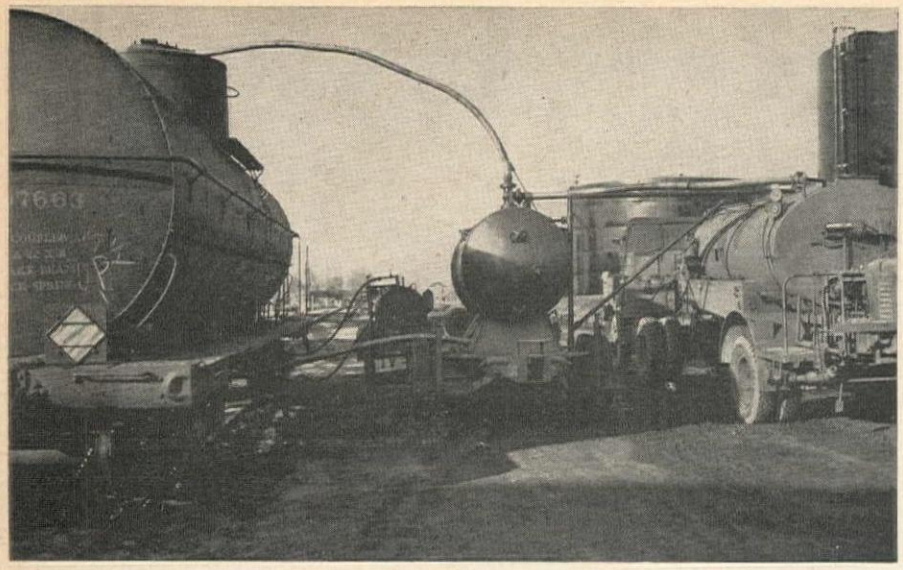
After the asphalt has chilled, the wooden plug will be removed and surplus asphalt will be removed from the hole and from the pavement around the hole. After the hole is properly cleaned, it will be filled with a mixture of dense graded, cold-mixed asphaltic concrete. It is essential that the pavement be wetted immediately adjacent to the hole prior to pumping operations in order to prevent spillage from sticking to concrete.

Safety precautions

Care shall be exercised to prevent raising the slab higher than the desired level. To avoid clogging of drainage structures when working near manholes, drains, and culverts a close check must be made to insure that asphalt will not be pumped out through, or around these utilities.

If asphalt extrudes through open joints or cracks, pumping will be stopped for a few minutes until the asphalt in the crack chills. Pumping may then be resumed. If cracks or joints are noticeably open, they should be filled with hot asphalt in advance of pumping operations. A hand pouring pot may be used for this purpose.

On airfields, the tower and operations officer will be contacted each morning and work will be coordinated with their activities insofar as is feasible. Arrangements will be made whereby the facility



VIEW AT railroad siding showing tank car heater, pumping-storage-booster, hose from top of the booster to tank car and hose from the top of booster to the distributor.

on which work is being performed will be cleared upon the pre-arranged signal from the tower, to permit landing or take-off of aircraft.

Nozzlemen and all others whose duties require that they handle or be subject to contact with hot asphalt or equipment will wear loose fitting coveralls, goggles, heavy gloves, and safety shoes covered with moistened burlap or other suitable material. Both nozzlemen and helper will also wear safety hat, mask with clear glass window, and cape to protect head, neck and shoulders.

Before work is started, the post fire chief will be advised as to nature of the work, the location of work and the location of tank car. One 25 to 50-gal. CO_2 fire extinguisher will be kept at the site of pumping activities, and one will be kept at the tank car for emergency use.

Quantity of asphalt

The amount of asphalt required for sub-sealing will depend upon the condition of the pavement and the subgrade at the time of sealing. Where only minor cavities exist, and slab movement has not resulted in serious pumping, as little as one-half gallon per square yard or from 15 to 20 gal. per highway pavement joint will be adequate. Where a more serious condition exists, it may be necessary to use two to three gallons of asphalt per square yard of pavement or 40 to 50 gal. per highway pavement joint. The raising of sunken slabs and sealing of extremely bad joints may require as much as five or six gallons per square yard or 100 to 150 gal. per joint. Where a sunken slab is to be raised for a height of one inch or more over a large area, the use of the mud jack method of slab raising is preferred to raising with asphalt.

Cost

Under average conditions, where asphalt is pumped under the pavements in quantities ranging from one to two gallons per square yard and where freight rates are not excessive, experience is that the cost of asphalt subsealing varies between 12¢ and 18¢ per gallon used. The cost of drilling the holes ranges between 20¢ and 25¢ each. These costs are based on pumping 8,000 to 10,000 gal. per day. These figures do not include certain overhead costs but do include the value of materials, equipment, and labor.

The foregoing instructions and specifications are recommended for use under what may be termed average conditions. It is realized, however, that no single standard specification will satisfactorily cover all varieties and local conditions which may prevail for individual jobs. The engineer, therefore, should give particular consideration to his own special problem and make adjustments in the specification where necessary.

It is recognized that the techniques and technologies used at present in this operation are not ideal. Advances and improvements in pavement maintenance procedures generally are the result of much thought given to the problems by many minds.

Note: This article, with some modifications, was originally presented by Maj. Truax at the Annual Highway Engineers Conference sponsored by the University of Utah at Salt Lake City in March 1946.

Steady Supply of Nails Should Relieve Shortage

IF UNINTERRUPTED, the current high rate of nail shipments should in a few months relieve the widely reported shortage of this product, especially for the housing program, according to the Amercian Iron and Steel Institute. During September nail shipments were equivalent to the highest peacetime annual rate since 1923, when 789,000 tons of nails were shipped. The total for September at 59,875 tons represents an annual rate of shipments at approximately 720,000 tons.

A major reason for the current nail shortage has been the prolonged effect of the loss of over 50,000 tons of wire nail and staple production in early 1946 because of strikes. Since the strikes, nail shipments have fared relatively well in relation to other steel products. Although the industry's potential steel production during the first nine months of 1946 was cut by 25 per cent due to strikes, nail shipments were only 6 per cent below the comparable months of 1945 and 1940.

Under a recent order, the government is setting aside one-half of the weight of each shipment of housing-type nails received by suppliers to fill rated orders largely for the veterans' Emergency Housing Program.

Brick and Tile Production Highest in Past Five Years

PRODUCTION of brick and tile rose 12 per cent in October and was higher than in any month since 1940, totaling 627,250,000 brick equivalents, according to preliminary figures provided by the Bureau of the Census.

The output during the month was at a rate more than double that required for the 1946 veterans' housing program. The October record of 528,000,000 brick was 94 per cent greater than in January of this year and 11 per cent above the September 1946 total.

Production of structural clay tile reached 133,000 tons in October, representing an increase of 90 per cent since January and 14 per cent over September of this year.

Brick production for the first ten months of 1946, according to Census Bureau figures, totaled slightly more than 3,900,000,000 units, while housing requirements are estimated at 2,700,000,000 units for the year as a whole.

Oregon Society Receives Historical Documents

DIARIES WRITTEN in 1865-66 by Col. Charles S. Bulkley during attempted construction of an overland telegraph line to Europe via Alaska and Siberia, and used by Brig. Gen. James A. O'Conner during the construction of the 1,600-mi. Alaskan highway in World War II, have been presented to the Oregon Historical Society. The presentation was made in Portland last month by Richard L. Neuberger, Portland, who served as aide-de-camp to Gen. O'Conner during construction of the Alcan highway. Participating in the ceremonies of presentation were Maj. Gen. Thomas M. Robins, who served as assistant chief of engineers during the highway construction, and Frank E. Andrews, who was engineer on the project for the Public Roads Administration. One of three copies which have been made of the original diary, the copy which was presented last month, was also used by President Franklin D. Roosevelt during the early planning of the highway, as well as by Gen. O'Conner during its construction.

Construction Design Chart

LXXVIII... Reinforced Concrete Columns

By JAMES R. GRIFFITH
Birch-Johnson-Lytle
Seattle, Wash.

THE FORMULA for the maximum allowable load on a concentrically loaded concrete column, as given by the 1940 Joint Committee Report, is to a certain extent empirical and is based on the results of extensive tests by the American Concrete Institute. The basic formula is given for spiral reinforced concrete columns and takes into account the toughening of the core due to the restraining action of the spiral steel. The formula is

$$P = 0.225\, f'_c\, A_g + A_s\, f_s$$

wherein

A_g = gross area of the column

f'_c = ultimate compressive strength of concrete

f_s = nominal working strength of vertical reinforcement

$A_s = p_g\, A_g$

p_g = ratio of the effective cross sectional area of vertical reinforcement to the gross area of the column.

While permissible to build a spiral reinforced column as a square, rectangle, or octagonal shape for ease in forming, in computing the gross area (A_g) only a circle of the same least lateral dimension of the column may be figured.

The allowable load on a tied column is to be taken as 80 per cent of that obtained from the above formula. The allowable range of (p_g) for tied columns is from 0.01 to 0.04, while it is permissible to increase it to 0.08 in the case of spiral reinforced columns. Since spacing rules also apply to adjacent bars at lap splices, it will be found impossible to utilize the higher values of (p_g) where columns continue from floor to floor. Therefore the designer must always be on the alert to assure himself that the section chosen will allow the necessary spacing of reinforcing bars.

Substituting the relation

$$A_s = p_g\, A_g$$

in the basic formula, we obtain a transformed version

$$P = A_g\,(0.225\, f'_c + p_g\, f_s)$$

which is the form I have used to construct the accompanying chart. In order to illustrate the use of this chart, let us assume the following conditions:

Total column load, $P = 205$ kips

Column size 14 × 14 in.

$f'_c = 2{,}000$ psi.

$f_s = 16{,}000$ psi, intermediate grade steel.

If a solution line is drawn, shown dashed on the chart, from a 14 × 14 square tied column through the given load, it will be seen that a value of $p_g = 0.054$ will be indicated as necessary. Since this value is higher than the maximum value of $p_g = 0.04$ allowed for tied columns, it will then be necessary to either increase the column size or resort to a column with spiral reinforcing. I have drawn a solution line, shown solid, on the chart for the required conditions using a spiral reinforced column. The required value of $p_g = 0.055$ indicated, is well within the limits allowed.

Substituting in the basic equation as transformed, for a check on the above results, we have

$$P = A_g\,(0.225\, f'_c + p_g\, f_s)$$
$$= 153.9\ (0.225 \times 2{,}000 + 0.055 \times 16{,}000)$$
$$= 204.5 \text{ kips}$$

The basic formula as originally given consists of two elements (1) the load carried by the concrete and (2) the load carried by the longitudinal reinforcement, or

$$P = P_c + P_s$$

For the assumed conditions of f'_c and f_s we then have

$$P_c = 0.225 \times 2{,}000\, A_g = 450\, A_g$$
$$P_s = 16{,}000\, A_s$$

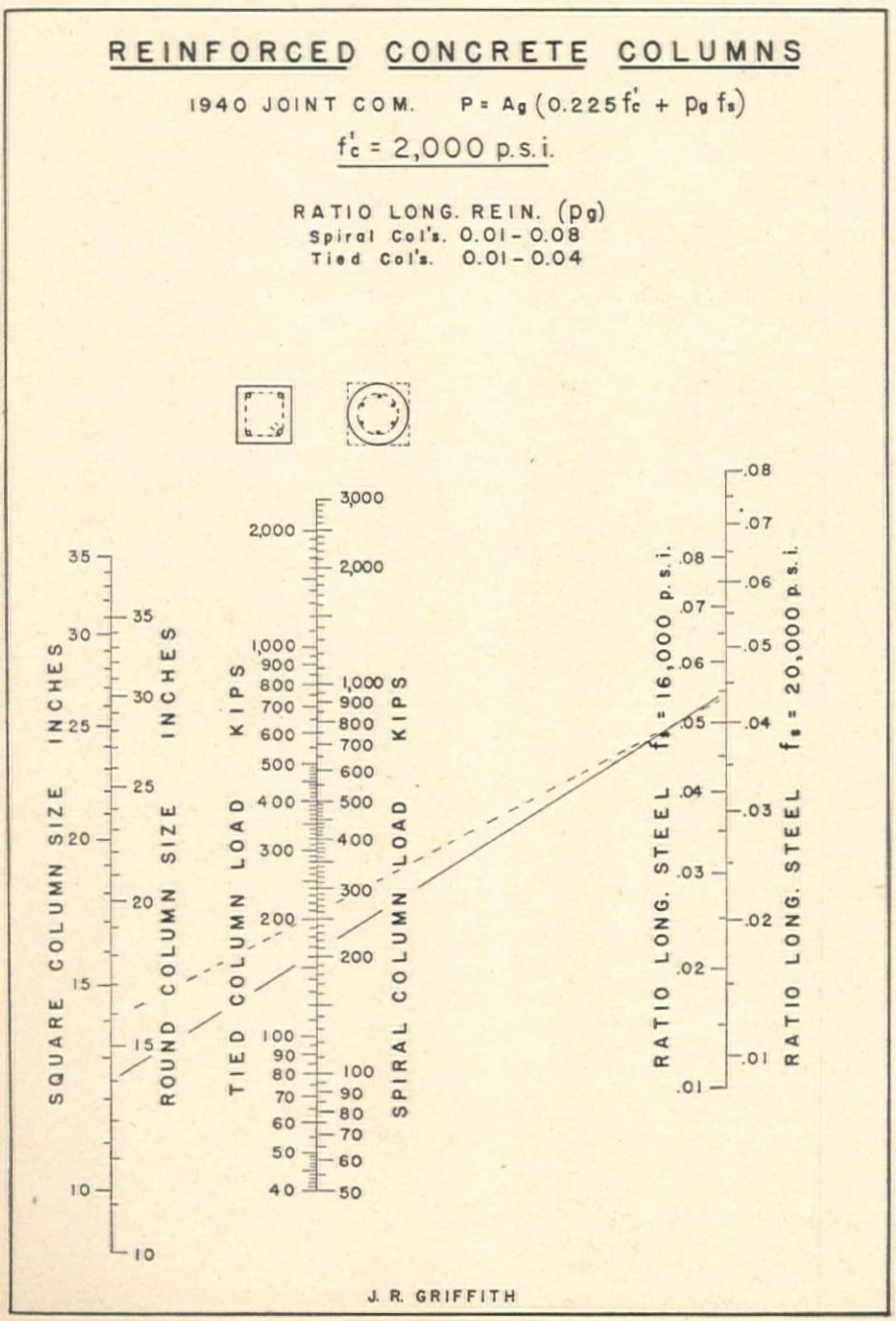
My own procedure is to use the chart to ascertain the size of tied or spiral column which will be necessary and a check on the range of (p_g). I then solve for the necessary area of steel by slide rule. For the assumed conditions I would then have

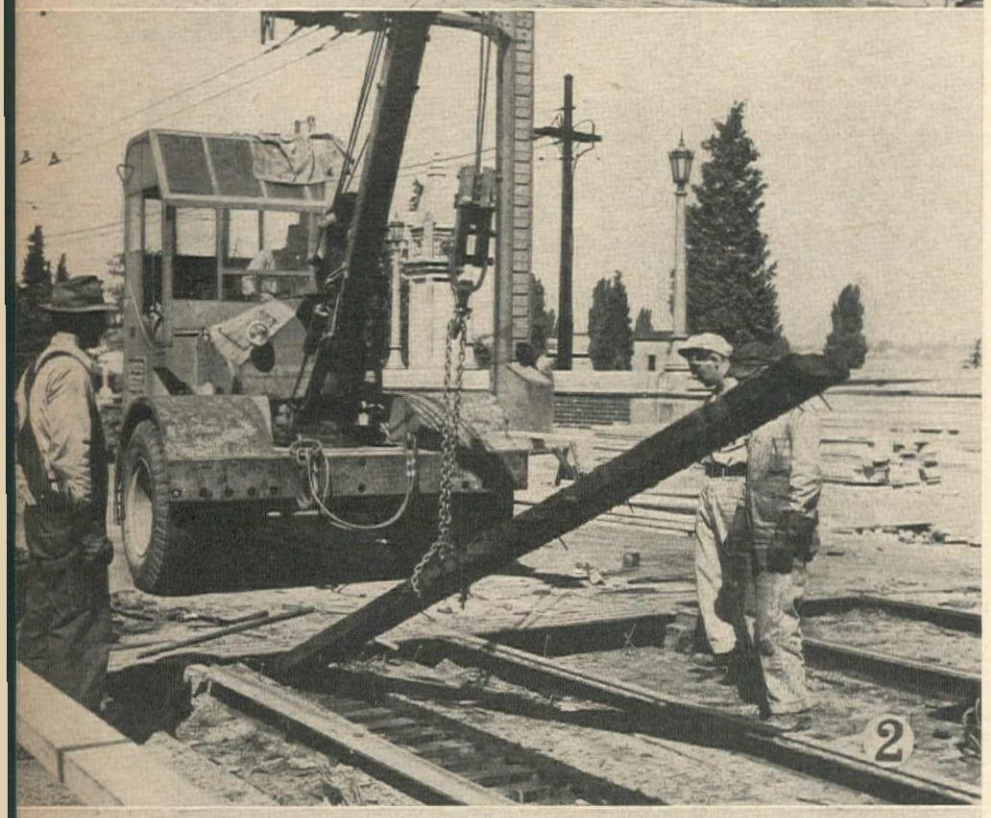
$$P = 205{,}000$$
$$\text{less } P_c = 450\, A_g = 450 \times 153.9 = \quad 69{,}200$$
$$P_s = 135{,}800$$

then by slide rule

$$A_s = \frac{P_s}{16{,}000} = \frac{135{,}800}{16{,}000} = 8.48 \text{ sq. in.}$$

$$\text{so } p_g = \frac{A_s}{A_g} = \frac{8.48}{153.9} = 0.0552$$





Seattle Wood Replaced with

Twenty-year old bascule span over Washington ship canal originally decked with wood blocks on timber planking and stringers—Wear from heavy traffic indicates new floor and steel grating is used as replacement, with virtually no change in weight of the leaves

THE OLD TIMBER deck on the Montlake bridge in Seattle consisted of nearly 17 in. of almost solid timber. It was part of the original construction, having been placed when the double leaf bascule structure was erected across the Lake Washington ship canal immediately south of the University of Washington in 1923. The deck consisted of creosoted wood blocks laid on two layers of creosoted wood planking which was supported on 8-in. creosoted wood stringers spaced very closely.

However, the steadily increasing flow of traffic and the wear from more than twenty years of continuous service, made it evident some time ago that a new floor was necessary. On Aug. 6, 1946, Hawkins & Armstrong, Seattle contractors, began the redecking work under a contract from the city. Total cost of the project was to be $43,665, including engineering and inspection costs.

1. The old deck as it appeared at the time construction was beginning, and sidewalks had been removed. The wood blocks had become unequally worn, resulting in a rough surface, and in some cases had been pushed out of proper alignment. The street car rails were no longer in service, all street cars having been replaced by busses or trolley busses.

2. Double-layer deck planking was barred loose and pulled free with the aid of a truck crane after the wood surface blocks had been barred off. Timber stringers were next removed, and existing street car rails, which had not been in use for a number of years, were also removed. Considerable thought and detailed engineering work was given to balancing the weight of the new deck to the weight of the old deck so that the counterweights would not have to be changed, and the bridge would open and close at the same rate of speed as before. In this connection, estimating the weight of the existing deck proved to be the chief problem. Estimates of the weight proved to be in error by about 6 or 7 lb. per cu. ft. as discovered when the first timber was removed and

Bridge Floor Steel Grating

weighed. The difference was attributed to traffic oil which had soaked completely through the wood blocks and formed a film between them and the timber planking during the 23 years that the decking had been in service.

3. Opening of the bridge during the construction period was required to maintain ship traffic in the canal. To permit opening at any time a system of temporary counterweights had to be provided to replace the decking removed. These consisted of two types, heavy concrete blocks and steel billets which were lashed in place at the extreme end of each leaf. During the construction period the bridge was closed to vehicular traffic, but pedestrians were allowed access at all times by a system of temporary timber walks. Steel stringers had to be built up to the level of the floor beams by I-beams welded longitudinally to the stringers with continuous fillet welds to prevent entrance of moisture between stringers and extensions.

4. Channels of uniform depth were arc welded to the stringer extensions and floor beams to support the new steel grating deck. Because the new deck was to be considerably lighter than the old, the timber walks were replaced by concrete walks as a means of increasing the weight of the new deck to approximate the original weight. By constructing concrete walks and curbs a uniformly distributed weight brought the redecked structure into approximate balance with the original weights.

5. Steel grating for the bridge deck surface, delivered in sections 26 in. wide, was placed on the supporting channels, aligned, and riveted to adjoining sections with a hand press. The grating was welded to the channels by a continuous fillet weld applied to every fourth longitudinal strip in the grating at every other channel. A total of 8,320 sq. ft. of grating was used to complete the deck surface.

6. Redecked bridge was opened to traffic on Sept. 27, fifty-one days after the start of the job. Weights of the redecked leaves were within 5,000 to 3,000 lb. of the original figures, fitting the existing counterweights so well that no change in speed of bridge opening and closing has taken place.

Harry H. Hawkins, partner of Hawkins & Armstrong, supervised the work for the contractor. Most of the work was performed under subcontract by Pacific Car & Foundry Co., Renton, Wash. Hall Cullop was field superintendent for the subcontractor. Design of the new deck was done in the engineering department of the City of Seattle. C. L. Wartelle is city engineer, and James Robertson, Jr., street maintenance engineer.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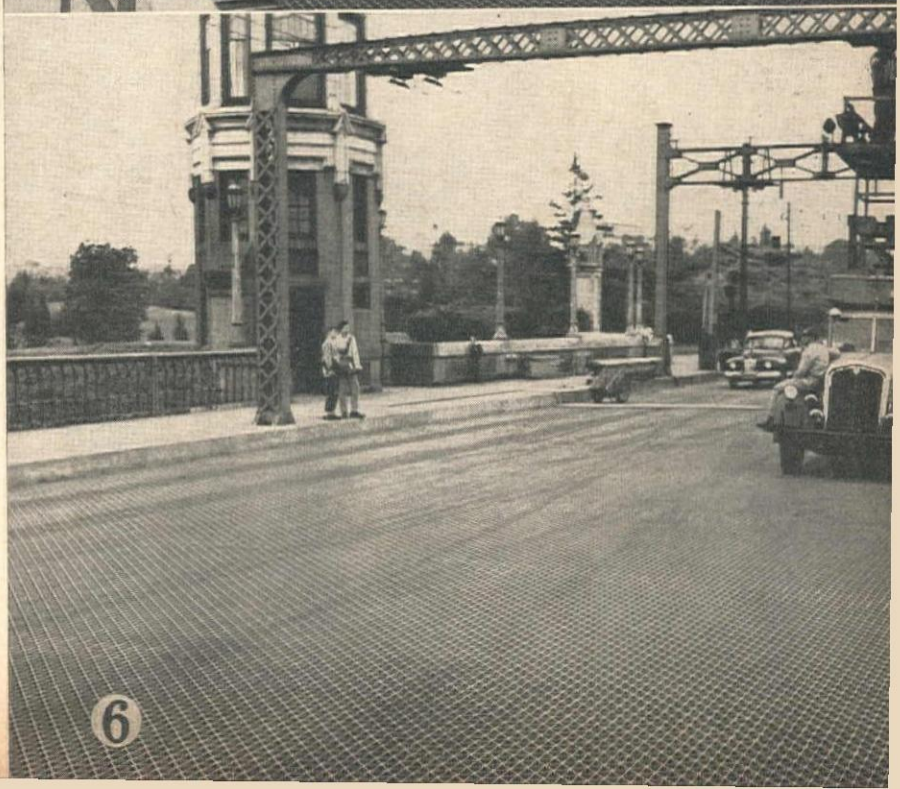
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Spring Bumper Fender Pile System

High loss of fender piles when used in rigid formation caused Navy to investigate use of springs or friction shock absorbers to afford lateral support — In plan adopted, the thrust is borne by a bolster which distributes it over all the units in the cluster of concrete bearing piles through gunited struts

By NORMAN B. GREEN
Structural Engineer
Los Angeles, Calif.

A SPRING BUMPER system installed during the war on several large piers at an important California Naval Operating Base has been very effective in preventing the breakage of wood fender piles. Prior to the installation of this bumper system, frequent maintenance work was required to replace fender piles broken by the movement of large ships berthed at the piers. This ship movement was produced by surge action and by wind pressure against the hull of the ship. Under storm conditions and when the surge was particularly severe, as many as twenty or thirty piles would be broken or seriously damaged at one berth in a single twenty-four hour period.

The piers concerned are heavy reinforced concrete structures 125 ft. wide, with a 2 ft., 3 in. thick flat slab deck supported in 45 ft. of water on concrete pile clusters spaced 27 ft., 10 in. c. to c. crosswise of the pier and 28 ft. longitudinally. The original fender system consisted of wood creosoted piles with a butt diameter of about 14 in. These piles were driven on 7-ft. centers with a 1 in 12 batter to a penetration of 10 ft. into the bottom. A top wale and blocking and a 12 x 12 in. continuous lower wale was provided at about half way between high and low water. Wood camel logs of a diameter of about 36 in. and 30 ft. long completed the fender system.

Faults of old system

In addition to the primary fault of inadequate bending resistance of the fender piles under the impact of a ship, experience demonstrated that there were several other secondary faults with this fender system. In the first place each pile was connected to the lower wale by means of a single bolt passing through the center of the pile and with its head and washer countersunk in the outer face. The center hole and countersinking weakened the pile so that it often broke at this point. The fender piles were further weakened by rubbing of the camel logs between high and low water, which in some cases wore away as much as two or three inches of wood on the face of the pile.

A further difficulty was experienced due to the fact that the camel logs were of varying diameter. On this account a single log, projecting several inches beyond its neighbors, would take more than its share of the impact load from the side of a ship, so that the fender piles behind it also were called upon to resist a greater load. The result was an uneven distribution of load to the fender piles along the pier.

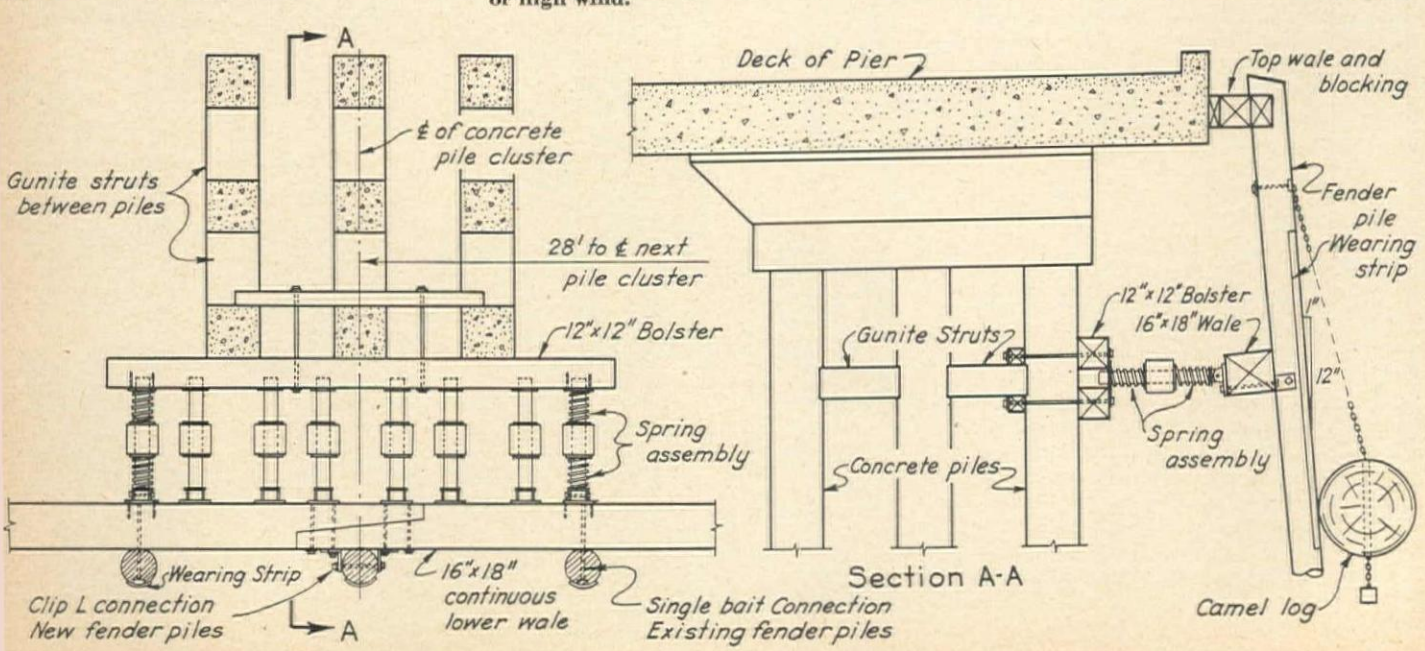
In regard to the primary fault of the fender system, inadequate bending resistance of the piles, it would have been possible to increase this resistance by driving additional fender piles. However, taking into account the severe nature of the damage to the piles it was not believed that sufficient increased resistance could be obtained in this manner.

Springs as alternative

The alternative was a system of springs or hydraulic or friction shock absorbers to afford the piles lateral support. Since the problem concerns the absorption of energy of impact, it is possible that shock absorbers would be more effective than springs, however the use of a suitable type of shock absorber was considered to be impracticable due to the added complication of the installation and the difficulty of maintenance. It was accordingly decided to use springs in conjunction with a heavy continuous lower wale to support the piles.

To provide an adequate margin of safety, it appeared that the strength and stiffness of the fender system should be increased by at least 200 per cent. To provide data for a design meeting this requirement, two fender piles were disconnected from the lower wale and tested in bending by applying a lateral load at the level of this wale and measuring the deflection. The table on the next page gives the results of this test.

The load deflection line is approximately straight to the ultimate load. The average stiffness of the piles is 1,700 lb. per in. of deflection. Since the piles are 7 ft. apart, the stiffness of the fender system was 240 lb. per in. of deflection, for each linear foot of pier. To obtain the required 200 per cent of increase, the springs should add a resistance of 480 lb. per in. of deflection per linear foot of pier. It will also be seen from the table that the deflection at failure for the stiffest of the two piles was 6.6 in. To develop the maximum resilience in the fender system and at the same time



PLAN AND SECTION of spring bumper fender system adopted by the Navy to reduce losses occasioned by big ships tied to piers bumping against the old rigid fenders during storms or periods of rough water or high wind.

PILING LOAD TEST RESULTS

Diameter of Pile at Butt	Diameter of Pile at Lower Wale	Length of Pile Butt to Lower Wale	Length of Pile Butt to Sand Bottom	Length of Pile Butt to Tip	Deflection lb. per in.	Breaking Load lb.	Maximum Deflection in.
14"	11.5"	9'-2"	59'	69'	1,400	15,500	11
13.5"	13.5"	9'-0"	59'	69'	2,000	13,200	6.6

prevent the breakage of piles, the spring assembly should therefore have a maximum travel between the unstressed condition and full closure of about 7 in.

The figure illustrates the spring bumper system that was employed and which meets the design requirements above established. In order to get the required maximum travel of 7 in. for the springs it was necessary to employ two springs in tandem for each assembly. It will be seen that a group of eight spring assemblies is placed at each of the clusters of concrete piles that support the pier. These pile clusters are 28 ft. between centers and since the spring constant of each spring assembly is 1,686 lb., the increased resistance provided is 480 lb. per in. of deflection per linear foot of pier. The reaction from each group of spring assemblies is transmitted through bolsters to the concrete piles supporting the pier. To avoid overstressing the three outer concrete piles due to this reaction, concrete struts are provided which carry a portion of the load to the inner piles. These struts were formed in place by the use of gunite so as to obtain perfect bearing and minimize shrinkage. All steelwork including the spring assemblies is galvanized and since the installation no trouble has been experienced from corrosion.

Other advantages

Other improvements are embodied in the new fender system to obviate the secondary faults above mentioned. Each new fender pile that was driven to replace a broken pile, is connected to the lower wale by means of a clip angle on each side of the pile, with a single bolt passing through these angles and the center of the pile. Since this bolt is on the neutral plane of the pile for lateral bending, it has practically no weakening effect.

To protect the fender piles from chafing on the camel logs, a ¼ x 8-in. steel plate is screwed to the outer face of the pile between extreme high and low water. These plates are bent to the curve of the pile. Due to this curvature it was found that the plates will break under repetitive bending of the pile unless each edge of the plate is notched to a depth of about 2 in. at intervals of about 18 in. To obviate the effect of the varying diameter of the camel logs, these were all removed and were sized to a maximum variation of one inch. Since these logs are prevented from rotating by means of a chain and weight, only the horizontal dimension need be sized.

The contract for this project was let in December 1943 to Warren Southwest Co., Los Angeles, and the cost of furnishing and installing the several items is as follows—lower wale including removal of existing wale $9.00 per lin. ft.; complete group of springs at a pile cluster, including bolsters and gunite struts, $750.00; wearing strips on fender piles $18.00 each.

The spring bumper systems were installed under the direction of the writer.

Reclamation Bureau Calls for Bids For Universal-Type Testing Machine

A CALL for bids for a five-million-pound universal-type testing machine has been announced by the Chief Engineer's office of the Bureau of Reclamation. The machine, which will be one of the world's largest, is to be installed in the new engineering laboratories of the Bureau, now under construction at a reconverted ordnance plant eight miles southwest of Denver.

Specifications call for a vertical, hydraulic testing machine with a capacity of five million pounds in both compression and tension. The new machine will accommodate compression or tension specimens up to 32 ft. long and will permit transverse testing of specimens up to 50 ft. in length. The completed machine is expected to approximate 70 ft. in height, about 20 ft. of which will be below floor level.

The testing machine will be equipped with a vertically movable, power-operated platform from which laboratory personnel can work, automatic graphic devices for recording load and elongation, and an intercommunication system with four stations: the pit, platform, control cabinet, and testing engineer.

The huge machine will be used principally in testing large drill cores from concrete structures, laboratory fabricated concrete specimens, structural steel, reinforcement steel, scale models of engineering structures, and will be adaptable to testing a variety of other construction materials.

Bids are to be opened at the Chief Engineer's office in Denver on Dec. 23.

Structural Engineers Hold First Convention Since 1941

THE STRUCTURAL Engineers Association of Northern California jointly held a three-day convention with the Structural Engineers of Southern California at the Biltmore Hotel in Santa Barbara, October 11, 12 and 13. Over 150 structural engineers and their wives attended the convention, which was the first held since 1941. A golf tournament was held Friday, Oct. 11, and on Saturday was an intensive business session, at which technical papers were read and structural engineering problems discussed. A banquet was held on Saturday evening, with William Jeffers, past president of the Union Pacific Railroad, as the principal speaker. He chose as his topic "A Structural Analysis of the American Foundation." This convention was the largest ever held by the Structural Engineers Association, and was considered most successful.

Santa Ana Association To Probe Water Supply

FORMATION OF THE Santa Ana River Water Association, which will investigate the adequacy of water supplies in the light of rapid industrial and population growth in Orange, Riverside, and San Bernardino counties of California, was announced recently. The association represents water suppliers of 69,000 ac. of the three counties.

The association's officers are J. J. Prendergast, Redlands, formerly chief engineer of the Bear Valley Mutual Water Company, president; Vernon C. Heil, Orange County Water District, vice-president; and John M. Mylne, Jr., Riverside, Gage Canal Company, secretary.

Directors include D. R. Gardner, J. C. Tuffree, and Heil, of Orange County; Mylne, W. R. Chawner and R. D. Kelley of Riverside County; P. B. Hasbrouck, Charles T. Paine, and Prendergast of San Bernardino County.

Purposes of the association are:

1. To make an investigation and report on the present and prospective use of waters from the Santa Ana River watershed and the amount obtainable from it.
2. To recommend action to avoid depletion of the supply.
3. To protect existing rights.
4. To protect irrigation water from pollution by industry or sewage disposal.
5. To make, in addition to the basic Santa Ana study, any water supply investigations bearing on the interests of the members that may appear to be necessary.

Ore. Reclamation Congress Met at Albany in November

OREGON RECLAMATION CONGRESS held its annual convention at Albany on Nov. 20-21 with the principal subjects under discussion being soil conservation, drainage, and irrigation. Those in attendance were told by Arnold Bottker, fieldman for the Oregon state production and marketing committee, that 800,000 ac. of otherwise non-irrigable land were in need of overhead sprinkler systems and nearly a half of these are readily available to water. Officers elected included Howard Turner, Madras, president; Henry Kopacz, Hermiston, vice-president; A. S. King, Corvallis, secretary, and La Salle Coles, Prineville, treasurer.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD

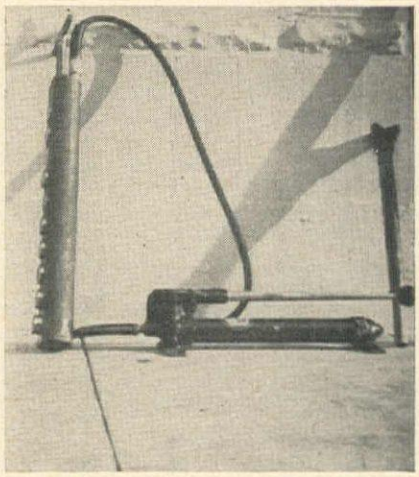
Multiple Hydraulic Jack Breaks Concrete and Rock

FOR REMOVING mass concrete structures such as gravity walls, engine bases, piers, footings and similar blocks, and in all demolition jobs where the use of explosives is prohibited, a hydraulic concrete and rock breaker has been developed in the West.

On alterations to existing outlet tubes at Friant Dam recently, these breakers were successfully used to remove 175 cu. yd. of concrete which was in the way of the required new construction. This contract was handled by Fred J. Maurer & Son, Eureka, Calif., and the work was supervised by Ira Wilkstrom for the contractor and K. O. Duncan of Los Angeles, the manufacturer of the device.

The tool is called the Duncan Rok-Jak and has been patented by Mr. Duncan. The original idea of a multiple jack is supposed to have originated in England, but the present development is much improved over anything originating in that country. It consists essentially of a chrome nickel steel bar 3 in. in diameter and 24 in. long, planed on one side, and a spring feather or equalizing shim provided to take the place of the removed material.

Over the full length of the bar equally spaced, are ten ports, each 1⅝ in. in diameter and 2 in. deep, connecting with a hole 3/32 in. in diameter running the length of the bar. Into each of the ports is fitted a piston machined to an accuracy of .002 in., and on the pressure end of these is a replaceable neoprene cup. From the upper end of the 3/32-in. hole, hose connections lead to a hand-operated, high pressure hydraulic pump which applies oil pressure equally on all the pistons. With this hydraulic pump, a total thrust of over 100 tons can be generated.



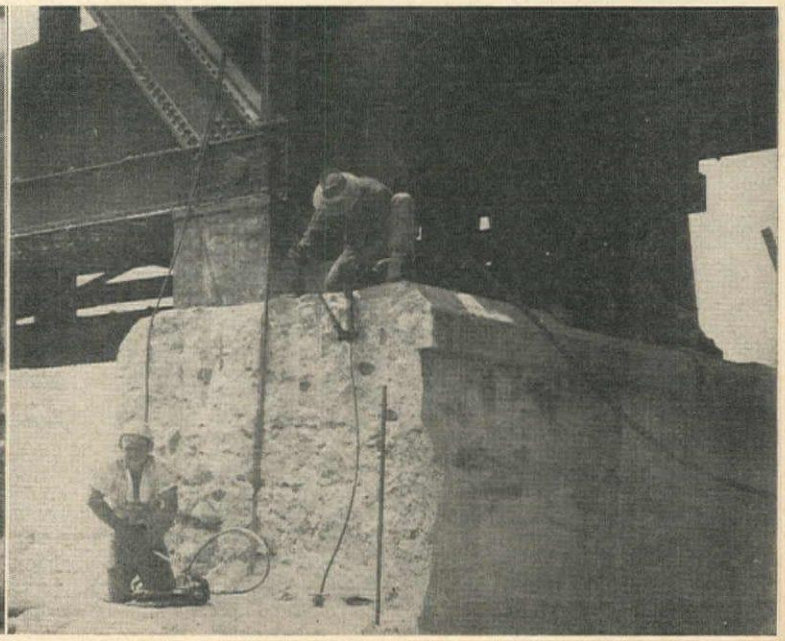
THE ROCK JACK, above, and the hydraulic pump which furnishes the pressure. Not shown is the equalizing shim which is inserted in the drill-hole to assure an equal pressure from each port of the jack. Below, a 4 x 5-ft. granite block is broken into thin slabs by the jack, right, and left, the old concrete is broken off the pier of the Santa Fe bridge over Rio Hondo, near Los Angeles, using two of the devices (only one shown).

To use the tool in concrete or rock, a hole 3½ in. in diameter is drilled into the block to a depth of 24 in. Inside this hole the tool is placed, and the equalizing shim is lowered to cover the pistons, thus assuring an even pressure over the full depth. When the pressure is subsequently applied by the pump, a clean, even break is secured as shown in the accompanying illustrations.

Usually not more than two jacks are required in removing large masses of material. In the case of alterations to the piers of the Santa Fe Railway's Rio Hondo bridge near Los Angeles, two of the tools were employed by Winston Bros. Co., the contractors, and a fine clean break was obtained. In another instance, granite rock was split into 4 x 5-ft. slabs by the use of only one jack.

It is believed by the manufacturer that the machine has other uses, such as lifting of heavy weights or large masses, splitting large logs, breaking of ice, and others, but so far the principal value has been in the breaking of concrete and rock. Most installations in the Southwest have been made under the personal supervision of the manufacturer.

Inquiries concerning the use or purchase of the rock jack will be forwarded by *Western Construction News* to the manufacturer.



Pipes Thawed Using Welding Equipment

THE USE of electric welding equipment to thaw frozen water pipes has been practiced successfully by a number of plant owners during the past few winters. Welding equipment offers advantages over other electrical means because it is self-regulating and can be accurately controlled. In addition, it is being put to good use in a season when it might otherwise remain idle, according to a General Electric Co. release.

No special equipment is necessary for doing this work other than reliable pipe clamps for making firm electrical connections. Strap-type clamps of copper, having ample section to carry several hundred amperes, are desirable. C-clamps may be used to clamp cable terminals directly to the pipe where necessary. A file, rasp, or abrasive cloth may be used to remove zinc oxide, rust, paint, and grease to assure a good contact. Cable should never be wrapped around the pipe as a connection, since it is practically certain to loosen, and may cause hazardous sparking.

The connections to the welding generator are made in the ordinary way with the work lead and electrode lead both connected to the pipe on opposite ends of the frozen section so that the heat generated in the pipe wall by the passage of current will thaw the ice in the pipe. The method of getting at the pipe will vary in almost every case, but for economy, it is desirable to get as close to the frozen portion as is feasible without excessive digging.

While the proper current for thawing pipes has been established as between 200 and 500 amp., the time needed to complete the job varies greatly according to the size, length, kind, and location of the pipe, condition of the surrounding soil, extent of the freeze, and temperature of the air.

Where welding sets are to be operated at less than 80 per cent of their ampere rating, the operation can be continuous. That is, a 400-amp. DC set can be operated continuously at 320 amp. without damage. Likewise, a 500-amp. transformer can be operated at 400 amp. continuous. The sets may be operated at their maximum output for intermittent periods up to 15 min. if sufficient time is allowed for return to normal temperature.

When using arc welding equipment for thawing purposes, there are a number of precautions which must be observed. If a good, low-resistance joint is not obtained between the copper cable and water pipe, excessive heat will be generated at the connection. If the current is allowed to form an arc at this point, it may damage the pipe.

Care should be taken to select the correct amount of current where there is known to be lead in the service pipe, because lead pipes will stand less current than iron. The pipes should be disconnected from the building piping before the wiring so that the current has only one path in which to travel—through the section which is frozen. If this is not done, where other devices are grounded to the water pipes the ground wires may burn out and cause a fire, since the grounding connections will be raised above earth potential.

In using single-operator DC sets, two points should be noted. The low load voltage will result in the possibility of unusually heavy currents on the lower taps. Since these taps are designed to carry the low currents which will be drawn at normal operating voltages, the result may be to overheat portions of the series field. This can be avoided by setting the units on the highest tap and lowest open-circuit voltage which will give the desired current.

In addition, the low load voltage should be considered in making an estimate of the current setting required. Since load voltages in the neighborhood of 5 or 6 volts will often be encountered, the output current on any setting will be as much as 1½ times the current which would be drawn by a welding arc. With transformers, however, the current drawn by the load will be very nearly that indicated on the nameplate.

As a final precaution, the resistance of the joints in the pipe should be determined. If the joints are insulated by rust or pipe dope, a spark may start a fire.

TABLE I—THAWING DATA

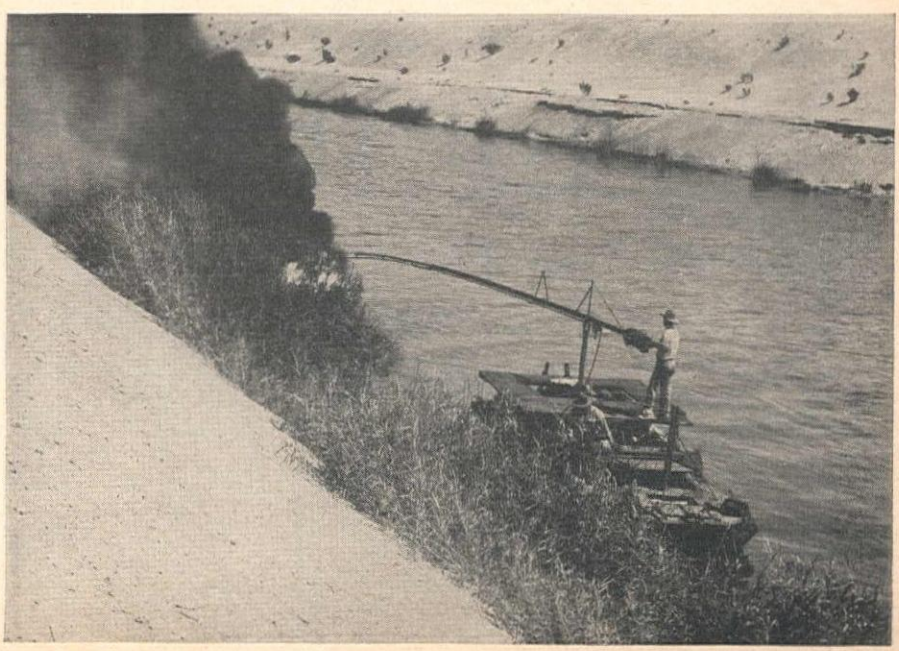
Pipe Diameter in Inches	Recommended Amperes	Approx. Minutes to Thaw	Recommended Cable Size	Resistance per 100 ft. Cable
¼	75	15	No. 6	.0395
½	125	20	No. 2	.0156
¾	200	20	No. 0	.00984
1	250	30	No. 00	.00780
1½	300	30	No. 000	.00619
2	350	40	No. 0000	.00491
4	600	75	400,000 cm	.00270
6	800	120	600,000 cm	.00180

TABLE II—OHM RESISTANCE PER 100 FT.

Pipe Diameter	Wrought Iron	Steel	Copper Tubing	Lead	Cast Iron Class A
½	.026	.0198	.00824	.0234	
¾	.0202	.01485	.00445	.01371	
1	.0138	.0100	.0034	.00984	
1½	.00842	.00618	.00208	.0064	
2	.00625	.0046	.00133	.0053	
4					.0092
6					.006

SEA-GOING WEED BURNER RIG USED ON ALL-AMERICAN CANAL

A WEED BURNER, similar to those described in Western Construction News, November issue, has been mounted on a war-surplus "duck" by Bureau of Reclamation crews to clear vegetation from the banks of the All-American canal, feeder canal for the vast Imperial and Coachella Valley irrigation projects in southeastern California.



NEWS OF WESTERN CONSTRUCTION

DECEMBER, 1946

San Diego Votes to Annex to Metropolitan Water District

THE SAN DIEGO County Water Authority was annexed to the Metropolitan Water District of Southern California by a decisive 14 to 1 vote of the people within the Authority at the November 5 election. The territory includes the cities of San Diego, National City, Chula Vista and Oceanside; the La Mesa, Lemon Grove and Spring Valley Irrigation District, the Lakeside Irrigation District, and the Fallbrook Public Utility District.

In that portion of the district outside of the city of San Diego voters approved the following three proposals:

1. Annexation to the Metropolitan Water District.
2. Assumption by the Authority of a contract existing between the U. S. Navy and the city of San Diego, which contract sets forth the financial terms under which the Navy is building an aqueduct to connect with the Metropolitan aqueduct at the west portal of the San Jacinto tunnel.
3. A $2,000,000 bond issue to finance construction of feeder lines to convey Colorado River water from the new aqueduct to the several constituent areas of the Authority.

In the city of San Diego two additional propositions were approved:

4. Merging San Diego's Colorado River water diversion rights with those of the Metropolitan Water District. San Diego has contract rights under the Colorado River Compact for diversion and use of 155 sec. ft. from the river. The Metropolitan District has rights to 1,500 sec. ft.
5. Assignment of the City-Navy contract to the Authority.

Cities and unincorporated areas in the Authority have a population of nearly 500,000 and an assessed valuation of $268,000,000. This raises the total population served by the Metropolitan Water District with water from the Colorado River to nearly 3,000,000 and total assessed valuation of land within the District now amounts to $2,681,000,000.

Under the law the San Diego Authority will be entitled to two representatives on the Board of Directors of the Metropolitan Water District, which will raise the total number on the board to twenty-one.

The San Diego aqueduct now being constructed by the Navy is about 60 per cent complete and will probably be in operation about the end of 1947. It is 71 mi. in length and terminates at San Vicente reservoir of the city of San Diego water system. Total cost will approximate $19,000,000.

COLORADO RESURFACES MOUNTAIN HIGHWAYS WITH ROADMIX MAT

DURING THE SUMMER, the Colorado State Highway Department used five Adams Motor graders to resurface black-top highways in the state. Shown here are two of the machines operating on U. S. Highway 6 east of Loveland Pass. The process is to scarify the old mat, pulverize it with a disc, mix and lay it out with the graders, add a sealcoat and fine chips spread with a spreader mounted on a grader, then roll with a smooth roller. The crew rebuilt 1 to 1½ mi. of road per day.

Navy Commissions Engineer Officers

A PROGRAM for direct commissioning of civil engineers into the U. S. Navy has just been inaugurated. These officers are to be selected from both service and civilian sources. The appointments are for the rank of Lieutenant (junior grade), Civil Engineer Corps, U. S. Navy (regular). The Office of Naval Officer Procurement anticipates that a majority of the candidates applying will be demobilized military personnel who may now desire a permanent commission in the Regular Navy, but it is emphasized that the program is open to civilians of all categories, as well as to those still in active service.

Since appointments will be determined on merit as well as officer ability, examinations will be required, and selection made on that basis. The following are those qualifications posted by the Navy Department in considera-

tion for a commission. Some latitude is provided those candidates who fulfill or partially satisfy some of the requirements, but are deficient in others. Waivers may be extended where noted:

(1) Be a graduate of an accredited college or university with a scientific degree in engineering.

(2) Have had three years professional experience in engineering or related active military service (not in a student status). Those who are engaged in such professional work or military service at the time of application and who will have completed the required 3 years by 1 July 1947 will be accepted.

(3) Be not less than 22 nor more than 30 years of age.

(4) Be a native born or naturalized male citizen of the United States for at lease ten years.

(5) Be physically qualified by standards set forth for officers of the U. S. Navy.

(6) Establish mental, moral, and professional fitness, as well as aptitude for the service by means of interviews, college and employment records, and written professional examinations.

Many Veterans Select Engineering in College

NEARLY ONE out of every 10 veterans enrolled in educational institutions under the G. I. Bill selected engineering as his training objective, according to a Veterans Administration survey of veterans in school at the end of the first half of 1946.

Of the total of 612,690 veterans in classrooms on June 30, 57,241—or 9.34 per cent—were enrolled in engineering courses.

Over 54,000 were attending institutions of higher education, while 2,832 were in vocational schools and 181 in secondary schools.

By Sept. 30, the total number of veterans in school under the G. I. Bill rose to 742,064. Veterans are eligible for education under the G. I. Bill if they saw 90 days or more of active military service, part of which was after Sept. 16, 1940, and were discharged under conditions other than dishonorable.

Contracting Firm Is Selling Stock to the General Public

MORRISON-KNUDSEN CO., INC., Boise, Idaho, one of the largest, if not the largest contracting firm in the world, is also one of the few in which a financial interest can be purchased by the general public. A few months ago they completed arrangements for a sale of stock, and that stock is now being offered by an investment banking group headed by Blyth & Co., Inc. Offerings to the public include 70,000 shares of 5 per cent cumulative convertible preferred stock at $50 per share, and 249,550 shares of common stock at $15.

McClure, New Mexico Water Authority, Dies

Thomas Mero McClure, 52 year old New Mexico state engineer and authority on surface and underground water, died of a heart attack November 5, at the San Juan Community Hospital in Farmington. McClure had been state engineer since 1933, serving previously with the State Highway Department. In 1935 he was vice-president for New Mexico in the National Rivers and Harbors Congress; had served as secretary of the State Planning Board; and was, at the time of his death, secretary of the State Board of Registration for Professional Engineers and Land Surveyors, and the New Mexico Interstate Streams Commission. He was a member of the State Flood Commission, the National Reclamation Assn., Rio Grande Compact Commission, Pecos and Costilla Compact Commissions, and served as vice-president, at various times, of the Association of Western Engineers.

Texas Gas Company Seeks Pipe Ahead of Russia

THE DELIVERY of 183 mi. of twenty-inch pipe to the Russian Government at this time would delay the construction of the West's own "Big Inch," a 1,200-mi. pipeline that would carry natural gas from west Texas and New Mexico to California (*Western Construction News*, August, 1946), according to Paul Kayser, president of the El Paso Natural Gas Company of Texas.

Kayser filed suit on Oct. 21, 1946 for an injunction to prevent the A. O. Smith Corporation of Milwaukee, Wis. and Houston, Tex., from delivering the pipe to the Russian Government before the El Paso company's $54,000,000 order is filled.

The Russian Government planned to take over an order for pipe which the United Nations Relief and Rehabilitation Administration canceled. This U. N. R. R. A. order was not placed with the Smith Corp. until Dec. 1945, or Jan. 1946, Kayser said, while the Texas company's order was placed on Aug. 6, 1945. He believes that the Russians should be required to take their place in line as if they were placing an order now.

City Water Department Will Construct Sewer

CONSTRUCTION of a sewer in Walla Walla, Wash., will be performed by the city water department as the result of a failure by the city council to secure bids on the project from contractors. Although the city had on hand sufficient materials to complete the line, no bids were received for the work. In an effort to secure a bid the time for submission was extended an additional day after bids were to have been opened on the contract.

Western Communities Receive Planning Funds From FWA

DURING THE PAST month additional planning funds were advanced to Western communities by the Federal Works Agency, Bureau of Community Facilities. These funds are provided by the Federal government to assist in drawing up plans and specifications, but they do not constitute a grant. They must be repaid without interest when construction is begun. Recent Western advances were as follows:

California

San Benito County High School District was allotted $19,500 for a shop and music building estimated at $174,675; San Dieguito High School District has received a loan of $11,250 for high school additions at Encinitas, estimated cost $261,600; San Joaquin County has been granted $5,290 for elementary school gymnasium and classroom additions, estimated to cost $97,640; San Jose Unified School District was allotted three advances: $8,050 for an elementary school, estimated cost, $154,050; $12,600 for the first unit of a new technical high school, estimated cost, $259,290; and $7,000 for the second unit of the new high school, estimated cost, $126,200; San Luis Obispo High School District has been advanced $25,000 toward the construction of a new junior high school, estimated to cost $570,000; San Luis Obispo School District was granted $7,500 for an elementary school, estimated to cost $167,000; Santa Maria has received $3,000 toward estimated $81,000 water distribution system extensions; Strathmore Public Utility District has been advanced $5,300 for preparation of plans and specifications for a sanitary

sewer system at Strathmore, estimated to cost $116,510; Tamalpais Union High School District was allotted $35,130 for a high school classroom unit at Mill Valley, estimated to cost $633,330; Trinity County has been advanced $3,300 for plans for a sewage collection system and treatment plant at Weaverville, estimated to cost $60,000; Tulare City Schools have received a loan of $9,600 for an elementary school, estimated to cost $175,300.

Colorado

Center was advanced $6,400 to design sewer system extensions including treatment plant and pump station, estimated cost $116,682; and Lafayette received $3,000 to design a sanitary sewer system, estimated to cost $87,000.

Idaho

Boise was granted an advance of $3,000 to assist in planning a city shop and warehouse building, estimated to cost $75,000.

Kansas

Jewell was allotted $1,200 to assist in planning of street improvements and drainage structures, estimated to cost $22,800; St. Francis received $1,350 to design water distribution system additions which will cost $37,310; Wakeeney was advanced $3,300 to assist in planning a sanitary sewage collection system and treatment plant, which will cost $89,830.

St. Francis was allotted $1,314 for extensions to its sanitary sewage collection system, estimated to cost $361,411.

Montana

Browning was given two advances: $1,769 for planning water system improvements estimated at $40,211, and $1,315 to design sanitary sewer system extensions, to cost $29,900; and Ronan was advanced $6,100 to lay out street improvements which will cost $132,710.

Nebraska

Brady was loaned $1,650 to plan a sanitary sewer system and treatment plant, estimated at $45,534, and $1,500 to design a complete water works system, to cost $40,262; Brule was allotted $1,900 to plan a sanitary sewer system and treatment plant, probably costing $52,140; Madrid received $1,900 also to plan a sewer system, which will cost $52,401; and Wallace received two advances: $1,700 for a water works system, which will cost $46,490, and $1,950 for a sanitary system, to cost $53,928.

Brule has received $1,380 for the preparation of plans and specifications for a complete new waterworks system, estimated to cost $43,306; Elm Creek School District was granted $2,000 toward an estimated $52,730 auditorium-gymnasium; Guide Rock has been allotted $3,011 for a new sanitary sewage collection system and treatment plant, estimated to cost $82,536.

Gordon has received two allotments: $1,204 for planning sanitary sewer extensions, which will cost $32,815, and $1,148 to lay out water distribution extensions, estimated to cost $31,778.

New Mexico

Roy was loaned $2,200 to assist in planning water supply and distribution system extensions including wells, pumps, tanks and pipelines, estimated cost $67,000.

North Dakota

Dickinson was granted five advances: $1,080 for a sanitary trunk sewer, estimated to cost $39,600; $1,344 for extensions to water distribution and sewage collection systems, estimated to cost $48,640; $1,845 for elevated storage tank and water main extension, estimated to cost $67,275; and $7,599 for a water treatment plant and supply lines, estimated to cost $273,465; McClusky received $759 for extensions to sewer and water systems, estimated to cost $27,800.

Oregon

Multnomah County School District was advanced $3,600 to design a grade school addition at Russellville, which will probably cost $93,000.

South Dakota

Roscoe has been granted $2,547 for a new waterworks system, including a deep well supply and elevated storage tank, estimated to cost $57,038.

Texas

Bellevue received $4,140 to design both a water system and sanitary sewer system, to cost in all $115,520; Cockran County was granted $9,300 for planning remodeling of the courthouse at Morton, estimated to cost $273,707; Edna Independent School District was allotted $3,350, to design a gymnasium and cafeteria, estimated to cost $120,690; Goldthwaite School District received $3,000, to plan a school addition, estimated at $83,500; and Littlefield was awarded an advance of $7,200 to design about 113 blocks of asphalt street paving, with curb and gutter, estimated to cost $264,400.

Utah

Midvale received an advance of $1,500 to plan a culinary water reservoir which will cost $43,000; Ogden was granted $30,000 to design a sewage treatment plant, which will probably cost $1,500,000; Salina was granted $1,750 for planning sanitary sewer improvements, to cost $58,300; Salt Lake County received two advances: $25,000 toward planning sanitary sewer extensions which will cost $1,028,164, and $3,800 to design a community building at Draper, which will cost $106,000.

Washington

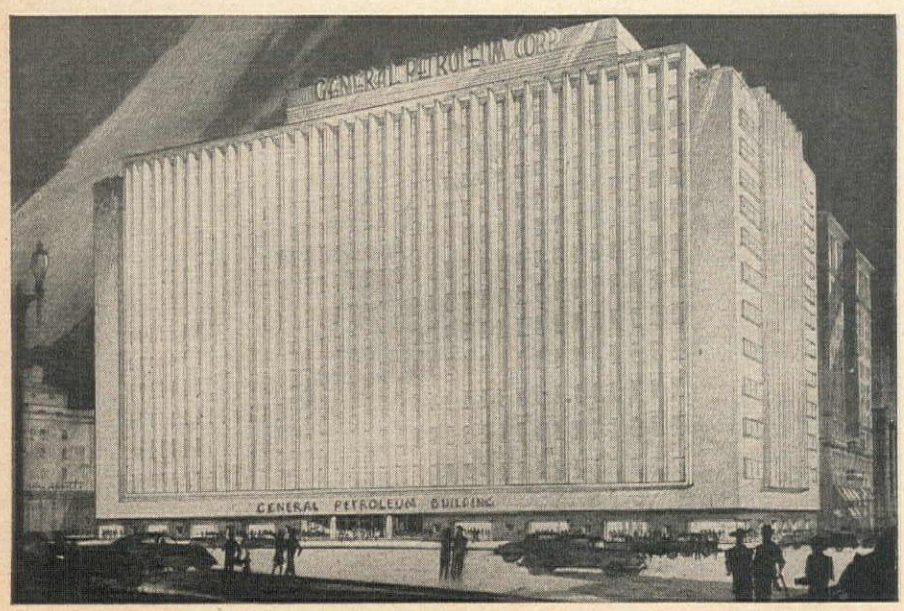
Concrete received an advance of $4,833 to plan a sanitary sewer system and treatment plant, estimated cost $138,938; and Naches was allotted $5,550 also to plan a sewer system and treatment plant, estimated to cost $113,814.

Hawaii

Hawaii County has been granted two advances for school buildings: $30,000 for an elementary school at Laupahoehoe, estimated to cost $642,000; and $26,000 for a high school at Kohala, estimated to cost $561,000; Kauai County has received two advances: $34,000 for a tuberculosis hospital at Lihue, estimated to cost $646,850; and $7,000 for a nurses' home at Lihue, estimated to cost $130,750; Hawaii County was also allotted $2,500 for water system improvements at Papailou, estimated cost $52,500; $2,500 for water system improvements at Pepeekeo, estimated cost $52,500; and $8,000 for a water system, including intake, storage tanks and pipe lines at Ahualoa-Kaapahu, estimated to cost $183,000.

GENERAL PETROLEUM CORP. TO ERECT NEW BUILDING IN LOS ANGELES

A HEIGHT-LIMIT building will soon be erected on Flower St., for the entire block between Sixth Street and Wilshire Blvd. in Los Angeles by General Petroleum Corp., according to a recent announcement. The estimated cost is $5,000,000 and construction will start about July, 1947. P. J. Walker Co. will be the contractors. Approximately 450,000 sq. ft. of floor space will be gained in the 13-story structure.



WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—The little man who wasn't there had nothing on the Congress which comes into Washington in January. The nation doesn't know anything about it, but it is a fact that the Clerk who calls to order the new assembly on the first day of the session is **not** the Clerk; and the Speaker who takes over and swears in the Members of the House is not the Speaker; and in literal fact the sworn Congressmen who go into business the first hour are not Congressmen. Many of them undoubtedly sincerely think they are, and they go through all the motions of formal authentication, but it is a curious and almost unknown truth that no one has yet devised a way by which the first session of the new House can bring itself into existence under double-copper-riveted certainty of completely assured compliance with constitutional formality.

Every two years the entire membership of the House is newly elected. Every Member is literally a new Member, no matter how long he or she may have served in previous sessions. This is the 80th session, a new session with no continuing formal tie connecting it with the previous sessions. All actions pending in the 79th Congress, all unfinished business of the 79th Congress, dies when that Congress dies on the midnight of Jan. 2, 1947. Every iota of business that comes before the new Congress is new business, no matter what it may be. Every Member, no matter if it is his first appearance on the scene or his tenth or twentieth, must again swear his allegiance to the Constitution.

There being no continuing organization of any kind which laps over from the 79th to the 80th Congress there is logically no official who has the authority to call the unsworn members to order. As a matter of expediency the man who was Clerk of the former Congress actually does the job, but since he is not the Clerk of an organization which has any real existence he actually performs much like the little man who wasn't there in the song. And from this running start out of nowhere with nothing as a foundation in the absolute sense, he guides these very substantial ghosts to the point where they nominate and choose a Speaker; and the Speaker, who also literally is not the Speaker, then causes the unsworn members to take the oath, and thus by a system of fudging, which is strikingly characteristic of so much that goes on in our political consistency—or inconsistency—the lower House of the Congress insinuates itself into existence.

Why some one has not worked out a manner by which the thing can be done beyond peradventure of a doubt, is one of those mysteries which make this Capital fascinating. Obviously it would be possible for a Senator to come over and swear in the potential Clerk, or the senior Member of the party taking over the new Congress; or by some other method which would launch the proceedings from a formal basis of assured certainty.

There have been times when it has been troublesome and embarrassing. Once in earlier days, when a new Congress came in on the House side, a debate arose during the first hours which became highly acrimonious. The newly designated Speaker tried to intervene. But some of the Members were veterans and knew the ropes. They challenged his status as Speaker, and he had to take it and like it, and tacitly acknowledge he could not intervene nor rule with authority. The debate ran along on this basis most of the day, without any real control of the proceedings.

The reorganized Congress

The same spirit of cute and slick suppleness appears in the manner in which the conditions of the Monroney-LaFollette Reorganization Act unquestionably will be imposed on the new Congress, although the House in all likelihood really means to defer proceedings under the terms of the reorganization.

Here is how the banana peel was hidden. As you know, the Reorganization Act telescopes a number of Committees, Senate and House, so as to reduce the overall count. The theory is that the overworked Members of Congress will have more leisure, probably leisure to look after the fences at home. Each Congressman would have only two assignments. Today he has anywhere from four to six. It keeps him busy signing the reports written by the technical people employed to do the work. Of course the more documents his name is attached to, the greater his opportunity to win acclaim. The prospect of limited name-signing is not popular. The incoming Congressmen, old and new, therefore are discontented with this reorganization.

The Steering Committee, which is doing the preliminary work, thinks the reorganization should stick. Apparently it thinks that what the incoming people don't know won't hurt them. Consequently they are not explaining what will happen when some old-timer pops up at the January session and moves that the rules and procedures of the last Congress be adopted as the regulations for the new Congress. What they do not know is that this motion will bring the Reorganization amendments into force, for these reasons: the Reorganization Act provides the changes shall be effective as of Jan. 1, 1947; as you have learned, the present, 79th Congress, does not fade out until midnight Jan. 2; therefore, any regulations or orders which become effective Jan. 1, 1947, apply to this present Congress; and when some innocent and well-meaning Member of the House, properly primed, gets up on his feet and moves that the rules of the last Congress shall apply to the 80th Congress, he is unwittingly putting the new Reorganization regulations into effect. But if he moves the reorganization rules shall be tabled for the time being, and the regulations in force previously to its adoption shall govern the new Congress, he will accomplish what he has in mind. There is a good deal of sentiment that these reorganization terms should be thoroughly explored and considered before they are accepted; it is quite likely therefore that some informed Gentleman from Somewhere will arise and suggest the brakes be applied, and that the House continue to function for a while on the historic basis.

All this does not affect the Senate. The Senate always retains at least two-thirds of its prior membership. It is, therefore, a continuing organization.

West loses friends

The situation is important to the people of the West because the reorganization inevitably will reduce its opportunity to retain even some of its terribly slimmed Committee representation. The Republican victory sharply cuts down the number of Westerners in places of power on Committees important to the interests of the West.

For instance, the House Committee on Appropriations is the bottleneck through which all funds must pass before they are made available. Representative Taber, N. Y., will be the Chairman of the new Committee. He is bull-voiced, and bull-spirited. He has absolutely no use for the appropriations for reclamation, irrigation, rivers and harbors, flood control, and the public works important to the West. Under his influence they will be greatly reduced, possibly largely eliminated. He has already announced he will cut appropriations for Government press agents to the vanishing point.

Either Congressman Jones, Ohio, or Congressman Jensen, Iowa, is slated to head the subcommittee on Appropriations for Interior, which obviously includes the potential allocation of funds of interest to the West. Both Jones and Jensen are very unfriendly to the present gods in the machines of Reclamation and other units of Interior. The House Committee on Public Works and Flood Control will probably be headed by Congressman Dondero, Mich.; and the House Committee on Public Lands, including Irrigation, Reclamation and Indian Affairs, would be headed by Congressman Short, Mo.

Congressman Charles Wolverton, N. J., would take the place of Congressman Clarence F. Lea, Calif., as head of the Committee on Interstate and Foreign Commerce; Military Affairs Committee will probably go to Congressman Walter G. Andrews, N. Y.; Naval Affairs to Congressman W. Sterling Cole, N. Y.; Post Office and Roads to Congressman Fred A. Hartley, N. J.; Ways and Means to Congressman Harold Knutson of Minnesota. And the all-powerful Rules Committee would be headed by Leo E. Allen, Ill.

On the Senate side the West scarcely fares much better. Sen. Wallace H. White, Jr., Maine, would be chairman of the Interstate Commerce Committee; Sen. Styles Bridges, N. H., becomes head of the Senate Appropriations Committee; Naval Affairs, Charles W. Tobey, N. H.; Post Office and Post Roads, Clyde M. Reed, Kans.; Agriculture, Arthur Capper, Kans.; Sen. Gurney, S. Dak., Interior subcommittee on Appropriations; Public Lands, Sen. Millikin, Colo., or Butler, Nebr. Sen. Reverscomb would be the Chairman of the Committee on Public Works. Sen. Millikin is the only prospective member of the Upper House who is from the Far West, and who is slated for some important Committee. At least (the very least), 90 per cent of the work and decisions of Congress are reached in these Committees.

It is patent the West is unhappily shorn of the means to be directly effective in the 80th Congress, unless the Westerners, who have some influence in the politics of the nation, get busy and bring to bear the pressure which will give the Western Senators and Congressmen a better representation. Seniority has something to do with this; but powerful influences exerted by those who know their way around probably have more.

Construction funds

Meanwhile, those funds frozen by the President undoubtedly will be quietly permitted to unfreeze and go into circulation through the Bureau of Reclamation, the U. S. Engineers, and other sources. It is possible some announcement may be released by War Mobilization Director Steelman; the probabilities, however, are that little will be said about it, but that the relaxation will occur without benefit of much press-agentry. In fact, most of the Reclamation funds have already been turned loose; and the Rivers and Harbors and Flood Control funds are expected to be freed in December without benefit of ballyhoo. The purpose is to start as much work under these appropriations as is possible before the new Congress comes in. After the 80th Congress takes over it is expected the flow of funds will swiftly dry up. Apparently not less, and possibly more, than 20 per cent of the taxes will be cancelled.

The Budget, both from the White House and the Hill, entirely leaves off irrigation, flood control, navigation, public roads, and other public works. Next year's—1947 to 1948—budget roughly totals $30,537,000,000, parcelled out to National Defense, Public Debt Interest, Veterans' Pensions and Benefits, International Finance, Agriculture, and Civil Departments. The $20,000,000,000 in cuts specifically mentions "unnecessary construction programs."

Miscellaneous

Incidentally, Interior Department apparently has come to a realization that it is unwise to draw unnecessary attention to itself. Without much fanfare, Reclamation Commissioner Mike Straus has been travelling about his principality, while William Warne has been Acting Commissioner. Straus slipped back into Washington quietly late in November.

The Geological Survey reports the run-off of southern Columbia River tributaries continued above normal, but flow of the Upper Columbia tributaries was deficient. It reports the highest flow for October in the Salmon River in Idaho for 34 years. Rainfall in Utah and Nevada was the greatest in 74 years. Drought in Arizona is reported to be over; but the flow of streams in the Colorado Basin above the Grand Canyon is reported to be subnormal.

Commerce Department recently issued a statement predicting "a high level of construction for another two years at least, but what happens after that will depend upon many factors that cannot now be accurately weighed. Current rising construction costs can retard the building boom. But these indications are not of overriding importance in view of the unprecedentedly large backlog of demand."

Public Roads Administration reported late in November that plans completed for Federal-Aid and State Highways and highways in National Forests and other Federal areas are estimated to cost $754,000,000, and aggregate 14,383 mi. Plans in process of preparation for 32,488 mi. of highway will cost $1,822,000,000. Upwards of 27,000 mi. of the Federal-Aid system is reported to be urgently in need of resurfacing or relocation. The work practically ceased during the war. Federal-Aid contracts awarded from Jan. 1, to Oct. 1, 1946, total $450,154,000 for 16,125 mi. of road. Total contracts awarded by State highway departments for 39,864 mi. of road amounted to $650,419,000. The average project was 4.6 mi. long.

CAA will announce in December the complete National Airport Plan which will list the class and general location of the airports to be built the next three years. These are designed for the most immediate needs. Only the airports in this list may be given Federal aid; but the fact that the airport is listed does not constitute a guarantee that the aid will be supplied. Airports listed, and for which aid will be provided, must be supported by a formal expression of interest from the community proving willingness to participate. During Christmas week, or early in January, CAA plans to announce the program for the fiscal year ending June, 1947. The airports which will receive aid during the next three years will be published. After the CAA announces a grant of funds the local agency is authorized to advertise for bids and to award contracts. CAA suggests the program should enable most localities to start construction in spring. No work on large terminal fields, Class 4 and 5 projects, will be included in the first list.

State Department has announced that 850 citizens of the Philippines will be trained by eight agencies of the United States under the terms of the Philippine Rehabilitation Act. The agencies include the Public Roads Administration, which will add ten engineers to its staff for the work; the Corps of Engineers, U.S.A.; the Public Health Service of the Federal Security Agency; the U. S. Maritime Commission; the Civil Aeronautics Administration; the Weather Bureau; the Coast and Geodetic Survey of the Department of Commerce; and the Fish and Wildlife Service of the Department of the Interior. State Department also has announced the establishment of the Philippine-American Financial Commission, to study the financial and budgetary problems and needs of the Philippine Government.

Bay Bridge Traffic to Retire Bonds by 1952

ON NOVEMBER 12, 1936, the San Francisco-Oakland Bay Bridge was first opened to traffic. Long before dawn on that date thousands of motorists lined the streets and highways leading to the east and west approaches of the span in order to be among the first across the bridge.

During the first year of operation, the daily average number of vehicular crossings was about 25,000. The use of the bridge increased steadily during the next three years, with a sharp increase during the first two years of World War II, reaching a peak during the autumn of 1942, when for several months the daily average number of vehicular crossings exceeded 60,000. With the extension of gasoline rationing to the Pacific Coast in December, 1942, bridge traffic suffered a sharp drop. The first month after V-J Day, traffic jumped to 71,000 a day and with slight variations has continued at that level.

In ten years of operation, the bridge has carried 166,910,000 vehicles, 191,440,000 interurban train passengers, and collected approximately $58,377,500 in tolls. Vehicular tolls amounted to $54,562,700 and train passenger tolls to $3,814,770.

The bridge was originally financed by the sale of revenue bonds in the total amount of $73,000,000 to the Reconstruction Finance Corporation. In addition, an allotment of $6,600,000 was granted from the State Highway Fund to be used for the construction of the bridge approaches, subject to the requirement that after the redemption of all revenue bonds, this amount would be refunded to the Highway Fund out of toll collections.

In 1939 a refinancing was effected and a new issue of 4% bonds in principal amount of $71,000,000 was sold. The specified redemption date of the last of these bonds was 1976.

The large volume of bridge traffic and the consequent increase in income, coupled with changed conditions in the securities market, made it advisable in 1944 to consider another refinancing of the debt. On May 22, 1944, the sale of $56,000,000 principal amount of revenue bonds at an average interest rate to maturity of 1.96613 per cent, effected a saving of $5,097,000 in interest costs.

Under the new bond issue, the last redemption date is Sept. 1, 1962. However, should revenues continue at the 1946 level, all outstanding bonds will have been retired by 1952.

Embankment Record Set At Anderson Ranch Dam

PLACEMENT OF CLAY in Anderson Ranch Dam near Mountain Home, Ida., has been halted for the winter, Construction Engineer Donald S. Walter notified Regional Director R. J. Newell of the Bureau of Reclamation. The embankment is 96 per cent complete, he said, with only about 360,000 cu. yd. of material of the 9,053,300-cu. yd. total remaining to be added.

The Regional Office of the Bureau said that approximately 2,890,000 cu. yd. of material have been added to the structure during the year by the Morrison-Shea-Twaits-Winston Co., contractor. The record year was highlighted by placement of the most material in a single month and in a single day. During September, 423,000 cu. yd. were added to the structure and on Sept. 18, a new high was reached with 20,680 cu. yd. for the day.

After Dec. 1 only necessary maintenance and minor other work will be done because of lack of funds for the project. Congress allotted $1,234,475 in the regular appropriations bill and later added $802,206 in a supplemental appropriation. Nearly all of the funds made available have been used to maintain orderly progress on the embankment.

Considerable work remains to be done on the spillway and other appurtenances. About 65 per cent of work on the spillway is completed, 83 per cent on the outlet works, 61 per cent on relocation of roads, and 64 per cent of the reservoir clearing. Excavation for the foundation of the powerhouse has started.

In announcing the shut-down of clay-placing activities, Walter said that the two-mile long conveyor belt which has been used to carry clay from the Dixie borrow pit would be dismantled as soon as possible. The remaining clay requirement probably will be transported by trucks next spring.

Anderson Ranch Dam when completed will be the highest earth-fill dam in the world and will store 500,000 ac. ft. of water to supplement existing supplies in the Boise Valley. The dam provided 80,000 ac. ft. of storage this season and will make available 135,000 ac. ft. next year. Power facilities at the dam will have an installed capacity of 40,500 kw. The dam also will provide flood and silt control.

Work on Kennewick Project Recommended by Bureau

RECOMMENDATION by the Bureau of Reclamation regional office at Boise to the Denver headquarters that the bureau proceed with construction of the $9,330,000 Kennewick highlands irrigation project in south central Washington has been made according to reports from Washington, D. C. The Kennewick project is a division of the Yakima project, and plans call for the irrigation of about 21,000 ac. on the west side of the Columbia River west of Pasco.

Construction Under Way on New U.A.L. Maintenance Base at San Francisco

CONSTRUCTION of United Air Lines' new maintenance base is under way at San Francisco, where United expects eventually to concentrate all its airplane maintenance activities.

Designed to incorporate the most streamlined ideas in airplane maintenance and overhaul, the two-story steel and concrete building will be 480 ft. long and 260 ft. wide, located north of United's present administration and hangar buildings at San Francisco Municipal Airport. Three new hangars, each 130 by 130 ft., are also planned. Design and construction is by the Austin Company, Oakland, Calif.

Maintenance and engineering facilities at San Francisco will be increased from the present 125,000 sq. ft. to almost 500,000 sq. ft. by 1955. By the same year, United's San Francisco maintenance personnel will have increased three-fold to approximately 3,000 persons.

Scheduled for completion early next fall, the new building will house mechanized engine overhaul shops, machine shops, instrument and radio shops. It will have space for cabin overhaul, sheet metal repair, plating facilities and offices.

United plans to make San Francisco the hub for maintenance of its entire fleet. At the present time, United's twin-engined Mainliner 180's (DC-3's) are overhauled at Cheyenne. Maintenance of four-engined equipment is already centered at San Francisco.

OBITUARIES . . .

Chester Hogue, nationally known to the lumber trade and to the engineering profession for decades, died at his Seattle home on November 4, at the age of 71. He had long been recognized as one of the foremost authorities on the characteristics, properties and uses of wood. In 1917 he joined the staff of the West Coast Lumbermen's Association and served as manager of the Portland branch and as New York manager, retiring from active service in January, 1946. Hogue was a life member of the American Society of Civil Engineers, and a member of the American Railway Engineering Association, the American Society for Testing Materials, the American Wood-Preserving Association, and many other engineering groups.

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Henry E. Stone, 58, former building inspector for Grants Pass, Ore., died in that city on Nov. 12. He had served as city building inspector for two years prior to his resignation this year.

* * *

Ernest E. Gray, one-time assistant city engineer of Seattle, died there on Nov. 14. At the time of his death he was associated with the Union Oil Co.

Martin Pardon Crandall, 53, construction foreman of Springville, Utah, died unexpectedly of a heart attack October 31, while on a construction job in Provo. Crandall had been employed by the Greer Construction Co., of Provo, for four years, and before that time had been employed as construction foreman for various other companies.

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Henry H. Ferguson, 62, project engineer for the Federal Public Housing Agency, Seattle, died Nov. 13 in Sheridan, Wyo. A native of Iowa, he had lived in Seattle two years prior to his death.

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Otis Fowler of Albuquerque, foreman for the Skousen Construction Co., was hit by a truck while he was on a road job west of Santa Fe. Fowler suffered a fractured skull and died en route to a hospital on October 21.

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Andrew H. Campbell, 62, general contractor of Seattle, died at his home Nov. 5. He came to the Pacific Northwest from Michigan forty years ago and had been engaged in contracting through the entire period. At the time of his death he was associated with the Siems-Spokane Co. of Spokane.

PERSONALLY SPEAKING

The California Region headquarters of the U. S. Forest Service has selected **William F. Fischer,** supervisor of the Cleveland National Forest at San Diego, to be the first supervisor of a recently created national forest with headquarters at Eureka, Calif. Fischer has served the Forest Service since 1933 at the Plumas, Tahoe, Mono and Shasta National Forests. He will be succeeded by **Hamilton K. Pyles** as supervisor of the Cleveland Forest.

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Irving C. Harris was recently appointed construction engineer at Shasta Dam. He is in charge of all work at Shasta and Keswick dams and on the Oroville-Sacramento transmission line. Under Harris' direction the dams will be completed and the remaining turbines, generators, and other facilities will be installed. This portion of the Central Valley Project is under the administrative supervision district manager **James K. Carr** at Chico. Harris was formerly director of power at Boulder Dam and transferred to Shasta Dam as senior engineer in 1941.

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H. Arthur Hook, veteran of nearly 20 years service with the C.A.A. and its predecessor organizations, has been appointed Deputy Assistant Administrator for Airports. He will serve in Washington under **Charles B. Donaldson,** Assistant Administrator for Airports, in the management of the federal government's share of the billion dollar airport program. Hook has been assistant administrator of the C.A.A.'s sixth region at Santa Monica, Calif., where he served as administrator while **Joseph Marriott** was in active military service.

Colonel Frederick K. DuPuy has been retained to prepare Sonoma County's Master Airport plan. This plan is to include long range airport facilities for Santa Rosa, Petaluma, Cotati, Sonoma, Glen Ellen, Valley of the Moon, Healdsburg, Geyserville, Cloverdale, Sebastopol, Bohemian Grove, and Guerneville, California. DuPuy, who is also Airport Engineer for William P. Kyne's Bay Meadows Airport, Napa County, and numerous other post-war airports, expects to complete the Sonoma County plans at an early date in order that this important county may take full and prompt advantage of available federal funds in the National Airport Program.

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R. Gail Baker, an authority on water engineering, is now city engineer at Phoenix, Ariz. He is also street superintendent. Baker is a member of the municipal water commission and is a consultant for the Arizona State Land Commission working on the Colorado River project. He was formerly an engineer on all of the Salt River dams except Roosevelt Dam. **J. Lee Chambers** of the city engineering staff has been acting city engineer for the last several months and will now resume his former position.

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Sidney P. Lathrop, formerly associated with various contractors in Portland, has formed the organization of Sidney P. Lathrop & Associates, which will provide engineering services for architects and builders. Lathrop was employed by Parker Schram Co., general contractors, from the time of his graduation from Oregon State College in 1934 until 1941.

After serving the California Highway Department Testing Laboratory for 22 years, **O. J. Porter** has gone into private consulting practice in Sacramento, Calif., doing business under the firm name of O. J. Porter & Co. At present he and his associates, **W. H. Jervis** and **H. R. Cedergren** are consultants on Stockton Army Air Field, Guam, and other runways, dealing with 200,000-lb. wheel loads.

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William E. Trommershausen is manager of the Bonneville Power Administration's Southwestern district office at Eugene, Ore. He succeeds **Chesley Brazil,** who has taken over as administrative officer of the Division of Power Sales & Services in Portland. Trommershausen was formerly electrical engineer in the administration's Upper Columbia district office at Spokane, Wash. As southwestern district manager, he will supervise Bonneville Power Administration operations in 14 Oregon counties.

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William S. Wagner, deputy in the Wyoming State Fish and Game Commission, chief of the control division, Seattle Engineer District of the U. S. Engineers, has been transferred to the Sausalito, Calif., headquarters of the Western Ocean Division Engineer Office. He will serve for the army engineer office that directs military construction and supply for the Honolulu, Okinawa and Manila Engineer Districts.

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Clarence C. Davis, engineer with the operations division of the Portland, Ore., District Engineer Office, has been called to active military duty with the U. S. Engineers. Davis served as a lieutenant-colonel in the Mediterranean and European theaters before returning to the Northwest last February. Since that time he has been engaged in construction planning of the Detroit and Meridian dams.

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Henry Altman is now civil engineer with the Manila Engineer District, Western Ocean Division, U. S. E. D. at Malolos, Bulacan and Luzon, in the Philippine Islands. He is resident engineer on a radio transmitting station being built for the U. S. State Dept. It is to be the largest transmitting station in the Orient. Altman was formerly with the 361st Engr. S. S. Regt., in ETO, the Philippines and Japan.

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John W. Miles, assistant to the chief of the engineering section, Portland district, U. S. Engineer Department, has been recalled to active service with the Corps of Engineers and attached to the Army Air Forces. During the war Miles supervised construction of air bases in Mexico, England, France, and Belgium. He will return to the service at Mitchell Field, N. Y., with the rank of lieutenant colonel.

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Allan J. Wagner, Capt., C.E.C., U.S. N.R., has been placed on the inactive list after nearly six years active service in the Navy. He returns to his former position as construction engineer for the F.P.H.A. in San Francisco, Calif. Capt. Wagner was formerly officer in charge of construction at Mare Island Navy Yard, at Norfolk, Va., and at Pearl Harbor, T. H.

NEW DIRECTORS of the California Associated Concrete Pipe Manufacturers, who held their annual convention in Fresno in November are, Standing, l. to r.: A. M. HERMAN, Concrete Conduit Co., Colton; FRANCIS PORTER, Lindsay Cement Products, Lindsay; HUGH POLLARD (Sec.-treas.), Pollard Bros., Ltd., Fresno; L. S. STROUD, Stroud-Seabrook, Bakersfield; L. L. DOBBINS, Fewell Concrete Pipe Co., Garden Grove; FRED N. LINN, United Concrete Pipe Corp., Modesto; C. V. WHALLEY, California Concrete Products Co., San Jose. Seated, l. to r.: H. W. CHUTTER, (Pres.), Jourdan Concrete Pipe Co., Fresno; G. D. WILLIAMSON, Valley Concrete Pipe & Products Co., Phoenix, Ariz.; and O. H. PRICE, Healdsburg Concrete Pipe Co., Healdsburg.

In the reorganization of the Utah Power & Light Co., a new board of twelve directors was elected: Newly elected: **H. A. Benning,** Ogden; **Fred A. Moreton,** Salt Lake City; **Charles Redd,** La Sal. Re-elected: **George R. Corey, George M. Gadsby, J. A. Hale, Lafayette Hanchett, R. H. Jones, Malcolm A. Keyser, Stephen L. Richards,** Salt Lake City; **E. G. Bennett** and **Fred M. Nye,** Ogden. **George R. Corey** is vice-president and secretary of the company.

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Frederick B. Farquharson, professor of structural engineering at the University of Washington, returned to Seattle last month after a three-months' inspection tour of Europe and attendance at two engineering conferences in Paris, France. Reconstruction of bridges and other damaged structures in Holland, Belgium, and France is progressing favorably, he reported.

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Hoffman & Alexander, consulting engineers of Boise, have been retained to design a new municipal airport for the city of Twin Falls, Idaho. **Paradice & Lash,** architects of Twin Falls, will prepare designs for the airport buildings. Total cost of the project is estimated at $500,000.

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Francis E. Downey is now chief Navy field auditor for the U. S. Navy on Guam, M. I. He supervises resident auditors on NOY contracts on the islands of Guam, Anguar, and Wake. Downey was formerly staff assistant to the corporation controller at Consolidated Vultee Aircraft Corp., San Diego, Calif.

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Robert A. Duff has been elected chairman of a professional engineers' club organized at Medford, Ore., last month. Membership of the organization includes registered engineers from Ashland, Grants Pass, and Medford. Other officers include **C. V. Signor,** vice-chairman; and **James K. Hooey,** secretary-treasurer.

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Alexander Nolte, formerly general manager and chief engineer of the Argonaut Engineer Corp., Inc., and during the war with the Corps of Engineers in Portland, Ore., is now senior architect for the U. S. Occupation Force in Korea, at the Headquarters of the XXIV Corps of Engineer Technicians.

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Carl B. Wirsching, commissioner of the Los Angeles Board of Public Works, has been appointed City Manager of Long Beach. He succeeds **Samuel E. Vickers** who has held the position for the past two years. Wirsching is retiring from the Board of Public Works position.

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Lewis J. Workman has returned to the Bureau of Reclamation as Irrigation Engineer. He was formerly located in Bogota, Colombia, S. A., as chief designing engineer for Parsons, Brinkerhoff, Hogan & MacDonald, consulting engineers on hydroelectric developments at Manizales and Medillin.

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Robert G. Brinkerhoff is now an inspector for the U. S. Bureau of Reclamation at the Columbia Basin Project, Ephrata, Wash. He is working on rock and earth excavation for the West Canal. Brinkerhoff was formerly with District VIII of the California State Division of Highways.

Harris A. Thompson, formerly with the Sperry Gyroscope Co., Garden City, N. Y., has accepted the position of assistant professor of electrical engineering at the University of Colorado. Also appointed to a similar post at the University is **Willis G. Worcester** who was formerly associated with the General Electric Co. in Schenectady, N. Y.

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Carl Leo Stetson, Jr., has accepted a position with the Los Angeles Turf Club, Lake Arrowhead Division, as engineer on an extensive land development project. Stetson served with State Water Resources for nine months following his discharge from the Army.

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Claude Baker has been appointed sanitary engineer for Douglas County, Oregon, with headquarters in Roseburg. He is the first to hold the position, which has just been created. During the war, Baker served with the Corps of Engineers at Ladd Field, Alaska.

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Murel M. Starr is construction engineer of the Tucumcari, N. M., irrigation project under construction by the Bureau of Reclamation. Starr has served the Bureau on various engineering assignments in Carlsbad and Tucumcari since 1936.

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H. M. Anundson, structural engineer, has opened a consulting office in Seattle. Prior to the war, Anundson was on the staff of the Oregon State Highway Commission for ten years, and during the war was on the Kaiser Co. staff at Swan Island.

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Hubert K. Bishop, a former deputy commissioner of the Public Roads Administration and well-known highway engineer, has joined the American Road Builders' Association as manager of the County Highway Officials Division and the Municipal Division. Bishop succeeds Major John A. Long who resigned last summer.

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R. M. Black is the new city engineer of Winnemucca, Nev. He is now on terminal leave from the service, and for many years prior to the war was employed by the state highway department. One of the first projects to be undertaken by Black will be the survey of city streets and culverts.

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Joseph P. McNulty, utility engineer for the Colorado Public Utilities Commission, submitted his resignation to the state civil service commission, saying there were "more opportunities for advancement elsewhere." McNulty is taking a position with the U. S. civil aeronautics authority at higher pay.

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Arthur J. Mahoney, structural engineer of Seattle, has resigned from the organization of Engineering Associates to take charge of the structural engineering department of the General Engineering Co., Inc.

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Perry A. Thompson, veteran member of the Forest Service, U. S. Department of Agriculture, and chief of the division of fire control with headquarters at Washington, D. C., is now regional forester for the California Region. Thompson succeeds **Stuart Bevier Show,** who recently became deputy director of the forestry division of the United Nations Food and Agriculture Organization after 20 years in charge of the national forests in California.

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H. S. Donnelly, formerly engineer with the Washington State Highway Department at Tacoma and Olympia, has been appointed county engineer for Ferry County, Washington, with county seat at Republic. Donnelly succeeds **B. O. Bendixen.**

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Joseph R. Blunt, Portland, Ore., for the past twenty-five years closely identified with the lumber industry in Oregon and Washington, has been named manager of the Washington, D. C., office of the West Coast Lumbermen's Assn.

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Harold Enderlin has established U. S. Soil Conservation Service headquarters in the California Fruit Bldg. in Sacramento. Enderlin recently received a Letter of Commendation from the Chief of Naval Personnel.

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Joe P. Haley is location engineer for the Washington State Highway Dept. on the location of 40 mi. of the Pacific Highway between Castle Rock and the Thurston County line. Haley works out of Chehalis, Wash.

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R. H. Corey, consulting engineer of Portland, has been retained by the city of Redmond, Ore., to prepare plans for the construction of a new water filtration plant there.

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Wayne W. Whitcanack, a former engineer with Montana state water conservation board, has been appointed as an engineer with the land acquisition division of Region 6 of the Bureau of Reclamation with headquarters at Billings, Mont.

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Ben R. Chandler, bank manager of Coos Bay, Ore., has been appointed a member of the Oregon State Highway Commission to succeed **Merle R. Chessman,** newspaper publisher of Astoria, Ore.

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J. A. Sonne is now connected with Kistner, Curtis & Wright, Los Angeles. He was formerly a practicing structural engineer in San Francisco.

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E. J. O'Neill, representative of the International Equipment Co., has been appointed warehouse manager for Morrison-Knudsen Co., at Vitaro, Brazil.

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John G. Collins has returned to the U. S. Geological Survey in Sacramento after having been in Washington, D. C. since 1942.

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Wm. W. Campton has a leave of absence from the Bureau of Reclamation in order to complete his college education. Campton was formerly an engineer with the bureau.

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V. G. Horton is the new construction superintendent in charge of the California Division of Water Resources flood control maintenance.

SUPERVISING THE JOBS

AT RIVERDALE overpass being constructed by Gibbons & Reed Co. south of Ogden, Utah, the contractor's personnel includes, standing, l. to r.: WILLIS MOODY, grade foreman; DEAN STRAW, equipment foreman; DOUGAL YOUNG, assistant superintendent; JACK CANNON, assistant office manager; A. W. BEEBE, office manager. Bottom, l. to r.: C. M. TAYLOR, Highway Department engineer; SETH ATKINSON, carpenter foreman, and JOHN NAZARK, chief mechanic. See article, page 78.

Leonard & Slate of Oregon, Ltd., and E. C. Hall Co., Portland, hold the $1,248,249 contract from the U. S. Engineers Office for relocation of the Oregon, Pacific and Eastern Railroad, Market Road No. 30, and the Cottage Grove Municipal Water Supply Line, which at present are located inside the reservoir area to be formed behind Dorena Dam which will be constructed on the Row River near Dorena. The project is a portion of the Willamette Valley flood control plan. Key men for Leonard & Slate are: **Leonard A. Runkle**, general superintendent; **Evan E. Anderson**, assistant superintendent; **W. E. Miller**, excavation foreman; **Ted T. Patnoe**, clearing foreman; **Jules Ringsmeyer**, engineer; and **W. E. Terry**, office manager. E. C. Hall Co. key men are: **Donald Hall**, general superintendent; **Ray Schrader**, job superintendent; **Harold Gilmore** and **Don Montgomery**, Schrader's assistants; **Dale Loftin**, plant foreman; and **Tom Miller** and **Jack Roach**, grade foremen.

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C. L. Peck, contractor, holds a contract for the construction of a store building at Crenshaw and Santa Barbara in Los Angeles. The contract calls for one story, basement, and penthouse, 150′ x 150′. **A. G. Buchanan** is general superintendent of the company and **G. W. Bauer** is general superintendent for the job. **L. M. Hill** is project manager. Other key men are: **D. Querner**, carpenter foreman; **W. M. Goozey**, steel foreman; **Bob Siens**, labor foreman; **J. D. Higgins**, office manager, and **W. B. LaMotte**, assistant office manager.

K. C. Smyth is general superintendent for the construction of a store building at the same intersection in Los Angeles, which is being built by Peck for Von's Market. The $325,000 contract calls for one story and basement, 175′ x 151′. It will be the largest market in southern California. **George Paul** is steel superintendent, and **A. Downing** is steel foreman. Other foremen are: **W. M. Ferguson** and **G. E. Turney**, carpenter; and **C. B. Hansen**, labor. **J. A. Scherer** is office manager, **E. G. Freestone** is detailer, and **D. L. Colbert** is expeditor.

George I. Terry is general superintendent on the construction of a store building at the same location in Los Angeles, being built by Peck for the Mervin Glass Co. **George I. Terry** is job engineer, **Lee** and **Joe Nethercott** are carpenter foremen, **Jack Brown** is general labor foreman, and **William Paett** is labor foreman.

The fourth building being constructed by Peck at the Crenshaw and Santa Barbara intersection is for Broadway Dept. Stores. **Chas. F. Stafford** is general superintendent, **A. B. Standard** is general carpenter foreman, **Bob Ball** is labor foreman, and **Al Frazer** is concrete foreman. **S. E. Young** is office manager.

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P. M. Morris is general superintendent for Wm. Simpson Co. on the construction of an office and warehouse located at 855 No. Cahuenga in Hollywood, Calif. The project is being built for the Chas. Bruning Co., Inc., Engineers' Supplies. **G. L. Dobbins** is assistant superintendent, **E. B. Armijo** is labor foreman, and **A. J. Rempel** and **Ardell Hickman** are carpenter foremen for the job. **C. C. Simpson, Jr.**, is office manager and **John E. Krieg** is assistant office manager. **D. B. Dunsmore** is inspector. The contract calls for one story and a mezzanine floor.

N. M. Ball Sons, Berkeley, will grade and surface 4.6 mi. of highway between Schilling and Shasta, Shasta Co., Calif. The $494,627 award was made by the Division of Highways at Sacramento. Key men on the job are: **Milton L. Simpson**, general superintendent; **Russell Webster**, job superintendent; **Andy Anderson**, master mechanic; **George Elliott** and **William Pressly**, grade foremen; **M. A. Baker**, engineer; **Wm. Beatty**, labor foreman; **Lawrence Gill**, oiler foreman; **James Lester**, powder foreman; **Jewel Mayes**, parts foreman; **Hugh Murray**, office manager; and **Drury Elder**, state resident engineer.

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Mark E. Haney is general superintendent for the M. E. Nelson Construction Co., Ephrata, Wash., who have just completed the sewer lines and streets for Ephrata Heights, the city's newest addition. The company has also been working on stock piles at Loomis, Omak, and Conconully, Wash. **M. E. Nelson** is company president and **D. R. Nelson** is assistant superintendent. Other key men are: **Harold Haney**, general foreman; **Howard Taylor**, engineer; **Dick Smith**, crusher foreman; and **Frank Carpenter**, welder.

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W. D. Janetzky is general superintendent on 3.5 mi. construction on highway 99 north of Merced, Calif. The job is being done by the Gunner Corp. for the State of California. **Merle W. Ellis** is resident engineer, and **S. T. Moody** is assistant superintendent. Foremen for the job are: **C. E. Jasper**, grade; **Harold H. France**, hotplant; **L. H. Blair**, rockplant; **Sam Chuk**, labor; **A. B. Littlejohn**, carpenter. Other key men are: **G. Davidson**, building superintendent; **Herb Gramatky**, office manager; and **N. E. Borgquist**, timekeeper.

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J. S. Clary is general superintendent on the construction of steamplant foundation piles at Redondo Beach, Calif., being built by the Raymond Concrete Pile Co. for the Southern California Edison Co. **Matt Reardon** is assistant superintendent. **Whitey Stanley** and **Carty Freese** are pile driver foremen, and **Howard Dunford** and **Bill Benson** are concrete foremen. Inspectors are **H. L. Sweet** and **G. M. Watters. George C. MacNeilage** is office manager. The contract calls for 2500 35′ piling for a 187′ x 261′ area.

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Dwight K. Bruner is project manager for Bechtel Bros.-McCone on the construction of a sewage disposal plant at Oildale, Calif., which the contractor is building for Kern County. The plant is located near Bakersfield north of River Sanitary District No. 1. **Fred S. Paul** is general superintendent for the job and **Jim Donovan** is job engineer. Other key men are: **H. L. Lendholm**, pipe superintendent; **Floyd Horne, Bob Jones**, and **Roy Willard**, carpenter foremen; **Bill Crause**, labor foreman; and **Bill Franklin**, purchasing agent.

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George Mashon is general superintendent for the Haddock Co., with headquarters at the site of the company's concrete dock contract in the outer harbor in San Pedro. The company is constructing 540 apartments for themselves in this area. **Ed Stone** is assistant superintendent on the building contract and is also manager of the yard at Normandie and East Road. Other key men on the job are: **Duncan Manning**, in charge of excavation; **Ed Crawford**, engineer; and **O. Kettering**, office manager.

Wm. Bushelle is general superintendent on the Willow Street Bridge at Long Beach, Calif., for the Guy F. Atkinson Co. and also remains supervisor of construction on the Wilmington Steam Plant for the same company. Other key men on the Willow Street Bridge project are: **Hank (W. E.) Bouck,** assistant superintendent; **Elmer Keyes,** pile foreman; **Jim Rader,** labor foreman; **Pat Mitchell,** office manager; and **R. S. Corr,** engineer. For the city of Long Beach **John A. Nesmith** is chief inspector and **D. N. McGinnis** is chief of survey party.

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The Young Construction Co. has a contract to build sound stages for the Motion Pictures Center Corp. in Hollywood, Calif. Designer for the job is **Phil Van Andrew,** and **O. L. Richardson** is general superintendent. Carpenter foremen are: **R. H. Bowman, W. S. Taul, George Thompson,** and **T. G. Todd. J. F. Smith** is steel foreman, and **Bill Meyers** and **Pat Brackney** are brick foremen. **J. D. Taylor** is office manager.

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Lease & Leigland and Kuney Johnson Co., Astoria, Ore., hold the $4,300,000 contract for the construction of a 370-unit naval housing project on a 290-acre site east of Astoria. **S. O. Claggett** is superintendent for the job; **Vince Abott** is grade superintendent; **Bob Wilson,** carpenter superintendent; **Pat Burns,** yard superintendent; and **S. A. Eberhardt,** engineer. **Comdr. Stanivnas** is the regional officer in charge of construction, and **Capt. Fischer,** officer in charge of construction.

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Fred S. Paul is general superintendent on the construction of a sewage disposal plant at Oildale, Calif., being built by Bechtel Bros. McCone for Kern County north of River Sanitary District No. 1. **Tim Donovan** is job engineer and **H. L. Lendholm** is pipe superintendent. **Floyd Horne, Bob Jones,** and **Roy Willard** are carpenter foremen, **Bill Crause** is labor foreman, and **Bill Franklin** is purchasing agent.

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Peter Kiewit Sons hold a contract for grading, paving and surfacing of taxiways at Mines Field for the City of Los Angeles Municipal Airport. **John McLaughlin** is engineer for the job; **Ben Williams** is project manager; **V. J. Rausch** is general paving superintendent; **Thos. H. Kelly** is black top superintendent; **Jess Overton** is grade foreman; **Jack Wilmont** is concrete foreman; and **Robert W. Westfall** is shovel foreman.

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J. A. James is general superintendent on construction of culverts for flood control at Wilbur Ave. and Ventura Blvd., in Tarzana, Calif. The culverts are being built by R. R. Hensler, contractor, for the City of Los Angeles. **Ray Wright** is grade superintendent and **Don Davidson** is carpenter foreman.

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The Springfield Sand & Gravel Co., Springfield, Ore., has recently opened a quarry and crushing plant at Springfield. The new plant will be operated in addition to a gravel plant which the company has had in operation for the past five years. **G. H. Stubbs,** formerly with Lane Sand & Gravel, is the new plant foreman. **W. H. Jewett, R. W. Jewett, Nelson Jewett, Jr.,** and **W. J. Reeves** are owners of the company.

E. S. McKittrick, Los Angeles and Oakland, Calif., is building a fertilizer plant on Highway 99 at Cedar Ave., Fresno, for the Fresno Agricultural Chemical Co. **E. E. Forester** is general superintendent for the job. **S. P. Bence** is carpenter foreman and **Hubert Chism** is labor foreman. The contract calls for a 91′ x 181′, two-story building.

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Duncan Manning, for many years a key man in the southwest construction field, is now superintending excavation for the 540 apartment units being built by the Haddock Co. for themselves, between Gaffey and Alma Streets in San Pedro, Calif. Manning has spent a number of years abroad with the U. S. Engineers, in Guatemala for two years as a highway engineer, and later with the Ambursen Co. in Ecuador.

O. H. Tucker is project manager for Morrison-Knudsen & Macco Corp., San Bruno, Calif., for a grading and paving job on 5.1 mi. of the Bayshore Freeway, Colma Creek to Broadway Ave., Burlingame. **George Haensel** is general superintendent for the job, **Harry Dutton** is structure superintendent. **Lex Hobson** is master mechanic and **Eugene Hargraves** is office manager.

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H. B. Shannon is general superintendent for A. Teichert & Son on 4.5 mi. of highway construction and blacktop being built for the State of California at Ripon. **C. J. McCullough** is resident engineer for the job, and **Art V. Towler** is assistant superintendent. Foremen are: **A. Zaretzka,** grade; **Harry Frederick,** general; and **Tony Azevedo,** labor. **Joe Parker** is master me-

chanic and **George D. Lamb, Jr.,** is office manager.

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J. A. Terteling & Sons, Inc., Boise, Ida., hold the $1,548,060 contract for building 5.4 mi. of the main irrigation canal of the Columbia Basin Project for the Bureau of Reclamation. Supervising the job are: **W. C. Foss,** general superintendent; **E. C. Williams,** general foreman; **Ben F. Alexander,** monighan operator foreman; **Wm. Kidwell,** office manager; and **John Moyer,** company engineer.

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Mel Scherer is general superintendent on the construction of five 130′ x 85′ store buildings on Wilshire Blvd. in Los Angeles, Calif. The buildings are being built by Waale-Camplan-Smith, contractors, for G. G. Gregory. **Henry Jenkins** is carpenter foreman for the job, and **Adam Rogalski** is labor foreman.

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R. E. Case is general superintendent for E. S. McKittrick, contractor, on the construction of grain elevators and a feed mill in Fresno, Calif., being built for the J. B. Hill Co. **Joe Ryals** is carpenter foreman, **Lester Whalen** is labor foreman, and **R. W. Rolofson** is steel foreman.

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Dallas Wells and **W. C. Whitman** are partners in the Oregon Construction Co., Eugene, Ore. **H. T. Germain** is general manager for the firm, **J. K. Long** is superintendent, and **E. G. Germain** is warehouseman. **Herman Berg** and **L. C. Hickson** are working as carpenter superintendent and foreman on the various jobs the company has under construction.

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T. Y. Johnston, who was formerly connected with Marshall S. Hanrahan Construction Co., is being employed by Morrison-Knudsen Co., Inc., as highway division manager. His office will be located in San Francisco. Johnston will take over his new position January 1.

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Bechtel Bros.-McCone Co., Los Angeles, are handling the pipe wrapping job for the H. C. Price contract on a pipe line between Santa Fe Springs and Blythe, Calif. Key men on the job are: **Frank Bort,** superintendent; **George Foster,** foreman; **Ray C. Avons,** master mechanic; **Bert Benson,** checker; **Bill Rutherford,** labor foreman; and **Hank Roberts,** office manager.

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Jack E. Bostwick is general superintendent on a housing project at 766 N. Vermont Ave., Los Angeles, Calif., which Harvey & Rose, Arcadia, Calif., contractors, are building for the F.P.H.A. The project calls for 32 dwelling units. **Paul Ducros** is carpenter foreman for the job.

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A. Teichert & Son, Sacramento, Calif., hold a contract to grade, base, and surface 6.7 mi. of highway north of Crazy Horse Summit in Monterey and San Benito Counties. **A. H. Bauer** is superintendent for the job and **G. C. Weeshoff** is project engineer.

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Ernest Hendersen is superintendent for C. & M. Homes, Los Angeles contractor, on the construction of 87 six-room dwelling units in Venice, Los Angeles Co., Calif. **Dell M. McDaniel** is general supervisor for the $654,000 job.

R. W. MEEKS is job superintendent for J. N. Meek, Dallas, Texas, contractor, on masonry construction for a warehouse building at 6519 Cedar Springs, Dallas.

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Roy F. Kees is tunnel superintendent for the Tennessee Valley Authority on the power tunnels for the Watauga Dam, at Elizabethan, Tenn. Walkers for the job are: **Jim Harding, Swede Sandstrom,** and **Leo Williams.** Shifters are **Wilbur Hall, J. M. Remick,** and **Roy Lee. Sam McJunkin** is in charge of the steel shops at the location.

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Charles Stickney is designer for the class A factory buildings at Adams and Hill Streets in Los Angeles, being built by Stronach Construction Co. for Marray-Goldstein. **Verne T. Davis** is general superintendent for the job and **Bill Joyce** is carpenter foreman.

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Paul Boitano is general superintendent for the construction of a third floor addition to a building at Fruitvale Ave. and Foothill Blvd., Oakland, Calif., being built by E. J. Freethy for the Bell Telephone Co. **J. J. Bailo** is carpenter foreman for the job, and **Bud Peterson** is brick foreman.

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Ira Wikstrom is general superintendent for Fred J. Maurer & Son of Eureka, Calif., on the Friant-Kern Canal Stilling Basin at Friant, Calif. **Walt Miller** is general foreman and a junior member of the firm. **F. J. Maurer** is office manager.

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I. G. Homes is job superintendent for the Del E. Webb Construction Co., Phoenix, Ariz., contract for the construction of a market center at 15th Ave. and Thomas Road in Phoenix. **J. O. Martin** is chief of operations and **P. D. Clouthier** is paymaster.

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Wallace Gibson is job superintendent for Leo G. Lynch, contractor, on 4.8 mi. of highway construction at Mosquito Ridge, Tahoe National Forest, Calif. **Fred E. Robie** is office manager and purchasing agent for the job.

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W. Cornell Clyde is job superintendent for W. W. Clyde & Co., Springville, Utah, on grading of the Mt. Dell-Henefer Highway, between Mt. Dell and Big Mt. Summit, Salt Lake Co., Utah. **Victor Anderson** is foreman for the job.

R. E. McGrew is job superintendent for Stone & Webster Engineering Corp., Bakersfield, Calif., for the construction of a PG&E steam-operated electric generating plant 5 mi. northwest of Bakersfield. Other key men for the $10,000,000 job are: **A. R. Stuckey,** resident engineer; **W. E. Harper,** assistant superintendent; and **E. L. Field,** electrical superintendent.

* * *

George V. Storm is superintendent for H. H. Larsen Co., contractors, on the job at Cottonwood, Calif., where the company is building a sub-station for PG&E. **Al Murdock** is carpenter foreman, **Tom York** is concrete foreman, and **Larry Messinger** is office manager.

* * *

Art Boatright is job superintendent for the Northwest Engineering Co., Rapid City, S. D., on the construction of 8 reinforced concrete deck bridges and 3.4 mi. of road work in Lincoln Co., Wyo. **Ben Wirch** is field clerk for the job.

* * *

The George Pollock Co. holds the contract for the aggregate on the canal job at Friant, Calif. **R. B. Rockwood** is superintendent of the project and **W. D. Henkel** is grade man. The Friant canal is a portion of the Central Valley Project.

* * *

H. A. Kenyon is superintendent for Morrison-Knudsen Co., Inc., Boise, Idaho, on a grading and paving job along 6 mi. of the Priest River Hwy., Bonner Co., Idaho. **John Presho** is office manager.

* * *

Tom O'Melveny is supervisor, **Roy Smith** is engineer, and **B. F. Sloter** is carpenter foreman for Robert E. McKee, Los Angeles contractor, for an addition to a machine shop building at the Big Creek Power Plant No. 3, Huntington Lake, Calif.

* * *

Ray Hall is superintendent for Morrison-Knudsen, Inc., Seattle, Wash., on the installation of a sewage treatment plant, two sewage lift stations, etc., at Soap Lake, Grant Co., Wash.

* * *

Ben Arp has been named superintendent of construction for Angostura Dam in South Dakota, by Utah Construction Co., contractors on the $4,237,476 structure.

* * *

Sam H. Lind is superintendent of construction for W. S. Smith, Inc., Portland, Ore., on a sewage treatment plant being installed at Milton, Umatilla Co., Ore. **Ed. C. West** is job foreman.

* * *

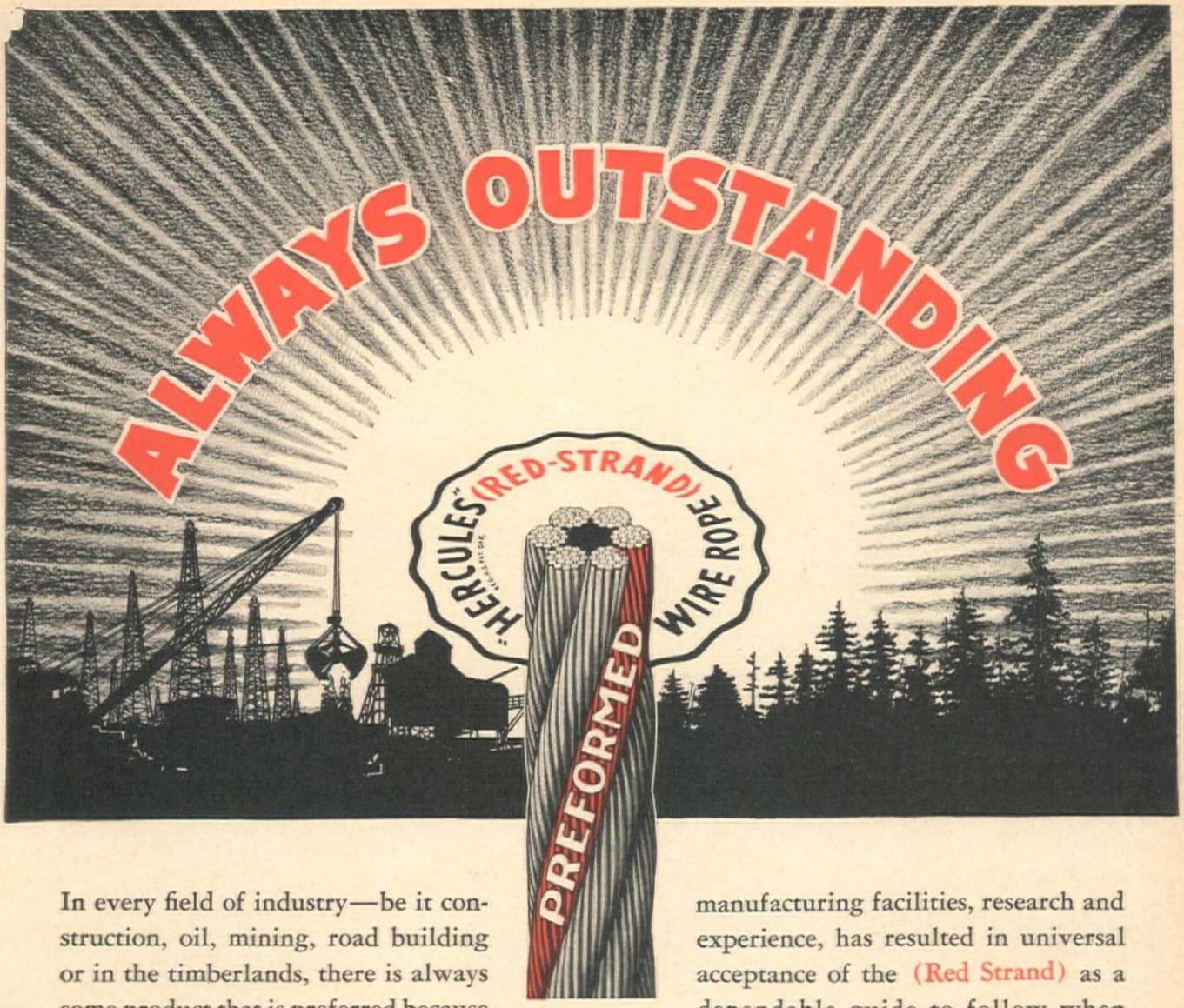
Emmet J. Fallon is in charge of the newly established San Francisco offices of the Vinnell Co., Inc. Fallon is vice-president of the company which has its headquarters at Alhambra, Calif.

* * *

Bill Yarnell is superintendent for Fred J. Early, Jr. Co., Inc., on the new storm drain pumping station at Willow and San Francisco Streets in Long Beach, Calif. **Joe Kohles** is carpenter foreman on the job.

* * *

C. E. Gathe is superintendent for Parkhill-Wade, who hold a contract for expansion of the Wilmington Gasoline Co. Refinery on Terminal Island, Calif.



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UNIT BID SUMMARY

Sewerage . . .

California—Los Angeles County—County—Outfall

Artukovich Bros., Hynes, bidding $537,323, was low to County Sanitation District No. 2 Los Angeles Co., for the construction of the joint outfall "B", Unit No. 1, Section No. 5, located north of Long Beach from Atlantic and Hunsaker to Main St. in Hollydale. Some 12,313 lin. ft. of reinforced concrete sewer will be constructed on this project. The unit bids were as follows:

(1) Artukovich Bros. $537,323
(2) P. & J. Artukovich 560,430
(3) VCK Construction Co. $576,674
(4) Steve P. Rados 787,385

	(1)	(2)	(3)	(4)
1,988 lin. ft. (1,000-D loading), 63-in. centri. reinf. conc. sewer	36.00	37.00	41.50	60.15
6,341 lin. ft. (1,200-D loading, same	37.00	46.00	42.50	61.15
3,984 lin. ft. (1,500-D loading), same	44.50	37.00	45.00	62.15
18 ea. Type "B" manholes	$1,200	$1,000	800.00	700.00
3 ea. special manholes	$1,750	$1,940	$3,000	750.00
1 ea. special manhole	$2,000	$1,750	$3,000	850.00
1 ea. special manhole	$1,500	$1,590	$3,000	750.00
100 cu. yd. std. concr. bed	20.00	20.00	20.00	25.00
5,000 ton gravel bed	5.00	4.50	4.00	3.00

California—Los Angeles County—County—Debris Basin

Bonadiman-McCain, Inc., Los Angeles, were low bidders to the Los Angeles County Flood Control District, Los Angeles, at $21,576 for the construction of the Sparr Heights debris basin in Glendale, east of Verdugo Road, near Chiquita Place. Plans and specifications were prepared by H. E. Hedger, flood control engineer, Los Angeles. The following bids were submitted:

(1) Bonadiman-McCain, Inc. $21,576
(2) J. Walter Johnson 22,154
(3) L. C. Nappe 22,814
(4) McDonald & Kruse, Inc. 25,104
(5) Parr Engineering & Construction Co. $25,349
(6) L. V. Mulherron 25,814
(7) Frank T. Hickey 27,422

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
10,000 cu. yd. basin excav.	.74	1.00	.90	.75	.80	.82	.65
385 cu. yd. stripping	.96	2.00	3.50	2.50	1.50	1.90	.85
460 cu. yd. structural excav.	3.50	1.00	3.00	4.00	2.50	4.35	2.50
1,350 cu. yd. compacting fill	.60	1.00	.30	2.50	.78	1.80	.85
221 cu. yd. concrete	33.00	25.00	30.50	37.06	48.00	39.00	59.40
24,800 lb. cutting, bending and placing reinf. steel	.04	.05	.045	.04	.05	.055	.06
340 bbl. furnishing portland cement	3.03	3.00	3.00	4.15	2.88	3.30	
1,100 sq. ft. reinf. asph. conc. facing	.75	.50	.69	.25	.30	.32	1.15
2,600 sq. ft. unreinf. asph. conc. facing	.35	.35	.30	.20	.20	.28	.30
24 lin. ft. 24-in. reinf. conc. outlet pipe	11.50	8.00	6.50	15.00	10.00	12.50	10.00
55 lin. ft. 6-in. conc. subdrains	1.10	2.50	2.00	1.50	4.00	2.00	5.00

California—Stanislaus County—City—Trunk Line

McGuire & Hester, Oakland, with a bid of $199,947 on Schedule A, was low before the Sanitary District of Hughson, for the construction of a sanitary sewer line and a main trunk sewer line. Schedule A bids were for vitrified clay pipe and Schedule B were on concrete pipe. All unit bids submitted follow:

	Schedule A	Schedule B	Total
(A) McGuire & Hester	$199,947	$ 92,370	$292,317
(B) A. J. Peters & Son	264,316	245,331	509,647
(C) VCK Construction Co.	256,220	264,127	520,347
(D) Underground Construction Co.	264,127	256,601	520,728
(E) R. Goold & Son	272,574	279,920	552,494
(F) Pacific Pipe Line Construction Co.	417,346	417,346	834,692
(G) Manuel Smith	77,411	80,576	157,987
(H) A. E. Downer	.....	259,858	259,858

SCHEDULE A—VITRIFIED CLAY PIPE

Unit I

(1) 25,954 lin. ft. 6-in. vit. clay pipe
(2) 4,624 lin. ft. 8-in. vit. clay pipe
(3) 2,630 lin. ft. 10-in. vit. clay pipe
(4) 1,487 lin. ft. 12-in. vit. clay pipe
(5) 19,500 lin. ft. 4-in. vit. clay pipe, lateral
(6) 24 lin. ft. 8-in. Class A C.I. pipe jacked under county road
(7) 36 lin. ft. 8-in. C.I. pipe jacked under railroad
(8) 503 ea. 6x4-in. vit. clay Y's
(9) 70 ea. 8x4-in. vit. clay Y's
(10) 20 ea. 10x4-in. vit. clay Y's
(11) 10 ea. 12x4-in. vit. clay Y's
(12) 81 ea. manholes with cast iron frames and covers and wrought iron steps; may be brick, concrete cast in place or precast
(13) 6 ea. risers with cast iron frames and covers

Unit II—Domestic Sewage Disposal Facilities

(1) 1 ea. lift station complete
(2) 8,540 lin. ft. 12-in. vit. clay pipe sewer
(3) 50 lin. ft. 12-in. vit. clay sewer with reinf. conc. encasement under canal
(4) 19 ea. manholes (same as Item 12, Unit I)
(5) 1 ea. treatment facilities

Unit III—Industrial Sewage Facilities

(1) 476 lin. ft. 15-in. vit. clay pipe sewer
(2) 10,307 lin. ft. 21-in. vit. clay pipe sewer
(3) 36 lin. ft. 16-in. Class A cast iron pipe jacked under railroad
(4) 70 lin. ft. 2-in. vit. clay pipe sewer with port. cem. jts., completed under canal
(5) 23 ea. manholes (same as Item 12, Unit I)
(6) 1 ea. effluent disposal facilities

SCHEDULE B—CONCRETE PIPE

Unit I

(1) 25,954 lin. ft. 8-in. conc. pipe
(2) 4,624 lin. ft. 10-in. conc. pipe
(3) 2,630 lin. ft. 12-in. conc. pipe
(4) 1,487 lin. ft. 14-in. conc. pipe
(5) 19,500 lin. ft. 6-in. vit. clay pipe lateral
(6) 24 lin. ft. 10-in. Cl. A C.I. pipe jacked under county road
(7) 36 lin. ft. 10-in. C.I. pipe jacked under railrd.
(8) 503 ea. 8x6-in. vitrified clay Y's
(9) 70 ea. 10x6-in. vitrified clay Y's
(10) 20 ea. 12x6-in. vitrified clay Y's
(11) 10 ea. 14x6-in. vitrified clay Y's
(12) 81 ea. manholes (same as Sch. A, Unit 1, Item 12)
(13) 6 ea. risers with cast iron frames and covers

Unit II

(1) 1 ea. lift station complete
(2) 8,540 lin. ft. 14-in. conc. pipe
(3) 50 lin. ft. 14-in. conc. sewer with reinf. conc. encasement under canal
(4) 19 ea. manholes (same as Sch. A, Unit 1, Item 12)
(5) 1 ea. treatment facilities

Unit III

(1) 476 lin. ft. 18-in. conc. pipe sewer
(2) 10,307 lin. ft. 24-in. conc. pipe sewer
(3) 36 lin. ft. 18-in. Class A cast iron pipe jacked under railroad
(4) 70 lin. ft. 4-in. vit. clay pipe sewer with port. cem. joints completed under canal
(5) 23 ea. manholes (same as Sch. A, Unit 1, Item 12).
(6) 1 ea. effluent disposal facilities

SCHEDULE A—UNIT I

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	1.50	2.20	1.87	2.00	1.97	3.98	1.20	.....
(2)	1.70	2.60	2.24	2.20	2.44	4.01	1.25	.....
(3)	2.10	3.00	2.65	2.70	2.73	5.23	1.60	.....
(4)	2.40	3.70	3.08	3.00	2.96	7.44	1.75	.....

(Continued on next page)

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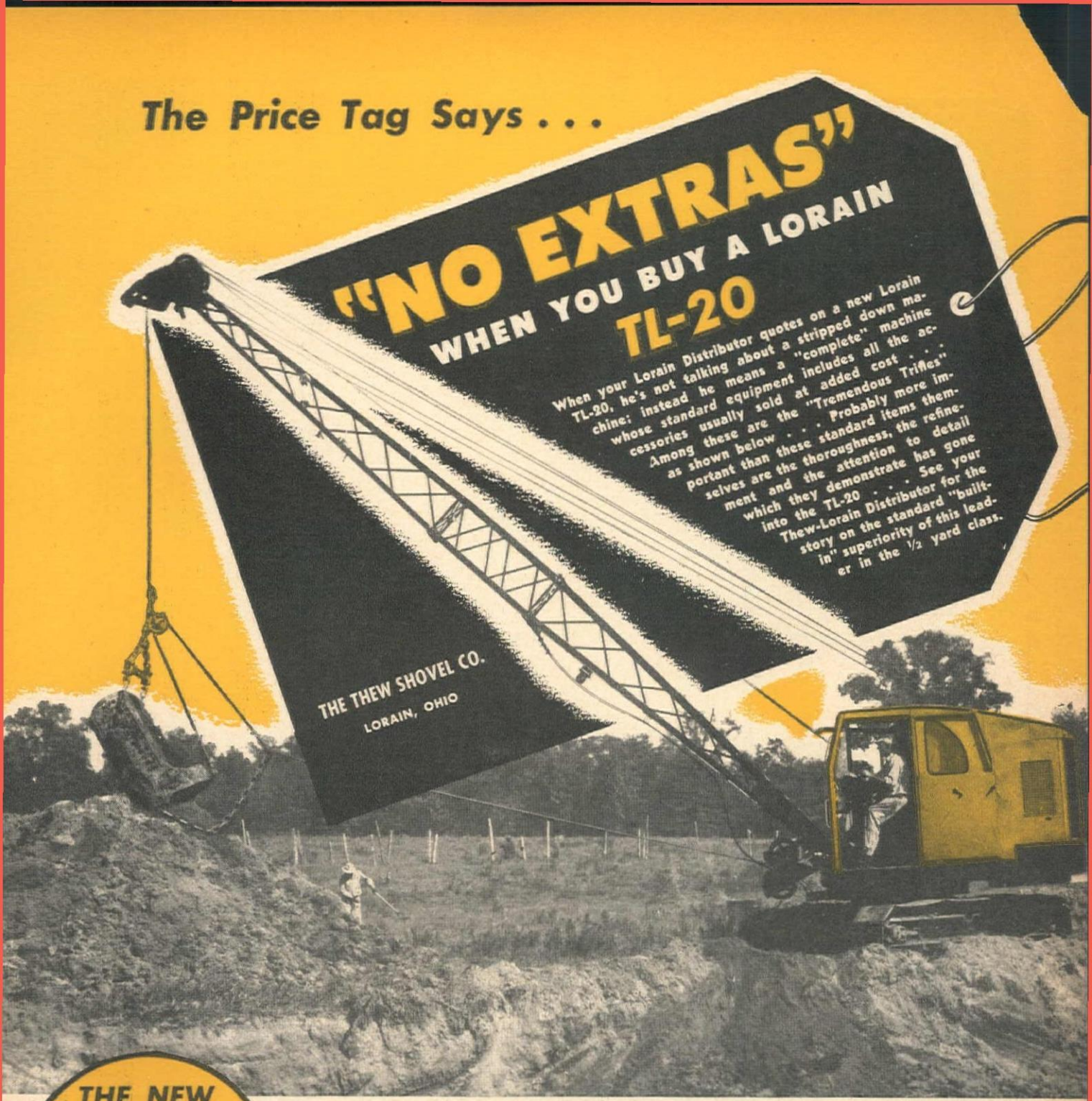
"NO EXTRAS" WHEN YOU BUY A LORAIN TL-20

When your Lorain Distributor quotes on a new Lorain TL-20, he's not talking about a stripped down machine; instead he means a "complete" machine whose standard equipment includes all the accessories usually sold at added cost . . . Among these are the "Tremendous Trifles" as shown below . . . Probably more important than these standard items themselves are the thoroughness, the refinement and the attention to detail which they demonstrate has gone into the TL-20 . . . See your Thew-Lorain Distributor for the story on the standard "built-in" superiority of this leader in the 1/2 yard class.

THE THEW SHOVEL CO.
LORAIN, OHIO



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HEADLIGHTS . . 2 operating headlights with plug for service light.

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LE ROI-RIX MACHINERY CO., Los Angeles 11
CATE EQUIPMENT CO., Salt Lake City 4
LIBERTY TRUCKS & PARTS CO., Denver 1
COAST EQUIPMENT COMPANY, San Francisco 1
A. H. COX & CO., Seattle 4, Washington
BUNTING TRACTOR CO., INC., Boise, Twin Falls, Gooding, Fairfield, and Burley, Idaho; LaGrande, Oregon
CONNELLY MACHINERY COMPANY, Billings and Great Falls, Montana
SANFORD TRACTOR & EQUIPMENT CO., Reno Nevada
THE MOUNTAIN TRACTOR CO., Missoula, Montana
THE TRACTOR & EQUIPMENT CO., Sidney, Montana
P. L. CROOKS & CO., Portland 10, Oregon
LEE REDMAN COMPANY, 2020 West Grant St., Phoenix, Arizona
WORTHAM MACHINERY CO., Cheyenne, Wyoming
Branches: **Sheridan, Greybull, Casper, and Rock Springs**

(5)	1.50	1.25	1.71	1.30	1.24	2.00	1.00	.....
(6)	12.00	6.80	50.00	15.00	48.02	7.00	20.00	.....
(7)	14.00	6.80	50.00	17.00	48.02	7.00	25.00	.....
(8)	2.00	3.40	1.50	2.00	2.55	3.00	2.00	.....
(9)	2.50	4.40	2.25	3.00	3.83	4.45	3.00	.....
(10)	3.00	5.50	3.10	5.00	4.99	5.00	3.50	.....
(11)	3.50	6.60	4.00	7.00	5.10	6.50	5.00	.....
(12)	160.00	165.00	200.00	200.00	203.00	160.00	140.00	.....
(13)	15.00	28.00	75.00	40.00	40.60	30.00	20.00	.....
UNIT II								
(1)	$6,000	$11,607	$14,000	$9,800	$14,761	$15,400	.....	.....
(2)	2.10	3.70	3.20	3.00	3.02	7.44	.....	.....
(3)	8.00	8.80	30.00	10.00	18.15	10.00	.....	.....
(4)	160.00	165.00	190.00	200.00	203.00	200.00	.....	.....
(5)	$9,000	$17,277	$17,010	$17,000	$25,354	$18,700	.....	.....
UNIT III								
(1)	3.20	4.10	3.82	4.00	4.52	8.04	.....	.....
(2)	4.90	6.00	5.91	6.60	6.21	8.75	.....	.....
(3)	18.00	20.50	55.00	26.00	51.91	15.00	.....	.....
(4)	10.00	16.40	40.00	15.00	32.54	15.00	.....	.....
(5)	180.00	165.00	200.00	200.00	203.00	200.00	.....	.....
(6)	$5,986	$7,627	$11,000	$13,200	$7,690	$12,100	.....	.....
SCHEDULE B—UNIT I								
(1)	.....	2.10	1.86	2.00	2.23	3.98	1.25	1.58
(2)	1.70	2.25	2.17	2.17	2.35	4.01	1.50	1.95
(3)	2.00	2.73	2.49	2.60	2.45	5.33	1.60	2.20
(4)	2.25	3.34	2.99	2.85	2.60	7.44	1.65	2.40
(5)	.....	1.25	1.71	1.30	1.29	2.00	1.00	1.45
(6)	13.00	7.70	50.00	18.00	49.18	7.00	20.00	25.00
(7)	15.00	7.70	50.00	20.00	49.18	7.00	25.00	31.25
(8)	2.00	3.10	2.25	2.50	4.12	3.00	3.60	2.20
(9)	2.50	4.10	2.80	3.50	5.28	4.45	3.60	2.50
(10)	3.00	5.15	3.10	4.50	6.73	5.00	3.85	3.30
(11)	3.50	6.05	3.50	5.00	9.05	6.50	4.20	4.00
(12)	160.00	165.00	200.00	200.00	203.00	160.00	140.00	174.00
(13)	15.00	26.00	75.00	40.00	40.60	30.00	20.00	30.00
UNIT II								
(1)	$6,000	$11,607	$14,000	$98,000	$14,761	$15,400	.....	$1,300
(2)	1.95	3.34	3.05	2.85	3.07	7.44	.....	4.20
(3)	8.00	8.10	30.00	10.00	18.21	10.00	.....	15.00
(4)	160.00	165.00	190.00	200.00	203.00	200.00	.....	225.00
(5)	$9,000	$17,277	$17,000	$17,100	$25,354	$18,700	.....	$25,000
UNIT III								
(1)	3.65	3.50	4.36	3.90	5.39	8.04	.....	4.95
(2)	4.30	5.05	5.71	6.10	6.15	8.75	.....	5.60
(3)	20.00	23.80	55.00	30.00	53.07	15.00	.....	40.00
(4)	12.00	15.30	40.00	15.00	32.54	15.00	.....	18.00
(5)	180.00	164.00	200.00	200.00	203.00	200.00	.....	245.00
(6)	$5,986	$7,627	$11,000	$13,200	$7,690	$12,100	.....	$7,250

Power . . .

Arizona—Pima County—Bureau of Reclam.—Transmission Line

Donovan, Inc., St. Paul, Minn., with a bid of $566,797 was lowest acceptable bid to the Bureau of Reclamation at Boulder City, Nev., for construction of a 115-kv. transmission line from Phoenix to Tucson, Ariz. This is a portion of the Davis Dam Project. The two lowest bids were irregular in form and were not considered. Unit bids were as follows:

(1) Donovan, Inc. $566,797
(2) Walker & Nickel 565,669
(3) J. & J. Construction Co. $335,039

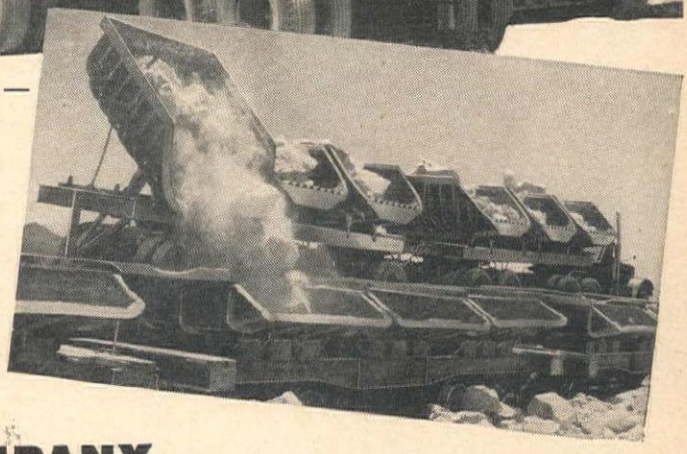
	(1)	(2)	(3)
Lump sum, clearing right-of-way	$31,000	$52,500	$16,520
5 ea. type HS structure, 45-ft. poles	166.00	138.47	88.52
25 ea. type HS structure, 50-ft. poles	170.00	144.47	90.52
359 ea. type HS structure, 55-ft. poles	170.00	150.47	95.02
366 ea. type HS structure, 60-ft. poles	185.00	156.47	97.02
47 ea. type HS structure, 65-ft. poles	192.00	162.47	98.52
29 ea. type HS structure, 70-ft. poles	270.00	168.47	108.52
5 ea. type HS structure, 75-ft. poles	246.00	179.47	113.52
4 ea. type HA structure, 55-ft. poles	184.00	156.01	95.02
2 ea. type HA structure, 60-ft. poles	200.00	162.01	97.02
1 ea. type HA structure, 65-ft. poles	215.00	166.01	98.52
6 ea. type HTR structure, 60-ft. poles	208.00	171.47	97.02
8 ea. type HTR structure, 65-ft. poles	220.00	177.47	98.52
2 ea. type HTR structure, 70-ft. poles	235.00	183.47	108.52
3 ea. type 3A structure, 50-ft. poles	197.00	183.97	112.72
5 ea. type 3A structure, 55-ft. poles	208.00	192.97	112.72
2 ea. type 3A structure, 60-ft. poles	227.00	201.97	112.72
1 ea. type 3AB structure, 50-ft. poles	196.00	200.97	125.85
1 ea. type 3AB structure, 55-ft. poles	205.00	200.97	125.85
1 ea. type 3AB structure, 60-ft. poles	215.00	218.97	125.85
1 ea. type 3AT structure, 50-ft. poles	391.00	284.97	125.85
1 ea. type 3AT structure, 55-ft. poles	414.00	293.97	125.85
1 ea. type 3AT structure, 60-ft. poles	333.00	302.97	125.85
1 ea. type 3T structure, 50-ft. poles	422.00	291.95	143.02
1 ea. type 3T structure, 55-ft. poles	430.00	300.95	143.02
1 ea. type 3T structure, 60-ft. poles	445.00	309.95	143.02
2 ea. type 3DE structure, 50-ft. poles	415.00	228.31	99.59
2 ea. type 3SWT structure, 50-ft. poles, complete with air-break switch	$3,460	$2,595	$2,563
10 ea. type WS structure, 55-ft. poles	95.00	86.67	39.28
15 ea. type WS structure, 60-ft. poles	98.00	86.67	41.78
20 ea. type WS structure, 65-ft. poles	102.00	92.67	43.28
10 ea. type WS structure, 70-ft. poles	110.00	95.67	49.28
1 ea. type WT structure, 60-ft. poles	240.00	89.27	46.78
1 ea. type WT structure, 65-ft. poles	250.00	92.27	48.28
1 ea. type SA structure, 60-ft. poles	97.00	75.47	57.10
1 ea. type SA structure, 65-ft. poles	106.00	78.47	59.60
1 ea. type SA structure, 70-ft. poles	120.00	81.47	64.60
1 ea. type SAT structure, 65-ft. poles	180.00	99.67	67.10
1 ea. type SAT structure, 70-ft. poles	215.00	102.67	67.10
50 ea. type X-braces	5.00	30.00	9.00
90 ea. single guys without strain insulators	22.00	28.11	35.85
100 ea. double guys without strain insulators	42.00	36.91	45.68
5 ea. double guys with strain insulators	50.00	159.01	82.81
10 ea. stub guys with 30-ft. poles	45.00	113.76	37.15
190 ea. plate anchors	24.00	15.00	15.00

(Continued on next page)

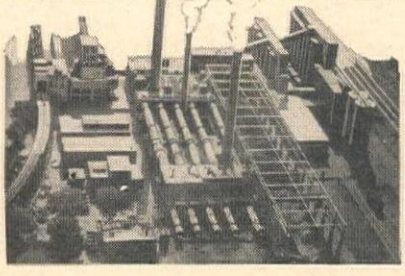
Shovel loading 60-80 tons of rock into Fruehauf Trailers at quarry for 10-mile haul to railroad.

Fruehaufs Move a Mountain of Stone

FOR SOUTHWESTERN PORTLAND CEMENT COMPANY



Dumping direct from Fruehaufs into rail cars. Load on each Trailer corresponds to capacity of one car.



FOUR Fruehauf "trains", each consisting of Tandem-axle Semi-Trailer and Three-Axle Trailer — pulled by a powerful diesel tractor — move 240 to 320 tons of limestone daily.

These units are owned and operated by Southwestern Portland Cement Company, and haul rock from quarry to dump in the Mojave Desert, not far from the company's enormous cement plant in Victorville, California.

During the war, demands for cement climbed to an all-time "high". This called for a big increase in rock. The company had to open a new quarry. The site was a mountain 10 miles from the nearest branch of the company's private railroad. Materials to extend the railroad were unavailable. So, A. E. Combs, superintendent of automotive equipment, recommended trucks and Trailers. His recommendation was adopted.

A road was bulldozed across the desert and into the mountains. Big diesel tractors and Fruehauf Trailers of special design were purchased and put to work. Cement production increased to unprecedented figures.

Today, demand exceeds the plant output. The mountain is being blasted into smithereens. More hauling equipment is necessary. And, upon the strength of the outstanding performance of the first Fruehaufs, expansion of the fleet means additional orders for Fruehauf.

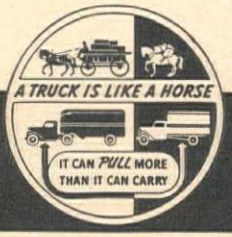
Where the going is tough, you can always expect to find Fruehaufs on the job. Carryalls, tilt-decks, end dumps, side dumps, hopper dumps—you need only name the load — there's a Fruehauf built to haul it. Let your nearest Fruehauf transportation engineer work with you to solve your hauling problem.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant — Los Angeles

SALES AND SERVICE BRANCHES — LOS ANGELES • SAN FRANCISCO
PORTLAND • SEATTLE • EL PASO • PHOENIX • SAN DIEGO
FRESNO • SPOKANE • BILLINGS
SALT LAKE CITY • DENVER



FRUEHAUF TRAILERS "Engineered Transportation"

10 ea. grouted anchors	30.00	25.00	25.00
2724 ea. suspension-insulator assembly with 7 units	30.00	30.35	27.76
24 ea. suspension-insulator assembly with 8 units	33.00	34.35	31.10
48 ea. suspension-insulator assembly with 9 units	36.00	38.35	33.94
24 ea. tension-insulator assembly with 8 units	35.00	16.95	35.50
54 ea. tension-insulator assembly with 9 units	40.00	20.35	28.59
125 3-phase-circuit mi. stringing 336,400 cir. mil steel reinf. alum. conductor	950.00	$1,201	333.40
200 ea. vibration dampers for alum. conductor	4.00	2.00	2.00
3 ea. 25-lb. holddown weights	7.00	20.00	18.00
3 ea. 50-lb. holddown weights	13.00	42.50	28.00
3 ea. 75-lb. holddown weights	18.00	55.00	40.50
122 mi. stringing two 3/8-in. galvanized steel overhead ground wires	$1,125	819.60	717.63
3 mi. stringing one 3/8-in. galvanized steel overhead ground wires	622.00	409.80	483.91
350 ea. fence ground rods	4.00	6.00	2.00

Bridge and Grade Separation . . .

California—Imperial County—State—Structural Steel

Bent Construction Co., Los Angeles, with a proposal of $245,709 was low in bidding before the Division of Highways, Sacramento, for construction of two bridges and approaches located 9 and 15.5 mi. northwest of Westmorland. They will cross Lone Tree Wash and San Felipe Creek. Railroad rails, torpedo netting and cable to be used in constructing bank protection adjacent to the bridges will be furnished by the state, but all other materials are furnished by the contractor. Unit bids were:

(1) Bent Construction Co. $245,709

(2) United Concrete Pipe Corp. and Ralph A. Bell $284,066

	(1)	(2)
57 cu. yd. removing concrete	6.00	6.00
36,900 cu. yd. roadway excavation	.65	.80
355 cu. yd. structure excavation	3.00	4.00
550 cu. yd. ditch and channel excavation	1.25	1.00
7,000 cu. yd. imported borrow	1.80	3.00
Lump sum, dev. water sup. and furn. watering equip.	$1,000	$4,000
1,710 M. gals. applying water	2.00	2.50
45 sta. finishing roadway	30.00	12.00
180 tons liquid asphalt, SC-3 or 4 (bit. surf. tr.)	20.00	20.00
19,300 sq. yd. prep., mix. and shaping surf. (bit. surf. tr.)	.15	.10
1,055 cu. yd. Class "A" P.C.C.	51.00	64.00
477,000 lb. furn. struc. steel	.095	.07
477,000 lb. erecting struc. steel	.025	.03
7,890 lin. ft. furn. concrete piling	2.50	4.00
133 ea. driving concrete piles	130.00	150.00
310 cu. yd. sacked concrete riprap	24.00	25.00
60 lin. ft. metal plate guard railing	2.50	5.00
140 lin. ft. reconstructing metal plate guard railing	1.50	4.00
200 lin. ft. removing and salvaging guard railing	1.00	1.50
2 ea. culvert markers	10.00	4.00
11 ea. guide posts	6.00	5.00
34 lin. ft. 18-in. C.M.P. (16 gauge)	3.00	5.00
104 lin. ft. 24-in. C.M.P. (14 gauge)	6.00	6.00
32 lin. ft. 42-in. C.M.P. (12 gauge)	10.00	10.00
104 lin. ft. salv. exist. C.M.P. culverts	4.00	1.50
190,000 lb. furn. bar reinf. steel	.05	.06
190,000 lb. placing bar reinf. steel	.03	.03
1,346 lin. ft. tee rail bridge railing	4.50	4.00
3,540 lin. ft. driving R.R. rails	1.00	.80
6,400 sq. yd. placing torpedo netting	.65	.70
8 ea. anchor blocks	25.00	40.00
Lump sum, removing existing bridges	$5,500	$6,800
Lump sum, misc. items of work	$2,500	$3,000

California—Los Angeles County—State—Undercrossing

Guy F. Atkinson Co., Long Beach, were low to the Division of Highways at Sacramento with a bid of $441,766 for the construction of a reinforced concrete undercrossing to be located on Hollywood Parkway at Silver Lake Blvd., Los Angeles. The largest single sum, $214,200, listed is for pavement with Class "B" Portland concrete cement. The unit bids are:

(A) Guy F. Atkinson Co. $441,766
(B) E. B. Bishop 492,319
(C) J. E. Haddock Co. 523,104
(D) Oberg Bros. 523,898
(E) E. W. Elliott Construction Co. 529,738
(F) Winston Bros. Co. $547,394
(G) United Concrete Pipe Construction Co. 547,942
(H) Johnson Western Co. 561,586
(I) Contracting Engineers 571,776

(1) 1,650 cu. yd. removing concrete
(2) 4,300 cu. yd. roadway excavation
(3) 4,500 cu. yd. structure excavation
(4) 3,020 cu. yd. structure backfill
(5) 3,500 cu. yd. imported borrow
(6) 125 tons plant-mixed surfacing
(7) 1,860 cu. yd. Cl. "B" P.C.C. (pavement)
(8) 4,200 cu. yd. Cl. "A" P.C.C.
(9) 42 cu. yd. Cl. "C" P.C.C. (pipe reinf.)
(10) 280 lin. ft. rubber waterstop
(11) 21,000 lb. misc. iron and steel
(12) 10,510 lin. ft. furn. concrete piling
(13) 386 ea. driving concrete piles
(14) 230 sq. yd. membrane waterproofing
(15) 345 cu. yd. Cl. "A" P.C.C. (curbs, gutters and sidewalks)
(16) 183 lin. ft. 18-in. R.C.P. (std. str.)
(17) 72 lin. ft. 21-in. R.C.P. (std. str.)
(18) 42 lin. ft. 27-in. R.C.P. (std. str.)
(19) 3 lin. ft. 30-in. R.C.P. (std. str.)
(20) 46 lin. ft. 6-in. C.M.P. (16 gauge)
(21) 12 lin. ft. 6-in. vit. clay pipe
(22) 63 lin. ft. 12-in. plain concrete pipe
(23) 235 lin. ft. 15-in. plain concrete pipe
(24) 264 lin. ft. 6-in. perf. M.P. undrdr. (16 ga.)
(25) 1,111,000 lb. furn. bar reinf. steel
(26) 1,111,000 lb. placing bar reinf. steel
(27) 686 lin. ft. steel railing
(28) 65 lin. ft. new brick manholes
(29) 4 lin. ft. pipe shaft manhole (storm drain)
(30) 3 ea. remodeling existing manholes
(31) 6 ea. adjusting manholes to grade
(32) Lump sum, electrical equipment
(33) Lump sum, misc. items of work

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	4.00	3.40	5.00	4.50	6.00	6.00	6.00	3.75	5.00
(2)	1.50	1.75	.90	1.86	1.25	1.20	2.00	1.55	2.00
(3)	1.75	4.25	3.45	1.33	3.50	2.80	2.00	5.50	2.00
(4)	3.00	1.35	2.85	1.50	1.50	2.50	3.00	5.00	2.00
(5)	3.50	4.75	3.55	1.50	2.50	2.50	4.00	4.50	3.00
(6)	5.00	8.00	5.45	7.00	10.00	6.00	6.00	6.35	6.00
(7)	14.00	15.00	14.50	16.00	13.20	18.50	18.00	15.80	20.00
(8)	51.00	59.00	64.00	65.00	63.00	60.00	66.00	63.00	65.00
(9)	15.00	22.00	17.75	20.00	40.00	20.00	20.00	16.00	25.00
(10)	2.00	1.25	4.00	3.00	2.00	2.50	3.00	3.00	3.00
(11)	.30	.40	.23	.25	.40	.35	.26	.32	.40
(12)	2.00	2.00	2.05	2.10	2.50	2.30	2.50	2.55	3.00
(13)	45.00	50.00	45.00	46.00	50.00	50.00	70.00	63.00	50.00
(14)	2.50	2.00	2.60	2.50	2.00	4.20	4.00	2.50	3.00
(15)	30.00	29.00	28.00	29.00	34.00	40.00	35.00	30.00	25.00
(16)	3.50	3.50	3.70	4.25	6.00	4.00	5.00	4.00	4.00
(17)	4.00	5.00	4.45	4.45	6.50	5.00	6.00	4.25	5.00

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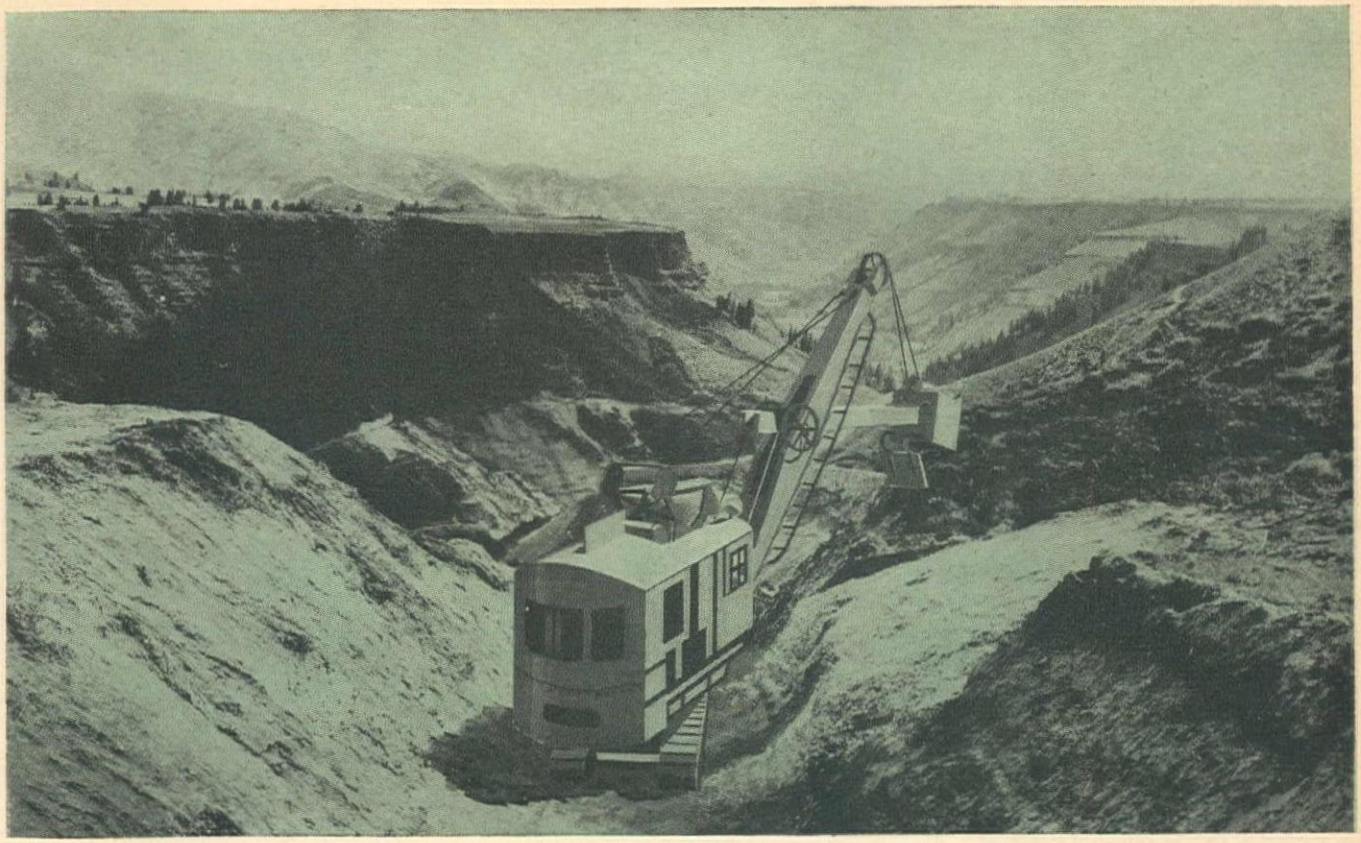

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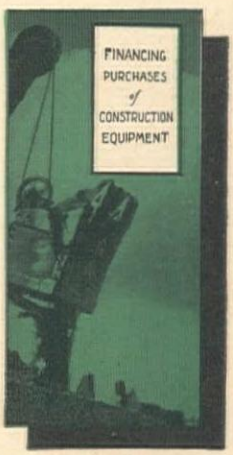

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(18)	5.00	6.25	5.45	5.50	8.00	6.50	8.00	7.00	6.00
(19)	6.00	20.00	8.20	9.00	20.00	9.00	20.00	10.00	15.00
(20)	1.00	3.00	3.45	2.50	2.50	1.00	2.00	2.00	2.00
(21)	1.25	3.00	1.55	4.00	2.00	1.00	5.00	2.00	2.00
(22)	1.50	3.00	1.50	2.00	2.50	2.00	4.00	4.50	2.00
(23)	2.00	2.25	1.80	2.40	4.00	2.00	5.00	3.50	3.00
(24)	1.00	1.75	2.60	5.00	2.00	1.00	3.00	.90	2.00
(25)	.05	.045	.0525	.07	.065	.065	.05	.055	.05
(26)	.02	.015	.03	.02	.02	.04	.02	.03	.03
(27)	7.50	7.75	7.65	7.20	10.00	10.00	8.00	12.00	7.00
(28)	20.00	25.00	29.25	25.00	25.00	18.00	20.00	28.00	15.00
(29)	20.00	30.00	14.60	22.00	20.00	20.00	20.00	7.00	15.00
(30)	60.00	200.00	110.00	150.00	100.00	110.00	50.00	70.00	100.00
(31)	20.00	200.00	30.00	150.00	50.00	40.00	20.00	30.00	20.00
(32)	$13,220	$19,000	$13,000	$16,217	$14,300	$19,000	$21,000	$16,700	$10,000
(33)	$2,000	$5,000	$7,100	$4,000	$5,000	$2,500	$2,500	$3,650	$40,000

Highway and Street . .

Nevada—Elko County—State—Grade, Surf.

W. W. Clyde & Co., Springville, Utah, submitted the low bid of $264,165 to the Department of Highways, Carson City, and was awarded the contract for the construction of 19 mi. of State Highway from Elko to one-half mi. east of Lamoille. Gravel base, liquid asphalt and roadmix make up nearly half the total bid. Unit bids are as follows:

(1) W. W. Clyde & Co. $264,165
(2) A. O. Thorn & Sons Construction Co. 289,747
(3) Hunt & Fransden $317,830

		(1)	(2)	(3)
Lump sum,	signs	$1,000	$1,500	400.00
38	ea. remove trees	25.00	10.00	20.00
14,377	lin. ft. remove fence	.10	.10	.07
1,010	lin. ft. remove culvert pipe	1.50	1.00	1.50
Lump sum,	remove concrete boxes (12)	500.00	$1,200	$2,400
2	ea. remove bridges	200.00	250.00	200.00
131,620	cu. yd. roadway excavation	.30	.28	.42
1,577	cu. yd. drainage excavation	.50	2.00	1.50
182	sta. V-type ditches	7.00	7.00	4.00
14,825	cu. yd. borrow	.28	.30	.30
238,560	yd. sta. overhaul, yd. sta.	.015	.02	.02
9,755	yd. mi. overhaul, yd. mile	.20	.20	.20
780	cu. yd. structure excavation	3.00	2.00	2.50
1,886	cu. yd. backfill	2.00	2.00	1.50
6,633	M. gal. water	1.50	2.00	2.50
419	hr. power roller	5.00	8.00	7.00
1,149	hr. tamping roller	5.00	8.00	8.00
48,822	ton Type 1 gravel base	.60	.65	.75
50,273	ton Type 2 gravel base (one inch size)	1.10	1.10	1.15
148	ton liquid asphalt, Type MC-2 (seal)	26.00	30.00	30.00
1,767	ton liquid asphalt Type SC-2 or SC-3 (rdmx.)	24.00	28.25	28.00
19.05	mi. roadmix	700.00	800.00	800.00
7	ea. roadmix intersections	50.00	150.00	200.00
259	cu. yd. Class A concrete	50.00	50.00	60.00
14	cu. yd. Class B concrete	50.00	50.00	60.00
34,660	lb. reinforcing steel	.10	.10	.12
1,186	lin. ft. 18-in. corrugated metal pipe (dipped)	2.50	3.00	2.50
632	lin. ft. 24-in. corrugated metal pipe (dipped)	3.50	4.00	4.00
192	lin. ft. 30-in. corrugated metal pipe (dipped)	4.50	5.50	5.00
134	lin. ft. 36-in. corrugated metal pipe (dipped)	6.75	8.00	8.00
150	lin. ft. 21½x13½-in. corr. metal arch pipe (dipped)	2.50	3.50	3.25
224	lin. ft. 30x17-in. corr. metal arch pipe (dipped)	3.80	5.00	5.00
104	lin. ft. 30-in. corr. metal siphon pipe (dipped)	5.00	7.00	5.50
346	lin. ft. relay culvert pipe	1.50	2.00	1.50
138	lin. ft. 18-in. perforated underdrain	2.75	3.00	2.50
120	ea. culvert markers	5.00	2.00	5.00
26	ea. guide posts	5.00	6.00	5.00
21,349	lin. ft. construct fence	.25	.30	.25
13,283	lin. ft. reconstruct fence	.15	.20	.10
6	ea. 16-ft. steel gates	40.00	30.00	50.00
47	ea. monuments	6.00	8.00	5.00
48	ea. 18-in. standard metal headwalls	22.00	25.00	28.00
28	ea. 24-in. standard metal headwalls	43.00	45.00	55.00
6	ea. 30-in. standard metal headwalls	65.00	65.00	85.00
2	ea. 36-in. standard metal headwalls	110.00	120.00	155.00
8	ea. 21½x13½-in. standard metal headwalls	25.00	24.00	27.50
6	ea. 30x17-in. standard metal headwalls	40.00	40.00	45.00
Force Account,	miscellaneous work	.....	.....	.....

Oregon—Douglas & Josephine Counties—State—Grade

McNutt Bros., Eugene, Ore., submitted the low bid of $877,031 to the Oregon State Highway Department, Salem, for 5.54 mi. of grading on U. S. Highway 99 between Glendale Junction and Wolf Creek. Bids were received from the following:

(1) Leonard & Slate $1,169,279
(2) White Bros. Co. 986,875
(3) McNutt Bros. $877,031
(4) Guy F. Atkinson Co. 884,962

		(1)	(2)	(3)	(4)
80	ac. clear and clean-up, Sta. 440+55 to 605	900.00	800.00	700.00	600.00
60	ac. clear and clean-up, Sta. 605 to 213+50	400.00	350.00	200.00	270.00
24	ac. grub Sta. 440+55 to 605	400.00	500.00	200.00	470.00
2	ac. grubbing, Sta. 605 to 213+50	400.00	300.00	200.00	300.00
14	ac. extra clearing	800.00	800.00	600.00	680.00
5	ac. extra grubbing	400.00	500.00	200.00	420.00
200	sq. ft. felling of danger trees	5.00	8.00	1.00	8.00
2,600	cu. yd. structural excav., uncl.	7.50	5.00	2.50	8.00
500	cu. yd. trench excav., uncl.	3.00	3.00	2.00	5.50
365,000	cu. yd. genl. excav., sta. 440+55 to 492, uncl.	.50	.60	.45	.36
515,000	cu. yd. genl. excav., sta. 492 to 520, uncl.	.85	.65	.58	.55
136,000	cu. yd. genl. excav., sta. 520 to 615, uncl.	.40	.30	.30	.37
94,000	cu. yd. genl. excav., sta. 615 to 213+50, uncl.	.75	.30	.35	.31
2,800,000	yd. sta. short overhaul	.02	.01	.015	.01
83,000	cy. yd. sta. long overhaul	.40	.40	.50	.34
20,000	lin. ft. rounding cutbanks	.25	.15	.10	.20
5.54	mi. finishing roadbed and slopes	500.00	700.00	500.00	400.00
3,800	lin. ft. 9-in. perf. cor. metal pipe	2.10	2.30	1.50	1.75
200	lin. ft. 48-in. cor. metal pipe, protected invert	14.00	15.00	14.75	14.00
3,000	lin. ft. 18-in. conc. pipe	3.50	3.50	3.50	3.75
270	lin. ft. 24-in. conc. pipe	4.70	4.50	5.00	5.50
120	lin. ft. 36-in. conc. pipe	10.00	8.50	9.25	10.50
970	lin. ft. 24-in. ex. str. conc. pipe	5.00	5.00	5.30	6.00

(Continued on next page)

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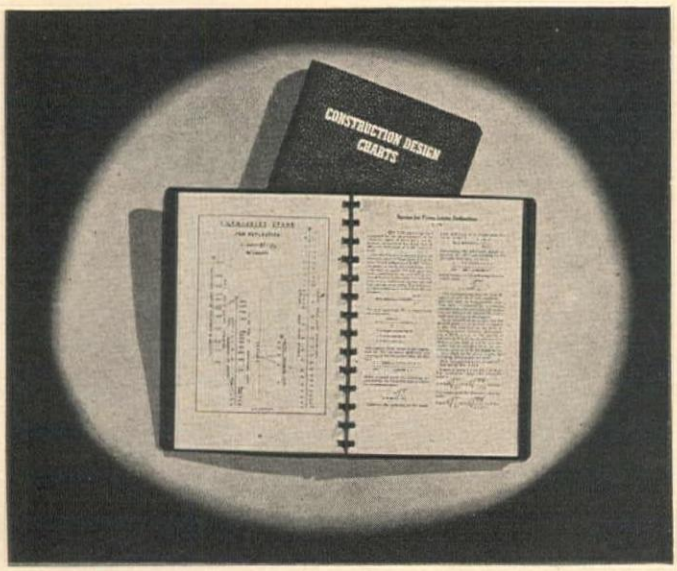

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700 lin. ft. 36-in. ex. str. conc. pipe	10.50	10.00	10.00	11.50
140 lin. ft. salvaging culv. pipe	2.00	2.00	1.00	5.50
780 cu. yd. rock or gravel backfill in drains	7.50	2.00	6.00	4.70
770 cu. yd. Cl. "A" conc.	55.00	55.00	40.00	63.50
127,000 lb. metal reinf.	.10	.10	.08	.10
0.4 M-FBM untr. lumber in dam	200.00	80.00	150.00	200.00
All specified detour bridge at Sta. 470	$11,000	$10,000	$16,000	$15,000
All specified detour bridge at Sta. 496	$12,000	$10,000	$16,000	$15,000
38 M-FBM lumber in appr. road tr.	125.00	100.00	90.00	220.00
45,000 cu. yd. sel. roadbed top	.70	.50	.50	.80
160,000 yd. mi. haul. roadbed top.	.15	.15	.12	.20
1,700 M. gal. sprinkling	3.00	3.00	3.00	3.40

California—Los Angeles County—State—Pave.

Peter Kiewit Sons Co., Arcadia, Calif., submitted the low bid of $1,543,233 to the Division of Highways, Sacramento, for grading and paving with Portland cement concrete 4.5 mi. of state highway between Latigo Canyon and Malibu Creek. Of special interest is the nearly 1½ million cu. yd. of roadway excavation valued under the contract at nearly a half million dollars, and the 14,500,000 station yards of overhaul involved in the contract. The following unit bids were submitted:

(1) Peter Kiewit Sons Co. $1,543,233
(2) H. Earl Parker and N. M. Ball Sons 1,561,101
(3) Guy F. Atkinson Co. 1,591,309
(4) Bressi-Bevanda Constructors 1,627,667
(5) Owen, McLaughlin & Lynch $1,808,201
(6) United Concrete Pipe Corp., Ralph A. Bell and Vinnell Co. 1,859,534
(7) Matich Bros. & Crow 1,893,329

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lump sum, removing exist. bridge	$4,000	$15,000	$9,500	$14,000	$15,000	$4,500	$10,500
3,300 cu. yd. removing concrete	3.00	3.50	3.00	4.50	7.00	2.80	5.00
240 sta. clearing and grubbing	20.00	50.00	20.00	10.00	30.00	30.00	24.00
1,420,000 cu. yd. roadway excavation	.33	.38	.41	.38	.43	.51	.505
16,500 cu. yd. structure excavation	2.50	2.10	1.70	1.90	3.00	2.20	3.50
36,000 cu. yd. ditch and channel excav.	.70	.80	.48	.55	.50	.45	1.50
30,000 sq. yd. compact. original ground	.02	.05	.03	.06	.10	.20	.10
17,000 cu. yd. sand filling material	1.20	1.30	1.80	1.00	2.00	1.15	4.00
14,500,000 sta. yd. overhaul	.004	.007	.004	.002	.007	.006	.003
103,000 sq. yd. slope erosion protection	.10	.06	.14	.10	.40	.14	.15
4,700 lb. seed	.10	.35	.33	1.65	.50	.55	1.00
118,000 sq. yd. cement tr. subgrade	.25	.26	.30	.31	.28	.28	.45
5,300 bbl. Portland cement (subgrade)	2.90	2.90	2.80	3.25	3.31	3.50	2.90
Lump sum, dev. water sup. & furn. water equip.	$5,000	$6,500	$9,000	$20,000	$14,000	$35,000	$18,500
25,000 M. gals. applying water	1.35	1.70	1.50	2.30	1.85	1.30	1.80
240 sta. finishing roadway	7.00	10.00	50.00	25.00	20.00	11.00	15.00
1,080 tons liquid asphalt SC-3	13.00	14.00	18.00	15.00	14.00	14.50	13.25
87,500 sq. yd. prep., mixing & shaping surf.	.10	.085	.10	.10	.10	.11	.10
8 tons liquid asph., SC-2 (prime coat)	22.00	20.00	34.00	35.00	17.00	16.50	25.00
1,900 tons plantmix surfacing	6.00	7.00	6.20	7.50	6.00	5.00	7.50
9,320 sq. ft. placing plantmix surf. drains	.50	.20	.33	.35	.10	.45	.50
124 tons asphaltic emulsion	26.00	43.00	44.00	32.00	45.00	27.00	40.00
38 tons liquid asphalt, SC-6	28.00	18.00	32.00	35.00	16.00	16.50	25.00
450 tons screenings	8.60	4.00	6.00	6.00	7.00	5.50	6.00
27,200 cu. yd. P.C.C. pavement	13.50	11.90	12.80	13.00	13.60	16.00	11.40
20,000 ea. tie-bolt assemblies	.45	.50	.55	.55	.45	.45	.70
2,340 cu. yd. P.C.C. (structures)	64.00	52.00	60.00	54.00	60.00	63.00	68.00
7,000 tons rock backfill	6.00	3.50	4.00	4.50	6.00	4.50	5.00
330,000 lb. bar reinforcing steel	.08	.08	.08	.09	.11	.09	.09
650 sq. yd. wire mesh reinf.	.60	.80	.50	.55	.30	.55	.50
4,000 lb. misc. iron and steel	.25	.31	.25	.35	.40	.35	.40
11,500 cu. yd. heavy stone riprap	6.00	4.50	3.30	8.25	2.80	3.00	6.00
2,200 cu. yd. P.C.C. (curbs and gutters)	30.00	23.50	24.00	33.00	35.00	22.00	25.00
64 ea. culvert markers	4.00	4.50	4.50	4.00	6.50	4.50	8.00
1.4 mi. remov. and reconst. prop. fences	$2,600	$1,000	$1,000	$1,000	$1,000	800.00	$1,500
1,240 lin. ft. 18-in. R.C.P. (std. str.)	4.50	3.50	3.00	3.50	3.50	2.80	3.75
2,060 lin. ft. 24-in. R.C.P. (std. str.)	5.80	4.70	4.00	4.75	4.25	3.60	5.00
130 lin. ft. 36-in. R.C.P. (std. str.)	8.70	8.50	8.50	8.00	8.00	6.80	10.00
110 lin. ft. 42-in. R.C.P. (std. str.)	10.70	11.00	10.50	10.50	9.25	9.00	15.00
260 lin. ft. 36-in. R.C.P. (extra str.)	10.20	11.00	9.50	9.00	9.25	8.00	10.00
340 lin. ft. 8-in. C.M.P. (16 gauge)	1.75	1.70	1.30	2.10	1.20	1.10	2.00
100 lin. ft. 12-in. C.M.P. (16 gauge)	2.00	2.30	2.00	2.30	1.50	1.70	2.00
2,100 lin. ft. 4-in. std. drain tile	.50	.80	.40	.60	.90	.55	.50
3 ea. spillway assemblies	25.00	30.00	50.00	25.00	25.00	16.00	25.00
470 lin. ft. salvaging exist. pipe culv.	1.90	1.00	1.25	1.20	1.50	1.20	1.00
42 lin. ft. relaying salv. C.M.P. culv.	1.30	1.00	1.00	1.75	1.50	1.20	1.00
4 ea. salv. exist. spillway assemblies	10.75	12.00	25.00	25.00	7.50	12.00	10.00
3 ea. install. salv. spillway assemblies	10.70	12.00	20.00	10.00	30.00	12.00	25.00
1,200 lin. ft. furnishing 90-lb. R.R. rail	.70	2.50	.80	1.20	1.70	1.10	2.00
45 ea. driving 90-lb. R.R. rail	40.00	20.00	22.00	25.00	30.00	22.00	75.00
2,000 lin. ft. furn. and placing ¾-in. cable	1.00	.50	.70	.60	.60	1.10	1.00
60,000 ea. mesembryanthemum cuttings	.04	.045	.04	.10	.035	.07	.05
75 ea. red reflectors	1.50	4.00	1.25	4.50	3.50	2.20	5.00

California—San Mateo County—State—Pave.

Macco Construction Co., and Morrison-Knudsen Co., Inc., a joint corporation with headquarters at San Bruno, Calif., were low bidders to the Division of Highways, Sacramento, at $2,993,138, for grading and paving with asphaltic concrete on crusher run base about 5.1 mi. of Bayshore Freeway from Colma Creek in South San Francisco to Broadway in Burlingame. The largest feature in the contract is the imported borrow totaling over 3,000,000 tons and costing roughly $1,400,000. An alternative to this type of borrow was a hydraulic dredger fill, bid on by only one contractor and which in his estimate would have cost $1,572,500. The following unit bids were submitted:

(1) Macco Construction Co. and Morrison-Knudsen Co. $2,993,138
(2) Case American Construction Co. 3,291,005
(3) Guy F. Atkinson Co. $3,365,440
(4) Charles L. Harney 4,128,363
(5) Eaton & Smith 4,656,694

	(1)	(2)	(3)	(4)	(5)
1,500 cu. yd. removing concrete	4.25	4.00	5.00	3.50	3.50
Lump sum, clearing and grubbing	$1,000	$1,000	$15,000	$4,000	$2,500
500,000 cu. yd. roadway excavation	.28	.50	.20	.45	.35
19,000 cu. yd. structure excavation	2.50	2.00	2.40	3.75	1.75
3,000 cu. yd. ditch and channel excavation	1.45	1.00	1.25	1.10	1.00
1,500,000 sta. yd. overhaul	.01	.006	.005	.006	.006
235,000 lin. ft. vertical holes (sand drains)	.63	.60	.60	1.00	.80
33,000 tons sand backfill (sand drains)	2.10	1.75	1.80	1.30	2.65
44,000 tons sand fill material (sand drain blanket)	2.00	2.00	2.10	1.75	1.90
1,200 sq. yd. prep. Class C and Class D subgrade	.30	.15	.25	.13	.12
270 sta. finishing roadway	30.00	35.00	80.00	33.00	25.00
148,000 tons crusher run base	2.00	2.30	2.25	2.05	2.25
120 tons asphaltic emulsion (pt. bdr. and sl. ct.)	22.00	25.00	22.50	27.00	25.00
4,100 tons screenings (armor coat)	5.30	4.00	4.20	5.15	4.00
196 tons liquid asphalt, SC-6 (armor coat)	21.00	25.00	22.00	25.50	25.00
78 tons liquid asphalt, SC-1 (prime coat)	20.00	25.00	21.00	22.00	25.00
40,000 tons asphalt concrete leveling course	5.00	4.40	4.90	4.75	4.75
24,000 tons asphalt concrete Type "A" surface	5.20	4.70	5.00	5.40	5.25

(Continued on next page)

60	lin. ft. asphalt concrete raised bars	2.00	2.00	2.00	1.25	2.00
210	cu. yd. Class "B" P.C.C. (base and parking strip)	20.00	14.00	16.00	16.50	15.00
1.4	M.F.B.M. redwood timber	280.00	350.00	250.00	195.00	200.00
3,950	cu. yd. Class "A" P.C.C. (structures)	34.00	50.00	50.00	45.00	50.00
1,300	cu. yd. heavy stone riprap	5.50	5.00	3.75	9.50	4.50
1,560	cu. yd. Class "B" P.C.C. (curbs and gutters)	30.00	25.00	32.00	31.00	25.00
100	each curb dowels	.25	.25	.30	.35	.35
64	cu. yd. Class "B" P.C.C. (sidewalks)	29.00	25.00	35.00	24.00	25.00
120	each monuments	5.50	5.00	5.00	4.50	6.00
32	each center line monuments	48.00	20.00	22.50	17.50	20.00
7,500	lin. ft. metal plate guard railing	1.80	2.10	2.75	2.20	2.50
280	each culvert markers	6.00	3.00	4.50	3.30	4.00
500	each guide posts	6.00	3.50	4.00	4.15	4.00
2,200	lin. ft. chain link fence	1.90	1.75	1.80	1.95	1.75
10.5	miles new property fence	$1,450	$2,000	$2,200	$2,200	250.00
630	lin. ft. 24-in. R.C.P.	4.50	4.00	4.00	3.70	6.00
380	lin. ft. 36-in. R.C.P.	7.80	7.50	7.00	8.00	12.00
180	lin. ft. 42-in. R.C.P.	10.00	9.00	10.00	12.70	22.00
1,420	lin. ft. 12-in. C.M.P. (16 gauge)	1.80	1.75	2.00	1.75	2.00
4,100	lin. ft. 18-in. C.M.P. (16 gauge)	2.80	2.50	3.00	2.85	3.00
2,380	lin. ft. 24-in. C.M.P. (14 gauge)	4.10	4.00	4.00	4.20	4.00
1,700	lin. ft. 36-in. C.M.P. (12 gauge)	7.60	7.75	7.00	7.75	5.00
210	lin. ft. 48-in. C.M.P. (12 gauge)	11.00	13.50	12.00	12.50	14.00
1	each 18-in. automatic drainage gates	60.00	50.00	60.00	58.00	80.00
2	each 24-in. automatic drainage gates	90.00	70.00	75.00	84.00	100.00
2	each manholes	300.00	150.00	150.00	325.00	225.00
6	each adjusting manholes to grade	170.00	50.00	90.00	41.00	30.00
100	lin. ft. salvaging existing pipe culverts	2.50	1.50	2.50	1.80	2.00
670,000	lbs. furn. bar reinforcing steel	.06	.05	.055	.06	.06
670,000	lbs. placing bar reinforcing steel	.03	.03	.04	.037	.02
4,000	lbs. misc. iron and steel	.55	.35	.35	.42	.35
85	each lighting standards	300.00	375.00	400.00	390.00	350.00
12,000	lin. ft. 1½-in. conduit	2.00	2.00	2.00	1.85	1.50
	ALTERNATIVE "A"					
1,850,000	cu. yd. hydraulic dredger fill	.....	.85	.....	.....	.....
Lump sum,	dev. water sup. and furn. watering equip.	.....	$2,000	.....	.....	.....
4,000	M. gals applying water	.....	2.00	.....	.....	.....
	ALTERNATIVE "B"					
1,270,000	tons imported borrow, Type "A"	.47	.....	.535	.72	.70
1,800,000	tons imported borrow, Type "B"	.44	.....	.535	.72	1.10
Lump sum,	dev. water sup. and furn. watering equip.	$15,500	.....	$15,000	$6,250	$2,000
58,000	M. gal. applying water	.25	.....	1.00	1.95	1.50

Arizona—Maricopa County—State—Grade, Surf.

Phoenix-Tempe Stone Co., Phoenix, was low bidder at $199,495 before the State Highway Department, Phoenix, for approximately 5 mi. of grading and draining the roadway, furnishing and placing $47,797 worth of imported borrow, $20,748 aggregate base, concrete pavement and furnishing and applying bituminous surface treatment to the aggregate base on the Phoenix-Rock Springs Highway. Unit bids from eight companies are as follows:

(A) Phoenix-Tempe Stone Co. $199,495
(B) Lee Moor Contracting Co. 212,334
(C) Fisher Contracting Co. 213,502
(D) Bowen & McLaughlin & L. G. Lynch 218,876
(E) Nathan A. Moore $220,263
(F) Tiffany Construction Co. 223,473
(G) Heuser & Garnett 235,941
(H) Wallace & Wallace 253,128

(1) 325 cu. yd. roadway excavation (unclass.)
(2) 1,825 cu. yd. drainage excavation (unclass.)
(3) 5,200 lin. ft. grader ditches
(4) 1,390 cu. yd. structural excav. (unclass.)
(5) 106,216 ton imported borrow
(6) 34,800 ton select material
(7) 19,035 ton aggregate base
(8) 2,800 M. gal. sprinkling
(9) 896 hr. rolling
(10) 160 hr. mechanical tamping
(11) 1,823 sq. yd. conc. pave. (8-in. conc. paved crossing)
(12) 446 cu. yd. Class "A" conc. (incl. cement)
(13) 94 cu. yd. Class "D" conc. (incl. cement)
(14) 50,873 lb. reinforcing steel (bars)
(15) 96.5 lin. ft. structural steel handrail
(16) 30 lin. ft. 24-in. corr. metal pipe (CIP except excavation)
(17) 54 lin. ft. 66x38-in. corr. metal pipe arches (CIP except excavation)
(18) 9,846 lin. ft. standard line fence
(19) 2 ea. standard steel gates (Type 1)
(20) 7,523 lin. ft. reconstructing fence
(21) 12 ea. guide posts (std. A-1 or special A-1a)
(22) 34 ea. right-of-way markers (Tpye "E")
(23) 8 ea. survey monument frames and covers (std. A-33)
(24) 3,240 lin. ft. irrigation ditch
(25) 48 lin. ft. 16-in. plain conc. pipe (irriga.)
(26) 6,045 lin. ft. 18-in. plain conc. pipe (irriga.)
(27) 200 lin. ft. 18-in. plain conc. pipe (culvert)
(28) 66 lin. ft. 20-in. plain conc. pipe (irriga.)
(29) 2,330 lin ft. 24-in. plain conc. pipe (irriga.)
(30) 280 lin. ft. 24-in. reinf. conc. pipe (culvert)
(31) 87 lin. ft. 42-in. reinf. conc. pipe (irriga.)
(32) 244 lin. ft. installing 24-in. conc. pipe (furn. by land owner)
(33) 200 lin. ft. Detail "X" conc. encasement (std. A-28) (for 16-in, 18-in. and 20-in. conc. pipe) (CIP except excav.)
(34) 320 lin. ft. Detail "X" conc. encasement (for 24-in. conc. pipe) (Std. A-28) (CIP except excav.)
(35) 95 lin. ft. Detail "X" conc. encasement (for 42-in. conc. pipe) (Std. A-28) (CIP except excav.)
(36) 6 ea. irriga. standpipes (36-in. x 8-ft. conc. pipe)
(37) 20 ea. irriga. standpipes (42-in. x 8-ft. conc. pipe)
(38) 3 ea. irriga. standpipes (42-in. x 10-ft. conc. pipe)
(39) 22 ea. 18-in. snow clamp head gates, or equal
(40) 37 ea. 24-in. snow clamp head gates, or equal
(41) 240 ton road oil (SC-2) (for B.S.T.)
(42) 125 ton road oil (SC-6) (for B.S.T.)
(43) 880 ton blotter material
(44) Lump sum, removal of conc. pipe
(45) Lump sum, installing irriga. gates (left of sta. 382+ and left of sta. 390+)
(46) Lump sum, removal of miscl. structs.
(47) Lump sum, reconst. 14-ft. timber bridge (left of sta. 383 + 09)
(48) Lump sum, miscl. irriga. work (right of sta. 455+ and sta. 504 + 77)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	1.05	.55	.40	.50	1.00	1.00	.50	.80
(2)	.49	.55	.45	.55	.50	1.00	.50	.80
(3)	.07	.06	.04	.05	.15	.10	.10	.10
(4)	2.10	4.00	1.60	3.00	2.00	2.50	2.50	4.00
(5)	.45	.54	.60	.52	.60	.55	.65	.70
(6)	.52	.68	.66	.67	.70	.75	.65	.80
(7)	1.09	1.15	1.02	1.05	.85	1.10	1.00	1.20
(8)	1.89	2.10	2.50	2.50	1.75	2.50	2.00	1.50
(9)	5.25	6.00	6.30	6.00	6.00	6.00	6.50	6.00
(10)	3.50	6.00	5.00	5.75	4.00	6.00	8.00	5.00
(11)	4.20	4.60	4.62	4.75	5.00	4.50	4.50	4.25
(12)	55.00	46.00	45.00	49.00	50.00	65.00	60.00	48.00
(13)	56.00	48.00	45.00	54.50	45.00	65.00	60.00	50.00
(14)	.10	.096	.10	.11	.09	.10	.10	.10
(15)	13.30	12.00	10.50	14.00	10.00	11.00	12.00	12.50
(16)	3.90	4.50	4.90	4.50	5.00	4.00	5.00	4.00
(17)	17.75	12.50	17.50	19.00	20.00	12.00	21.00	22.00
(18)	.11	.12	.19	.15	.15	.15	.12	.14
(19)	66.50	40.00	38.00	55.00	50.00	40.00	50.00	40.00
(20)	.11	.09	.15	.11	.15	.12	.10	.10
(21)	5.00	5.00	5.00	6.00	7.00	4.00	5.50	5.00
(22)	6.30	6.00	5.00	7.00	7.00	4.00	6.00	6.00
(23)	51.00	40.00	25.00	45.00	25.00	4.00	20.00	50.00

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(24)	.21	.11	.15	.15	.25	.40	.40	1.00
(25)	1.55	2.10	1.60	2.00	2.30	2.00	2.30	2.20
(26)	1.98	2.25	2.00	2.70	2.55	2.20	2.50	2.70
(27)	2.17	3.15	2.25	4.00	2.75	2.40	3.00	6.00
(28)	2.15	2.50	2.50	3.00	2.75	2.40	3.00	2.75
(29)	3.15	3.40	3.60	3.90	4.00	3.30	4.00	3.60
(30)	4.70	4.50	4.60	5.00	5.00	4.50	5.00	8.00
(31)	10.15	11.00	12.25	11.70	12.75	10.00	12.00	15.00
(32)	.84	1.85	2.85	2.00	2.35	1.50	2.50	4.00
(33)	2.69	2.60	1.55	3.00	5.00	2.00	5.00	6.00
(34)	3.88	3.00	2.00	3.50	6.00	2.50	5.00	9.00
(35)	6.03	7.00	4.50	7.70	9.00	3.00	6.00	14.00
(36)	86.50	70.00	80.00	70.00	65.00	60.00	70.00	150.00
(37)	108.50	85.00	92.00	90.00	88.00	70.00	90.00	180.00
(38)	125.00	105.00	110.00	110.00	110.00	100.00	125.00	200.00
(39)	42.50	33.00	47.00	35.00	40.00	30.00	40.00	60.00
(40)	84.00	60.00	77.00	65.00	65.00	50.00	70.00	100.00
(41)	26.00	23.00	23.00	22.00	23.50	20.00	25.00	26.00
(42)	34.00	27.00	29.00	28.00	29.00	26.00	30.00	28.00
(43)	2.80	3.75	3.80	5.00	3.75	4.00	5.00	4.50
(44)	300.00	500.00	580.00	700.00	600.00	500.00	700.00	$1,000
(45)	350.00	100.00	120.00	300.00	60.00	50.00	100.00	200.00
(46)	$3,100	$1,200	882.00	$1,700	$1,800	$1,400	$2,000	500.00
(47)	500.00	100.00	165.00	220.00	300.00	250.00	500.00	300.00
(48)	450.00	300.00	290.00	450.00	300.00	300.00	500.00	400.00

Utah—Salt Lake County—State—Grade, Drain

W. W. Clyde & Co., Springville, submitted the low bid of $189,194 to the State Road Commission, Salt Lake City, for slightly more than 5 mi. of excavation, watering, rolling, clearing and grubbing on the Mountain Dell-Mountain Summit Road. Bids were taken as follows:

(1) W. W. Clyde & Co. $189,194
(2) Floyd S. Whiting 234,812
(3) Palfreyman Constructors $289,257

		(1)	(2)	(3)
318,000	cu. yd. unclassified excavation	4.05	.56	.65
440,000	sta. yd. overhaul, Class "A"	.015	.015	.015
2,000	yd. mi. overhaul, Class "B"	.25	.25	.25
2,700	1,000-gal. watering	1.00	1.00	3.00
2,400	hr. rolling	4.00	4.50	4.50
20,000	lin. ft. surface ditches	.10	.05	.10
60	ac. clearing and grubbing	250.00	200.00	500.00
61	cu. yd. concrete, Class "A"	45.00	40.00	32.00
11,700	lb. reinforcing steel	.10	.10	.10
600	cu. yd. excavation for structures	1.50	2.00	2.00
2,041	lin. ft. 18-in. concrete pipe	3.50	3.50	3.50
1,626	lin. ft. 24-in. concrete pipe	4.50	4.00	4.90
135	lin. ft. 36-in. concrete pipe	8.40	8.00	9.50
111	lin. ft. 60-in. concrete pipe	20.00	20.00	22.00
5,000	lin. ft. right-of-way fence, Type "B"	.25	.25	.25
5	ea. 14-ft. gates	25.00	25.00	30.00

Irrigation . . .

California—San Joaquin County—Bur. of Reclam.—Earthwork & Struct.

Morrison-Knudsen Co., Inc., and M. H. Hasler, Los Angeles, were low bidders to the Bureau of Reclamation, Sacramento, at $3,025,181 for earthwork, concrete lining and structures on the Delta Mendota Canal, a unit of the Central Valley Project, designed to convey water along the west side of the San Joaquin Valley. This is the first unit of the canal system and extends from the pumping plant which will raise the water from the Sacramento River delta to a point south of Tracy, a distance of about 11 mi. The canal invert will be 48 ft. wide and bank slopes will be 1½ : 1, with a water depth of about 18 ft. Following unit bids were submitted:

(1) Morrison-Knudsen Co., Inc. and M. H. Hasler $3,025,181
(2) J. A. Terteling & Sons, Inc. 3,031,797
(3) Guy F. Atkinson Co., W. E. Kier Construction Co., Bressi-Bevanda Constructors, Inc., and A. Teichert & Son 3,224,643
(4) Arizona-Nevada Construction Co. $3,858,398
(5) Utah Construction Co. 4,060,693
(6) Hubert H. Everist, Sr. 4,569,706

	SCHEDULE NO. 1	(1)	(2)	(3)	(4)	(5)	(6)
3,700,000	cu. yd. excavation for canal	.1435	.15	.17	.20	.28	.23
500,000	sta. cu. yd. overhaul	.01	.02	.01	.02	.02	.03
172,000	cu. yd. compacting embankments	.23	.37	.16	.24	.33	.24
58,000	cu. yd. excav. for drainage channels	.23	.36	.30	.28	.35	.513
37,600	cu. yd. excavation for structures	.76	.75	.90	1.15	1.00	1.95
10,500	cu. yd. backfill	.38	.20	.50	.80	.50	.94
10,000	cu. yd. compacting backfill	2.53	3.00	3.00	3.30	2.65	2.51
665,000	sq. yd. trimming found. for conc. lining	.36	.30	.48	.33	.33	.811
2,450	sq. yd. dry-rock paving	6.33	5.00	6.00	7.00	6.00	7.79
6,540	cu. yd. concrete in structures	52.50	45.00	58.20	58.00	65.00	49.14
36,900	cu. yd. conc. in reinf. canal lining	11.25	11.50	11.40	16.50	13.10	15.50
36,900	cu. yd. conc. in unreinf. canal lining	11.25	11.50	11.70	16.25	13.10	16.11
120,000	bbl. furnishing and handling cement	2.78	3.37	2.40	2.65	4.35	3.43
998,000	lb. reinf. bars in structures	.038	.0325	.03	.045	.035	.038
2,330,000	lb. reinf. bars in canal lining	.027	.03	.025	.035	.037	.034
3,460	sq. ft. elastic filler matl. in joints	.63	1.00	1.00	1.75	1.05	1.14
330	lin. ft. rubber waterstops in joints	1.27	1.00	1.10	1.75	1.25	1.14
1,800	lb. metal water stops in joints	.13	.24	.30	.20	.35	.19
370	M.F.B.M. timber in structs., except cattlegds.	115.00	100.00	90.00	120.00	120.00	145.00
34	ea. cattleguards	165.00	240.00	200.00	250.00	260.00	252.00
10,000	lin. ft. underdrains with uncem jts.	1.50	1.00	1.20	2.00	1.35	2.10
2,000	lin. ft. laying sewerpipe with cemented jts.	1.00	.75	1.00	1.25	.53	1.37
432	lin. ft. laying 15-in. conc. pipe	1.90	1.00	2.25	3.60	1.35	2.55
432	lin. ft. laying 18-in. conc. pipe	2.50	1.25	2.75	4.40	1.65	3.80
72	lin. ft. laying 24-in. conc. pipe	3.20	1.50	3.50	5.00	2.35	5.05
81,500	lb. installing gates and gate hoists	.075	.18	.08	.12	.12	.13
48,000	lb. installing miscel. metalwork	.25	.26	.30	.25	.32	.25
80	lin. ft. installing elect. metal conduit	1.00	1.00	2.00	2.00	2.15	2.51
70	lb. installing ground wires	1.00	1.00	1.50	2.50	2.15	2.51
	SCHEDULE NO. 2						
85,000	cu. yd. excavation for structures	.67	.35	.50	.35	.68	2.51
57,000	cu. yd. backfill	.28	.20	.25	.80	.45	.94
6,000	cu. yd. compacting backfill	2.53	3.00	2.25	3.00	3.00	2.51
8,200	cu. yd. concrete in structures	26.45	24.00	34.00	41.25	29.00	49.14
12,300	bbl. furnishing and handling cement	2.78	3.35	2.40	2.65	4.35	3.43
2,665,000	lbs. placing reinforcement bars	.032	.025	.025	.045	.038	.038
600	sq. ft. elastic filler material in joints	.63	1.00	1.00	1.65	1.05	1.14
15,500	lb. metal waterstops in joints	.10	.30	.30	.20	.27	.19
2,000	lb. installing miscel. metalwork	.25	1.00	.40	.25	.31	.25

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 $10,000 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 . . .

Wunderlich Contracting Corp., Jefferson City, Mo., will build the $4,109,927 dam and reservoir across Frenchman Creek near Enders, Neb., for the Bureau of Reclamation, Washington, D. C.

Utah Construction Co., San Francisco, Calif., and **Winston Brothers Co.,** Los Angeles, Calif., have a joint contract of $3,977,136 for construction of a section of the east low canal and three siphons, Columbia Basin Irrigation Project. Bureau of Reclamation, Washington, D. C., awarded the contract.

James I. Barnes Construction Co., San Francisco, Calif., will build a boiler house, steam generators and an oil storage tank at the San Francisco Naval Shipyard for $1,000,000.

J. A. Terteling and Sons, Inc., of Boise, Idaho, received $1,770,592 from the Bureau of Reclamation for the construction of the Long Lake Dam, NE. of Stratford, Wash.

Morrison-Knudsen Co., San Francisco, and **M. H. Hasler,** Santa Ana, Calif., have a contract from the Bureau of Reclamation at Antioch, Calif., for earthwork, lining and structures on an 11.2 mile section of the Delta Mendota Canal in San Joaquin County, Calif. Contract price is $3,025,121.

Robert E. McKee of El Paso, Tex., was awarded $1,909,085 by the U. S. Engineer Office at Kirtland Field for the construction of 118 buildings at the Sandia Base, Albuquerque, N. Mex.

L. H. Hoffman, Portland, Ore., will build a 4-story newspaper plant in Portland for the Oregonian Publishing Co. of the same city for $2,000,000.

Wonderly Construction Co., of Long Beach, Calif., received $671,272 from the Burbank City Council for the construction of a water distribution reservoir to be built in the McClure Canyon Wash in Burbank, Calif.

Oilfields Truck Co. and **Phoenix Construction Co.,** Bakersfield, Calif., were awarded a $718,234 contract by the Division of Highways, Sacramento, for 4.6 mi. highway construction between Mountain Creek and Piercy, Calif.

Western Pipe & Steel Co., San Francisco, Calif., will furnish and deliver 12 pump discharge pipes to be installed at the Grand Coulee pumping plant for $1,272,854. **Westinghouse Corp.,** of Denver, Colo., also received from the Bureau of Reclamation, Washington, D. C., a $3,367,717 contract for 3 generators to be installed at the Grand Coulee Dam, Wash.

American Pipe & Construction Co., Portland, Ore., have received a $805,135 contract from the City Council at Olympia, Wash., for pipeline construction at McAllister Springs, Wash.

L. E. Dixon Co., San Gabriel, Calif., received $1,000,000 from the Hollywood Turf Club at Hollywood Park, Calif., for the construction of an addition to the existing clubhouse at Inglewood, Calif.

Babbitt & Mercer, Inc., of Portland, Ore., are building for themselves 750 or 800 dwellings in the Bangor Section of North Bend, Ore. The cost will be $5,000,000.

C. & F. Trucking and Contracting Co., Butte, Mont., received a $498,307 contract for 7.6 miles of highway construction on the Flathead Lake East Shore Highway, Mont., from the State Highway Commission at Helena.

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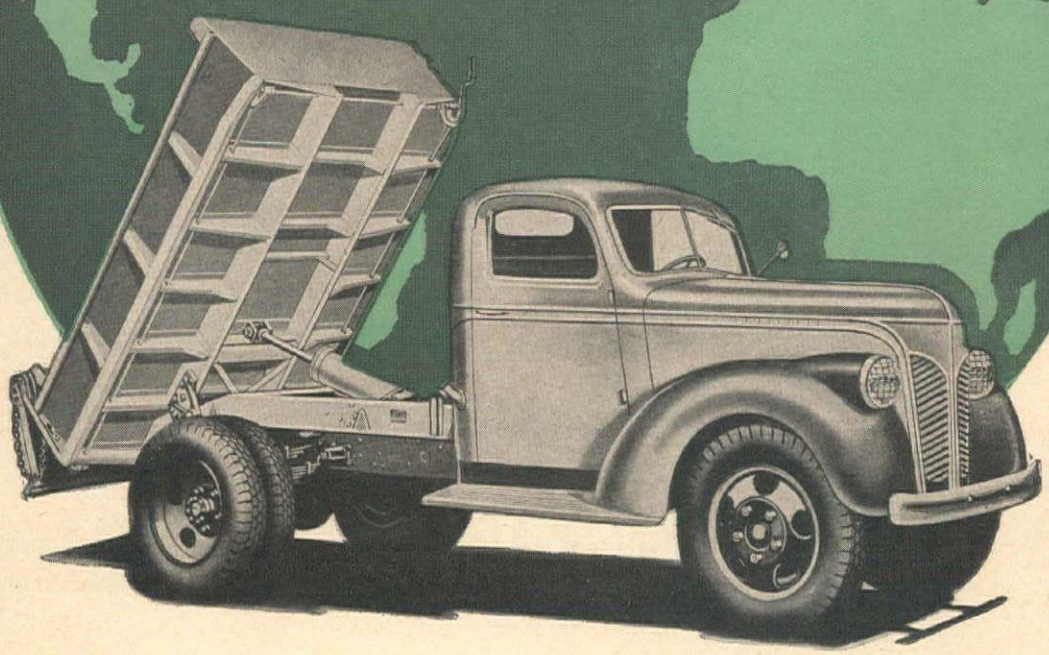

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ARIZONA: Allison Steel Mfg. Co., 19th Ave. and So. Pac. Tracks, Phoenix; CALIFORNIA: Gar Wood Industries, Inc., 1210 Mateo St., Los Angeles 21; Gar Wood Industries, Inc., 17th and Folsom Sts., San Francisco 10; COLORADO: Liberty Trucks & Parts Co., 690 Lincoln St., Denver 1; IDAHO: Olson Mfg. Company, 4000 Warm Springs, Boise; General Machinery Co., E. 3500 Block, Riverside Ave., Spokane 1, Wash.; MONTANA: Reymer Machine Co., Inc., 115 N. 25th St., Billings; Granite Alaska Garage, 45 W. Granite St., Butte; NEW MEXICO: Oden Equip. Co., 312-24 N. 4th St., Albuquerque; Lone Star Equip. Co., 1500 Texas St., El Paso, Texas; OREGON: Fruehauf Trailer & Equip. Co., 1138 S. E. 10th St., Portland 14; UTAH: Lundberg Equip. Co., 257 N. Main St., Logan; Cate Equip. Co., 49 East 9th South, Salt Lake City 4; WASHINGTON: Fruehauf Trailer & Equip. Co., 300-4 Michigan St., Seattle 8; WYOMING: Wilson Equip. & Supply Co., 902 W. 22nd St., Cheyenne.

Swinerton & Walberg, San Francisco, Calif., will receive $972,000 for the construction of a manufacturing plant on Harbor Blvd. in Redwood City, Calif. Plant Rubber & Asbestos Co. of San Francisco awarded the contract.

Jones-Hettelsater Construction Co., Kansas City, Mo., holds the $775,000 Globe Mills, Inc., Los Angeles contract for the construction of a grain elevator on E. Ferguson Dr., East Los Angeles, Calif.

W. T. Bookout Construction Co., Las Vegas, N. Mex., will grade and construct 7 box culverts on 7.5 mi. of Hwy., between Silver City and Bayard, N. Mex., for the State Highway Department, Santa Fe. Contract price is $539,293.

J. A. Terteling and Sons, Inc., Boise, Ida., have the $934,948 contract from the Bureau of Reclamation for the construction of earthwork and structures for Hudson Canal, Troutman, Smith and Harris laterals near Tucumcari, N. Mex.

Adler Construction Co., Seattle, Wash., will receive $602,832 for irrigation system construction near Metolius and Madras, Ore., part of the Deschutes Project. Bureau of Reclamation awarded the contract.

Porter W. Yett of Portland, Ore., has the $739,472 Oregon State Highway Commission contract for the construction of 4 bridges and paving on the North Plains-Barnes Road in Washington County, Ore.

H. J. Von Rosenberg, San Antonio, receives $500,000 for the construction of 3-story addition to the Sears Roebuck & Co. Bldg., San Antonio, Tex.

Austin Co., Seattle, Wash., has the United Airlines $750,000 contract for hangar construction, Seattle, Wash.

Highway and Street . . .

Arizona

COCHISE CO.—**R. H. Martin Contracting Co.,** Box 934, Tucson—$212,871 to grade, drain, place base and surf. a section of Douglas-Safford Hwy., from 3½ mi. E. of Pearce for 10¼ mi. NW.—by State Highway Department, Phoenix. 11-15

COCHISE CO.—**Winston Bros. Co.,** 411 W. 5th St., Los Angeles, Calif.—$311,102 for 5.3 mi. grade, drain, base and surf. on Douglas-Safford Hwy., from Bowie Junction N.—by State Highway Department, Phoenix. 11-15

MARICOPA CO.—**Phoenix-Tempe Stone Co.,** Box 1670, Phoenix—$189,813 for 5.7 mi. grade, drain imported borrow, base and surf. on Mission Dr., starting 6 mi. N. of intersection of Grand Ave., Thomas Rd. and Mission Dr.—by State Highway Department, Phoenix. 11-5

NAVAJO CO.—**Wallace & Wallace,** S. 19th Ave., Phoenix—$61,145 for 13.2 mi. constr. on Globe-Holbrook rd., Sitgreaves National Forest—by Public Roads Administration, Phoenix. 11-1

PINAL CO.—**Nathan A. Moore,** 105 E. Garvey Blvd., San Gabriel, Calif.—$344,980 for hwy. constr. on Florence-Superior Hwy., from Florence Junction E.—by State Highway Department, Phoenix. 11-20

California

ALAMEDA CO. — **Key System,** 1106 Broadway, Oakland — $10,247 to remove tracks and prepare subgrade, Broadway and College Ave., betw. Piedmont Ave. and N. boundary of Oakland—by City Council, Oakland. 11-5

FRESNO CO. — **Basich Bros. & Basich Bros. Construction Co.,** Box 151, Alhambra—$316,444 for 4 mi. grade and pave, betw. Shields and Herndon Ave.—by Division of Highways, Sacramento. 11-20

FRESNO CO.—**Louis Biasotti & Son,** 40 W. Clay St., Stockton—$156,420 for 8.6 mi. grade, surf. with imported borrow and bitum. surf. on the Fresno-Coalinga Rd., betw. Mt. Whitney Ave. and St. Hwy. Rt. 10—by Division of Highways, Sacramento. 11-20

HUMBOLDT CO. — **W. C. Railing,** 27 Lowell St., Redwood City—$59,744 for 4.7 mi. furnish and place base material, betw. Redwood Summit and 1 mi. E. of Redwood Creek—by Division of Highways, Sacramento. 11-4

LOS ANGELES CO.—**J. C. Hickey, Inc.,** 1645 Allesandro St., Los Angeles—$62,492 to grade and pave Sepulveda Blvd. temporary by-pass, slightly S. of Century Blvd., to Imperial Hwy., Los Angeles—by City Board of Public Works, Los Angeles. 11-22

MENDOCINO CO.—**Oilfields Truck Co.,** Box 751, Bakersfield, and **Phoenix Construction Co.,** Box 806, Bakersfield—$718,234 for 4.6 mi. grade and pave with plant mix surf. on cement treat. base, betw. Mountain Creek and Piercy—by Division of Highways, Sacramento. 11-1

SACRAMENTO CO.—**J. R. Reeves,** Box 1072, Sacramento—$38,718 to grade, etc. in vicinity of Folsom Blvd., 55th and Q Sts., Sacramento—by City Council, Sacramento. 11-5

SACRAMENTO CO.—**A. Teichert & Co.,** Box 1133, Sacramento — $69,979 to grade, pave, etc., the Wright & Kimbrough Arden Park Vista Unit No. 4, Sacramento—by County Board of Supervisors, Sacramento. 11-20

SANTA BARBARA CO. — **N. M. Ball Sons,** Box 430, Berkeley—$418,948 for 2.9 mi. grade and surf. betw. Las Varas Creek and El Capitan Creek — by Division of Highways, Sacramento. 11-4

SANTA CLARA CO.—**Piazza & Huntley,** 175 S. Montgomery St., San Jose—$40,552 for base surf. roadway finish, etc., on Phelan Ave., Alma, 7th and 10th Sts. — by County Council, San Jose. 11-14

SANTA CLARA CO. — **Stuart Equipment Co.**, 870 Savaker Ave., San Jose—$13,067 for macadam roads at Airport Village, San Jose—by City Council, San Jose. 11-7

VENTURA CO.—**Jesse S. Smith**, 444 Ross, Glendale—$44,237 for 5.1 mi. improvement of Wood Rd., betw. Pleasant Valley Rd. and U. S. Hwy. 101 Alternate—by City Council, Ventura. 11-15

Colorado

DOUGLAS CO.—**Platt Rogers, Inc.**, Pueblo—$87,740 for 1.9 mi. hwy. constr. on the Colorado Forest Project 50-72, Jarre Canyon—by Public Roads Administration, Denver. 11-8

JACKSON CO.—**Wyoming Construction Co.**, Laramie, Wyo. —$171,707 for 6.4 mi. to constr. Colo. Forest Project 24-F, Willow Creek Pass—by Public Roads Administration, Denver. 11-8

Idaho

ADAMS CO.—**Tony Marrazzo**, Box 876, Boise—$430,896 for 8 mi. of roadbed, drain structs., surf. on U. S. No. 95, betw. Tamarack and New Meadows—by Bureau of Highways, Boise. 11-16

BINGHAM AND BONNEVILLE COS.—**Western Construction Co.**, Box 628, Pocatello—$65,696 for 4.5 mi. roadbed constr., drain. structs. and surf. of Shelley-East Rd.—by Bureau of Highways, Boise. 11-9

CANYON CO.—**H. A. Gardner**, 685 NW. Main St., Blackfoot —$223,735 for 4.9 mi. roadbed, drain. structs. and bitum. surf. of U. S. Hwy. 20, from Caldwell E.—by Bureau of Highways, Boise. 11-23

GOODING CO.—**Shoshone Co.**, 113 Shoshone, Twin Falls—$100,896 for 4 mi. roadbed, drain structs. and crushed gravel surf. on Clear Lakes Rd.—by Bureau of Highways, Boise. 11-23

KOOTENAI CO.—**Clifton & Applegate**, Box 1473, Spokane, Wash.—$42,392 for constr. of 3.2 mi. of McGuires N. rd.—by Bureau of Highways, Boise. 11-1

ONEIDA CO.—**Whiting & Haymond**, Springville—$58,725 for 5 mi. constr. of Malad City-Daniels rd., betw. Elkhorn school and Elkhorn dam—by Bureau of Highways, Boise. 11-1

TWIN FALLS CO.—**Duffy-Reed Construction Co.**, Twin Falls

—$94,435 for 3.5 mi. road constr. of Filer N. rd. and 2.8 mi. of Radio Tower N. rd.—by Bureau of Highways, Boise. 11-1

TWIN FALLS CO.—**Triangle Construction Co.,** Box 2617, Boise—$119,982 for constr. of 5.8 mi. Park Lane rd. and 2.9 mi. of Twin Falls S. rd.—by Bureau of Highways, Boise. 11-1

WASHINGTON CO.—**Quinn-Robbins Co., Inc.,** 703 S. 16th St., Boise—$71,998 for 7.3 mi. roadbed constr., drain. structs. and surf. of Crane Creek Rd.—by Bureau of Highways, Boise. 11-22

Kansas

DECATUR CO.—**D. G. Hansen,** Logan—$13,581 for 5.8 mi. light type surface—by State Highway Commission, Topeka. 11-13

DECATUR CO.—**D. G. Hansen,** Logan—$10,775 for 6.6 mi. light type surfacing—by State Highway Commission, Topeka. 10-29

GOVE CO.—**Rhoades Construction Co.,** Newton—$11,028 for 5.5 mi. grading—by State Highway Commission, Topeka. 10-29

HASKELL CO.—**List & Clark Construction Co.,** Railway Exch. Bldg., Kansas City—$51,942 for 12.1 mi. grading—by State Highway Commission, Topeka. 11-13

HASKELL CO.—**J. H. Shears' Sons,** Box 227, Hutchinson—$10,193 for 15 mi. light type surface—by State Highway Commission, Topeka. 11-13

HASKELL CO.—**Southwest Sand & Gravel Co.,** Dodge City—$101,198 for 12.1 mi. subgrade modification and dense graded surf. course—by State Highway Commission, Topeka. 11-13

MORTON CO.—**Caughey Construction Co.,** Russell—$18,189 for 2.4 mi. grading—by State Highway Commission, Topeka. 11-4

MORTON CO.—**Caughey Construction Co.,** Russell—$11,340 for 3.2 mi. grading—by State Highway Commission, Topeka. 11-4

OSBORNE CO.—**Broce Construction Co.,** Dodge City—$54,121 for 32.6 mi. light type surf.—by State Highway Commission, Topeka. 10-29

PAWNEE CO.—**Miller-Clarkson, Inc.,** Dodge City—$70,503 for 10.2 mi. grading—by State Highway Commission, Topeka. 11-4

RAWLINS CO.—**D. G. Hansen,** Logan—$10,707 for 7 mi. light type surfacing—by State Highway Commission, Topeka. 11-4

SEDGWICK CO.—**Stannard Construction Co.,** Wichita—$109,449 for 1 mi. grading—by State Highway Commission, Topeka. 10-29

SHERMAN CO.—**Harry Henery,** Ottawa—$15,183 for 12 mi. grading—by State Highway Commission, Topeka. 11-13

SMITH CO.—**Blair Construction Co.,** Omaha, Neb.—$15,286 for 9.6 mi. light type surface—by State Highway Commission, Topeka. 11-13

SMITH CO.—**E. W. Geiger,** Leavenworth—$207,123 for 9.6 mi. grading—by State Highway Commission, Topeka. 11-13

STAFFORD CO.—**Miller Clarkson, Inc.,** Dodge City—$41,735 for 8.9 mi. grading—by State Highway Commission, Topeka. 11-4

THOMAS CO.—**M. W. Watson,** Topeka National Bank Bldg., Topeka—$45,441 for .3 mi. grade, conc. pave and seeding—by State Highway Commission, Topeka. 11-4

TREGO CO.—**Broce Construction Co.,** Dodge City—$11,040 for 11.9 mi. light type surfacing—by State Highway Commission, Topeka. 10-29

TREGO CO.—**Raymond Johnson,** LaCrosse—$25,390 for 11.9 mi. grading—by State Highway Commission, Topeka. 10-29

WALLACE CO.—**Harry Henery,** Ottawa—$29,364 for 11.1 mi. grade and subgrade reconditioning—by State Highway Commission, Topeka. 11-13

Montana

CARBON CO.—**Peter Kiewit Sons Co.,** Omaha National Bank Bldg., Omaha—$167,272 for 6.9 mi. grade, surf. and oil Belfry-Bridger Hwy., from Bridger SW.—by State Highway Commission, Helena. 11-1

CASCADE CO.—**S. Birch & Sons Construction Co.,** Ford Bldg., Great Falls—$465,873 for 9.5 mi. grade, surf. and oil Vaughn-Conrad Hwy., from Vaughn E.—by State Highway Commission, Helena. 11-1

LAKE CO.—**C. & F. Trucking and Contracting Co.,** Box 4, Butte —$498,307 for 7.6 mi. grade, surf. and cover on Flathead Lake-

East Shore Hwy.—by State Highway Commission, Helena. 11-1

LEWIS & CLARK CO.—**Clifton & Applegate Co.**, Box 1473, Spokane, Wash.—$417,890 for 5.8 mi. clear, grub and grade from Rogers Pass E. on Rogers Pass-Simms Hwy.—by State Highway Commission, Helena. 11-1

MEAGHER CO.—**Peter Kiewit Sons Co.**, Omaha National Bank Bldg., Omaha, Neb.—$112,475 for 11.5 mi. grade, drain and surf. Martinsdale-Ringling Rd. — by State Highway Commission, Helena. 11-4

RAVALLI CO. — **Nilson-Smith Construction Co.**, Box 1147, Great Falls—$203,985 to grade on W. fork of Bitterroot Forest Development Rd.—by Public Roads Administration, Missoula. 11-15

Nevada

ELKO CO.—**W. W. Clyde & Co.**, Springville, Utah—$264,165 for 19 mi. hwy. constr. 12 mi. SE. of Elko to Lamoille, and placing of roadmix surface from Elko to ½ mi. E. of Lamoille—by Department of Highways, Carson City. 11-7

NYE CO.—**Dodge Construction Co., Inc.**, N. Main St., Fallon—$184,932 for 21.6 mi. hwy. work from Round Mountain Junction to Milletts, Rt. 8A, Section B—by Department of Highways, Carson City. 11-7

North Dakota

MORTON CO.—**Clyde Coman**, Bismarck—$160,033 for .4 mi. grade, base and surf. on U. S. Hwy. 10 E. of Glen Ullin—by State Highway Department, Bismarck. 11-1

Oregon

BAKER CO.—**J. C. Papin**, Baker—$332,918 for 5.3 mi. grade and oil mat surf. of Love Bridge-Black Bridge section of Baker-Homestead Hwy.—by State Highway Commission, Salem. 11-8

DESCHUTES AND KLAMATH COS.—**Oscar E. Joelson**, Eugene—$45,000 for constr. of Lapine rock production proj. on Fremont and Dalles-Calif. Hwys.—by State Highway Commission, Salem. 11-8

GRANT CO.—**Sound Construction & Engineering Co.**, 1403 W. 45th, Seattle, Wash.—$219,456 for 7.9 mi. grade, surf. and stockpiling, Dry Creek-Monument Section of Kimberly-Long Creek Secondary Hwy.—by State Highway Commission, Salem. 11-8

GRANT CO.—**Sound Construction & Engineering Co.**, 1403 W. 45th, Seattle, Wash.—$41,836 for 5.4 mi. surf. and oiling of Kimberly-Dry Creek Section of Kimberly-Long Creek Secondary Hwy.—by State Highway Commission, Salem. 11-8

LINN CO.—**Doybons & Webb**, Salem—$13,700 for .2 mi. rock revetment on Sanderson Bridge revetment section near Albany-Lyons Hwy.—by State Highway Commission, Salem. 11-8

LINN CO.—**Sound Construction & Engineering Co.**, 1403 W. 45th, Seattle, Wash.—$223,239 for 15.5 mi. surface and oiling South Santiam Hwy., from junction of S. and N. Hwys. to Tombstone Prairie—by State Highway Commission, Salem. 11-1

MULTNOMAH CO.—**Edlefsen-Weygandt Co.**, Box 5626, Portland—$117,813 for .2 mi. pave. widening and .6 mi. grade and pave, Jantzen Beach section of Pacific Hwy. and connecting roads—by State Highway Commission, Salem. 11-22

SHERMAN CO.—**Vernie Jarl**, Gresham—$65,973 for 1.2 mi. grade and surf. the N. Unit, Fulton Canyon Section of the Fulton Canyon-Wasco Hwy. — by State Highway Commission, Salem. 11-8

Texas

ATASCOSA CO.—**Killian-House Co.**, Box 1981, San Antonio—$71,840 for 5.2 mi. grade, structs., base and surf., slightly E. of Poteet to Pleasanton—by State Highway Department, Austin. 11-8

CAMERON CO.—**Dodds & Wedgartner Construction Co.**, San Benito—$93,986 for 9.8 mi. grade and structs. on FM. 511—by State Highway Department, Austin. 11-11

CARSON CO.—**Austin Road Co.**, Box 1590, Dallas—$214,767 for 15.8 mi. conc. pave. widening from Gray Co. line to 10 mi. E. of Conway—by State Highway Department, Austin 11-4

COLLIN CO.—**Austin Road Co.**, Box 1590, Dallas—$145,575 for 8.5 mi. grade, structs., base and surf. on FM. 543, from Anna to Weston—by State Highway Department, Austin. 11-11

CORYELL CO.—**J. W. Perry**, Insurance Bldg., San Antonio—

$81,952 for 8.8 mi. grade, struct., and seal coat on FM. 182, betw. Turnersville and Amos—by State Highway Department, Austin. 11-1

DEAF SMITH CO.—**Bell & Braden,** Herring Hotel Bldg., Amarillo—$160,322 for 8.8 mi. grade, base and surf. on Hwy. 51, N. of Hereford—by State Highway Department, Austin. 11-11

FALLS CO.—**Vilbig Construction Co.,** 817 Bouborn St., Dallas—$88,010 for 1.2 mi. grade, drain structs. and surf. from McLennan Co. line to U. S. 77, W. of Chilton—by State Highway Department, Austin. 11-19

HUNT CO.—**R. W. McKinney,** Box 190, Nacogdoches—$285,025 for 5.8 mi. grade, base and surf. from Celeste to Kingston and Greenville, SE. 2.9 mi.—by State Highway Department, Austin. 11-11

JACK CO.—**A. R. Lipsey,** Dallas—$72,743 for 5.2 mi. grade, structs., base and surf. on Hwy. 59, from Hwy. 24, N.—by State Highway Department, Austin. 11-11

JOHNSON CO.—**John F. Buckner,** Box 76, Clebourne—$175,302 for 11.1 mi. grade, drain. structs., base and surf., betw. Venus and Ellis Co. line—by State Highway Department, Austin. 11-8

KAUFMAN CO.—**John T. Leslie,** Bailey—$90,685 for 17 mi. grade and drain structs. on FM. 85 and 148—by State Highway Department, Austin. 11-11

KIMBLE CO.—**Killian-Keller Co.,** Box 1981, San Antonio—$68,350 for 10 mi. grade, structs., base and surf. from U. S. Hwy. 290, .3 mi. W. of Gillespie Co. line NW.—by State Highway Department, Austin. 11-19

LIVE OAK CO.—**Ned B. Hoffman,** Mid-Continent Bldg., Fort Worth—$122,589 for 6.3 mi. paved sts. and 1.1 mi. grade and structs. in Three Rivers—by City Council, Three Rivers. 11-12

REEVES CO.—**F. M. Reeves & Sons,** Box 972, Pecos and **Dean Skinner,** Box 1042, Austin—$394,266 for 15.8 mi. grade, structs., base and surf., from Pecos SE.—by State Highway Department, Austin. 11-11

REFUGIO CO.—**H. B. Zachery,** Box 596, San Antonio—$113,192 for 5.4 mi. hot mix asphalt surf. on U. S. Hwy. 77, from Woodsboro to Greta—by State Highway Department, Austin. 11-5

STARR CO.—**Contractors Finance Co.,** Houston—$189,635 for 7 mi. grade, structs., base and surf. on FM. Rds. 650 and 649—by State Highway Department, Austin. 11-8

WILLIAMSON CO.—**Burnham Construction Co.,** Rt. 3, Box 164, Georgetown—$114,419 for 10.3 mi. grade, structs. and base on FM. 620, betw. Round Rock and Williamson-Travis Co. line—by State Highway Department, Austin. 11-19

Washington

COWLITZ CO.—**George Oakes,** Longview—$65,828 to widen portion of Allen St., Kelso—by City Council, Kelso. 10-31

KITTITAS CO.—**C. E. O'Neal,** Ellensburg—$48,040 for .08 mi. grade and drain of P. State Hwy. 3, near Wilson Creek—by Department of Highways, Olympia. 11-1

KLICKITAT CO.—**Guy J. Norris,** Shelton—$153,380 for 11.5 mi. grade and surf. of Goldendale-Bickleton Rd.—by Department of Highways, Olympia. 10-30

WAHKIAKUM CO.—**Leonard & Slate, Ore. Ltd.,** 7805 SW. 40th Ave., Portland, Ore.—$106,323 for 1.7 mi. clear, grub, roadway borrow, base and top course surf., P. State Hwy. 12, Skamokawa W.—by Department of Highways, Olympia. 11-4

Wyoming

ALBANY CO.—**Northwest Engineering Co.,** Box 1392, Rapid City, S. Dak.—$64,272 for 4.4 mi. surf. and oiling of Laramie-Cheyenne rd.—by State Highway Commission, Cheyenne. 11-1

FREMONT CO.—**Sharrock & Pursel,** Box 316, Casper—$275,219 for 15.5 mi. grade, drain and surf. of Shoshone-Pavillion rd.—by State Highway Commission, Cheyenne. 11-1

GOSHEN CO.—**Hopkins & McPherson,** Box 977, Laramie—$67,459 for 4.5 mi. grade, drain and surf. of Torrington-West rd.—by State Highway Commission, Cheyenne. 11-1

NATRONA CO.—**Lichty Construction Co.,** Rawlins—$36,616 for grade, drain and constr. of one reinf. conc. culvert on Bates Creek-Medicine Bow rd. — by State Highway Commission, Cheyenne. 11-1

UINTA CO.—**J. J. Dooling,** Denver, Colo.—$142,245 for 5.3 mi. grade, drain and base course surf. on Evanston-Hillard Flat rd.—by State Highway Department, Cheyenne. 10-30

Bridge & Grade Separation...

California

DEL NORTE CO.—**Tom Hull,** 930 Carson St., Eureka—$14,990 for constr. of bridge No. 1-C-8 across Gilbert Creek—by County Board of Supervisors, Crescent City. 11-13

IMPERIAL CO.—**Bent Construction Co.,** 5359 Valley Blvd., Los Angeles—$245,709 for constr. of 2 bridges and approaches about 9 and 15.5 mi. NW. of Westmorland at Lone Tree Wash and San Felipe Creek—by Division of Highways, Sacramento. 11-4

ORANGE CO.—**O. B. Pierson,** 621 Flower St., Bellflower—$12,886 for constr. of reinf. conc. bridge on N. Cypress Ave., Fullerton—by City Council, Fullerton. 11-15

RIVERSIDE CO.—**J. F. Fredenburgh,** 1717 Garibaldi Ave., Temple City—$35,544 for constr. of reinf. conc. slab bridge across Coachella Canal, 5 mi. E. of Indio—by Division of Highways, Sacramento. 11-19

SAN DIEGO CO.—**Spencer Webb,** 1111 N. Sycamore St., Los Angeles—$219,257 for constr. of bridge, cattlepass extension and grade and surf. approaches, across Santa Ysabel Creek, 8.7 mi. E. of Escondido—by Division of Highways, Sacramento. 11-5

Montana

CASCADE CO.—**Walter Mackim,** Billings—$34,224 for constr. of 2 conc. and steel bridges and conc. box culvert on Vaughn-Conrad Hwy., NW. of Vaughn—by State Highway Commission, Helena. 11-1

FERGUS & JUDITH BASIN COS.—**Stanley H. Arkwright, Inc.,** Securities Bldg., Billings—$170,052 for 7.3 mi. grade, surf. and oil and constr. of 4 treated tim. structs., Harlowton-Moore Hwy., Judith Gap N.—by State Highway Commission, Helena. 11-1

MEAGHER CO.—**Peter Kiewit Sons Co.,** Omaha National Bank Bldg., Omaha—$112,475 for 11.5 mi. grade, surf. and constr. of conc. and steel bridge of Martinsdale-Ringling Hwy. from Lennep E.—by State Highway Commission, Helena. 11-

TETON AND PONDERA COS.—**O'Neil Construction Co.** Havre—$108,346 for 9.2 mi. grade and surf. and constr. of timbe bridges on Pendroy-Conrad Hwy.—by State Highway Commis sion, Helena. 11-

New Mexico

CHAVES CO.—**G. I. Martin,** 520 S. Tulane, Albuquerque—$302,167 for 8.7 mi. grade, drain structs., surf. and constr. of box culverts on U. S. Hwy. 285, betw. Roswell and Artesia—by State Highway Department, Santa Fe. 11-

GRANT CO.—**W. T. Bookout Construction Co.,** Box 298, Las Vegas—$539,293 for 7.5 mi. grade, drain. structs. and constr. o 7 box culverts on U. S. Hwy. 260, betw. Silver City and Bayard—by State Highway Department, Santa Fe. 11-

LUNA CO.—**Brown Brothers,** Box 1479, Albuquerque—$229,48 for 12.9 mi. grade, watering and rolling, ballast, level course surf. and constr. of 3 conc. box culverts on N. M. Hwy. 11, betw Deming and Columbus—by State Highway Department, Santa Fe. 11-

Oklahoma

JACKSON CO.—**Stebbins Construction Co.,** 801 N. Lewis Place, Tulsa—$29,756 for constr. of bridges, culverts and drain inlets for Altus—by Bureau of Reclamation, Washington, D. C 11-11

Oregon

UMATILLA CO.—**John Logan,** Portland—$73,960 for constr. of 34-ft. bridge and 1 mi. grade and surf. on Tutuilla section of John Day-Pendleton Hwy.—by State Highway Commission, Salem. 11-21

WASHINGTON CO.—**Porter W. Yett,** 6500 NE. Ainsworth, Portland—$739,472 for constr. of 4 bridges and to pave on 11.7 mi. of North Plains-Barnes Rd. section of Sunset Hwy.—by State Highway Commission, Salem. 11-8

Texas

BELL AND FALLS COS.—**Thomas & Ratliff,** Rogers—$112,-

469 for constr. of 4 bridges and approaches on State Hwy. 320, betw. Lott and Hwy. 53 —by State Highway Department, Austin. 11-4

DALLAS AND KAUFMAN COS. — **Markham & Brown-Kearney, Crume & Co.,** Box 2056, Capital Sta., Austin—$424,908 for 5.3 mi. grade and constr. of culverts, from .5 mi. W. of Seagoville to Crandall—by State Highway Department, Austin. 11-11

HAMILTON CO.—**Markham & Brown-Kearney, Crume & Co.,** Box 2056, Capital Sta., Austin—$245,609 for 9.8 mi. grade and culvert constr., from Hamilton to Lanham —by State Highway Department, Austin. 11-11

Washington

CLALLAM CO.—**Owens Bros.,** Railroad & Oak, Port Angeles—$11,100 to remove portions of existing struct. and replace with untreated timber, Elwha River Bridge—by Department of Highways, Olympia. 11-4

PIERCE CO.—**Guy F. Atkinson & Co.,** 807 4th Ave., Seattle—$408,791 for constr. of reinf. conc. arch bridge and reinf. conc. girder approaches, E 24th St., over Tacoma E. Gulch, betw. B and D Sts., Tacoma—by City Council, Tacoma. 11-5

SKAGIT CO.—**C. B. Croy,** Bellingham—$19,988 to constr. reinf. conc. bridge over a slough approx. 4.4 mi. W. of Mt. Vernon on P. State Hwy. 1—by Department of Highways, Olympia 11-1

STEVENS CO.—**Don L. Cooney & Co.,** Seattle—$22,700 for constr. of bridge and piers in Colville—by County Council, Colville. 11-5

Wyoming

CONVERSE CO.—**Knisely-Moore,** Box 77, Douglas — $87,747 for 5.1 mi. grade, drain and constr. of 4 reinf. conc. culverts on Douglas-Cold Springs rd. — by State Highway Commission, Cheyenne. 11-1

LINCOLN CO.—**Northwest Engineering Co.,** Box 1392, Rapid City, S. Dak.—$205,470 for constr. of 8 reinf. conc. deck bridges and grade, drain, surf. and seal coat on 3.4 mi. of Grover-Aubrun rd. and on 3 mi. of Afton-West rd.—by State Highway Commission, Cheyenne. 10-30

SUBLETTE CO.—**J. J. Dooling,** Denver, Colo.—$117,905 for constr. of 5 reinf. conc. culverts and 8.3 mi. grade, drain on Boulder-Big Sandy rd. — by State Highway Commission, Cheyenne. 10-30

UINTA CO. — **Peter Kiewit Sons Co.,** Omaha National Bank Bldg., Omaha, Neb. —$455,716 for 9.6 mi. grade, drain, base course, plantmix surf. and constr. of 2 reinf. conc. culverts on Lincoln Hwy. from Utah state line to Evanston and W. from Evanston toward Granger Junction—by State Highway Department, Cheyenne. 10-30

Airport . . .

California

SAN MATEO CO.—**Empire Construction Co., Ltd.,** 344 Harriet St., San Francisco—$100,000 for constr. of steel nose hangar at San Francisco Airport, San Bruno—by TWA, Inc., San Francisco. 11-27

STANISLAUS CO. — **Standard Materials Co.,** 1411 9th St., Modesto—$15,760 to improve taxi lane and aprons at Municipal Airport, Modesto—by City Council, Modesto. 11-15

Oregon

MULTNOMAH CO.—**E. E. Settergren,** Henry Bldg., Portland—$150,000 for construction of airport terminal, Portland Columbia Airport, Portland—by United Airlines, Portland Columbia Airport, Portland. 11-12

Washington

KING CO. — **Austin Co.,** Dexter-Horton Bldg., Seattle—$750,000 for hangar constr., Seattle—by United Airlines, 4th and University, Seattle. 11-12

Water Supply . . .

California

ALAMEDA AND CONTRA COSTA COS.—**Elmer J. Freethy,** 1432 Kearney St., El Cerrito—$203,826 for constr. of prestressed conc. Castro Valley, Baseline and Tewkbury Reservoirs—by East Bay Municipal Utility District, Oakland. 11-25

HUMBOLDT CO.—**Arcata Pump & Electric Co.,** Arcata—$7,500 to furnish and lay pipeline from Janes Creek to storage reservoir, Arcata—by City Council, Arcata. 11-22

LOS ANGELES CO. — **Wonderly Construction Co.,** 2694 Lime Ave., Long Beach —$671,272 for constr. of 25,000,000 gal. water distribution reservoir by N. section of McClure Canyon Wash, Burbank—by City Council, Burbank. 11-25

SAN DIEGO CO.—**American Pipe & Construction Co.,** 4635 Firestone Blvd., South Gate — $489,608 for constr. of El Monte pipeline Section IV, Grossmont tunnel to Alvarado filtration plant, San Diego—by City Council, San Diego. 11-15

SAN DIEGO CO.—**Robert McKenna,** Solano Beach—$27,510 for constr. of 2 reinf. conc. reservoirs, on El Granito Ave., near Fuerte Dr. and Helix Reservoir, La Mesa —by La Mesa, Lemon Grove and Spring Valley Irrigation District, La Mesa. 11-8

Oregon

CLACKAMAS CO. — **Rushlight Automatic Sprinkler System Co.,** 55 N.E. Farragut St., Portland—$113,339 under two schedules for extensions and replacements of water pipelines at Oak Grove—by Oak Lodge Water District, Oak Grove. 11-15

LINN CO. — **Henshaw Bros.,** 4006 N.E. Davis St., Portland—awarded contract for constr. of 250,000-gal. reservoir at Brownsville—by City Council, Brownsville. 11-19

Texas

HIDALGO CO. — **Reising Construction Co.,** Edinburg—$51,424 to install conc. pipe line drains and appurtenant work, Elsa—by Hidalgo Co. Water Improvement District No. 6, Elsa. 11-21

Washington

KING CO.—**State Construction Co.,** 1750 19th Ave., S., Seattle—$157,995 for constr. of reservoir, W. Myrtle St., Seattle—by Board of Public Works, Seattle. 11-1

KING CO. — **Superior Construction Co.,** 3281 36th St., S.W., Seattle—$5,035 for reconstr. of portions of existing distribution system, Seattle—by County Water District No. 20, Seattle. 11-1

KING CO. — **Superior Construction Co.,** 3281 36th St., S.W., Seattle—$3,360 for constr. of portion of L. I. D. 13, Seattle—by County Water District No 20, Seattle. 11-1

KING CO.—**Thorburn & Logozo,** 4608 36th St., S.W., Seattle—$6,845 for constr. of portion of L. I. D. 12, Seattle — by County Water District No. 20, Seattle. 11-1

KITTITAS CO.—**Layne-Pacific Co.,** Seattle—$16,350 for 1,000 ft. test hole for well to produce 700 gal. per min. capacity. If well fails to meet those specifications only $5,190 is to be paid.—by City Council, Ellensburg. 11-5

PIERCE CO. — **American Pile Driving Co.,** Everett—$64,193 for constr. of reservoir and water system at Eatonville—by City Council, Eatonville. 11-8

PIERCE CO.—**Eivinid Anderson,** Tacoma —$23,457 to install water mains betw. Sixth Ave. and S. 12th St., from Jackson to Mt. View Aves., Tacoma—by City Council, Tacoma. 10-31

THURSTON CO. — **American Pipe & Construction Co.,** 518 NE. Columbia Blvd., Portland, Ore.—$805,135 for conc. pipeline constr. at McAllister Springs—by City Council, Olympia. 11-13

THURSTON CO.—**Scheumann & Johnson,** Lloyd Bldg., Seattle — $496,685 for constr. of pumping station, reservoir and valve house, McAllister Springs—by City Council, Olympia. 11-13

Sewerage . . .

California

ALAMEDA CO.—**A. J. Hopper Co.,** 243 Langton St., San Francisco—$16,357 for sewer installation E. side of Broadway, from S. end of Eagle Ave. to the Estuary, Alameda—by City Council, Alameda. 11-12

ALAMEDA CO.—**Edwin J. Tobin,** 5708 Glenbrook Dr., Oakland—$15,972 to install reinf. conc. pipe storm sewer, catchbasins, etc., on 7th St., betw. Jones and Gilman, Berkeley—by City Council, Berkeley. 11-27

LOS ANGELES CO.—**Burch & Bebek,** 2803 Los Flores Blvd., Los Angeles—$238,-176 for constr. of sanitary sewers in Norwalk Blvd., Los Angeles—by County Board of Supervisors, Los Angeles. 11-15

LOS ANGELES CO.—**Michael Izzi,** 1033 Arden Dr., Temple City—$9,137 to install sanitary sewers in Bedford, West and Huntington Drives, San Marino—by City Council, San Marino. 11-22

MONTEREY CO. — **McGuire & Hester,** 796 66th Ave., Oakland—$17,272 for installation of sanitary sewer mains with wye branches and laterals and appurtenant work, Glen Haven Park, Salinas—by Alisal Sanitary District D., Salinas. 11-22

RIVERSIDE CO.—**Pipeline Construction Co.,** 2391 Main St., Riverside—$7,626 for sanitary sewers in Brentwood-Edgewood Sewer District, Riverside—by City Council, Riverside. 11-15

SACRAMENTO CO. — **Steve P. Rados,** 2975 San Fernando Rd., Los Angeles—$147,820 to install outfall sewer lines in Fruitridge Rd. and Franklin Blvd., Sacramento—by County Sanitation District No. 1, Sacramento. 11-6

SACRAMENTO CO. — **A. Teichert & Co.,** Box 1133, Sacramento — $46,267 for constr. of 30-in. pipe sewage force main extending E. of Riverside Rd. to river, Sacramento — by County Sanitation District No. 1, Sacramento. 11-5

SAN DIEGO CO. — **Walter H. Barber,** 7309 El Cajon Blvd., La Mesa—$42,172 to install sewers in various sections of La Mesa district, San Diego—by City Council, San Diego. 11-8

SAN FRANCISCO CO.—**Murphy & McNair,** Laguna and North Point Sts., San Francisco—$24,460 for sewer constr. at Palace of Legion of Honor, Lincoln Park to 34th Ave. and Clement St., San Francisco—by Department of Public Works, San Francisco. 11-22

SAN LUIS OBISPO CO.—**O. R. Ochs & Sons,** 1630 Higuera St., San Luis Obispo—$37,980 to furnish and install sewage treatment plant equipment, pipe work and otherwise improve, San Luis Obispo—by City Council, San Luis Obispo. 11-22

Idaho

TWIN FALLS CO.—**Shoshone Construction Co.,** Twin Falls—$120,000 for constr. of sewer project at Twin Falls—by City Council, Twin Falls. 11-2

Montana

CASCADE CO.—**Robertson & Cave,** 2127 Eighth Ave., S., Great Falls—$10,414 for installation of sanitary sewer in First Alley S, betw. 35th and 38th Sts., Great Falls—by City Council, Great Falls. 11-5

CASCADE CO. — **Utility Builders, Inc.,** Great Falls—$13,666 to install 8-in. sanitary sewer in 12th Alley, betw. 16th and 13th Sts. and from 12th Alley S. to 11th Alley, Great Falls—by City Council, Great Falls. 11-1

CASCADE CO. — **Utility Builders, Inc.,** Great Falls — $12,511 to install sanitary sewer in Eleventh Alley N., betw. 10th and 12th Sts. and in 10th St., betw. Tenth and Eleventh Alleys N., Great Falls—by City Council, Great Falls. 11-5

New Mexico

SANTA FE CO.—**Robert E. McKee,** Box 2848, Dallas, Tex.—$343,000 for constr. of sewage disposal plant for west housing area and main community at Los Alamos Scientific center—by Army Engineers, Washington, D. C. 11-22

Oregon

CROOK CO. — **Leonard & Slate,** 7805 S.W. 40th Ave., Portland—$114,472 for constr. of city-wide sewage disposal system, Prineville—by City Council, Prineville. 11-18

Texas

BROWN CO.—**E. H. Reeder,** 4013 Glendora St., Dallas—$168,914 for storm sewer drainage system, Brownwood — by City Council, Brownwood. 11-13

DALLAS CO.—**P. C. Sorenson,** Southland Life Bldg., Dallas—$75,107 for storm sewer improvements on Jim Town Fork, betw. Waverly Dr. and Marlborough Ave., Dallas—by City Council, Dallas. 11-20

TARRANT CO. — **E. L. Dalton & Co.,** Box 7125, Dallas—$27,389 to install sanitary sewer in Homeland Addition, Fort Worth —by City Council, Fort Worth. 11-12

TARRANT CO.—**W. R. West,** Box 974, Fort Worth—$64,975 for storm sewer installation in Factory Place Addition, Fort Worth—by City Council, Fort Worth. 11-20

TRAVIS CO. — **Joe Bland Construction Co.,** Box 1158, Austin—$165,464 to install municipal sanitary sewer near Colorado River, from S. line of Tom Miller Dam property to Taylor Slough, Austin—by City Council, Austin. 11-19

TRAVIS CO. — **Collins Construction Co.,** 1701 W. 5th St., Austin—$80,221 for storm sewers in various sections of Austin—by City Council, Austin. 11-19

TRAVIS CO.—**T. H. Lee,** Texas Theater Bldg., San Antonio — $19,811 to install sewers adjacent to H. & T. C. R. R. betw. Conway St. and 19th St., Austin—by City Council, Austin. 11-19

TRAVIS CO.—**Moore Construction Co.,** 125 Riverside Dr., Austin — $81,503 for storm sewer in Kinney Ave. and in Barton Springs Rd., Austin — by City Council, Austin. 11-19

TRAVIS CO. — **Karl B. Wagner,** 4200 Bradwood Rd., Austin—$206,811 to install sanitary sewers N. of 49th St., betw. Burnet Rd. and Ave. F, Austin—by City Council, Austin. 11-19

Waterway . . .

California

SAN FRANCISCO CO.—**Johnson-Western Co.,** Box 416, Alameda—$14,763 for reconstr. of N. and S. corners of Pier 31 and N. corner of Pier 29, San Francisco—by Board of State Harbor Commissioners, San Francisco. 11-14

Dam . . .

Nebraska

CHASE CO. — **Wunderlich Contracting Corp.,** Jefferson City, Mo.—$4,109,927 for constr. of rolled earth dam and reservoir across Frenchman Creek near Enders—by Bureau of Reclamation, Washington, D. C. 11-6

Washington

GRANT CO.—**J. A. Terteling and Sons, Inc.,** Box 1428, Boise, Ida.—$1,770,592 for constr. of earth and rock fill, Long Lake Dam, approx 2½ mi. NE. of Stratford—by Bureau of Reclamation, Washington, D. C.

Irrigation . . .

California

LOS ANGELES CO. — **Bonadiman-McCain, Inc.,** 1709 W. 8th St., Los Angeles—$21,576 for constr. of Sparr debris basin in Glendale—by City Flood Control District, Los Angeles. 11-22

SAN JOAQUIN CO.—**Morrison-Knudsen Co.,** 111 Sutter St., San Francisco and **M. H. Hasler,** Box 387, Santa Ana—$3,025,121 for constr. of 11.2 mi. earthwork, conc. lining and structs. from station L-185 plus 00 to station L-774 plus 00, Delta Mendota Canal, Central Valley Project—by Bureau of Reclamation, Antioch. 11-5

STANISLAUS CO.—**Harvey Brizendine,** 135 Faustina Ave., Modesto—$65,221 for canal lining of Improvement District No. 45, Curtis Branch of lateral No. 6, Modesto —by Modesto Irrigation District, Modesto. 11-22

STANISLAUS CO.—**Harvey Brizendine,** 135 Faustina Ave., Modesto—$13,187 for canal lining of Bowron Branch of Weldy-Jones, Irrigation District No. 234, Modesto —by Modesto Irrigation District, Modesto. 11-15

STANISLAUS CO.—**Harvey Brizendine,** 135 Faustina Ave., Modesto—$12,256 for canal lining of Johnson Branch of lateral No. 2, Irrigation District No. 123, Modesto —by Modesto Irrigation District, Modesto. 11-15

STANISLAUS CO.—**M. J. Ruddy & Son,** 922 J St., Modesto—$131,920 on schedules 4, 5, 6 and 8 for conc. line bottom of main canal, Dry Creek flume to first weir E, from Hopper Rd. W. to first weir, from Hopper Rd. E. to end of lining on sides and for complete section of lateral No. 5 from weir E. of Broyles Ave. to weir W. of Broyles Ave., Modesto—by Modesto Irrigation District, Modesto. 11-22

STANISLAUS CO.—**M. J. Ruddy & Son,** 922 J St., Modesto—$24,831 for canal lining of lateral No. 3, betw. McDonald Ave. and Blue Gum Ave., Modesto—by Modesto Irrigation District, Modesto. 11-15

STANISLAUS CO.—**Standard Materials Co.,** 1411 9th St., Modesto—$48,409 for constr. of reinf. conc. siphon, lateral No. 4, from Hwy. 99 to 8th St. under the S. P. railroad tracks at Modesto—by Modesto Irrigation District, Modesto. 11-15

STANISLAUS CO.—**T. C. Tunsen,** Rt. 2, Box 856, Modesto—$14,077 for canal lining in Irrigation Districts: No. 220, Foote branch of lateral No. 2; No. 226, Beck branch of Hinning extension No. 1; No. 230, Meyers branch of lateral No. 3, Modesto—by Modesto Irrigation District, Modesto. 11-15

New Mexico

QUAY CO.—**J. A. Terteling and Sons, Inc.,** Box 1428, Boise, Ida.—$934,948 for constr. of earthwork and structs., station 418 plus 80 to station 889 plus 00, Hudson Canal, lateral system unit No. 5, and Troutman, Smith and Harris laterals, near Tucumcari—by Bureau of Reclamation, Tucumcari. 11-5

Oregon

JEFFERSON CO. — **Adler Construction Co.,** 3416 W. Smith, Seattle, Wash.—$602,832 for constr. of earthwork and structs., station 2377 plus 00 to station 2994 plus 00, Deschutes Project, near Metolius and Madras—by Bureau of Reclamation, Denver, Colo. 11-5

Washington

GRANT CO.—**Utah Construction Co.,** 1 Montgomery St., San Francisco, and **Winston Brothers Co.,** Los Angeles, Calif.—$3,977,136 for constr. of 12.3 mi. section of east low canal and 3 conc.-lined siphons, near Adrian—by Bureau of Reclamation, Washington, D. C. 11-1

Power . . .

California

SOLANO CO. — **Judson-Pacific-Murphy Co.,** 1200 17th St., San Francisco—$150,000 for constr. of 2 steel crossing towers for the Vaca, Sobrante, Moraga 220-kv. transmission line, Carquinez Straits—by Pacific Gas & Electric Co., San Francisco. 11-8

Montana

ROSEBUD AND CUSTER COS.—**D. M. Manning,** Hysham—$30,836 for constr. of 46.1 mi. of rural electric transmission line —by Mid-Yellowstone Electric Cooperative, Hysham. 11-8

New Mexico

OTERO CO.—**Reynolds Electrical & Engineering Co.,** El Paso, Tex.—$156,790 for constr. of Alamogordo-Hollywood 115-kv. transmission line and Alamogordo air base tap to substation—by Bureau of Reclamation, Denver, Colo. 11-15

Texas

KAUFMAN CO.—**B. & C. Construction Co.,** Dallas—$126,727 for constr. of 125.7 mi. of rural electric lines—by Kaufman County Electric Cooperative, Kaufman. 11-12

Washington

GRAYS HARBOR CO. — **Puget Sound Electric Co.,** 2135 Fifth Ave., Seattle—$16,750 for constr. of 8.5 mi. distribution line—by Grays Harbor County Public Utility District No. 1, Montesano. 11-14

Building . . .

Arizona

MARICOPA CO.—**P. W. Womack Construction Co.,** 1712 S. Central Ave., Phoenix —$196,900 for constr. of reinf. brick, 12 classroom school bldg., 11th St., and Henshaw Rd., Phoenix—by Board of Trustees, School District No. 1, Phoenix. 10-31

California

ALAMEDA CO.—**Cahill Bros.,** 206 Sansome St., San Francisco — $500,000 for constr. of one-story struct. steel frame

and protected metal factory bldg., Alameda —by Kieckhefer Container Co., Oakland. 11-15

ALAMEDA CO. — **Haas & Rothschild,** Merchants Exchange Bldg., San Francisco —$265,000 for constr. of 2-story and basement, Class A, steel frame telephone bldg. at B and 1st Sts., Hayward—by Pacific Telephone & Telegraph Co., San Francisco. 11-20

ALAMEDA CO.—**Risdon & Sons, Inc.,** 5977 Majestic Ave., Oakland—$300,000 for constr. of wood frame and stucco recreation center at 139th Ave. and E. 14th St., Oakland—by self. 11-1

CONTRA COSTA CO.—**Lewis Construction Co.,** 516 18th St., Oakland—$115,000 for constr. of one-story, struct. steel frame and corrugated iron factory bldg., on Rd. 17, near Richmond—by Myers Barrel Co., Oakland. 11-6

IMPERIAL CO. — **M. H. Golden Construction Co.,** 3486 Noell, San Diego—$50,000 for constr. of ammonia bottling plant at Imperial—by Shell Chemical Co., San Francisco. 11-15

LOS ANGELES CO.—**Baruch Corp.,** 621 S. Flower St., Los Angeles—$759,590 for constr. of 7 one-story, frame and stucco high school bldgs., Agra St. and Compton-Jaboneria Rd., Bell Gardens—by Montebello Unified School District, Montebello. 11-6

LOS ANGELES CO.—**Frank A. Basso,** 7867 S. Western Ave., Los Angeles—$159,000 for constr. of 9 frame and stucco apartment bldgs., 6101-47 S. Hobart Blvd. and 733-37 W. 62nd St., Los Angeles—by Harvard Square Development Co., Los Angeles. 11-4

LOS ANGELES CO. — **Buttress & McClellan, Inc.,** 1013 E. 8th St., Los Angeles—$192,000 for constr. of 3-story, reinf. conc. factory bldg, at 4400 E. Washington Blvd., Los Angeles—by Western States Lacquer Corp., Los Angeles. 11-22

LOS ANGELES CO.—**Coronet Construction Co.,** 5733 Lankershim Blvd., N. Hollywood—$443,200 for constr. of 56 frame and stucco, 5-and 6-room dwellings on Emilita, Califa, Trara and Hateras Aves., Van Nuys —by self. 11-1

LOS ANGELES CO.—**L. E. Dixon Co.,** 409 S. California St., San Gabriel—$1,000,000 for constr. of 2- and 3-story addition of reinf. conc. and steel frame to clubhouse bldg., Inglewood — by Hollywood Turf Club, Hollywood Park. 11-25

LOS ANGELES CO.—**Ray Gerhart,** 334 S. Greenwood Ave., Pasadena—$200,000 for constr. of 3-story and 2-basement addition to Guggenheim Aeronautical Laboratory Bldg., Pasadena—by California Institute of Technology, Pasadena. 11-1

LOS ANGELES CO. — **Ann Goldstein,** 3010½ Wabash Ave., Los Angeles—$85,300 for constr. of 2- and part 3-story, frame and stucco apartment bldg., 8427 Fountain Ave., Hollywood—by self. 11-15

LOS ANGELES CO.—**Jones-Hettelsater Construction Co.,** Mutual Bldg., Kansas City, Mo.—$775,000 for constr. of 1,250,000 bu. capacity reinf. conc. grain elevator, 5541 E. Ferguson Dr., E. Los Angeles—by Globe Mills, Inc., Los Angeles. 11-15

LOS ANGELES CO.—**A. A. Makowski,** 9700 W. Pico Blvd., Los Angeles—$400,000 for constr. of 42 five-room dwellings and 5 four-unit apartment bldgs. on Columbus, Halbrant Aves. and Victory Blvd., Van Nuys—by Calbing, Inc., Van Nuys. 11-8

LOS ANGELES CO.—**J. A. McNeil Co.,** 714 W. Olympic Blvd., Los Angeles—$210,000 for constr. of addition to mausoleum at Calvary Cemetery, E. Los Angeles—by Roman Catholic Archbishop, Los Angeles.

LOS ANGELES CO.—**Arthur Pinner, Jr.,** 116 W. 94th St., Los Angeles—$71,500 for constr. of one-story, reinf. conc. addition to Longfellow School, 545 N. Magnolia St., Whittier — by Whittier School District, Whittier. 11-22

LOS ANGELES CO.—**S. G. Ponty,** 1728 W. 106th St., Los Angeles—$264,000 for constr. of 2 three-unit and 10 four-unit, frame and stucco apartment bldgs., 300 Hollywood Way block, Burbank—by self. 11-15

LOS ANGELES CO.—**Al Reingardt,** 3825 E. 7th St., Long Beach — $700,000 for constr. of one-story, gunite wall constr., copra plant bldg., 914 San Clemente St., Wilmington—by Copra Oil & Meal Co., Wilmington. 11-22

LOS ANGELES CO.—**Southwestern Engineering Co.,** 4800 S. Santa Fe Ave., Vernon—$300,000 for constr. of steel frame and corrugated asbestos paper factory bldg., W. Holt Ave. near Erie St., Pomona —by Fernstrom Paper Mills, Inc., Los Angeles. 11-5

LOS ANGELES CO.—**Stivers & Co.,** 365 El Encanto Dr., Pasadena—$91,900 for constr. of 2- and 3-story, frame and stucco apartment bldg. at 410 S. Sierra Madre Blvd., E. Pasadena—by self. 11-8

LOS ANGELES CO.—**Paul W. Trousdale,** 650 N. Sepulveda Blvd., W. Los An-

geles—$500,000 for constr. of 70 six-room, frame constr. dwellings on Langdon and Peach Aves., Van Nuys—by Second Valley Housing Corp., Van Nuys. 11-1

LOS ANGELES CO. — **United Building Co.,** 717 N. Highland Ave., Los Angeles—$136,000 for constr. of 17 frame and stucco dwellings, 5200 Batavia Rd. and Aldrich Rd. blocks, South Gate—by self. 11-8

LOS ANGELES CO.—**Wilson Bros.,** 1129 Montana Ave., Santa Monica—$77,500 for constr. of 3-story, 18-unit, frame and stucco apartment and store bldg. at 1660 Ocean Ave., Santa Monica—by George Don, Santa Monica. 11-22

MARIN CO.—**Sven A. Munk,** 1735 Lincoln Ave., San Rafael—$50,000 for constr. of one-story, 16-unit, frame and stucco motel on 1700 Lincoln Ave. block, San Rafael—by self. 11-4

RIVERSIDE CO. — **O. L. Carpenter,** Spreckels Theater Bldg., San Diego—$248,863 for constr. of 14-room classroom school bldg. in Indio—by School District, Indio. 11-14

SACRAMENTO CO.—**Central California Construction Co.,** Capitol National Bank Bldg., Sacramento—$80,000 for constr. of one-story and basement, conc. and brick store bldg. on Alhambra Blvd., Sacramento—by Western Auto Supply Co., Sacramento. 11-25

SACRAMENTO CO.—**Central California Construction Co.,** Capitol National Bank Bldg., Sacramento—$50,000 for constr. of one-story, reinf. conc. and brick nursery bldg., Sacramento—by F. Lagomarsino & Sons, Sacramento. 11-25

SAN FRANCISCO CO.—**James I. Barnes Construction Co.,** Russ Bldg., San Francisco—$1,000,000 for constr. of boiler house, steam generators and oil storage tank at Naval Shipyard, San Francisco—by Bureau of Yards and Docks, Washington, D. C. 11-22

SAN FRANCISCO CO.—**Cahill Brothers,** 206 Sansome St., San Francisco—$330,000 cost plus basis for constr. of reinf. conc. and structl. steel meat processing plant, 4th and Townsend Sts., San Francisco—by Kingan & Co., San Francisco. 11-4

SAN FRANCISCO CO.—**Swinerton & Walberg Co.,** 225 Bush St., San Francisco—$500,000 for constr. of 3- and part 2-story, Class B, reinf. conc. headquarters bldg., Sutter St., betw. Octavia and Gough Sts., San Francisco—by American National Red Cross, San Francisco. 11-21

SAN JOAQUIN CO.—**Cahill Bros.,** 206 Sansome St., San Francisco—$125,000 for constr. of one-story, frame and conc. cannery plant on Garwood Ferry Road across from Flotill cannery, Stockton—by Pacific Can Co., San Francisco. 11-25

SAN MATEO CO.—**William Horstmeyer,** 23 Mars St., San Francisco—$57,870 for constr. of steel frame, stucco and masonry classroom addition to grammar school, San Carlos—by Elementary School District, San Carlos. 11-13

SAN MATEO CO.—**Swinerton & Walberg,** 225 Bush St., San Francisco—$972,000 for constr. of one-story manufacturing plant on Harbor Blvd., adjacent to present plant, Redwood City—by Plant Rubber & Asbestos Co., San Francisco. 11-14

SANTA BARBARA CO. — **Theo M. Maino,** 1424 Mill St., San Luis Obispo—$130,000 for constr. of reinf. brick market bldg. on E. Main St., betw. Bonita St. and

Airport Ave., Santa Maria—by E. T. Strobridge, San Luis Obispo. 10-31

SANTA CLARA CO.—**Oscar H. Liebert,** 467 S. Taaffe, Sunnyvale — $50,000 for constr. of one-story reinf. conc. store bldg., SW. corner of McKinley and Murphy Aves., Sunnyvale—by Sunnyvale Furniture Co., Sunnyvale. 11-7

TULARE CO. — **Trewhitt, Shields & Fisher,** Pacific Southwest Bldg., Fresno—$765,000 for constr. of steel frame and reinf. conc. telephone bldg., Acequia St., Visalia—by Pacific Telephone & Telegraph Co., San Francisco. 11-27

YUBA CO.—**Far West Construction Co.,** 3400 San Bruno Ave., San Francisco—$65,200 for constr. of quonset type grocery warehouse, Third and G Sts., Marysville—by Bert McDowell Co., Sacramento. 11-12

Idaho

ADA CO.—**J. O. Jordan & Son,** Boise—$198,328 for constr. of additions to Whitney school, Boise—by Board of Trustees, Independent School District, Boise. 11-1

ADA CO.—**Kloepfer & Gramkow Co.,** 416 S. 6th St., Boise—$114,751 for constr. of additions to Washington school, Boise—by Board of Trustees, Independent School District, Boise. 11-1

ADA CO. — **C. B. Launch Co.,** Boise—$169,983 for constr. of addition to Lowell school, Boise—by Board of Trustees, Independent School District, Boise. 11-1

New Mexico

BERNALILLO CO.—**Robert E. McKee,** 1918 Texas St., El Paso, Tex.—$1,909,085 for constr. of 118 frame and brick bldgs., pumphouse, etc., at Sandia Base, Albuquerque—by U. S. Engineer Office, Kirtland Field, Albuquerque. 11-15

SANTA FE CO.—**Robert E. McKee,** Box 2848, Dallas, Tex.—$185,484 for constr. of two food markets at Los Alamos Scientific center—by Army Engineers, Washington, D. C. 11-22

Oregon

COOS CO.—**Babbitt & Mercer, Inc.,** Portland—$5,000,000 for constr. of 750 or 800 dwellings in Bangor section of North Bend—by self. 11-12

MULTNOMAH CO.—**Chicago Bridge & Iron Co.,** Rialto Bldg., San Francisco—$60,000 for constr. of 120 by 40 oil storage tank on NW. St. Helens Rd., Portland—by Texas Company, Portland. 11-12

MULTNOMAH CO.—**Ross B. Hammond Co.,** Builders Exchange Bldg., Portland—$60,000 for constr. of conc. and tile walls and installation of grease service pits at 2029 NW. Quimby, Portland—by Consolidated Freightways Terminal Co., Portland. 11-12

MULTNOMAH CO. — **L. H. Hoffman,** 715 Jefferson St., Portland—$2,000,000 for constr. of 4-story newspaper plant, Columbia and Broadway, 6th and Jefferson, Portland—by Oregonian Publishing Co., Portland. 11-12

MULTNOMAH CO.—**Reimers & Jollvette,** Builders Exchange Bldg., Seattle, Wash.—$150,000 for reinf. conc., reinf. steel and conc. block warehouse and distributing plant, 3700 Yeon Ave. block, Portland—by Van Waters & Rogers, Inc., Portland. 10-31

YAMHILL CO. — **Ross B. Hammond Construction Co.,** Builders Exchange Bldg., Portland—$115,000 for constr. of 5-story, brick veneer, stone trim college bldg., Sheridan—by Jesuit Novitiate, Sheridan. 11-18

Texas

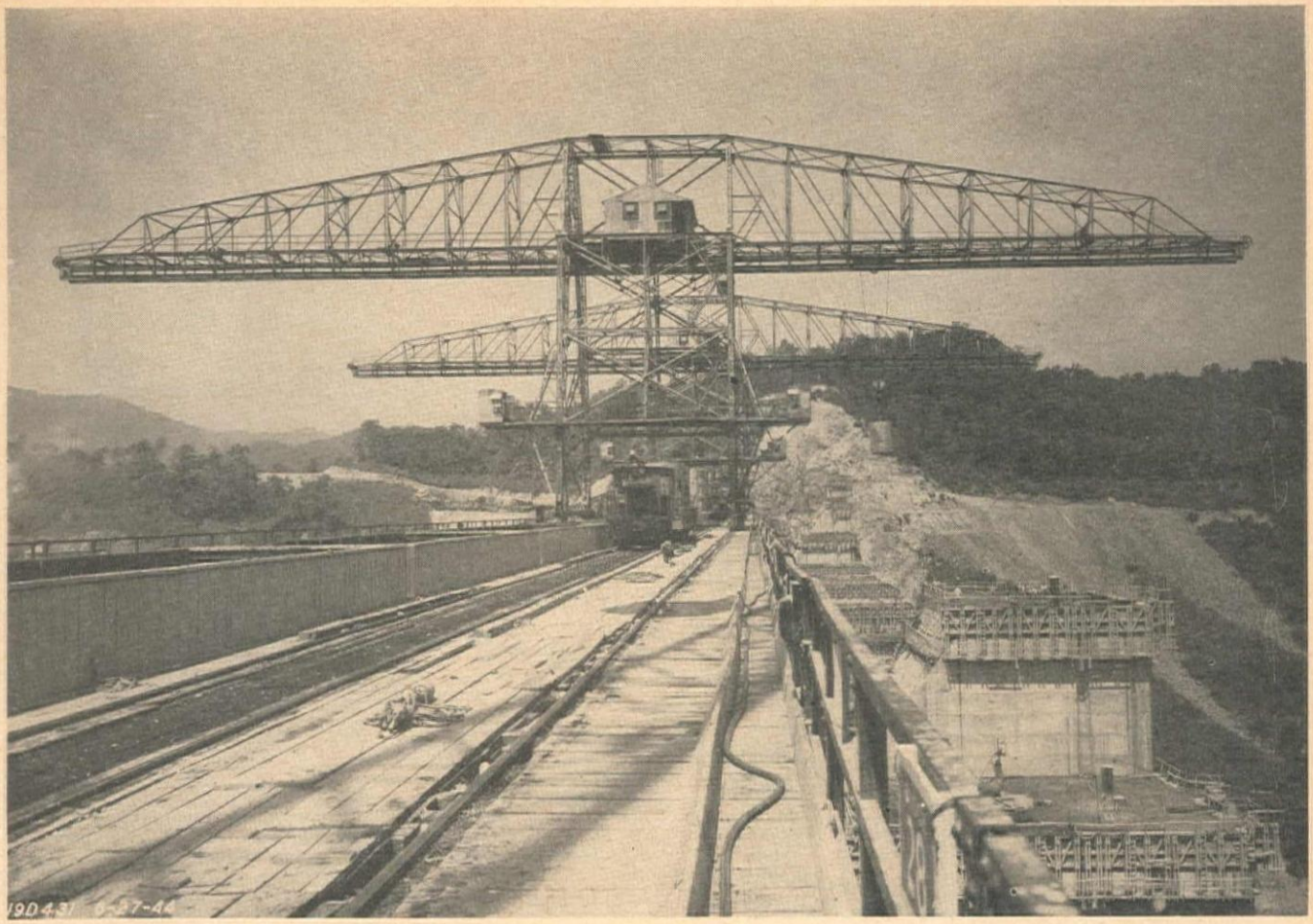
ANDREWS CO.—**C. H. Leavell & Co.,** El Paso—$45,745 for constr. of brick, tile and masonry swimming pool and shower house, Andrews — by City Council, Andrews. 11-21

BELL CO. — **Guy H. Baker,** Box 466, Temple—$75,000 for alterations and additions to central office bldg., Temple—by Southwestern Bell Telephone Co., Temple. 11-15

BEXAR CO.—**C. L. Browning, Jr.,** Insurance Bldg., San Antonio—$58,500 to convert dissembled airplane hangar into factory bldg., E. Commerce and M.K.&T. Railway, San Antonio—by Lone Star Cone Co., San Antonio. 11-5

BEXAR CO. — **H. J. Von Rosenberg,** American Hospital & Life Bldg., San Antonio—$500,000 for constr. of 3-story and basement addition to store bldg., San Antonio—by Sears, Roebuck & Co., Romana Plaza, San Antonio. 11-15

DALLAS CO. — **Branwell Construction Co.,** 1100 Cadiz St., Dallas—$50,000 for



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TENNESSEE VALLEY AUTHORITY — SALES AND TRANSFER SECTION
KNOXVILLE, TENNESSEE
PHONE 2-7181

constr. of one-story bldg. at 5244 Grand Ave., E., Dallas — by Safeway Grocery Stores, Inc., Dallas. 11-11

DALLAS CO.—**Cowdin Brothers,** 411 S. Haskell St., Dallas—$40,000 for constr. of one-story and balcony theatre bldg., 3319 Hackberry St., Dallas—by Delman Theatre Corp., Dallas. 11-4

DALLAS CO.—**E. F. Crain,** 703 S. Cumberland Ave., Dallas—$96,563 to install jail cells and alter existing cells on 5th floor of City Hall, Dallas—by City Council, Dallas. 11-21

DALLAS CO.—**Keele & Jones,** 418 Montreal St., Dallas—$125,000 for constr. of 2-story church and school bldg., 839 W. 10th St., Dallas — by Grace Temple Baptist Church Supervisors, Dallas. 11-21

DALLAS CO. — **Texas Prefabricated Housing Co.,** Denton—$42,000 for constr. of 3 prefabricated huts at 4225 Lancaster, Dallas—by Board of Education, Dallas. 10-30

EL PASO CO.—**J. E. Morgan & Sons,** 210 N. Campbell St., El Paso — $75,000 for constr. of 2-story and basement bank bldg., El Paso—by Southwest National Bank, El Paso. 11-11

HAYS CO.—**J. E. Wyatt,** Box 336, San Marcos—$40,000 on cost plus basis for cold storage lockers at meat processing plant, San Marcos—by H. P. King & J. D. McIntyre, San Marcos. 11-1

TRAVIS CO. — **Robert Morris,** 1800 Koenig Lane, Austin—$160,000 for constr. of 20 one-story dwellings at 1705-1805 Palo Duro Rd. and 1709-1808 Alamo Rd., Austin —by Page, Southerland & Page, Austin. 11-11

UVALDE CO.—**J. C. Worcester,** American Hospital & Life Bldg., San Antonio—$136,036 for constr. of gym. bldg., high school, Uvalde—by Board of Trustees, Independent School District, Uvalde. 11-30

Washington

GRANT CO.—**Hansen & Parr Construction Co.,** W. 232 Pacific, Spokane—$184,000 school bldg. constr. at Grand Coulee—by High School District, Grand Coulee. 11-22

KING CO. — **Balch & Sexter,** 1010 2nd Ave., Seattle—$130,000 for constr. of 13 frame and stucco, one-story dwellings on 26th Ave. NE. and E. 70th St., Seattle—by self. 11-18

KING CO.—**W. G. Clark,** 408 Aurora Ave., Seattle—$100,000 for renovation of 3-story shoe store bldg., 5th and Pike Sts., Seattle —by Lloyd & Everett Nordstrom, Seattle. 11-18

KING CO.—**First American Corp.,** 1010 2nd Ave., Seattle—$360,000 for constr. of 36 frame and stucco, one-story residences, betw. 37th and 36th Aves., NE. and E. 82nd St., Seattle—by self. 11-18

MASON CO. — **A. G. Homann,** 112 N. Franklin, Olympia—$265,400 for constr. of fish hatchery near Shelton — by County Council, Olympia. 11-15

SNOHOMISH CO.—**Ole K. Sather,** 921 Rucker Ave., Everett—$130,000 for constr. of reinf. conc., brick exterior, 2-story addition to Old Age Home, Everett—by F. Sistit and M. Gowdy, Everett. 11-15

SPOKANE CO.—**Henry McInnis & Roberts,** Spokane—$274,813 for general work on constr. of reinf. conc. and steel, 2-story bus depot at 1st and Jefferson Sts., Spokane—by Spokane Union Bus Depot, Inc., Spokane. 11-20

Canada

BRITISH COLUMBIA—**B. C. Bridge & Dredging Company, Ltd.,** 554 Howe St., Vancouver—$57,000 for constr. of 2-story plant bldg. at Harbor Ave. and Railway St., N. Vancouver—by International Paint Co., Vancouver. 11-22

Miscellaneous . . .

California

ALAMEDA CO. — **Ransome Co.,** 4030 Hollis St., Emeryville—$51,520 for constr. of curbs and gutters, surf. portions of Broadway, betw. Piedmont and College Ave., Oakland—by City Council, Oakland. 11-5

LOS ANGELES CO.—**Nichols Engineering & Research Corp.,** Wall Tower, New York City, N. Y.—$316,680 for constr. of incinerator at NE. corner of 3rd and Foothill Rd., Beverly Hills—by City Council, Beverly Hills. 11-12

Colorado

LARIMER CO.—**Darby Products of Steel Plate Corp.,** Kansas City, Kan.—$677,330 to furnish and deliver one 96-in. dia. welded steel plate penstock for Marys Lake power plant and three 78-in. dia. penstocks for Estes power plant, f.o.b. Loveland—by Bureau of Reclamation, Denver. 11-8

Oregon

WASHINGTON CO.—**Beall Pipe & Tank Corp.**, 1945 N. Columbia Blvd., Portland—$206,445 to supply 53,000 ft. of 18-in. steel water pipe and 1,500 couplings for Hillsboro—by City Utilities Commission, Hillsboro. 11-20

Washington

GRANT CO.—**American Bridge Co.**, Denver, Colo.—$130,412 to furnish and deliver materials for one steel warehouse for Grand Coulee Dam, Columbia Basin Project—by Bureau of Reclamation, Denver, Colo. 11-29

GRANT CO.—**Columbia Electric & Manufacturing Co.**, Spokane—$446,799 to furnish and deliver crest railings to Odair—by Bureau of Reclamation, Denver, Colo. 11-29

GRANT CO.—**Newport News Shipbuilding & Drydock Co.**, Newport News, Va.—$2,247,531 for three 165,000 hp. hydraulic turbines to be used at Grand Coulee Dam—by Bureau of Reclamation, Washington, D. C. 11-12

GRANT CO. — **H. F. Green & Co.**, Chronicle Bldg., Spokane—$373,621 to prepare and stockpile sand and coarse aggregate at Adrian Deposit—by Bureau of Reclamation, Coulee Dam. 11-19

GRANT CO.—**Western Pipe & Steel Co.**, 200 Bush St., San Francisco, Calif—$1,272,854 to furnish and deliver 12 pump discharge pipes to be installed at Grand Coulee pumping plant—by Bureau of Reclamation, Denver, Colo. 11-8

GRANT CO.—**Westinghouse Corp.**, Denver, Colo.—$3,367,717 for 3 generators to be installed at Grand Coulee Dam — by Bureau of Reclamation, Washington, D. C. 11-12

GRANT CO.—**Woodward Governor Co.**, Rockford, Ill.—$122,916 for 3 governors for Grand Coulee Dam Project—by Bureau of Reclamation, Washington, D. C. 11-12

Wyoming

NATRONA CO. — **Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis.—$347,250 to furnish and deliver at Casper hydraulic turbines and governors for Kortes power plant, Kortes Unit—by Bureau of Reclamation, Denver, Colo. 11-5

Canada

BRITISH COLUMBIA — **Marwell Construction Company, Ltd.**, 410 Seymour St., Vancouver—$180,000 to clear 165 acres of land, Vancouver—by British Pacific Properties, Vancouver. 11-22

PROPOSED PROJECTS

Power . . .

Arizona

MARICOPA CO.—Ma-Yu Electric Cooperative, Inc., Buckeye, received a loan in the amount of $485,000 for the constr. of 205 mi. of line to serve 272 rural consumers—by Rural Electrification Administration, Washington, D. C.

California

SISKIYOU CO.—Klamath River Electric Cooperative, Inc., Hornbrook, received a $240,000 loan to constr. a 3-phase power line from Hwy. 99 bridge N. of Yreka to Happy Camp to serve 500 consumers—by Rural Electrification Administration, Washington, D. C. 11-22

Oregon

TILLAMOOK CO.—Tillamook People's Utility District, Tillamook, obtained a loan of $95,000 for system improvements and for 17 mi. of line to serve 23 rural consumers—by Rural Electrification Administration, Washington, D. C.

UMATILLA CO.—Eastern Oregon Electric Cooperative, Weston, received a $215,000 loan for constr. of 120 mi. of line to serve 180 farms, 140 summer homes and 80 other rural consumers—by Rural Electrification Administration, Washington, D. C.

Texas

CLAY CO.—J-A-C Electric Cooperative Association, Bluegrove, received $240,000 for system improvements and for 164 mi. of line to serve 254 consumers—by Rural Electrification Administration, Washington, D. C.

Washington

LINCOLN CO. — Lincoln Electric Cooperative, Inc., Davenport, was given a loan of $87,000 for 41 mi. of line to serve 65 rural consumers and for system improvements—by Rural Electrification Administration, Washington, D. C.

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

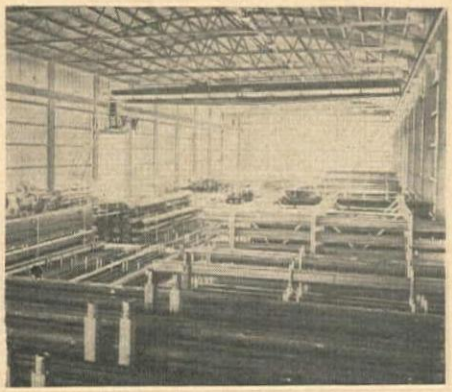
SOULE' EQUIPMENT CO. has opened a service office in its own new building at 1718 Mariposa Road, one mile south of the Stockton city limits on U. S. 99. The new building houses a complete stock of parts and is well equipped with service facilities, including welding equipment and a service truck for field repair work. This is the third service office to be established by the company in northern California, the others being located in Oakland and Sacramento.

☆ ☆ ☆

PACIFIC COAST AGGREGATES, INC., with offices in San Francisco, Oakland, Sacramento, Stockton and San Jose, is a new distributor for Darex AEA, air-entraining agent for concrete, in northern California and western Nevada.

☆ ☆ ☆

CAINE STEEL CO. has begun construction of its new quarter million dollar steel warehouse and service center in Emeryville. **Max Rudorfer,** Northern California manager with offices in Emeryville, will be in charge of the new facility. The new plant will be equipped with shearing and slitting equipment, planagraph cutting tables, and all other necessary machines to insure rapid and efficient handling of steel products.



PART OF THE interior of the expanded warehouse facilities of the Drake Steel Supply Co., in Los Angeles. A new wire products division has been added recently.

Keeping pace with the fast growing industrial development in the southwest, the DRAKE STEEL SUPPLY CO. has completed the expansion of its plant at Los Angeles. In addition to more than doubling the office space, 33,000 sq. ft. have been added to the warehouse facilities. A new wire products division has been added under the management of **F. Burneby. A. H. Weinert** is president of the firm and it is his policy to keep the company fully expanded to meet the increased requirements of a fast growing market for steel and tubular products. A new plant was recently opened at Fresno, where facilities similar to those at Los Angeles are provided.

☆ ☆ ☆

INTERMOUNTAIN

Two recent appointments are in line with the program of expansion now being conducted by THE COLORADO FUEL AND IRON CORP. **Howard J. Jones** is the new manager of industrial relations. For the past twelve years he was associated with the Republic Steel Corp. in a similar capacity. He will head a progressive program of industrial relations. **Horace J. Jones** was named manager of industrial engineering for the company. His comprehensive knowledge of this highly important work was gained through twenty-nine years of practical experience with his former connection, the Republic Steel Corp.

☆ ☆ ☆

PACIFIC NORTHWEST

EMPIRE BUILDING MATERIAL CO. has begun the operation of its new plant at 92nd Avenue and Halsey Street in Portland, having removed last month from its old plant on 82nd Avenue. With a capacity of 15,000 blocks per day the new plant is turning out four different sizes. Future plans call for the production of a wider variety. **H. L. Priest** is president of the firm, **Frank Spangler** is vice-president, and **C. H. Farrington,** secretary-treasurer.

☆ ☆ ☆

George P. Torrence, president of the LINK BELT CO., Chicago, recently inspected construction progress of the firm's

new Seattle plant during a tour of the Pacific Division of the company. He was accompanied by **W. C. Carter, Howard Coonley,** and **Russell B. Livermore,** members of the company's executive committee. **F. A. Koepf,** Seattle district manager, was host to the party.

☆ ☆ ☆

J. Charles Peterson has been named as president of OREGON TRUCK SALES, INC., a newly organized firm in Portland which has been granted the Northwest distributorship for AUTOCAR trucks. **E. S. Earls,** as vice-president, will have charge of parts sales and service; **Charles L. Hull,** as secretary, will have charge of used equipment sales; and **Glenn Connolly,** assistant treasurer, will have charge of sales in Washington. The company has established offices at 1846 Interstate Avenue in Portland, and under the name of WASHINGTON TRUCK SALES, INC., has established offices in Spokane to handle sales in eastern Washington, northern Idaho, and western Montana.

☆ ☆ ☆

A. P. Lerch has taken over as chief tool design engineer for the HYSTER CO. Lerch, with headquarters at the Portland plant of the company, will be in charge of all tool designing for Hyster's three plants.

☆ ☆ ☆

SMITHWICK CONCRETE PRODUCTS CO., headed by **S. Carl Smithwick,** former cement association representative, has begun the production of light weight concrete blocks at its new plant at 1750 N. E. Lombard Place in Portland. Pumice for the blocks is shipped from Bend. The plant has been in production since August with a line of standard concrete building blocks.

☆ ☆ ☆

GLADDING, McBEAN & CO. have closed the office of the SEATTLE BRICK & TILE CO. at Ninth Avenue South and Andover Street, Seattle, following the purchase of the local company by Gladding, McBean.

☆ ☆ ☆

Roden Herlinger and **Keith Foster** have purchased the interest of **E. R. Wright** in the TRI-COUNTY EQUIPMENT CO., INC., at Redmond, Ore., and will continue to operate the equipment distributing organization.

☆ ☆ ☆

Paul W. Berry has been appointed as engineer for the GENERAL TIRE & RUBBER CO. in Portland. He will assist distributors in the Portland branch area on all phases of tire renewing by a factory-controlled system.

☆ ☆ ☆

Raymond A. Cramer, associated with E. I. Du Pont de Nemours & Co., Inc., Explosives Department, for over forty-two years, died at Seattle, Washington, on November 3.

☆ ☆ ☆

AMONG THE MANUFACTURERS

Howard Coonley, chairman of the Executive Committee of the American Standards Assn., has been elected president of the new INTERNATIONAL ORGANIZATION FOR STANDARDIZATION,

the formation of which has just been completed by delegates from 25 nations meeting in London. **Gustave L. Gerard,** staff president of the Belgian Standards Assn., will be vice-president of the new organization. Coonley is a former president of the National Association of Manufacturers and of the American Standards Assn. He was for many years chairman of the Walworth Co., and is still a director of that company. During the war he served as director of the Conservation Division of the War Production Board and at the appointment of President Roosevelt he became chief adviser of the Chinese War Production Board. Gerard is president of the government sponsored Institut Belge de Normalisation and was secretary of its predecessor, the Association Belge de Standardisation which was founded in 1919.

Clifford A. Sharpe is the recently elected vice-president in charge of manufacturing for GAR WOOD INDUSTRIES, INC. He will supervise the company's manufacturing operations in Detroit, Wayne and Marysville, Mich.; Mattoon, Illinois; Findlay, Ohio; Newport News, Va.; and St. Paul, Minn.

☆ ☆ ☆

Walter A. Ridings, president of the PORTER-CABLE MACHINE CO., Syracuse, N. Y., died Thursday, October 17.

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Net profit from the sale of bulldozers, scrapers and other earthmoving units manufactured by LA PLANT-CHOATE MFG. CO., INC., Cedar Rapids, Iowa, totalled $209,227.85 for the fiscal year ended June 30, 1946, which is equivalent to 96 cents per common share, after payment of Convertible Preferred Stock Dividends. Quarterly dividend rate of 20 cents per share which has prevailed on LaPlant-Choate common stock since June 1944 was continued, making a total dividend for the year of 80 cents per share. All outstanding Convertible Preferred Stock was called for redemption by the Board of Directors on December 4, 1945, and the entire capital stock of the company now consists of 208,000 shares of Common Stock. Net working capital, after provision for all taxes, amounted to $1,955,061.56 at the close of the fiscal year.

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J. T. Myers recently took over the position of vice-president in charge of sales and production for the DAVEY COMPRESSOR CO., Kent, Ohio. Myers has been a member af the Davey organization for the past five years. During the war he served as engineering officer aboard a mine sweeper in the Atlantic, later being attached on special assignment to the Naval Engineering Laboratories at Annapolis. In the latter post he contributed to the development of important new life-saving equipment for the Navy. For the past year since his release from the Navy, Myers has served as assistant general manager of the Davey Compressor Co.

☆ ☆ ☆

Three sales personnel positions have changed hands in the CARRIER CORP. **O. W. Bynum** has been promoted to manager of direct sales; **John A. Gazelle,** to manager of distributor-dealer sales; and **Carl U. Spriggs,** to assistant general sales manager. All three men will have headquarters in Syracuse, N. Y.

☆ ☆ ☆

LISTER-BLACKSTONE, INC., Milwaukee, Wis., has announced a complete new set-up in the manufacture of its diesel engines, which will result in greater production and highest quality of product. All production has been moved to a new modern plant, a new parts department has been established and a new downtown office opened for the transaction of all the company's business. A departure from past policy will be the complete concentration on production of straight diesel engines, with some adaptations, such as power take-off, irrigation pump outfits and possibly marine propulsion units. No diesel generator sets or combination auxiliaries will be produced.

☆ ☆ ☆

A new company, TRACTOMOTIVE CORP., has been formed to manufacture equipment for industrial wheel and crawler tractors. **V. M. Dobeus,** formerly Chief Engineer, Springfield Works, Tractor Division of Allis-Chalmers, is president. **Paul B. Cochran,** formerly general manager of Buckeye Traction Ditcher Co., is vice-president and treasurer.

☆ ☆ ☆

Roy A. Shipley, president of the National Fireproofing Corp., Pittsburgh, Pa., was elected president of the STRUCTURAL CLAY PRODUCTS INSTITUTE, national association of brick and tile manufacturers, at the Institute's recent

convention at New Orleans. Other officers elected at the convention were: vice-president, **Joseph A. Brown,** president of the Baltimore Brick Co., Baltimore; treasurer, **W. Gardner Long,** treasurer of the New England Brick Co., Boston; and secretary, **J. J. Cermak** of Washington, D. C.

☆ ☆ ☆

Frank C. McManus, former factory manager of the Long Island City, N. Y., plant of Mack Trucks, is now factory manager of the FULLER MFG. CO. of Kalamazoo, Mich. McManus comes to Fuller with nearly 30 years of experience in automotive work and plant supervision. Before joining Mack, he held a series of responsible positions with such automotive pioneering firms as Fiat Automobile Co., The Moline Plow and Implement Co., the Walter C. Guilder Engineering Co. of Poughkeepsie, N. Y., and the Bridgeport Motor Truck Co. He was associated with Mack for 20 years, serving in many diversified capacities.

☆ ☆ ☆

The Contractors' Pump Bureau and the Mixer Manufacturers' Bureau, both affiliates of the ASSOCIATED GENERAL CONTRACTORS OF AMERICA, reported production increases at annual meetings recently held at Hot Springs, Va. The pump manufacturers reported a new peacetime record production figure, and the mixer makers were confident of their ability to meet all demands. **A. S. Marlow, Sr.,** president of MARLOW PUMPS, Ridgewood, N. J., will head the pump men for the next year, and **Julien R. Steelman,** KOEHRING CO., was elected chairman of the mixer bureau.

☆ ☆ ☆

J. C. Voiles has taken over as Division Manager for PLANT RUBBER & ASBESTOS WORKS, with jurisdiction over the entire east and midwest territories. His headquarters will be in New York City. Prior to his promotion, Voiles was chief engineer for Plant Rubber & Asbestos Works, in which post he applied his specialized knowledge on the engineering and technical aspects of heat engineering. For years he has been closely identified with insulation installations in the oil industry, power and chemical, and other process plants, and in ship building.

☆ ☆ ☆

K. V. (Ken) Turner has taken a step up to become assistant sales manager of LA PLANT-CHOATE MFG. CO., INC., Cedar Rapids, Iowa. Turner started work for LaPlant-Choate in 1938 as a blueprint clerk in the Engineering Department. Since that time his experience with the company has been diversified, including service work, export sales, coordination between the Federal Government, sales and production; government sales, field engineering research, and district sales representative in northeastern United States. Last year he was called back to the Cedar Rapids office to assist in organizing the company's independent dealer program. His recent promotion is a result of outstanding work in connection with this program which will be complete with the appointment of more domestic dealers.

NEW EQUIPMENT

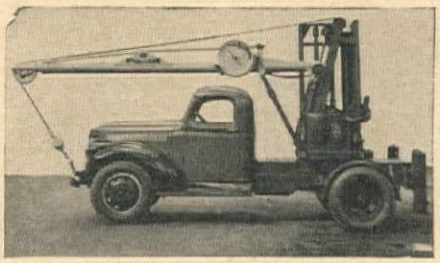
MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, California.

Hydraulic Truck Crane

Manufacturer: The Milwaukee Hydraulics Corp., Milwaukee, Wis.

Equipment: The model H-2 two ton hydro-crane.

Features claimed: A simple, high capacity hydraulic system operates the entire unit, boom, hoist, swing and even the clamshell bucket. The standard tubular boom raises and lowers as well as telescopes from 16 ft.



to 22 ft. under hydraulic power, enabling the operator to spot loads quickly and accurately, reach into box cars, over walls or piling, between beams or into buildings. 360° swing is provided. Ample stability is assured by means of hydraulically powered outriggers which can be independently extended or retracted both horizontally or vertically in 3 to 5 seconds, from the operator's seat. The model H-2 mounts on 1½ ton trucks or special 6 x 6 drive Jeeps available at the factory. For clamshell service a standard ½ yard bucket, hydraulically powered, is available as well as a hydraulic low headroom bucket for congested quarters.

Rear Axle Assembly

Manufacturer: Knuckey Truck Co., San Francisco, Calif.

Equipment: The Brumbaugh Rear Axle Assembly.

Features claimed: This unit offers a remarkably clean design and ample ground clearance. Chain mountings and radius rods serve to keep the road axles parallel in a vertical plane. The housing containing the drive elements is connected to the frame through heavy trunnions and the load is distributed to the dead axle by rigid side beams which are pivoted on the jackshaft. One end of each beam rests directly on the dead axle part while the other end of each beam is connected through a dual coil spring system contained in the beam end. A diagonal cross-rod connects one end of each side beam with the jackshaft housing and thus the lateral position of the beam and its connected load-carrying axle is rigidly main-

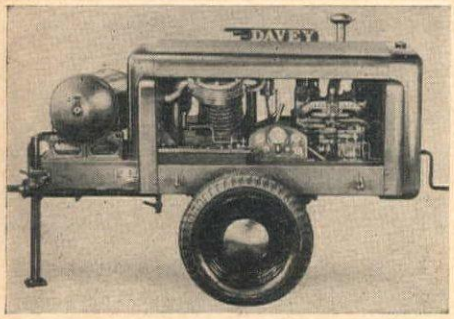
tained. Thus the chains are held in operating alignment under all conditions. The tension on the driving chain is maintained by adjusting screws within the radius rods.

New Portable Compressor

Manufacturer: The Davey Compressor Co., Kent, Ohio.

Equipment: New model 60V portable compressor.

Features claimed: This new unit is available in standard skid and 2-wheel pneumatic tired trailer mounting styles, also with flanged wheels for railroad work. It is likewise offered as an "Auto-Air" compressor



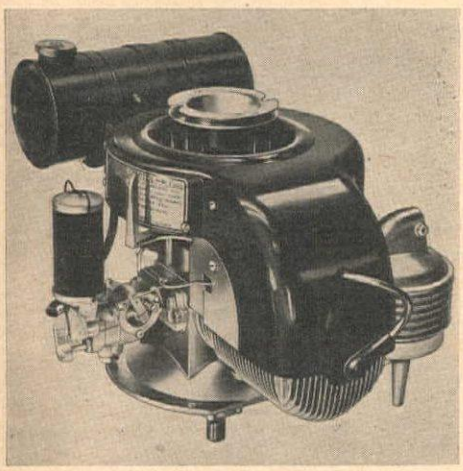
for truck mounting. The compressor produces 60 cfm. at 100 lbs. pressure and is designed for heavy duty service. It has one low pressure cylinder with 5¾" bore and 4½" stroke. The high pressure cylinder has 3⅝" bore. Operating speed is 1225 rpm. Weight of the 2-wheel model is 2100 lb. It is powered by a Hercules IXB engine.

New Gasoline Engines

Manufacturer: McCulloch Motors Corp., Los Angeles, Calif.

Equipment: New type, light-weight industrial gasoline engine.

Features claimed: Model 1200D is a single-cylinder, 2-cycle, air-cooled unit that weighs only 24 lb., yet develops a rated 2.5 hp. at 2500 rpm. It possesses all the advantages of the two-cycle engine—extreme



light weight, small size, simplicity, fast acceleration, and low maintenance. In addition, the new model has features not always associated with 2-cycle engines, such as easy starting and smooth idling. Unusual operating advantages can be traced directly to the "reverse-flow" scavenging system. This new and exclusive design permits the use of flat-top, non-deflection pistons, and results in improved scavenging, better fuel efficiency, better cylinder-wall lubrication, and consistently cleaner and unfouled spark

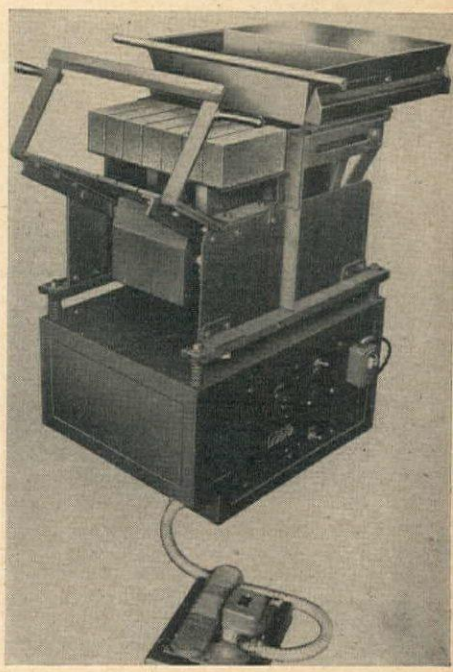
plugs. All bearings are the anti-friction type. The engine is air-cooled and has a high-tension flywheel magneto and a rope starter. Bore and stroke are 2 x 2 in.; displacement is 6.28 cu. in. Overall dimensions including gas tank and spark plug, are: height, 14.6"; length, 17.8"; width, 14.2".

Concrete Brickmaker

Manufacturer: The R. S. Reed Corp., Three Rivers, Mich.

Equipment: Vi-Brik-Crete, a new semi-automatic vibrating machine for making concrete products.

Features claimed: Rigidity of machine structure and simplicity of design together with multiple molding capacity are the keys to lower manufacturing costs and the exceptional production-capacity of this equipment. Concrete bricks made by this machine have compressive strengths up to 100% greater than those of a given mix by other



methods. Absorption will be reduced as much as 35%, and the brick will have greatly increased resistance to weather. The machine can produce 28 concrete bricks per minute that are uniform in size and density with smooth finished sides and sharp edges and corners. It has 3000 vibrations per minute, and is foot switch controlled for immediate full power action without over-travel insuring a short molding cycle. A built-in electronic control allows the operator to vary the amplitude of vibrations at will permitting a wide range of mixes and aggregate selections. Operation of the machine does not require skilled labor.

Earth Spreader Wagon

Manufacturer: Dixson Wagons, Inc., Alhambra, Calif.

Equipment: Model D-P earth spreader wagon.

Features claimed: This new wagon is designed for maximum efficiency when operating with almost any conventional type large truck or tractor unit having 10 or more tons capacity, with 150 to 200 hp. It has a struck measurement capacity of 16 cu. yd. and will handle a heap load, at 3:1 slope, of nearly 19 cu. yd. Its clamshell bucket type design permits the spreading of fine

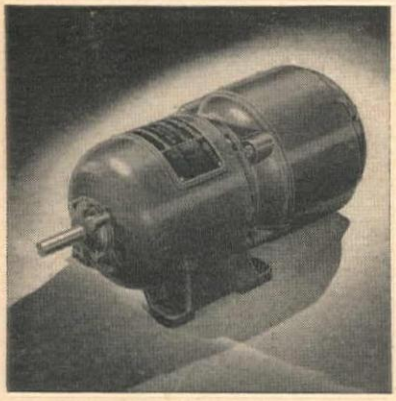
material in uniform layers or it can discharge boulder filled earth in one dump. Another model of 25 cu. yd. measured capacity is now on the proving ground, and it is expected that this larger unit will be in production shortly.

Link-Belt Electrofluid Drive

Manufacturer: Link-Belt Co., Chicago, Ill.

Equipment: New and revolutionary type of "packaged" power unit.

Features claimed: The electrofluid drive is a neat, compact, motorized hydraulic combination consisting of a general-purpose A.C. induction motor flange-mounted on a sturdy housing containing a hydraulic coupling, also called "fluid coupling." Its



output shaft may be direct-connected to the driven machine or to a speed reducer unit. It may also be connected to driven machine through the medium of chain, gear or belt drives. The size of the motor is based on the running horsepower, not on starting requirements. Smooth, cushioned starting is assured and overload shear pins are unnecessary.

New Centrifugal Pump

Manufacturer: Construction Machinery Co., Waterloo, Iowa.

Equipment: 3-M Dual Prime CMC Centrifugal pump.

Features claimed: New lightness in weight has been accomplished by complete new metal pattern equipment and high production precision foundry moulding machines. You now get uniform wall thickness throughout the pump case and other parts. Unnecessary waste metal and unduly heavy wall sections have been eliminated, yet the pump case and suction head are still interchangeable. A double shaft seal with flexible neoprene diaphragms, hardened ball bearing steel rotating seal surfaces, and stationary bronze seal plates give the ultimate in seal performance and life. A large pump case and dual prime construction assure fastest priming, a trash-type impeller and streamlined case offer the best nonclogging design, double shaft seal and alloy pump parts provide the longest life, and a high suction inlet gives dependability of priming time.

Low-Hydrogen Electrode

Manufacturer: The Lincoln Electric Co., Cleveland, O.

Equipment: Shield-Arc LH-70 electrode with a low-hydrogen, low-moisture coating.

Features claimed: Designed for use with DC polarity, as the welded tensile properties are 70,000-80,000 tensile strength and elongation is 25 to 30 per cent, the new unit uses welding currents which are high in comparison with other all-position-type electrodes. The range is: ⅛", 100 to 135 amperes; 5/32", 140 to 190 amperes; and 3/16", 180 to 250 amperes. A rather short arc is recommended. Preheating of high-tensile, low-alloy steels can now be eliminated or largely reduced; welds of exceptional toughness can be made on high carbon and other steels which tend to show underbead cracking when welded with the usual type of electrodes; welding high-silicon electrical sheet steel is highly practicable with the new electrode and high sulphur steels can be welded as readily as low sulphur mild steel. Countless other savings and new applications for arc welding are made possible by the new low-hydrogen electrode.

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.

CONVERTIBLE POWER SHOVEL —**Buckeye Traction Ditcher Co.**, Findlay, Ohio, supplies information concerning the Model 70 power excavation equipment in its 36-page booklet. Action pictures of the power shovel, trench hoe, dragline and crane, also diagrams and charts, augment the text describing the vacuum power con-

trol, power hookups and drives, proper balance, ease of operation, digging capacity and simple convertibility.

INTER-COMMUNICATION EQUIPMENT—**Talk-A-Phone Co.,** Chicago, Ill., recently "unveiled" their latest model—the KR-4010 Special DeLuxe line, containing features previously found only in the more expensive DeLuxe and other exclusive Talk-A-Phone models. Their 14-page catalog lists the complete line of intercommunication systems.

NEW CRUSHING AND SCREENING PLANT — **Pioneer Engineering Works,** Minneapolis, Minn., has released an amply illustrated booklet which explains how the new diesel-electric crushing and screening plant is constructed, the arrangement of the simplified drives and complete specifications. Special emphasis is given to the features which make it possible to secure unusual portability and maneuverability of a high capacity plant. The reduction in weight and savings in mechanical maintenance costs accomplished by electric drive are also pointed out.

PROFIT-PRODUCING TOOLS — **Wyzenbeek & Staff, Inc.,** Chicago, Ill., have just published a new 16-page, two-color folder listing new additions to and present models of the "Wyco" line of flexible shaft machines, high speed grinders, tools and accessories. Detailed specifications and prices are listed for all items.

U.S.S. COR-TEN—**United States Steel Corp. Subsidiaries,** Pittsburgh, Pa., presents complete data on the properties, fabrication and application of U.S.S. Cor-Ten in the 68-page, liberally illustrated, two-color booklet just published. Test data, lists of equipment and users are used to substantiate the claims made for the various properties and applications of this product.

CLOSE-COUPLED VERTICAL PUMP — **Peerless Pump Division, Food Machinery Corp.,** Los Angeles, Calif., has issued a new 20-page bulletin in color devoted in its entirety to describing and illustrating the specialized application of Peerless Turbine Pumps to industrial, municipal, engineering and agricultural installations where short pump settings are encountered and where there is a strong necessity for deep well turbine pump power and capacity in these applications.

THRU-WALL FLASHING — **Chase Brass & Copper Co.,** Waterbury, Conn., have released a booklet announcing the production of a new and improved thru-wall flashing that embodies six outstanding new features. It is designed to prevent leaks and seepage in building walls, streaks, stains and efflorescence which so often disfigure a building, and the rusting of spandrel beams.

TRACTOR AND GRADER—**Caterpillar Tractor Co.,** Peoria, Ill., is distributing "High Speed Earthmoving with Caterpillar," an 8-page, color booklet that records and illustrates the accomplishments of rubber tired equipment on medium and long earthmoving hauls where ground conditions are conducive to the use of wheeled vehicles. The Diesel No. 212 Motor Grader is again in production. The manufacturer has published a new folder outlining the construction attributes and operational advantages of this machine.

DECAY RESISTANT AND FLAME PROOFED LUMBER—**American Lumber & Treating Co.** of Chicago, Ill., has recently published a bulletin, "Wolmanized Lumber and Flameproof Lumber" which describes and illustrates the treatment and uses of decay and termite resistant lumber and flameproofed, Minalith-treated, lumber.

CONCRETE DENSIFIER — **Sika Chemical Corporation,** Passaic, New Jersey, in its 8-page booklet explains the action and benefits of Plastiment when added to cement. The result of the increase in the density of concrete when used with Plastiment, its strength and setting time are illustrated with photographs and charts.

DIESEL ENGINE COOLING SYSTEMS—**Binks Manufacturing Company,** Chicago, Ill., has published an 18-page booklet with illustrations, diagrams and tables describing the new efficiency, simplicity and advanced engineering which provides higher thermal engine efficiency in the Binks closed type cooling systems.

AIR CONTROL — **The Osgood Company,** Marion, Ohio, has ready a 12-page, color booklet giving the advantages of the Type 81 Air Control whether for shovel, dragline, backhoe, clamshell or crane service. Details of construction and various uses of the equipment are enumerated and profusely illustrated.

PLANTS, PORTABLE AND STATIONARY—**Universal Engineering Corp.,** Cedar Rapids, Iowa, recently issued an 18-page booklet in color dealing with standard plants for the low-cost production of sand, gravel, aggregates, aglime, etc., which are built from Universal "Basic Units." Briefly defined and illustrated are a few of the many standard quarry and gravel plants that consist of varying arrangements of the basic units.

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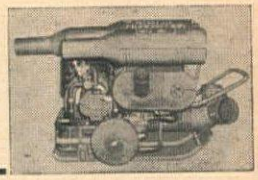

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