

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED

WESTERN HIGHWAYS BUILDER

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IN THIS ISSUE

Construction Can Lead the Way

Masonry Dam at Altus, Oklahoma

Suspension Bridge Rope Replaced

Alaska Construction Problems

Huge Railroad, Warehouse Depot

Bridge Re-decked Under Traffic

ONE HUNDRED NINETY-TWO timber trusses were required in each of the 12 warehouses at the Auburn, Wash., holding and reconsignment center. Four acres of ground were covered by each of the structures. Trusses were set by mobile crane.

ROPE TRICK



IT takes skill on the part of the operator to drop that bucket over the exact spot...skill and well-conditioned wire rope.

To keep their wire rope flexible, protected against core rot, contractors everywhere are lubricating with *Texaco Crater*.

Texaco Crater penetrates to the very core of wire rope, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion, keeps rope strong longer.

Used on open gears, *Texaco Crater*

cushions load shocks, stops undue wear, quiets the noise. It doesn't ball up, channel or throw off, but clings to tooth surfaces, following through from gear to gear, despite heavy pressures, high temperatures and peripheral speeds.

So effective have Texaco lubricants proved that they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 E. 42nd St., New York 17, N. Y.

THEY PREFER TEXACO

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.



TEXACO CRATER

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Talk to Northwest owners NOW!

Talk to Northwest owners NOW!

YOU'RE planning for the future—making up your mind about methods, jobs, personnel, equipment.

The pressure of war construction, more than ever before, is showing the difference in performance between equipment built to do a job and equipment built to meet a price.

Talk to Northwest owners! Learn something about the type of performance that Northwests are giving under the conditions of continuous service and high pressure war jobs.

You'll learn why one out of every three Northwests for years has been a repeat order in the hands of the nation's leading contractors.

Ask how the Northwests are doing!

NORTHWEST ENGINEERING CO.
1736 Steger Bldg., 28 E. Jackson Blvd.
Chicago 4, Illinois

NORTHWEST

Branch Offices: 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash.; 3707 Santa Fe Avenue, Los Angeles, Calif.
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when you have
a real Rock Shovel
you won't have
to worry about
output in dirt

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CHICAGO
BRIDGE
IRON
COMPANY

LOOK at it. Northwests are
the real Rock Shovel
and the real Rock Shovel
is the Rock Shovel.

NORTHWEST
ENGINEERING CO.

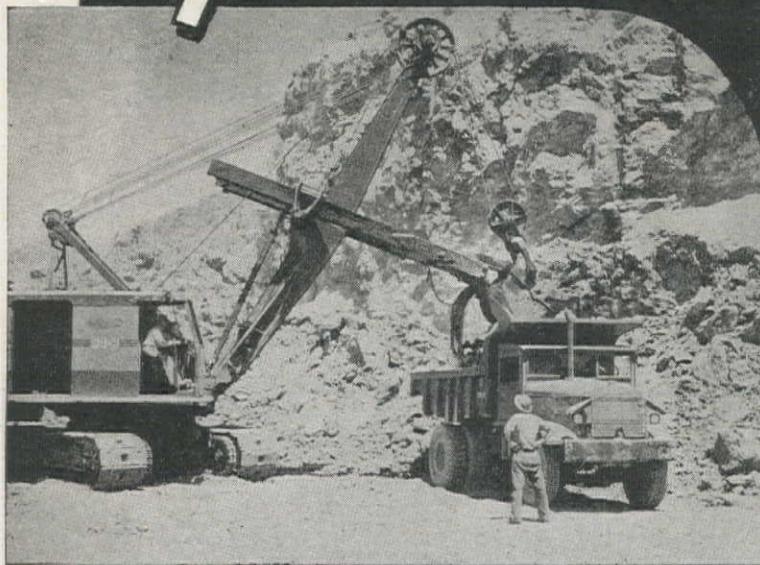
1736 Steger Bldg.

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Chicago, Illinois

Dependable EUCLIDS

COST LESS TO OWN



On scores of big earth and rock moving jobs, and in industrial operations too, Rear-Dump and Bottom-Dump EUCLIDS are moving more yards and tons per hour at consistently lower cost. Carrying pay loads of 15 to 30 tons at speeds up to 33 m.p.h., EUCLIDS cut down the round trip time from the loading unit to dump and carry more pay loads per hour.

Designed and built throughout for the hard service of off-the-highway hauling, EUCLIDS actually cost less to own than ordinary hauling equipment. Lower operating and maintenance

cost, plus dependable trouble-free operation, has made Euclid the favorite equipment of contractors and industrial users for hauling all kinds of heavy excavation and materials.

If you need new equipment for a current job or are planning for your peace time requirements, be sure to consult your Euclid distributor or write us for descriptive literature.

The EUCLID ROAD MACHINERY Co.
Cleveland 17, Ohio



THE EUCLID ROAD MACHINERY Co.

3710 SAN PABLO AVENUE — PIEDMONT 8046 — EMERYVILLE, CALIFORNIA

CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque; INTERMOUNTAIN EQUIPMENT COMPANY, Boise; HALL-PERRY MACHINERY COMPANY, Butte; F. W. McCOY COMPANY, Denver; LOGGERS AND CONTRACTORS' MACHINERY CO., Portland; A. H. COX & CO., Seattle

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER ▶

*Covering
the Western Half of
the National
Construction Field*



J. M. SERVER, JR.
Editor

SUBSCRIPTION RATES

The annual subscription rate is \$3 in the United States and foreign countries where extra postage is not required. To Canada and to foreign countries where extra postage is necessary the annual rate is \$4. Single copies, 35 cents.

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IT WILL PAY YOU TO COMPARE **YOU** WITH ORDINARY **SPEED**

To More Profitable Earthmoving

Postwar construction plans for rebuilding, relocating and widening highways and for lengthening airports definitely show the trend is to longer hauls. To profitably handle these longer-haul jobs of tomorrow, you'll need equipment that can move big yardages fast. Tournapulls are the answer. Compare them with ordinary tractors and tractor-drawn scrapers for:

SPEED

Tractor speeds range from 1.5 to 7 m.p.h. Tournapulls operate from 2.6 to 14.3 m.p.h. and average 2 to 3 times faster than the fastest tractors. Chart here shows what this greater speed can mean to you in extra yardage.

YARDAGE

ONE-WAY HAUL DISTANCE—CU. YDS. PER HOUR*

Tractor-drawn Scrapers:	400'	600'	800'	1,000'	2,000'	3,000'	4,000'	5,000'	6,000'
30-Yd. Capacity	—	—	175	153	97	71	56	46	39
23-Yd. Capacity	—	187	162	142	89	65	51	—	—
18-Yd. Capacity	196	163	139	122	74	—	—	—	—
15-Yd. Capacity	170	142	121	106	65	—	—	—	—
With 15-Yd. Super C Tournapull you get:	200	180	168	156	116	91	76	65	55

*All units pusher loaded on level.

Example: On a 2,000-foot, one-way haul, the Super C Tournapull will move, on an average, 27 cu. yds. more per hour than a 23-yard scraper.

On 10,000-hour working life, that's 270,000 cu. yds. Figure the gain to you at your own usual bid price!

TOURNAPULLS

RUBBER-TIRED POWER FOR FASTER EARTHMOVING

TOURNAPULLS

BY TRACTORS ON THESE 4 POINTS

YARDAGE WEIGHT POWER

WEIGHT

POWER

Prime Mover and Equipment	Super C Tournapull & 15-Yd. Carryall	Tractor & 15-Yd. Scraper Approx.	Tractor & 18-Yd. Scraper Approx.	Tractor & 23-Yd. Scraper Approx.	Tractor & 30-Yd. Scraper Approx.
Weight of combined Units	31,000#	53,500#	57,575#	65,575#	70,875#

On a 30-yard scraper, this difference in weight is the equivalent of 14.5 pay yards. Can you afford to lug that

much dead weight back and forth over a 10,000-hour working life?

What's more, the Tournapull has more power for its working weight—150 d. b. h. p. for 31,000 lbs.—which gives you higher average speeds and quicker getaway.

Why use slow-moving, overweight equipment, when you can have faster-moving, job-proved Tournapulls? You'll pay less, move more yardage . . . more profitably. Figure NOW to use Tournapulls on your postwar jobs.



Like all big-capacity earthmovers, Tournapulls are built for quick loading with pusher aid. Their extra speed makes long hauls profitable.

LET TOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

Manufacturers of TOURNAPULLS*, DOZERS, CARRYALL*, SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.

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



"The high accomplishment of you men and women of the Los Angeles plant of the Soulé Steel Company is inspiring. Your record will be difficult to surpass, yet the Army and Navy have every confidence that it was made only to be broken."

JAMES FORRESTAL,
Under Secretary of the Navy.

*The "E" speaks for itself
we are proud of it!*

"E" AWARD

In making selection of a company to receive the "E" award, the Army and Navy considers the full utilization of available equipment, avoidance of stoppages; maintenance of fair labor standards; cooperation with the war program; effective management and engineering; record on accidents, health, sanitation and plant protection; utilization of subcontracting facilities and training of additional labor forces. Instituted in 1906 by the Navy as an award of excellence in gunnery, it is now awarded jointly by the Army and Navy to industry for excellence in war production.

It is with a feeling of immense pride that the employees and management of the Los Angeles plant of Soulé Steel Company receives the Army-Navy Production Award. The Army-Navy "E" flying over our plant, will symbolize to all that we are keeping faith; that in common with American industry we are pledging all our energies and skills to the end that our fighting men shall have the tools of Victory.

This is our promise, at a time when the tide is already running in favor of the United Nations, that we of the Soulé Steel Company will not rest on our laurels; that grateful for our country's recognition and honor, we will carry on, in the unshakable belief that Victory and Peace are the destiny of America.

To our employees now serving with the armed forces we pay tribute and voice our hope for their early return.

In grateful appreciation, Soulé Steel Company acknowledges its debt to its many suppliers and subcontractors, whose tireless energy and efficient cooperation have contributed so much to make possible the honors we are permitted to enjoy.

SOULÉ STEEL COMPANY

6200 WILMINGTON • LOS ANGELES, CALIFORNIA

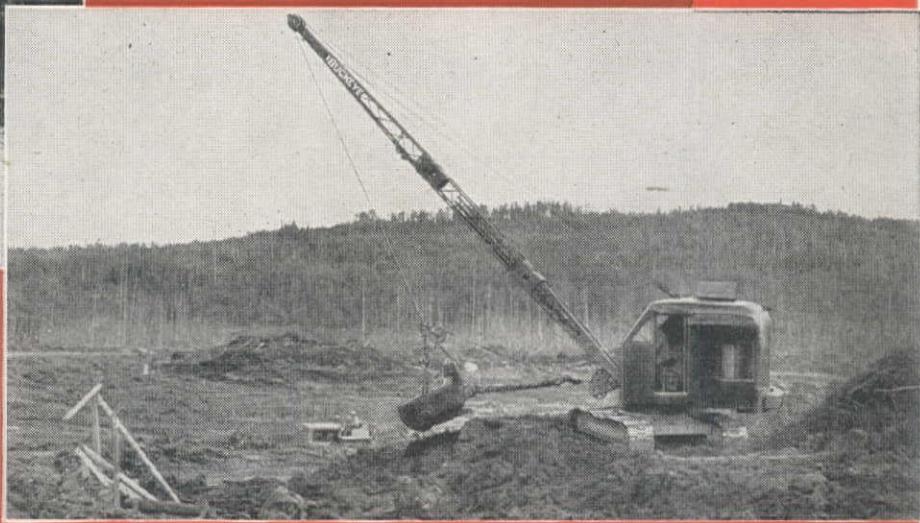
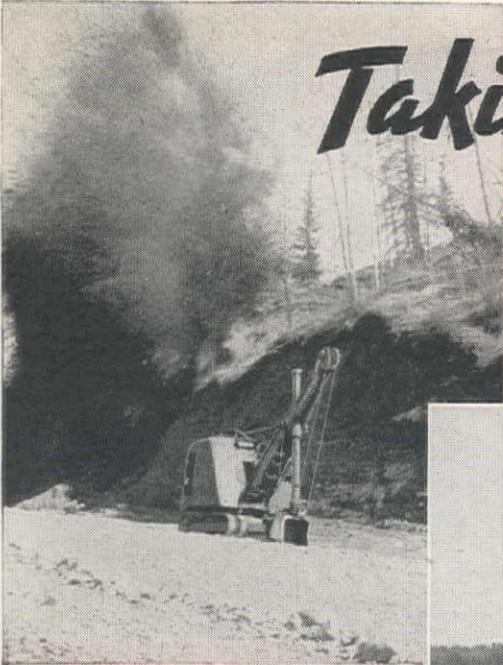


SAN FRANCISCO • TORRANCE • PORTLAND



A Good Safe Place to Work

Taking the KINKS out of the ALASKA HIGHWAY



with

BUCKEYE CLIPPERS

When the Alaska Highway was originally built, "Hurry" was the slogan. Engineers laid it out along the natural contours of the land—the line of least resistance—to rush the military roadway to completion.

Today with less need for haste, the highway is being streamlined. Hills are being cut away, depressions filled in and curves straightened. It will be 107 miles shorter. On this job, as on the construction of the original highway, Buckeye Clipper convertible shovels are playing important roles.

The success of Buckeye Clippers on this job is evidence of what they can do for you on peace time projects. Under the most severe weather conditions, with little maintenance available, they came through handily. Because of their intelligent design, rugged construction and ease of operation due to "Mevac" finger-tip control, these shovels have made an enviable reputation for greater yardages with less effort.

For post-war operations, write for Buckeye Clipper Bulletin 543. It will show you why Buckeye Clippers should be your choice among 1/2 and 3/4 yard power shovels.

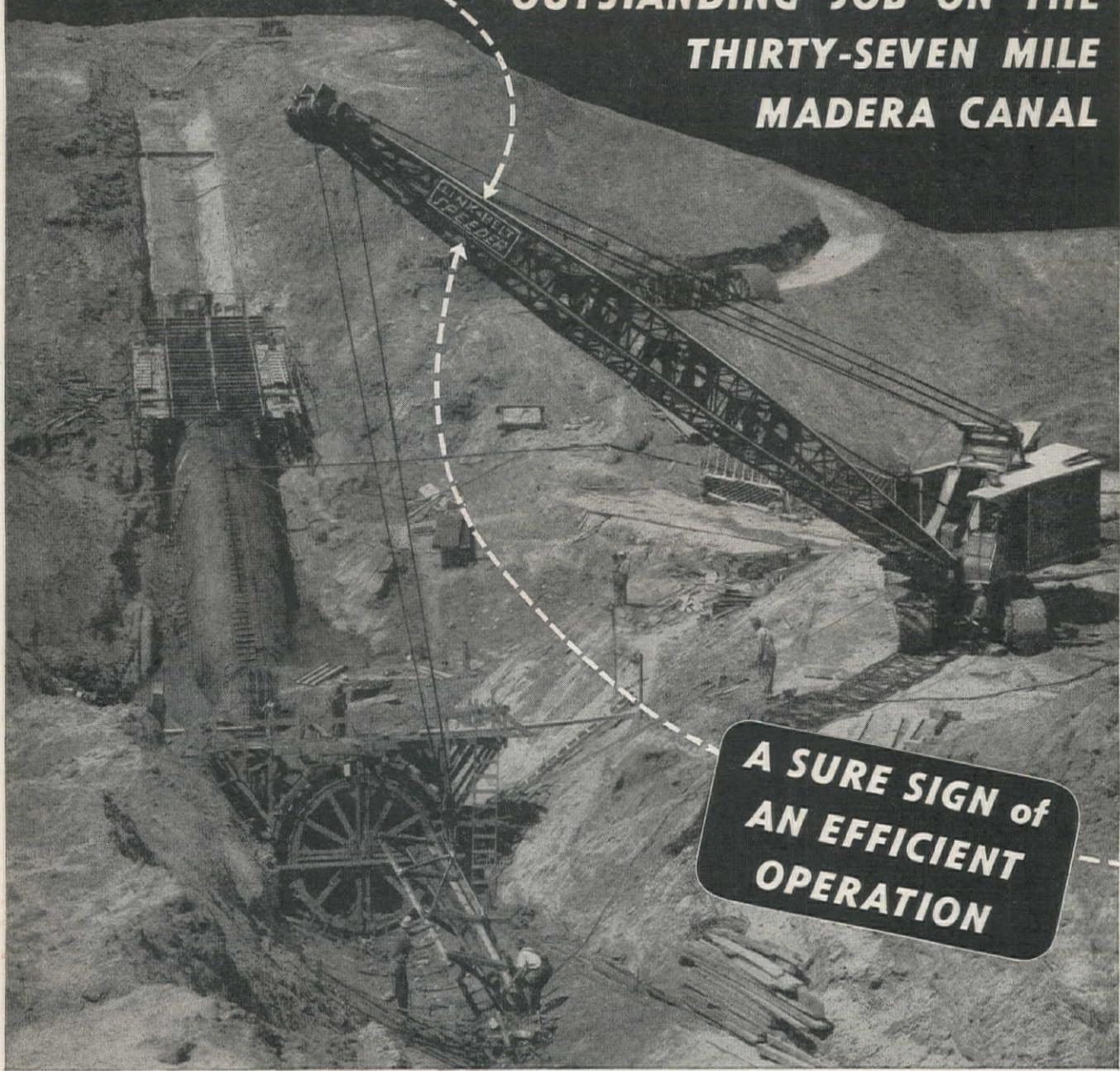
BUCKEYE TRACTION DITCHER CO., Findlay, Ohio



® **Built by Buckeye** ✓

Convertible Shovels Road Wideners Trenchers
Spreaders R-B Power Finegraders Tractor Equipment

**UTAH CONSTRUCTION CO. DID AN
OUTSTANDING JOB ON THE
THIRTY-SEVEN MILE
MADERA CANAL**



**A SURE SIGN of
AN EFFICIENT
OPERATION**

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

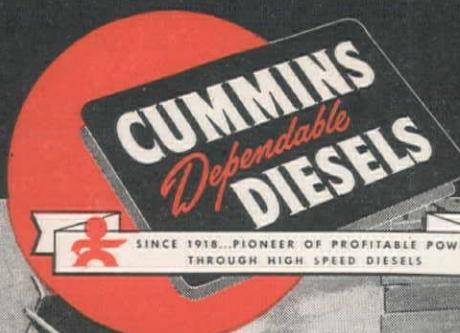
LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO-9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

CHECK AND DOUBLE CHECK



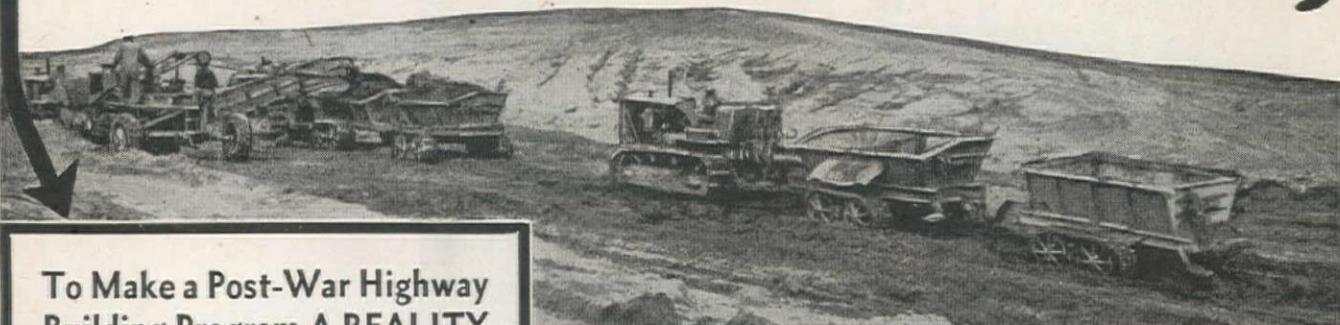
Check the course of Cummins Dependable Diesels since the beginning—26 years ago. You'll find that the trend has been always toward higher horsepower output per pound of engine weight through HIGHER ENGINE SPEEDS. Then double check the record of Cummins Diesel Power in every heavy-duty service—automotive, industrial and marine. You'll find that the result has been consistently the same . . . increased payloads . . . improved performance . . . higher profits.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.



HEAVY-DUTY MODELS FOR AUTOMOTIVE AND INDUSTRIAL SERVICE

\$3,000,000,000 Per Year!



To Make a Post-War Highway Building Program A REALITY

—WORK FOR IT!

Once thoroughly aroused, we Americans are the greatest people on earth to jump in and DO!

There is now before the law makers of this country a proposal in which every reader of this publication has a vital interest. Whether manufacturer, dealer or user of any type of construction equipment or material, or just plain citizen, this proposal is as close as his pocketbook, his home, his business, his very future.

H.R. 2246-S971—a bill to create a Post-War highway program amounting to 3 billions of dollars per year for three years, and to be matched by the States, has the support of the American Association of Highway Officials, American Road Builders Association, Associated Equipment Distributors, and other associated groups. If enacted into law, it will assure a long range, comprehensive plan of adequate State and National Highway development. It will assure the practise of free enterprise in its fulfillment. It will assure the employment of from six to ten millions of PEOPLE. Factories will be busy making equipment for dealers and their salesmen to sell to contractors, pits, and quarries who will employ and pay regular wages to countless men who care for families who eat, sleep, live, buy clothing, automobiles, amusement, etc., etc.!

Lip service—a "let George" attitude—won't make it come to pass. Do you want it? Of course you do! Then do something about it. ACT! You, and you—and YOU. See or write your congressman and representatives. Think it. Talk it. WORK FOR IT! NOW!

SEND FOR RESOLUTION

Already drawn up and printed, with space for 30 signatures, which you and your associates can sign and forward to your Congressman.

A comprehensive program of street and highway construction will require millions of tons of crushed, screened, and washed stone and gravel. Wartime "high pressure" requirements proved conclusively which equipment can best stand the gaff of steady, uniform, uninterrupted production!

DIAMOND CRUSHERS—SCREENS—PLANTS FOR HIGH PRODUCTION, ECONOMICAL OPERATION, LOW MAINTENANCE COSTS

Low, costly production pays no profits. Every piece of DIAMOND crushing, screening, washing, and conveying equipment has proven, however, that it helps make its operator profits because it gives high production at low cost.

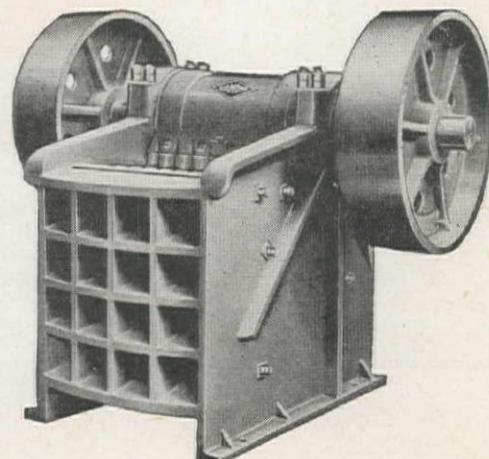
DIAMOND stationary and portable plants have established enviable records. The new DIAMOND Dual-Action crusher is the most sensational advance in crusher design in many years. It is fully described in Bulletin D-44-M. Ask for it, and for special bulletins on other DIAMOND equipment.

JAW CRUSHERS - ROLL CRUSHERS - NEW DUAL ACTION CRUSHER - HAMMER MILLS - SCREENS - CONVEYORS BINS - GRIZZLIES - FEEDERS - PORTABLE PLANTS



DIAMOND DEALERS

COAST EQUIPMENT COMPANY, San Francisco 1, California
GARLINGHOUSE BROS., Los Angeles 21, California
A. H. COX & CO., Seattle 4, Washington
LOGGERS' & CONTRACTORS' MACHY. CO., Portland 14, Oregon
CONSTRUCTION EQUIPMENT COMPANY, Spokane, Washington
CONTRACTORS' EQUIP. & SUPPLY CO., Albuquerque, New Mexico
WESTERN EQUIPMENT CO., Boise, Idaho
C. H. JONES EQUIPMENT CO., Salt Lake City, Utah



DIAMOND IRON WORKS, INC.

ESTABLISHED 1880

AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH



MINNEAPOLIS 11, MINN.

GROOMING THE GREEN



HIGHWAYS or RUNWAYS

Case Power Sees Things Through

WHEREVER ribbons of concrete lie against a ground of green, whether runways of airfields or highways among farm fields, the way to keep grass in condition and weeds in control is with a Case Highway Mower and Case "VAI" tractor. The same swift teamwork also keeps grounds groomed around industrial plants and along rights of way.

Built by a company with a vast experience in manufacture of farm mowers, combines and other harvesting machines that employ sickle-bar cutting, the Case highway mower is notable, not for similarity to farm mowers, but for its striking differences. Only such wealth of experience could so fully satisfy all the exacting demands of a highway and airport mower.

On this amazing mower the knife sections remain in perfect register with the guards at all angles of the cutter-bar, cutting just as clean when it stands vertical or droops down at 45 degrees as when it is level. Its positively-timed mechanical lift enables the operator to work swiftly, confidently among obstacles. Its various safety features reduce the shock when hidden obstructions are accidentally encountered.

Only with a tractor like the "VAI" can these advantages be fully realized. It has clearance for the cutterbar to operate above curbs, clearance for the operator to see full length of cutterbar and ahead, mobility and compactness for swift maneuvering in cramped corners, stability to work safely and steadily in wide ditches and on steep slopes.

This happy proportion of dimension and design in the "VAI" is no accident. Back of every Case industrial tractor is seventy years experience in applying engine power to varied jobs on field and highway. Earmarks of Case power are Endurance to keep going long hours and long years, Economy to take little of fuel and of maintenance.

★ ★ ★

Case industrial tractors are built in four basic sizes, with varying wheel and tire equipment to cover a weight range from 2500 to more than 10,000 pounds and to suit every sort of traction condition. For power you may need in essential work, see your Case distributor about specifications and availability. Use his service to help get all the long life from Case equipment you now have. J. I. Case Co., Oakland, Los Angeles, Calif.

CASE



KEEP ON BUYING BONDS
... TO SEE THINGS THROUGH

BACK OF EVERY ATTACK ...

Preformed wire rope

Preformed wire rope gives sinews of steel to bulldozers that clear the way so jeeps, planes, and trucks can advance. Preformed is in the fight on practically every kind of mobile war machine.

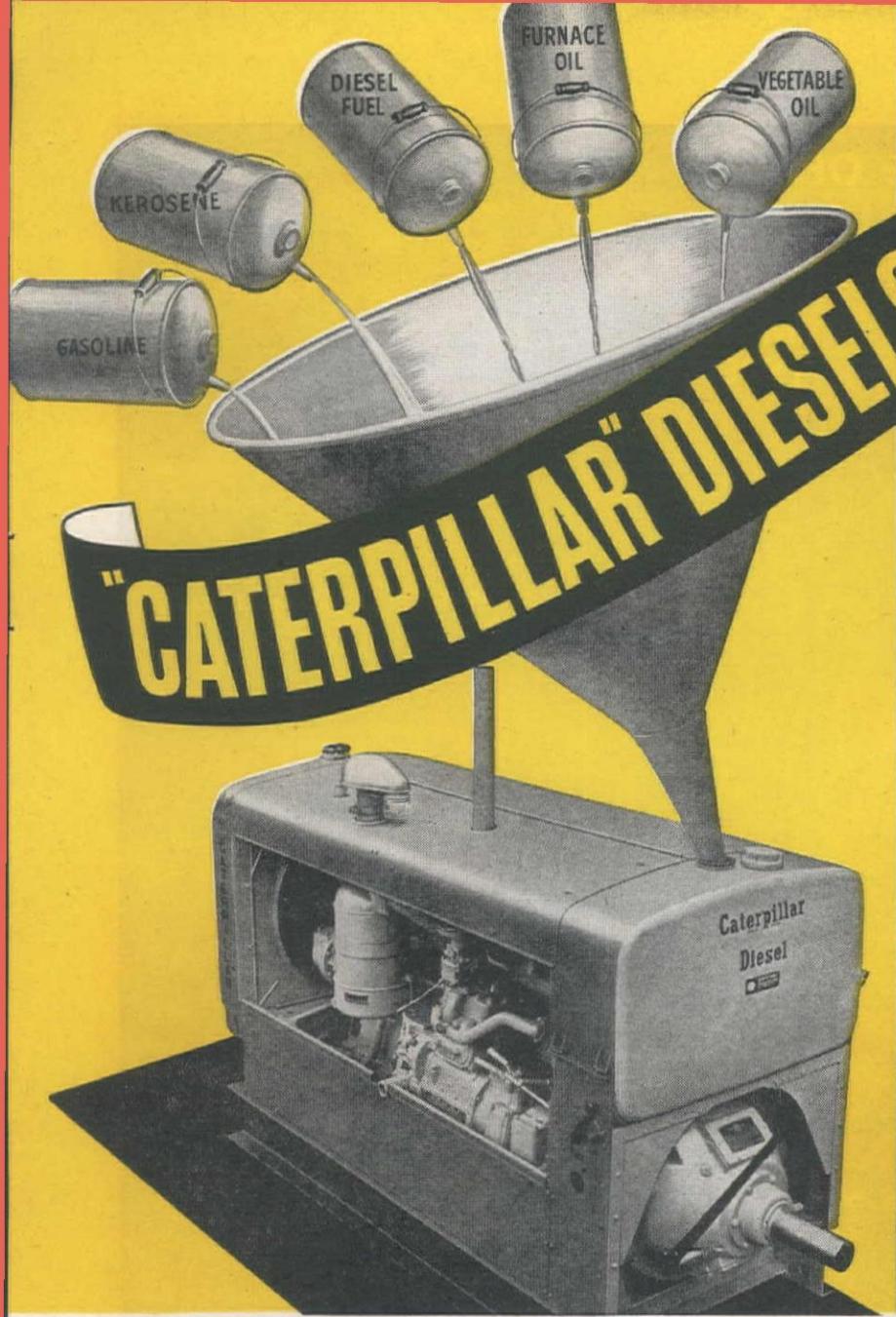
Men who use Preformed wire rope know that it outlasts and outworks ordinary wire rope.

That it handles easier—speeds up operations—safeguards men and equipment.

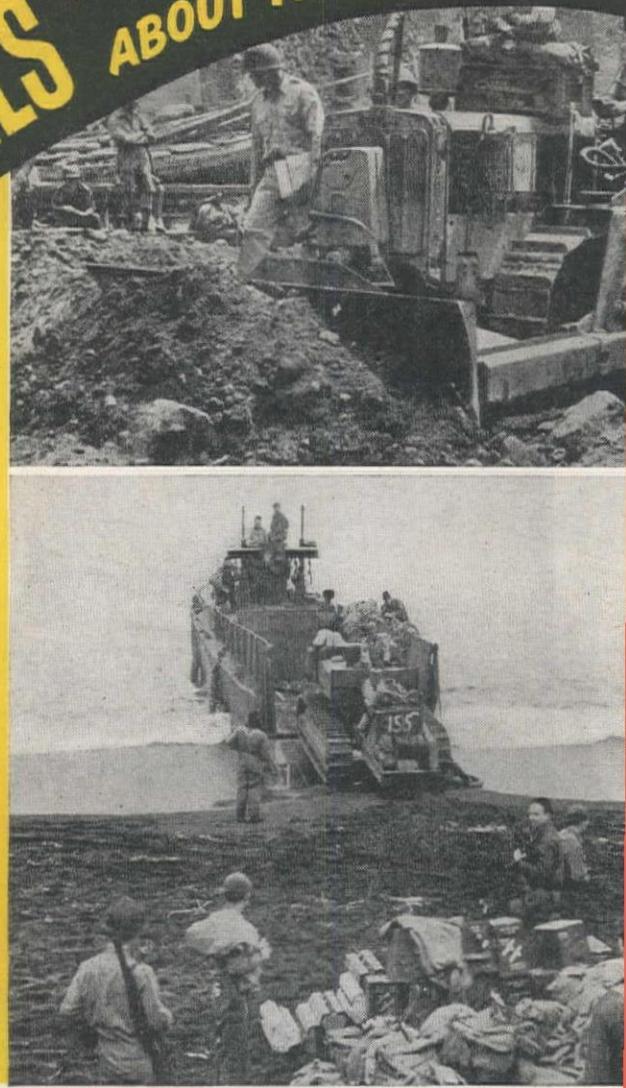
In the past, Preformed has proved it is the wire rope for the tough peacetime jobs. Today, back of every attack, it is proving that it is the wire rope for the tough war jobs.



ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE



AREN'T CHOOSY
ABOUT THEIR DIET



A "Caterpillar" Diesel Engine has a digestion like an Army mule. It's ready to do a cheerful day's work on any kind of fuel you feed it—and mighty little of that!

The "Caterpillar" fuel injection system is the only one of its kind in the world. Designed and built by "Caterpillar," it's extraordinarily simple, yet machined with watch-like precision.

That's why you don't have to worry about fuel. A "Caterpillar" Diesel will burn anything from cleaned crude oil to gasoline without adjustment.

The "Caterpillar" Diesel fuel system is completely protected from dust and grit, and it needs no operating adjustments whatever. When service is necessary, your "Caterpillar" dealer has factory-

trained men, parts and special tools to make servicing quick, easy and inexpensive.

Simplicity, power and long life explain why "Caterpillar" Diesel equipment is the overwhelming choice of men who use heavy-duty machines.

As long as the war lasts, the bulk of new "Caterpillar" production goes to the armed forces, and the remainder is allocated by WPB among war-essential users. Meanwhile, "Caterpillar" dealers everywhere are keeping older machines in shape to carry the load at home. But a day will come when our hugely increased output can be swung back to peacetime work. And those new "Caterpillar" Diesels will be worth waiting for!

Caterpillar Tractor Co., San Leandro, Calif. • Peoria, Ill.

THE "FIGHTING FOUR"

INSPECT. Look your equipment over frequently. For expert "internal" inspection of operating parts or functions, call in a trained "Caterpillar" service man. Read your Operator's Instruction Book.

LUBRICATE. Use the right oil at the right time in the right place and in the right quantity. Keep the oil clean—change before it becomes dirty and deteriorated. Follow the Operator's Instruction Book.

ADJUST. Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work. He'll do it well.

REPLACE. Have your service-dealer replace or repair worn bearings, track rollers, pins and bushings, sprockets, cylinder liners, clutch linings. His service helps restore power and extend equipment life. Saves critical materials, too.

CATERPILLAR DIESEL

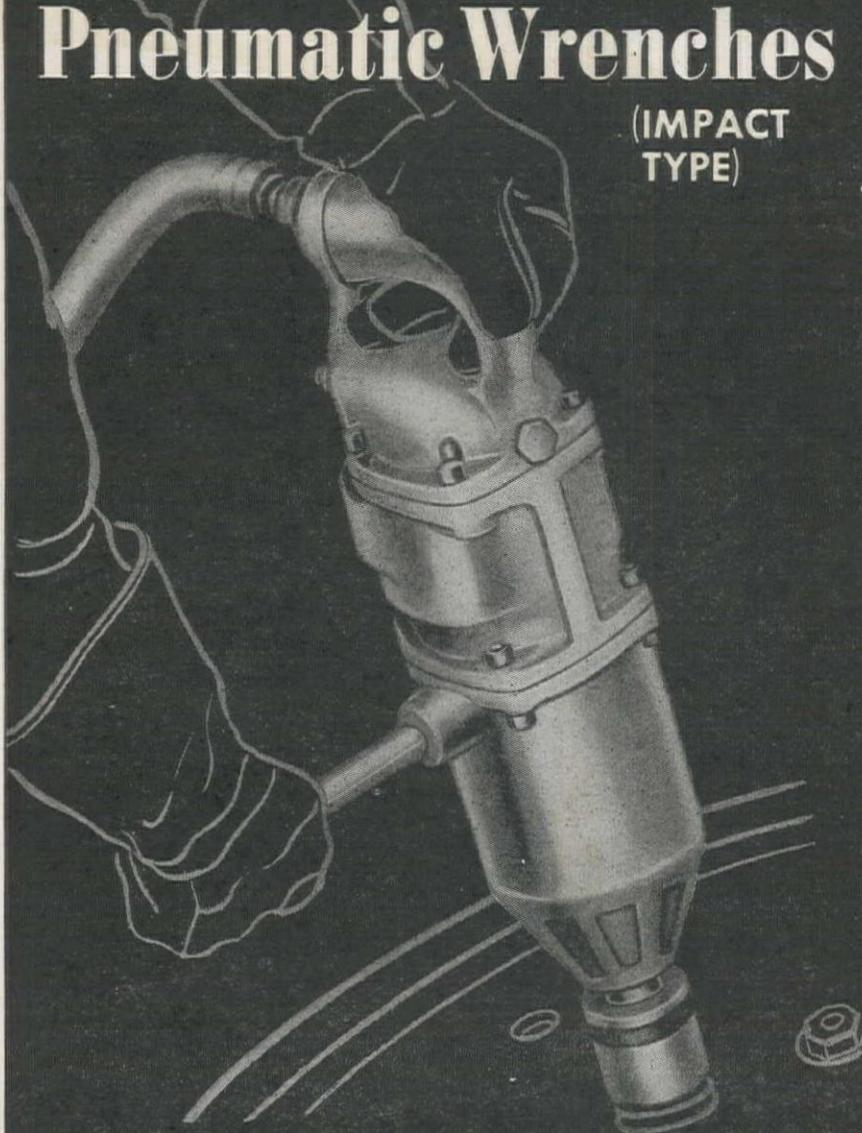


TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

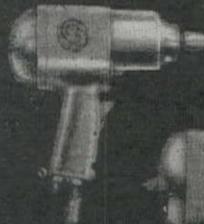
WORLD'S LARGEST LINE OF

Pneumatic Wrenches

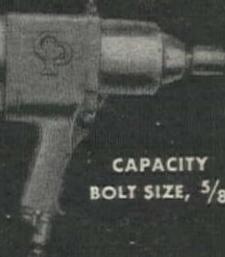
(IMPACT
TYPE)



CAPACITY
BOLT SIZE, $\frac{1}{4}$ "



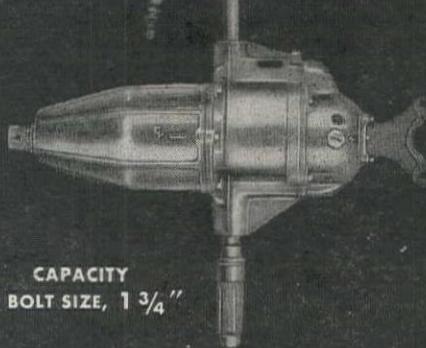
CAPACITY
BOLT SIZE, $\frac{3}{8}$ "



CAPACITY
BOLT SIZE, $\frac{5}{8}$ "



CAPACITY
BOLT SIZE, $\frac{3}{4}$ "



CAPACITY
BOLT SIZE, $1\frac{3}{4}$ "

Few parts... low maintenance

Speedy...powerful...CP Pneumatic Wrenches (Impact Type) will remove nuts, bolts, studs—or apply them—in a fraction of the time required to do either job by hand. Available in six sizes to handle bolts, nuts, lag screws, studs. Illustrated above is the popular CP 365-RP, for bolts, nuts, etc., up to $1\frac{1}{4}$ " bolt size.

SPECIAL FEATURES OF CP PNEUMATIC WRENCHES

(Impact Type)

No Springs — No Gears
Few Parts — Low Maintenance

"Smooth-Flow" Clutch
Absence of Torque Reaction
Slow Speed — Long-Life Motor
Easy to Dismantle and Assemble
Perfect Balance — Easy Handling
Short Length — Light Weight
Angle Types Available in Capacities
of $\frac{1}{4}$ ", $\frac{3}{8}$ and $\frac{5}{8}$ " Bolt Size

★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY

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

★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES



PORTER W. YETT
reports:

We are more than satisfied with the operation of our 4000-lb. Madsen Plant. In considering the purchase of a plant to meet our requirements, which was the construction of over 100,000 tons of asphaltic concrete roadways and facilities for three of Henry J. Kaiser Company shipbuilding plants, requiring speed and more speed, continuous operation and dependability. We, after careful consideration, selected Madsen which has more than made good. One of our best production records in one shipbuilding plant was 33,000 tons of 2½-inch asphaltic concrete to Oregon State Highway specifications in 26 light-hour days without one breakdown.

We are glad we bought a Madsen Plant.

...depend upon Madsen

When Porter W. Yett wanted speed and more speed to mix 100,000 tons of asphaltic concrete for the Henry J. Kaiser Company shipyards, he chose a Madsen Asphalt Plant. Why? Because Madsen plants have the pressure-injection system . . . the fast-dumping mixer gate . . . the synchronized plant operations and five other exclusive Madsen-patented features — time-savers that have been developed over a period of twenty-nine years.

On one project, Mr. Yett's plant mixed 33,000 tons in 26 light-hour days to Oregon State Highway specifications without a breakdown.

Only tons talk where asphalt plants

are concerned — here's what other Madsen Plant owners report:

"It is not unusual to mix in excess of 200 tons per hour with our 3000-lb. Madsen plant."

"We produced 149,121 tons in 8 months with our 3000-lb. Madsen Plant."

"We mixed 75,920 tons from October 1 to December 8 with our 3000-lb. Madsen Plant."

"We have consistently mixed 3500-lb. batches with production reaching 200 tons per hour."

Bona fide letters from which these excerpts were taken are available. Plan for tomorrow today; write for the new Madsen plant catalog — MP-120.

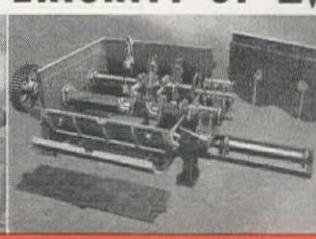
MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

4 REASONS FOR THE SUPERIORITY OF MADSSEN

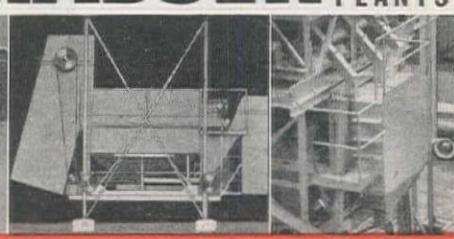
EXCLUSIVE FEATURES
ON EVERY MADSSEN
ASPHALT PLANT



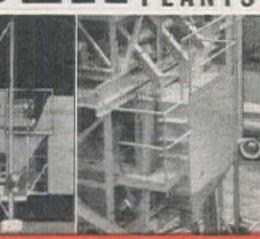
1. Asphalt Pressure-
Injection System



2. Sectional twin-shaft
Pug Mill Mixer



3. Jack-Erection Sys-
tem and power lift



4. Overflow Bin for
easy truck loading

Positive Control FOR ACCURATE SPOTTING

DEPEND ON YOUR KOEHRING DISTRIBUTOR

to help you keep your equipment operating. Care for your Koehring equipment **NOW**, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

Independent Boom Control . . .

saves seconds on material handling work. Independent boom control permits accurate handling of piling for high speed pile driving on bridge and building construction projects. Raising or lowering the boom while swinging or traveling is a second-saving feature. Koehring Cranes are high speed, easy handling, have accurate and positive control. The many time-saving advantages of Koehring means speed on the job, more work per shift, less man power . . . waste motion is reduced to a minimum, every move is a production move.

KOEHRING COMPANY

Milwaukee 10, Wisconsin



HEAVY-DUTY CONSTRUCTION EQUIPMENT

HARRON, RICKARD & McCONE CO., San Francisco-Los Angeles • PACIFIC HOIST & DERRICK CO., Seattle, Wash. • WESTERN CONSTRUCTION EQUIPMENT CO., Billings • CONTRACTORS EQUIPMENT CORP., Portland • LUND MACHINERY CO., Salt Lake City • NEIL B. McGINNIS CO., Phoenix, Ariz. HARRY CORNELIUS CO., Albuquerque, New Mexico • KOEHRING COMPANY WEST COAST PARTS WAREHOUSE, San Francisco, 10, California.

Only HENDY DIESELS Combine all these Features!

TOMORROW'S DIESEL
TODAY



GENERAL SPECIFICATIONS SERIES 50

Bore—12"; Stroke—15"

Speed—350 to 600 RPM

Rated Power at 450 RPM—
75 hp. per cyl.



Write for complete data on
the Hendy Series 50
Diesel Engine

- Unit-type fuel-pump injectors
- Dual alloy-steel intake and exhaust valves
- Jet action cooling in cylinder head
- Cross-heads which eliminate side thrust from rocker arm
- Hydraulic tappets that eliminate valve adjustments in service
- Overhead-type camshaft
- Centrifugally cast, babbitt-lined, steel-backed bearings
- Double bearing at flywheel end
- Rigid steel engine bed
- Welded-steel cylinder block with sleeve liners
- Forged-steel or cast-alloy crankshaft
- Forged-steel connecting rods
- Oil-cooled cast-iron pistons
- Cage-type relief valve and compression release
- Improved type camshaft chain drive system
- Auxiliaries engineered to suit application
- Integral fresh-water cooling
- Positive, full-automatic lubrication
- Mechanical or hydraulic governing
- Water-cooled exhaust manifold
- Starting and operating controls centralized at gauge board
- Friction clutch for power takeoff, as optional equipment

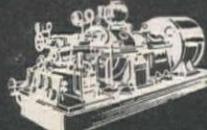
*For simplicity—long life—for modern design—
look to Hendy!*

JOSHUA HENDY Division
JOSHUA HENDY IRON WORKS

ESTABLISHED 1856

SUNNYVALE, CALIFORNIA

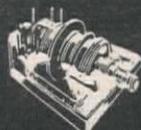
BRANCH OFFICES: Boston • Buffalo • Chicago • Cincinnati • Cleveland • Detroit • New York • Philadelphia • Pittsburgh • San Francisco • St. Louis • Washington • Los Angeles



TURBO-GENERATORS



REDUCTION GEARS



STEAM TURBINES



DIESEL ENGINES



POWER TO WAGE WAR AND TO SERVE PEACE

FROM the very beginning, GM Diesels have been tested in the crucible of war. They power tanks, heavy gun tractors and bulldozers; submarines and subchasers; invasion boats and lighters. And everywhere, always, these weapons are proving worthy of the fine fighting men who are using them.

That is because GM Diesel operation is based on simple and sound mechanical principles. GM Diesel construction is exceptionally strong and uniformly precise—the way General Motors always builds.

When normal life and living are resumed, GM Diesels will be as ready to step back into private life and resume service in peace as they were to go to war. And you will find them as capable of sure, reliable, low-cost performance on the toughest jobs at home as they are on fighting fronts the world over.



America's farms are going to need GM Diesel power for their tractors. This sure, reliable, low-cost source of power will go far toward solving some of the farmer's most vexing problems. And not the least of these problems is to get more work done, faster and at lower cost in labor and mechanical power. GM Diesels will help.



ENGINES...15 to 250 H.P....DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

ENGINES...150 to 2000 H.P.....CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

LOCOMOTIVESELECTRO-MOTIVE DIVISION, La Grange, Ill.

TYPICAL DIESEL LUBRICATION PROBLEMS:

1. Port Clogging

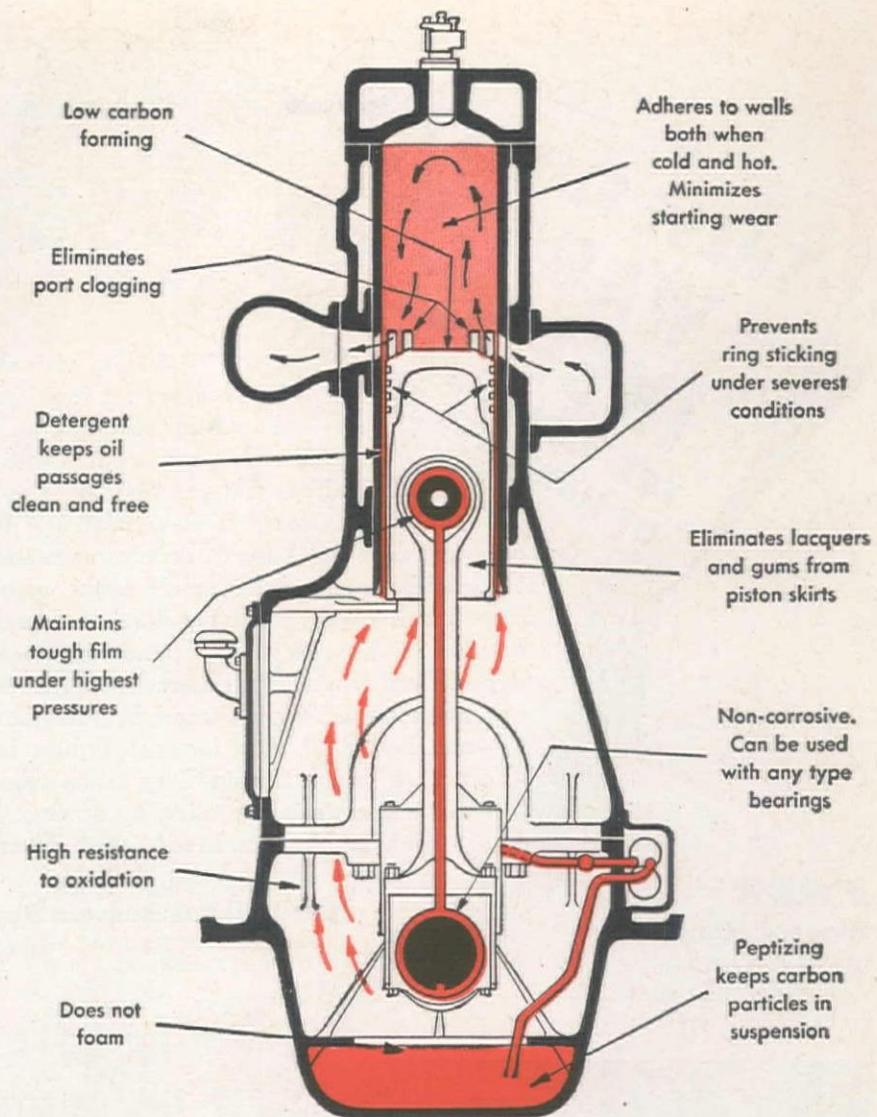
The plugging of intake and exhaust ports is frequently a factor in the operation of two-cycle Diesel engines.

Port clogging results from the combination of fuel soot with the residues of oxidized lubricating oil, which acts as a binder to plug the port openings. This clogging, of course, results in a sharp drop in efficiency.

In simplified form, the deterioration of lubricating oil in an engine involves a combination of oxygen and oil at high temperatures. As the oil continues to absorb more and more oxygen, acids called "oxyacids" are produced. These oxyacids tend to polymerize or form very large, oil insoluble molecules. These form the binder for the deposits on intake and exhaust ports.

The problem, then, of eliminating these deposits may be solved by the use of a lubricating oil properly compounded to prevent it becoming a binder. RPM DELO accomplishes this in four separate ways.

1. RPM DELO is manufactured from a carefully selected base oil containing natural inhibitors highly resistant to



Diagrammatic sketch of 2-cycle Diesel, showing the typical location of intake and exhaust ports and the advantages obtained from the use of RPM DELO.

oxygen. It contains no heavy residues which may be left behind to act as a binder for the fuel soot.

2. RPM DELO contains a powerful oxidation inhibitor, which greatly reduces the rate at which the oil absorbs oxygen.

3. RPM DELO has chemical detergent properties. The compounding material reacts with the oxyacids to render them essentially inert so that they are no longer able to polymerize to form gums and lacquers.

4. RPM DELO has peptizing properties which enable it to maintain soot and oxidation products in suspension in mi-

nuate particles. This prevents these materials from settling from the oil and forming engine deposits.

The elimination of port clogging, is, of course, only one of the valuable properties of RPM DELO. It also minimizes ring and cylinder wear, eliminates ring sticking, prevents excessive deposits on rings and will not corrode bearings.

Standard Diesel Fuel is 100% distilled—"Vapor-clean" for long injector and fuel pump

life. You get extra performance for your money—more complete combustion because of carefully controlled ignition quality, viscosity and volatility.



STANDARD OF CALIFORNIA

THESE SLINGS PASS
WARTIME
INSPECTION
FOR SAFETY... SPEED... ECONOMY
OF MANPOWER AND MATERIALS

When virtually every load is tagged for war production, efficient handling becomes an obligation—one you'll discharge on all counts with Yellow Strand Braided Wire Rope Slings.* *Safety?* The strength of this patented sling lies in tough Yellow Strand Wire Rope, so braided that it gains marked flexibility... conforms readily to any product... grips it gently but securely. *Speed?* Light weight and high kink-resistance make the sling easy to carry, attach and remove. *Economy?* A compact braided sling conserves manpower and materials, compared with bulky types. Even when lifting heavy locomotives, turbines, pressure towers or weapons, a Yellow Strand Braided Sling will require fewer men—and less steel. And for such lighter lifts as jigs, tools, drums or crates, a Yellow Strand Sling offers relief from the fiber shortage.

Fitting material-handling equipment to your specific job is the function of Broderick & Bascom's specialized Sling Engineers. Investigate today!

Broderick & Bascom Rope Co., St. Louis

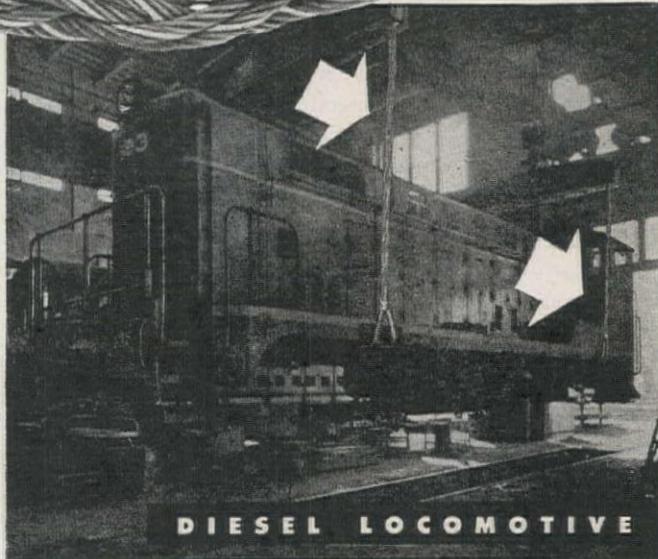
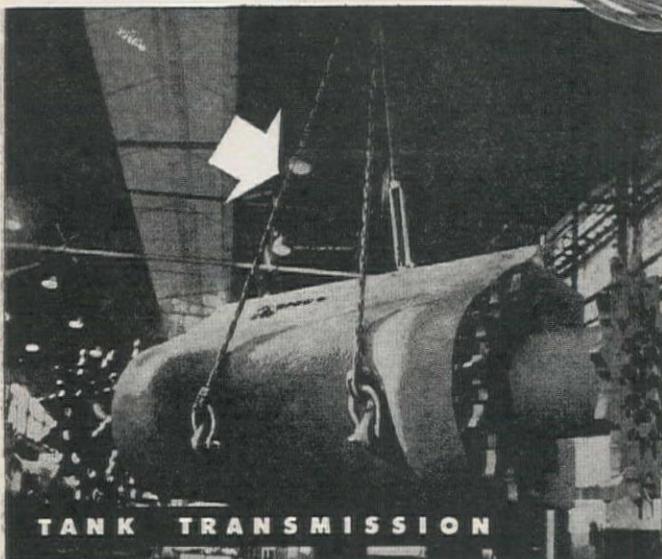
Branches: SEATTLE, New York, Chicago, Houston, Portland

Factories: SEATTLE, St. Louis, Peoria

FREE

Riggers' Hand Book

96-pages of practical wire rope sling information. Send for free copy.



*Patents: U. S., 1475859, 1524671, 2142641, 2142642, 2299568 • Canadian, 252874, 258068



YELLOW STRAND
Braided Wire Rope **SAFETY SLINGS**

PICKS UP and LOADS *Salvaged Material* from **HIGHWAY MAINTENANCE and CONSTRUCTION**

War-Traffic, Shortages in Equipment and Manpower Have Played Havoc With Your Roads and Highways. The Athey Force-Feed Loader Can Help Solve Your Maintenance Problems.



TODAY'S highway conditions are critical and prompt action is essential if tremendous investments in highways are to be saved before additional damage is done.

During 1944 a vast program of highway maintenance will get underway — roads will be graded, widened, straightened, — ditches will be cleaned and relocated — surfaces repaired — shoulders widened and slopes refaced and graded. The Athey Force-Feed Loader, a proved highway maintenance loading tool, will eliminate the former slow and costly method of loading surplus materials.

Helps You Do Better Job

Operating as a companion tool to the Motor Grader, it gathers up windrows of surplus material, removes it from the highway and loads it into trucks for disposal or salvage. Earth, sod, rock, sand, oil mix, and many other unruly materials are loaded at higher speed and in greater volume than ever before possible. To load this material by hand labor would be not only expensive, but practically impossible with today's manpower conditions.

The Athey Force-Feed Loader thus saves you time and expense in removing surplus road materials, and also, salvages materials for use where needed on other jobs.

Ditch Cleaning

Loading and handling excess materials thrown up and windrowed from ditches by the motor grader has long been a problem for engineers and maintenance men. Today, the Athey Force-Feed Loader not only makes this work quick and easy, but it saves so much of the maintenance crew's time that men are released for other road repairs.

One man operated, the Athey Force-Feed Loader can be moved quickly under its own power from job to job. Its simple and dependable operation affords faster, cleaner, lower cost loading than ever before.

Get complete information on an Athey Self-Propelled, Force-Feed Loader from your Athey-“Caterpillar” Dealer, or write direct to us. Athey Truss Wheel Co., 5631 W. 65th Street, Chicago 38, Illinois.



Reloading material salvaged from highway resurfacing job.

FREE ENTERPRISE • THE OPPORTUNITY AND OBLIGATION TO COMPETE



Athey Force-Feed Loader picking up windrow of oil mix material.

athey
FORCE-FEED LOADERS



IT'S NOT SO EASY—

BUT EVEN IN THE DESERT, WITH THE HELP OF
HERCULES CARGO BODIES, THE ARMY
REPAIRS ITS EQUIPMENT



HOW MUCH EASIER IT IS FOR YOU TO KEEP YOUR EQUIPMENT IN REPAIR!

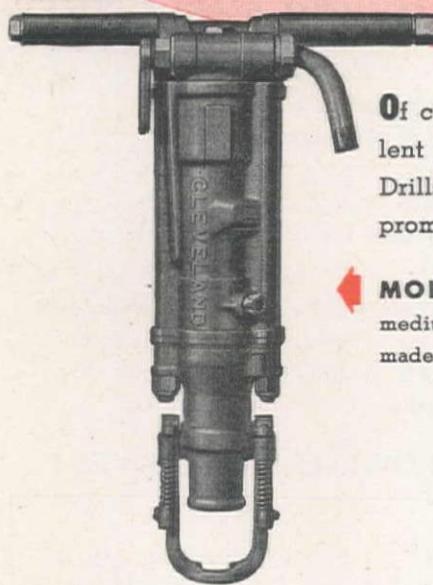
Don't neglect your Hercules Hydraulic Hoists and Bodies, or your Hercules Split-Shaft Power Take-offs.

Quick service on all Hercules parts is always maintained, and there's a Hercules Distributor with a well equipped Service Department near you.

HERCULES STEEL PRODUCTS CO.
GALION, OHIO

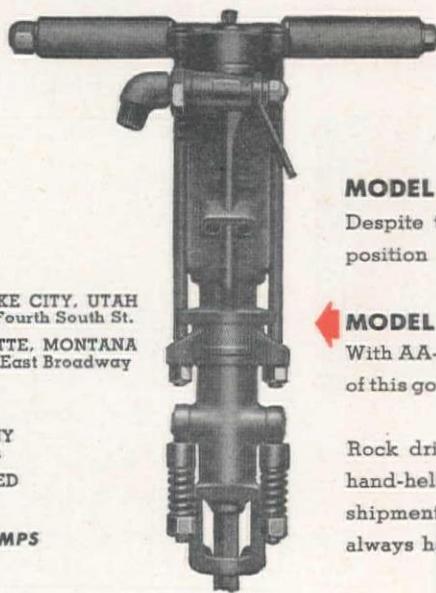
UTILITY TRAILER SALES, Seattle, Wash.; NEWELL TRUCK EQUIPMENT CO., Portland, Ore.; A. PASTERIS CO., Oakland, Calif.; STANDARD CARRIAGE WKS., INC., Los Angeles, Calif.; STANDARD IRON WORKS, San Diego, Calif.; SAWTOOTH CO., Boise, Idaho; WESTERN CONSTRUCTION CO., Billings, Mont.; WYOMING AUTOMOTIVE SUPPLY CO., Casper, Cheyenne, Rock Springs, Sheridan, Wyoming; McKELVY MACHINERY CO., Denver, Colo.; MORROW & CO., Albuquerque, New Mexico.

HOW ABOUT Availability OF CLEVELAND ROCK DRILLS?



Of course, you are well acquainted with the excellent performance and durability of Cleveland Rock Drills. Our purpose here is to inform you of the prompt delivery we can make on this equipment.

MODEL H111—Leader in the 55-pound class for soft, medium, or hard rock. With AA-1 priority, shipment will be made within a week of receipt of order.



MODEL H10—The favorite in the 45-pound class. Despite the popularity of this drill, we are still in position to accept orders carrying AA-1 priority.

MODEL H66—The light drill with the big wallop. With AA-1 priority, we can ship reasonable numbers of this good machine within a week of receipt of order.

Rock drill users, that's the situation on Cleveland hand-held drills. On spare parts we make *immediate* shipment. Be assured that your requirements will always have our best attention.

WESTERN BRANCHES

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THE RIX COMPANY, INCORPORATED
582 - 6th Street, San Francisco

BUY U. S. WAR BONDS AND STAMPS

The CLEVELAND ROCK DRILL CO.

Division of The Cleveland Pneumatic Tool Company

CABLE ADDRESS: "ROCKDRILL"

, CLEVELAND 5, OHIO

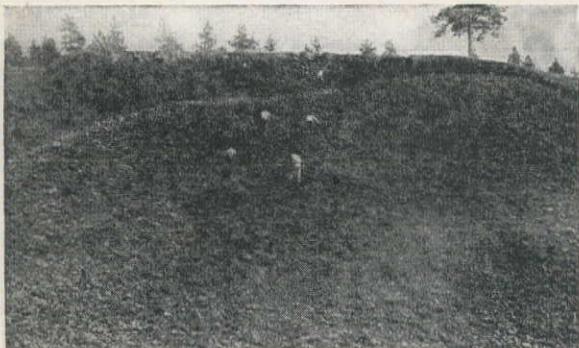
LEADERS IN DRILLING EQUIPMENT



Basaltic cliff near Spokane, Wash., into which the Standard Asphalt Paving Company has tunneled to place Atlas free-flowing explosives in a "single T coyote hole."



The blast! The height of the trees beyond and above show lift as well as push.



75,000 tons of ballast neatly laid down. A fine feast for the shovel.

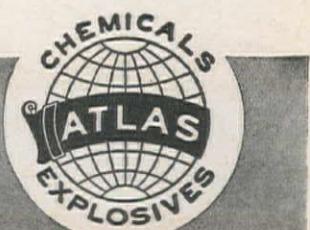
***Synergism:** The force that produces "2 + 2 = 5" results when both you and we really get together and "click."

Flo-dyn: Reg. U. S. Pat. Off.

ATLAS

EXPLOSIVES

"Everything for Blasting"



Offices in Principal Cities

SAN FRANCISCO 4, CAL.

ATLAS POWDER COMPANY

SEATTLE 1, WASH.

Shovels Are Weapons, Too

Good Blasting Saves the Shovel—Cuts Costs

Consistently good blasting—which saves the shovel and cuts time, labor, and oftentimes explosives cost—doesn't "just happen." It's the result of properly analyzing the blasting problem—then using the right explosive in the right way.

In considering improved breakage it is well to study the characteristics of the explosive. For use in dry work, for example, consider the effectiveness of—

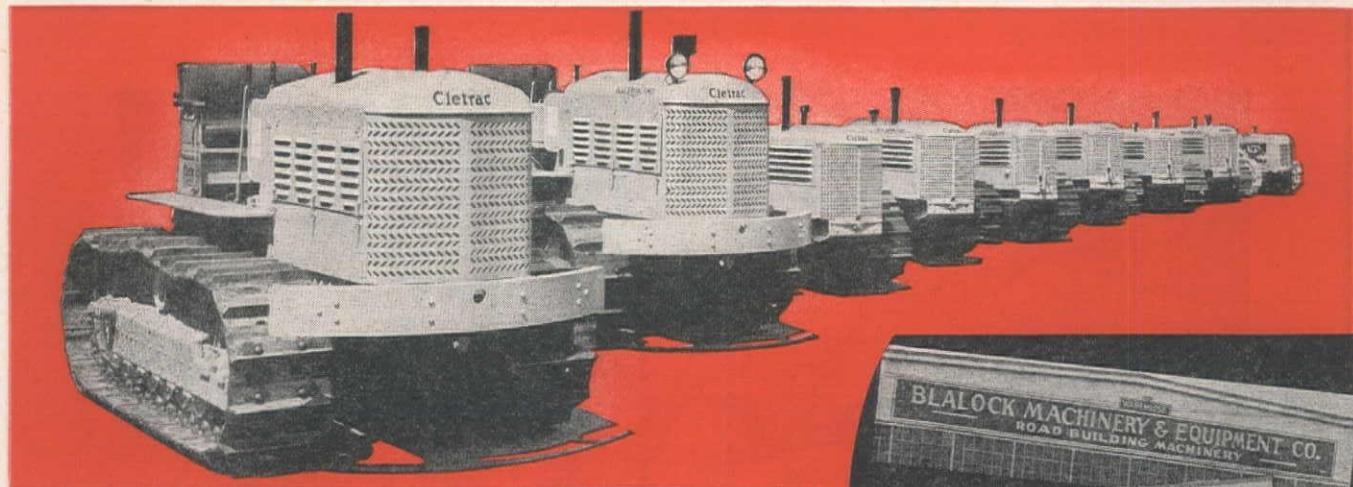
ATLAS FREE-FLOWING EXPLOSIVES

Flo-dyns and *Canyon Bag*, Atlas free-flowing explosives, are made by new and improved methods of manufacture. Packed in 12½-lb. bags, these explosives are easily loaded into coyote holes. Excellent pouring powders for use in vertical holes in dry work.

We would like to try synergistic* thinking with you in regard to your blasting problems. This intelligent exchange of ideas frequently produces blasting results far in excess of all anticipation.

ATLAS FREE-FLOWING EXPLOSIVES

GRADE	% Weight Strength	Velocity, feet per second, in the open 1 ½" x 8"	Velocity, feet per second, confined in pipe, 1 ½" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 10% MORE)
Canyon Bag	10	4600	5000	1 ¼" 132
Flo-dyn No. 2	20	5200	5800	Packed 4—12½-lb. bags
Flo-dyn No. 3	30	5200	5800	
Flo-dyn No. 4	40	5200	5800	
Flo-dyn No. 5	50	5300	6000	
Flo-dyn No. 6	60	5300	6200	per 50-lb. Case
Flo-dyn No. 7	65	5400	6300	



THERE'S A CLETRAC *Tru-Traction** TRACTOR FOR EVERY POWER JOB

and a Cletrac Dealer near you who
will give you complete information

NO MATTER what the work may be, you can do it faster,
easier, better with Cletrac Tru-Traction.

Tru-Traction—power on both tracks at all times—provides the operator with the ability to handle large loads when turning and to steer the tractor downhill the same as uphill or on the level.

With Tru-Traction you have dependable power in getting through tough spots without stalling or miring down. Power that can be used by turning at high speeds without jack-knifing. Power that will do your job better—and put more money in your pocket.

Ask your Cletrac Dealer. There's a Cletrac dealer near you who is ready to assist you in keeping your present Cletrac equipment in full working condition—and to aid you in securing a new Cletrac for essential work if you can meet government regulations. Call on him—he's a good man to know.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO

*Tru-Traction is power on both tracks at all times.

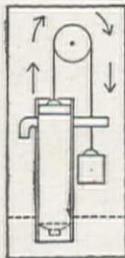
CLETRAC *Tru-Traction* TRACTORS
GASOLINE OR DIESEL



STATE OF CALIFORNIA—Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Raymond L. Comber, Modesto; Nelson Equipment Co., Los Angeles; Tractor & Equipment Co., San Leandro. STATE OF WASHINGTON—Burrows Motor Company, Yakima; A. C. Haag & Co., Spokane; Pacific Hoist & Derrick Co., Seattle. STATE OF OREGON—A. C. Haag & Co., Portland; Loggers & Contractors Machinery Co., Portland. STATE OF IDAHO—Idaho Cletrac Sales Co., Lewiston; The Sawtooth Company, Boise. STATE OF MONTANA—Western Construction Equipment Co., Billings, Montana. VANCOUVER, B. C.—A. R. Williams Machinery Co., Vancouver.



FAIRBANKS-MORSE, big name in Diesels—descendants of Huygens' internal combustion engine of 1680—builds 52 models and sizes for the Armed Forces and the home front. Shell supplies both Diesel oil and Diesel fuel.



POP goes the Diesel

Christian Huygens, "connecting link between Galileo and Newton," built an engine embodying a cylinder, piston, valves. For fuel he used gunpowder... Although structural defects caused the abandonment of this design—and nearly put an end to Huygens—it's the granddaddy of all combustion engines, most efficient of which is the modern Diesel.

Fairbanks-Morse makes more types of Diesels than any other firm in America. These supply motive power in submarines and PC's for the Navy; in tugs, cargo vessels, tankers for the Maritime Commission and Army. On the home front they're used in industrial and municipal power plants, locomotives and Marine service—for many another use.

Power for the vast Fairbanks-Morse plant is furnished from Diesels on test and in the powerhouse. For these engines Shell Dieslene is used as fuel—Shell Diesel Oil as the lubricant. Shell Diesel Oil was chosen because of its remarkable performance in keeping Diesels clean, and because Fairbanks-Morse engineers were confident there would be no trouble in test runs due to faulty lubrication.

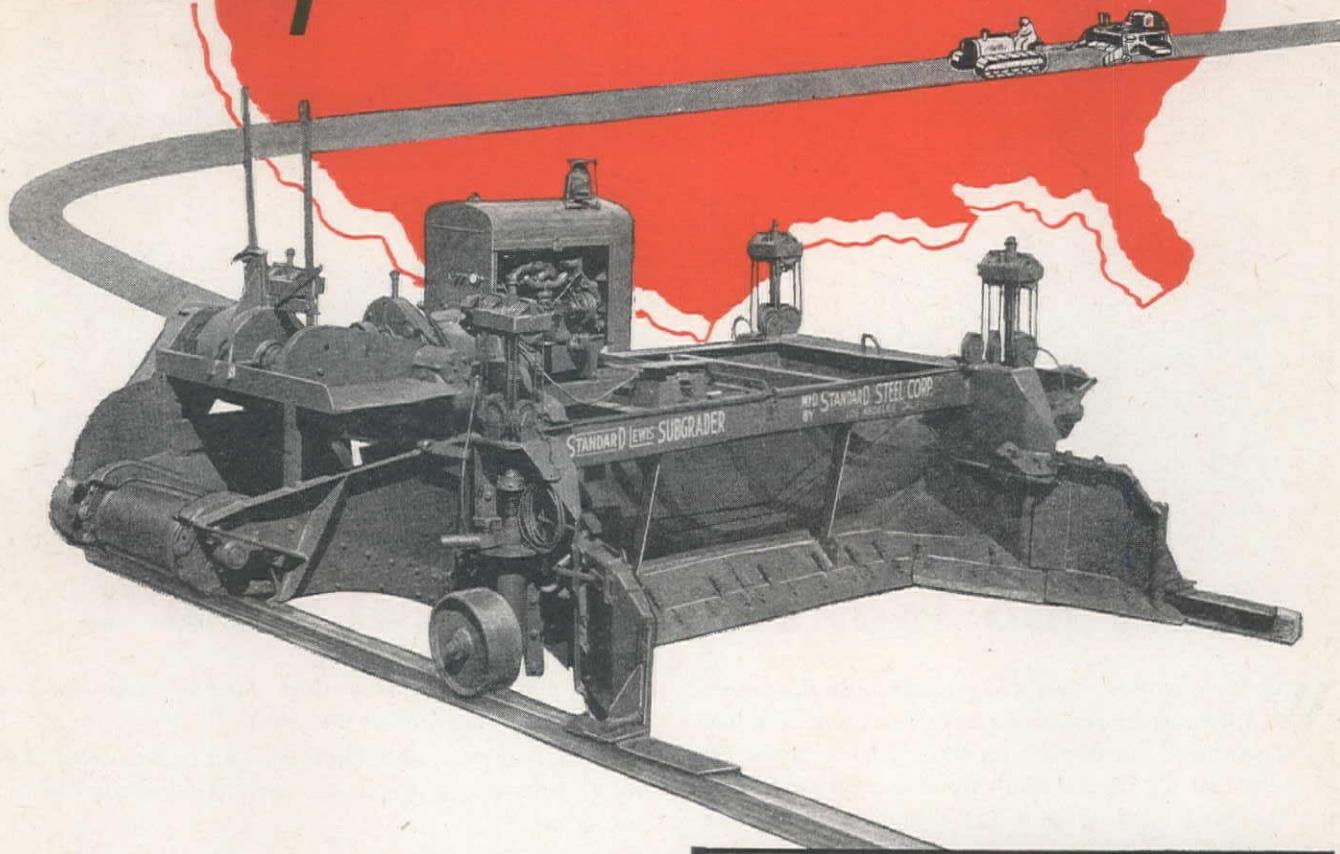
In tractors, trucks, buses, ships, in all types of Diesels on land and sea, you'll find this same confidence expressed by those who use Shell Diesel Lubricants. A confidence founded on the sterling performance of Shell Diesel Lubricants under all sorts of operating conditions.

Know what really dependable Diesel lubrication is—call in the Shell man now.



SHELL DIESEL LUBRICANTS

Ready for the Nation's Highways



A STANDARD-LEWIS SUBGRADER EMBODIES MANY NEW AND EXCLUSIVE FEATURES

To meet the contractors' demands for lower subgrading costs and the engineers' exacting requirements for finished sub-grade, our engineers have perfected the only subgrader embodying the exclusive features cited below.

Ready for production when the word is given, the Standard-Lewis Subgrader is the contractors' and engineers' dream.

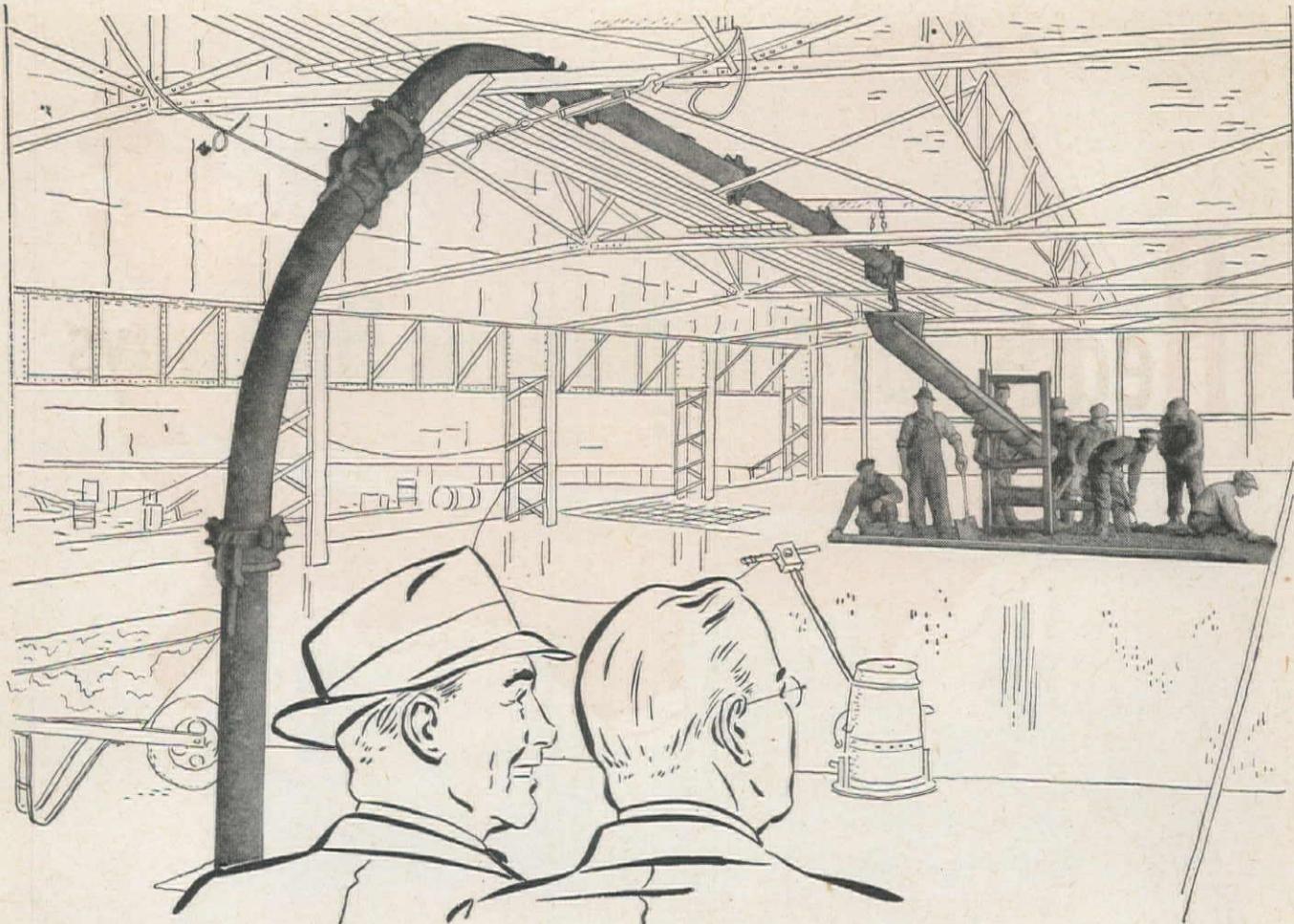
FEATURES

1. Quickly adjustable to variable digging depth.
2. Cuts in either direction without turning.
3. Works around curves without binding and tows sideways through narrow places.
4. Digs right up to the header boards, eliminating hand cleaning.
5. Simple lever adjustment for spoiling at either side.

STANDARD
STEEL CORPORATION

General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California

OTHER STANDARD ROAD CONSTRUCTION
EQUIPMENT: ROLLERS, PAVING PLANTS,
BATCHING PLANTS, DRYERS, FINISHERS,
BROOMS.



This job looked like a real "lulu"!

WE had to put a new concrete floor in the second floor testing room of a busy war plant and do it, mind you, without disturbing the workers in the rest of the plant. We just couldn't run concrete down from the roof or haul it up from the ground without interfering with somebody.

The Rex Distributor had the answer though . . . Rex Pumpcrete. No chutes, no hoists, no towers, no buggy runs . . . just a pipe line. We ran the pipe line through one of the first floor windows, up through the ceiling, along the second floor, past offices to the testing room. That Pumpcrete, outside the building, pumped concrete through the pipe line in a fraction of the time it

would have taken with old-fashioned methods. We didn't bother anyone at the plant.

I'm a Pumpcrete fan from here on in. It sure makes tough jobs easy and cuts concrete placing time to the bone.

RELY ON YOUR Rex Distributor. He handles the complete line of Rex equipment for speeding up the mixing, hauling and placing of concrete and the moving of water. See him for Pumps, Pavers, Pumpcretes, Moto-Mixers and Mixers. You'll find him always ready and willing to help you locate new and used equipment, and to help you keep your present equipment in top running order.

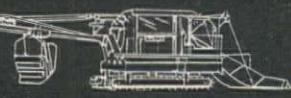
Arnold Machinery Co., Salt Lake City, Utah; Brown-Bevis Equipment Co., Los Angeles, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Construction Equipment Co., Spokane, Washington; Contractors Equipment and Supply Co., Albuquerque, New Mexico; Corson Machinery Co., Ray—Denver, Colorado; Hall-Perry Machinery Co., Butte, Montana; Intermountain Equipment Co., Boise, Idaho; Loggers & Contractors Machinery Co., Portland, Oregon; Star Machinery Co., Seattle, Washington; Industrial Equipment Company, Emeryville, California.



CONSTRUCTION MACHINERY



PUMPS



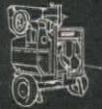
PAVERS



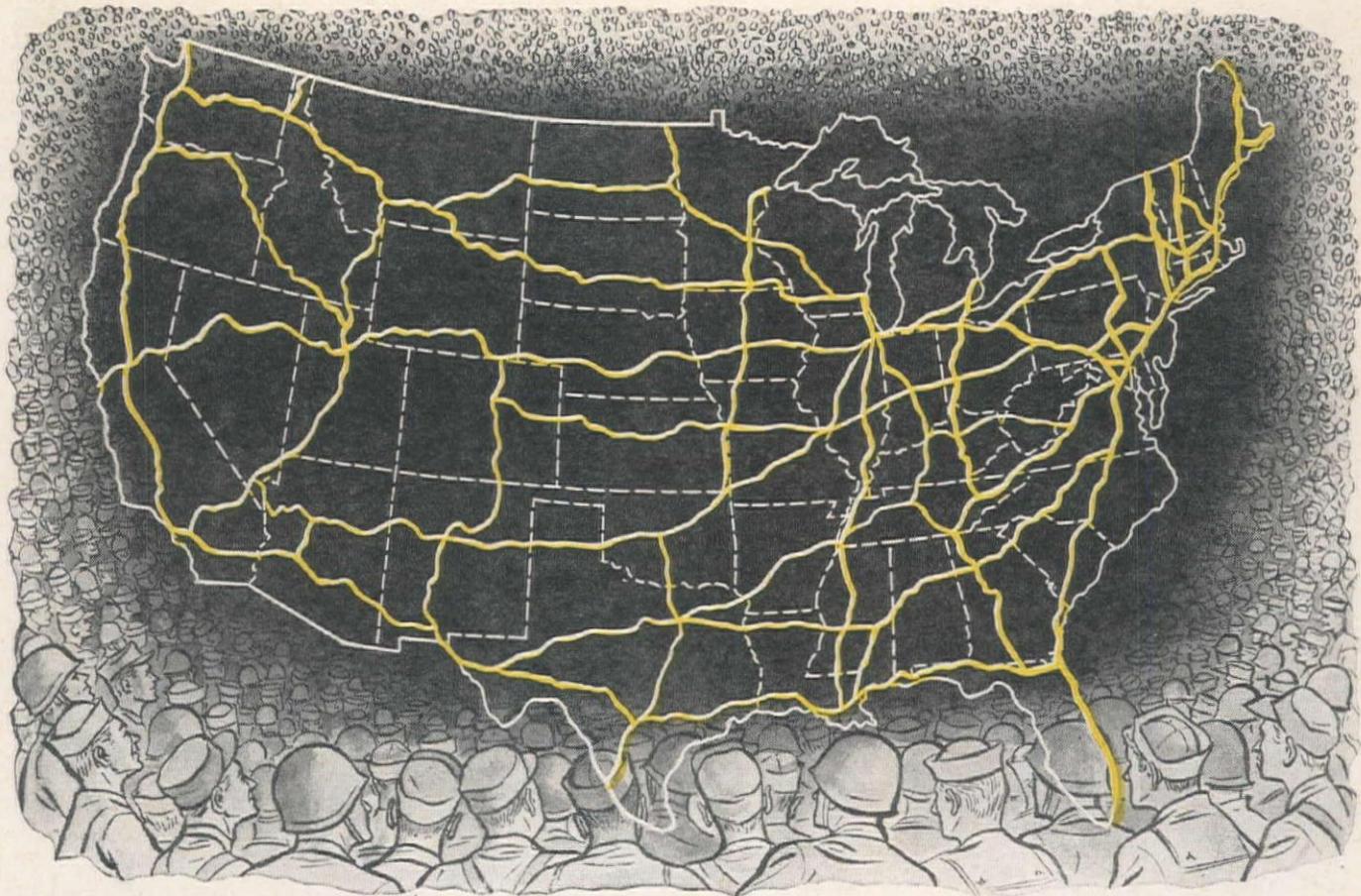
PUMPCRETES



MOTO-MIXERS



MIXERS



PLANNED POSTWAR HIGHWAY PROGRAM MEANS Quick Employment For 3 Million

No one wants another depression 13,000,000 people deep. It will be much better to measure the height of national prosperity by the number of people employed.

Since it is generally agreed that gainful employment is the No. 1 factor in the national economy, it is to every American's best interest to get behind and push forward every sound postwar plan. *One such is that of the American Road Builders' Association.*

It is sound because it will quickly and directly employ 3,000,000 people on a planned highway building program sorely needed before the war and absolutely necessary postwar.

It is sound because it eliminates attempts to fill depressions with improvised work relief amply demonstrated to be slow, costly, inefficient, and demoralizing.

It is sound because it is based upon plans and specifications carefully prepared in advance, cost estimates made in advance by public engineers, bids made by competing contractors who are willing to back up their judgment with their own funds, and the requirement

of ample bond to further guarantee the delivery of quality work at contract costs and on time.

It is sound because it makes more efficient use of on-site employment and affords far more off-site employment in the production of materials and equipment. Thus, in addition to stimulating the consumer goods market, it induces far reaching employment throughout the production, transportation, and service industries. Studies made by the U. S. Public Roads Administration indicate that the proposed investment of 3 billion dollars annually in highways eventually results in business transactions totaling 9½ billion dollars.

Every American who wants to get early enjoyment of a better planned highway system, constructed better at the lowest bid cost, should write for and read the 64-page book entitled "A Sound Plan For Postwar Roads and Jobs." Among other things it points out that nearly enough in motor vehicle taxes is normally collected to pay for this sound, planned program if used for the purpose intended.



WRITE FOR THIS FREE BOOK.::

E-44

Address

AMERICAN ROAD BUILDERS' ASSOCIATION, 1319 F Street, N.W., Washington 4, D.C.
OR
UNION WIRE ROPE CORPORATION, 2146 Manchester Ave., Kansas City 3, Missouri

AS YOU BACK THE ATTACK GUARD AGAINST A FUTURE SLACK

LIMA ADVANTAGES PAY EXTRA DIVIDENDS..

INDEPENDENT CLUTCHES

Independent clutches is one of the greatest advantages a crane, shovel or dragline can have. LIMA cranes, shovels and draglines can hoist, swing, travel and boom up or down at the same time. Imagine the saving in time and convenience of such a feature when working in close quarters.

ANTI-FRICTION BEARINGS

Anti-friction bearings not only help to reduce friction and conserve fuel but they also keep shafts in proper alignment thus assuring a smoother running and longer lived machine.

BIG DRUMS

Big drums go a long way in prolonging cable life. Cable manufacturers recognize the injury to the cable if too small a drum is used. Therefore they recommend that drum diameters be not less than 30 times the diameter of the cable used. LIMA drums in most cases either meet or exceed these recommendations.

There are many good reasons why LIMA Cranes, Shovels and Draglines are doing such a fine job here and at the war front. They are rugged and strong, built to match whatever job there is to do. Independent clutches, big drums, anti-friction bearings and other modern features help keep the job moving at top speed.

Low cost operation, big output under adverse conditions and long dependable service assures complete satisfaction and pride in ownership. Consider these advantages when you plan your future excavating and material handling needs. Remember the name, LIMA, foremost in crane, shovel and dragline design.

LIMA LOCOMOTIVE WORKS, INCORPORATED

Shovel and Crane Division

NEW YORK, N.Y. PHILADELPHIA, PA. NEWARK, N.J. MEMPHIS, TENN.
SEATTLE, WASH. SAN FRANCISCO, CALIF. LOS ANGELES, CALIF.

ST. LOUIS, MO. SPOKANE, WASH.

DALLAS, TEXAS.

PORTRLAND, ORE.
MONTREAL, Quebec, Can.

MINNEAPOLIS, MINN.
VANCOUVER, B.C.

CRANES
13 TONS TO 100 TONS
CAPACITY

VARIABLE
DRAGLINES

LIMA

SHOVELS
1/4 YARD TO 5 YARDS
CAPACITY

PULL-SHOVELS

A TYPE AND SIZE FOR EVERY MATERIAL HANDLING JOB

Garfield & Company, 1232 Hearst Building, 5 Third Street, San Francisco, Calif.; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles, Calif.; Western Machinery Company, P. O. Box 2196 (748 W. 8th St.) Salt Lake City, Utah; and the Seattle Office, 1932 First Avenue, South, Seattle, Washington.

You May Find the Answer to Your \$1,000 Question!



Q Is the wear and tear on track rollers on "Cars" out of proportion to use?

A Here's an outfit that answers "No!". Working with Alemite Lubrication Specialists, they adopted an "on the job" method of pressure lubrication. An 18 month check showed that track roller wear had been reduced 32% over hand type greasing. That's very important these days when replacement parts are tough to get. Chances are this Alemite method could show you some amazing results, too.



Q Are you throwing lubricants away or risking contamination?

A The experience of this organization may be your answer. The Alemite Lubrication Specialist recommended a simple "barrel to barrel" method of power lubrication that greased machines right on the job. The end result was a 19% reduction in consumption of oil and grease. Every bearing and gear got clean, uncontaminated lubricants. Would a 19% saving in lubricants mean anything to you?



Q Can your grease "take it" come hell or high water?

A "Yes," if it's Alemite. On hundreds of jobs Alemite's amazingly tough, versatile lubricants are fighting friction in ground air temperatures ranging from hottest tropical to arctic cold. Alemite #33, an exclusive water repellent, endures tremendous loads safely, can't clog grease guns or bearing lubricant grooves. Have you checked up on your lubricants lately?

Yes! "Lubri-chaos" Can Cost You Money, Machines and Production!

"Lubri-chaos" is an affliction found in the best managed construction setups. Today, with more inexperienced help on the job, "impossible" schedules to meet, and far-flung projects to serve, "Lubri-chaos" has become a nightmare of management.

Alemite, as the pioneer in pressure lubrication, has crusaded for years to remedy this costly evil. Today, the modern Alemite method of handling and application of lubricants is recognized as the answer to "Lubri-chaos" and is proving its worth wherever machines are at work.

Tomorrow, when post-war competition makes new demands on the construction industry, the Alemite method will play an important role. That is why operators with an eye to post-war business are getting together with Alemite Lubrication Specialists to gain the competitive advantage of the world's most advanced lubricating methods. Alemite, 1819 Diversey Parkway, Chicago 14, Ill., or Belleville, Ontario.

WANTED Tough Job by Man with "MML" Degree!



This man, an Alemite Lubrication Specialist, is a "Master of Modern Lubrication." His technical training, skill and experience equip him to come on your job and consult with you about applying the most modern lubricating methods. He has added more productive time to machines, saved lubricants and man-power. He has installed safer, surer, more accurate lubricating methods.

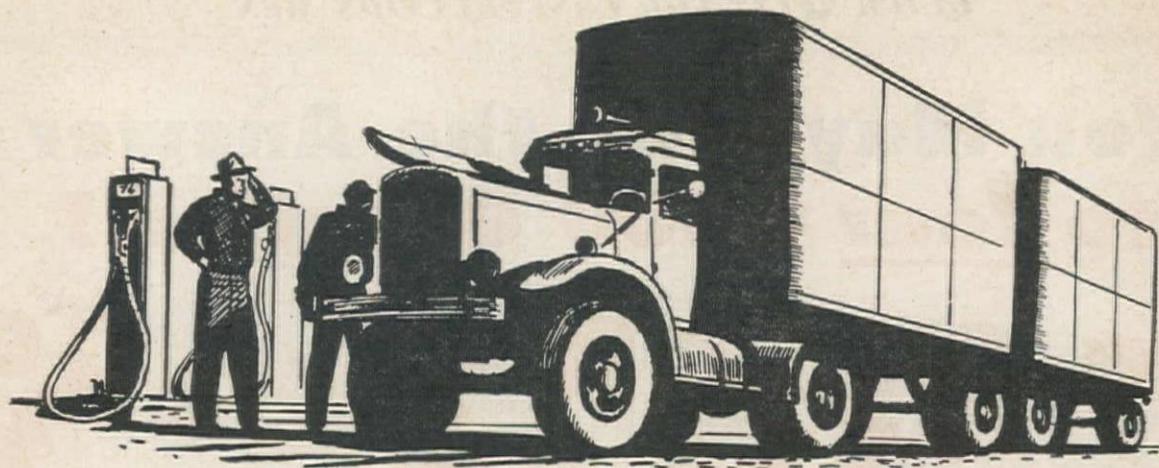
He's ready to go to work for you now, backed by the world's most experienced organization in the handling and application of lubricants. Call him. Or, if you prefer, write, wire or phone Alemite for his address.



ALEMITE

REG. U. S. PAT. OFF.
First in Modern Lubrication

LUBRICATION • CONSULTATION • ENGINEERING • EQUIPMENT • MAINTENANCE



A motor oil that cuts repair bills!

Carbon in a motor is an old story.

Periodical engine overhauls to remove carbon deposits are an accepted item of necessary expense on every operator's cost sheet. En-

If you operate a fleet of trucks, or a bus line, or any type of gasoline engine, you will be interested to know the results of a carbon-forming test made on the 9 leading premium motor oils sold in the West.

combination of top lubrication and low carbon formation means better engine performance, improved mileage, and longer periods between overhauls and shop lay-ups.



gine knocking, overheating, abrasive scoring of piston rings and cylinder walls, and burned out valves are the result of excessive carbon formation.

Yes, everyone knows about carbon ... what everyone doesn't know is that nearly all carbon formed in motors comes from motor oils.

This laboratory test showed that TRITON Motor Oil contained 38% less carbon-forming elements than any of the other oils and 86% less than the average!

TRITON Motor Oil is a 100% pure



paraffin-base lubricant, carefully refined by Union Oil Company's patented propane-solvent process. This



You can get TRITON at any Union Oil Station, or if you would like a supply delivered, just phone the Union Oil Resident Manager in your area.

TRITON



Dependable power in the making . . . final assembly of



LEROI

valve-in-head engine

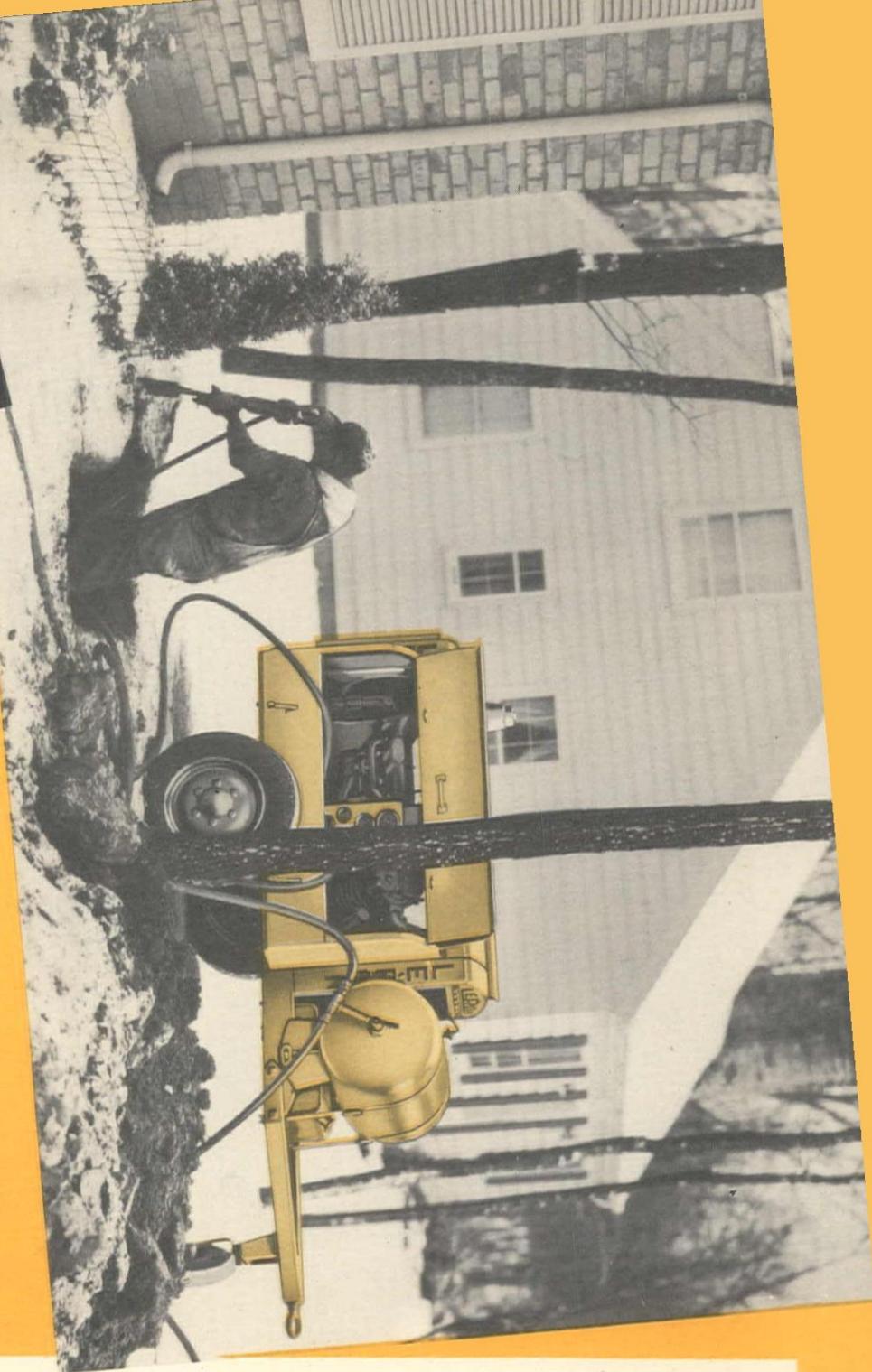
TURN
THE
PAGE

LE ROI

Portable Air Compressors Make Easy Jobs Out of Tough Ones!

Cutting through frost ordinarily slows up scheduling of work. But with a Le Roi Compressor on the job, you find no hours lost — for here is a machine that is powered to give you plenty of pressure with an extra margin of reserve for the pinches.

for the oil pump is part of a complete force-feed system that assures you of adequate lubrication regardless of the tilt of the machine. Ask your nearest Le Roi dealer for complete information or write for bulletins.



Le Roi Compressor Features

BALANCED CRANKSHAFTS

Le Roi Compressors have dynamically balanced crankshafts with integral counterweights. Weight of pistons and connecting rods held to extremely close limits.

HEAVY-DUTY ENGINE

Overhead valve construction, hardened valve seat inserts, removable wet sleeve cylinders are features of Le Roi power that save time and money on maintenance.

EXTRA MOBILITY

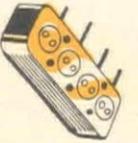
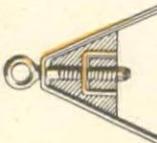
Spring-cushioned towing eye — truck-type springs — retractable castor-wheel — enable you to get air for a job in a hurry, with minimum time lost on and between jobs.

SOUND DESIGN

Compressor oil pump shown at right is part of a complete force feed system, assuring you of adequate lubrication whether unit is standing on level or uneven ground.

FORCE FEED LUBRICATION

Compressor oil pump shown at right is part of a complete force feed system, assuring you of adequate lubrication whether unit is standing on level or uneven ground.



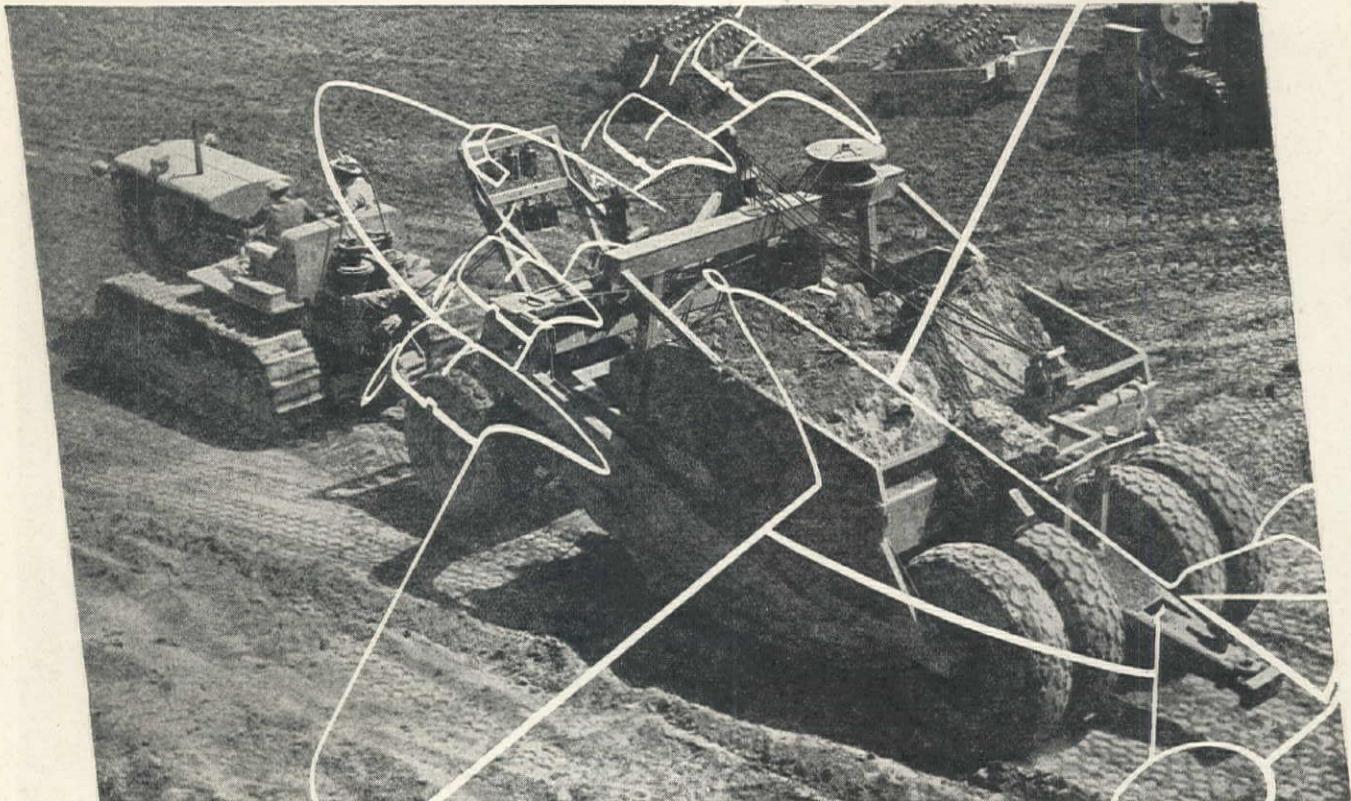
Cutting through frost ordinarily slows up scheduling of work. But with a Le Roi Compressor on the job, you find no hours lost — for here is a machine that is powered to give you plenty of pressure with an extra margin of reserve for the pinches. Its extra mobility permits you to move it right next to the job. The machine does not have to stand on level ground to be lubricated properly —

LE ROI COMPANY
1726 S. 68th St., Milwaukee 14, Wisconsin



ON THE REVERSE SIDE — A skilled assembler installs each part carefully and with utmost precision. He is proud of the quality he plays in building an engine of unquestioned power when the going is tough. An engine that delivers dependable power when the going is tough.

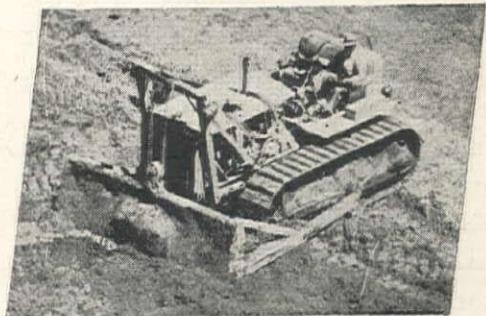
WOOLDRIDGE TERRA CLIPPER SCRAPERS



MOVE WORLDS OF EARTH

IN LESS TIME — AT A LOWER COST

Backed by a world of job-proven performance, Wooldridge huge-capacity Terra-Clipper Scrapers operating on the Boiling-Bowl principle move worlds of earth faster, cheaper and easier. They are designed and built from the ground up with proper load balance and super-dreadnought construction to withstand greater abuse over longer periods of constant use—with less wear and tear—less down-time for repair. Faster loading and dumping of larger heaping loads enables them to make more trips per shift—moving greater yardages in less time—with less trouble—at a lower yardage cost. Put Wooldridge Scrapers on every job and compare the contrast in yardages, time and cost.



Wooldridge Bulldozers are also built first—to outlast.

WOOLDRIDGE SCRAPERS ARE SUPPLIED TO THE U. S. GOVERNMENT FOR 2-LINE OPERATION, PERMITTING THE USE OF 2-DRUM POWER UNITS

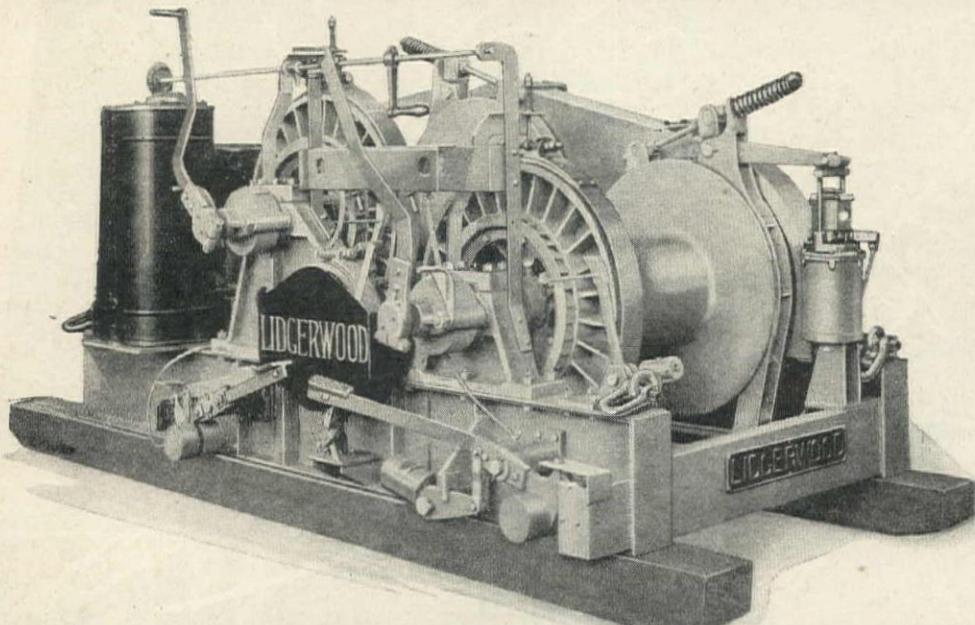
BOILING BOWL
TERRA CLIPPER PRINCIPLE
SCRAPERS

WOOLDRIDGE

MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

When Men's Lives Hung on a "Dead-Man's Lever"



WHEN the tallest structure in the world was building, a legal man-carrying hoist was required to get workmen to their working level, hundreds of feet above street level.

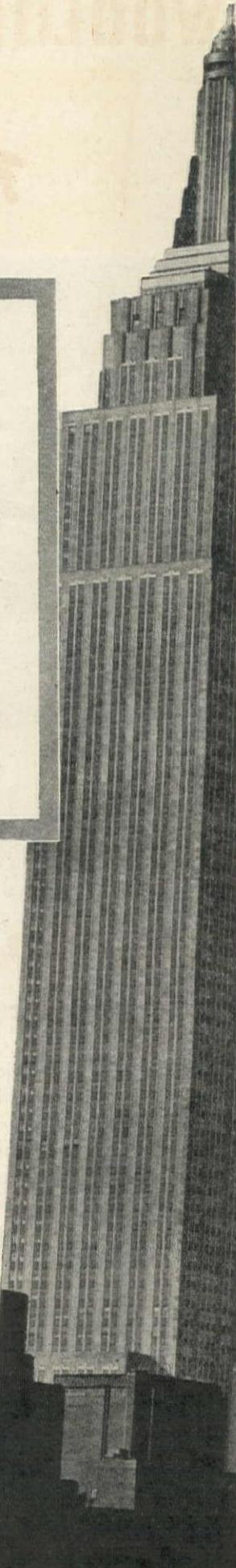
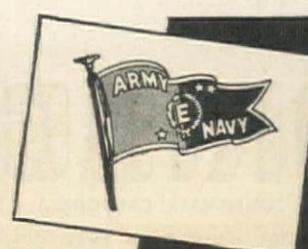
Lidgerwood built the hoist—built into it all the dependability and ruggedness for which Lidgerwood hoists have become known in the past 70 years. But that wasn't enough; with men's lives concerned, the element of human error remained to be overcome.

The "Dead-Man's Lever" was the answer! Let the hoist operator release

this lever for any reason, and immediately all mechanism locks, preventing the cage from rising or falling.

This particular Lidgerwood Safety Hoist with "Dead-Man's" Control represents merely one of the many examples of how Lidgerwood *builds the hoist to fit the job*. Wherever a hoisting job is indicated, there is a Lidgerwood electric, steam, gasoline or Diesel hoist to do the job *right*—dependably and efficiently. At present, Lidgerwood is supplying hoists to the government and contractors serving the war.

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS • ELIZABETH, NEW JERSEY



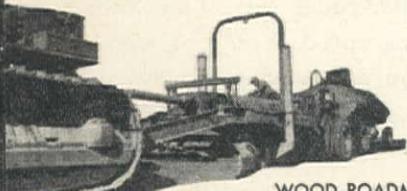
What Does a Good Highway Cost?

That depends entirely on how it is designed and built.

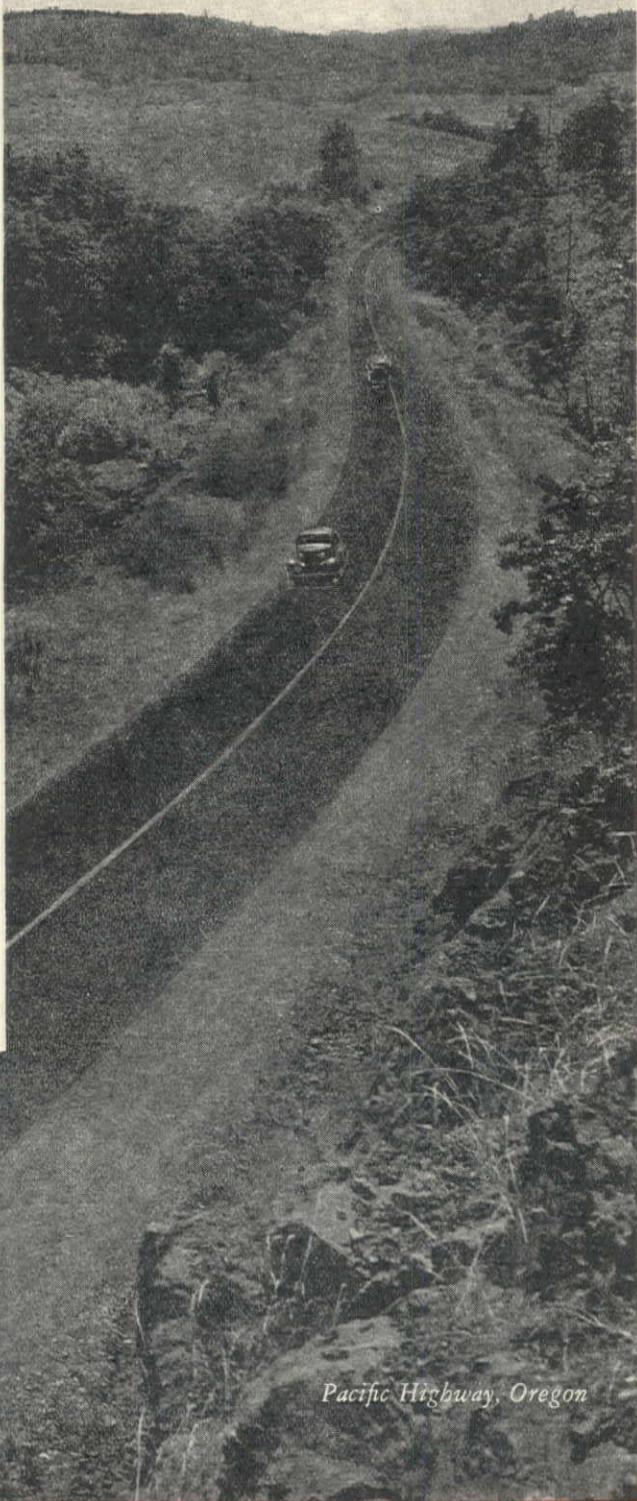
If it is designed for road-mix and a Wood Roadmixer, it can be built for one-third the cost of any other method of pavement construction. It will be a top-quality, long-life highway, low in first cost and low in maintenance cost.

The Wood Roadmixer is a complete traveling mixing plant. It uses local or native materials proportioned and mixed *on the job*. It produces more than 2,000 tons of mix per 8-hour day in *one pass* with a two-man crew, and handles either emulsion, road-oil or soil cement mixes. The Wood Roadmixer is the world's most versatile road-building equipment. As such, it gives free rein to the use of common sense in the design, preparation and finish of a job. That's why today Wood Roadmixers are building pavement faster, better and at less cost. And that's why they will be in even greater demand for peacetime pavement construction.

Write today for literature and prices.



WOOD ROADMIXER
A Complete Traveling Mixing Plant



Pacific Highway, Oregon

DESIGN FOR

ROAD-MIX

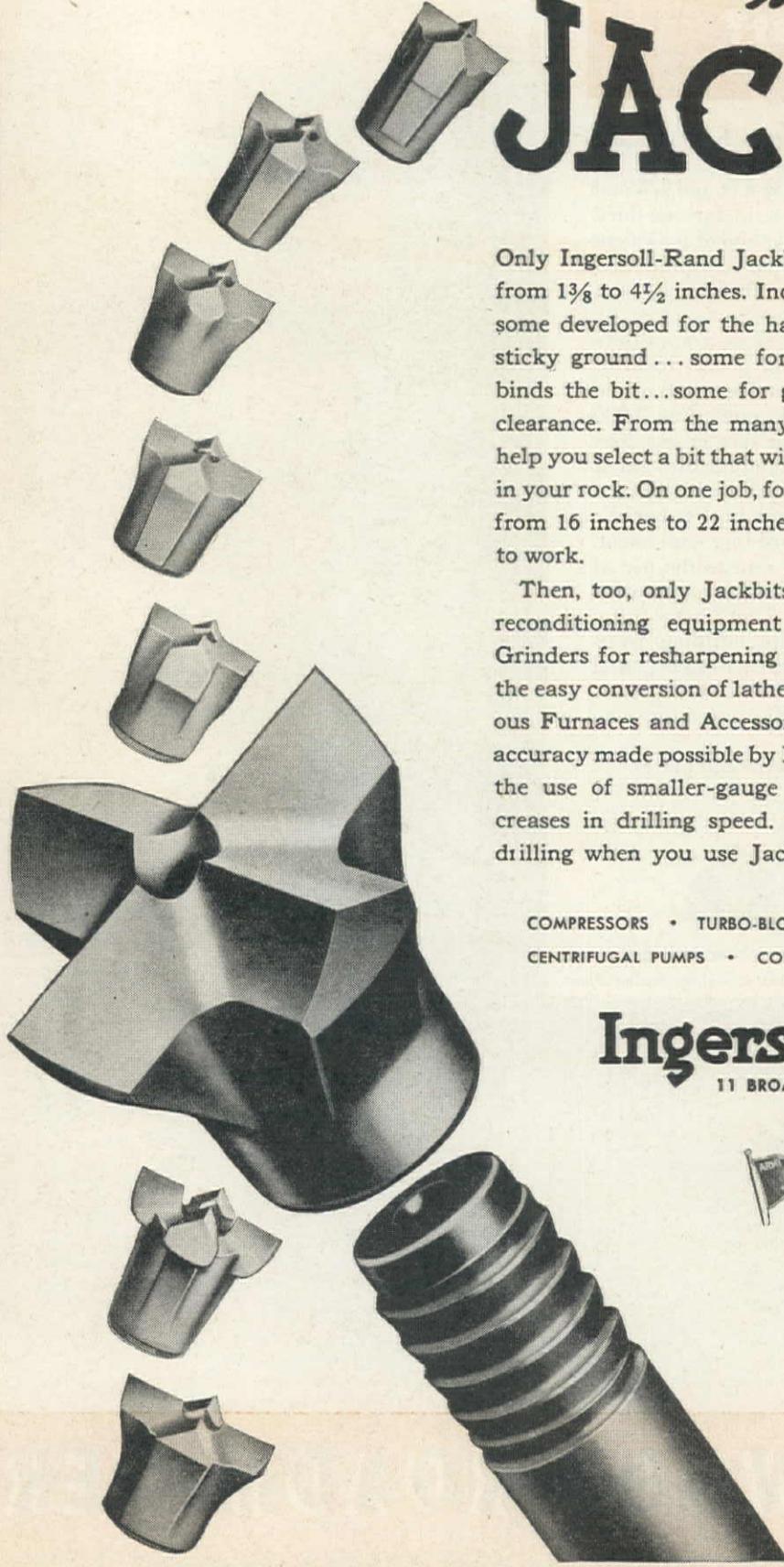


WOOD ROADMIXER

Wood Manufacturing Co. • 816 West 5th St., Los Angeles 13, California

For more efficient drilling

use
JACKBITS



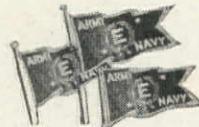
Only Ingersoll-Rand Jackbits cover a complete range of sizes from $1\frac{3}{8}$ to $4\frac{1}{2}$ inches. Included in this group are special bits, some developed for the hardest rock... some for abrasive or sticky ground... some for ground that tends to rifle or that binds the bit... some for ground that requires maximum bit clearance. From the many different sizes and designs, let us help you select a bit that will give you the best drilling efficiency in your rock. On one job, for example, the drilling rate increased from 16 inches to 22 inches a minute when Jackbits were put to work.

Then, too, only Jackbits are backed by a complete line of reconditioning equipment which consists of Hotmills and Grinders for resharpening bits, a Box Tool and Die Head for the easy conversion of lathes for Jackrod threading, and numerous Furnaces and Accessory Equipment. The great degree of accuracy made possible by I-R resharpening equipment permits the use of smaller-gauge bits. This leads to surprising increases in drilling speed. Yes, you will have more efficient drilling when you use Jackbits.

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

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

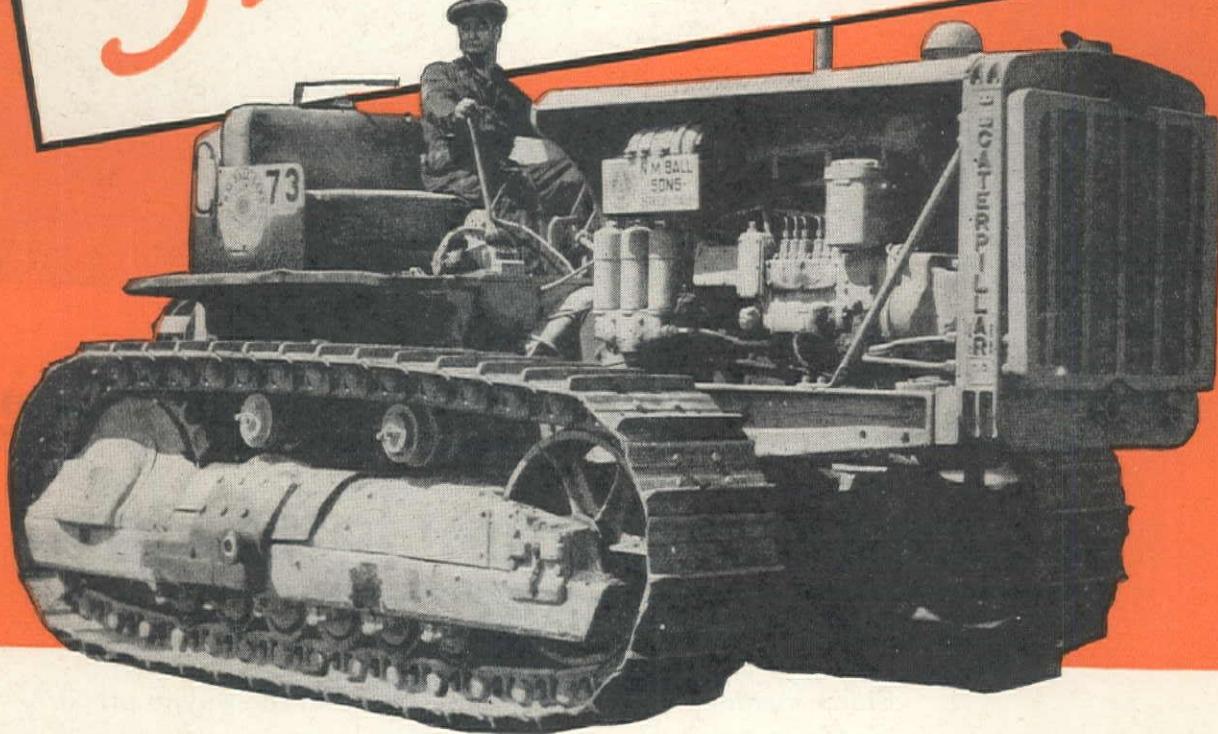


JACKBITS OFFER THE WIDEST RANGE OF DESIGNS AND SIZES

IN THIS D-8 . . . VELVETOUCH FACINGS WEAR

3 Times Longer

THAN ALL OTHERS USED



Actual performance records kept by N. M. Ball & Sons, General Contractors of Berkeley, Calif., prove that Velvetouch wears, on an average, three times longer than any other type friction material they have used.

As a result, they have installed Velvetouch Bimetallic linings and facings on 90% of their earth-moving equipment, consisting of D-8 Caterpillar Tractors, Road Graders, Rollers, Le Tourneau Power Units, etc.

Mr. W. D. Sorenson, Sup't., Tractor Equipment, writes: "Velvetouch is all you claim it to be. We have tested it in our severest operations, and it has proven the best

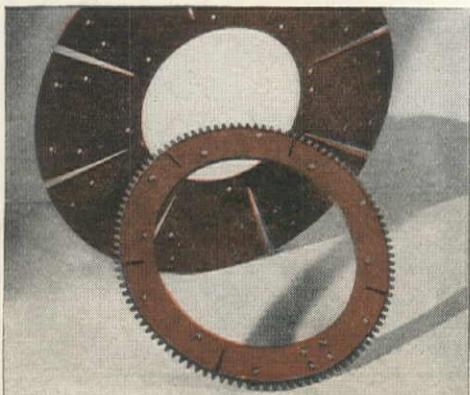
material we have ever used . . . cuts lay-up time and replacement costs to a minimum."

VELVETOUCH IS ALL METAL . . .

made entirely from compressed powdered metals, welded to solid steel backing plates. Because it is all metal, Velvetouch wears longer . . . requires less adjustment . . . is little affected by oil or water.

For complete details write to:

THE S. K. WELLMAN CO.
1374 EAST 51st ST. • CLEVELAND 3, OHIO



FOR BRAKE AND CLUTCH

USE

Velvetouch

BIMETALLIC FRICTION MATERIAL—TRADE MARK REGISTERED



Above: Flame cleaning a section of a bridge.

Right: The same panel after flame cleaning and wire brushing. Note absence of loose rust, scale or old paint.



A simple, inexpensive way to make paint last longer on structural steelwork

Flame cleaning, perfected by Airco, goes all the way in preparing structural steel surfaces for maintenance painting. Quickly and easily applied, the oxyacetylene flame process not only burns off the old paint but also loosens all scale and rust which hold entrapped moisture, the frequent cause of premature failure of the paint coat. The surface, after wire brushing, is left free of all loose material.

In addition, the heat of the flame warms the steel and drives off all moisture, affording ideal conditions for repainting promptly after wire brushing.

For complete information with suggested specifications covering work of all types, obtain your copy of our folder ADG-1066A. Use the coupon — no obligation.

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SALES CO.
60 East 42nd Street
New York 17, N. Y.

Gentlemen: CE-1

Please furnish me with a copy
of Form ADG-1066A by early
return mail.

Name.....
Title.....
Firm.....
Address.....
City..... State.....



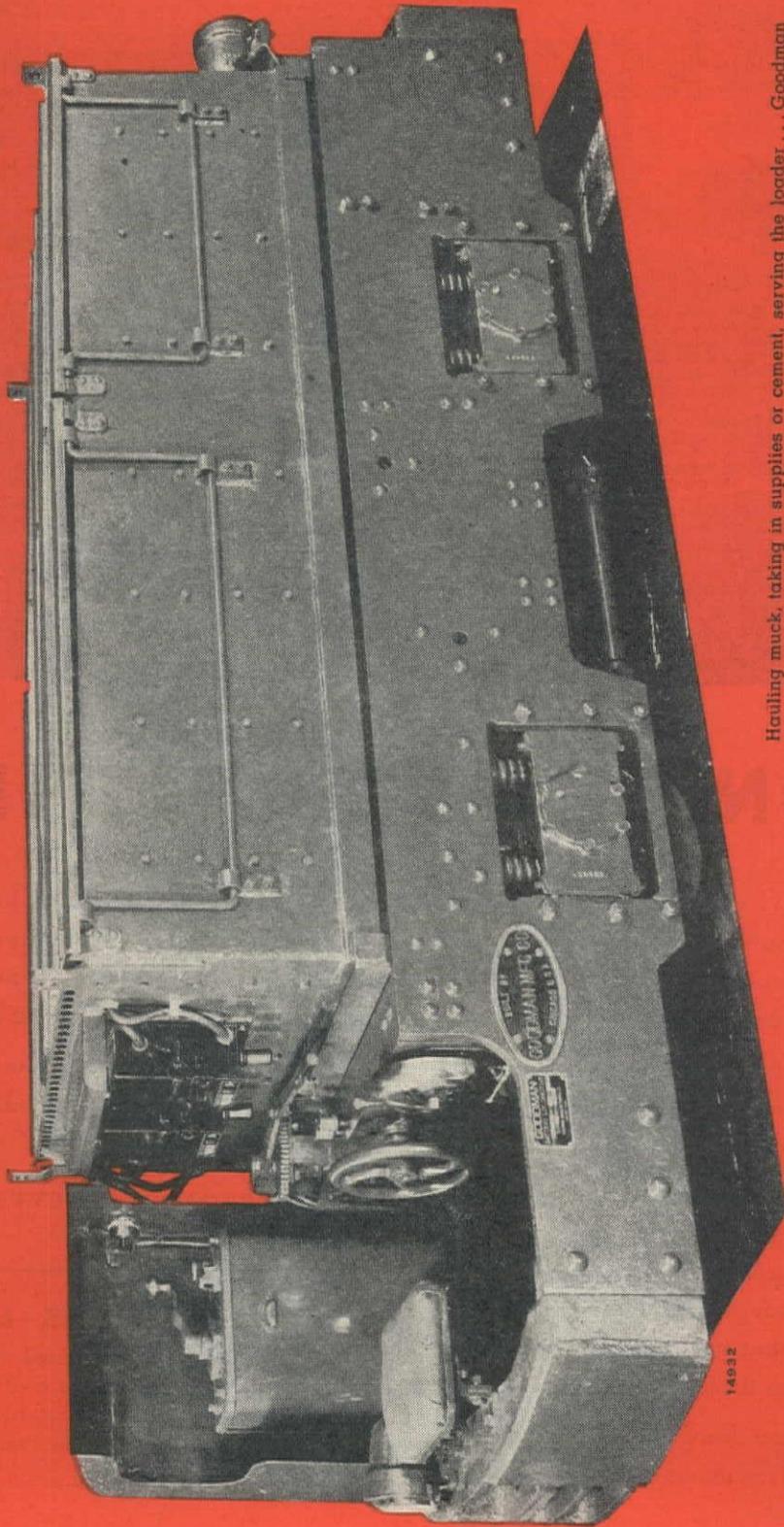
★ BUY UNITED STATES WAR BONDS ★

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General Offices: 60 East 42nd Street, New York 17, N. Y.
In Texas: Magnolia Airco Gas Products Co. General Offices: Houston 1, Tex.
Offices in all Principal Cities

WESTERN OFFICES: SAN FRANCISCO, CALIF. • EMERYVILLE, CALIF. • PORTLAND, OREGON • LOS ANGELES, CALIF. • SEATTLE, WASHINGTON

Goodman Tunnel Locomotives



Hauling muck, taking in supplies or cement, serving the loader... Goodman tunnel locomotives do the job, do it speedily, and can be kept constantly on the job without penalty of excessive cost or expensive breakdowns. A wide variety of types and sizes is available.

Call in a Goodman sales engineer for complete details.



GOODMAN MANUFACTURING COMPANY • HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS



★ ON THE WARPATH! ★

EVERY U. S. HIGHWAY, every street and country road—wherever hauling has had to keep step with fast-moving war construction—has been converted into a warpath by trucks.

Fast, dependable trucks—working long hours under heavy loads, often in the toughest kind of going—have moved mountains of material, *on time*.

A good share of the trucks on America's construction warpaths are Internationals. Performance made them the largest-selling heavy-duty trucks on the market. And the same toughness, dependability and economy of operation that put them out in front in days of peace keep them there in these days of war.

It's a big job trucks are doing—a job that *must* be done. That means your trucks must be maintained,

must be kept in tip-top shape. International civilian truck service—the nation's largest company-owned truck service organization—is now a *wartime* truck service . . . more alert, more efficient than ever.

No matter what your make or model of truck, let International Service keep your trucks rolling on the warpath for Victory!

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

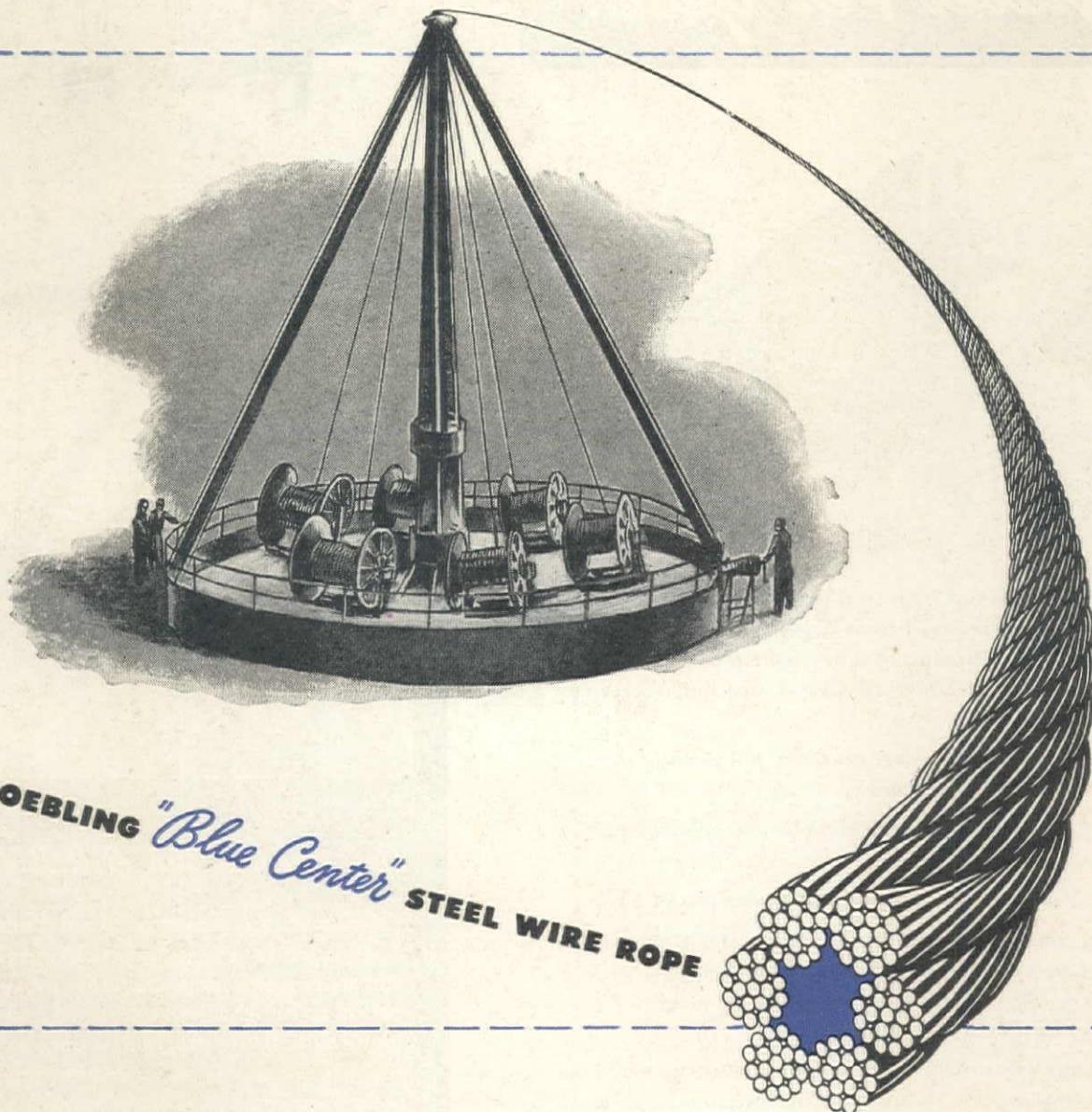
NEW TRUCKS—*Limited!*

The government has authorized the manufacture of a limited quantity of trucks for civilian hauling in essential occupations. For your new truck, see your International Dealer or Branch right away. Don't delay!

International Truck Branches located at San Diego, Los Angeles, West Los Angeles, Glendale, Fresno, Sacramento, Oakland, San Francisco, Portland, Tacoma, Seattle, Spokane, and Salt Lake City.

INTERNATIONAL Trucks

Rope making, stranding, closing equipment fitted to the job. If you need a 5" diameter rope this giant is ready to close a single 80 ton length of it



ROEBLING "Blue Center" STEEL WIRE ROPE

WHAT CAN YOU EXPECT from Roebling? Rope that has known capacity to deliver service. Engineering, in our plant and at your job, to put the rope to work right. Maintenance practices that protect its long life. » Your postwar profits and postwar jobs will depend in part on operating rope-rigged equipment at lowest cost. You can leave that part to Roebling.

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA
San Francisco • Los Angeles • Seattle • Portland

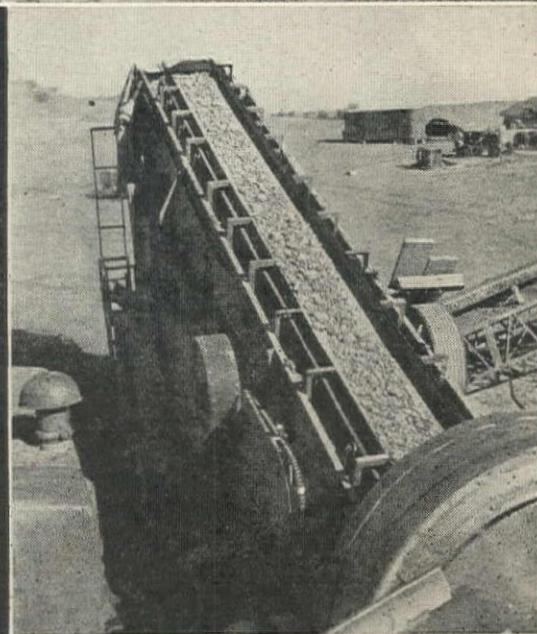
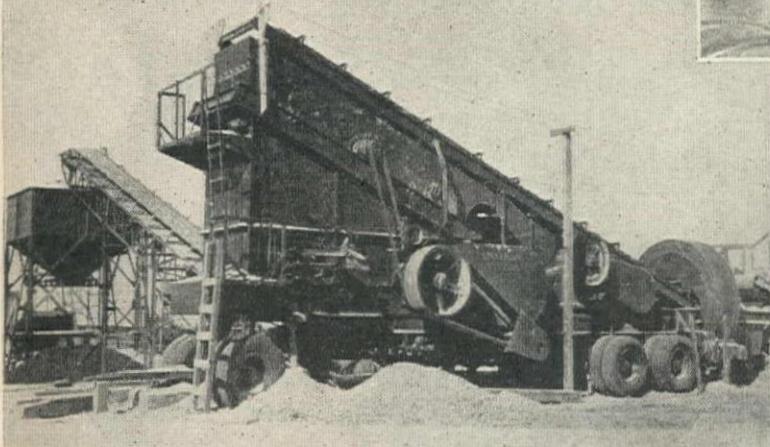
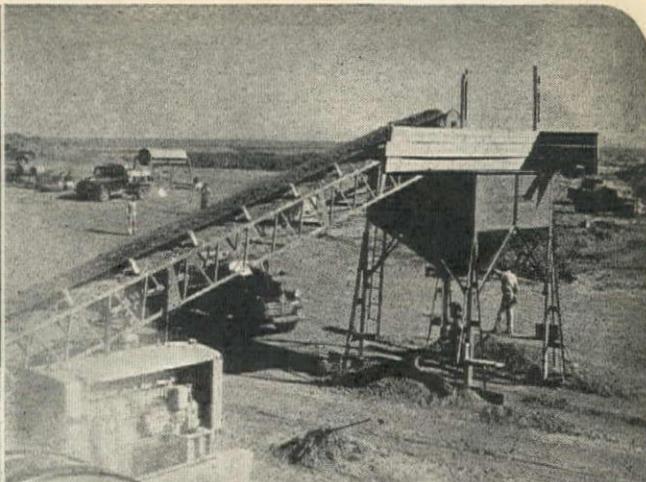


ROEBLING

PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • COLD ROLLED STRIP • SUSPENSION BRIDGES AND CABLES • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • AERIAL WIRE ROPE SYSTEMS • ELECTRICAL WIRES AND CABLES • ROUND AND SHAPED WIRE • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • WIRE CLOTH AND NETTING

*Over 500,000
Yards of
Gravel Per Year!*



Success stories of Universal plants are many. Typical is the one recently received from Cage Bros. & J. Floyd Malcolm, Texas, gravel producers. They have given us the following report on their Universal Gravel Crushing, Screening and Loading Plant:

Maximum yardage per hour: 400 yards of material 2" and under.

Average production in continuous operation: 275 yards per hour.

Average annual production: over 500,000 yards.

This compact portable plant consists of a 1036 primary jaw crusher, 40"x 24" secondary roll crusher, 2½ deck 4"x 12' screen, rotovator and conveyors—a lot of gravel produced with a minimum of equipment.

Ask any user of Universal equipment about production costs, fuel consumption, bearing life, maintenance costs and other operating factors. *When results are checked, Universal is the choice!*

UNIVERSAL ENGINEERING CORP.
323 8th Street, West Cedar Rapids, Iowa

Get Behind the A.R.B.A.!

Officials of the American Road Builders' Association have issued a plea to members, affiliated organizations and other interested parties to launch a well integrated post-war highway building program at once so that the wheels can be set in motion immediately upon conclusion of the war.

A copy of "A Sound Plan," detailing the program to hedge against post-war deflation is available to those interested, from the A.R.B.A., 1319 F St. N. W., Washington, D. C.

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

Springtime!



THE *Right* TIME TO PUT YOUR ROADS IN ORDER!

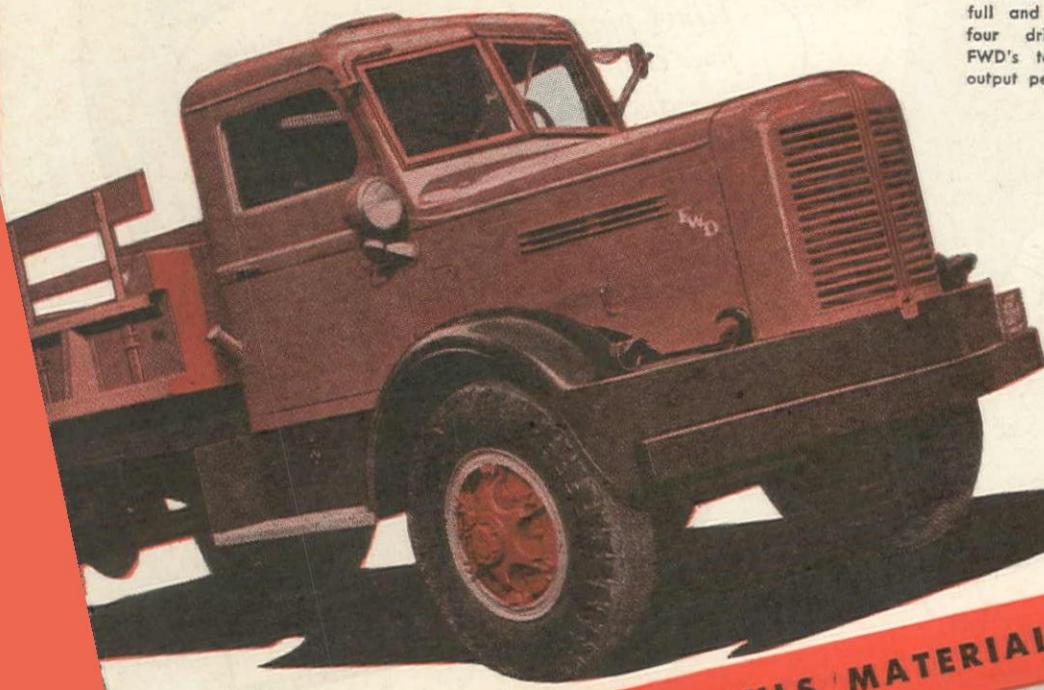
You don't have to be an aviator to know what "crack-ups" are . . . you'll have plenty of them this Spring, as usual, in roads ravished by "old man Winter." With FWD Model HG All-Season Road Maintenance Trucks, you can give damaged roads "first aid" in a hurry, and later fully repair or fully recondition them. There are more than 60 road building, conditioning, and maintenance jobs FWD's can do faster, better, at less cost . . . for instance:

- **Scarifying** . . . raising buried binding material . . . mixing soil constituents . . . loosening irregular hard-pan . . . displacing oversize material.
- **Grading** . . . cutting down backslopes with leaning wheel grader . . . widening traveled roadway . . . removing slides . . . deepening ditches and gutters.
- **Ice Removal** . . . with underbody scraper.
- **Compacting** surface materials with flat blade.
- **Marking** . . . replacing markers, signs, traffic signals.
- **Reclaiming** . . . saving valuable surfacing material from road shoulders.
- **Hauling** . . . gravel, sand, asphalt heaters, materials for patching or rebuilding roads . . . hauling snow fence to storage . . . hauling men, equipment and materials to remote locations.

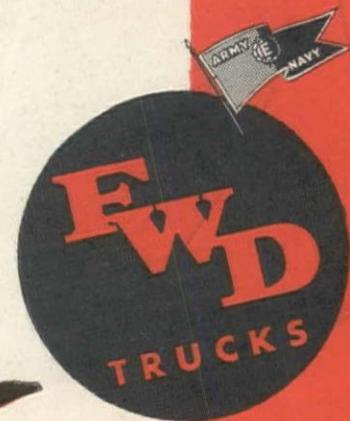
. . . and many other heavy-duty road jobs that need FWD's extra ruggedness, stamina and endurance for sustained superior performance, Spring, Summer, Fall and Winter. Easy on gas, oil, tires, replacements . . . FWD's hold all operating and maintenance costs to a minimum.

THE FOUR WHEEL DRIVE AUTO COMPANY • Clintonville, Wis.

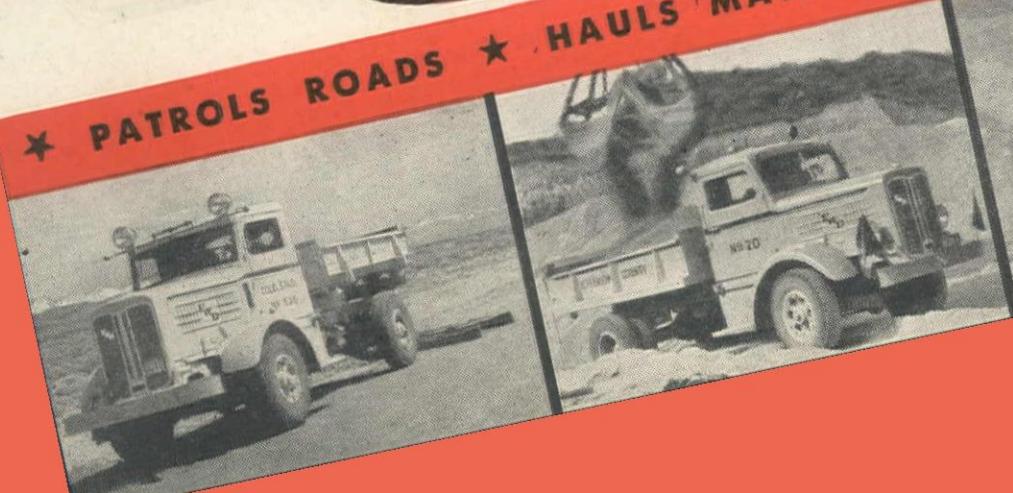
Canadian Factory: Kitchener, Ontario



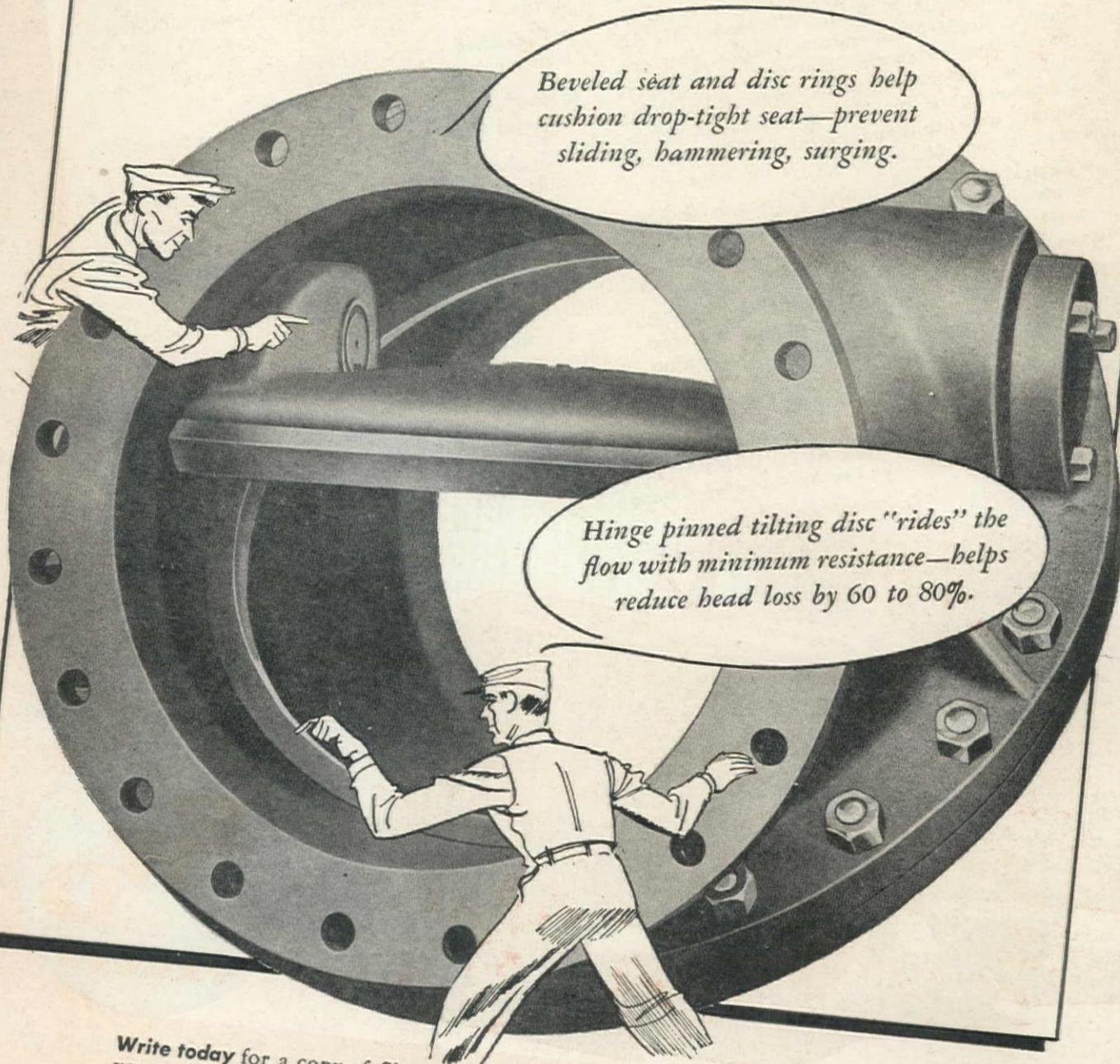
The wide range of gear ratios, tremendous reserve power, the full and balanced traction of four driving wheels enable FWD's to deliver more work output per truck dollar.



* PATROLS ROADS * HAULS MATERIALS * PLOWS SNOW *

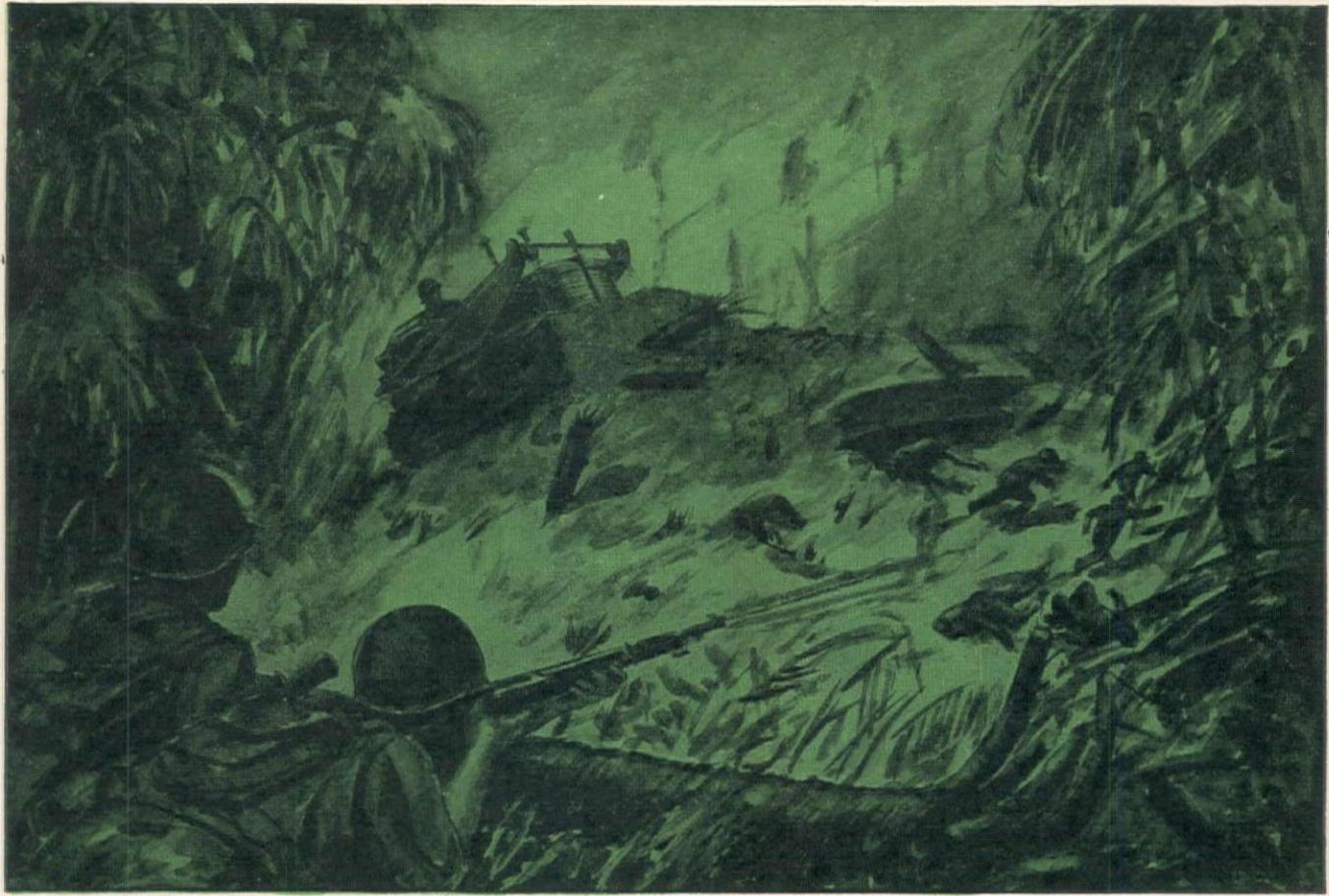


LOOK WHAT
CHAPMAN'S AIRFOIL DESIGN
CAN DO FOR YOU!



Write today for a copy of Chapman's illustrated Engineering Data Book. Gives you complete information on how Tilting-Disc Check Valves improve your plant operation and cut costs far beyond ordinary swing-type checks. The Chapman Valve Manufacturing Company, Indian Orchard, Massachusetts.

CHAPMAN **CHECK VALVES**
Equally efficient on horizontal or vertical installations on water, steam, oil, gas and air lines



*"You should have seen
those little rats run!"*

On fighting fronts all over the world, word has come back of bulldozers in action, not only doing the vital jobs for which they are built, but *fighting* jobs as well. Among the most spectacular of these reports is the following contained in a letter from one of Buckeye's men in service:

"Now here is something I would like to tell you, now that I am back out of New Guinea. We had two pillboxes that were impossible for us to take, so they had a bulldozer about four miles away. We brought it up and by raising the blade charged the boxes. You should have seen those little rats run. We are still laughing. Now let me tell you something—it was a Buckeye blade and a Buckeye winch on the back! Keep up the good work and keep the Japs on the move."

After the war you can count on Cable Controlled Buckeyes to keep costs on the run. They've been proved in action — stripped down to fighting trim and built to take a beating. You'll be buying new equipment when it's available again. *Keep your eye on Buckeye!*

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

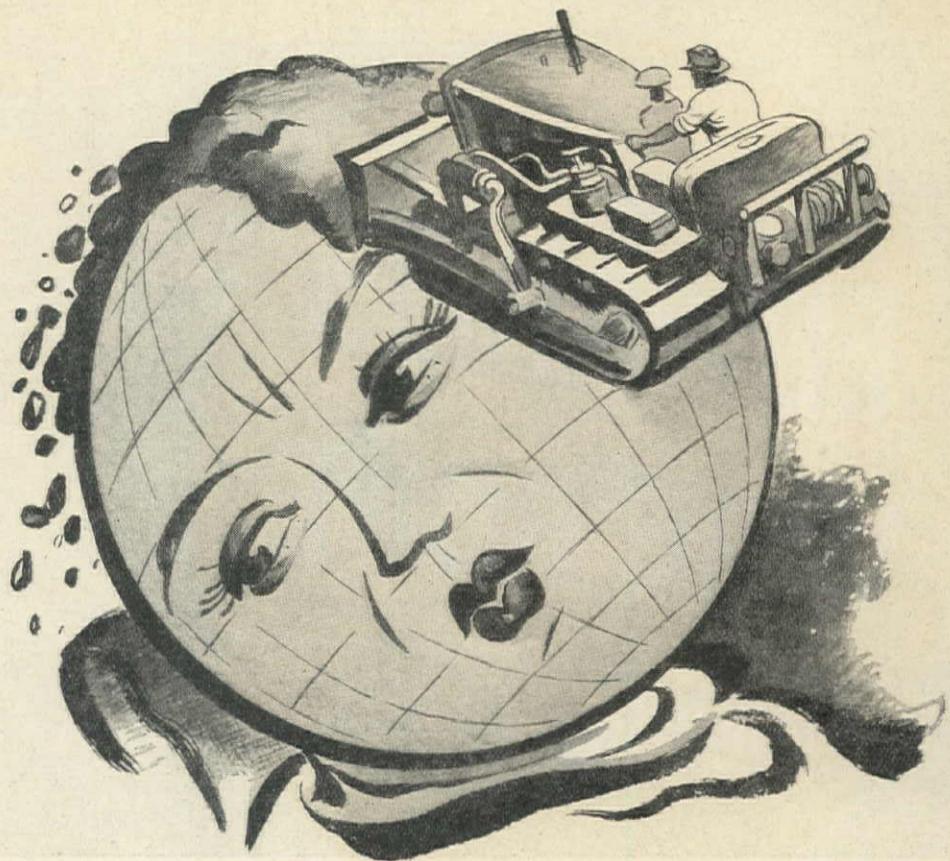
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YOUR TRACTORS
CAN DO MORE
JOBS!



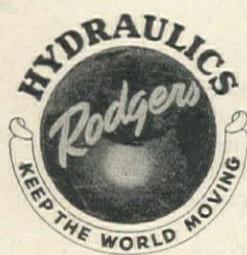
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Convertible Shovels
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MOTHER EARTH IS GOING TO HAVE HER FACE LIFTED!



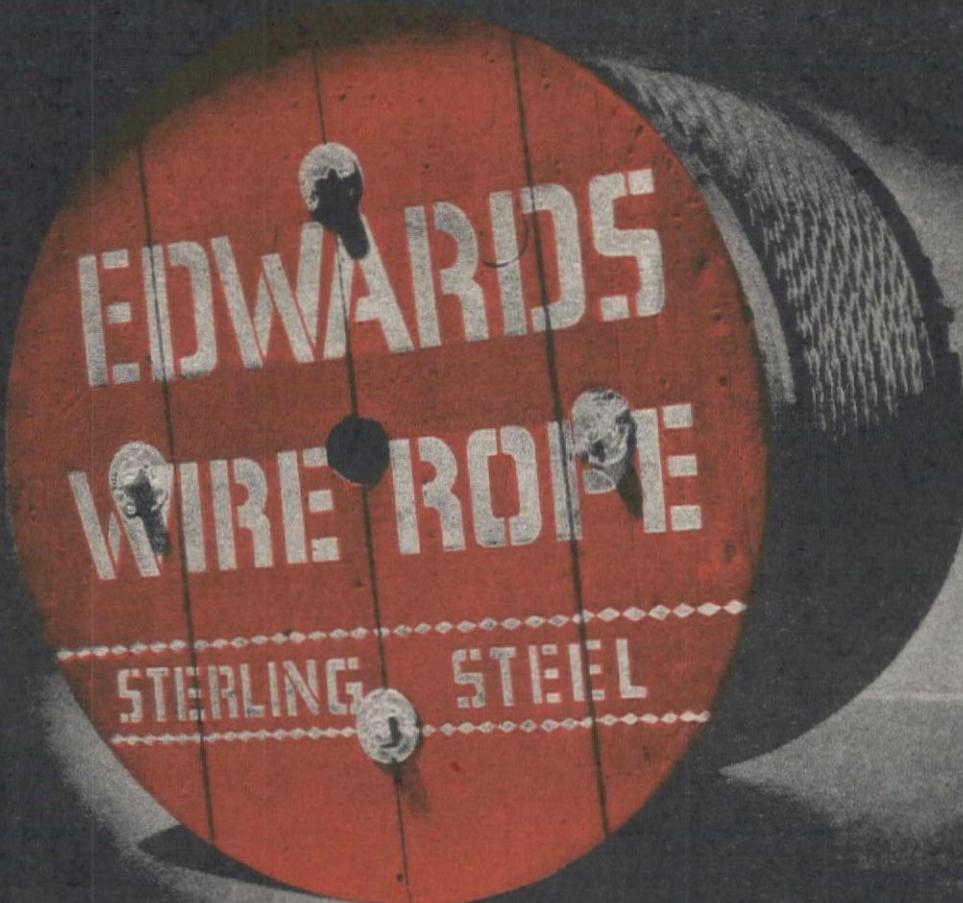
Manufacturers of:

UNIVERSAL HYDRAULIC PRESSES
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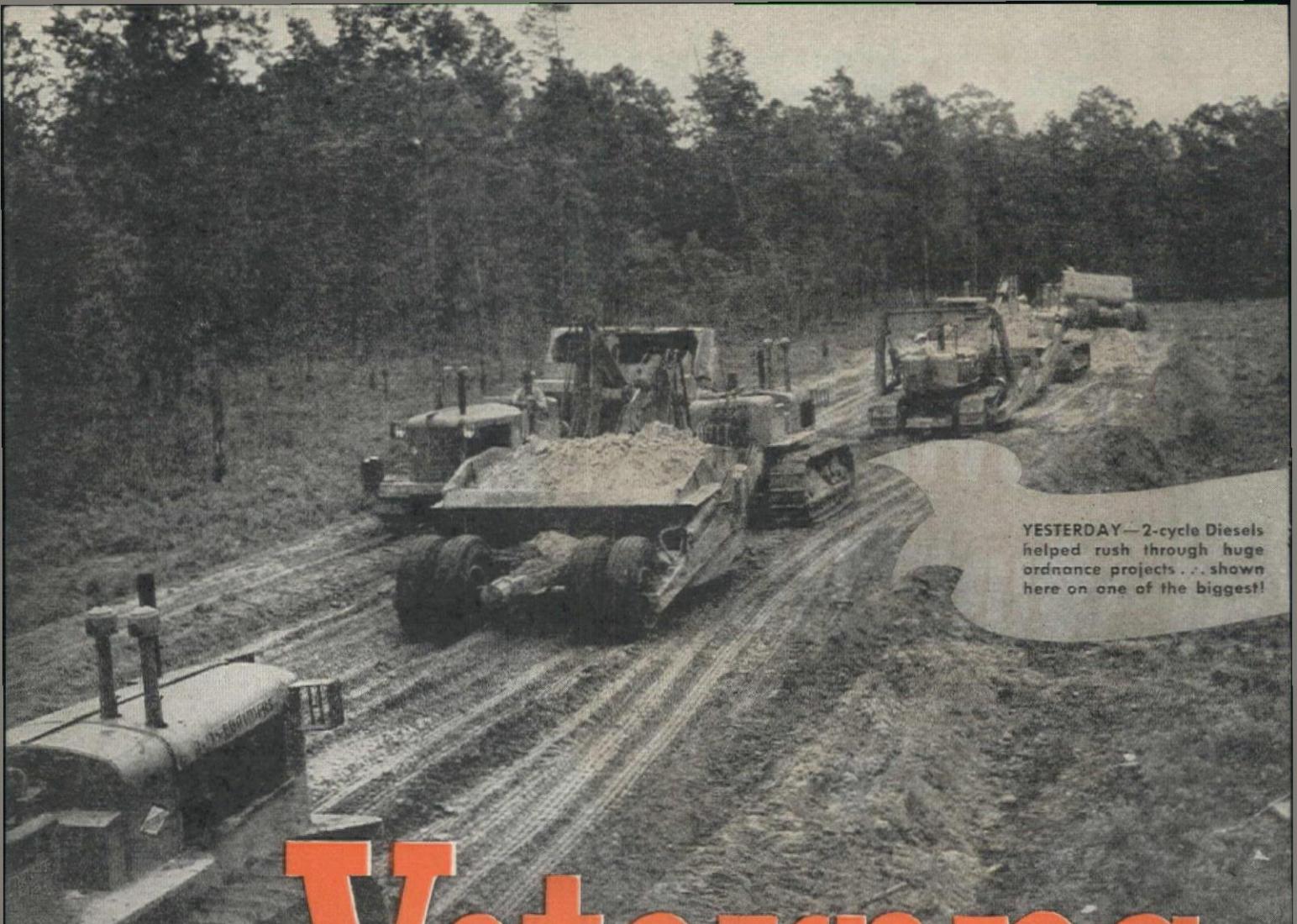
SOUNDS like a rather ambitious undertaking, doesn't it, but that is more or less what is going to happen after this World Struggle is over. The Earth is in for a tremendous resurfacing operation.

The construction, road building and grading jobs for Crawler type tractors in that not too distant period are colossal. While our Plant is now engaged in essential work for the Armed Forces, we are not forgetting for a moment our duty and obligation to those who depend on Rodgers presses for quick repair of crawler tracks and other heavy machinery. Right now, all engaged in essential work are eligible for Rodgers Hydraulic Track and Universal Presses. Wire or write for full information and prices. *If it's a Rodgers, it's the best in Hydraulics.* Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minnesota.

Rodgers HYDRAULIC Inc.



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YESTERDAY—2-cycle Diesels helped rush through huge ordnance projects . . . shown here on one of the biggest!

Veterans...

They're at it again! They put in thousands of tough hours on the huge, home front construction program of the past several years . . . now the same 2-cycle Diesel tractors are handling even tougher going on overseas work for our Armed Forces.

Completely overhauled and repaired—much of it done by Allis-Chalmers dealers—there's plenty of service left in these fast-moving, powerful tractors. Today they are doing their part building advanced bases and helping reconstruct devastated areas.

2-cycle Diesel tractors are built to last . . . to perform faithfully for years with less attention. Moreover, they go right to work . . . *start instantly*—no wait-

Pioneer can deliver ESSENTIAL CIVILIAN EQUIPMENT



● This is the kind of advertisement you used to read a couple of years ago when manufacturers like us solicited your business. Today, Pioneer is at your service—and soliciting your business again.

At the beginning of the War Pioneer was called upon to produce the big equipment—the large portable plants used in basic construction work. We delivered the big Pioneer plants to the Government. We've done the job assigned to us.

The completion of these war orders finds our expanded production facilities and increased personnel in a position to produce crushing, screening, and handling equipment for essential work—such as Mining, Railroad Ballast, Agricultural Limestone, Airports, Essential Highways.

You'll find us prepared to help you with your important equipment needs—ready to design layout—submit it for your consideration—and proceed with manufacture for early delivery. On plants and most units, releases and priorities are essential. On feeders and screens, only suitable priorities are needed. We, or our distributors, will help you with the necessary applications.

This is a good time to get your equipment needs under consideration—work out details. Working and planning with Pioneer involves no obligation. We're ready to set up an early meeting with you. Write today.

Pioneer
ENGINEERING WORKS

Jaw Crushers • Roll Crushers • Screens • Conveyors • Feeders • Washers

MINNEAPOLIS 13, MINNESOTA

ENGINEERS and
MANUFACTURERS of
QUARRY, GRAVEL
AND
MINING MACHINERY

USE YOUR SHOVEL'S "Second Wind" TO GET GREATER YARDAGE



● Tap that reserve capacity of your excavator. Every extra yard that can be produced beyond normal expectation is an added contribution to victory on the production front.

Good planning and job organization of course are "musts." So is proper maintenance of your equipment. And, equally important, an experienced operator through skillful handling of his machine can save a minute here and a minute there which add up to a substantial yardage bonus at the end of the shift.

Perhaps these suggestions may help you to speed up your shovel's output:

Heap the dipper. Get a full load every pass. Heap every truck but don't overload.

●
Take a thin slice at a cut. Dipper will hoist through



the bank faster and more easily than if you try for a deep cut. Take cut out in layers across face of bank.

●
Use two truck spotting wherever possible. Spot trucks in line with arc of swing and spot them the same distance from center of rotation.

●
Keep close to your digging — don't "stretch" to reach it. Spot trucks so as to dig and dump at same radius. Move up while waiting for trucks.

●
Work for smooth, well-balanced operation in a close tie-in with the flow of trucks. Steady operation is what breaks output records and gets out big yardage.



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Four major factors are responsible for the outstanding success of the Timken Rock Bit: our superior method of attachment, with shock-taking shoulder; a bit for every kind of rock, each scientifically designed to do its special job with maximum effectiveness; our intimate knowledge of rock formations and rock drilling; nation-wide service facilities from 15 factory branches supplemented by a network of Authorized Distributors, conversion and reconditioning shops, all strategically located for instant availability.

Important as the performance of the Timken Rock Bit is today, it will be even more important during the intensive years of reconstruction that lie ahead; then its ability to effect radical savings in time and cost will help users to operate profitably while meeting any competitive challenge.

That's why it will pay you to adopt Timken Bits *now*. May we have the privilege of discussing your rock drilling problems with you in the near future? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

G. I.

finds

a friend



G. I. (as the Yank soldier prefers to call himself) has to handle a lot of wire rope these days. On landing barges . . . on cranes, hoists, and power shovels . . . and especially on trucks and tanks, most of which carry an emergency winch cable as standard equipment. For such uses, Bethlehem has supplied millions of feet of wire rope—much of it in our top-quality Form-Set (preformed) construction.

When a truck is mired, or when there's a heavy hauling job to be done, the G. I. winch cable is a friend in need. And when it's supple, easy-handling Form-Set it's doubly a friend. That means a lot to G. I., who as likely as not was a traveling salesman or grocery clerk in civilian life, and had no experience in handling wire rope.

Because its strands and wires are preformed in their cork-screw shape, Form-Set is free from locked-up constructional tensions. It's easy to splice and spool, requires no seizing, and sprouts no spiny wire bristles to slash the hands of men who work with it. All of which explains why Government agencies have bought it in such vast quantities for military operations.

You get the utmost in service and long life from Form-Set when it's in the Purple Strand grade. Purple Strand wire rope is made of strong, tough Improved Plow Steel, the highest-quality steel that's used in wire-rope construction.

In Form-Set Purple Strand you get the ideal combination of preformed ease of handling with the unmatched strength and ruggedness of Improved Plow Steel. Plan to order it for your next wire rope job, or for replacements. But make your plans, please, as far in advance as possible, so that you will be sure to have Form-Set Purple Strand Wire Rope when you need it.

Form-Set
Purple Strand
Wire Rope



★ ★

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CARCO HOISTS ARE *Economical* TOO!

WHEN it comes to economy of operation, Carco puts a Scot to shame! Because Carco Hoists are built to last, designed to perform with low upkeep.

Carco Hoists have one-piece, sealed case of rugged Carcometal, patented steel alloy product of Pacific Car with an elastic strength almost twice that of ordinary steel. The gears operate in a continuous oil bath, and all parts are

standardized and interchangeable. Economical, speedy, dependable Carco Hoists have long been first choice on tough lumber and construction jobs.

Pacific Car and Foundry Company is turning out great quantities of hoists for war, today. But production has been almost tripled since Pearl Harbor, so Carco Hoists are still available for war-essential jobs.

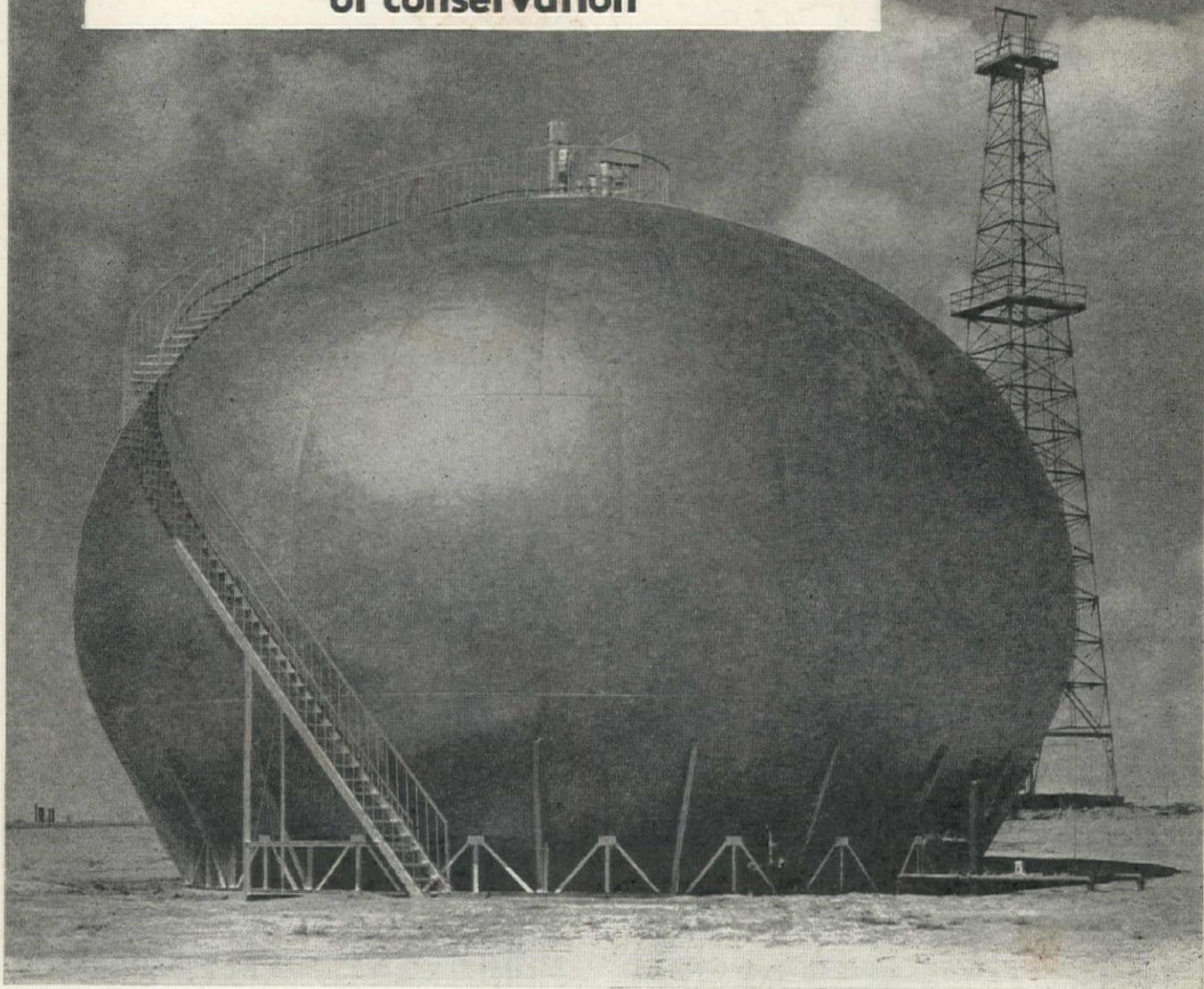
PACIFIC CAR AND FOUNDRY COMPANY

SEATTLE 4, WASHINGTON

Carco's "know-how" and production are going (in whole or part) into: bridges, hoists, cargo ships, corvettes, cranes, aircraft carriers, lighters, mine sweepers, gun emplacements, yarders, power line equipment, aircraft, railroad equipment, structural steel, logging equipment, motor coaches, diesel engines, machine guns, dry docks, steel castings, seaplane tenders, trucks.

HORTONSPHEROIDS

....a part of today's program
of conservation



THESE pressure vessels fit in perfectly with the nation's program of conservation. To attain maximum production of aviation gasoline, synthetic rubber and other vital war products, it is essential to eliminate or *reduce to a minimum* evaporation losses during the handling and storing of the component volatiles. Experience has proven that the use of pressure storage is one of the most efficient methods available for preventing these evaporation losses as well as deterioration of the products stored.

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which Hortonspheroids operate, they are ideally suited to the storing of many diversified products. A product stored in these vessels will not evaporate as long as the vapor pressure does not exceed the operating pressure for which the tank is designed.

Hortonspheroids are built in capacities of 2,500 to 40,000 bbls. for pressures up to 35 lbs. per sq. in., and in capacities up to 120,000 bbls. for pressures of $2\frac{1}{2}$ to 20 lbs. per sq. in.

The Hortonspheroid shown has a capacity of 20,000 bbls. and was designed for 20 lbs. per sq. in. pressure.

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WESTERN CONSTRUCTION NEWS

May, 1944

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

Vol. 19, No. 5

J. M. SERVER, JR. Editor
W. A. DAVIS Assistant Editor
ARNOLD KRUCKMAN Associate Editor
A. H. GRAHAM Field Editor

Bad Fire Record in the West

THE CITY OF HARTFORD, Connecticut, was named the 1943 winner in a National Fire Safety Contest conducted by the National Fire Waste Council.

Western cities were noticeable by their absence in the list of awards in the contest. In Class 1, population over 500,000, no western city was included in the eight winners. In Class 2, population between 250,000 and 500,000, San Antonio, Texas, was sixth on the list, and no other western city is named.

In Class 3, population 100,000 to 250,000, Spokane, Washington, was fifth; Sacramento, California, was eighth; and Berkeley, California, was tenth. In Class 4, population 50,000 to 100,000, not a single western city received an award. In Class 5, population 20,000 to 50,000, again not a single western city was named.

In Class 6, population less than 20,000, the winner was Fort Collins, Colorado; Port Angeles, Washington, was second; Raton, New Mexico, was eighth among the winners in this group.

Undoubtedly, western cities can point to rapidly growing fire hazards brought about by war expansion, to fire departments depleted by manpower demands, to limited water supplies, to shortages of equipment. Yet it seems to this editor that similar handicaps must have been encountered by many of the eastern cities that placed high in this contest. Thus, the recognition accorded them signifies good fire prevention and good fire control.

This unenviable western record is reflected in higher fire insurance rates, destruction of war-vital supplies, and loss of important time which might result in serious consequences at the battlefield.

Western Construction News calls for improvements all along the line in the governing of fire hazards. Employee education campaigns should be instituted more widely in manufacturing and other plants. Inspection of fire hazards should be more frequent. Community organization for fire prevention should be established. More rigid building and fire prevention codes should be framed by western cities; and building inspectors should be more diligent in seeing that the code provisions are complied with. Firemen and fire safety employees should be appointed wherever fire hazards exist.

The West is the nation's coming industrial area. It must not be held back by obsolete fire fighting methods or equipment which will result in a continuation of this regrettable 1943 fire loss record.

Construction Temporarily Better

THE VOLUME OF CONSTRUCTION, nationally and in the West, has been in a steady decline since August, 1942—the national figure for February, 1944, being only about 20 per cent of that for the record month. The reasons are of course obvious. With private construction still hindered by lack of critical materials and manpower, and with the military establishment now nearly complete, it is natural that the dollar volume of construction should be reduced. The percentage of reduction in the western states has been somewhat less marked than the national figure.

A note of optimism has been sounded for the immediate

future in the passage of the 32 billion dollar Naval bill by Congress, along with several other smaller Naval appropriations and the continued expansion of western reclamation facilities.

Some large naval projects have been instituted along the Pacific Coast in recent months. These include a depot at Seal Beach, California, an ordnance testing ground at Inyokern, California, and expansion of facilities at Farragut, Idaho, Seattle, Washington, San Diego, and the San Francisco Bay area in California.

As a result, engineers and contractors are again very busy. It must not be anticipated, however, that this upsurge of work will continue for any great length of time. The construction industry may well be building its fences for the postwar period.

Planning Is Inadequate

STARTING WITH the February issue of *Western Construction News* an attempt was made to tabulate the postwar projects proposed for the western states, and the proposals of one of the states was to be considered each month. February was devoted to Arizona; March to California; April to Colorado. Were this program to continue, Idaho would be considered in this issue.

However, in making these compilations it was found that the amount of real postwar construction planning is so tiny when compared with the magnitude of the problem facing the nation at the conclusion of hostilities that our staff has become discouraged with the effort. In many cases agencies which should have comprehensive programs well underway declined to reply to the request for information. And in many more cases, the lists of proposed projects were mere tabulations of desirable improvements in the city or other geographical unit. It may be seen, then, that attempts by this or any other publication or organization to arrive at a satisfactory total of construction available when peace comes is little short of ridiculous.

Therefore, such tabulation will not be continued in *Western Construction News* until really comprehensive planning is undertaken on a far wider scale than at present.

For a lucid review of the post-war planning problem, the reader is referred to the article on Page 77, prepared by Rex L. Nicholson, managing director of Builders of The West. This article should be read by every engineer and official who has any responsibility for planning.

The problem is tremendously greater than merely finding desirable projects; and it must be approached from the standpoint of permanent and enduring value to the community rather than from the standpoint of merely furnishing stop-gap employment. Plans and specifications must be drawn and ready to submit for bidding when hostilities cease. Obviously, bids cannot be called unless needed rights-of-way have been secured and the method of financing determined.

The construction industry has always been noted for its ingenuity and ability to succeed when others have predicted failure. At the present moment this editor, basing his opinion on the reports received from the three states named above, sees failure and depression facing the returning soldier in the western states.

However, he is still confident that the qualities ascribed to the engineers, contractors and manufacturers who compose the construction industry will meet the challenge. Builders of The West is a splendid beginning step; and its proposal to coordinate the construction field with agriculture, industry, labor and government—the four factors which influence American progress—bids fair to establish it as the over-all leader of postwar planning in the West.

IN WAR as in PEACE



A far cry from the landing fields and construction jobs of peacetime U. S. A., but the same reliable A-W Badger Crane; "99-M" All-Wheel Drive, All-Wheel Steer Power Grader, and variable weight Tandem Roller, helping the Seabees do their magnificent job of building air bases ever closer to Tokyo.

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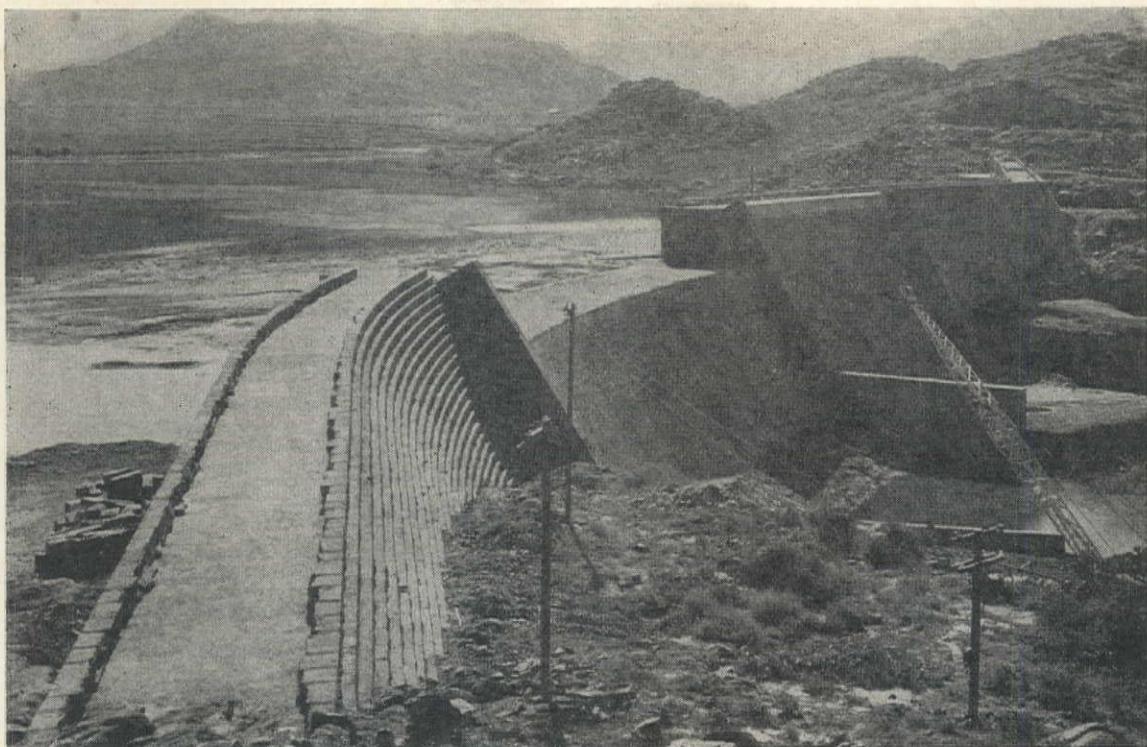
Reno, Nevada

Portland 14, Oregon

Salt Lake City 13, Utah

Seattle, Washington

Cheyenne, Wyoming



Masonry-Faced Dam— First Stage of Altus Dam Completed

Reclamation and water supply structure in Oklahoma only partially built because of critical material shortage—Center of very lean concrete and facing of masonry are principal features of new structure—Because of limited suitable site an existing Ambursen dam had to be removed before present structure could be built

THE COMPLETION of the first stage construction of Altus Dam in southwestern Oklahoma has concluded the initial step leading to the ultimate establishment of the first irrigation project in this semi-arid portion of the state. The dam, located on the North Fork of the Red River, will eventually provide a storage of 163,000 ac. ft. to be allocated to irrigation, flood control and a domestic water supply for the nearby City of Altus. Completion of the dam was deferred by a War Production Board limitation order restricting the height to that necessary for relief of a critical water shortage facing the City of Altus and adjacent military installations.

General description

As early as 1902 the need for irriga-

By WAYNE S. BYRNE
Field Engineer, Bureau of Reclamation
Altus, Oklahoma

tion in this region was recognized. Extensive engineering and economic reports were made by various agencies whose recommendations were periodically reviewed and extended until the approval for construction was granted in 1940. The project as finally approved provided for the supplemental irrigation of some 70,000 ac. of land lying almost entirely within the boundaries of Jackson County. Most of this land is now under cultivation by dry-farming methods but is subject to drouth as well as a deficiency in moisture in normal years during critical periods of the growing

season. In addition to the irrigation features of the project, considerable impetus was given the final decision and approval by the rapidly decreasing water supply storage facilities for the City of Altus, county seat. Also, flood control on the North Fork of the Red River was considered highly desirable because of the sudden flash floods occurring during the spring and fall with peak flows of as much as 30,000 c.f.s.

The ultimate reservoir development includes, in addition to the dam, two highway and two railroad relocations, 3 mi. of compacted earth-fill dikes, relocation of power and telephone lines, and the relocation of power, water and sewage facilities of the Oklahoma State Reformatory. The storage system as a unit requires approximately 1,750,000 cu. yd. of common and 300,000 cu. yd. of rock excavation, and is at present approximately 75 per cent complete. The distribution system will consist of 4.4 mi. of main canal of 1,000 c.f.s. capacity and over 300 mi. of smaller canals and laterals. Construction of this feature has been deferred until such time as critical materials are available.

The finding of feasibility on the project was approved on February 13, 1941, subject to the condition that non-reimbursable flood control funds be pro-

vided, and that the Work Projects Administration, or a similar agency, participate also on a non-reimbursable basis. The balance or approximately 55 per cent of the total cost was to be borne by the City of Altus and the local irrigation district water users. Participation by W. P. A. was confined chiefly to furnishing labor and small tools, and extended only to October 15, 1942, when impending liquidation forced this agency to withdraw.

War status

The declaration of war found project construction forces at work on the highway and railroad relocations with the reservoir dikes approximately 90 per cent complete. Two of these units, State Highway 44 and the A. T. & S. F. Ry., were eventually completed by the reconstruction of State Highway 9 and the C. R. I. & P. Ry. was carried only far enough to prevent damage to the partly completed work during an indefinite suspension period.

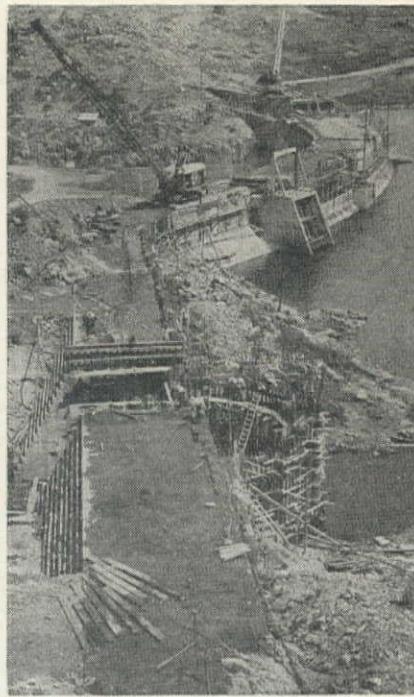
In May, 1942, the War Department announced its intention to build a large twin-engine, advanced flying school near the outskirts of Altus. The additional demand of such an installation on the city water supply prompted the Bureau at the request of the city, to apply for a priority rating on such materials as would be required to complete the dam and storage system excluding all irrigation features. Such a rating was granted in June, 1942, and work was begun on the dam in July.

On October 20, 1942, the W. P. B. issued a stop order halting all construction on the project and this order was not rescinded until December 8, 1942, after a showing had been made of the vital necessity of materially increasing the city's water supply storage facilities. The stop order was modified to permit construction of the dam to continue but limiting the height to that necessary to provide an adequate water supply for the City of Altus and adjacent military installations.

Design of dam

Altus Dam is a curved, gravity type structure with a crest length of 1,100 ft. and a maximum height of 100 ft. The river bed portion of the dam is designed on a radius of 487 ft. ending in a reverse curve of 50-ft. radius on the left abutment. Extensions of both right and left abutments are tangent sections. The site is the same as that of an Ambursen type dam built by the City of Altus in 1927, and because of the limited space on the foundation it was necessary to place the upstream face of the new dam just 15 in. from the axis of the old dam at crest elevation.

The surface of the overflow-type spillway is divided into two sections by three concrete training walls extending from the toe of the dam to the piers on the crest. The controlled portion of the spillway will have a crest elevation of 1,547 and a maximum discharge capacity of 54,000 c.f.s. The uncontrolled spillway will have a crest elevation of 1,559 and a maximum discharge capacity of 6,000 c.f.s. Ultimately nine 21 x 15-ft. radial



THE CANAL OUTLET trashrack structure during construction. The river was diverted through this opening during the early stages of construction, and the trashrack was used as a closure structure as the work on the dam progressed.

gates will be installed on the spillway to provide storage up to the normal water surface elevation of 1,559. These gates will be operated from a bridge on top of the spillway piers.

The dam was originally designed as a stone masonry structure throughout, the stone to be quarried from one of the low granite hills near the damsite. However, it developed that the labor supply was not sufficient and it was subsequently decided to eliminate the stone masonry except as a facing. In place of the stone interior it was planned to use a lean, mass concrete in which approximately 30 per cent by weight of the normal cement content was replaced by an equal volume of pumicite. All exposed concrete surfaces had a minimum thickness of 3 ft. of concrete containing the normal amount of cement.

The entire upstream face and the downstream face of both abutments were constructed of face masonry laid in approximately 20-in. courses, but the surface of the spillway was formed for a 3-ft. layer of rich concrete. The slope of the downstream face in both the spillway and abutments is 0.6 to 1.0 and the upstream face varies from a batter of 0.1 and 1.0 to vertical, depending on the height of the section. The lower portions of the right and left training walls, only one of which was completed, will be gravity type, and built of the same masonry as the abutments, but the lower intermediate training wall is built of concrete.

Construction plan

The plan of construction of the dam is unusual in that only four radial contraction joints are provided; one at each end of the spillway section, and

one on either side of the canal outlet control works. Each joint is provided with an asphalt seal and with provisions for reliquefying the asphalt as the need arises. In order to minimize cracking between the contraction joints, the concrete was to be placed in 20-in. lifts, conforming to the height of one course of masonry, and was to be placed during the winter months using a low-heat cement. Unfortunately, delays made it necessary to place about 50 per cent of the concrete during the summer months, and wartime restrictions governing cement production necessitated the substitution of modified cement for low heat. A minimum of 72 hours was allowed between lifts and accelerated cooling was effected by evaporation through keeping the exposed surfaces of each lift constantly damp.

One 36-in. river outlet is located in each spillway at El. 1490.5, controlled by the usual type slide gate and hand-operated gate hoist. Each outlet will have a maximum discharge capacity of 425 c.f.s. at the normal head-water elevation. The canal outlet control works will consist of three 72-in. steel conduits controlled by three 5 x 5-ft. high pressure slide gates capable of discharging a total of 1000 c.f.s. into a stilling basin at the head of the proposed main canal. Emergency bulkhead gates will be installed between the upstream face of the dam and the trashrack structure.

The original Altus reservoir had been rendered practically useless through 17 years' accumulation of river silt, the average elevation of the silt beds being only 5 ft. from the crest elevation of 1515. The storage capacity was estimated to be about 700 ac. ft. Under the provisions of the limitation order issued by WPB the controlled spillway was built to elevation 1523.6 and the uncontrolled spillway and abutment sections were raised to El. 1543. The capacity of the new reservoir thus formed is approximately 11,000 ac. ft. or less than 7 per cent of the ultimate capacity. However, out of a total of 66,000 cu. yd. of concrete and masonry required for the completed structure a total of 53,000 cu. yd. or 80 per cent has been placed in the initial construction.

Diversion and care of the river

Diversion of the river during construction was accomplished by means of a channel excavated partly through rock and partly in sand from the site of the canal outlet works in the left abutment to a point about 500 ft. downstream from the dam. The bottom grade at the inlet end of the channel was set at El. 1510, giving a maximum discharge capacity of 5000 c.f.s. with a head of 10 ft. The old dam served as the upstream cofferdam and to obtain the maximum freeboard, timber flashboards were erected on the crest to El. 1520.

The downstream cofferdam was constructed of earth and rockfill. The entire area downstream of the old dam was covered by river silt released through the sluice gates during a low water period. This silt was as much as 50 ft. deep in places and the surface was dry and covered by heavy vegeta-

tion. Beginning from the river bank a dragline was used to excavate the silt until it became "soupy." The dragline was then withdrawn and the earth and rockfill end-dumped into the "soup" until a solid foundation was reached. The river silt cast on the downstream side of the cofferdam served as an effective seal against seepage.

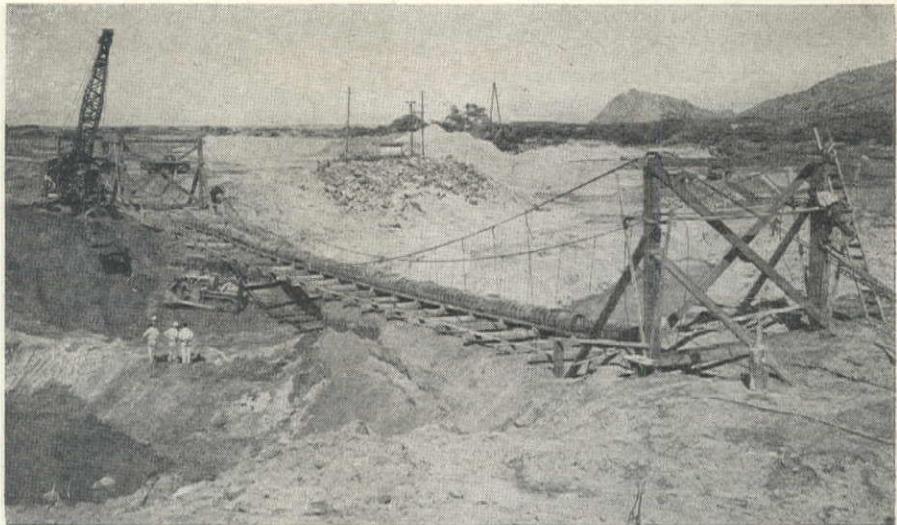
At the lower end of the diversion channel, where the entire cut was in sand, it intersected the City of Altus' 24-in. wood-stave water main. The line crossed the channel at an angle, making a total span of 182 ft. The pipe was excavated to bottom level prior to removing this section of the channel and 6 x 8-in. supporting timbers driven beneath the pipe on 6-ft. centers. Heavy timber towers were erected at either end equipped with shopmade saddles on rollers at each point of suspension, and two $\frac{7}{8}$ -in. 6 x 7 guy strand cables were strung on each side. Hanger cables, cut to the correct length, were attached to the supports by means of eye bolts and to the suspension cables with cable clamps. When the hangers were made fast the entire load was lifted by means of turn buckles in the suspension cables. After the load had been held satisfactorily for a time and adjustments made for elongation in the cables, the excavation beneath the pipe was completed with a bulldozer and dragline working in conjunction.

Demolition of old dam

The rather limited area of the foundation rock below the old Altus Dam made it necessary to remove the downstream apron and buttresses to a point within 15 in. of the axis. Line drilling and light shots with dynamite and black powder proved too slow and costly. Drop hammers and other heavy steel objects operated by a crane were tried but the slope of the apron caused them to slide off the surface, endangering the crane boom. The next method tried was the use of a large granite rock, about 1 cu. yd. in size, that had been used at the end of a heavy chain to drag rip rap slopes and had been worn to a "pear" shape. A hole previously drilled through the rock provided a place for a sling by which it was attached to the drop cable on the crane. The abrasive surface of the granite did not allow the rock to slip when dropped on the sloping apron and the result was a remarkably shattering effect on the concrete. Two of these stones were used to demolish the entire 2,000 cu. yd. of concrete at a cost of less than 50 per cent of the original estimate. The stone hammer shattered the concrete so effectively that over 40,000 lb. of reinforcing steel in the apron slabs was salvaged for reuse in the new dam.

Foundation cleanup and grouting

The most difficult task in the cleanup of the foundation was the removal of over 14,000 cu. yd. of river silt deposited at the toe of the new dam and overlying the entire river bed portion of the foundation. The top few feet, which had partly dried, was removed by a dragline, after which a mud pump mounted on a

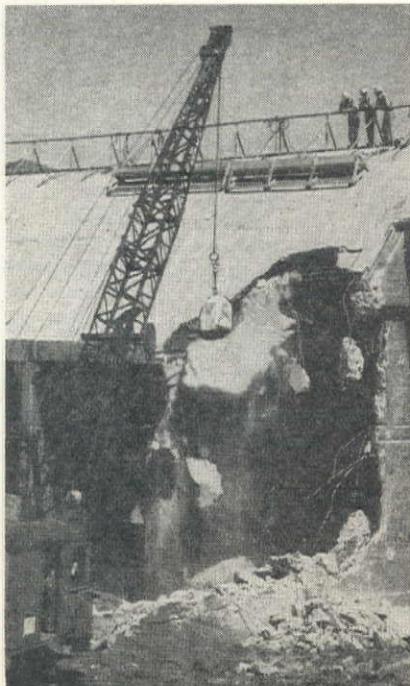


THE RIVER DIVERSION canal was not completed under a City of Altus 24-in. wood stave water supply line until the pipe had been lifted by turnbuckles in suspension cables supported on temporary timber towers. Material removed was deposited silt.

barge was used to pump the silt and water into the river. The slope of the foundation was downstream, dropping away abruptly beyond the end of the new spillway apron location to form a natural sump. Final cleanup of the surface was accomplished by means of high pressure air-water jets which washed the mud into the sump. The entire surface of the foundation was water-worn in large crevices and pot-holes, the latter varying from a few inches to 15 ft. in diameter.

Rock excavation was, in general, necessary only to provide the proper thickness of concrete in the spillway apron. Some unsound rock was present on the

DEMOLITION of the old dam was accomplished by swinging a worn granite block. This so completely broke up the old concrete that most of the reinforcing steel was salvaged. Ordinary drop hammers proved ineffective because of slope.



surface and in the water-worn crevices but only surface treatment was required for its removal. Much of the surface in the river bed proper was worn so smooth that it required some degree of roughening to insure adequate bond with the concrete. To accomplish this, four-pointed surfacing chisels were made to fit plug drills and the surface in question was thoroughly scarred without removing any great amount of the rock. This same method was used on the small portion of the buttresses of the old dam that extended into the concrete of the new dam at the upstream toe. Because of the high cost of diamond drilling in the granite rock of the foundation, it was planned to complete, prior to concrete placing, all drilling for grouting and drainage with wagon-mounted percussion drills. Briefly the grout holes consisted of the following: one "A" line above El. 1490 with holes 10 ft. apart and 25 ft. deep, one "A" line below El. 1490 with holes 10 ft. apart and 40 ft. deep plus two "B" lines with holes 15 ft. apart and 20 ft. deep.

Grouting was begun on the abutments while the excavation and cleanup was in progress in the river bed. All holes were grouted in stages of 10 ft. each at a maximum pressure of 200 p.s.i., subject to first testing with water. If the water "take" was less than one cu. ft. in five minutes at maximum pressure, that particular stage was declared tight. If the "take" was greater, the stage was grouted starting with a 10:1 mixture of water and cement and gradually decreasing the water if necessary until all leaks were sealed or the hole refused grout at maximum pressure.

Because of delays in construction progress and the fear of impending spring floods it was necessary to continue grouting in the river bed while concrete placing was in progress in the spillway apron. However, a grout leak broke out in a section of freshly placed concrete more than 50 ft. from a hole early in the program and, for fear of further damage, the grouting below El. 1490 was deferred until the dam was

completed and operations could be carried on from the gallery.

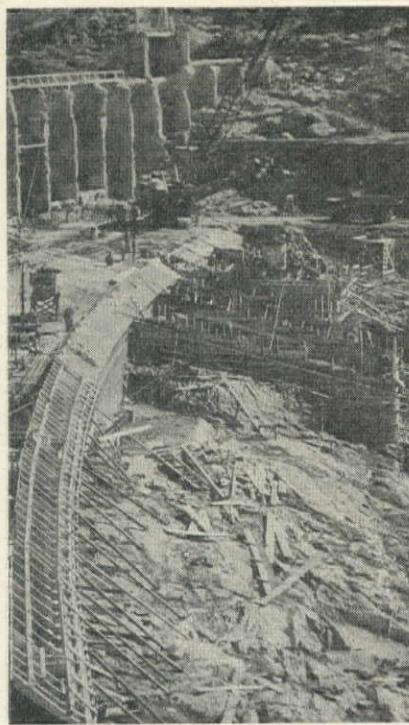
Concrete materials and manufacturing

Coarse aggregates for concrete were produced in a dry-type crushing and screening plant, capable of producing an average of 60 cu. yd. per hr. Broken granite from the Santa Fe Railway excavation was dropped on a stationary grizzly with rails set at 12 in. The material passing through the bars fell into a truck and the reject was stockpiled for future use as riprap. The minus 12-in. material was then hauled to a receiving hopper at the plant from which it was fed, by a chain feeder into a 5 x 20-ft. trommel screen. The trommel first removed all material passing the 3-in. opening and second the 3 in. to 6 in. fraction. The latter was conveyed to a loading bin below the plant. The 6 to 12-in. material was ejected from the end of the trommel into a 12 x 36-in. gyratory crusher set to produce 3-in. maximum material, which joined the minus 3-in. rock from the screen and dropped to the upper deck of a 4 x 10-ft. shaker screen. The shaker screen separated the material into 1½ to 3-in., ¾ to 1½-in. and 0 to ¾-in. sizes which were conveyed directly to loading bins. Excess 1½ to 3-in. material was diverted to jaw crushers for recrushing and returned to the shaker screen by means of a bucket elevator.

The 0-¾-in. material was hauled from the crushing plant to the raw feed stockpile at a small screening and washing plant located on the river bank just below the dam. Here natural sand taken from the river bed was blended with the crushed material as it was dozed into a hopper from which it was fed to a conveyor belt by means of a small apron-type feeder. This plant was capable of producing a maximum of 25 cu. yd. per hour of washed blended sand and washed fine gravel. The sand was stockpiled near the batching plant and the fine gravel was hauled to the coarse aggregate stockpiles.

The pumicite used in the lean, interior concrete was mined from a pit 17 mi. from the damsite and hauled to the batching plant in a 13 cu. yd. bottom dump truck equipped with sideboards to increase the capacity to 20 cu. yd. Pumicite is an inert material of about the same fineness as cement. Being slightly damp, it was easily dozed into a feeder hopper and loaded into the truck by a small conveyor belt. Approximately 100 tons of this material was hauled per month during the peak of construction. The total unit cost of the pumicite was \$0.26 per cu. yd. of concrete as compared to \$0.93, the cost of the cement replaced.

The batching and mixing plants were what might be termed of the "Joe McGee" variety. Only one new piece of equipment, a 2 cu. yd. stationary, tilting-type concrete mixer, purchased prior to Pearl Harbor, was on hand when plant construction was begun. Two used, three-compartment steel bins were set up side by side over a second-hand, 24-in. x 135-ft. conveyor belt extending to a charging hopper in



FOUNDATION SPACE at Altus dam was very limited. In the background is the partially demolished old structure and, foreground, the steeply sloping rock.

the mixing plant. To one side a guy derrick, removed from the quarry, equipped with a 100-ft. boom and clamshell bucket was so situated that all bins could be filled from the stockpiles. On the opposite side of the batching bins a barracks building, moved from an abandoned C. C. C. camp for cement storage, was installed on a fill high

Type of Concrete	Cement to Aggregate by Weight	Net w/c by weight	Cement Content bbl./cu. yd.	Average 28-Day Unit Strength p.s.i.
6 -in. max size lean	1 : 13.32	0.93	0.69	2150
6 -in. max. size rich	1 : 8.60	0.59	1.05	4180
3 -in. max. size	1 : 7.30	0.57	1.18	4150
1½-in. max. size	1 : 5.60	0.56	1.50	4250
¾-in. max. size	1 : 5.00	0.56	1.62	4390

PUMICITE was hauled 17 mi. by truck and was used in the lean mix concrete for the central part of the dam, replacing about 30 per cent of the cement normally used.



enough to permit the loading platform to be extended to the batcher floor. Cement in paper bags was moved by hand truck to a small hopper directly over the main conveyor belt. Pumicite was added at this same hopper after being weighed on platform scales on the opposite side of the belt.

The aggregates were batched by hand in weigh hoppers suspended below the storage bins. The mixing cycle occurred as follows: upon a signal from the mixing plant operator, the material in the weigh bins was fed to the conveyor belt manually, in ribbon formation, the fine gravel overlying the coarse and the cement and pumicite distributed over the fine gravel and sand. Water was added at the mixing plant in the usual manner through an automatic meter and all batches were mixed a minimum of 1½ min., after which they were dumped into a 6 cu. yd. shop-built receiving hopper suspended over a roadway. An air-operated hopper door, activated by a cylinder and ram taken from a salvaged dump truck, fed the concrete into bottom dump buckets which were hauled by truck from the plant to the point of placement.

The maximum sustained production during concrete placing was 320 cu. yd. over a 6-hr. period and the highest hourly production was 64 cu. yd. Normally the plant operated at a rate of about 250 cu. yd. per 8-hr. shift. The workability of the concrete was good considering that 65 per cent of the aggregates were crushed and also that the bulk of the concrete contained only 0.69 bbl. of cement and was placed at 1½ to 2-in. slump at the forms.

The mixes used during construction were essentially as given below:

Concrete handling and placing

The problem of placing concrete in the dam could easily have been solved by the use of a cableway; however, due to the curves in the alignment and the overall length of the structure, a cableway installation would have been far too costly for the amount of concrete involved. In addition, the first 18 months' work on the project having been almost entirely confined to earth and rock excavation, there remained a considerable investment in earth-handling equipment which necessarily required that it be used in preference to other machinery even if it had been available.

A plan was therefore devised whereby using a system of ramps and a maximum of three cranes, both the concrete and masonry could be placed continuously and without delay or interference. Because of the general profile of the foundation, and the inaccessibility of certain sections, the dam was divided, for the purposes of placing activities, as follows:

(1) That portion of the left abutment on the left side of the diversion channel, to be served by a ramp paralleling the channel.

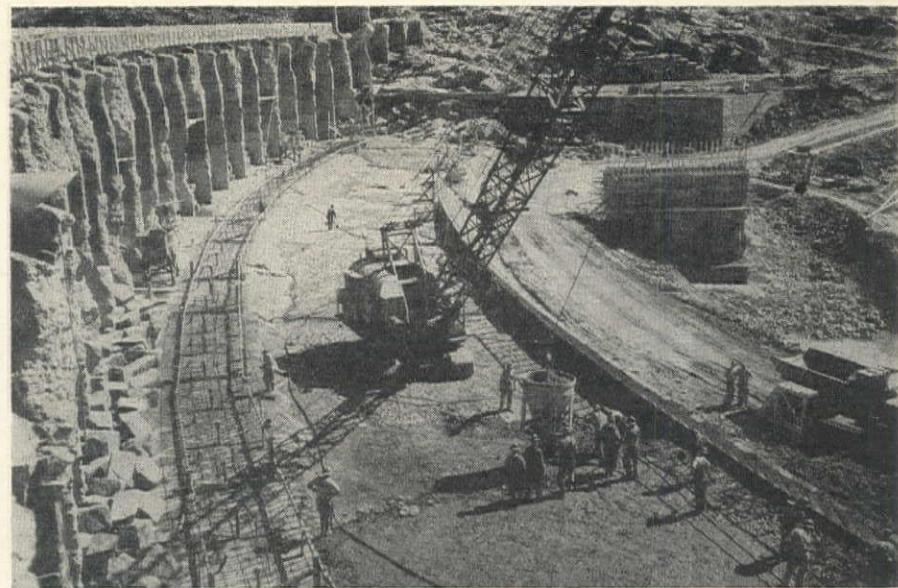
(2) That portion of the left abutment between the diversion channel and the spillway section, to be served by two ramps at different levels.

(3) The spillway section, to be served by a ramp originating at one end of the cofferdam and traversing the full length of the spillway apron (after it had been completed), returning to the opposite end of the cofferdam.

(4) The right abutment, which could be reached up as far as El. 1523.6 from the spillway ramp, but beyond that elevation required approximately a mile of haul on the right bank of the river to a ramp located on the upstream face of this section.

The actual placing methods were essentially the same in all sections of the dam. The concrete, with few exceptions, was placed during the two night shifts while the day shift was used to place masonry and perform the necessary form building and raising. In the spillway section, a concrete strip was first placed along the downstream toe of the dam proper about 30 ft. wide. A 2½-cu. yd. dragline crane equipped with a 90-ft. boom then was moved up on the concrete on timber mats from which point the spillway apron and the entire river bed section of the foundation became accessible. After the concrete in the apron was placed it was covered by an earth ramp to provide a thoroughfare, thereby making it possible for trucks to be spotted directly beneath the boom of the crane on the dam.

Concrete placing in the spillway section began at one abutment, or contraction joint, and proceeded along the axis the full width of the section to approximately the halfway point between the abutments. A construction joint was formed here by sloping the concrete off at about 3 : 1. During the early part of the construction period, covering this area with the predetermined



CONCRETE PLACING in the lower portion of the dam. The concrete was hauled in buckets by truck, then moved to position by crane. It was poured in 20-in. lifts. An access ramp crosses the completed spillway apron. Background, buttresses of old dam.

20-in. lift amounted to approximately 600 cu. yd. or at least two shifts' work. The next day the process was repeated beginning at the opposite abutment. At the end of the required 72-hr. period between lifts the same process was repeated, but meanwhile concrete placing continued on another portion of the dam in the same manner so that a continuous operation was maintained. In 153 calendar days the dam rose 71 ft., or an average of 1.4 ft. every 72 hours, and beginning in April, 1943, concrete was placed in the dam every day for 90 consecutive days without a breakdown.

Concrete was transported to the dam in bottom dump buckets and vibrated into place by means of 5-in. electric internal concrete vibrators. The 20-in. lift was placed in two overlapping layers, first because of the better job of placing obtained and second in order to keep the exposed face of the lift constantly alive. As the concrete approached the spillway forms a 3-ft. space between the lean concrete and the forms was left to be filled by periodic batches of rich concrete dispatched from the mixing plant for that purpose.

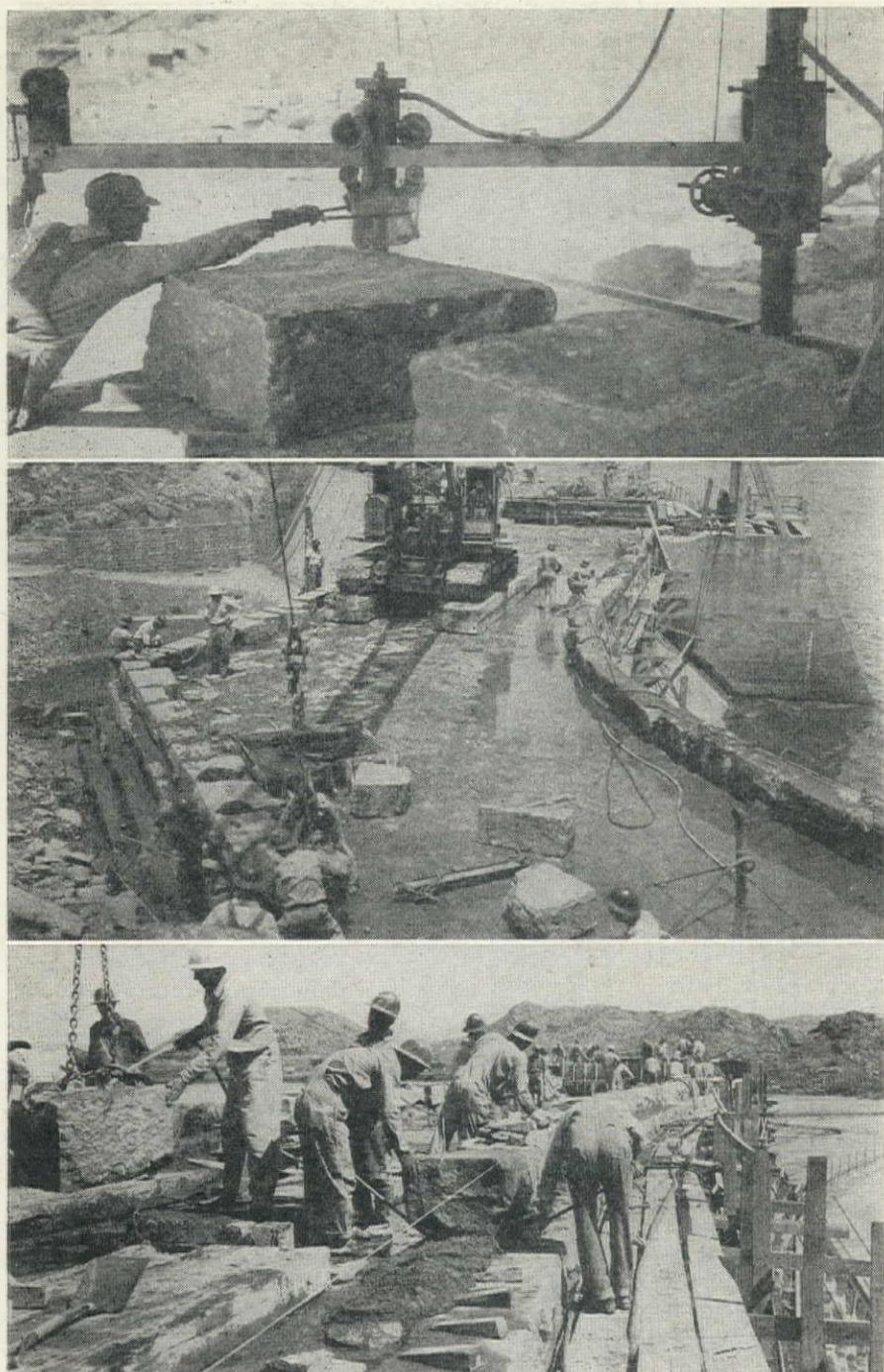
Transportation of the concrete from the plant to the point of placement was first accomplished in dump trucks each hauling one bucket. This method was used until the ramps could be widened enough to permit larger vehicles to turn and trucks with semi-trailers were then tried, each hauling two 2-cu. yd. buckets. Trouble with transmission breakdowns and the fact that these machines were slow prompted the use of two and sometimes three 13-cu. yd. bottom dump trucks which had been idle since completion of the earth work. The dump doors were locked and timber mats placed on them to prevent any damage from the buckets. These trucks proved to be ideal for hauling two concrete buckets since the location of the various ramps made both speed and maneuverability necessary.

Masonry handling and placing

Masonry in the dam was placed by the same handling equipment as the concrete. The stone was hauled from the quarry stockpile to the dam both in dump trucks and on 20-ton semi-trailers. As the height of the dam increased, two large steel pans were employed on the trailers each capable of holding about 2½ cu. yd. of stone and by means of chain slings could be lifted to the working area, dumped and returned to the trailer, a procedure which saved much time.

As mentioned previously, the placing of masonry was carried on during the day shift with as many as three cranes at one time. Stone stockpiled along the downstream face of the dam plus the constant hauling with the 20-ton trailers assured the three masonry crews of sufficient patterns at all times. Only one course of stone was set on the downstream face prior to placing concrete because of the offset necessary to obtain the 0.6 to 1 slope, but several courses were sometimes laid ahead on the nearly vertical upstream face. As each course was placed, leaded points on the line were located in the rock surface from which the masons might set a string to maintain the exact line of the course. The upstream face in the spillway section was built in chords from center-line to center-line of the piers and the curves in the abutments were built on chord lengths of 5 ft. The maximum spacing of headers was 5 ft., horizontally and vertically.

The surface for a masonry course was prepared first by washing and if necessary scrubbing with a wire broom prior to shoveling the mortar in place. With an excess of mortar heaped near the center of the bed, the stone to be placed was lifted by the crane and a high pressure water jet used to clean all surfaces of dirt or other foreign material. Wooden wedges were placed in position to effect the proper joint thickness and the stone carefully lowered into place. As the



MASONRY PLACING at Altus Dam. **TOP**, the beds of the granite facing were reduced by a surfacing machine to obtain a 2-in. joint; surfacing time varied from 5 to 15 min. **CENTER**, the blocks were set by crane after thorough cleaning. **BOTTOM**, wooden wedges were placed so as to assure proper joint thickness. The back side of block was supported on spalls, an excess deposit of mortar assured well-filled joint.

mortar and wedges took the weight of the stone the hooks were disengaged and two men with bars settled the stone in place in proper alignment while the crane picked up another stone. Meanwhile two men were following with mortar trowels to fill the vertical joints and do the initial pointing. A short time later, after the initial set had taken place, the wedges were removed and the joint again pointed, followed by "wiping" the joint with burlap or a wire brush to remove the rough edges and give a neat, uniform appearance.

The mortar used consisted of one part of cement to three parts of sand and, at the proper consistency of about 1½-in.

slump, the water-cement ratio varied between 0.52 and 0.55 by weight. To reduce the inherent harshness of the crushed particles in the sand, 0.1 part by weight of pumicite was added, resulting in a "fat" workable mortar.

Construction joints

Construction joint cleanup was accomplished by a moderate cut on the concrete surface with an air-water jet from 6 to 10 hours after placing. In order to save the expense of drains into the gallery, sumps were formed in each lift close to the upstream face from which the cleanup water and tailings could be pumped by means of an air-operated

sump pump. If the surface was to be left longer than the usual 72 hours or if there was a possibility of it being subject to sharp temperature changes, a covering of damp sand was placed immediately after cleanup. Otherwise the surface was kept continuously wet by sprinkling and frequent washings with an air-water jet. Before placing another lift of concrete a final cleanup was performed with a high velocity air-water jet and wet sand-cement grout was broomed into the surface to insure the proper bond between lifts.

Curing except in a few isolated instances, was maintained by perforated pipes and continuous sprinkling. The spillway face, training walls and other exposed surfaces were kept wet by means of perforated pipe attached to the forms. Masonry courses were covered with burlap immediately after the final pointing and held in place by a system of perforated pipes, the water from which drained down the outside of the stone and served to keep the masonry wet on the entire exposed face.

Canal outlet control works

All irrigation features of the dam were deferred until some later date in accordance with the limitations set by W. P. B. Therefore, in order to permit water storage to El. 1523.6 and also to eliminate the expense of a temporary closure structure, the canal outlet trashrack structure was carried to completion.

During a period of low flow in the diversion channel, a sack dam was thrown across the inlet end and the downstream face covered with rock so that overtopping would not wash it away. The forms for the base were then set and the concrete placed in the floor slab up to El. 1514.

The superstructure was semi-circular in shape and built on chords of approximately 11 ft. At the intersections of the chords a pier was located, slotted on two sides to hold the trashrack metal work, and supported by intermediate beams and a top slab. Wherever possible, reclaimed oil field sucker rod was used for reinforcing steel as was done in all reinforced concrete in the dam. Concrete in the superstructure was placed by means of a crane located on the dam and the same 2 cu. yd. concrete buckets equipped with a suspended hopper and a canvas "sock." Concrete stoplogs cast with cable slings were placed in the trashrack slots up to El. 1526 and the joints sealed with oakum.

River outlet gates

The two 36-in. steel outlet pipes installed at El. 1490.5 are controlled by a standard type slide gate to be actuated by hand operated hoists. The trashrack structures consisted of two vertical slotted walls extending upstream 5 ft. 11 in. from the upstream face. To complete these walls to El. 1520, the upstream face of the old dam had to be cut away to El. 1508 which was two feet lower than the lowest point in the diversion channel inlet. Since both river outlets were located between buttresses of the old dam a number of dowel holes were drilled through the upstream face.

slab and down into the buttress on either side of the trashracks. Dowel steel was grouted into place and forms for walls similar to those of the regular trashrack structure were placed over the steel on the sloping upstream face of the old dam. These walls were then brought up to El. 1520. When the proper concrete strength had developed, timber stoplogs were placed in the slots and sealed first by caulking the large leaks with oakum and then breaking bags of fine cinders several feet beneath the water on the reservoir side. The silt in the water, in combination with the cinders, sealed the enclosure in a few hours, thus making possible the removal of the concrete in the upstream face of the old dam.

Temporary arrangements necessarily had to be made to install the gate hoists on the uncompleted top surface of the dam. Since it would be impossible to operate the hoist from the controlled spillway (El. 1523.6) the gate stem was brought up to El. 1520 and provisions made to raise or lower the gate by means of a temporary chain hoist and hydraulic jack, should this ever become necessary. The other gate hoist located on the uncontrolled spillway (El. 1543) was placed on a temporary operating platform built of reinforced concrete and extending out over the center of the gate stem.

100-mi. British Columbia Road Link Is Nearing Completion

NEARING COMPLETION in British Columbia is the Prince Rupert-Terrace-Cedarvale Highway. It is being built by the Department of Mines and Resources for National Defence authorities with the purpose of connecting Prince Rupert with the Highway system of British Columbia.

The road follows the north side of the Skeena River and involves the construction of approximately 100 mi. of highway. It is being put through under very considerable difficulties, as at many points steep mountain slopes extend into the river and little ground is available for construction. The highway is located in the heavy rain and snow belt, which has further increased the problems and aggravated the labor situation.

Existence of the Canadian National Railway line to Prince Rupert on the north side of the Skeena River means that much of the limited terrain suitable for highway construction was already occupied. The work required a large amount of solid rock excavation, most of which was immediately adjacent to the operating railway, providing further attendant difficulties. The Skeena River has several large tributaries from the north and the crossing of these streams calls for the construction of ten bridges. Shortage of steel made it necessary to construct timber bridges and wooden trusses with spans ranging from 80 to 225 ft. The more common bridges and trestles were constructed by the contractors on the road work. The work was handled under contract in sections,

Organization and personnel

All work on the Altus Project is being carried on by the Bureau of Reclamation forces under the general supervision of H. W. Bashore, Commissioner and S. O. Harper, Chief Engineer. The Regional Director of the area in which the project is located is Wesley R. Nelson, with headquarters at Amarillo, Texas. H. E. Robbins is construction engineer in charge of the project. All construction activities were under the supervision of the writer who was assisted by P. J. McGovern, superintendent of construction; R. A. McCallum, assistant field engineer and W. G. Holtz, materials engineer in charge of testing, inspection and control.

NOTE

WORD HAS BEEN RECEIVED just as this article on Altus Dam is going to press that the War Production Board on April 6 rescinded its stop work order on construction of the project. This permits the Bureau to go forward with the construction of the irrigation features and will provide irrigation facilities for approximately 40,000 ac.

length, and there are two tangents each over $1\frac{1}{2}$ mi. in length. This section of the road has four and six degree curves permitting travel at a speed of 80 mi. per hr. There are three pile trestles in this section, and one of these was built on a 20-deg. curve with super-elevation on the deck.

In the construction of this particular 13-mi. section, the Campbell Co. moved 500,000 cu. yd. of gravel and other material and 40,000 cu. yd. of rock. On the three bridges it used 250,000 bd. ft. of lumber and over 5,000 ft. of piling, while over 4,000 ft. of culvert pipe was installed.

Reduced Concrete, Added Steel OK for Buildings

NATIONAL EMERGENCY specifications for reinforced concrete buildings (War Production Board Directive 9) have been amended to increase the amount of reinforcing steel that may be utilized, to exempt from their provisions small projects using less than five tons of steel, and to eliminate some of the paper work requirements for the construction industry.

A similar reduction in paper work requirements was made in Directive 8, governing structural steel for buildings, and Directive 29, governing stress grade lumber for buildings. Simultaneously, Directive 8 was amended to exempt from the specification provisions any project using less than five tons of steel.

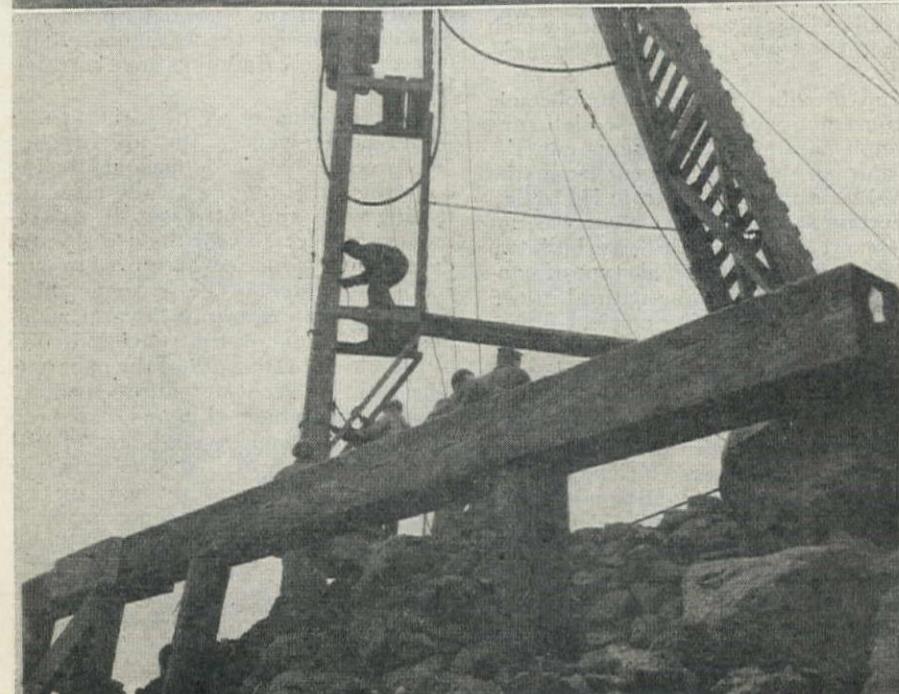
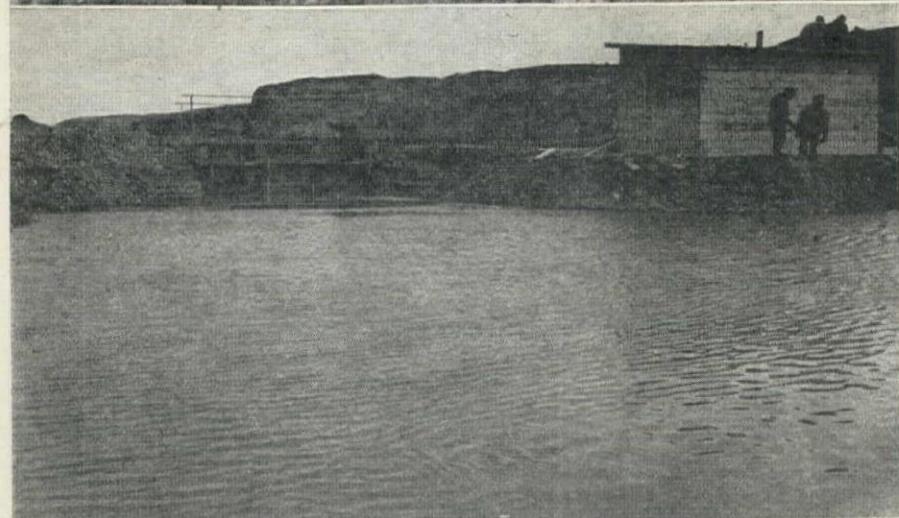
In reinforced concrete construction, W. P. B. Directive 9 is amended to permit the use of about 5 per cent more reinforcing steel, with a consequent reduction of about 10 per cent in the size of concrete beams and columns. This will re-establish design practices that were in common use before the war. From now on it will not be necessary for building designers to file a certificate declaring that the National Emergency Specifications for the Design of Reinforced Concrete Buildings have been followed.

The amendment removes the former preferences given to the use of non-reinforced concrete or masonry in the construction of footings, walls, piers, retaining walls and buttresses. It also removes the necessity for the use of extra deep members formerly required to save reinforcing steel. The extreme fibre stress in compression in flexural members has been increased from 0.35 to 0.45 of the ultimate strength of the concrete. The ratio of vertical reinforcement in spirally reinforced columns has been changed to permit a minimum of 0.01 and a maximum of 0.08. Similarly, the ratio of vertical reinforcement in tied reinforced columns has been changed to permit a minimum of 0.01 and a maximum of 0.04.

However, the increased working stresses in reinforcing steel required by the original emergency specifications have not been modified in this amendment.

ALASKA

Army Engineers Conquer Odds To Build Bases in Aleutians



By SGT. ALLAN MERRIT, U. S. A.

Somewhere in the Aleutians

PICTURED on these pages are a few of the Army Engineers who played a major role in the battle of the Aleutians. Their work is construction, and even yet it is not finished. But in a comparatively short space of time they have transformed the naked, windswept islands of the Aleutian archipelago into a chain of mighty fortresses.

When the U. S. Army landed on Amchitka Island last January the Engineers learned that the Japanese, in a manner of speaking, had challenged them to a race.

Through the Intelligence Officer at Amchitka came reports that the Nips were speeding construction of a fighter runway at Kiska and a bomber runway on Attu, presumably hoping the airfields could be finished before the American soldiers could transform bleak Amchitka into an effective offensive base.

But their few trucks and push-carts, their picks and shovels were no match for the modern heavy equipment of the U. S. Army's Engineers. Neither did they possess the resourcefulness of the American soldiers—and construction in the Aleutians calls for plenty of resourcefulness as well as good equipment.

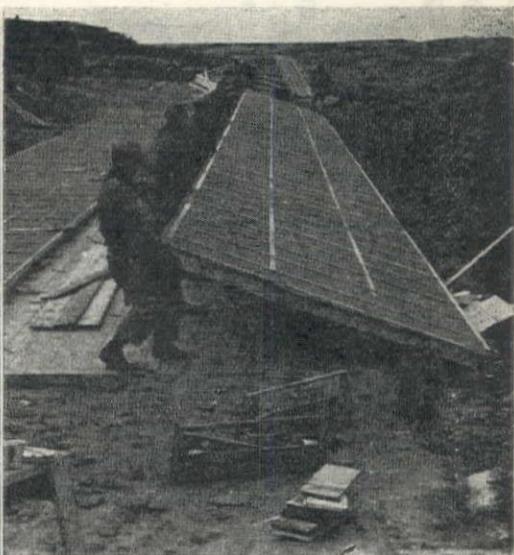
Difficulties tremendous

The Engineers started from scratch. Every stick of wood, every piece of equipment was unloaded from the ships in a harbor in which there were no docks, moved across soggy tundra on which there were no roads in the first weeks of the occupation of any of the islands.

Construction progress was visible from one day to the next on every job. On his way to work a soldier would be surprised to see an airplane taxiway that had not been there the day before, crossing his path. He would be detailed to excavate a site for a warehouse building with his bulldozer, pass there a week later to find the building completed and already in use.

Construction work by the Japanese on Attu and Kiska went on at a feverish pace, too, but the Japs were a poor second in the construction contest. Perhaps it was not a fair race.

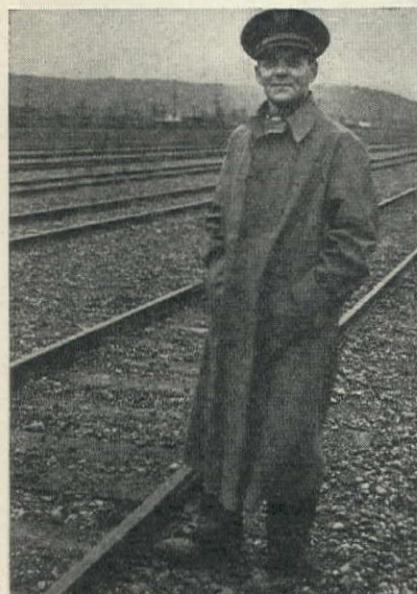
All early construction work in the Aleutians was performed by Army Engineer forces, but contracts have recently been awarded for aviation and other facilities at various points on the island chain to western civilian contractors. Among construction firms recently receiving such awards are: Guy F. Atkinson Co.; West Construction Co.; Morrison-Knudsen Co., Inc.; Birch Construction Co., and Inland Construction Co.



ARMY ENGINEER activities in the Aleutians. TOP LEFT, whereas most excavation is in muskeg, volcanic rock is also encountered. TOP RIGHT, prefabricated warehouse walls save much time. CENTER, camouflage in the Aleutians calls for plenty of ingenuity—Engineer troops cut osnaberg cloth to cover a military installation. BOTTOM, an Air Corps storage depot requires pipe lines, using welded joints, for fuel transportation and tank for storage.

On the opposite page, TOP, this man-made valley was formerly a height on one Aleutian island, but over a million cubic yards of material has been made into runways. CENTER, tidal flats have been found excellent sites for quick construction of runways; here gates of a tidal dam are installed to expedite drainage. BOTTOM, an Engineer pile driver crew starts construction of a wharf in the harbor of one of the Aleutian chain of islands.

Washington Holding Yard and Transit Storage Center Is



CAPT. JOHN X. STARK, resident engineer at the Auburn holding and reconsignment center, supervised most of the construction. He was formerly an engineer with the firm of Stone & Webster. A portion of the trackage may be seen.

LOCATED AT AUBURN, thirty miles south of Seattle, Wash., because the four transcontinental railways to the Northwest are in close proximity at that point, a tremendous holding and reconsignment point has been built by the Army Engineers of the Seattle District and several large contracting firms.

This transit storage depot site is $\frac{1}{2}$ mi. wide and $2\frac{1}{2}$ mi. long. On the site are located twelve warehouses 835 ft. long and 200 ft. wide, each roof covering nearly four acres. There is approximately 41 mi. of railroad trackage adjacent to the warehouses and forming the holding yard with storage of approximately 1,400 standard freight cars, and a complete network of paving for the operation of trucks and other vehicles.

In addition, some open storage areas have been provided and space is available for six additional warehouses of the same dimensions as those already constructed. One transit storage section of the depot is to be used for the storage and reshipment of Transportation Corps materials, another section is exclusively devoted to the use of the Army air forces, and a third to the regular Army quartermaster department.

Railroad construction

The 41 mi. of standard gage railroad track is constructed of second-hand 65, 75, 85 and 90-lb. rail, some brought

Forty miles of trackage, twelve huge warehouses built at junction point of four transcontinental railroads to facilitate storage and transshipment of military supplies—Work performed by northwest contractors, U. S. Army Engineers

from as far away as the east coast. In the main storage yard there are 39 parallel tracks, and spurs run to each warehouse and other points within the site. Connecting tracks have been laid to the main lines of the Union Pacific; Northern Pacific; Chicago, Milwaukee & St. Paul, and Great Northern Railways, all of which pass within a few hundred yards of the location.

The track was laid on 1 ft. of compacted ballast and the yards are drained by perforated pipe laid in ditches and covered with 2 ft. of gravel. These pipes run between each of the tracks. Ties and switch timbers were of new lumber.

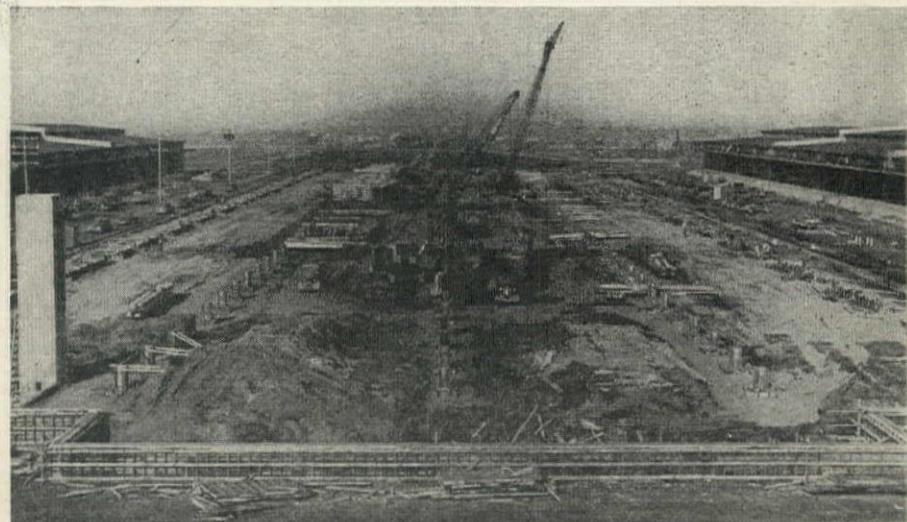
The latest track laying devices were used in this work. Spikes were driven by air hammers, and air driven automatic tighteners were used on the track bolts. The ballast was compacted with air hammers. The compressed air for these operations was furnished by a self-propelled compressor car.

Contractors for the railroad work were: Sound Construction and Engineering Co. of Seattle; Ford J. Twaits, Los Angeles, Calif., and Morrison-Knudsen Co., Inc., Boise, Idaho, as a joint venture.

Warehouses

Each of the twelve main warehouses

PRELIMINARY CONSTRUCTION work on one of the 12 warehouses at the Auburn depot. In the completed structures may be seen firewalls which divide the buildings.



Material Complete

ing paper with a 15-lb. cap sheet on nine of the warehouses.

The two center trusses are raised six feet, for the installation of windows which admit adequate light to the structure.

Other construction in each warehouse includes a central heating plant and distribution ducts, the fire walls which in some cases were completely of concrete blocks, in other cases completely of hollow tile, and in still others were partly solid concrete and partly tile, and necessary sanitary, office and operating facilities. Pilings were driven underneath the base of the chimney for each of the heating plants, but no other piling was required. The concrete floors were cured by use of Hunt Process curing membrane.

Materials used in each of the twelve warehouses included the following totals:

Form lumber.....	103,000 b. ft.
Structural lumber.....	900,000 b. ft.
Concrete.....	5,000 cu. yd.
Steel.....	52,000 lb.
Fire wall tile.....	73,000
Roofing felt.....	80,000 sq. yd.
Piling.....	100 ft.

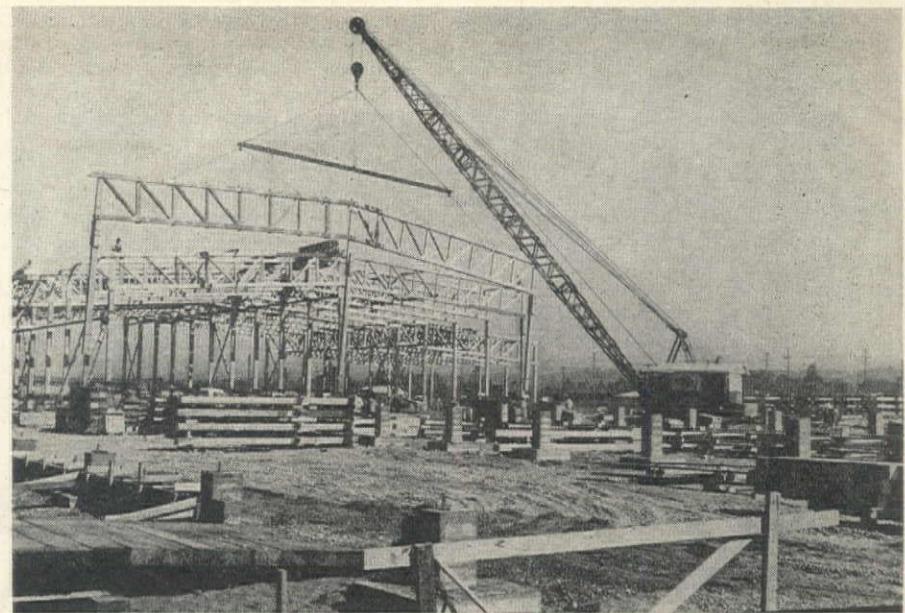
Sewers and storm drains

Because of the practically flat terrain, both sewage and storm waters are collected in gravity pipelines and elevated by pumps to points of disposal. In the case of the sanitary sewers, 14,000 ft. of concrete pipe of various diameters were used in the collecting system. An Imhoff sewage disposal plant has been constructed on the grounds. The raw sewage is transferred from the collecting system to the disposal tanks by one 800-g.p.m. and two 400-g.p.m. pumps and 9,000 ft. of special cast iron force main.

There are 139,000 ft. of storm drain in the depot grounds. This is composed of 16,000 ft. of perforated metal pipe in the railroad yards as described above, 13,000 ft. of open-joint concrete pipe, and 110,000 ft. of concrete pipe laterals and mains. At the lowest point of the storm drain system, four 5,700-g.p.m. pumps operating against a 12-ft. head introduce the water to a 48-in. discharge line. This line is $\frac{1}{4}$ mi. long and opens into an open ditch which conducts the water 2 mi. further to the Stuck river. The system will handle a maximum of 33,000,000 gal. of storm water per day.

Water supply

Water for the storage depot is supplied by the municipal system of the city of Auburn and is conducted onto the site through a 10-in. cast iron line. This line enters a 750,000-gal. fire reservoir built by cut-and-fill and concrete



ALL TRUSSES for the warehouses were pre-fabricated and set in place by mobile cranes. Footings were poured first, later fill was placed and concrete floor poured.

lined. The water for normal consumption by-passes the reservoir by means of an automatic check valve.

A 16-in. main leaves the reservoir and a 90-lb. pressure is maintained in the fire lines by four 1,000-g.p.m. pumps operating at 185-ft. head. These pumps are powered by stationary gas engines. Forty-four thousand feet of cement asbestos pipe, 5,000 ft. of metallic pipe and 2,100 ft. of universal pipe are used in the water distribution system.

Other details

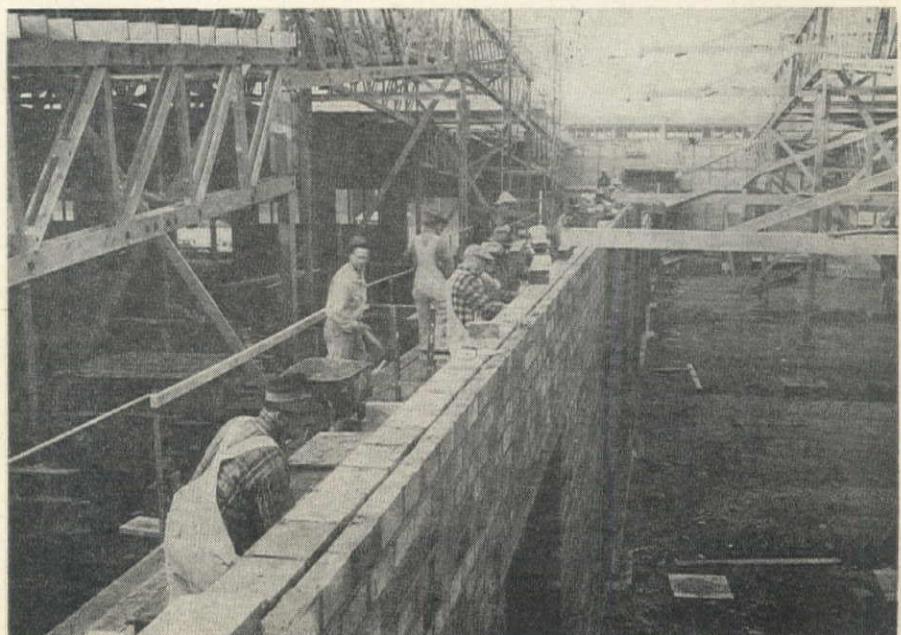
Concrete for the floors, piers and other structures was batched in a central plant and was conveyed in mixer trucks to the point of placement. Aggregate was trucked from a pit approximately 3 mi.

from the site to the batching plant. About 500,000 cu. yd. of ballast were used in the railroad roadbed. It was secured from a neighboring pit and hauled by truck.

Roadway paving was of plantmix bituminous material placed $1\frac{1}{2}$ in. thick on compacted sub-grade.

Grading and excavation began on the site July 15, 1943, and was completed November 16. Building work began on August 1, 1943, and was completed March 15, 1944. The most serious handicap to the work was the continuous presence of thick mud which bogged down heavy equipment, handicapped the placing of foundations, and was a steady irritation to the workers. However, an enviable record of accomplishment and

FIRE WALLS being laid up by masons. Each 835-ft. warehouse had three fire wall divisions. In some cases these were of hollow tile, in some cases concrete blocks and in other cases a combination. The arrangement of trusses is shown in this view.



speed of construction was established by the several contractors.

Organization

The holding and reconsignment project was constructed under the supervision of the Seattle District Engineer Office. Col. Richard Park was District Engineer at the beginning of the work, and Col. Conrad P. Hardy occupied that position during the closing phases of the construction. Capt. Leonard W. Bindon was Resident Engineer during the greater part of the construction, and Capt. John X. Stark completed the project in that position. Ray Smith was Office Engineer at the site.

The Sound-Twaits-Knudsen contracting group constructed the railroad trackage, roads, open storage facilities and drainage system. Albert H. Johnson was project manager for the group. Alden Woodworth was project manager for Woodworth and MacDonald on their contract for the buildings, electrical distribution, water reservoir, and the sewage treatment plant and pumping station.

The West Coast Construction Co. had contracts for clearing and grading, the administration building, water distribution and sanitary sewer system work, which was supervised by J. B. Jenkins, project manager.

the color of the water changes to a skim milk appearance or a bluish tinge. Here the process is repeated again, injecting the required amount of Benoclor to the stream to restore the bright white color. The distance that the cloud or blanket of Benoclor travels before it begins to lose its brilliant whiteness and it becomes necessary to add additional compound to maintain dilution determines the position of the next station. In this way advantage may be taken of the Benoclor remaining in the water and the application rate reduced. The best results have been obtained where the velocity of the water was around 2 ft. per sec. A reduction in velocity increases the contact time at any given point, up to 45 minutes being desired.

In static water it is necessary for the men to move along the channel and for care to be taken to get good dispersion of Benoclor No. 3 Regular to give desired results. Where conditions permit a boom from the side of a truck extending out over the channel for the man handling the spray nozzles facilitates applications in static water.

Effect on plants

Following applications the effect upon the plants is sometimes noticeable almost immediately, the growth turning darker and a downward trend of the water surface becoming noticeable. Within 24 hours following application the plants collapse and in 4 or 5 days turn white, with disintegration beginning at tip ends of the growth and working progressively toward the root crown. The growth breaks up into minute particles, which are carried away by the stream, unnoticeable except by close inspection, eliminating all difficulty with debris.

An example of the results that may be obtained with Benoclor occurred on an application made on 6 mi. of canal during July, 1943. The capacity of the canal was 100 sec. ft., but the development of *Potamogeton* caused 85 sec. ft. to overflow the banks. The discharge was reduced 8 sec. ft. per day, with overflow occurring at the end of each period. This procedure was continued until the flow reached 45 sec. ft., with overflow of banks continuing at the end of the period.

The discharge was reduced to 10 sec. ft., and run to waste for a 24-hr. period, during which time application of Benoclor No. 3 Special was made. Two workmen made the application in 6 hours. The following day the discharge was increased to 45 sec. ft., and on the second day to 85 sec. ft., with the water surface 1½ ft. below the water surface with 45 sec. ft. three days prior. The cost for chemical, labor, and transportation was \$35.00 per mile, which permitted the completion of the season's run without further congestion of the channel.

With the simplicity of application, the rapidity in restoring capacity, the elimination of debris, and the cost experienced so far, it appears that Benoclor will take an important place on future moss-control work in the irrigation and water works field.

Ditch Vegetation Is Removed Without Stopping Water Flow

THE ENCROACHMENT of aquatic growth during the 1943 season on the 3,000 mi. of canals and drains operated by the Imperial Irrigation District in the Imperial Valley of southern California, made necessary the development of a method of control requiring a minimum of man power, yet which would keep the channels clear and maintain full water capacity during the heavy irrigation season.

Experimental work was begun with a compound known as Benoclor, to control the growth of *Potamogeton*, *Chara*, *Horned Pondweed*, *Spiny Ned* and *Tules*, on irrigation and drainage channels. While this work is yet in the experimental stage and not conclusive, the results obtained indicate definite possibilities. The experimental work has been carried on in close cooperation with the Field Research Engineer of the manufacturer.

The material

The Benoclors are liquid chlorinated-hydrocarbons, and are produced by the Cloroben Corporation of Jersey City, N. J. The material is available under two formulae, Benoclor No. 3 Regular and Benoclor No. 3 Special, the former being adapted to use in static water and the latter to running water.

The material is retailed to the area west of the Mississippi River at \$2.75 per gallon in 50-gal. steel drums. It is a clear, colorless liquid, non-toxic to animal life, and is handled in the field by laymen without special equipment or danger to themselves. Benoclor has a specific gravity of 1.4 and is not harmful to crops unless there is a residual of over 500 parts per million, which does not present a problem, as the dosage required on moss control is a much lower dilution.

The Benoclor No. 3 Regular has been in use in the Eastern States for some time in potable water supply reservoirs with the approval of the State Health Commissions concerned. In experimental work on canals the discharge has been reduced to 10 or 15 sec. ft., or an

New compound causes moss and other growth to collapse and disintegrate almost on application—Growth is carried away in fragments, and no harmful effects are noted on agricultural products being watered

By W. E. HARTZOG

Superintendent

Water Distribution and Drainage Construction
Imperial Irrigation District
Imperial, Calif.

amount that could be run to waste for 24 hours, at the time applications have been made. Fish appear to be as susceptible to Benoclor as are the plants, and on channels where the fish are valued Benoclor must be used with caution.

Application of Benoclor

The equipment required consists of a stirrup pump, 20 ft. of flexible hose, 6 ft. of ¼-in. pipe, and a fine spray nozzle with 20 to 40 thousandths opening. The Benoclor is pumped from a container on the canal bank to a spray nozzle discharging into the stream under 60-lb. pressure. Two men are required to make an application, one working the pump on the bank and the other standing on a temporary footboard over the stream handling the spray nozzle injecting material into the stream 4 in. under the water surface. The nozzle must be kept in motion back and forth across the stream to obtain the desired dispersion, as the material is too heavy to disperse itself laterally through the stream.

The Benoclor contacts the water from the spray nozzle in a white milky cloud, and as the dosage is applied the stream becomes a white milky mass, the specific gravity causing the Benoclor gradually to drop to the bottom. As this occurs

Bay Bridge Suspender Rope Replaced

PROVISION for adjusting the length of the suspender ropes during construction is usually incorporated in the design of suspension bridges. Increasing air traffic and also higher vehicular speeds and loads, where suspenders are exposed to damage at the roadway level, may necessitate considering details and equipment to facilitate the replacing of suspender ropes as a maintenance operation. The method used on the San Francisco-Oakland Bay Bridge recently indicates that simple structural details lend themselves to an uncomplicated solution when repairs were required.

Damage to the ropes

The collision of a Navy SBD-5 airplane with the San Francisco-Oakland Bay Bridge on the morning of September 12, 1943, destroyed one suspender rope and damaged the adjacent rope. The plane, flying in a northerly direction, struck the bridge about 100 ft. west of the west tower of the East Suspension Bridge about 60 ft. below the main cable, or 145 ft. above the upper deck which is about 250 ft. above the bay at this point. The plane, of short wing spread, did little damage (abraded paint) to the third and fourth sets of suspenders on the south side of the bridge. However, the engine and fuselage, apparently stripped of its wings, struck the third set of ropes on the north side nearly head on.

The sets of suspender ropes are 30 ft. on centers and consist of four parts of $2\frac{1}{4}$ -in. diameter wire rope made up of six 19-wire strands and an independent wire rope center of seven 7-wire strands. The four parts are formed by looping two lengths over the main cable. The

Proper stressing and attachment of suspender rope replacement for cable damaged by an airplane calls for careful study and interesting installation techniques

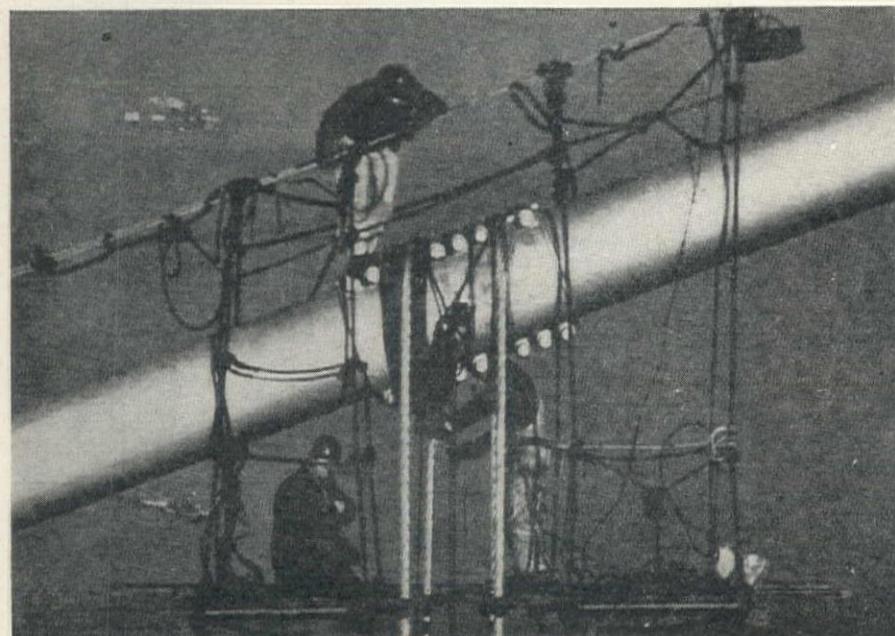
By EDWIN F. LEVY

Associate Bridge Engineer
San Francisco-Oakland Bay Bridge
Oakland, Calif.

specified breaking strength of the prestressed rope is 400,000 lb. on a direct pull, and 380,000 lb. when passed around a 30-in. diameter sheave which is the approximate diameter of the cable band grooves. The ropes are subjected to a prestressing load of not less than 200,000 lb., or sufficient to raise the modulus of elasticity to 20,000,000 lb. per sq. in. The panel point dead load is 280,000 lb. and the maximum live load is 120,000 lb. The ropes at panel point 121NE, the ones replaced, are about 432 ft. long and weigh 4,000 lb. each with the closed sockets which were used in place of the original button or ferrule type sockets.

The suspenders were socketed to the exact length of the original ropes and installed without the use of shims. The connection to the stiffening truss is external; that is, the ropes do not pass through the chord. Bearing, guide, and reinforcing angles, and plates to make the connection are attached to the outside of web or gusset plates of the upper chord which is a box section. The ropes hang freely from the cables, there being

THE NEW ROPE was looped over the main cable by workmen on staging suspended from it. The rope is not attached, but rides over the main cable on band saddles.



SUSPENDER ROPE to be raised to position was clamped to a $\frac{3}{4}$ -in. load line and hoisted to the main cable. The galvanized rope was protected by several wraps of burlap under the clamp.

no drawing in of the parts under the main cable.

Installation of the suspenders

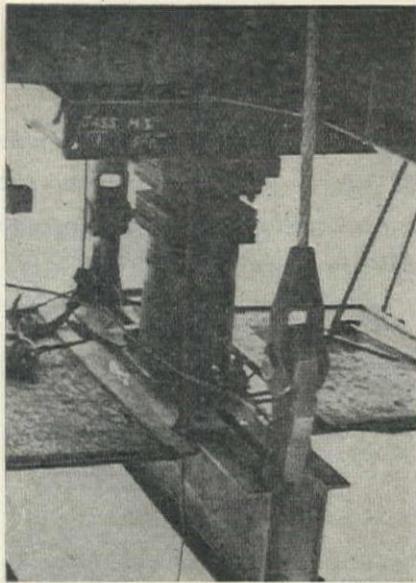
The destroyed suspender had been removed by the maintenance forces soon after the accident, so the first operation performed by the contractor was the installation of the new rope.

The contractor set up a two-drum, gasoline-engine-driven hoist about 50 ft. east of Panel Point 121 on the upper deck of the bridge adjacent to the north rail. The reel holding the new suspender rope was placed in a cradle, near the panel point, for unreeling. Three-quarter-inch wire ropes were reeved through sheaves hung on either side of the cable band. About 425 ft. of the inner or load line was pulled through the sheave attached to the cable band. An end of the suspender rope to be raised was clamped to the load line at the deck level, or 230 ft. more or less from the end of the load line. The clamps were of the two-piece, parallel-wire type, forged from two pieces of $\frac{3}{8}$ -in. plate and held together with nine $\frac{1}{2}$ -in. bolts in three rows of three each. The galvanized rope was protected by placing several wraps of burlap under the clamps, which were placed at 15 to 20-ft. intervals as the rope was raised. Upon reaching the main cable the end of the suspender was detached from the load line. Further lifting permitted the rope to be looped over the main cable under the permanent wire rope handlines and to be clamped to the snub line. By simul-

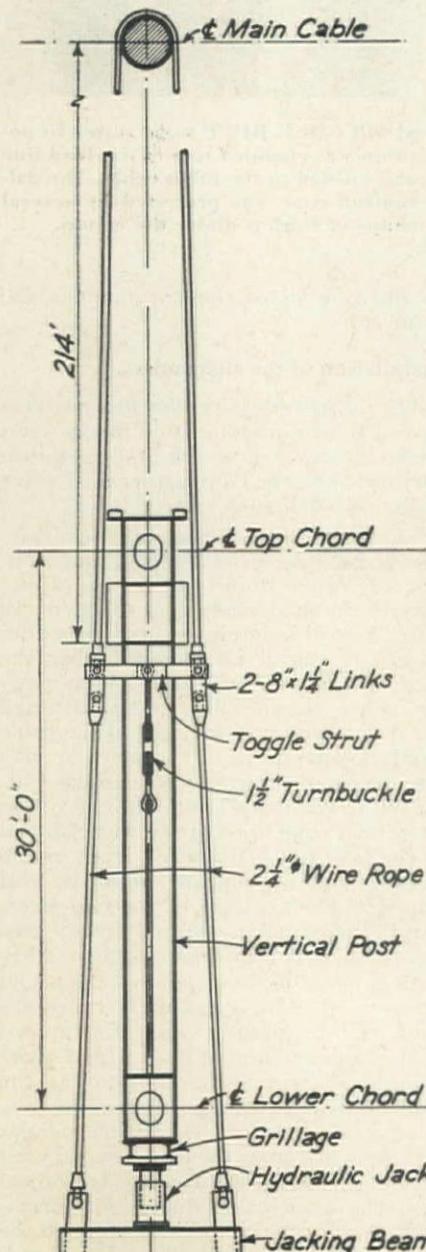
taneously raising on the load line and lowering on the snub line, the rope was passed over the main cable clear of the cable band, clamps being removed from the former and placed on the latter as they reached the staging hung under the main cable.

Tensioning of suspenders

An elongation of 9 in. (4½ in. per part) was required to position the suspender ropes. The tension, 18,500 lb. per in. of elongation, was obtained by means of the jacking rig. The major parts are (a) jacking beam; (b) hydraulic jack, 500-ton capacity used because it was available; (c) bearing grillage, to reduce bending in lower chord and to carry the jacking reaction into the truss vertical; (d) two 26-ft. lengths of 2½-in. wire rope with open and closed sockets; and (e) toggle linkage for drawing the sockets laterally into the connection. The flare of the suspender ropes was governed by the distance required to clear the lateral gusset plates. At this location the length of the



JACKING RIG used to secure the required tension in the suspender rope. The pressure was exerted against a truss vertical; after extending the jack, a toggle linkage seated the sockets.



suspender was such as to produce almost a direct pull from the main cable to the jacking beam; with shorter suspenders the toggle linkage would act as a spreader to keep the sockets clear of the connection angles.

The tensioning of the suspenders was accomplished without incident. The suspenders were drawn down by extending the hydraulic jack, and, with the sockets slightly below the bearing angles of the connection, the toggle linkage was collapsed by means of the turnbuckle. Striking the jack seated the sockets.

Removing old suspender rope

The arrangement of the jacking rig to release the sockets from the connection angles is shown on an accompanying drawing. Two 48-ft. lengths of 2½-in. wire rope were substituted for the toggle linkage which could not be attached to the button sockets of the original suspender rope. Ten Crosby clips were used at each end of the 48-ft. lengths of rope to attach it to the suspender and to the 28-ft. rope of the jacking rig. Due to the painted surfaces, considerable slippage occurred between the suspender and the 48-ft. lengths which had been salvaged from the destroyed rope. The clips distorted the cable and it is believed that this method of attachment would be unsatisfactory for adjusting suspender ropes. The original button sockets had been forged with a 5/8 x 3-in. plinth or band which was to have provided a point to attach an adjusting device. The method proposed by the contractor required no new patterns or dies which would have been needed

DIAGRAM of the jacking procedure is shown at the left; the arrangement of the rig to release the sockets from the connection angles to remove the old suspender rope is illustrated in drawing at the right.

had attachment of the jacking rig been made directly to the button sockets.

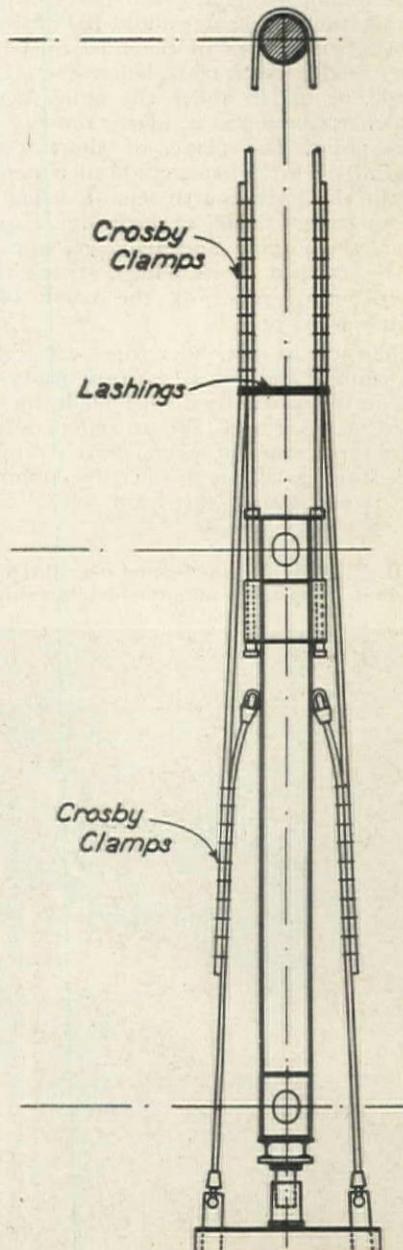
With the sockets free of the connection angles, the hydraulic jack was struck and the suspender rope removed by a reversal of the procedure described above for the installation.

The net value of contract work was \$5,916; the jacking rig was \$1,710; and the two new suspender ropes \$2,800, or a total of \$10,484.90, including taxes, but exclusive of work performed by the State.

Contracts and personnel

The Columbia Steel Company of San Francisco held the contract for the work. R. C. Schwab was erection superintendent for the American Bridge Company which fabricated and erected the work for the Columbia Steel Company.

The work was under the supervision of the California Division of Highways, G. T. McCoy, State Highway Engineer, and Howard C. Wood, Senior Bridge Engineer, San Francisco-Oakland Bay Bridge.



WANTED: 3,000,000 Jobs

By REX L. NICHOLSON

Managing Director, Builders of the West, Inc.
San Francisco, California

return. We must keep faith with this promise. Next to winning the war, providing those jobs is our number-one responsibility.

Twice during the past decade the American people have come face-to-face with major national problems with little, if any, advance preparation to cope with them. The first instance was the great depression of the 1930's; the second, the Japanese attack on Pearl Harbor. In each of these cases, some of the outstanding leaders of our country warned the people well in advance that difficulty lay in the immediate future. But all to no avail!

After Pearl Harbor, I reviewed the history of all the wars that had been fought by the American people since the Nation was founded. The record reveals that, without exception, history has repeated itself to the extent that developments preceding each of our wars, and conditions following them, have formed a complete cycle that is repetitious in every respect. We never have been prepared to fight when the time came. In each case we declared war, rushed out, and frantically marshalled our manpower and productive strength after the fight had started. This, in spite of the fact that ample advance warning was given time and time again.

Another very interesting phase of this cycle was the effect each war had on the peace-time economy of the country following the war. After the battle was over and war contracts had to be cancelled and fighting forces demobilized, the country went into a tremendous industrial slump which lasted, in some cases, from eighteen months to two and one-half years. This slump was then followed by a major industrial boom, which lasted from four to seven years, depending on the size and length of the war that had been fought. Then the industrial boom was followed by a major depression that lasted about the same length of time as the preceding prosperous period.

The autobiography of the late Theodore Roosevelt was one of the books reviewed in this study. One of his chapters interested me particularly. It was captioned, "The Wars of America, the Unprepared." Mr. Roosevelt opened the chapter with this statement, "I suppose the American people will always be unprepared for war, and as a result will be exposed to very great expense and to the

ultimate danger of complete defeat. But this is no new thing. The American people learn only from catastrophe, and not from experience."

I would like to underscore and repeat his last statement, "The American people learn only from catastrophe, and not from experience." This is a sad commentary, indeed, on the foresight, the initiative, and the willingness to face facts on our part.

We have reached a point in this war where we think we foresee the end. We also foresee some of the major problems that will confront us when that end finally arrives. These problems become more significant each day, because up to now the major portion of our so-called post-war preparation to meet these issues has been conducted either from a speaker's platform or through the press. And this, in spite of the fact that next to winning the war, they are the most important problems confronting the American people today. The big question before us is, "What are we going to do about them?"

Will we continue to make speeches and argue among ourselves about what should be done and how to do it, until the storm breaks in our faces? Or, will we step out now and face this problem and find a solution for it? If we follow the former course, we will have leaf-

REX L. NICHOLSON, managing director of BUILDERS OF THE WEST, formerly western director of the Federal Works Agency. He prepared the first published article on post-war construction planning. It appeared in *Western Construction News*, January, 1943.



THE NUMBER ONE objective of the American people today is to out-produce, out-build, and out-fight our enemies on every front until finally, in sackcloth and ashes, they capitulate in complete and unconditional surrender. While the task yet remaining before us is gigantic in scope, much has been accomplished since December 7, 1941. If we can continue to concentrate our combined resources and strength on the objective, a final victorious outcome is assured.

The second most important problem confronting us is to make the necessary advance preparation to protect and retain the things we are fighting for. The period following the war will be fraught with confusion and mass unemployment unless something very concrete is done to prevent it—now. Of all the questions being asked by our men on the fighting fronts, the one they are most interested in, and the one that is asked more often than any other, is, "What are we coming back to when the war has been won?"

They want to know whether there really will be opportunities for good jobs at good wages on important work, or whether they will return to another leaf-raking program or be given a box of apples to sell on some street corner. Our Government has promised them there will be good jobs waiting when they

raking programs again and our war heroes will be forced to sell apples on some street corner. But the pitiful part about it is there will be no one to blame for it but ourselves.

No, I believe we have in this present generation of Americans the necessary initiative to break this repetitious cycle, but we must will jointly to do it. The one great lesson learned from the depression of the 1930's was that mass unemployment on a prolonged basis is a parasitical growth on a free economy that is insidious in its every aspect. It never must be tolerated again in this country if we expect our system of private competitive enterprise to survive.

Good jobs in this country are the results of a high, well-balanced industrial and agricultural production for active consumer markets. Such markets can exist only when the masses of the people have the purchasing power with which to buy. The program of the BUILDERS OF THE WEST for the stimulation of total employment after the war is built around three basic requirements. They are:

1. Industry and agriculture must have the necessary incentive to stimulate the development now of comprehensive plans for a quick conversion to peace

production when war contracts are canceled.

2. There must be developed a close working relationship between the four major forces—industry, agriculture, labor, and Government—for an all-out effort to provide full employment during conversion.

3. A concentrated drive must be made for an early stabilization of industry and agriculture at production levels high enough to insure the steady employment of the major portion of our people who are able and willing to work. Salaries and wages must be compatible with the highest standard of living possible of attainment.

A well-planned program of much-needed private and public construction should be planned and made ready now to facilitate employment and help sustain purchasing power during conversion.

The suggestion that the four great forces—industry, agriculture, labor, and Government—could get together on a peace-time program would have been given the horse laugh a few short years ago. But the war has changed all that. It has been demonstrated conclusively that we can get together in this country, and when we do, there is simply no limit

to what can be accomplished.

It has been said again and again that we shall come out of this war with a tremendous national liability, and certainly every thinking person agrees with this statement. But our leading financiers tell us that there is no particular need to worry about liabilities as long as there are sufficient assets to offset them. If properly harnessed, we have sufficient assets to offset the liabilities of this Nation. We have the space, the fertile soil, the natural resources, and the manpower. But the most important asset that we have is our power and ingenuity to produce. There is no power under heaven to compare with it when it is in full swing. Therefore, we have a right to assume an optimistic view. If this productive power is harnessed for peace-time purposes, we can produce our way out of debt. This is the only way it can be accomplished in our lifetime.

There are pessimists who say it will be impossible for us to consume what we produce, because the American people cannot afford it. But good common sense tells us that, without exception, a people can afford anything and everything that they can produce. We need to ask and attempt to find the answer to three major questions. They are:

These Are The Job Makers . . .

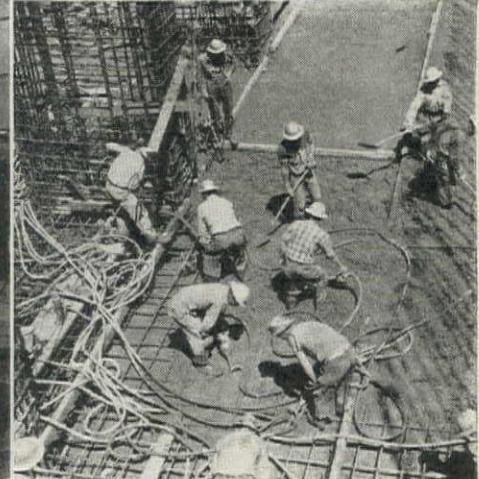
Agriculture



Industry



Construction



These Things Must Be Done Now:

Crop Planning

Reclamation

Soil Conservation

Modernize Equipment

Rural Electrification

Preserve Present Gains

Develop New Products

Build Wider Markets

Improve Labor Relations

Revise Freight Rates

Selection of Projects

Engineering Design

Prepare Specifications

Secure Rights-of-way

Plan Financing

1. What are we fighting for?
2. What do we want for post-war America?
3. How do we propose to get it?

An answer to the first question was provided by President Roosevelt and Prime Minister Churchill in their Atlantic Charter, wherein they declared the main objective of the allied nations in this war is to preserve and make available to all nations who desire them the advantages of the Four Freedoms. Certainly every real American will subscribe wholeheartedly to this objective.

The answer to the second question covers a combination of desires and objectives for post-war America. First, we want a lasting peace that is protected in such a way that we will not have to fight a similar war during this century. We want to retain our system of free competitive enterprise, because it is our firm belief that it is the best system yet devised by man for the production and distribution of the goods and services necessary to provide the high standard of living to which we aspire. American labor must have the assurance of steady employment at wages compatible with a high standard of living, with the hope of attaining a standard that is even higher than anything yet experienced. We want a richer, deeper cultural and social life for our people, with broader opportunities for education and the enjoyment of the better things of life.

There is only one answer for the third question. We can accomplish all these things if we will jointly to do so. But they never can be accomplished as long as the four major forces in this country stand in their respective corners and regard each other with distrust. An honest willingness to meet the other fellow halfway in the solution of mutual problems will get the answer. No other system will.

There is a great need for common-sense leadership that understands and appreciates the significance of this statement. We need leaders with the pioneer spirit who believe in the future of this country and its people. Leaders who have vision, initiative, determination, stamina, and optimism. The late Will Rogers said, "In my opinion, a real optimist is a man who can enjoy the view after having been treed by a bull." This is the kind of optimistic leadership needed to solve our problems after this war—a leadership that can see beyond the obstacles that are in our immediate way, the tremendous possibilities for the development of the West and that can work to accomplish all of these things.

The average enterpriser is vitally interested in two questions. First, he wants to know what else he can do to help win the war. Second, he wants to know what will happen to his business or industry when the war is finally won. In order to provide a cushion of employment and an assurance to private industry that the purchasing power will be sustained during the conversion period, there is an immediate need for the planning of a huge construction program. The plan should include all types of industrial construction, office buildings, hotels,

apartment houses, and other business and industrial establishments; preparation for the continuous rebuilding of our urban centers with special emphasis on modern layouts and designing; development of programs for the financing and construction of new homes and community centers, and the remodeling and modernizing of the older homes in the community.

The municipalities should be encouraged to plan for the provision of additional necessary domestic water supply and sewer systems and sewage disposal facilities; street construction and improvement programs; freeways and parkways to alleviate traffic congestions, where necessary; schools, hospitals, health centers, playgrounds, recreational areas, parks, and airport facilities. The communities should be encouraged to prepare working plans, specifications and contract documents; to select rights-of-way, determine their cost, and pre-

Of all the questions being asked by our men on the fighting fronts, the one they are most interested in, and the one that is asked more often than any other, is, "What are we coming back to when the war has been won?"

pare for prompt acquisition; to complete the legal and financial arrangements for immediate construction when the time comes.

The county and State governments should be encouraged and assisted in the preparation of detailed plans and specifications for the construction and improvement of county roads and State highways, farm- and mine-to-market roads, county, and State institutional buildings, conservation, flood control, land usage projects, et cetera. The Federal agencies should prepare plans now for the construction of Federal buildings, such as post offices, banks, Federal office buildings; inter-state and transcontinental highways; large scale soil and water conservation projects; flood control and channel stabilization for our larger rivers and streams; reclamation of arid lands, land-use programs, reforestation, irrigation, and power development; slum clearance; malaria control; and large land-drainage projects.

The leading men of the construction industry in the eleven western States are fully aware of the problems confronting us in the next decade. They know the number-one requirement for any post-war preparedness program is that it be so organized and so executed that it will not detract at any time or in any way from the main war effort. If properly executed, the morale of our fighting men



JOBS . . . or depression?

and our war workers can be boosted tremendously through the knowledge that the necessary advance preparations are being made.

To accomplish this, they have set up the BUILDERS OF THE WEST, INC., a non-profit, non-political organization that has been financed in its entirety with private capital and dedicated to the development of the West. Its objectives are threefold:

1. An all-out drive will be made to accomplish the preparation of plans and specifications for a huge construction program comprised of both public and private projects, such as those listed above, that will be ready to go when the fighting ceases and the boys start coming home.

2. The entire weight of the organization will be thrown into the fight for the retention and expansion of the industrial gains experienced in the West during the war. Also, every effort will be made to assist the communities in attracting new industries and business.

3. The third objective will include a determined effort to stabilize the construction industry during the post-war adjustment period.

In spite of the fact that it is the third largest industry in the United States, the construction industry is the most unstable of them all. It always has been either a feast or a famine. The contractor, the material, and the equipment manufacturers either find their organizations completely swamped with work and orders, or they have no work or orders at all, and their equipment and plants sit idle and deteriorate. By working jointly with the several levels of government, much can be done to help stabilize construction and facilitate total employment through the various public-works programs of the country. In most cases, the release of public-works projects for construction can be controlled in a given locality and used as a cushion

to balance employment. When private construction needs the workers, public projects can be held up and released during slack periods of private construction, thus serving to level the peaks and valleys in the entire industry. This form of control is highly desirable, and would have a much-needed stabilizing effect on the peace-time economy of the country as a whole.

To help accomplish this, BUILDERS OF THE WEST have established a regional office in San Francisco that is being staffed with specialists in these respective fields of operation. A fact-finding division has been created that will gather and correlate all information possible pertaining to the private and public construction needs of the various communities, counties, and States throughout this area. This information will be tabulated for reporting purposes and made available to all of the interested groups.

Its second function is to assist in every way possible in bringing about a closer cooperation between the existing agencies and groups concerned with the problem of post-war preparedness in all of its ramifications. Third, a common mouthpiece for informing the public by radio, newspapers, and other media is being set up.

The specialized staff of the organization will assist the smallest communities, the largest urban centers, and county, State, and Federal bodies concerned with planning, with their problems of manpower, finance, legislation, coordination, and the preparation of their respective

If you believe that the objectives set forth in this article are sound—

If you believe that the home front owes a tremendous obligation to the men on the fighting fronts—

If you believe that advance preparation is the only way to avoid a repetition of what we experienced during the 1930's—

The BUILDERS OF THE WEST challenges you to join in a determined effort to find a solution for our post-war problems, before it is too late!

plans. The organization will work also toward the establishment of a close relationship with the Western Conference of Governors, Congressional delegations, the various State commissions on interstate cooperation, and all civic and professional groups now set up and dealing with the question of conversion and employment following the close of the war.

There are those who contend that this advance planning cannot be accomplished without detracting from the war effort, but such contentions are fallacious. Most of the larger industrial organizations are in the process of preparing their post-war plans now, or have pretty clearly in mind what they want to plan for. With the establishment of the incentives enumerated earlier, they will proceed with the completion of their plans and maintain their war production schedules simultaneously. The middle-

sized and smaller enterprisers, farmers, and local governments can and will develop plans for their post-war operations without lessening their contributions to the war effort in the least, if they are furnished the proper encouragement and assistance.

It is entirely logical for the construction industry to take the lead in this regard, because, in the main, the major portion of the required war construction is completed, or is now in the process of completion. Therefore, the industry is ready for its next big assignment. There are a sufficient number of engineers, architects, and construction specialists available now to undertake the preparation of the plans and specifications for the suggested construction program and complete them on schedule. It shall be understood clearly that all projects to be constructed must pass the test of genuine need for the structure, and not merely to furnish employment.

The financial position of many of the States and governmental units has improved materially because of wartime activities. Others have suffered financially because of labor migration to war production areas. For those units not financially able to accomplish adequate advance planning, assistance should be provided from State or Federal funds.

The first objective is to effect a complete transition from war to peace without widespread unemployment and dissipation of the now-accumulated purchasing power. A consistent effort to stabilize industry and employment should follow.

Bonneville Suggests Northwest Plan

PRESENTED AS A BASIS for a full and well-formulated program for regional power development, the Bonneville Power Administration has released a comprehensive study of Pacific Northwest operations. It is not presented as a final and overall regional plan but is the Administration's effort to put the power program into its essential setting and to show its relation to the full possibilities of development in the region.

The study concerns itself with the development of all the resources of the states of Washington, Oregon, Idaho, and that portion of western Montana lying within the Columbia River basin and then proposes a scheme for basic physical development which will produce adequate power to fully utilize the enormous opportunities outlined in agriculture, commerce and industry.

Among the industries proposed for development in the northwest states are the light metals, magnesium and aluminum, several reduction and fabrication plants in this field being already established in the area. The ferrous metal group, including iron, steel and alloys, also appears to have an important future, a considerable quantity of min-

A physical and industrial development plan for the Columbia Basin states is suggested for consideration by Bonneville Power Administration which includes 30 dams, and full exploitation of mineral, lumber, and agriculture resources, as well as expansion of industrial facilities

erals being known to exist in the area and plants now being in existence which produce 250 thousand tons of ingots annually.

The report proposes several additional iron and steel plants in order that the region may be nearly self-contained. Numerous non-ferrous elements, notably copper, zinc and lead, are common in the northwest states, particularly in Montana. And while smelting capacity is already adequate, there is a noticeable shortage of fabricating plants; and the study proposes much development in this field.

Among the non-metallic minerals known to exist in the Northwest are

ample supplies of material necessary for the manufacture of concrete, cement, dimension stone, tile, brick, glass and other ceramic products. While the full development of these products is generally contingent upon local conditions, it is believed that extensive developments in other fields will bring an increase in activity in the non-metallic group. Several industrial carbon developments are possible. Coal and lignite fields are known to exist and are currently being exploited. They are generally of bituminous quality, but a few beds are semi-anthracitic. No petroleum is known to exist in the region, but charcoal is readily available from the

sawmill industry. One small graphite deposit is known in Washington. Because of the depletion of petroleum reserves in other sections of the nation, it is believed that the coal and charcoal industries have an extensive future.

Other industries which it is believed can be developed to a far greater extent than currently are the industrial gas group and refrigerants; the chlorine and caustic group; calcium carbide and its derivatives; fertilizer, and plastics. The forest industries will of course continue, and the construction of dams and irrigation systems will tremendously expand the agricultural fields, both horticultural and livestock.

A full exposition of the anticipated future industrial development is being prepared for presentation in an early issue of *Western Industry*, the journal of western industrial development.

Having outlined the possible future need for power and water development, the report proceeds to outline a comprehensive power development program. Some 30 dams are included within the outline for the Columbia River and its tributaries. Of these, six are already in existence, being the Bonneville, Rock Island and Grand Coulee dams on the Columbia River; Anderson Ranch dam on the Snake River; and Fern Ridge and Cottage Grove dams on the Willamette River. Designed for early construction are the Hungry Horse, Cabinet Gorge, and Albeni Falls dams on the Clark Fork River; the Foster Creek and Umatilla dams on the main stem of the Columbia River; Palisades, Cascade and four other dams on the Snake River; and Detroit dam on the Willamette River. The remaining structures

are proposed, but no survey or preliminary designs have been completed.

The complete development of the structures already designed will result in new power capacity of about one and a half million kilowatts; agricultural land development of about one million new acres; additional water supplies for several hundred thousand acres of already irrigated land; improved navigation along 470 miles of waterway between Lewiston, Idaho, and the ocean; improved flood control; direct employment of 50,000 people in construction; and considerable additional employment in contingent jobs.

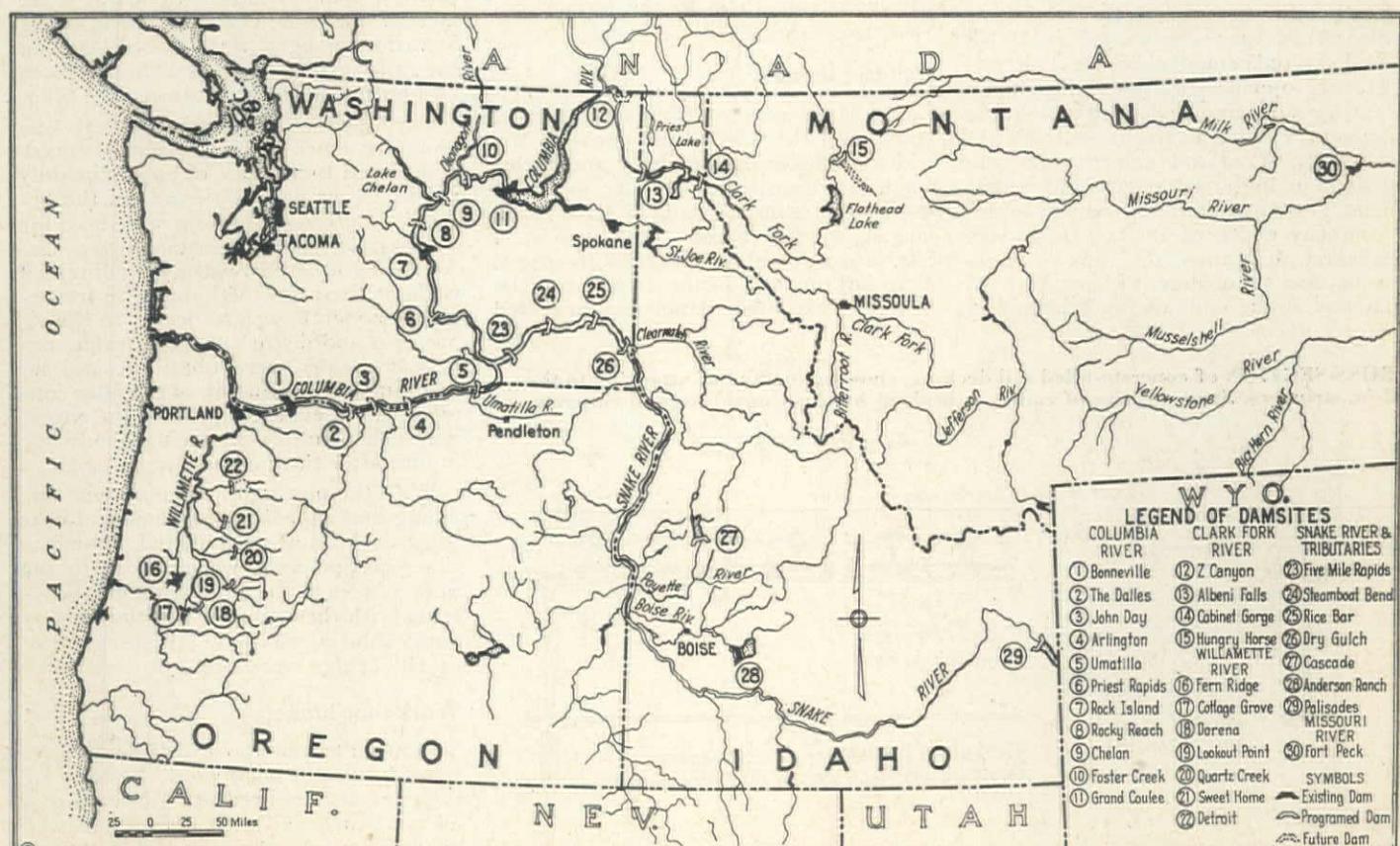
It is not anticipated that power shall be the consideration in designing the projects proposed in the report. It is a multiple purpose development throughout and is intended to apply to the Columbia basin in its entirety. According to the report, the basic aims and principles which should apply to long-range programs of river development are: (1) It should cover the entire region or drainage basin in such a way as to provide a basis for development of the various sections as well as of the region as a whole; (2) it should take into account the rights and interests of all the states and economic areas; (3) the multiple purpose principle should be applied—development for irrigation, navigation, power, flood control and other beneficial uses being complementary and mutually supporting; (4) the most important

COMPLETE UTILIZATION of natural resources of the Northwest will require construction of 30 dams, according to the Bonneville plan. Seven are already constructed, or work is proceeding on them.

uses of water should be determined and safeguarded, in general considering domestic and irrigation uses as superior to others; (5) the prior right to the beneficial use of water near the sources should be recognized. The application of this principle is necessary for the protection of the semi-arid upstream areas in the Columbia basin; (6) the federal government should aid the states in making a program for full development of water resources and in the formulation of interstate compacts, and (7) in power development the principle of sound economical construction in advance of the development of a promising power market should be followed everywhere.

This study has been prepared after due consideration of major projects proposed by the Northwest States Development Association and by the numerous federal construction agencies. It is pointed out that the entire program must be carried to completion in a cooperative manner. Cooperative agreements will be made between the Bonneville Power Administration and other interested groups to set forth clearly their joint objectives, methods and procedures, as well as their joint responsibilities and promotional programs.

Agencies specifically mentioned which will cooperate in the development of these Pacific Northwest operations are: U. S. Forestry Service, Bureau of Reclamation, the Corps of Engineers, state conservation and agricultural departments, Bureau of Mines, public and private power agencies, federal power commission, railroad and other transportation companies, colleges and universities.



Re-deck Bridge Under Traffic

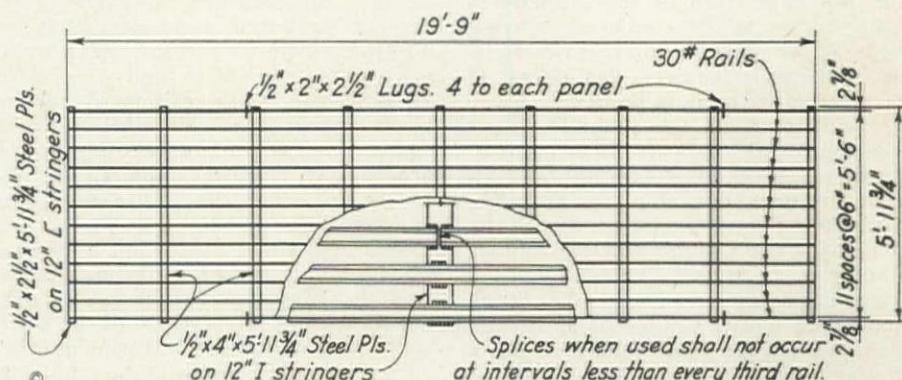
OLD RAILROAD RAILS were used to redeck the highway bridge over the Colorado River connecting Arizona and California at Yuma, Arizona. The condition of the old timber deck required replacement which had to be constructed full width under heavy wartime traffic. The design was rather novel and so far as is known, the only one of its kind.

This bridge, constructed in 1915, is an old design, pin-connected through truss span 336 ft. long with one deck truss span 105 ft. in length. The structure is the joint property of the states of California and Arizona. It is located on Federal Highway 80, the principal transcontinental and only primary route in this district, and is the only highway bridge crossing the Colorado River for many miles in either direction.

The laminated timber deck which was covered with an asphaltic mix of variable thickness was deteriorating to such a condition that the bridge could not be safely kept in service any longer without redecking. As there were no detours available it was imperative that traffic be permitted to pass through construction operations on this important structure with as little inconvenience and delay as possible. The problem was complicated by the narrow roadway width of 18 ft. 1 in., which was insufficient to permit redecking one-half width at a time.

The bridge, with the exception of the deck, was in a satisfactory condition. The timber deck was removed and replaced with mats constructed of used railroad rail, spaces between being filled with Portland cement concrete. The concrete was topped with a layer of asphaltic plantmix surfacing sealed with asphaltic emulsion, varying in thickness from $2\frac{1}{2}$ to $3\frac{1}{2}$ in. Portland cement concrete curbs 12 in. high replaced the old timber curbs. The completed new deck provides a roadway width of 18 ft. 0 in. It was necessary to remove the tops of abutments due to change of elevation of roadway at the ends of the bridge, and

Mat of railroad rails, with intervals filled with concrete, and surfaced with asphaltic plantmix placed on highway bridge over the Colorado River at Yuma, Ariz., while maintaining the heavy flow of traffic using the structure—Road width only 18 ft., making half-width work impossible



TYPICAL 6-FT. MAT of 30-lb. railroad rail used in re-decking the Yuma bridge. The length of the mat is equal to the total width of the bridge roadway and curbs.

By M. A. CLARK

Associate Bridge Engineer
California Division of Highways
Los Angeles, California

to reconstruct them to the proper elevation.

Rail laid in mats

The mats were approximately 6 ft. in width and the length was equal to the width of the bridge roadway and curbs. Each mat consisted of twelve pieces of used 30-lb. railroad rail, 19 ft. 9 in. in length, welded to nine $\frac{1}{2}$ in. x 4 in. x 5 ft. $11\frac{3}{4}$ in. steel spacer strips so spaced as to fall on the I-beam stringers of the bridge deck. Each panel was provided

with four $\frac{1}{2}$ in. x 2 in. x $2\frac{1}{2}$ in. lugs so located as to prevent sideway movement of the mats under traffic before being welded to the stringers.

The rail panels were welded 6 in. center to center, by the electric arc process, to the I-beam stringers. Strips of sheet metal 5 in. wide, cut from steel sheets of various gauges, were placed between the rails resting on the rail bases to act as a bottom form for the concrete filler.

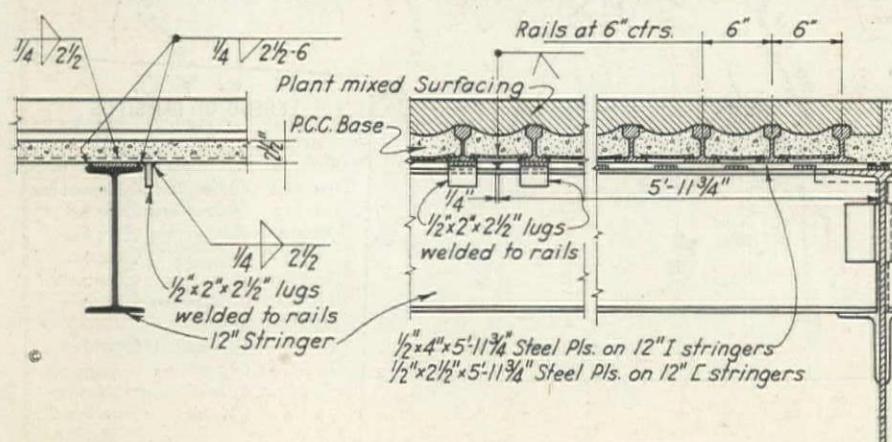
The Class "A" six-sack concrete was hauled in a pick-up truck from the mixer and placed to a depth of approximately $2\frac{1}{2}$ in. in the deck, by hand. In the beginning, internal vibrators were used for compaction; however, their use was discontinued as better results were obtained without their use. Although the freshly placed concrete was subjected to the vibrations and disturbances of traffic, excellent results were obtained, and no cracking or breaking up of the filler concrete was in evidence prior to the covering with plantmix surfacing about one month after the concrete was placed.

With the placing of the plantmix surfacing and asphaltic emulsion seal coat the redecking was completed. From the time the first mats were welded to the floor system to the time of the final covering with the asphaltic plantmix a very noticeable increasingly stiffening effect on the bridge was noted.

Work time limited

In order to more positively control the time the bridge deck would be torn up, the contract required pre-fabrication of all rail panels and their delivery, as well as delivery of all incidental materials

CROSS-SECTION of concrete-filled rail decking, showing method of attaching to the 12-in. stringers. Space at base of rails was bridged by sheet metal to hold concrete.



and equipment required for their installation, before the removal of the bridge deck was begun. The contract also limited to thirty calendar days the time when interruption to traffic would be permitted. During this period, traffic through the construction could be stopped for the first forty-five minutes of each working hour provided the bridge was open to the free passage of traffic for fifteen minutes of the hour.

The removing of the deck and curbs, which required less than two weeks' time, was performed with the aid of a light truck crane, compressor, pavement breaker, and hand tools. As portions of the old deck were removed, they were

hauled away on a flat bed truck. The same equipment was used to place the pre-fabricated sections of the railroad rail mats over which traffic was immediately permitted to pass.

The closing of the bridge to traffic was limited to two forty-five minute periods. At times the traffic was quite heavy and required up to one hour to clear the congestion at both ends of the bridge. The bridge was open to traffic at all times except during actual working hours.

The construction by the U. S. Army of a ponton bridge and roadway across the river immediately below the highway bridge permitted the diverting of a ma-

ior portion of the military traffic. None but strictly military vehicles were permitted to use the ponton bridge.

Organization

The cost of the work was prorated between the states of California and Arizona in the ratio of their ownership. The contract was awarded by the State of California, G. T. McCoy, State Highway Engineer, and F. W. Panhorst, Bridge Engineer. The construction was done under the supervision of J. W. Green, Southern Representative of the California Bridge Department, with W. V. Cryderman as Resident Engineer. Fred D. Kyle of Los Angeles was the contractor.

Suggestions for Cable Care

ORDINARY GOOD SENSE in operation and the application of a few time-proved methods of maintenance will extend the working life of wire rope, help conserve critical materials, and help keep equipment working toward victory.

Wire rope maintenance begins the day a new reel or coil arrives on the job. As the rope is wound, care must be taken that the turns are started correctly and the cable lies flat. Strands must not cross each other. As the drum is faced from the rope side, a right-lay wire rope should be started from the right side and a left-lay rope from the left flange. When a Lang-lay rope is used, a pre-formed type wire rope is desirable since the pre-forming process minimizes the tendency of Lang-lay to loop and squirm and makes the spooling smoother.

It would be difficult to exercise too much care in reeving a new rope. New wire rope must be installed properly, spooled correctly and clipped sufficiently. The rope should be the proper length for the job. Many operators believe in spooling on the drum an amount of extra footage just to have it there "in drum storage" so that the worn cable end can be cut off, the rope pulled forward and attached—thus saving considerable machine outage time when wire rope adjustments must be made. This practice is satisfactory when the basis wraps on the drum are smooth and tight. If the cable is too long, but not properly spooled, excessive over-winding will greatly increase wear.

Select proper rope

Care should be taken in selecting the proper type and construction of rope. There are many constructions and grades of wire ropes, each designed for specific purposes. Wherever possible, the cable should be the one best suited to the particular needs of the user. At the request of the Steel Division of the W. P. B. the wire rope industry has recently developed and adopted a plan for the simplification of its products. The purpose was to help conserve both materials and productive capacity by elimi-

Methods of ordinary good sense are outlined which will extend working life of wire rope and keep equipment operating at top efficiency — Reaving, sheaves, lubrication, overloading are all features to be watched by cable users

nating non-essential wire rope constructions and by limiting the number of sizes and grades of standard ropes. This simplified practice recommendation was approved by the National Bureau of Standards of the U. S. Department of Commerce. Some special wire ropes are still available and some are listed in catalogs although they are not included in the

recommendations. However, no more of these special designs will be manufactured. Out of consideration for this recently established "simplification" it will be found helpful for operators to get the recommendations of their wire rope manufacturer or supplier.

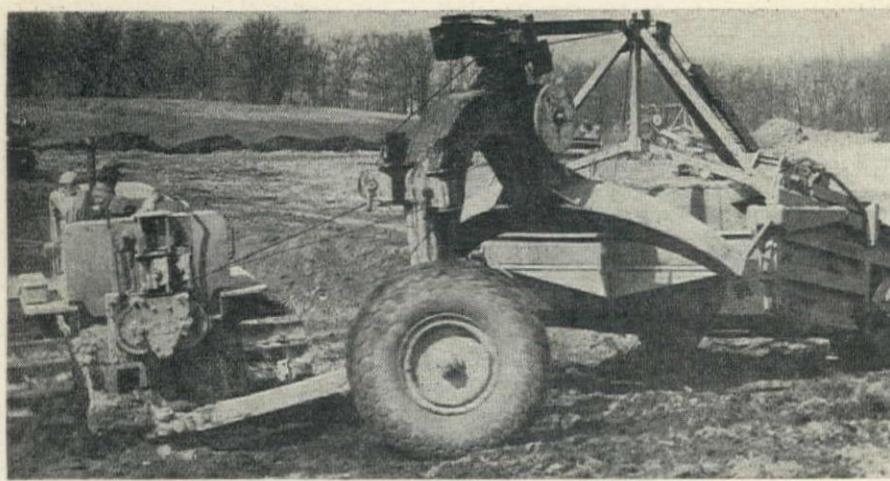
Spooling and sheaves

When the new rope goes into operation care should be taken that the slack is spooled carefully. A sudden load placed on a slack line may snap it. A pre-formed type wire rope will give an extra margin of safety because each wire has the same load bearing quality and is less likely to fail under shock stresses. Even so, it is costly practice to apply loads to a slack line in any sudden manner.

The cable should not be dragged over obstacles during its use. This not only

KEEPING CABLE clean and well lubricated is one of the most important factors in long useful life. Another is care in the use of sheaves over which the rope will be run. Worn sheaves or grooves too narrow to accommodate the cable will damage it.





AVOIDANCE of sharp kinks in cable is very important. One important way to prevent them is by careful spooling, as indicated in this photo of construction equipment.

causes abrasion but often allows grit to penetrate between the strands and wires, creating internal wear which hastens rope destruction.

The condition of sheaves and drums is especially important to the life of the rope. Sheaves must be of the proper size for the wire rope being used. Occasionally the basic design of a machine compels the use of critical diameter sheaves. Wherever such small diameter sheaves must be used it is wise to standardize on preformed rope since that type possesses considerably greater resistance to bending fatigue. Regardless of the type of rope used, it always pays, wherever possible, to use sheaves of ample diameter. In the experiences of literally hundreds of operators, changing from critical to ample sheave diameter has doubled the service life of wire rope, whether preformed or ordinary.

A worn sheave with a wide groove will flatten a rope and distort its construction. But much more serious, a too narrow sheave groove will squeeze and pinch the rope, and quickly shorten its life. A gauge should be used to check sheaves for worn or corrugated grooves and regular inspections should be made for broken rims.

Worn or damaged journals will cause sheaves to stick or wobble, while bent shafts will cause whipping or vibration in the rope. With preformed rope there is less squirming and twisting of the cable in the grooves and less internal movement of the wires and strands. This reduces both external and internal wear, insuring longer service. But there is no panacea for long life of wire by mere construction. Sheave grooves and flanges should fit and be smooth. Frequently worn grooves can be built up by metallizing.

Rope lubrication

One of the most important single factors in the conservation of steel cables is lubrication. While all wire ropes are now manufactured with a built-in, inner lubrication, continuous service eventually wears away the original deposit. It is a little known, but nonetheless true, fact that there is as much metal-bearing surface on a hundred feet of

wire rope as there is in a giant Baldwin locomotive. In a 6 x 19 wire rope (six strands of nineteen wires each) there are 114 individual moving parts. These parts (wires) move over and pass one another as the rope bends, reverse bends or straightens. The endless multiplicity of bearing surfaces thus caused actually resolves itself into a greater metal-against-metal contact than would be found in a railroad locomotive. The necessity for adequate lubrication is thus obvious. This lubrication protects the many wires from corrosion and friction-wearing and, of course, should be renewed regularly.

All ropes should be cleaned thoroughly before lubricating. If the rope is of large diameter, an effective means of cleaning is to pass it through high pressure jetted steam. Smaller diameter rope may be cleaned with kerosene and a wire brush. In applying the lubricant to the rope, several methods are used successfully. A common method is to

apply the lubricant with a stiff brush. A fairly good stiff-bristled paint brush may be used satisfactorily.

Frequent applications of a light-bodied lubricant are more desirable than infrequent treatment with a heavier lubricant. The heavier-bodied lubricant has difficulty penetrating the wires and strands. The use of discarded crankcase oil as a wire rope lubricant is not advisable. The minute particles of carbon and grit in this type of oil become abrasives which create wear on the rope instead of dispersing it. After each lubrication, all excess lubricant should be wiped off before the rope is again placed in operation.

It is an economical practice to occasionally remove cables from drums, cut off a foot or two, and rewind. This changes the locations of areas where the cable rides up to form a new layer of turns on the drum. In cutting the rope, if not a preformed type, care should be taken to seize it securely, or bind the cable on each side of the proposed cut to prevent dangerous wickering. It should never be placed in a vise for cutting or splicing.

Another life-extender for cable is the practice of removing the entire length of rope and turning it end for end. This more evenly distributes the wear over the entire section of rope.

Summary

In brief, wire rope can be conserved by observance of the following suggestions:

Select the proper rope for the job to be done.

Don't overload.

Be sure drums and sheaves are properly aligned.

Be sure journals are not damaged and that shafts are not bent.

Avoid overwinding.

Lubricate regularly and properly.

Grand Coulee Power Plant Sets New Energy Production Record in March

WITH AN OUTPUT of more than 621,000,000 kw.-hr., the Bureau of Reclamation's giant powerplant at Grand Coulee Dam in March broke all records for power production by a single plant in a month's time.

The output, nearly all of which was transmitted to vital Pacific Northwest war industries, exceeded by about 17,000,000 kw.-hr., the previous world's record high, set at Grand Coulee Dam in Jan., 1944. While the rated capacity of the plant is about 800,000 kw., the generators were overloaded and the maximum hourly load during the 31-day run was more than 880,000 kw.

For the second time in three months, the Grand Coulee production exceeded that of the Bureau powerplant at Boulder Dam. The Colorado River plant, however, still retains the distinction of having the largest installed capacity in the world—about 950,000 kw. The present installation at Grand Coulee is less

than half of its ultimate development.

To pool the vast power resources of the region for maximum war benefits the generating facilities of 11 important public and private power systems in the five Pacific Northwest states—Oregon, Washington, Montana, Utah and Idaho—have been interconnected. About a third of the energy transmitted over the 13,000 mi. of transmission lines comprising this vast network is contributed by the Bureau of Reclamation at Grand Coulee Dam.

Power production at Grand Coulee Dam has been expanded at a record-breaking pace — from scratch to the world's second largest powerplant in less than three years' time. Nearly half the 817,000 kw. of new power added on the Pacific Coast in 1943 were installed here. About one-seventh of the power produced last year in the three Coast states — Washington, Oregon, and California — was generated at Grand Coulee.

HOW IT WAS DONE

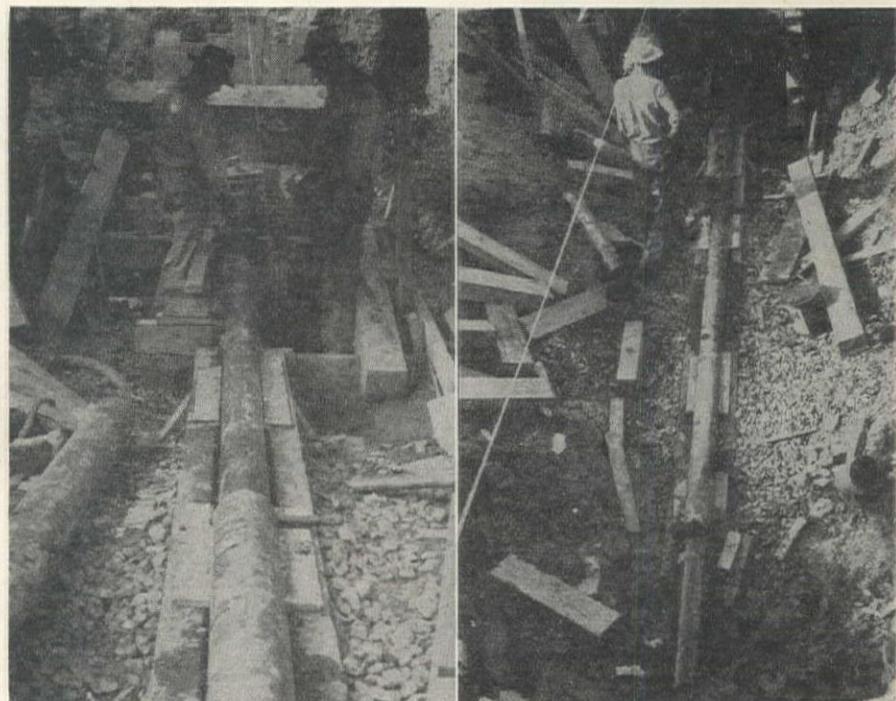
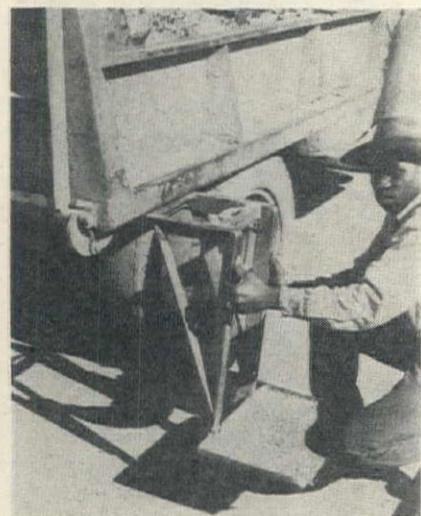
JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

Truck Step Saves Cleaning Time

THE STREET DEPARTMENT of the City of Phoenix, Ariz., has developed a useful device that has proved to be a timesaver in street cleaning operations. It consists of a metal step attached to the rear of a street cleaning truck. A man rides on this step, and as the truck moves along he picks up with a flatpoint shovel the hand sweepings from driveways and places that have been missed by the power sweeper. This material is scooped into the rear of the truck.

The step can be attached with one simple operation, as it is locked into position on the truck body by means of a metal tongue falling into a slot. The device is sturdy and safe and when not in use is easily removed.

Fred Stegner is superintendent of streets for the City of Phoenix.



Wrought Iron Pipe Jacked by Cable From Dragline Drum

A UNIQUE METHOD was recently employed by a Los Angeles, California, contractor to jack an 8-in. wrought iron pipe underneath a four-lane divided highway in San Diego, California. The total width of fill to be penetrated was 120 ft., and the material was a sandy loam.

A 5-in. pipe was placed against the jack. Holes were drilled in this pipe at 10-in. intervals to allow a steel pin to pass all the way through. The 5-in. pipe was then inserted inside a 6-in. pipe, which in turn butted against a metal plate over the mouth of the 8-in. pipe being drilled through the fill.

The pin was passed through the hole nearest the end of the 6-in. pipe, and the jack extended to its limit. When the furthest extension of the jack had been reached, it was retracted, the 5-in. pipe pulled back, and the pin advanced to the next hole. At first a hand ratchet was used on the jack and the pipe was advanced at the rate of 10-in. per hour. But later another system was devised, using a cable attached to a dragline drum. A sheave wheel was placed on the jack and a quarter-inch cable passed over the boom of the dragline from the drum to the sheave. As each throw of the jack was finished, the cable was unwound from the drum and wound on

the sheave wheel, temporarily removed from the jack for the purpose.

Using this mechanical method of operating the jack, the pipe was advanced at the rate of 20 in. per hour.

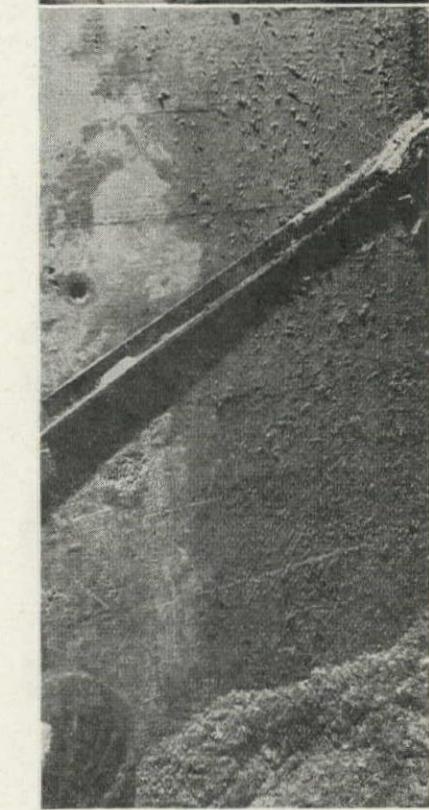
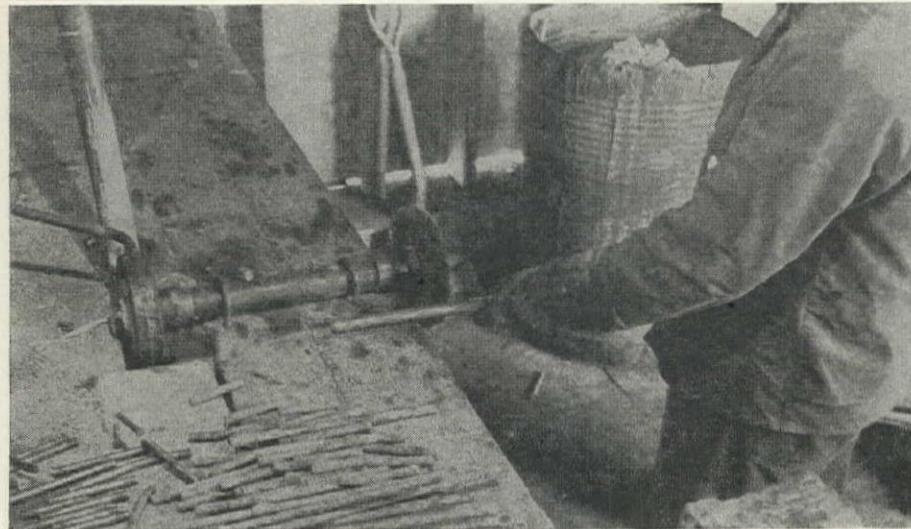
The jack used was of 50-ton capacity. The 8-in. pipe line was made up of 21-ft. joints. At first timber was used between the jack and the 8-in. pipe but it was found unsuitable, because as the pressure increased it had a tendency to buckle.

The work was performed by P. & J. Artukovich for the Federal Housing Authority. The pipe line was installed for the purpose of supplying water to a housing project under construction in San Diego. It passed beneath Rosecrans Street, the major highway.

T. G. Smith was in charge of the work for the Artukovich firm.

The photographs at the head of this article illustrate the complete operation. At the left is shown the 4-in. pipe and the pin which exerts the pressure against the 6-in. section. Also visible is the sheave wheel on the jack and the cable running upward through the dragline boom. The photo at the right shows the 8-in. pipe and the metal plate against which the 6-in. section is exerting pressure. The 8-in. pipe was greased to reduce friction to a minimum.

Compressed Air Tools Speed Construction at Keswick Dam



TWO IMPLEMENTS DEVISED in the shops of the contractor at Keswick dam have proved useful and time-saving. They were built of material already on the job in the contractor's shop and have saved much time and money in the construction of the project. They are a buffer and a router, both operated by compressed air.

The buffer was designed to clean the threads on the shee bolts and tie rods to permit their reuse. It is constructed from a 13-in. length of standard iron pipe as a casing to house the bearings and grease retainers. On one end, a 7-in. blower case is welded to a standard coupling. Running through the pipe casing is a $\frac{5}{8}$ x 20-in. steel shaft, on one end of which is fitted the blower wheel consisting of a 4 $\frac{1}{4}$ -in. hub with 12 blades, each measuring 1 $\frac{1}{4}$ x $\frac{1}{2}$ x $\frac{1}{8}$ in. A clearance of $\frac{1}{8}$ in. is allowed between the blades and the blower case. The buffer is mounted on the other end of the steel shaft.

The air supply is fed to the blower through a $\frac{1}{2}$ -in. pipe and is controlled by a foot throttle, connected to a quick acting valve. The exhaust is carried from the blower by a 1 $\frac{1}{2}$ -in. pipe connecting to a muffler. Two alemite fittings in the pipe casing serve for lubrication.

The router was designed to remove the 1-in. firtex joint filling material which was placed between the walls and columns of the powerhouse as a convenience in pouring the two separately. The router has a 36-in. handle made of $\frac{1}{4}$ -in. pipe, reinforced by a piece of $\frac{1}{8}$ x 1-in. strap iron. Air is introduced through the handle to the cutting wheel housing.

The cutting wheel consists of a 4-in. hub, holding eight cutting teeth. The wheel revolves on a ball bearing taken from a whirley air pump. A clearance of $\frac{1}{8}$ in. is allowed between the cutting

By R. K. FOWLER

Job Engineer
Atkinson Kier Company
Keswick Dam
Redding, California

teeth and the wheel housing. The entire machine is only $\frac{1}{8}$ in. thick, allowing it to be used in the 1-in. space between the powerhouse walls and columns with ease.

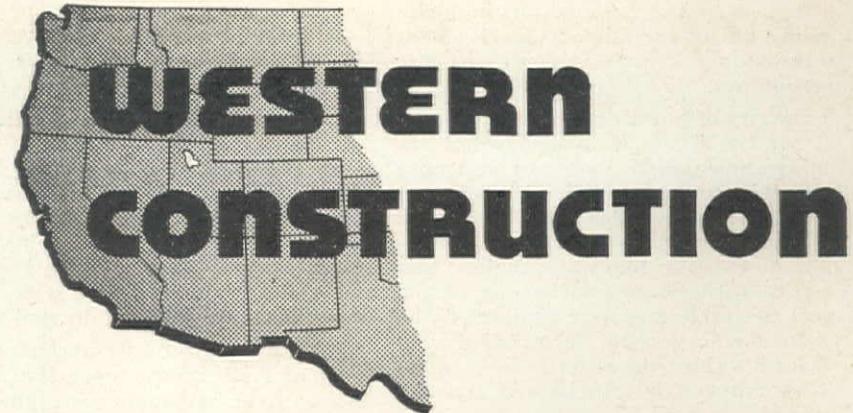
The experimental models of both machines have proven very successful and they have met the full requirements of the jobs for which they were designed. In the case of the router, the job has progressed with four times the speed of the original work, in which the joint filler was dug out by hand, many times as far as three feet back from the face of the joint. The buffer has speeded up the reclaiming of the shee bolts and tie rods many times, making much more form equipment available for reuse. Both machines have substantially lowered the cost of the work in which they are involved.

Keswick dam is a unit of the Central Valley Project, located on the Sacramento river about ten miles south of Shasta dam. It will serve as a secondary regulating basin for the discharge from Shasta dam, and its powerhouse will house three 25,000 kva. generators.

Atkinson Kier Company received the contract for the first step of the dam in August, 1941. In August, 1942, a continuation order was awarded to the same company. Critical material shortages and WPB stop-work orders have necessitated two shutdowns in construction, but the project is now proceeding and will soon be completed.

BUFFER AND ROUTER developed in the shops of Atkinson Kier Co., contractors on Keswick dam of the Central Valley Project. Both are operated by compressed air and have been found both useful and economical on the construction project. The buffer is shown in use cleaning shee bolts, and the router is shown as it removes firtex sheeting from between a wall and a column of the Keswick powerhouse. It will reach as deep as 36 in. into the joint.

NEWS OF



WESTERN

CONSTRUCTION

MAY, 1944

Nation's Construction Volume Declines; West Holds Its Own

THE TOTAL VOLUME of construction activity in the United States in February was \$304,459,000, a 5 per cent decline from the January level and 60 per cent less than the \$767,262,000 volume put in place during February, 1943, according to the War Production Board. It is only about 20 per cent of the volume for August, 1942, the peak month.

This volume of \$304,459,000 comprised the four major classifications: (1) military, \$69,374,000; (2) industrial expansion, Government and privately financed, \$72,085,000; (3) housing, \$65,000,000; and (4) all other construction, including public roads, sewer and water, community buildings, farm utilities and other non-residential, \$98,000,000.

Activity in the second and third quarters of 1944 is expected to show mild seasonal gains as the relative importance of the volume of work in the restricted normal construction categories tends to overcome the continued decline persisting in construction work for direct war purposes.

Military construction as a whole (troop housing, hospitals, airfields and bases, storage facilities, etc.) declined 12 per cent in February and totaled \$69,374,000, 77 per cent under the February 1943 volume of \$302,113,000. Military-housing work dropped 17 per cent over the month, aeronautics construction 7 per cent, and other military work 12 per cent. Construction at Navy shore establishments—hospitals, housing, aviation facilities, etc.—in February accounted for over half the total direct military construction volume. Work in the Army military construction categories, with a greater percentage of programmed work in place, is declining at a more rapid rate than comparable work for the Navy, with the result that Navy military construction volume will be greater than similar Army work for subsequent months in 1944.

Expansion of government-financed industrial facilities (construction volume

and machinery and equipment deliveries combined) declined 8 per cent in February and amounted to \$156,468,000. Expansion volume in February of 1943 amounted to \$575,343,000. Factory construction virtually held the activity level of January and totaled \$61,085,000.

W. P. B. estimates for 1944, based on the assumption that present policies affecting construction will remain in force and that total war will continue through 1944, indicate a volume of construction in the United States of \$3,600,000,000 or 48 per cent of the 1943 and 27 per cent of the 1942 volume.

Western picture brighter

In the western states, the construction activity for February showed a much

brighter picture than did the nation-wide tabulation. In the West, construction totalled nearly 70 per cent of the February, 1943, volume. Most of this is attributed to increased naval construction on the West coast and inland bases.

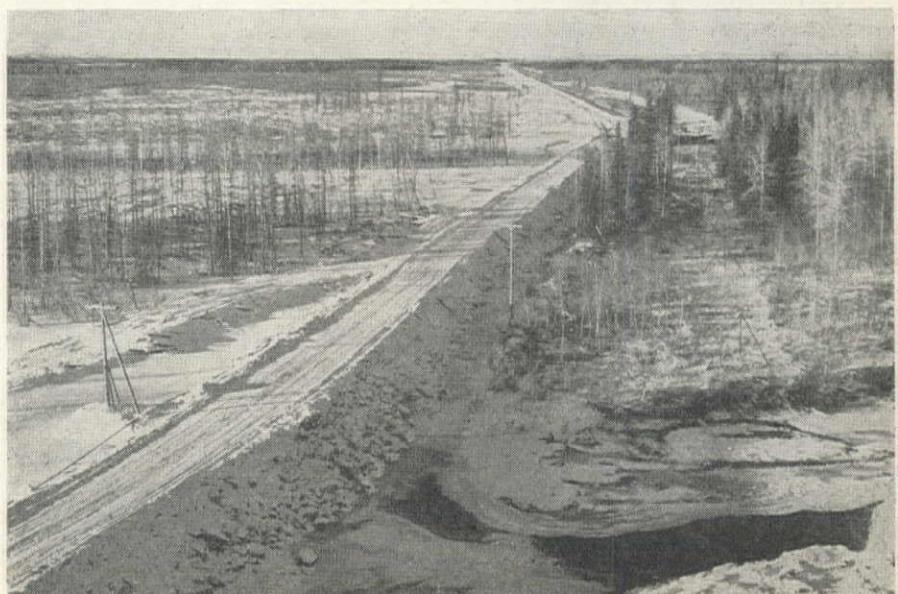
It is anticipated that this naval work will hold the March construction volume in the western states about even with 1943, and that April may actually show an increase, due to the same operations. Passage of the \$32,000,000,000 Navy Department bill by Congress is expected to speed construction by that agency.

Alaska Railroad Slated For Continued Operation

CONTINUED OPERATION of the entire length of the Alaska Railroad, at least until such time as a good system of roads can be built in Alaska connecting the Kenai peninsula with Anchorage, is the settled policy of the Department of the Interior. This statement was

FLOOD CONTROL STRUCTURE COMPLETED ON ALASKA RIVER

THE CHENA RIVER flood control dike and wing dam near Fairbanks, Alaska, was recently completed by the Army Engineers. The structure will protect aviation facilities in the area, as well as the city. It is a rolled earth and rock structure, partly composed of detritus from early day Alaska gold mining operations.



made in response to numerous inquiries arising out of the military development of the port of Whittier and its post-war possibilities.

The city of Seward is the natural outlet for the Kenai peninsula, which includes a substantial amount of land more favorable to agricultural development than almost any other part of Alaska. The Department considers the extension of existing highways to link this district with Seward to be one of the most desirable post-war projects to be undertaken in Alaska. The railroad from Seward is the only connection between this territory and Anchorage and the interior.

The Alaska Railroad was constructed to serve all of central Alaska, and to sever rail connections between Kenai peninsula and the interior would be a step backward. In the long run the line will have to justify itself on a revenue basis, unless Congress decides to make up the possible deficits, but as the situation now stands it is the desire of the Department to keep every mile of the Alaska Railroad in service.

Huge Glued Wood Arches Span Boeing Cafeteria

GLUED TIMBER ARCHES over 90 ft. long were erected by Western Construction Co., Seattle, Wash., in construction of a cafeteria at the Boeing Aircraft Company main plant in Seattle recently.

The Boeing company, realizing the value of good food served in pleasant surroundings to morale and efficiency, has allocated \$750,000 for its in-plant feeding program. The new building, a

cafeteria and kitchen, is a permanent type brick veneer structure. When completed it will accommodate 1600 persons at once.

The total area spanned by the glued arches is 112 x 220 ft. Each of the ten arches has an individual span of 92 ft. 4 in. with a center rise of 28 ft. 3½ in. The arches were made in twenty individual units, each unit having a base width of 2 ft. 4 in. The ridge was 1 ft. ½ in. wide, the elbow 3 ft. 6 in. wide and the stock used was 1-in. fir dressed to ¾ in.

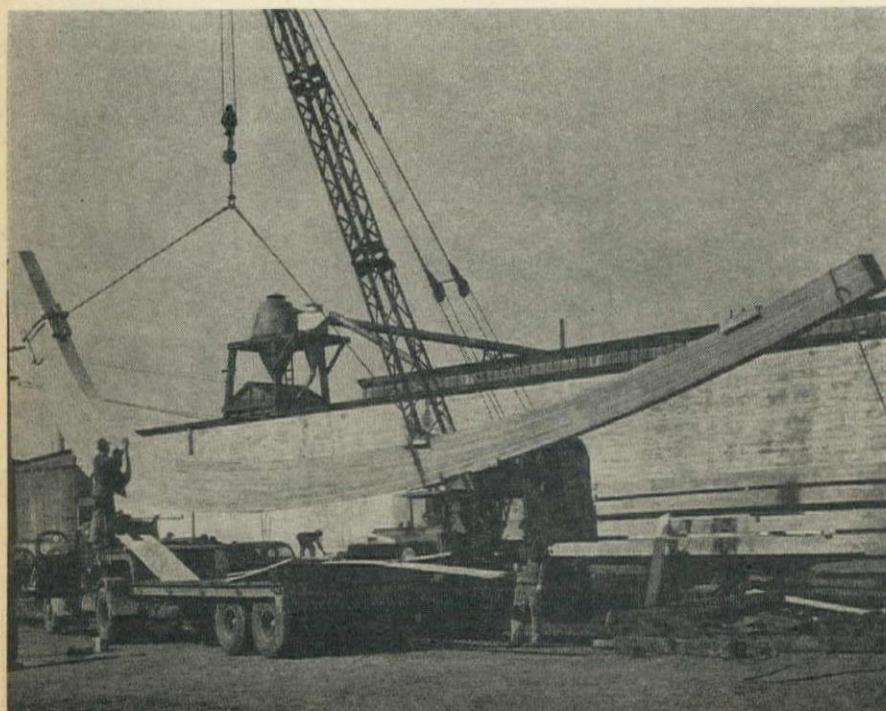
The arches were prefabricated in the yard of Timber Structures, Inc., in Seattle, and the segments were glued with construction glue manufactured by I. F. Laucks, Inc., Seattle.

Simplified Pipe Fitting List Revision Approved

A REVISION of the Simplified Practice Recommendation R185-42, Pipe Fittings (Gray Cast Iron, Malleable Iron, and Brass or Bronze), has been approved by the Pipe Fittings Manufacturers Assn., and the Division of Simplified Practice of the National Bureau of Standards has mailed copies to all interests for consideration and approval.

This recommendation was originally adopted by the industry in 1941 on the suggestion of the Office of Price Administration and Civilian Supply as a means of increasing output, and conserving manpower and machines. It was widely distributed throughout the trade and its general adoption enabled the industry to obtain the desired results. When the production of fittings was placed under the control of the War Production Board, the simplified list of fittings was

GLUED ARCHES for the new Boeing cafeteria were fabricated in Seattle, trucked to the plant, and erected by crane. Each unit was 92 ft. long, built of 1-in. stock.



made mandatory through limitation orders, the latest of which, L-288, is still in effect.

Experience with the simplified list has indicated the desirability of continuing it after the emergency, and to this end, the Pipe Fittings Manufacturers Assn. requested that R185-42 be revised, to conform to the simplified list as amended and be made available to the trade for use when L-288 is revoked.

The original simplified list provided for the continued production for stock of but 1311 of the 4964 gray cast iron fittings previously offered; of 1169 of the 2331 malleable iron fittings, unions, and union fittings, and 487 of the 1271 brass or bronze screwed fittings, unions, and union fittings, previously stocked.

The revised list permits the production of 277 additional gray cast iron fittings, the majority of which are sprinkler fittings, and 97 additional malleable iron fittings.

A limited number of mimeographed copies of the proposed revision may be obtained without charge from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

WMC Releases New Labor Market Classifications

RECENT REVISIONS in the labor market classifications released by the War Manpower Commission have altered the status of several western cities. In order to clarify the position of western defence areas in the labor classifications setup, a complete list of groupings is given herewith:

Included in Group I (areas of acute labor shortage) are Eureka, Los Angeles, San Francisco bay, Santa Ana and Ventura-Oxnard, California; Las Vegas, Nevada; Portland, Oregon; Vancouver, Tacoma and Seattle-Bremerton, Washington; Ogden and Tooele, Utah; Cheyenne, Wyoming; Hastings, Nebraska; all of the Territory of Hawaii.

Group II (areas of labor stringency or anticipating a shortage within six months) includes Bakersfield, Fresno, San Bernardino-Riverside, San Jose and Stockton, California; Phoenix and Tucson, Arizona; Everett, Longview-Kelso, and Spokane, Washington; Reno, Nevada; Great Falls, Montana; Pocatello, Idaho; Provo and Salt Lake City, Utah; Dallas and Fort Worth, Texas; Grand Island, Nebraska.

In Group III (areas in which a supply of labor reserves will remain after six months) are California, not listed above; Aberdeen, Hoquiam, Bellingham, Olympia, and Yakima, Washington; Billings and Butte, Montana; Boise, Idaho; Colorado Springs, Denver and Pueblo, Colorado; El Rio, Brownsville, Corpus Christi, El Paso, Laredo, San Angelo and Wichita Falls, Texas.

Group IV (areas in which substantial labor reserves will exist after six months) includes Abilene, Austin, Lubbock, San Antonio and Waco, Texas; Albuquerque, New Mexico.

Spur Will Link Rail Transportation With Coulee Reservoir Boat Traffic

THE BUREAU OF RECLAMATION has cleared the way for linking water transportation on the 151-mi. reservoir behind Grand Coulee Dam with transportation by rail.

Frank A. Banks, Regional Director of Reclamation, announces that the Bureau has granted the Great Northern Railway Co. a lease to construct and operate a short spur track on government-owned land near Kettle Falls, 100 mi. above the dam, from an existing line to the water's edge. Lumber, a critical war commodity, will comprise the bulk of proposed rail-water shipments.

The contract was negotiated jointly by the Bureau of Reclamation and the National Park Service, which, under an inter-bureau agreement, handles applications for permits to use the reservoir and adjoining lands and makes recommendations as to general administrative policy.

The proposed track would connect the Great Northern's Republic line (Kettle Falls, Wash., to Grand Forks, B. C.) with water carrier service to be

provided by the Lafferty Transportation Co. of Coeur d'Alene, Ida. This company has an Interstate Commerce Commission certificate to operate barges and towing vessels on the reservoir.

The Lafferty company contemplates hauling lumber to the railroad connection from the Lincoln Lumber Co. mill, situated approximately 70 mi. downstream. It is expected that as the water line develops other commodities will be handled and other points served.

The company is completing construction of three large 150-ton barges on the Spokane River and the Bureau of Reclamation has granted it a lease to construct and operate a tugboat terminal and transfer facilities near the Lincoln plant.

The proposed spur track will run from the east end of the railroad bridge at Kettle Falls to a junction with the reservoir less than a mile downstream. The track will be extended into the reservoir on a trestle and loading and unloading equipment, which can be operated at various levels of the reservoir, will be constructed thereon.

war program because the West Texas area, with its substantial reserve of "sour" crude oil, is one of few remaining areas where production capacity has been in excess of existing pipeline capacity.

Yellowstone Pact Commission Extended by Legislative Act

THE YELLOWSTONE Compact commission, originally created by Congress and ratified by the legislatures of Montana, Wyoming and North Dakota, to formulate an agreement on the division of the waters of the Yellowstone watershed, has been extended by Congress until 1947. Its original term was to have terminated in 1943.

Each of the three states appoints ten members to the Commission. The first to announce its members under the new extension is Montana. Five appointees were renamed. They are: State Engineer Fred Buck, W. E. Ogden, P. F. Leonard, H. W. Bunston, president of the Yellowstone Basin Assn., and Wesley A. D'Ewart, president of the Montana Reclamation Assn. New members appointed were: E. A. Tiffany, D. M. Manning, Chester E. Onstad, Paul Hagen and Axel Persson.

Pipeline Carries Texas Crude Oil to Oklahoma

OPERATIONS on the recently completed 385-mi., 16-in. Stanolind crude oil pipeline from the Slaughter Field in West Texas to Drumright, Okla., began April 1.

The Stanolind is the second new big pipeline to carry "sour" crude oil from the West Texas fields, the other being the 336-mi., 12-in. Magnolia pipeline from Midland to Corsicana, Tex., which began operations on March 10.

The Stanolind and Magnolia crude oil lines are particularly important to the

According to word received from officials of the Stanolind line, pipe laying was completed on March 15. No leaks, air traps or other difficulties were experienced during the testing period. Approximately 490,000 bbl. of oil were required to fill the line, the first oil arriving at Drumright at 9:50 a.m., Thursday, March 30. It was anticipated that regular operation could begin with an initial capacity of 50,000 bbl. a day.

Rated capacity of the Stanolind line is 65,000 bbl. a day. Pumping capacity in the 12-in. Magnolia line will reach 42,000 bbl. a day as soon as the full complement of pumping units are tied into the line, which parallels an existing 8-in. line on the same system. Both lines can be boosted in capacity at a later date by addition of more pumping stations; the Magnolia line to 62,000 bbl. daily; the Stanolind line to 116,000 bbl. daily.

Fire Destroys Alaska Hangar Of Construction Contractor

A FIRE in the airplane hangar owned by Morrison-Knudsen Co., Inc., at Anchorage, Alaska, on April 11, caused damage estimated at \$250,000, destroyed three airplanes owned by the company and damaged two others. Expensive tools and equipment were also lost. It is believed that the fire started from an acetylene torch.

The company, which for several years has had extensive contracts in Alaska and is still operating in that field, has used its own air transportation regularly to keep in touch with its jobs.

HUGE RUBBER HOSE TO BE USED IN HYDRAULIC MINING

JOHN CURTIS, veteran hose builder is shown as he completed final inspection of a section of flexible hose built in the factory of B. F. Goodrich Co. The hose will be used in the hydraulic mining of phosphate in a western mine. Fourteen plies of heavy weight duck coated with synthetic rubber, reinforced with two coils of wire are used in the massive conductor, of which each 15-ft. section weighs 2,200 lb.



WASHINGTON NEWS

... for the Construction West

By ARNOLD KRUCKMAN

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ASHINGTON, D. C.—There should soon be another \$30,000,000 in the Treasury to be expended by the Public Roads Administration for access roads to military and naval reservations and defense industries. The bill passed both the Senate and the House and was ready to go to the President for signature in April. The original bill provided \$25,000,000; the additional \$5,000,000 was suggested by the Senate.

By the time this is published H. R. 2426, providing \$3,000,000,000 for post-war road building, undoubtedly will have been reported to Congress for discussion on the floor of the House. Commissioner Thomas H. MacDonald was the last witness called before the Roads Committee of the House. He summarized the hearings which had been in progress for almost 8 weeks. One of the last westerners to appear was Lloyd Aldrich, City Engineer of Los Angeles. During the past four weeks most of the testimony and discussion in the committee turned on the apportionment of the funds. The eastern group, especially those from New England, have made a hard drive to secure allocation of the funds on a basis of population or of soldier participation in the war. Obviously this would unfairly leave States such as Utah, Nevada, Idaho and others on the West Slope stranded.

The bill, as written, will make \$3,000,000,000 available in three annual equal consecutive instalments. The apportionment is to be made within 30 days after the bill becomes law. Broadly, the plan was to give half to Federal Aid and half to urban projects; and to distribute secondary and feeder project funds according to population in urban and other areas. Prognostications are always uncertain when dealing with affairs in Washington. It is probable, however, the plan for apportionment finally adopted will allocate one-half on the basis of population (which will obviously work out from one-third to one-half); one-fourth on the basis of area, and the final one-fourth on the basis of post road mileage. It is anticipated this formula will provide approximately satisfactory allocation to urban areas, and will deal reasonably fairly with the Western States. It is based on the formula adopted in 1916, which has enabled the protesting Eastern and Northeastern States to share generously in the prosperity which followed the developments that came with the building of highways in the Western states.

The testimony here the past months was a revelation to some tight-minded members of Congress who had never taken time to consider the richly profitable market for the products of their areas which flowed into the Western region after the roads were built with

Federal aid. It apparently became still more clear to them that the West Slope and the Plains states are on the brink of another great development in American evolution. They have now translated highways into terms of dollars for textiles, shoes, machinery and innumerable other Eastern products. It has become apparent to many of them that it might even be as good a bet as spending money on the numerous good neighbors in South America and across the seas.

Pan-American highway

Commissioner Thomas H. MacDonald of the Public Roads Administration has just returned from a three-weeks' inspection tour over the Inter-American Highway. The party included Maj.-Gen. Philip B. Fleming, Federal Works Administrator, and E. W. James, Chief, P. R. A. Inter-American Regional Office. They flew to Tapachula, on the Mexican-Guatemalan border, and traveled by car through Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica. The Inter-American Highway runs 3,356 mi. from the U. S. border at Laredo to the Panama Canal; about three-fourths is now open for all-weather travel.

MacDonald found the 71-mi. section now under construction in Costa Rica, between Cartago and San Isidro del General, the toughest and most difficult road-building ever attempted anywhere in America. The road climbs to 10,931 ft., the highest elevation on the entire route. Efficiency of machinery as well as men drops off sharply. Word has come back from Americans down there that this 71 mi. is equal in difficulties and problems to two-thirds of the entire 1,400 mi. of the Alaska Highway. About 28 mi. runs along the top of the Talamanca range, more than 18 mi. at 9,000 to 11,000 ft. above sea level. Over a stupendous tumble of soaring mountain peaks and knife-edged ridges the Atlantic may often be seen 50 mi. away and the Pacific 30 mi. in the other direction.

The 71 mi. at the Continental Divide will cost over \$15,000,000. There will be five tunnels, totaling a third of a mile in length; the job requires the handling of 17,000,000 cu. yd. of excavation, nearly 250,000 yd. per mi., compared with 15,000 yd. per mi. on the Alaska Highway. Nearly half this job is rock. One mile on the crest is expected to require over 500,000 cu. yd. of excavation, somewhat greater than a 30-mi. section of the Alaska Highway in Alaska. The enormous cuts, sometimes over 100 ft. deep, and fills over 125 ft. make high pressures which cause great slides and collapses. After a tropical downpour a good fill will collapse like

stiff mush and a slide will bring a juvenile mountain onto the highway.

Near the crest only 28 days passed in twelve months without rain. The highway crosses the many streams near their sources, making unnecessary bridges of any consequence, but requiring 750 culverts. These are brought up in advance of grading on a "pilot" road.

It was found here that a 100-h.p. diesel tractor, which pulls a carryall with a 20-ton load at sea level, hauls considerably less than half as much at 10,000 ft. Compressors, power shovels, trucks and other power-driven equipment all operate far below par.

The Americans of Central and South America want their own contractors and their own engineers. About all they want from us is the equipment they cannot get elsewhere, and our money. Mexico did all surveying, engineering and construction without assistance on the 1,200 mi. completed in that country. It still has 600 mi. to build. Guatemala has built 300 mi., linking Mexico and Salvador. In El Salvador 146 mi. is paved, and the remaining 50 mi. surfaced. Honduras has 95 mi., of which 76 is an all-weather road. Nicaragua has 255 mi., mostly all-weather highway. In Costa Rica, through jungle, plain and cities, there is a total of 383 mi. of road. In Panama, 33 mi. of the 377 total is still trail. The rest is all-weather or paved. We have paid \$30,000,000 for these roads in all countries except Mexico. Mexico paid its own. We still have \$10,000,000 to spend, under the Inter-American Highway Act of 1941. In theory, at least, each country contributes at least one-third of the cost.

Road law changes

Federal, State or other government agency highways, heretofore under Order L-41, have been placed under a separate Order L-41-e. No specific W. P. B. authorization is necessary if a project costs \$5,000 per mi. or less, when the aggregate cost is not over \$25,000; or when the project costs \$10,000 or less; or when the project provides access to sources of raw materials under Section 6 of the Defense Highway Act of 1941, certified by the W. P. B.; or when the project is owned by Army, Navy, Maritime Commission, War Shipping Administration, Coast Guard, Marine Corps, Civilian Aeronautics Authority, Coast and Geodetic Survey, or Panama Canal.

Rep. Wene, N. J., introduced H. R. 4628 to supplement the Federal-Aid Road Act of 1916, to provide for an inter-regional highway system and authorizes \$2,010,000,000 for postwar construction of greatly needed highway facilities where they are most urgently needed, and where conversion from wartime to peacetime activities needs the cushioning of public works. Rep. Magnuson introduced H. R. 4625 to continue the Alaskan International Highway Commission for another four years.

Water bill high pressure

The battle over the Rivers and Harbors Omnibus Bill (and the allied Flood

Control Bill) will undoubtedly be out in the open on the floor of the Senate when this is published. A hostile sub-committee in the Senate rushed it to hearings in order to secure action, if possible, before the Western Governors could visit us on their way to the meeting of all Governors at Harrisburg, Penn., on May 28. The unfriendly sub-committee is part of the Senate Rivers and Harbors Committee, and consists of Sen. Overton, Ga., chairman; Sens. Caraway, Ark.; Bilbo, Miss.; Mead, N. Y.; Wallgren, Wash.; Vandenberg, Mich.; Robertson, Wyo.; and Wiley, Wis. Not all members are opposed but the chairman is definitely against the prior rights of irrigation and other un-navigational uses of water; and his associates take his program, with the exception of some of the Western members and possibly Sen. Vandenberg. The report of the sub-committee is expected to deny the validity of the amendment offered by Sen. Robinson, making domestic, industrial, power and irrigation uses come before navigation.

The Eastern States Conservation Association met in New England in April and came out solidly in support of the Western program. It is anticipated at least 12 Western Senators will make a strong fight for the Robinson amendment on the floor of the Senate. Judge Clifford H. Stone, Director of the Colorado Water Conservation Board, and Chairman of the Committee of Fourteen on the Colorado River, also author of a book on State water laws, has been retained by the Governors of Montana, North Dakota, Wyoming, Washington, Utah and Colorado to represent the interests of these States in securing appropriate amendments. There is confidence that the fight on the floor of the Senate will be supported by a majority cutting across party lines. This majority, if it is reflected in the final vote, will send the Rivers and Harbors Bill and the Flood Control Bill to conference with the House Committee.

There is a possibility the conference might evolve a compromise conceding the water rights of the West. But it is only proper to state it is mainly a possibility. The navigation and flood control interests are strongly organized and have the cooperation of the Army Engineers. One fortunate circumstance is that the Bureau of Reclamation is expected to have ready on May 1 its comprehensive multiple-purpose development plan for the same area. It is hoped the Army program and the Reclamation plan may be coordinated either by Congress, budget or by the two agencies themselves. If something of the kind does not happen, the fight will be bitter and protracted.

Flood control bill

The Flood Control Bill, H. R. 4485, reported out of the House Committee on Flood Control, is closely inter-related to the Rivers and Harbors Bill. One bill must in essence articulate with the other. Both pertain to public works on rivers and harbors. How they mesh is still rather vague. It appears the

Flood Control bill involves considerably over one billion dollars in potential appropriations.

Section 6 of the bill provides that when the Secretary of War and the Chief of Engineers decide any project operated under the direction of the Secretary of War can be consistently used for reclamation it shall be the duty of the Secretary of Interior to make regulations and fix rates for the use of water; and the power developments shall be installed by the Secretary of War on the recommendation of the Chief of Engineers and the Federal Power Commission; and certain other measures of soil conservation shall be under the jurisdiction of the Secretary of Agriculture subject to improvements of rivers and other waterways for flood control and allied purposes under jurisdiction of the Secretary of War and the Chief of Engineers. This obviously makes all improvements for irrigation and allied purposes subordinate to navigation.

The Flood Control Bill is composed of 54 major items. Thirty-six items are located east of the Rockies, mostly beyond the Plains States, and 18 items are in the area beyond the Rockies. Projects in the West are listed as, California: San Diego River Basin, \$370,000; Ventura River Basin, \$1,600,000; Santa Ana River Basin, \$10,000,000; Los Angeles-San Gabriel Basin and Ballona Creek, \$25,000,000; Sacramento-San Joaquin River Basin, Sacramento River, \$15,000,000, and San Joaquin River, \$6,800,000, Kaweah and Tule Rivers, \$4,600,000, Kings River and Tulare Lake Basin, \$19,700,000, Merced County Stream Group, \$1,300,000, and Lower San Joaquin River and tributaries including Tuolumne and Stanislaus Rivers, \$8,000,000; Oregon: Coquille River Basin, \$143,000; Nehalem River Basin, \$23,000; Willamette River Basin, \$20,000,000; Columbia River Basin, at Heise, Roberts and Weiser, \$743,000; at Arlington, on Alkali Canyon, \$118,000. Washington: Willapa River Basin, \$127,000; at Pullman and Colfax, on the Palouse River and tributaries, \$478,000.

Preliminary investigations are planned at San Rafael Creek and its tributaries in California. Conservation programs are planned in the Los Angeles River Basin to cost \$8,300,000.

Rep. Elliott, Calif., introduced H. R. 4530 to authorize expenditure of \$2,900,000 for emergency flood control work in the Tulare Lake Basin, Calif. H. R. 3570 was passed by Congress late in April to authorize partial construction of the Hungry Horse Dam on the Flathead River in Montana as an emergency war project. The bill is expected to become law early in May.

Lots of money

Appropriations processed in Congress included the largest naval appropriation in our history, \$32,647,124,336. An effort was made to pass it with fifty members in the House, but objections caused postponement until 258 were rounded up and all voted affirmatively without a single dissenting voice. It includes \$8,200,640,000 for naval aviation, \$7,800,-

000,000 for replacements and new vessels, involving 24,230 airplanes, 807 combat vessels and 30,151 ships of other categories, most of which are classified as landing craft. Another appropriation bill sent to the White House provided \$1,644,373,000 for shore stations. This is H. R. 4381.

H. R. 4560, Rep. Gearhart, Calif., provided \$4,000,000 for a Veterans Home in Central California. S. 1771, introduced by Chairman Walsh of the Senate Committee on Naval Affairs, provides \$65,000,000 for ordnance plants and facilities for production in behalf of the Navy. Another \$115,000,000 was appropriated to Federal Works Agency to build community facilities. Another billion dollars was appropriated for advanced bases for the Navy to be built in the Pacific, and \$600,000,000 for more shore facilities. It is expected the \$50,000,000 Army supply bill will be enacted before this is published. H. R. 4070 appropriated \$8,000,000,000 for independent offices and executive establishments; and \$567,995,779 for the Department of Agriculture.

Miscellaneous

Secretary of State Hull has actively moved to induce Congress to provide \$421,000,000 for the St. Lawrence seaway and hydro-electric project. An effort to secure a treaty to build the project was defeated in 1934; the present effort to secure the appropriation is regarded as a plan to avoid the necessity for the treaty.

Rep. Mott, Ore., introduced H. R. 4488 for an investigation of Tillamook Bay and Bar, Ore. H. R. 4617 authorizes the Secretary of Agriculture to requisition war material and equipment (not needed) for use of irrigation, grazing and other districts. H. R. 4574 would amend the Boulder Canyon Project Act to enable veterans of this war to have prior rights in filing for entry on lands irrigated by Boulder Dam and withdrawn from public entry by the Secretary of Interior. Rep. Anderson, Calif., introduced H. R. 4427 to authorize an investigation of the Pajaro River and its tributaries, under the Flood Control Act.

Sen. Bailey, N. Carol., proposed that Congress name the prospective Umatilla Dam in the Columbia River in honor of the late Senator McNary.

U. S. Geological Survey reported stream flow was subnormal during the months between October 1, 1943, and March 31, 1944, in most of the Western States. In the Pacific Northwest the deficient runoff developed since January. The deficiency has existed during the whole period in the Gila and the Salt Rivers of Arizona, and in the Kings River, California. Conditions have been reasonably good in Nevada.

The recent Navy appropriation for shore facilities included an addition to the Lindbergh Airway at San Diego which will increase its length over one-half mi., be 12 in. thick, 300 ft. wide, one of the most extraordinary slabs of concrete ever made. The over-all length of the runway will be 185,000 ft. when complete.

Pit River 5 Project Is Dedicated To Production of Power on May 1

THE PIT RIVER No. 5 project of the Pacific Gas & Electric Co. in northern California has been completed. It was dedicated and put into service on May 1. The five generators of the project are producing 214,477 hp. of electrical energy for the war industries of California.

The \$25,000,000 project has been under construction since July 1, 1941. It embraces a diversion dam; a tunnel intake structure; 28,180 ft. of 19-ft. concrete-lined circular tunnel; four welded steel

penstocks, each 1380 ft. long; and a powerhouse accommodating four 40,000 kw. generators.

Additional construction included 5020 feet of earthfill for an open section conduit, a concrete-lined surge chamber 101 ft. deep and 88 ft. in diameter, and 14 mi. of two-circuit transmission line, partly 1.1-in. aluminum wire and partly 1-in. I-beam construction copper carrier.

The addition of the Pit 5 powerhouse to the P. G. & E. generating system raises installed production capacity to 2,302,700 hp. and the total power available for distribution by the company (including purchased power) to 2,825,155 hp. The company now operates 165 generating plants, 52 of them hydro-electric. The construction of the Pit 5 project was described in *Western Construction News* for September, 1943.

The work was under the supervision of I. C. Steele, chief engineer of the P. G. & E.; O. W. Peterson, construction engineer; and H. W. Haberkorn, assistant construction engineer. G. M. Wehrle was project superintendent for the company. Work on the dam and tunnels was performed by T. E. Connolly Inc. & Hanrahan Co. William Connolly was general superintendent for the contractor. The powerhouse was constructed by H. H. Larsen Company with Oscar Thompson as construction superintendent.

British Columbia Firms Announce Incorporation

INCORPORATION of the Black & Boyce Construction Company, Limited, under the B. C. Companies' Act has just

Robert E. Strahorn, 92, died recently in San Francisco. Besides being a pioneer railroad builder, he had also financed and promoted power systems and finance companies and helped build several small towns. He was president of the North Coast Railroad, as well as an executive of the Southern Pacific and Western Pacific Railroads.

William C. Hammatt, hydraulic and construction engineer and president of the W. C. Hammatt Co., Los Angeles, Calif., died recently in that city at the age of 71. One of the chief activities of his long career was in connection with the building of main highways in San Fernando Valley.

Roy E. Stafford died Apr. 7 in Seattle at the age of 54. He had long been identified with construction work in that area, and at the time of his death was a King County road foreman.

Edwin P. Brewster, Chehalis, Wash., contractor, died recently at the age of 63. He was responsible for the construction of many large buildings in the Chehalis area during his 31 years' residence there.

Lester Lee Conrad, electrical engineer with the Southern California Edison Company, died April 6, in Pasadena, Calif.

William J. Sadler, former city engineer and water superintendent of Port Townsend, Wash., died recently in Spokane.

been announced. Registered offices of the firm are located at 301 Standard Bank building, Vancouver, B. C., and the authorized capitalization of the company has been set at 100 shares without nominal or par value. The firm will carry on business as general contractors.

Incorporated with capitalization of \$10,000, Moncrieff Construction Co. Ltd., has now commenced business as general contractors. Registered offices of the firm are located at 408 Standard Bank Building, Vancouver, B. C.

Clifton Construction, Limited, was recently incorporated at Victoria, B. C., with authorized capitalization of \$10,000. Registered offices are located at 1001 W. Pender St., Vancouver, B. C., and the firm will carry on business as general contractors.

WPB Allows Manufacture Of New Concrete Mixers

THE WAR PRODUCTION Board has removed restrictions on the manufacture of 3½-cu. ft. portable construction concrete mixers, by including the size in Schedule V of the construction machinery simplification and conservation order L-217. The schedule, originally issued in February, 1943, limits the manufacture of portable construction concrete mixers to the types, models, and sizes specified.

Prior to this amendment the smallest size permitted was 7 cu. ft. The 3½-cu. ft. size has always been used for small building jobs, Construction Machinery Division officials said, and contractors have had to depend upon the larger size when inventories of the 3½-cu. ft. size were exhausted. The manufacture of the smaller size will therefore result in a substantial saving of materials and components.

Fire Hazard Reduces Recreational Use of Southern California Forests

FOLLOWING the pattern in effect during the past two years, a reduction in the area of Federal land open to recreational use and travel will be made in the Angeles, Cleveland, San Bernardino and Los Padres National Forests of southern California as soon as the fire hazard reaches a dangerous stage, according to announcement by Regional Forester S. B. Show, Chief of the U. S. Forest Service in California. In a normal season this period of high hazard is reached about the first of June.

The protection of the chaparral and timber covered mountains of southern California is one of the most critical fire protection problems which each year confronts the Forest Service. The number of fires which occur in the southland may not be large as compared with other parts of the State, but because of the steep slopes, dense brush cover and high winds every fire that starts may become a major conflagration. The proximity of the forests to

large centers of population makes them attractive recreation grounds and even with the many wartime restrictions imposed on travel, records show over half a million visitors to the mountain areas that were open last year to the public. Records show that more than 80 per cent of the fires that occur in these forests are caused by people who are careless with matches, cigarettes, debris burning and camp fires. The number of fires from recreational use in the southern National Forests during the two years of closure dropped 20 percent with a reduction in area burned of over 90 percent from major fires of this type.

The high value of these mountain watersheds as conservers of water supply and as a protection against destructive floods and erosion which invariably follow large fires makes it imperative that they be given the maximum degree of protection, even if it does necessitate a curtailment of privileges of some who seek sport and pleasure.

A.W.W.A. to Have Meet at Milwaukee

THE 1944 CONFERENCE of the American Water Works Association will be held in Milwaukee, Wisconsin, June 13-16. All daytime technical sessions and exhibits by manufacturers and others interested in the water works field will be located in the municipal auditorium. One special evening session and the ceremony of presentation of awards will be staged at the Schroeder Hotel.

The opening session of the conference will be devoted to papers concerning the public water supply of Milwaukee by officials of that city. The second day will be devoted to papers relating to the cost and useful life of water works structures and a joint session of the Plant Management and Operation Divisions, and the Finance and Accounting Division will hear a symposium of the water works management and administration. Statewide operations in California, Nebraska and Virginia will be considered. Col. William N. Carey and Abel Wolman will discuss postwar construction and water works plans at a public session the same evening.

The following days will be spent in considering water distribution problems, current policies of the Water Division of WPB, modernized meter rates and wartime problems of jointly administered water and sewage works. The Water Purification Division will hold three sessions, the committee of steel pipe will conduct an open session and other special committees and groups will hold meetings during the sessions.

War Causes Development Of Superior Map Paper

TO MEET the exacting requirements for maps instantly usable under severe combat conditions everywhere, the National Bureau of Standards, in cooperation with the Corps of Engineers and the paper manufacturers, has developed a paper far superior to any heretofore used for this purpose.

The paper on which war maps are printed must not only withstand rough treatment but must be as useful when wet as when dry and hold its size and shape under combat service conditions.

As an outgrowth of the cooperative project, launched early in 1942, at the request of the War Department, this new type of map paper is now being produced commercially in quantities sufficient to meet the needs of the armed forces. It is made from a detailed specification developed from the results of extensive laboratory tests at the Bureau, correlated with the results of comprehensive field tests during maneuvers.

Maps printed on the new paper have greater strength, which they retain after being soaked with water or oil, trampled in the mud and subsequently washed

with soap and water or dipped in gasoline. They also have satisfactory writing and erasing qualities even when soaking wet.

The performance of the maps has been so good that the improved paper has been adopted as standard by all agencies making war maps, and for export to Allied nations under lend-lease.

California Mineral Output Establishes New High Record

PRODUCTION of carbon dioxide in California in 1943 was 227,424,000 cu. ft., which was compressed to make 14,037 tons of dry ice valued at \$248,126. This was an increase of about 2,000 tons of dry ice over the 1942 production, but the dollar value was reduced by \$62,000 in 1943. All the gas came from wells operated by two companies near Niland and one company near Hopland.

Iron ore shipments in California during 1943 totaled 907,458 tons valued at \$2,341,827, coming principally from four

properties in San Bernardino County. This was by far the largest annual production of iron ore ever reported in the state, being, in fact, more than the total of all iron ore produced since 1881. The ore was hematite and went to the new steel plant operated by the Kaiser Company at Fontana.

Quicksilver production in California during 1943 was also a record high for the state, 33,948 flasks valued at \$6,177,159 being produced by 86 mines. This was approximately 63 per cent of the total quicksilver production in the nation.

Railroad Construction Restrictions Are Eased

RESTRICTIONS on the construction of certain railroad operating facilities, such as tunnels, overpasses, underpasses and bridges not exceeding \$2,500 in cost of materials used, have been lifted by the War Production Board.

This action is covered in an amend-

CONSTRUCTION TRAILERS FIND IMPORTANT NEW WAR USES

THE HEAVY-DUTY flat-bed trailers which have proved so useful in transporting heavy peacetime machinery are now being used in the war theaters, with considerable additional equipment added, to haul fighting tanks to the front, and to retrieve them when damaged or disabled mechanically. These Freuhauf trailers illustrate the point.



ment to Preference Rating Order P-142. Railroad operators may acquire the exempted amount of materials either by placing new Maintenance, Repair and Operating Supplies orders under P-142 or they may withdraw this quantity of materials from priority-obtained inventories.

With respect to any project costing over the above limits, after the operator gets specific authorization in writing from WPB he may withdraw amounts over those limits from his inventory of materials acquired with priorities assistance. However, replacement in inventory of any additional materials so withdrawn may be made only by using the ratings and allotments assigned by the specific authorization.

Nonoperating railroad buildings, such as stations and loading platforms, remain subject to the controls of L-41 and MRO materials can be used only within L-41 cost limits.

Fund For Post-War Work In California Increases

GOVERNOR WARREN of California has reported to the State Legislature that according to present estimates a total of 62 million dollars will be available by June 30, 1945, from sales tax collections earmarked for postwar state building projects. This is a substantial increase from the 43 million dollars which had been estimated during the last session of the Legislature.

The Governor reported that plans are virtually complete for 25 million dollars worth of state building construction, and suggested an additional one and a half million dollars be made available for the expense of preparing plans and specifications for additional projects.

Surveys will be completed by the end of this year on about 43 per cent of the 80 million dollar postwar highway con-

struction program now being prepared by the state highway engineer. The state highway engineer told the Legislature that in addition to the 80 million dollar program already authorized, the state needs 183 million dollars for highway construction immediately to meet imperative needs of traffic and that a total long-range highway construction program of approximately 515 million dollars is in view.

Washington Wins The Right To Cross Indian Reservation

A SUIT which has been pending for nearly a year in the Federal Court of the state of Washington has been won by that state. The defendants were Indians and others living on 139 tracts within the Yakima Indian Reservation. The purpose of the suit was to secure right-of-way for relocation of a highway running through the reservation.

PERSONALLY SPEAKING

Operations of the Water System of the Department of Water and Power of the City of Los Angeles, Calif., are handled through eight major divisions, following a reorganization recently approved by **H. A. Van Norman**, general manager and chief engineer. The eight divisions are administered through **W. W. Hurlbut**, chief engineer of water works and deputy general manager, and his immediate assistant, **Laurence E. Goit**, assistant chief engineer of water works and engineer of operation and distribution. The major units of the Water System, with executive personnel, are as follows—Distribution Division: **Laurence E. Goit**, engineer; **E. W. Breitkreutz**, assistant. Los Angeles Aqueduct Division: **B. S. Grant**, engineer; **W. W. Wyckoff**, assistant. Sanitary Engineering Division: **R. F. Goudey**, engineer; **Harry Hayes**, assistant. Electrical Division: **E. F. Leahy**, superintendent; **R. A. Erwin**, assistant. Mechanical Engineering Division: **S. M. Dunn**, engineer; **J. T. Whitestone**, assistant. Design Division: **C. J. Itter**, engineer; **M. K. Socha**, assistant. Construction and Field Engineering Division: **H. L. Jacques**, engineer; **R. R. Proctor**, field engineer. Executive Division: **E. B. Mayer**, engineer.

Lt. Col. James Wild has been assigned as Chief, Supply Division, Seattle Engineer District, to succeed **Lt. Col. Ernest J. Riley** who has been transferred to the Pacific Engineer Division headquarters at San Francisco. Col. Riley has been head of the military supply division for the Seattle Engineers since 1942. Col. Wild has been Operations and Contracting Officer for the Seattle District since last November. Prior to that he was in the Office of the Chief of Engineers in Washington, D. C., attached to the office of the Quartermaster General.

Preparing to enter the general contracting field at Vancouver, B. C., **J. E. and G. E. Amundson** have formed a partnership under the name of Amundson Construction

Co. Offices have been established at 530 Standard Bank Bldg., 510 W. Hastings St., Vancouver, B. C. J. E. Amundson was for three years manager of the Vancouver office of Poole Construction Co., Ltd. Later he was affiliated with E. J. Ryan Construction Company as general superintendent. He held the latter position for about 13 years. G. E. Amundson, his son, was for the past two years associated with the U. S. Engineers, located at a northern British Columbia office.

E. C. Osborn, engineer and assistant to the Director of Operations Control at Lockheed Aircraft has been chosen vice-president of the national Society of Aircraft Industrial Engineers, at the annual meeting recently held in Hollywood, Calif. He was also elected chairman of the Los Angeles Chapter of the Society. **Dick R. Linch**, Lockheed engineer, was appointed to the board of directors. **Gus Michael**,

ENGINEERS on the Sweetwater Falls dam being built east of San Diego, Calif. L. to r.: **Chas. P. WILLIAMS**, resident engineer, **ALBERT JONES**, engineering clerk, and **E. R. ROMBERG**, office engineer.



construction and production processing engineer from Lockheed, will be vice-chairman of the Los Angeles chapter.

Edward E. Simmons, Jr., Pasadena, Calif., engineer who received the Longstreth award for his invention of a "strain gauge" used in aircraft construction to measure strength of wings and girders, was one of three named in the award at Franklin Institute in Philadelphia recently. Simmons is now a radio engineer stationed at McClelland Field, Sacramento. He invented the gauge while working for a graduate degree at California Institute of Technology in 1936.

James Spofford, state reclamation engineer for Idaho, recently resigned that office to accept a position with the U. S. Bureau of Reclamation as engineer on the Owyhee project, with headquarters at Nyssa, Ore. Spofford had been state reclamation engineer since January, 1943. **Mark R. Kulp**, associate professor of agricultural engineering and irrigation at the University of Idaho, was immediately appointed to fill the vacant post having been granted a leave of absence from the university to accept the appointment.

The appointment of **A. J. Shaver** of Winnemucca, Nev., to fill the position of resident engineer for the Colorado river commission has been announced. This position was left vacant by the death of **Charles De Armond**. Shaver, a member of the State Board of Registered and Professional Engineers, was for several years connected with the Sierra Pacific Power Co. in Reno, and more recently has been utilities engineer for the Western States Utilities Co. at Winnemucca.

At a meeting of the Building Code Correlating Committee of the American Standards Association, the following officers

were elected for the coming year: **George N. Thompson** of the National Bureau of Standards, chairman; **Walker S. Lee**, Building Officials Conference of America, vice-chairman. Members of the Executive Committee were elected as follows: **Clinton T. Bissell**, National Board of Fire Underwriters; **J. Andre Fouilhoux**, American Institute of Architects; **R. P. Miller**, American Society of Civil Engineers, and American Society of Testing Materials; **E. W. Roemer**, member-at-large; and **Edward Ruehl**, American Municipal Association.

Kenneth Markwell who until recently has been serving as regional director and special representative of the Administrator of the Federal Works Agency, has joined the staff of Commissioner Harry W. Bassore as an Assistant Commissioner of the Bureau of Reclamation. He brings to his new office a wide experience in construction and the administration of construction work gained as a state director when the Bureau of Reclamation's water control and power programs were part of the P. W. A. program.

J. C. Boespflug of the well known Seattle, Wash., firm of J. C. Boespflug Construction Co. has accepted the chairmanship of the construction and civic development committee of the Seattle Chamber of Commerce. The committee which Boespflug heads is organized to serve the construction industry and is comprised of 46 members drawn from the field of contractors, architects, engineers, building material men and others.

Announcement of the appointment of **Paul F. Hatch** as acting district engineer has been made by the mid-Columbia District Office of the Bonneville Power Administration. Hatch has been in the service of BPA since 1939, first as engineering draftsman, later advancing to assistant and associate engineer. In his new office he will handle engineering and operating problems relating to customer service in the South-eastern Washington-Eastern Oregon area.

Franklin Thomas, director of the division of civil and mechanical engineering at California Institute of Technology in Pasadena, Calif., has been appointed dean of Caltech's upper classmen. He is vice-president for the current year of the American Society of Civil Engineers. Prof. Thomas replaced **Col. Fredrick W. Hinrichs, Jr.**, who died early in February.

In accordance with the U. S. Army policy of releasing from active duty those men whose specialized services are no longer required, **Capt. William H. Stephens** of the Corps of Engineers recently reverted to inactive status, and expects to return to his civilian work as an engineer at Los Angeles, Calif.

James T. Derrig, who has been acting assistant chief engineer of the Northern Pacific Ry. in Seattle, Wash., since last October, has now been appointed to that position. He succeeds **A. F. Stotler**, who remains with the company in an advisory capacity.

Professor Stephen P. Timoshenko of Stanford University, California, will receive

the Louis E. Levy Medal for his paper, "The Theory of Suspension Bridges," published in the Journal of the Franklin Institute.

Homer Wall has resumed his duties as city engineer of The Dalles, Ore. after a two-year leave of absence in which he was employed by the FWA at Seattle. He will also serve as engineer for The Dalles port commission.

Eugenio Rodriguez y Parra is now chief engineer of the National Railways of Mexico. His predecessor, **Adrian del Paso**, remains with the railroad in another capacity.

Lt. Comdr. H. B. Gates, Jr. is now public works officer at Clearfield Naval Depot, in charge of engineering and construction, succeeding **Lt. E. G. Underhill**.

Arthur C. Showman, recently commissioned Lt. (jg) USN, left for Tucson, Ariz., on March 13 for several months' training. He was a Senior Engineer in charge of Investigation and Reports for Water Resources, U.S.E.D., Sacramento, Calif.

Commander Geo. F. Nicholson, former chief engineer of the Port of Seattle, Wash., and recently in charge of important construction in San Francisco, Calif., for the Navy, has been advanced to the rank of captain.

Earl S. Bennett, engineer of Pasadena, Calif., recently returned from 20 months' service with the Lockheed Overseas Cor-

poration. He was stationed at an 8th AAF Service Command Depot in North Ireland. Just before going overseas, Bennett was building superintendent for the Latisteel Corporation of Pasadena.

Franklin Craig of Spokane, Wash., has moved to Sacramento, Calif., to replace **J. W. Odell** as USGS Hydrographer for Central Valley gaging stations. Odell moved to the St. Louis District.

John A. Baamer, dam builder of the Bureau of Reclamation, has retired after completing the foundation for Anderson Dam in Idaho, to a farm at Folsom, Calif., he picked out for the purpose five years ago.

David W. Lyndall, formerly Assistant City Engineer of Hayward, Calif. is now located with the U. S. Navy in Hawaii, attached to the Seabees.

Maj. Maurice C. Tobin, resident engineer in Guatemala for the U. S. Army Engineers during their period of construction on the Pan-American Highway, has been assigned to duty at Fort Belvoir, Va.

John Gardiner of the Tucson, Ariz., office of the Geological Survey, has been nominated as a candidate for 11th district director of the American Society of Civil Engineers.

T. L. Latimer was recently appointed city engineer of Provo, Utah, to succeed **Elmer A. Jacob**, resigned.

SUPERVISING THE JOBS

M. L. (Milt) Simpson, who has supervised many of the large highway jobs for the contracting firm of N. M. Ball Sons, is now acting as general superintendent at the company's yard in Berkeley, Calif. Other yard, shop and office personnel include: **W. D. Sorenson**, master mechanic; **Elmer Sholin**, shop foreman; **Sam McKinney**, rock plant superintendent; **R. W. Noble**, hot plant superintendent; **Tom Dalby**, equipment superintendent; **Herb Duncan**, truck and equipment dispatcher; **Larry Wigle**, paymaster, and **Vernon Clark**, office manager.

Fred Westlund is general superintendent for Zoss Construction Co., Los Angeles, Calif., on construction of a new section of the Army airforce supply depot at Maywood, Calif. Carpenter foremen on the job are **Paul Smith**, **Fred Olson**, **George Tamplin** and **John Dahlin**. **L. B. Wiggins** is labor superintendent. **Louis Bradvica** is superintendent for Martin Construction Co., which is building the sewers for the

project, and **C. J. Baaker** is superintendent for H. B. Nicholson, contractor on the excavation and railroad work. **T. C. Morgan** is project engineer.

In addition to personnel reported in the March issue of *Western Construction News*, others on the Guy F. Atkinson Co. contract to build a pontoon bridge at Terminal Island, Calif., are **Al Nemitz**, **Mel Smith**, **Lee Thompson** and **Axel Carlson**, carpenter foremen; **Tom Richmond**, pump foreman; **Peter Beirly**, labor foreman; **Harry Mulvaney**, in charge of plumbing, and **Charles Thompson**, engineer. **Bill Denning** is master mechanic and **H. H. Johnson** and **C. J. Dudley** are mechanics.

Hill Lind is general superintendent for the Kuckenberg Construction Co. of Portland, Ore., on their \$178,000 contract for clearing channel excavation in the Willamette River, Wheatland Bar, in Yamhill

County, Oregon. L. W. Kuckenberg is project manager; R. C. Edwards is assistant superintendent. G. Giebisch, E. Anderson and J. Faukald are working as foremen and J. P. Mimnaugh is office manager.

Key men for the engineering-contracting firm of A. Teichert & Co. of Sacramento, Calif., on the Madera Canal project are the following: Martin Green, Jr., general superintendent; Harry Rotruck, excavation superintendent; Martin Green, Sr., structure superintendent; Harry Schuetze, concrete foreman; Herman Smith, Robert Brock, Charles Stahn, Ken Carpenter and Larry MacDonald, grade foremen. Mel VanWagenen is carpenter foreman; M. W. Chenoweth, office manager; Wayne Selby, master mechanic and Al Otis, engineer. This contract, which was awarded to Teichert at \$456,306.50, is for construction of earth work and structures, and is 14 mi. long.

W. E. Bradbury, formerly superintendent on construction of warehouse units and miscellaneous facilities at McClellan Field, near Sacramento, Calif., and recently in charge of construction of 160 family dwellings built by the Lawrence Construction Co. of Sacramento, Calif., at Stockton, Calif., is now supervising the construction for this company of emergency wards at the State hospitals at Stockton and Napa, Calif. The contract price of the work is \$109,643.

Ramey & Mathis of Amarillo, Texas, are the general contractors in charge of construction on the Clovis War Housing Project. Sub-contractors on the job are: plumbing, Abilene Plumbing & Roofing Company, Abilene; electrical, Witherspoon Electric Co., Amarillo; insulation John Weeks Insulation Co., Amarillo; and painting, Davis Brothers of Fort Worth.

Jesse West is superintendent on the \$300,671 contract recently awarded to J. F. Cummins of Burbank, Calif., for construction of a hangar, auxiliary buildings and appurtenance facilities at the Muroc Materiel Command Flight Test Base in Kern County, Calif. S. J. Cook is project manager and J. F. Cummins purchasing agent.

S. A. Johnson, formerly job superintendent for R. J. Daum on construction at the Marine Corps Air Station at El Centro,



HARRY ROTRUCK

Calif., is now general superintendent for the same firm on the construction of additions to the Veterans Hospital at Sawtelle, Calif. Chas. R. Page is assistant superintendent. W. H. (Mike) Murphy and L. A. (Ben) Benjamin are carpenter foremen. Work is under the supervision of the U. S. Corps of Engineers with J. H. Heinmiller resident engineer in charge.

V. O. Crocket who supervised the large sanitary sewer installation in Newport Beach, Calif. for R. A. Watson Co., North Hollywood, Calif., is now in charge of sewer construction in Rhodes Ave. and Moorpark Sewer District in Los Angeles, for the same firm, which was awarded the contract at \$89,126. S. A. Wattson is manager and purchasing agent, and Al Payton is foreman.

B. C. Gray is general superintendent in charge of wiring and line work on the contract recently awarded to the American Electric Construction Co. of San Francisco for electrical installation at the U. S. Navy Hospital in Oakland, Calif. E. E. Lickiss is foreman at large, and W. E. Brady is superintendent of pole line. Lt. Grady is resident engineer; Wm. O. Hurtado, expediting engineer.

T. M. Beebe is general superintendent on construction of the naval hospital at San

THREE OF THE SEVEN Morrison-Knudsen men honored last month by the Navy for meritorious services in the construction of the naval ordnance plant at Pocatello, Idaho, were, l. to r.: JOHN V. OTTER, project manager for M-K. on the job; C. O. DUNN, chief engineer of the contracting firm, located at the Boise office; WALLACE H. PUCKETT, vice-president. Ceremony took place at the company's Boise headquarters.



Leandro, Calif., for which Monson Bros. of San Francisco hold the contract. Other key men on the job are: N. M. Holgren and Bert Sandstrom, superintendents; E. H. Martin, H. R. Tosh, W. H. Croy, Russell Crook, Melvin Johnson and Harry Brown, foremen. E. E. Roberts is office manager.

R. E. Lee, superintendent for A. R. Liner, Merced, Calif., who recently built the additions to the Solano County General Hospital at Fairfield, Calif., is now supervising this contractor's \$326,094 contract to build the Marysville Community Hospital at Marysville in Yuba County, Calif. Other key men on the job are Ed Sparth and A. F. Sale.

Andrew Hansen, who has supervised many large projects for Robert E. McKee, Los Angeles, Calif., is now supervising the \$936,900 contract job which was awarded this contractor for 3 class A buildings totalling 448 additional beds at Veterans Administration Facilities in Los Angeles. V. Z. Skinner is chief engineer for the contractor.

J. W. Jones is job superintendent for M. M. Sundt Construction Co., Albuquerque, N. M. on their contract for crushing, hauling and placing base course surfacing on 11.1 mi. of S. R. 39, between San Jon and Grady in New Mexico. M. Eugene Sundt is Division Manager and Ward Anderson, office manager on this \$79,103 job.

Art Gavel, superintendent for the construction firm of William Crowell Company, Pasadena, Calif., is now supervising site improvement work, including water distributing and sewer systems, in the city of Long Beach, Calif. D. A. Draney is acting as project manager and purchasing agent. This is an over \$300,000 contract.

John LaRue is superintendent, Harry Talmage is project manager, and Ben O. Davey is project engineer in charge of purchasing on the \$2,118,000 contract held by M. M. Sundt Construction Co. of Tucson, Ariz., for the construction of additional aviation facilities and warehouses at the Marine Corps Air Station at El Centro, in Imperial County, Calif.

Paul L. Moore is general superintendent for M. J. Ruddy & Son, Modesto, Calif. on this company's \$124,475 highway repair job between the Madera county line and Merced, Merced County. The company recently completed a large airfield construction at Muroc, Calif., also under the supervision of Moore.

N. W. (Ax) Axline, superintendent for Tiffany Construction Co., contractor of Phoenix, Ariz., is supervising construction for the firm on a \$289,290 contract at Yucca Army Airfield in Arizona. J. S. Parker is his assistant and P. K. Stephens is engineer. Work comprises concrete paving and taxiway extensions.

C. P. Henry is general superintendent for the contracting firm of C. Dudley De Vebiss at their shop and yard in Oakland, Calif. Assisting him are: B. Reynolds, master mechanic; C. C. McKissick, shop



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foreman; Vern Phelps, welder foreman, and C. F. Hart, office engineer.

John H. Miller is superintendent for the San Francisco firm of Barrett & Hilp on their general construction contract for the Navy at Camp Parks, near Pleasanton, Calif. Also on the same job are Charlie Jess, Lloyd Green, Walt Gunn, Vernon Phillipi and Dick Ione.

A. M. Harsh, widely known superintendent for the Oakland, Calif., contracting firm of Fredrickson & Watson Construction Co., who has supervised many large jobs in the West, is presently supervising work for his company at the Naval Magazine at Port Chicago in Contra Costa County, Calif. This is a \$112,925 contract for fill work for additional ammunition storage facilities. Assisting on the job are W. H. McNutt, foreman, and Geo. Passmore, office manager.

Frederick Fischer is in direct charge of construction for his company of 120 6-room frame and stucco dwellings in the Del Rey area, Venice district, Los Angeles County, Calif. The Frederick Fischer Construction Co. of Hollywood received the contract at \$500,000. One of the key men assisting in the work is Emil G. Barbul.

Nels B. Jensen is superintendent, M. E. Didier is project manager, and H. H. Burgess is purchasing agent on the construction of barracks and mess hall at the Target Repair Base, San Pedro, Calif. This contract was awarded to W. C. Smith, Inc., Los Angeles, Calif. at cost of \$122,736.

Jack Loveday is superintendent and George R. Nethery is project manager on construction of recreation buildings in connection with the Naval Hospital at San Diego, Calif. The contract, which amounts to \$167,566, was awarded to L. P. Scherer-T. C. Pritchard of Redlands, Calif.

E. E. Lowell, Vallejo, Calif., who was awarded the contract by the city of Vallejo for paving, curbs and gutters in that city, is personally superintending the work. Acting as concrete foreman is Charles J. Dinelly and grade foreman is W. T. Poyser. The contract is for over \$100,000.

James P. Steele, assisted by Wm. Horsewood, is supervising the building of 80 temporary family units for E. C. Nickel, contractor of Arcadia, Calif. This construction is being done at Tonopah, Nev. at a cost of \$141,000.

Sam Mattoon is job superintendent and Buster Morrison is plant superintendent on the \$66,952.50 contract recently awarded to Lester L. Rice, Marysville, Calif. for plantmix repair work on California State Highway in Sutter and Yuba counties.

Sam Abrams is job superintendent for the Empire Construction Co., Portland, Ore., on a \$248,500 contract for the construction of sewers, water facilities, walks, curbs, street lights, etc., at the U. S. Naval Station,



A. M. HARSH

Astoria, Ore. Other key men on the job are Louis Unis and E. L. Lankins.

A. H. Steiner is acting as project manager for Guy F. Atkinson Co., Long Beach, Calif., on the rock jetty and dredging work at the Naval magazine and net depot at Seal Beach, Calif. Contract was awarded to Atkinson at \$3,444,400.

Wm. T. Miller is supervising the construction of five temporary storehouses at the Naval Supply Depot in Oakland, Calif. Robert Glenn is office engineer on the job and Wm. Freeman timekeeper. Ford J. Twain Co. and Morrison-Knudsen Co., Inc., hold the joint contract, in the amount of \$814,850.

Adam Goetz is job superintendent for Lester L. Rice, Marysville, Calif. on a 16.6-mi. highway plantmix repair job between Morgan Summit and the Plumas County line in Tehama Co., Calif. Ed Dingy is plant superintendent on the \$107,872 job.

Clark Ellsworth is supervising the construction of additional barracks and other facilities for Wells P. Goodenough and H. C. Geyer, Palo Alto, Calif., on their \$1,536,667 contract at San Bruno, Calif. Another key man on the project is J. B. Fratessa.

Herbert Ponfret is acting as superintendent for Ford J. Twain Co., Los Angeles, on a \$342,991 contract yard work, utilities, and paving at the Navy plane service center at Van Nuys, Calif. A. W. Schoolmaster is engineer and F. H. Oliver is purchasing agent.

E. H. Blakeslee is superintending the installation of a night lighting system for Utility Builders of Great Falls, Mont. The construction is being done at Great Falls at a cost of \$148,000. Chas. P. Wells is engineer for the contractors.

Fred W. Busse is superintendent for G. C. Gammill, Prescott, Ariz., on construction of 100 war dwelling units at Winslow, Ariz. T. V. Tupman is assistant superin-

tendent, and H. Newmark is office manager. The contract price was \$243,590.

Harold O. Prosser has been named superintendent for Drake, Wyman & Voss, Portland, Ore., on reconstruction of a roofing plant owned by the Lloyd A. Fry Roofing Co., of Portland, recently damaged by fire. It is a \$125,000 job.

M. Collins is general superintendent for J. P. Brennan, San Francisco, Calif., on a housing project in Oakland, Calif. Cal Mecham is general foreman, and acting as carpenter foremen are Fred Orinde and Guy Jury.

Leslie E. Deal, for three years assistant purchasing agent for Morrison-Knudsen Co., Inc., contractors of Boise, Idaho, has resigned to become purchasing agent of the Pacific Machinery & Tool Company of Portland, Ore.

Paul Crowell is superintendent on construction of 500 pre-fabricated portable shelter units at Long Beach, Calif. William Crowell Company of Pasadena, Calif., received the contract at \$315,300.

Vic Weidmer is superintendent for Stolte, Inc., contractors of Oakland, Calif., on their \$85,000 contract for building erection at the Navy Air Station, Alameda, Calif.

Warren Williams is superintendent on the \$150,000 contract awarded Short & Bungaard, Denver, Colo., for the construction of a garage and office building in Denver.

Harry Stackhouse is acting as superintendent of cranes and rigging at an Army base in Oakland, Calif.

MANUFACTURERS AGENT OR SALESMAN

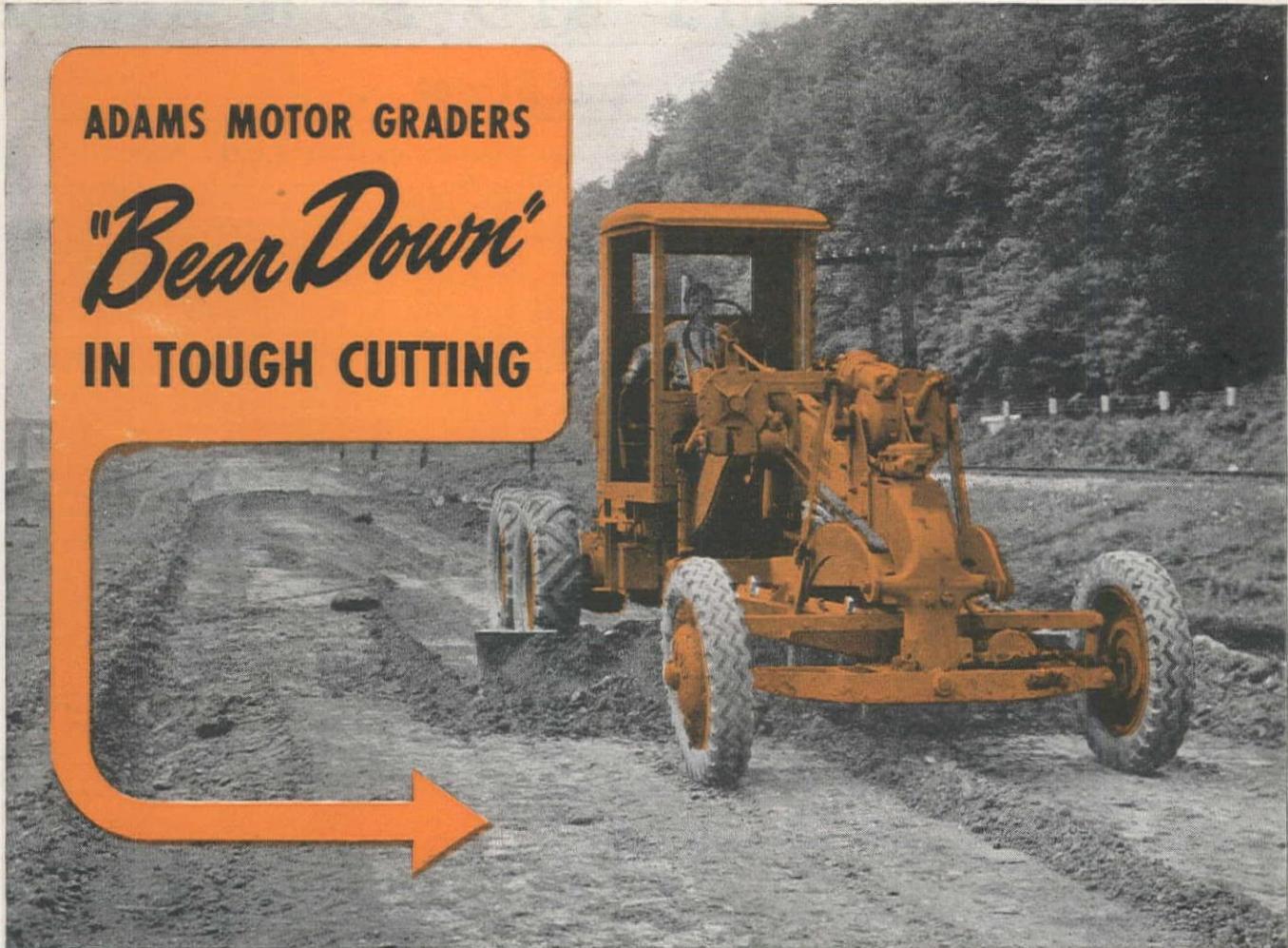
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Sutton Tractor & Equip. Co., Sacramento
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COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equipment Co., Boise, Pocatello
MONTANA—Industrial Equipment Company, Billings

NEVADA—Allied Equipment, Inc., Reno
NEW MEXICO—Hardin & Coggins, Albuquerque
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UNIT BID SUMMARY

Highway and Street...

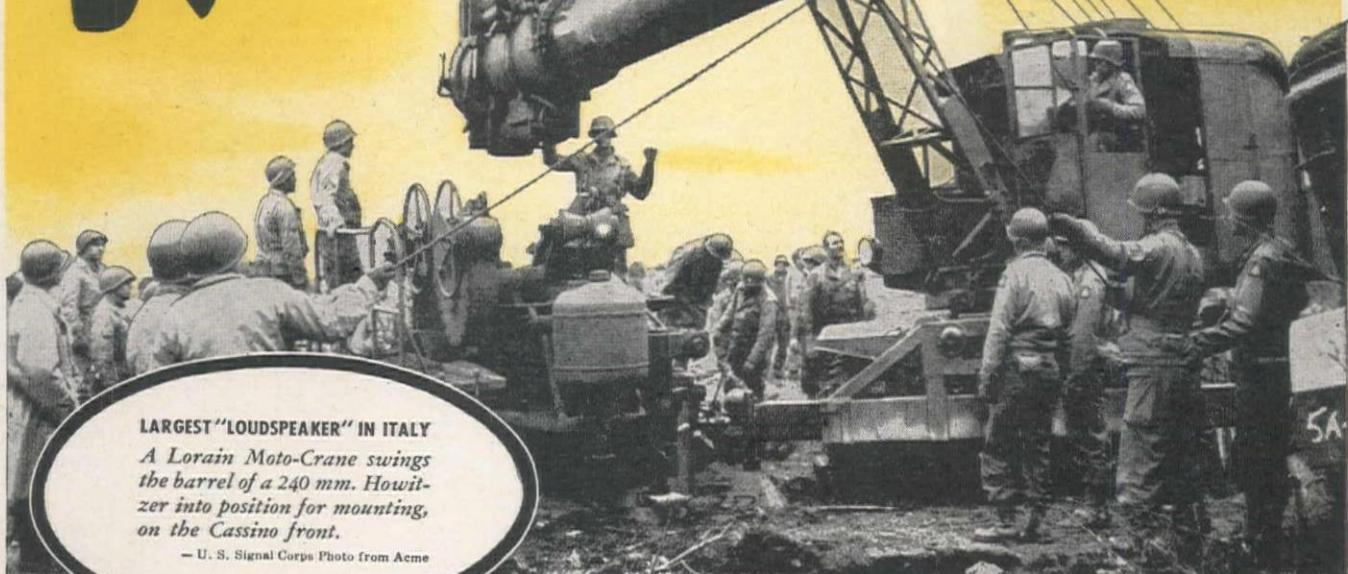
California—Los Angeles County—U.S.E.D.—Surf.

O'Neal and Hedberg, Los Angeles, submitted the low bid of \$241,627 to the Los Angeles District Office of the U. S. Engineer Department for construction of roads, underground utilities and fences at the Maywood Supply Depot. The base for the roads is to be made of 6-in. lean-mix cement aggregate and the surfacing is to be a plantmix bituminous material. Sewers and water piping are also included in the contract. The following unit bids were submitted:

(A) O'Neal & Hedberg.....	\$241,627	(F) M. W. Stanfield Co.....	\$266,741								
(B) D. A. Williams & Frontier Construction Co.....	246,968	(G) Oswald Bros.....	266,778								
(C) United Concrete Pipe Corp.....	259,204	(H) Warren-Southwest, Inc.....	274,872								
(D) Griffith Co.....	259,844	(I) H. B. Nicholson.....	290,256								
(E) Basich Bros. Construction Co.....	265,214	(J) Heuser, Garnett & Hensler.....	291,022								
(1) 100 cu. yd. rough grading		(K) Clifford C. Bong.....	321,308								
(2) 169,400 sq. yd. prep. of subgrade											
(3) 110 cu. yd. conc. curbs											
(4) 28,230 cu. yd. gravel base											
(5) 15,545 cu. yd. 6-in. lean-mix cem.-agr. base											
(6) 46,635 sk. cem. for lean-mix cem.-agr. base											
(7) 384 T. liquid asph., grade MC-1											
(8) 123 tons cover agrgr.											
(9) 26 T. 200-200 pen. paving asph. for bitum. surf. treatment											
(10) 918 T. coarse agrgr.											
(11) 510 T. fine agrgr.											
(12) 1,140 T. 85-100 pen. paving asph.											
(13) 13,360 T. cement plant hot-mix bitum. mixt.											
(14) 122 T. liquid asph. grade RC-3, for seal coat											
(15) 1,200 T. cover agrgr. for seal coat											
(16) 841 lin. ft. 12-in. C.I. water pipe											
(17) 2,618 lin. ft. 10-in. C.I. water pipe											
(18) 10,995 lin. ft. 8-in. C.I. water pipe											
(19) 882 lin. ft. 6-in. C.I. water pipe											
(20) 1,853 lin. ft. 2-in. C.I. water pipe											
(21) 323 lin. ft. 1½-in. black steel water pipe											
(22) 56 lin. ft. ¾-in. black steel water pipe											
(23) 356 lin. ft. salvg. and relaying 8-in. C.I. pipe											
(24) 26 lin. ft. salvg. 18-in. cor. metal pipe											
(25) 2 ea. 12-in. gate valves											
(26) 3 ea. 10-in. gate valves											
(27) 18 ea. 8-in. gate valves											
(28) 2 ea. 6-in. gate valves											
(29) 21 ea. 2-in. gate valves											
(30) 6 ea. T-handled shut-off rod											
(31) 2 ea. type 1 valve box for 12-in. gate valve											
(32) 3 ea. type 1 valve box for 10-in. gate valve											
(33) 10 ea. type 1 valve box for 8-in. gate valve											
(A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K)											
(1)	1.50	2.50	1.00	1.00	1.00	1.25	1.00	1.10	1.00	2.00	2.00
(2) .....	.07	.06	.07	.04	.06	.10	.07	.06	.10	.05	.10
(3)	27.00	24.00	15.00	21.00	20.00	40.00	33.00	24.00	20.00	20.00	30.00
(4)	1.65	1.70	1.75	2.30	2.00	2.18	2.50	2.35	3.00	2.00	2.30
(5)	2.75	2.94	3.00	2.94	3.35	2.55	3.00	3.30	3.90	4.00	4.15
(6) .....	.60	.60	.55	.57	.58	.60	.55	.60	.50	.50	.55
(7)	15.00	17.00	16.00	19.00	17.40	16.50	24.00	15.00	20.00	17.00	15.00
(8)	3.00	2.50	2.40	2.50	3.60	4.00	3.30	2.60	3.00	2.25	3.30
(9)	20.00	22.00	20.00	23.00	20.00	20.00	18.00	14.00	20.00	14.00	30.00
(10)	3.00	2.50	2.40	2.70	3.60	4.00	3.00	2.60	3.00	2.10	3.75
(11)	2.65	2.50	2.40	2.80	3.60	3.00	3.00	2.60	3.00	1.70	3.75
(12)	12.50	12.00	12.00	13.50	14.75	11.10	12.00	11.50	11.25	10.00	12.00
(13)	2.00	2.10	2.70	2.65	2.56	2.64	2.45	2.65	2.75	2.90	2.30
(14)	15.00	17.00	14.00	21.50	16.80	16.00	15.00	13.00	20.00	15.00	15.00
(15)	2.50	2.50	2.40	2.50	3.00	2.75	3.00	2.60	3.00	1.75	3.00
(16)	3.75	3.80	4.10	4.00	3.80	4.02	3.80	3.85	3.50	4.00	3.91
(17)	2.97	3.50	3.10	3.20	3.00	3.60	3.40	3.35	3.05	3.50	3.03
(18)	2.27	2.65	2.50	2.40	2.30	2.76	2.60	2.80	2.50	3.00	2.33
(19)	1.62	1.60	2.00	1.70	1.65	1.70	1.60	2.20	2.00	2.00	1.93
(20) .....	.81	1.00	1.00	.85	.85	1.06	1.00	1.55	1.40	1.00	.90
(21) .....	.81	.70	.90	.85	.85	.74	.70	1.75	1.60	1.25	.78
(22) .....	.70	.60	.60	.75	.75	.64	.60	1.65	1.50	1.00	.45
(23)	1.08	3.00	2.00	1.10	1.10	3.18	3.00	2.75	2.50	2.00	5.50
(24) .....	.81	3.00	3.00	.85	.85	3.18	3.00	2.20	2.00	1.25	1.65
(25)	130.00	110.00	150.00	140.00	135.00	117.00	110.00	140.00	125.00	167.00	123.00
(26)	103.00	90.00	110.00	110.00	100.00	95.00	90.00	100.00	90.00	125.00	75.00
(27)	65.00	55.00	80.00	70.00	66.50	59.00	55.00	65.00	60.00	90.00	50.00
(28)	45.00	37.00	50.00	45.00	45.00	40.00	37.00	50.00	40.00	60.00	123.00
(29)	16.00	15.00	20.00	17.00	16.50	16.00	15.00	27.50	25.00	23.00	15.00
(30)	5.50	5.00	7.00	6.00	6.00	5.30	5.00	5.50	5.00	12.00	5.50
(31)	3.50	4.00	20.00	3.50	3.50	4.25	4.00	5.50	5.00	3.00	13.30
(32)	3.50	4.00	18.00	3.50	3.50	4.25	4.00	5.50	5.00	3.00	13.32
(33)	3.50	4.00	17.00	3.50	3.50	4.25	4.00	5.50	5.00	3.00	10.30
(34)	5.85	6.00	16.00	6.00	6.00	6.36	6.00	8.25	7.50	5.50	9.50
(35)	3.50	4.00	14.00	3.50	3.50	4.25	4.00	5.50	5.00	3.00	9.50
(36)	5.85	6.00	12.00	6.00	6.00	6.36	6.00	8.25	7.50	5.50	9.50
(37)	3.50	4.00	12.00	3.50	3.50	4.25	4.00	5.50	5.00	3.00	7.50
(38)	5.85	6.00	10.00	6.00	6.00	6.36	6.00	8.25	7.50	5.50	6.50
(39)	5.20	8.00	12.00	5.50	5.30	8.50	8.00	9.50	8.50	5.50	12.00
(40)	4.50	7.80	11.00	5.00	4.60	8.25	7.80	9.00	8.00	4.50	11.00
(41)	4.30	7.50	10.00	4.50	4.40	7.95	7.50	8.25	7.50	4.00	10.00
(42)	108.00	100.00	110.00	110.00	110.00	106.00	100.00	115.00	105.00	125.00	105.00
(43)	25.00	25.00	3.00	26.00	25.00	26.50	25.00	33.00	30.00	20.00	15.00
(44)	108.00	200.00	300.00	110.00	110.00	215.00	200.00	225.00	200.00	300.00	350.00
(45)	2.20	1.50	2.90	1.80	2.25	1.60	1.50	2.20	1.90	4.00	1.95
(46)	2.75	2.20	3.00	2.70	2.75	2.34	2.20	2.60	2.10	5.00	2.75
(47)	1.93	1.40	1.40	1.60	1.90	1.50	1.40	1.70	1.35	2.50	1.70
(48)	2.20	1.60	2.40	1.80	2.20	1.70	1.60	2.30	1.60	3.40	2.15
(49)	1.54	1.20	1.30	1.50	1.35	1.27	1.20	1.50	1.40	2.40	1.70
(50)	4.40	3.50	3.00	5.00	6.00	3.70	4.00	5.00	5.00	6.00	5.50
(51)	22.00	11.00	30.00	13.00	35.00	11.65	11.00	16.50	11.00	50.00	35.00
(52)	16.50	18.00	15.00	21.00	15.00	19.10	18.00	13.00	12.00	25.00	15.00

(Continued on next page)

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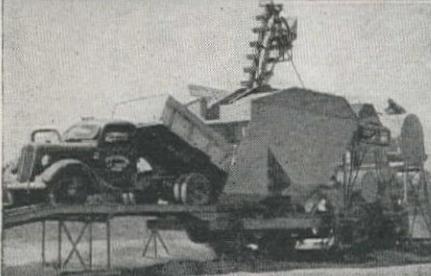
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(53)	27.50	8.00	30.00	9.00	22.00	8.50	8.00	9.00	10.00	25.00	24.00
(54)	22.00	22.00	35.00	25.00	27.50	23.30	22.00	30.00	25.00	40.00	40.00
(55)	80.00	25.00	150.00	29.00	75.00	26.50	25.00	27.50	25.00	50.00	85.00
(56)	250.00	250.00	250.00	300.00	50.00	265.00	250.00	275.00	250.00	425.00	200.00
(57)	240.00	230.00	300.00	250.00	50.00	244.00	230.00	250.00	250.00	425.00	200.00
(58)	100.00	25.00	600.00	30.00	100.00	26.50	25.00	30.00	25.00	500.00	60.00
(59)	.17	.165	.17	.18	.185	.175	.18	.15	.175	.15	.18
(60)	75.00	70.00	90.00	78.00	80.00	75.00	110.00	110.00	125.00	100.00	75.00
(61)	70.00	65.00	80.00	73.00	75.00	70.00	85.00	90.00	100.00	90.00	70.00
(62)	45.00	45.00	50.00	46.00	50.00	50.00	56.00	45.00	50.00	50.00	50.00
(63)	33.00	35.00	35.00	35.00	36.00	40.00	25.00	20.00	35.00	25.00	40.00
(64)	10.00	7.50	10.00	6.00	20.00	8.00	4.00	11.00	10.00	4.00	6.00
(65)	2.50	3.00	3.00	2.35	2.00	3.35	2.00	2.25	4.00	2.00	3.50
(66)	300.00	320.00	250.00	350.00	300.00	320.00	320.00	375.00	375.00	300.00	50.00

New Mexico—Quay and Curry Counties—State—Surf.

M. M. Sundt Construction Co., Tucson, at \$79,103, was low bidder to the New Mexico State Highway Dept. on 11.1 mi. of surfacing and some additional stockpiling on State Road 39 between San Jon and Grady. The contract was awarded to the low bidder. Unit bids submitted:

(1) M. M. Sundt Construction Co.	\$79,103	(4) Henry Thygesen & Co.	\$ 90,700
(2) Brown Bros.	81,361	(5) D. D. Skousen	97,451
(3) Leslie Wheeler	83,967	(6) Martin & Cowart	115,721

	(1)	(2)	(3)	(4)	(5)	(6)
444 hr. rolling, steel tired roller	4.25	5.00	5.00	5.00	5.00	6.00
1,094 M. gal. watering	3.00	2.00	2.00	3.00	3.00	4.00
22,249 T. base course surf., No. 1 aggr.	.88	.90	.89	1.06	1.08	1.10
23,335 T. base course surf., No. 2 aggr.	.735	.95	.84	1.04	1.08	.90
34,210 T. stockpiled base course surf.	.588	.61	.70	.76	.825	.90
4,631 T. stockpiled cover material	3.69	3.00	3.50	2.45	3.13	7.00

Montana—Sanders County—State—Surf.

Union Construction Co., Great Falls, was the low bidder to the Highway Department and received the contract with a proposal of \$52,594 to apply a gravel surface and bituminous surface treatment on 2 mi. of highway between Perma and Dixon. The work is to be completed by Aug. 31. Unit bids received were as follows:

(1) Union Construction Co.	\$52,594	(5) Bernard-Curtiss Co.	\$ 59,007
(2) Nilson Smith Construction Co.	54,688	(6) Northwestern Engineering Co.	70,005
(3) Chas. Shannon & Son	55,186	(7) Birch & Sons Construction Co.	78,413
(4) Big Horn Construction Co.	55,367	(8) Engineer's estimate	51,839

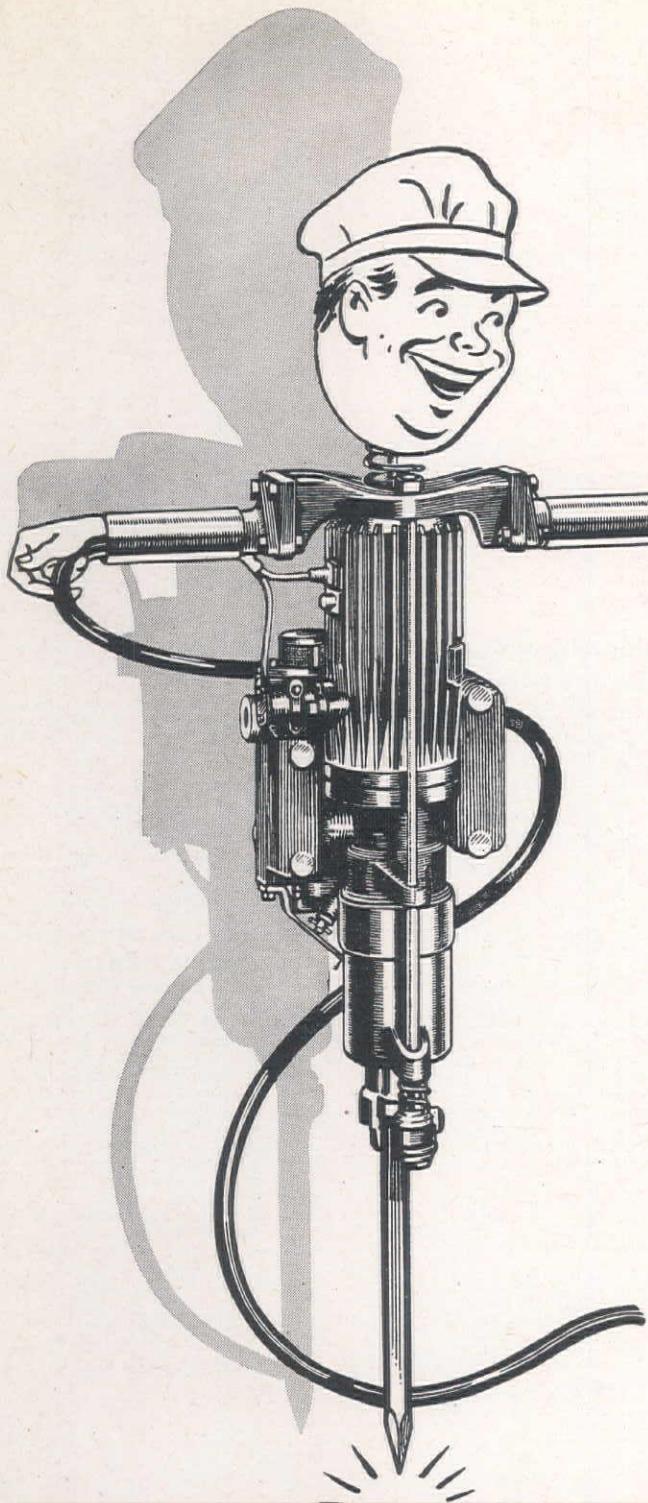
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
16,223 cu. yd. uncl. excavation	.25	.30	.30	.41	.45	.30	.50	.30
27,915 cu. yd. select borrow	.35	.30	.35	.54	.55	.70	.50	.30
245 cu. yd. culv. excavation	1.00	2.00	2.00	1.56	2.50	1.25	1.00	1.00
19,320 sta. yd. overhaul	.015	.01	.02	.01	.03	.03	.02	.01
33,605 mi. yd. overhaul on sel. borr.	.15	.15	.15	.17	.15	.20	.22	.12
16,067 T. base crse. cr. grav. surf. matl.	1.00	1.20	.85	.73	.80	1.25	1.50	1.10
3,831 T. Gr. "A" top crse. cr. gr. surf.	1.00	1.20	1.10	.99	1.50	1.35	2.00	1.25
756 T. coarse aggre. matl.	3.00	2.00	3.00	2.55	1.50	1.10	2.00	2.00
350 T. fine aggre. matl.	3.00	2.50	8.00	2.76	1.50	1.35	6.00	2.50
900 cu. yd. mi. binder	.10	.20	.10	.01	.10	.60	.05	.30
1,800 cu. yd. mi. overhaul on binder	.10	.10	.10	.01	.10	.20	.05	.15
430 M. gal. watering	1.25	1.00	1.50	1.21	2.50	2.50	2.00	1.50
10,584 gal. prime coat oiling with MC-1...	.11	.10	.14	.12	.14	.12	.20	.11
15,119 gal. tk. coat oiling with 150-200...	.11	.12	.14	.11	.12	.14	.20	.10
13,154 gal. sl. coat oiling with 150-200...	.15	.12	.14	.11	.12	.14	.20	.10
192 lin. ft. 15-in. reinf. eqnc. pipe culv.	2.00	2.00	3.00	1.66	2.25	2.35	2.05	2.25
232 lin. ft. 18-in. reinf. conc. pipe culv.	3.00	3.00	4.00	2.31	3.00	2.95	2.55	3.25
250 lin. ft. 24-in. reinf. conc. pipe culv.	4.00	4.00	5.00	3.59	3.50	4.25	3.70	4.50
136 lin. ft. 18-in. corr. mtl. sply. pipe	5.00	3.00	4.00	3.18	2.50	3.95	3.25	3.00
20,93 cu. yd. Class "A" conc.	40.00	50.00	50.00	53.30	40.00	40.00	45.00	35.00
1,253 lb. reinf. steel	.10	.10	.15	.12	.10	.15	.25	.12
32 ea. conc. r/w monuments	3.00	5.00	5.00	2.62	2.00	5.15	3.50	3.50
10 ea. conc. sta. markers	15.00	5.00	10.00	2.62	3.75	6.25	3.50	3.50
1 ea. conc. proj. marker	25.00	10.00	20.00	12.26	10.00	15.00	12.00	15.00
75 T. stk. piled coarse aggr.	2.00	2.00	3.00	2.80	1.50	1.40	2.50	2.00
75 T. stk. piled fine aggr.	3.00	2.50	4.00	3.03	1.50	1.60	3.00	2.50

California—San Diego County—State—Pav.

Ralph O. Dixson, Los Angeles, bidding \$326,647, was low to the California State Highway Commission on grading and paving with asphaltic concrete and Portland Cement concrete on 1 mi. of the Douglass St. extension in San Diego. The State is to furnish steel street piling, steel H-piling and railroad rails. A Controlled Materials Plan rating of AA3 has been assigned to the project. The following unit bids were submitted:

(1) Ralph O. Dixson	\$326,647	(4) Ralph A. Bell	\$388,412
(2) Griffith Co.	343,889	(5) V. R. Dennis Construction Co.	414,425
(3) Basich Bros. Construction Co.	350,113	(6) Dailey Corporation	482,649
	(1)	(2)	(3)
2,200 cu. yd. removing concrete	3.00	3.40	2.50
Lump sum, clearing and grubbing	\$4,800	\$4,300	\$2,000
134,000 cu. yd. roadway excavation	.35	.45	.36
8,600 cu. yd. structure excavation	1.70	2.30	2.50
3,400 cu. yd. ditch and channel excav	.60	.60	.90
780,000 sta. yd. overhaul	.005	.01	.005
33,000 sq. yd. subgrade	.10	.18	.13
Lump sum, developing wtr. sly. and furn. wtg. eqpt.	\$1,000	\$3,600	500.00
4,250 M. gal. applying water	1.50	1.50	2.00
53 sta. finishing roadway	15.00	11.00	5.00
1,650 T. imported base material	2.50	2.50	2.00
9 T. asph. emulsion	30.00	65.00	35.00
8 T. liq. asph. MC-2 (Prime Coat)	25.00	45.00	30.00
1,100 T. bituminous surfacing	3.00	4.80	6.00
2,275 T. asph. conc. (base and level course)	5.00	4.55	5.50
1,150 T. asph. conc. (Type "A" surf. course)	5.00	4.55	5.50
5,800 cu. yd. Cl. "B" P.C.C. (pavement)	11.10	10.50	13.00
1,800 cu. yd. pavement dowels	.30	.35	.35
200,700 lbs. bar reinforcing steel	.05	.05	.08
150 sq. yds. mesh reinforcement	.40	.50	.50
1,100 lbs. misc. iron and steel	.27	.24	.15
7 ea. driving steel H-piles	50.00	63.00	100.00
315 ea. driving R.R. rails, piles	17.00	16.50	16.00
7 ea. steel H-pile splices	18.00	12.00	50.00
1,125 cu. yd. Cl. "A" P.C.C. (structures)	41.00	43.00	50.00

(Continued on next page)



**"I MAKE
LIGHT WORK
OF
HEAVY JOBS"**

*Drilling, digging, driving,
breaking or tamping*

The tougher the job the greater your need for a low-cost Barco Portable Gas Hammer. A self-contained unit, it is portable under any conditions. With eleven special tool attachments available, you can meet any job on the spot. Barco Manufacturing Company, Not Inc.



BARCO PORTABLE GASOLINE HAMMERS

**BARCO MANUFACTURING CO., NOT INC.
1819 Winnemac Ave., Chicago 40, Ill.**

Gentlemen:

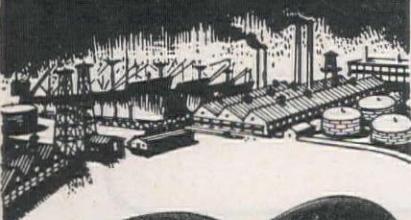
Without obligation on my part please send me a copy of the BARCO HAMMER BOOKLET.

Name _____

Street _____

City _____ State _____

OUR HAT'S IN THE RING AGAIN!



MCDONALD Type T SAFETY HAT

No longer on the restricted list, the famous McDonald "T" hat now comes in two shell sizes with an adjustable full-floating headband that makes a comfortable fit for any head-size.

Ask for new "T" hat circular

B. F. McDONALD CO.



MANUFACTURERS AND
DISTRIBUTORS OF
INDUSTRIAL SAFETY EQUIPMENT

5102 South Hoover Street
LOS ANGELES 37, CALIF.

Other Offices in San Francisco & Houston

74 cu. yd. Cl. "B" P.C.C. (encasement).....	14.00	16.00	12.00	27.00	15.00	10.00
1,080 lin. ft. driving steel sheet piling.....	1.00	.80	.75	.70	1.00	2.00
125 cu. yd. placing broken conc. riprap.....	11.00	14.00	5.00	2.50	10.00	8.00
500 cu. yd. Cl. "A" P.C.C. (slope paving).....	22.00	19.50	23.00	27.00	34.00	20.00
1,050 cu. yd. Cl. "A" P.C.C. (curbs, gutters & sidewalks).....	22.00	20.00	20.00	40.00	23.00	25.00
60 ea. monuments.....	3.00	4.50	3.00	5.00	4.00	5.00
325 ea. curb dowels.....	.10	.33	1.00	.75	.40	.50
514 lin. ft. timber bridge railing.....	2.00	3.00	2.00	2.50	3.00	3.50
100 lin. ft. laminated guard railing.....	2.00	2.40	1.75	2.50	2.50	3.00
60 ea. guide posts.....	3.25	3.00	3.00	4.00	5.00	6.00
26 ea. culvert markers.....	3.00	3.50	3.25	4.00	4.00	3.00
1,600 lin. ft. timber fence.....	.75	1.05	.50	.50	1.25	2.50
17 ea. adjusting manholes to grade.....	38.00	18.00	10.00	30.00	15.00	25.00
6 ea. new sewer manholes.....	135.00	150.00	100.00	150.00	100.00	200.00
60 lin. ft. reinf. conc. manhole rings.....	7.00	3.50	5.00	6.00	5.00	5.00
1 ea. manhole frame and cover.....	30.00	25.00	50.00	300.00	25.00	25.00
1,100 lin. ft. 6-in. V.C.P.....	2.00	1.05	.75	2.00	1.00	1.50
1,050 lin. ft. 8-in. V.C.P.....	2.50	1.30	.85	2.50	1.15	2.00
156 lin. ft. 12-in. R.C.P.....	2.50	2.50	2.40	3.00	3.30	2.80
242 lin. ft. 18-in. R.C.P.....	3.50	3.60	3.00	4.00	4.30	3.50
2,036 lin. ft. 24-in. R.C.P.....	4.50	4.55	4.00	5.00	5.20	5.00
1,166 lin. ft. 30-in. R.C.P.....	6.00	6.15	5.00	6.00	7.00	6.00
4 ea. timber spillways.....	12.50	30.00	20.00	30.00	25.00	50.00
230 lin. ft. timber down drains.....	1.10	1.40	1.75	2.75	2.00	3.50
6 ea. salvaging existing grates.....	12.50	6.00	5.00	25.00	10.00	3.50
2 ea. resetting salvaged grates.....	12.50	6.00	5.00	25.00	10.00	5.00
16,000 sq. yds. preparing slopes (slope erosion protection).....	.40	.12	.10	.15	.36	.50
14 T. straw (slope erosion protection).....	130.00	50.00	150.00	50.00	40.00	50.00
750 lbs. seed (slope erosion protection).....	.55	.36	.30	.60	.25	.25
12,000 ea. Mesembryanthemum Edule cuttings.....	.06	.04	.05	.06	.07	.10
95 ea. red reflectors.....	2.50	1.90	1.00	2.00	2.00	3.00
Lump sum, trash rack.....	\$1,600	400.00	250.00	500.00	\$1,000	\$2,000
Lump sum, 6-in. wrought iron stand pipe.....	55.00	200.00	250.00	100.00	220.00	100.00
Lump sum, traffic signal equipment.....	\$6,500	\$7,000	\$6,000	\$6,000	\$7,500	\$7,000
Lump sum, bridge electrical equip.	750.00	600.00	250.00	\$1,000	500.00	700.00
Lump sum, misc. bridge items of work.....	500.00	\$1,200	\$1,000	\$1,500	\$1,200	500.00

Washington—King County—State—Grade & Surf.

Joe P. Surace & Co., Seattle, on a low bid of \$42,367 to the Department of Highways, Olympia, was awarded the contract for clearing, grading, draining, surfacing and constructing bituminous plant-mix surface with non-skid single seal treatment on 0.81 mi. of city street and county road from the Kirkland Housing Projects to Lake Washington Shipyard. Time allowed for completion is 120 calendar days from Feb. 1. The following total and unit bids were submitted:

(A) Joe P. Surace & Co.....	\$42,367	(G) Northwest Construction Co.....	\$47,963
(B) S. S. Mullen.....	42,672	(H) Erickson Paving Co.....	48,432
(C) M. P. Munter Co.....	44,743	(I) Puget Construction Co.....	51,573
(D) Superior Construction Co.....	45,271	(J) C. V. Wilder.....	53,158
(E) A. C. Goerig Construction Co.....	45,423	(K) Sound Construction & Engineering Co.....	54,940
(F) L. Coluccio Co.....	46,856	(L) Frazier & Olels.....	62,669

(1) 4.0 ac. clearing	
(2) 3.2 ac. grubbing	
(3) Lump sum, clearing and grubbing	
(4) 18,330 cu. yd. unclass. excav. incl. haul of 600 ft.	
(5) 50 cu. yd. com. trench excav. incl. haul of 600 ft.	
(6) 1,990 cu. yd.-sta. overhaul on above materials	
(7) 175.6 M. cu. yd.-sta. overhaul on above mats.	
(8) 430 cu. yd. structure excav.	
(9) 4,420 lin. ft. slope treatment	
(10) 42.8 stas. (100-ft.) finishing roadway	
(11) 8,090 cu. yd. selected roadway borrow in pl. incl. haul	
(12) 905 cu. yd. one crse. screened grav. surf. in pl.	
(13) 210 cu. yd. sand filler in place, incl. haul	

BITUMINOUS SURFACE TREAT.

"PLANT MIX" TYPE CL. F.

(14) 0.8 mi. preparation of untreated roadway	
(15) 10 M. gal. water	
(16) 125 cu. yd. furn. & placing new fine min. agre.	
(17) 13 T. bit. cement (prime coat) MC-2 in place	
(18) 65 T. bit. cement (plant mix) RC-5 in place	
(19) 1,290 T. furn. min. aggs.; mixing and placing bit. mixture	

NON-SKID SINGLE SEAL TREAT.

SCHEDULE "B"

(20) 150 cu. yd. furn. & placing coarse screenings (3/8-in. to No. 4 sieve)	
(A) 200.00	200.00
(B) 100.00	200.00
(C) 500.00	125.00
(D) .28	.40
(E) 2.00	1.90
(F) .10	.01
(G) 8.00	5.00
(H) 2.85	1.90
(I) .12	.15
(J) 20.00	10.00
(K) 1.00	1.25
(L) 2.50	1.90
(M) 2.50	1.90
(N) 1,227	\$1,050
(O) 4.00	3.03
(P) 4.13	3.54
(Q) 47.20	40.40
(R) 35.40	30.30
(S) 7.96	6.82
(T) 5.00	4.29
(U) 4.15	3.54
(V) 47.20	40.40
(W) 45.00	38.50
(X) 15.00	17.20
(Y) 1.90	2.00
(Z) 180.00	290.00
(AA) 200.00	\$1,040
(BB) 300.00	200.00
(CC) 200.00	300.00
(DD) 500.00	200.00
(EE) 1,200	\$1,000
(FF) 300.00	\$1,040
(GG) 300.00	\$1,040
(HH) 30.00	30.00
(II) 40.00	40.00
(JJ) 2.25	1.75
(KK) 2.25	1.75
(LL) 1.25	1.50
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(DD) 4.25	4.25
(EE) 4.25	4.25
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STEADY DOES IT!

● **And steady it is**, with a Pierce Governor at the engine throttle, assuring the operator of dependable unvarying engine speed, under all the changing load conditions encountered on the job.

On every type of power equipment, Pierce Flyball Governors are constantly on the alert to provide exactly the amount of power that's needed, automatically and instantaneously . . . to protect both engine and equipment against destructive over-speeds.

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Manufacturers of Pierce Precision Governors
and Sisson Automatic Chokes

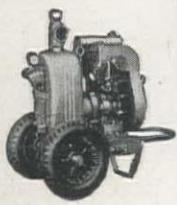
Canadian Manufacturer and Distributor:
BURLEC LIMITED, Toronto 13, Canada

The time-proven flyball principle of Pierce Governors, and their rugged, precision construction assure efficient governing, and long trouble-free service under the toughest conditions. These are the reasons that Pierce Governors have been so widely adopted as standard equipment. And these are the reasons you should specify Pierce Governors on all new equipment, and for replacement, when necessary, on your present equipment.



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GOVERNORS

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PUMPS • HOISTS • LIGHT PLANTS



DEPENDABLE
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SAVE
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SAVE
TIME

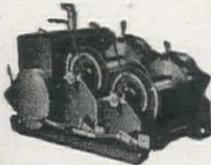
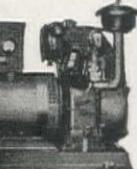
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(26)	20.00	16.50	110.00	20.00	15.00	7.00	40.00	20.00	10.00	40.00	25.00	45.00
(27)	1.00	.25	1.00	.80	.10	.25	.40	.25	.10	.75	.50	.50
(28)	.50	.25	1.00	.80	.15	.40	.40	.20	.50	.50	.20	.50
(29)	50.00	20.00	50.00	100.00	25.00	35.00	50.00	15.00	30.00	10.00	50.00	45.00
(30)	20.00	5.00	30.00	20.00	8.00	15.00	15.00	15.00	5.00	15.00	25.00	35.00
(31)	1.00	.55	.74	1.00	1.50	.65	.60	.50	.50	.50	1.00	1.25
(32)	1.15	.55	.74	.75	1.50	.75	1.00	.75	.75	.50	1.00	1.25
(33)	.65	.66	.74	1.00	1.25	.65	.60	.75	1.25	.65	1.00	1.50
(34)	.75	.83	1.12	1.25	1.50	.85	.85	.95	1.50	1.00	1.00	1.75
(35)	.70	.55	1.12	1.15	1.75	.90	.75	1.25	1.50	1.00	1.00	2.00
(36)	1.50	.63	1.12	2.50	2.00	.65	1.00	1.00	1.00	2.50	2.00	2.00
(37)	2.50	3.93	1.42	2.50	3.50	1.90	3.00	2.50	2.00	3.00	5.00	2.50
(38)	1.25	1.83	.90	1.50	1.25	.65	.70	1.00	1.50	.75	1.50	1.75
(39)	1.50	2.10	1.40	1.75	1.75	1.15	1.25	1.25	2.00	1.25	2.00	2.00
(40)	2.25	2.85	2.75	2.50	2.50	2.25	2.50	2.00	3.00	2.25	2.50	3.25
(41)	3.50	5.60	4.00	4.00	5.00	3.25	5.00	3.50	5.00	4.00	5.00	4.50

Bridge . . .

California—San Diego County—State—Reinforced Concrete

Ralph O. Dixon, Los Angeles, was low with a bid of \$151,914 to the California Division of Highways on construction of a reinforced concrete bridge across the San Diego river in the city of San Diego. None of the material is to be furnished by the state. A preference rating of AA3 for rated materials under the Controlled Materials Plan has been assigned, but no preference rating is available for shells for cast-in-place concrete piles. The unit bids follow:

(A) Ralph O. Dixon.....	\$151,914	(I) Bent Construction Co.....	\$192,485
(B) Griffith Co.....	161,970	(J) Carlo Bongiovanni	199,999
(C) M. H. Golden Construction Co.....	164,991	(K) Vinnell Co.....	203,057
(D) Kiss Crane Co.....	176,531	(L) L. E. Dixon	207,153
(E) R. R. Hensler-Heuser & Garnett.....	177,854	(M) Byerts & Dunn	217,810
(F) B. G. Carroll.....	183,345	(N) Shanahan Bros., Inc.....	219,492
(G) Oberg Bros.....	183,730	(O) W. J. Distelli	224,767
(H) Ralph A. Bell.....	184,480	(P) J. E. Haddock, Ltd.....	229,379

	(A)	(B)	(C)	(D)	(E)	(F)
(1) Lump sum, removing exist. bridge.....	535.00	750.00	\$1,000	\$9,500	\$3,100	\$1,000
(2) 2,200 cu. yd. structure excavation.....	.70	1.35	1.50	1.00	1.50	3.00
(3) 2,300 cu. yd. Cl. "A" P.C.C. (structure).....	28.00	30.30	38.00	33.00	35.00	38.50
(4) 111 cu. yd. Cl. "A" P.C.C. (railing).....	55.00	70.00	75.00	70.00	60.00	80.00
(5) 6,000 lb. misc. iron and steel.....	.25	.24	.25	.30	.20	.20
(6) 10,080 lin. ft. furnishing conc. piles.....	2.05	2.00	1.70	1.70	1.80	1.75
(7) 210 ea. driving piles.....	45.00	52.50	58.00	110.00	60.00	50.00
(8) 2,200 cu. yd. riprap.....	7.60	8.20	3.00	5.00	8.00	8.00
(9) 675,000 lb. bar reinforcing steel.....	.045	.043	.04	.035	.05	.045
(10) Lump sum, misc. items of work.....	625.00	\$1,100	550.00	\$4,500	\$1,000	\$1,000
	(G)	(H)	(I)	(J)	(K)	(L)
(1)	\$1,000	\$1,000	600.00	200.00	\$1,500	\$1,500
(2)	2.00	1.00	1.00	3.00	2.00	1.80
	(M)	(N)	(O)	(P)		
	\$3,500	\$1,100	3.00	3.85	500.00	900.00
					2.00	1.85

(Continued on next page)

ALL STEEL HAND HOIST
Seattle U.S.A.

COMPACT
POWERFUL
SAFE

*For Use Where Power is
Not Practical, Available
or Sufficient*

"The strongest geared power for its weight in the world"

Three sizes: 2-, 5- and 15-ton. Capacity comparison figuring $\frac{1}{2}$ " flexible plow steel cable.

2-ton "Lightweight" 75 ft.
5-ton "General Utility" 250 ft.
15-ton Triple-Geared "Special" 1200 ft.

With patented instant gear change and positive internal brake that never fails, and will lock and hold load until released.

Ratios Weight Price
2-ton 4 & 22 to 1 60 lb. \$50
5-ton 4 & 24 to 1 110 lb. \$75
15-ton 4, 10 & 100 to 1 680 lb. \$250

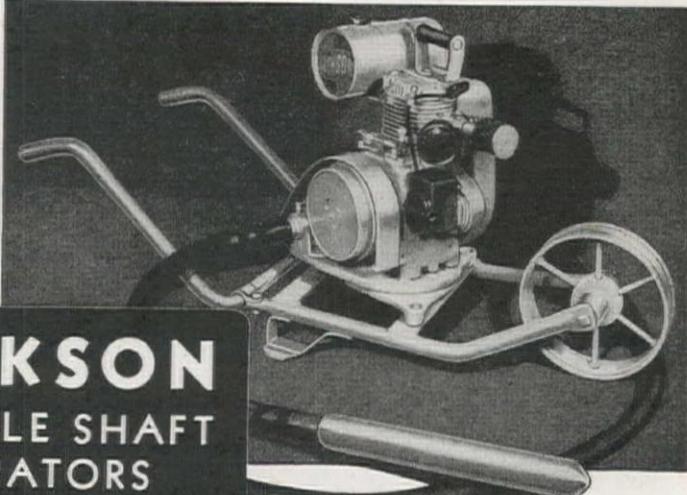
15-ton special priced f. o. b. Seattle. 5-ton size can also be furnished from factory with special 16" or 24" wide drum in place of standard drum 8" wide. Scatter them around the job to suit, one or 100, distributing the load "evenly". Place assembled pipe lines, caissons, trusses, girders, or what have you. Just be sure of your rigging and anchorage. Manpower never grew that could break a Beebe Hoist on a full pull—a 5-ton General Utility withstood a mechanical pull of 43,000 lbs. on official test, breaking a $\frac{1}{2}$ " plow steel cable with Hoist remaining intact.

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JACKSON FLEXIBLE SHAFT VIBRATORS



are the choice of those who want JACKSON standards of quality, dependability and performance. No other flexible shaft vibrator can offer such assurance.

Supplied with a $2\frac{3}{8}$ " and a $1\frac{3}{4}$ " head. These two heads give user a vibrator efficient in and suitable for a wide range of applications. For instance, from wall sections of comparatively large size to narrow sections.

Model FS-6A, illustrated above, is furnished complete with 7, 14, 21 or 28 feet of shaft. Has dirt-proof turntable base. Supplied with or without wheelbarrow mounting.

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EDWARD R. BACON COMPANY, San Francisco, California

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LUDINGTON, MICHIGAN

It Pays To SPECIFY FLAME-PRIMING on New Equipment and Structural Steel

*because it prepares steel
for better, faster, longer-
lasting paint jobs . . .*

OXY-ACETYLENE flame-priming of steel, to remove loose scale, rust, and moisture before painting, can frequently eliminate sand-blasting completely. At the same time, this process does away with the necessity for chemical treatment of the steel prior to painting.

Flame-priming can be applied to structures of practically any size. Irregularity of shape, recesses, rivets, or other "hard-to-get-at" parts offer no obstacle. This process is easy to learn, easy to use, and requires only a small amount of equipment.



Above an operator is using an Oxweld flame-priming blowpipe to prepare a large tank for a lasting paint job. The acetylene is from three manifolds Prest-O-Lite cylinders.



How It Works—To use flame-priming, a heating head is passed quite rapidly over the surface to be cleaned. The quick surface heat causes the loose scale to break away, and at the same time drives out surface moisture. The priming operation is closely followed by wire-brushing, and the paint is then applied while the metal is still warm and dry. As a result, the paint flows on faster, bonds tighter, and dries quicker. And because loose scale, rust, and surface moisture have been eliminated, subsequent paint flaking is avoided.

and *Linde* can help you use it!

If you would like to know more about flame-priming, get in touch with Linde! Whether it's welding, cutting, flame-hardening, flame-softening, descaling, or hard-facing—if it is a "flame" process—it pays to ask Linde!

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Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N.Y.  Offices in Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

WCN-5

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THE LINDE AIR PRODUCTS COMPANY
30 East 42nd Street — Room 308
New York 17, N.Y.

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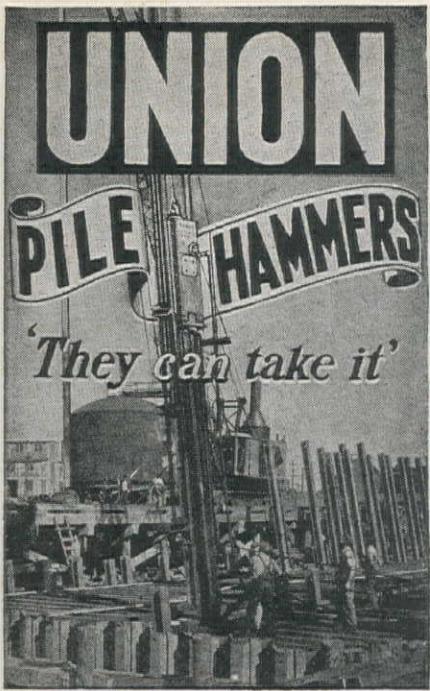
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OXWELD, PUROX, PREST-O-WELD APPARATUS . . . OXWELD SUPPLIES**

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ELIZABETH, New Jersey

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for Every
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Whether it's a Giant Corrugated Culvert or the simplest of water systems—there's a Beall pipe to fit the job. You'll find that engineers and contractors specify Beall pipe because they have learned to depend on its uniform quality.

Beall industrial pipe ranges from 4" to 84" diameter and it includes pipe for every purpose.

MUNICIPAL WATER SYSTEMS
DRAINAGE SYSTEMS
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IRRIGATION SYSTEMS

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PIPE & TANK CORP.
1945 NORTH COLUMBIA BOULEVARD
PORTLAND, OREGON
Offices in: SEATTLE, SPOKANE, BOISE

(3)	40.00	37.50	44.00	40.00	39.50	46.00	43.00	38.17	50.00	55.00
(4)	60.00	70.00	75.00	80.00	85.00	72.50	80.00	88.00	70.00	75.00
(5)	.25	.30	.30	.30	.30	.27	.25	.275	.20	.205
(6)	2.00	2.00	2.00	1.65	2.15	2.50	2.25	3.41	3.40	2.05
(7)	53.50	85.00	60.00	49.00	95.00	65.00	70.00	88.00	45.00	64.00
(8)	7.00	6.00	8.00	12.00	8.50	7.50	9.00	5.50	9.00	9.25
(9)	.045	.05	.04	.04	.05	.045	.05	.066	.045	.048
(10)	\$1,000	500.00	\$1,000	\$10,197	\$1,000	500.00	\$7,500	\$1,210	\$2,000	\$1,500

California—San Joaquin County—State—Bascule Repair

James H. McFarland, San Francisco, bidding \$31,999, submitted the low proposal for repairing the fenders and deck of a bascule bridge across the San Joaquin river at Mossdale. A preference rating of AA2 has been assigned to the project. Bids submitted were as follows:

(1) James H. McFarland	\$31,999	(4) J. Philip Murphy Corp.	\$49,454
(2) Kiss Crane Co.	46,153	(5) H. F. Lauritzen	50,788
(3) Pomeroy Sinnock	49,109		

	(1)	(2)	(3)	(4)	(5)
Lump sum, removing and resetting Protection pier lights	67.00	300.00	150.00	750.00	300.00
Lump sum, removing fenders	\$1,217	\$5,000	\$2,500	\$3,000	\$1,500
Lump sum, removing bridge deck	.654.00	\$5,000	600.00	\$2,000	750.00
50 M.F.B.M. treated Douglas fir timber	163.00	160.00	395.00	300.00	320.00
5,700 lbs. structural metal	.21	.15	.23	.10	.25
56,000 lbs. open steel floor	.131	.205	.155	.18	.27
15,000 lbs. structural steel	.14	.275	.15	.14	.22
4,860 lin. ft. furn'g treated Douglas fir piles	1.00	1.50	1.75	2.00	1.50
81 ea. driving piles	72.00	40.00	55.00	50.00	50.00
121 lin. ft. temporary railing	2.40	3.00	4.20	4.00	2.50
Lump sum, misc. items of work	296.00	500.11	400.00	\$1,700	750.00

Irrigation . . .

California—Riverside County—Bureau of Reclamation—Canal Lining

M. H. Hasler, Santa Ana, Calif., submitted low bid of \$392,560 when proposals were opened by the Bureau of Reclamation for earth lining 442,000 ft. of the Coachella canal of the All American Canal System in southern California, and surfacing approximately $\frac{1}{2}$ mi. of road. The high bid was more than \$1,000,000 above the lowest submitted. Following is an abstract of bids:

(1) M. H. Hasler	\$392,560	(6) Vinnell Co.	\$ 621,500
(2) Nathan A. Moore	399,950	(7) Mathew S. Ross	697,720
(3) Ralph O. Dixon	425,300	(8) Clyde W. Wood, Inc.	731,200
(4) Ralph A. Bell & Triangle Rock & Gravel Co.	546,040	(9) W. E. Callahan Construction Co. & Gunther & Shirley Co.	1,426,700
(5) Morrison-Knudsen Co., Inc.	610,250		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2,000 cu. yd. stripping borrow pits	.40	2.00	.30	1.00	.50	.25	.25	.75	.50
395,000 cu. yd. earth lining	.83	.71	.89	1.12	1.25	1.27	1.50	1.36	3.20
77,000 cu. yd. road surfacing	.83	1.50	.95	1.32	1.50	1.55	1.36	2.50	2.10

Utah—Utah County—Bureau of Reclamation—Canals

J. B. & R. E. Walker, Inc., Salt Lake City, submitted the low bid of \$359,311 to the Bureau of Reclamation at the bid opening in Provo for construction of the Provo reservoir canal, including siphons, flume and structures in four different sections, totaling about $1\frac{1}{4}$ mi. in length. The following unit bids were submitted:

(1) J. B. & R. E. Walker	\$359,311	(4) Morrison-Knudsen Co., Inc.	\$440,876
(2) Stroud-Seabrook	382,519	(5) Vinnell-Engineers, Ltd.	447,765
(3) David A. Richardson	384,825		

	(1)	(2)	(3)	(4)	(5)
82,000 cu. yd. excav., common, for structures	.61	.55	1.10	.62	.45
3,000 cu. yd. excav., rock, for structures	6.50	5.00	1.10	3.00	2.85
10,500 cu. yd. excav., common, for river-channel change and for wastewater channel	.50	.50	1.00	.35	.50
50 cu. yd. excav., rock, for river-channel change and for wastewater channel	10.00	5.00	1.00	5.00	6.00
3,500 cu. yd. overhauling	.03	.05	.10	.05	.03
6,000 cu. yd. compacted embankments	.45	2.00	1.00	.50	.50
63,000 cu. yd. backfill	.39	.35	.20	.35	.30
6,500 cu. yd. compacting backfill	1.00	5.00	.50	1.50	1.70
30 sq. yd. dry-rock paving	2.50	5.00	2.00	5.00	20.00
40 cu. yd. riprap	7.00	7.00	3.00	5.00	15.00
3,000 cu. yd. rock backfill	2.00	4.00	2.50	1.50	5.75
10 cu. yd. constructing reverse filter	3.00	10.00	4.00	10.00	20.00
7,600 cu. yd. concrete in structures	25.17	22.00	27.00	35.00	34.50
1,900,000 lb. placing reinforcement bars	.0234	.03	.02	.0325	.035
27 welds, welding 1 $\frac{1}{4}$ -in. square reinf. bars	3.00	5.00	5.00	5.00	20.00
540 lin. ft. placing rubber water stops in joints	2.00	1.50	.50	.40	1.75
40,000 lb. placing metal water stops in joints	.091/3	.08	.08	.07	.12
410 sq. ft. placing elastic joint filler in joints	1.00	.90	.50	.50	1.50
50 lin. ft. laying 24-in. diam. conc. pipe	1.50	2.00	2.00	5.00	6.50
7,000 lb. installing radial gates and gate hoists	.10	.20	.07	.14	.12
36,000 lb. installing misc. metalwork	.05	.20	.08	.10	.22
2,500 sq. ft. painting inside surf. of conc. pipe	.06	.10	.15	.50	.15

Miscellaneous . . .

California—Los Angeles County—City—Railroad

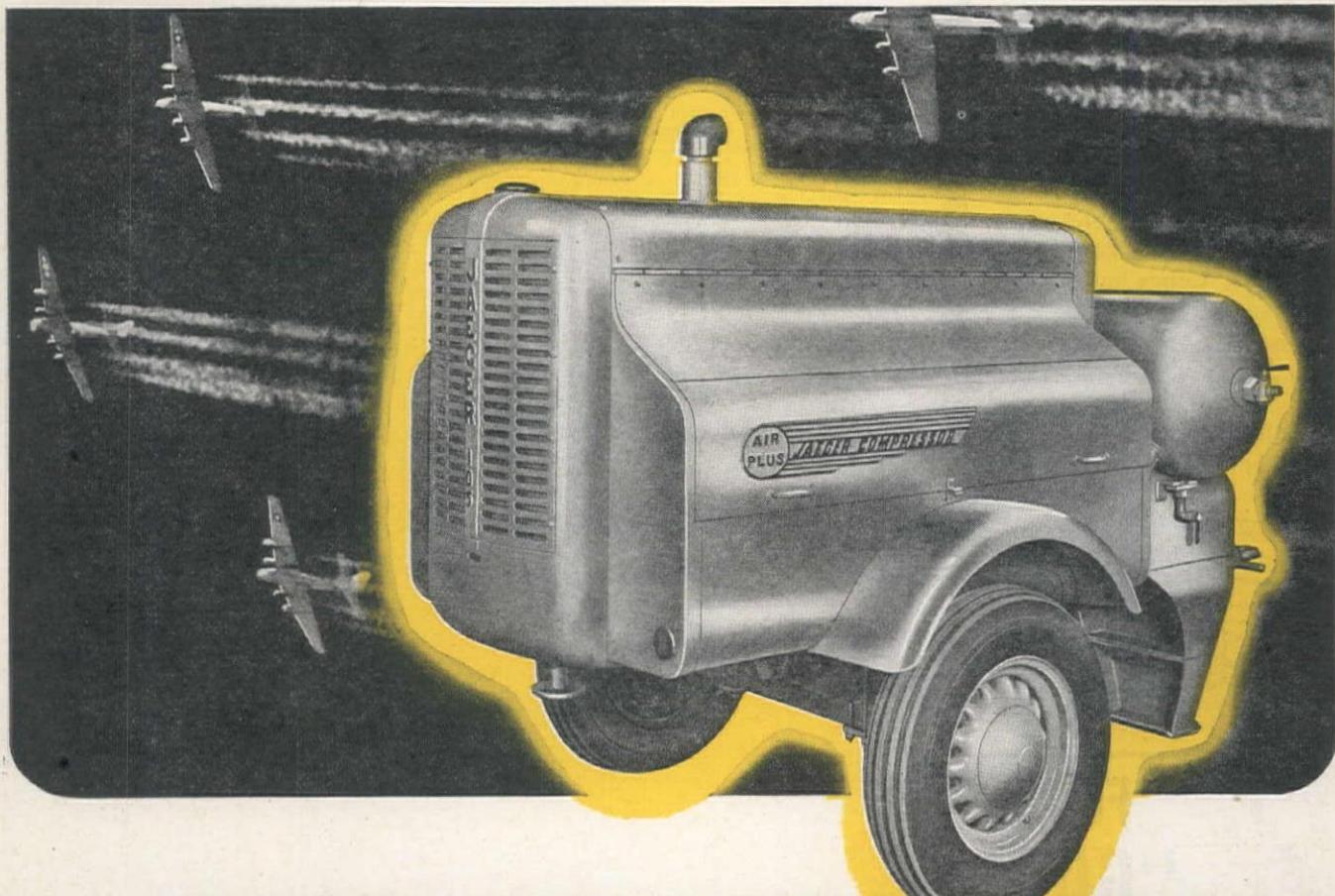
H. F. Kretlow & Co., Huntington Park, submitted a low bid at \$14,766, to the Long Beach Harbor Commission and was awarded the contract for construction of railroad tracks at Pier D, Long Beach outer harbor. The following unit bids were submitted:

(1) H. F. Kretlow & Co.	\$14,766	(3) Modern Builders	\$22,682
(2) Shanahan Bros.	19,602	(4) Morrison-Knudsen Co., Inc.	26,022

	(1)	(2)	(3)	(4)
3,775 ft. lay 128 lb. rail	2.18	2.43	3.25	3.65
127.6 ft. remove 90 lb. rail	1.00	.70	1.00	3.00

(Continued on next page)

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JAEGER COMPRESSOR

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As in aircraft motors, the moving parts are micro-honed and lapped, resulting in lifetime characteristics of high efficiency, smooth operation and ample reserve power for extreme altitude work.

The Jaeger-designed, air-animated "Tough Swedish Twin" Valves, which insure air plus coolness, are an advance in compressor design. Accessibility has been so well provided that it is a matter of minutes to remove and replace any compressor part.

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"AIR-PLUS" 2-STAGE AIR-COOLED COMPRESSORS 60 TO 500 FT. — "FLEET-FOOT" CRANE-LOADERS — "SURE PRIME" CENTRIFUGAL PUMPS — "SPEEDLINE" BUILDING MIXERS — "DUAL-MIX" TRUCK MIXERS — "JAEGER" HOISTING ENGINES AND TOWERS — "JAEGER-LAKEWOOD" PAVING EQUIPMENT

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SMITH BOOTH USHER COMPANY, Distributor
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Factory Representative:
 John F. Kezley & Son, Los Angeles, Calif.

127.6 ft. lowering track.....	1.00	2.75	2.30	3.00
127.6 ft. relaying 128 lb. rail.....	1.50	3.15	3.35	4.00
75 ea. remove cross ties and replace with switch ties.....	.75	.70	1.00	3.50
66.5 ft. remove girder rail.....	1.00	.80	1.00	3.00
5,500 sq. ft. remove 8 in. asph. conc.....	.10	.16	.22	.28
6 ea. install 128 lb. turnouts.....	100.00	135.00	275.00	450.00
3 ea. install Buda bumpers.....	25.00	35.00	80.00	145.00
162 ea. install tie rods.....	.25	.55	.60	1.40
400 cu. yd. excavation.....	1.25	.80	1.00	1.40
1,200 T. No. 1 crushed rock ballast in place.....	1.65	3.40	1.90	2.15
2,250 T. No. 3 crushed rock ballast in place.....	.87	1.26	1.20	.95
50 sq. ft. remove 8 in. concrete wall section.....	55.15	20.00	35.00	50.00
Lump sum, provide conc. protection for exist. conduit.....	200.00	315.00	412.00	250.00

California—Santa Barbara County—U. S. Engineer Office—Drainage

Midland Construction Co., South Gate, submitted the low bid of \$184,378 to the U. S. Engineer Office, Los Angeles, and was awarded the contract for construction of additional drainage facilities at the Santa Maria Army Air Base, Santa Maria. The following total and unit bids were submitted:

(A) Midland Construction Co.....	\$184,378	(D) Clyde W. Wood.....	\$214,801
(B) Frederickson & Watson.....	189,058	(E) E. T. Haas Co.....	239,297
(C) Burch & Bebek.....	194,906	(F) Modern Builders Construction Co.....	310,357

(1) 460 sy. yd. removal of existing bituminous surfacing.....	(18) 9 ea. catch basins, type D-3.....
(2) 55 sq. yd. removal of existing Portland cem. conc. pavement.....	(19) 2 ea. manholes, type D-2.....
(3) lump sum, removal of existing catch basin.....	(20) 4 ea. manholes, type D-3.....
(4) lump sum, lowering existing 6-in. cast-iron water pipe.....	(21) lump sum, pond outlet structure.....
(5) 25,000 cu. yd. unclass. excav.....	(22) lump sum, trash rack.....
(6) 2,000 lin. ft. 15-in. reinf. conc. pipe drain.....	(23) lump sum, concrete dike spillway structure.....
(7) 506 lin. ft. 18-in. reinf. conc. pipe drain.....	(24) lump sum, conc. struct. for protection of exist. sanitary sewer pipe.....
(8) 1,620 lin. ft. 21-in. reinf. conc. pipe drain.....	(25) 40 cu. yd. grouted rock apron.....
(9) 1,268 lin. ft. 24-in. reinf. conc. pipe drain or culvert.....	(26) 48,500 sq. yd. 4-in. soil-cement surf. course.....
(10) 500 lin. ft. 27-in. reinf. conc. pipe drain.....	(27) 460 sq. yd. 6-in. soil-cement base.....
(11) 1,450 lin. ft. 30-in. reinf. conc. pipe drain.....	(28) 3,820 bbl. Portland cement for soil-cement base and surface courses.....
(12) 1,435 lin. ft. 33-in. reinf. conc. pipe drain.....	(29) 40 T. quick-setting emulsified asphalt for seal coat, applied.....
(13) 217 lin. ft. 39-in. reinf. conc. pipe drain.....	(30) 460 sq. yd. 2-in. central plant-mixed bitum. surf.....
(14) 3,348 lin. ft. 48-in. reinf. conc. pipe drain.....	(31) 55 sq. yd. 9, 6, 9-in. Portland cement conc. pavémént, including gravel base course.....
(15) 1,200 lin. ft. 10-in. vit. clay pipe drain.....	(32) 10 ac. seeding.....
(16) 7,100 cu. yd. gravel for sub-surface drains.....	
(17) 12 ea. catch basins, type D-2.....	

(A)	(B)	(C)	(D)	(E)	(E Alt.)	(F)
(1)	\$ 1.25	\$.50	\$.50	\$.50	\$.60	
(2)	1.90	5.00	1.00	.50	2.00	
(3)	135.00	50.00	300.00	150.00	175.00	
(4)	150.00	100.00	350.00	300.00	250.00	
(5) .....	.67	.40	.40	.40	1.20	
(6)	3.95	3.55	5.25	3.40	\$ 2.80	11.00
(7)	4.45	4.00	5.75	4.10	3.45	11.50
(8)	5.38	4.95	6.35	5.00	4.20	12.50
(9)	5.84	5.75	6.90	5.55	5.10	13.25
(10)	6.70	7.00	7.35	7.00	6.25	13.50
(11)	7.87	8.00	9.00	7.70	6.80	14.00
(12)	8.96	9.50	10.25	8.75	7.60	15.00
(13)	11.91	11.50	15.00	10.80	10.10	16.00
(14)	14.43	15.00	16.50	14.30	12.90	18.55
(15)	1.76	2.50	3.75	2.25	8.70	
(16)	2.84	3.50	3.95	3.00	3.50	
(17)	260.00	400.00	350.00	200.00	675.00	
(18)	480.00	300.00	675.00	300.00	750.00	
(19)	245.00	400.00	360.00	300.00	275.00	
(20)	315.00	300.00	775.00	350.00	320.00	
(21)	225.00	500.00	300.00	500.00	1250.00	
(22)	40.00	200.00	100.00	300.00	500.00	
(23)	395.00	1500.00	350.00	800.00	1100.00	
(24)	155.00	100.00	250.00	300.00	300.00	
(25)	32.00	10.00	45.00	20.00	35.00	
(26) .....	.27	.33	.35	1.60	.50	
(27)	1.00	.40	1.00	2.70	.80	
(28)	2.75	4.00	2.85	2.90	3.33	
(29)	26.00	27.00	40.00	40.00	45.00	
(30) .....	.80	7.00	1.00	2.70	6.00	
(31)	4.50	10.00	3.60	5.00	11.00	
(32)	2.60	200.00	150.00	30.00	150.00	

UNIT BIDS NOT AVAILABLE

California—San Mateo County—City of San Francisco—Reservoir Outlet Works

R. G. Clifford, South San Francisco, and Peter Sorensen, Redwood City, bid low to the Public Utilities Commission of San Francisco, for the construction of Outlet No. 3 on the easterly shore of San Andreas Reservoir, approximately 2 mi. west of Millbrae. The following total and unit bids were submitted.

(1) R. G. Clifford & Peter Sorensen.....	\$345,222	(4) Morrison-Knudsen Co., Inc.....	\$441,907
(2) Piombo Bros.....	392,156	(5) MacDonald & Kahn, Inc.....	460,758
(3) Guy F. Atkinson.....	426,235	(6) T. E. Connolly.....	542,195

(1)	(2)	(3)	(4)	(5)	(6)
10,500 cu. yd. excav., Cl. 1, open cut.....	1.30	1.25	1.25	1.00	1.60
6,100 cu. yd. excav., Cl. 2, open cut.....	1.30	1.25	1.25	3.00	1.60
800 cu. yd. excav., shafts, 66-ft. deep, 14-ft. dia.....	19.50	14.00	48.00	30.00	22.80
9,650 cu. yd. excav., tunnels, horseshoe shaped.....	10.80	15.65	17.10	19.00	20.00
470 cu. yd. conc. for shafts.....	35.60	25.50	30.00	40.00	26.00
1,150 cu. yd. conc., tunnel floors.....	24.20	24.70	20.00	25.00	27.60
3,430 cu. yd. conc., tunnel sides and arches.....	25.50	29.70	26.00	25.00	27.60
490 cu. yd. conc. structs., open cut.....	40.00	34.20	35.00	44.00	36.60
200 bbl. extra cement.....	3.00	3.00	2.50	2.75	3.15
71,000 lb. place reinf. steel.....	.04	.035	.05	.05	.036
300 ea. furn. and inst. grout pipe.....	4.00	4.40	3.00	5.00	3.80
2,400 cu. ft. pressure grouting.....	2.00	1.85	1.25	2.50	1.50
46,000 lb. furn. and inst. steel castings.....	.41	.37	.40	.37	.39
14,500 lb. furn. and inst. misc. metalwork.....	.25	.33	.40	.27	.25
Lump sum, install 48-in. valves.....	\$1,350	\$1,780	\$5,000	750.00	\$2,530
Lump sum, const. timber roof for shaft.....	800.00	275.00	350.00	700.00	519.00
18,400 lb. furn. and inst. welded steel stand pipe.....	.30	.15	.35	.28	.34
42,000 lb. furn. and inst. intake screens.....	.30	.35	.35	.28	.60

HEAVY STRUCTURAL DIMENSION AND TIMBERS ARE AVAILABLE

W.P.B. Material Substitutions and Supply List, Issue No. 12, which indicates the relative availability of the most important materials essential to the war, states:

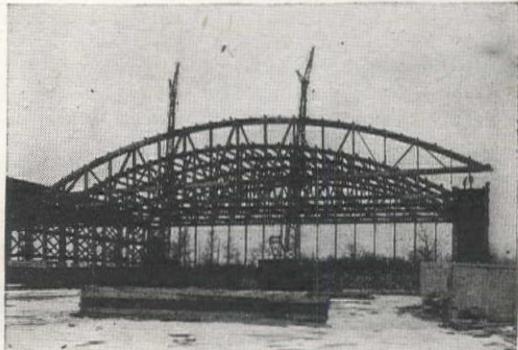
GROUP III

"Supplies of Group III materials, except for local shortages, are readily AVAILABLE for essential uses. They should be used instead of those in Groups I and II wherever possible.

"(III) D. LUMBER

- "Cedar, Red, Western: Timbers.
- "Cypress: Pecky; Timbers.
- "Douglas-Fir: Dimension (3" and 4" thicknesses only); Timbers.
- "Hemlock, Western: Dimension (3" and 4" thicknesses only); Timbers.
- "Larch, Western: Dimension (3" and 4" thicknesses only); Timbers.
- "Pine, Southern: Dimension (3" and 4" thicknesses only); Timbers.
- "Redwood: Timbers."

The lumber manufacturing industry recommends that 3-inch and thicker lumber be specified for essential construction uses as a stimulus to the production of the much needed 1-inch and 2-inch lumber, which generally is produced along with structural and timbers...Specifying and design officers can help by specifying timber construction using these available sizes and dimensions...Well balanced orders facilitate maximum production of lumber.



Cleveland Municipal Airport 201' clear span timber trusses prefabricated by Timber Structures, Inc., Portland and New York...glued-laminated top and bottom chords using Teco Connectors with 28' glued-laminated columns.

NATION-WIDE TIMBER FABRICATORS CAN SERVE YOU

Experienced timber fabricators have large production facilities throughout the country to aid the war effort promptly...And these facilities are ready to serve private industry in postwar planning...Consult them now or write us.



TIMBER ENGINEERING COMPANY

WASHINGTON, D. C. - PORTLAND, OREGON

TIMBER CONNECTORS AND TOOLS

Endorsed by Leading Lumber Manufacturers and Fabricators

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 pro-

vide 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 on many of these projects is often available, and will gladly be furnished upon your request to the Editor, WESTERN CONSTRUCTION NEWS, 503 Market Street, San Francisco.

CONTRACTS AWARDED

Large Western Projects...

Wells P. Goodenough and H. C. Geyer, Palo Alto, Calif., at \$1,536,667, were awarded a contract for barracks and facils. at the Navy personnel depot, San Bruno, Calif., by the Bureau of Yards & Docks, Washington, D. C.

Arizona Sand & Rock Co., Phoenix, was awarded a contract at \$321,701 to grade, drain and pave 11 mi. of the Ashfork-Flagstaff highway in the vicinity of Flagstaff by Arizona Highway Dept.

Guy F. Atkinson Co., San Francisco, bidding \$431,624, was awarded a contract for a bridge across Long Beach Channel to Terminal Island by Bureau of Yards & Docks, Washington, D. C.

Gibbons & Reed, Salt Lake City, Utah, received a contract at \$465,945 for taxiway extensions and conc. pave. at Kingman, Ariz. army airfield by U. S. Engineer Office, Los Angeles, Calif.

Del E. Webb Construction Co., Phoenix, Ariz., \$693,720 for additional aviation facils. at the Marine air station at Mojave, Ariz., by Bureau of Yards & Docks, Washington, D. C.

Winston Bros. Co., Minneapolis, Minn., has a \$1,727,000 contract for aviation facils. and bldgs. at the Marine air station, Miramar, Calif., by Bureau of Yards & Docks, Washington, D. C.

A. D. Drum, Jr., Fallon, Nev., a contract for \$624,116 for landing fields and roads at Indian Springs, Nev., airport by U. S. Engineer Office, Los Angeles, Calif.

Johnson, Drake & Piper, Inc. and **S. J. Groves & Sons Co.**, Minneapolis, Minn., approx. \$9,000,000 for a waterworks system in Caracas, Venezuela, by Venezuelan Institute of Sanitary Works.

A. S. Vinnell, Alhambra, Calif., with a proposal of \$316,000, has been awarded contract for excav. in the bed of the Colorado River, below Parker powerhouse, by Bureau of Reclamation, Washington, D. C.

San Francisco Bridge Co., San Francisco, \$418,510 for dredging and **Macco Construction Co.**, Oakland, \$273,650 for a rock seawall, are recently let contracts at the Naval air station in Alameda, Calif., by Bureau of Yards & Docks, Washington, D. C.

Mercer-Fraser Co., Eureka, Calif., \$421,990 and **Healy-Tibbitts Co.**, San Francisco, \$299,000, have contracts for construction of piers at Treasure Island section base by Bureau of Yards & Docks, Washington, D. C.

J. B. & R. E. Walker, Inc., Salt Lake City, received contract at \$359,311 for construction of Provo reservoir canal, Provo project, Utah, by Bureau of Reclamation, Washington, D. C.

Wixson & Crowe, Redding, Calif., have the contract at \$451,690 for tunnels on the Deschutes project near Terrebonne, Ore., by

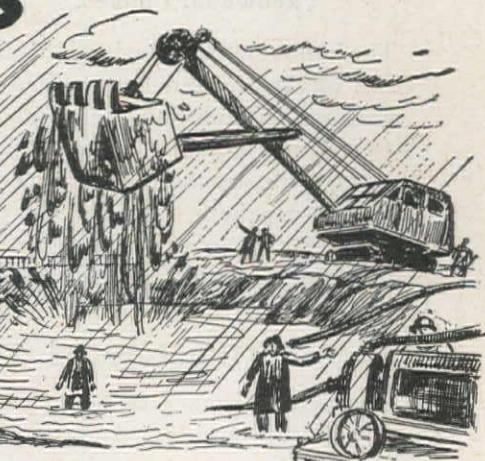
"IT WAS AN AWFUL MESS"

SAID THE VETERAN CONTRACTOR—

They were excavating for a Navy Yard dry dock when it started to rain... and it rained for days. The "dry dock" became a bog of heavy soup...

They had ruined several centrifugal pumps trying to move the muck. They were even trying a crane when I was called in... "Relax," I said. "while I call the Marlow Distributor..."

It took "Marlow Mud Hogs" just 2 days to suck that swamp dry. They gulped up ooze, rocks, trash and all. "Next time you'll know better," I told them.



THIS INCIDENT, based on an actual happening, shows how Marlow "Mud Hog" diaphragm pumps do jobs that other pumps can't touch.

You will find them unequalled for moving mud, sand, heavy ooze and liquids with a high content of solids. They will take almost unbelievable abuse.

Send for the free 80-page Marlow Pump-book. It may put you money ahead on your next job.

MARLOW PUMPS RIDGEWOOD NEW JERSEY

Makers of the World's Largest Line of Contractors' Pumps

CLYDE EQUIPMENT CO., Portland and Seattle
GEORGE M. PHILPOTT CO., San Francisco
LeROI-RIX MACHINERY CO., Los Angeles
GLENN CARRINGTON & CO., Seattle (for Alaska)
MONTANA POWER & EQUIPMENT CO., Helena

"..not one single shut-down with RING-FREE"



Strippers and other motorized equipment (gasoline and Diesel) give performance you're proud of when lubricated with Macmillan RING-FREE Motor Oil. They deliver more usable power—dependable power—under toughest operating conditions because RING-FREE reduces friction *fast!*

And Macmillan RING-FREE removes carbon while your engine runs! Changing to RING-FREE means getting a motor that has to run sweeter as it benefits fully from rapid, thorough penetration. You get high film strength, high heat resistance and long cling from RING-FREE.

Macmillan representatives welcome your trial and comparison of RING-FREE on the basis of complete records of operating performance and economy!

MACMILLAN PETROLEUM CORPORATION

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Quoting the WILMINGTON COAL MINING CORP., Morris, Illinois: "...through dust, sand and mud in all sorts of weather, operating 24 hours a day in 3 shifts—we have not had one single shut-down as a result of stuck rings or valves, since we adopted RING-FREE. We have proven in this extremely difficult operation that RING-FREE'S ability to penetrate rapidly to tightly fitted valve stems and rings and to resist high temperatures, as well as the sludging effect generally caused by cold weather work, places it far above any lubricant we have had before."

**MACMILLAN
RING-FREE
MOTOR OIL**

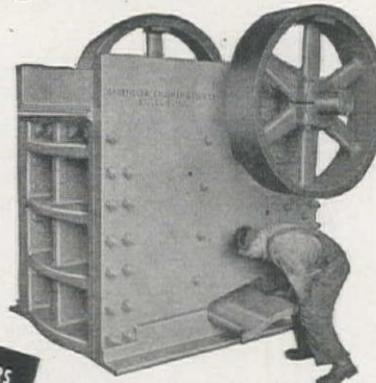
REDUCES WEAR BY REDUCING FRICTION

GRUENDLER CRAFTSMANSHIP
Serving Industry over 50 Years

**150 to 200 tons per hour
Crushing hard rock**

Steam Shovel
sizes to 5" to 6"
minus in one-
operation

These heavy plate and cast
steel constructed roller bearing
JAW CRUSHERS have
tremendous crushing power.
Built to take it for continu-
ous operation with minimum
maintenance.



The complete weight of above
JAW CRUSHER is 54,200 lbs.

Mfrs. of Double Roll Crushers
and Hammer Crushers for Sec-
ondary Crushing requirements.

BULLETINS MAILED ON REQUEST

GRUENDLER
CRUSHER and PULVERIZER CO.

2915-17 North Market St., ST. LOUIS (6), MO.

Bureau of Reclamation, Washington, D. C.

Guy F. Atkinson Co., San Francisco, Calif., at \$1,184,080, will construct addtl. barracks and necessary facils. at Camp Parks, Calif., on contract let by Bureau of Yards & Docks, Washington, D. C.

Atherton Construction Co., Seattle, approx. \$500,000 for a conc. diesel engine shop bldg. at Auburn, Wash., by Northern Pacific Ry. Co., Seattle.

William Simpson Construction Co. and W. E. Kier Construc-
tion Co., Los Angeles, have been awarded a contract at \$3,218,077
to construct magazines and other facils. at the Naval ordnance
depot at Seal Beach, Calif., by Bureau of Yards & Docks, Wash-
ington, D. C.

General Railway Signal Co., Rochester, N. Y., have been given
a \$500,000 contract to install automatic signals on 112 mi. of the
Canadian Pacific Ry. in Sask. and Alta. by C. P. Ry.

Shannahan Bros., Inc., Huntington Park, Calif., on a contract
for \$424,000, will relocate the Calif. state highway and Pacific
Electric Ry. around the new Naval depot at Seal Beach, Calif.,
contract by Bureau of Yards & Docks, Washington, D. C.

Highway and Street...

Arizona

COCHISE CO.—Martin Construction Co., Box 934, Tucson—
\$18,836 for street improvements, Ft. Huachuca—by U. S. Engr.
Office, Los Angeles.

4-19

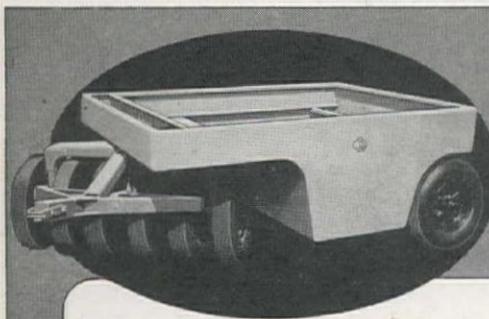
COCONINO CO.—Arizona Sand & Rock Co., Box 1522, Phoenix—\$321,701 for grade and drain, base course and Portland
cement conc. pavement and salvage bitum. mix shoulders on
Ashfork-Flagstaff Highway, 3 mi. W. to 8 mi. W. of Flagstaff
—by State Highway Dept., Phoenix.

4-25

MOHAVE CO.—H. L. Royden, Box 3703, Phoenix—\$13,330 for
entrance road at Army Airfield, Kingman—by U. S. Engr. Office,
Los Angeles.

4-19

YUMA CO.—P. D. O. C., 409 Luhrs Bldg., Phoenix—\$10,740



It's all in the Action!
VOIDS ELIMINATED—COMPACTION INCREASED
with **BROS WOBBLE-WHEEL ROLLERS**

● It's all in the action of the Bros Wobble-Wheel Roller—a
more efficient rolling method for the construction of bases
and mats for roads and airports.

The uniform fluid down pressure of the pneumatic tire
roller and its wobble action work and knead the materials
together, eliminating voids and compacting the materials to
a stabilized, uniform density, from top to bottom and from
side to side, with a surface free of ridges.

A firm, integrated durable foundation is created for roads,
runways and flight strips. The mats they build have a smooth-
riding, coarse-grain surface, which reduces skidding in wet
weather. Bros Wobble-Wheel Rollers are building impor-

tant military and commercial airfields both here and abroad.

Since it's the action of the pneumatic tire wobble-wheel
roller that does the work, and *not the weight*, only com-
paratively light loading is recommended. Maximum compac-
tion can be obtained at speeds up to 15 miles per hour, or
faster with less power consumption. You can do the job
better, faster and at lower cost with the Bros Wobble-
Wheel Roller. Complete information, illustrated and detailed,
mailed on request.

ROAD MACHINERY DIVISION
WM. BROS BOILER & MFG. CO.
Minneapolis, Minnesota

BROS Wobble-Wheel ROLLERS



SNOW PLOWS
ALL TYPES



BULLDOZERS AND
TRAILBUILDERS



TANK CAR HEATERS



CIRCULATORS



TAMPING ROLLERS

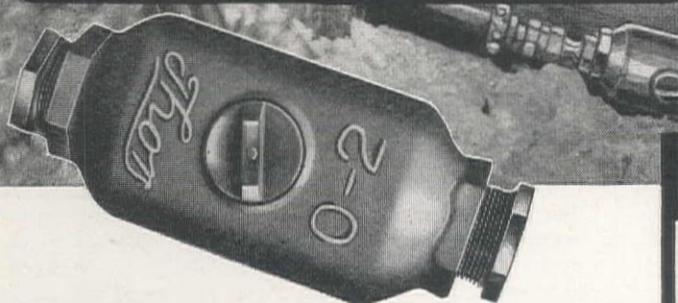


WOBBLE-WHEEL
ROLLERS

Thor AIR LINE OILERS

KEEP AIR TOOLS

Running Smoothly . . .
Cut Maintenance Costs



DEPENDABLE LUBRICATION FOR CONSTANT, LOW COST PROTECTION

The Thor Air Line Oiler is the most efficient and economical means for providing *constant lubrication* to all moving parts of the tool on the line. It feeds finely atomized lubricant into the air stream to reduce frictional losses and keep the machine working at highest efficiency. Operating wear is lessened to lower maintenance costs. Automatic, fool-proof, inexpensive . . . Thor Line Oilers cut your costs; give you constant protection for hard-to-get air tools.

NOW AVAILABLE for important work. Made in one-pint capacity for large air tools and one-half pint capacity for small air tools. Write for details and prices.



POSITIVE! AUTOMATIC! SIMPLE!

AUTOMATIC—Place a Thor Line Oiler in the air line. Fill it . . . and forget it. Works by itself.

FOOL-PROOF—Operates perfectly in any position . . . any direction.

POSITIVE—Feeding of lubricant continues to the last drop.

SIMPLE, SURE CONTROL—4-position nozzles are easily set to control amount of lubricant fed into air stream.

"NO-BLEED" CONSTRUCTION—Lubricant positively cannot "bleed" into air line after air is turned off.

LONG-LASTING—No moving parts, nothing to wear out. Easy to clean.

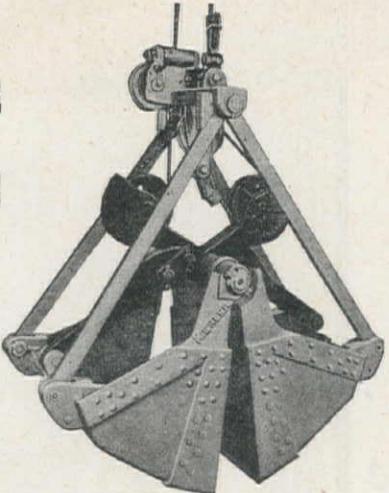
HERE'S HOW IT WORKS

Compressed air enters adjusting nozzle (1), passes through small holes into annular groove around the nozzle; out through the copper tubes (2), of which there are four; and into the oil chamber (3). The oil and air mixture is forced under pressure through the opposite four submerged copper tubes (4); out through the annular groove around the opposite adjusting nozzle (5); and into the air stream going into tool.

Thor
Portable Pneumatic and Electric Tools
INDEPENDENT PNEUMATIC TOOL COMPANY

For Best Results
USE GENUINE THOR ACCESSORIES
For All Air Tools

**WHY
KIESLER
2 LEVER ARM
BUCKETS**
give a payload
every trip



The Mighty Ice Tong Principle—power on BOTH shells—assures unequalled gripping and digging power. This exclusive Kiesler feature means fast digging under toughest conditions because "the harder the pull—the tighter the grip."

JOS. F. KIESLER COMPANY
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Sold and Serviced in the West by:

BROWN-BEVIS EQUIPMENT CO.
Los Angeles, Calif.

EDWARD R. BACON COMPANY
San Francisco, Calif.

FEENAUGHTY MACHINERY CO.
Portland, Oregon

LOMEN COMMERCIAL COMPANY
Alaska & Yukon Territory, Seattle, Wash.

MIDLAND IMPLEMENT CO.
Billings, Montana

MINE & SMELTER SUPPLY CO.
Denver, Colorado

for pave and utils. at a Trailer Camp, Army Airfield, Dateland—
by U. S. Engr. Ofc., Los Angeles.

4-19

California

ALAMEDA CO.—W. C. Railing, 27 Lowell St., Redwood City
—\$26,791 for 0.9 mi. grading and surf. on Dougherty Access
Road to Navy Replacement Center—by Public Roads Adminis-
tration, San Francisco.

4-12

ALAMEDA CO.—Lee J. Immel, Box 65, Station A, Berkeley
—\$28,675 for approx. 1.3 mi. repairing with asph. conc. surf.
through San Leandro—by Calif. Division of Hwys., Sacra-
mento.

4-7

ALAMEDA CO.—W. C. Railing, 27 Lowell St., Redwood City
—\$24,152 for 2.6 mi. portions to be repaired with plantmix surf.
betw. Dublin and Castro Hill—by Calif. Division of Highways,
Sacramento.

4-11

KERN CO.—Basich Bros. Construction Co., P. O. Box 151,
Alhambra—\$16,066 for 7 mi. of portions to be repaired with
roadmix surf. over exist. bitum. surf., betw. Mojave and Ricardo
—by Calif. Div. of Hwys., Sacramento.

4-4

LOS ANGELES CO.—R. W. Hampton Co., 4031 Goodwin
Ave., Los Angeles—\$10,902 for entrance road, Army airfield,
Palmdale—by U. S. Engineer Office, Los Angeles.

4-13

LOS ANGELES CO.—Warren Southwest, Inc., 2145 E. 25th
St., Los Angeles—\$28,852 for 1.2 mi. grade and plantmix surf.
on several streets in Burbank and on Claybourne Ave. in Los
Angeles—by Calif. Division of Highways, Sacramento.

4-7

MENDOCINO CO.—E. J. Warner & Ted Watkins, 1103 Sycamore St., Stotckton—\$29,173 for 4.4 mi. imported base and seal
coat betw. Wendling and Sonoma County line—by California
Division of Highways, Sacramento.

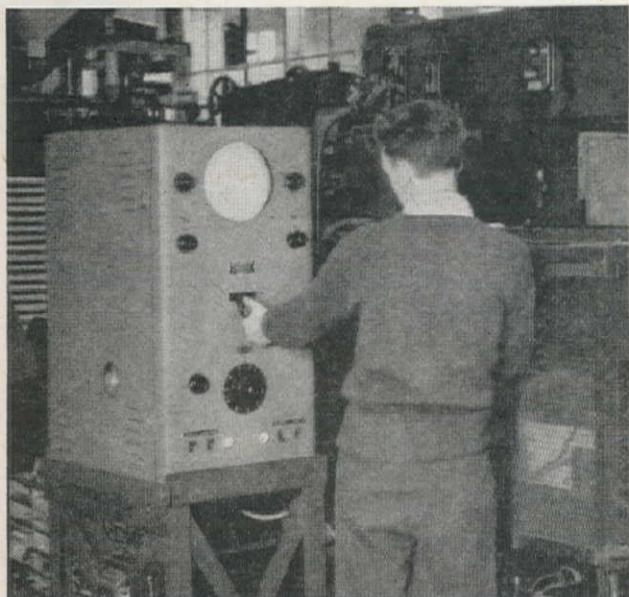
4-18

MERCED CO.—M. J. Ruddy & Son, Box 1122, Modesto—
\$124,475 for repair with imp. borrow, untreated rock base and
plantmix surf. of portions of 13 mi. highway betw. Madera Co.
line and Merced—by Calif. Div. of Hwys., Sacramento.

4-24

PLUMAS CO.—Lester L. Rice, Rt. 2, Box 625, Sacramento—
\$107,872 for 16.6 mi. portions repaired with plantmix material
betw. Morgan Summit and Plumas County line—by Calif. Div.

New Electronic Tester



**Verifies strength of
TRI-CLAD motor windings**

This electronic test of insulation makes a "cardiogram" of
every Tri-Clad motor winding, ferreting out weaknesses that
might lead to shorts caused by voltage surges in service. It
tests each turn, coil, and phase group of the windings for
adequate insulation strength to withstand the "steep front"
high-voltage surges of actual service. First developed and
applied by G.E., it's one of the production tests which all
Tri-Clad motors must pass. For information on the wide
range of Tri-Clad types and ratings available, consult our
local office. *General Electric Company, Schenectady 5, N. Y.*



GENERAL ELECTRIC

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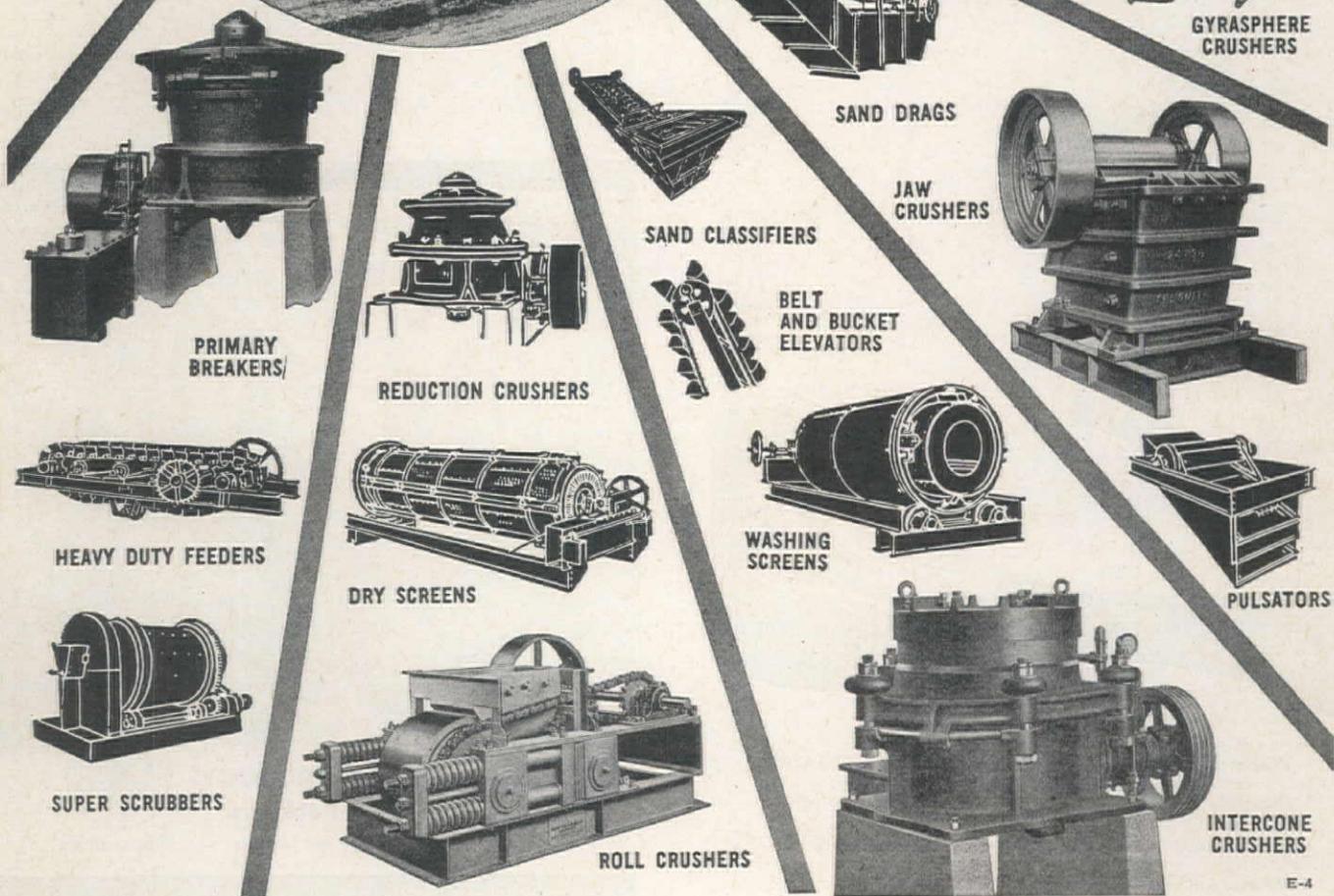
TRI-CLAD
REG. U. S. PAT. OFF.
MOTORS

Each week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.

TELSMITH GRAVEL PLANT and QUARRY Equipment



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E-4

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Clyde Equipment Co.
Seattle 4, Wash.

Clyde Equipment Co.
Portland 9, Ore.

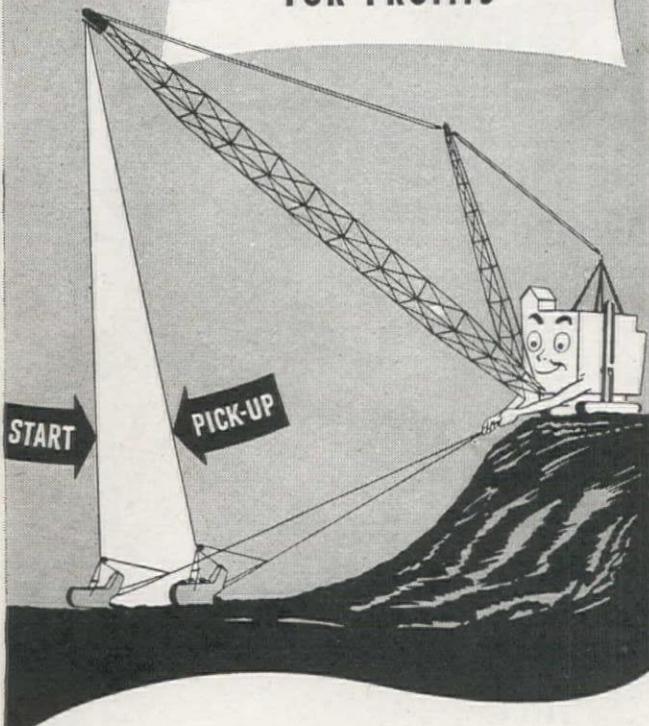
General Machinery Co.
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NO. 2

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BUCKET AS SOON AS
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AND WASTES TIME...
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PAGE
Automatic DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILL.

of Hwys., Sacramento.

4-12

SACRAMENTO CO.—A. Teichert & Son, Inc., 1846 37th St., Sacramento—\$22,970 for surf. on 2 mi. of Power Line Road from Garden Hwy. north; 0.8 mi. on Coloma Road north from Folsom Blvd.; 3.5 mi. on Garden Hwy. from Govt. docks to Power Line Road—by City of Sacramento.

4-17

SAN BERNARDINO CO.—George Herz & Co., Box 191, San Bernardino—\$91,795 for repair of 7.5 mi. hwy. betw. approx. 2 mi. east of Newberry and 3.5 mi. west of Hector, by plantmix surf. over exist. surf. and imp. borrow on shoulders—by Calif. Div. of Hwys., Sacramento.

4-24

SAN DIEGO CO.—Ralph O. Dixson, 3901 Medford St., Los Angeles—\$326,646 for 1.0 mi. grade and pave with asph. conc. and p. c. c. betw. Pacific Hwy. and Washington St., in San Diego—by Calif. Div. of Hwys., Sacramento.

4-24

SAN FRANCISCO CO.—Chas. L. Harney, 443 Call Bldg., San Francisco—\$10,480 for pave at Industrial Bldg., Treasure Island—by Bureau of Yards & Docks, Washington, D. C.

4-27

SAN JOAQUIN CO.—George French, Jr., Box 307, Stockton—\$85,710 for portions only, 5 mi. imp. borrow, rock base and plantmix surf. betw. Holt and Stockton—by Calif. Div. of Hwys., Sacramento.

4-14

SAN JOAQUIN CO.—E. J. Warner & Ted Watkins, 1103 Sycamore St., Stockton—\$23,706 for 9.1 mi. grade shoulders, rock base over exist. surf. and seal coat betw. Potato Slough bridge and Ray Road—by Calif. Div. of Hwys., Sacramento.

4-14

SANTA CLARA CO.—Granite Construction Co., Box 900, Watsonville—\$87,200 for roads, gates and gate bldgs., Moffett Field—by Bureau of Yards & Docks, Washington, D. C.

4-17

SANTA CLARA CO.—Piazza & Huntley, 175 S. Montgomery St., San Jose—\$42,823 for 5.1 mi. grav. base, armor coat and pen. treat. betw. 5.5 mi. E. of Gilroy and San Felipe—by Calif. Div. of Hwys., Sacramento.

4-14

SOLANO CO.—Louis Biasotti & Son, 40 W. Clay St., Stockton—\$35,032 for 0.9 mi. grade and surf. access road to Benicia Arsenal—by Public Roads Admin., San Francisco.

4-17

SOLANO CO.—E. A. Forde, 640 Sir Francis Drake Blvd., San



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BUY U. S. WAR BONDS

Anslem—\$21,419 for roads and drainage for Homoja Housing Project, Mare Island—by Bureau of Yards & Docks, Washington, D. C. 4-3

SOLANO CO.—Parish Brothers, 619 H St., Sacramento—\$69,387 to pave lumber storage and hard standing areas, Benicia Arsenal—by U. S. Engineer Office, San Francisco. 4-25

STANISLAUS CO.—Standard Materials Co., 1411 9th St., Modesto—\$24,790 for wearing surface on roads at Crows Landing—by Bureau of Yards & Docks, Washington, D. C. 4-21

STANISLAUS CO.—George French, Jr., Box 307, Stockton—\$163,756 to repair 13 mi. hwy. with imp. borrow, untr. rock base and plantmix surf., betw. San Joaquin Co. line and Crows Landing and betw. San Joaquin Co. line and Modesto—by Calif. Div. of Hwys., Sacramento. 4-25

STANISLAUS & MERCED COS.—W. C. Railing, 27 Lowell St., Redwood City—\$110,304 to repair 10.8 mi. hwy. with untr. rock base and plantmix surf. betw. Newman and Los Banos—by Calif. Div. of Hwys., Sacramento. 4-25

SUTTER & YUBA COS.—Lester L. Rice, Route 2, Box 625, Sacramento—\$66,952 for repair of 6.5 mi. hwy. with plantmix surf., etc.—by Calif. Div. of Hwys., Sacramento. 4-25

TEHAMA CO.—Lester L. Rice, 217 17th St., Marysville—\$107,872 to repair portions of 16.6 mi. hwy. with plantmix, betw. Morgan Summit and Plumas Co. line—by State Div. of Hwys., Sacramento. 4-13

TEHAMA CO.—Mercer-Fraser Co., Second and Commercial Sts., Eureka—\$87,255 for repairing 16.7 mi. hwy. with plantmix material betw. 3.0 mi. east of Paynes Creek and Mineral—by Calif. Div. of Hwys., Sacramento. 4-18

YOLO & COLUSA COS.—Clements & Co., 941 Atherton St., Hayward—\$27,248 for repairing portions 5.9 mi. hwy. with plantmix surf. betw. Bretona and Geneva—by Calif. Div. of Hwys., Sacramento. 4-18

Idaho

BANNOCK CO.—H. A. Gardner, Blackfoot—\$47,886 for 1 mi. roadbed, drainage struct. and roadmix bitum. surf. on Kraft Cheese Factory Road—by Comm. of Public Works, Boise. 4-6

Nevada

WASHOE CO.—Isbell Construction Co., 1300 E. 4th St., Reno—\$11,077 for plantmix surf. on streets in Lincoln Park, Sparks—by City of Sparks. 4-12

New Mexico

CHAVES & LEA COS.—Henry Thygesen & Co., Box 876, Albuquerque—\$72,720 for cr. and stockpiling chats and base course surf. on U. S. Hwy. 380 betw. Roswell and Tatum—by State Hwy. Dept., Santa Fe. 4-14

QUAY CO.—M. M. Sundt Construction Co., Box 2592, Tucson, Ariz.—\$79,103 for base course surf. on 11.1 mi. of S. R. 39, betw. San Jon and Grady; and for cr. and stockpiling chats and base course surf.—by State Hwy. Dept., Santa Fe. 4-14

ROOSEVELT CO.—Hayner & Burn, Las Cruces—\$39,136 for cr. and stockpiling chats and base course surf. on U. S. Hwy. 70, betw. Elida and Portales—by State Hwy. Dept., Santa Fe. 4-17

SAN MIGUEL CO.—Henry Thygesen & Co., Box 876, Albuquerque—\$9,207 for roadway slopes across Storrie dam on State Hwy. No. 3 betw. Las Vegas and Mora—by State Hwy. Dept., Santa Fe. 4-14

Oklahoma

CARTER CO.—McDonald Bros., Dallas, Tex.—\$32,342 for access roads and small arms ranges—by U. S. Engineer Office, Denison, Tex. 4-12

Oregon

LINN CO.—Warren Northwest, Inc., Box 5072, Portland—\$57,975 for 6.2 mi. asph. conc. paving betw. Crabtree Corner and Crabtree Creek on Albany-Lyons Secondary Hwy.—by State Hwy. Comm., Salem. 4-7

MALHEUR CO.—Russell Olson, Box 390, Hayward, Calif.—\$40,388 for 33.4 mi. reoiling on the Owyhee River-McDermitt section of I. O. N. Hwy.—by State Hwy. Comm., Salem. 4-6

Texas

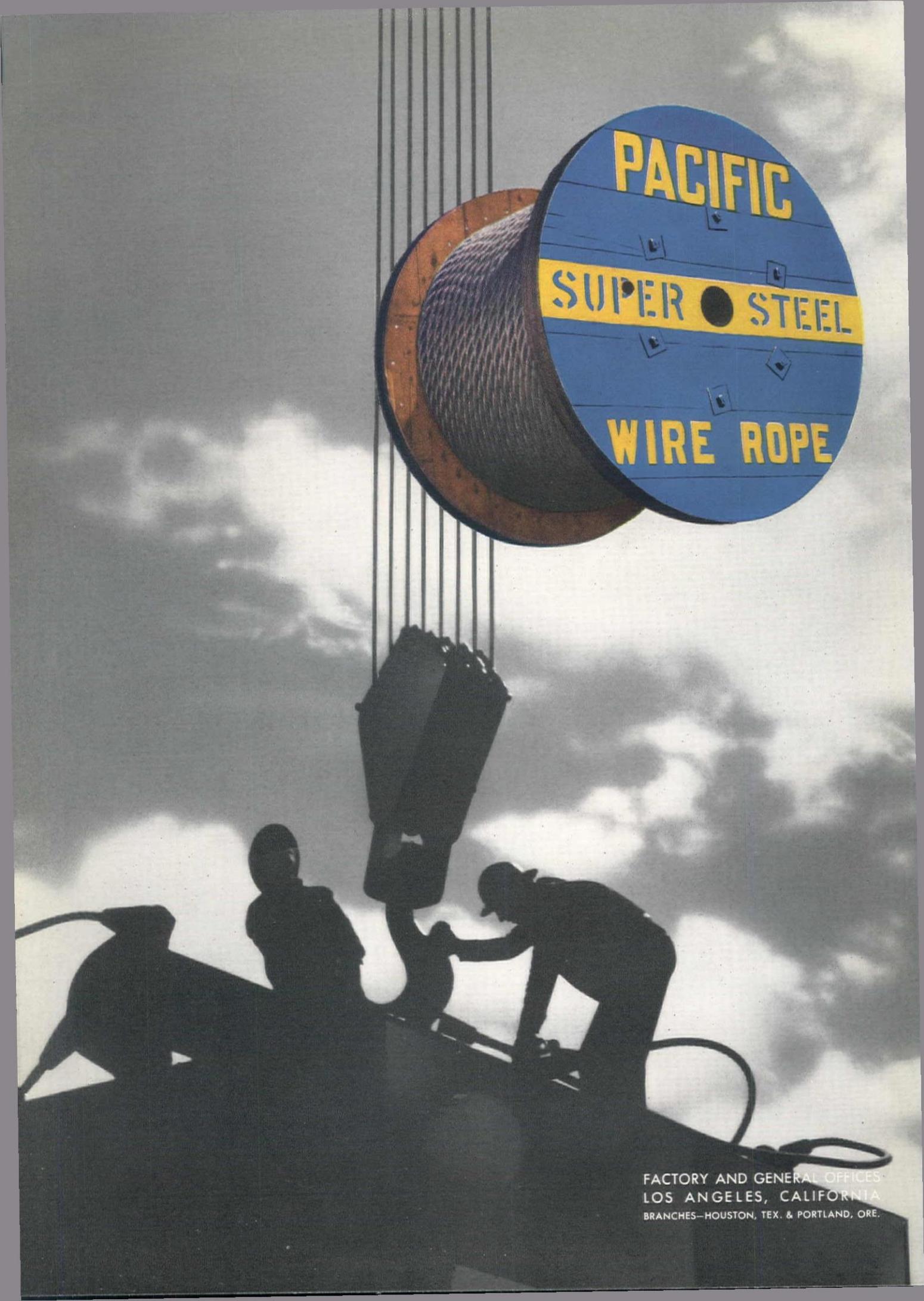
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As the result of extended research and test, Fuller engineers have modified the time-honored formula for designing gear teeth in order to produce a shape which reduced the stresses that lead to fatigue and breakage. Proof of the soundness of this engineering departure is found in the performance records of Fuller transmissions now in service, for the different tooth shape has long been employed on Fuller gears. Although the changes in dimensions are, of course, very small, their effect is surprisingly great in extending wear-life. This exclusive tooth shape is available only on genuine Fuller gears, and that is why, should replacement become necessary, you should make sure that the replacement gear bears the Fuller name.

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The Galion Allsteel Body Co., Galion, Ohio

\$15,882 for addtl. drives and parking areas—by U. S. Engineer Office, Denison. 4-12

CAMERON CO.—Holland Page, Georgetown Road, Austin—\$70,315 for 1.7 mi. grading, structures and conc. pave at S. W. corner of Harlingen army airfield to Palmetto Blvd. in Harlingen—by State Hwy. Dept., Austin. 3-29

EL PASO, CULBERSON, JEFF DAVIS, HUDSPETH COS.—Ned B. Hoffman, Mid-Continent Bldg., Fort Worth—\$73,773 for 77 mi. seal coat on U. S. Hwy. 80; SF 76; SF 34; US 62 and S 54—by Texas State Hwy. Dept., Austin. 4-7

GAINES CO.—Nolan Brothers, Minneapolis, Minn.—\$14,483 for 19.9 mi. of leveling course from Yoakum County line to Seminole, State Highway 214—by Texas State Hwy. Dept., Austin. 4-7

LYNN, HOCKLEY, GARZA & DAWSON COS.—Public Construction Co., Denton—\$54,825 for 71.3 mi. seal coat on Hwy. U. S. 84, S. 51, U. S. 180, U. S. 380, S. 137, S. 214 and S. 328—by Texas State Hwy. Dept., Austin. 4-7

PARMER CO.—Nolan Bros., Minneapolis, Minn.—\$77,454 for 25.6 mi. leveling course from Farwell to 16.5 mi. west of Fiona on U. S. Hwy. 60—by Texas State Hwy. Dept., Austin. 4-7

SWISHER AND OTHER COS.—Public Construction Co., Denton—\$55,433 for 75.2 mi. of seal coat on Highways U. S. 87; S. 86; S. 207 & U. S. 70—by Texas State Hwy. Dept., Austin. 4-7

Washington

KING CO.—Northwest Construction Co., 3950 6th Ave., NW, Seattle—\$23,543 for repaving, resurfacing Stewart St.—by Board of Public Works, Seattle. 4-17

KITSAP CO.—Northwest Procote Co., Inc., 7343 E. Marginal Way, Seattle—\$21,200, for 25,000 sq. yd. 1½-in. bitum. resurf. at View Ridge housing proj.—by Federal Public Housing Authority, Seattle. 4-13

SPOKANE CO.—Inland Asphalt Co., Spokane—\$13,345 for paving & curbing of 29th, from Howard to High Drive, Spokane—by City Council, Spokane. 4-22

With an Eye to the Future



THE part we play in the war effort has grown tremendously in 1½ years. Producing both for war and essential industry, we've increased our output many times over. To gain and maintain this production called for expansion—new machinery, new buildings. The illustration above shows Monarch as it is today—grown from a single building in 1941. This growth at Monarch is planned with an eye to the future. Fully equipped for today's demands, we will be better equipped for your peacetime needs. Monarch men and Monarch machines—today producing rudder bearings, roller chocks, roller fairleads, davits, rudder pintles, anchor windlasses, capstans and steering engines—will offer even more complete and efficient facilities for the manufacture and repair of your heavy machines, special machinery and construction equipment tomorrow.

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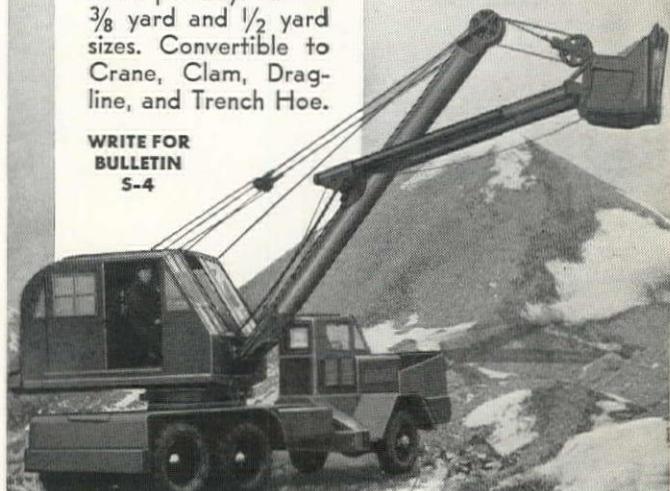
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With road speeds up to 30 miles per hour the Mobile Michigan is on the job and earning for you more hours per day. Built in 3/8 yard and 1/2 yard sizes. Convertible to Crane, Clam, Dragline, and Trench Hoe.

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Using the Barber-Greene Tamping-Leveling Finisher, only a minimum operating crew is required.

There is little traffic interruption as the Barber-Greene lays one ten to twelve foot lane at a time. Because of the tamping action, material is compacted immediately behind the machine so that rolling can progress right up to the Finisher.

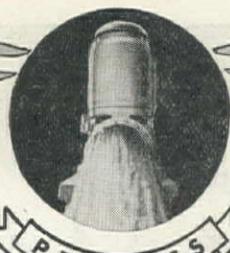
For further information on the B-G Finisher and its availability now, write Barber-Greene Co., Aurora, Illinois, U. S. A.

44-7

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LINCOLN & SUBLIN CO. — Wyoming Improvement Co., Cheyenne—\$78,057, for 64.5 mi. seal coat on Kemmerer-Big Piney Rd. & 4.5 mi. on LaBarge-Calpet Road—by State Hwy. Comm., Cheyenne. 4-11

Bridge & Grade Separation...

California

BUTTE CO.—James H. McFarland, 17 Marcella Ave., San Francisco—\$15,106, for repairing bridge across Feather River at north city limits of Oroville—by Calif. Div. of Hwys., Sacramento. 4-14

EL DORADO CO.—Bati Rocca, 44 W. Clay St., Stockton—\$9,769 to repair bridge across South Fork, American River, near Lotus—by Calif. Div. of Hwys., Sacramento. 4-24

HUMBOLDT CO.—Kiss Crane Co., Box 171, Berkeley—\$11,637 for bridge repair, South Fork Trinity River, 1 mi. w. of Salyer—by Calif. Div. of Hwys., Sacramento. 4-18

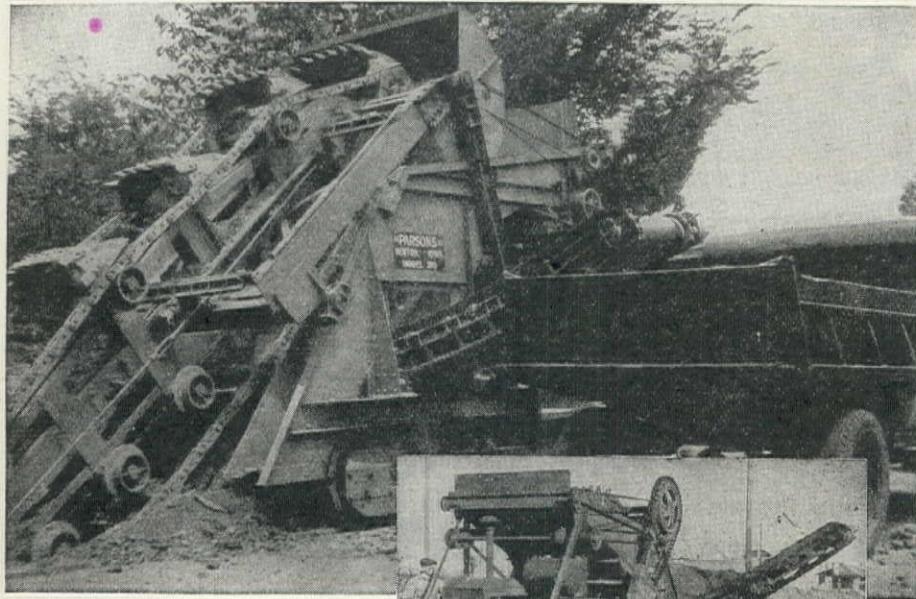
LOS ANGELES CO.—Guy F. Atkinson Co., 662 Russ Bldg., San Francisco—\$431,624, for a bridge across Long Beach channel to Terminal Island—by Bureau of Yards & Docks, Washington, D. C. 4-17

SACRAMENTO CO.—M. A. Jenkins, 3560 Broadway, Sacramento—\$9,435 for repairing timber fender of bridge & build pile dolphin across Steamboat Slough, N. of Walnut Grove—by Calif. Div. of Hwys., Sacramento. 4-25

SAN JOAQUIN CO.—Wallace Engineering Co., 2nd & Coley Sts., Escalon—\$8,208 for repairs to deck of bridges across Mosher and Bear Creeks, betw. 9 & 11 mi. NE of Stockton—by Calif. Div. of Hwys., Sacramento. 4-25

SAN JOAQUIN CO.—James H. McFarland, 17 Marcella Ave., San Francisco—\$31,999, for repairing fenders & deck of bascule span across San Joaquin River, Mossdale—by Calif. Div. of Hwys., Sacramento. 4-11

PARSONS



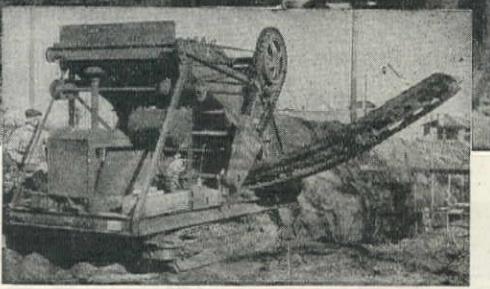
When desired a conveyor extension may be added to facilitate loading higher trucks or keep spoil bank farther from trench.

QUICK SHIFT CONVEYOR

The arc type discharge conveyor on a Parsons Trencher shifts through the machine by power so that spoil may be deposited on either side of trench as desired by the operator. This shift may be made in less than fifteen (15) seconds so that an obstruction can be cleared while machine is digging—a most important feature when operating in close quarters. The shift is by worm and worm gear which automatically locks conveyor in any position.

The conveyor is permanently located for height and does not vary when boom is raised or lowered. Trucks may, therefore, be loaded at fixed position discharge height.

The spoil to be retained for backfill is piled on opposite side of trench by merely moving a lever to reverse the direction of belt. Investigate Parsons superiority before you buy.



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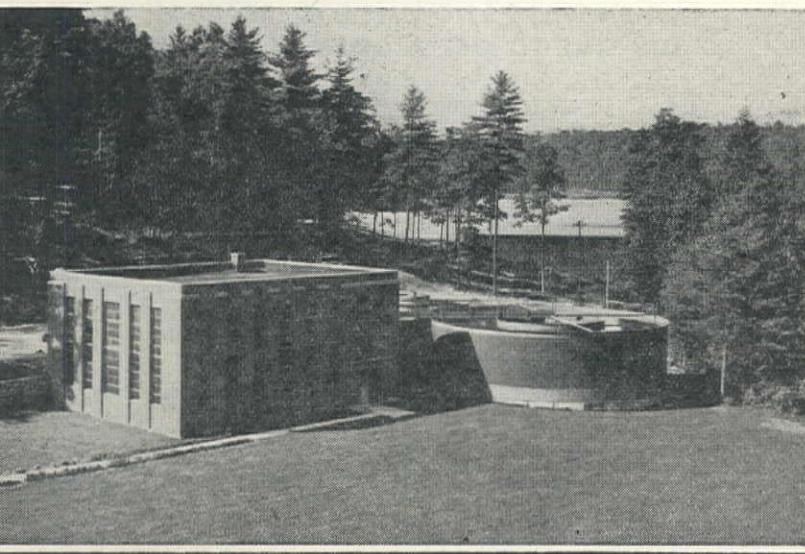
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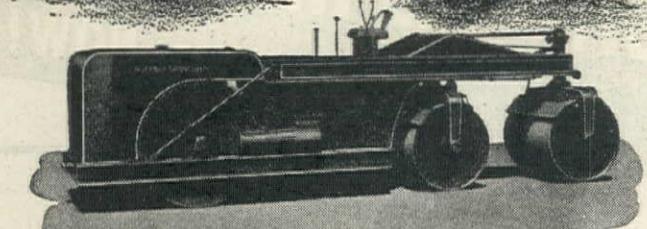
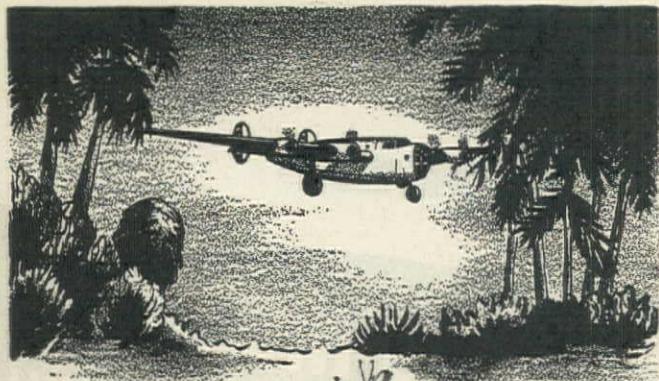
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Rolling Runways TO TOKYO

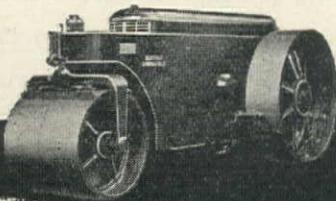
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Prominent in the preparation of these runways are Buffalo-Springfield rollers . . . the same rollers that will again serve in peacetime.

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SANTA CRUZ CO.—Karl Kellogg, Watsonville—\$12,100 for reinforced concrete bridge & roadway approaches across Lone Creek at Ben Lomond—Board of Supervisors, Santa Cruz. 4-18

SOLANO & SONOMA COS.—Bati Rocca, 44 W. Clay St., Stockton—\$8,485, for repairing bridge across Sonoma Creek, 10 mi. west of Vallejo—by Calif. Div. of Hwys., Stockton. 4-14

Washington

PIERCE CO.—S. R. Gray, Puyallup—\$4,370 for new south approach to bridge over Puyallup Riv.—by City of Puyallup. 3-31

Airport . . .

Arizona

MOHAVE CO.—Gibbons & Reed, 259 W. 3rd South St., Salt Lake City, Utah—\$465,945 for taxiway extensions & conc. pave. at Kingman army airfield—by U. S. Engr. Ofc., Los Angeles, Calif. 4-24

NAVAJO CO.—Silver State Construction Co., Fallon, Nev.—\$437,119, for runway exten., taxiway, warm-up apron & accessories, Winslow airport—by Civil Aeronautics Admin., Santa Monica, Calif. 4-17

California

KERN CO.—Del E. Webb Construction Co., 302 S. 23rd Ave., Phoenix, Ariz.—\$693,720 for addl. aviation facil. at Marine Air Station, Mojave — by Bur. of Yards & Docks, Washington, D. C. 4-21

LOS ANGELES CO.—Fred D. Chadwick, 4335 Brewster Ave., Lynwood—\$51,905 to improve east-west taxiway, Long Beach Municipal Airport—by City Commission, Long Beach. 4-26

SACRAMENTO CO.—McGillivray Construction Co., Box 873, Sacramento—\$10,607 for repaving portion of apron at Mather Field—by U. S. Engineer Office, Sacramento. 4-5

SAN DIEGO CO.—Winston Bros. Co., 1470 Northwestern



WHEN THERE'S NO TIME FOR BREAKDOWNS IT'S TIME TO GET A GORMAN-RUPP PUMP

Today, when time is the essence, you need a Gorman-Rupp Self-Priming Centrifugal Pump more than ever. There is not a quitter among them. The water passage has the same area as the suction hose. Muck, gravel, cinders—you simply can't clog them because solids cannot accumulate. There is no recirculation orifice to clog—no shut-off valve to jam—no hand priming regulator. There isn't a self-priming centrifugal pump made that will out work a Gorman-Rupp in gallonage or continuous hours. Gas engine or electric motor driven. Capacities up to 125,000 GPH. There is a type and style to fit your every requirement. Stocked for immediate delivery in 100 principal cities.

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Calif.; Joseph O. Reed, Parklawn Apts., 2504 N. E. Hoyt St., Portland 14, Ore.;

Star Machinery Co., 1741 First Ave., South, Seattle 4, Wash.



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Bank Bldg., Minneapolis, Minn.—\$1,727,000, for addtl. aviation facil. & medical reception center at Marine Corps Air Station, Miramar—by Bureau of Yards & Docks, Washington, D. C. 4-7

TUOLUMNE CO.—**McGillivray Construction Co.**, Box 873, Sacramento—\$10,607, for repav. of maintenance washrack area at Mather Field—by U. S. Engineer Office, Sacramento. 4-3

Idaho

ONEIDA CO.—**Carl E. Nelson**, Box 397, Logan, Utah—\$130,456, for clearing, grading, & drainage at an intermediate landing field at Malad City — by Civil Aeronautics Admin., Seattle, Wash. 4-14

Nevada

CLARK CO.—**A. D. Drum, Jr.**, Fallon—\$624,116 for additional landing field facil. and roads at Indian Springs Army Airfield, Indian Springs — by U. S. Engineer Office, Los Angeles, Calif. 3-30

Oklahoma

CARTER CO.—**Plains Construction Co.**, Pampa, Texas — \$130,579 for runway & taxiway shoulders at Ardmore army airfield—by U. S. Engr. Ofc., Denison, Texas. 4-14

Texas

TOM GREEN CO.—**Cage Brothers, Bishop & J. Floyd Malcom**, Abilene—\$30,135 for dust control at Goodfellow Field, San Angelo—by U. S. Engr. Ofc., Fort Sam Houston. 4-5

Wyoming

NATRONA CO.—**Knisely-Moore Co.**, Box 77, Douglas—\$24,236 for grade runway shoulders and planting at Casper airbase—by U. S. Engineer Office, Denver, Colo. 4-27

Water Supply ...

California

LASSEN CO.—**W. P. Day & Associates**, Financial Center

Bldg., San Francisco—\$24,000 for drilling and casing well at Herlong—by Federal Public Housing Authority, San Francisco. 4-24

LOS ANGELES CO.—**Paddock Engineering Co.**, 9060 Santa Monica Blvd., Los Angeles—\$9,559, for repairing storage reservoir at Army supply depot, Maywood—by U. S. Engineer Office, Los Angeles. 4-10

SAN DIEGO CO.—**American Pipe & Construction Co.**, 4635 Firestone Blvd., South Gate—\$99,584 for Dyke Pipe Line, San Diego—by Federal Works Agcy., San Diego. 4-21

SAN FRANCISCO CO.—**San Francisco Water Dept.**, 425 Mason Street, San Francisco—\$16,569 for mains at Lane Street pumps—by Public Utilities Commission, San Francisco. 4-19

SAN LUIS OBISPO CO.—**Clinton Construction Co.**, 923 Folsom St., San Francisco—\$30,124 for a water supply system at Morro Bay — by Bureau of Yards and Docks, Washington, D. C. 4-25

SISKIYOU CO.—**E. T. Haas Co.**, 1104 Merchants Exchange Bldg., San Francisco—\$11,287 for high pressure water line at Segregation Center, Tulelake—by U. S. Engr. Office, San Francisco. 4-19

Montana

LEWIS & CLARK CO.—**Otis Williams & Co.**, Box 1124, Helena—\$17,250 for municipal water well & pumping plant in Helena valley—by City Council, Helena. 4-1

Oregon

WASHINGTON CO.—**Oscar Butler & Sons**, 4910 N. E. 42nd St., Portland—\$10,000 for water system at Laurelwood Academy near Forest Grove—by City Council, Portland. 4-25

Texas

ECTOR CO.—**F. M. Reeves & Son**, Pecos—\$106,496 for laying 12,400 ft. of 12-in. pipe to new water wells at Odessa—by J. E. Ward, Wichita Falls. 4-17

HARRISON CO.—**Morgan & Manes**, 20½ Highland Park Shopping Village, Dallas—\$21,000 for a water line at Marshall

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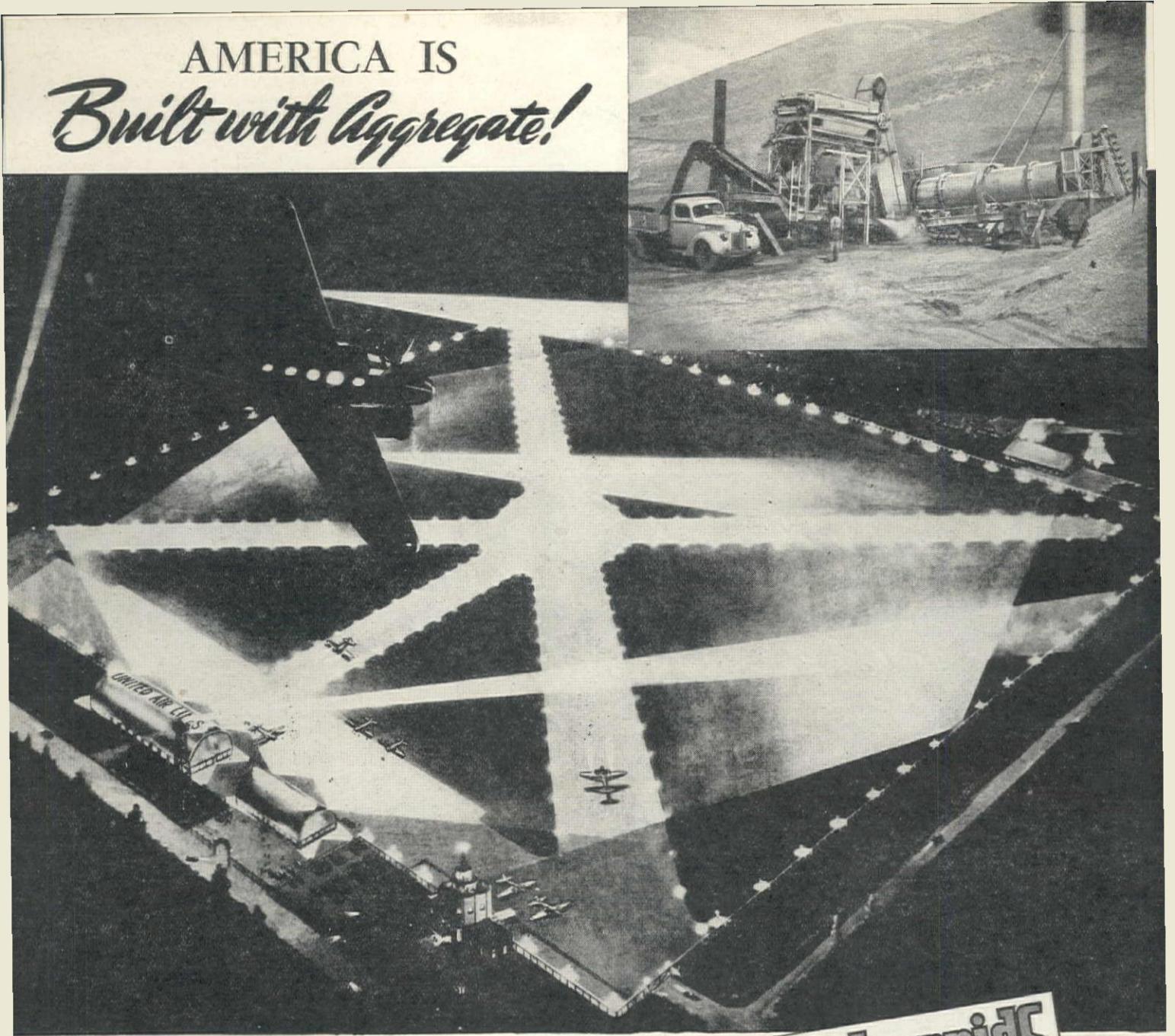
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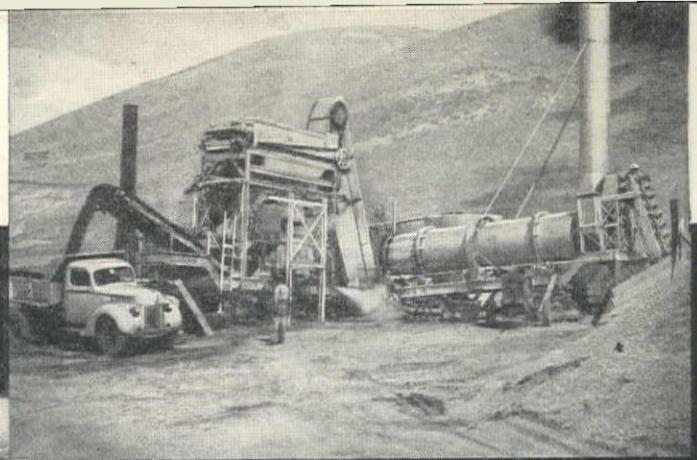
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EDWARD F. HALE CO.
San Francisco, Calif.

ARIZONA CEDAR RAPIDS CO.
Phoenix, Ariz.

—by T. & P. Railway Co., Dallas. 4-7

NUECES CO.—Akin & Hinman, Box 2350, Corpus Christi—for addns. to filtration plant and distrib. system—by Central Power & Light Co., Corpus Christi. 4-21

Washington

KING CO.—M. Moschetto, 5501 13th Ave. S., Seattle—\$58,534, for water system at Black Diamond—by King County Water Dist. No. 66, Seattle. 4-3

KING CO.—Valley Construction Co., 8423 48th Ave., S., Seattle—\$5,082 for water mains over 12th Ave. South bridge, Seattle—by Board of Pub. Works, Seattle. 4-20

KITSAP CO.—Valley Construction Co., 8423 48th Ave. S., Seattle—\$45,672 for water system in N. Manette area near Bremerton—by North Perry Ave. Water Dist., Bremerton. 4-24

Foreign

VENEZUELA — Johnson, Drake & Piper, Inc., 1138 Baker

Bldg., and S. J. Groves & Sons Co., 509 Wesley Temple Bldg., Minneapolis, Minn.—\$9,000,000 for constr. of part of waterworks system in Caracas—by National Institute of Sanitary Works, Caracas. 3-30

Sewerage . . .

Arizona

NAVAJO CO.—Valley Sheet Metal Co., 1030 Grand Ave., Phoenix—\$7,175, for sewer system at Winslow—by Federal Public Housing Authority, San Francisco, Calif. 4-12

California

LOS ANGELES CO.—Artukovich Brothers, 7320 N. Atlantic Blvd., Hynes—\$64,767 for sewer in El Selina Ave., and other streets—by Board of Supervisors, Los Angeles. 4-26

LOS ANGELES CO.—Midland Construction Co., 8677 Otis St., South Gate—\$68,769 for outfall sewer at the polymer plant, Azusa—by U. S. Engr. Ofc., Los Angeles. 4-14

LOS ANGELES CO.—Burch & Bebek, 8003 S. Broadway, Los Angeles—\$14,750 for lateral sewers in Sewer Dist. No. 19-A-2, Long Beach—by City Council, Long Beach. 4-19

LOS ANGELES CO.—Tom L. Gogo, 10024 S. Figueroa St., Los Angeles—\$10,019, for lateral sewers in Sewer Dist. No. 13D-2, Long Beach—by City of Long Beach. 4-5

LOS ANGELES CO.—R. A. Wattson Co., 5528 Vineland Ave., North Hollywood—\$89,126, for sewer in Rhodes Ave. and Moorpark Ave. Sewer Dist., Los Angeles—by City of Los Angeles. 4-17

LOS ANGELES CO.—Sanitary Construction & Engineering Co., 439 W. 20th St., Long Beach—\$9,573 for lateral sewers in Sewer Dist. No. 13C-2, Long Beach—by City Council, Long Beach. 4-19

SAN FRANCISCO CO.—M. J. Lynch, Barneveld & Oakdale Sts., San Francisco—\$7,307, for repair of sewers in Langton St., betw. Harrison & Folsom Sts. San Francisco—by Dept. of Public Works, San Francisco. 4-12

SAN FRANCISCO CO.—W. J. Tobin, 5708 Glenbrook Dr., Oakland—\$11,245 for laying 6- & 8-in. mains, in various locations in Sunset-Parkside Dist.—by City of San Francisco. 4-5

SAN MATEO CO.—Henry Doelger, Inc., 320 Judah St., San Francisco—\$6,219, for 8-in. & 10-in. vitr. sewers in Spruce Ave. and Canal St., So. San Francisco—by City of So. San Francisco. 4-4

Montana

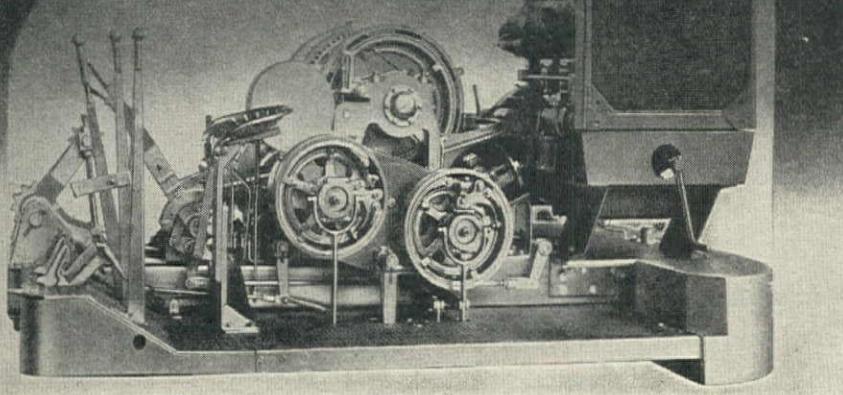
YELLOWSTONE CO.—Megarry Brothers, St. Cloud, Minn.—\$86,622 for approx. 22 mi. of deep drains & about 675,000 cu. yd. excav. at Shepherd—by Shepherd Drainage District, Billings. 4-5

Texas

DALLAS CO.—Ransdell Construction Co., Liberty Bank Bldg., Dallas—\$96,957 for sanitary sewers in Coombs Creek District—by City of Dallas. 4-12

NUECES CO.—Aiken & Hinman, Box 1248, Corpus Christi—\$19,515 for improvements to Oso sewage disposal plant—Federal Works Agency, Fort Worth. 4-7

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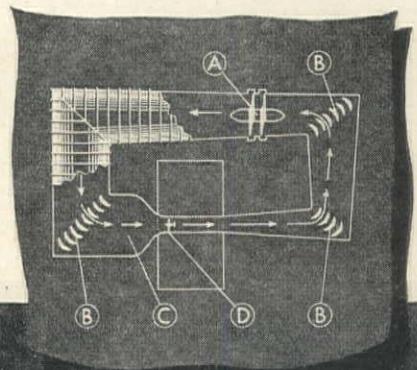


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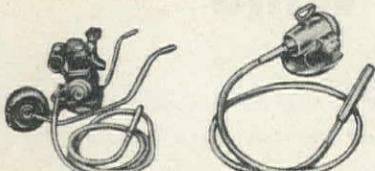
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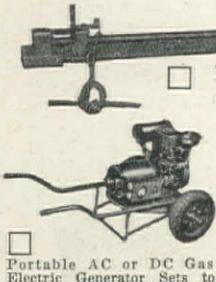
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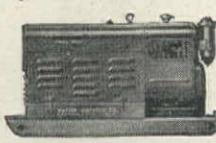
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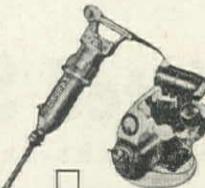
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Electric "Power Blow" Hammer and Tools for heavy or light duty work. Model 650 Generator Plant to operate hammer when electricity not available.

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Waterway . . .

Arizona

YUMA CO.—A. S. Vinnell, 1145 Westminster Ave., Alhambra, Calif.—\$316,000, for 400,000 cu. yds. excav., 1 mi. of bed of Colorado River, below Parker powerhouse—by Bureau of Reclamation, Washington, D. C. 4-4

California

ALAMEDA CO.—Macco Construction Co., Freight & Ferry Sts., Oakland—\$87,255 for an untreated pile & timber bulkhead, at Alameda Naval air station—by Bur. of Yards & Docks, Washington, D. C. 4-21

ALAMEDA CO.—J. D. Proctor, Inc., Foot of S. 8th St., Richmond—\$46,648, for wharf extension at Municipal Airport, Oakland—by U. S. Engineer Office, San Francisco. 4-11

ALAMEDA CO.—Macco Construction Co., Freight & Ferry Sts., Oakland—\$273,650 for rock seawall at Alameda Naval air station by Bur. of Yards & Docks, Washington, D. C. 4-21

ALAMEDA CO.—San Francisco Bridge Co., 503 Market St., San Francisco—\$418,510 for dredging at Alameda Naval air station—by Bur. of Yards & Docks, Washington, D. C. 4-21

ALAMEDA CO.—Duncanson-Harrelson, 1404 DeYoung Bldg., San Francisco—\$169,925, for exten. to wharf 7, Oakland Port & Depot—by U. S. Engineer Office, San Francisco. 4-13

LOS ANGELES CO.—C. R. Butterfield Co., 1401 N. Gaffey St., San Pedro—\$31,500, for exten. of river diversion dike, Long Beach Outer Harbor—by Harbor Comm., Long Beach. 4-7

SAN DIEGO CO.—Case Construction Co., Box 6, San Pedro—\$13,334, for repairing moorings, Naval Air Station, San Diego—by Bur. of Yards & Docks, Washington, D. C. 4-17

SAN FRANCISCO CO.—Mercer-Fraser Co., 2nd & Commercial Sts., Eureka—\$421,990 for 4 additional maintenance piers at section base, Treasure Island—by Bur. of Yards & Docks, Washington, D. C. 4-21

SAN FRANCISCO CO.—Healy-Tibbitts Construction Co., 1100 Evans Ave., San Francisco—\$299,000, for addtl. docking facil., repair pier & industrial docks at section base, Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 4-3

SAN FRANCISCO CO.—J. D. Proctor, Inc., Foot of S. 8th St., Richmond—\$35,013 for floating & mooring facil. for small boats, Aquatic Park, Fort Mason—by U. S. Engr. Office, San Francisco. 4-20

Washington

COWLITZ CO.—R. A. Heintz Construction Co., 8101 N. E. Union Ave., Portland, Ore.—for repairing embankments & stone revetments in Cowlitz River—by U. S. Engineer Office, Portland, Ore. 4-8

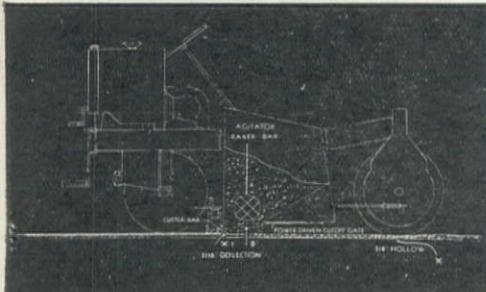
KING CO.—General Construction Co., 3840 Iowa St., Seattle—\$34,250, for tug & barge moorage at Seattle Port of Embarkation—by U. S. Engineer Office, Seattle. 4-12



Continuous RIBBONS OF RESPONSIBILITY



Drawings show how even a big movement of the wheel is smoothed out at points X on first course and XI on second course.



As the last smooth run is being completed by a Foote Adnun paver, two shiny black continuous ribbons appear briefly—a trademark to signal the completion of the job. It is almost as if the machine itself were saying: "There you are boys, smoothly finished!"

These ribbons actually are the marks of the two rear rollers, that appear only after the mix has been put down with a paperlike smoothness and finish. They disappear completely with rolling.

It is important to note that Adnun rollers do run on the finished surface, because it is this feature of Foote design which provides a smoother finish. We call it "Continuous Course Correction."

Note in the two diagrams how the Adnun wheels and rollers reduce irregularities to insignificance. A large movement at the wheels is changed into a very small one at the cutter bar. With each successive course, the smoother the surface becomes.

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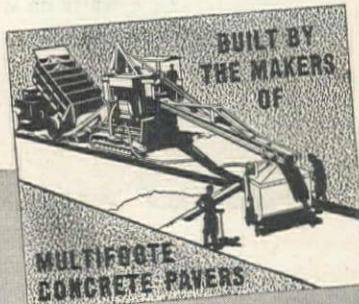


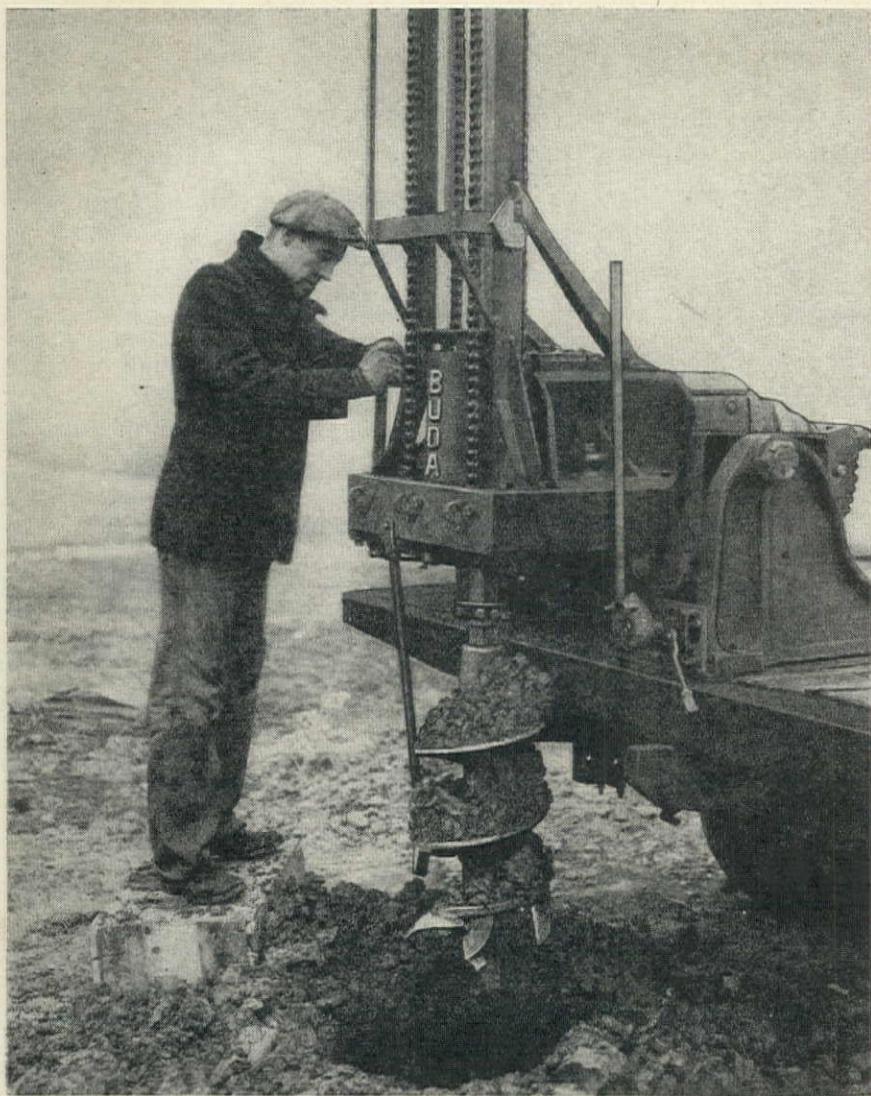
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SNOHOMISH CO.—M. P. Butler, 3419 13th St., S. W., Seattle—\$76,356 for car ferry terminal at Mukilteo—by Bur. of Yards & Docks, Washington, D. C. 4-18

Dam . . .

Colorado

MONTEZUMA CO.—Harold Easterday, 718 Majestic Bldg., Denver—\$44,664 for approx. 6,200 tons of sand & 3,300 tons coarse aggregate for the Jackson Gulch dam & inlet & outlet canals, Mancos Project—by Bur. of Reclamation, Denver. 4-13

Washington

KING CO.—Guy F. Atkinson Co., O'Shea Bldg., Seattle—\$22,555, for test pits at the Green River Dam site, 6 mi. from Auburn—by U. S. Engineer Office, Seattle. 4-3

Irrigation . . .

Arizona

YUMA CO.—D. W. Bowman, Ogden, Utah—\$30,000, for earthwork, canals & land leveling, Yuma-Mesa predevel., Gila Proj.—by Bureau of Reclamation, Washington, D. C. 4-10

California

IMPERIAL CO.—Vinnell-Engineers, Ltd., 1145 Westminster Ave., Alhambra—\$83,275, for check & drop, Sta. 288-15 of the Coachella Canal, All-American Canal System—by Bureau of Reclamation, Washington, D. C. 4-4

Idaho

BUTTE CO.—Arco Tract Association, Arco — contract for enlargement of the Arco canal, near Arco—by the Big Lost River Irrigation District, Arco. 4-20

Utah

UTAH CO.—J. B. & R. E. Walker, Inc., 21 S. 10th St. W., Salt Lake City—\$359,311 for siphons, flume & structures, on 4 sections of the Provo Reservoir Canal, Deer Creek Div. of the Provo River Proj., near Provo & American Fork—by Bureau of Reclamation, Washington, D. C. 4-20

Washington

YAKIMA CO.—H. H. Walker, Inc., Box 398, Ellensburg—\$32,001, for earthwork, pipelines & struct., ext. of laterals & channels, Roza Div., Yakima Proj., near Sunnyside—by Bureau of Reclamation, Washington, D. C. 4-14

Tunnel . . .

Oregon

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An open letter to the Municipal Executives of Everytown, U.S.A.

On battlefronts throughout the world, our boys are risking their lives to preserve our way of life. When they return, what will they find here at home? A better America? An immediate job? That is what everybody hopes.

Helping to provide that is the desire as well as the responsibility of every mayor, every city manager, every councilman, every operator of municipal services, and every citizen of America.

One way we can provide our boys with immediate jobs...and at the same time benefit our cities, towns, and villages...is to improve and expand our water and sewage systems.

Such a program would be of particular value because it could be started immediately when wartime restrictions are lifted, providing returned soldiers and war workers with jobs during the period that industry will require to reconvert from war to peace production.

But if this program is to be effective, planning must be started now.

Time may be shorter than we think. By starting now, confusion can be avoided. Planning can be constructive, efficient. Local needs can be analyzed. Working plans prepared. Specifications and contract documents drawn up. Enabling legislation enacted. Financing arranged. Rights of way purchased. Everything put in order, ready to go when the boys come home again.

As an aid to municipalities in planning permanent public improvements of benefit to every member of the community, the Committee on Water and Sewage Works Development has prepared a booklet entitled "Blueprint Now." In case you have not received a copy, we are sure they will be glad to send you one. The Committee may be addressed at Suite 2110, 500 Fifth Avenue, New York 18, New York.

Johns-Manville



This booklet can help you start planning now.



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It's a continued source of gratification to us at Calco to see our products become part of essential war building.

Here's a battery of 24" Culverts. With the increased run-off created by rapid erection of war workers' homes in a northern California city, and because of very limited headroom, Calco pipe arches on either side completed a highly satisfactory installation.



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Necessary pipe lines, water gates and maintenance materials can be supplied now. Armco Emergency Wood Pipe, a practical wartime substitute for metal culverts, is likewise available.

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OREGON CULVERT & PIPE CO.
2321 S. E. Gladstone Street, Portland 2

Box 799, Redding, Calif., \$451,690, for tunnels No. 1 & No. 2, North Unit Main Canal, Deschutes Proj. near Terrebonne—by Bureau of Reclamation, Washington, D. C. 4-14

Utah

EMERY CO.—Earl F. Moultrie, Huntington—\$12,750, for 750-ft. rock tunnel at Millers Flat Reservoir, Huntington Canyon—by Huntington-Cleveland Irrig. Dist., Salt Lake City. 4-17

Building ...

Arizona

MARICOPA CO.—M. W. Bobo, 1462 E. McKinley St., Phoenix—for a new passenger station at First & Monroe Sts., Phoenix—by Menderson Bus Line, Phoenix. 4-14

PIMA CO.—M. M. Sundt, 440 S. Park Ave., Tucson—\$76,436 for housing & facilities for servicing detachment ATC, Tucson Municipal Airport—by U. S. Engineer Ofc., Phoenix. 4-11

California

ALAMEDA CO.—George Peterson & Son, 1841 Bancroft Ave., San Leandro—\$34,490 for an open air theater at Naval Hospital, Oakland—by Bureau of Yards & Docks, Washington, D. C. 4-12

ALAMEDA CO.—Willis F. Lynn, 1037 Ashmount Ave., Oakland—\$104,840, for a 14-class-room elementary school in Alameda—by Federal Public Works Agency, Washington, D. C. 4-13

ALAMEDA CO.—Central California Construction Co., 233 California St., San Francisco—\$89,939 for two barracks & addl. boilers at Oakland—by Bur. of Yards & Docks, Washington, D. C. 4-21

ALAMEDA CO.—Guy F. Atkinson Co., 662 Russ Bldg., San Francisco—\$1,184,080, for addl. barracks, etc., at Camp Parks—by Bureau of Yards & Docks, Washington, D. C. 4-12

ALAMEDA CO.—H. J. Christensen Co., 3454 Harlan St., Oakland—\$58,000, for an 8-class-room elementary school in Alameda—by Federal Works Agency, Washington, D. C. 4-13

CONTRA COSTA CO.—Stolte, Inc., 8451 San Leandro Blvd., Oakland—\$27,186 for recreation bldg. at Camp Stoneman—by U. S. Eng. Office, San Francisco. 4-19

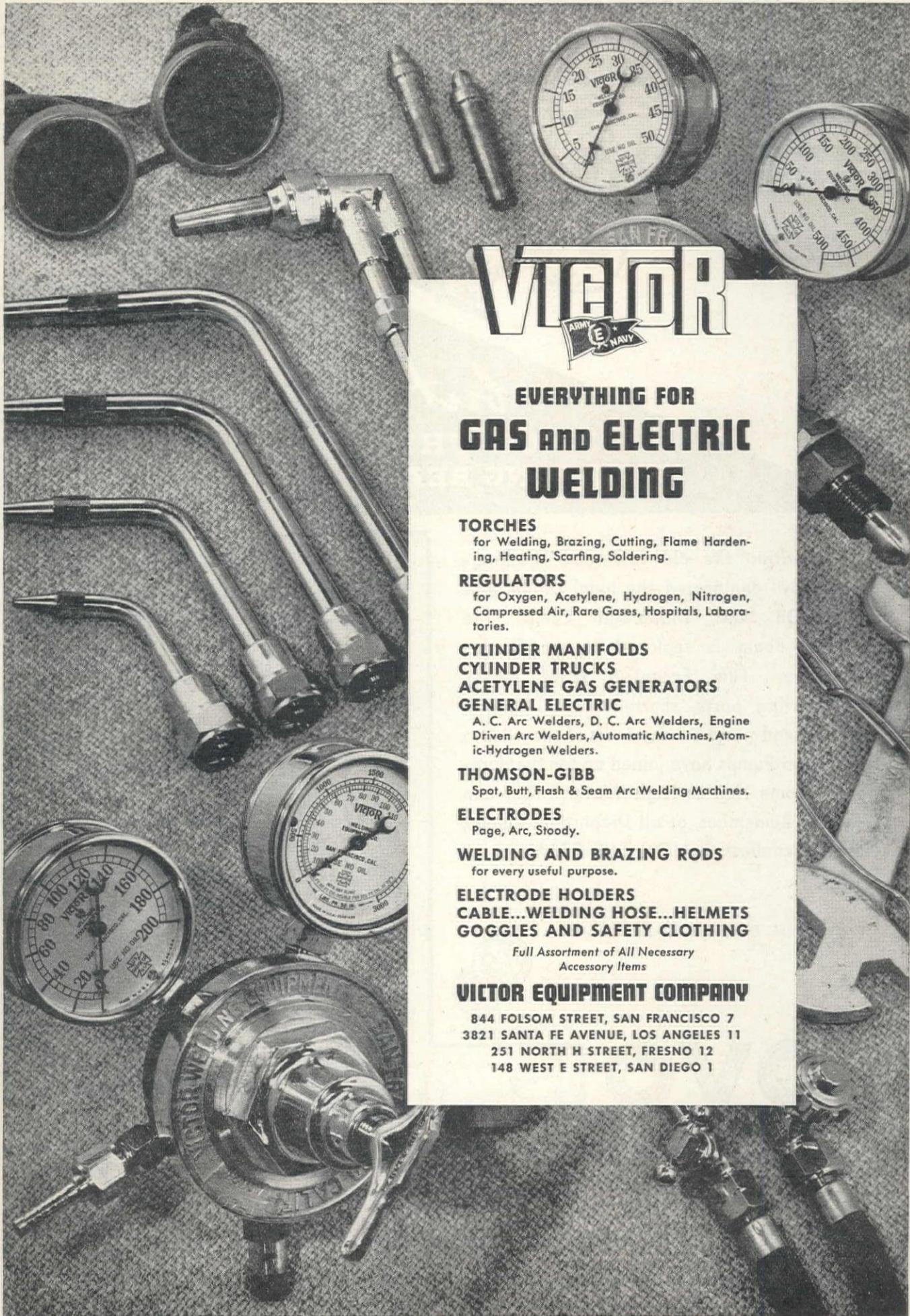
FRESNO CO.—Harold E. Peterson, 2917 V St., Sacramento—\$203,000 for 100 family units on N. Angus St., Fresno—by Housing Authority, City of Fresno. 4-24

HUMBOLDT CO.—Fred J. Maurer & Son, 3031 E. St., Eureka—\$77,000 for ship service & welfare bldg. at Arcata—by Bur. of Yards & Docks, Washington, D. C. 4-24

KERN CO.—William Simpson Construction Co., 816 W. 5th St., Los Angeles—\$300,000 for conc. and steel short wave station for CBS—by Defense Plant Corp., Washington, D. C. 4-19

KERN CO.—J. F. Cummins, 245 E. Olive St., Burbank—\$300,671, for hangar and auxiliary bldgs. at Muroc Flight Test Base, Muroc—by U. S. Engineer Office, Los Angeles. 4-12

LOS ANGELES CO.—The Austin Co., 777 E. Washington Blvd., Los Angeles—\$164,000 for reinf. conc. cafe. bldg., two stories—by North American Aviation, Inc.,



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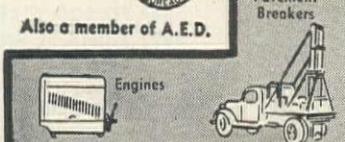
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SUPPLY CO., Denver

LANG CO., Salt Lake City
MINE & SMELTER EQUIPMENT CO.,
Phoenix

NEVADA TRUCK SALES, Reno



Venice.

4-20

LOS ANGELES CO. — Ford J. Twaits Co., 451 S. Boylston Ave., Los Angeles—\$146,500 for 220-unit portable dwel. project near Watts—by Housing Authority, City of Los Angeles.

4-4

LOS ANGELES CO. — Ivan M. Wells Construction Co., 201 S. Linden Dr., Beverly Hills—\$87,963, for new bldgs. alters. to bldgs., & appurt. facils., for Motion Picture Unit, Army Air Force, Culver City—by U. S. Engineer Office, Los Angeles. 4-14

LOS ANGELES CO. — Weymouth Crowell Co., 2104 E. 15th St., Los Angeles—\$77,904, for prefabricated hangar bldgs. & service apron at Palmdale Army airfield—by U. S. Engineer Office, Los Angeles. 4-17

LOS ANGELES CO. — H. W. Baum & Co., 1816 Doras Court, Burbank—\$840,000 for hangar bldg. at Lockheed Air Terminal—by Lockheed Aircraft Corp., Burbank.

4-17

LOS ANGELES CO. — W. C. Smith, Inc., 411 W. 5th St., Los Angeles—\$122,736 for barracks & mess hall at the Target Repair Base, San Pedro — by Bur. of Yards & Docks, Washington, D. C. 4-18

MARIN CO. — W. C. Akard, 225 Cervantes Blvd., San Francisco—\$51,173, for commissary warehouse, Fort McDowell, Angel Island—by U. S. Engineer Office, San Francisco. 4-14

NAPA & SAN JOAQUIN COS. — Lawrence Construction Co., 3020 V St., Sacramento — \$109,643, for emergency wards, Stockton State Hospital & Napa State Hospital—by State Div. of Architecture, Sacramento.

4-12

SAN BERNARDINO CO. — Stronach Construction Co., 115 N. Robertson St., Los Angeles—\$46,498, for enclosing existing sheds at San Bernardino Air Depot—by U. S. Engineer Office, Los Angeles. 4-13

SAN BERNARDINO CO. — William Simpson Construction Co., 816 W. 5th St., Los Angeles—\$840,390, for 4 storehouses & facil. at Marine Corps Supply Depot, Barstow—by Bureau of Yards & Docks, Washington, D. C. 4-7

SAN DIEGO CO. — Haddock-Engineers, Ltd., 3538 E. Foothill Blvd., Pasadena—\$67,380, for special facil. at the Naval Hospital, Santa Margarita Ranch, Oceanside—by Bureau of Yards & Docks, Washington, D. C. 4-11

SAN DIEGO CO. — Bryans & Larsen, 3401 Granada, San Diego—\$49,678, for revisions to machine shop bldg., Naval Repair Base, San Diego—by Bureau of Yards & Docks, Washington, D. C. 4-4

SAN DIEGO CO. — F. E. Young, Bank of America Bldg., San Diego—\$60,600 for recreation-welfare bldg. at Naval air station, San Diego — by Bur. of Yards & Docks, Washington, D. C. 4-21

SAN DIEGO CO. — W. D. Haxton, 4267 35th St., San Diego—\$50,400 for recreational facil. & enlarge P. O. bldg. at Camp Matthews—by Bur. of Yards & Docks, Washington, D. C. 4-24

SAN FRANCISCO CO. — Moore & Roberts, 693 Mission St., San Francisco—\$432,250 for 224 family units at Hunters Point—by Housing Authority, City & County of San Francisco.

4-24

SAN FRANCISCO CO. — Carrico & Gauquier, 365 Ocean Ave., San Francisco—\$91,528, for the Park-Merced School at N. E. corner of Tapia Dr. & Arballo Dr., San Francisco—by Dept. of Public Works, San Francisco.

4-24

SAN FRANCISCO CO.—G. W. Williams Co., 10 California Dr., Burlingame—\$382,900 for housing & recreation facil., at Hunters Point — by Bur. of Yards & Docks, Washington, D. C. 4-21

SAN FRANCISCO CO.—Parker, Steffens & Pearce, 135 S. Park St., San Francisco — \$520,550, for addtl. barracks & facil., Treasure Island — by Bureau of Yards & Docks, Washington, D. C. 4-7

SAN FRANCISCO CO.—Standard Building Co., 1500 Judah St., San Francisco—\$164,485, for 304 dormitories & site work, Oakdale & Griffith Sts., San Francisco—by Housing Authority, San Francisco. 4-10

SAN MATEO CO.—Wells P. Goodenough, 49 Wells Ave., Palo Alto—\$1,536,667 for rehabil. and new const. for U. S. Naval Personnel Depot, San Bruno—by Bureau of Yards & Docks, Washington, D. C. 4-17

SANTA BARBARA CO.—W. J. Hunter, 660 Heliotrope Drive, Los Angeles—\$40,000 for prisoner of war camp at Camp Cooke—by U. S. Engineer Office, Los Angeles. 4-25

SOLANO CO.—Guy E. Hall, 1326 30th St., Bakersfield—\$59,300 for housing facil. at Fairfield — by U. S. Engineer Office, Sacramento. 4-4

SOLANO CO.—M. J. King, 231 Franklin St., San Francisco—\$90,842 for extensions and alterations to subsistence bldg.—by Bureau of Yards and Docks, Washington, D. C. 4-25

SOLANO CO.—Stolte, Inc., 8451 San Leandro Blvd., Oakland—\$60,671 for bldg. at Benicia Arsenal — by U. S. Engineer Office, San Francisco. 4-20

TULARE CO.—MacIsaac & Menke, 3440 E. 22nd St., Los Angeles — for an olive packing plant & warehouse at Lindsay—by Sylmar Packing Co., Los Angeles. 4-26

YUBA CO.—A. R. Liner, Box 43, Merced—\$322,494 for Marysville Community Hospital—by Federal Works Agency, Washington, D. C. 4-11

Colorado

DENVER CO.—Brown-Schrepfman & Co., 240 Washington St., Denver—\$70,590 for bldg. and remodeling exist. bldgs. at Rocky Mountain Arsenal, Denver — by U. S. Engineer Office, Denver. 4-14

Idaho

BUTTE CO.—Idaho Northwest Construction Co., Salt Lake City, Utah—\$118,817, for machine shop & equipment storage area at Arco—by Bureau of Yards & Docks, Washington, D. C. 4-24

Nevada

CLARK CO.—Lembke Construction Co., Albuquerque, N. Mex.—\$386,700 to build Clark County Hospital at Las Vegas—by FWA, Washington, D. C. 4-26

NYE CO.—E. C. Nickel, 1401 Rancho Road, Arcadia, Calif. — \$141,000, for 80 temp. family units, Tonopah—by Federal Public Housing Authority, San Francisco, Calif. 4-12

Oregon

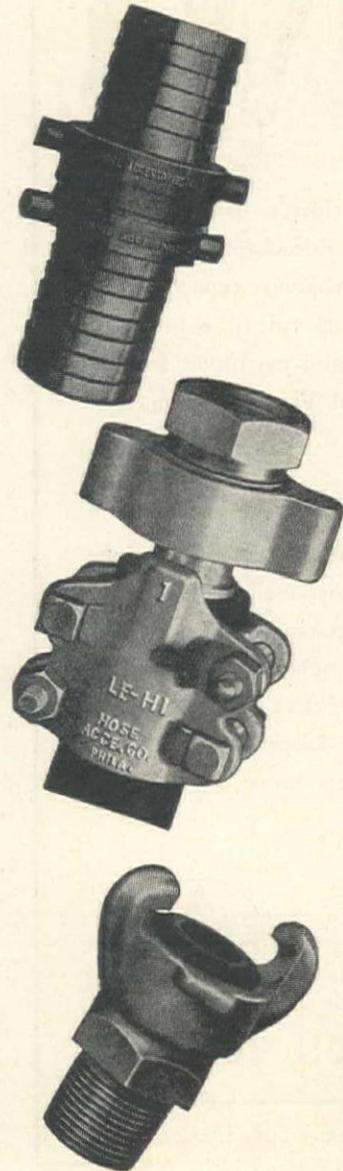
KLAMATH CO.—K. T. Henderson, Longview, Wash.—\$101,842 for 40 family dwelling units at Klamath Falls—by Federal Public Housing Authority, Seattle, Wash. 4-21

MULTNOMAH CO.—Drake, Wyman & Voss, Lewis Bldg., Portland—\$125,000 for

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rebldg. roofing plant at 3750 NW Yeon Ave.—by Lloyd A. Fry Roofing Co., Portland. 4-20

WASCO CO.—Dan Malarkey, 923 S. W. 17th St., Portland—\$87,189 for 40 family, temporary dwelling units at The Dalles—by Federal Public Housing Authority, Seattle. 4-6

Texas

GAINES CO.—Phillips Petroleum Co., Bartlesville, Okla.—for 50 family units at Seminole—by Federal Public Housing Authority, Fort Worth. 4-14

HARRISON CO.—Russell J. Brydon, 5836 Reiger St., Dallas—\$30,000 for brick & steel shop bldg. at Marshall—by Texas & Pacific R. R. Co., Dallas. 4-5

MCLENNAN CO.—Brown & Root, Box 3, Houston—\$3,000,000 for constr. of tire factory, embracing one steel bldg., one reinf. conc. bldg. and other structures at Waco—by General Tire & Rubber Co., Akron, Ohio. 4-6

Washington

BENTON CO.—Nettleton & Baldwin, Lloyd Bldg., Seattle—\$133,560 for 60 dwelling units at Prosser—by Federal Public Housing Authority, Seattle. 4-6

BENTON CO.—Brady Construction Co., Seattle—\$30,700 for new county jail at Prosser—by Benton County Commissioners. 4-13

KING CO.—Western Construction Co., 419 Arctic Bldg., Seattle—\$106,615, for addtl. housing facil. at U. S. Naval Receiving Barracks, Houghton—by Bureau of Yards & Docks, Washington, D. C. 4-7

KING CO.—Atherton Construction Co., Terminal Sales Bldg., Seattle—\$500,000 for a 75 x 230-ft. conc. diesel engine shop bldg. at Auburn—by Northern Pacific Railway Co., Seattle. 4-24

KING CO.—Western Construction Co., 419 Arctic Bldg., Seattle—\$163,876 for addl. housing & recreation barracks, Harbor Island, Seattle—by Bureau of Yards & Docks, Washington, D. C. 4-21

THURSTON CO.—Dolph Jones, 2213 N. Proctor St., Tacoma—\$66,969 for reconst. of 1-story recreatn. bldg. at Olympia—by Federal Works Agency, Seattle. 4-3

Miscellaneous . . .

Arizona

COCHISE CO.—Martin Construction Co., Box 934, Tucson—\$56,614, for swimming facil. at Fort Huachuca—by U. S. Engineer Office, Phoenix. 4-11

California

ALAMEDA CO.—A. D. Schader, 144 Spear St., San Francisco—\$52,366 for railroad holding yard, at Oakland Intransit Depot—by U. S. Engineer Office, San Francisco. 4-21

ALAMEDA CO.—Mattock Construction Co., 212 Clara St., San Francisco—\$35,439, for incinerator at Naval Supply Depot, Oakland—by Bureau of Yards & Docks, Washington, D. C. 4-7

CONTRA COSTA CO.—C. Dudley Velbiss, Eastshore Hwy., Richmond—\$41,215 for grading, El Cerrito High School Grounds, El Cerrito—by Board of Educ.,

CONTRA COSTA CO.—Fredrickson & Watson Construction Co., 873 81st Ave., Oakland—\$112,925, for fill for ammunition storage facil., Port Chicago—by Bureau of Yards & Docks, Washington, D. C. 4-17

IMPERIAL CO.—Shannahan Bros., Inc., 6193 Maywood Ave., Huntington Park—\$38,129, for marine railway at Naval Auxiliary air station, Salton Sea—by Bureau of Yards & Docks, Washington, D. C. 4-12

LOS ANGELES CO.—E. A. Kaiser Co., 8825 W. Olympic Blvd., Beverly Hills—\$190,715, for site improv. at 3 housing projs. along Alameda St., Los Angeles—by Federal Public Housing Authority, Los Angeles. 4-12

LOS ANGELES CO.—Modern Builders Construction Co., 2812 American Ave., Long Beach—\$20,200 for railway track scale bldg., Naval Dry Docks, San Pedro—by Bureau of Yards & Docks, Washington, D. C. 4-18

LOS ANGELES CO.—Griffith Co., Los Angeles Railway Bldg., Los Angeles—\$57,100 for facil. for an industrial bldg. at Caltech—by California Institute of Technology, Pasadena. 4-26

LOS ANGELES CO.—Ford J. Twaits Co., 451 S. Boylston Ave., Los Angeles—\$342,991 for outside yardwork, utilities & paving at Lockheed Navy Plane Service Center, Van Nuys—by Lockheed Aircraft Corp., Burbank. 4-5

ORANGE CO.—William Simpson Construction Co., and W. E. Kier Construction Co., 816 W. 5th St., Los Angeles—\$3,218,077 for magazines and facil. at Naval ordnance depot, Seal Beach—by Bureau of Yards and Docks, Washington, D. C. 4-27

ORANGE CO.—Morrison-Knudsen Co., Inc., 411 W. 5th St., Los Angeles—\$345,060 for rough grading, fine grading, water-bound macadam bases, for paving & floors, etc., at Marine Corps air station, El Toro—by Bureau of Yards & Docks, Washington, D. C. 4-10

ORANGE CO.—Shannahan Bros., 6193 Maywood Ave., Huntington Park—\$424,000 to relocate Calif. State Hwy. & Pacific Elec. Ry. at Naval Depot, Seal Beach—by Bureau of Yards & Docks, Washington, D. C. 4-21

RIVERSIDE CO.—Clifford C. Bong, 6 North First Ave., Arcadia—\$18,650, for railroad & drainage facil. at Quartermaster Depot, Mira Loma—by U. S. Engineer Office, Los Angeles. 4-10

SAN BERNARDINO CO.—Shannahan Brothers, Inc., 6193 Maywood Ave., Huntington Park—\$23,658, for spur track & facil. at San Bernardino Engineer Depot—by U. S. Engineer Office, Los Angeles. 4-14

SAN BERNARDINO CO.—H. S. McClelland, 1928 Compton Ave., Los Angeles—\$124,849, for circulating air system in engine repair bldg. at San Bernardino Air Depot—by U. S. Engineer Office, Los Angeles. 4-10

SAN BERNARDINO CO.—Shannahan Bros., Inc., 6193 Maywood Ave., Huntington Park—\$23,657, for a spur track & facil. at the National Orange Show, San Bernardino—by U. S. Engineer Office, Los Angeles. 4-4

SAN DIEGO CO.—Lee Engineering Co., Youngstown, Ohio—\$124,200, for instal. doors for Radio, Radar, and Repair Hangar, at Naval air station, San Diego—by Bureau of Yards & Docks, Washington, D. C. 4-5



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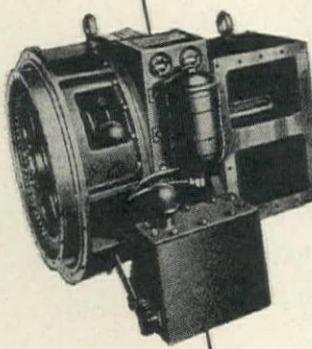
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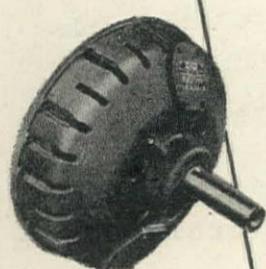
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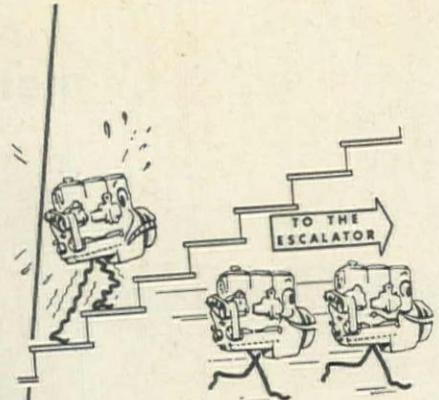


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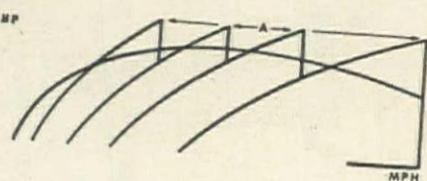


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Internal combustion engines, because they cannot start in high, are usually provided with a series of steps or gears so that the driven load can be applied gradually as the engine gains speed.

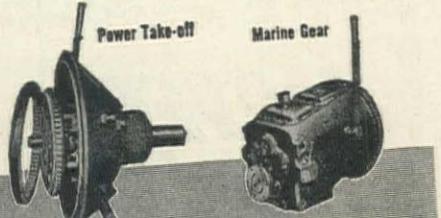
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SAN DIEGO CO.—Walter Trepte, 631 9th St., San Diego—\$44,790 for magazine facil. & land firing range in San Diego—by Bureau of Yards & Docks, Washington, D. C. 4-3

SAN JOAQUIN CO.—M. R. Carpenter, 907 Front St., Sacramento—\$41,989 for sprinkler sys., Stockton ordnance depot, Stockton—by U. S. Engineer Office, Sacramento. 4-24

SOLANO CO.—Fredrickson Bros., 1259 65th St., Emeryville—\$330,180 for roads & railroad storage yard at Benicia Arsenal—by U. S. Engineer Office, San Francisco. 4-21

SONOMA CO.—Younger Construction Co., Cheda Bldg., San Anselmo—\$16,390, for addtl. laundry facil. at Santa Rosa—by Bureau of Yards & Docks, Washington, D. C. 4-3

STANISLAUS, SAN BENITO, SANTA CRUZ & SAN JOAQUIN COUNTIES—Scott-Buttner Electric Co., 534 20th St., Oakland—\$75,500 for radio transmitter facil. at Crows Landing, Hollister, Watsonville & Vernalis—by Bureau of Yards & Docks, Washington, D. C. 4-21

Colorado

MORGAN & OTHER COS.—C. and W. Construction Co., Omaha, Neb.—\$57,231 for approx. 33 mi. of electric line—by Morgan County Rural Electric Corp., Fort Morgan. 4-5

DENVER CO.—Automatic Sprinkler Corp. of America, 1207 Grande Ave., Kansas City, Mo.—\$55,200 for automatic sprinkler systems at Warehouses Nos. 1 & 2 and at the inflammable storage warehouse, Medical Supply Depot, Denver—by U. S. Engineer Office, Denver. 4-13

Nevada

MINERAL CO.—Cal-Vada Construction Co., 13 W. 2nd St., Reno—\$243,211 for ammunition overhaul facil. at Hawthorne & ammunition depot—by Bureau of Yards & Docks, Washington, D. C. 4-24

Utah

SALT LAKE CO.—George C. Reid, 1236 S. Walnut St., Casper, Wyo.—\$192,000 for 84-bed detention hospital of brick and reinf. conc. at Westminster Ave. & 2nd East, Salt Lake City—by Federal Works Agency, Washington, D. C. 4-14

Washington

KING CO.—Grinnell Co. of the Pacific, Elliott & Bay Sts., Seattle—\$63,902, for an automatic sprinkler system in 2 warehouses at Army Service Force Depot, Seattle—by U. S. Engineer Office, Seattle. 4-10

BENTON CO.—Lent's Inc., Bremerton—\$50,000 for roofing of bldgs. at the DuPont plant at Richland, near Kennewick—by Navy Dept., Washington, D. C. 4-20

KITSAP CO.—Lent's Inc., Bremerton—\$60,000 for plumbing, heating, sheet metal & roofing at Waves' barracks at Fort Ward naval radio station—by Navy Dept., Washington, D. C. 4-20

KITSAP CO.—Gaastrand Construction Co., 1161 Ellis St., Bellingham—\$194,000, for radio facil. at Fort Ward, Bainbridge Island—by Bureau of Yards & Docks, Washington, D. C. 4-17

SPOKANE CO.—W. E. Beggs Co., 416 Bell St., Seattle—\$297,793 for automatic sprinkler system in several warehouses at Spokane army air depot—by U. S. Engineer Office, Seattle. 4-24

Foreign

CANADA—General Railway Signal Co., Rochester, N. Y.—\$500,000 for installation of automatic block signals on 84 mi. of Canadian Pacific Railway main line from Swift Current to Maple Creek, Sask., and on 28 mi. from Medicine Hat to west limits of Suffield, Alta.—by Canadian Pacific Railway.

PROPOSED PROJECTS

Highway and Street...

Idaho

BONNEVILLE CO.—Bonneville Co. and State of Idaho have signed an agreement providing for the oiling of 7.3 miles of the Idaho Falls-Taylor road.

New Mexico

MCKINLEY CO.—Concrete apron slabs in front of and adjacent to 254 igloo magazines used for storage of ammunition and heavy bombs at Wingate ordnance depot, Gallup—by U. S. Engineer Office, Albuquerque.

Airport...

Wyoming

LARAMIE CO.—Extension to runways at Municipal Airport, Cheyenne, including grading, drainage, lighting and fencing appurtenant thereto—by U. S. Engineer Office, Denver, Colo.

Water Supply...

Montana

CASCADE CO.—A waterworks project embracing addl. watermains & storage is contemplated at Great Falls. Estimated cost, \$325,000—by City of Great Falls.

Texas

WICHITA CO.—\$3,500,000 in bonds has been voted for constr. of dam, spillways & 25-mi. conduit at Wichita Falls—by Sept. of Waterworks, Wichita Falls.

Utah

TOOELE CO.—Grant of \$45,180 approved for construction of 2,000,000-gal. water storage tank and new feeder water lines in Tooele.

Washington

COWLITZ CO.—Plans and specifications are being prepared for construction of a water filtration plant & facilities at Longview, estimated to cost \$225,000. Included in the contract will be construction of a 3-story operation house, a settling tank, & 6000 ft. of 16-in. pipe.



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Albuquerque, N. M., Motor Equipment . . . Dallas, Texas, F. C. Crane Company . . . Denver, Colorado, McKelvy Machinery Co. . . . Houston, Texas, Koehring Company . . . Los Angeles, Calif., Harron Rickard & McCone Company . . . Phoenix, Ariz., Neil B. McGinnis Co. . . . Portland, Ore., Contractor's Equipment Corp. . . . Salt Lake City, Utah, Lund & Machinery Corp. . . . San Antonio, Texas, Alamo Iron Works . . . San Francisco, Calif., Harron Rickard & McCone Company . . . Seattle, Wash., Pacific Hoist & Derrick Company . . . Spokane, Wash., General Machinery Co.



★★ Immediate delivery on Gasoline Powered 1½ H.P. and wheelbarrow or round base mounted 3 H.P. units on suitable priority.

★SAVE 7 WAYS with

Mall
TRADE MARK

Concrete Vibrators

1½ H. P. GASOLINE POWERED UNIT

1. Place a stiffer mix and save sand, water and cement.
2. Eliminate expensive hand patching after forms are removed, because MALL vibrated concrete is free from honeycombs and voids.
3. Use less labor.
4. Finish work faster and get stronger, water-tight concrete.
5. Strip forms earlier and release form boards for other use.
6. Reduce power and maintenance costs.
7. Variable speed engine operates 8 other tools eliminating need for separately powered tools.

Write for literature and prices.

MALL TOOL COMPANY • 7735 SOUTH CHICAGO AVE.
CHICAGO 19 ILLINOIS

CALIFORNIA OFFICE—1025 S. SANTA FE AVE., LOS ANGELES, CALIF.

Authorized Distributors—CALIFORNIA: Electric Tool & Supply Co., Los Angeles; Hudson-Tucker, Inc., San Diego; Delta Equipment Agency, Oakland; Southern Equip. & Supply Co., San Diego; Harron, Rickard & McCone Co., San Francisco & Los Angeles. ARIZONA: Pratt-Gilbert Hdwe. Co., Phoenix. COLORADO: Hendrie & Bolthoff, Denver. MONTANA: Connelly Machy. Co., Billings; Hall-Perry Machy. Co., Butte. IDAHO: The Sawtooth Co., Boise. OREGON: Cramer Machy. Co., Portland. UTAH: Arnold Machy. Co., Salt Lake City. WASHINGTON: A. H. Cox & Co., Seattle; Construction Equip. Co., Spokane.

KING CO.—Plans being prepared for a new 6,000,000-gal. reservoir to serve Magnolia Bluff Dist., north of W. Bertona St. near 27th Ave. W., to cost about \$35,000.

3-30

Waterway ...

California

LOS ANGELES CO.—Construction was approved by the Los Angeles County Board of Supervisors, for 2-mi. permanent channel in Los Angeles Riv., from Stewart and Grey Rd. to the P. E. Ry. Santa Ana branch—Estimated cost, \$1,800,000. 4-17

Building ...

California

ALAMEDA CO.—\$1,000,000 has been appropriated for construction of an Army Postal Concentration Center at the Oakland Army Base—by U. S. District Engineer Office, San Francisco. 4-14

CONTRA COSTA CO.—Two publicly-financed war housing projects, one 50 family and one 100 family, to be constructed in Pittsburg-Antioch, Calif.—by F. P. H. A., San Francisco. 4-7

LOS ANGELES CO.—Plans have been filed with FHA for 32 apt. bldgs. with 100 dwel. units in Glendale, est. cost \$400,000—by Kenneth P. Schmidt, Inc., Glendale. 4-26

SAN BERNARDINO CO.—Preparation of plans and specifications for 50 stopgap



Scoopmobile

*Moves the Stockpile
Faster*

Economical . . . Sturdy steel construction makes for durability and low maintenance cost.

Speed Fast pickup and dumping plus maneuverability plus scoop capacity of $\frac{3}{4}$ cu. yd. makes record time on stockpile work.

Scoopmobile is equipped with 8 Cylinder Ford Truck 95 H.P. Engine. Transmission is also Ford Truck Type—4 speeds Forward; 1 Reverse. Speed Range 2 MPH. to 30 MPH.

Smart Contractors are using SCOOPMOBILE to cut costs and get the job done on time.

WRITE FOR FULL DETAILS

MIXERMOBILE MANUFACTURERS

Manufacturers of BUGGYMOBILES, WAGNER TRUCK CRANES AND SCOOPMOBILES

6855 N. E. HALSEY ST. PORTLAND 16, OREGON Phone SUNset 1105

housing units at Victorville are being prepared by the Federal Public Housing Authority. 5-2

SAN DIEGO CO.—Publicly-financed war housing project, 50 family units at Ocean-side—by F. P. H. A., San Francisco. 4-7

SOLANO CO.—Two publicly-financed war housing projects, one 60 family and one 100 family, to be constructed in Fairfield—by F. P. H. A., San Francisco. 4-7

Montana

LEWIS & CLARK CO.—Approval received for an overpass to replace old structure over the Northern Pac. Ry. tracks at U. S. Hwy. 10, near Bozeman, to cost about \$90,000. 4-15

Nevada

NYE CO.—Plans are being prepared by the FPHA, San Francisco, Calif., for the const. of 80 family dwelling units at Tonopah. 3-7

Texas

HUTCHINSON CO.—Constr. of school bldg. to cost approx. \$213,800 has been proposed at Borger—by Board of Educ., Borger. 4-18

Utah

WEBER CO.—Hospital will be erected in Ogden, Utah, bldg. of reinf. conc. framing and brick curtain wall construction—est. cost, \$1,340,000—by Catholic Sisterhood of St. Benedict, St. Joseph, Minn. 4-20

Washington

FRANKLIN CO.—Preparation of plans and specifications for 700 private trailer spaces and 200 stopgap housing units at Pasco are being prepared by the Federal Public Housing Authority. 5-2

Canada

BRITISH COLUMBIA — Announcements were made for the New British Columbia provincial government bldgs., to cost more than \$1,200,000.

Miscellaneous . . .

California

LOS ANGELES CO.—Budget increase requested for addtl. gas storage and distribution facil. in Long Beach, to cost \$1,456,512—by Municipal Gas Dept., Long Beach. 4-26

It's a CINCH with a WINCH!



YOU CAN'T STICK A WINCH-EQUIPPED TRACTOR HYSTER Winches --



... give "Caterpillar" track-type tractors increased pulling power—50 to 80% more pull than at the drawbar. That enables a tractor to handle loads that it could not otherwise move; equips it to reach in with the winch line to inaccessible places and is assurance against the tractor ever getting stuck.

Made for all sizes of "Caterpillar" track-type tractors and sold and serviced by "Caterpillar" dealers everywhere.

LARGEST MANUFACTURER
OF
TRACTOR HOISTS AND WINCHES

— Over 20,000 in Use —
— FACTORIES —

2951 N. E. Clackamas - Portland 8, Oregon
1851 North Adams - Peoria 1, Illinois



RAPID DUMPING FOR HI-SPEED

In digging and material handling, too, rapid discharge of the load is an essential feature. Every Owen Bucket is designed to incorporate rapid discharge operation—a factor responsible for their outstanding performance.

Owen Bucket Co., Limited

2nd & Gilman Sts., Berkeley, Calif.

OWEN BUCKETS

A MOUTHFUL AT EVERY BITE

REPRESENTED BY: Contractors' Equipment & Supply Co., Albuquerque, N. M.; Clyde Equipment Co., Portland, Ore.; General Machinery Co., Spokane, Wash.; A. H. Cox & Co., Inc., Seattle, Wash.; Electric Steel & Foundry Co., Honolulu, T. H.

TRADE WINDS

News of Men Who Sell to the Construction West

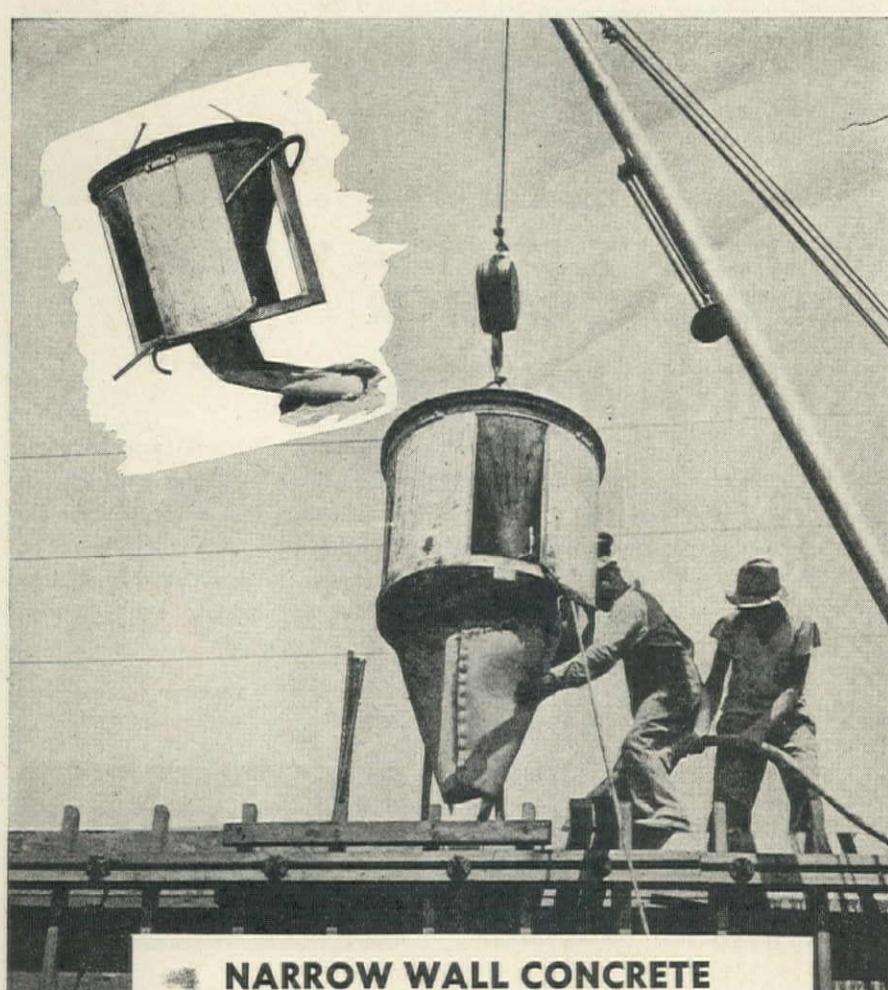
CALIFORNIA

BELAIR SHIPYARD in South San Francisco has received the United States Maritime Commission's Award of Merit. The special ceremony took place at the launching of Belair's nineteenth ship-shaped concrete barge, the "Cinnabar." Presentation of the Maritime "M" Pennant, Victory Fleet Flag and employees' Merit Badges was made by Carl W. Flesher, director of the Maritime Commission's West Coast Regional Office. J. F. Barrett and H. H. Hilp accepted the award in behalf of the construction firm of BARRETT & HILP, which built and operates the shipyard.

The employees of the SEASIDE OIL CO., Santa Barbara, Calif., have been awarded the Treasury Department "T" flag, which means that 98 per cent of all regular employees are investing the equivalent of 10.00 per cent of the gross payroll in War Bonds, via the payroll allotment plan. This award includes all the company's refining and marketing operations in California and Arizona. Presentation was made at the company's general offices in Santa Barbara.

☆ ☆ ☆

H. N. How and Jack H. How have become associated as general partners with Edward R. Bacon and W. F. McGourk in the operation of the ED-



NARROW WALL CONCRETE

Concrete can be easily placed in narrow walls with a GAR-BRO Center Discharge Concrete Bucket with attached accordion hopper thereby saving Manpower, runways and buggies. Flexible hopper folds under bucket when loading. Buy or rent a Gar-Bro Bucket from your Distributor

Edward R. Bacon Co. — San Francisco

Garlinghouse Bros. — Los Angeles

Loggers & Contractors Machinery Co. — Portland

A. H. Cox & Co. — Seattle

Arnold Machinery Co. — Salt Lake City

Construction Equipment Co. — Spokane

Contractors Equip. & Supply Co. — Albuquerque

Conley-Lott-Nichols Mach. Co. — Dallas

Mfg. by

GARLINGHOUSE BROTHERS

2416 East 16th Street — Los Angeles, 21 — JEFFERSON 5291

WARD R. BACON CO., construction equipment dealers of San Francisco, Calif. At the same time Paul W. Mohr, Alfred B. Hartley, Harry J. Learn and S. J. Clark were named as limited partners. Mohr is manager of the Oakland, Calif., division of the company, Learn is Fresno, Calif., division manager, Harry B. Ogle is manager of the Sacramento division. Jack H. How is general manager of the organization.

☆ ☆ ☆

Richard B. Borland, for the past 14 years an application engineer for the WESTINGHOUSE LAMP DIVISION at Los Angeles, has been named manager of that division. Borland will have charge of all activities of his organization in the Southern California area. At present, most of the company's output of all lamps and tubes is going to war-time industries and the armed services. Borland joined Westinghouse in 1925 as an application engineer for the Lamp Division in San Francisco. In 1930 he was transferred to Los Angeles and has remained there permanently.

☆ ☆ ☆

Lieutenant Commander Charles C. Morgan, U. S. N. R., former industrial engineer at the Pittsburg (Calif.) Works of COLUMBIA STEEL CO., has been awarded the Legion of Merit, his second decoration in the past five months for gallantry as commanding officer of a destroyer transport in the South Pacific.

☆ ☆ ☆

HAMMOND LUMBER CO., Samoa, Calif., for the second time in three years has been awarded the C. R. Johnson Memorial Safety Trophy for the best safety and accident prevention record of the California Redwood lumber industry. As shown by the Donovan Accident Index, the company in 1943 established the lowest injury rate of any year since the contest was inaugurated.

☆ ☆ ☆

E. J. Masline, general superintendent of THE UNION METAL MANUFACTURING CO. for the past 19 years, has been appointed general manager and a director of PACIFIC UNION MAR-BELITE CO., a subsidiary functioning as manufacturers and Pacific Coast sales representatives with headquarters in Los Angeles. A. R. Miller, electrical and maintenance engineer, succeeds Masline as general superintendent.

☆ ☆ ☆

In March Howard W. Cheney became advertising and sales promotion manager of MACMILLAN PETROLEUM CORP., the same position he formerly held with LOCKHEED AIRCRAFT CORP. Cheney has an impressive background in advertising and merchandising. For three years he was an account executive with Lord and Thomas Advertising Agency (now Foote, Cone and Belding); and prior to that time he spent five years in Europe engaging in merchandising study and free-lance writing. Following a three months' national tour of the company's district offices and distributors, Cheney will make his headquarters at Macmillan's main office in Los Angeles.

☆ ☆ ☆

F. Lowell Garrison succeeds Paul C. Wilmore as Public Relations Representative for the GENERAL ELECTRIC COMPANY in the Pacific Coast area. He will continue to maintain contacts with all media having offices located in the West, from his established headquarters in the Russ Building, San Francisco. Garrison, who was born in San Jose, Calif., has been with General Electric since his graduation from the University of California in 1929. For the past two years he has been field engineer for the company's San Francisco office, contacting Bay area shipyards. Prior to this assignment, he was sales manager for the General Electric Supply Corporation in Butte, Montana.

Arthur J. Pilgerrim has been added to the KOTAL COMPANY'S staff and will make his headquarters with the SMITH BOOTH USHER COMPANY, Los Angeles, new distributors for Kotal in California, Nevada and Arizona. Pilgerrim, formerly with



the Bureau of Public Roads and the United States Engineering Department, has been active for a number of years in construction work on the West Coast in public and private capacity.

☆ ☆ ☆

THE FAFNIR BEARING CO., New Britain, Conn., announces the opening of a new branch office and warehouse at 434 Larkin Street, San Francisco, Calif., to better serve bearing users in that area. H. W. Mendenhall, formerly with F. SOMERS PETERSON CO., will be manager of the new branch.

☆ ☆ ☆

Albert E. Deegan, for 20 years special field representative of ATLAS POWDER CO. in the West, died in Los Angeles, Calif., February 18, 1944, after a short illness. Deegan was well known in the explosives industry and was considered an authority on the proper application of explosives. Deegan joined Atlas in the capacity of special field representative in 1924. In World War I he was cited for bravery during his service with the U. S. Engineers in France.

☆ ☆ ☆

The California chapters of the PRODUCERS' COUNCIL announce selection of officers for 1944. In Northern California H. L. Pickett of the NATIONAL LEAD COMPANY was chosen president, and the secretary is E. E. Cathcart of JOHNS MANVILLE. The Southern California chapter elected John Vandenburg of the BLUE DIAMOND CORPORATION president and Paul Keenen, W. P. FULLER & CO., secretary.

☆ ☆ ☆

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY announces the following changes in their organization: William D. Turnbull has been appointed manager of the Agency and Specialties Department. Ernest H. Fincher has been named engineering and service representative for the company in the San Diego area. Westinghouse also announces that Gano R. Baker has been made Southern California manager for the WESTINGHOUSE ELECTRIC ELEVATOR CO. at San Francisco and that Fred H. Luithle is the new district stores manager for WESTINGHOUSE ELECTRIC SUPPLY CO. for the North Pacific District.

☆ ☆ ☆

PACIFIC NORTHWEST



A. F. Sersanous

The veteran LOGGERS AND CONTRACTORS MACHINERY COMPANY, of Portland and Eugene, Oregon, is the first Western Division distributor to be signed under the exclusive dealer policy recently announced by R. G. LeTOURNEAU, INC., of Peoria, Illinois, and Stockton, California. Claude I. Sersanous, president, and A. F. Sersanous, treasurer and general manager, head the nearly 40 year old organization. Under their new contract they will offer exclusive LeTourneau

sales and service in all Oregon counties except the eastern tier plus a portion of southern Washington.

In addition to handling the entire LeTourneau line—Tournapulls, Carryall Scrapers, Cranes, Power Control Units, Dozers, Tournarope, Tournaweld and all parts—the Sersanous brothers' firm will continue to represent the noncompetitive Ingersoll-Rand Compressor Company, P. & H. Shovels, Chain Belt Mixers and Pumps, Diamond Iron Works' Crushers and De-Walt Power Saws.

☆ ☆ ☆

I. F. LAUCKS, INC., Seattle, Wash., has been awarded another star signifying a second renewal of the Army-Navy "E" award for meritorious service on the production front. This star is regarded as symbolic of the research and production that Laucks has accomplished for the armed forces in the field of synthetic resins, waterproof plywood and protective coatings.

☆ ☆ ☆

BELL AND MORRIS, wholesale plumbing and builders' supply dealers in Calgary, Alberta, has been sold to WESTERN SUPPLIES of Edmonton, and David Burgess of Calgary. The new firm will be known as BUILDERS AND MINES SUPPLIES, LIMITED. Leslie Bell will remain with the new company for the duration, but C. E. Morris will retire.

☆ ☆ ☆

CARTER-HALLS-ALDINGER COMPANY, LIMITED, widely-known Western Canada construc-

tion firm, will go out of business on completion of its present contracts. Three subsidiaries—COMMONWEALTH CONSTRUCTION CO., Winnipeg; CARTER CONSTRUCTION CO., Toronto; and a Vancouver construction firm—will continue to operate.

☆ ☆ ☆



Dar Johnson is the new sales promotion and advertising manager of the WILLAMETTE HYSTER COMPANY, Portland, Ore. and Peoria, Ill. The firm manufactures heavy duty high-speed hoist equipment for use with Caterpillar tractors and Hyster lift and straddle trucks. Johnson comes to the company from the Peoria, Ill. Journal-Transcript, where he was public relations and industrial promotion manager.

F R U E H A U F TRAILER COMPANY has opened a new branch at 118 South Division Street, Spokane, Washington. The Sales Manager in charge is Ben Critzer, who for 18 years has been active in the automotive industry throughout the states of Washington, Idaho and Western Montana. The new Fruehauf branch already reports delivery of two Fruehauf logging trailers and orders for 13 units.

☆ ☆ ☆

M. D. Tucker of Portland, Ore., vice-president of EVANS PRODUCTS COMPANY, has purchased from Evans the fir plywood plant located at Lebanon, Ore., and rated the largest and most modern plywood plant in the world. CASCADES PLYWOOD CORPORATION has been organized, with Tucker as president, to own and operate the Lebanon plant.



Dependable Parts Service Keeps "CLEVELANDS" ON THE JOB—



DISTRIBUTED BY

EDWARD R. BACON CO., San Francisco, California—NELSON EQUIPMENT CO., Portland, Oregon—H. W. MOORE EQUIPMENT CO., Denver, Colorado—SMITH BOOTH USHER CO., Los Angeles, California and Phoenix, Arizona—CONSTRUCTION MATERIAL & SUPPLY CO., Santa Fe, New Mexico—INDUSTRIAL EQUIPMENT CO., Billings, Montana—LANDES ENGINEERING CO., Salt Lake City, Utah



THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE.

"Pioneer of the Small Trencher"

CLEVELAND 17, OHIO



"CLEVELANDS" Save More... Because they Do More

Under the largest sales contract ever effected in the plywood industry, Cascade's entire output will be manufactured and marketed under U. S. Plywood's Weldwood plywood process and brand.

☆ ☆ ☆

The Seattle, Wash., office and warehouse of THE FAFNIR BEARING CO. has been moved to 611 East Pine Street.

☆ ☆ ☆

INTERMOUNTAIN

I. A. Leimbrook, formerly assistant manager for INTERNATIONAL HARVESTER CO., at its Denver office, has been appointed manager, motor trucks, at that point. Two other personnel changes which have taken place at Denver are the appointment of C. H. Moore (formerly manager at Great Falls, Mont.) to manager of the farm and industrial equipment branch. J. I. Chitwood, formerly credit and collection manager at Cheyenne, Wyo., has been made assistant manager of this same branch.

☆ ☆ ☆

William Bryce, president and manager of the ALBUQUERQUE FOUNDRY AND MACHINE

WORKS and a resident of Albuquerque, New Mexico, for 55 years, died recently at the age of 84. He was a member of the Temple Lodge of the Masons and the Eastern Star.

☆ ☆ ☆

CATERPILLAR TRACTOR CO. announces the appointment of CLIFF MILLER MACHINERY CO. as distributor for Omaha, Nebraska, and surrounding territory. Cliff Miller will become general manager. Assistant manager will be M. Lee Coonan, and sales manager for the concern will be Clare Fintzell.

☆ ☆ ☆

As field project manager, Harry L. Sutton will supervise work for E. I. du PONT de NEMOURS & COMPANY at its projected chemical plant on the Houston-Galveston ship canal near La Porte, Tex. The first production unit of what will be known as the Houston Works of the Du Pont Grasselli Chemicals Department will make phenothiazine, a chemical for ridding livestock of internal parasites.

☆ ☆ ☆

J. W. Frasche will take over the assignment of plant manager of the new tire factory now being

constructed in Miami, Okla., by the B. F. GOODRICH CO. Since joining the company in 1928 Frasche has held a number of important posts. He managed the traffic and purchasing departments when Goodrich constructed and began operations of a large bomb and shell landing plant for the government in Texas. The start of the large-scale production of synthetic rubber for the government by Goodrich brought Frasche to Louisville, Kentucky, where he directed the early operations of a large plant there. After that he was in charge of the completion and first production of rubber in a similar plant near Borger, Tex.

☆ ☆ ☆

J. I. CASE CO. boasts a mayor among its western dealers. Charles F. MacDonald is mayor of Burley, Idaho, as well as being the local Case dealer. Mayor MacDonald does business under the firm name of BURLEY IMPLEMENT COMPANY.

☆ ☆ ☆

AMONG THE MANUFACTURERS

R. W. Hofheins has been appointed field technical engineer of WILLYS-OVERLAND MOTORS. In his new position, Hofheins, who has been technical adviser in the South Pacific for the U. S. Navy during the past year, will represent the auto concern in all government field tests of the "Jeep," the scout car it developed in cooperation with the Army, and other military automotive equipment. Former president of the Amphibian Car Corp. in Buffalo, N. Y., Hofheins fills the vacancy in the company's engineering staff caused by the recent death of Henry Amon.

☆ ☆ ☆

R. T. Dunlap and E. F. Early were elected vice-presidents of the WICKWIRE SPENCER STEEL COMPANY. Dunlap was previously assistant to the president and is well known in the steel industry as an authority on plant installations, production and operation. Early has long been associated with the company as general superintendent at their Morgan Plant in Worcester, Mass. Wickwire also announces the appointment of Harry E. Roulfs as labor relations manager. For the past two years Roulfs has been connected with the W. P. B. as a labor relations consultant. He will make his headquarters at the Buffalo mill of the company.

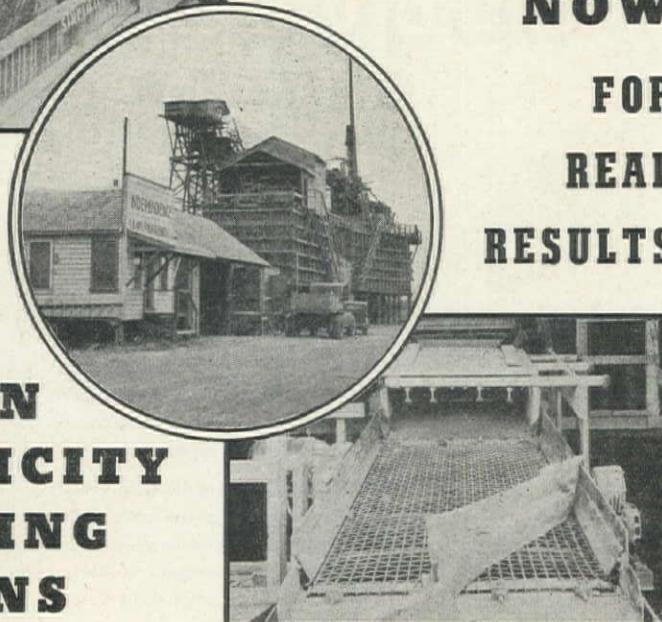
☆ ☆ ☆

U. S. STEEL CORP. in its 42nd annual report announces a gross income of \$1,976,844,751 for 1943. Net income was \$63,448,546. Dividends to preferred and common stockholders in 1943 remained unchanged at \$60,032,685. The report disclosed that an all-time record production of 30,540,000 tons of ingots was set by U. S. Steel in 1943.

☆ ☆ ☆

E. W. Potratz was recently appointed manager of the Hoist Sales Division of HARNISCHFEGER CORPORATION, Milwaukee. Since 1935, when he joined the hoist division as estimator, Potratz's association with the company has been marked by sound and rapid advancement. In 1939 he was named as

USE THE PROVEN SIMPLICITY GYRATING SCREENS



The above illustrated plant added three Simplicity Gyrating Screens, thereby tripling their production of specification material, while reducing their per ton cost of operation. You can do the same by installing the fully guaranteed Simplicity Screens, manufactured for service since 1922.

Secure a recommendation and quotation by contacting the factory or one of our listed dealers.

THE DONALD KENNETH CO.	San Francisco, Calif.
SNYDER FOUNDRY SUPPLY CO.	Los Angeles, Calif.
CONTRACTORS EQUIPMENT CORP.	Portland, Oregon
PACIFIC HOIST & DERRICK CO.	Seattle, Washington
EMPIRE EQUIPMENT COMPANY	Spokane, Washington
ARIZONA MINING SUPPLY CORP.	Prescott, Arizona

Simplicity Engineering Co.

Durand, Michigan



sistant sales manager; and with the protracted illness of George Drake, Potratz has been acting sales manager since 1942. Many important product developments in the P&H line have been inaugurated during Potratz' term of service with the company—among them the double I-beam Trav-Lift crane, the

compact, multi-purpose steel cable Zip-Lift hoist, and the P&H five-step variable speed, full magnetic push-button hoist control. Merchandising and distribution policies were steadily modernized to meet the demands of markets.

☆ ☆ ☆

John O. Chesley, railway sales manager, and Frank C. Barrows, Jr., automotive sales manager, are the two recently appointed industry managers for ALUMINUM COMPANY OF AMERICA. Both men have been with Alcoa for over 30 years. Their new positions were established in order to provide a direct contact between the company and the railway and automotive markets in meeting the anticipated demand for aluminum in these two fields after the war.

☆ ☆ ☆

Officials of FAIRBANKS, MORSE & CO. have announced that \$784,855.54 has been set aside out of 1943 profits to be distributed to eligible employees, under the company's profit-sharing plan. The profit sharing disbursement based on a payroll of over \$19,000,000 in 1943 is at the rate of 4.08 per cent of a participant's annual earnings. This compares with the rate of 2.301 per cent based on the payroll of over \$13,000,000 in 1942. The company's financial statements disclose a net profit for 1943 of \$2,787,439.67 or \$4.65 per common share, after provision had been made for a special contingency reserve of \$2,500,000. Federal income taxes were \$15,175,000 and refund in renegotiation of government business amounted to \$38,600,000.

☆ ☆ ☆

For 1943 MACK TRUCKS, INC., reports a net income of \$3,073,088, amounting to \$5.14 per share, after making provision of \$1,000,000 for renegotiation and \$500,000 for postwar reserve. Also during 1943 negotiations were completed for a V-loan providing Mack with a revolving credit of \$50,000,000, of which \$25,000,000 has been borrowed. During 1943 the company continued its participation in the war effort in an increasing degree. There also is the prospect of resumption to limited commercial production during 1944.

☆ ☆ ☆

THE HEIL CO., Milwaukee, announces that its southwest Sales Representative, Howard Mann, has opened district sales offices for the company in Dallas, Texas. This special office is the answer to the rapidly growing demand for Heil products in this territory. Mann will represent the company in the sale of all its lines of manufacture including truck tanks and "trailered" tanks for milk, petroleum and other liquid transportation, stationary milk tanks, truck bodies and hoists, road machinery, forage crop dehydrators, oil heating systems, and dairy and beverage bottle washers.

☆ ☆ ☆

THE RICKRAFT CO., with offices in the Builders Building in Chicago and an eastern office in Westport, Conn., has recently been organized to market reinforced building paper, curing compound, reflecting paint, joint sealer and kindred products for the construction industry. Franklin A. Richards, formerly with Sisalkraft Co., is senior partner and general manager. E. M. Reynolds, who was also with Sisalkraft, is junior partner and eastern manager. H. H. Deputy, who will handle sales, is a general partner, as is Grace E. Shaunessy, in charge of the inside work of the firm.

☆ ☆ ☆

THE KWIK-MIX CONCRETE MIXER CO., subsidiary of THE KOEHRING CO., Milwaukee, Wisconsin, has assumed the sale, service, engineering and development of the 7-S, 10-S and 14-S Koehring Dandie Mixers, which are now known as Kwik-Mix Dandie Mixers. Service will be directed from the Kwik-Mix Concrete Mixer Co. and inquiries for information should be addressed to this company at Port Washington, Wisconsin. A. E. Kelbe, recently appointed sales manager for Kwik-Mix, announces that the present distributor organization will be considerably increased to provide adequate coverage for postwar sales.

☆ ☆ ☆

R. P. Exten has joined the YOUNG RADIATOR CO. of Racine, Wis.—heat transfer products engineers and manufacturers—as executive assistant to the president. One of Exten's most recent accomplishments was the invention and design of the first successful, lightweight, high torque capacity clutch for engaging the horizontal rotor of the autogiro. In his new position, Exten will be concerned chiefly with production matters.

The annual report for WICKWIRE SPENCER STEEL COMPANY and subsidiaries has just been released. Net earnings for the year 1943 amounted to \$1,516,613, or \$3.30 per share on 459,316 shares of common stock. The report discusses various factors affecting the company's operations, including sales, labor and post war plans, and on the whole it reflects optimism and confidence for 1944.

☆ ☆ ☆

Dr. V. N. Krivobok, recognized authority on stainless steel and former professor of metallurgy at Carnegie Institute of Technology for many years, has joined the Development and Research Division of THE INTERNATIONAL NICKEL COMPANY at New York. Krivobok's services will be utilized mainly in the development of markets for alloy and stainless steels and to assist steel manufacturers in expanding markets for their postwar products.

☆ ☆ ☆

LAPLANT-CHOATE MANUFACTURING CO., Cedar Rapids, Iowa, pioneer builders of earth-moving and land-clearing equipment, announces the opening of a sales office in the International Building, Rockefeller Center, New York City. The new

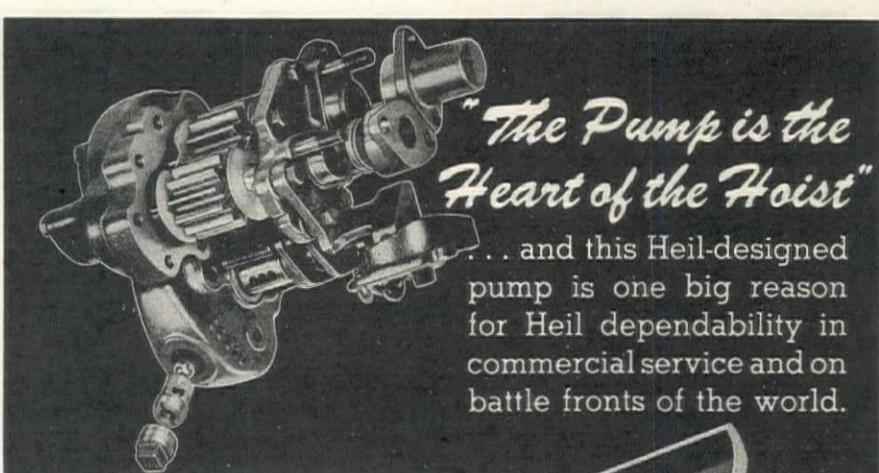
office will be in charge of Jay Fettner, formerly London Manager of CATERPILLAR TRACTOR CO., and more recently on the staff of the Chief of U. S. Army Engineers. Fettner also represented Caterpillar in India, Burma, Afghanistan and Ceylon for six years.

☆ ☆ ☆

ALBERT RAMOND AND ASSOCIATES, INC. (formerly THE BEDAUX COMPANY, INC.) announces that the firm will continue to provide a broad industrial engineering service under the management of the group of executives who have directed the affairs of the company since 1937. The field engineering staffs also remain intact.

☆ ☆ ☆

The AETNA CASUALTY AND SURETY CO. announces the retirement of Edward W. Bush, engineer in the fidelity and surety underwriting department, and the appointment of Thomas Fraher as his successor. Bush is an authority on contract specifications and as such was invited to assist in the wording of the specifications for the \$50,000,000 Boulder Dam contract. Fraher, who succeeds Bush, has been with Aetna since 1922. He is well known to Aetna representatives and underwriters throughout the country.



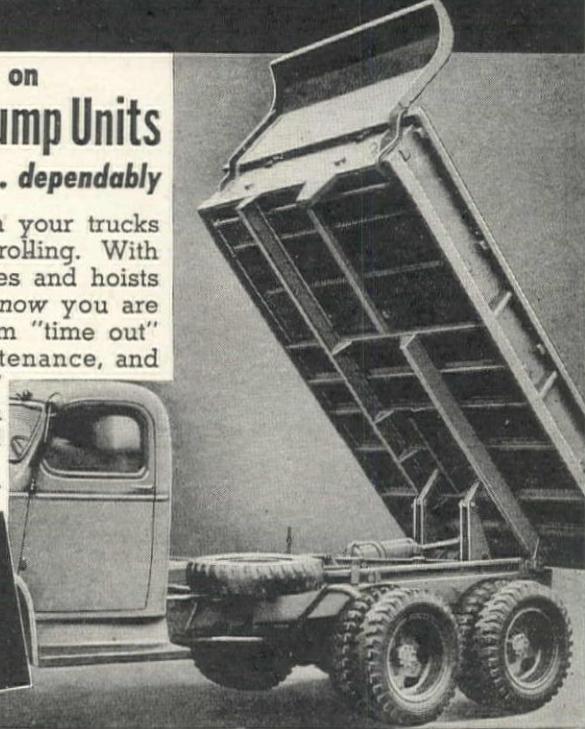
You can rely on
Heil Hydraulic Dump Units
to stay on the job . . . dependably

You make money with your trucks only when they keep rolling. With Heil Quality-Built bodies and hoists on your trucks, you know you are going to have minimum "time out" for adjustments, maintenance, and repairs. For "on-time" performance, equip with Heil Dump Units now!

Write for bulletins.

BH-80C

The Heil Co. offers a complete line of light-, medium-, and heavy-duty dump units with arm, telescopic, or twin-cylinder hoists.



THE HEIL CO.

GENERAL OFFICES

MILWAUKEE 1, WISCONSIN

Authorized Distributors

ANCHOR BODY & STEEL MFG. CO., Phoenix, Ariz.; UTILITY TRAILER SALES CO., Los Angeles, Calif.; THE HEIL CO., San Francisco, Calif.; HARRIS HIGHWAY EQUIP. CO., Pueblo, Colo.; THE LANG CO., Salt Lake City, Utah; GRAEHL MOTOR SERVICE, Missoula, Mont.; MOTOR EQUIPMENT CO., Gallup, & Santa Fe, N. Mex.; BEALL PIPE & TANK CORP., Portland, Oregon & Seattle, Wash.; AMERICAN MACHINE WORKS, Spokane, Wash.; HARDIN & COGGINS, Albuquerque, New Mexico.

NEW EQUIPMENT



FOR SALE

AVAILABLE FOR PROMPT DELIVERY HIGH GRADE FIRE HOSE

Present government contracts are ahead of schedule. Immediate production of high grade, rubber-lined fire hose is available to industry. Offer good only as long as Army and Navy demands do not take entire plant capacity for fire hose. Suggest you estimate needs quickly; write, wire or phone Pioneer Rubber Mills, 353 Sacramento Street, San Francisco, 11, California, or your local Pioneer distributor for complete details on grade, price and delivery.

PIONEER RUBBER MILLS
353 Sacramento St., San Francisco, 11, Cal.

Job Tailored **PIONEER**
INDUSTRIAL HOSE

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.

Truck Crane

Manufacturer: Harnischfeger Corporation, Milwaukee, Wisc.

Equipment: Heavy duty truck crane.

Features claimed: The unit includes a carrier built both for crane work and crane transportation. A low center of gravity gives stability in terms of hoisting capacity and boom reach without using outriggers. Boom sway is reduced by a new weave-proof frame of all-welded box section with built-in torsional bar. The unit is built within standard road clearances. Tractive power is by double drive axles mounted in tandem. There are 10 forward speeds and two in reverse. Eight large rear tires provide low-ground pressure. Steering is made easy because of a 21 to 1 ratio. Air lines, tanks and other equipment are protected against damage, yet are fully accessible.

Pile Driver

Manufacturer: Members of Compressed Air Institute.

Equipment: Portable compressed air pile driver.

Features claimed: Powered by compressed air taken from the air line of the normal portable or stationary compressor, the portable pile driver will handle 2-in., 2½-in. or 3-in. wooden sheet piling, or it will also handle round piling by shaping the pile ends to fit the driving head of the machine. Short steel sheet piling is being driven by the air-operated pile driver in many construction operations. The design features of the compressed air pile driver are essentially those of the familiar paving breaker. A suitable driving head is made a part of the machine and the driving is by rapid blows with little vibration. It can be readily moved by hand. The front head, anvil block bearings, cylinder, piston, cylinder cover, throttle lever and bolts are all drop forged from special steels. A device, which "air cushions" the blows, prevents the piston from hitting the front head of the machine. The net weight is about 125 lb. and the overall length 28 in.

Jaw Crusher

Manufacturer: Smith Engineering Works, Milwaukee, Wisc.

Equipment: Jaw crusher.

Features claimed: A new standard cast steel frame and swinging jaw crusher similar to others manufactured by the company but now produced in an 18x32-in. size. It is built with heavy steel castings, eliminating any chance for weaving or cracking with resulting misalignment of bearings and other parts.

Grease Solvent

Manufacturer: Kelite Products, Inc., Los Angeles, Calif.

Equipment: Grease remover.

Features claimed: Known as Kelite Pro-Star, the material is used most successfully in a mixture with kerosene and sprayed on grease covered equipment before steam cleaning. A powerful "wetting-out" agent and a controlled pH which is high enough for effective cleaning action but low enough for easy rinsing are important features. The manufacturer recommends it for use in cleaning oil field equipment, construction machinery and other equipment coated with heavy grease or oil.

Plastic Board

Manufacturer: U. S. Rubber Company, New York City.

Equipment: Plastic resin board.

Features claimed: The board is washable and is not affected by gasoline, oils, acids, most alkalis or alcohol. It can be made highly decorative by changing the color or design of the fabric or paper base. A hard transparent surface of resin assures permanence of any printed or woven design. The material is very light weight, has great tensile strength and ability to withstand strains and vibration. Now used almost entirely in airplane design, its post-war possibilities include wall paneling, flooring, table tops and furnishings.

Plastic Screening

Manufacturer: Dow Chemical Company, Midland, Mich.

Equipment: Plastic window screen.

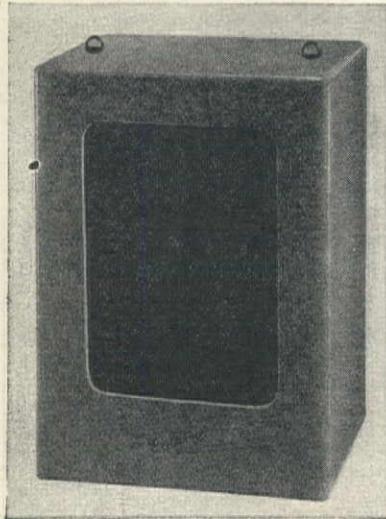
Features claimed: Made from saran, the plastic developed by Dow, these screens have several advantages over metallic types, corrosion resistance being

of particular importance. Installations of the screening at Dow Plants in Los Angeles, Calif., and Freeport, Tex., have demonstrated resistance not only to humidity, salt air and fog, but also to chemical fumes which would cause metallic screens to deteriorate rapidly. Light transmission and visibility are as good as or better than metal screens, and cleaning may be readily accomplished by brushing, steam cleaning or washing with soap and water.

Loudspeaker

Manufacturer: Executone, Inc., New York City.
Equipment: Duo-directional sound reproducer.

Features claimed: Openings both at the front and back provide duo-directional sound transmission. The unit is designed for use in any plant or area where up to medium noise conditions exist and wide angle dis-



tribution of voice and sound is desired. It can be used for morale building and employee interest programs both of music and voice types. Suspension rings are fastened on the top of the unit to facilitate hanging. The openings are covered with a protective mesh faced with harmonizing grill cloth.

LITERATURE...

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, California.

Victor Equipment Company, Welding Equipment Division, San Francisco, Calif.—To further acquaint customers, distributors and stockholders with their products Victor has issued an interesting booklet, "More About Victor." Equipment such as combination welding and cutting units, pressure regulators, cylinder manifolds, types of welding torches (including an underwater cutting torch), and electric welding machines are shown. Action photos of tools in use on wartime jobs furnish added interest to the booklet.

Hercules Powder Company, Wilmington, Del.—In a publication titled "Stabilinol" Hercules introduces its new resin for soil stabilization which bears this same name. Stabilinol, a dry powder for easy mixing with soil, actually makes soil waterproof. The booklet tells what Stabilinol is—what it does—its advantages. Two pages show in pictures the test that demonstrates Stabilinol's efficacy. Three pages of the 8-page booklet tell how to use new soil stabilizer.

Andrew C. Campbell Division, American Chain & Cable Company, Inc., Bridgeport, Conn.—Bulletin DH-870 illustrates the Campbell horizontal wet abrasive cutting machine which may be used for cutting steel, aluminum, copper, glass, plastics and other materials. Facts and figures of the machine are given, and cross sections of materials which have been cut are shown. Other abrasive cutting machines manufactured by the company are briefly described on the last page of the bulletin.

National Association of Manufacturers, New York, N. Y.—The Association announces the release of a "Guide to Postwar Product Development," the third in a series of five reports on post-war subjects. The report reviews the three phases of postwar product

development under the headings of: Creation of a New Product, Acquisition of New Products, and Improvement of Present Products. Also, it gives practical advice on research methods and recommends procedure on product development.

General Electric Company, Schenectady, New York, N. Y.—The fundamentals, various applications and advantages of electronic control are described in a new 12-page illustrated bulletin (GEA-4126). It explains in clear, simplified language the basic principles of electronic tubes and their operation; describes the construction of the thyratron tube; and lists the function of eight of the more widely used industrial-type tubes.

Inertol Company, Inc., San Francisco, Calif.—A convenient Index of Inertol Uses has been compiled which outlines some of the company's recommendations for protecting plant and equipment with Inertol protective coatings.

American Council of Commercial Laboratories, New York, N. Y.—A "Directory of the American Council of Commercial Laboratories" is now available. It is described as a guide to the leading independent, testing, research and inspection laboratories of America. Contents include services and specialties of member laboratories; a classification of analytical,

inspection, and testing services; and a geographical distribution of membership.

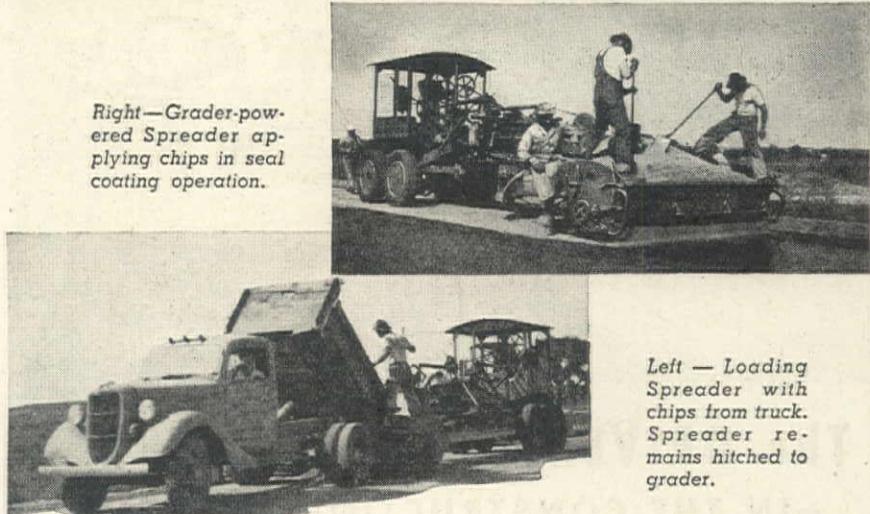
West Coast Lumbermen's Association, Seattle, Wash.—In a new booklet titled "Trees and Schools" the Association demonstrates through interesting pictures and description the transition in school design which has taken place on the West Coast in recent years. As an example the booklet cites the newly completed Blue River School at Vida, Oregon, which is designed throughout in wood. This school illustrates the two basic changes effected in the transition: (1) wood construction to provide security against earthquakes; (2) ground level classrooms bordering open grounds to assure safety for students in emergencies demanding rapid exits.

Sullivan Machinery Company, Michigan City, Ind.—A new 56-page two-color bulletin (A-52) is offered by the company, describing their line of heavy-duty, two-stage, air-cooled compressors for industrial plants, mines and heavy contracting. The amply illustrated bulletin shows installation; gives full description of available sizes, types and drives and of construction detail; and also information as to foundation requirements, regulation, accessories and servicing.

John A. Roebling's Sons Company, Trenton, N. J.—The new Roebling Wire Rope Sling Catalog de-

Power Graders drive BUCKEYE SPREADERS in Colorado!

Right—Grader-powered Spreader applying chips in seal coating operation.



Left—Loading Spreader with chips from truck. Spreader remains hitched to grader.

THE versatility of Buckeye Spreaders is shown again by the ingenious spreading method devised by the Colorado State Highway Department. Spreaders are hitched to power graders and need not be unhitched during the entire spreading operation. When the spreader has emptied, the grader backs up enough to permit a truck to back in over previously laid chips instead of over freshly applied oil, to reload the box. Delay and truck time are minimized.

Buckeye Spreaders, according to signed reports from users, are capable of spreading chips, sand, stone, etc., to accuracies as high as 98 to 99%. Boxes available in 9, 10, 11, and 12 foot widths. Complete data and specifications in *Bulletin available on request*. **BUCKEYE TRACTION DITCHER COMPANY**, Findlay, Ohio, *Earth Moving and Road Building Machinery for Over 50 Years!*

See your Buckeye Spreader dealer.

WASHINGTON—Spokane: F. M. Viles Company, 1007 West Second Avenue; **Seattle:** Lomen Commercial Company, 327 Colman Building; **A. H. Cox & Company, Inc.**, 1757 First Avenue, South. **OREGON—Portland:** Loggers and Contractors Machinery Co., 240 Southeast Clay Street. **CALIFORNIA—Los Angeles:** LeRoi-Rix Company, 3817 Santa Fe Avenue; **Emeryville:** Industrial Equipment Company, 1301 - 59th Street; **San Francisco:** Jenison Machinery Company, 20th and Tennessee Streets; **Oakland:** Buran Equipment Co., 777 - 100th Avenue.

Power Finegraders
Tractor Equipment
Trenchers

Buckeye

Convertible Shovels
Road Wideners
Spreaders

votes 72 pages to the showing of various types of slings made by the company. It gives data on wire rope and grommet slings for both standard and special uses, and also the company's new "Flat-weave" Sling. In addition to recommended safe loads and size ranges, the book is profusely illustrated with application pictures of slings in actual service; and a section is devoted to the various types of wire rope fittings which are used in connection with slings.

Twin Disc Clutch Company—Hydraulic Division, Rockford, Ill.—Facts concerning the function, operation and installation of "Hydraulic Torque Converters" are concisely presented in a 16-page booklet so entitled and just published by the company. Several models of the converter are described in detail, and sufficient installation data is included to make this booklet a valuable aid in the planning of initial layouts and in drawing up preliminary specifications for equipment on which torque converters are to be used.

R. G. LeTourneau Inc., Peoria, Ill.—A completely detailed brochure on the Model D Tournapull, designed to meet the Armed Forces' demand for a prime mover small enough to stow in a transport plane, but equally useful to civilian construction, has been released. Carrying a specifications list and much other D Tournapull data, the pamphlet explains that the job-proved "D" has a 2.3 cubic yard heaped Carryall Scraper capacity and is easily interchanged to truck or crane work. It has travel speeds up to 16.1 miles per hour. One-man operated, the "D" can also be equipped with a 6-ft. 8-in. Tiltodozer, husky Rooter tooth and other appliances.

Committee For Economic Development—Concrete steps which may be taken by industrial employers in planning for high postwar levels of production and employment are set forth in great detail in a handbook, "Planning The Future Of Your Business", prepared for the C. E. D. by a special committee of Consulting Management Engineers. The handbook divides its discussion of suc-

cessful postwar planning into six steps: (1) Define and place responsibility; (2) plan your product program; (3) plan your market and sales program; (4) plan required manufacturing facilities; (5) estimate your employment requirements, and (6) estimate needed funds, plan sources.

The B. F. Goodrich Company, Akron, Ohio—"How To Prevent Truck Tire Failures" is an extremely informative booklet on truck tire care, and is particularly timely now because of the critical shortages in this field. The old motto, "An ounce of prevention is worth a pound of cure," is the underlying theme of the booklet, which lists the eight most common causes of premature truck tire failures and points out how these can be prevented by paying attention to some simple rules. The booklet is written in language the hauler will understand, has clear illustrations showing the common causes of tire failure.

Chemical Division of The B. F. Goodrich Co., Akron, Ohio—Description of the unique group of polyvinyl resins and plastics which it has recently developed and offered for distribution to industrial users under the trade name "Geon" is contained in an attractive four-page folder just issued by Goodrich. One page is devoted to an outline of the characteristics of the four Geon resins with a properties table for each. Another page describes Geon plastics and their range of characteristics. And one page is devoted to a partial list of the Geon resins and plastics applications, including electrical service, extruded products, gaskets and packing, as protective coatings, for coated fabrics and papers and calendered and cast sheets and films.

The Hayward Company, New York, N. Y.—A small two-color booklet has just been issued with the object of giving a condensed index of all types of Hayward digging and rehandling orange peel and clam shell grab buckets. A return mailing card is attached to the booklet, and by filling in and mailing this card to the company, your files may be kept up-to-date on new designs and materials entering into the construction of Hayward grab buckets.

Chain Belt Company, Milwaukee, Wisc.—Bulletin No. 441, "Wartime Care and Maintenance of Rex MoToMixers," is a compact booklet of general cleaning and operating suggestions for the users of truck mixers. It contains a lubrication chart and many other helpful hints in convenient pocket-size form. The thought behind this booklet is chiefly assistance in maintaining present equipment at highest efficiency under wartime difficulties, but this guide would be useful at any time.

The Galion Iron Works & Manufacturing Co., Galion, Ohio—Catalog 275 shows two Galion high capacity motor graders in action and furnishes descriptions and complete specifications on each. Both graders may be had with either gasoline or diesel power. Specifications for the two types of engines are also given in the catalog. In addition, information and pictures demonstrate the tandem drive and accessory equipment.

Keystone Asphalt Products Co., Chicago, Illinois—A new leaflet describes the Keystone asphalt mastic board dummy joints for highway and airport paving; they may be used longitudinally and transversally. The dummy joint strip can be easily installed by one man and gives a true alignment for the joint. A special installing channel is illustrated in the leaflet.

The Baldwin Locomotive Works, Philadelphia, Pa.—The company announces the first issue of a new publication called "Baldwin," which replaces two former publications. Subjects discussed include the turbines used by T.V.A., Victory ships manufactured by Baldwin, a new food press, and the 70,000th locomotive manufactured by the company. Two pages are devoted to products of the Pelton Water Wheel Company, a subsidiary of Baldwin.

Diamond Iron Works, Inc., Minneapolis, Minn.—A booklet entitled "Products of Diamond Iron Works, Inc." presents various products manufactured by that company and its subsidiary, the Mahr Manufacturing Co. These products include transmission machinery, sawmill and grain elevator machinery, rock crushers, screens and conveyors, street and highway equipment, furnaces, ovens, burners and miscellaneous items. Each product is described briefly and one illustration is shown.

Ideal Commutator Dresser Co., Sycamore, Ill.—Machine tool accessories manufactured by the company are introduced in a new illustrated leaflet, Form MTC-943. List of accessories include magnetic chuck, live centers, "Etcher-Demagnetizer," metal etcher, electric tachometer, grinding wheel dresser, variable speed transmission, and electric cleaners. Method of operation and description of items are given.

American Manganese Steel Division of American Brake Shoe Company, Chicago Heights, Ill.—Bulletin 244-P is concerned with the application of manganese steel to oil field operations. The question, "What Is Manganese Steel?" is dealt with in a helpful questions-and-answers page. Two other pages give the properties of the alloy. Sprocket wheels, bushings, sheaves and pumps, particularly applicable to well drilling, are pictured and explained.

Littleford Bros., Inc., Cincinnati, Ohio—Bulletin W-442 describes and pictures Littleford road equipment, including such items as light rollers, oil spray attachments, spray tanks, and heating kettles. Specifications are not given, but various airport and highway uses are illustrated.



The DRIVERS' FAVORITE TRUCK —IN THE CONSTRUCTION INDUSTRY

The driver of a Marmon-Herrington *All-Wheel-Drive* Ford has a feeling of power and invincibility which he cannot experience with any conventional drive truck, regardless of its size and horse power. For general construction work, road building and road maintenance, these economical, fast and unusually maneuverable trucks have no equal. For snow-removal and for operation in loose dirt, mud, and on slippery surfaces they are unexcelled. Buy War Savings Bonds now, and plan to invest in Marmon-Herrington *All-Wheel-Drive* converted Fords when the war ends.

MARMON-HERRINGTON CO., INC., INDIANAPOLIS 7, INDIANA

MARMON-HERRINGTON *All-Wheel-Drive* TRUCKS

Western Distributors: Truck Parts & Equipment, Ltd., 1095 Homer St., Vancouver, B. C.; Western Road Machinery Co., 2815 N. E. 18th Ave., Portland, Ore.; Western Traction Co., 450 Bay Shore Blvd., San Francisco; The Crook Co., 2900 Santa Fe Ave., Los Angeles; The O. S. Staley Co., 723 Grand Ave., Phoenix; Smoot Machinery Co., 2320 Neff's Lane, Salt Lake City; The Sawtooth Co., 715 Grove St., Boise; Midland Implement Co., 2303 Montana Ave., Billings; Natrona Motor Co., 125 N. Center St., Casper; Dean Gillespie & Co., 601 E. 18th Ave., Denver; Morrow & Co., 1022 North Fourth St., Albuquerque; Richardson Locomotive, Inc., 35 East Fourth St., Reno.

— FOR SALE —

12-1942 Model SUPER C TOURNA-PULLS
2-E-2 BUCYRUS-ERIE 1½ Yd. Drag-lines
35-1942 CHEVROLET 1½ Ton Dump Trucks
1-1943 JAEGER - LAKEWOOD 25 Ft. Concrete Spreader
Also
POWER UNITS, GRADERS, CONCRETE EQUIPMENT, ETC.

WESTERN EQUIPMENT CO.

Box 1456, Phone 366,
BOISE, IDAHO

For Sale: Lincoln Shield-Arc Welder

Type SAE 200-J. Powered by Hercules 1XA 4-Cylinder Gas Engine.

H. S. TITTLE COMPANY
85 Columbia Square San Francisco
Telephone HEmlock 2865

FOR SALE—Diesel Engine, 100 HP, 2 cylinder F. M. vertical direct connect to 3 phase 440 volt generator. Has been through fire but is in excellent condition except minor repairs and generator rewind. Box 911 Western Construction News, 503 Market Street, San Francisco 5, California.

OPPORTUNITY SECTION

EQUIPMENT FOR SALE

2-600 cu. ft. Sullivan Air Compressors.
1-800 cu. ft. Sullivan Air Compressor.
1-1100 cu. ft. Sullivan Air Compressor.
2-5 ton 36" gauge Mancha Battery Locomotives.
2-8 ton 36" gauge Plymouth Gasoline Locomotives.
9-2 yard 24" gauge Mine Cars.
200 Lin. ft. Blaw-Knox tunnel forms—16 ft. horse shoe.
3-Trench Machines—Austin & Buckeye.
1-Cedar Rapids Crushing & Screening Plant.
1-Vulcan No. 1 Steam Pile Driver.
1-2 drum Clyde Hoist driven by 30 HP. Waukesha.
2-2 drum Thomas Hoists.
1-Set 16" x 36" Colorado Iron Works Crushing Rolls.
1-2 cu. yd. Amsco Shovel Bucket.
2-1½ cu. yd. Amsco Shovel Buckets—Rock Type.
1-4 yd. Esco Dragline Bucket.
1-4 yd. Saureman Crescent Drag Scraper Bucket.
1-2 yd. Saureman Crescent Drag Scraper Bucket.
1-1 cu. yd. Ransome Concrete Mixer.
1-25 cu. yd. Steel Bin with 4 legs & 2 gates.
Pumps—Electric Motors, 10 to 250 HP.—
Various Transformers—Concrete Vibrators
—Air Drills and other Tools.

BRODERICK & GORDON
1900 - 31st Street Denver 5, Colorado

TRENCHING MACHINES

For Sale or Rent

ALL SIZES

Air Compressor Rental Co.
2324 E. 105th ST., CLEVELAND, OHIO



**EQUIPMENT,
RAILROADS,
PLANTS OF ALL
KINDS,**

**BOUGHT — SOLD AND
LIQUIDATED**

**Good Used
CONSTRUCTION AND
MAINTENANCE EQUIPMENT
FOR SALE**

**— Any Quantity —
RELAYING RAIL &
ACCESSORIES
BOUGHT - SOLD**

**DULIEN STEEL PRODUCTS, INC.
OF WASHINGTON**

Seattle 4, Wash. Portland 4, Oregon

CONSTRUCTION PLANT AND EQUIPMENT FROM SHASTA DAM, CALIF.

Available For Sale

Immediate Delivery

Listed below are a few of the items of plant and equipment used in the construction of this dam. Most of the equipment purchased new for this project. All items available for immediate shipment, F.O.B. Shasta Dam, California, subject to prior sale.

AIR COMPRESSORS

1-Sullivan Model WN4, size 22-13 x 14 twin angle compound. Complete with all regular equipment, after cooler, syn. motor 500 hp. direct connected, motor generator set, auto starter panel, air receiver.
1-Sullivan Model WN31 with G.E. synch. motor, 250 hp. auto starting panel, after cooler, air receiver.
1-C-200 Fuller single stage rotary compressor, Westinghouse motor 100 hp.

CABLEWAYS

1-Lidgerwood, 3-drum electric hoist, 500 hp. complete with controls, panels, resistors, etc.
1-Cableway tower, 75 ft. with travel mech.
1-1790 ft. pc. locked coil 3 in. cable, new. Also carriages, sheaves, buttons, slack carriers and operating ropes.

CEMENT SILOS

5-6000 bbl. storage units complete with rotary cement feeders, feeding from 80 to 200 bbls. per hr.

The above listed items are but a few of the items of good construction equipment on this Project. Several hundred items of plant and equipment including shops, compressors, cableways, trucks, shovels, pumps, camp houses and dormitories, mess-hall, hospital, electrical distribution system and many other units will be available in the next six months.

BELT CONVEYORS

7-Flights 36 in. conveyors 246 ft. to 1135 ft. ctrs. complete with belting, troughing and return rolls, drive, tail, snub, gravity take-up pulleys; Dodge Timken pillow blocks Westinghouse gearmotors 50 to 150 hp.
5-New Westinghouse gear units, 10, 50, 75, 100, 150 hp. Speeds vary from 70 to 234 r.p.m.

DRILLING EQUIPMENT

10—I-R drifters DA35.
5—I-R Wagondrills—pneu. tires, hoists, X71 drifters mounted.
1—I-R-54 Drill Sharpener.
10—I-R Jackhammers.

PUMPS

2-Byron-Jackson 400 hp. 12 in. deepwell.
3-Bingham type SVD submersible pumps.
1-Bingham 100 hp. 18 in. deepwell.
1-Byron-Jackson 150 hp. 10 in. deepwell.
Other pumps complete with motors from 1½ hp. to 200 hp., also several I-R #25 sump pumps.

MIXING PLANTS

1-3000 cy. bin with 5 compartments for aggregates, 2 compartments cement, incl. turnhead, gates.

1-Complete set C. S. Johnson fully automatic batching equipment for 5 aggregates, cement and water for 4 cy. batchers.

3-4 cy. Koehring Concentric zone mixers, incl. batchmeters, timers, consistency meters.

MISCELLANEOUS

Pipe—used, 3, 4, 6, 8, 10, 12, 16 inch.
Valves—1, 2, 3, 4, 6, 8, 10, 12, 16 inch.
10,000 ft. Type S rubber covered cord cable.
Pole line hardware.
Floodlights—500 to 1500 w.
Structural Steel—all shapes and sizes—girders 48 and 72 inch—28 to 50 ft.

PACIFIC CONSTRUCTORS, INC.

GENERAL CONTRACTORS — SHASTA DAM, CALIFORNIA

PHONE 512 REDDING

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