

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED

WESTERN HIGHWAYS BUILDER

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IN THIS ISSUE

Second Step of Ross Dam

Will Increase Seattle Power

Santa Fe Topock Bridge

Uses Deep Caisson Piers

California Access Roads

Open Mineral-Timber Resources

Colorado Railroad Tunnel

Opens Second Tennessee Pass Route

Skagit Bay Tidegate

Repaired to Save Farm Crops

Arizona Irrigation Limited

By Colorado River Hydrology

Pan-American Highway

Contracts Under Investigation

DECK TRUSS RAILROAD bridge recently completed by the Santa Fe Railway across the Colorado River at Topock, Arizona. Looking through the sway bracing extending between main trusses, which are 28 ft. center to center and 46 ft. deep.





ROCK drills and other air-driven construction machinery can operate dependably only when air supply from the compressor is full and continuous. This necessitates keeping air lines clear and compressors operating at maximum efficiency.

To assure the effective compressor lubrication essential to trouble-free performance, *Texaco Alcaid, Algol or Ursa Oils* are used by contractors all over the world.

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continuous air supply. And these benefits, in turn, mean assurance of maximum service life between overhauls, fewer repairs and replacements . . . *better performance at lower cost!*

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Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

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DRIVING the New Bozeman Pass Tunnel for the Northern Pacific was a Real Rock job and the Union Construction Co. of Great Falls, Montana, had real Rock Shovels to handle it with. Starting with two Northwest Rock Shovels in January the 300,000 Cu. Yds. of the approaches were out of the way before the middle of May.

Northwest brings you advantages that assure you better output in rock. Such features as the Dual Independent Crowd and the Northwest Welder Boom (and remember no Northwest Welded Shovel Boom has ever failed) warrant your investigation. Plan on Northwest Rock Shovel Performance on your future contracts—and you'll never have to worry about output on other classes of digging. We'll be glad to supply any desired information.

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you won't have
to worry about
output in dirt*

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Dependable day-in and day-out performance has made Euclids the favorite off-the-highway hauling equipment for the toughest mining and construction jobs. Simple, rugged construction combined with large capacity and ample power and speed results in lower hauling costs for any material and any length of haul.

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Your Euclid distributor or representative is at your service to provide detailed information on the Euclid models best suited to your hauling needs.

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WESTERN CONSTRUCTION NEWS — August, 1945

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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There are hundreds of licensees

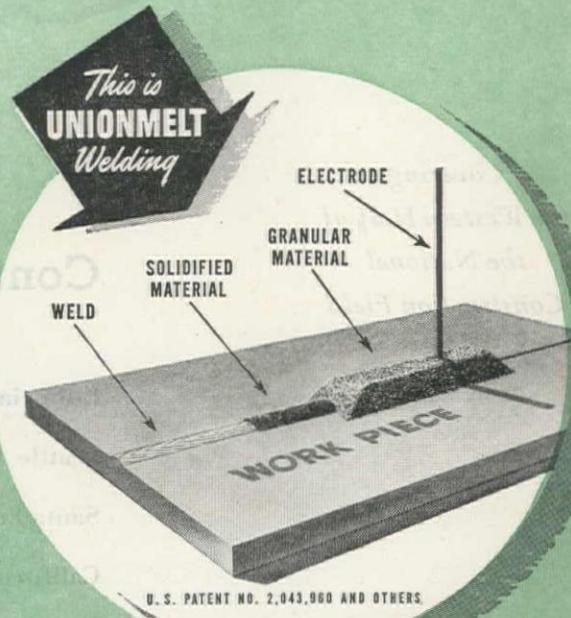
AMONG WHOM ARE:

- Automobile Manufacturers
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- Aircraft Manufacturers
- Shipbuilders and Ship Repairers
- Railroad Equipment Builders
- Chain Manufacturers
- Manufacturers of Pressure Vessels
- Manufacturers of Pipe and Tubes
- Structural Steel Fabricators
- Machinery Manufacturers
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... and successful producers of other things as widely varied as airplane propellers, tanks, gun mounts, blowers, chemical plant equipment, conveyor screws, and sheet metal parts.

UNIONMELT welding is electric welding done as diagrammed above. It makes top quality welds at speeds that are greater than with any other similarly applicable process.

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*A process of welding electrically
beneath a mineral melt*



For additional information send for "Report No. 6 on the Use of Linde Methods in Mass Production" or ask a Linde representative to help you determine where you can use the UNIONMELT process advantageously.



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Excavating to help build a way of life . . . excavating to help destroy an enemy . . . the purpose and the operating environment are different — but the basic operations are the same. A road, for example, whether it carries the products of peacetime or the ordnance for offensives, is still a road. The same amount of dirt must be moved to build it!

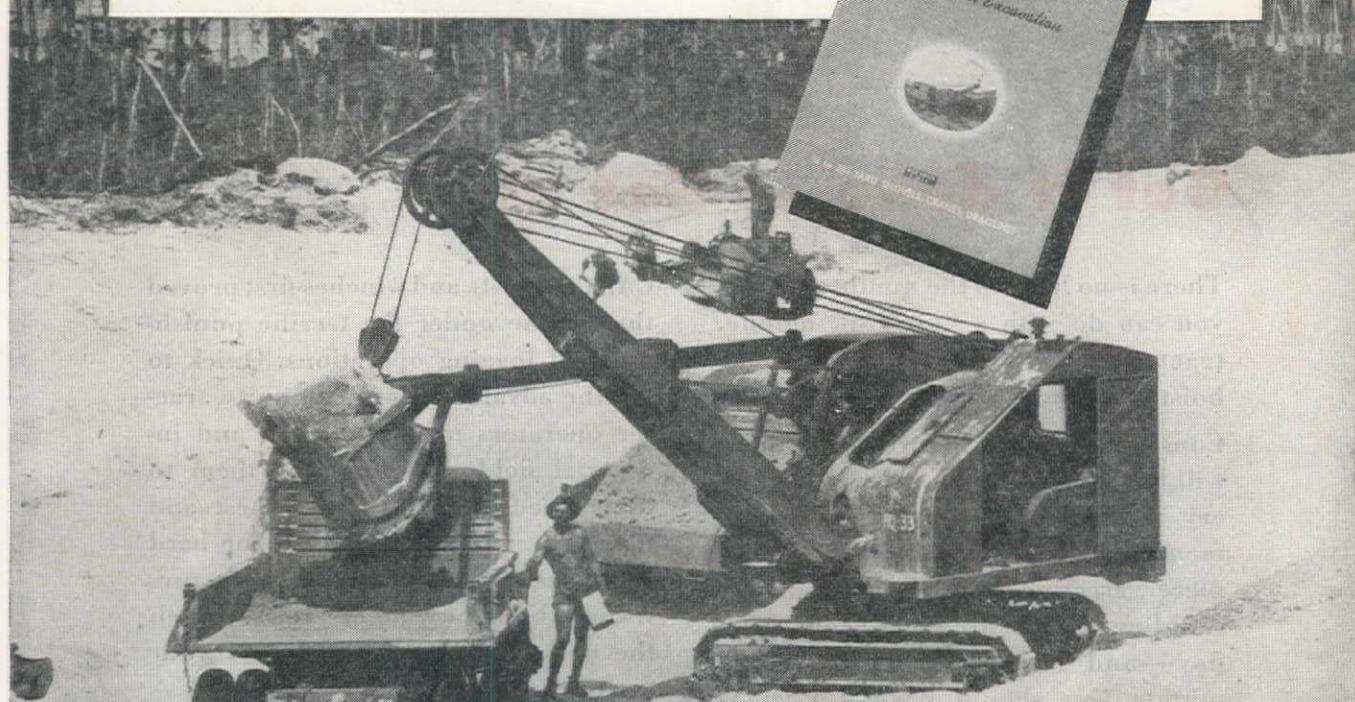
This new free 36-page booklet gives you the dramatic picture story of excavating in war and peace. It shows you, too, why the more than

3000 fighting Bucyrus-Erie excavators, as their peacetime counterparts have done yesterday and will do tomorrow, perform with an efficiency that makes them truly fundamental tools for progress.

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Get it done -- Get out

There is no limit to the number of jobs you can do with a powerful, mobile, tractor-mounted CARCO winch or hoist.

Consider the work before you—there will be materials to be moved, machinery or products to be loaded, equipment and supplies to be hoisted into place, erection, demolition, pulling, skidding. Something different each day—and right on the job every minute you should have a CARCO hoist mounted on your tractor, speeding from one task to another, eliminating delay, making money for you.

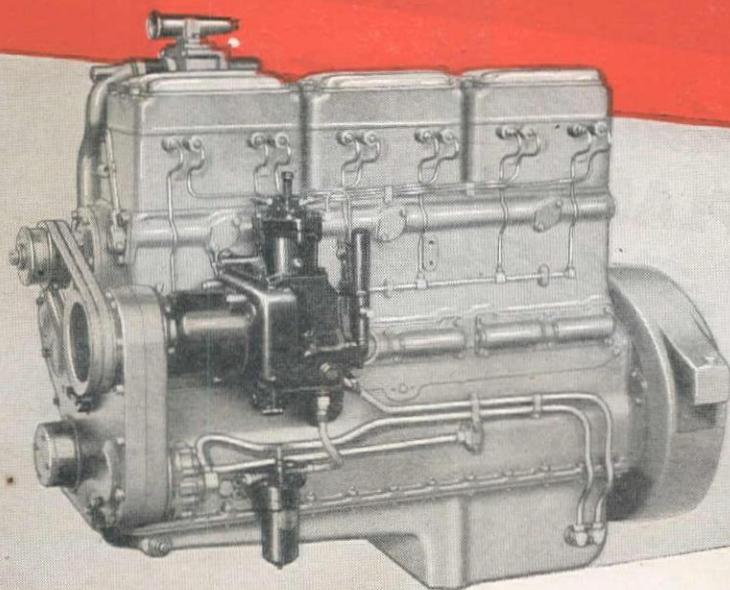
CARCO hoists and winches first proved their value under the terrific punishment of logging operations. Quick to see the advantages of such units, tractor operators in construction and industrial fields have adapted them to their needs. Built of the finest and toughest materials, designed for hard work, heavy loads and constant use, CARCO hoists are engineered to match the power and performance of your tractor.

See your tractor dealer today—he has complete specifications on the extensive CARCO line.

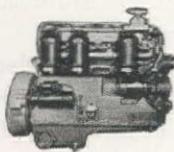
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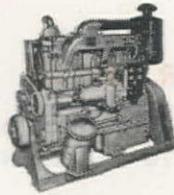
CARCO



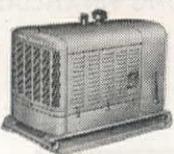
The **PROVED** producer of low-cost yardage



Model HB-600: Automotive engine, 6 cylinders, $4\frac{7}{8}$ " x 6", 150 hp. at 1800 rpm. (maximum).



Model NHI-600: Power unit, 6 cylinders, $5\frac{1}{8}$ " x 6", 200 hp. at 2100 rpm. (maximum).

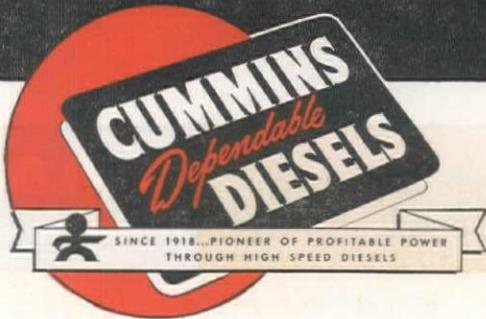


Model NHPS-600: Supercharged power unit, 6 cylinders, $5\frac{1}{8}$ " x 6", 275 hp. at 2100 rpm. (maximum).

The line of Cummins Dependable Diesels includes automotive, portable, stationary and marine models—50 to 275 hp.

In choosing the power for your new earth-moving and material handling equipment, make sure that you get a proved producer of low-cost yardage. That Cummins Diesel power is such a producer—a producer of faster, cheaper yardage—has been demonstrated by its 12-year performance record in trucks, shovels, draglines, dredges, compressors, rock-crushers and virtually every other type of portable or stationary application. As a result, Cummins Dependable Diesels are now standard with successful contractors and aggregates producers everywhere . . . are offered as standard or optional power by leading construction equipment manufacturers.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana



A plain statement of **LA PLANT-CHOATE'S** *Sales Policy*



For over 22 years, thousands of successful operators in all parts of the world have been accustomed to buying LaPlant-Choate equipment for use exclusively with "Caterpillar" tractors. As a result of this arrangement and LaPlant-Choate's leadership in pioneering new developments, this company has now become one of the world's largest manufacturers of tractor equipment.

Since 1941 alone, LPC has delivered over 30,000 earthmoving machines of all types (spare parts excepted)—including almost half of all the hydraulic and cable operated dozers produced by the entire industry for military and civilian use.

While there have been all sorts of confusing rumors, it can now be announced that job-proved LaPlant-Choate scrapers, hydraulic dozers, rippers and land clearing tools will continue to be available with "Caterpillar" tractors for many months to come. In addition, as soon as conditions permit, LPC will offer a complete new line of improved cable dozers, scrapers and hydraulic power units for use with certain other track-type and high speed rubber tired tractors.

LaPlant-Choate has always believed that the job of designing and building dependable tractor equipment is a special business in itself, requiring "undivided interest" and years of specialized "know-how". Consequently, it is LPC's firm intention to go forward as an independent organization with one basic objective—to continue building the best tractor equipment on the market at the lowest possible cost to the user. Isn't that exactly what you want when you buy tractor equipment? LaPlant-Choate Manufacturing Co. Inc., Cedar Rapids, Iowa, San Leandro, California.

SIX REASONS WHY LPC IS YOUR BEST BET . . .

JOB-PROVED PERFORMANCE

WORLD-WIDE USER ACCEPTANCE

**34 YEARS OF ENGINEERING AND
MANUFACTURING "KNOW-HOW"**

**ENTIRE ORGANIZATION STRICTLY
"TRACTOR-EQUIPMENT-MINDED"**

LATEST MODERN PRODUCTION FACILITIES

STRONG FINANCIAL POSITION



LA PLANT
EARTHMOVING AND LAND



CHOATE
CLEARING EQUIPMENT





Why
**Construction Methods Demand
ISAACSON KABLE TRAC-DOZERS**

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

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

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



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

See your dealer or write for full details.

ISAACSON
Tractor Equipment
A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE



HENDRIX

Lightweight

DRAGLINE BUCKETS

TYPES

LS . . . A lighter weight bucket designed for levee and drainage work.

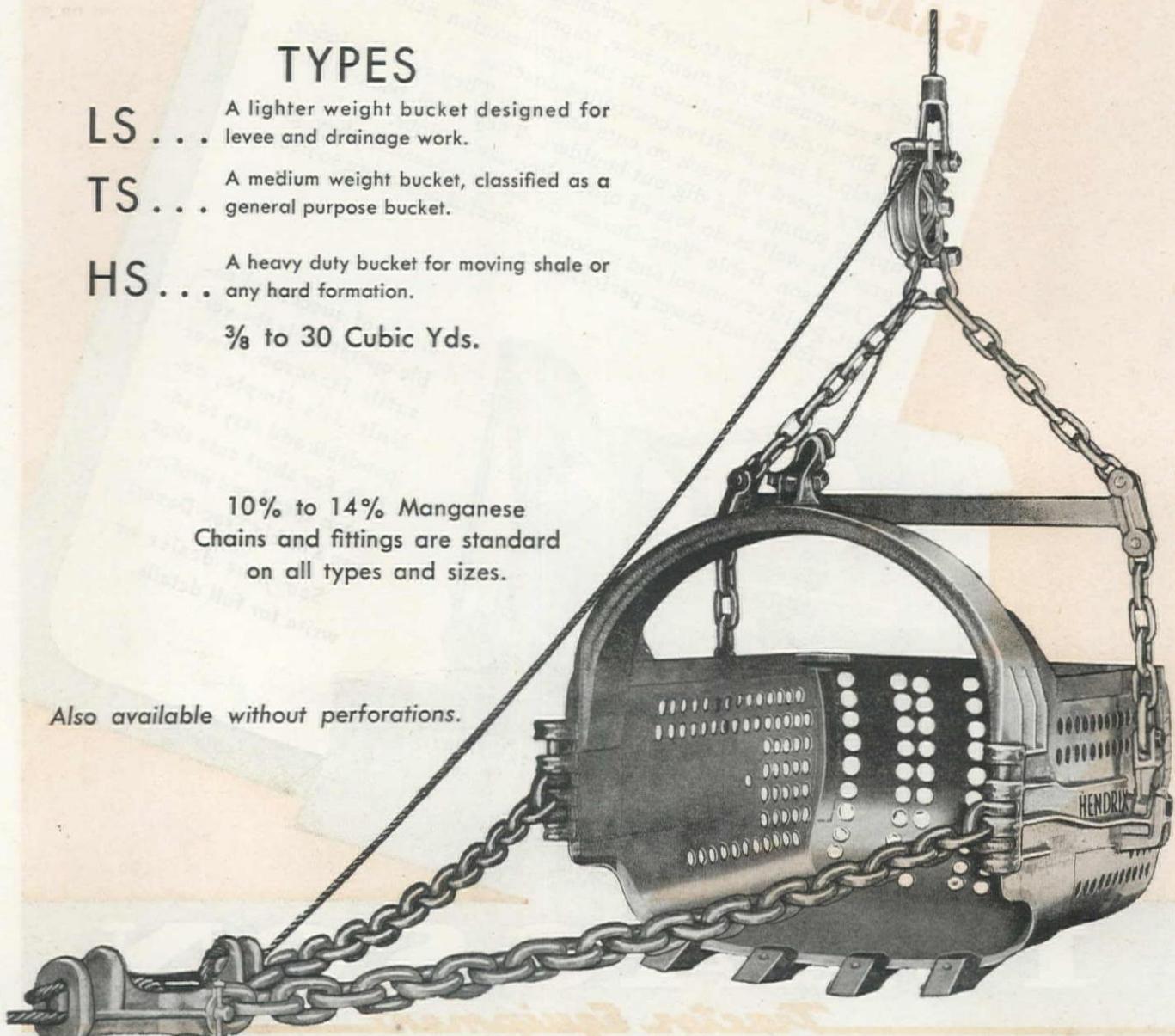
TS . . . A medium weight bucket, classified as a general purpose bucket.

HS . . . A heavy duty bucket for moving shale or any hard formation.

$\frac{3}{8}$ to 30 Cubic Yds.

10% to 14% Manganese
Chains and fittings are standard
on all types and sizes.

Also available without perforations.



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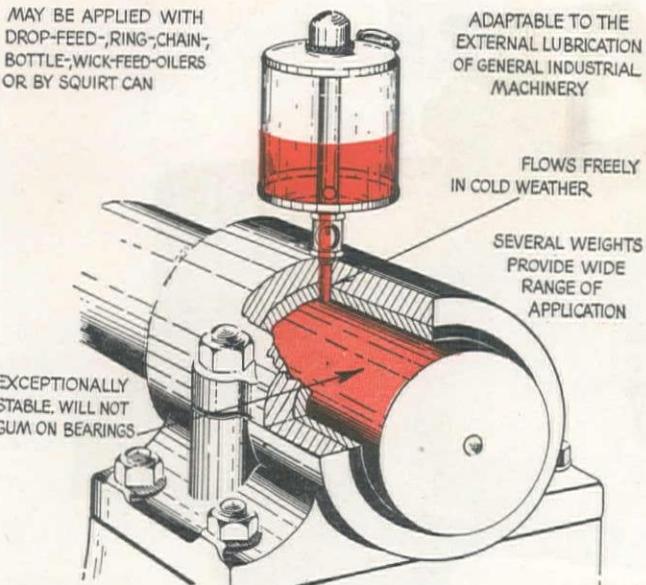


STANDARD ENGINEERS NOTEBOOK

VOL. 2-W No. 8

Stable, all-purpose oils stop wear on external bearings

MAY BE APPLIED WITH
DROP-FEED-RING-CHAIN;
BOTTLE-WICK-FEED-OILERS
OR BY SQUIRT CAN



Because they are carefully refined for stability, Calol Red Engine Oils are always the same and may be depended upon to give constant, uniform protection to external bearings on all general industrial machinery. With a comparatively low carbon residue and low pour test, they have a wide range of application in all atmospheric temperatures.

They are made in five viscosity grades:

Calol Red Engine Oil—11. An all-purpose grade which can be filtered for re-use. It is used on engine bearings, machinery and shafting.

Calol Red Engine Oil—15. Heavier than Number 11 and used for the same general purposes.

Calol Red Engine Oil—18. Used on slow-speed bearings, air cylinders of blowing engines.

Calol Red Engine Oil—20. A heavy grade for heavy-duty machinery bearings.

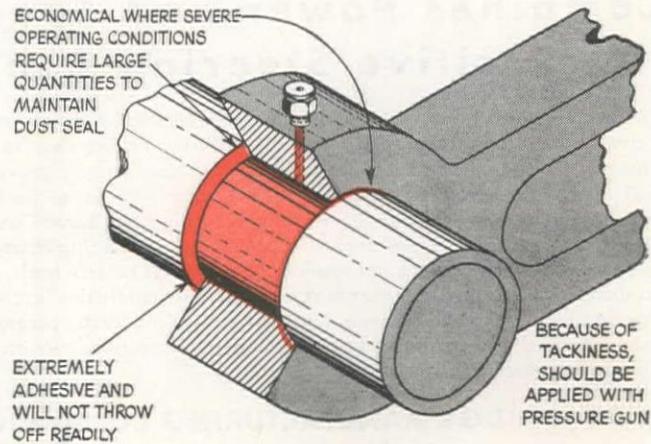
Calol Red Engine Oil—25. The heaviest grade, used for the same purposes as Number 20.

Tacky greases seal out dust and water

Where rough, grease-lubricated bearings must operate in severe conditions, Calol Multi-Service Greases are recommended. Black in color, these special base greases are blended into a heavy, rugged oil. The lubricant film they provide stands up under the heaviest shock loads. Because they are extremely adhesive, Calol Multi-Service Greases resist high centrifugal action. They are economical and maintain a seal against water and dirt.

There are seven grades of Calol Multi-Service Grease: Numbers 0 and 1, the softest, are non-fluid at ordinary temperatures. Number 0 is particularly adapted for use in cold weather. Numbers 2 and 3 are slightly heavier in consistency and higher in melting point. Numbers 4, 5 and 6 are very stiff.

In the proper grades, Calol Multi-Service Greases are used on small enclosed gears, on ball and roller mine car wheels, heavy-duty chassis, rough machinery bearings and low-speed journal bearings.



MAINTAINS RICH OIL FILM THAT RESISTS DISPLACEMENT BY SHOCK LOADS

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help — make your maintenance job easier. Call your Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California.

STANDARD OF CALIFORNIA

High Speed EARTHMOVING

ON L-O-N-G AND SHORTER HAULS



Combines Power and Speed With Positive Steering Control

Powered by a heavy duty diesel with four speeds forward and a reverse gear, Wooldridge Terra-Cobras attain travel speeds up to 21 M.P.H. on either short or long stretches. Surplus rim pull permits fast acceleration in a short distance and provides ample power to pull up comparatively steep slopes—fully loaded without a "pusher." Regardless of whether it is loading, travelling, spreading or turning, the Terra-Cobra maintains a fixed direction of travel due to positive two-wheel hydraulic steering control. Full traction and power is constantly applied and maintained on BOTH drive wheels, at all times . . . even on sharp turns. As no fatiguing effort is required to handle the Terra-Cobra, full production and higher average yardages can be expected from each operator on every shift. To combine speed with safety on your earthmoving operations rely on Wooldridge Terra-Cobras. Investigate fully, today.

WOOLDRIDGE MANUFACTURING CO. SUNNYVALE, CALIFORNIA

WOOLDRIDGE

TERRA COBRA

SELF-PROPELLED EARTHMOVERS

No Danger of "JACKNIFING"

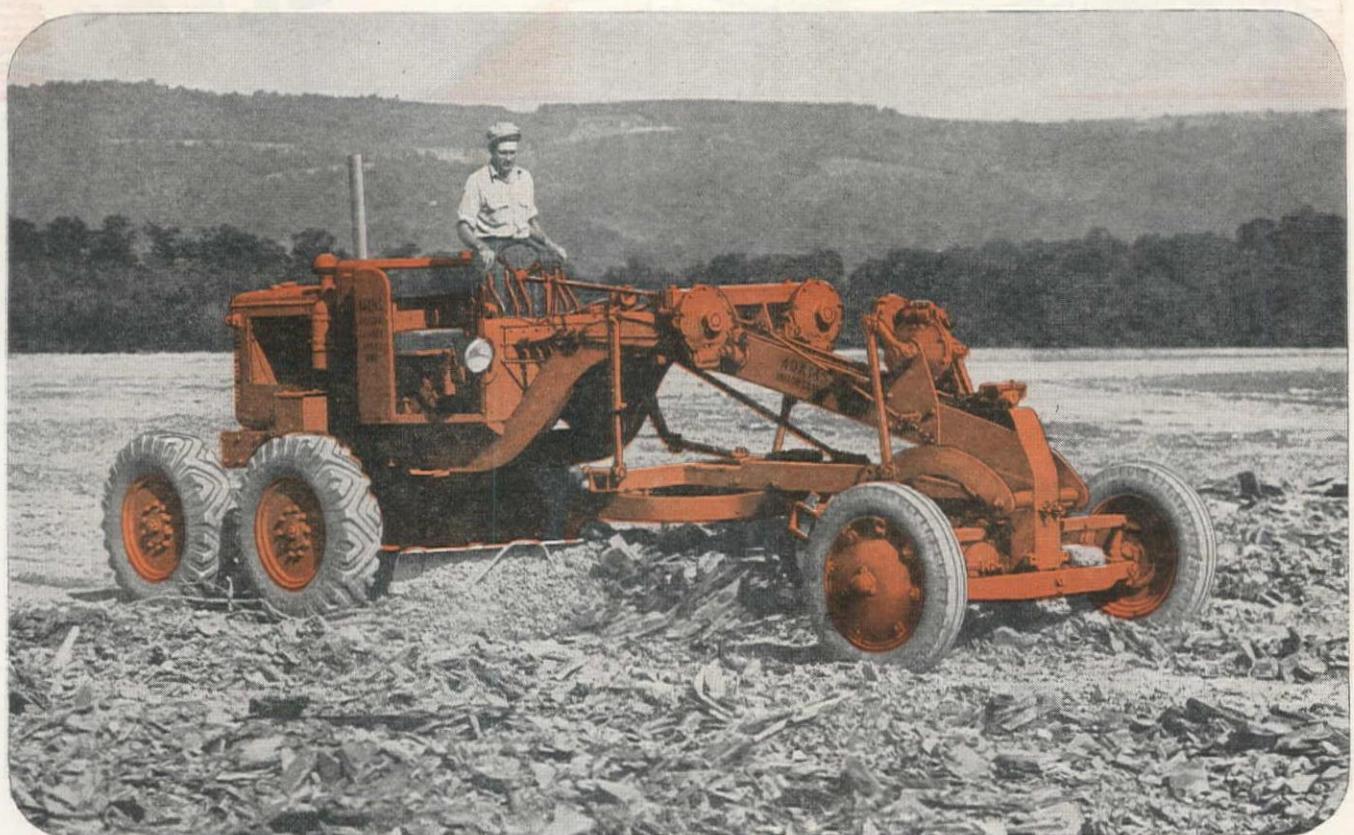
It is unnecessary to slacken speed when traveling, spreading or turning in order to maintain safe control of a Terra-Cobra, as there are no steering clutches to fight nor individual brakes to grab. Positive two wheel steering eliminates any possibility of "jacknifing."

WRITE TODAY

For your copy of new Bulletin giving full details on Wooldridge Terra-Cobras. Ask for Bulletin TA-425.



Easily Operated in the Roughest Going!



Yes, Adams Motor Graders are engineered for fast, easy operation—even in the roughest kind of going. Here are just a few salient features:

- **Efficient Push-Button Starting Arrangement:** Starts heavy-duty Diesel engine quickly, easily—regardless of weather or temperature—right from the cab.
- **Big, Comfortable Cab:** Wide, adjustable seat—Plenty of room for stand-up or sit-down opera-

tion—All operating controls within easy reach.

- **Positive Mechanical Steering System:** Mounted throughout on anti-friction bearings—Provides easy steering with *safe control* under all conditions—at all speeds.

Ease of operation is just one more reason why rugged, multiple-duty Adams Motor Graders are the wise choice for high-speed efficiency and economy. Ask your local Adams dealer for convincing proof.

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INDIANAPOLIS, INDIANA

Sales and Service Throughout the World



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ROAD-BUILDING AND
EARTH-MOVING EQUIPMENT

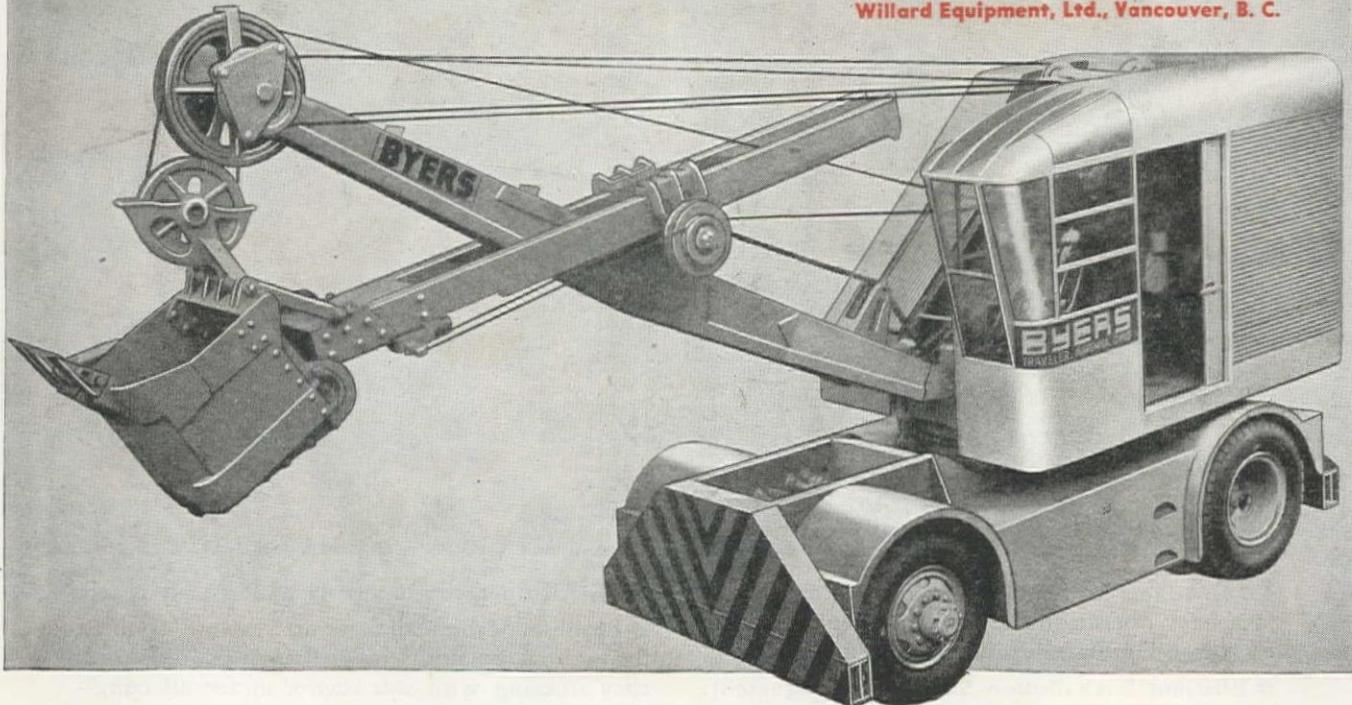


HERE'S HOW
YOUR NEW 1/2-YARD SHOVEL
WILL LOOK ...

ONLY ONE OPERATOR ON
BYERS
TRUCK TYPE
"TRAVELER"

Your Local Byers Distributor Is:

Edward R. Bacon Co., San Francisco
Nelson Equipment Co., Portland & Seattle Offices
Harris Auto & Parts Co., Denver
Willard Equipment, Ltd., Vancouver, B. C.



HERE is a power shovel and crane with new, wide range Mobility because it is built on its own rubber tired all wheel drive "truck".

This rubber-tired chassis was specially engineered to provide a short coupled under-carriage that permits full circle shovel operation.

Thus, it is the first and foremost shovel that combines truck mobility *without sacrificing full circle 360° operating advantages*.

In addition, it is entirely operated by *one man*, who completely and easily controls all operations of traveling and operating. *No longer is it necessary for truck type excavators to have separate*

drivers and operators.

Byers "Traveler" is: first, a fast, smooth operating, powerful excavator with new economy features every shovel runner has wanted. It is: second, a self-propeller truck-type excavator that gets around as readily on the job as a truck and which travels at adequate truck speeds on the highway. It is: third, a tested, proved and approved unit for half-yard shovel jobs or ten ton crane jobs which contractors will be needing to meet today's competition for work.

If this is the type of excavator or crane you'd like to have, inquire for further details today.

TOMORROW'S SHOVEL IS HERE TODAY

OUTSTANDING FEATURES OF **BYERS HALF-YARD TRAVELER**

1. **Self Propelled** . . . around the job or on the highway.
ELIMINATES TRAILER
2. **One man operated** . . . All controls conveniently grouped for operating or steering by the one operator.
ELIMINATES SECOND MAN
3. **4-wheel drive** . . . 6 wheel traction, mud grip tires.
SPECIALLY ENGINEERED CHASSIS

4. **Digs all around . . . Over front, sides, back.**
A FULL CIRCLE MACHINE
5. **Air controls, hydraulic brakes. Power steer.**
NOT AN "OLD" DESIGN MODERNIZED
6. **New, smooth "Airflex" cool internal expanding clutches.**
FREE FROM ADJUSTMENT AND REPAIR
7. **Enclosed gears running in flowing oil.**
EFFICIENT, CLEAN, LONG LIVED

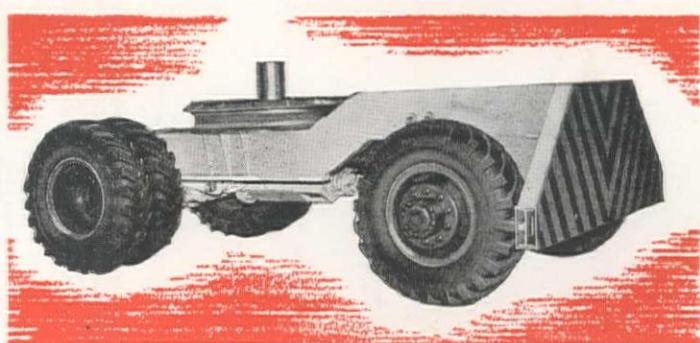
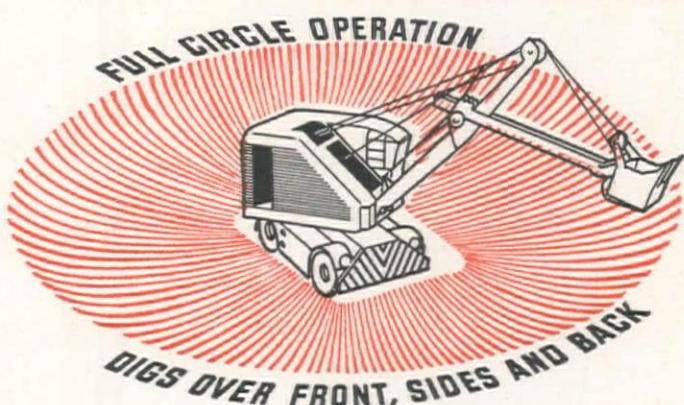
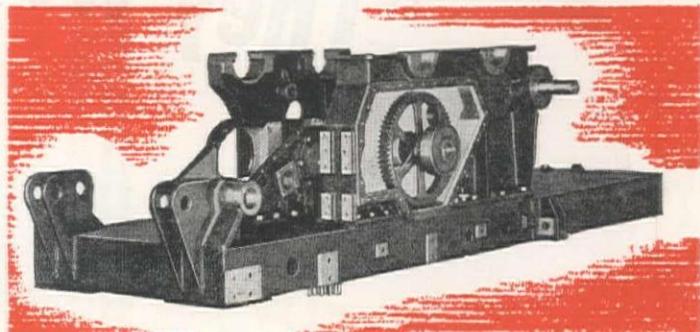
BUILT LIKE A BATTLESHIP —STURDY FRAMES

Because the chassis frame and main revolving frame of Byers "Traveler" was specially engineered for this particular excavator, the owner is assured of strong, rigid warp-proof construction. Capable of resisting twists and strains incident to traveling over rough ground, and shock loads of heavy digging, the "Traveler" combines maximum strength with minimum weight.

Basic construction of the "Traveler" has been proved rugged and dependable in actual service.

NEW SHOVELS AND CRANES WILL HAVE NEW, WIDE RANGE MOBILITY

because they will be built over a specially designed chassis like this . . . which overcome crawler handicaps and permits them to travel on the highway at adequate truck speeds.



BYERS HALF YARD TRAVELER

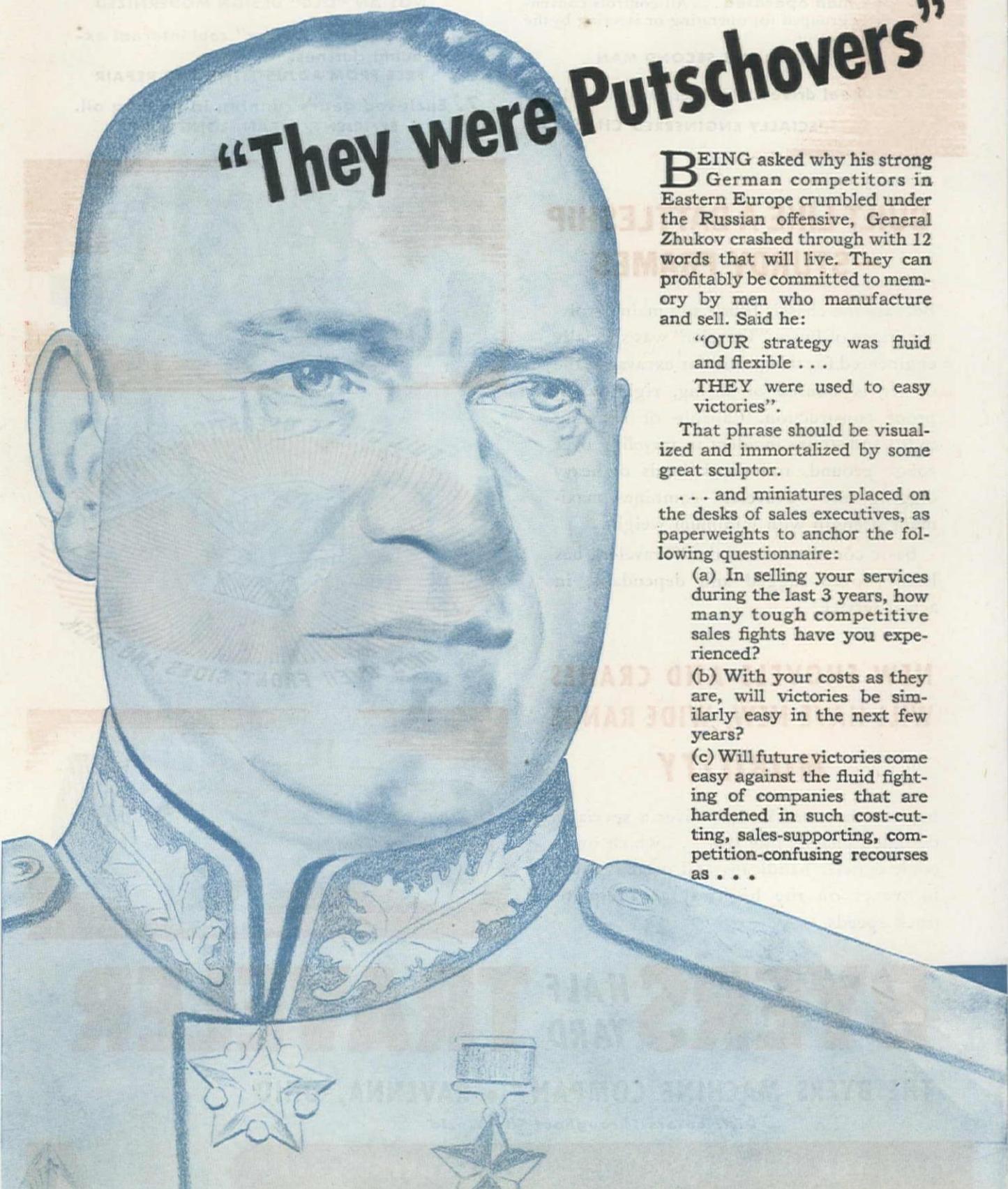
THE BYERS MACHINE COMPANY • RAVENNA, OHIO

Distributors Throughout The World

WRITE FOR THIS FREE ILLUSTRATED BOOKLET TODAY



then he said to himself



“They were Putschovers”

BEING asked why his strong German competitors in Eastern Europe crumbled under the Russian offensive, General Zhukov crashed through with 12 words that will live. They can profitably be committed to memory by men who manufacture and sell. Said he:

“OUR strategy was fluid and flexible . . .

THEY were used to easy victories”.

That phrase should be visualized and immortalized by some great sculptor.

. . . and miniatures placed on the desks of sales executives, as paperweights to anchor the following questionnaire:

(a) In selling your services during the last 3 years, how many tough competitive sales fights have you experienced?

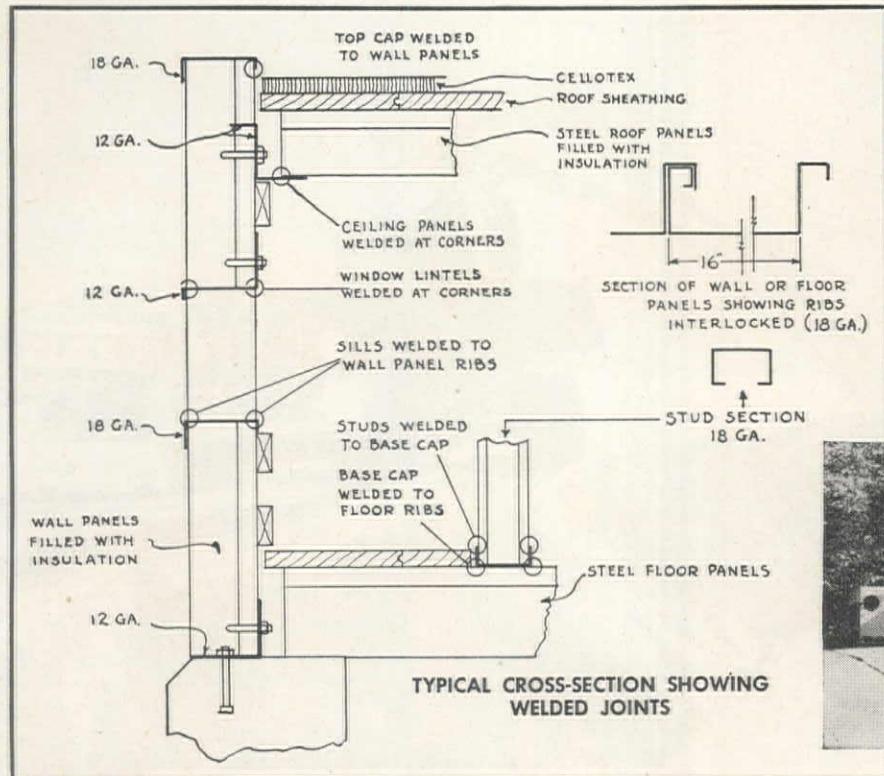
(b) With your costs as they are, will victories be similarly easy in the next few years?

(c) Will future victories come easy against the fluid fighting of companies that are hardened in such cost-cutting, sales-supporting, competition-confusing recourses as . . .



"Fluid and Flexible" . . . he says

THAT, ZHUKOV, is also the battle cry of engineers, designers and contractors using Arc Welding to win business victories.



Stiffer structure,
simplified erection
by **ARC WELDING**
of panels



PREFABRICATED sheet metal panels . . . used extensively for enclosures, partitions, flooring and small building frames . . . are conventionally joined by screws and bolts.

Lawrence C. Blazey, Cleveland designer, shows how this panel construction can be improved by arc welding erection. His application is a house; it could just as well be an aircraft hangar, a pumping station, a garage or a bus terminal. He reports these advantages:

Greater rigidity. More area is joined—devoid

of holes—panels fused into a strong unit construction. Ceiling panels extended 3 ft. out over walls by welding small angles to ribs—impractical by old method. Long spans, such as big window lintels, readily reinforced to permanently eliminate sag.

Faster, easier erection. Simple tack welds replace drilling, screwing and bolting—take half as much time per joint. Easy to get into close quarters. Provides versatile tool for all metal connections . . . panels, column supports, door and window lintels, streamlined corners, brackets, hangers, and other members.

Studies in Structural Arc Welding free to architects and engineers. Request them on your letterhead.

THE LINCOLN ELECTRIC COMPANY • DEPT. W-1 • CLEVELAND 1, OHIO

America's greatest natural recourse

ARC WELDING

SOULE' EQUIPMENT COMPANY

1750 EAST 12th STREET
PHONE: ANDOVER 2555
OAKLAND 6

701 12th STREET
PHONE 2-4983
SACRAMENTO 14



New Distributor

for Bucyrus-Erie Shovels,
Draglines, Cranes

To give you outstanding assistance with your excavating problems, Bucyrus-Erie Company is happy to announce the appointment of Soule' Equipment Company as distributor in Northern California for the complete line of Bucyrus-Erie shovels, draglines and cranes in the $\frac{3}{8}$ cubic yard to $2\frac{1}{2}$ cubic yard sizes. To help solve your problems, the facilities of this California organization will be ready to assist you in forming and fulfilling your postwar plans.

15Y45



SOUTH MILWAUKEE, WISCONSIN

The Right Trucks FOR ALL TRADES

Light loads or heavy pulls, long-distance hauling or local delivery—Chevrolet trucks will do the job economically and dependably, because they are designed, engineered and built for truck work exclusively.

Because truck operators recognized the famous features of Chevrolet trucks as "built-in values" they bought more Chevrolet trucks than any other make in seven of the last nine prewar years. These same features are continued in the 1945 Chevrolet trucks. Should your needs demand extra payload capacity, your Chevrolet dealer can provide the right truck by the installation of the necessary equipment (auxiliary axles, springs, trailers, bodies, etc.).

Buy only as much truck as you need, because it's payload, not chassis weight, that pays profits. *Buy a Chevrolet truck—the right truck for all trades.*



NEW 1945 CHEVROLET TRUCKS

All Chevrolet trucks are equipped with the famous valve-in-head six-cylinder truck engine—recirculating ball-bearing steering—diaphragm-spring clutch—hypoid rear axle—articulated hydraulic brakes—sturdy truck frame.

HEAVY-DUTY TRUCKS, 134½-inch and 160-inch wheelbases—Load-Master engine, 93 horsepower, 192 foot-pounds of torque—4-speed transmission, power take-off opening—hypoid single-speed full-floating rear axle—2-speed rear axle—auxiliary rear springs—all-steel cab.

LIGHT DELIVERY PICK-UP TRUCK, 115-inch wheelbase—90-

horsepower engine—3-speed Syncro-Mesh transmission—hydraulic shock absorbers, front and rear—all-steel cab—unit-designed body.

SCHOOL BUS CHASSIS, 160-inch and 195-inch wheelbases—safety features to comply with all state regulations: vacuum-power brakes—Tru-Stop, propeller-shaft hand brakes—propeller-shaft guard—special heavy-duty front springs and front axle—two-stage, progressive-action rear springs—double-acting shock absorbers—20-gallon side-mounted fuel tank. Other features same as heavy-duty.

CHEVROLET MOTOR DIVISION
General Motors Corporation
DETROIT 2, MICHIGAN



ONE OUT OF EVERY 3
TRUCKS IS A CHEVROLET

PIPE AND TUBE FITTINGS

- any type - any metal

As specialists in PIPING, Grinnell is your logical source of performance-proved Fittings for every pipe or tubing installation.

The Grinnell line of Pipe Fittings includes screwed, flanged and welding types, in all standard metals. Tube Fittings of Superseal, "AN" Aircraft and S.A.E. designs are available in aluminum, bronze, steel, air furnace malleable and plastics.

Available from your local Grinnell jobber, or from any of the Grinnell branch warehouses listed below.

GRINNELL  **COMPANY**

Executive Offices: Providence 1, R. I.

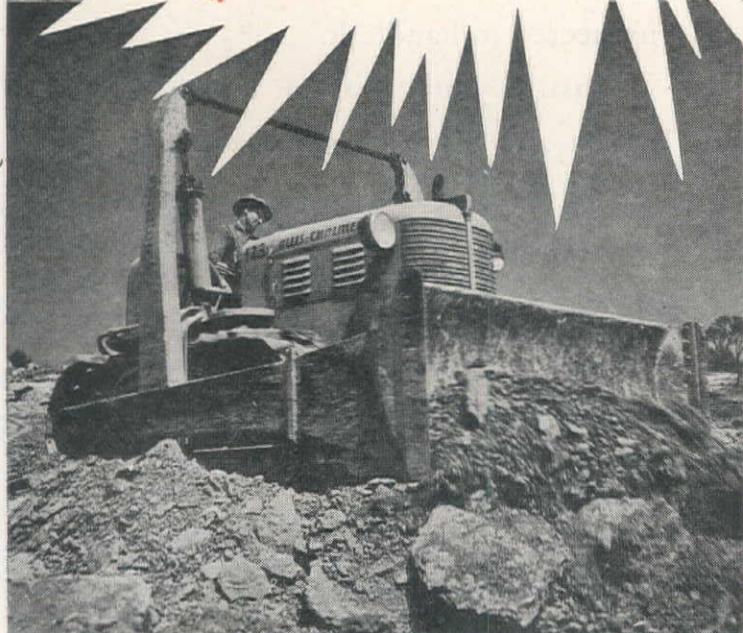
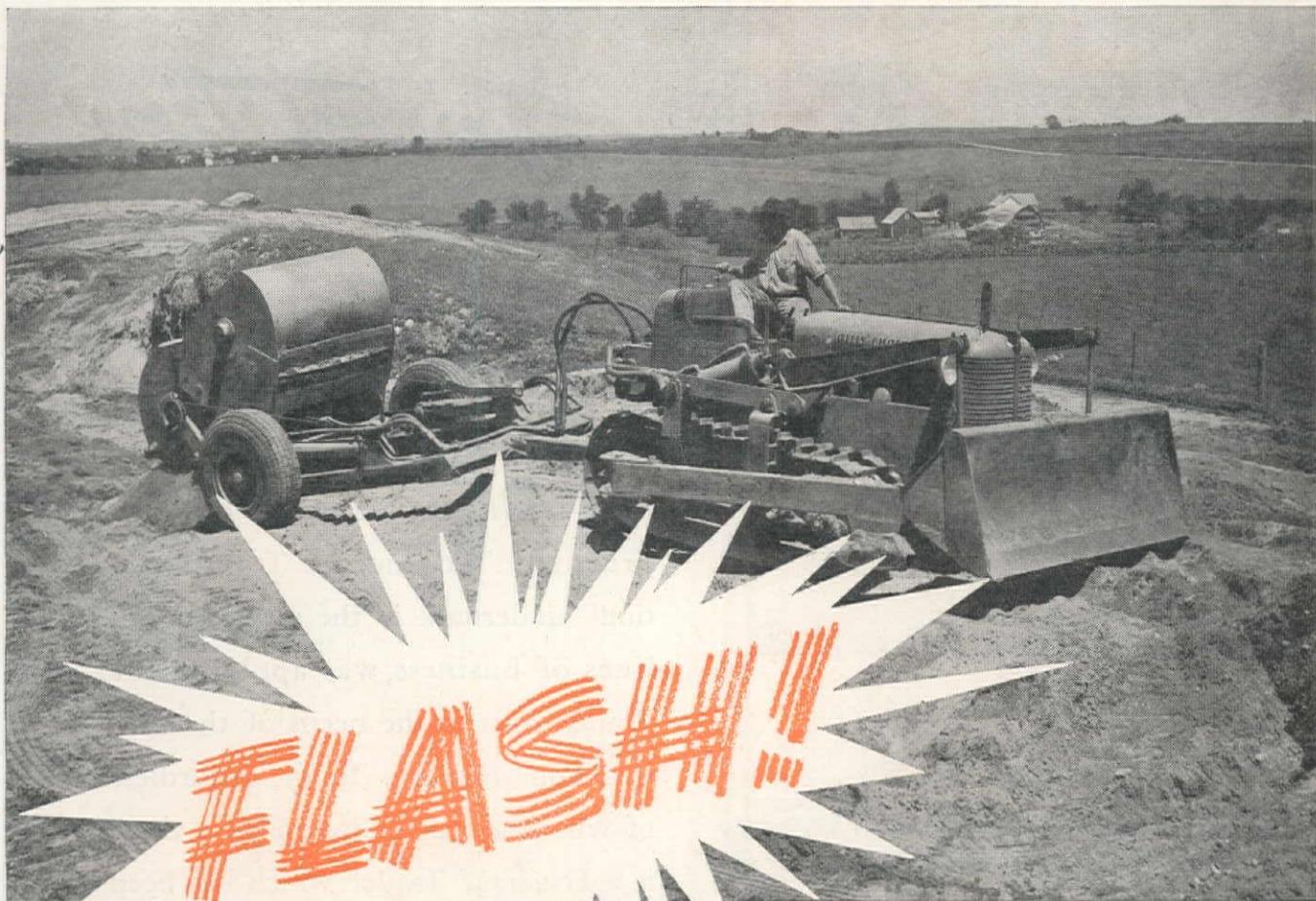
Branch Warehouses

Atlanta 2, Ga.
Charlotte 1, N. C.
Chicago 9, Ill.
Cleveland 14, O.
Houston 1, Tex.

Los Angeles 13, Cal.
Minneapolis 15, Minn.
New York 17, N.Y.
Oakland 7, Cal.
Philadelphia 34, Pa.

Providence 1, R. I.
St. Louis 10, Mo.
St. Paul, Minn.
San Francisco 7, Cal.
Seattle 1, Wash.

GRINNELL
WHENEVER PIPING IS INVOLVED



TRACTOR SITUATION IMPROVED

More Allis-Chalmers Diesels in the smaller models are now tagged for civilian use. This largely means HD-7's, although HD-10's will also be available in greater quantity.

Because of the big demand, production will still be allocated—of necessity, essential users come first. This does, however, mean many more tractors to go around... an easing of the situation!

We are continuing our high production to more quickly satisfy essential needs. Let your Allis-Chalmers dealer help determine your eligibility.

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

* *2-Cycle*
THE MODERN
DIESEL POWER



"Transportation Engineered" to handle any job

ONE OF THE special jobs that Fruehauf "Engineered Transportation" undertook in the service of all lines of business, was applying the Trailer Idea to the needs of the construction industry. Today, regardless of what the type of job may be, there is a Fruehauf Trailer which has been engineered to handle it.

Consult your nearest Fruehauf Branch and let them show you how they have helped to speed up operations and lower hauling costs for others.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant — Los Angeles

Sales and Service Branches:

Los Angeles
San Diego
San Francisco
Salt Lake City

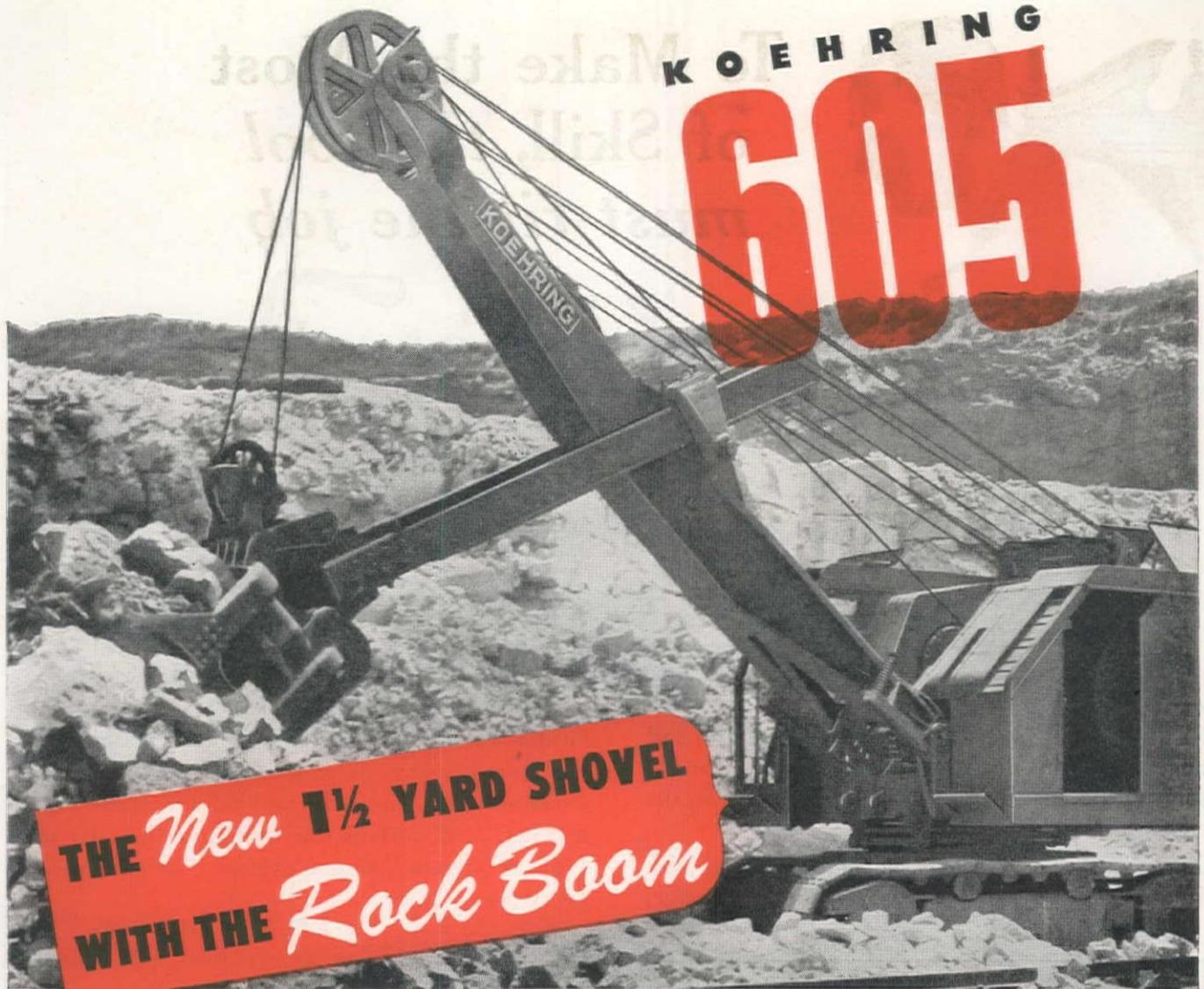
Fresno
Phoenix
Seattle

Portland
Spokane
Denver
El Paso



ENGINEERED
TRANSPORTATION

FRUEHAUF
Trailers



KOEHRING
605

THE New **1½ YARD SHOVEL**
WITH THE **Rock Boom**

Designed for Tough

Rock Digging. Heavy welded box boom. Boom-foot shock absorber takes out lateral twisting strains. Larger shipper-shaft sprocket gets more push into crowd action. Chain drive tightened by power. Three-foot boom point sheaves go easy on hoist cables. Straight, simple shipper shaft comes out easily. No boom weakness below shipper shaft because shipper shaft is set into upper edge of boom, not through center.

These base machine advantages, too, add up to better rock performance: Separate crawler frames provide the flexibility needed for tough digging. Adjustable hook rollers make possible the fine adjustment that eliminates tipping. Power clutch, set by 15-pound pull, retains "feel" of load. Straight splined shafting, not weakened by shoulders and keyways, adds digging strength.

KOEHRING COMPANY, Milwaukee 10, Wis.

**ASK FOR YOUR
605 CATALOG**

Today.....



KOEHRING COMPANY, Dept. R, Milwaukee 10, Wis.

PLEASE SEND NEW 605 EXCAVATOR CATALOG TO:

COMPANY NAME

STREET ADDRESS

CITY AND ZONE

STATE



HEAVY-DUTY CONSTRUCTION EQUIPMENT

To Make the Most of Skill, *the tool must fit the job*



THE cabinet maker has an assortment of drill and auger bits at his disposal. He chooses the bit made for the job, uses it in the right way to get the right results.

Explosives, like bits, are designed for different jobs. In a bit it's type, shape, pitch of the cutting edge,

hardness that are important—in an explosive it is strength, velocity, density, consistency, water resistance that distinguish one kind and grade from another. And, just as one drill isn't right for all types of material, so one explosive isn't right for every type of rock.

ATLAS AMODYNS

When an explosive "takes hold" of rock, it means that it has just the right combination of strength, density and velocity. The two series of Atlas Amodyns are designed to give new exactness to the choice of an explosive. Made in a High Velocity series of six grades, and a Low Velocity series of six grades, all Amodyns have the same weight strength, but each grade has a different cartridge count, and hence a different cartridge strength.

To pick the one right explosive for your job, and to find the right blasting method, consult the Atlas Representative.

GRADE	% Weight Strength	Velocity, feet per second, in the open 1 1/4" x 8"	Velocity, feet per second, confined in pipe 1 3/4" x 8"	MINIMUM NUMBER 8" CARTRIDGES PER 50 LBS. (MAXIMUM 5% MORE)						
				1 1/8"	1 1/4"	1 1/2"	1 3/4"	2"	4"	5"
Amodyn No. 2	65	7000	9500	143	118	80	60	46	11	7
No. 3	65	7000	9500	154	127	91	66	50	13	8
No. 4	65	6800	9250	164	137	99	74	54	13	8
No. 5	65	6500	8500	177	147	104	77	58	14	9
No. 6	65	6350	8000	196	160	111	82	61	15	10
No. 7	65	5800	8000	210	173	118	88	67	15	10
Amodyn No. 2-H	65	10000	13000	143	118	80	60	46	11	7
No. 3-H	65	9500	12000	154	127	91	66	50	13	8
No. 4-H	65	9000	11000	164	137	99	74	54	13	8
No. 5-H	65	8500	10500	177	147	104	77	58	14	9
No. 6-H	65	8500	10000	196	160	111	82	61	15	10
No. 7-H	65	8000	10000	210	173	118	88	67	15	10

ATLAS EXPLOSIVES

"Everything for Blasting"

SAN FRANCISCO 4, CAL.

ATLAS POWDER COMPANY



SEATTLE 1, WASH.

America's most complete line
of material handling buckets.



WE BUILD ALL

4

MATERIAL HANDLING BUCKETS



ALL PURPOSE

- **SHOVEL**
- **PULLSHOVEL**
- **DRAGLINE**
- **CLAMSHELL**

We build a wider and more complete line of material handling buckets than any other manufacturer. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

FRONTS, BOTTOMS, SCOOPS, and teeth, shown in red on buckets, are 14% manganese steel developing up to 120,000 tensile p.s.i. for long service life and hard abuse.

Experience Counts

See your shovel engineer or equipment dealer about PMCO Dippers and Buckets.



Quality Since 1880

PETTIBONE MULLIKEN CORP.

CHICAGO 51,
U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.



CLEAR THE WAY FOR NEW CONSTRUCTION

WITH

Thor

PAVING BREAKERS

THOR FEATURES THAT
SPEED UP HEAVY
DEMOLITION . . .



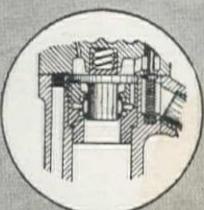
4-BOLT BACK HEAD

Gives maximum strength and rigidity when prying or when leverage action is applied to the breaker.



LATCH-TYPE RETAINER

Simple, efficient. A spring detent holds latch retainer in closed position. Operator has only to press down on retainer with his foot to insert or release tool.



POSITIVE, SHORT-TRAVEL TUBULAR VALVE

This actuates a block-type piston, minimizes vibration and makes machine easier to handle. Also assures reliable performance with low air consumption.



No. 25 Heavy Duty
Thor Paving Breaker

BUILT FOR HEAVY DUTY . . .

DESIGNED FOR FAST, EASY HANDLING

Thor Breakers pack the power to make fast work of toughest demolition jobs—pavements, walls, columns, piers, foundations, etc. Operators enjoy the smooth, easy handling of Thor Breakers that is due to improved balance and freedom from unnecessary vibration. Together, these features assure more work in less time with less effort—at a definite saving in job costs.

Strength, rigidity and longer life are guaranteed by alloy-steel drop-forged construction . . . Thor Breakers have the extra stamina and capacity to handle the toughest jobs day after day at minimum operating and maintenance costs. "Measured air"—an exclusive Thor feature—provides maximum power for peak efficiency.

For complete information about Thor light, medium and heavy duty paving breakers and other Thor contractors' tools, write for Catalog 42-A.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 West Jackson Blvd., Chicago 6, Illinois

New York • Los Angeles • San Francisco • Salt Lake City • Seattle

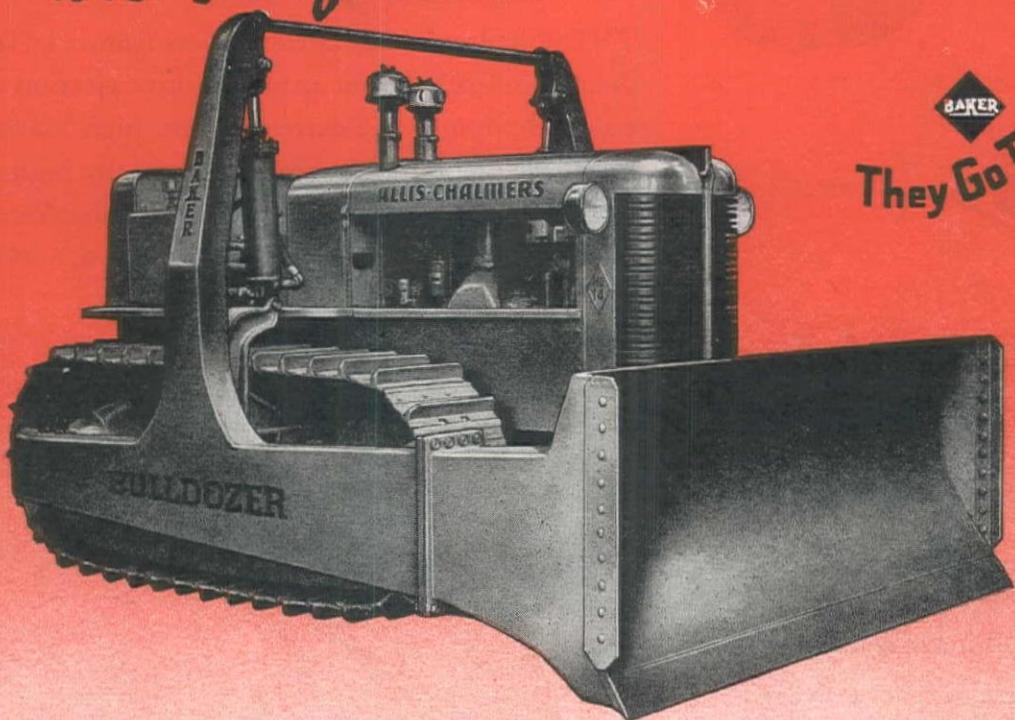
ROCK DRILLS • CLAY DIGGERS • TAMPERS • SAWS • SUMP PUMPS

• • • • MAKE THIS SIMPLE

TEST—

see why

BAKER *Hydraulic* BULLDOZERS are Preferred!



BAKER
They Go Together
AC

Place a suitcase or similar weighty object several feet in front of you. Bend over and pick it up at arms length. Puts a strain on the old back and gives the biceps a workout, doesn't it? Now place the suitcase at your side. Bend the knees, keeping your body erect, until you can grasp the suitcase handles. Comes up easy, doesn't it? You can lift a lot more this way, without straining your back, than you could at arms length.

Baker hydraulic Bulldozers operate on the same principle — the hydraulic cylinders work straight up and down, direct and positive. They lift the blade faster and can bring the full weight of the tractor front end to bear on the blade —

no linkage lever losses — no "shooting around corners."

That's why Baker hydraulics outclass all comers for greater yardages per shift, lower operating costs and decidedly lower maintenance costs.

Keep your eye on the future. In the "sharp pencil" bidding to come after the war you will make greater profits with Bakers on your earth-moving jobs.

THE BAKER MFG CO.
542 Stanford Ave. Springfield, Ill.



BULLDOZERS SNOW PLOWS

CONSTRUCTION EQUIPMENT

NOW AVAILABLE...



ATECO Carry Scrapers

THESE hydraulic-operated scrapers feature an independently-controlled front apron, positive ejection of material in dumping, and extremely fast, high loading with light tractor draft. Clearance is unusually high; loaded scrapers are easily hauled over levee embankments and ditches. Available in capacities of 4, 4½, 6, 8, 10 cu. yds.



ATECO *Counterbalanced*

FRONT END LOADER

POWER is used to lift only the load, not dead weight, in this *counterbalanced* loader. Bucket (or interchangeable dozer blade, lifting fork or other front-end tool) remains level at every point in the lift, and lift is exceptionally high (8' 6" clearance from ground to bottom of bucket in dumping position). Smooth, fast, hydraulic control is easy to operate.

Available for International tractor models I-4, I-6, I-9 and T-6 or TD-6.



SEE YOUR INTERNATIONAL DEALER FOR COMPLETE INFORMATION

AMERICAN TRACTOR EQUIPMENT CORPORATION

9131 SAN LEANDRO BOULEVARD • OAKLAND 3, CALIFORNIA

BULLDOZERS • ROADBUILDERS • SCRAPERS • TAMPERS • RIPPERS • FARM IMPLEMENTS • FRONT LOADERS • LANDPLANERS
TRACTOR CRANES • SUBSOILERS • PUMPS • VALVES • CYLINDERS • HYDRAULIC MOTORS • OIL HOSE AND FITTINGS



"NO TRAFFIC JAM WITH THAT SKIP!"

"That Rex skip really keeps us moving right ahead because it gives us those extra few seconds of loading time that mean more batches per hour," says a well-known paving contractor.

Why, it's practically a "one-man ground crew" that kicks the batch into the drum almost faster than you can say "Jack Robinson." Then—zingo—the skip is back on the ground again and it stays there just long enough to give the exact time needed for dumping the next batch into the skip.

The operator is *not* required to turn the water on or off manually, he can drop the skip *faster* . . . permit it to remain on the ground those few seconds longer that mean more orderly loading, more yards per day.

And it's all made possible by the famous Rex Mechanical Man that automatically controls the batch transfer and entire mixing cycle right to a split second. It opens and closes the discharge door—it opens and closes the transfer door—it controls the water and it starts the skip upward—all in perfect timing and with valuable seconds saved.

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, Mixers, Pavers, Moto-Mixers and Pumpcretes. 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., 610 W. Jefferson, Los Angeles, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Construction Equipment Co., Spokane, Washington; Contractors Equipment and Supply Co., Albuquerque, New Mexico; Ray Corson Machy. Co., Denver, Colorado; Hall-Perry Machinery Co., Butte, Montana; Industrial Equipment Company, Emeryville, California; Intermountain Equipment Co., Boise, Idaho; Loggers & Contractors Machinery Co., Portland, Oregon; Star Machinery Co., Seattle, Washington.



CONSTRUCTION MACHINERY



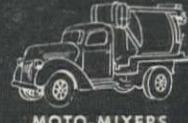
PUMPS



PAVERS



PUMPCRETES



MOTO-MIXERS



MIXERS

Cast iron pipe foundries, having broken all pipe production records for war requirements, are now also producing pipe for civilian needs. These foundries, with increased facilities, are all set for V-J Day and the vast tonnage of cast iron pipe which will shortly thereafter be required by war-deferred water works construction. Meanwhile, pipe is obtainable in growing volume without detriment to war orders and is becoming increasingly available, month by month. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3, Illinois.



CAST IRON PIPE

SERVES FOR CENTURIES

THEY NEVER LOSE THEIR GRIP!



• Hard or muddy ground...turns or straightaway...downhill or up, Oliver "Cletrac" crawler tractors never lose their sure-footed grip on the ground. For only Oliver "Cletracs" have *controlled differential steering*...the patented principle that keeps power on both tracks at all times.

You simply slow down one track and speed up the other to get a short, sharp turn. This feature alone assures greater safety on hills and slopes, for there is always traction on both tracks. They steer the same going downhill with a load as up. There is no need for the operator to cross-over on the

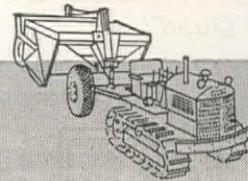
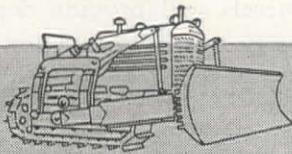
controls as is necessary on the ordinary tractor.

Oliver "Cletrac" tractors are designed for tough, hard service. Lubrication and maintenance are simple, for these tractors are unusually accessible. They are ruggedly built to resist the twists and strains of tractor service.

Substantial numbers of Oliver "Cletracs" are now being released for essential service. Your Oliver "Cletrac" dealer will gladly assist you in making application for a new tractor. **THE OLIVER CORPORATION**, Industrial Division, 19300 Euclid Avenue, Cleveland, Ohio.



OLIVER - Cletrac



State of California: Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Comber & Mindach, Modesto; Nelson Equipment Co., Los Angeles; Tractor & Equipment Co., San Leandro; Flood Equipment Co., Sacramento; Hamsher Tractor Co., Stockton; W. J. Yandle, Santa Rosa. State of Washington: Burrows Motor Co., Yakima; Inland Truck & Diesel Co., Spokane; Pacific Hoist & Derrick Co., Seattle. State of Oregon: Loggers & Contractors Machinery Co., Portland. State of Idaho: Idaho Cletrac Sales Co., Lewiston; The Sawtooth Company, Boise. Western Montana: Western Construction Equipment Company, Billings. British Columbia: A. R. Williams Machinery Co., Vancouver.



LCI powered by two
Series 6-71 "Quad" Engines



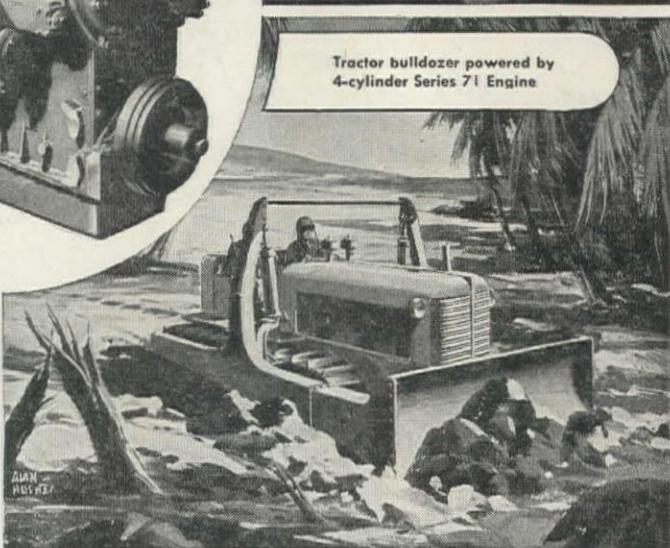
M-4 tank powered by
Series 6-71 "Twin" Engines.



Portable Welder powered by
2-cylinder Series 71 Engine.



Army Shovel powered by
3-cylinder Series 71 Engine.



Tractor bulldozer powered by
4-cylinder Series 71 Engines

THERE WHEN NEEDED

In addition to providing plenty of dependable power for the machines our fighting men use, this engine, because of its interchangeable parts, helps them keep everything on the move.

For example, a shell-torn shovel or tractor engine can be fixed with an engine part from a wrecked landing craft. A landing craft can keep going by picking up a part it needs from a disabled tank.

Every GM Series 71 engine, whether a two-cylinder or one of a "Quad" six, has the same bore and stroke, and most moving

parts from one engine will fit and work perfectly in any other.

This feature of interchangeability of parts in these engines will be equally important in peace-time. The elimination of *different* sizes of parallel parts increases the availability to owners of the right part *when it is needed*.

In construction, fishing, transportation and all through industry, these "Single", "Twin" or "Quad" GM Diesels will provide dependable, low-cost and *easily maintained power*.

KEEP AMERICA STRONG
BUY MORE WAR BONDS



SINGLE ENGINES . . Up to 200 H.P. } MULTIPLE UNITS . . Up to 800 H.P. } " DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

ENGINES . 150 to 2000 H. P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES ELECTRO-MOTIVE DIVISION, La Grange, Ill.



A Barber-Greene bituminous paver, dependably powered with a Le Roi engine, laying runways at a midwestern airfield.

Where speedy completion is essential...
LE ROI POWER
"pays off" in-service and satisfaction

Building airfield runways is a job that calls for fast work — steadily, dependably. That is one of many reasons why construction men all over the country like to see Le Roi engines power the equipment they buy.

Le Roi engines are designed from scratch for heavy-duty service, incorporating many "extra" features that give you more H.P. hours per dollar. You get precision machining, advanced design, quick-maintenance features, and highly engineered details that assure you of efficient, dependable service.

Let the performance record established through Le Roi's quarter-century of experience and research guide your judgment when selecting equipment. Le Roi engines are built in sizes from 2 to 12 cylinders with ratings from 4 to 400 H.P., for use on almost every type of construction equipment. For specific details, write for bulletins.



TURN THE PAGE ➤

LE ROI Portable Air Compressors

**have the versatility to serve you
dependably on many different types of jobs**

Construction men appreciate the ability of Le Roi Compressors to operate dependably on so many different types of jobs. Le Roi Compressors have been used to considerable advantage not only in supplying air for concrete-breaking tools, spaders, and tampers, but also to operate many different types of air-driven tools such as saws, hammers, riveters, chisels, etc. Other uses include the operation of concrete vibrators, water pumps, sand blasters, paint sprayers, sheet piling drivers, cement

sprayers, caulkers, and hosts of others.

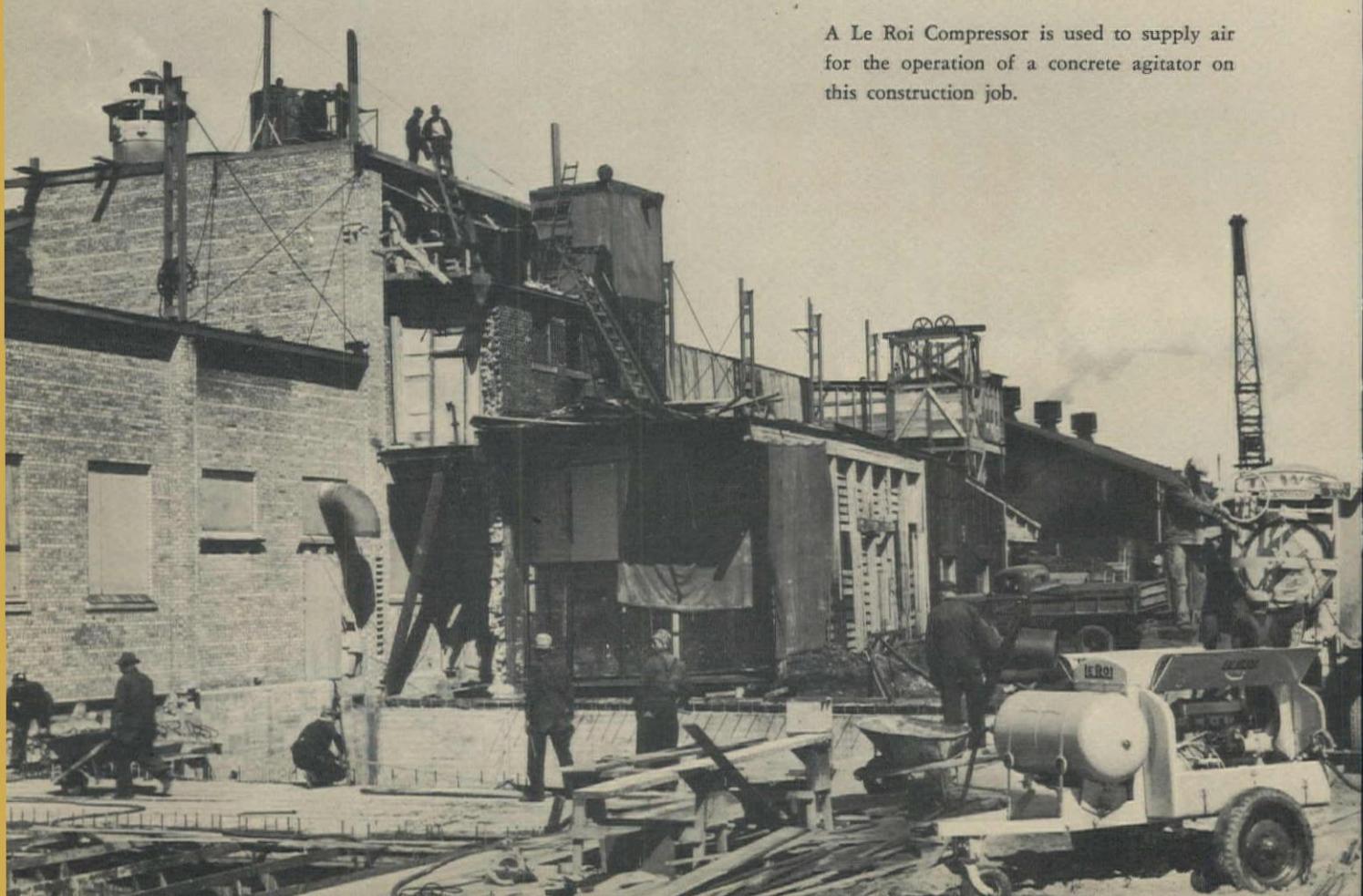
You can handle these jobs profitably with a Le Roi Compressor because it's built by a manufacturer specializing in the heavy-duty field, and it's designed to take the punishment handed out to construction equipment.

Le Roi Compressors are available in sizes from 60 to 315 c.f.m. gasoline-powered and 105 to 500 c.f.m. Diesel-powered. Write for bulletins giving complete information.

LE ROI COMPANY

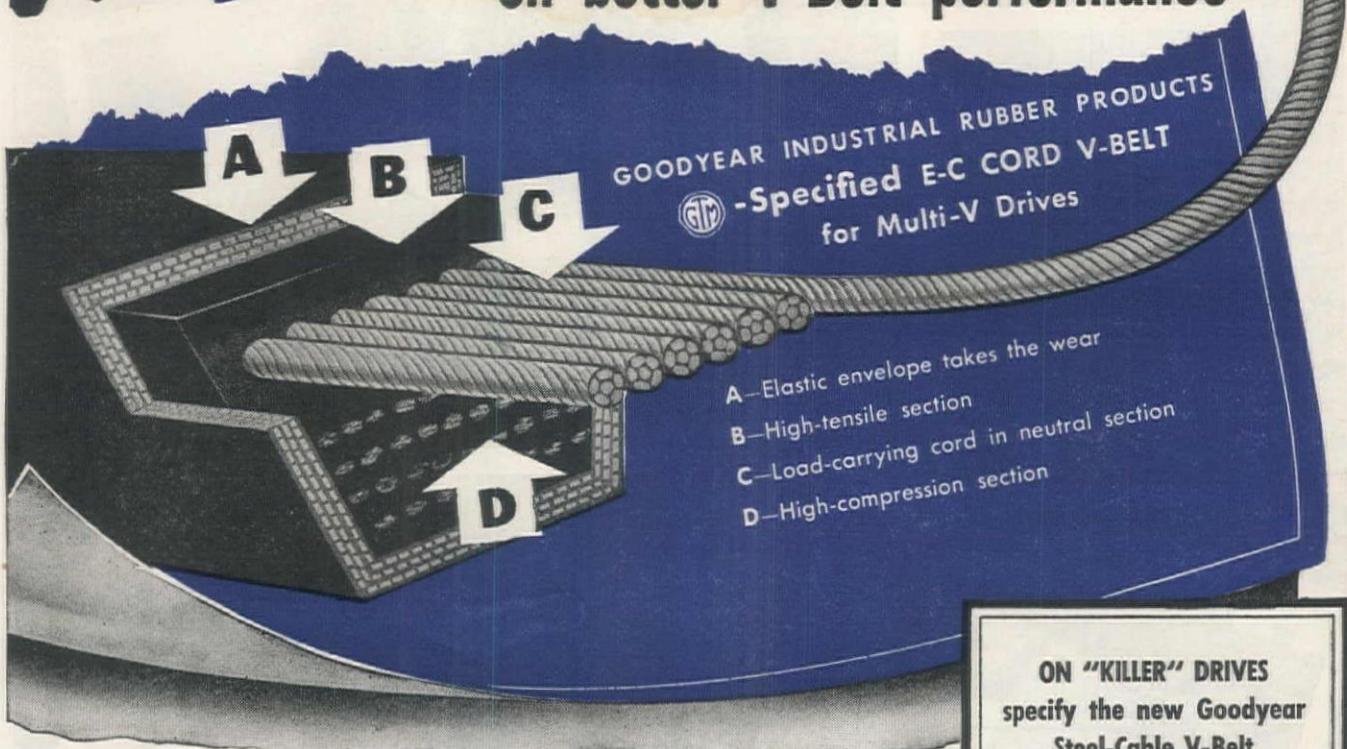
1726 S. 68th Street • Milwaukee 14, Wisconsin

Distributors Located in Principal Cities



A Le Roi Compressor is used to supply air for the operation of a concrete agitator on this construction job.

An "Inside" Tip on better V-Belt performance



HERE you see the "inside" reason why Goodyear's time-proved E-C Cord Multi-V Belt is the standout cotton cord belt for high-efficiency performance and long life. Note the large diameter of the tough, endless, heavy-duty cord that sinews this great belt. Comparatively speaking, it is truly ropecord—high in tensile strength and stretch resistance.

This Goodyear-pioneered construction makes it possible to concentrate the load-carrying cord in the neutral section—where it is not subject to either extreme tension or compression in bending around the pulleys.

Thus the entire strength of the cord is employed in pulling the load—not sapped by internal friction, buckling or distortion. Every cord does its full share of work.

Add to this the precision-matching that insures uniform length in every set and it is easy to see why Goodyear E-C Cord belts are the best-balanced belts you can buy for multi-V drives. Every cord in every belt pulls its full share of the load, insuring longer life and maximum power output. Order from your V-belt jobber, or write Goodyear, Akron 16, Ohio, or Los Angeles 54, California.

ON "KILLER" DRIVES specify the new Goodyear Steel-Cable V-Belt

This revolutionary Goodyear development handles drives never successfully powered by V-belts before. Operates at belt speeds ranging from 38 to 9,400 F.P.M. — with negligible stretch, creep or slip. Strength to spare for heaviest shock loads. The ultimate V-belt — nearly THREE MILLION now in use.

E-C Cord—T.M. The Goodyear Tire & Rubber Company

FOR HOSE, BELTING, MOLDED GOODS, PACKING built to the world's highest-quality standard, phone your nearest **GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR**.

THE GREATEST NAME IN RUBBER

GOOD YEAR

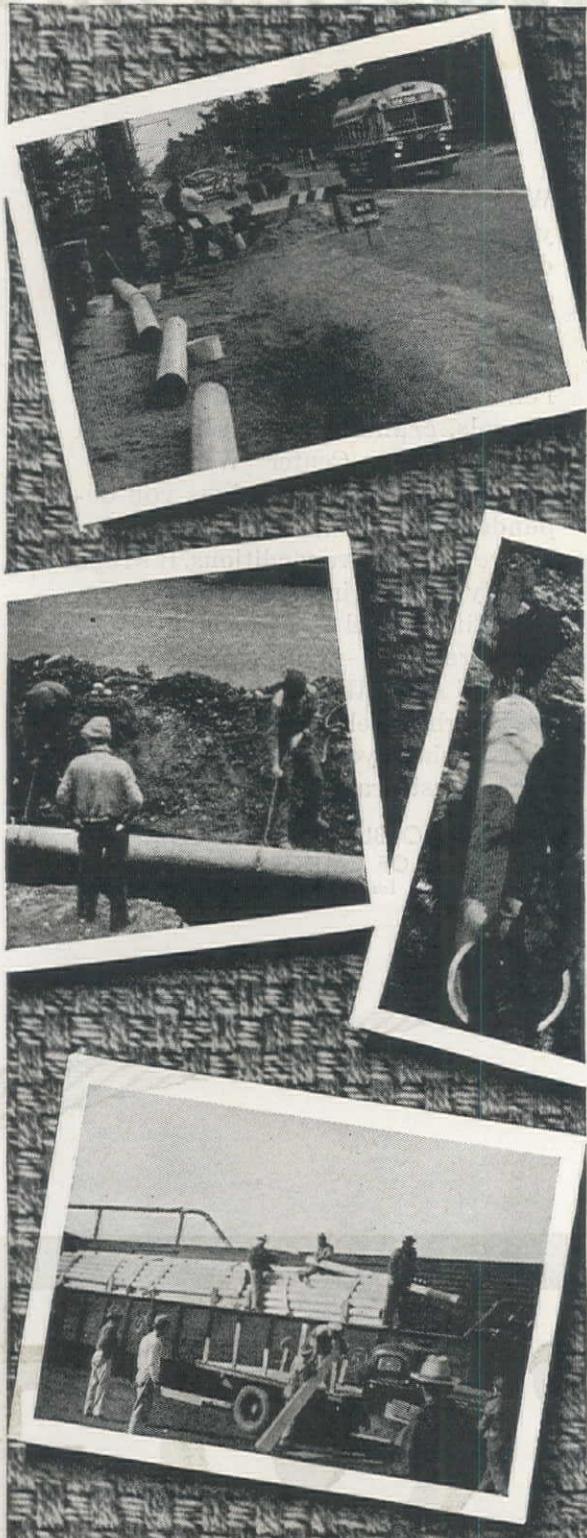
Wherever planning



JOHNS-MANVILLE
JM
PRODUCTS

Johns-Manville

committees meet...



The *swing* is to **TRANSITE PIPE** for efficient, economical Water Transportation

FOR the same good reason that Transite Pipe has been chosen for service in thousands of American communities in the past... this asbestos-cement pipe is now getting the call on many of the water-works projects planned for tomorrow.

That reason is: efficient, economical water transportation—proved through the years.

If you are planning an improvement program for the days ahead, it will pay you to look into these money-saving advantages of Transite Pipe:

High Flow Capacity. Because Transite is non-metallic, tuberculating waters can never reduce its initial high flow rate (C=140). This often permits use of smaller diameter pipe... and ends problems arising from progressive reduction of carrying capacity due to tuberculation.

High Corrosion Resistance. And that means outside, inside and all the way through... proved by installations in virtually all types of soils, under a wide range of service conditions.

Low Installation Costs. Light in weight, Transite Pipe requires fewer men for handling, smaller installation crews. Mechanical handling equipment is not needed except for the larger sizes.

Rapid Assembly. The Simplex Coupling provides tight, flexible joints... permits quick, easy assembly even with inexperienced crews. And, joints stay tight even when the line is deflected as much as 5° at each coupling.

* * *
For detailed information about these and other advantages of Transite Pipe as a water carrier, send for illustrated brochure TR-11A. Address Johns-Manville, 22 E. 40th St., New York 16, N.Y.



Asbestos

TRANSITE PIPE

Wire Rope Value Begins With Wire

ROPE REMINDERS

Regular inspection of wire rope is necessary for operating efficiency.

And proper rope inspection means, first, examining its entire length to find the most worn or deteriorated spot.

Check the number of broken wires in the worst rope lay—and the rope's diameter at that point. See how much abrasion has occurred on the wires.

Look in the valleys between the strands for rust and pitting. Note carefully, too, the condition of the rope near attached fittings.

If wire breaks have occurred prematurely, check the installations carefully to locate possible causes.

A detailed study made by a Roebling engineer will show whether a more suitable rope is the answer . . . or whether improvements should be made on the installation.

WHAT DETERMINES THE PERFORMANCE you get from wire rope? It's the handling it gets—the equipment it works on—the job to be done.

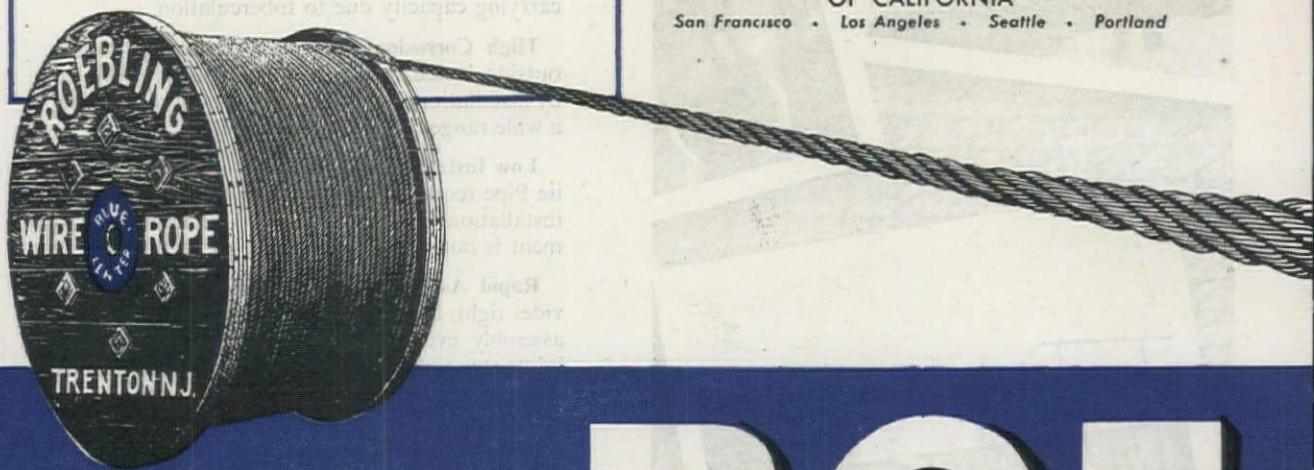
All these count. But what counts most is the rope itself. And that's the reason why you should rig your shovels, cranes and draglines with Roebling "Blue Center" Wire Rope.

For "Blue Center" gives you dependable performance—even under severe and abusive conditions. It's rope quality that begins with wires drawn from finest steel . . . Roebling-made!

To get best results from "Blue Center" select the right rope . . . and use it right. Roebling engineers will be glad to show you how. Call or write our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

San Francisco • Los Angeles • Seattle • Portland



Wire Rope and Strand • Fittings • Slings • Cold Rolled Strip • Round and Shaped Wire • Wire Cloth and Netting • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Suspension Bridges and Cables • Electrical Wires and Cables • Aerial Wire Rope Systems

ROE

P A C E M A K E R I N

...OF ROEBLING-MADE STEEL!

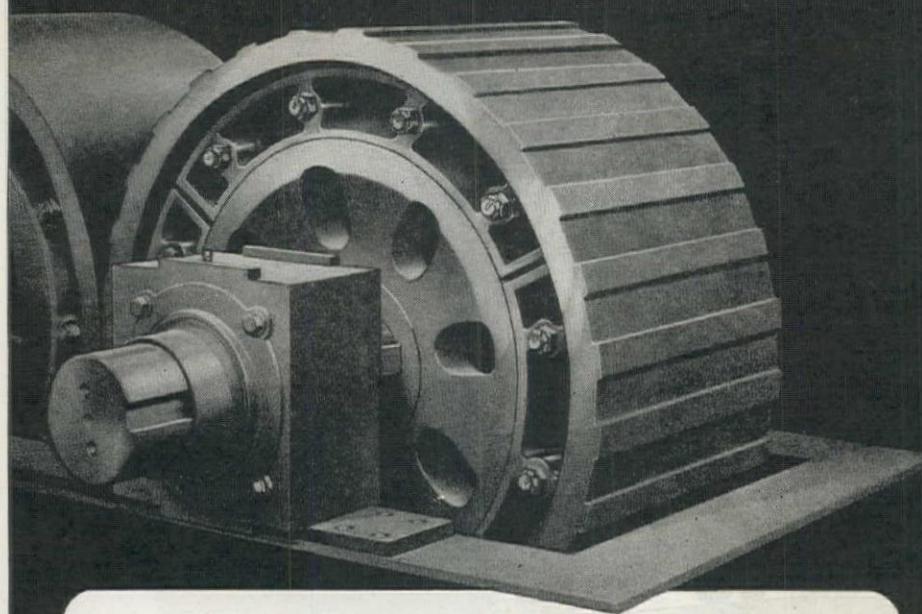


BLING



WIRE PRODUCTS

On Fine Reduction Crushing
*Up to 8 times
 more production*
 with Pioneer Roll Crushers

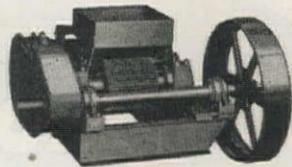


● To lower the costs of secondary crushing still further, more and more operators are installing Pioneer Roll Crushers because they deliver more on every score. They deliver small materials, in large quantities, at high speeds and at low production costs.

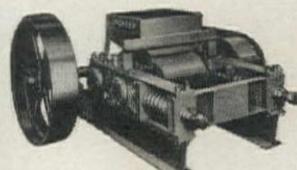
Power cost per yard of output is much lower than that of any other type of crushing. It is estimated that you get up to 8 times more production from your investment in manganese crushing surface when you use roll crushers because 100% of the shell area is at work and producing, and the wear is evenly distributed over the entire surface of the shell. Compare this to other types of crushers where only 10% to 20% of the manganese surface does all the work, all the fast wearing out.

What other operators are doing with Pioneer Roll Crushers is information that interests every man considering secondary crushing. We'll be glad to place these records before you—give you the benefits of Pioneer's experience in selecting roll crushers that fit your needs completely.

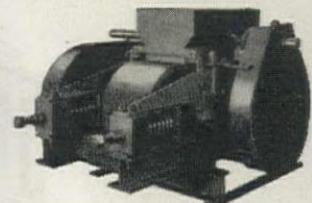
Plan with Pioneer
 FOR PROFITABLE PRODUCTION



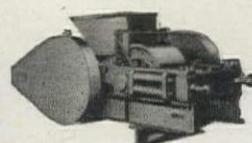
Pioneer 16" x 16"



Pioneer 24" x 16"



Pioneer 30" x 18"



Pioneer 40" x 22"



Pioneer 54" x 24"

Pioneer
 ENGINEERING WORKS

Jaw Crushers, Roll Crushers, Screens, Conveyors, Feeders, Washers
 MINNEAPOLIS 13, MINNESOTA

ENGINEERS
 AND
 MANUFACTURERS
 OF QUARRY
 GRAVEL AND
 MINING
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FOR YEARS International Power has been a partner in the achievements of the construction industry. When the Pacific war is finally won, and International Power is again available in needed quantity, it will play an important part in the great program of peacetime construction and reconstruction.

International Power includes TracTractors, Wheel Tractors, and Power Units, both Diesel and gasoline. These time-tested, war-proved tractors and engines bear the stamp of International Harvester's years of engineering and manufacturing know-how.

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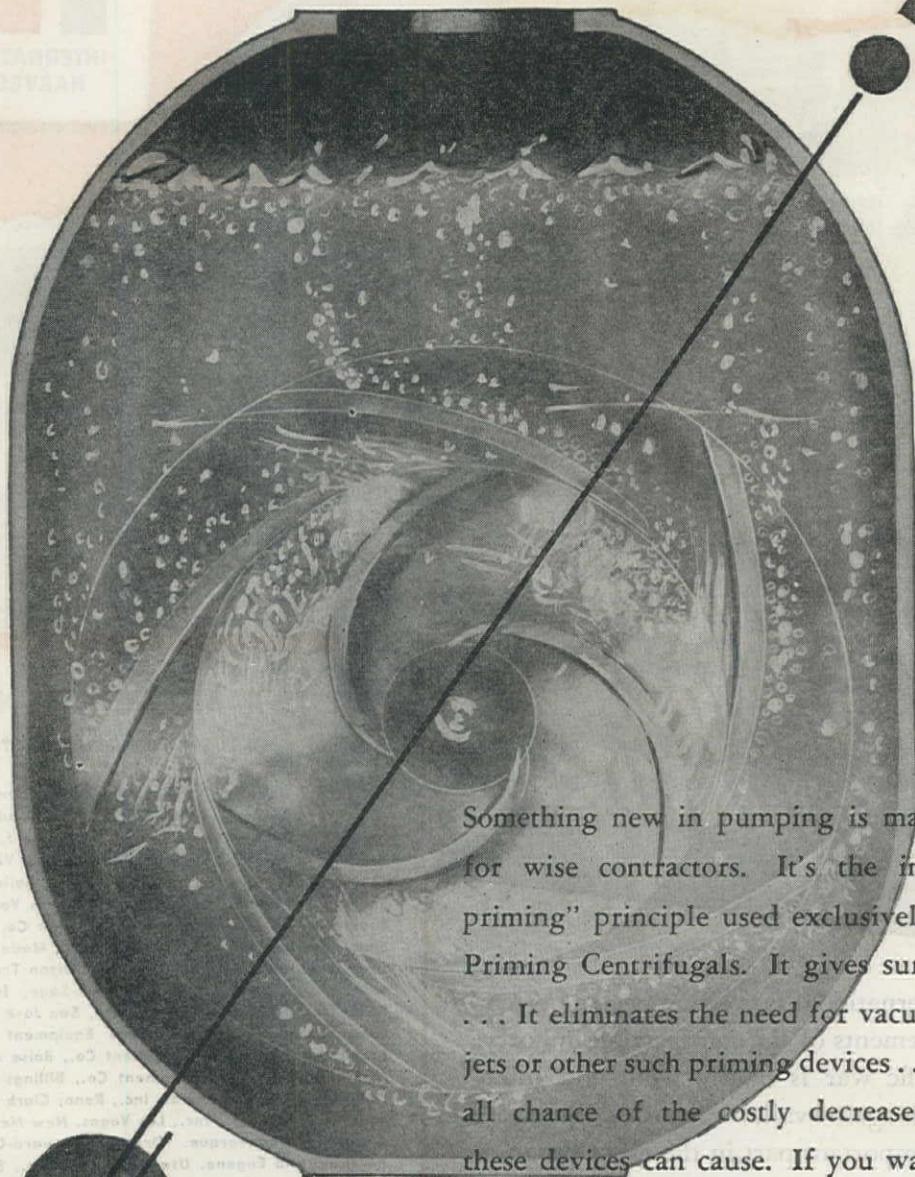
tributor analyze those needs with you and recommend the particular kind and size of International Power equipment your work calls for.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL POWER

Is this NEW pumping principle

MAKING MONEY *for YOU*



Something new in pumping is making more money for wise contractors. It's the ingenious "diffuser priming" principle used exclusively in Marlow Self-Priming Centrifugals. It gives surer, faster priming . . . It eliminates the need for vacuum pumps, valves, jets or other such priming devices . . . thus it eliminates all chance of the costly decreased efficiency which these devices can cause. If you want the lowest possible self-priming pumping costs, use Marrows. Sizes 1½ to 10-inch; 50 to 3600 GPM.

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MARLOW PUMPS, RIDGEWOOD, NEW JERSEY

Bechtel, Price, Callahan, used 30-foot Tournacrane to set up gasoline and fuel oil storage tanks at Camp Canol, near the McKenzie River.

TOURNACRANES travel with maximum loads on and off-road . . . give you truck crane service at lower first cost and lower operating cost



You will find the Tournacrane's ability to travel, carrying maximum loads, gives you a definite advantage over ordinary truck cranes on your heavy-lifting jobs. These mobile cranes eliminate need for outriggers or side and end jacks. Big 5' 6" diameter tires provide ample flotation to move bulky loads in soft material where small-tired truck cranes bog down. Easily maneuvered in hard-to-get-at spots.

One-man operated

Tournacranes are operated by one man. A standard LeTourneau Power Control Unit, mounted at the rear of the Tournapull seat, provides accurate, independent boom-hoist and load-line control.

Low-cost lifts
At exceptionally low equipment investment and reduced operating costs, Tournacranes economically load and unload flat cars, erect structural steel, assemble and place heavy machinery, culverts, foundation and bridge steel, transmission line poles and towers.

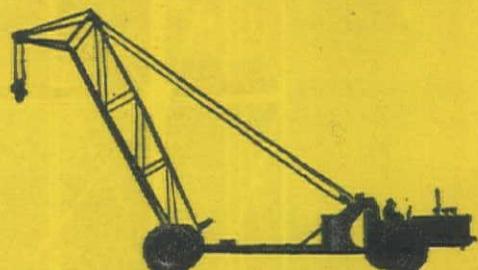
When not in use, the Tournapull prime mover can be transferred to Scraper or hauling units; only the few thousand dollars invested in the Crane stand idle.

You can get complete information on Tournacranes and other LeTourneau construction rigs from your local LeTourneau distributor. Ask him for new 24-page complete line catalog . . . or write to R. G. LeTourneau, Inc., Dept. WCN845, Peoria, Ill. Do it NOW.

S P E C I F I C A T I O N S

TC30 Tournacrane with 150 h.p. Super C Tournapull

Capacity	20,000 lbs.*
Lift	30'
Boom Reach (upright position)	9' 6"
Tires:	
Tournacrane	2(21 x 24)16
Tournapull	2(21 x 24)16
Overall Dimensions:	
Length, upright	33' 6"
Width, rear wheels	12' 6"
Height, upright	33' 3"
Approx. Weight complete	24,450 lbs.
Trotel speed	to 14.9 m.p.h.



*Other fast-moving, rubber-tired Tournacranes are available with lifting capacities up to 50,000 lbs. . . . lifting heights from 20 to 40 feet . . . 8 to 21' boom reach (upright position) depending on Tournacrane model.

C 27

SAME TOURNAPULL PRIME MOVER AND PCU INTERCHANGEABLE FOR USE WITH:



15-heaped-yard Carryall® Scraper, to load, haul and spread.



Tournatrailer® . . . powerful rear-dump haul unit . . . 17 heaped-yard capacity.



Flat-bed Tournatruck® . . . for off-road hauling of materials and machinery.

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TOURNACRANES

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FWDs MAKE THE MOST OF *Truck* POWER AND *Man* POWER

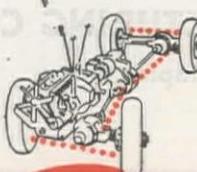
In everyday duty on highway construction and maintenance, FWDs regularly do 61 jobs. Including special jobs, there are more... write for list. For all year 'round highway work, you can always depend on FWDs.

FWD trucks... rugged, reliable, modern... embody the highest development of the original four-wheel-drive principle, pioneered and advanced by FWD since 1910. The true FWD principle with

center differential and properly balanced power on all wheels, gives these trucks outstanding mechanical advantages and highway performance leadership... the FWD principle that provides the power and stamina to get through, regardless of weather, road conditions, or lack of roads, with greater assurance and safety. Balanced weight distribution on all four wheels conserves precious tires, replacements, oil and gas.

As leaders in performance, economy and style, FWDs are a great "buy" for highway service. Their value is so widely recognized that they outnumber all other four-wheel-drives 4 to 1 in this field of heavy-duty truck work.

THE FOUR WHEEL DRIVE AUTO COMPANY, Clintonville, Wisconsin
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TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS
OF FOUR-WHEEL-DRIVE TRUCKS.

More than \$75,000,000
in purchases of FWD
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in the comparatively
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eight months, emphasizes
FWD leadership
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continuous flow, smoothly and economically. The entire plant is on wheels and can be moved easily from one job to the next without delay. Every part is designed and built to stand up under the hardest use with only a minimum of maintenance.

Whatever your requirements for aggregate producing or asphalt mixing equipment for tomorrow's construction jobs you'll find your best source of supply in Iowa's complete line. See your local dealer or write.



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IOWA



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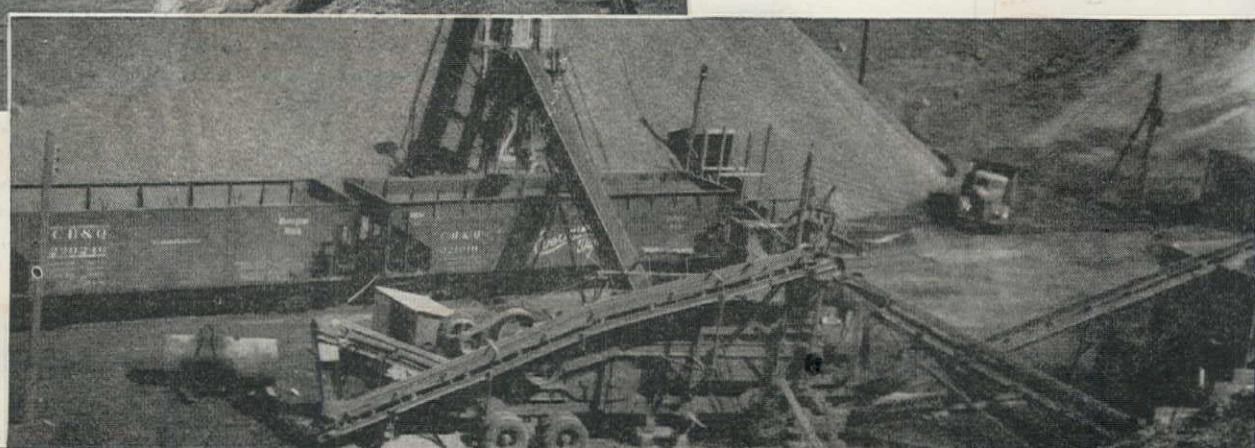
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SPEEDED THE JOB...
GAVE CONTRACTOR THE "EDGE"

IT WAS a hurry-up job, and Winkelman* did it! . . . because it was organized with equipment thoughtfully "zoned" according to the sphere for which each unit was best suited. That's how the moving of 2½ million yards of earth for the Natchez Airport was accomplished quickly and at low cost.

Cuts ranged up to 25 feet; fills to 44 feet; hauling distances to 1800 feet. For fastest and most economical operation, all three modern methods were used: (1) Track-type tractors and bulldozers for the "pushaways"; (2) Track-type tractors and large-capacity carry-type scrapers for the shorter hauls; (3) Wheel tractors and pushdozer-loaded scrapers for the distance hauls.

23 out of the 24 track-type tractors used were "Caterpillar" Diesels.

All 11 of the wheel tractors were "Caterpillar" Diesel DW10's.

The 7 motor graders used were "Caterpillar" Diesels.



*D. W. Winkelman Co., Inc., contractor. Illustration shows only a small portion of equipment used on project.



Wagons, bulldozers, rollers, scarifiers, distributors, mixers and minor pieces completed the well-rounded equipment for handling this and similar large-scale projects with efficiency—and with minimum risk of underestimates or delays.

"Caterpillar" builds the power units you need to zone your equipment for LOWEST COSTS ON EARTH

There are "Caterpillar" Diesel track-type tractors, wheel tractors, motor

graders and engines—all in the right models or sizes for a wide range of earth-moving jobs.

Thus, the contractor who "goes one hundred per cent 'Caterpillar'" gives himself the further advantage of having all his equipment kept in good serviceable condition by one service-dealer organization. It is a nationwide organization—the most complete, conveniently spotted and efficiently equipped of its kind in the world.

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

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ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



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Remember his service and honor him.*

FLUID PRESSURE COMPACTION



... with a BROS "Wobble Wheel" * ROLLER

Road or air-field foundations must be evenly and thoroughly compacted to support surfaces that have a low-cost maintenance and lasting utility. They need the fluid pressure compaction of the Bros "Wobble Wheel" * Roller which works and kneads the material together, eliminating voids, and compacts them to a uniform density from top to bottom

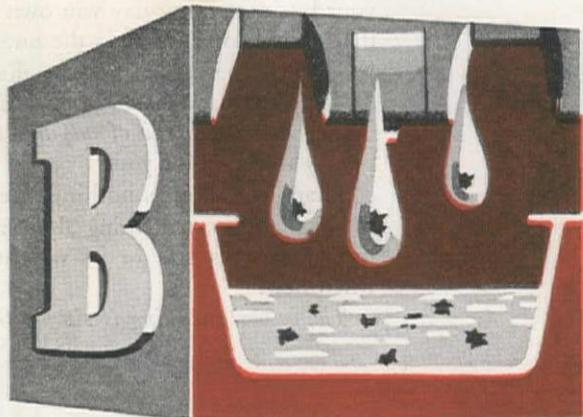
and from side to side. The rubber tire rollers, low-pressure inflated and with smooth treads, provide a firm and durable foundation—proving once again that "you get the most and only from Bros". Wm. Bros Boiler & Manufacturing Company, 1057 10th Avenue Southeast, Minneapolis 14, Minnesota.

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The life of your Diesel depends largely on the lubricating oil you use. First of all, the oil must do a thorough job of lubricating vital engine parts under every operating condition.

It must contain a detergent to wash off gummy, unburned fuel residues and soot. It must also keep these particles afloat to prevent scratching, blow-by and stuck rings.



The lubricant you use must itself have a low coefficient of friction if the engine is to operate efficiently and the cylinders are to be protected against wear under normal operating conditions.

It must have the film strength to resist severe loading at high operating temperatures. The film must not burn off during the firing stroke or drain away when the engine is idle.

Dieso-Life possesses these four factors that keep Diesels fit. Try it as an aid in cutting maintenance expense. Phone your local Union Oil representative for a supply.



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Another **UNION OIL**
Success-Tested Product



Affiliate Member, Associated General Contractors of America

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Your truck is mechanical equipment in your business. As such it *makes or loses money* for your business every day you own it. The truck that costs least *at work* is the one to use.

As with any production machine—the *longer* your truck lasts—the *harder* it works—the *less it costs per unit of output*—then the more money it makes for you.

That's why there's nothing like a Mack.

For, the important thing about a Mack is not its name or its size or its weight or its price when new.

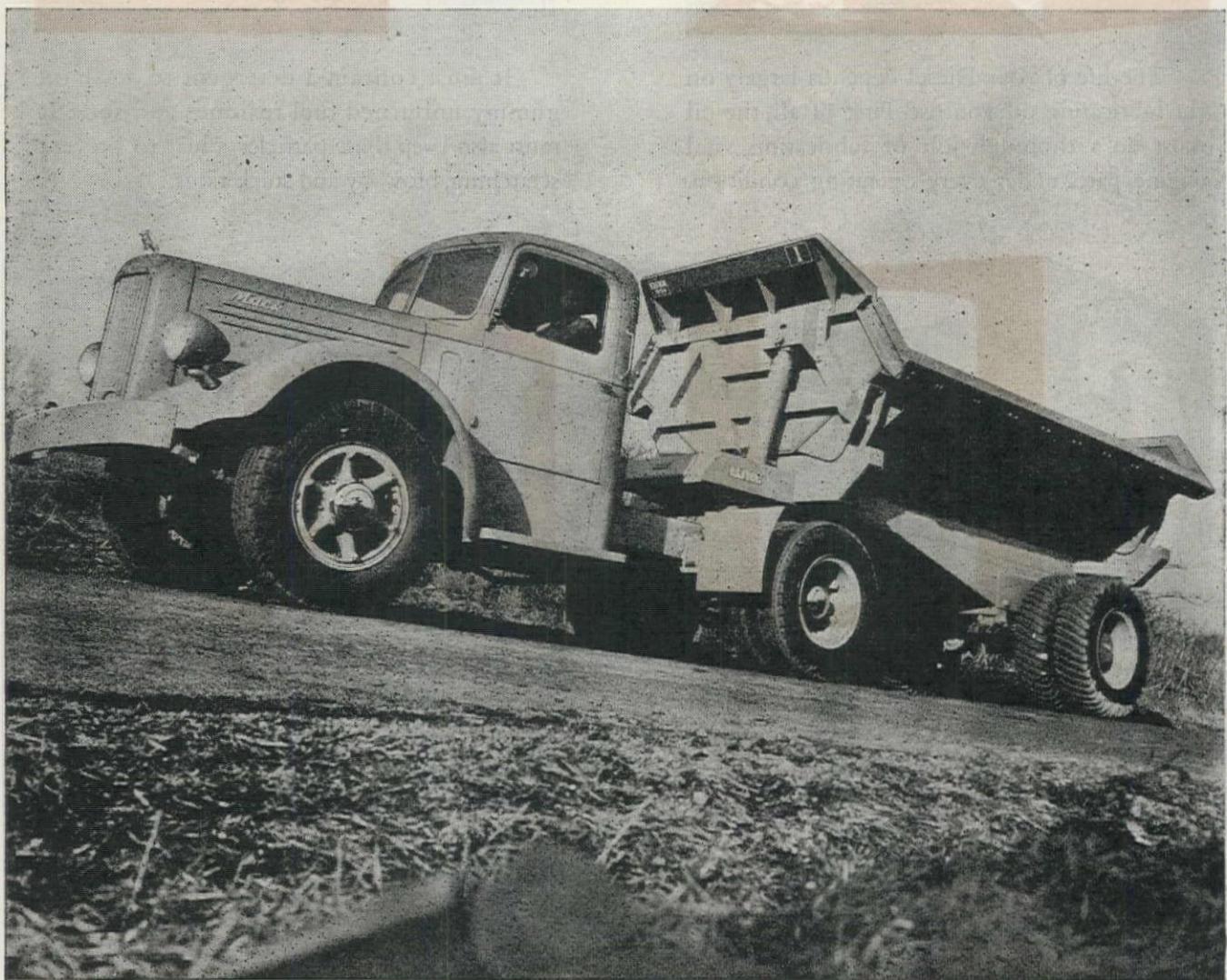
The important thing is simply that a Mack is

built to work harder, longer, and at lower per-day cost, than any other truck in the world.

The reasons why it can do this, the Mack owner may never see—such as Mack wristpins finished to one ten thousandth of an inch—one of many Mack quality processes that insure better fit, and greater durability at work.

But the reasons are *there*—in every Mack truck. And the results are on the records of American business since 1900.

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★ BUY THAT EXTRA WAR BOND TODAY ★



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TRUCKS

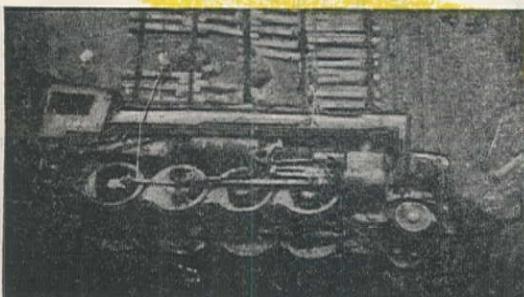
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ONE TON TO FORTY-FIVE TONS



NEW Mack Trucks
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essential civilian use.
Ask for details.

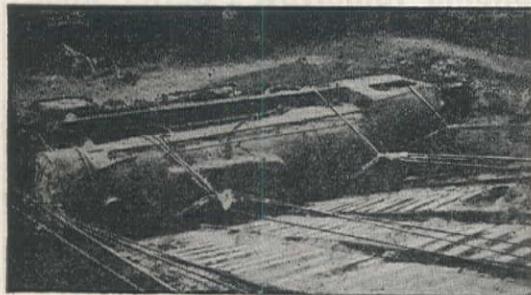
HYSTERS are 'naturals' for tough hoisting - pulling jobs like this...



1 This 2-8-0 U. S. A. locomotive slid down the side of a 60-foot fill that gave way after unusually heavy rains. It lay on its side at the bottom of a 45 degree slope.



2 A nearby British school of mechanical engineers loaned two "Caterpillar" tractors equipped with HYSTER Towing Winches. A skid mat of rails anchored to ties was built.



3 Two slings leading from the HYSTER Winches, and double-blocked to hand winches as a safety precaution, were then placed around the locomotive and raising got underway.

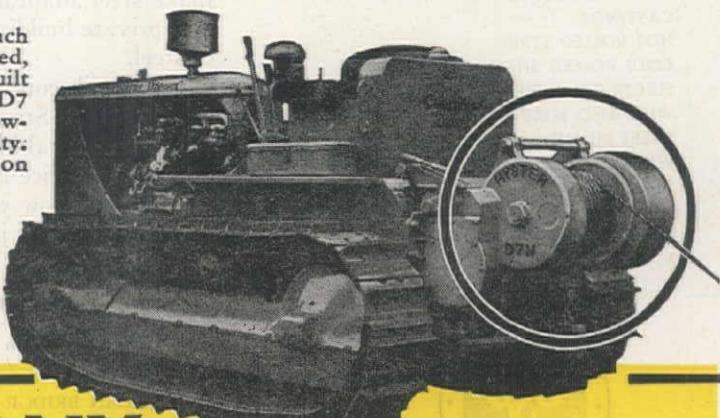


4 The locomotive was finally raised to level ground, rotated parallel to right-of-way, and rolled over on its wheels. Job was completed during bitter cold and stormy weather.



5 This HYSTER D7N Towing Winch was the model used on the job. Rugged, direct-geared and reversible, it's built strong to utilize the "Caterpillar" D7 tractor's immense power. Tough towing and hoisting jobs are its specialty. Write for complete specifications on HYSTER Winches.

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FABRICATED STRUCTURAL WORK

STEEL'S dependable performance in the rush of war—where time was often the factor that won battles—has provided additional proof that you can't beat steel for construction work of all kinds.

Steel will play a bigger role in peacetime road and bridge building than ever before. Already, draftsmen and engineers are writing pre-fabricated steel into the specifications of tomorrow's better street and highway projects.

What does this mean to you? More efficient operation. Fewer man-hours per project. Less overtime work. Surer profits.

STEEL'S recognized versatility, great strength and durability will be reflected in every mile of roadway you lay . . . every bridge span you erect. Its high modulus of elasticity and high strength-weight ratio make steel adaptable to all types of construction. Tomorrow's public and private buildings, too, will be monuments to the lifetime qualities of steel.

For details concerning specific applications of U·S·S Steel Engineering Products—Structural Shapes, Reinforcing Bars, Wire Rods, Fabricated Structural Work, Plates, Sheets, Piling, I-Beam-Lok Flooring—address the office nearest you. Our engineers welcome an opportunity to show you how you can advantageously use these better steel products on your new jobs.

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I-R WAGON DRILLS • JACKHAMERS • DRIFTERS • PAVING BREAKERS • PORTABLE COMPRESSORS



Deep-hole drilling power and unusual flexibility result from using FM-2 Wagon Mountings equipped with the sturdy X-71WD Drill.

More feet of hole per shift from I-R Jackhamers, with their easy holding, high drilling speed and durability. There is a size and type for every drilling problem.

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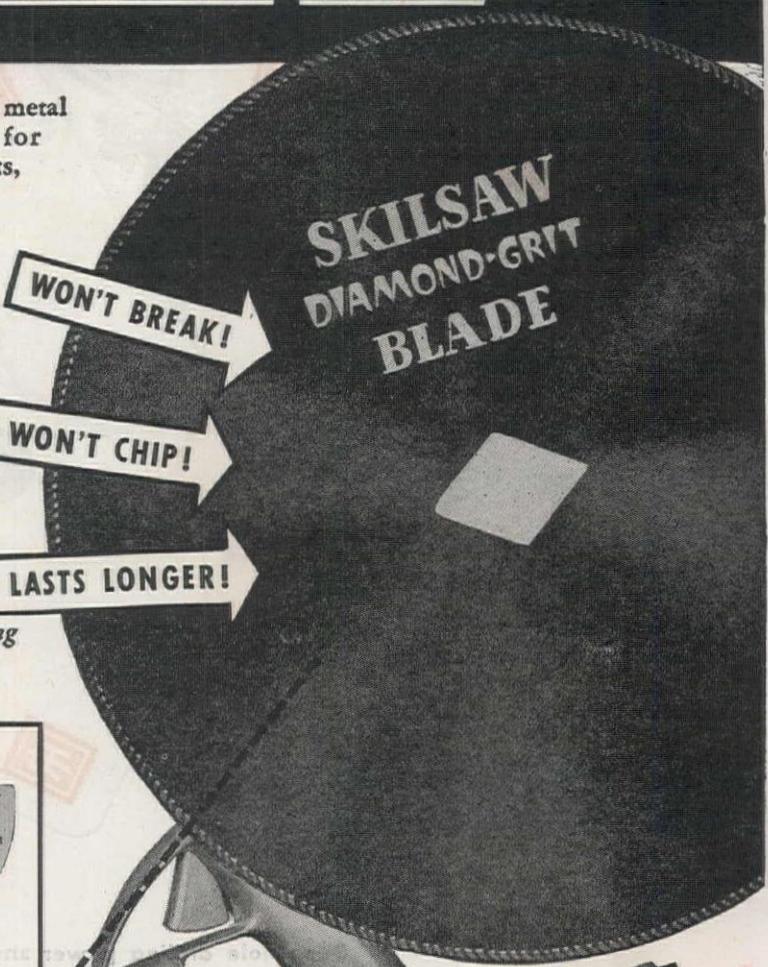
14-713

This Metal Blade in your SKILSAW cuts all masonry products Faster, Cleaner, ***Without Dust!***

Embedded diamond grit gives this SKILSAW metal blade a faster-working, longer-lasting edge for smoother, cleaner cutting of all masonry products, hardened asbestos cement, glass, and a host of other building materials.

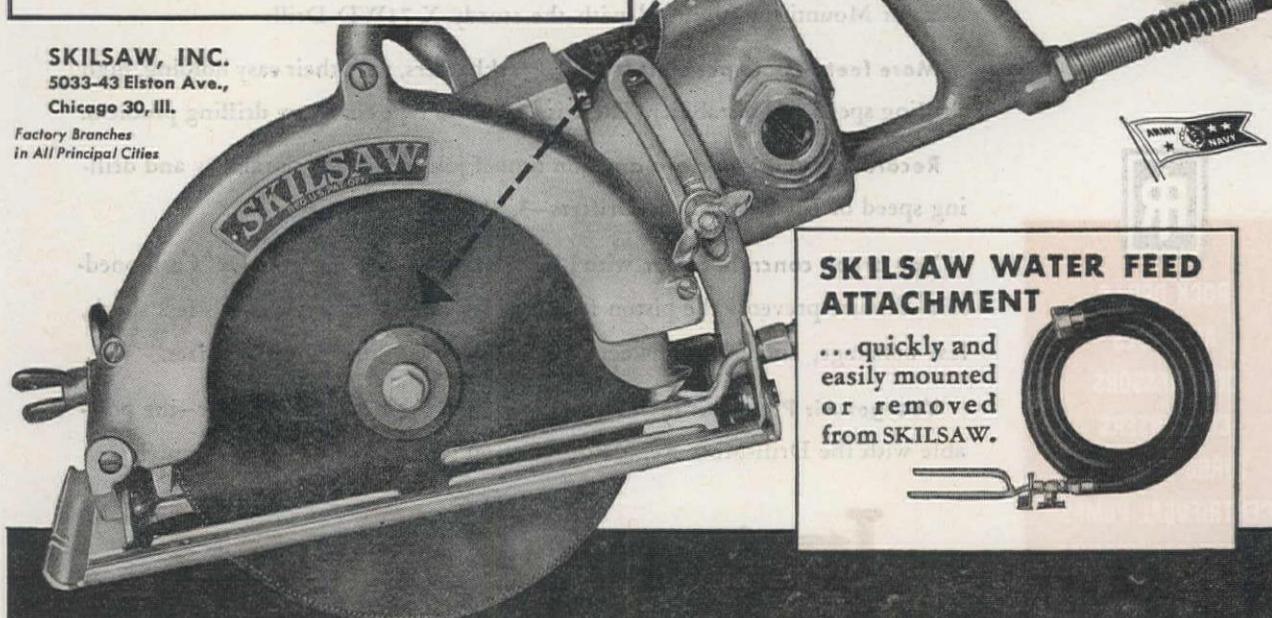
Outlasts abrasive discs 5 to 1 . . . there's only $\frac{1}{8}$ -inch loss of radius during the entire life of the blade. Saves time . . . eliminates need of frequent adjustment of saw base (a real time killer, as any user of abrasive discs knows.) It's safer . . . shatter-proof, no danger of flying pieces of abrasive. It's dustless . . . a practical, easy-to-install water attachment supplies water to point of cut, eliminates dust. This blade cannot be used dry.

Available in thin, medium or heavy types in 7, 8, 9 and 10-inch sizes to fit SKILSAW Models "77", "825", "87" and "127". Ask your distributor today to demonstrate the greater cutting speed, safety and economy of the SKILSAW Diamond-Grit Blade!



SKILSAW, INC.
5033-43 Elston Ave.,
Chicago 30, Ill.

Factory Branches
in All Principal Cities

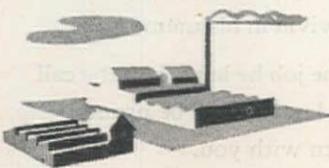


SKILSAW WATER FEED ATTACHMENT

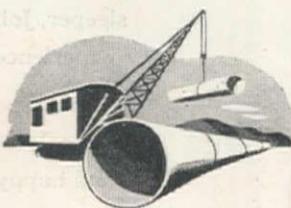
... quickly and
easily mounted
or removed
from SKILSAW.

UNUSUAL STEEL JOBS HANDLED QUICKLY, CAPABLY

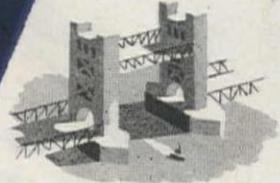
Here are examples of the unusual and specialized steel jobs that Consolidated Steel Corporation is prepared to help plan and fabricate for you now.



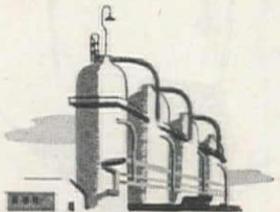
INDUSTRIAL BUILDINGS



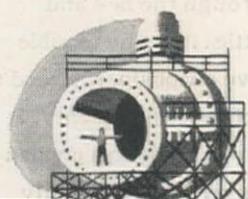
PIPE LINES



BRIDGES



PETROLEUM EQUIPMENT



LARGE VALVES



TRANSMISSION TOWERS



TANKS

For precision steel fabrication—handled quickly and capably—call in Consolidated Steel Corporation, 5700 South Eastern Avenue, Los Angeles 22, Calif. Other plants at Long Beach, Wilmington, Newport Beach, Calif.; Orange, Texas.

Largest Independent in the West

Consolidated Steel

FABRICATORS

ENGINEERS

CRAFTSMEN





A different Johnny is marching home

For one thing, he won't parade up Main Street the way you always expected. He doesn't much care for the ticker tape and bunting. By day coach or sleeper, Johnny is coming home with the experiences of battle vivid in his memory.

He may be back for the job he left when the call to colors came. You know you'll be proud and happy to have him with you.

But it's a *different* Johnny. Not quite the happy-go-careless guy you knew before. He's older for one thing. More thoughtful. You may even find him brusque or restless now and then.

Why?

When a man's been through the hell and pandemonium of battle... or the terrible boredom of lonely, inactive outposts, it's hard to readjust to a paradise of peace and plenty. It will take Johnny time to settle in a civilian groove, and the call's on you for friendly tact and patience.

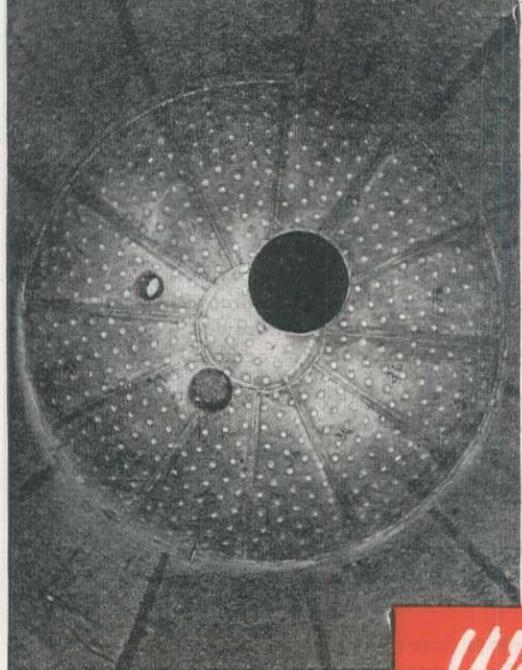
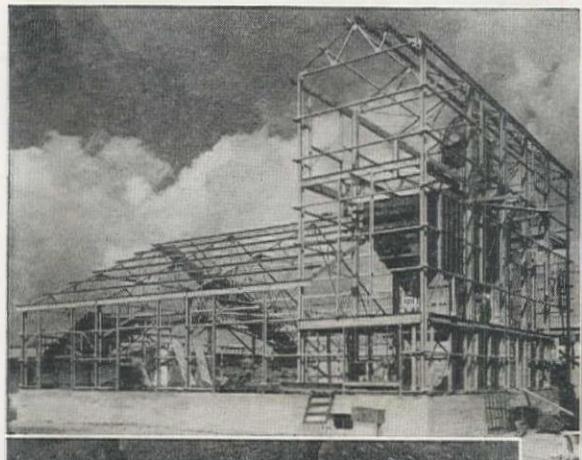
Pull with Johnny. Give him time to come through at home, as he came through on the fighting front. Play ball with Johnny.

He made a swell soldier. And he's going to make a swell civilian.

MACWHYTE COMPANY, 2909 Fourteenth Avenue,
Kenosha, Wisconsin... manufacturers of "Hi-Fatigue" Aircraft
Cable, "Safe-Lock" Cable Terminals, Aircraft Tie-Rods,
Braided Wire Rope Slings, and Wire Rope for all requirements.



STEEL CONSTRUCTION MEN *who know how!*



Developments by steel construction men today are numerous and varied. Tomorrow's demands call for precision and exactness. Pipe will be bent into intricate shapes, while sheets will be stamped or formed, punched and welded to special contours.

Western Pipe & Steel Company's personnel over the past forty years has accumulated millions of hours of steel construction knowledge and 'know-how'. Whether it be of a storage tank, smoke stack, pressure vessel, water, oil or gas pipe line, Western Pipe & Steel Company has the answer to your steel construction problems.

Our staff will be glad to make recommendations on the application of steel to your needs. A letter or call is all that is necessary.

WESTERN BUILT PRODUCTS INCLUDE:

Tanks
Bolted
Galvanized
Riveted
Welded
Towers
Gas Cleaners
Gas Holders
Gas Separators
Heat Exchangers

Linings, Corrosion
Resisting
Pipe
Gas, Water & Oil
Towers
Bubble
Evaporator
Fractionating
Vessels
Pressure
Walkways
Structural

Western PIPE & STEEL COMPANY OF CALIFORNIA

Fabricators and Erectors

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Box 2015, Terminal Annex
Los Angeles 54, California

200 Bush Street
San Francisco 6
California

*Plants and Offices: FRESNO, BAKERSFIELD,
TAFT, CALIFORNIA AND PHOENIX, ARIZONA*



HOW A  TRAVEL PLANT
GIVES YOU MORE MILES
FOR YOUR MONEY



• Building longer lasting asphalt roads is only one of the ways a Barber-Greene Travel Plant gives you more for your money.

Here's how a B-G Travel Plant cuts down construction expense to help you stretch limited funds into more miles of completed highways:

* **Continuous, high quality production.** No batches, no pauses. No human element to lower capacity . . . no dependence on operating skill to maintain consistency.

* **Reduction of the weather hazard.** No partially-prepared material to be spoiled by sudden showers.

* **Full working periods.** Short mixing cycle permits operation on colder days, later at night, earlier and longer in the season.

* **No sacrifice of bitumen quality to allow for time-consuming blading.** No rich or lean spots.

Lower percentages of heavier and quicker-setting bitumen with less solvent produce uniformly-coated mixes.

* **Easy job coordination.** Mixing and proportioning performed by a single unit under control of two or three men. When aggregate is windrowed well ahead, it's automatically available as needed.

* **Low investment.** Cost of the B-G Travel Plant is no more than that of the necessary machines for mixed-in-place construction of the same mileage.

* **Versatility.** Handles all types of bituminous and stabilized work. Can be centrally located for maintenance requirements . . . becomes an integral part of Central Plant set-up for production of high-type mixes.

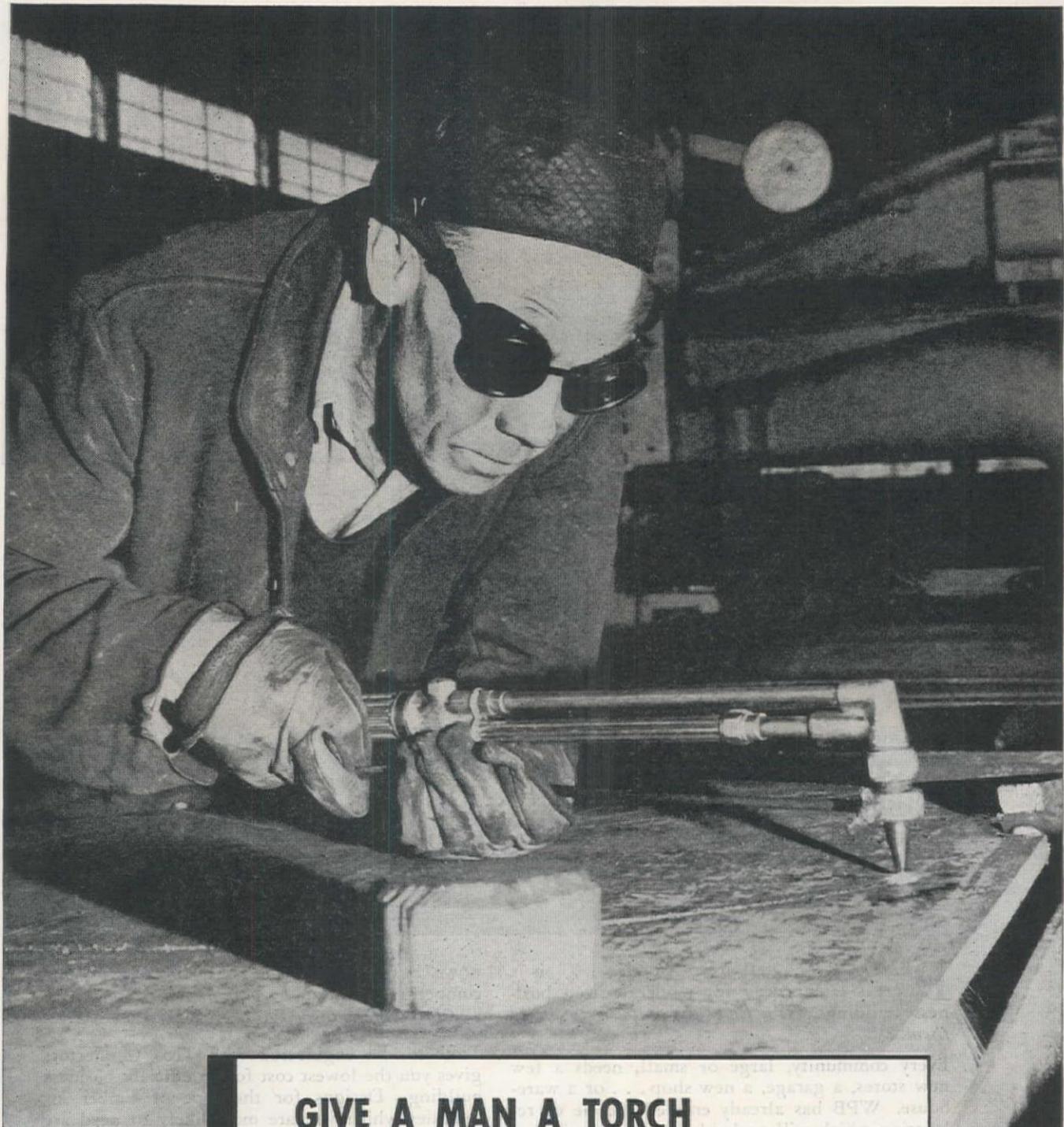
Write for catalogs describing how the economical operation of B-G equipment enables you to surface roads with plant-mixed material at blade-mix cost. Barber-Greene Company, Aurora, Illinois.

Barber-Greene



Constant Flow Equipment





GIVE A MAN A TORCH HE CAN TRUST

Frankly, we have no way of knowing how many burners are using VICTOR cutting torches, but over 75,000 of them have gone to war. Of one thing we are sure—experienced burners, once acquainted with VICTOR torches, will choose them every time.

VICTOR EQUIPMENT COMPANY

844 FOLSOM ST. • SAN FRANCISCO 7, CALIFORNIA

DISTRIBUTORS FROM COAST TO COAST

VICTOR



Ad 136

NEW BUSINESS BUILDINGS NEEDED *Everywhere*



STORES



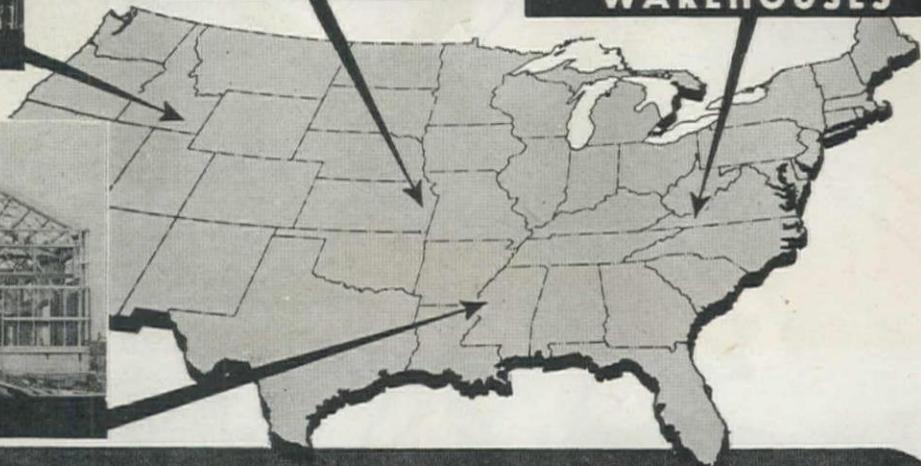
GARAGES



WAREHOUSES



SHOPS



**GET READY TO DESIGN THEM IN TIMBER
... with TECO CONNECTORS**

PENT UP . . . all over America . . . is a great latent need for moderate-sized business buildings. It's time to prepare to build them.

Every community, large or small, needs a few new stores, a garage, a new shop . . . or a warehouse. WPB has already entered a cycle of relaxation which will probably continue until new business structures begin to appear everywhere. PREPARE FOR THIS PHASE IN THE COMING CONSTRUCTION REVIVAL. Examine your local market . . . prepare your designs

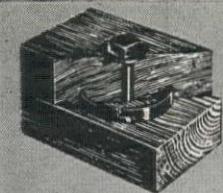
now . . . but, be sure you are in the best possible competitive position by planning in timber with TECO connections.

Timber . . . engineered with Teco Connectors gives you the lowest cost for an efficient business building. Designs for the type of timber assemblies which you are most likely to need are already available to you . . . at no cost or obligation.

Get them—Send for TECO's catalog of "Typical Lumber Designs." Use the coupon below.

Timber Engineering Co., Inc. of Washington, D.C.

Monadnock Building, 681 Market Street, San Francisco • Telephone Garfield 6296



**SPECIFY TECO CONNECTORS
SPLIT RINGS • SHEAR PLATES
GROOVING TOOLS**

USE THIS COUPON

Timber Engineering Company

Monadnock Building, 681 Market Street, San Francisco

Please send me without obligation a copy of "Typical Lumber Designs."

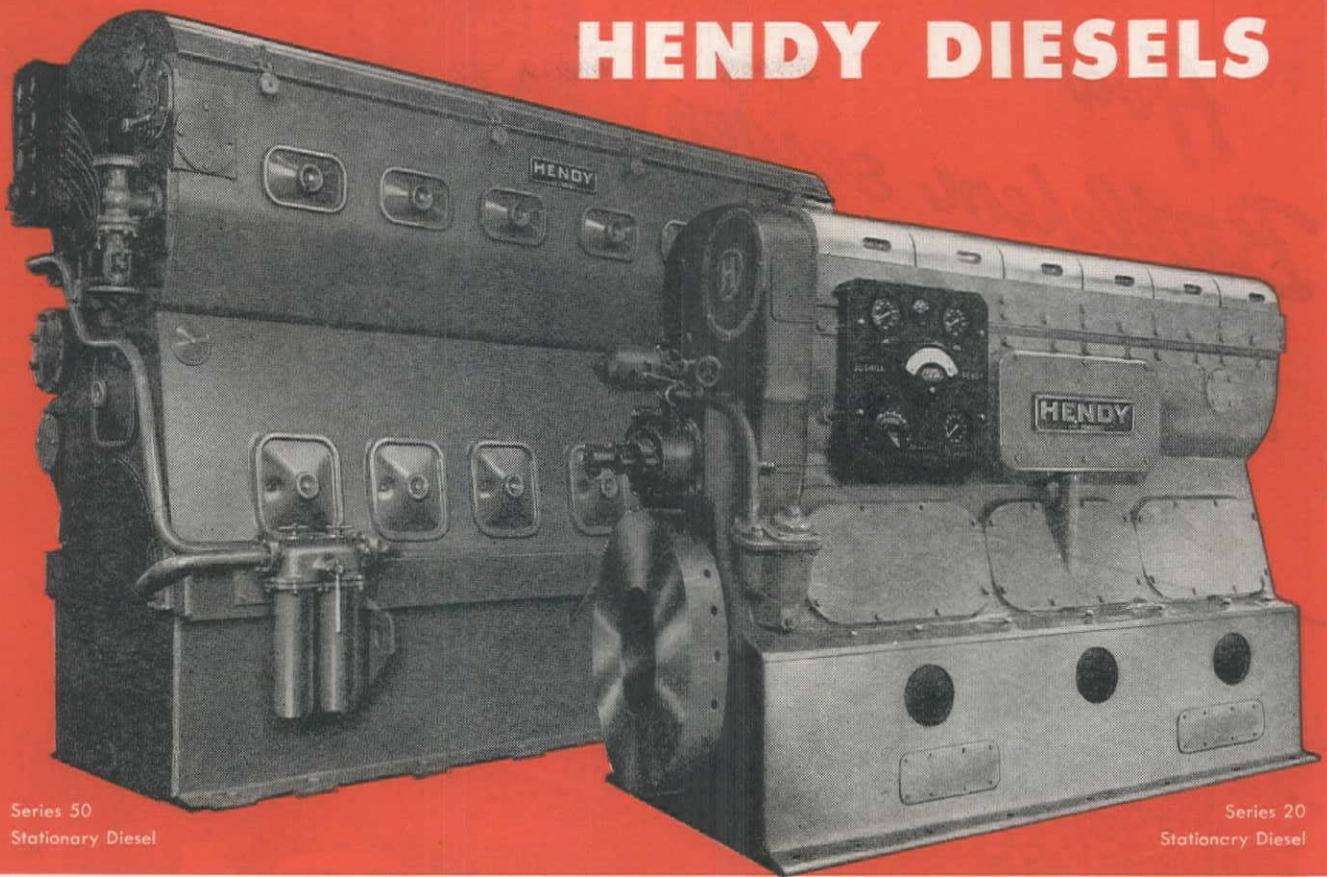
Name.....

Company..... Title.....

Address.....

City..... State.....

HENDY DIESELS



now available from 125 to 780 horsepower

GENERAL SPECIFICATIONS

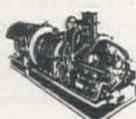
Industrial operators are finding that in Hendy Diesels there is *more* than meets the eye. Besides their clean-cut appearance, they embody many features never before available in any one engine.

DEPENDABILITY: Unit-type fuel pumps and injectors eliminate high-pressure fuel lines and danger of air-locks. Overhead camshafts eliminate many moving parts and give quiet, reliable valve and fuel-pump action. Full pressure lubrication to moving parts assures the correct amount of oil at the right places, automatically.

ACCESSIBILITY: Fuel-transfer, lubricating-oil and cooling-water pumps, oil coolers, fuel and lube-oil filters are conveniently located and instantly accessible. Large inspection-doors, which can be removed without disturbing any other assemblies, give easy access to crankshaft and connecting-rod bearings.

LONGER LIFE: The conservative ratings and heavy-duty characteristics of these engines assure long life and smooth operation. The crankshaft, which is large and well proportioned, is supported by large, replaceable, bronze-backed bearings, all of which receive positive pressure lubrication.

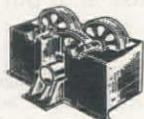
JOSHUA HENDY IRON WORKS
ESTABLISHED 1856
SUNNYVALE, CALIFORNIA



HENDY TURBO-
GENERATORS



HENDY STEAM
TURBINES



HENDY
REDUCTION
GEARS

JOSHUA HENDY IRON WORKS SUNNYVALE, CALIFORNIA

Please send illustrated catalog on Hendy Diesel engines.

I am interested in engines up to 300 hp ; over 300
hp ; Diesel electric generating plants up to 225 kw ;
over 225 kw .

Name _____

Company _____

Street _____

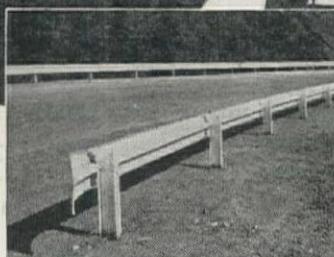
City _____ Zone _____ State _____

96-D-19

How Bethlehem serves HIGHWAY BUILDERS



REINFORCING STEEL—Bethlehem Bar Mats, made of deformed bars clipped together, are easy and convenient to install, and lie flat.



HIGHWAY GUARD—Bethlehem's beam-type guard rail, called the Safety-Beam, is made in standard 12 ft., 6 in. lengths, or can be supplied in lengths up to 50 ft.

THREE'LL be a great army at work—perhaps as many as 7,000,000 men—when postwar highway and bridge building gets under way.

Your district will have its part in this big, constructive peacetime push. You may have already figured out your manpower needs, and how your logistics—the fine art of keeping supplies moving to the front—will work out.

Make Bethlehem the G.H.Q. for your road and bridge steel needs. Bethlehem can supply every one of the many steel items needed to build a modern concrete highway, and bridges. There's a Bethlehem warehouse near you, and all you'll need to do to get your complete road steel order moving fast is to put in a telephone call.

BETHLEHEM STEEL COMPANY—on the Pacific Coast—District Offices: San Francisco, Los Angeles, Portland, Seattle; Steel Plants: South San Francisco, Los Angeles, Seattle; Fabricating Works: South San Francisco, Alameda, Los Angeles; Shipyards: San Francisco, Alameda, San Pedro.

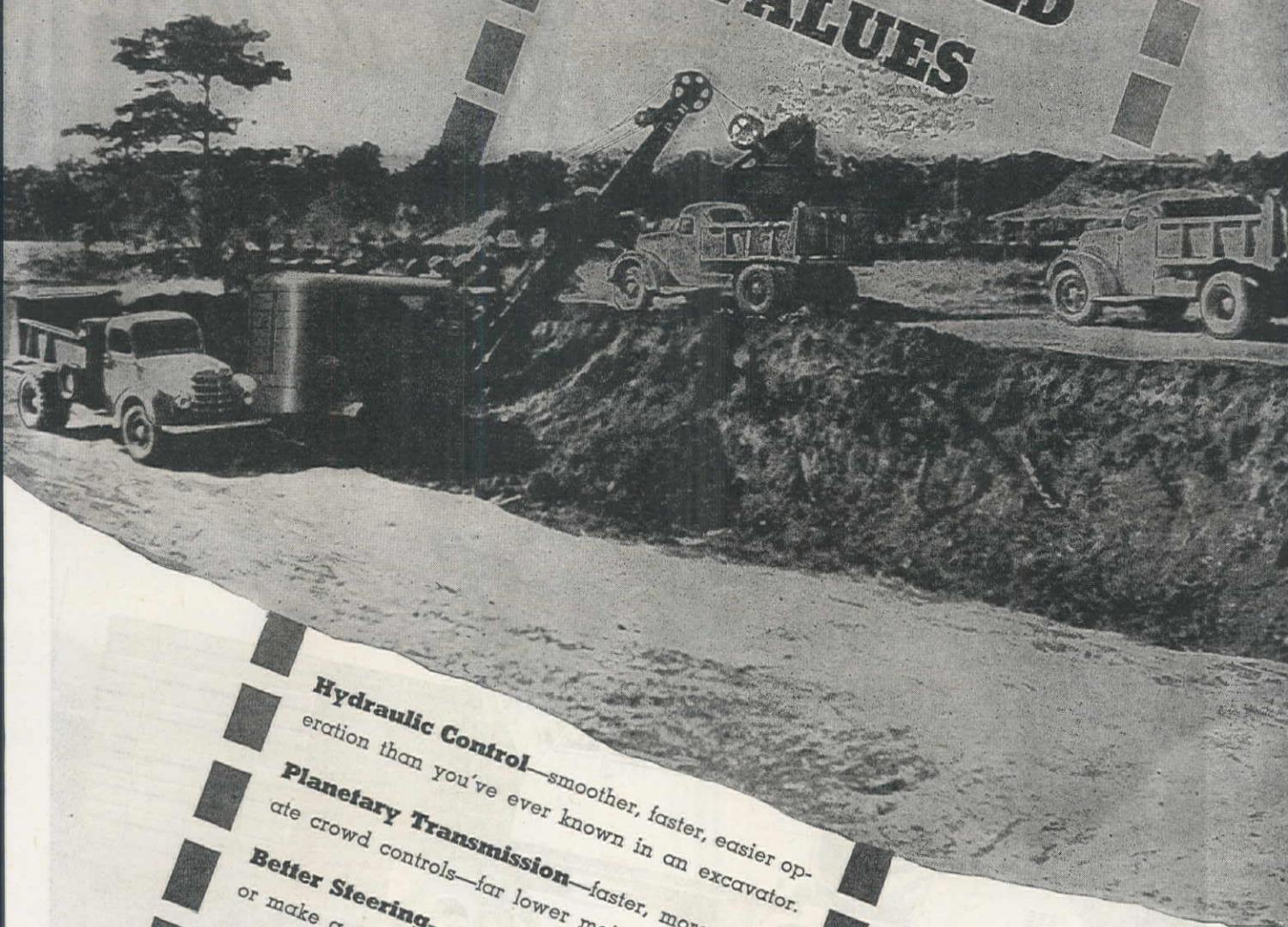


**BETHLEHEM PRODUCTS
FOR HIGHWAYS**

Road Joints • Center Strip • Dowels
Dowel Bar Supports • Reinforcing Bars
Bar Mats • Bar Ties • Reinforcing for
Concrete Pipe • Bridge Floor Reinforcing
• Concrete Slab Spacers • Welded
Wire Fabric • Guard Rails • Guard
Posts and Brackets • Wire Rope and
Strand • Right-of-Way Fence and Posts
Anchor Rods • Pipe • Hollow Drill Steel
Digging Bars • Structural Steel • Mold
Boards • Corrugated Sheets • Turn-
buckles • Tie Rods, Spikes, Bolts
and Nuts • Timber Bridge Hardware
Sheet and H-Bearing Piling

P & H

ADD UP
THE ADDED
VALUES



Hydraulic Control—smoother, faster, easier operation than you've ever known in an excavator.

Planetary Transmission—faster, more accurate crowd controls—far lower maintenance costs.

Better Steering—can turn right or left abruptly or make a complete circle without stopping.

Tractor Type Crawlers—save hundreds of dollars each year in trouble-free travel.

All Welded Construction—rolled alloy steels provide greater strength, greater rigidity—longer life throughout.

Ask for literature giving details on these and the many other P&H advantages.

Dollars Buy More When You Buy a P & H

HARNISCHFEGER CORPORATION
82 Beale Street San Francisco, Calif.

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Portland, Ore.: Loggers & Contractors Machinery Co., 240 S. E. Clay St.; Willows, Calif.: Willows Motor Sales Co.; Napa, Calif.: Berglund Tractor & Equipment Co., 1224 Third St.; Salt Lake City, Utah: National Equipment Co., 101 West Second St., So.; Boise, Idaho: Olson Manufacturing Company, 2223 Fairview Ave.; Spokane, Wash.: F. M. Viles & Co., 1007 Second Ave., West; Sacramento, Calif.: Capital Tractor & Equipment Co., 235 West 16th St.; Reno, Nev.: Dennison Tractor & Supply Company, 559 East Fourth St.

P & H

HARNISCHFEGER CORPORATION

EXCAVATORS

4490 W. National Ave.,
Milwaukee 14, Wis.

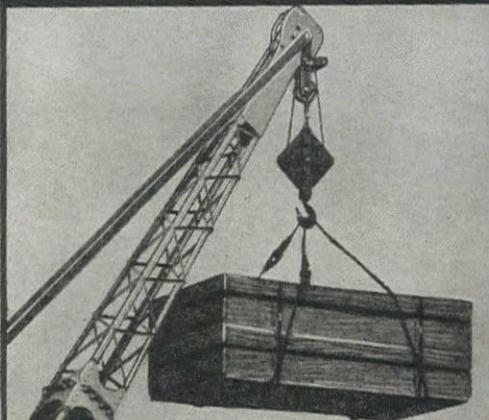
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS



Crane today -

DRAGLINE, CLAM,
SHOVEL OR HOE
tomorrow

To be most profitable for its owner, a mobile power shovel must have **CONVERTIBILITY** that matches its mobility. Quick change-over to all standard attachments is possible with **MICHIGAN** because it was designed all the way through for operating flexibility. No changing of drums is necessary—all connections are simple, accessible and easy to make . . . This fast-conversion feature alone saves hours and hours of time every month when the machine must serve a variety of purposes. . . Every **MICHIGAN** is **AIR CONTROLLED**—for continuous work all day at top speed and with operator-ease. . . . This is Model T-6-K—the $\frac{3}{8}$ -yard Shovel, 6-ton Crane unit which, along with the larger 10-12-ton models, is making materials-handling history in civilian as well as military use today.



Remember—

The **MICHIGAN** is a heavy-duty unit built from the ground-up by the pioneers in this specialized field.

"America's Truck-Shovel-Crane Specialists"
Write today for Bulletin W-85

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

Continental Red Seal Engines



POWER TO WIN

This compact, powerful Dozer is small enough to stow in a transport plane. It is powered by a Continental Red Seal Engine and has great earth-moving, hauling, or lifting capacity.

Continental Red Seal Power has contributed so much to the efficiency of all types of vital war equipment that it has earned its reputation as — the Power to Win.

Your Dollars are Power, Too!
Buy War Bonds and Keep Them!



Awarded to the Detroit
and Muskegon Plants of
Continental Motors
Corporation for High
Achievement

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SALES AND SERVICE

Continental Red Seal Engines and Parts
Los Angeles • Sacramento • San Francisco • Oakland • Fresno

MARION
HAS THE ANSWER!

What is Your Material Handling Problem?

Construction will benefit materially from the billions of dollars now being set aside for post-war developments.

To meet the demand that will exist for proven equipment, MARION has a machine of the right size and type from $\frac{1}{4}$

cubic yard to 35 cubic yards. Put a fast, powerful MARION on that postwar job — then watch the rock and dirt fly! Let's discuss your problems!

IS IT AGGREGATES



The huge building boom ahead will require millions of yards of aggregates — stone — slag — sand and gravel. You can bank on the dependability of a MARION. Let us help you select the MARION most suitable for your requirements.

THE MARION STEAM SHOVEL CO. • MARION, OHIO
SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS
CLAMSHELLS • WALKERS • from $\frac{1}{4}$ cu. yds. to 35 cu. yds.

MODERNIZE WITH

THE MARION

STEAM SHOVEL COMPANY
Marion, Ohio
3/4 CU. YD. TO 35 CU. YDS.

Hosted out of basement
No street equipment line

MARION DISTRIBUTORS

Edward R. Bacon Company, Folsom at 17th Street, San Francisco 10, Calif.; Geo. B. Brose, The Marion Steam Shovel Company, 571 Howard St., San Francisco 5, Calif.; Joseph O. Reed, 603 Terminal Sales Bldg., Portland 5, Ore.; Star Machinery Co., 1741 First Ave., South, Seattle 4, Wash.; Shaw Sales Service Co., 2027 South Santa Fe Ave., Los Angeles, Calif.; H. H. Nielson, 902 Boston Bldg., Salt Lake City, Utah.

ENGINEERED BY AUTOCAR!



A limited quantity of new, heavy-duty Autocar Trucks is now being built by Government authorization. A fortunate few haulers of essential loads can buy them. Maybe you can qualify.

Precision engineered . . . superbly engineered . . . engineered by men who know heavy-duty trucks and what heavy-duty trucks must be to make money and save money on every kind of heavy-duty hauling. Autocar Trucks cost more—more to make and more to buy—*because they're worth more*. And they prove this by mile-after-mile, year-after-year performance for increasing numbers of leading heavy-duty haulers from coast to coast. Gulf Oil Corporation and Gulf Refining Company, for example. . . . Buy Autocars . . . by Autocar! Follow the leaders, for they know the way.

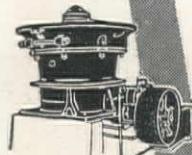
AUTOCAR TRUCKS

Famous for Heavy-Duty Hauling

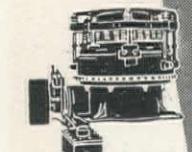
Manufactured in Ardmore, Penna. • Serviced by Factory Branches and Distributors from Coast to Coast



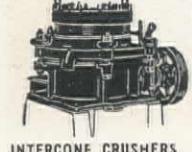
WILL YOUR PLANT BE ready to meet *after-the-war* COMPETITION?



PRIMARY BREAKERS



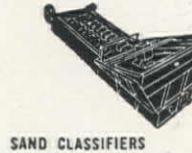
GYRASPHERE CRUSHERS



INTERCONIC CRUSHERS



JAW CRUSHERS



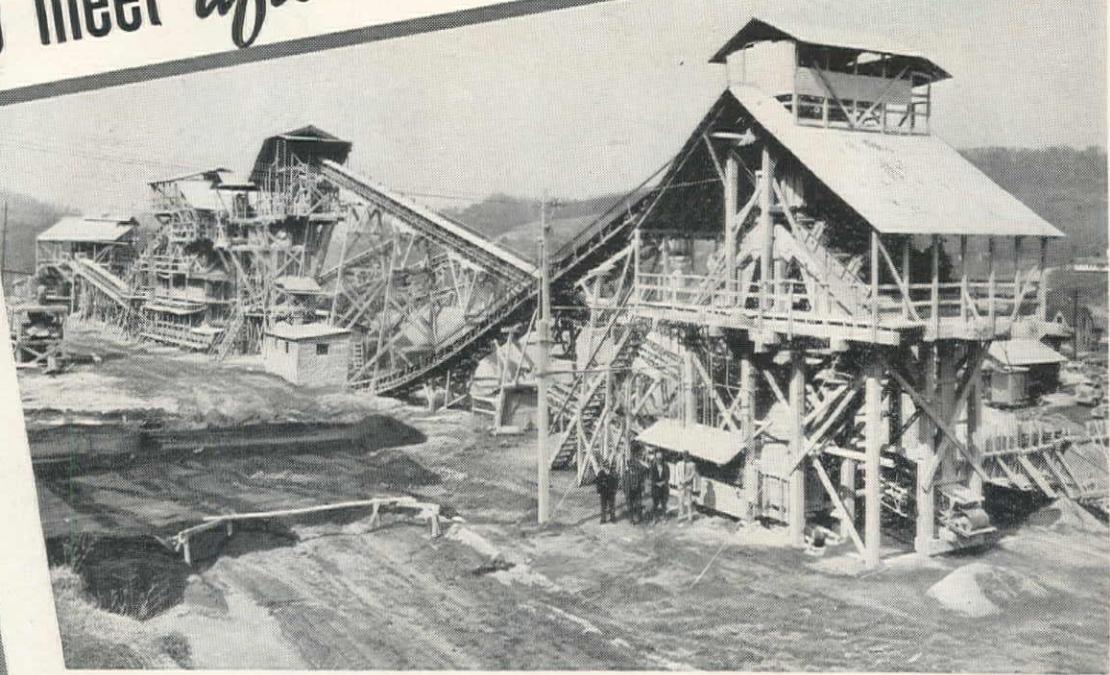
SAND CLASSIFIERS



PULSATOR VIBRATING SCREENS



HEAVY DUTY FEEDERS



Complete modern Telsmith plant
... producing both coarse and
fine aggregates in several sizes.

● AFTER VICTORY your plant will face a

changed market. Peacetime construction contracts and customers will be different. Competition will be keener. Such changes call for plant planning *now!* Rearrangements and additional equipment will be needed. For example, more re-crushing, screening, washing capacity ... to produce the smaller sizes, in the quantities and quality your market demands. Modernize with Telsmith equipment. Give your plant this necessary product flexibility. Boost its output with Telsmith big capacity, free-from-grief, continuous, fast operation. Less power is required. Upkeep is lower. Telsmith equipment keeps your production costs down to a figure that insures you a good profit. Telsmith's 40 years of equipment-building complete-plant-engineering *know-how* is at your disposal. Write us in detail; or send for Bulletin E-30.

E-8

TELSMITH

Equipment

FOR SAND, GRAVEL AND ROCK CRUSHING PLANTS

SMITH ENGINEERING WORKS, 4010 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Mines Engineering & Equipment Company, 369 Pine St., San Francisco 4—811 W. 7th St., Los Angeles 14

Clyde Equipment Co. Clyde Equipment Co. General Machinery Co. Gordon Russell, Ltd. Contractors' Eqpt. & Supply Co.
Portland 9, Ore. Seattle 4, Wash. Spokane 1, Wash. Vancouver, B.C. Albuquerque, N.M. — El Paso, Tex.

Contractors are our best salesmen!



Every owner of a **STANDARD - LEWIS** subgrader
says unreservedly that it **excels in every way**

Here are a few reasons why:

The Standard-Lewis subgrader is designed with a sectional stationary cutting blade (adjustable to any desired subgrade contour) on each side so that grading may be done in either direction without turning machine or time consuming "pull backs." It can be raised by power to pass over manholes, culverts and other obstructions, while in operation. Wheels may be turned 90° to permit towing by truck or tractor over bridges or through narrow places. Many other features make it the one subgrader designed to meet postwar requirements for better, faster paving.



**GET THE WHOLE STORY—
SEND FOR THIS BULLETIN**

STANDARD
STEEL CORPORATION

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

Distributors throughout the United States and Canada

*Space will not permit full addresses which will be sent on request.

"WE RAN 52,480 TONS AT BISHOP,
CALIF.; 20,033 TONS AT WELLS,
NEVADA; 48,019 TONS AT ELY,
NEVADA AND 28,589 TONS AT AUS-
TIN, NEVADA. THIS WAS ACCOM-
PLISHED WITH OUR MADSEN 3,000-
LB. PLANT IN 8 MONTHS."

"OUR MADSEN PLANT REALLY GETS AROUND"

The field report, illustrated above, helps to prove another feature of Madsen's *superiority on the job*. Road-builders and contractors who travel from job to job recognize mobility and self-erection of Madsen Plants as outstanding in the field.

Here are two Madsen-exclusives that help to make this superiority possible.

JACK ERECTION SYSTEM: In cases where a crane is unobtainable or impractical for Plant setup the Madsen-patented jack erection system saves the day. When set up by power lift, a Madsen Plant can be erected for operation in 2 or 3 hours. Without power, and using one man on each of the four jacks, erection is accomplished in an 8-hour day.

The Madsen jack erection system is simplicity itself

...no cranes, skids, ramps or winches....another reason to specify Madsen.

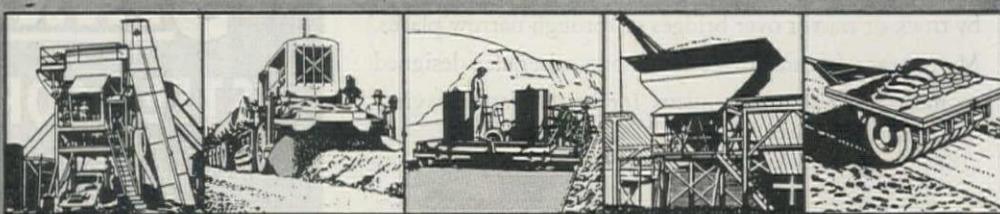
MADSEN TWIN-SHAFT PUG MILL MIXER: Madsen engineering experience and precision parts make possible this sturdily constructed mixer that is easily capable of mixing a capacity batch in 30 to 40 seconds. This feature alone assures you 30 to 40 more batches per day.

Madsen Asphalt Paving Plants are available in 500, 1,000, 2,000, 3,000, 4,000 and 6,000 lb. capacity, with or without jack erection. Write for descriptive Bulletin for more information on Madsen Plants.

MADSEN IRON WORKS
HUNTINGTON PARK • CALIF.



Write
for
Catalog



MADSEN ASPHALT PLANTS • ROAD PUGS • CEMENT FINISHERS • BATCHERS • COMPACTORS



makes your . . . *TOUGHEST* jobs seem *EASY!*

● Rumbling irresistibly over the crest of a ridge comes this new and huskier Buckeye Dozer—ripping up stubborn stumps and boulders, rolling huge masses of earth before it, making short work of the hardest dozing jobs.

Heavy reinforced ribs on moldboard and pushplate maintain rigidity under the toughest dozing conditions. Rugged, but without excess weight, the moldboard can take the full power of the tractor on one corner without permanent deflection. The new Buckeye double trunnion mounting provides an improved method of adjusting the digging angle and tilting the moldboard to take advantage of every working condition, keeping the blade rigid at all times.

Investigate these profit making dozers. Write today for bulletins.



Built by Buckeye ✓

Buckeye Traction Ditcher Co., Findlay, Ohio



Convertible Shovels



Trenchers



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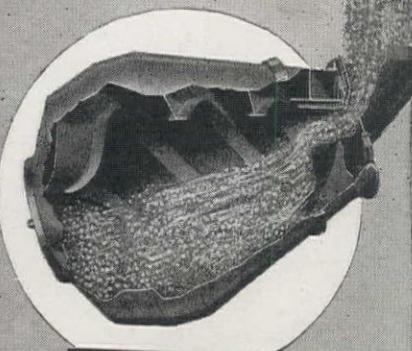
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FASTER DISCHARGE — Open sealing door as far as you wish, and reverse rotation of drum. Instantly the uniformly mixed concrete is discharged by gravity . . . as fast or slow as you want it . . . any quantity you desire. The speed of the drum controls the speed of discharge.

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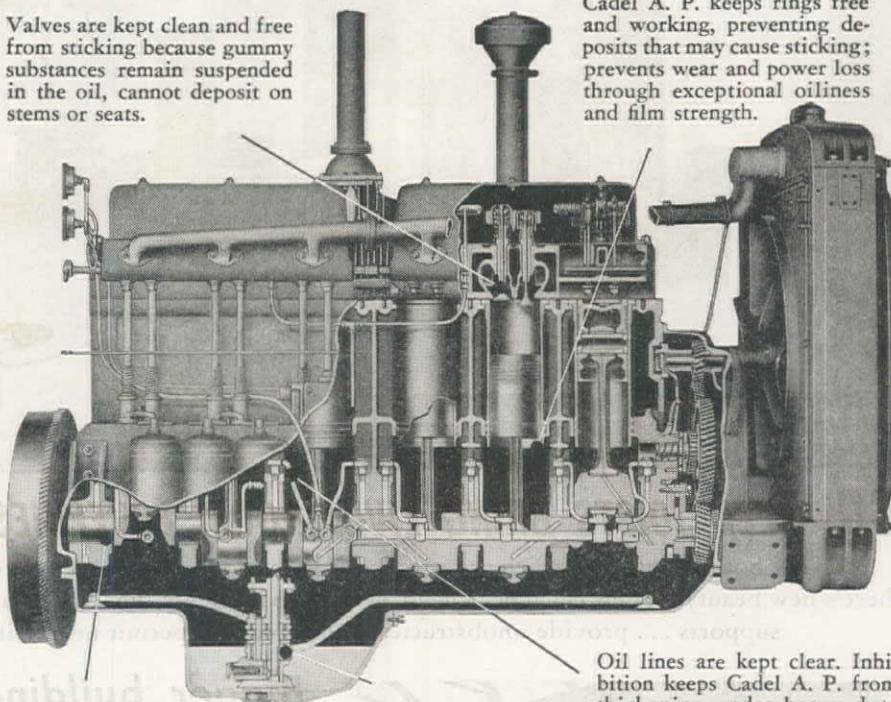
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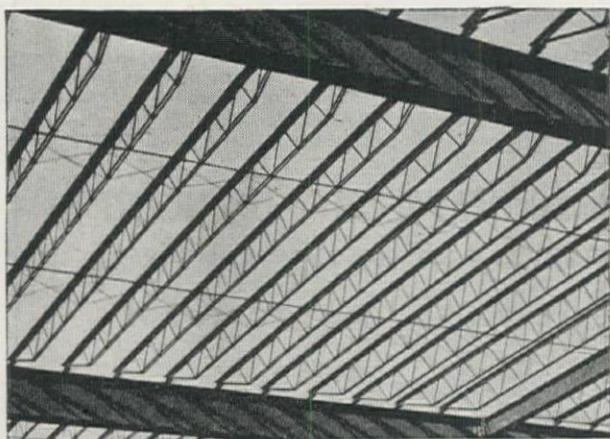


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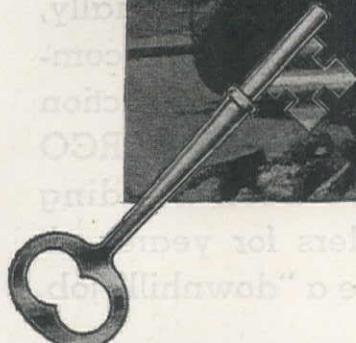
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The "Quick-Way" is the best way to meet a heavy schedule of widely separated jobs requiring different attachments: crane, clam shell, trench hoe, pile driver, or dragline.

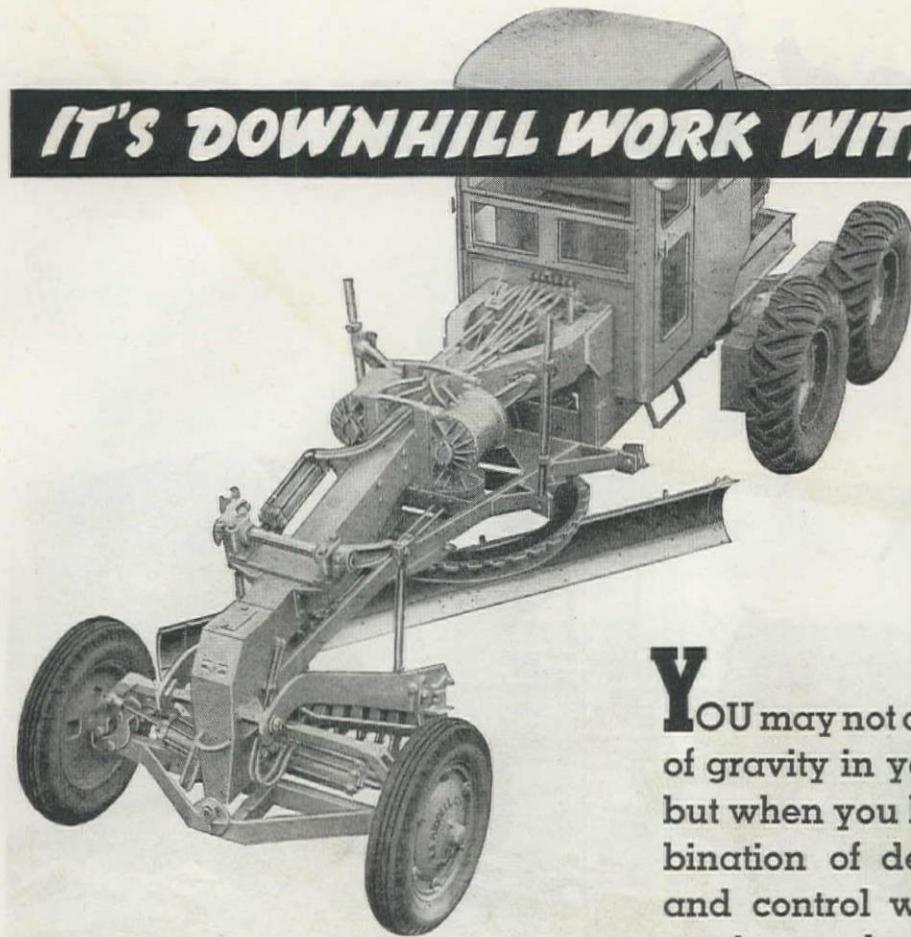
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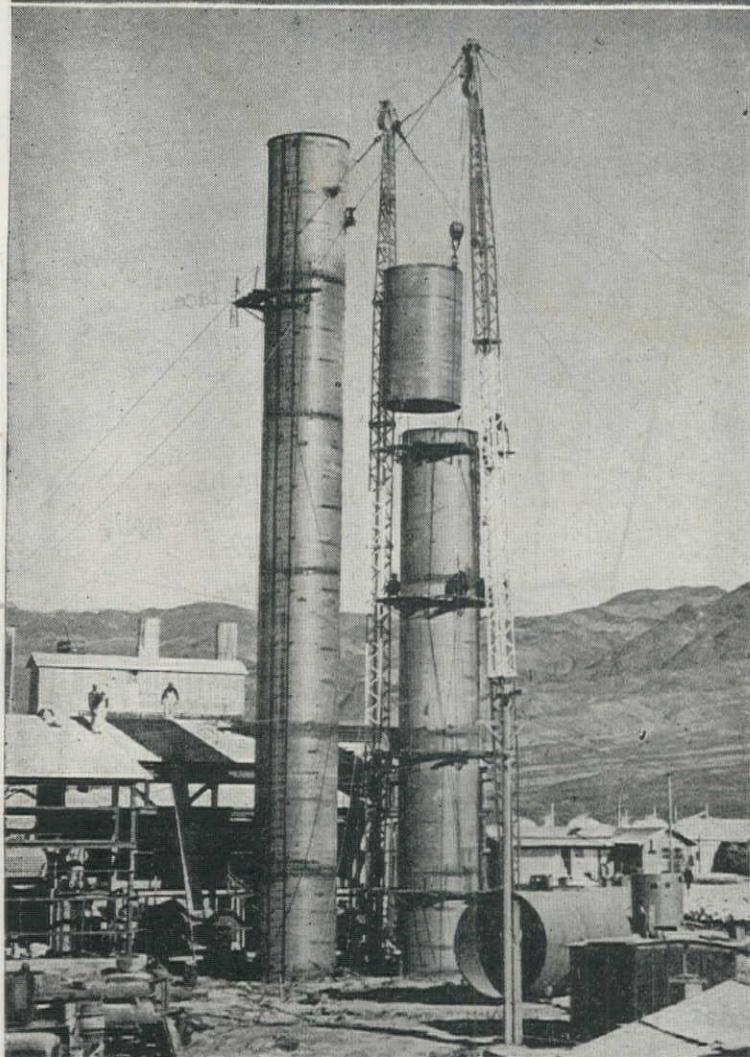


AILING THE WEST'S

PRODUCTION OF *Sodium Carbonate*

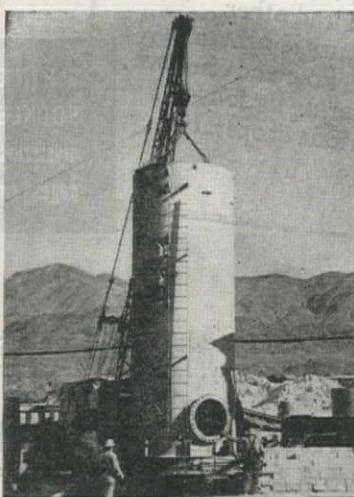
We recently played another part in the West's rapid industrial growth when we installed two brine towers, a scrubber tower and several other welded steel plate structures at the Keeler, California, plant of Natural Soda Products Company. The new brine towers, to be used in the production of sodium carbonate, are 9 ft. 5 $\frac{1}{2}$ in. in diam. by 97 ft. 7 in. high and have a series of mushroom type baffles of new design on the inside.

The brine is pumped from 8 ft. below the surface of a dry lake bed into clay vats about 1,000 ft. sq. and 10 ft. deep. The continuous evaporation which takes place in these vats removes some of the water and increases the salt content of the remaining brine which is pumped from the vats through heat exchangers into the top of the two brine towers. The baffles "break up" the brine as it works its way slowly down through the towers. Purified CO₂ gas is fed into the bottom of the towers and percolates upward through the descending brine and is absorbed, transforming the sodium carbonate in the brine into sesqui carbonate crystals.



In addition to the brine towers, we furnished a 9 ft. diam. by 41 ft. 3 in. scrubber tower, a 5 ft. diam. by 15 ft. draw box and a control tank 3 ft. in diam. by 7 ft. 6 in. The towers and scrubbers were fabricated in sections at one of our plants and were field erected. If you need steel plate work of any description, why not write our nearest office?

The scrubber tower, shown being erected at the right, was fabricated in two sections at our plant and welded together at Keeler, Calif.



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WESTERN CONSTRUCTION NEWS

August, 1945

WVN WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

Vol. 20, No. 8

J. M. SERVER, JR. Editor
T. D. OVERTON Managing Editor
ARNOLD KRUCKMAN . . . Associate Editor
A. H. GRAHAM Field Editor

Optimistic Postwar Views

A RECENT TRIP through the Northwest has indicated to this editor the enthusiastic view held by that region for the future postwar years. The western portion of Washington, Oregon, and British Columbia can be compared in its optimistic outlook with the Los Angeles, Calif., area and the Phoenix, Ariz., section.

The people in each of these areas are far-sighted and are vigorously promoting plans for maintaining full and even expanded employment when the war emergency work is terminated. No one is sitting down with a long face wondering what will happen to industry, commerce and jobs after the war, but they are seeing their areas as the sites of expanded industry, as centers of commerce for great agricultural and industrial areas, as well as of foreign trade, and as a place where everyone who wishes may find work.

Studies are being conducted to determine suitable plant sites; representatives are constantly indicating to eastern manufacturers and business men the advantages of the West, and especially of the particular spot from which the speaker comes; plans for future housing, streets, water supply and sewerage are ready for early construction; adjacent agricultural areas, mines, forest and other natural resources are being catalogued and made ready for development; but most of all, in their minds and imaginations, the people are seeing great things, dreaming great futures, and believing in their ability to accomplish their dreams.

As a concrete example, and hundreds might be cited, is the advance planning for cheap power production in the Northwest. When Coulee dam was built and the energy produced in its mighty powerhouses was added to that then already available in Oregon, Washington, and Idaho, practically the entire country felt the investment would be lost, that so much power could only be wasted.

With the sudden expansion of industry because of the war, this abundance of power was instrumental in bringing much manufacturing to the Northwest, particularly aluminum, magnesium and plastics manufacturing, and shipbuilding. In fact, so much industry was established that every generator in the whole area has been running to capacity and beyond. In order that no kilowatts might be lost, a "Northwest Power Pool" was formed, into which a dozen or more generating agencies, both public and private, poured their production, and from which all demands were met, thus making sure that no generators were idle nor was any industry short of energy.

In spite of this meritorious effort to make maximum use of all facilities, there has been barely enough electricity to go around.

"But," say the skeptics, and not least among them a powerful eastern magazine chain, "when the war demand ceases, the aluminum plants shut down and shipbuilding and airplane factories are closed, there will be power to burn, and half the generators will remain idle."

"Tain't the way I heerd it," might well be the rejoinder of the progressive citizens of the area. The city of Seattle is proceeding with construction of Ross dam (see page 83, this issue) which will, upon ultimate completion, increase the city's production along the Skagit river from 235,000 to 1,120,000 hp. The city of Tacoma, famous as "The Electric City," on about Sept. 1 will put into operation its new Second

Nisqually plants, which will increase its hydro output from 450,000,000 kwh. per yr. to 852,000,000 kwh. per yr., and foresees still other future expansion.

The Bonneville Power Administration, marketing agency for electricity generated at Bureau of Reclamation and U. S. Engineer Department dams along the Columbia River, is expanding its distribution facilities and studying the possibilities of long-distance transmission, anticipating a very large increase in energy with the erection of Hungry Horse, Umatilla; Foster Creek, and numerous other dams. The private power companies, threatened with business extinction by the public agencies, are nevertheless planning full development of their hydro energy sources in the coming years.

Nor are these various agencies building merely for the fun of building, or planning because postwar plans are in demand. They have each made careful checks and studies of the areas they serve and conscientiously calculated the probable future demand for their product. They are confident, with a confidence based on thorough research, that their heavy expenditures of money and effort are a good investment. They KNOW that a great future lies before their area, and will be ready to welcome it.

In the first place, it is by no means a certainty that the industries now producing for war will collapse when the strife is over. Aluminum can be produced and rolled as cheaply or perhaps cheaper in the Northwest than anywhere else. Shipbuilding, both repair and new work, will continue for a considerable period after the war and may, to a large extent, continue as a permanent industry. The demand for lumber and its products will enforce maximum production for years to come. Steadily expanding acreage of irrigated farmland will cause a wide increase in rural electrification. New home uses will absorb more power than ever before.

These comments are based especially on the Pacific Northwest, but are equally applicable to other sections of the great Western Empire, of which the Northwest is but a part. The two other areas mentioned at the outset are also particularly active in their optimistic planning and well-founded postwar prospects. Other sections of the region are or should be equally on the move.

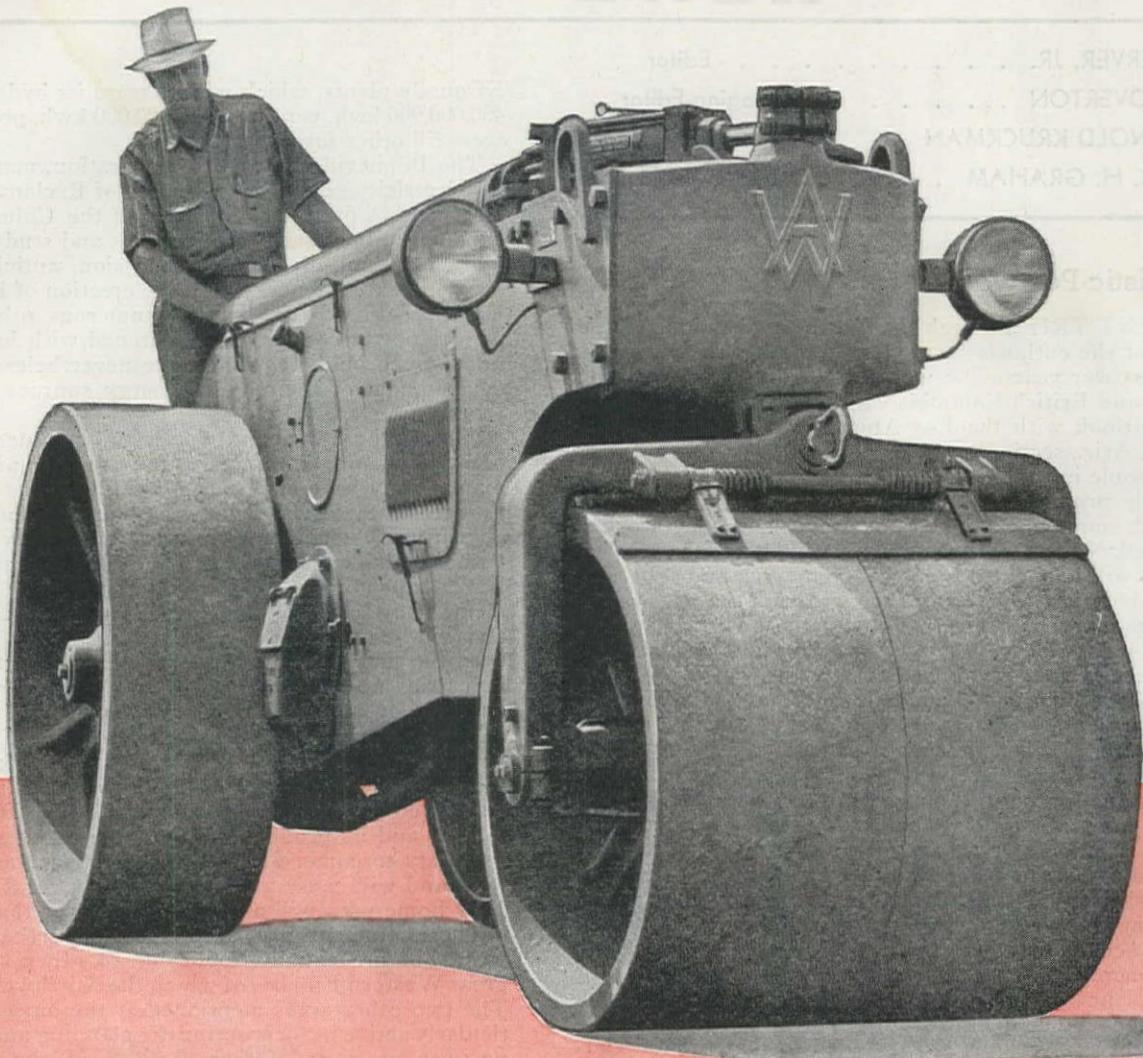
A Needed Improvement

CIVIL AERONAUTICS ADMINISTRATION, with an eye to a vastly expanded use of airplanes in the postwar period by private citizens not very well versed in navigation, is encouraging municipalities and organizations to initiate airmarkings in their localities. These can be marked on the roofs of large buildings, on road intersections, on big lawns or on a nearby mountainside or expanse of desert. Included should be the name of the town, an indicator of magnetic north and the direction and distance to the nearest airport.

It is hoped that 100,000 of these airmarkers can be located over the nation. Without them it is necessary for the pilot unversed in celestial navigation to follow a highway or railway, which may entail many extra miles of travel, follow a compass course, which is apt to be very inaccurate, due to windage and compass variations, or follow a radio course, which is rather a mysterious science to the uninitiated, although very simple to the experienced pilot. All of these involve extra expense or extra time, or both, and a simple system of clearly painted markers would be of inestimable value.

It is to be hoped that the CAA program is widely adopted in the West, where distances between identifiable objects are greater than in the eastern half of the country, and because of rough terrain flying is considerably more dangerous if the pilot is not sure of his bearings.

They all like it!



OPERATOR: . . . for its ease of handling

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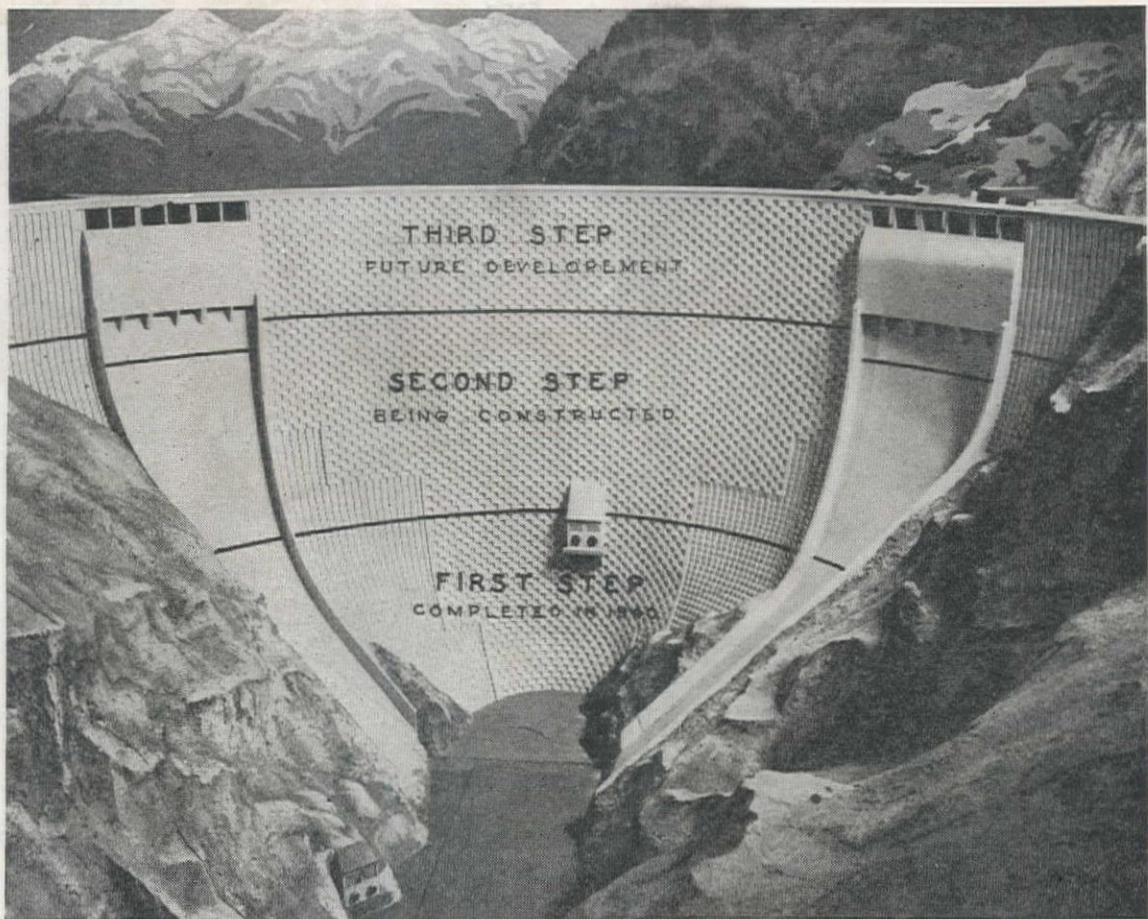
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The A-W 3-Wheeled Roller is made in sizes ranging from 6 to 12 tons. All have full-length side plates for maximum rigidity; low center of gravity for smooth operation, and hydraulic power steer. All may be had with gas or Diesel engine. Special equipment includes lights, sprinkling system, canopy top and powerful Hydraulic Scarifier.

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UTAH—WESTERN MACHINERY COMPANY Salt Lake City 13
WASHINGTON—COLUMBIA EQUIPMENT COMPANY Seattle



Seattle's Ross Dam— Second Step Under Construction

Isolated in the rough terrain of Skagit River Gorge, this structure is the uppermost of three power dams built by the City of Seattle, Department of Light — Aggregate and other material for the project transported by the combined use of railway, car barge, hopper barge and funicular incline

CONSTRUCTION IS ADVANCING, in spite of extreme difficulties in procurement of materials and manpower, on the second step of Ross Dam, the highest unit in the Seattle, Washington, City Light Department's program for full utilization of the power of the Skagit River for electrical generation.

Two power tunnels have been driven, rock excavation and scaling on the canyon walls has been completed and concrete placement on the 185-ft. vertical lift has been started.

River development program

The full program of power generation on the Skagit River includes three dams and three powerhouses. The first constructed and lowest on the river is the Gorge plant. Here a small dam was constructed in 1924 and the single generator now produces 75,000 h.p. of energy.

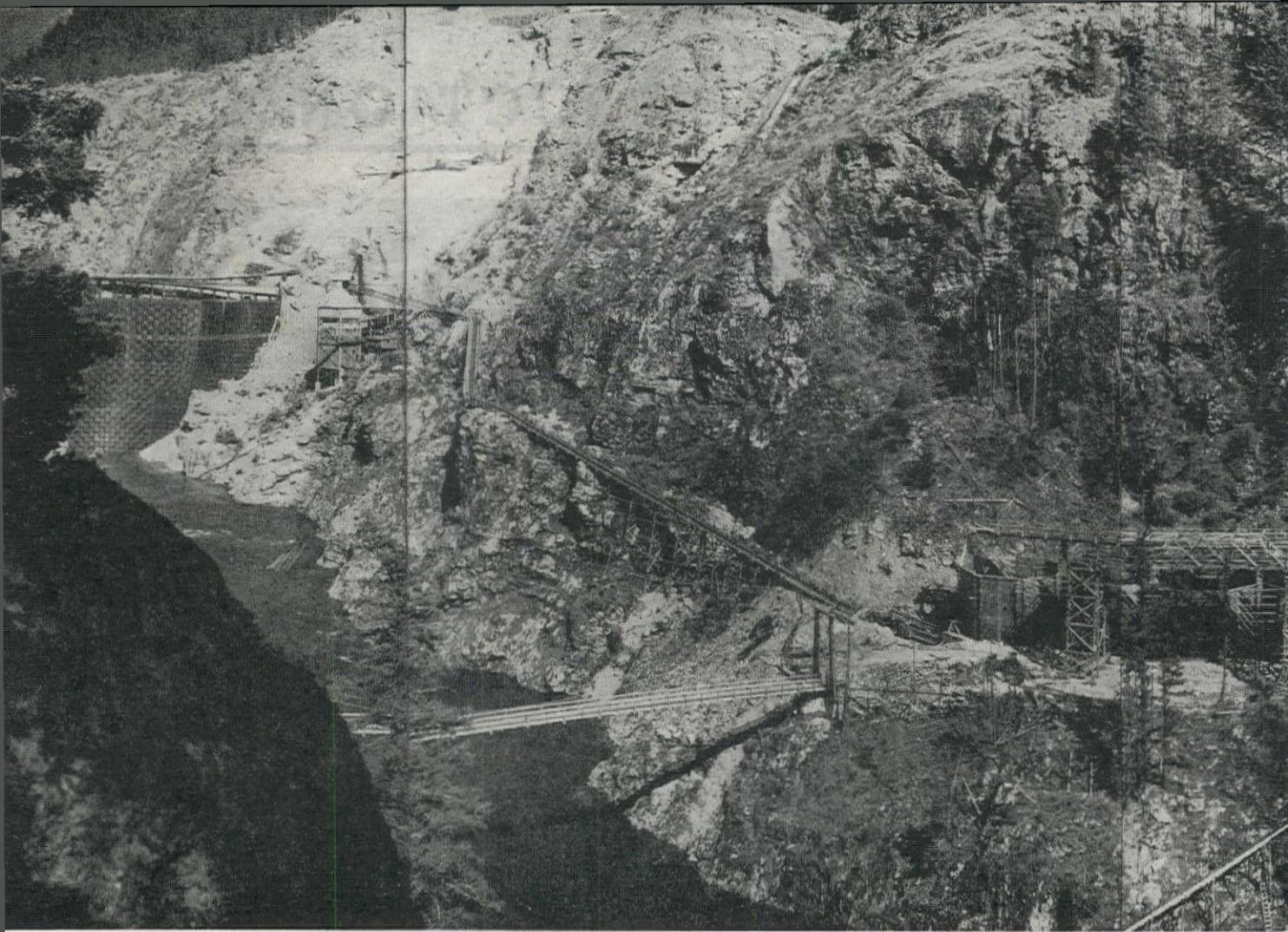
The second plant, completed in 1936 and known as the Diablo dam and power plant, is 7 mi. upstream from Gorge, at the upper end of the Gorge pool, and is now producing 160,000 h.p.

Ross Dam, the third step in the pro-

gram, was completed in 1940 to a crest elevation of 1,365 ft. It is located 5 mi. upstream from Diablo at the headwaters of that lake. No powerhouse was installed at that time, the storage of 100,000 ac. ft. being used solely to supplement that in the lower reservoirs. The present construction is the addition of 185 ft. to this height, making a roadway elevation of 1,550 ft. and increasing the water storage to 676,000 cu. ft., still solely used supplementally for the lower power plants.

The ultimate development of the river includes a higher Gorge dam and installation of a second generator at that plant to boost production there to 320,000 h.p. through utilization of the entire flow, with no spillage; installation of a second generator at Diablo, doubling its present capacity, to 320,000 h.p.; addition of third and fourth steps to Ross Dam, and construction of a power plant at its toe which will manufacture 480,000 h.p. of electrical energy.

The completion of the third step will raise the crest to an elevation of 1,650



AGGREGATE HANDLING at Ross Dam, above. Left to right, lower face of Ross Dam, batching plant and cement silo, belt conveyor, screened aggregate bins, and below them cement pumping line crossing river, shops and equipment barge in lower right. Trestle being constructed over stockpile area, and aggregate barge landing in background. Below, left abutment wall scaled ready for grouting, and portals of power tunnels driven above the first step of dam so that work can progress without lowering water level.



ft., and will be the ultimate on the present foundation. At that time 1,800,000 ac. ft. of water will be impounded. For the fourth step, the entire dam will be thickened by adding a blanket to the downstream face from foundation to crest. The earlier stages have been poured so as to leave a grid surface on the downstream face to more adequately bind the blanket to the earlier portions of the structure. When the ultimate height is reached, a storage capacity of 3,450,000 ac. ft. will be available.

Second step contract

The present contract was awarded to the joint firm of General Construction Co.-J. F. Shea Co.-Morrison-Knudsen Co., Inc., on Feb. 10, 1943, and included raising the dam 185 ft., providing gates, valves, spillways, etc., for regulation of the water required for the lower power houses, drive two power tunnels to a distance approximately 900 ft. downstream from the dam, plug the first step diversion tunnel, grout abutments, foundations, joints, etc., and other work. About 460,000 cu. yd. of concrete will be required.

The power tunnels are 24½ ft. in diameter, and by terms of the contract were required to be driven before the commencement of concrete placement so as to eliminate the concussion from blasting in rock close to the dam. The invert elevation of the tunnel intake is 58 ft. above the crest of the first step, so work could proceed with the present



reservoir full. They were carried to 900 ft. below the dam, but were not holed through at this time. The remaining 400 ft. of tunnel and the penstocks will be completed in connection with construction of the powerhouse when the third step is added. The tunnels pass around the left end of the dam through extremely hard granite. No lining will be required except at the portals.

Concrete work

The batching and mixing plant is located on the left abutment, above the level of the completed construction. The first step of the job was to blast out a site for these operations, the canyon walls being so precipitous that practically no level ground is to be found anywhere. About 75,000 cu. yd. of rock excavation were required for this alone.

The concrete mixing plant consists of two 4-cu. yd. tilting mixers, and automatic weigh-batching control for aggregate, cement and water. Each batch is mixed for 2½ min. and is dumped into 8-cu. yd. cars in which it is hauled about 220 ft. across the spillway area where it is dumped into 8-cu. yd. bottom dump highline buckets and transported to its point of placement.

As the concrete is deposited from the bucket it is vibrated into layers of not more than 18 in. in thickness, although each block is raised in 5-ft. lifts. The surface of the previous pour is wire brushed and cleaned with air and water jets just previous to grouting. After all

free water is removed a layer of grout made in the proportion of 1:27, cement and sand, is carefully brushed over the surface.

Curing will be effected by keeping all horizontal surfaces wet either by ponding or hosing, and vertical surfaces by pipe spray sprinkling. Cooling pipes at each 5-ft. interval will have a continuous flow of river water until the temperature

of the concrete is reduced sufficiently to grout construction joints. Copper water seals will protect each 5-ft. horizontal construction joint on the upstream face.

There will be no heating of aggregate in cold weather, and during the warmer seasons, aggregate is washed with cold river water and stored in cool places so that concrete does not exceed 65 deg. F. at the time of placement.

PREPARING HARD GRANITE bedrock of the left abutment wall for first pour of concrete. The structure will be poured in 5-ft. lifts and cooled with cold river water.



Concrete specifications

Four types of concrete are used in the structure. Class "A," to be used for the mass of the dam, is made from aggregate up to 6 in. in diameter and one barrel of cement per cubic yard.

Class "B" concrete, to be used for the upstream face and against the rock of the abutments, also utilizes aggregate of 6-in. maximum size, but cement content is increased to 1.3 bbl. per cu. yd. It is placed integral with Class "A," so that no separation plane will develop.

Class "C" is used in reinforced sections where the bars are 6 in. or more on center. It has a maximum aggregate size of 3 in., and cement content of 1.4 bbl. per cu. yd.

Class "D" is used in thin sections and where reinforcement is closely spaced, having no aggregate over 1½ in. in diameter, and using 1.5 bbl. of cement to the cubic yard.

Cement used is a moderate heat type, the specifications requiring that the combined sodium and potassium oxide content shall not exceed 0.6 per cent.

Aggregate handling

One of the most difficult and most interesting features of the second step construction is the procurement of concrete aggregate. In construction of the first step of Ross Dam, this material was procured about 4 mi. above the dam, but that site is now flooded and it was necessary to find another source of supply.

Prospecting discovered a bar in the main river bed some distance below the Gorge power plant, which produces a

Condensed Statistics

Drainage of Skagit River watershed above Gorge Dam: 1,200 sq. mi.

Average rainfall: 74 in. per year.

Stream flow recordings by U. S. Geological Survey, thirty-year period:

Maximum at Diablo: 70,000 cu. ft. per sec.

Minimum at Diablo: 470 cu. ft. per sec.

Average at Diablo: 4,160 cu. ft. per sec.

Ross reservoir, ultimate elevation 1,725 ft.; 3,450-ac. ft. water capacity.

Average flow into Ross reservoir: 3,300 cu. ft. per sec.

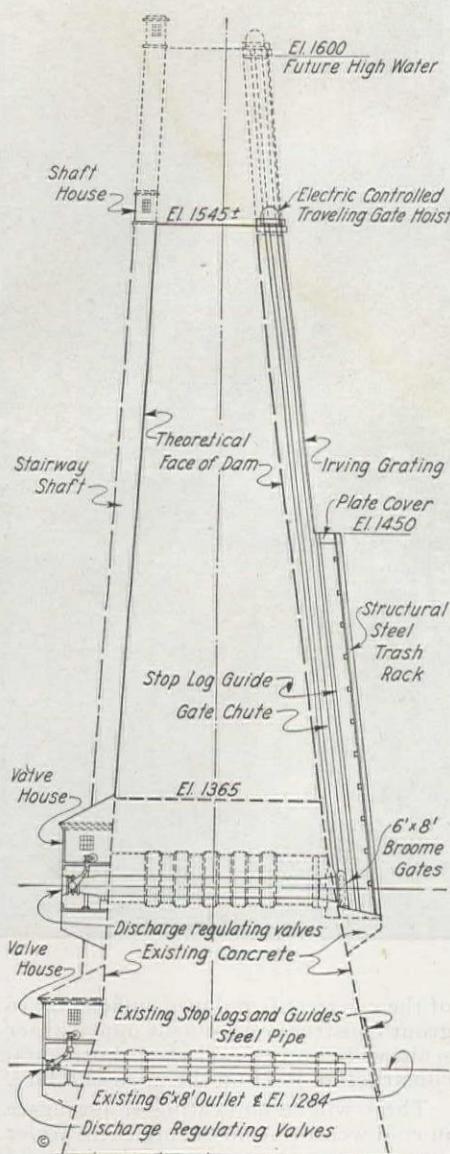
Ultimate development of Skagit River power plants:

Gorge plant: 320,000 h.p. at 385 ft. gross head.

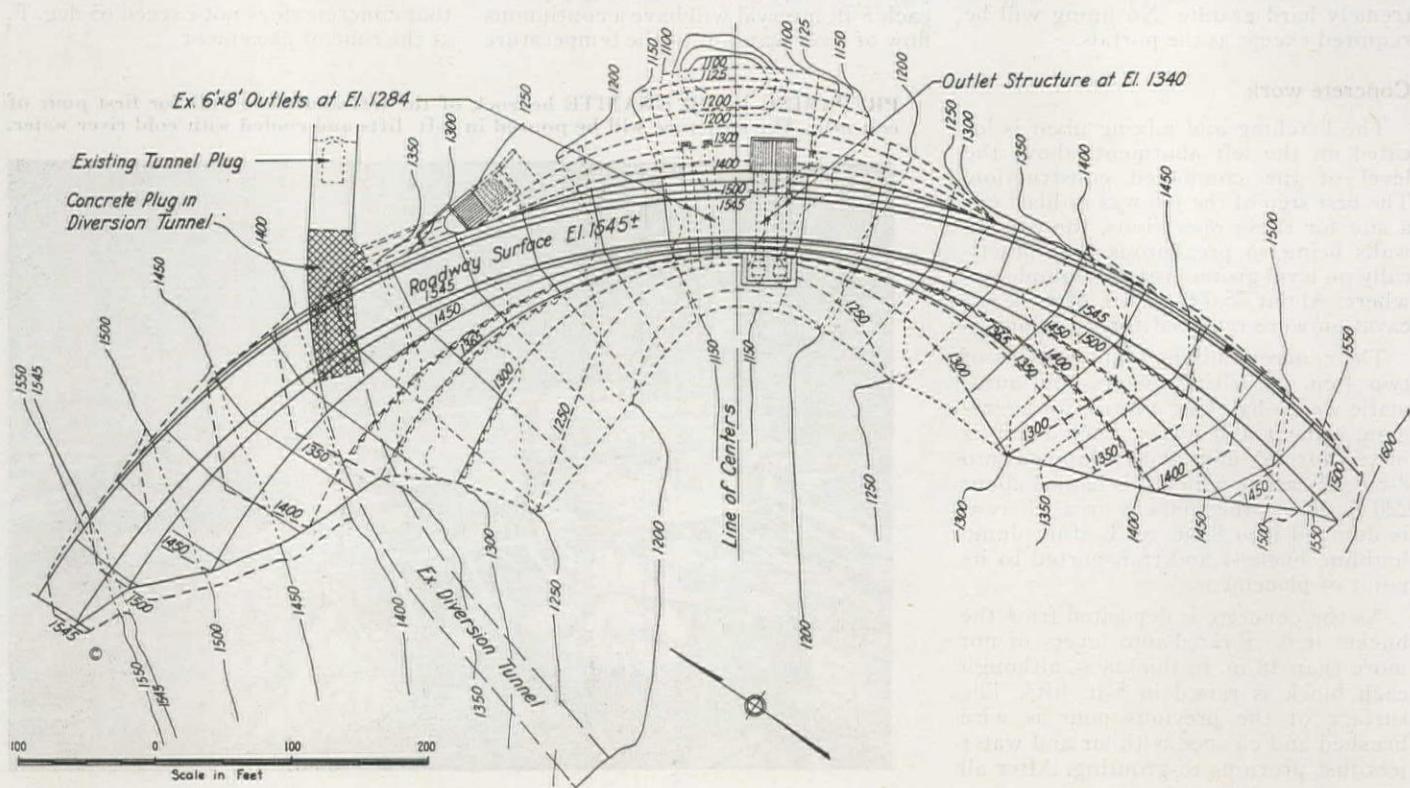
Diablo plant: 320,000 h.p. at 330 ft. gross head.

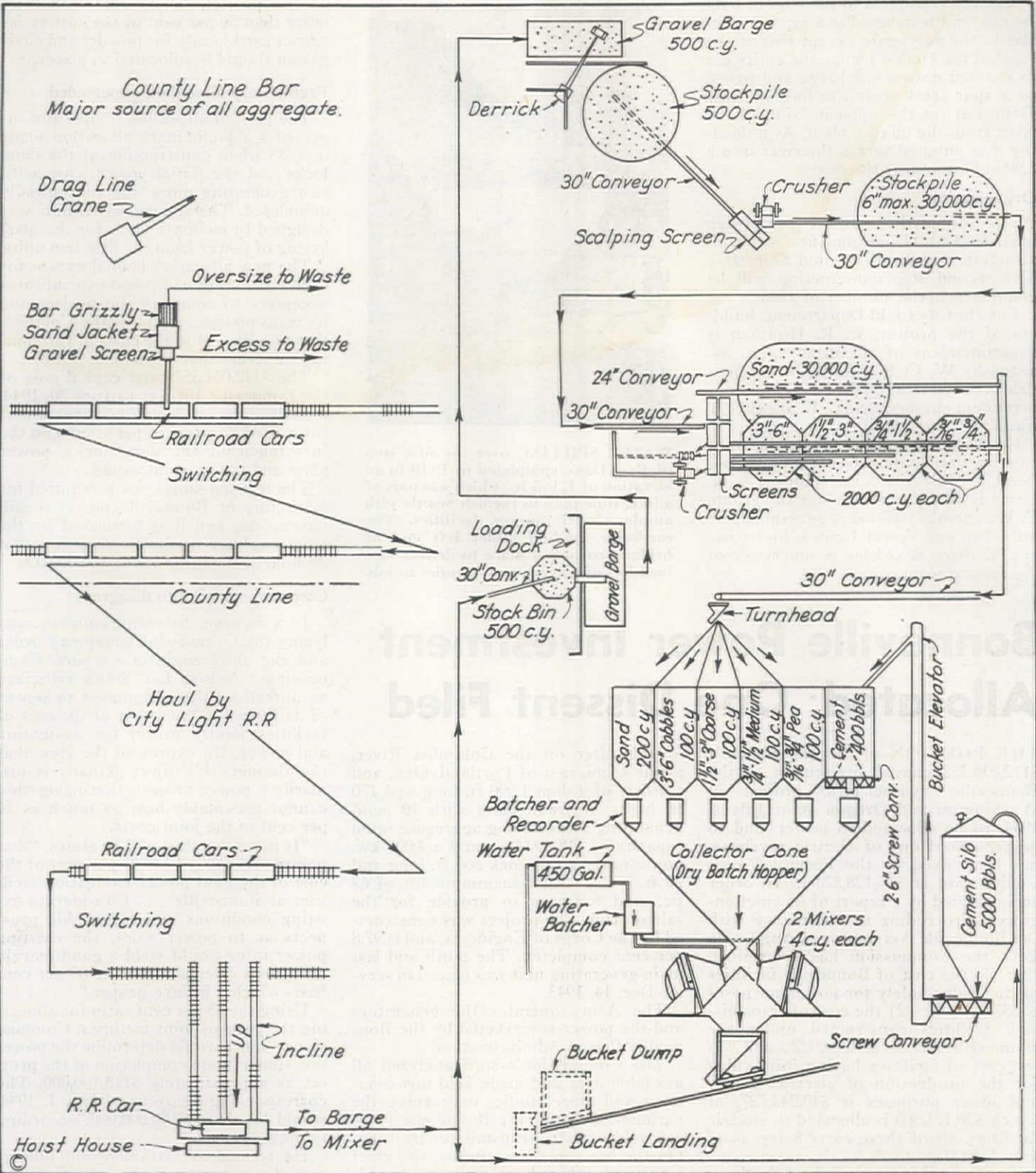
Ross plant: 480,000 h.p. at 520 ft. gross head.

Total estimated output of combined plants: 2,860,000,000 kw.-hrs. per year.



VERTICAL SECTION through Ross Dam at discharge valves and trash rack. Future third step indicated, will raise the structure to an elevation of 1,600 ft., left. Below, plan of structure with the original diversion tunnel plugged. The new double 24-ft. diam. power tunnels driven in the opposite wall are not shown in this plan.





and a dragline bucket into 32-cu. yd. bottom dump railroad cars, which are hauled over the City Light-operated railroad to the bottom of a funicular railroad near Diablo Dam. This is a three-track incline upon which operates a wedge-shaped platform car capable of carrying one of the dump cars sideways up the hill to the elevation of the crest of the Diablo Dam.

There it is shunted off the lift platform and its load dumped into a bin from which it is conveyed by belt to 500-cu. yd. steel barges (built in yards

SCHEMATIC FLOW sheet of aggregates from County Line Bar through processing plant to batching and placement of the concrete. Rock and sand are handled by shovel, car, barge and belt, cement by car, barge and pump, and concrete by car and highline bucket.

erected by the contractors on the shore of Diablo Lake). These are then towed across the lake by tugboats, also assembled at the site, to a hopper station about a half mile below Ross Dam, where the material is unloaded by a clamshell bucket. It is then transferred by belt to

From here it is fed onto another belt running in a tunnel underneath, and is carried to the washing and screening plant, where it is separated into four sizes: 3/16 to 3/4 in.; 3/4 to 1 1/2 in.; 1 1/2 in. to 3 in.; and 3 to 6 in. The segregated aggregate is then stored in separate 5,000-cu. yd. bins and dropped onto still another belt in required quantities to service the mixing plant. Sand is stored over a loose rock fill to furnish adequate drainage so that it will go to the mixer carrying as little moisture as possible.

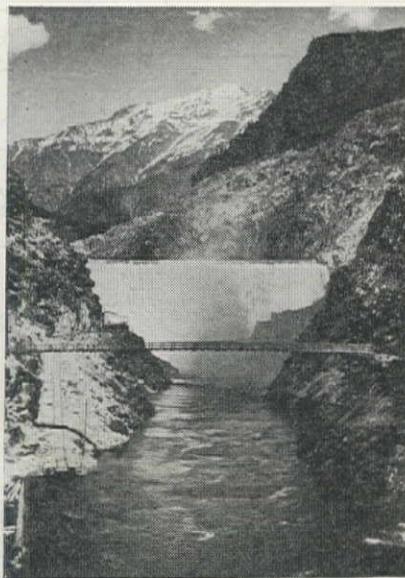
Cement is shipped to the dam in bulk by rail, and is handled in a manner similar to the aggregate except that at the head of the Diablo incline the entire car is shunted onto a car barge and towed to a spur track near the foot of Ross Dam, but on the opposite side of the river from the mixing plant. At unloading it is pumped across the river into a 5,000-bbl. silo near the mixer.

Organization

The estimated cost of the second step is \$13,500,000. The original first step construction cost approximated \$7,000,000. The second step construction will be completed in the summer of 1946.

For the City Light Department, builders of the project, E. R. Hoffman is superintendent of the department, assisted by W. C. Snow, W. B. Wolfendale is project engineer. H. F. Faulkner is resident engineer and C. E. Shevling is Faulkner's assistant.

Of the three contractors in the joint construction venture, General Construction Co. of Seattle is the sponsor. T. H. Orme is project manager for the group. C. W. (Smoky) Wood is general superintendent and Forest Jones is his assistant. Wallace Beardsley is supervisor of the mixing plant.



WATER SPILLING over the first step of Ross Dam, completed in 1940 to an elevation of 1,365 ft., which was part of a long-time plan to furnish Seattle with ample electric power facilities. The car-barge landing under left end of bridge provides a place to deliver car-load lots of cement and supplies to job.

Bonneville Power Investment Allocated; One Dissent Filed

THE PORTION of the government's \$112,034,352 capital investment in the Bonneville hydroelectric project in Washington and Oregon as of July 1, 1944, to be allocated to power, and to be recovered out of electric revenues, has been fixed by the Federal Power Commission at \$86,128,370 in an order accompanied by a report of its chief engineer. Proceeding in accordance with the Bonneville Act approved August 20, 1937, the Commission has determined that (1) the cost of Bonneville facilities having value solely for power purposes is \$37,681,648; (2) the cost of transmission facilities constructed under the Bonneville Act is \$28,324,922; and (3) the cost of facilities having joint value for the production of electric energy and other purposes is \$40,243,727, of which \$20,121,800 is allocated to electric facilities, all of these costs being as of July 1, 1944.

The Commission recognized the "parity in importance of low-cost transportation and power" in development of the resources of the Pacific Northwest and stated that such recognition is "consistent with the intent of the Congress as expressed in the Act."

The order states that "the Bonneville dam and reservoir, the permanent buildings and grounds, and the fishways, are facilities having a joint value for the production of electric energy and other purposes."

Project rated at 518,400 kw.

The Bonneville Project is at the head

of tidewater on the Columbia River, about 42 mi. east of Portland, Ore., and consists of a dam 1,090 ft. long and 170 ft. high; a power plant with 10 main generating units having aggregate rated capacity of 518,400 kw., and a 4,000-kw. house unit; a ship lock 500 ft. long and 76 ft. wide, with a maximum lift of 68 ft.; and fishways to provide for the salmon run. The project was constructed by the Corps of Engineers, and is 97.8 per cent completed. The tenth and last main generating unit was placed in service Dec. 14, 1943.

The Army operates the generators and the power is marketed by the Bonneville Power Administration.

The Commission's staff analyzed all available data and made field investigations and office studies concerning the various aspects of the Bonneville Project and its related transmission facilities. On the basis of these studies, the chief engineer prepared and submitted a 61-page report and accompanying exhibits, entitled "Bonneville Project and Transmission System, Allocation of Costs."

In this report, the chief engineer points to the language of the Act which says that the Bonneville Project as authorized is "for the purpose of improving navigation on the Columbia River and for other purposes incidental thereto." "With this legislative determination," he says, "the question as to the primary purpose of this project is a settled matter."

Since power by the terms of the Act is an incidental and subordinate purpose

of the project, he concludes that no more than 50 per cent of the cost of facilities used jointly for power and navigation should be allocated to power.

Preliminary allocation superseded

The present allocation revises and supersedes a preliminary allocation made in 1938 when construction of the dam, locks and the initial power plant with two generating units was substantially completed. The interim allocation was designed to facilitate plans for the marketing of power from the first two units.

The new allocation is final except for such portions of additional expenditures necessary to complete the project and its transmission system as the Commission may charge to the costs of the Bonneville electric facilities.

The \$112,034,352 total capital cost of the Bonneville Project to June 30, 1944, includes interest during construction at the rate of 2.5 per cent per annum on the investment in the dam, locks, power plant and appurtenant works.

The transmission system required for marketing of Bonneville power is still incomplete, and it is estimated by the chief engineer of the Commission that its final cost will be about \$40,000,000.

Commissioner Smith disagrees

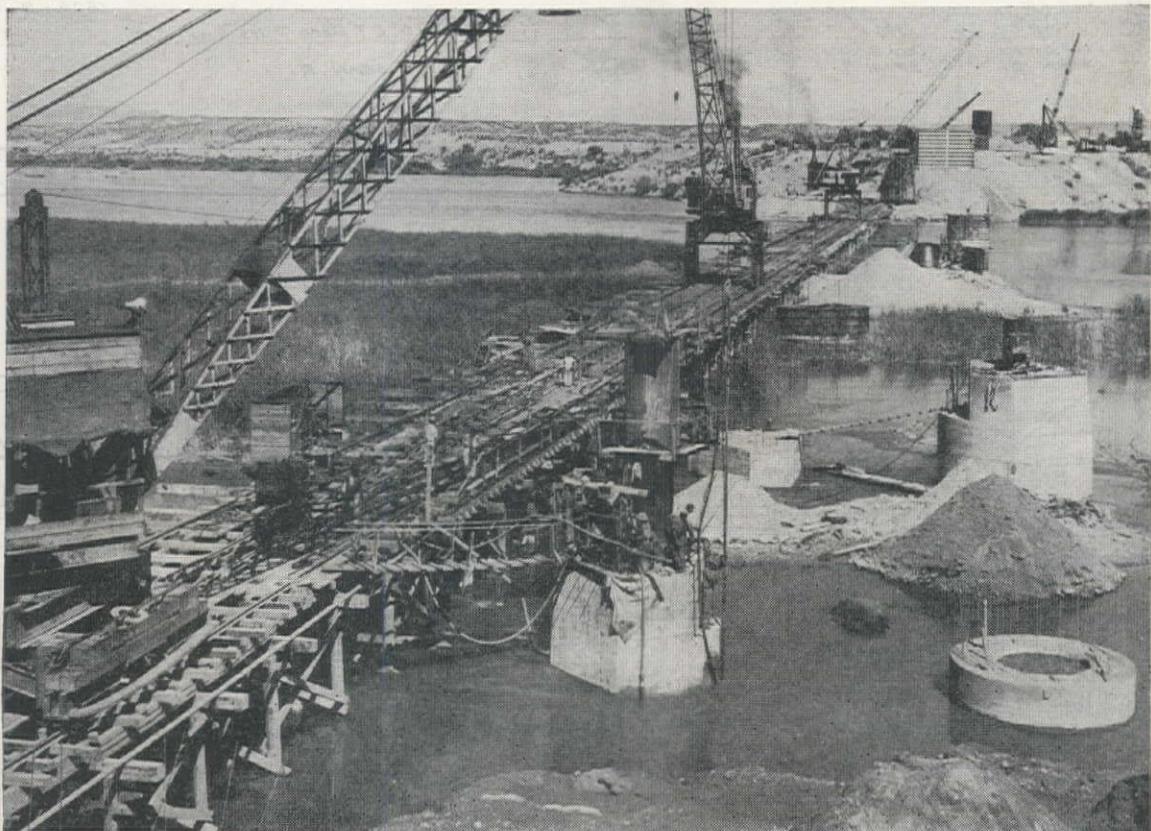
In a 36-page dissenting opinion analyzing the Commission's majority order and the chief engineer's report, Commissioner Nelson Lee Smith criticized as unrealistic the assignment to power of as little as 50 per cent of the cost of facilities jointly useful for navigation and power. He expressed the view that the Bonneville Project actually is primarily a power project, that navigation cannot reasonably bear as much as 50 per cent of the joint costs.

"It is my conclusion," he states, "that power may fairly bear 85 per cent of the cost of the joint power-navigation facilities at Bonneville. . . . Considering existing conditions and reasonable prospects as to power sales, the existing power rates would yield a good margin over costs calculated on the 85 per cent basis which I believe proper."

Using the 85 per cent ratio for allocating the costs of joint facilities, Commissioner Smith would determine the power investment upon completion of the project as approximately \$113,100,000. The corresponding figure as of July 1, 1944, would be about \$100,000,000, according to his analysis.

He termed as "strained and unwarranted construction" the interpretation placed upon the statute by the chief engineer, who held in his report that since power is an incidental purpose, the share of costs allocated to that purpose must not exceed 50 per cent. In discussing the expected benefits to navigation, he concluded that the estimates of these values had been exaggerated.

"It seems to me plain," said Commissioner Smith, "that in describing navigation as a 'primary' purpose Congress was not undertaking to establish a standard for cost allocation; it was simply following the familiar pattern dictated by considerations of constitutionality."



CAISSON SINKING operations during excavation work for the piers of the Topock, Arizona, bridge were carried on from a temporary pile trestle. Airlock for men is shown in place on the pier in foreground. Concrete and muck were handled through a lower airlock alongside, where the men are working. In background, a sand island, start of another caisson.

Deep Caisson Bridge Piers

Piers excavated for Santa Fe bridge at Colorado River crossing in deepest caissons ever used in water-bearing material, requiring a special ruling to use air at more than legal pressure — Irregular river bottom formation causes many unforeseen problems — Operations carried on from man-made sand islands

THE GENERAL STORY of the construction of the Atchison, Topeka and Santa Fe Railway Company's new deck truss bridge over the Colorado River at Topock, Arizona, was told in *Western Construction News* for March, and it was promised that a later article would go into additional details covering the interesting and difficult problems involved in construction of the deep piers for the structure.

The bridge has an overall length of 1,507 ft., consisting of three deck truss spans each 350 ft. in length and 46 ft. in depth, four 100-ft. deck girder spans, and one 50-ft. beam span. The trusses are of Pratt design, on 28-ft. centers, and calculated for Cooper's E-72 loading. With stringers, decking, and other structural elements, base of rail is 57 ft. above the top of the masonry of the piers. Low steel at the bottom chord of the truss is

28 ft. above the normal water level of the river, as it exists at the present time. A view of the steel in the trusses and cross braces is shown on the cover of this magazine.

The details of the superstructure and its erection were covered in the earlier article. The underwater and pier work was not thoroughly covered.

Piers and abutments

The elements of the bridge are supported on two abutments, one at each end, two piers excavated on shore, again one on each bank, and five piers excavated in caissons through water-bearing material.

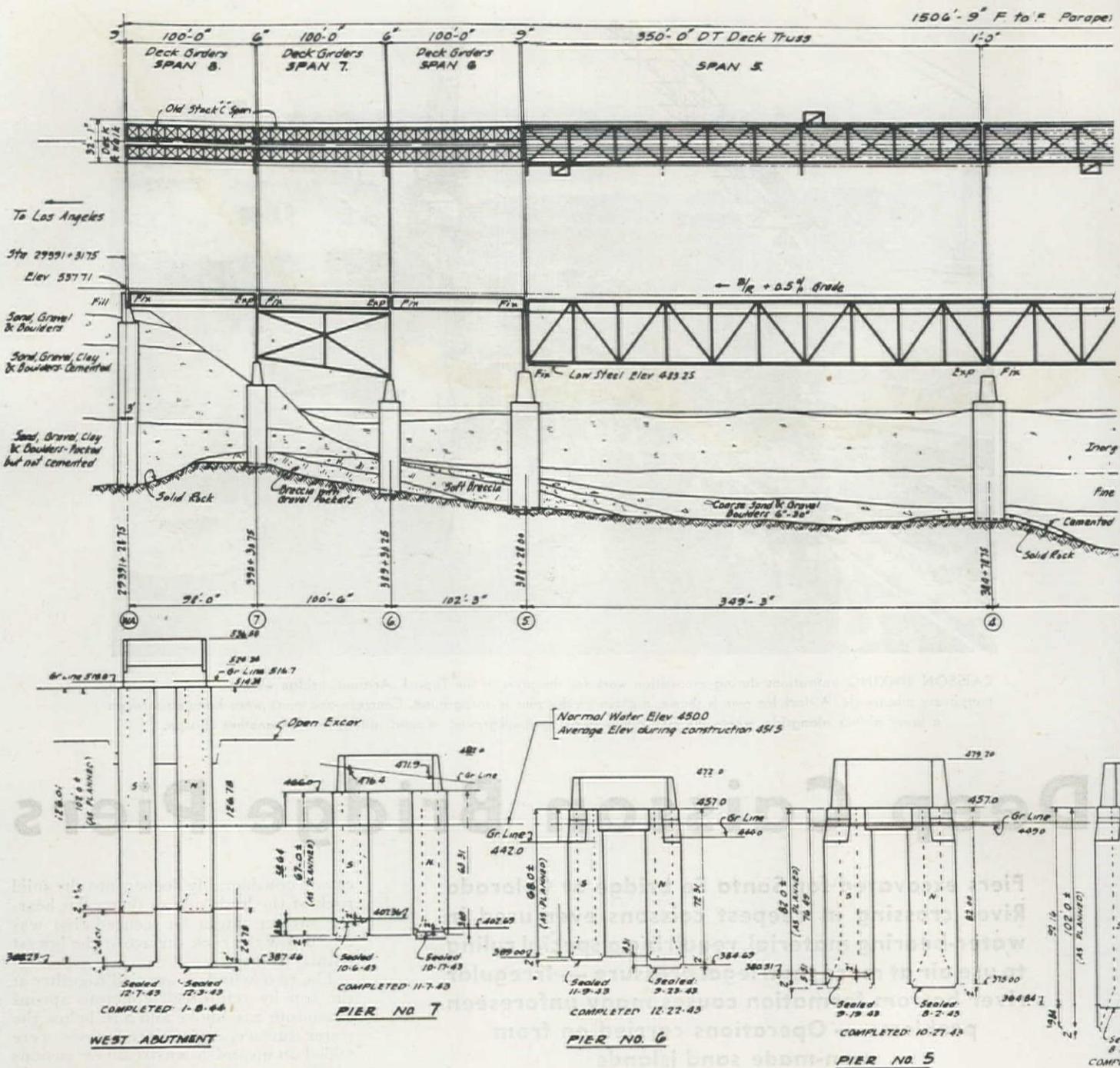
Each of the piers consists of two concrete cylinders imbedded at least 2 ft. into the solid rock of the stream bed on all sides. Where the bedrock was dipping abruptly, it was necessary to ex-

cavate considerably deeper into the solid rock of the high side so that a flat bearing surface might be secured that was 2 ft. below the rock surface at the lowest point.

The two cylinders are tied together at the top by reinforced concrete aprons extending 5 ft. above and 5 ft. below the water surface, and pointed noses were added on up and downstream extensions of the centerline of the cylinders in order to minimize current drag.

Piers are numbered consecutively from the Arizona end. The east abutment rests on two 14-ft. diameter cylinders, 24 ft. on center. Pier No. 1 is also built of two 14-ft. cylinders, but the center-to-center distance is 28 ft. The cylinders of Pier No. 2, upon which rests the fixed end of the first truss span, are 22 ft. in diameter, on 36-ft. centers.

Pier No. 3, supporting the movable ends of both the first and second truss spans, also has two 22-ft. cylinders, but are only 34 ft. center-to-center. Pier No. 4, upon which rests the fixed end of the second span and the expansion end of the third set of trusses, is constructed of 24-ft. diameter cylinders on 32 ft. centers; Pier No. 5 supports the fixed end of the third truss span, and utilizes 22-ft. cylinders on 38-ft. centers. Piers No. 5 and 6, supporting girder spans, are each built of two 16-ft. cylinders, 36 ft. between centers.



Substructure excavation

The excavation and concrete work for the substructure were carried out from a temporary wood pile trestle constructed across the river at a point 52 ft. upstream from the centerline of the new structure. About 600 piles were used in five and seven-pile bents, and on the deck, tracks were laid on 18-ft. centers for two gantry cranes and one whirley crane. Later tracks were also laid on the deck of this temporary trestle for a narrow-gauge "dinky" train which shuttled concrete from the mixer to the piers.

To facilitate the start of the excavation for the cylinders, an island was built up to several feet above water level by driving sheet piling around the working area and filling with sand. On this sand foundation a circular steel cutting shoe, sharpened on the lower edge, was set, and removable inside and outside steel forms placed above it for pouring

the shell of the lower 12 ft. of the cylinder. The outside forms were perpendicular, but the inside form for this 12-ft. section sloped inward from the top of the cutting shoe so as to leave an opening of 8-ft. diameter at the top of the section. Thus, when the forms were removed, a domed working space was available, varying in diameter from the full area of the cylinder base at floor level to 8 ft. at 12 ft. above the floor.

The 12-ft. section was poured before any excavation took place, and after it had set, workmen started removing the enclosed sand by means of a $\frac{1}{2}$ -cu. yd. clamshell bucket lowered from the whirley crane through the 8-ft. opening. As the material was removed, the cutting edge, impelled by the weight of the concrete above it, gradually settled, and excavation proceeded in this manner for the entire depth.

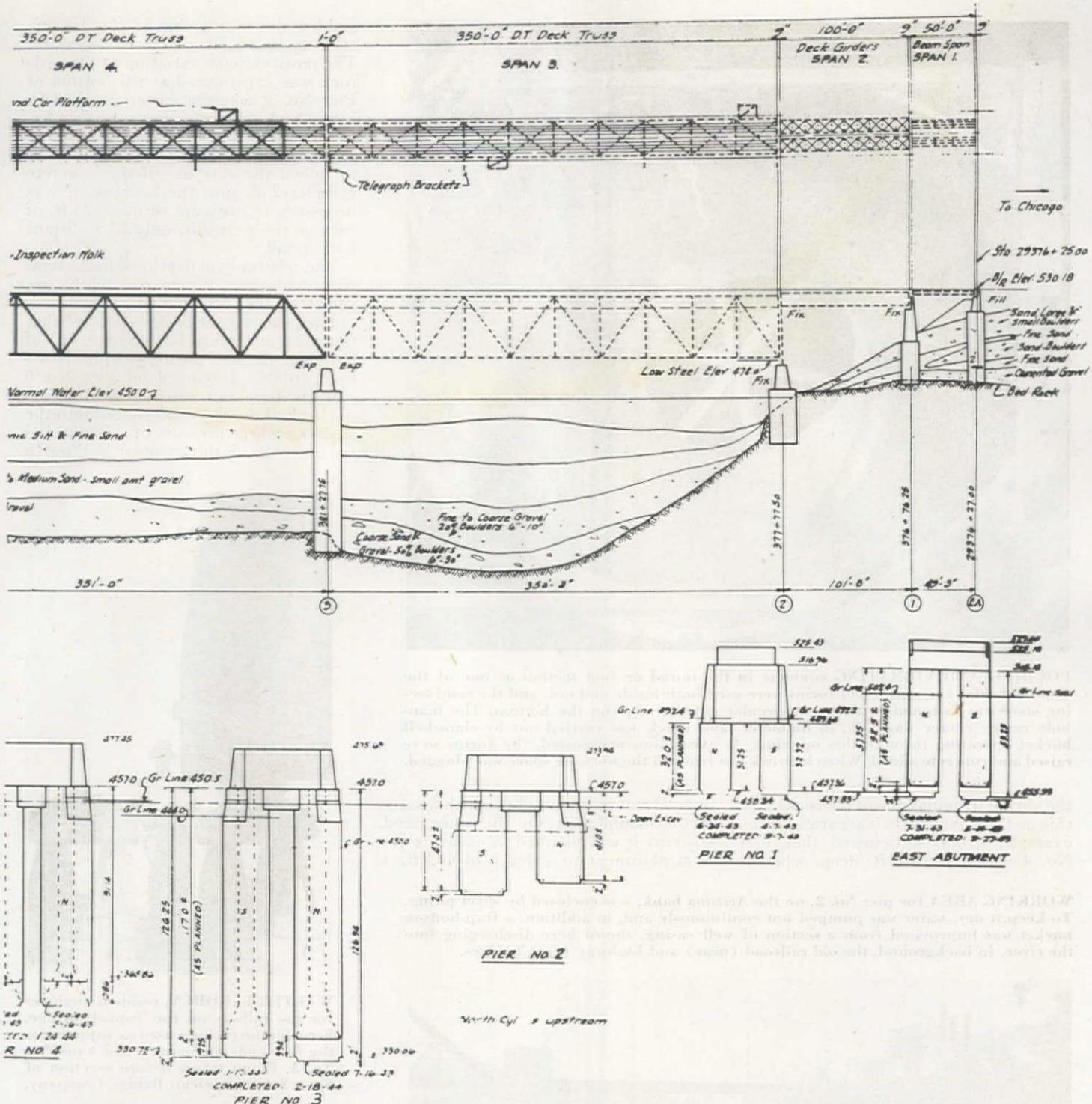
As the concrete cylinders settled, the

PLAN AND PROFILE of the Santa Fe deck truss bridge across the Colorado River at Topock, Ariz., showing also the profile and sediment content of the river bed. Most difficult pier to excavate was No. 3, which fell on an abrupt break in the brecchia bedrock. An interesting geological occurrence is the decline of the bedrock outside the west limit of the river channel, necessitating much deeper excavation for west abutment.

steel forms were raised, reinforcing bars were added, and additional height was poured. When the cylinders had been sunk to 25 ft. the sheet piling around the islands was pulled.

Pneumatic work

As the excavation reached a depth where there was danger of a blow-in of sand and water from external pressure, the 8-ft. opening was sealed off, leaving only two 36-in. openings for the remain-



ment than originally planned. Expansion ends of truss spans from both east and west were set on Pier No. 3, so that this deepest member would have a minimum of thrust. The top of the masonry of the piers is about 7 ft. above normal water level, and lowest bridge steel about 23 ft. above.

der of the cylinder. On the top of these the airlock chambers were installed, one opening being used as a man lock, the other for equipment passage and removal of muck by the crane. Excavation continued by the same methods until firmly consolidated material or bedrock was reached, after which air hammers and powder were used.

Air pressure used in excavation of Pier No. 3, the deepest of the project, and believed to be the deepest pneu-

pneumatic excavation ever undertaken in the United States through water-bearing soil, was raised to 52 ft. per sq. in. To achieve this it was necessary to have special permission from the Arizona Industrial Accident Commission, the code limit for the state having been established at 50 lb. per sq. in. Under this pressure, men's work shifts were limited to 30 minutes. However, pneumatic excavation was continued 24 hours a day.

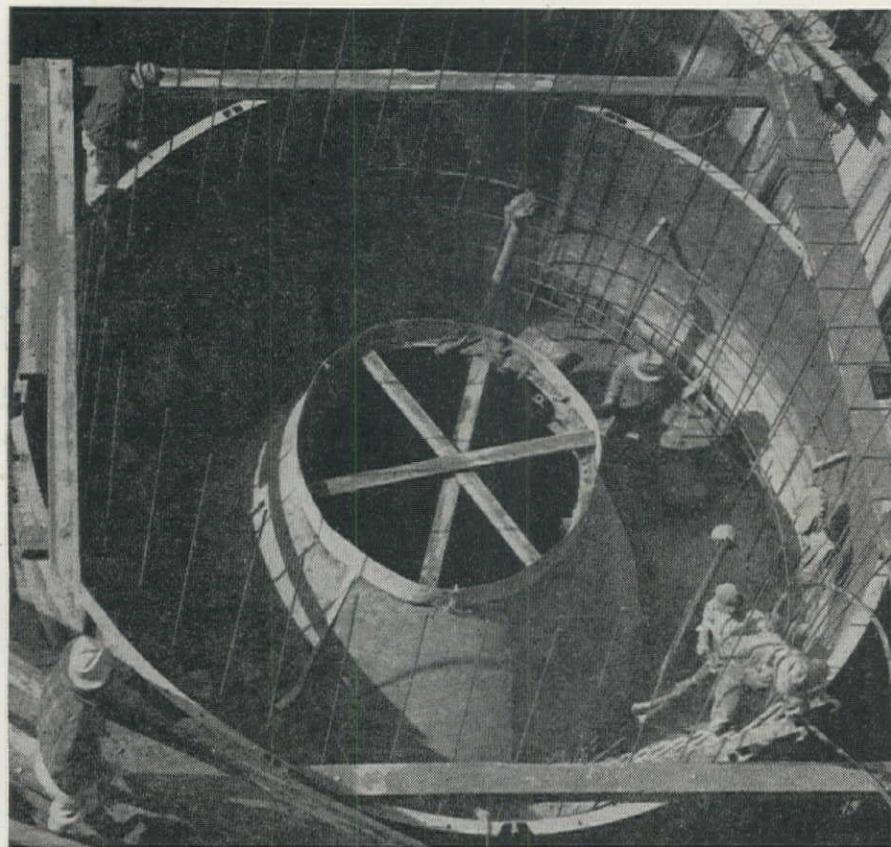
Air for the deep work was compressed in a plant established on the Arizona bank of the river, where all the operating shops were located, and passed through a 6-in. pipeline laid on the temporary trestle. Because summertime temperatures are so excessive at the site, the pipe was laid for a part of the distance in a trough of running wa-

ter to reduce the heat of the air. Wet sacking was also used in the lock chamber and elsewhere to reduce the extreme summer temperature.

Irregular bedrock

One unexpected problem was encountered in the unpredictable irregularities of the bedrock of the river's bed. The preliminary design of the bridge had contemplated the use of 400-ft. spans, and careful soundings were taken at the locations of piers for such structures. When, later in the course of the design studies, it was decided to use 350-ft. spans, the presumed bedrock level was established by interpolation between the earlier soundings.

As the sinking of the caissons proceeded, however, it became evident that

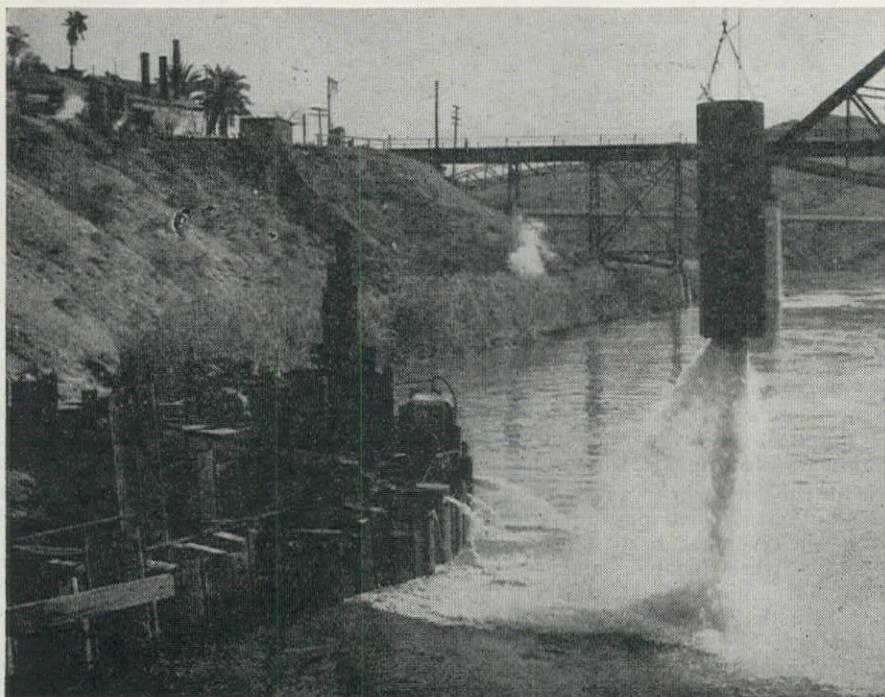


POURING AND VIBRATING concrete in the initial or foot section of one of the Topock bridge caissons. Steel forms were used both inside and out, and the reinforcing steel was fastened to the steel circular cutting edge on the bottom. The man-hole in the center was 8 ft. in diameter, and muck was carried out by clamshell bucket operating through this opening. As excavation progressed, the forms were raised and concrete added. When bedrock was reached the working space was plugged.

the abrupt irregularities of the rock made this method extremely inaccurate. As an example, it was anticipated that Pier No. 4 would be 102 ft. deep, whereas

only 92 ft. was required to reach a satisfactory foundation. On the other hand, whereas it was planned to excavate the west abutment to a depth of 102 ft., a

WORKING AREA for pier No. 2, on the Arizona bank, was enclosed by sheet piling. To keep it dry, water was pumped out continuously and, in addition, a trap-bottom bucket was improvised from a section of well casing, shown here discharging into the river. In background, the old railroad (near) and highway (far) bridges.



sudden downward dip of the breccia rock made a depth of 126 ft. necessary. The most extreme variation of the bedrock was experienced at the bottom of Pier No. 3, where a variation of 18 ft. in the rock surface was experienced between the east and west edges of the 22-ft. cylinder. In other words, in order to imbed the east toe of the concrete cylinder 2 ft. into the bedrock, it was necessary to excavate through 20 ft. of rock on the west side, only 22 ft. distant horizontally.

The relative final depths of the several piers and their anticipated depths are shown on the accompanying sketch.

The plans for the bridge specified that the cylinders must be within 6 in. of plumb at all times during sinking. However, trouble developed on Pier No. 6 when material excavated on the California bank of the river was sluiced into the stream, and the pressure of this material on one side of the cylinder without a



WALTER E. ROBEY, resident engineer for the railway on the Topock bridge, between the rockers used as support for the free ends of Spans 3 and 4 on Pier No. 3. Photo taken before erection of Span 3 by American Bridge Company.

balancing force on the opposite side caused tipping to the east to about 24 in. from plumb. It was necessary to remove some of the material causing the pressure; then by use of an air jet on the west side and jacks on the east side, the member was restored to its perpendicular position.

When excavation for the piers was completed, the center openings of the cylinders were filled with concrete, and erection of the superstructure proceeded.

Concrete for all the pier work was mixed on the Arizona side and poured into $\frac{1}{4}$ -cu. yd. concrete buckets on the dinky train which hauled them out on the tramway trestle. The buckets were then picked up by one of the cranes and deposited at the required spot.

Organization

The contract for the foundation work was awarded to the Kansas City Bridge Co., and a total of 19½ months was required to complete the project. Lou J. Greible was superintendent for the firm.

Other contractors on the bridge and approaches were American Bridge Company, for erection of the superstructure, which required 10 months' time, Edward Nimmergood being the superintendent; Sharp & Fellows Contracting Company, a 4½-mi. realignment at the west approach; A. S. Vinnell Company, a half-mile approach from the east; Morrison-Knudsen Co., Inc., abutments and miscellaneous work; and Stanley Hanks Painting Co., painting of the structure.

For the railway, the bridge was designed and constructed under supervi-

sion of G. W. Harris, system chief engineer, and M. C. Blanchard, chief engineer of the road's Coast Lines. Bridge engineer is R. A. Van Ness, who directed the design. Field supervision of the construction was in charge of W. E. Robey, resident engineer.

The bridge was opened to traffic on March 6, 1945. The original Santa Fe bridge crossing at Topock, about 300 yards downstream from the new structure, is being turned over to the State Highway Departments of Arizona and California, who will redeck it for use as a highway structure, to replace the existing inadequate and extremely light road structure still further downstream. Plans for the conversion of the cantilever railroad span to highway use are now being drawn. The old highway span, in turn, will be scrapped.

Sharpe finally spoke up. "It's like this about that wonder material. As I said, I'd even forgotten the names of the building materials you make out here. It just came to me, I got this one backward—and 'rebmul' spelled backward is"

Idaho Highways Bureau Reports 1944 Activities

DURING THE BIENNIAL 1943-1944 the Idaho Bureau of Highways received \$8,318,185 in gas taxes and from motor vehicle licenses \$334,373. In addition, federal cooperative funds for the period totaled \$3,127,553.06, and cooperative funds from local governments \$42,654.31.

These figures are contained in the biennial report of retiring Commissioner of Public Works Joe D. Wood.

The major items of expenditures from the highway fund were: \$1,700,000 in allocation of motor fuels tax to counties; \$6,555,466 for construction of roads and bridges; \$3,244,060 for maintenance; \$241,770 for overhead; \$7,089 for traffic regulation; \$24,695 for purchase of road machinery; \$21,348 for purchase of land and buildings.

The report shows 5,134 mi. of highway on the state system; 24,110 on county and highway district roads; 5,645 mi. on national forest development roads; 486 mi. on Indian reservation roads, and other miscellaneous developments bringing the total system to 35,399 mi. in length.

The report shows that during the war biennium there have been 47.14 mi. of grading, draining and surfacing, at a cost of \$1,510,000; 17 mi. of grading, draining, surfacing and oiling, at a cost of \$691,000; 137.67 mi. of surfacing, cost \$682,000; surfacing and oiling, 12.25 mi., \$164,000; bituminous surfacing, 139.74 mi., \$524,000; seal coating, 462 mi., \$351,000; structure and channels, \$161,000; stockpiles, \$575,000.

Highway personnel on June 30, 1944, was 52 per cent below the corresponding date in 1942, making it difficult to carry on normal highway functions, especially field surveys.

"The greatest problem," according to the report, "now confronting all highway agencies is preparing for postwar rehabilitation of our various highway systems. Due to deterioration and virtual cessation of construction under war conditions, a materially greater program will be needed at the close of the war. . . . The state has programs prepared to cost about \$4,000,000 and is working in collaboration with other agencies to develop further plans which will equitably distribute the benefits and financial responsibilities of the program among federal, state, and local units of government."

The report notes that 137 employees of the department are in the armed forces, including one personnel director, one office assistant, one junior bridge designer, 12 laboratory technicians, two resident engineers, one resident assistant engineer, five draftsmen, eight transitmen, 46 engineering assistants, and 60 maintenance employees.

"Out of the Woods," or "A New Marvelous Building Material"

MR. PARVIN SHARPE, building materials dealer of Appanoose, Iowa, had me worried. He'd listened most politely, laughing at the right spots, while I sounded off with a couple of yarns on Paul Bunyan and the Blue Ox, and now he was talking.

First off, Mr. Sharpe informed me he hadn't made a call at a sawmill, shingle mill or plywood plant in Oregon or Washington.

"Not interested," he said. "Been so long since I've seen a sliver of any of their products I've forgotten what any of them looks like. Gosh, I've even forgotten the names of the products. Anyhow, it's the building materials of the future, for the dream homes of the future, that I'm interested in."

"Materials like this here rebmul, now." Mr. Sharpe cocked an anxious, inquiring eye at me. "I wonder if you could help me to track it down. I've heard of it being used in a number of places in Iowa but I could never locate any. Most builders and dealers agreed it was made somewhere out here on the West Coast. 'Wonderful rebmul!' said one and all, of this building material. 'Rebmul can't be beat,' they said. Could you help me to locate some?"

I had to admit that rebmul and I were strangers. "Never even heard the name before," I confessed. "What's it like?"

"Rebmul is wonderful," said Mr. Sharpe soulfully. "Oh, for some!"

The dream material

Mr. Parvin Sharpe was, I soon realized, a survivor of those forgotten men—salesmen. He went right on talking, and the first thing I knew I was drawn into the orbit of rebmul wanters, although I'd never seen it to know it or heard of it before.

"Rebmul," said Mr. Sharpe, "is a material that can be sawed, turned, chiseled, carved, bolted, screwed, glued, bent, bored, sanded, stained, colored, painted, impregnated and hardened."

By JAMES STEVENS

Northwest Lumbermen's Association
Seattle, Wash.

"Glory be!" I exclaimed. "Sounds like one of those postwar dreams, sure enough!"

"I know rebmul is real," Mr. Sharpe asserted. "I'm bound to track it down. Yes, sir, rebmul is light in weight for its strength. Strong as steel, pound for pound, strong enough to support hundreds of times its own weight. Yet it is so doggoned workable it can be worked by hand, or it can be worked on a manufacturing production line with simple machines."

"You are trying to show up my Paul Bunyan yarns," I accused.

"I'm talking straight and true," said Mr. Sharpe, with a steady eye, "when I say rebmul has natural insulation qualities hard to beat, in strips or panels. It withstands weathering of sun, rain, snow and sleet, and is warm and somehow loving to the touch"

"You'd better look for rebmul in Hollywood," I broke in.

"I'm talking about a building material," said Mr. Sharpe reprovingly. "Rebmul holds up under foot for flooring, resists abrasions from family traffic and furniture moving. Rebmul never rusts. It even holds its strength in fire longer than steel does. Why, from foundation to roof you can build a whole house or a barn, or just about any kind of structure you want to name, all and entirely from rebmul!"

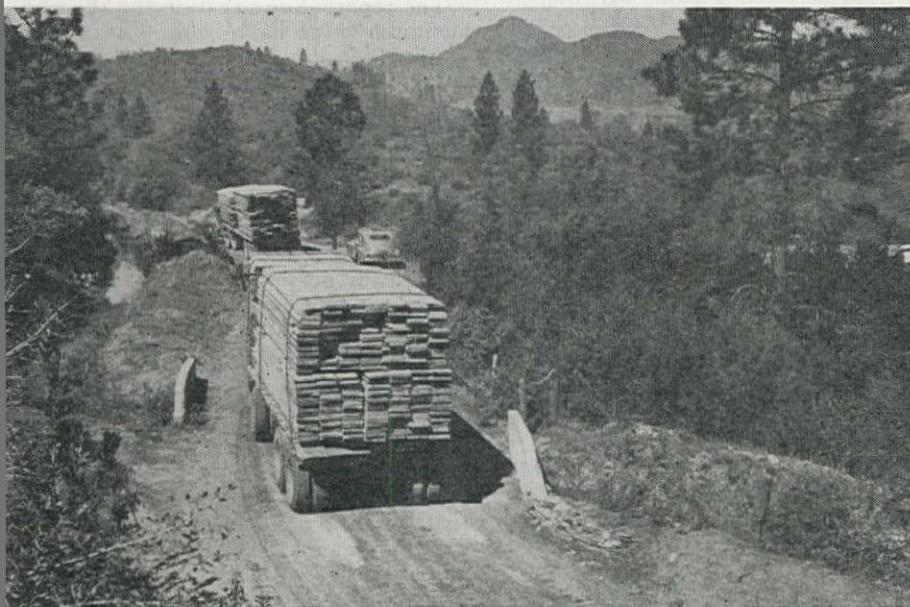
"I give up," I said feebly. "You've got a customer for rebmul."

Of course my business was selling the products of the forest, but now there seemed to be no more hope for anything of the kind. All that Parvin Sharpe was interested in was rebmul—and if many dealers and consumers were like him

"Don't look so bothered, bud," Mr.



New Roads to Critical War Supplies



Twenty-two ft. wide, bituminous surfaced access roads eliminate bottlenecks in transporting war-vital California timber and minerals from isolated areas to centers of industry — Federal, State and local governments, as well as logging companies, participate financially

THE CALIFORNIA State Highway construction program during the war years has been limited, as is the case in all other Western States, to minimum maintenance and access road construction. Numerous highways have been built to afford ingress and egress to deposits of critical minerals, timber stands and war plants.

Examples of this type of construction are two roads completed last year to reach important lumbering properties in the mountainous Sierra Nevada country of eastern California. The first was 29 mi. long and consisted of widening, straightening and surfacing existing mountain county and state road between Martell and Cooks Station, in Amador

OLD LOGGING TRAILS meant hauling heavy loads up steep grades of narrow, rutted roadway. Below, logs are moved along new, realigned, wide highway over Mokelumne Hill, Amador Co.

GRADING ABOUT 2.1 MI. of line change on new Mokelumne Hill route is shown on the opposite page. Urgent timber need made it necessary to continue log hauling before access roads were completed (right). Route 34 in Amador County (bottom), shown after completion.

County, where it joined private logging roads.

Financial contributions toward construction of the new access road were as follows: The Federal Raw Materials Access Road fund, \$300,000; State Division of Highways, \$40,000; the Winton and Berry lumber companies, \$6,000 each, and the McDonald Logging Co., financing clearing and grading of numerous line and grade changes.

Construction work

Construction work consisted of grading of a new roadbed to a width of 24 ft., exclusive of side ditches and berms; base construction, using mineral aggregates poured to a depth of 12 to 18 in., and surfacing with 22 ft. of bituminous mix 3 in. thick. About 9 mi. had been widened and surfaced previously, using county and logging company funds, but it was necessary to reinforce the base in some spots and apply a 22-ft. blanket of bituminous mix 2 in. thick.

The maximum cut on the road amounted to 40,000 cu. yd. of rock, requiring drilling and shooting. One hundred sixty thousand cubic yards of mineral aggregate was produced and placed. On the westerly 15 mi. of the road, creek gravel was employed for the base, and on the remaining portion lava and decomposed granite were used. Since the job was done by day labor, it was necessary to run trucks for hauling aggregate, surfacing and other materials. This was difficult in war time, especially since trucks in good operating condition were required, because the hauling was on adverse grades sometimes running as high as 16 per cent. Curvatures of the old road over which the dump trucks were obliged to operate were in some cases as sharp as 50-ft. radius.

The bituminous surfacing was laid in two courses. A leveling course over the entire 29 mi. was road mixed, using a fleet of motor graders, and the finish course on the easterly 12 mi. was also road mixed. On the westerly 17 mi. the finish course was plant mixed. Both pneumatic and power rollers were used in compacting surfacing material.

Calaveras County road

The second typical lumber access road was a 17.6-mi. stretch linking Toyon and West Point, for the purpose of serving the properties of several companies subsidiary to the American Box Co. The financing was again cooperative, \$322,300 being supplied by the federal government, rights-of-way being secured by the county and clearing and grading being done by the lumber companies.

The existing highway, as in the previous case, was a tortuous mountain road, with grades up to 16 per cent, with the exception of two stretches totaling about 6 mi. in length which had been constructed in 1942 with federal funds.

The new construction included base



reinforcing where required, usually from 4 to 6 in. in thickness, and a 20-ft. width of 2-in. road mix surfacing. Maximum grade on the new highway was 8 per cent, with only very short sections exceeding 7 per cent. Curves have been super-elevated and, using the new road, lumber production has been doubled. Annual production which will use the new road is estimated at close to 110,000,000 bd. ft.

Quantities involved in this road work were: 100,000 cu. yd. of excavation; 55,000 cu. yd. imported base; 14,000 cu. yd. aggregate for road mix surfacing; 217,000 sq. yd. surfacing; 2,900 ft. culvert,

and 1,800 T. of liquid asphalt.

This access road was constructed under contract, Claude C. Wood of Lodi being the low bidder.

Organization

George T. McCoy is State Highway Engineer. On the first project described above, R. H. Lapp and Frank Lucas were the resident engineers for the State Division of Highways and John Rukavina was superintendent for the McDonald Logging Co. in its grade operations. On the Toyon-West Point road, A. N. Lund was resident engineer in charge of construction.

New Colorado Railway Tunnel

COMPLETION OF THE NEW Tennessee Pass tunnel on the Denver and Rio Grande Western Railroad early in September will mark another conquest of the towering mountains of the Continental Divide. The pass is located in the Rocky Mountains 8 mi. north of Leadville, Colo.

The railroad was originally constructed over the summit of the pass at an elevation of 10,424 ft. above sea level and was a narrow gauge road. However, in 1890 a tunnel was driven through the summit about 200 ft. lower than the crest which effected a reduction in the maximum gradient on the west slope from 4 to 3 per cent.

New tunnel needed

When the narrow gauge tracks were replaced by others of standard gauge, the existing tunnel was used without any expansion, necessitating rerouting of any trains with wider-than-standard loads. Examination of the tunnel recently disclosed that it was badly in need of relining, and rather than delay war traffic while the job was undertaken, officials of the railroad appropriated \$800,000 for construction of a new bore parallel to the old, and 75 ft. southerly from it. The new tunnel has a standard width clearance and a vertical clearance of 23 ft. This eliminated the necessity for detouring oversize loads by way of the Moffat

Denver and Rio Grande Western Railway chose to drive a new tunnel rather than to attempt relining job on the existing bore at a time of peak war traffic — The completion of this new route will protect the road with an alternate tunnel through 10,000-ft. Tennessee Pass

By KENNETH CHARLES
Denver, Colorado

Tunnel. In fact, the new tunnel is 1 ft. taller than the 6-mi. Moffat structure, which has a vertical clearance of 22 ft.

The apex of the new 2,550-ft. tunnel is 10,242 ft. above sea level and is the highest point reached by standard gauge rails in the United States. The maximum grade in the tunnel is 0.34 per cent as compared with a grade of 1 per cent in the old tunnel. As soon as construction is completed and rails laid, traffic will be diverted through the new passage, immediately after which the railroad will

commence relining the old tunnel so that it may be kept in service as a standby.

Rails to be laid in the tunnel will be 131-lb. continuous welded. This type of rail was installed in the Moffat Tunnel, owned by the same railroad, about 2 years ago and, despite the heavy war time traffic over the road, no rail failure has been reported.

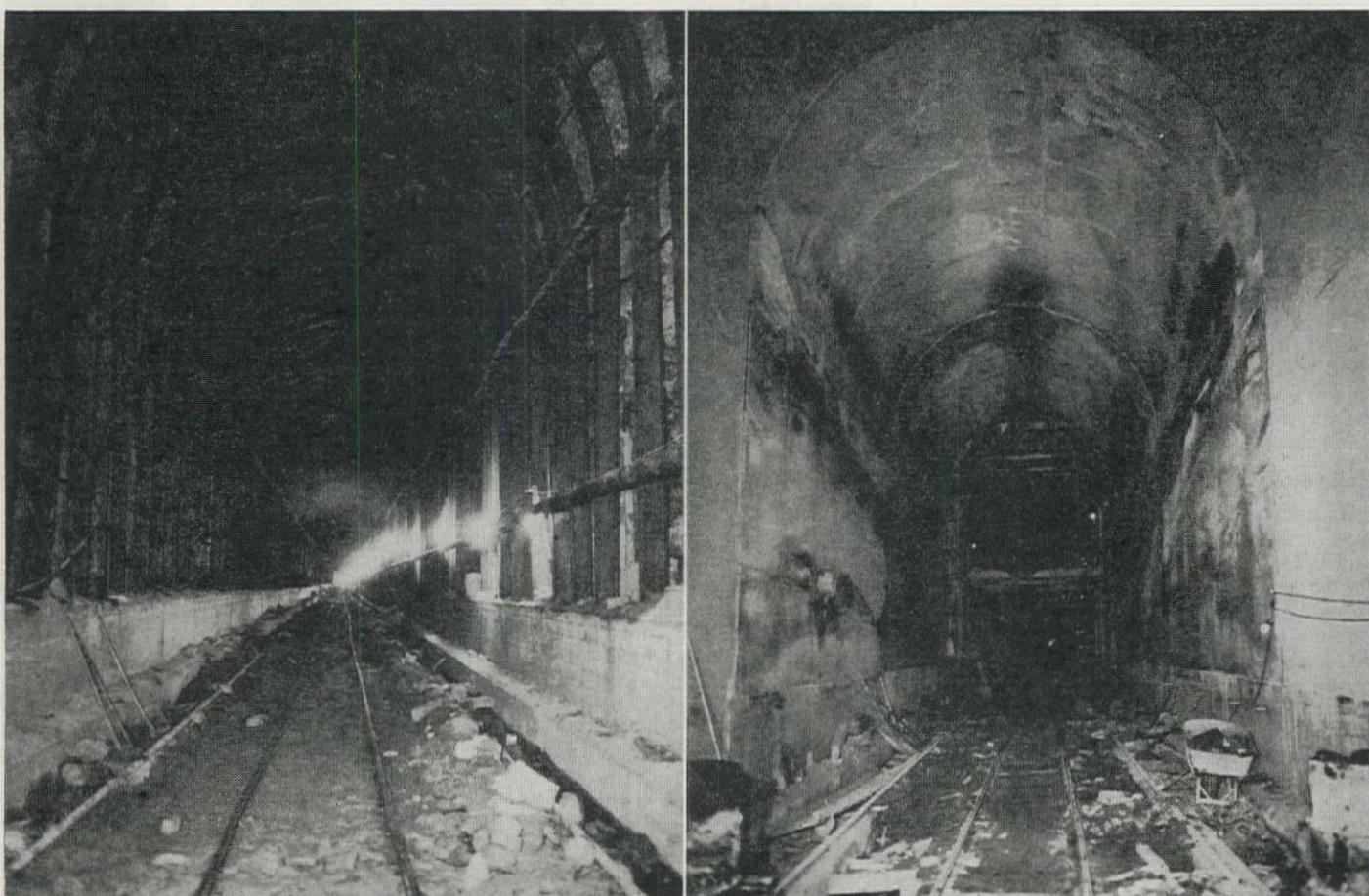
Construction work

A contract for the construction work was awarded to Winston Bros. Construction Co., of Minneapolis, Minn.

Standard excavating practices were employed. The rock was a hard granite but required a fairly heavy support. For this purpose, steel I-beam arches were installed on 2½-ft. centers. Loose rock was restrained behind these I-beams with 2 x 8-in. timber lagging.

In lining the tunnel, heavy curbs

NEW TUNNEL with curb poured and steel arch in place ready for the arch section concrete, left. Completed tunnel lining has 16-ft. horizontal clearance, and is 23 ft. from top of rail to arch.





WEST PORTAL of the D. & R. G. W. tunnels at Tennessee Pass, the new one on the right. The old, originally driven in 1890 for narrow gauge trains, will be relined and maintained as standby structure.

along each side and the lower 3 ft. of the wall were poured first, using forms made of 1 x 6-in. lumber. The I-beam arches were left in place and covered by the concrete.

The remainder of the lining was then poured monolithically using movable steel forms supported on the previously poured curbs. The concrete was mixed outside the tunnel and transported by cars to the location of the forms, whence it was pumped to the point of placement in the wall or arch. All wall concrete was vibrated to secure maximum compaction. The forms remained in place until the concrete was set, after which

they were collapsed internally and moved on to the next section.

Approximately 50 trains per day pass through the tunnel, with westbound trains of war materials from five other railroads funneling through the Pueblo gateway, the gorge of the Arkansas river and thence to Tennessee Pass, after which they move westward through the valley of the Colorado river to the Pa-

cific and shipment to the war front.

The second installation of Centralized Traffic Control anywhere in the United States was made at Tennessee Pass in 1928. The Rio Grande has since made many other installations of the modern traffic control system, and now has a greater percentage of its trackage operated with this method than any other line in the country.

The new tunnel was designed under the direction of O. K. Peck, engineer of structures for the Denver and Rio Grande Western at its Denver office. Resident engineer on the job for the road was G. C. Doan.

British Columbia Hospital Building Expenditures Reach High Proportion

OVER \$6,000,000 will be spent this year on hospital construction in British Columbia. This situation was recently revealed by Hon. George Pearson, provincial secretary, who stated that the B. C. government would contribute approximately \$2,250,000 to this building program. In contrast to the \$6,000,000 expansion indicated, Pearson pointed out that within the past 14 years there had been only \$5,000,000 spent in the expansion of general hospitals in the province.

It is interesting to note that British Columbia has more general beds per 1,000 population than any other province in the Dominion of Canada, or any state in the Union.

The new projects are practically all either under way or about to commence. Of the \$6,000,000 program approxi-

mately \$3,000,000 will be involved in the erection of a T.B. Unit and other building activities at the Provincial Mental Hospital at Essondale. New Westminster City has approved the by-law which has paved the way for the erection of a Maternity Unit at the Royal Columbian Hospital there at a cost of \$750,000. Construction is just being completed on the new Maternity Wing at the Royal Jubilee Hospital in Victoria, which is costing around \$300,000. In addition, a Military Hospital with 250 beds is being erected on the grounds of the Royal Jubilee Hospital, Victoria, at a cost of approximately \$900,000. In Vancouver a new wing has been added to Shaughnessy Military Hospital at a cost of \$450,000 and a Chest Unit has been erected at a cost of \$400,000. Expenditure of almost \$300,000 on the erection of an addition

to the Provincial Government Mental Hospital in New Westminster is also planned, and work is being completed on an Observation Unit at the Royal Jubilee Hospital at Victoria at a cost of around \$40,000. Vancouver General Hospital is planning the erection of a new Nurses' Home at a cost of \$1,200,000.

The Royal Inland Hospital at Kamloops is considering the erection of a new addition, which, it is believed, will cost around \$175,000. St. Joseph's Hospital, Victoria, is planning a large addition in the immediate future, and erection of the Mount St. Joseph's Hospital at Vancouver, one of the most modern institutions of its type, is just being completed. Erection of an addition to the Crippled Children's Hospital at Vancouver, at a cost of \$70,000 is also proposed. While no details have yet been revealed, it is understood that further expansion is planned in the immediate future by St. Paul's Hospital, which completed a \$400,000 wing at the outbreak of war.

Pan-American Road— Editorial Position Widely Applauded

IN THE JULY ISSUE of *Western Construction News*, the editors attempted to set forth a few facts which would clarify the position of the contractors on the Pan-American Highway, constructed in 1942-43 for the U. S. Army Engineers, in view of aspersions and insinuations against them which had been contained in a series of radio broadcasts by Fulton Lewis, Jr., an eastern radio commentator, "exposing" graft on the \$42,000,000 project.

The response has been so great that nearly 7,500 reprints of the editorial have been requested for distribution by contractors, contractors' organizations, the Army Engineers, and individuals. A great number of complimentary letters of approbation have been received, of which a few are printed below.

Lewis' broadcasts have of recent weeks dealt principally with other subjects and his "expose" of the Pan-American project has been left hanging in mid-air, but it has inspired investigations by several bodies, notably the Mead Committee of the Senate, a special committee of the House, and an Army Engineer group. No reports have yet been released. Neither has Lewis made any reply to the *Western Construction News* editorial, so far as reported to the editors.

The latest from Washington, at press time, on the matter is reported herewith by our Washington editor:

Washington Report

By ARNOLD KRUCKMAN

Washington Editor, *Western Construction News*

THE MEAD COMMITTEE has terminated three public hearings and more private hearings focussed upon its inquiry into the planning and basis for the wartime Pan-American Highway project. Late in August or early in September the committee plans to resume both public and private hearings to find out how much fraud was connected with the job and the extent of possible improper practices connected with the letting of contracts. Meanwhile, a corps of investigators for the committee is in the field to verify the documentation supplied by Fulton Lewis and to make inquiries into information received by the committee from other sources.

It is anticipated the second phase of the investigation will produce more dramatic news. The Senators apparently feel that the first investigations have developed sufficient reasons for the assumption that there is distinctly something queer somewhere. The keynote of the first phase was the reluctance to define the reason for the enterprise in spite of General Eisenhower's disapproval and the lack of enthusiasm on

the part of the general staff.

It became clear during the progress of the inquiry that the influence of the State Department and the economic benefits derived by Latin American countries were as potent in the planning as were the direct war needs. Lt. Gen. LeRoy Lutes of the Army Service Forces told the committee, "It had been understood from the outset that one of the principal advantages to be derived from the project was the improvement of international relations with Central American countries," to which Senator Ferguson of Michigan rejoined, "But the cost of this project started out to be \$15,000,000 and grew to \$42,000,000. It appears the Army was making it cost as much as possible to aid the economies of the republics benefiting from this highway."

General Lutes declined to discuss the diplomatic phases, saying it was a "State Department matter." He denied waste or extravagance on the basis that only "100 tons of new steel were allocated to the project, and about 600 tons of used steel salvaged from abandoned bridges and smaller works in the United States. One of the Senators pointed out the steel used apparently would have abundantly supplied the needs for a number of projects in the West which would have substantially helped to supply food now so dangerously short, and that these projects were denied priorities by WPB because they were not directly necessary for the war. General Lutes apparently regarded such projects as yardsticks having no bearing on the Pan-American enterprise. "At no time," said he, "did the transportation, manpower and critical materials used ever interfere with the successful accomplishment of domestic or overseas supply projects with higher priority."

The project originally was deemed to be necessary as a military necessity to reach the Panama Canal overland during 1942 when submarines were very dangerous in the Caribbean. In April, 1943, Lt. Gen. Eugene Reybold, Chief of Engineers, advised the Army Service Forces general staff that he thought the Pan-American Highway job interfered with the war effort. The report lay in someone's files for many months, apparently unregarded. It reached the general staff late in August and the general staff made further studies until Oct. 1, 1943, when the Army determined to quit the job and it was turned over to the Public Roads Administration.

Senator Mead demanded detailed reports on why the Reybold recommendation was "lost" for three or four months, and why there was such reluctance to stop work. General Lutes repeatedly stressed the embarrassment partly lay in the fact that it was necessary to explain

to the Latin American governments, separately and diplomatically, the reasons for stopping work. "It was necessary to explain it diplomatically because we did not want to ruffle their feathers," said General Reybold. "It wasn't a War Department matter."

Highly peeved, Senator Ferguson exclaimed, "Ruffle their feathers, weren't they supposed to be fighting the same war as we are? The job was ordered stopped because it was ruled out as a war project. Were the 'domestic economies' of these nations the controlling factor in keeping the work going?" General Reybold again stressed that was "not a War Department matter."

This hearing also brought out the surprising fact that the Pan-American Highway received a higher priority rating than the Alcan Highway, which was built for movement of supplies for the immediate war against Japan. The hearings also brought out that when gasoline and rubber were in most desperately short supply the Army allocated 480,000 gal. of gasoline and 75 tons of rubber to the Pan-American Highway. Sen. Robertson, Wyoming, produced the record to show that the general staff approved the project with the specific condition that no critical materials be used. Sen. Ferguson stressed the point that critical materials were used on the Pan-American Highway while General Douglas MacArthur, in the Philippines, was pinched for lack of the same materials. Study of the transcript of the hearings leaves the impression that the Army witnesses (the only witnesses heard) left much untold that might be variously embarrassing.

The Editor's Mail

Chief of Engineers

Washington, D. C.
19 July 1945

Dear Mr. Server:

I appreciate your letter of July 13th and the reprint you inclosed from the July issue of *Western Construction News*.

The statement has been read with considerable interest not only by myself but also by Colonel Edwin C. Kelton and others who had a part in the construction work on the Pan-American Highway. We believe you have done an accurate and constructive job in compiling this information and in presenting it in your publication.

We have taken the liberty of reproducing a limited number of copies of the article for the information of those who are most interested in this subject.

Sincerely,
E. REYBOLD
Lieutenant General
Chief of Engineers

Federal Works Chief

July 18, 1945

My dear Mr. Server:

I am much obliged to you for giving me an opportunity to read, in advance of publication in the *Western Construction News* for July, Mr. Kruckman's article on the Inter-American Highway, together with the editorial comment based thereon.

It obviously would be improper for me to indulge in ~~exten~~ comment prior to the conclusion of the Senate Committee's investigation. However, I can say that I made a personal inspection of the Inter-American Highway a year ago last spring and was greatly impressed by the difficulty of much of the terrain and by the speed with which the work was progressing despite arduous climatic and other handicaps.

It must be remembered that at the time the work in question was undertaken, there was every reason to believe that it might prove imperative to the national defense. Looking back upon this project, as upon many others urgently necessary to the war effort, it is possible to suppose that some aspects of it might have been improved upon. Hindsight is always better than foresight, but unfortunately war cannot be waged by benefit of afterthought.

I do not understand that the participation of the Public Roads Administration of the Federal Works Agency in the Inter-American Highway has been a subject of criticism at any time.

Sincerely yours,
BAIRD SNYDER
Acting for Philip B. Fleming
Major General, U. S. A.
Administrator
Federal Works Agency

A District EngineerPortland, Ore.
July 21, 1945.

Dear Mr. Server:

I am sorry not to have been in the office when you called on the 19th, but hope my luck will be better on your next trip.

Thanks for sending me an advance copy of your editorial on the Pan-American Road. While I had no personal contact with that project, I feel your discussion is a very fair-minded analysis. It is a service to the construction industry and the engineering profession.

Sincerely yours,
RALPH A. TUDOR,
Colonel, Corps of Engineers,
District Engineer.

A Pan-American EngineerLos Angeles, California
July 17, 1945.

Dear Sir:

I read with interest your editorial on the Pan-American Highway. As you say, the insinuations as carried by Fulton Lewis, Jr., over the air should not go unchallenged.

In my particular status of the work, namely the Republic of Guatemala, I had no rental equipment to speak of, just one motor patrol. That may be one reason that my job was not mentioned over the air. Another reason could be that my job was well done. My books and accounts were always in first class condition. I had no trouble whatsoever with the natives and got along famously with the representatives of the Government of Guatemala.

I could discuss this job for an indefinite period, but being still in the Army, on inactive status, I do not have the authority to say anything. Maybe some day these conditions will be changed.

Thank you again for the opportunity to read the advance notice of the editorial.

Sincerely yours,
MAJOR MAURICE C. TOBIN

The Contractors' Committee

Sacramento, California

July 14, 1945

Dear Sir:

I have read with much interest the reprint of your July issue editorial regarding the Pan-American Highway work in an endeavor to correct some of the misinformation contained in Mr. Fulton Lewis, Jr.'s, broadcasts. I found your editorial interesting and informative.

As you already know, the Associated General Contractors of America, Inc., is very interested in this investigation also, and has appointed a special committee, of which I am a member, to keep informed and "advise the Association's officers and staff" in this matter.

Will you please send copies of this reprint to the members of this special committee.

Yours truly,
A. TEICHERT & SON, INC.
By A. TEICHERT, JR.,
President.

An AGC ManagerLos Angeles, California
July 19, 1945.

Dear Mr. Server:

Once more *Western Construction News* has exhibited real, thoughtful leadership in the "Pan-American Road" editorial for the July issue.

The general contractors of Southern California wish to express their very sincere appreciation and thanks for this fine article.

We like it so well I wish to order 500 copies for distribution to the members of the Southern California Chapter, and we should like to have 3,000 copies sent to Mr. H. E. Foreman, Managing Director of the A. G. C. at Washington, for distribution to the entire membership of the A. G. C. throughout the United States. Will you please furnish these reprints at our expense.

Thanking you for your splendid service to the western construction industry, I remain,

Sincerely yours,
F. J. CONNOLLY, Manager

A Contractor

Redwood City, Calif.

July 17, 1945.

Gentlemen:

Having just read your letter regarding Fulton Lewis' broadcasts, I wish to call your attention to one more statement made by him in regard to the condition of some D8 "Cats."

As you remember, he had on the air a master mechanic from the U. S. Engineers, and this man's job was to inspect the equipment. This man stated that some of the "Cats," when they returned, had only one and two rollers on the top and bottom of the tracks. Lewis asked how many there should be, and the reply was that there were supposed to be (6) six above and (6) six below. Some Master Mechanic!

Yours truly,

W. C. RAILING.

A Few Facts

There may have been graft on construction of the Pan-American Highway, and other war construction. In fact, it would be unusual if there had not been some money misappropriated when it was thrown so recklessly about.

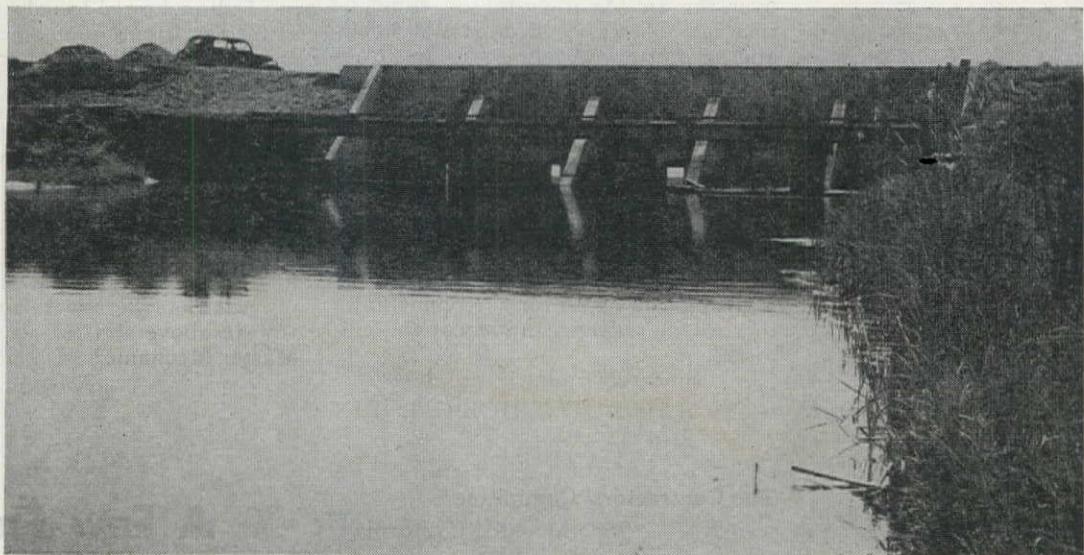
Also, the Pan-American Highway and other war and war-related projects may have been badly designed by Army Engineers or others. That, too, is almost inevitable in a holocaust, the whole purpose of which is waste and destruction.

The Pan-American Highway, which is but one section of the Inter-American Highway, designed eventually to reach all the Latin-American countries, was not planned hurriedly by the Army. This is a fact that should not be overlooked in "panning" the Army. It was laid out years ago by the U. S. Public Roads Administration, the Pan-American Union, and the governments of the Latin-American countries involved.

Broadcaster Lewis did not mention what is in the opinion of the editors of *Western Construction News* the real waste in connection with the project. Practically everyone will agree that the idea of the Inter-American Highway is a good one. Because of this war emergency work, a great part of that desirable highway was built, and practically all of it was cleared and graded. Forty-two millions, a lot of money, admittedly were spent. For a few more millions, a completed surfaced road could have been constructed. But the project being closed short of completion, a great portion will be soon grown over with jungle and destroyed by the weather. When work is undertaken again, most of the accomplishments of the wartime builders will be gone, and many more millions will be required to reestablish the line and grade than could have completed it in 1943. This, we believe, constitutes the real steal.

Perhaps the Army should never have undertaken the job, but, having so nearly completed it, it should have been allowed to finish it.

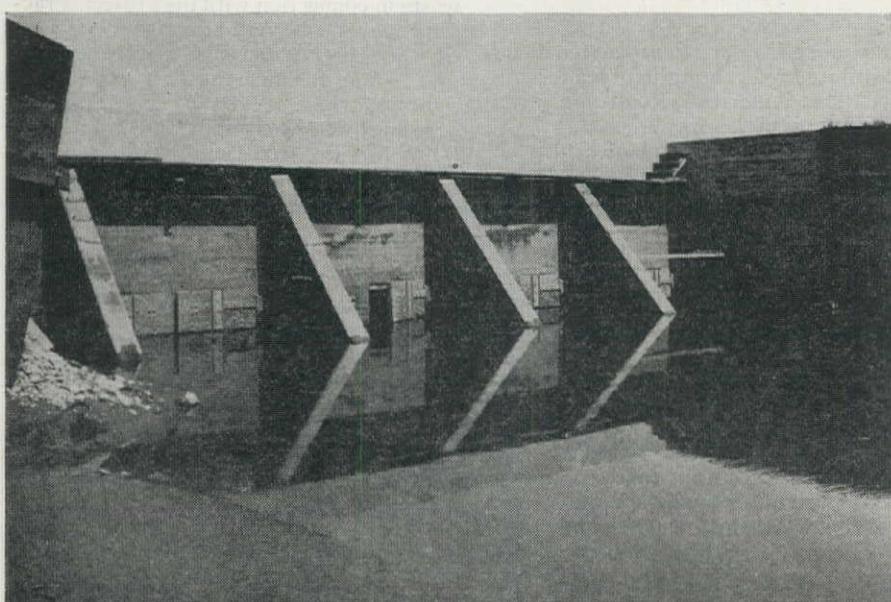
Skagit Bay Tidegate Repaired



A REINFORCED CONCRETE outfall dam was constructed by Drainage District No. 17, Skagit County, Washington, in 1936, to control their drainage water flow into Puget Sound. In February, 1945, the safety of the structure was jeopardized by a water flow under and along the dam and an emergency repair was necessitated to prevent a salt water intrusion over 6,000 acres of highly productive essential war crop farm land.

The emergency repair consisted of plugging the openings of a passageway which had formed under the apron of the structure and it became necessary to do the work during the periods of high tide. Operations were rushed because of the development of a partial

REPAIRED flood control dam from inland side, above. Approximately 240 cu. yd. of rock and sacked, dry-mixed concrete were placed in eroded channel under the apron and deposited in adjacent dikes. Seaward view of dam with tidegates open, below.



Drainage control channel maintained and salt water intrusion of productive farm lands prevented by emergency repair of tidegate structure and abutting dikes during the period of maximum tides — The supporting apron was undermined to such a degree that failure was imminent

By FRANK K. MUCEUS
Field Engineer, Soil Conservation Service
Sedro Woolley, Wash.

failure in the dike at the east end of the dam, where a breach would have resulted in a serious inundation. The work was carried out on a day labor basis un-

der the direction of engineers of the United States Soil Conservation Service.

Description of the dam

The dam is located at the lower end of a three-mile ditch that aligns south and west from the south boundary of the district on the Skagit-Snohomish County lines, to deep water on Skagit Bay. It is a reinforced concrete structure of the flat slab and vertical wall construction, is 55 ft. long across the drainage ditch and 15 ft. high. The wall is located 21 ft. from the upstream edge of the 38-ft. apron, and has five pairs of automatic vertically hinged wooden tidegates. Between each pair of tidegates the wall is tied into the footing on each side by counterforts. The structure is tied into the abutting dike on each end by wing walls that extend five feet into the earth embankment.

The foundation material is a soft blue clay with little inherent bearing value. Four rows of foundation piles were originally driven across the site on 10-ft. centers. The first row is located three feet from the upstream edge of the apron, and three cutoff walls of Wakefield sheet piling were also driven across the ditch. Submerged logs and stumps encountered 10 to 15 ft. below the surface deflected the piling and made it practically impossible to drive a tight cutoff wall so three rows of piling were used instead of one. In building the floor or apron, forms were supported on the piling, leaving in several areas open

spaces between the ground line and the bottom of the apron.

Failure of the dam

Leakage under the dam was noted a short time after its completion. At the east wing wall a small washout of the dike had periodically needed maintenance. A few years ago Wakefield pilings were driven along the downstream toe of the apron to eliminate the leak. However, due to poor alignment and deflected piles, this did little toward stopping it. While the drainage district realized that eventually the foundation must be repaired, no great concern was felt until last January, when a serious backflow took place during the high flood tides. Instead of a hole three feet in diameter at the east wing wall, it had increased to ten feet in diameter and was increasing further with each high tide.

Water was rushing through a large, deep hole at the west edge of the apron and going diagonally under the slab to boil up on the outside of the east wing into the upstream channel. Engineers of the Soil Conservation Service, who were working on the Skagit Soil Conservation District, began to study the problem and design emergency repairs feasible during the high tides found at this time of the year. Measurements and soundings taken in the downstream area reveal that the large volume of reverse flow during flood tides was coming through one large hole in the west edge of the concrete apron. The hole was 12 by 15 ft. in area and 26 ft. deep below the concrete apron. It was found that the sheet piling walls were driven to a depth of 24 ft. below the slab, and that several piles were out of alignment and bent upstream, a condition that was not indicated by the sheeting across the channel at the edge of the apron. The hole at the east end of the dam was 10 ft. in diameter and 17 ft. deep.

Repairs to the structure

High tides with the probability of winter storms, shortage of critical material such as wood and steel sheet piling and the fact that it would be difficult to obtain contractors, determined that it would only be feasible to attempt an emergency repair at that time. The proposed emergency repair was to fill up the two holes at each end of the channel and to bring the eroded dike up to full section.

It was planned to have the work performed by contract under the technical direction of the Soil Conservation Service. The downstream hole would be filled first, the bottom 10 ft. to be filled with large boulders, grading from 6 in. to one-man size. It was estimated that this would require 25 cu. yd., including 20 percent of finer material for filler. The next 6-ft. lift called for a fill of sacked, dry-mixed concrete. Pit-run gravel was the material to be used for the remaining 10 ft.

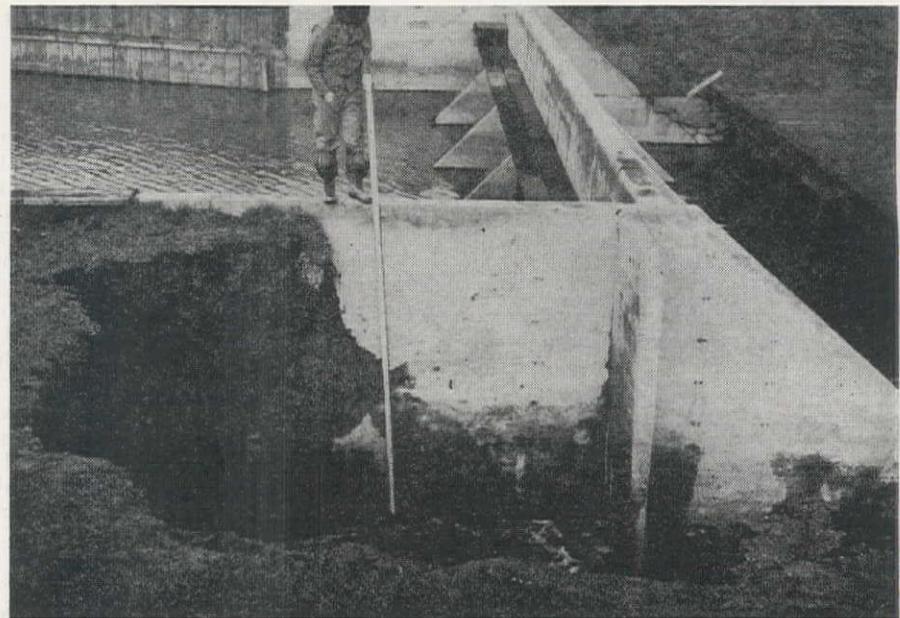
The plan for filling the upstream hole called for a fill of 220 cu. yd. of pit-run gravel with a large clay content. Plans and specifications were prepared and bids were ready to send out to local con-

tractors when it was reported that if the repair was not made immediately, the structure would fail. An additional section of the dike had been washed away and only 5 feet of dike was preventing the free flow of salt water around the east end of the dam. At this critical stage, the drainage commissioners decided to begin the repairs at once, so a crew of men was hired, and arrangements were made for the use of a $\frac{1}{2}$ -cu. yd. shovel operating in a gravel pit about two miles from the job, and two 3-cu. yd. dump trucks.

The problem at the moment was to stop further erosion of the dike, and to effect this in the shortest time the gushing water in the upstream hole had to be checked first. Since the turbulent stream would wash the fines out of the pit-run gravel, the original plan for filling the hole in the dike with this material was abandoned, and instead loose-

ly sacked gravel was used. Batches of 30 to 40 sacks were thrown into the hole, beginning at the outer periphery on the dike side of the boil and gradually confining and reducing the turbulent area until a small hole next to the wall was finally plugged. By the second evening the placement of 380 sacks of gravel had reduced the flow from an estimated 25 to 50 sec. ft. to a quiet flow of one sec. ft., and had brought the fill to 2.5 ft. above the floor level of the apron. Low tide that night exposed the top layer of sacks, which were more evenly distributed and covered with 6 cu. yd. of rock, graded from hand size to one-man size. In the next two days the final 12-ft. section of the dike was filled with a clay and gravel mixture. In the first four feet of this lift the fill material was carefully mixed and hand tamped. The balance of the 100-cu. yd. fill was delivered to the hole by dump trucks and spread by hand.

CAVED DIKE at the east end of dam before repair work was started, the level rod in engineer's hand points to the intake hole on seaward side of apron, top. Tide water boiling up on outside of east end of dam. Concrete wing wall shows on extreme right.



As soon as the flow had been practically stopped in the upstream area, filling of the downstream hole was started. The original plan for filling this hole specified a 10-ft. lift of boulders to be followed by a 6-ft. fill of sacked concrete. Due to equipment shortage and the long haul necessary, sacked dry-mixed concrete was substituted for the boulder fill in the bottom, and was used for the first 16 ft. of the fill. A four-man crew with a one-bag mixer placed 500 sacks of 1:5 concrete in two days.

To control the placement and prevent damage to the footing slab, the sacks

were placed in position from the west dike bank. The hole was filled and top of the fill brought one foot above the apron grade with 104 cu. yd. of pit-run gravel dumped in the hole by trucks, and at low tide some spreading by hand was possible. This fill was speeded up by 6 trucks furnished by the Skagit County Road Department.

The job was started Monday noon and completed Friday noon — 380 sacks of gravel, 500 sacks of dry-mixed concrete and 204 cu. yd. of fill had been placed at a total cost of \$675.

This was an emergency repair only,

carried out during the high winter tides. The large channel that must exist under the apron has not been filled and remains a threat of similar occurrence in other upstream areas.

Tentative plans for permanent repairs, based on a reconnaissance survey, but pending further investigations, call for two cutoff walls of interlocking steel sheet piling across the channel at the upstream and downstream edge of the apron. These walls will confine the area under the slab, and permit filling the channel and other open spaces under the slab.

Northwest Unites to Develop Area

REALIZING THE NEED for singleness of purpose in the development of the resources of the Columbia River Basin and the importance of supporting a program through existing federal, state and local agencies for the development of such resources, a group of citizens in the Portland area recently called a meeting of representatives from the states of Oregon, Washington, Idaho, Wyoming and Montana to determine how best to meet the situation.

It was decided that the most practicable manner of proceeding was to form a non-profit corporation under the laws of the State of Oregon and to qualify such corporation to do business in the states of Washington, Idaho, Montana and Wyoming. Thereupon such a corporation was organized as an Oregon corporation under the name of Pacific Northwest Development Association.

The first meeting of the board of directors of this association was held at Portland on May 11th and 12th, 1945. At this meeting by-laws were adopted, the articles of incorporation were approved and officers and directors were elected.

A jelling period of several weeks followed, during which further details of procedure were worked out, office space was secured and a managing director was sought.

A second meeting of the board of directors of the association was held on June 1st and 2nd, in Spokane, Wash. At this meeting the policy of the association was restated, L. A. Colby, of Missoula, Mont., was employed as managing director, and a preview of the development work of the Corps of Engineers and of the Bureau of Reclamation was presented by representatives of those organizations.

The Pacific Northwest Development Association is now engaged in settling state policy and in establishing personnel and field organization procedure.

The chief objectives of the PNDA, as disclosed by its articles of incorporation, are to actively support a program for the development of the resources of the Columbia River Basin through existing federal, state and local agencies and to gather and disseminate information relative to the development of such

All segments of industry in the Columbia Basin combine efforts in a new association designed to foster healthy and prosperous growth of the five northern states

resources; to lend assistance to any plans that have for their purpose the providing of full employment for the inhabitants of the Columbia River Basin by the development of such resources through existing federal, state and local agencies, and also to cooperate with these agencies and all firms, associations, corporations and persons interested in the protection of state and individual rights, including water rights.

In order to carry out these objectives, industries, businesses and individuals in all walks of life who are interested in the proper development of the Columbia River Basin are furnishing the necessary funds.

Organization procedure

The states of Oregon, Washington and Idaho have been divided into five districts, with one director from each district. The other two states, Wyoming and Montana, have relatively small areas in the Columbia River Basin. Therefore they are set up on a two-director basis.

Representative citizens from the various counties within the districts will be selected and will be given the task of stimulating interest in the work of the organization and will aid in the dissemination of all necessary information to the people of that county.

State directors of the PNDA will determine state policy of operation, guided at all times by the broad principles established under the articles of incorporation.

Within each of the various states of the Columbia River Basin there are a number of local and state organizations having the same general objectives as does PNDA, and the work of PNDA will be correlated to that of these local and state organizations so that singleness of purpose will be maintained

throughout the region in all activities.

The president of the organization is J. C. Compton, contractor, of McMinnville, Oregon, and representatives of industry, labor, transportation, the press and government are on the board of directors.

Chinese Engineers Will Study Highway Methods

TWENTY-SIX Chinese engineers who expect to have an active part in the future development of China's highways will spend the next several months working in various state highway departments, gaining practical experience in highway and bridge design, construction, maintenance, equipment and material-testing methods used by highway engineers in this country.

They are part of a group of over 700 Chinese who arrived in the United States recently to devote a year to the study of communications, engineering, industrial and agricultural problems. They were brought to this country under the auspices of the Foreign Economic Administration, with the co-operation of the International Training Administration, Inc., and the Chinese Supply Commission. While in the United States they will receive subsistence pay under lease provisions.

An additional group of 500 or more Chinese trainees are expected to arrive in the near future, making this the largest international training program of its kind in world history.

The 26 Chinese studying highway matters are college or university graduates who have degrees in civil engineering. Four members of the group have been assigned to the state highway department in California, five to Washington state, three to Oregon, two to Wyoming, two to Texas, one to the materials-testing laboratory of the Public Roads Administration in Washington, and the balance to various eastern states.

Later in the year they will be transferred to other states in order to give them experience in several types of road construction and design in different sections of the country.

Port of Oakland Plans Far-Reaching

PLANS for after-the-war improvement and expansion of harbor and airport facilities along San Francisco Bay's east shore, including twenty major projects, were recently announced by O. H. Fischer, chairman, Maritime and Harbor Committee of the Oakland Chamber of Commerce. The improvement will embrace the entire East Bay shoreline and expenditures are estimated to total more than \$55,700,000.

Important in the post war improvement planning, according to James J. McElroy, president of the Oakland Port Commission, is the recovery under the terms of a compromise agreement with the War Department of certain vital areas and port facilities on the waterfront which were made available for the Army's use in prosecuting the war. McElroy points out that with the end of hostilities, the Commission will endeavor to have returned to the Port as large a portion of these facilities as possible. In the event these facilities now used by the Army are returned to form a nucleus for the important outer harbor facilities, the Oakland Port Commission plans further expansion with the North Harbor Development. In this area, immediately north of the San Francisco Bay Bridge approach, the Port controls 1540 ac. of tideland in which it expects to develop berthing space for approximately 90 vessels. The initial development of the North Harbor unit—piers, warehouses, and open storage space, totaling 1,080 ac., is estimated to cost \$15,000,000.

An additional \$14,500,000 development is planned for the Outer Harbor area adjacent to the Key System mole, for the construction of two mole type piers, with "U"-shaped transit sheds and terminal buildings providing over one million square feet of storage space. The outer portion of piers is to be reinforced concrete on concrete piles protected with creosoted pile aprons. Piers will be 1,600 ft. long by 580 ft. wide, providing a total berthing space for 18 vessels. Double shipside railway tracks will be provided as well as three depressed tracks to serve the rear of each shed.

Outer Harbor Terminal

Extension of the present Outer Harbor Terminal wharf to connect with the Seventh Street unit is estimated to cost \$550,000. The existing oil pier in this area is considered by the U. S. Engineers to be an obstruction to free movement of vessels and will be replaced by a new \$350,000 structure. The proposed wharf expansion for the Seventh Street unit will include widening the existing transit shed from 120 ft. to 180 ft. for a distance of 500 ft. Another transit shed 180 ft. by 720 ft. will be built over existing wharf area. It will be constructed on independent foundations of reinforced concrete piles. Shed construction will be of wood columns and fabricated trusses, purlins and sheathing. The walls will be of reinforced concrete and the roof fabricated of composition material. Ade-

Airfields — railroads — warehouses — wharves and roads comprise a small portion of the multi-million dollar enterprise being planned for the comprehensive enlargement of San Francisco Bay's east shore area

quate trackage and roadways are planned for this project which include the necessary relocation of the tracks and road required by widening the transit shed. Expenditures for improvement and rehabilitation of the transit shed area, including complete automatic sprinkler system, is estimated to be \$600,000.

Inner Harbor development

The Port Commission also plans an extensive improvement of the Inner Harbor expected to total \$1,700,000. A wharf and transit shed at the foot of Clay Street will provide 1,570 ft. of berthing space and 219,000 sq. ft. of storage space.

The wharf construction will provide a 16-ft. outer fender line of creosoted piles, flanked by a 76-ft. reinforced concrete deck supported by reinforced concrete piling. Inside this will be a concrete bulkhead wall on timber piles. The portion inshore from the concrete bulkhead wall will consist of a concrete slab supported on compacted fill. Structural steel columns and trusses will sup-

port the wood purlins and roof sheathing and a composition roof for this transit shed. Protective walls of reinforced concrete and an ample automatic sprinkler system connected to a gravity tank of 100,000-gal. capacity provide adequate fire protection for this pier situated close to the downtown area.

At the foot of Fallon Street it is proposed to expend \$960,000 for a wharf and transit shed. This construction will consist of a creosoted timber apron wharf protected by a reinforced concrete retaining wall approximately 90 ft. in rear of the wharf face. The wharf provides 450 ft. of berthing space along the Estuary and 760 ft. of slip length. Total wharf area provided by the Fallon Street terminal is 100,000 sq. ft., with an additional paved area of 720,000 sq. ft. in rear of wharf.

The Port Commission has four other improvement projects in the planning stage, which will provide additional construction work and harbor facilities as demands for additional shipping may require. They are the Ninth Avenue Terminal, with an easterly extension of the pier and a similar extension to be built along the Clinton Basin. Construction is planned for a new storage warehouse in the rear of the pier and for the building of a new 1,500-ft. transit shed extension on the existing wharf and proposed wharf extension. The wharf will be of creosoted timber construction 100 ft. x 370 ft. provided with two railroad tracks. The deck will be surfaced with asphaltic concrete. It will also be protected by complete automatic sprinkler systems installed under the deck.

(Continued on page 113)

Contemplated East Bay Harbor and Airport Expansion

Outer Harbor Terminal:

1—North Harbor Development.....	\$15,000,000
2—Pier and Terminal Buildings near Key Mole.....	14,500,000
3—Extension Outer Harbor Terminal Wharf.....	550,000
4—Seventh Street Unit Transit Shed.....	600,000
5—Outer Harbor Oil Wharf.....	350,000

Inner Harbor:

6—Wharf and Transit Shed at foot of Clay Street.....	1,700,000
7—Wharf and Transit Shed at foot of Fallon Street.....	960,000
8—Extension of the Ninth Avenue Pier.....	185,000
9—Storage Warehouse in rear Ninth Avenue Pier.....	315,000
10—Ninth Avenue Pier Transit Shed Extension.....	675,000
11—Ninth Avenue Pier Eastern Extension.....	950,000
12—Brooklyn Basin Channel Wharf and Transit Shed.....	2,810,000
13—San Leandro Bay Development.....	5,000,000
14—Embarcadero—Clay Street to Nineteenth Avenue.....	450,000

Total Harbor \$44,045,000

Airport:

1—Alameda Road	\$ 275,000
2—Roadway to Eastshore Highway and Overpass.....	125,000
3—Air Freight Terminal	500,000
4—Administration Buildings	800,000
5—Extension to the Landing Area.....	1,500,000
6—Expansion of the Field to provide Duplicate Runways.....	8,500,000

Total Airport \$11,700,000

Grand Total \$55,745,000

Arizona Reclamation Limits

FORTY-FIVE YEARS AGO, when the author first came to Arizona, it was still a frontier state. The sun-tanned, hardy prospector and his burros were often met on the rutted roads and trails.

But since 1921, the great Colorado River has been the symbol of hope and aspiration of Arizonans contemplating a future greater state. The magnitude of the task of harnessing the Colorado was appalling. But when other states of the basin evinced their determination to utilize its waters, Arizonans suddenly became confident that they also could do so. It was not until the summer of 1923 when the Arizona Engineering Commission, composed of LaRue, Preston and Turner, made its report to Governor Hunt that the state awoke to a realization of the vast areas of arable desert which might be watered from the Colorado River. It was then too late to present such need for water since the Colorado River Compact had been signed at Santa Fe eight months earlier. Arizona, in fact, did not become a signatory to the compact until last year.

At the present time, the state's use of water from the main stem of the river consists of the 50,000-ac. project in the Yuma Valley and the initial development on the nearby Yuma Mesa, and the diversion to 6,000 ac. on the Colorado River Indian Reservation.

The great Imperial Dam-Gila Valley project—the short name is the Gila project—to irrigate 585,000 ac. in Yuma County was adopted by the Bureau of Reclamation in 1934. Had it received the immediate enthusiastic support of the entire state some of the obstacles

Re-survey of the Colorado River hydrology indicates that the water supply from that source will be inadequate to fill the needs of Arizona and surrounding Basin States, in view of the current Mexican Water Treaty and a probable period of low flow now beginning

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might have been removed by local and state action, and by now that immense development might be well on its way toward completion.

Specific authorization under the Reclamation Act was made June 21, 1937, for a portion of the Gila project comprising 150,000 ac. There has been some revision and shifting of areas. Present plans call for two mains on the mesa extending to the international boundary and serving 30,000 and 45,000 ac. respectively, one main extending to the Wellington and Mohawk areas for 68,000 ac., and a short extension to Texas Hill covering 7,000 ac. The authorization of funds by Congress is sufficient to complete the project after the war at 1940 prices.

Hydrology of the Colorado River

In June, 1921, a high-class gaging station was installed at Lee's Ferry, near the Utah boundary line, and has been maintained continuously. It will be

LAKE MEAD, 115-mi. long lake formed by Boulder Dam, is the dominant factor in control and use of the waters of the Colorado River for power, irrigation, etc.



maintained always, since it is necessitated by the Colorado River Compact. Because of the early intention of the upper basin states to make Lee's Ferry the division point between upper and lower parts of the Colorado Basin, E. C. LaRue, then an engineer of the Geologic Survey, synthesized a tabulation of the historical stream flow at Lee's Ferry as far back as possible, through study of the stream measurements at various points farther upstream, especially Fruita, Colo., and near Green River, Utah. This tabulation was needed and was used by the Colorado River Commission in 1922. It was accepted by all hydrologists as reasonably adequate. But now the hydrology of the river needs reworking and revision. The revision, regrettably, is drastically downward. Engineers look askance at this duty. I shall get no applause for this presentation. If you and I should picture the irrigation of half of Arizona, if we should promise the moon, we would be wildly acclaimed.

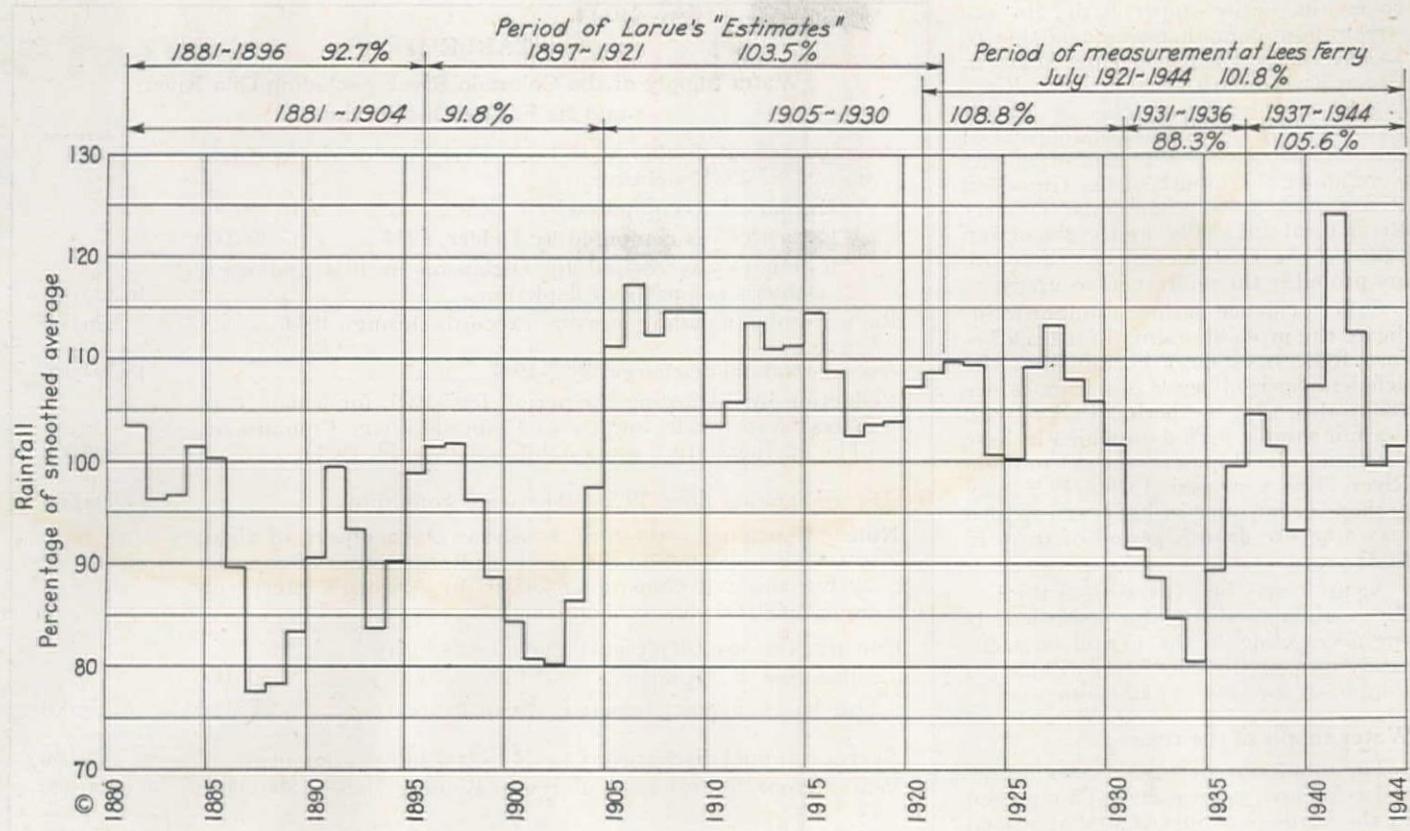
In 1922, the figures presented to the Commission indicated a total water supply in the basin of from 21,000,000 to 24,000,000 ac. ft. The author's studies at that time indicated 20,500,000 ac. ft.

During the last few years the early stream flow of the Colorado River has been restudied under the direction of W. E. Dickinson, hydrologist of the Geological Survey, and was published last year as Water Supply Paper 918. He revised the tabulation downward, even lower than LaRue's figures. He found some important errors, notably one at Green River, where the length of a skew bridge had been used instead of the width at right angles to the piers.

Early inaccuracies

LaRue's estimates—he himself called them "estimates"—were made by legitimate methods accepted by hydrologists for use in cases where data is incomplete or lacking. The runoff of some tributary basins was estimated by comparison of areas, physiography and vegetal cover with nearby basins. Stream-bed gains and losses were estimated on the basis of experience and on some observations of losses covering two years.

The upstream flow records on which LaRue had to depend were not very accurate. Stream measurement in the nineties and prior to 1920 was crude as compared with that of the last 20 or 25 years. Both the equipment used and the technique have been greatly improved and



developed. At important stations now a gaging is made almost every day instead of at irregular intervals whenever the station might be visited, as in the old days. On some of the gaging stations in Arizona engineers used to feel lucky if they got one or two gagings at flood flow in a year. As late as 1918, Joe Kunesch worked with one helper, sometimes with none, to cover the whole state. When the floods were at their best, very likely he was trying to dig his car out of the mud at some isolated spot. Then, too, dependence was had on reading a gage twice a day or once a day instead of on continuous recording gages. The old records should have had "plus or minus 20 per cent" written after the figures. LaRue's estimates could have been perhaps 10 per cent or more in error, and probably were.

A long record of accurately measured stream flow at Lee's Ferry is now available, reaching from June, 1921, to date, 24 years. The average snow cover on April 1, this year, measured as water, was 14 in., exact average for the period of record since snow survey forecasting was established, presaging average runoff this spring and summer. That period, 24 years, should be long enough to serve as the basis for planning and designing unless it is known to cover a period of rainfall higher or lower than the average.

Studying the averages

The stream flow at Lee's Ferry for the 24 years since June, 1921, has averaged much less than the average of LaRue's estimates. Apparently the error in LaRue's estimates was on the high side. Possibly 2 per cent more rainfall could produce 11½ per cent more runoff,

THE TEST of La Rue's estimates of runoff at Lee's Ferry in relation to rainfall in the Upper Basin States, shows too high a figure in that area for period 1897-1904.

but it is unlikely. For this reason, and for another which I shall present, I believe the LaRue estimates should be discarded entirely.

If it be argued that there is no justification for throwing out the years of highest rainfall (assuming for the moment that the records for those years are accurate) the answer is that it is not practicable to store water 20 to 30 years from a long wet period to a dry period because of the evaporation loss and the cost of storage space which is so seldom used, and further, it is inadvisable and inhumane to build projects and settle agricultural areas where the population can succeed for 20 years and must then starve for 20 years.

It is recognized that the period 1906-1929, inclusive, was a relatively wet period. To determine the relationship of this period to a much longer period, a study was made of the precipitation in Utah, Colorado and Wyoming, the states which produce the runoff at Lee's Ferry. Records were available from 1881 to date. The three state annual averages were averaged, weighting Colorado records double. The records were then smoothed in 3-year running averages, weighting the middle one double each time. The figure for each year was then

reduced to a percentage of the 64-year mean. The results, when plotted against an overall mean, represented by a horizontal 100 per cent line, show a long period of deficient precipitation to 1906 followed by a long wet period to 1930, and that followed by short wet and dry periods.

Admittedly, rainfall and runoff curves do not coincide, but they are roughly parallel. The maximum precipitation in one year occurred in 1941; the runoff that year was not the highest, but one of the highest, one of the reasons for this being that the wet winter followed two dry years and much moisture was absorbed into the ground.

Reference to the above-mentioned graph shows that for the period of LaRue's estimates the average rainfall was 3½ per cent above the long-time mean and 1.7 per cent higher than for the period 1921-1944. If his study had included all the years 1881 to 1921, for that period the average rainfall would have been about one per cent below the long-time mean and his stream-flow average would have been much lower than his published average.

In order to test the LaRue estimates further, the relationship of runoff at Lee's Ferry to rainfall in Utah, Colorado and Wyoming was plotted, taking the averages of groups of years. The group that plots farthest from the curve is the group comprising the years 1897-1904, the first eight years of the synthetic estimates. The plotted point is about 2,000,000 ac. ft. per year more than it apparently should be. The presumption is that the estimated runoff for those eight years was too high, either because the base records were too high or because of errors in extending the base data to

This paper was recently presented by Prof. Smith to the Arizona Section, American Society of Civil Engineers.

cover the entire upper basin. In the stream-flow data that was available to LaRue there is a gap in the record at Green River, Utah, on the Green River extending from Sept., 1897, to March, 1905, while on the main stem, then called the Grand River, the measurements were above the mouth of the Gunnison River until 1908, and above Dolores River until 1913. The first eight or ten years of the LaRue estimates therefore are probably the poorest in accuracy.

Other evidence has been sought to indicate the probable rainfall far back before 1881. It is quite certain that the deficiency period began ten years before 1881; also, that the period 1921 to date is a fair sample period on which to base the future development of the Colorado River. The wet period 1906-1929 may perhaps occur once in 100 years, so also may a severe drouth period of from 15 to 35 years.

Again it may be asserted that the LaRue estimates should be discarded. If engineers cling to the period of accurately-measured record, they will have a solid basis for studies and estimates.

Water supply of the river

The tabulation of annual stream flow at Lee's Ferry as measured and reported by the Geological Survey, and of annual depletion above Lee's Ferry as determined by the Bureau of Reclamation, is presented in Table I.

Table II is a study of the water supply and of its distribution as determined

TABLE I
Measured Flow, Upstream Depletion
and Virgin Flow at Lee's Ferry
Quantities in Thousands
of Acre-feet

Calendar Year	Recorded Flow at Lee's Ferry	Depletion in Upper Basin	Virgin Flow at Lee's Ferry
July-Dec.			
1921	5,881	.....	.....
1922	16,070	2,427	18,497
1923	16,950	2,473	19,423
1924	11,690	2,084	13,774
1925	12,340	2,153	14,493
1926	13,060	2,198	15,258
1927	17,510	2,521	20,031
1928	14,710	2,318	17,028
1929	19,590	2,685	22,275
1930	12,390	2,157	14,547
1931	6,218	1,691	7,909
1932	15,130	2,354	17,484
1933	9,733	1,942	11,675
1934	3,948	1,541	5,489
1935	10,270	2,023	12,293
1936	12,110	2,185	14,295
1937	11,980	2,232	14,212
1938	15,640	2,572	18,212
1939	8,839	2,075	10,914
1940	7,589	2,015	9,604
1941	17,860	2,912	20,772
1942	14,790	2,652	17,442
1943	11,410	2,366	13,776
1944	13,020	2,500	15,500
Jan-Mar.			
1945	1,110	.....	.....
	Average		14,996

TABLE II
Water Supply of the Colorado River, excluding Gila River,
and Its Future Distribution

	Acre-feet
Average annual discharge at Lee's Ferry under virgin conditions, 1897-1921, inclusive:	
"Estimates" as computed by LaRue, 1922.....	16,856,000
"Estimates" as computed by Debler, 1934.....	17,390,000
"Estimates" as revised by Dickinson in 1944 and using Debler's estimates of depletion.....	16,720,000
Reduction by including measured records through 1944.....	826,000
Average annual discharge, 1897-1944.....	15,894,000
Reduction by discarding the period 1897-1921, for which "estimates" were made for use of Colorado River Commission. (The gaging station was established June 13, 1921).....	898,000
Average annual flow, 1922-1944, virgin conditions.....	14,996,000
Note: A surplus, as the term is used in the compact, of about 950,000 is indicated on the basis of interpretation of compact by Bureau of Reclamation; 650,000 by Arizona's interpretation; 2,000,000 plus by California's.	
Consumptive use (depletion) above Lee's Ferry:	
Allocation by compact.....	7,500,000
One-half deficiency to satisfy Mexican treaty.....	275,000
	7,225,000
Average annual discharge at Lee's Ferry, full development.....	7,770,000
Water supply (gain) Lee's Ferry to Boulder Dam....(800,000?)	1,000,000
	8,770,000
Depletion, ultimate:	
Nevada (300,000)	200,000(?)
Other irrigation	250,000
Evaporation—Lake Mead	640,000
Bridge Canyon	75,000
Marble Canyon	95,000(?)
	1,260,000
Flow past Boulder Dam.....	7,510,000
Inflow, Williams River and various washes.....	150,000
	7,660,000
Depletion, Boulder Dam to Laguna Dam:	
Stream bed losses	500,000
Evaporation (reservoirs)	140,000
Consumptive use:	
California (5,362,000)	4,875,000
Colorado River Indian Reservation	300,000
Yuma Valley	210,000
Gila Project (under construction)	660,000
*Mexico	1,500,000 plus
Unusable, flood peaks, etc.....	(No allowance)
	8,185,000
Deficit	525,000
Future authorization for Arizona.....	None

*No allowance for "return flow" because "consumptive use" is employed.

by the compact, by contracts between the federal government and the states, and by the Mexican water treaty ratified by Congress on April 18 of this year.

The computation starts with the virgin flow at Lee's Ferry for 1897-1921 based on the estimates published in Water Supply Paper 918 and the Bureau of Reclamation's tabulation of depletion. The average annual virgin flow for the period 1897-1921 is stated as 16,720,000 ac. ft. Reduction resulting from extending the records forward through 1944 is 826,000 ac. ft. Further reduction, if the

early synthetic "estimates" are discarded, is 898,000 ac. ft., leaving very close to 15,000,000 ac. ft. as the average annual virgin flow at Lee's Ferry for the period of record.

Under the terms of the compact, 7,500,000 ac. ft. of consumptive use is allocated to the upper basin. Water granted to Mexico by treaty is to come out of the unallocated surplus, but in case of deficiency one-half of the deficiency must be taken from the upper basin allotment. This reduces the permitted consumptive use or depletion above

Lee's Ferry to 7,225,000 ac. ft., leaving the average flow at the gaging station at 7,770,000 ac. ft.

The next step is to apply gains and losses from Lee's Ferry to Boulder Dam. The quantities shown in the tabulation are based on those used by the federal government agencies. Reservoir evaporation losses, as measured during the past nine years, are proving to be higher than was predicted. The flow past Boulder Dam is shown to be 7,370,000 ac. ft. There is reason to believe the increase of 1,000,000 ac. ft. is about 200,000 too high, but will not raise that issue at this time.

There is little likelihood that California will be able to obtain as much water as was promised in the contracts signed by the Department of the Interior in 1931. The quantity shown, 4,875,000 ac. ft., is based on the provision in the Boulder Canyon Project Act, by reason of which California agreed to a limitation of 4,400,000 ac. ft., plus one-half of the surplus. California will suffer by reason of the Mexican water treaty. The quantity shown for Nevada is also less than the quantity proposed in the Boulder Project Act, which was 300,000 ac. ft.

The Colorado River Indian Reservation cannot be denied water for its 100,000 ac. It is the most feasible and cheapest irrigation project left in the United States. The Gila project, Unit 1, will be built as authorized eight years ago.

Jacobs and Stevens in their exhaustive report allowed about 1,000,000 ac. ft. for unusable flow or waste at the boundary line due to excess flood flows when very wet years succeed each other, to big floods in Williams River, to difficulty in regulating outflow at Davis and Parker dams to meet exactly the Mexican demand and various other factors. The present tabulation allows nothing, although this item will be a material quantity. Throughout, the effort has been to be as optimistic as possible. No allowance for return flow is shown because the deductions above are based on consumptive use, not on diversions.

The final result is a deficiency of 525,000 ac. ft.

Arizona's prospects

There appears to be no possibility of any further authorization for Arizona except perhaps a small project on the Little Colorado.

California is assured of most of her water supply. The reasons are: first, her contracts have 13 years' priority over the Arizona contract; second, her projects are, for the most part, built, excepting a 16,000-ac. project on the first benchland adjacent to the Palo Verde valley. Projects already built will receive water; "possession is nine points of the law." When the investment has been made and the land is settled with people—people with voices and votes—the water will be forthcoming. A corollary to that theorem is that a representative from such a district will make sure that Congress does not authorize other undertakings which might reduce or destroy the water supply for his constituents.

Some conclusions

Many important inferences and conclusions can be drawn from the above study. I shall discuss only one of them:

The Mexican water treaty is inimical to the interests of Arizona. As stated by the editors of "Civil Engineering" and *Western Construction News*, the division of the waters of the Rio Grande is especially advantageous to the United States, while the division of Colorado River waters is especially advantageous to Mexico.

The treaty is a boon to Texas and a severe blow to the Colorado basin states. Arizona, having the latest and lowest priority, suffers first and suffers most. A reduction of 10 per cent in an irrigation supply may not appear serious; it may mean 100 per cent of the lowest priority. On April 18, when the Mexican Water Treaty was ratified, Arizona's last chance faded.

The worst feature of the treaty is that it encourages the increase of colonization on the Colorado delta. It invites the

use of more water. The use may increase to 2,000,000 or 3,000,000 ac. ft., while the upper basin is making up its collective mind which of its many projects shall be built. Then what? Shall we take the water away and leave the thousands of poor Mexican families to starve? Mexico would demand a new treaty and would appeal to courts of arbitration. Eventually Mexico would get the water, not as legal right, but as comity.

The engineering profession is obligated by its sense of public duty and its accepted ethics to disillusionize the public, so that planning may conform to fact and waste of effort and funds may be prevented. Arizona must be made to understand the true facts, as California and Nevada already do.

My purpose has been to present the unpalatable hydrologic data without flinching. I hope I am a realist. More brilliant minds than mine may devise ways of dividing drops of water and doubling them like the amoeba or of making one acre-foot of water accomplish the duty of two.

War Housing Insurance Program Ends With All Guaranty Funds Obligated

THE WAR HOUSING insurance program of the Federal Housing Administration, a financing operation that aided private builders in producing more than 400,000 dwelling units for war workers over the country, is approaching completion.

The program was inaugurated in March, 1941, when Congress added Title VI to the National Housing Act. Insurance authority originally was limited to \$100,000,000 as to the principal obligation of all mortgages insured, but as the needs of the program became apparent, Congress progressively increased the authorization to a total of \$1,800,000,000.

From March, 1941, through June, 1945, private lending agencies have advanced about \$1,773,000,000 in mortgage loans insured by FHA under Title VI. During the past three years it is estimated that these loans accounted for construction of more than 90 per cent of the nation's privately-financed war housing.

Since the start of the program, about 395,000 mortgages on one-to-four family dwellings have been insured by FHA under Title VI for a total of approximately \$1,607,400,000. In addition, 457 mortgages to finance large-scale housing projects have been insured for approximately \$165,291,000 providing about 38,000 dwelling units built specifically for occupancy by in-migrant workers in essential war industries. Thus, the total Title VI program adds up to about 434,000 dwelling units.

Title VI clearly recognized the increased risks for FHA in insuring mortgages on war housing and gave the Administration wide latitude in their acceptance. Further, in view of the risks involved, a separate War Housing Insurance Fund was established as a pro-

tection to FHA's Mutual Mortgage Insurance Fund under which peacetime operations are carried out.

It is too early to tell what FHA's ultimate experience will be in the insurance of war housing. However, if the War Housing Insurance Fund should prove unable to cope with the situation, it was recognized from the start that any losses simply would have to be written off as part of the cost of the war, according to officials.

The National Housing Agency estimates that about a million privately financed units, including conversions of existing structures, have been provided since the summer of 1940 for war workers and their families.

Field Survey Being Made for Proposed Hood River Dam

THE EAST FORK Irrigation District of Hood River, Ore., will probably undertake construction of a \$200,000 earth fill dam on Neale creek, 11 mi. south of the city of Hood River, during the coming year. Field surveys are now being made by Sporseen and Associates, Portland civil engineers, and as soon as these surveys are completed plans and specifications will be drawn up, and it is hoped that a call for bids can be issued in June.

The dam will be about 1,200 ft. long and 100 ft. high and will involve approximately 400,000 cu. yd. of excavation. The structure will probably cost about \$180,000 and outlet works will add about \$20,000. The reservoir will be capable of storing over 5,000 ac. ft. of water, which will be used for supplemental irrigation on fruit farms on the east side of the Hood river.

news of **WESTERN** **CONSTRUCTION**

AUGUST, 1945



New Construction Volume for June 1945 Up 19 Per Cent

NEW CONSTRUCTION activity in the United States during June, 1945, amounted to \$403,000,000, a four per cent increase over May and a 19 per cent increase over the \$340,000,000 level of June, 1944, the War Production Board reports.

The volume of new construction for the first half of 1945 was \$2,049,000,000. It is expected that construction activity for the entire year will amount to \$4,400,000,000, or 12 per cent more than that for 1944. This estimate for 1945 is based on the assumption that war with Japan continues throughout 1945.

Estimates of 1945 construction, broken down into major categories, follow:

Privately-financed construction (in-

dustrial, housing and all other types) is expected to exceed publicly-financed work in 1945 for the first time since 1940. Non-industrial military construction is expected to decline in 1945 to 20 per cent less than the 1944 volume; and declines of about six per cent from 1944 levels are expected in government-financed industrial and civilian housing construction. WPB pointed out that these declines will be more than offset by sharp increases in other types of construction, particularly in privately-financed factory building, and in commercial, religious, educational, hospital and miscellaneous structures.

A summary of construction activity since the inception of the defense and

war construction program in July, 1940, follows. Data for 1944 and for the first half of 1945 were prepared by WPB in conjunction with the U. S. Departments of Labor and Commerce.

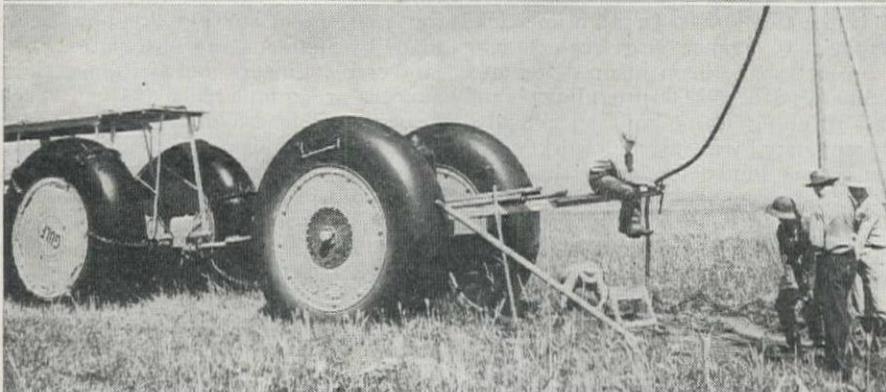
Total new construction activity in the country for the five-year period June, 1940, through June, 1945, was \$41,900,000,000. Of this, \$10,500,000,000 was for non-industrial military work (troop housing, airfields and bases, military hospitals, storage facilities, etc.); and \$8,200,000,000 was for government-financed industrial construction put in place (exclusive of machinery and equipment).

Idaho Power Co. to Issue New Shares

THE FEDERAL POWER Commission has authorized the Idaho Power Co., Boise, Ida., to issue 39,413 shares of preferred stock, \$100 par value, with cumulative dividends at the rate of 4 per cent a year, at a tentative offering price of \$105.50 a share, as of Aug. 1, 1945. The company proposes to enter into an underwriting agreement which calls for a commission of \$1.50 per share on the entire issue, or an aggregate of \$59,119.50. The company estimates its expenses in connection with the sale at \$19,701, which would result in a total for commissions and expenses of \$2.00 per share.

The Public Utilities Commissioner of Oregon has authorized the issuance of the preferred stock and the Public Service Commission of Nevada has advised the FPC that it has no objection.

The purpose of the proposed issue is to obtain capital for the construction, extension and improvement of Idaho Power's facilities. According to the application filed by Idaho Power on June 2 for authority to issue the preferred stock, the projects the company proposes to construct include the Hagerman Valley hydroelectric development with an approximate capacity of 13,500 kw., estimated to cost \$2,000,000; 122 mi. of 138-kv transmission line estimated to cost \$1,150,000; and a substation, switching equipment, and miscellaneous transmission and distribution system additions and betterments, estimated to cost \$1,310,000, making a total of \$4,460,000.



The FPC authorization provides that the company shall "promptly file a Declaration of Intention to construct the proposed hydroelectric development and appurtenant facilities, including any existing 'project' of which the proposed facilities may be a part."

Idaho Power Company, a Maine corporation, is an electric public utility operating primarily in portions of southern and central Idaho, in a portion of Elko County in northern Nevada, and in portions of Baker and Malheur counties in eastern Oregon. The company supplies electric service to some 77,800 customers.

Judge Would Stabilize Position of Sub-Bidder

A SUPERIOR JUDGE at Seattle, Wash., has rendered an important opinion in the matter of the relation of prime contractors and sub-contractors. The Western Asphalt Co. of Seattle alleged that it had furnished services to the Henrik Valle Company for their bid on the general construction contract at the Tacoma Naval Advanced Depot, and that the Valle Company had used those services to submit the low bid and received the contract.

After receiving the contract, the subcontract for the asphalt work was given to another contractor, and the Western Asphalt Company was suing for the value of its services, in the amount of \$43,000.

The jury ruled that the sub-contractor was not entitled to judgment, but Judge Clay Allen held that the decision was "somewhat at variance with what the court regards as conscientious results."

In analyzing the verdict, Judge Allen pointed out that a service had been performed, and that it was used to aid in securing the contract for the Valle Company. He agreed that no expressed agreement as to compensation had been made, but he felt that the services of the sub-contractor had a definite value. If his view is upheld in a subsequent trial, it will in every case be necessary for a prime contractor to utilize the services of the sub-contractor he employed to estimate the job or pay him the reasonable value of services made use of in preparing the sub-bid.

More Government Sites For End-of-War Market

GOVERNMENT-OWNED manufacturing plants or sites available for post-war sale were listed in *Western Construction News* for November, 1944, but the following additional facilities have been announced for sale by the Reconstruction Finance Corporation:

ARIZONA: GLOBE—Pinetop Asbestos Mine—a complete plant; KINGMAN, General Fibre Products Corp.—8,000 sq. ft.—a complete plant for production of yucca fibre.

MONTANA: COLUMBUS—Anaconda Copper Mining Co.—a complete

mining plant, producing chrome ores; Anaconda Alloys Corp.—an uncompleted plant.

NEVADA: LAS VEGAS—Manganese Ore Co.—a complete plant of 69,100 sq. ft., producing processed manganese oxide nodules.

OREGON: EUGENE—Approved Flax Co.—an incomplete plant for the processing of flax fibre; PORTLAND—Iron Fireman Mfg. Co.—approximately 42,000 sq. ft. of land only; MARSHFIELD—Southwestern Engineering Co.—a complete 8,740 sq. ft. plant, producing chrome concentrates; TROUTDALE—United Engineering and Foundry Co.—approximately 114 acres of land only.

UTAH: BLANDING—Blanding Mines Co.—a complete plant, producing vanadium oxide.

WASHINGTON: TACOMA—Wilkeson Products Co.—a complete plant of 6,305 sq. ft. for production of metallurgical coke.

Congress Endorses Reclamation Funds

PRECEDED BY a long and stormy passage through the legislative detours of Congress, the bill appropriating funds for construction by the Bureau of Reclamation during 1946 was finally passed last month and signed by the President. The original recommendations were very materially cut when the measure was considered in the House, and the Senate, in its turn, increased most of them to an even higher level than that originally proposed. However, when the conference committee appointed to iron out the differences finished its work, an appropriation generally regarded as adequate by Reclamation Bureau officials and others interested, was passed. The items as approved are shown in the following table:

PROJECT	Original Budget Recommendation	Approved by House	Approved by Senate	Finally Approved by Congress
Gila	\$ 550,000	500,000	950,000	550,000
Colorado Big Thompson	900,000	800,000	1,400,000	800,000
Palisades	500,000	450,000	500,000	450,000
Hungry Horse	475,000	100,000	475,000	200,000
Sun River	66,000	60,000	66,000	60,000
Fort Peck	.....	.....	200,000	155,800
Deschutes	500,000	450,000	500,000	450,000
Provo River	2,219,000	1,750,000	2,219,000	2,000,000
Shoshone	23,500	23,500	23,500	23,500
Administrative Expense	4,000,000	2,500,000	4,000,000	*3,000,000
Colorado River, Front Work	125,000	.....	125,000	112,500
Colorado River Development	500,000	400,000	900,250	500,000
Central Valley	5,500,000	4,500,000	4,715,300	4,500,000
San Luis Valley	500,000	400,000	500,000	450,000
Anderson Ranch	3,041,000	3,000,000	3,041,000	3,000,000
Tucumcari	1,460,000	1,400,000	2,500,000	2,000,000
Lugert Altus	650,000	600,000	1,300,000	1,000,000
Columbia Basin	8,332,000	6,000,000	8,332,000	6,000,000
Yakima-Roza	350,000	300,000	350,000	325,000
All American	3,327,000	3,000,000	3,327,000	3,000,000
Missouri River Basin (for pre-construction)	4,480,000	1,440,000	4,680,000	3,200,000
General Investigations	5,500,000	125,000	5,500,000	2,250,000
TOTAL	\$43,488,500	\$27,798,500	\$45,904,050	\$34,026,800

Dates Set for Closing War Relocation Centers

WITH JAPANESE-AMERICANS leaving war relocation centers at a rate that reached 1,100 a week in June, a schedule has been announced for closing the eight projects on successive dates between October 15 and December 15.

The centers and the dates by which they will be closed follow:

Granada at Amache, Colo., Oct. 15; Central Utah at Topaz, Utah, and Minidoka at Hunt, Idaho, Nov. 1; Heart Mountain, Wyo., and Gila River at Rivers, Ariz., Nov. 15; Colorado River at Poston, Ariz., and Manzanar, Calif., Dec. 1, and Rohwer, Ark., Dec. 15.

Plans for disposition of the Tule Lake segregation center at Newell, Calif., will be announced at a later date.

The increasing number of evacuees leaving the projects each week, and a rapid rise in departure expected in each of the remaining months, will depopulate the centers by the scheduled dates. A partial shutdown will take place Oct. 1 at the Poston and Gila River centers in Arizona where relocation to outside communities throughout the country has reduced the original Japanese-American population by 40 per cent. Units at Poston and Gila River, comprising nearly half the housing facilities at those two centers, will be closed.

There are two major reasons for closing the centers on a spaced-out basis rather than closing them all on a single date. First, under the staggered schedule of closings, the War Relocation Authority will be able to give more careful attention to the welfare and financial needs of each relocating family and individual. Secondly, WRA will be able to schedule rail and bus transportation for the departing evacuees more efficiently and thus avoid the development of bottlenecks in the relocation movement.

Mill Operators Protest Use of Denver Overpass

A PETITION has been received by the Colorado state public utilities commission for the re-opening of Rickles road, north of the city of Denver. The petition is signed by the Intermountain Elevator Co. and Omar Mills, Inc., grain elevator operators, for whom much of the traffic on the Brighton highway is destined.

The state of Colorado spent nearly a million dollars in 1941, according to A. F. Hewitt, acting state highway engineer, for a cloverleaf intersection system to eliminate the serious traffic hazard created by the fact that Rickles road crossed six railroad tracks near the mills, and some of the ramps of the system were constructed especially to serve the mills. The contention of the mills in their petition is, however, that tires and gasoline would be saved to the farmers bringing their grain to mill if they did not have to traverse the cloverleaf.

According to Hewitt, farmers entering the system from the west, drive a little under a mile farther in traversing the structure than would be required on the old road, and those approaching from the east are obliged to move an extra half-mile. They are not subject to lost time at the railroad intersections, however, nor is there any danger of collision with trains. Hearings are to be held on the petition.

Columbia Basin Farmers Favor Reclamation Plan

COMPLETE RETURNS of the vote by the land owners of the three irrigation districts in the Columbia Basin project of western Washington showed a vote of 472 to 20 in favor of the government repayment contract, covering construction costs by the Bureau of Reclamation of the 1,000,000-ac. basin irrigation project. Before water is released for irrigation in the project, land owners will sign contracts covering specific costs to each holding. These costs will be determined on the basis of the appreciated value of the land, its productivity, the construction costs involved and the amount of water used. During the first ten years of the contract only a small water rental assessment will be payable. But during the remainder of the 40-year repayment period, payments will be decided according to production of the land and the owner's ability to pay.

The original Columbia Basin Project included approximately 1,250,000 ac., but about 290,000 ac. were withdrawn before July 18. It is anticipated that a total of approximately \$90,000,000 will be repaid over the 40-year period. This will not exceed \$85 per acre and will amount to approximately one-third of the total construction cost. The balance of the cost will be paid by power sales from Grand Coulee Dam.



FLOYD O. BOOHE, secretary-manager of the Northern California chapter of Associated General Contractors for the past 19 years, resigned, effective July 31, to engage in other lines of activity.

Suggest Commercial Standard For Pre-fabricated Houses

A RECOMMENDED commercial standard for pre-fabricated homes is now being circulated among members of the trade. The tentative draft being circulated for study by the National Bureau of Standards has been revised in line with a consensus of suggestions received.

The purpose is to establish a measure of quality for such homes providing minimum requirements for one, one and a half-, and two-story prefabricated homes. It covers the structural strength of the various component parts, requirements for light and ventilation, and recommendations for foundations, chimneys, heating, plumbing, insulation and wiring. It also includes general requirements for material, workmanship, site erection, and protection during transportation and erection.

OBITUARIES . . .

Chester Ross Davis, in charge of operation and maintenance of the Carquinez and Antioch bridges over the Sacramento River for the California State Division of Highways, died June 13 at Vallejo, Calif., at the age of 55. He was an electrical and mechanical engineer, and had held his appointment at the bridges since 1940. He had previously worked on the San Francisco Bay and other bridges.

Olaf Lauregaard died recently in San Francisco, Calif., at the age of 65. He had been city engineer of Portland, Ore., for sixteen years, and left the city's em-

ploy in 1933 to join the Tennessee Valley Authority. He was employed by the U. S. Maritime Commission and resided in Alameda, Calif., at the time of his death.

Fred H. Vore, who retired two years ago after serving under the construction division of the city of Pasadena, Calif., in the capacity of city electrician for 32 years, died at Lake Arrowhead, Calif., on July 13. He was well known among the building and contracting fraternity in southern California.

Harold D. Farmer, senior engineer of the Public Roads Administration at Portland, Ore., was found dead near Oregon City, where he had been working in the area with a locating engineer. He had been missing since May 11, and it was not until June 4 that his body was discovered. He was 56 years of age.

Dr. Roscoe Gilkey Dickinson, internationally known chemical engineer and acting dean of the graduate school of California Institute of Technology in Pasadena, Calif., died following a brief illness on July 13. He was the first man to receive a doctorate from Cal-Tech, in 1920. He was 51 years of age.

Earl Warren Nay, pioneer plumbing and heating contractor of Pasadena, Calif., died recently at the age of 68. He came to Pasadena in 1884 and, together with his brother, E. O. Nay, founded the plumbing contracting firm of E. O. Nay & Co. in 1895.

Charles H. Conser, for many years a resident of Hayward, Calif., and in recent years engaged in the drilling contracting business in Reno, Nev., was killed in a truck collision while returning home from a business trip to Grass Valley, Calif. He was 59 years of age.

Donald K. Evans, contractor of Perris, Calif., died recently when the truck he was driving plunged over a cliff. He was 44, and was working on a government road-building project at the time of his death.

Frederick Bartels, 79, pioneer roofing contractor of Denver, Colo., died on June 25 as a result of a skull fracture suffered in a 15-ft. fall while repairing a roof.

F. Raymond Siegrist, well-known member of the contracting industry, specializing in heavy concrete work for over 25 years, died in Oakland, Calif., after a short illness.

Walter B. Taylor, manager-secretary of the Thermalito Irrigation District, Oroville, Calif., died suddenly of a heart attack early in June.

WASHINGTON NEWS

... for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—The reconversion manna did not shower down upon parched industry in July, as promised by Krug. There were cutbacks, but most of them are like a delayed-fuse bomb; it will be some time before they are apparent, and some may never be apparent because materials and manpower will be absorbed otherwise. They tell us out on the Coast you have not yet felt the real pressure that will result when troops and materiel bring you the ultimate point of saturation, before moving across the Pacific, which is expected to be somewhere between December and April. This can be translated to mean in cutbacks that there may be complete stoppages of production in some lines, but that the basic materials chiefly will be diverted to production of other things; ditto, manpower. For this reason we here in Washington are just as much puzzled by the reconversion hooey as you are. The explanation that seems most sensible is that the pressure upon Congress and the Administration for more elbow room in making civilian supplies has been so great that the reaction drove the war agencies to express their wishful optimism in the wave of promises and cancellation of orders and regulations which has led the business people throughout the country to expect infinitely more than can be delivered at this time.

How long controls?

The steel that was promised is absent for reasons that are not quite clear, so far as official explanations are concerned. It will be recalled last Fall we assumed the method by which civilian industry would be able to resume would be by means of PR 25, "spot authorization." It obviously did not work. This time the solution of the problem is expected to be found in PR 29, just announced, which has been outlined as a sort of dress rehearsal for the complete abolition of all controls after New Year's Day, except inventory controls. During the intervening half year, PR 29 is intended to gradually simplify economic existence under controls. The idea is that after January 1, economic freedom will be restored with virtually complete liberty to exercise all the privileges of pre-war competition. The trouble is that it seems daily more bleakly clear that this free competition will be much like the competition when you have 1,000 loaves and there are 1,000,000 persons who want the bread. As we see it from the Potomac, this is apt to result in confusion worse confounded for all except the big fellows in industry who, naturally, have legitimate facilities for procuring things that are not accessible to others. This has led Dr. William Y. Elliott, WPB Vice Chairman for the Office of Civilian Requirements, to urge

the Murray Small Business Committee of the Senate to create an independent civil agency to organize and police the distribution of limited materials to all industry now and after the war.

The Administration is clearly impressed by the impatience of the business community with controls. At the same time the Administration appears to realize that there must be controls. It feels that controls must be exercised far longer than the public will like, and that probably most controls must be continued permanently under the new conditions in the world. The problem is to make the imposition of the controls palatable. That is one reason for the appointment of Vinson to Treasury, Byrnes to State Department, Anderson to Agriculture, Schwellenbach to the Department of Labor, Clark to Justice; and that is why Ickes seems bound to be eased out of Interior, and why it is more likely that Wallace will not permanently remain in Commerce.

Vinson and Byrnes are the keynotes. The job ahead requires suave, politic, velvety technique. The new Cabinet members with the paramount influence have learned the business for many years in Congress. They know how to administer unpleasant doses with a triple-plating of sugar. They will know how to abolish the war agencies almost painlessly by imperceptible absorption; and they will know how to make the absorption agreeable while the old-line agencies are expanded in personnel, functions, and in their need for more funds. This method makes the cooperation of Congress much easier.

If the war agencies, as such, were to carry on after the war, even temporarily, the outcry would be deafening. But if much of the work they now do gradually flows from regular historical agencies, the essential controls will undoubtedly be accepted with little grumbling.

The irritating feature of the administration of orders and regulations during the war has been the multiplicity of the individual interpretations and overlapping officials the individual firm had to deal with. If and when the new system functions, the controls will flow from tax laws, and other laws, of which Congress will be the author, not the Executive. The proposed system inevitably would expand the bureaucracy, but the bureaucrats would be able to bounce the objections back to Congress. It comes down to this: you will have just as many basic government officials to deal with, but you will have to deal with them differently, and the process will undoubtedly be smoother, and the government officials will probably represent more assured authority.

Recentralization

There are recurrent suggestions that

federal agencies which have been moved to various cities will return to Washington. It is generally believed here that most of them will come back when shelter is easier. At present we have not only the tremendous expansion caused by our own war agencies and their employees, but we have the numerous agencies of foreign governments which occupy dozens of buildings in the Capital as offices, plus the private shelter required by their personnel. For this reason any immediate shift, wholesale, of federal agencies now in the West, is improbable. But some time, after the war, there is bound to be a hegira back to the Capital, which seems certain to include the Bureau of Reclamation.

The signs are that there will be more than a trek back to the Capital. The present division of opinion in the Bureau about matters of fundamental policy, whether it stems from the higher reaches of the Department or from the internal recesses of the Bureau, was bound to come to the notice of the White House, and is bound eventually to prompt the sort of action that will result in a seismological shake-up. The coming of a new Secretary of the Interior will inevitably pull the trigger. The present Commissioner of Reclamation, Harry W. Bashore, is respected for his professional qualifications, for his integrity, and for his independence. He is admired for some of the results he has achieved. There has been reorganization, and the construction of some important works have been brought closer. But the interplay of intricate influences upon the Bureau, from within as well as without, subtle as well as obvious, together with the singular personality of the Secretary, create an exasperating muscle-bound condition that apparently requires a skill at diplomatic massage and adjustment which the forthright director does not possess.

The Missouri Valley

The Missouri Basin Interagency Committee was scheduled to meet with the representatives of the governors of four Missouri Valley states in late July. The states are Missouri, Montana, Nebraska, and Wyoming. Why the six others did not participate was not divulged. The committee consisted of H. D. Comstock, Reclamation Bureau Director of Region 6, Billings, Mont.; Brig. Gen. Proscoc C. Crawford, Corps of Engineers; Benj. H. Green, Acting Regional Engineer, Federal Power Commission, Chicago; A. E. McClymonts, Regional Soil Conservation Service Director, Omaha, Neb.; plus the unnamed state delegates. The conference is chiefly conversational, because it has no power to act unless the decisions are unanimous in all details.

The discussion involved consideration of the suggested postwar appropriation of \$1,500,000,000 which would be spent on the MVA program if Congress authorizes such postwar expenditure. Interior Department would have the spending of \$320,000,000. Recent legislation provides \$3,200,000 for immediate MVA surveys, of which \$1,700,000 will be used by the Bureau of Reclamation; \$936,000 by the Geological Survey; \$252,-

000 by Fish and Wild Life Service; \$200,000 by the Bureau of Mines; \$37,500 by the Indian Service; \$32,000 by the General Land Office; \$26,000 by the National Park Service; and \$6,500 by the Grazing Service.

The Central Valley

It is anticipated some clarification may be in process on the 160-ac. land use limitation. Assistant Secretary of the Interior Michael W. Straus and his brother-in-law, Assistant Commissioner of Reclamation William E. Warne, went out to California in July to confer with the governor and members of his staff about the deadlock over the 160-ac. limitation which the Bureau insists must be enforced in the Central Valley. The assumption here is that the Secretary of the Interior regards the enforcement in the Central Valley as a means of breaking up the large land holdings which would benefit by the use of supplemental water from federal reservoirs without contributing adequate returns. It is charged the large land holdings in many instances would be able to secure water without cost from underground reservoirs, and that the water in these underground pools would be derived from the drainage of the lands for which the smaller land holders are compelled to pay charges.

Another aspect of the Central Valley development was left unsolved by Congress after weeks of debate over the proposed appropriation for the Delta steam power plant and transmission lines. The Senate restored the appropriation eliminated by the House; but after the diverging bills went to conference between the House and the Senate, it was decided to accept the theory of the steam power plant and transmission lines in principle, but to deny the appropriation. Congress thus declares it is convinced the plant and the lines are proper and essential, but that it would be improper to supply funds at this time. Nor does Congress define when the building of the facilities would be appropriate. The declaration of principle does, however, give the champions of public power a peg upon which to base future efforts to secure the funds.

The Columbia Valley

Sen. Hugh Mitchell of Washington has reported here that President Truman approves of the creation of the Columbia River Authority as an independent, autonomous, federal regional agency, under the administration of people in the region. This would apparently place the President definitely in opposition to the Ickes plan, which would bring all Authorities under the direction of the Secretary of the Interior, and would give the Secretary the ultimate power to designate the administrative officials.

The over-all debate about regional Authorities was recently given sharper definition by Dr. Arthur E. Morgan, the first chairman of TVA. He suggested, in connection with the Missouri Valley Authority discussion, that the upper and lower parts of the Missouri River have entirely different "functional

regionalism." In the upper 2,000 mi., flood control problems are minor, navigation interests almost non-existent, while the chief use of the water is for irrigation, and secondarily for power. "For the lower several hundred miles the interest of irrigation disappears, power development is probably not economical, while navigation and flood control are the controlling issues." The upper reaches are administered chiefly by the Reclamation Bureau, while the lower Missouri has long been closely associated with the U. S. Corps of Engineers.

Dr. Morgan urges that functional regionalism therefore is entirely different from administrative regionalism. Functional regionalism is clear in its identity in the upper and lower Missouri, each having a specific and definite purpose. Administrative regionalism is the machinery of administering the functions of government, which do not vary greatly with locality. The thought apparently has made a deep impression on the people involved in the controversy.

Pan-American highway

The Mead Committee began its investigation of the Pan-American highway "scandal" by interrogating Lt.-Gen. Eugene Reybold, Chief, U. S. Corps of Engineers, who testified the original estimate of cost was \$14,714,000, and that the job was dropped unfinished after \$42,715,591 had been spent. He acknowledged the original estimate was hastily based on incomplete information, and that much loss came from lack of shipping which delayed materials. These delays, in turn, kept workers idle, under pay, for long periods.

The testimony of Brig.-Gen. Kenneth Hertford, of the Army General Staff, presented a memorandum from Gen. Eisenhower, written when he was Assistant Chief of Staff in 1942, in which he opposed the project because no justification existed, in his opinion, for diversion of critical materials to the job. The Army Service Forces, on the other hand, urged the highway was necessary to speed materials to the Panama Canal area. The General Staff gave its approval, and the Secretary of War accepted its judgment. Sen. Mead told the Senate his committee will go into every phase of the Pan-American job as well as the Alcan Highway and the Canol project.

Highway news

The President, while in the Northwest, gave pledge of support to the plan to build the last 600-mi. link of the Alaska Highway, from Prince George, British Columbia, to Whitehorse, Yukon Territory. HR 3547 and HR 3548 provide the President with authority to share the cost of surveys and construction with the Canadians, at an expense not to exceed \$15,000,000. The route must follow the plan "A" selected by the original Alaska International Highway Commission. Thus far no vigor has been discovered behind the program here. What happens after the Summer recess, when Congress reconvenes in September, will tell the story.

The Public Roads Administration

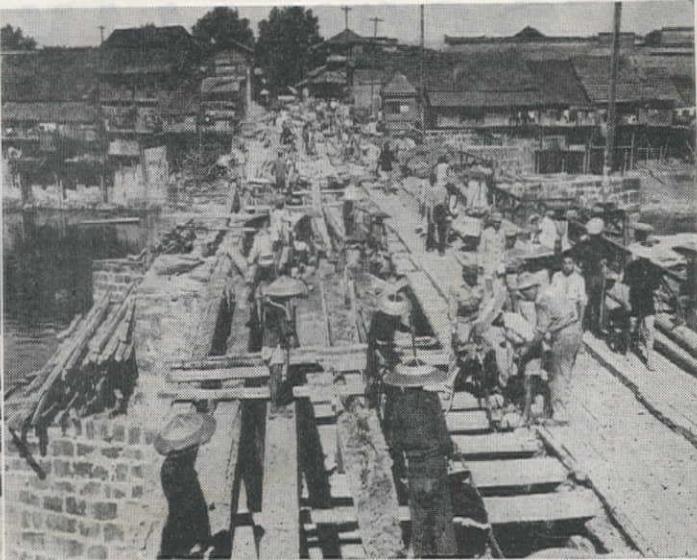
field organization has been re-grouped to conform with the regional and divisional set-up of the Federal Works Agency. The plan became effective on July 1. The new grouping establishes divisional offices, with district offices in various states. Dr. Lawrence I. Hewes remains as Chief of Western Headquarters, in charge of Divisions 7, 8, and 9. He is the only general chief, outside of Washington, D. C., in charge of a group of divisions. His headquarters remain at San Francisco. Division 7, part of Dr. Hewes' group, covers Arizona, California, Nevada, and Hawaii, and is in charge of Division Engineer C. C. Morris, also located in San Francisco. Division 8, another part of Dr. Hewes' group, consists of Montana, Oregon, Idaho, Washington, and Alaska, and is headed by Division Engineer W. H. Lynch, in Portland, Ore. Division 9, the third part of the western group, includes Colorado, New Mexico, Wyoming, and Utah, and comes under the direction of Division Engineer B. W. Matteson in Denver.

The \$100,000,000, which Congress intended should be made available for immediate use in connection with postwar highway plans and construction, was reduced to \$25,000,000 during the long debate over the FEPC appropriation. In the final confusion the \$25,000,000 item was dropped from the bill, and the bill was enacted providing nothing for the preliminary highway activities. It is anticipated the full sum of \$100,000,000 may be restored in the next deficiency appropriation bill.

A special Committee of American Association of Highway Officials assembled in July to discuss standards for interstate and secondary roads, and drew up recommendations which will be presented to Public Roads Administrator McDonald. All states' recommendations were filed with the Public Roads Administration before July 1, and are now being analyzed in the administration to fit in the nationwide 40,000-mi. program. The report by the administration is expected to be completed in the Fall. It is understood the system as outlined earlier in the year has been accepted by the majority of the states.

The Federal Airport Bill, HR 3615, which will provide \$700,000,000 for post-war airport establishment, is held over until the Congress comes back after the Summer holidays. With the money which must be contributed by the states, the bill represents a potential expenditure of \$1,400,000,000. The plan provides for construction of 3,050 airports, and improvement of 1,652 existing fields. Grading, paving, lighting, and other facilities, would cost \$1,021,000,000. Land and structures, not including hangars, are estimated at \$230,000,000. Federal appropriations would be allocated 75 percent on the basis of population, 25 percent as determined by CAA.

The \$21,500,000,000 military appropriation, adopted by Congress, includes \$176,000,000 for construction work, and \$540,000,000 for repair and maintenance of Army barracks, quarters, airfields and posts; also \$2,600,000,000 for procurement of construction machinery and similar equipment.



A BRIDGE 1,800 YEARS OLD is being repaired in southwest China, under direction of the U. S. Army Corps of Engineers. The bridge crosses the Yuan Hwo river, and was built during the Tong dynasty. Massive stone piers were built during the

reigns of three emperors, and wooden stringers and decking were floated hundreds of miles. Being replaced is 756 ft. of woodwork in 15 spans, traffic being maintained over half the structure at all times. Labor is being done by Chinese coolies.

Oakland Harbor

(Continued from page 103)

Near the Ninth Avenue Pier a new wharf and transit shed on the Brooklyn Basin Channel, between Eleventh and Seventeenth Avenues, is proposed. The wharf structure will be of reinforced concrete supported on concrete piles with creosoted timber apron, over-all dimensions will be 264 by 2,296 ft. To accompany this wharf there is planned a 220 x 2,000-ft. transit shed to be constructed of reinforced concrete walls, structural steel frame supporting wood purlins and sheathing, and a composition roof. The area will be serviced with two shipside railroad tracks and three depressed tracks in rear of the shed.

Embarcadero

To provide a much-needed access to Oakland's Inner Harbor, the Port Commission has planned to construct an 80-ft. roadway extending along the waterfront from Clay St. to Nineteenth Ave., which is estimated to require the expenditure of \$450,000. Plans call for 60 ft. of improved surfacing including 5 ft. of shoulder on each side. The road bed will be composed of 4-in. second-grade rock base, overlain by 8 in. of crushed run base, and finished with 2 in. of asphaltic concrete surface.

Airport expansion plans

Several projects are contemplated for the improvement of the Oakland Municipal Airport which would require the expenditure of an estimated \$11,700,000. These projects include a new road from Alameda to connect direct with the administration area and traverse the north side of the airport. The new road would eliminate the present meandering route around the periphery of Bay Farm Island, and tie in with the proposed plans to connect the airport with the new Eastshore Highway.

New administration buildings, taxways and passenger loading aprons are

planned which would cost \$800,000. Also contemplated in the expansion program is an air freight terminal and expansion of the field to provide duplicate runways in three directions with maximum lengths of 10,000 ft. These proposed improvements will carry on the present \$5,000,000 development of the federal government.

NEW BOOKS...

A TREATMENT OF FIRE PROTECTION THROUGH MODERN BUILDING CODES provides information on the nature and severity of fire hazards.—By B. L. Wood, consulting engineer, on the staff of the publisher, the American Iron and Steel Institute, 350 Fifth Avenue, New York 1, N. Y. 124 pages, 6 x 9 in.

Mr. Wood has acquired a comprehensive knowledge of those problems of construction and fire protection standards through close cooperation and association with most of the organizations which formulate these codes. The author has drawn heavily on this past experience to produce a book which should be of assistance to the men who usually constitute the code-writing committees in our cities. He states in part: "A new consideration which may focus greater attention on the fire protection regulations in the future is the emergence of fire as one of the most devastating weapons of modern aerial warfare. In the future no city may be safe or beyond range of possible air attack."

THE CHEMICAL FORMULARY, VOLUME VII, a collection of valuable, timely, and practical commercial formulae and recipes for making thousands of products in many fields of industry. Published by Chemical Publishing Co., Brooklyn, N. Y., H.

The initial unit of Airport Administration building will be a two-story reinforced concrete structure supported on pile foundations. The control tower will, however, be a four-story structure of similar construction which will house the central traffic control stations. The building will contain a total of 400,000 cu. ft. and 27,000 sq. ft. of floor space.

Bennett, Editor-in-chief. 474 pages, 6 x 9 in. Price \$6.00 per copy.

It contains many formulae for the preservation, canning and drying of foodstuff, fruits and vegetables. Also included is a wide variety of formulas useful to farmers and gardeners for the preparation of insecticides, fertilizers, and livestock medicines easy to make at home at low cost. Recipes for hundreds of useful household articles, such as cosmetics, polishes, cleaners, lubricants, adhesives, and inks are listed which the housewife will find easy to make with ingredients readily obtainable.

BUILDING CONSTRUCTION ESTIMATING. Textbook on the estimating for building construction—By George H. Cooper, instructor of estimating classes, Mechanics Institute, New York City. Published by McGraw-Hill Book Co., New York, N. Y. 282 pages, 6 x 9. Price \$3.00 per copy.

Here is a comprehensive textbook that should establish new standards in this field due to its complete treatment and its specific handling of the essential without involving cumbersome detail. The book contains two sets of plans and outline specifications, many specimen estimates, essential reference data, and an outline for a comprehensive examination of the subject matter. The text is well illustrated, and both text and illustrations are in accord with present architectural and construction practice.

PERSONALLY SPEAKING

Recent personnel changes in the New Mexico State Highway Department include the following: **W. B. Catchings**, design and specifications engineer, has been named maintenance engineer, succeeding **Charles M. Johnstone**, who becomes district engineer at Las Vegas. **T. H. Card**, formerly assistant district engineer at Roswell, is now district engineer at Deming, succeeding **W. R. Eccles**, who has been assigned to Albuquerque. **F. D. Hawley** has been transferred from Las Vegas to Albuquerque, to become assistant district engineer there. **K. D. McCrary**'s title has been changed from acting assistant to assistant engineer at Santa Fe. The position of traffic and safety engineer, formerly held by **C. O. Faulk**, has been abolished.

Ford J. Twaits, owner of the important Los Angeles construction firm which bears his name, is retiring from active participation in the industry. His firm has built, either as sole contractor, or as participants in a joint venture, some of the largest war projects in the West, and its activities have been observed in all sections. He was president in 1943 of the southern California chapter of Associated General Contractors of America, and has been active in its work at all times. He has also participated in shipbuilding and was for several years executive vice president of Consolidated Steel Corp., of Los Angeles. He plans to retire to his 30,000-ac. cattle ranch near John Day, Ore.

L. J. Dowell, president of the Dowell Construction Co., of Seattle, Wash., which firm has for 22 years been engaged in construction in Alaska, and built 600 mi. of the Alaska Highway, has been named by Pan-American Airways Alaska Service as public relations counsel. His headquarters will be in Seattle, but he will travel extensively throughout the territory to acquaint residents with the domestic and Orient service of Pan-American.

Arthur J. Swank has been promoted from assistant engineer of station construction to head of that department, upon the retirement of **M. C. McKay**, veteran construction engineer of the Pacific Gas & Electric Co., San Francisco, Calif. McKay had been with the company for 37 years, and in addition has participated in the design and construction of several large power plants for other western firms. Swank has been with the company since 1919.

LeRoy R. Bible is now utility officer at the Veterans' Administration Facility at Augusta, Ga. He was formerly of Tucumcari, N. Mex., and Green Mountain Dam, Colo., projects of the Bureau of Reclamation, and spent 18 months in northern Canada as engineer in charge of construction of air bases leading to Russia, before transferring to the Veterans' Administration.

Francis T. Hayden, an engineer from Wyoming, after having worked for 14 months for Mason & Hanger Co. on the Badger Ordnance Works, and also on the Hanford Engineer Works at Hanford,



DEL E. WEBB, above, and **L. C. JACOBSON**, below, have entered into a partnership agreement for carrying on the business of Del E. Webb Construction Co., of Phoenix, Ariz., formerly conducted by Webb as sole owner. The firm has done a vast amount of war construction all through the Southwest. Webb recently became a part owner of the New York American League baseball team.



Wash., is now surveyor and party chief for Francis Engineering Co., Saginaw, Mich., on postwar plans for various municipal works at Saginaw and Bay City.

Lt. Comdr. Walter L. Dickey, for several years officer in charge of construction at the new naval drydocks built at Hunters Point, San Francisco, Calif., has been transferred to Davisville, Rhode Island, and has been replaced by **Lt. Comdr. John J. Morton**, who was in charge of construction of the ammunition and net depot at Seal Beach, Calif.

Col. William N. Carey, since 1942 chief engineer of the Federal Works Agency, was appointed Secretary of the American Society of Civil Engineers, succeeding **George T. Seabury**, who died on May 25. Col. Carey was released from military duty on June 1 to accept the position. He is a native of St. Paul, Minn., and former city engineer of that city.

J. W. Southin, former city engineer of Point Grey, Vancouver, B. C., has been named to a similar position in Prince Rupert, B. C. He received the appointment when **E. C. McEachern** was unable to accept the position when it was offered to him. Southin succeeds **George S. Hanes**.

R. L. Patterson, city engineer of Newport Beach, Calif., resigned that position, effective July 31, but will be retained as a consulting engineer on beach erosion and other problems for so long as his services may be required. He was in charge of the extensive dredging of Newport harbor in 1933, and has supervised over \$4,000,000 of construction in the city during his term of office.

Ivan Oakes, formerly an engineer for the War Production Board in Portland, Ore., has been employed by the Willamette River basin commission as an engineering analyst to compile information on the various reclamation and flood control projects proposed for construction in the basin. The commission was established by the 1945 Oregon legislature.

W. J. Homan, in charge of civil works activities of the U. S. Engineer Department in the Great Salt Lake basin and upper Colorado River basin since 1940, has joined the staff of the Federal Power Commission as senior engineer. His new headquarters are in San Francisco, Calif.

Lt. (jg) John Walker, on leave from the Klamath Irrigation Project at Klamath Falls, Ore., after completing 19 months' service at the naval air station at Kaneohe Bay, T. H., is now assigned to the Navy Department in Washington, D. C., developing ground equipment for the maintenance of naval aircraft.

In the July issue of *Western Construction News*, **Otto R. Lunn** was erroneously stated to be "chief engineer for Umatilla dam." His proper title is Head of the Snake River Subsection, Portland District office of the U. S. Engineer Department. He is supervising planning and preliminary design on the proposed lower Snake River dams.

Carl Meng, Bureau of Reclamation engineer who has been serving as a colonel in the armed forces, has returned to duty with the Bureau and has been assigned to Friant dam of the Central Valley Project.

Fred E. Lange and **Dave Ross**, until recently in charge of utilities construction on the DuPont Richland Village job at Richland, Wash., have organized their own firm,

to be known as G. & H. Engineering Co., and located in Portland, Ore., to engage in steel fabrication, welding, and general construction.

W. Paul Zimmerman, one-time city engineer of San Bernardino, Calif., and for the past seven years an estimator with the J. H. Fitzmaurice Co., of Oakland, Calif., has taken a similar position with the D. W. Nicholson Construction Co., of San Leandro, Calif.

James A. Davis, Assistant Director of Highways of the State of Washington, has been appointed Acting Director, succeeding Clarence Hickey, who died on June 20. The governor has announced that no permanent appointment will be made for some time.

John E. Kenney, assistant director of the Federal Housing Administration in northern California, has become partner in the building construction firm of Whiteside, Pulliam and Kenney, which will engage in building erection in the vicinity of Oakland, Calif.

Lewis J. Workman, assistant engineer of the Bureau of Reclamation's Region No. 7, located in Denver, Colo., has gone to Bogota, Colombia, to serve as chief designing engineer for a firm of consulting engineers engaged in hydraulic projects in that country.

Col. B. C. Allin, head of Allin Associates, dealers in prefabricated airport buildings of various kinds, has been named vice president of Airways Engineering Consultants, Inc., and has opened offices in San Francisco, Calif., for the purpose of consulting on harbor and airport projects.

F. A. Allwood, formerly district construction supervisor under the Veterans' Land Act at Vancouver, B. C., has opened a consulting engineering business in Kelowna, B. C.

J. F. Barrett, partner in the construction firm of Barrett & Hilp, has been named by the San Francisco Chamber of Commerce as chairman of a new committee on sites and building for industrial development.

Bart Dunn, who resigned as a planning engineer with the Los Angeles County Planning Commission on July 1, has been appointed planning engineer for Washoe Co., Nevada, with headquarters in Reno.

Herbert P. Nilmeier has resigned his instructorship at the University of California, Berkeley, and is now a sanitary engineer with the 12th Naval District.

C. U. Smith, one-time chief engineer and general manager of the Milwaukee, Wis., Board of Harbor Commissioners, was appointed city engineer of Lindsay, Calif., effective June 1.

V. A. Prisadsky, formerly with Roy W. Johnson at Ketchikan, Alaska, is now an engineer with W. C. Nickum & Sons, Seattle, Wash., engaged in design and drafting work for the naval architectural and marine engineering firm.



THREE ENGINEERS have been appointed assistant chief engineers of the Bureau of Reclamation, with headquarters at Denver, Colo. They are, l. to r.: RALPH LOWRY, in charge of construction, formerly construction engineer at Shasta dam; LESLIE N. McCLELLAN, electrical and mechanical, since 1925 chief electrical engineer of the Bureau; WILLIAM H. NALDER, civil, formerly assistant chief designing engineer.

Lloyd Thomas, Bureau of Reclamation engineer formerly stationed at Friant dam of the Central Valley Project, has been transferred to the Bureau's office in Sacramento, Calif., where he is in the project planning section.

Harlen H. Smith, formerly a construction engineer with the contracting firm of Henrik Valle Co., has opened his own civil and structural engineering offices in the Stuart Bldg., Seattle, Wash.

Dr. E. W. Schilling, dean of engineering at Montana State College, has been elected president of the Montana Society of Engineers. Other officers are: C. H. Steel, Butte,

JAMES M. FOX, staff engineer in charge of design in the Los Angeles office of the Donald R. Warren Co., consulting engineers. He has held important posts in the design of the Kaiser steel mill at Fontana and the Naval Supply Depot at Rough and Ready Island. On completing the latter job, he was transferred to the responsible Los Angeles position.



and E. A. Barnard, Anaconda, vice presidents; Fred Schwanz, Butte, secretary-treasurer; and R. E. Gibbs, Bozeman, and F. C. Jaccard, Butte, trustees.

J. R. Lester Boyle, city engineer of Laguna Beach, Calif., and E. C. Hillman, consulting structural engineer of Los Angeles, have formed a partnership to engage in engineering work relating to municipal and industrial refuse disposal. Boyle will continue his connection at Laguna Beach.

Finley W. Parker, formerly port manager at Galveston, Tex., has been appointed as a consultant on seaports to the United States Railway Mission to Mexico. He has served in Galveston for 17 years, and was administrator of railroads in Texas during the first World War.

Paul R. Corner has become associated with the Gus T. Bouten Construction Co., of Spokane, Wash., as an estimator, working principally on estimates for building construction.

A. S. Kibbe, assistant project manager during construction of the Basic Magnesium plant at Las Vegas, Nev., and more recently engaged in consulting work as an industrial engineer, has set up his own office in this field at Henderson, Nev.

Walter K. Hopkins, formerly city manager at Brawley, Calif., has been appointed city engineer and superintendent of streets and waterworks at Hanford, Calif. His appointment became effective July 16.

John D. Mendenhall, structural engineer on war plants built by Bechtel-McCone Co., of Los Angeles, Calif., has been appointed chief engineer of that company's aircraft modification center at Birmingham, Ala., said to be the largest plant of its kind in the country.

Dr. Will V. Norris, University of Oregon professor of physics and planning engineer for the campus, has been named

supervising engineer for the university. He will supervise all new building and remodeling on the campus.

John K. Minasian, formerly associated with the Department of Water and Power of the city of Los Angeles, has been appointed building structural engineer with the Department of Building and Safety of the same city.

R. Rolleston West has opened a new consulting engineering office in the Hearst Bldg., San Francisco, for special work in connection with industrial reconversion in the West.

The corporate name of the W. E. Callahan Construction Co., of Los Angeles and Dallas, Tex., has been changed to Grafe-

Callahan Construction Co. Paul Grafe is president of the firm.

Lt. James Cawdry, before the war an engineer on the staff of Henrik Valle, Seattle, Wash., contractor, has returned to Seattle following his release as a prisoner of war.

Walter G. Carson, until recently with the U. S. Engineer Department at Kingman, Ariz., is now in the project planning division of the Bureau of Reclamation at Boise, Idaho.

Arthur J. Klein has re-established his business as a building contractor in the city of Los Angeles, under the name of Arthur J. Klein Co.

Bluff section of the Pacific Highway, now under construction by the Washington State Highway Department. Assisting him are Roy Runnels, Jules Ringsmeyer, Dwain Amens, and Frank Simms as foremen. In the shop, the foremen are Herman Nothiger and Vincent Howarth. Engineer for the contractors is Walter Higgins. Harry Kline of the Vancouver office of the highway department is resident engineer.

Raymond Preston is district manager for the Griffith Company of Los Angeles, Calif. Chester O. Nelson is in charge of all outside construction for this contractor in San Diego and vicinity. He has been with the company for the past thirteen years in key capacities. Shelton Immil is superintendent for the company on state work.

Louis G. Fleming is general superintendent for Reimers & Jollivette, of Portland, Ore., on construction of a concrete and timber warehouse for the Farmer's Pacific Cooperative in Portland. Whitehouse & Church were the architects on the structure. The building is at Upshur and Vaughan Sts., and has a floor area of 46,000 sq. ft. Timber Structures, Inc., were sub-contractors on the timber work, and their portion of the job was supervised by E. L. Duke.

Forrest Kimball is general superintendent for McNeil Construction Co., Los Angeles, Calif., on this company's contract for the erection of offices, shops and warehouses at the refinery of the Union Oil Co. in Wilmington, Calif. Victor Bonnat is assistant superintendent. Jimmy Davis is carpenter foreman and Ed Ball is labor foreman. Office engineer is Arthur Moen, and Frank Reimer is timekeeper.

J. Ira McNutt, project manager, and Theodore H. Schaefer, general superintendent, are in charge of construction on the Coyote Creek-Grave Creek section of Pacific Highway in Josephine Co., Oregon, on a \$601,501 contract awarded to McNutt Bros., Eugene, Ore. Stanley E. Quigley is foreman and Thelma Schaefer is office manager. Glen Roberts is resident engineer for the highway department.

Jack Taylor is general superintendent for Nathan A. Moore, San Marino, Calif., on the firm's contract at Mines Field Airport in Los Angeles. George Stover is grade foreman, L. D. (Larry) Van Over is shovel foreman, and "Red" Truman and Carl Mauer, shovel operators. Camillo Bros. Dump Truck Co. of Glendale, Calif., holds the trucking contract.

Joe H. Thomas, who has been associated with Haddock-Engineers, Ltd., for a good many years and recently was a key man on the company's Homojah housing unit contract at Oceanside, Calif., is now at Inyokern, Calif., where he is acting as superintendent for the same company.

Chet Mason, formerly with Del E. Webb Construction Co., Phoenix, Ariz., is now general superintendent for Structon of Los Angeles, Calif., on this company's contract for the erection of prefabricated houses at a site in Bakersfield, Calif. F. A. Rowley is general carpenter foreman on the project.

SUPERVISING THE JOBS

Assisting Robert J. Kallender, project manager on the construction of additional warehouses at the U. S. Naval Air Station at North Island, Calif., is Art Vitus. On the same job are Harold Tchan, general carpenter foreman; William Blackstone, expeditor; Tobe Wight, concrete superintendent; W. G. Spalding, labor foreman; and Jesus Avallano, concrete foreman. Otto Anfricht is timekeeper. M. H. Golden Construction Co. of San Diego has the contract for this additional construction work. The dirt-moving contract was awarded to Rhoades Bros. & Shofner of Los Angeles, for whom Paul Lemaster is working as foreman.

Jack Jenson is general superintendent for Strong & MacDonald, of Tacoma, Wash., on their section of the Pacific Highway work south from Kalama, Wash., and Roy King is foreman. The shop crew on this contract includes John Chilbeck, master mechanic, Al Hathaway, master mechanic, and Ben Moore, welder. Roy Jorgenson is office manager. Resident engineer for the state on this section is E. G. Nettleton of Kelso, Wash.

L. R. Mallory is project manager and T. P. Brittain is general superintendent for A. Farnell Blair, San Francisco, Calif., contractor, on the Volaire housing project at San Diego, Calif., which calls for an expenditure of approximately \$250,000. Field superintendent is Pat Pattillo; labor foreman, Pete Gonzales; grading superintendent, Horace M. Strickland; engineer, Mac Phelps. Carpenter foremen are C. P. Pattillo, M. M. Pattillo, W. E. Pickering, Ray Friberg, Russell Henry, L. J. Cook and Lowell Thu. Ray Kennedy is superintendent for Newbery Electric Co. of Los Angeles, Calif., on the project.

Henry Walder is general superintendent on a contract valued at \$322,900 held by Warren Northwest, Inc., Portland, Ore.,

for road work and culverts on the Steiwer Hill-Albany section of the Pacific Highway in Oregon. W. W. Kenworthy is foreman on the work and Earl King is supervising the pipe work. Resident engineers for the State Highway Department on the project are Heddon Schwartz and V. C. Benedict. Concrete aggregates are being furnished by Riverbend Sand & Gravel Co., of Salem.

William Timmons is general superintendent for Baruch Corporation, Los Angeles, Calif., on the new test call building at North Island, San Diego, Calif. Assisting are O. K. Foster and Jake Moe as carpenter foremen, and Ed Fulton, labor foreman. Contract for the chapel at this site is held by Scherer - Prichard of Redlands, Calif. Tom C. Loveday is the general superintendent and L. A. Baker is carpenter foreman. E. K. Rose is inspector for the Navy.

M. P. Munter is project manager for his firm's contract to construct an overpass at Kalama, Wash., as a part of the Pacific Highway construction of the State Highway Department. Fred Moore is general superintendent. Assisting these two executives are Ed McIrvin, in charge of piledriving, and Roy Kinney, concrete foreman. C. A. Pilon is the state's resident engineer on the structure. This is a \$45,223 job.

John D. Myers, under whose direction the \$560,000 housing project at Oxnard, Calif., was erected by E. A. Kaiser Co. of Beverly Hills, Calif., is now project manager on the Cholla View housing contract held by this firm at San Diego. This is a prefabricated housing project for the Navy. Evan B. Cottam is general superintendent, and Leo (Curley) Miner is superintendent in the field.

Jack Ware is general superintendent for Leonard & Slatte of Oregon, Ltd., Portland, Ore., on the Woodland - Martins

Roscoe P. Downs is project manager and Al Erickson is general superintendent on the Lytle Creek channel improvement in San Bernardino, Calif., for Bressi & Bevanda and Macco, contractors. Ralph Van Patton is excavation superintendent; Hank Weiners, concrete superintendent; H. V. (Red) Rout, master mechanic; Don Clement, shop foreman; Ralph Nelson, field mechanic foreman; and Frank N. Garrison, carpenter superintendent. John Christensen, Sam Hughes, Vern Blont and Charles K. Dale are carpenter foremen. Foreman on the steel work is J. H. Dennison, and S. C. (Peewee) McCormick is concrete foreman. L. W. Stultz, for many years with the Macco Construction Co. of Clearwater, Calif., is crane operator. On the engineering end are Harry Porter, chief engineer; Charles E. Reid, construction engineer, and Far Glidden, office engineer. Charlie Eddy is the office manager.



AL ERICKSON

W. C. Smith is general superintendent of R. A. Heintz Co., Portland, Ore., on a clearing and grading contract on a 9.9-mi. section of the Steiner Hill-Albany section of the Pacific Highway being constructed by the Oregon State Highway Commission. R. A. Heintz is acting as project manager. General foreman is George Zigler, and J. A. Hughes is grading superintendent. Grading foremen are Mike Scott and Frank Scott. Lloyd McInray is the master mechanic and James Hughes purchasing agent.

W. J. Durbin is general superintendent for Strong & MacDonald, Tacoma, Wash., on their contract to straighten the channel and erect flood control structures on the Long Tom River in Oregon, an Army Engineer project. J. A. MacDonald is master mechanic for the contractor and Ed Gardner is shop foreman. Inspectors for the U. S. Engineers are James M. Partridge and C. F. Burgoine.

Frank Buyer is project superintendent for Pozzo Construction Co. of Los Angeles, Calif., on a new health center costing about \$220,000 for the city of Los Angeles. The new construction is at 49th and Avalon Blvd. R. G. Whitaker is general foreman on the job. Dave McMillen is the office manager.

N. B. Bennet is supervising road construction and repairing between Fall River Mills and 8.3 mi. east of Bieber, Calif., for M. J. Ruddy & Son, Modesto, Calif., which firm was awarded the \$195,169 contract. M. J. Ruddy, Jr., is project manager, and R. C. Thompson is purchasing agent.

Elmer Lindstrom is general superintendent for Lindstrom Bros., of Portland, Ore., and D. E. Johnson is project manager, on a \$64,160 contract awarded that firm for erection of a 395-ft. concrete bridge over the Southern Pacific Railroad at Jefferson Junction, Ore., a part of the Pacific Highway project. J. T. Skelton is state resident engineer.

Harry Holland is general superintendent of work on forms for the Lytle Creek flood control project at the yard of Macco Construction Co., in Clearwater, Calif. Assisting him are J. R. (Russ) Jewell, general

man held a building contract at the Muroc Air Base. Gillman & Gillman, plumbing contractors of Lynwood, Los Angeles, were awarded the plumbing contract there.

Hugh L. Williams, formerly with Kaiser Co., Inc., as general superintendent and consulting engineer at the Richmond shipyards in California, is now at the Denver, Colo., ordnance plant of Kaiser Industries, Inc., where shell boosters are being manufactured. Williams is general superintendent of the booster division.

Paul Turley, for many years with R. E. Hazard & Sons Contracting Co., San Diego, Calif., is now shop superintendent at the Mission Valley shops of the same company in San Diego.

W. B. (Bill) Townsend, as superintendent, has just completed Homona housing jobs for Haddock-Engineers, Ltd., at Camp Kearney, Miramar and at Camp Elliott, Calif.

A. L. (Red) Watts is field representative for the Griffith Company of Los Angeles, Calif., on various jobs in Los Angeles County, including the Morgan Bros. service building at Downey.

O. J. Lloyd, widely known in the West, where he has worked as excavation foreman at Boulder, Parker and Shasta dams, is now with the United States Engineer Department in Honolulu, T. H.

J. W. McVay is general construction superintendent for Santa Ana Homes, on a new subdivision being developed by the firm at Downey, Calif.

C. E. (Mac) McCracken is general superintendent for the Griffith Co., Los Angeles, Calif., on the Gaffey & Anaheim overhead at San Pedro, Calif.

J. L. Graves is general superintendent for Collins Construction Co., Kansas City, Mo., on the new building under construction for Fruehauf Trailer Co. at San Diego, Calif.

Robert Skamnes, formerly for many years with the United Concrete Pipe Co. of Los Angeles, Calif., is now with the U. S. Army, stationed at Camp Roberts, Calif.

H. F. Doyle has recently moved to Deming, N. Mex., where he is employed as a master mechanic by the Brem Motor Co.

Gilbert Gunderson is now employed by the Ford Motor Co. at Richmond, Calif., where he is pursuing his trade as carpenter.

Now electrical maintenance foreman. Twenty years' experience on steam, turbine, and power house plants. Most time in key capacity. Open for position as foreman. Will go anywhere. Box 927, Western Construction News, San Francisco, Calif.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

Boise Buries Pumphouse for Well at Busy Intersection

FACED WITH the problem of installing a pumphouse for a well drilled in one of the busiest intersections in Boise, Idaho, the Boise Water Corporation solved the matter by "going underground." The increasing demand for water by Boise's rapidly expanding population forced the corporation to develop a site it had owned for many years. It is near the point where U. S. Highway No. 30 enters the western city limits, where a regulation pumphouse was out of the question.

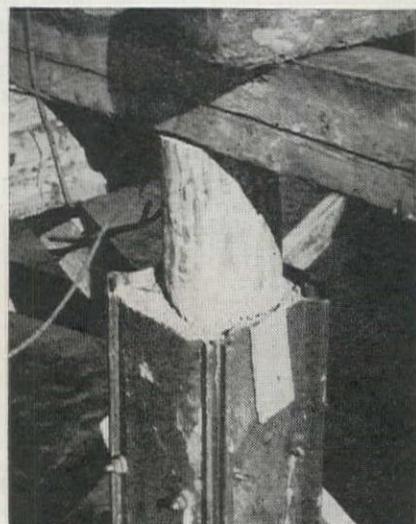
The well was drilled 476 ft. deep, with the 16-in. bore passing through several strata of impervious clay above the 250-ft. depth, where casing was landed. This procedure prevented any possible contamination of the well water with surface flows. Only below this level is the casing perforated so that the water can enter the well from the aquifer.

An oil-sealed electric motor direct connected to the pump was sunk 90 ft. below the surface. This 70-h.p. motor

delivers 1,350,000 gal. per day to the city main through an 8-in. pipe. To prevent water leakage around the shaft into the otherwise hermetically sealed oil bath around the motor, or into the motor itself, a mercury seal has been installed and pressure above and below this seal is kept constant.

The pump house is flush with the surface of the street with only a manhole to indicate its presence. The sump is sealed off from the well below, thus further guarding against contamination.

Boise's new pumping plant was placed in service in mid-May.



Concrete Poured in Steel Sheet Piling

RECENTLY OBSERVING a dredger contractor attempting to stretch the kinks out of a long new rope by towing it out to sea and pulling, *Western Construction News*' field representative, Herbert Dale, suggested an almost forgotten trick for accomplishing the purpose, and it was successfully used. The idea is to unravel each end and tie only one strand to the pulling device. When pulled, the rope twists and at full tension becomes perfectly straight, and will never coil again. A small rope may be untwisted by two men.

WHEN WOOD PILING became hard to get during construction of the Topock bridge over the Colorado River by the Santa Fe Railway, steel sheet piling, of which the contractor, Kansas City Bridge Co., had plenty, were connected in rectangular position to act as forms for poured-in-place concrete piles, with a short section of wooden piling set in the top for a bearing and connecting member. These were used in supporting a portion of the temporary construction trestle erected to facilitate work on the bridge piers.

BOISE'S NEW WELL and pumphouse at the intersection of two busy streets. Left, the pumping element being lowered into the well to couple onto the motor. Right, with pump and motor 90 feet underground, pumping directly into mains, only a flush manhole cover and electric connections on adjacent pole show presence of the well.



"HERCULES" (Red-Strand) Wire Rope



Hercules of mythology has lived through the ages because of his ability to do the big jobs. His super-human strength and endurance made this possible—

"HERCULES" (Red-Strand) Wire Rope is also a "doer." Its qualifications, too, are the same. It not only has the strength to handle the big loads, but—and this is of great importance in wire rope usage—it also has the stamina and endurance to stand up under bending stresses and other gruelling conditions encountered in present day work.

For consistent top-flight performance you can rely on this modern "HERCULES". It is available in both Round Strand and Flattened Strand constructions, in either the Preformed or Non-Preformed type.



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UNIT BID SUMMARY

Water Supply...

California—San Diego—Navy—Pipeline

Grafe-Callahan Construction Co., Los Angeles, submitted the low bid of \$2,248,409 to the Public Works Office, U. S. Navy, 11th Naval District, San Diego, for the construction of 25 miles of pipe line south of the reservoir as detailed in specification 16,781, NOy 12,575. Quantities and unit bids received for this project are listed as follows:

(A) Grafe-Callahan Construction Co.	\$2,248,409	(E) L. E. Dixon Co.	\$2,648,643
(B) United Concrete Pipe Corp.	2,473,496	(F) Bressi-Bevanda Constructors, Inc.	2,730,762
(C) Guy F. Atkinson Co.	2,537,097	(G) Peter Kiewit Sons Co.	2,972,363
(D) S. A. Healey	2,583,902	(H) Clyde Wood, Inc.	3,296,748
(1) 430,000 cu. yd. excav., Sta. 138 plus 86 to Sta. 478 plus 00		(18) 16,120 lin. ft. conc. pipe, symbol C-72NC50	
(2) 50,000 cu. yd. excav., Sta. 478 plus 00 to Sta. 599 plus 00		(19) 8760 lin. ft. conc. pipe, symbol D-72NC50	
(3) 24,000 cu. yd. excav., Sta. 599 plus 00 to Sta. 620 plus 00, No. Sta. 744 plus 00 to Sta. 757 plus 00, and Sta. 780 plus 00 to Sta. 801 plus 00		(20) 9300 lin. ft. conc. pipe, symbol E-72NC50	
(4) 57,000 cu. yd. excav., Sta. 620 plus 00 to Sta. 744 plus 00, Sta. 757 to Sta. 790 plus 00, and Sta. 801 plus 00 to Sta. 826 plus 00		(21) 16,550 lin. ft. conc. pipe, symbol A-54NC50	
(5) 135,000 cu. yd. excav., Sta. 826 plus 00 to Sta. 1146 plus 50		(22) 14,160 lin. ft. conc. pipe, symbol B-54NC50	
(6) 575,000 cu. yd. backfill		(23) 1460 lin. ft. conc. pipe, symbol C-54NC50	
(7) 45,000 cu. yd. compacting backfill		(24) 160 lin. ft. conc. pipe, symbol D-54NC50	
(8) 790 cu. yd. conc. in struct. except cement		(25) 1330 lin. ft. conc. pipe, symbol A-54NC75	
(9) 96,000 lbs. furnishing and placing reinf. bars in struct.		(26) 3750 lin. ft. conc. pipe, symbol B-54NC75	
(10) 28,000 lb. furn. and install nozzles and covers		(27) 1040 lin. ft. conc. pipe, symbol C-54NC75	
(11) 65,000 lb. furn. and install cast iron pipe, fit'gs		(28) 500 lin. ft. conc. pipe, symbol D-54NC75	
(12) 12 valves, furn. and install 8-in. valves		(29) 160 lin. ft. conc. pipe, symbol A-54NC100	
(13) 36,000 lb. furn. and install misc. metalwork		(30) 580 lin. ft. conc. pipe, symbol B-54NC100	
(14) 780 lin. ft. furn. materials and erecting chain link fence		(31) 500 lin. ft. conc. pipe, symbol C-54NC100	
(15) 4 valves, furn. and install 4-in. air valves		(32) 240 lin. ft. conc. pipe, symbol D-54NC100	
(16) 9800 lin. ft. conc. pipe, symbol A-72NC50		(33) 460 lin. ft. conc. pipe, symbol E-54NC100	
(17) 4060 lin. ft. conc. pipe, symbol B-72NC50		(34) 230 lin. ft. conc. pipe, symbol B-54NC125	

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	.45	.48	.32	.60	.50	.35	.60	.59
(2)	.42	.57	.44	.80	.50	.52	.60	.59
(3)	.42	2.00	.75	1.51	1.00	1.50	1.00	1.87
(4)	.42	1.20	.55	1.00	1.00	.50	1.00	.69
(5)	.42	.90	.47	1.49	1.00	1.50	1.00	1.75
(6)	.18	.20	.28	.47	.63	.34	.50	.65
(7)	2.20	1.35	2.25	1.00	1.35	4.55	2.00	5.94
(8)	48.00	60.00	55.00	25.00	40.00	60.00	50.00	82.50
(9)	.07	.12	.076	.06	.08	.07	.09	.09
(10)	.52	.50	.36	.12	.375	.45	.40	.35
(11)	.15	.15	.125	.08	.10	.20	.15	.20
(12)	112.00	125.00	100.00	75.00	80.00	125.00	90.00	137.50
(13)	.44	.40	.25	.07	.30	.45	.30	.50
(14)	3.80	3.00	3.00	4.00	2.50	2.00	3.00	2.75
(15)	162.00	300.00	150.00	150.00	125.00	175.00	150.00	200.00
(16)	13.50	16.50	17.20	16.00	15.51	16.30	18.70	17.65
(17)	14.75	17.70	17.94	16.75	16.16	16.90	19.30	18.35
(18)	17.20	18.55	18.88	18.00	17.02	17.70	20.50	19.25
(19)	19.65	19.50	19.94	19.50	17.94	18.55	21.70	20.20
(20)	22.30	22.75	22.48	21.50	20.20	20.65	23.50	22.60
(21)	11.08	12.00	15.72	11.50	13.21	14.40	16.85	15.55
(22)	11.75	12.60	16.25	12.00	13.59	14.75	16.90	15.95
(23)	13.45	13.00	16.58	12.50	13.97	15.10	18.10	16.35
(24)	15.40	14.00	17.10	13.00	14.45	15.55	19.00	16.85
(25)	11.70	12.75	16.14	11.75	13.59	14.75	17.10	15.95
(26)	12.26	13.10	16.58	12.50	13.97	15.10	17.60	16.30
(27)	14.45	13.70	17.00	13.25	14.35	15.45	18.30	16.70
(28)	15.32	14.00	17.40	13.50	14.72	15.80	18.80	17.10
(29)	12.40	13.20	16.75	12.50	14.13	15.25	18.80	16.50
(30)	12.80	13.80	17.00	12.75	14.35	15.45	18.90	16.70
(31)	13.60	14.00	17.48	13.25	14.77	15.85	19.70	17.15
(32)	15.30	14.60	17.90	13.75	15.15	16.20	20.00	17.55
(33)	16.60	14.90	18.50	14.25	15.69	16.70	20.20	18.15
(34)	13.50	14.00	17.48	13.25	14.77	15.85	20.00	17.15
(35)	14.10	14.50	17.85	13.75	15.10	16.15	20.20	17.50
(36)	15.50	15.00	18.30	14.25	15.48	16.50	20.40	17.90
(37)	10.50	11.50	15.25	9.75	12.69	14.00	13.00	14.90
(38)	11.00	11.90	15.60	10.00	12.97	14.25	13.50	15.15
(39)	12.70	12.50	16.10	10.50	13.40	14.65	13.70	15.60
(40)	14.58	14.00	16.50	11.00	13.77	15.00	15.00	16.00
(41)	2.94	2.50	2.31	2.20	2.50	2.35	2.25	2.50
(42)	3.23	2.50	2.56	2.50	2.50	2.60	2.50	2.75

Highway and Street...

New Mexico—McKinley County—State—Grade & Surf.

J. E. Skousen, Albuquerque, N. M., submitted the low bid of \$322,458 to the New Mexico State Highway Department for the construction of 5.4 mi. of the Gallup-Fort Wingate highway. Units bids submitted are as follows:

(1) J. E. Skousen	\$322,458	(4) Skousen Construction Co.	\$337,638
(2) Henry Thygesen & Co.	328,120	(5) Brown Brothers	359,295
(3) Martin & Ryan	337,268	(6) M. M. Sundt Construction Co.	363,325

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, removal of old drainage structs.	\$1,500	\$1,650	\$1,250	\$3,320	\$3,000	\$9,100
Lump sum, removal of obstructions.	\$5,000	750.00	500.00	\$1,000	500.00	500.00
213,100 cu. yd. excavation, unclassified.	.27	.34	.32	.31	.28	.31
3,460 cu. yd. excavation for structs.	1.50	1.00	.75	1.50	1.00	1.90
600 cu. yd. excavation for structs.	1.50	1.50	1.00	1.50	1.00	1.90
590 cu. yd. excavation for pipe culverts.	1.50	1.50	2.00	1.50	1.00	2.00

(Continued on next page)



Absorbing Shock

IS VITAL TO EXCAVATING PERFORMANCE, TOO!

Dig into the toughest rock—handle the heaviest rock—the 2-yard Lorain 82 will never yell quits! Its operating mechanism and cables are cushioned against sudden, severe shocks and impacts. Its engine won't stall or loaf—because of the Fluid Clutch.

This outstanding Lorain feature of the 2-yard Lorain 82 and Lorain 820 big dragline gives you power and digging force to "hang on" until the most unyielding rock or material is in the dipper. Under any digging circumstances, you can't stall the engine.

The Fluid Clutch also relieves the mechanism of terrific shocks—permits constant peak engine pulling power—eliminates vibration—assures longer equipment life and lower maintenance expense by reducing the wear and tear of the sudden impacts and shocks of extra tough digging.

Add to these, the advantages of the Thew Center Drive design and you have a big-production, cost-cutting, hard-working unit that will increase your profits—whether it's a 2 yard Shovel or a long range Lorain 820 dragline.

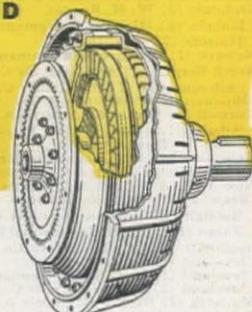
Ask your Lorain Distributor for complete data and be ready to meet the unprecedented construction demands when peace comes.



LORAIN 82 & 820

EQUIPPED
WITH

*Fluid
Clutch*



Cutaway illustrates Fluid Clutch showing impellers and oil between them, in color. This oil cushion is the reason mechanism and cables are free of impacts and shocks—why this engine can't be stalled.

CRANES • SHOVELS • DRAGLINES • CLAMSHELLS • MOTO-CRANES

See Your
Thew-
Lorain
Dealer

Le Roi-Rix Machinery Co., Los Angeles 11
Cate Equipment Co., Salt Lake City 4

Liberty Trucks & Parts Co., Denver 1

Coast Equipment Company, San Francisco 1

A. H. Cox & Co., Seattle 4, Wash.

Bunting Tractor Co., LaGrande, Ore., Boise and Twin Falls, Ida.

Connelly Machinery Company, Billings and Great Falls, Mont.

Sanford Tractor & Equipment Co., Reno, Nev.

The Mountain Tractor Co., Missoula, Mont.

The Tractor & Equipment Co., Sidney, Mont.

P. L. Crooks & Co., Portland 10, Oregon

Worthington-Ransome Blue Brute Distributors

By referring to the advertisement on page 123 you'll learn the meaning of the (1), (2) or (1-2) beside their names.

Ala., Birmingham (1) J. D. Pittman Tractor Co.

Ariz., Phoenix (2) Smith Booth Usher Co.

Ark., Fort Smith (2) R. A. Young & Son

Little Rock (1) Kern-Linerick, Inc.

Little Rock (2) R. A. Young & Son

Calif., Los Angeles (1) Garlinghouse Bros.

Los Angeles (2) Smith Booth Usher Co.

San Francisco (2) Coast Equipment Co.

Colo., Denver (2) John N. Meade

Denver (1-2) Power Equipment Co.

Conn., Hartford (2) The Holmes-Talcott Co.

New Haven (1) W. I. Clark

Waterbury (1) Contractors Supply Co.

Del., Smyrna (1) King-Burrous

D. C., Washington (1) M. A. Doetsch Machinery Co.

Fla., Jacksonville (1) Julian P. Benjamin, Inc.

Tampa (2) S. M. Regar

Ga., Atlanta (2) Tractor & Machinery Co.

Savannah (1) Morgans, Inc.

Ida., Boise (1-2) Olson Manufacturing Co.

Ill., Chicago (1-2) Chicago Construction Equipment Co.

Chicago (2) John A. Roche

Chicago (1) Thomas Hoist Co.

Ind., Fort Wayne (1) American Steel Supply Co.

Indianapolis (2) Reid-Holcomb Co.

Iowa, Des Moines (2) Electric Eng. & Const. Co.

Ky., Harlan (2) Hall Equipment Sales Co.

Louisville (2) T. C. Coleman & Son

Louisville (2) Williams Tractor Co.

Paducah (1) Henry A. Petter Supply Co.

La., New Orleans (1) Ole K. Olson Co.

New Orleans (2) Wm. F. Surgi Equipment Co.

Maine, Portland (1-2) Maine Truck-Tractor Co.

Md., Baltimore (1) Stuart M. Christy & Co.

Baltimore (2) D. C. Elphinstone, Inc.

Mass., Boston, Allston (1-2) Clark-Wilcox Co.

Cambridge (2) W. W. Field & Son, Inc.

Mich., Detroit (1) T. G. Abrams

Detroit (2) W. H. Anderson Co., Inc.

Flint (2) Grands-Hall & Co.

Muskegon (1-2) Lakeshore Machinery & Supply Co.

Minn., Minneapolis (1-2) Phillipi-Murphy Equip. Co.

St. Paul (2) D. L. O'Brien

Miss., Jackson (1) Jackson Road Equipment Co.

Mo., Clayton (1-2) The Howard Corporation

Kansas City (1) Brown-Strauss Corp.

Kansas City (2) Machinery & Supplies Co.

St. Louis (2) W. H. Reaves

Neb., Lincoln (1) Highway Equipment & Supply Co.

N. J., Hillside (2) P. A. Drobach

Newark (1) Johnson & Deelman

North Bergen (2) American Air Compressor Corp.

N. M., Albuquerque (2) Bud Fisher Co.

Albuquerque (1) Morrow & Co.

Roswell (2) Smith Machinery Co.

N. Y., Albany (1-2) Milton-Hale Machinery Co.

Buffalo (2) Dow & Co., Inc.

New York (2) Air Compressor Rental & Sales

New York (1-2) Hodge & Hammond, Inc.

New York (1-2) Railroad Materials Corporation

Utica (2) Freeborn Equipment Co.

N. C., Raleigh (2) Carelina Tractor & Equipment Co.

N. D., Fargo (1-2) Smith Commercial Body Works, Inc.

O., Cincinnati (2) Finn Equipment Co.

Cleveland (2) S. M. Clasen

Cleveland (1) H. B. Fuller Equipment Co.

Cleveland (2) Gibson-Stewart Co.

Marietta (2) Northwest Supply & Equipment Co.

Toledo (1) Edmund Supply Co.

Toledo (2) M. W. Kilcorse & Co.

Okla., Oklahoma City (2) Townsco Equipment Co.

Oregon, Portland (2) Andrews Equipment Service

Pa., Allentown (2) H. N. Crowder, Jr., Inc.

Easton (2) Sears & Bowers

Harrisburg (2) N. A. Coulter

Oil City (2) Freeborn Equipment Co.

Philadelphia (1) Giles & Ransome

Philadelphia (2) Metalweld, Inc.

Pittsburgh (2) Atlas Equipment Corp.

Wilkes-Barre (2) Ensminger & Co.

Wilkinsburg (1) Arrow Supply Co.

York (2) George F. Motters Sons

S. C., Columbia (2) Smith Equipment Co.

Tenn., Knoxville (2) Wilson-Weesner-Wilkinson

Memphis (2) Tri-State Equipment Co.

Tex., Dallas (1) Service Equipment Co.

Dallas (2) Raw Equipment Co.

El Paso (2) Equipment Supply Co.

El Paso (1) Mine and Smelter Supply Co.

Houston (2) Dye Welding Supply Co.

Houston (1) McCall Tractor Equipment Co.

San Antonio (2) Patten Machinery Co.

San Antonio (1) San Antonio Machine & Supply Co.

Utah, Salt Lake City (1-2) Landes Engineering Co.

Vt., Barre (1-2) A. M. Flanders, Inc.

Va., Richmond (2) Highway Machinery & Supply Co.

Wash., Seattle (1) Columbia Equipment Co.

Seattle (2) Star Machinery Co.

Spokane (2) Andrews Equipment Service

Spokane (1) Columbia Equipment Co.

W. Va., Charleston (1) West Virginia Co.

Fairmont (2) Interstate Engineers & Constr., Inc.

Wisc., Milwaukee (1) Meekel Engineering Co.

Wyoming, Cheyenne (2) Wilson Equipment & Supply Co.

Buy Blue Brutes

Worthington Pump and Machinery Corp.

Worthington-Ransome Construction

Equipment Division

Holyoke, Massachusetts

352,000 sta. yd. overhaul	.02	.02	.02	.02	.02	.02
221,080 1/4 mi. yd. haul	.05	.06	.05	.07	.10	.08
1,540 rolling—sheepfoot roller	5.00	6.00	5.00	4.00	6.00	4.50
2,977 M. gal. watering	3.00	4.00	3.00	3.00	2.00	3.00
1,884 cu. yd. Class "A" concrete	27.00	26.00	26.00	26.00	31.00	33.75
167 cu. yd. Class "AR" concrete	28.00	27.00	27.50	30.00	31.00	35.00
621 sq. yd. waterproofing concrete	1.00	1.00	1.00	.50	.50	1.50
327,690 lb. reinforcing steel	.07	.06	.06	.07	.08	.08
596 lin. ft. std. reinf. conc. culv. pipe, 24 in. diam.	5.50	5.00	5.50	4.50	5.00	6.60
180 lin. ft. std. reinf. conc. culv. pipe, 30 in. diam.	8.00	6.50	6.80	6.00	7.00	8.10
420 lin. ft. std. reinf. conc. culv. pipe, 36 in. diam.	9.70	7.50	9.00	7.50	8.60	9.20
1,250 lin. ft. treated timber anchor piling	2.00	1.80	2.50	2.00	2.25	2.25
200 treated timber anchor logs	5.00	1.25	2.00	2.50	2.00	3.00
1,071 rock fill bank protection	4.00	4.50	4.00	3.00	4.00	3.00
21,450 lb. wire fabric bank protection	.12	.12	.10	.11	.12	.13
1,500 lin. ft. cable	1.00	.80	.75	.60	1.00	.67
1 each reinforced conc. monument and marker	50.00	50.00	50.00	50.00	50.00	50.00
32,400 lin. ft. galv. barbed wire fence	.10	.10	.10	.10	.10	.18
10 each gates, Texas type	20.00	5.00	10.00	10.00	5.00	16.00
70 each bracing	5.00	3.00	5.00	3.00	3.00	7.50
50 each right of way and station marker	6.00	6.00	6.00	3.50	5.00	5.00
12,100 lin. ft. removing and rebuilding fence	.10	.06	.10	.05	.06	.15
5.20 mi. obliterating old road	\$1,000	550.00	850.00	900.00	\$2,500	\$1,000
13,400 lin. ft. contour ditches	.06	.05	.08	.07	.10	.10
1,030 hr. mechanical tamping	6.00	5.00	5.00	4.50	5.00	3.00
48,243 ton ballast	.60	.78	.85	.85	.77	.77
22,923 ton leveling course	1.00	.89	1.25	1.25	1.00	.82
491 bbl. cutback asphalt, Type MC-1	4.50	4.50	5.50	4.50	6.00	5.53
5,010 lin. ft. drain pipe 4 in. diam.	.75	.30	1.00	.70	1.50	.95
582 hr. rolling—steel tired roller	6.00	5.50	5.00	6.00	5.00	5.00
3,811 ton. blended rock asphalt surf. course	10.00	9.50	9.75	10.00	9.80	
5,716 hr. hot plant asphalt surfacing	6.00	5.50	5.00	6.00	6.00	
1,815 bbl. 200-300 asphalt for hot plant mix	4.50	4.50	4.50	4.50	5.00	
454 bbl. 200-300 asphalt—for seal coat	4.50	4.50	4.50	4.50	5.00	
777 ton aggregate seal coat	7.00	5.00	4.50	4.50	5.00	

Oregon—Josephine County—State—Highway Grading and Surfacing

McNutt Brothers, Eugene, Oregon, made the low bid of \$601,501 to the Oregon State Highway Department for the construction of Coyote Creek-Grave Creek section of the Pacific Highway. Unit bids received are summarized as follows:

(A) McNutt Brothers	\$601,501	(G) E. B. Bishop	\$771,784
(B) Guy F. Atkinson Co.	662,230	(H) Leonard & Slatte	772,185
(C) K. L. Goulter	664,865	(I) Guerin Brothers	805,489
(D) Larson Bros. & Harms Bros.	678,246	(J) Peter Kiewit Sons Co.	820,064
(E) E. C. Hall Co.	692,403	(K) Morrison-Knudsen Co.	887,516
(F) Kuckenberg Construction Co.	728,657	(L) C. J. Eldon	984,636

(1) 70 acres clearing and cleaning-up	(28) 220 lin. ft. 30-in. extra strength conc. pipe
(2) 30 acres grubbing	(29) 1 only std. conc. catch basins
(3) 19 acres extra clearing	(30) 1 only special conc. catch basins
(4) 3 acres extra grubbing	(31) 1,300 cu. yd. gravel backfill in drains
(5) 200 sq. ft. felling danger trees	(32) 170 only wood sight posts
(6) All specified, shoring, cribbing, etc.	(33) 510 cu. yd. Cl. "A" conc. in slab bridge and box culverts
(7) 540 cu. yds. struct. excav. below elev. shown	(34) 740 cu. yd. Cl. "A" conc. in Grave Creek bridge
(8) 50 cu. yd. struct. excav. below elev. shown	(35) 214,000 lbs. metal reinf.
(9) 3,200 cu. yd. trench excav., unclassified	(36) 620 lin. ft. metal handrail
(10) 590,000 cu. yd. gen. excav., loc. "A", unclass.	(37) All specified detour bridge
(11) 100,000 cu. yd. gen. excav., sta. 326 to 332+, unclass.	(38) 2.5 M.F.B.M. untreated lumber in place
(12) 25,000 cu. yd. gen. excav., sta. 342 to 344, unclass.	(39) 14,500 cu. yd. 2-in. - 0-in. gravel in base
(13) 100,000 cu. yd. gen. excav., sta. 356 to 373, unclass.	(40) 13,000 cu. yd. 3/4-in. - 0-in. gravel in base and shoulders
(14) 48,000 cu. yd. gen. excav., sta. 412 to 446+, unclass.	(41) 4,000 cu. yd. addtl. 3/4-in. - 0-in. gravel in key course
(15) 2,700,000 yd. stas. short overhaul	(42) 200 cu. yd. filler
(16) 74,000 cu. yd. stas. long overhaul	(43) 400 yd. mi. hauling filler
(17) 15,000 lin. ft. rounding cutbanks	(44) 1,300 M. gal. sprinkling
(18) 4.36 miles finishing roadbed and slopes	(45) 4.36 miles preparation of base
(19) 1,800 lin. ft. 9-in. perforated corrug. pipe	(46) 7,300 cu. yd. furn. and placing aggregates
(20) 1,200 lin. ft. 6-in. perf. conc. pipe	(47) 450 tons furn. and placing 120-150 asphalt
(21) 2,100 lin. ft. 10-in. perf. conc. pipe	(48) 70 tons furn. and placing RC-3
(22) 660 lin. ft. 12-in. perf. conc. pipe	(49) 600 cu. yd. 3/4-in. - 1/2-in. crushed gravel in stockpile
(23) 1,120 lin. ft. 18-in. conc. pipe	(50) 600 cu. yd. 1/2-in. - 3/4-in. cr. gravel in stockpile
(24) 1,300 lin. ft. 24-in. conc. pipe	(51) 200 cu. yd. 3/4-in. - 0-in. cr. gravel in stockpile
(25) 290 lin. ft. 30-in. conc. pipe	(52) 3,500 yd. mi. hauling cr. gravel, pile measure
(26) 330 lin. ft. 18-in. extra strength conc. pipe	
(27) 420 lin. ft. 24-in. extra strength conc. pipe	
(A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L)	
(1) 335.00 350.00 250.00 200.00 300.00 200.00 300.00 200.00 700.00 250.00 250.00 540.00	
(2) 335.00 150.00 250.00 100.00 200.00 250.00 250.00 200.00 700.00 200.00 300.00 400.00	
(3) 350.00 250.00 300.00 200.00 300.00 200.00 300.00 300.00 400.00 700.00 350.00 200.00 400.00	
(4) 350.00 200.00 300.00 100.00 300.00 250.00 250.00 200.00 400.00 700.00 250.00 300.00 600.00	
(5) 1.00 4.00 3.00 3.00 10.00 5.00 25.00 4.00 10.00 1.50 3.00 6.00	
(6) \$2,100 \$10,000 \$1,600 \$1,000 \$4,000 \$1,000 \$4,200 \$2,500 \$5,000 \$4,000 500.00 \$6,000	
(7) 4.00 4.00 6.00 5.00 7.00 5.00 7.50 5.00 2.50 7.00 2.50 5.00	
(8) 4.00 10.00 13.00 6.00 10.00 10.00 10.50 10.00 5.00 10.00 5.00 10.00	
(9) 2.00 2.25 2.00 3.00 2.35 1.50 4.00 5.00 7.00 3.40 3.50 5.00	
(10) .30 .40 .38 .38 .37 .40 .42 .42 .46 .44 .49 .50	
(11) .35 .46 .38 .38 .37 .40 .45 .46 .44 .48 .42 .46	
(12) .35 .40 .38 .38 .37 .40 .40 .40 .46 .44 .40 .46	
(13) .35 .45 .38 .38 .37 .40 .42 .42 .44 .46 .43 .45	
(14) .30 .39 .38 .38 .37 .40 .35 .46 .44 .45 .42 .45	
(15) .01 .004 .01 .01 .02 .015 .005 .01 .01 .01 .01 .015 .03	
(16) .28 .25 .40 .30 .30 1.00 .50 .20 .15 .20 .20 .20 .16	
(17) .10 .10 .15 .50 .20 .20 .15 .20 .15 .20 .20 .10 .10	</td

AIR POWER THAT BEATS SCHEDULES



On those jobs you win with a sharp pencil, there's no room for compressors and air tools that waste air or have a habit of quitting at the wrong time. Avoid interruptions and air-power losses by using Blue Brutes.

Let's take a 315' Blue Brute Portable Compressor, for example. You'll like the way light, tight, quiet Feather* Valves help squeeze the most air out of each gallon of fuel . . . the way special unit coupling in 3-point suspension cushions engine and compressor against vibration, shocks, distortion . . . the way the smooth-run-

*Reg. U.S. Pat. Off.

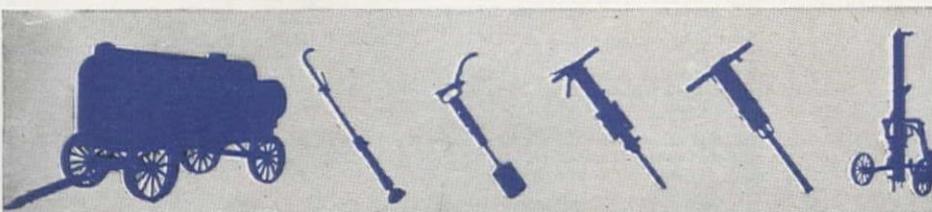
ning Diesel or gasoline engine drives the compressor. And especially will you like the way it powers such air tools as Rock Drills, Paving Breakers, and Wagon Drills.

If you don't know it already, it will pay you now to investigate why a Blue Brute air-power team beats construction schedules and keeps costs low by saving hours and dollars by speeding up the work. You'll find, as others have before you that *there's more worth in Worthington*. Your nearest Blue Brute distributor is listed on page 122

H5-13

Get more WORTH from air with WORTHINGTON

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Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have

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(33).....	46.50	40.00	40.00	45.00	41.00	35.00	43.50	50.00	40.00	41.00	38.50	35.00
(34).....	43.00	42.50	43.00	45.00	43.00	35.00	46.00	40.00	35.00	43.00	40.00	37.50
(35).....	.0625	.06	.0775	.08	.065	.07	.07	.075	.06	.065	.075	.07
(36).....	9.00	5.75	6.75	4.00	8.00	5.00	8.50	8.00	8.00	8.00	10.00	9.00
(37).....	\$7,500	\$11,500	\$6,800	\$5,000	\$6,000	\$5,000	\$6,300	\$5,000	\$15,000	\$6,000	\$10,000	\$3,500
(38).....	125.00	160.00	140.00	120.00	120.00	250.00	126.00	100.00	100.00	120.00	120.00	100.00
(39).....	2.00	2.00	2.25	3.00	2.20	2.35	3.00	2.25	2.00	2.50	3.20	2.65
(40).....	2.50	2.30	2.70	3.00	2.40	2.80	3.00	2.70	2.00	2.60	3.20	2.65
(41).....	3.00	2.50	2.40	3.00	2.40	2.50	2.50	2.40	2.00	2.60	2.20	2.65
(42).....	.50	.75	.35	2.00	1.00	.75	2.00	.35	1.00	1.70	.83	.60
(43).....	.10	.20	.12	.25	.20	.25	.30	.12	.15	.25	.22	.25
(44).....	2.00	2.50	1.50	3.00	1.50	2.50	2.00	1.50	3.00	1.60	2.48	3.50
(45).....	150.00	200.00	200.00	300.00	100.00	200.00	500.00	200.00	\$1,200	250.00	192.50	200.00
(46).....	3.50	3.10	3.40	3.50	3.80	3.40	3.00	3.40	3.00	3.25	4.35	3.50
(47).....	28.50	24.00	27.00	28.00	30.00	27.00	30.00	27.00	30.00	33.50	29.15	37.00
(48).....	28.50	28.00	27.00	30.00	30.00	27.00	30.00	27.00	35.00	33.50	30.80	35.00
(49).....	3.00	1.75	2.10	2.50	2.40	2.10	3.00	2.10	1.25	1.80	2.31	2.20
(50).....	3.00	2.00	2.10	2.50	2.40	2.10	3.00	2.10	1.25	1.80	2.31	2.20
(51).....	2.00	2.50	2.10	3.00	2.40	2.10	3.00	2.10	1.25	1.80	2.31	2.20
(52).....	.10	.15	.12	.25	.15	.12	.30	.12	.15	.15	.20	.20

California—Yolo County—State—Surf.

N. M. Ball Sons, Berkeley, made the low bid of \$117,925 to the California Division of Highways, Sacramento, for the construction of 8.1 mi. of roadway between Davis Wye and Willow Slough, between Cashe Creek and 3 mi. north, and between Woodland and 1.3 mi. north, to be repaired with plant-mix surfacing. The following is a summary of the unit bids received:

(1) N. M. Ball Sons.....	\$117,925	(5) Harms Brothers.....	\$139,840
(2) W. C. Thompson.....	118,770	(6) Louis Biasotti & Son.....	152,784
(3) A. Teichert & Co.....	125,649	(7) E. B. Bishop.....	156,928
(4) Clements & Co.....	131,617		

LOCATION 1

7,500 cu. yd. imported borrow.....	1.20	1.50	1.35	1.62	1.00	1.55	1.80
17,400 tons crusher run base.....	2.12	1.80	2.40	2.60	2.55	2.25	2.60
Lump sum, dev. water sup. & furn. watering equip.....	500.00	150.00	300.00	100.00	500.00	300.00	250.00
650 M. gal. applying water.....	1.80	1.75	1.50	1.50	2.00	1.50	1.50
70 tons liquid asphalt M.C.-2 (prime coat).....	21.00	20.00	29.50	22.00	20.00	23.00	30.00
240 tons sand (prime coat).....	2.15	1.50	2.40	2.50	3.00	4.00	4.00
1 ton. asphaltic paint binder.....	31.00	50.00	65.00	30.00	100.00	50.00	60.00
5,200 tons plant-mixed surfacing.....	3.90	4.00	3.90	3.42	4.25	5.50	5.60

LOCATION 2

2,000 cu. yd. imported borrow.....	.97	1.50	1.40	1.54	1.00	1.00	1.40
8,700 tons crusher run base.....	1.73	1.80	1.90	2.35	2.55	2.35	2.20
Lump sum, dev. water sup. & furn. watering equip.....	400.00	150.00	200.00	100.00	500.00	300.00	250.00
250 M. gal. applying water.....	1.60	1.75	1.50	1.50	2.00	1.50	1.50
40 tons liquid asphalt M.C.-2 (prime coat).....	21.30	20.00	29.50	22.00	20.00	25.00	30.00
140 tons sand (prime coat).....	1.80	1.50	2.00	2.50	3.00	3.50	4.00
3 tons asphaltic paint binder.....	30.00	50.00	65.00	30.00	100.00	34.00	60.00
4,200 tons plant-mixed surfacing.....	3.58	4.00	3.30	3.12	4.25	6.10	5.30

LOCATION 3

1,500 cu. yd. imported borrow.....	1.17	1.50	1.40	1.65	1.00	1.25	1.30
2,500 tons crusher run base.....	1.77	1.80	1.90	2.27	2.55	2.25	2.10
Lump sum, dev. water sup. & furn. watering equip.....	200.00	150.00	200.00	100.00	500.00	300.00	250.00
120 M. gal. applying water.....	1.30	1.75	1.50	1.50	2.00	1.50	1.50
12 tons liquid asphalt M.C.-2 (prime coat).....	21.00	20.00	29.50	22.00	20.00	24.00	30.00
50 tons sand (prime coat).....	1.80	1.50	2.00	2.50	3.00	3.75	4.00
3 tons asphaltic paint binder.....	28.00	50.00	65.00	30.00	100.00	34.00	60.00
1,880 tons plant-mixed surfacing.....	3.77	4.00	3.30	3.12	4.25	5.65	5.10

Idaho—Payette and Canyon Counties—State—Grade and Surface

J. C. Compton, McMinnville, Oregon, offered the low bid of \$62,037 to the Idaho Bureau of Highways, Boise, Idaho, for placing bituminous mat. and seal coat on 12 miles of U. S. Route 30, U. S. Route 95, and State Route 45, and for seal coat only on 14.8 of U. S. Route 30 in Payette and Canyon Counties. Unit bids are summarized in the following list:

(A) J. C. Compton Co.....	\$62,037	(E) Carl E. Nelson.....	\$74,030
(B) A. D. Stanley.....	62,799	(F) Hoops Construction Co.....	75,293
(C) Triangle Construction Co.....	63,791	(G) Morrison-Knudsen Co., Inc.....	76,205
(D) Standard Asphalt Paving Co.....	64,958	(H) Engineers' Estimate.....	71,255

(1) 1,390 cu. yd. cr. gravel surfacing for shoulders L-H-P	(5) 12.30 miles mix, finish and roll							
(2) 26 days rolling power roller	(6) 4,300 bbl. SC-3 liquid asphalt road mix							
(3) 10,250 cu. yd. cr. gravel surfacing L-H-W	(7) 2,300 bbl. MC-3 liquid asphalt seal							
(4) 765 bbl. SC-1 liquid asphalt prime coat	(8) 3,265 cu. yd. cover coat matl., type "X" L-H-P							
	(9) 12.30 miles scarify and relay existing surf.							
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	
(1) .....	.80	1.40	1.00	.75	1.50	1.50	2.00	.60
(2)	30.00	24.00	16.00	25.00	40.00	40.00	40.00	35.00
(3) .....	.55	.75	.75	.75	1.00	1.00	1.40	.75
(4)	4.50	4.40	4.50	5.00	4.95	5.50	4.35	4.50
(5)	600.00	900.00	775.00	800.00	700.00	700.00	750.00	\$1,000
(6)	4.25	4.40	4.50	4.75	4.95	5.50	4.35	4.50
(7)	5.00	4.75	4.75	5.50	5.50	6.00	4.35	4.50
(8)	2.00	1.40	1.50	1.20	1.75	2.25	2.50	1.25
(9)	600.00	300.00	500.00	400.00	700.00	350.00	700.00	\$1,000

Montana—Jefferson County—State—Surfacing

S. Birch & Sons Construction Co., Great Falls, Montana, submitted the low bid of \$29,365, to the Highway Commission of Montana and was awarded the contract to apply seal coat and cover to 21.4 mi. of the Helena-Boulder highway. A summary of the unit bids follows:

(A) S. Birch & Sons Construction Co.....	\$29,365	(F) R. P. Herrick Co.....	\$32,725
(B) Nolan Bros., Inc.....	29,990	(G) Union Construction Co.....	33,525
(C) Nilson-Smith Construction Co.....	30,600	(H) Northwestern Engineering Co.....	35,125
(D) McLaughlin, Inc.....	32,575	(I) Big Horn Construction Co.....	38,300
(E) Chas. Shannon & Son.....	32,725	(J) Engineer's estimate.....	29,650

(1) 37,500 gal. seal coat oiling (150-200 asph.)	(4) 1,800 cu. yd. ½-in. stone chips in stockpile
(2) 37,500 gal. seal coat oiling (emul. asph.)	(5) 175 hrs. rolling
(3) 3,200 cu. yd. ½-in. stone chips in cover	

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	
(1) .....	.13	.12	.13	.12	.155	.15	.15	.14	.16
(2) .....	.14	.13	.13	.15	.145	.20	.15	.16	.175
(3)	4.50	4.20	4.50	5.00	4.75	4.00	5.00	5.50	6.00
(4)	2.30	3.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00
(5)	4.00	5.00	6.00	6.00	5.00	8.00	5.00	5.00	6.50

THE JOB...

CLEMENTS & CO.

CONTRACTOR

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HAYWARD, CALIFORNIA

May 22, 1945

C. H. Grant Company
435 Bryant Street
San Francisco, California

Gentlemen: Subject: Adnun Black Top Paver

About two years ago we bought a used Adnun from Harms Brothers after they had used the machine on the Airport at Minden, Nevada. As this was our first experience with an Adnun, we carefully watched its performance and its operating costs.

One of our first jobs on which we used the machine, was the mountainous grade running out of Redding toward Weaverville, and which naturally presented practically every problem known to black top paving. We believe that the State Engineers were as pleased as we were with the work the Adnun did under these severe conditions, and in fact we have been told that this is one of the finest black top jobs in this territory.

Since that time, we have used the Adnun on practically every type of black top job and after this lengthy experience, we can say without qualification that we can turn out the highest quality of pavement with this machine.

Furthermore, due to the simplicity of design and rugged construction, our repair costs have been far below anything we have previously experienced.

It is a pleasure to send you these thoughts on the Adnun as the machine thoroughly deserves our most hearty recommendation.

Yours respectfully,

CLEMENTS & COMPANY

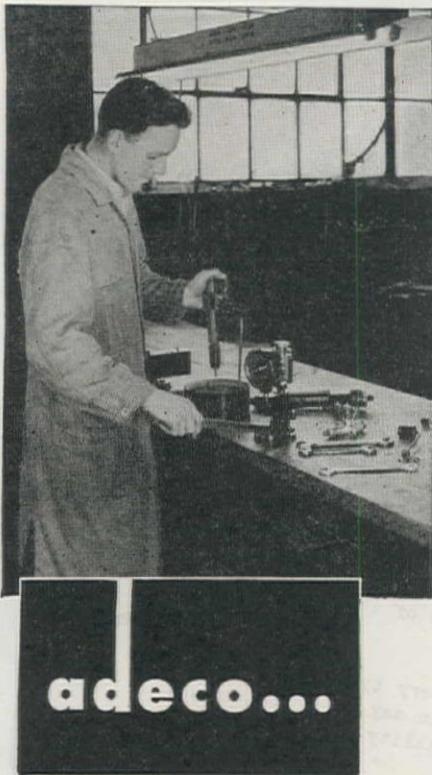
By *Al White*

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To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

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AND HYDRAULIC DE-
VICES at Pressures up
to 10,000 p.s.i.



**AIRCRAFT & DIESEL
EQUIPMENT CORP.**

DEPT. 24: 4411 N. RAVENSWOOD AVE.
CHICAGO 40, ILLINOIS

Washington—Kitsap County—State—Pave.

N. Fiorito Co., Seattle, submitted the low bid of \$177,452 to the Washington Department of Highways, Olympia, for the construction of 7.4 mi. of access county roads to the Bangor Naval Installation. The unit bids submitted are as follows:

(A) N. Fiorito Co.	\$177,452	(F) Goetz & Brennan	\$204,757
(B) The Harrison Bros. Co.	187,378	(G) Peter Kiewit Sons Co.	214,188
(C) Northwest Construction Co.	194,643	(H) Axel Osberg	216,410
(D) Fiorito Brothers	199,726	(I) L. Coluccio Co.	232,197
(E) L. Romano Engineering Co.	204,374		

(1) 29.2 acres clearing		(20) 4,745 cu. yd. furn. and pl. min. agg. $\frac{3}{4}$ in to 0	
(2) 25.9 acres grubbing		(21) 2,420 cu. yd. min. agg. in place from skpl.	
(3) 117,760 cu. yd. uncl. excav. incl. haul 600 ft.		(22) 131.4 tons bituminous cement RC-5	
(4) 640 cu. yd. channel excav. incl. haul of 600 ft.		(23) 43.3 tons bituminous cement MC-2	
(5) 570 cu. yd. com. trench excav. incl. haul 600 ft.		(24) 1.5 cu. yd. conc. Class C in place	
(6) 73,610 cu. yd. sta. overhaul on above mats.		(25) 1 only, std. conc. manhole with C.I. ring and cover	
(7) 827.8 M. cu. yd. sta. overhaul on above mats.		(26) 580 lin. ft. asphaltic conc. traffic bars in place	
(8) 1,430 cu. yd. structure excavation		(27) 66 only, asphaltic conc. buttons in place	
(9) 416.8 cu. yd. (100 ft.) finishing roadway		(28) 744 lin. ft. relaying conc. pipe 12 in. diam.	
(10) 58,390 cu. yd. sel. roadway borrow in pl. incl. haul		(29) 399 lin. ft. plain conc. drain pipe 12 in. diam.	
(11) 5,210 cu. yd. cr. stone surf. top crse. in place		(30) 1,134 lin. ft. pl. conc. or V.C. culv. pipe 12 in. diam.	
(12) 2,040 cu. yd. shoulder material in place		(31) 703 lin. ft. pl. conc. or V.C. culv. pipe 18 in. diam.	
(13) 399 M. gal. water		(32) 42 lin. ft. std. reinf. conc. culv. pipe 24 in. diam.	
(14) 1,480 cu. yd. crse. cr. ser. $\frac{3}{8}$ in. to $\frac{3}{4}$ in. in skpl.		(33) 87 lin. ft. std. reinf. conc. culv. pipe 36 in. diam.	
(15) 940 cu. yd. fine cr. ser. $\frac{3}{8}$ in. to 0 in skpl.		(34) 36 lin. ft. corrugated culv. pipe 10 gauge, 72 in. diam.	
(16) 7.9 miles preparation and finishing of rdwy.			
(17) 514 tons bituminous cement MC-2 in place			
(18) 7.9 miles mixing			
(19) 2,875 cu. yd. furn. and pl. min. agg. $\frac{3}{4}$ in. to $\frac{3}{4}$ in.			

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1) 150.00	200.00	200.00	175.00	300.00	300.00	225.00	300.00	325.00
(2) 150.00	200.00	250.00	175.00	300.00	300.00	180.00	100.00	375.00
(3) .22	.25	.24	.29	.31	.33	.33	.45	.30
(4) 1.00	1.50	1.50	1.50	1.00	1.00	2.00	.75	1.25
(5) 2.00	2.00	1.50	1.50	1.00	1.50	2.00	.60	1.25
(6) .01	.01	.01	.02	.02	.01	.015	.02	.02
(7) 4.00	5.00	5.00	7.00	6.00	5.00	4.00	7.50	
(8) 1.50	2.00	1.50	2.00	2.00	2.00	2.00	1.50	1.50
(9) 10.00	5.00	8.00	12.00	8.00	10.00	8.00	15.00	15.00
(10) .95	1.05	.95	1.00	1.05	.95	1.25	.99	1.20
(11) 2.20	2.00	2.20	2.05	2.25	2.05	2.25	2.05	2.45
(12) 1.50	1.50	2.20	2.05	1.50	2.05	2.25	2.05	1.75
(13) 4.00	3.00	3.50	3.00	3.00	2.00	4.50	3.00	3.00
(14) 4.00	2.75	2.75	2.50	2.60	2.50	2.25	2.50	2.45
(15) 3.50	2.75	2.75	2.50	2.60	2.50	2.25	2.50	2.45
(16) 200.00	200.00	300.00	250.00	200.00	250.00	300.00	250.00	350.00
(17) 25.00	25.00	33.00	33.00	28.00	33.00	22.00	33.00	35.00
(18) 700.00	750.00	900.00	750.00	600.00	750.00	850.00	750.00	850.00
(19) 1.85	2.00	2.50	2.25	2.20	2.25	2.25	2.25	2.75
(20) 1.85	2.00	2.50	2.25	2.20	2.25	2.25	2.25	2.75
(21) 1.40	1.50	1.50	1.50	1.10	1.50	1.60	1.50	1.50
(22) 32.50	35.00	35.00	35.00	32.00	35.00	33.00	35.00	38.00
(23) 28.00	30.00	35.00	35.00	30.00	35.00	32.00	35.00	38.00
(24) 75.00	100.00	50.00	50.00	60.00	50.00	60.00	100.00	60.00
(25) 100.00	50.00	150.00	300.00	150.00	150.00	175.00	90.00	125.00
(26) 1.75	1.60	1.50	2.00	1.50	1.00	1.00	1.00	2.50
(27) 1.75	2.00	2.00	2.00	1.50	1.50	1.25	2.50	
(28) 1.00	1.00	1.00	1.30	1.00	.75	.65	1.00	.75
(29) 1.40	1.50	1.25	1.50	1.25	1.10	1.35	1.00	.85
(30) 1.40	1.60	1.50	1.50	1.25	1.10	1.35	1.00	1.25
(31) 2.50	2.35	2.50	2.25	2.50	2.20	2.20	2.00	2.50
(32) 3.25	4.00	3.50	3.50	4.50	3.50	3.75	5.00	4.50
(33) 7.75	6.50	7.00	7.50	8.00	6.60	7.00	8.50	12.00
(34) 17.00	12.00	14.00	30.00	25.00	22.00	21.00	24.00	20.00

Wyoming—Sheridan County—State—Grade and Surface

The Big Horn Construction Co., Sheridan, Wyoming, offered the low bid to the Wyoming Highway Department, Cheyenne, for the construction of 9 miles of the Sheridan-Buffalo road. The following unit bids were received for this project:

(A) Big Horn Construction Co.	\$344,419	(E) Northwestern Engineering Co.	\$422,428
(B) Taggart Construction Co.	373,438	(F) Inland Construction Co.	422,465
(C) Brown Construction Co.	380,608	(G) H. W. Read	512,369
(D) Knisely-Moore	412,138	(H) Engineers' Estimate	354,749

(1) 594,000 cu. yd. excavation		(26) 7,000 cu. yd. binder	
(2) 282,000 cu. yd. sta. overhaul		(27) 18,100 ton cr. gravel surfacing ($\frac{3}{4}$ in. max.)	
(3) 110,000 cu. yd. mi. haul		(28) 1,470 ton stone chips	
(4) 3,870 hr. sheep's foot roller operation (emb.)		(29) 343 ton base treatment MC-0	
(5) 430 hr. pneumatic tired roller opera. (emb.)		(30) 300 ton seal coat RC-4	
(6) 4,500 M. gal. watering (emb.)		(31) 1,032 ton S.C. liquid asphalt distr. SC-4	
(7) 3,355 cu. yd. excavation for pipe culverts		(32) 176,600 sq. yd. processing roadway	
(8) 360 cu. yd. structure excavation		(33) 1,360 M. gal. watering (base)	
(9) 1,435 hr. mechanical tamping		(34) 500 hr. roller operation (base)	
(10) 360 cu. yd. Class 1 riprap		(35) 6,800 lin. ft. shaping and tamping curb	
(11) 120 cu. yd. grouted riprap		(36) 180 lin. ft. shaping and tamping spillway	
(12) 964 lin. ft. 12-in. std. R.C.P.		(37) 5.5 mi. old road obliteration	
(13) 4,476 lin. ft. 18-in. std. R.C.P.		(38) Lump sum, removing and resetting bldgs.	
(14) 628 lin. ft. 24-in. std. R.C.P.		(39) Lump sum, removing and resetting flume	
(15) 340 lin. ft. 30-in. std. R.C.P.		(40) Lump sum, removing existing structures	
(16) 612 lin. ft. 36-in. std. R.C.P.		(41) 330 cu. yd. special backfill	
(17) 56 lin. ft. 36-in. extra strength R.C.P.		(42) 330 cu. yd. sub-excavation	
(18) 65,450 lin. ft. standard right of way fence		(43) 3 ea. timber project markers	
(19) 24,900 lin. ft. Type "A" right of way fence		(44) 1,310 MBM untreated timber	
(20) 1,250 lin. ft. Type "B" right of way fence		(45) 2 ea. removing and resetting cattle guards	
(21) 8,000 lin. ft. std. r/w fence (5 wire barbless)		(46) 150 lin. ft. 3-in. std. black iron pipe	
(22) 120 ea. end panels		(47) 885.5 lin. ft. 18-in. siphon R.C.P.	
(23) 250 ea. brace panels		(48) 226.2 lin. ft. 30-in. siphon R.C.P.	
(24) 27,500 ton cr. stone (scoria) base crse. (1 in. max.)		(49) 132.2 cu. yd. Class A concrete	
(25) 16,100 ton cr. gravel base crse. (1 in. max.)		(50) 6,350 lb. reinforcing steel	
		(51) 4,410 lb. structural steel	

(Continued on next page)

BREAK IT UP IN A HURRY!

WITH A
SULLIVAN
K-81
BREAKER . . .



There are two reasons why the Sullivan K-81 paving breaker will finish up the job in a hurry. First, the patented Sullivan Dual-Valve, which increases the number and the power of blows. Second, the operator works faster because the K-81 has been designed to eliminate fatigue and make operation easier.

Because of the Dual-Valve, the K-81 uses a miserly amount of air, yet it packs a real wallop down at the steel, where power really counts.

Let your runner get his hands on a K-81 and you'll readily see why he can get more work done. He'll like the easy way it handles and the smooth, flat-sided cylinder that furnishes a comfortable working surface against his leg.

The Sullivan K-81 will stay on the job, day after day, pounding out profits for you. **Sullivan Machinery Company, Michigan City, Indiana.** **IN CANADA: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.**

SULLIVAN

PRODUCTS—Portable Compressors • Stationary Compressors • Rock Drills • Wagon Drills • Core Drills • Portable Hoists • Spaders • Paving Breakers • Trench Diggers • Sheetng Drivers • and other Pneumatic Tools.

OFFICES—Birmingham • Boston • Butte • Chicago • Claremont • Dallas • Denver • Duluth • El Paso • Huntington • Knoxville • Los Angeles • Middlesboro • New York • Pittsburgh • Portland • Salt Lake City • San Francisco • Seattle • St. Louis • Washington D. C.

YOU and this New JOHNSON TWIN Silo Cement Plant



for a profitable partnership

This new plant has the greatest capacity of all Johnson portable plants (up to 1600 bbls). Provides fast and economical handling of bulk cement on paving jobs. Silos are water tight and require no field bolting. Constructed in all-welded units, it can be set up quickly *without a crane*. The entire leg and silo assembly tip into position on pivoted base with gin pole and tractor winch.

PORTABLE SECTION BINS

If you need less cement storage capacity this portable equipment deserves careful consideration: 280, 390 and 500 barrel capacity. Johnson Portable Section Bins are designed for unloading and batching cement delivered by any type of transportation.

JOHNSON DUTCH MILL

Constructed in 3 or 4 sections for easy, fast set-ups and dismantling. No pit required for elevator. Easily converted into cement transfer plant. 50, 100 and 150 barrel capacity. Can be equipped with 2 cement batchers.

ELEVATING CHARGER

Where no storage is required the Johnson Elevating Charger will batch cement directly from hopper bottom or boxcars.

Whatever your needs—from a small charger to the largest central mix plant—there is Johnson equipment to fit your requirements. Write today.

a Koehring Subsidiary



WEST COAST DISTRIBUTORS

HARRON, RICKARD & McCONE CO. of Southern Calif., Los Angeles; EDWARD R. BACON COMPANY, San Francisco; CRAMER MCHY. COMPANY, Portland, Oregon; WESTERN MCHY. CO., Spokane, Washington; WESTERN EQUIPMENT CO., Boise, Idaho; WESTERN MCHY. CO., Salt Lake City, Utah; NEEL B. McGINNIS Co., Phoenix, Arizona; R. L. HARRISON CO., Albuquerque, New Mexico.

The C. S. Johnson Company

Champaign, Illinois

(6)	1.50	3.50	1.00	1.40	2.00	1.55	2.00	1.75
(7)	1.00	1.00	2.00	1.00	2.00	1.50	2.50	1.50
(8)	1.50	2.00	2.00	2.00	2.00	3.00	2.50	2.00
(9)	4.25	5.50	2.50	3.25	5.00	3.00	3.60	3.50
(10)	5.00	5.00	5.00	8.00	8.00	8.50	6.50	6.00
(11)	12.00	11.00	10.00	15.00	15.00	14.00	15.00	10.00
(12)	1.75	1.80	3.00	2.00	1.85	2.00	2.00	2.00
(13)	3.25	2.80	4.00	3.00	3.25	3.40	3.10	2.50
(14)	5.00	4.50	6.00	5.00	5.00	4.75	4.60	3.50
(15)	7.00	6.40	7.50	7.00	7.00	6.20	6.35	5.50
(16)	10.00	8.70	9.00	9.00	9.35	7.75	8.50	7.00
(17)	12.00	10.00	10.00	10.00	10.50	9.00	9.90	8.00
(18)	.10	.09	.10	.09	.11	.10	.08	.075
(19)	.15	.13	.20	.20	.16	.21	.15	.12
(20)	.25	.14	.22	.30	.20	.24	.17	.13
(21)	.10	.09	.09	.09	.12	.11	.09	.08
(22)	7.00	10.00	10.00	22.00	15.00	7.00	9.00	10.00
(23)	6.00	6.00	10.00	8.00	8.00	5.50	6.00	7.00
(24)	1.00	1.10	1.20	1.00	1.15	1.00	1.23	.90
(25)	1.00	1.00	1.20	1.20	1.15	1.15	1.60	1.10
(26)	.25	.30	1.20	.60	.65	.50	.80	.50
(27)	1.00	1.00	1.00	1.25	1.05	1.15	1.50	1.20
(28)	3.00	3.60	4.00	3.50	3.75	3.30	3.50	4.00
(29)	24.00	23.10	20.00	20.00	26.70	29.00	29.50	25.00
(30)	25.00	24.50	20.00	20.00	27.60	30.00	29.50	25.50
(31)	19.00	18.15	20.00	19.00	21.50	26.50	23.75	23.00
(32)	.05	.045	.03	.04	.05	.045	.06	.055
(33)	1.50	2.50	2.00	1.50	2.00	1.60	2.00	1.75
(34)	4.00	5.00	4.00	4.30	4.00	4.25	3.60	5.00
(35)	.15	.10	.20	.15	.12	.10	.15	.15
(36)	1.00	.35	1.00	.50	.40	.35	.50	.50
(37)	10.00	300.00	100.00	500.00	800.00	\$1,150	350.00	300.00
(38)	50.00	10.00	100.00	100.00	500.00	150.00	100.00	25.00
(39)	100.00	25.00	100.00	150.00	400.00	250.00	150.00	150.00
(40)	\$1,500	\$2,000	100.00	250.00	500.00	\$1,200	\$3,500	300.00
(41)	2.00	1.50	3.00	1.25	2.00	2.25	3.50	1.50
(42)	1.50	1.50	3.00	1.00	1.00	2.25	4.75	1.00
(43)	20.00	10.00	30.00	20.00	12.00	15.00	15.00	10.00
(44)	200.00	100.00	200.00	200.00	200.00	200.00	400.00	150.00
(45)	50.00	60.00	100.00	50.00	50.00	100.00	100.00	100.00
(46)	1.10	1.00	1.00	1.00	1.00	1.50	1.00	1.00
(47)	4.00	4.10	4.00	4.00	3.75	5.00	7.00	3.10
(48)	10.00	9.00	8.00	6.50	6.75	9.00	9.00	6.30
(49)	34.00	35.00	50.00	40.00	40.00	28.00	40.00	30.00
(50)	.10	.07	.10	.08	.08	.11	.12	.10
(51)	.35	.45	.20	.50	.65	.28	.45	.10

Washington—Lewis County—State—Grade and Surface

Consolidated Construction Co., Tacoma, Washington, submitted the lowest offer of \$127,848 to the Director of Highways, Olympia, Washington, for the construction of 11 miles of state highway route No. 12 from Raymond easterly. The unit bids received are as follows:

(1) Consolidated Construction Co.	\$127,848	(4) Peter Kiewit Sons' Co.	\$172,210
(2) T. W. Thomas	149,782	(5) Goetz & Brennan	187,258
(3) J. N. & M. J. Conley	170,904	(6) J. D. Shotwell	242,764

	(1)	(2)	(3)	(4)	(5)	(6)
30.2 acres clearing	150.00	125.00	200.00	100.00	260.00	150.00
16.7 acres grubbing	150.00	125.00	150.00	100.00	250.00	300.00
38,460 cu. yd. uncl. excavation incl. haul	.50	.50	.70	.50	.67	.75
30 cu. yd. common trench excav. incl. haul	2.00	2.00	2.00	6.00	2.00	3.00
150 cu. yd. structure excavation	2.00	3.00	3.00	6.00	2.00	3.00
11.00 miles finishing roadway	250.00	250.00	250.00	300.00	400.00	450.00
7 cu. yd. gravel backfill in place	5.00	5.00	5.00	5.00	4.00	4.50
21,580 cu. yd. ballast in place on roadway	2.00	3.00	3.15	3.15	3.56	5.00
6,720 cu. yd. place ballast on rdwy. from stockpile	.75	.70	.90	.60	.80	.60
9,160 cu. yd. cr. st. surf. top course in pl. on rdwy.	2.75	3.00	3.35	4.20	3.56	5.00
5,460 cu. yd. cr. st. surf. base course in pl. on rdwy.	2.75	3.00	3.15	3.95	3.56	5.00
450 cu. yd. pl. cr. st. surf. top course on rd. stkppl.	.85	.70	.90	.60	.80	.60
910 cu. yd. pl. cr. st. surf. base crse. on rd. stkppl.	.85	.70	.90	.60	.80	.60
903 M. gal. water	3.00	1.00	2.00	1.60	2.50	4.50
MIN. AGG. FOR NON-SKID SINGLE SEAL TREAT. SCH. A IN STKPPLS.						
710 cu. yd. crse. cr. scr. 5/8-in. to 1/4-in. in stkppl.	3.50	3.75	4.50	6.00	4.25	5.00
210 cu. yd. fine cr. scr. 1/4-in. to 0 in stkppl.	3.50	3.75	4.50	6.00	4.25	5.00
MISCELLANEOUS ITEMS						
100 only, placing spot posts	2.00	1.50	2.50	2.00	2.50	1.50
6,407 lin. ft. removing exist. guard rail	.20	.10	.25	.35	.25	.38
2 only, remov. and replac. exist. conc. headers and 1 joint of pipe	10.00	75.00	40.00	75.00	25.00	75.00
198 lin. ft. relaying conc. pipe, 12-in. diam.	1.00	1.00	1.00	.65	1.00	1.50
345 lin. ft. pl. conc. or V.C. culv. pipe, 12-in. dia. in place	1.50	1.75	1.00	1.50	1.10	1.50
108 lin. ft. pl. conc. or V.C. culv. pipe, 18-in. dia. in place	2.50	3.50	2.00	2.75	2.00	2.55
30 lin. ft. pl. conc. or V.C. culv. pipe, 24-in. dia. in place	3.50	6.00	2.50	4.00	3.00	4.13
42 lin. ft. std. reinf. conc. culv. pipe 30-in. dia. in place	6.00	8.00	5.00	6.75	6.50	6.75
9 lin. ft. std. reinf. conc. culv. pipe 36-in. dia. in place	10.00	15.00	8.00	10.00	10.00	9.75

Irrigation . . .

Oregon—Deschutes County—Bureau of Reclamation—Structures

Bickle & Cater, Portland, Oregon, submitted the low bid of \$158,428 for the construction of structures and laterals for the Deschutes Project as specified by the Bureau of Reclamation. The following is a summary of the unit bids submitted:

(1) Bickle & Cater	\$158,428	(5) C. J. Montag & Sons	\$208,675
(2) W. C. Thompson	175,950	(6) E. B. Bishop	217,902
(3) United Construction Co.	192,298	(7) Leonard & Slatte	244,235
(4) J. N. & M. J. Conley	206,580		
	(1)	(2)	(3)
135,000 cu. yd. excav., common, for laterals	.32	.35	.40
1,100 cu. yd. excav., rock for laterals	2.50	2.50	2.50
6,000 sta. cu. yd. overhaul	.07	.02	.05
1,300 cu. yd. compacting embankments	.60	.20	.50
13,000 cu. yd. excavation, common, for structures	.70	1.20	.75
1,500 cu. yd. excavation, rock for structures	3.00	4.00	5.00
7,000 cu. yd. backfill	.45	.30	.35
3,600 cu. yd. compacting backfill	1.00	1.50	.80
2,030 cu. yd. concrete in structures	37.00	40.00	45.00
152,000 lb. placing reinforcement bars	.04	.04	.05
150 sq. yd. dry-rock paving	4.00	5.00	4.50

(Continued on next page)

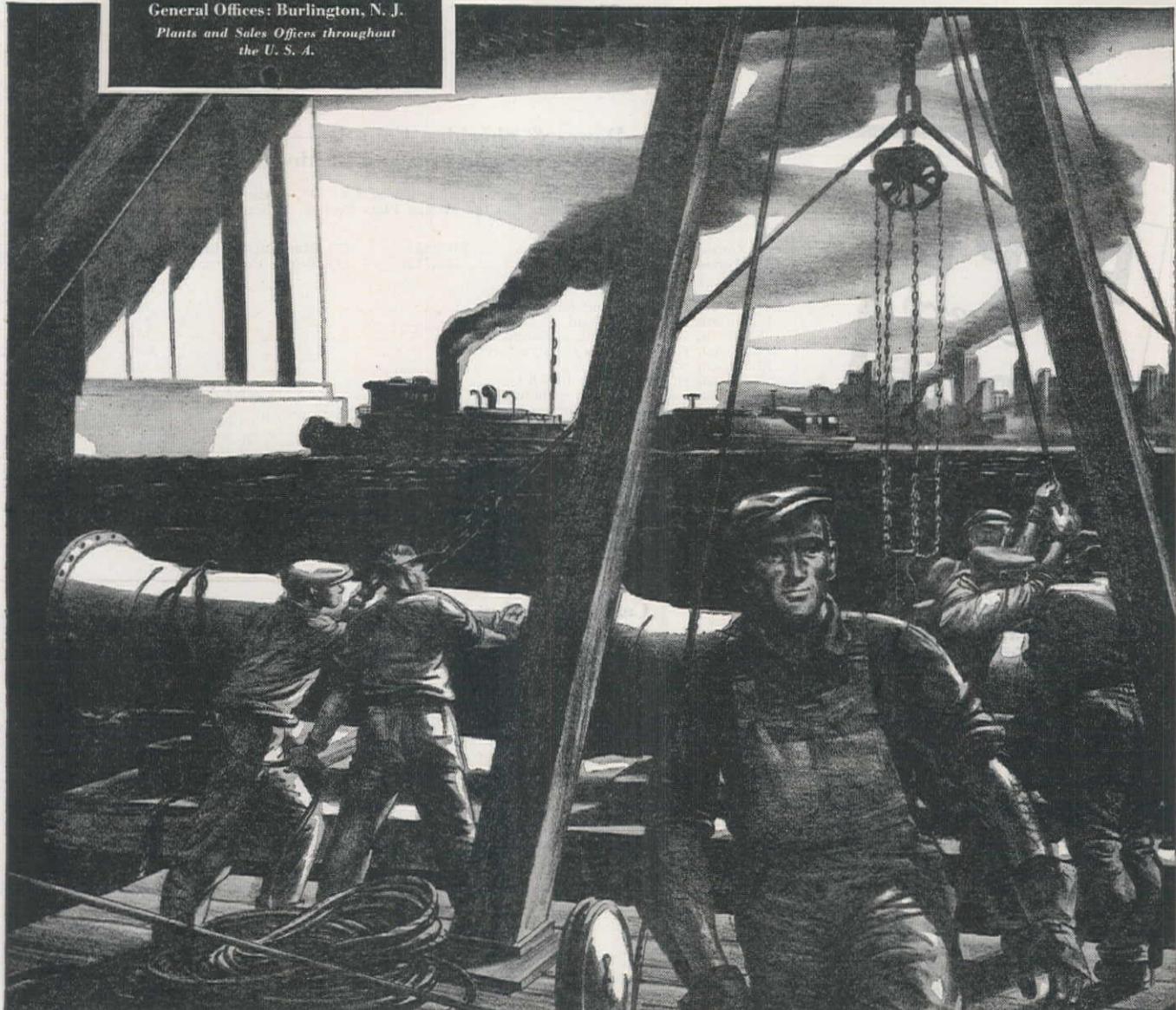
Behind the products of this Company is over forty years of engineering experience covering designs for installations in all fields of pressure pipe service. With this experience are coupled the resources of our modern research laboratory for the development of new and improved practice in the production and utilization

of cast iron pipe and fittings. If you have a pipe design problem, feel free to draw on the experience and "know how" of our technical staff, without obligation.

U.S. cast iron PIPE

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

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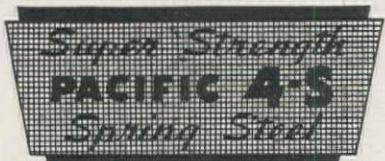


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They always

MAKE GOOD!

Pacific Super Strength Spring Steel "4-S" Wire Screen has made good on big gravel production jobs when wear-resistant screen is needed for long, uninterrupted service. Complete for Vibrators, Shakers, Cones, Cylinders.

Ask your dealer or order direct.
Be specific — say PACIFIC 4-S.
Prompt deliveries.



PACIFIC WIRE WORKS CO.

KARL H. KAYE, President

Factory and Warehouse
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Established 1891

PIPE
for Every
PURPOSE

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
ROAD CULVERTS
PUMPING PLANTS
WELL CASINGS
INDUSTRIAL USES
IRRIGATION SYSTEMS

10% of our gross payroll goes into war stamps and bonds.



48 M.F.B.M. erecting timber in structures.....	50.00	60.00	80.00	90.00	75.00	100.00	100.00
1,280 lin. ft. laying 18-in. diam. concrete pipe.....	1.25	1.00	1.75	1.00	1.50	1.75	1.50
1,120 lin. ft. laying 24-in. diam. concrete pipe.....	1.60	1.50	2.25	1.50	3.00	2.00	2.00
225 lin. ft. laying 30-in. diam. concrete pipe.....	2.25	2.00	2.75	2.00	4.00	2.50	3.00
18,000 lb. installing gates and misc. metal work....	.14	.10	.15	.20	.12	.17	.20

California—Fresno County—Bureau of Reclamation—Earthwork & Conc.

Peter Kiewit Sons Co., San Francisco, submitted the low bid of \$1,163,340 to the Bureau of Reclamation office, Sacramento, for the construction of Friant-Kern Canal consisting of earthwork, concrete lining and structures in the Central Valley Project from Sta. 6 plus 10 to Sta. 301 plus 60. The following is a list of bidders and unit bids submitted:

(A) Peter Kiewit Sons Co.....	\$1,163,340	(G) Griffith Co.	\$1,565,595
(B) Rhoades Bros. & Shofner.....	1,246,710	(H) N. M. Ball Sons.....	1,649,919
(C) S. D. Healy Co.....	1,295,010	(I) Graft-Callahan, Gunther & Shirley and Mark C. Walker.....	1,789,580
(D) Guy F. Atkinson Co.....	1,346,885	(J) L. E. Dixon and Arundel Corp.....	1,798,800
(E) Larsen Bros. & Harms Bros.....	1,376,120	(K) Ralph A. Bell.....	1,994,220
(F) Morrison-Knudsen Co. (L. A.).....	1,487,756		
(1) 613,000 cu. yd. common excav. for canal		(10) 155,000 sq. yd. trimming earth foundations for concrete lining	
(2) 767,000 cu. yd. rock excav. for canal		(11) 4,000 cu. yd. backfill	
(3) 166,000 sta. cu. yd. overhaul		(12) 2,000 cu. yd. compacting backfill	
(4) 116,000 cu. yd. compacting embankments		(13) 1,100 cu. yd. concrete in structures	
(5) 4,000 cu. yd. common excav. for drainage channels and dikes		(14) 28,800 cu. yd. concrete in canal lining	
(6) 5,000 cu. yd. rock excav. for drainage channels and dikes		(15) 1,300,000 lbs. placing reinforcing bars	
(7) 3,200 cu. yd. common excav. for structures		(16) 100 sq. yd. dry rock paving	
(8) 4,000 cu. yd. rock excav. for structures		(17) 165,000 lbs. erect'g structural steel in bridges	
(9) 143,000 sq. yd. preparing rock foundations for concrete lining		(18) 75,000 ft. b.m. erecting timber in structures	

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1) .....	.44	.53	.80	.58	.58	.19	.70	.74	.71	.84	.90
(2) .....	.44	.53	.80	.58	.58	.84	.70	.74	.71	.84	.90
(3) .....	.01	.05	.02	.045	.02	.022	.015	.02	.02	.02	.015
(4) .....	.30	.20	.06	.24	.25	.25	.22	.25	.22	.15	.16
(5) .....	.85	1.50	.50	1.75	2.00	1.63	.50	3.00	.86	2.00	1.60
(6) .....	.85	1.50	1.75	1.75	2.00	1.63	2.00	3.00	1.45	2.00	1.60
(7)	3.20	2.50	1.40	3.00	2.00	.77	2.00	4.50	4.25	3.00	2.70
(8)	3.20	2.50	2.20	3.00	2.00	8.95	4.50	4.50	8.50	3.00	2.70
(9) .....	.53	.32	.60	.50	.35	1.10	.81	.70	1.25	.56	.56
(10) .....	.53	.32	.40	.50	.35	.55	.27	.70	.30	.56	.56
(11)	1.00	.30	.45	.50	.50	.29	.55	2.00	.45	.50	.30
(12)	2.60	.60	1.00	2.50	1.00	1.30	2.00	2.00	3.50	1.25	1.00
(13)	36.00	34.00	50.00	40.00	45.00	38.00	34.00	48.33	64.00	45.00	40.00
(14)	8.00	9.50	8.00	8.00	10.00	10.60	9.60	6.97	12.75	10.00	14.00
(15) .....	.03	.0225	.03	.025	.04	.03	.033	.04	.03	.04	.05
(16)	10.00	8.00	5.00	8.00	6.00	5.00	11.00	15.00	5.00	10.00	10.00
(17) .....	.04	.05	.03	.025	.04	.025	.045	.025	.05	.06	.04
(18)	70.00	70.00	50.00	80.00	80.00	59.00	80.00	65.00	50.00	100.00	100.00

Nebraska—Dawes & Sheridan Counties—Bureau of Reclamation—Structures and Earthwork

Roush Construction Co., Crawford, Nebr., bid low at \$168,655, to the Bureau of Reclamation for the construction of laterals and sub-laterals of the Mirage Flats Project, Nebraska. Unit bids submitted for specification No. 1098 are as follows.

(1) Roush Construction Co.....	\$168,655	(3) Marshall & Haas.....	\$212,220
(2) Morrison-Knudsen Co., Inc.....	183,712	(4) Brown Construction Co.....	235,025
		(1) (2) (3) (4)	
220,000 cu. yd. excavating for laterals.....		.23	.20 .225 .45
15,000 sta. cu. yd. overhaul.....		.03	.03 .05 .02
5,000 cu. yd. compacting embankment.....		.50	.50 .50 .40
15,000 cu. yd. excavation for structures.....		1.50	.60 1.00 2.00
12,500 cu. yd. backfill.....		.30	.30 .40 .40
2,300 cu. yd. compacting backfill.....		.50	.60 1.00 2.00
1,340 cu. yd. concrete in structures.....		42.00	62.00 73.00 50.00
112,000 lbs. placing reinforcement bars.....		.05	.045 .06 .05
1,000 sq. yd. dry-rock paving.....		5.00	7.50 5.30 3.00
60 M.F.B.M. erecting timber in structures.....		70.00	57.50 92.00 100.00
2,200 lin. ft. laying 18-in. dia. concrete pipe.....		1.50	1.75 1.80 1.00
300 lin. ft. laying 24-in. dia. concrete pipe.....		2.00	2.25 3.00 1.50
2,850 lin. ft. laying 30-in. dia. concrete pipe.....		2.50	2.75 3.00 1.50
56,000 lbs. installing gates and misc. metalwork.....		.10	.20 .15 .10

Sewerage . . .

California—Los Angeles County—City—Sanitary

Artukovich Bros., Hynes, presented the lowest bid of \$97,441 to the County Board of Supervisors, Los Angeles, Calif., for the construction of 4.3 miles of sanitary sewers in Clara Street and others for county improvement No. 1087. The following is a summary of quantities and unit bids received:

(A) Artukovich Bros.	\$97,441	(F) Burch & Bebek.....	\$100,565
(B) Steve P. Rados.....	97,676	(G) Bebek & Brkich.....	102,070
(C) Tom L. Gogo.....	98,210	(H) Martin Construction Co.....	105,820
(D) R. A. Wattson Co.....	98,480	(I) Leko & Radich.....	106,380
(E) Bob Bosnyak.....	98,705	(J) V C K Construction Co.....	110,995
		(4) 6,350 lin. ft. 6-in. connection sewer, std. stren. vitrified clay pipe.....	
		(5) 91 brick sewer structures.....	
		(6) 3 trap manholes.....	
		(7) 2 double trap manholes.....	
		(8) installing 2 trap manhole castings.....	

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	4.00	3.60	5.00	4.00	6.00	5.00	3.75	4.00	5.00	5.00
(2)	2.88	2.80	3.00	2.90	2.80	3.00	2.70	3.40	3.10	3.25
(3)	3.50	3.00	3.00	4.00	4.00	3.00	3.00	4.00	4.00	4.00
(4)	2.50	2.25	2.00	2.60	2.00	2.50	2.40	2.00	2.80	2.50
(5)	150.00	194.00	160.00	150.00	200.00	150.00	250.00	150.00	160.00	200.00
(6)	225.00	225.00	200.00	200.00	275.00	200.00	300.00	200.00	300.00	250.00
(7)	300.00	250.00	230.00	300.00	300.00	225.00	300.00	250.00	400.00	300.00
(8)	100.00	150.00	100.00	110.00	250.00	150.00	150.00	200.00	200.00	150.00

Simplicity

GYRATING SCREENS

are

EFFICIENT and ECONOMICAL



View of temporary West Coast plant using three 4' x 10' Triple Deck Screens to produce 3130 tons per hour of rock.

Simplicity Gyrating Screens are at work in every state in this country, in Alaska, Canada, Mexico and other foreign lands. The reputation earned by these universally used screens is best expressed by this statement made by one of the army of satisfied Simplicity users, "It is hard to believe, but we are now getting 50% more capacity from our plant, with the only change in our equipment being the replacement of our screening unit with the same size Simplicity Gyrating Screen. The cost of operation has also been greatly reduced."

To secure a recommendation and quotation covering Simplicity Gyrating Screens for your job, contact the factory or one of our listed dealers.

The Donald Kenneth Co., Rialto Bldg., San Francisco, Calif.; Snyder Foundry Supply Co., 2444 E. 57th St., Los Angeles, Calif.; Contractors Equipment Corp., 1215 S. E. Grand Ave., Portland, Oregon; Pacific Hoist & Derrick Co., 3200 Fourth Ave. So., Seattle, Wash.; Empire Equipment Co., E. 3627 Alki Avenue, Spokane, Washington; Arizona Mining Supply Corp., Prescott, Arizona.

Simplicity
ENGINEERING COMPANY · DURAND MICH.

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 . . .

N. M. Ball Sons, Berkeley, Calif., received a \$1,047,795 contract to construct a runway, taxiways, parking apron, etc., at the Merced Army Air Field, near Merced, Calif., by U. S. Engineer Office, Sacramento, Calif.

M. B. Killian and Co., and **E. B. Darby and Co.**, San Antonio, Tex., were awarded a \$2,573,024 contract for additional airfield facilities at Randolph Field, San Antonio, Tex., by U. S. Engineer Office, San Antonio, Tex.

Del E. Webb Construction Co., Phoenix, Ariz., on a bid of \$1,957,007 was awarded a contract for additional new and converted bldgs. at Mitchell Convalescent Hospital, Camp Lockett, near Campo, Calif., by U. S. Engineer Office, Los Angeles, Calif.

Robert E. McKee, Los Angeles, Calif., holds a contract for \$4,040,850 for construction of maximum security disciplinary barracks at Camp Cooke, Calif., by U. S. Engineer Office, Los Angeles, Calif.

Walsh and Burney Co., Inc., San Antonio, Tex., were awarded a contract worth \$798,086 for conversion of barracks at Brooke General Hospital, Fort Sam Houston, Tex., by U. S. Engineer Office, San Antonio, Tex.

Nettleton & Baldwin, Seattle, Wash., on a bid of \$1,407,376 were awarded the contract to move 616 dwelling units from Vancouver,

Wash., and relocate them at Sinclair Park housing project, Bremerton, Wash., by Federal Public Housing Authority, Seattle, Wash.

James W. Glover, Honolulu, T. H., were awarded a \$1,492,391 contract for construction of 482 family dwelling units on Oahu, Hawaii, by Federal Public Housing Authority, San Francisco, Calif.

Pacific Construction Co., Honolulu, T. H., on a bid of \$1,755,281, was awarded the contract to build 518 family dwelling units on Oahu, Hawaii, by Federal Public Housing Authority, San Francisco, Calif.

Frederickson and Watson Construction Co., Oakland, Calif., have been awarded a \$1,690,000 contract for additional car-holding facilities and related operating facilities, Inland Storage Area, Naval Magazine, Port Chicago, Calif., by Bureau of Yards and Docks, Washington, D. C.

MacDonald and Kahn, Inc., and **A. Teichert and Co.**, and **John C. Gist**, on a joint venture, were awarded a \$6,214,000 contract for construction of the new Sacramento Signal Depot at Sacramento, Calif., by U. S. Engineer Office, Sacramento, Calif.

Grafe-Callahan Construction Co., Los Angeles, Calif., received a \$2,248,409 contract to construct the pipeline and structures from north station 138 plus 86 to north station 1146 plus 50 of the San Diego, Calif., aqueduct, by Bureau of Yards and Docks, Washington, D. C.

Duncanson-Harrelson Co., and **Healy Tibbitts Construction Co.**, San Francisco, Calif., were awarded a \$3,330,730 contract for the construction of piers at California Point, Calif., by U. S. Engineer Office, San Francisco, Calif.

THE INSIDE STORY OF A FIGHTING PUMP

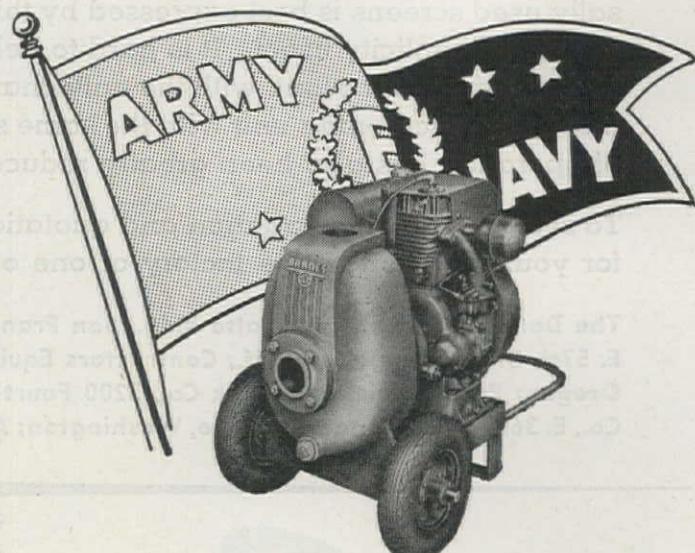
A CITATION — AND A FURTHER PLEDGE

Having been awarded its third Army-Navy "E" Star — a citation for a continuous job well done.

Barnes has just been awarded its third Army-Navy "E" Star — a citation for a continuous job well done. Barnes Automatic Centrifugal Pumps have seen duty on all fronts—the African, the European, the Pacific—duty teeming with formidable tasks, successfully completed. And Barnes war production facilities are still pledged to final victory in the battle of the Pacific.

Careful company planning and allocation of production, throughout the European conflict, made possible equitable serving of distributor pump needs on the home front. However, requirements of the Services are becoming less severe, and an increasing number of Barnes Pumps are now available for distributors and their customers.

In every service, on the battle front or on the home front, Barnes Pumps will deliver *more gallons of water for your pumping dollar!*



ATTENTION DISTRIBUTORS! A number of territories are still available. Write, wire or phone.



BARNES MANUFACTURING CO.
Quality Pump Manufacturers for 50 Years

MANSFIELD, OHIO

Bressi - Bevanda Constructors and Macco Construction Co., Los Angeles, Calif., on a joint venture were awarded the \$2,528,350 contract to construct the Lytle Creek channel, between Warm Creek and a point approx. 700 ft. upstream from Foothill Blvd., near San Bernardino, Calif., by U. S. Engineer Office, Los Angeles, Calif.

Winston Brothers Co., and Vinnell Co., Los Angeles, Calif., were awarded a \$2,768,432 contract for construction of Lytle and Cajon creeks improvement, levee and bypass and appurtenant work near San Bernardino, Calif., by U. S. Engineer Office, Los Angeles, Calif.

Peter Kiewit Sons Co., San Francisco, Calif., have received a \$1,163,340 contract for earthwork and structures on the first section of the Friant-Kern Canal, in Fresno County, Calif., by Bureau of Reclamation, Washington, D. C.

MacDonald and Kahn, Inc., San Francisco, Calif., were awarded a \$1,430,841 contract to construct postal concentration center No. 2 at Oakland Army Base, Oakland, Calif., by U. S. Engineer Office, San Francisco, Calif.

James I. Barnes Construction Co., Santa Monica, Calif., on a low bid of \$1,381,000 was awarded the contract for addition to a machine shop bldg. at the U. S. Naval Drydocks, Naval Operating Base, Terminal Island, Calif., by Bureau of Yards and Docks, Washington, D. C.

Myers Brothers, Los Angeles, Calif., have received a \$4,000,000 contract for the construction of 563 apartment units in the Venice Dist., Los Angeles, Calif., by Union Housing Plan, Inc., Los Angeles, Calif.

Stone and Webster Engineering Co., Los Angeles, Calif., received the \$2,000,000 contract for a new isoprene recovery and purification plant at Torrance, Calif., by Reconstruction Finance Corp., Washington, D. C.

F. H. McGraw and Co. and Warren Brothers Co., Hartford, Conn., have been awarded a contract of \$9,500,000 for a 250-mi. highway, with asphalt surface, between Cachabamba and Santa Cruz, Bolivia, by Corporacion Boliviana De Fomento, La Paz, Bolivia.

Highway and Street ...

California

ALAMEDA CO.—N. M. Ball Sons, Box 404, Berkeley—\$172,945 for construction of storage area at the AAF Intransit Depot, Alameda—by U. S. Engineer Office, San Francisco. 7-12

ALAMEDA CO.—Clements & Company, 941 Atherton St., Hayward—\$27,799 for about 6 mi. repairing with plantmix surf. betw. San Joaquin County line and Livermore, and betw. Niles and Sunol—by State Division of Highways, Sacramento. 7-10

ALAMEDA CO.—Fredrickson and Watson Construction Co., 873 81st Ave., Oakland—\$147,179 for about 1.2 mi. grading and plantmix surf. on crusher run base and imported base material, access road from Maitland Dr. to Earhart Rd., in the Auxiliary Naval Air Station, Oakland Airport, Alameda—by Division of Highways, Sacramento. 6-21

ALAMEDA CO.—Charles L. Harney, 625 Market St., San Francisco—\$376,935 for grading and paving of streets at the Naval Supply Depot, Oakland—by Bureau of

THIS NEW AND IMPROVED GALION

HYDRAULIC HOIST and BODY Will Add Extra Utility to Any Conventional Platform Truck!

SIZES—7 to 12 feet in length. 72 or 78 in. wide inside. (Over all widths 6 in. additional.)

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stopped in any
position. The pow-
er cuts out autom-
atically at the end of its
stroke and the hoist locks
automatically at any angle.

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DISTRIBUTOR for complete
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platform hoist and body.
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you will find a better material
handling unit for your imme-
diate and postwar require-
ments.

THE GALION ALLSTEEL BODY CO.
Galion, Ohio, U. S. A.



Standard body has removable sides and rear corner posts with double acting end gate that drops flush with floor. Available with 18" solid sides or 42" stake sides. Body longitudinal sills ride on chassis frame.

Yards and Docks, Washington, D. C. 7-23

ALAMEDA CO.—J. Henry Harris, 2657 9th St., Berkeley—\$22,549 for construction of 0.7 mi. of access road to Alameda Naval Air Station, Alameda—by Public Roads Administration, San Francisco. 7-18

ALAMEDA CO.—Heafey-Moore Co., 344 High St., Oakland—\$10,475 for resurfacing of Gibbons Dr. from Central Ave. to High St. with asph. conc., removal and reconstructing portions of conc. curb and curb returns, etc., at Alameda—by City Council, Alameda. 7-19

ALAMEDA CO.—Independent Construction Co., 46th and Clement, Oakland—\$34,168 for paving of storage area and construction of a wooden shed at NMSD, Oakland—by Bureau of Yards and Docks, Washington, D. C. 7-13

CONTRA COSTA CO.—Lee J. Immel, Box 65, Station A, Berkeley—\$29,422 for about 2.5 mi. surf. with plantmix, on existing pave. and on new crusher run base betw. Concord and Ohmer—by State Division of Highways, Sacramento. 7-5

EL DORADO CO.—K. R. C. Construction Co., 2068 Allston Way, Berkeley—\$31,350 for 9 mi. of access road at Cat Creek basin timber areas—by Public Roads Administration, San Francisco. 6-26

GLENN CO.—E. B. Bishop, Orland—\$13,000 for repairing with plantmix surf., portions of highway betw. Oak St. in Willows and Orland—by State Division of Highways, Sacramento. 7-25

INYO CO.—Basich Bros., Box 151, Alhambra—\$55,750 for about 6.2 mi. repair with imported borrow and plantmix surf. 7-25

on portion of highway betw. Fish Creek Rd. and Bishop—by State Division of Highways, Sacramento. 7-18

INYO AND MONO COS.—Vinnell Co., 1145 Westminster, Alhambra—\$17,918 for about 6.2 mi. net length repairing by placing roadmix surf. over existing surf. and reshaping existing shoulders on portions of highway betw. Alabama Gates and Whiskey Canyon—by State Division of Highways, Sacramento. 7-5

KERN CO.—Griffith Co., 1060 So. Broadway, Los Angeles—\$53,960 for highway improvements betw. state hwy. rte. No. 139 and Rosedale, and betw. 2.8 and 3.8 mi. north of state hwy. rte. No. 140—by State Division of Highways, Sacramento. 7-2

KERN CO.—Oilfields Trucking Co., Box 751, Bakersfield—\$42,190 for about 6 mi. net length repairing by reshaping shoulders, applying prime coat and placing plantmix surf., etc., on portions of hwy. betw. Mojave and Cinco—by State Division of Highways, Sacramento. 6-28

KINGS AND TULARE COS.—Brown, Doko & Baun, Dolliver St., Pismo Beach—\$28,509 for highway improvements betw. Hanford and State Hwy. 4, to be repaired with plantmix—by State Division of Highways, Sacramento. 7-13

LOS ANGELES CO.—Griffith Co., 502 Los Angeles Railway Bldg., Los Angeles—\$40,471 for improvements along Anaheim-Telegraph Rd.—by County Board of Supervisors, Los Angeles. 7-20

LOS ANGELES CO.—T. E. Sherlock, 1103 W. 40th Pl., Los Angeles—\$23,549 for grading, paving, and improving a waterway in the North Outfall sewer right-of-way and Cabo Dr., Los Angeles—by Board of Public Works, Los Angeles. 7-30

LOS ANGELES CO.—Sully-Miller Contracting Co., 1500 W. 7th St., Long Beach—\$40,280 for paving misc. areas at the Long Beach Harbor—by Harbor Commission, Long Beach. 8-1

LOS ANGELES CO.—Weymouth Crowell Co., 2104 E. 15th St., Los Angeles—\$29,814 for constr. of roads, fencing and appurtenant facilities for Jet Propulsion Laboratory at Calif. Institute of Technology, Pasadena—by U. S. Engineer Office, Los Angeles. 7-13

LOS ANGELES CO.—Griffith Co., 502 Los Angeles Railway Bldg., Los Angeles—\$40,600 for paving roadways, shed floors and wharf decks at Los Angeles Harbor—by Los Angeles Harbor Department, Los Angeles. 7-18

LOS ANGELES CO.—Vido Kovacevich, 5400 Imperial Highway, South Gate—\$39,680 for about 1.1 mi. grading and plantmix surf. on El Segundo Blvd. betw. Main St. and Sepulveda Blvd., in El Segundo—by State Division of Highways, Sacramento. 7-25

MARIN CO.—E. A. Forde, 640 Sir Francis Drake Blvd., San Anselmo—\$10,116 for highway improvements betw. San Rafael and San Quentin Wye, to be graded and surf. with crusher run base and seal coat to be applied—by State Division of Highways, Sacramento. 7-27

MENDOCINO CO.—John Bermand & Sons, Eureka—\$19,183 for highway improvements at Chadbun Creek about 13.4 mi. north of Fort Bragg—by State Division of Highways, Sacramento. 7-13

MENDOCINO CO.—W. C. Railing, 27 Lowell St., Redwood City—\$26,341 for about 1.9 mi. net distance furnishing and placing imported base material and applying seal coat on portions of the state hwy. 7-13



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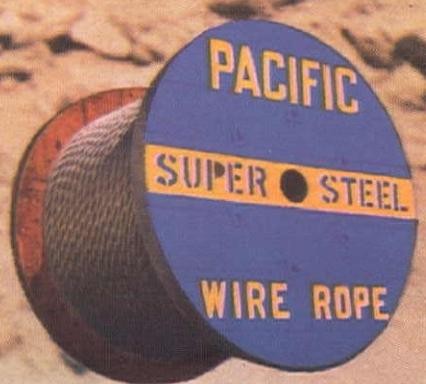
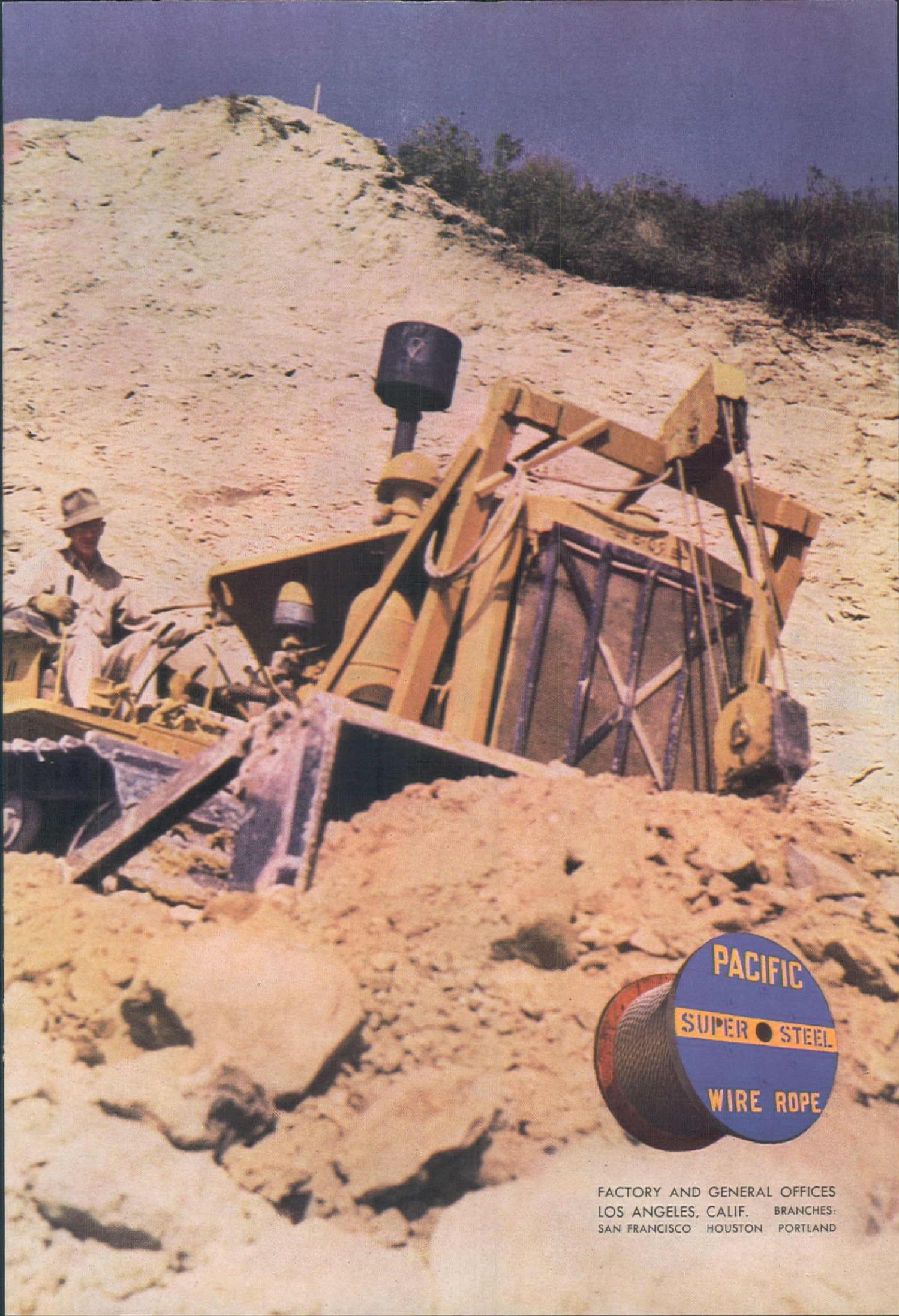
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FACTORY AND GENERAL OFFICES
LOS ANGELES, CALIF. BRANCHES:
SAN FRANCISCO HOUSTON PORTLAND

betw. Navarro River and Mendocino—by State Division of Highways, Sacramento.

6-28

MONTEREY CO.—**A. Teichert & Co.**, Box 1133, Sacramento—\$99,869 for repairing by placing plantmix surf. over existing surf., reshaping existing shoulders and applying bitum. surf. treatment thereto, etc., betw. San Ardo and King City—by State Division of Highways, Sacramento.

7-25

NAPA CO.—**E. E. Lowell**, Box 148, Vallejo—\$91,434 for construction of approx. 4.3 mi. of new highway in Conn Valley—by County Board of Supervisors, Napa.

NAPA & SONOMA COS.—**A. A. Tieslau & Son**, 1220 Eastshore Highway, Berkeley—\$42,658 for highway improvements betw. Napa and Oakville and betw. Santa Rosa and Beltane, about 7.5 mi. to be repaired

with plantmix surf.—by State Division of Highways, Sacramento.

7-27

NEVADA & PLACER COS.—**Clements & Co.**, Box 277, 941 Atherton St., Hayward—\$48,926 for repairing with plantmix surf. existing roadbed and new crusher run base on portions of highway betw. Gold Run and Kingvale—by State Division of Highways, Sacramento.

7-23

RIVERSIDE AND SAN BERNARDINO COS.—**George Herz & Co.**, Box 191, San Bernardino—\$27,950 for highway improvements betw. Riverside and Colton, about 2.6 mi. in net length, to be repaired by placing plantmix surf. with seal coat over the existing surf., placing local borrow on portions of the shoulders and reshaping shoulders—by State Division of Highways, Sacramento.

6-22

SAN BERNARDINO CO.—**Schroeder and Company**, 8140 Tujunga, Roscoe—\$173,775 for highway improvements betw. Barstow and Field, about 22 mi. to be repaired by placing plantmix surf. over the existing surf. and reshaping the shoulders—by State Division of Highways, Sacramento.

6-28

SAN BERNARDINO CO.—**Tanner Construction Co.**, Box 1832, Phoenix—\$49,175 for about 7.3 mi. repairing by placing plantmix surf. over existing surf. and reshaping the shoulders, betw. Daggett and Hector—by State Division of Highways, Sacramento.

6-29

SAN JOAQUIN CO.—**W. W. Clyde & Co.**, Springvale, Utah—\$23,775 for an open storage area, railroad trackage and additional hard standing area at Tracy QM Depot—by U. S. Engineer Office, Sacramento.

7-6

SAN JOAQUIN CO.—**Fredrickson Brothers**, 1259 65th St., Emeryville—\$139,124 for construction of hard standing and open storage area at Tracy—by U. S. Engineer Office, Sacramento.

6-28

SAN JOAQUIN CO.—**A. Teichert and Co.**, Box 1133, Sacramento—\$43,997 for about 7.1 mi. repairing with plantmix surf. betw. Stanislaus River and Manteca—by State Division of Highways, Sacramento.

6-27

SAN LUIS OBISPO CO.—**Granite Construction Co.**, Box 900, Watsonville—\$39,970 for highway improvements betw. Del Rio Ave. and Templeton, betw. Paso Robles and Monterey Co. line, and betw. Estrella River and Cottonwood Pass Rd.—by State Division of Highways, Sacramento.

7-27

SAN MATEO CO.—**Fredrickson Brothers**, 1259 65th St., Emeryville—\$18,854 for repaving of roads, streets and areas at the U. S. Naval Advance Base, San Bruno—by Bureau of Yards and Docks, Washington, D. C.

7-13

SAN MATEO CO.—**Peninsula Pacific Construction Co.**, 680 Laurel Ave., San Carlos—\$12,951 for street work, sidewalks, curbs and sewers at Rosefield Subdivision, Menlo Park—by Pacific Homes, Inc., San Carlos.

6-25

SAN MATEO CO.—**Peninsula Pacific Construction Co.**, 680 Laurel Ave., San Carlos—\$20,397 for street work, sidewalks, curbs and sewers on the McCue Subdivision, San Carlos—by W. A. Gould, San Carlos.

6-20

SAN MATEO CO.—**Union Paving Co.**, 212 Babcock Bldg., San Francisco—\$25,257 for grading, asph. conc. pave., cement conc. curbs, gutters and sidewalks, sanitary sewers, storm drains and electrolier in Sunnybrae Subdivision, San Mateo—by City Council, San Mateo.

7-13

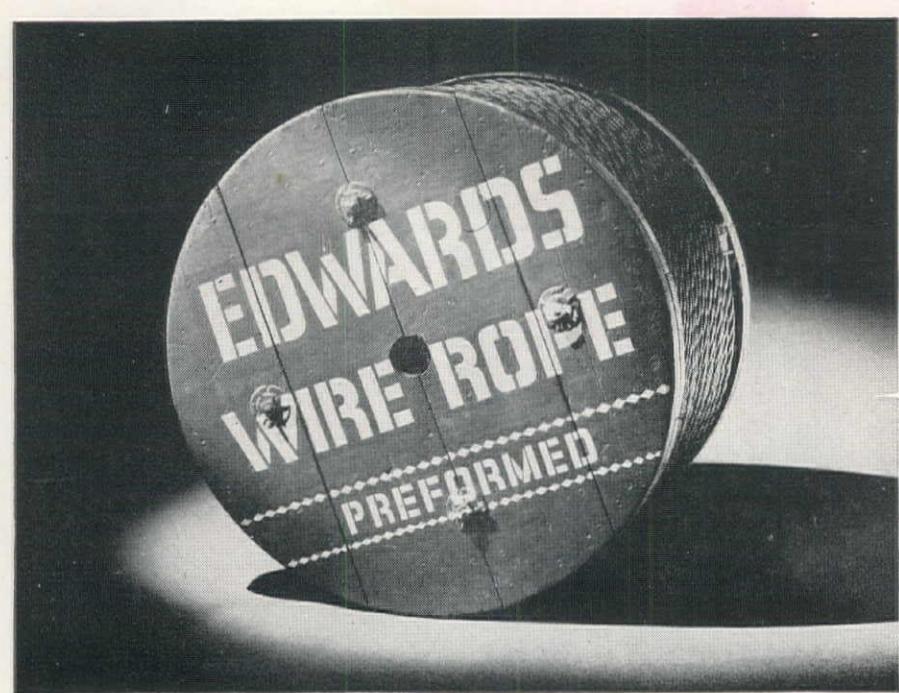
SANTA BARBARA CO.—**Dinsmore & McCoy**, 935 Fellowship Rd., Santa Barbara—\$13,935 for constructing an access road to Point Arguello Naval Reservation and Coast Guard Lifeboat Station—by Public Roads Administration, San Francisco.

7-12

SANTA CLARA CO.—**Granite Construction Co.**, Box 900, Watsonville—\$26,088 for repair with plantmix surf. betw. Gilroy and 4 mi. southerly—by State Division of Highways, Sacramento.

7-25

SANTA CLARA CO.—**A. J. Raisch Paving Co.**, 900 W. San Carlos St., San Jose—\$57,531 for about 11 mi. net length repairing highway with plantmix surf. betw. Alameda County line and Milpitas, betw. Los Gatos and San Jose, betw. Saratoga



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Play safe where safety is at stake . . . order EDWARDS PREFORMED Wire Rope on your next replacement requisition.

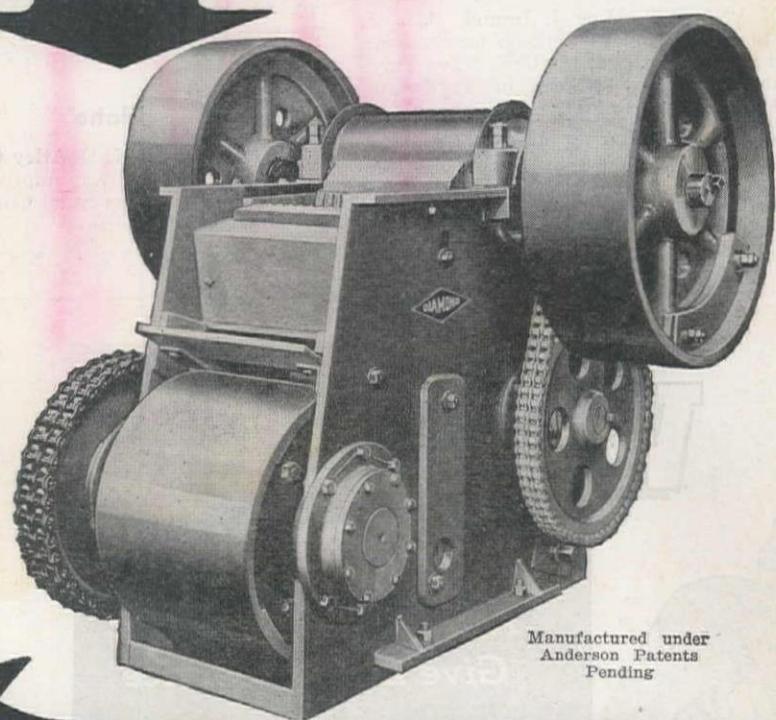
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Note the diagram above. The upper compartment is similar to usual jaw crusher design with stationary and movable jaws, and properly handles any stone up to capacity. The roll operates in perfect unison with the eccentric action of the lower part of the movable jaw, and this action (not gravity) forces the material through in a steady delivery without effort and without choking.

But, get the complete story of this sensational crusher from the new bulletin D-45-M. Ask your DIAMOND dealer, or write us.



OTHER DIAMOND PRODUCTS include both standard type and "DUAL-ACTION" Plants, Washing and Screening Plants, Jaw Crushers, Roll Crushers, Hammermills, Screens, Conveyors, Bins, Feeders.

IN THE NEW DIAMOND "DUAL-ACTION" CRUSHER

Operators who have seen the new "DUAL-ACTION" perform are amazed! Here is a single compact crusher doing the work of both jaw and roll in one continuous operation. With at least equal capacity, at half the weight, it brings a 160 yard portable plant to less than 40,000 lbs.,—way under all highway load limits. It uses less power, and turns out equal or greater production with a minimum of oversize.

DIAMOND DEALERS

Oakland	SOULÈ EQUIP. CO.
Los Angeles	GARLINGHOUSE BROS.
Seattle	A. H. COX & CO.
Portland	LOGGERS & CONTRACT'S MACH. CO.
Boise and Spokane	WESTERN EQUIP. CO.
Salt Lake City	C. H. JONES EQUIP. CO.
Phoenix	O. S. STAPLEY CO.
Albuquerque	CONTRACTORS' EQUIP. & SUP. CO.



DIAMOND IRON WORKS, INC.

AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH

MINNEAPOLIS 11, MINNESOTA

and Los Gatos, and between Sunnyvale and Saratoga—by State Division of Highways, Sacramento. 7-5

SHASTA CO.—J. Henry Harris, 2657 9th St., Berkeley—\$15,789 for applying seal coat to existing surfacing betw. Bass Hill and Crespos—by State Division of Highways, Sacramento. 7-25

SOLANO CO.—Lee J. Immel, Box 65, Station A, Berkeley—\$312,427 for repaving and paving repairs at the U. S. Navy Yard, Mare Island—by Bureau of Yards and Docks, Washington, D. C. 7-23

SOLANO CO.—E. E. Lowell, Box 148, Vallejo—\$27,734 for improvement of Monterey St. from the north line of Kentucky St. to the north line of Georgia St. at Vallejo—by Public Roads Administration, San Francisco. 7-12

TEHAMA CO.—J. Henry Harris, 2657 9th St., Berkeley—\$20,590 for about 23.6 mi. repairing with seal coat betw. Rte. 3 and 3 mi. east of Paynes Creek—by State Division of Highways, Sacramento. 7-18

YOLO CO.—A. Teichert & Co., Box 1133, Sacramento—\$32,915 for repairing with plantmix, portions of road near Arcade Station and betw. the Yolo Causeway and 1 mi. west of Washington Underpass—by State Division of Highways, Sacramento. 7-23

Idaho

ADAMS CO.—F. H. DeAtley Co., Lewiston—\$33,000 for highway improvements to U. S. Hwy. No. 95—by State Commissioner of Public Works, Boise. 7-26

BLAINE AND LINCOLN COS.—Nick

Burggraf, Idaho Falls—\$16,440 for furnishing 15,000 tons of crushed gravel surf. in stockpiles adjacent to U. S. No. 93—by State Commissioner of Public Works, Boise. 7-5

BONNER CO.—Standard Asphalt Paving Co., 603 Chronicle Bldg., Spokane, Wash.—\$91,322 for approx. 58,000 sq. yd. soil cement base and oil mat and light bitum. treatment on existing roads throughout the U. S. Naval Training Station at Farragut—by Bureau of Yards and Docks, Washington, D. C. 6-21

BONNEVILLE CO.—Nick Burggraf, Box 397, Idaho Falls—\$15,343 for seal coating all the paved streets in Idaho Falls—by City Council, Idaho Falls. 7-12

CLARK AND JEFFERSON COS.—A. D. Stanley, Box 1605, Boise—\$35,875 for seal coating 57.5 mi. of U. S. No. 91, betw. Roberts and Monida—by State Commissioner of Public Works, Boise. 7-26

CLARK AND LEMHI COS.—Western Construction Co., Pocatello—\$75,837 for bitum. treated surf. and furnishing bitum. treated stockpiles on 35.7 mi. of the Lemhi Highway—by Commissioner of Public Works, Boise. 7-5

IDAHO CO.—H. A. Gardner, Blackfoot—\$32,980 for furnishing crushed gravel or crushed rock surf., etc., in stockpiles adjacent to U. S. Highways Nos. 30 and 91—by Commissioner of Public Works, Boise. 7-26

IDAHO, LEWIS AND NEZ PERCE COS.—McAtee & Heathe, 3527 Trent, Spokane, Wash.—\$35,384 for applying bitum. surf. treatment on 10.8 mi. of State Rte. 12, seal coating 15.3 mi. on U. S. No. 95, and 9.2 mi. betw. Lewiston and Spalding—by State Commissioner of Public Works, Boise. 7-5

KOOTENAI CO.—Standard Asphalt Paving Co., Chronicle Bldg., Spokane, Wash.—\$22,760 for stockpiling cover and coat material and seal coating 16.2 mi. of U. S. Highway No. 95, betw. Coeur d'Alene and Mud Bay School—by State Commissioner of Public Works, Boise. 7-5

ONEIDA CO.—H. A. Gardner, Blackfoot—\$32,047 for highway improvement betw. Pleasantview and Holbrook—by Commissioner of Public Works, Boise. 7-26

Montana

CARBON CO.—Charles Shannon and Son, Butte—\$28,600 for seal coat and cover on 22.4 mi. of road betw. Wade and Rockvale—by State Highway Commission, Helena. 6-30

DAWSON CO.—Big Horn Construction Co., Sheridan, Wyo.—\$37,230 for reconditioning and seal coating 19 mi. of road betw. Glendive and Sidney—by State Highway Commission, Helena. 6-30

GLACIER AND PONDERA COS.—Nilson-Smith Construction Co., Box 1147, Great Falls—\$21,930 for seal coating 27 mi. of county highways—by State Highway Commission, Helena. 6-30

WIBAUX CO.—Nolan Brothers Construction Co., Inc., 20 No. 2nd St., Minneapolis, Minn.—\$27,222 for regrading 3.9 mi. of the Glendive-Wibaux road—by State Highway Commission, Helena. 6-30

Nebraska

CHEYENNE CO.—Peter Kiewit Sons Co., and Big Horn Construction Co., 1024 Omaha National Bank Bldg., Omaha—

WELLMAN

Williams BUCKETS

Are Lighter, Stronger
Give Longer Service

Now all Wellman
Buckets are weld-
ed rolled steel con-
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Loggers & Contractors Machinery Co., Portland
Pacific Hoist & Derrick Co., Seattle
Cate Equipment Co., Salt Lake City
Construction Equipment Co., Spokane

Construction Plant and Equipment From Shasta Dam, California

Available For Sale

CABLEWAYS AND HOISTS

- 3—Lidgerwood, 3-drum electric hoists with 500 H.P. G.E. Motors, Ward Leonard control, complete with controls and all electric equipment.
- 2—Lidgerwood, 3-drum electric hoists with 500 H.P. Westinghouse motors complete with controls and all electrical apparatus.
- 5—Cableway towers, structural steel, 3—125 ft.; 1—75 ft. and 1—45 ft., complete with travel mechanism.
- 6—Complete sets of carriages, main and auxiliary, fall and dump blocks, fall rope carriers, buttons, takeup bars and takeup sheaves.
- 1—American pillar crane. Cap. 5 T. at 48½ ft. and 15 T. at 25 ft. radius.
- 1—Colby elevator hoist, double drum, 75 H.P., equipped with brakes and emergency equipment including one hoist cage. 15 ton capacity.
- 12,000 lin. ft. of used 3" dia. locked coil cable in length from 500 to 2600 lin. ft.
- Misc. lot of sheaves, jewels, blocks, etc.

CEMENT PLANT

- 1—Dual #265 Fuller Fluxo cement pump, duplex type complete with gravity feed and automatic control equipment. 400 bbls. per hr. capacity. Pumping distance 3300 ft.
- 2—Fuller-Kinyon Pumps—type "D" 125 h.p. complete with air hose power control cable, control cabinets.
- 1—C-200 Fuller single stage rotary compressor Westinghouse motor 100 h.p.

CONVEYORS

- 66—Motor operated gates for sand and gravel up to 6" cobbles with 1-h.p. Allis-Chalmers gear motor.
- 2—Complete sets, including 42" tandem drive pulleys, 42" head pulleys, 36" tail pulleys.
- 3—150 h.p. Westinghouse gear motors, 144 r.p.m., 2300 volts, 3-phase, 60 cycle.
- 1—Airplane tripper for 36" belt with two 17' wing belts, capacity 1,000 T per hour, complete with pulleys, drives and gear motors.



16—White Dump Trucks Model 1580-691, 24 cu. yd. capacity in good condition.

DRILLING EQUIPMENT

- 2—Mod. 315 I-R portable compressors, gas driven.
- 5—I-R paving breakers.
- 8—I-R drifters DA35.
- 2—I-R Wagondrills—pneu. tires, hoists, X71 drifters mounted.
- 1—I-R-54 Drill Sharpener.
- 10—I-R Jackhammers.

TANKS & RECEIVERS

- 10—8 cu. yd. steel hoppers including gates and air rams.
- 2—Water filters.
- 2—Wallace & Tiernan Chlorinators.
- 1—9500 bbl. all welded water tank, 48' dia., 30' high.
- 1—5400 bbl. all welded water tank, 36' dia., 30' high.
- 1—200 bbl. steel water tank.
- 10—Sandblast tanks 24" x 96" with hoppers and fittings.
- 10—Lubricator tanks 14" x 30"; 24" x 48"; and 24" x 60".

ALL ITEMS SUBJECT TO PRIOR SALE

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PUMPS

- 3—Bingham type SVD submersible pumps.
- 1—Byron-Jackson 150 h.p. 10 in. deepwell.
- 2—Byron Jackson 200 h.p., 5 K-H type 8Q1 deep well turbine pumps.
- 1—Gardner-Denver grout pump model FD-FS, 10" x 2½" x 10", with case-hardened liners and Calmex pistons and rods, 1,000 lb. pressure at 90 lb. air.
- 10—I-R #25 Sump Pumps.

MIXING PLANTS

- 1—3000 cu. yd. 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 cu. yd. batchers.
- 5—4 cu. yd. Koehring Concentric zone mixers, incl. batchmeters, timers, consistency meters.
- 1—100-ton steel bin.

MISCELLANEOUS

- 1—P.A.X. Automatic Telephone Switchboard with 76 phones.
- 1—Robbins Contractor Screen 16" x 36".
- Valves—1, 2, 3, 4, 6, 8, 10, 12, 16-inch.
- Pole line hardware.
- Floodlites—500 to 1500 w.
- 1—1½ cu. yd. Heavy Duty Clamshell Bucket.
- 12—Muck Skips, 7—14 cu. yds.
- 50—Chicago Pneumatic concrete vibrators, Nos. 417, 518 and 519.
- Several sizes of monkey wrenches, wood borers, chipping and riveting guns.
- New and used rubber hose ¾" to 4".

MACHINERY AND SUPPLIES

- 1—125 KW. motor generator set, 275 volts DC.
- 5—Blowers; American and Buffalo.
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- Complete line of transformers and electric motors.

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\$141,662 for construction of roads at Sioux Ordnance Depot, Sidney—by U. S. Engineer Office, Denver, Colo.

New Mexico

CURRY CO.—Allison & Armstrong, Roswell—\$12,908 for sealing 20 ft. wide with asph. and chips a 26.5-mi. length of highway betw. Clovis and San Jon—by State Highway Department, Santa Fe. 7-13

DONA ANA CO.—Henry Thygesen & Co., Korber Bldg., Albuquerque—\$358,256 for additional paving at the Ordnance Proving Ground, Las Cruces—by U. S. Engineer Office, Albuquerque. 7-18

RIO ARRIBA, SANTA FE AND SANDOVAL COS.—Floyd Haake, Santa Fe—\$47,845 for misc. road work, throughout

the counties—by State Highway Dept., Santa Fe. 7-27

ROOSEVELT CO.—Henry Thygesen & Co., Box 876, Albuquerque—\$25,834 for construction of Federal Aid Secondary Project No. 63, located on State Hwy. Rte. 88, betw. Portales and Arch—by State Highway Dept., Santa Fe. 6-29

SANDOVAL CO.—Brown Brothers, Box 1479, Albuquerque—\$270,356 for grading, minor drainage structures, one multiple span concrete box culvert and 20-ft. clear span, ballast and black top surf. betw. Cuba and Bloomfield—by State Highway Dept., Santa Fe. 6-29

Oregon

LINN CO.—D. F. McKenzie, Sherwood—\$49,935 for constructing nine street im-

provement projects at Albany—by City Council, Albany. 7-20

South Dakota

FALL RIVER CO.—Peter Kiewit Sons Co., and Big Horn Construction Co., 1024 Omaha Natl. Bank Bldg., Omaha, Nebr.—\$244,715 for construction of roads at the Black Hills Ordnance Depot, Provo—by U. S. Engineer Office, Denver, Colo. 7-23

Utah

SALT LAKE CO.—W. W. Clyde, Springville—\$23,775 for constructing an open storage area at Tooele Ordnance Depot, near Salt Lake City—by U. S. Engineer Office, Sacramento, Calif. 6-28

SALT LAKE AND SUMMIT COS.—J. M. Sumson, Springville—\$25,100 for constructing gravel stockpiles throughout the two counties—by State Road Commission, Salt Lake City. 7-25

WEBER CO.—Reynolds Construction Co., Springville—\$44,500 for the construction of a roadmix bitum. surf. road, approx. 8 mi. in length, betw. junction State road No. 39 above Pine View Dam and the forest shelter house at Snow Basin—by State Road Commission, Salt Lake City. 7-5

WEBER CO.—Utah Construction Co., First Security Bank Bldg., Ogden—\$218,086 for the construction of open storage areas and conc. floor in sheds at the Utah ASF Depot, near Ogden—by U. S. Engineer Office, Salt Lake City. 7-5

Washington

ASOTIN, FRANKLIN AND GARFIELD COS.—McAtee and Heathe, Inc., Box 2188, Spokane—\$28,527 for 14 mi. light bitum. surf. treatment and 23 mi. of non-skid single seal treatment on primary State hwys. Nos. 3 and 11, Stember Creek to Salmon Bar—by State Director of Highways, Olympia. 7-11

CHELAN CO.—M. E. Nelson Construction Co., Box 458, Ephrata—\$37,657 for surf. and light bitum. surf. treatment of 3.9 mi. of primary State highway No. 10, Entiat to Pateros—by State Director of Highways, Olympia. 6-27

CLARK CO.—United Contracting Co., 311 Stock Exchange Bldg., Portland—\$11,101 for furnishing and placing asph. conc. on streets at Vancouver—by City Commissioners, Vancouver. 7-21

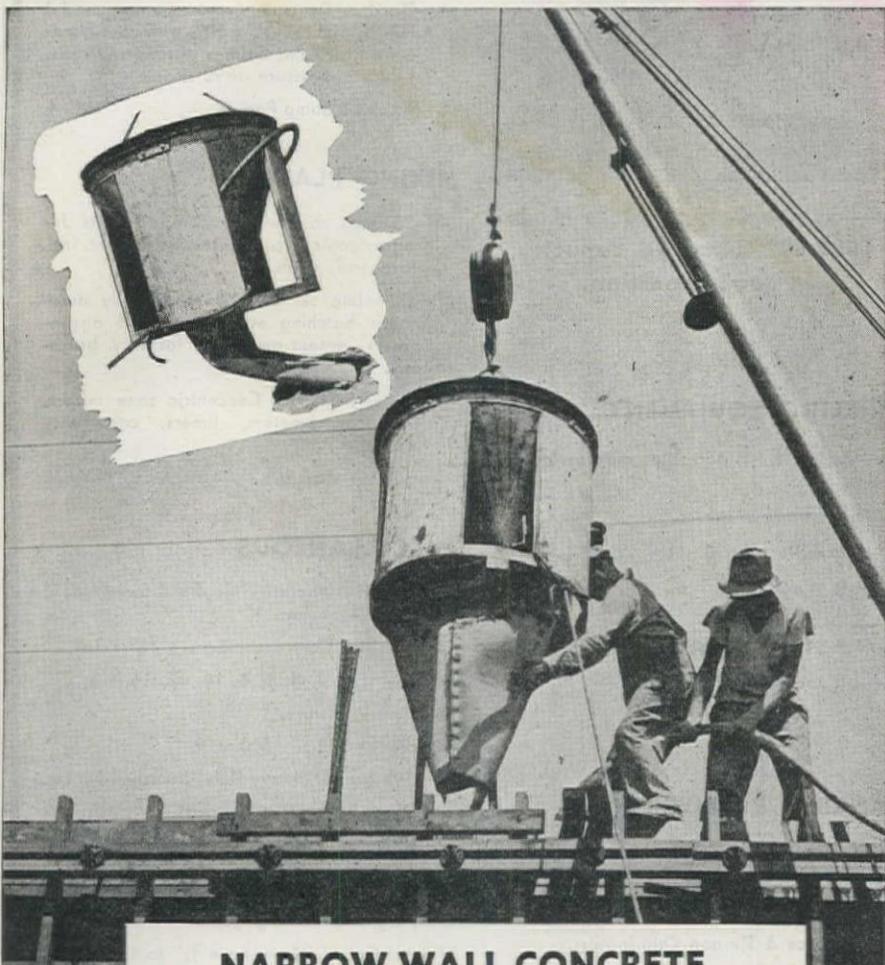
CLALLAM CO.—J. D. Shotwell, 1624 Puget Sound Bank Bldg., Tacoma—\$13,952 for resurfacing with crushed stone surfacing and stockpiling on 6.2 mi. of highway from Pysht to Clallam Bay junction—by State Director of Highways, Olympia. 7-25

GRANT CO.—M. E. Nelson Construction Co., Inc., and McAtee & Heathe, Box 2188, Spokane—\$23,905 for repair and paving of streets and dust palliative treatment at Ephrata Air Base, Ephrata—by U. S. Engineer Office, Seattle. 7-4

GRAYS HARBOR CO.—Grays Harbor Construction Co., Box 743, Aberdeen—\$20,791 for repairing and reconstructing drawrest on primary State Highway No. 13, west bridge drawrest, Aberdeen—by State Director of Highways, Olympia. 7-11

GRAYS HARBOR CO.—Sjoberm Brothers, Olympia—\$17,926 for construction of the Burrows-Ocean City road—by County Commissioners, Montesano. 7-20

JEFFERSON CO.—Joslin & McAllister,



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Box 1174, Spokane—\$64,907 for resurfacing, stockpiling and construction light bitum. surf. treatment on secondary State Hwy. No. 9-E—by State Director of Highways, Olympia. 7-26

KING CO.—Diesel Oil Sales Co., 2155 Northlake, Seattle—\$13,300 for surf. 5.3 mi. of city streets with light bitum. surf. treatment at Enumclaw—by City Council, Enumclaw. 7-12

KING CO.—Northwest Construction Co., 3950 6th NW, Seattle—\$40,511 for paving, etc., of Vassar Ave. and other streets in Seattle—by Board of Public Works, Seattle. 7-27

KING CO.—Western Asphalt Co., Seattle—\$63,962 for mixed seal treatment, median strip treatment, and non-skid single seal treatment of highway betw. Factoria and High Point—by State Director of Highways, Olympia. 7-24

LEWIS CO.—Homer E. Johnson, Portland—\$31,476 for surf. 1.3 mi. with selected roadway borrow and crushed stone surf., stockpiling crushed stone surf., etc., on primary State Hwy. No. 5—by State Director of Highways, Olympia. 7-11

LEWIS CO.—Homer Johnson, Portland—\$93,645 for clearing, grading, draining, surf. with selected roadway borrow and crushed stone, stockpiling crushed cover stone and mineral aggr. and construction of a reinf. conc. bridge on secondary State Hwy. No. 5-K, Cinebar to Bear Canyon—by State Director of Highways, Olympia. 7-11

LEWIS CO.—C. W. Thomas & Son, Winlock—\$21,531 for grading, draining, removing existing bridge, surf. with selected roadway borrow and crushed stone surf. on secondary state highways—by State Director of Highways, Olympia. 7-11

PACIFIC CO.—Consolidated Construction Co., 3102 No. 28th St., Tacoma—\$127,848 for grading, draining and surfacing on about 11.1 mi. of primary State Hwy. No. 12, from Raymond, easterly—by State Director of Highways, Olympia. 6-27

PIERCE AND THURSTON COS.—The Harrison Brothers Co., 225 Wakefield Dr., Tacoma—\$87,239 for highway improvements from Yelm to Nisqually River—by State Director of Highways, Olympia. 7-13

PIERCE CO.—Woodworth & Co., Inc., 1200 E. D St., Tacoma—\$56,105 for grading, draining, surf. and constructing asph. conc. pave., etc., from Steilacoom to Puyallup—by State Director of Highways, Olympia. 7-26

SPOKANE CO.—Inland Asphalt Co., 10th and Havana, Spokane—\$31,061 for paving streets, drives and walks at Army Air Force Convalescent Hospital, Fort George Wright, Spokane—by U. S. Engineer Office, Seattle. 7-10

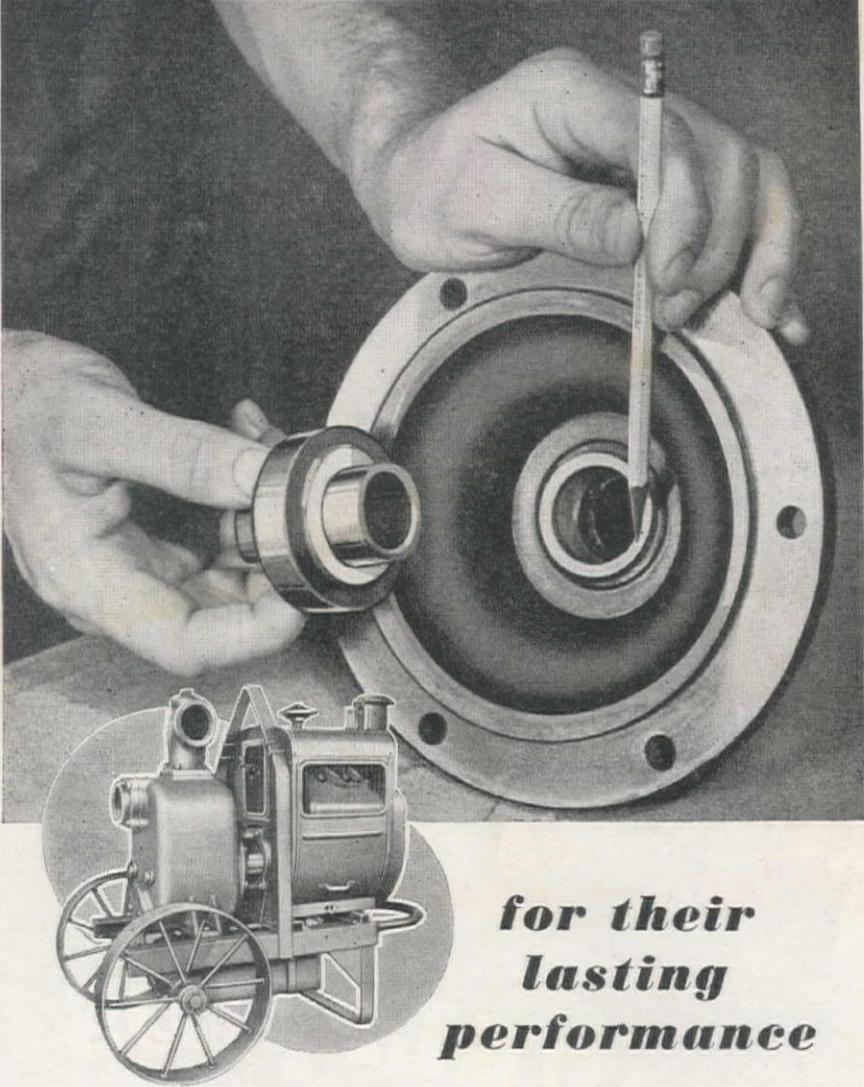
SPOKANE CO.—Standard Asphalt Paving Co., Chronicle Bldg., Spokane—\$81,685 for 34.8 mi. of light bitum. surf. treatment on county roads—by County Board of Commissioners, Spokane.

Wyoming

ALBANY CO.—A. H. Read Co., 706 W. 19th St., Cheyenne—\$22,585 for repair and maintenance work on streets of the University of Wyoming at Laramie—by State Highway Commission, Cheyenne. 7-2

CARBON CO.—Big Horn Construction Co., Sheridan—\$83,059 for base course surf. oil treatment, stone chip seal coat and misc. work on the Saratoga-Centen-

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CARVER DISTRIBUTORS: Andrews Equipment Service, 404 N.W. Broadway, Portland, Ore., 126 S. Walnut St., Spokane, Wash.; Electric Tool & Supply Co., 6316 Santa Fe Ave., Los Angeles, Calif.; Olson Mfg. Co., Boise, Idaho; L. A. Snow Co., 1222 Airport Way, Seattle, Wash.; Steebeck Equipment Co., Helena, Mont.; Bernstein Bros. Pipe & Mach., 164 N. Mechanic St., Pueblo, Colo.; The Rix Company, 582 - 6th Ave., San Francisco, Calif.; Lund Machinery Co., 49 N. Second West St., Salt Lake City, Utah.

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Certified PUMPS**

nial Rd.—by State Highway Commission, Cheyenne. 7-2

CARBON CO.—Taggart Construction Company, Cody—\$84,483 for the construction of the Meeteese-Pitchfork oil access road. Work includes grading, draining and base course surf. of 11.4 mi.—by State Highway Commission, Cheyenne. 7-24

CARBON CO.—Wyoming Improvement Co., Cheyenne—\$116,341 for construction of base course surf., oil treatment by road-mix method, sand seal coat and misc. work on 13.5 mi. of Creston-Baggs Rd.—by State Highway Commission, Cheyenne. 7-2

SHERIDAN CO.—Big Horn Construction Co., Sheridan—\$53,592 for grading, draining, one R. C. box culvert, one steel-concrete bridge and misc. work on 0.5 mi.

of the Dayton-Kane Rd.—by State Highway Commission, Cheyenne. 7-2

SUBLETTE AND SWEETWATER COS.—Woodward Construction Co., Rock Springs—\$99,985 for base course surf., oil treatment, sand seal coat, and misc. work on 10.9 mi. of the Rock Springs-Pinedale Road—by State Highway Commission, Cheyenne. 7-2

Brothers Co., 38 Memorial Dr., Cambridge, Mass.—\$9,500,000 for a new highway, 250-mi. long and 16-ft. wide, with asphalt surface, between Cachabamba and Santa Cruz—by Corporacion Boliviana De Fomento, La Paz. 8-6

Bridge . . .

California

LOS ANGELES CO.—Bonadiman-McCain, Inc., 1709 W. 8th St., Los Angeles—for the construction of 10 steel-timber bridges, appurtenant bridge approaches and incidental roads, along the open wire and cable rte. in Castaic and Cienega Canyons, Los Angeles—by Southern California Telephone Co., Los Angeles. 7-20

LOS ANGELES CO.—O. B. Pierson, 621 Flower St., Bellflower—\$20,445 for a timber and steel extension to the existing bridge on Bouquet Canyon Rd., over the Santa Clara River—by County Board of Supervisors, Los Angeles. 6-28

MARIN CO.—Macco Construction Co., Front and Ferry Sts., Oakland—\$249,653 for constructing a highway overpass at California Point—by U. S. Engineer Office, San Francisco. 7-26

MARIN CO.—J. D. Proctor, Inc., Box 247, Pt. Richmond Station, Richmond—\$57,868 for constructing a trestle at California Point—by U. S. Engineer Office, San Francisco. 7-12

VENTURA CO.—C. B. Tuttle, 268 Belmont Ave., Long Beach—\$35,055 for a reinforced conc. bridge, approx. 150 ft. in length across Santa Paula Creek in Steckel Park—by County Board of Supervisors, Ventura. 7-13

Washington

LEWIS CO.—M. P. Munter, Joseph Vance Bldg., Seattle—\$23,955 for constructing a reinforced concrete bridge over Olequa Creek on secondary State Hwy. No. 12-E—by State Director of Highways, Olympia. 7-11

Wyoming

SUBLETTE CO.—Geo. M. Barruth & Son, Evanston—\$45,552 for a steel and conc. bridge, grading of approaches and misc. work on 0.2 mi. of the Jackson-Pinedale Rd.—by State Highway Commission, Cheyenne. 7-6

Airport . . .

Arizona

PIMA CO.—Basich Brothers, 600 S. Fremont Ave., Alhambra, Calif.—\$111,000 for taxiway No. 7 and extension of parking apron at Davis-Monthan Field, Tucson—by U. S. Engineer Office, Los Angeles. 6-29

California

KERN CO.—R. R. Hensler and Peter L. Ferry & Son, 5201 San Fernando Road, Glendale—\$425,287 for the extension of the east-west runway at Muroc Army Air Base, Muroc—by U. S. Engineer Office, Los Angeles. 7-6

LOS ANGELES CO.—Pacific Rock & Gravel Co., and M. W. Stanfield Co., 1231 Broadway, Fresno—\$117,669 for surfacing plane anchorage at the Long Beach AAF—by U. S. Engineer Office, Long Beach. 7-12

CLEVELANDS . . . Modern, dependable, rugged and fast—represent the highest development in the full-crawler, wheel type trencher, pioneered by "Cleveland" more than twenty years ago.

A wide range and combination of digging and travel speeds, ample power for the toughest going in all kinds of soil and terrain, ease of handling, low fuel and operating costs and minimum times out for repairs, are some of the many practical advantages characteristic of Clevelands that assure you most completed trench at least cost on all your trenching jobs.

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THE CLEVELAND TRENCHER CO.
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MERCED CO.—N. M. Ball Sons, Box 404, Berkeley—\$1,047,795 for construction of runway, taxiways, parking apron, etc., at the Merced Army Air Field, near Merced—by U. S. Engineer Office, Sacramento. 7-21

SACRAMENTO CO.—McGillivray Construction Co., Box 873, Sacramento—\$108,869 for overlay paving at McClellan Field, Sacramento—by U. S. Engineer Office, Sacramento. 6-28

SONOMA CO.—Union Paving Co., Babcock Bldg., San Francisco—\$58,838 for forward firing rocket training facilities at the Auxiliary Air Station, Santa Rosa—by Bureau of Yards and Docks, Washington, D. C. 7-2

Idaho

IDAHO CO.—Gibbons and Reed, 259 W. 3rd St., Salt Lake City, Utah—\$292,109 for construction of an airport at Idaho Falls—by U. S. Dept. of Commerce, Washington, D. C. 7-31

New Mexico

CHAVES CO.—Standard Paving Co., 2119 E. 11th St., Tulsa, Okla.—\$898,160 for additions to the Roswell Army Air Field, Roswell—by U. S. Engineer Office, Albuquerque, N. M. 7-12

CURRY CO.—Western Contracting Corp., 400 Warnock Bldg., Sioux City, Iowa—\$175,710 for additions to parking apron at the Clovis Army Air Field—by U. S. Engineer Office, Albuquerque, N. M. 6-20

OTERO CO.—Henry Thygesen & Co., Box 876, Albuquerque—\$107,938 for additions to parking aprons at Alamogordo Army Air Field, Alamogordo—by U. S. Engineer Office, Albuquerque. 6-20

Texas

BEXAR CO.—M. B. Killian & Co. and E. B. Darby & Co., Box 1981, San Antonio—\$2,573,024 for additional airfield facilities at Randolph Field, San Antonio—by U. S. Engineer Office, San Antonio. 7-12

TARRANT CO.—Uvalde Construction Co., Box 3027, Dallas—\$124,500 for asph. surf. course at the Marine Corps Air Station, Eagle Mountain Lake, near Fort Worth—by U. S. Bureau of Yards and Docks, Washington, D. C. 7-17

WARD CO.—Uvalde Construction Co., Box 3027, Dallas—\$108,187 for addition to parking apron at the Pyote AAF—by U. S. Engineer Office, Albuquerque, N. M. 6-20

Washington

KING CO.—N. Fiorito, Inc., 844 W. 48th St., Seattle—\$85,610 for excavating, grading and seeding at Seattle-Tacoma Bow Lake Airport—by Port of Seattle, Seattle. 6-19

Water Supply . . .

Arizona

PIMA CO.—Carl W. Pistor Drilling Co., 1441 So. 4th Ave., Tucson—\$2,712 for drilling a water well near the elevated storage tank on No. 3rd Ave. and Elm St., Tucson—by City Council, Tucson. 6-22

California

SAN BERNARDINO CO.—Edward Green, 3001 Coolidge Ave., Los Angeles—\$17,811 for the construction of additional



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water supply facilities at San Bernardino Army Airfield, San Bernardino—by U. S. Engineer Office, Los Angeles. 7-25

SAN DIEGO CO.—Grafe-Callahan Construction Co., 714 W. Olympic Blvd., Los Angeles—\$2,248,409 for construction of pipeline and structures from north station 138 plus 86 to north station 1146 plus 50 of the San Diego aqueduct—by Bureau of Yards and Docks, Washington, D. C. 7-12

SAN DIEGO CO.—E. O. Nay Co., 186 E. Union St., Pasadena—\$62,681 for the replacement of thin-wall pipe in fresh-water main at the Naval Air Station, Otay Mesa—by Bureau of Yards and Docks, Washington, D. C. 6-20

SAN DIEGO CO.—F. E. Young, 2141 Main St., San Diego—\$39,500 for the construction of a salt water pumping station at Mooring H, NAS, San Diego—by Bureau of Yards and Docks, Washington, D. C. 7-25

SAN FRANCISCO CO.—J. G. Grattan, 730 Laguna Honda Blvd., San Francisco—\$21,932 for drilling vertical drains at the Sutro Reservoir site, San Francisco—by Public Utilities Commission, San Francisco. 7-12

SANTA BARBARA CO.—Wonderly Construction Co., 2694 Lime Ave., Long Beach—\$44,264 for additional water supply facilities at Hoff General Hospital, Santa Barbara—by U. S. Engineer Office, Los Angeles. 7-4

Colorado

DENVER CO.—Schwartz Construction Co., Colorado Springs—\$93,630 for construction of a water supply system at Fitzsimmons General Hospital, Denver—by U. S. Engineer Office, Denver. 7-23

Montana

WHEATLAND CO.—Cahill & Mooney Construction Co., 420 No. 25th St., Billings—\$19,606 for construction of a 500,000-gal. concrete water tank at Harlowton—by City Council, Harlowton. 6-20

New Mexico

DONA ANA CO.—Hayner & Burn, Las Cruces—\$238,519 for a water works system at the new ordnance proving grounds to be located near Las Cruces—by U. S. Engineer Office, Albuquerque. 7-12

Oregon

MULTNOMAH CO.—Oscar Butler & Son, 4900 NE 42nd St., Portland—\$39,801 for construction of a 1,000,000-gal. conc. covered reservoir at Portland—by West Slope Water Dist., Portland. 6-29

Texas

NOLAN CO.—Lippert Brothers, 2036 NW 23rd St., Oklahoma City, Okla.—\$48,752 for improvements to the city water works at Sweetwater—by City Council, Sweetwater. 7-3

Utah

WEBER CO.—George A. Whitmeyer & Sons Co., 2759 Grant Ave., Ogden—\$13,894 for additional water supply system at the Ogden Arsenal, near Ogden—by U. S. Engineer Office, Salt Lake City. 7-6

Washington

CLARK CO.—Clarence A. Gilmer, Portland, Ore.—\$18,302 for the construction of water supply facilities at Barnes General

Hospital, Vancouver—by U. S. Engineer Office, Portland, Ore. 7-23

COWLITZ CO.—Leonard & Slate, Ltd., 7805 SW 40th St., Portland, Ore.—\$14,974 for construction of a water works pumping plant at Kalama—by City Council, Kalama. 7-23

WHATCOM CO.—C. V. Wilder, 2006 State St., Bellingham—\$112,260 for installation of a water system in an area along Marine Drive and in Marietta—by Whatcom County Public Water District No. 2. 6-21

Sewerage . . .

Arizona

MARICOPA CO.—Fisher Contracting Co., So. 19th Ave., Phoenix—\$15,421 for sewage works additions at the Maricopa County Hospital, Phoenix—by County Board of Supervisors, Phoenix. 7-6

California

ALAMEDA CO.—R. Goold and Son, Box 190, Stockton—\$19,310 for construction of Unit 1 of the North Ashland storm drain system between the area from San Leandro to 150th Ave., between Foothill Blvd. and East 14th St., Hayward—by Oro Loma Sanitary Dist., Hayward. 6-28

ALAMEDA CO.—Edward Keeble, Rte. 4, Box 64, Tully Rd., San Jose—\$21,583 for construction of Unit 3 of the North Ashland storm drainage system at Hayward—by Oro Loma Sanitary Dist., Hayward. 6-28

ALAMEDA CO.—John Pestana, 990 73rd Ave., Oakland—\$59,128 for construction of Unit 2 of the North Ashland storm drainage system at Hayward—by Oro Loma Sanitary Dist., Hayward. 6-28

LOS ANGELES CO.—Bob Bosnyak, 3014 Worthen Ave., Los Angeles—\$29,246 for a 21-in. vitrified clay sanitary sewer line on 203rd St., Torrance—by City Council, Torrance. 7-27

LOS ANGELES CO.—Culjak & Ozida, 1354 So. Bonnie Beach Pl., Los Angeles—\$68,296 for sanitary sewers, curbs and sidewalks in Vesper Ave. and Hatteras St., Los Angeles—by Board of Public Works, Los Angeles. 7-30

LOS ANGELES CO.—Nick R. Gogo, 1596 Waldron Ave., Eagle Rock—\$22,926 for sanitary sewer in Daphne St., Los Angeles—by County Board of Supervisors, Los Angeles. 7-13

LOS ANGELES CO.—D. D. Gray, 2803 Los Flores, Lynwood—\$25,439 for 1.71 mi. of sanitary sewers and appurtenances in Live Oak St., and other sts.—by County Board of Supervisors, Los Angeles. 7-27

LOS ANGELES CO.—Charles H. Johnson, 530 N. Martel Ave., Los Angeles—\$92,677 for a storm drain known as the Walnut Terrace lateral and the Leoto St. stub of the East Compton Creek No. 1 drainage system and appurtenant sanitary sewers in Walnut Park—by County Board of Supervisors, Los Angeles. 6-29

LOS ANGELES CO.—C. Warren Messing, 124 W. 4th St., Los Angeles—\$8,376 for sanitary sewers and appurtenances in Cartwright Ave. and Magnolia Blvd., Los Angeles—by Board of Public Works, Los Angeles. 7-27

ORANGE CO.—J. S. Barrett, 1300 Coast Highway, Newport Beach—\$46,132 for

vitrified clay pipe sanitary sewers and house connections, cast iron pipe sanitary sewer, steel pipe sanitary sewer with concrete base, in Avocado Ave., Newport Beach—by City Council, Newport Beach. 7-2

SAN JOAQUIN CO.—Steve Rados, 2975 San Fernando Rd., Los Angeles—\$500,000 for sanitary sewer and water improvement program at Tracy—by City Council, Tracy. 7-27

SANTA BARBARA CO.—Hoagland-
Findlay Engineering Co., 3254 Cherry Ave.,
Long Beach—\$73,938 for sewage disposal
facilities at Camp Cooke—by U. S. Engi-
neer Office, Los Angeles. 7-13

SANTA BARBARA CO.—J. A. Wood-
ward, 1726 Rio Hondo Parkway, El Monte
—\$8,115 for construction of additional
sewage facilities at the Army ground and
service redistribution center, Santa Bar-
bara—by U. S. Engineer Office, Los An-
geles. 7-27

SOLANO CO.—Stolte Inc., 8451 San Le-
andro Blvd., Oakland—\$16,949 for con-
struction of portions of combination storm
water and sanitary outfall sewer on So-
noma St., Vallejo—by City Council, Val-
lejo. 7-13

VENTURA CO.—Hoagland-
Findlay Engineering Co., 3254 Cherry Ave., Long
Beach—\$211,400 for alterations and addi-
tions to the sewage treatment facilities at
Oxnard—by City Council, Oxnard. 7-12

Colorado

DENVER CO.—M. R. Latimer, W. 7th
and Navajo Sts., Denver—\$120,941 for the
construction in the Mountain View Park
special sanitary sewer district at Denver—
by City and County of Denver.

Texas

BEXAR CO.—Knutson Construction Co.,
2233 Commerce Bldg., Houston—\$571,185
for construction of internal drainage at
Randolph Field, San Antonio—by U. S.
Engineer Office, San Antonio. 7-12

DALLAS CO.—Ben Sira & Co., 3901 Elm
St., Dallas—\$45,558 for storm sewer in
Lovers Lane, between Inwood and Loma
Alto, Dallas—by City Council, Dallas.

Utah

WEBER CO.—Enoch Smith Sons Co.,
1441 Beck, Salt Lake City—\$29,155 for the
construction of a sanitary sewer in Ogden
—by City Council, Ogden. 7-12

Washington

BENTON CO.—Twin City Plumbing &
Heating Co., Kennewick—\$75,644 for the
construction of intercepting sewer lines at
Kennewick—by City Council, Kennewick.
7-23

KING CO.—Valley Construction Co., 7708
Rainier Ave., Seattle—\$115,397 for con-
struction of a sewer system at Roxbury
Heights—by City Council, Seattle. 6-16

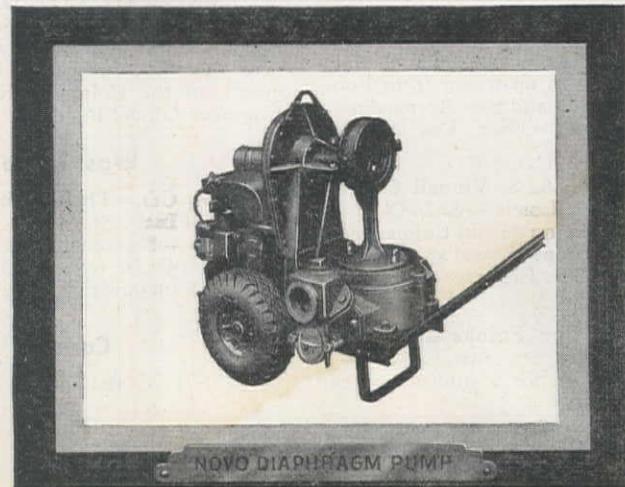
YAKIMA CO.—Goerig and Philp, Lloyd
Bldg., Seattle—\$156,393 for a sewage treat-
ment plant at Sunnyside—by City Council,
Sunnyside. 6-27

Waterway ...

California

CONTRA COSTA CO.—Freethy-Kim-
ball Co., Kohl Bldg., San Francisco—\$76,
701 for construction of a tug basin and dis-

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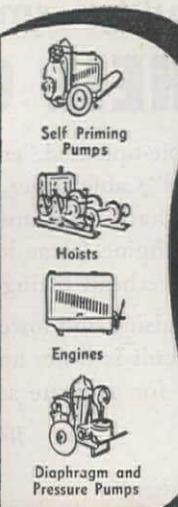


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patcher's office at the Naval Magazine, Port Chicago—by Bureau of Yards and Docks, Washington, D. C. 7-30

MARIN CO.—Duncanson-Harrelson Co., and Healy Tibbitts Construction Co., 690 Market St., San Francisco—\$3,330,730 for construction of piers at California Point—by U. S. Engineer Office, San Francisco. 7-21

SAN BERNARDINO CO.—Bressi-Bevanda Constructors and Macco Construction Co., 208 W. 8th St., Los Angeles—\$2,528,350 for the construction of the Lytle Creek channel, between Warm Creek and a point approx. 700 ft. upstream from Foot-hill Blvd., in Colton and San Bernardino—by U. S. Engineer Office, Los Angeles.

SAN BERNARDINO CO.—Winston Brothers Co., and A. S. Vinnell Co., 411 W. 5th St., Los Angeles—\$2,768,432 for the construction of Lytle and Cajon creeks improvement, levee and bypass and appurtenant work—by U. S. Engineer Office, Los Angeles. 7-31

SAN DIEGO CO.—Franks Contracting Co., 260 California St., San Francisco—\$77,650 for dredging for a stud pier at the

Naval Repair Base, San Diego—by Bureau of Yards and Docks, Washington, D. C. 6-22

SAN FRANCISCO CO.—Eaton & Smith, 715 Ocean Ave., San Francisco—\$393,392 for excavation, Zone 9, at the Naval Dry-docks, Hunters Point—by Bureau of Yards and Docks, Washington, D. C. 7-23

Oregon

MULTNOMAH CO.—D. F. Whittaker Co., 702 Smith Tower, Seattle, Wash.—\$271,212 for rehabilitation work on jetty A, near the west end of Sand Island at the mouth of the Columbia River—by U. S. Engineer Office, Portland. 7-23

Washington

CLARK CO.—The Marine Contractors, Inc., 8444 NW. St. Helens St., Vancouver—\$80,000 for extension of eight outboard ways by 47 ft. each at Vancouver—by Kaiser Vancouver Shipyard, Vancouver. 7-5

Canada

BRITISH COLUMBIA — McKenzie

Barge & Derrick Company, Ltd., Vancouver, B. C.—\$300,000 for the preliminary dredging for a new pleasure pier to be built at English Bay, B. C. 7-26

Dam . . .

California

NEVADA CO.—Guy F. Atkinson Co., 662 Russ Bldg., San Francisco—\$118,475 for construction of the foundation of the Scotts Flat Dam, located east of Nevada City—by Nevada Irrigation Dist., Grass Valley. 7-19

Montana

LINCOLN CO.—Midland Constructors, 211 W. Wacker Dr., Chicago, Ill.—For the construction of an arched concrete dam near Libby—by Mountain States Power Co., Albany, Ore. 7-13

MADISON CO.—Charles Shannon and Sons, 502 So. Washington St., Butte—\$51,833 to build a spillway and repair and extend the main tunnel of the Willow Creek dam near Harrison—by State Water Conservation Board, Helena. 7-14

Irrigation . . .

California

FRESNO CO.—Peter Kiewit Sons Co., 442 Post St., San Francisco—\$1,163,340 for construction of earthwork, concrete lining and structures, Station 6 plus 10 to Station 301 plus 60, Friant-Kern Canal, Central Valley Project—by Bureau of Reclamation, Washington, D. C. 7-19

LOS ANGELES CO.—Stratton Construction Co., 3537 E. Colorado St., Pasadena—\$25,555 for construction of a 1,000,000-gal. water reservoir on a site in the vicinity of Los Amigos St. and Castle Rd., Montrose—by Board of Directors, La Canada Irrigation Dist., Montrose. 7-27

Nebraska

DAWES CO.—Roush Construction Co., Crawford, Neb.—\$168,655 for earth work and structures, Sturgeon and Fairfield lateral and sublaterals, Mirage Flats Project—by Bureau of Reclamation, Hemingford. 7-3

Oregon

DESCHUTES CO.—Bickle and Cater Construction Co., Portland—\$158,428 for construction of irrigation canals on the north unit of the Deschutes irrigation project near Bend—by Bureau of Reclamation, Washington, D. C. 6-23

Building . . .

Arizona

MARICOPA CO.—K. C. Wilson, 3402 Longview Ave., Phoenix—\$62,175 for construction of a 7-classroom, domestic science room and toilet addition to the Washington school at Phoenix—by Washington School Dist. No. 8, Phoenix. 7-6

California

ALAMEDA CO.—N. M. Ball Sons, Box 404, Berkeley—\$172,945 for additional construction, open storage area, AAS, Intransit Depot, Alameda—by U. S. Engineer Office, San Francisco. 6-22



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ALAMEDA CO.—Dinwiddie Construction Co., Crocker Bldg., San Francisco—\$546,972 for modernization of engine test cells at the U. S. Naval Air Station, Alameda—by Bureau of Yards and Docks, Washington, D. C. 7-2

ALAMEDA CO.—Haas Construction Co., 326 Merchants' Exchange Bldg., San Francisco—\$185,980 for construction of Homojah housing, Seabee Reconsignment Depot, Camp Parks, Shoemaker—by Bureau of Yards and Docks, Washington, D. C. 7-31

ALAMEDA CO.—MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco—\$1,430,841 for construction of a postal concentration center No. 2, at Oakland Army Base, Oakland—by U. S. Engineer Office, San Francisco. 6-20

ALAMEDA CO.—Newsom & Bechtel, 2287 Telegraph Ave., Berkeley—\$249,176 for 126 temporary dwelling units at Berkeley—by Federal Public Housing Authority, San Francisco. 7-18

ALAMEDA CO.—J. D. O'Connor Construction Co., 391 Sutter St., San Francisco—\$814,364 for erecting an office bldg., cafeteria and boiler house at A.A.F. Intransit Depot, Alameda—by U. S. Engineer Office, San Francisco. 7-5

ALAMEDA CO.—J. D. O'Connor Construction Co., 391 Sutter St., San Francisco—\$459,570 for troop housing to be constructed at the A.A.F., Pacific Overseas Depot, Alameda—by U. S. Engineer Office, San Francisco. 7-5

ALAMEDA CO.—C. L. Wold Construction Co., 4412 Fulton St., San Francisco—\$115,900 for housing at Berkeley—by U. S. Engineer Office, San Francisco. 7-12

FRESNO CO.—Cahill Brothers, Inc., 206 Sansome St., San Francisco—\$62,000 for the construction of addition to winery plant, including a reinf. conc. and steel bldg. at Sanger—by Sanger Winery, Sanger. 6-26

FRESNO CO.—George E. Gaymond Construction Co., P. O. Box 186, Fresno—\$97,500 for constr. of the new San Joaquin Memorial High School at Fresno—by Roman Catholic Church, Monterey-Fresno Diocese. 7-13

LOS ANGELES CO.—George Alexander, 8425 W. 3rd St., Los Angeles—\$132,000 for six frame and stucco apartment bldgs. on So. Plymouth Blvd., Los Angeles—by Self. 7-20

LOS ANGELES CO.—The Austin Co., 777 E. Washington Blvd., Los Angeles—\$160,000 for an addition to a factory bldg. at 2828 E. 12th St., Los Angeles—by U. S. Envelope Co., Los Angeles. 7-30

LOS ANGELES CO.—James I. Barnes Construction Co., 1119 Montanan Ave., Santa Monica—\$1,381,000 for construction of an addition to machine shop bldg. at the U. S. Naval Drydocks, Naval Operating Base, Terminal Island—by Bureau of Yards and Docks, Washington, D. C. 7-13

LOS ANGELES CO.—Brunzell Construction Co., and V. O. Brunzell, 14715 La Salle Ave., Gardena—\$89,424 for the construction of the North School at 120th St. and Anza Ave., Hawthorne—by Board of Trustees, Wiseburn School Dist., Hawthorne. 7-12

LOS ANGELES CO.—Buttress & McClellan, 1013 E. 8th St., Los Angeles—\$110,000 for a warehouse and factory bldg. at 5022 Anaheim-Telegraph Rd., county dist.—by Republic Supply Co., Los Angeles. 7-26

LOS ANGELES CO.—Buttress & McClellan, 1013 E. 8th St., Los Angeles—\$65,000 for a warehouse and office bldg. at 1404 Calzona St., Los Angeles—by Baker Steel & Tube Co., Los Angeles. 7-26

LOS ANGELES CO.—Community Building Co., 6307 Wilshire Blvd., Los Angeles—\$220,000 for forty-five 6-room, frame and stucco dwellings at Los Angeles—by Self. 7-20

LOS ANGELES CO.—W. H. Coulter, 1207 S. Ardmore Ave., Los Angeles—\$137,500 for twenty-three 7-room frame and stucco dwellings on Chase Ave., Los Angeles—by A. K. Skinner, Los Angeles. 7-13

LOS ANGELES CO.—Gallinger Construction Co., 418 Gaffey St., San Pedro—\$62,078 for the construction of school additions at the Eucalyptus Ave. School, the Fifth Ave. School and the York Ave. School

at Hawthorne—by Federal Works Agency, Los Angeles. 7-19

LOS ANGELES CO.—Jackson Brothers, 3475 W. 8th St., Los Angeles—\$75,000 to erect a brick and conc. market bldg. at 8837 Sepulveda Blvd., Venice—by Sepulveda Housing Corp., Los Angeles. 8-1

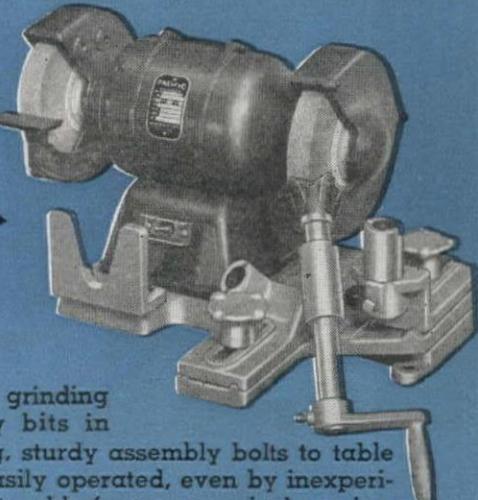
LOS ANGELES CO.—Paul D. Jenkins, 5079 Glen Iris Ave., Los Angeles—\$300,000 for 47 single-family dwellings in the Belmont Shore, Naples Dist., Long Beach—by Belna Housing, Inc., Pasadena. 7-20

LOS ANGELES CO.—Meyer - Nash Corp., 1414 Hollywood Way, Burbank—\$72,000 for twenty-four frame and stucco dwellings to be located in North Hollywood—by Self. 7-13

LOS ANGELES CO.—Myers Brothers, 3407 San Fernando Rd., Los Angeles—

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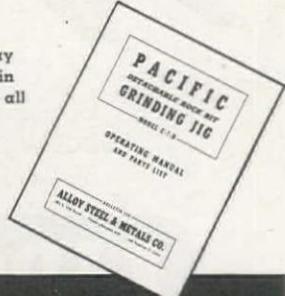


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over \$4,000,000 for constructing 563 apartment units, consisting of 175 buildings on the east side of Lincoln Blvd. between Lake and Rialto Sts., Venice—by Union Housing Plan Inc., Los Angeles. 7-20

LOS ANGELES CO.—**Myers Brothers**, 3407 San Fernando Road, Los Angeles—\$100,000 for the construction of a personnel center at Fort MacArthur—by U. S. Engineer Office, Los Angeles. 6-20

LOS ANGELES CO.—**Stone & Webster Engineering Co.**, 601 W. 5th St., Los Angeles—\$2,000,000 for a new isoprene recovery and purification plant at Torrance to be operated by Shell Chemical Division, Shell-Union Oil Corp.—by Reconstruction Finance Corp., Washington, D. C. 7-31

LOS ANGELES CO.—**P. A. Weeger**,

4565 Santa Monica Blvd., Los Angeles—\$61,588 for a six-classroom and kindergarten addition to the Eastmont Elementary School, East Los Angeles—by Montebello School District, Los Angeles. 6-25

LOS ANGELES CO.—**Bert C. Yager**, 4641 Crenshaw Blvd., Los Angeles—\$117,000 for seven 4-family, frame and stucco apartment bldgs. at West Los Angeles—by Milton Gersten, Los Angeles. 7-20

MARIN CO.—**Williams and Burrows**, 10 California Dr., Burlingame—\$918,220 for constructing California Point housing—by U. S. Engineer Office, San Francisco. 7-5

MERCED CO.—**Trewhitt, Shields & Fisher**, Pacific Southwest Bldg., Fresno—\$100,720 for alterations to steel hangars and erection of steel hangar at the Merced

Army Air Field—by U. S. Engineer Office, Sacramento. 6-21

ORANGE CO.—**Allison-Honer Co.**, 1032 3rd St., Santa Ana—\$55,000 for construction of a chapel at El Toro—by Bureau of Yards and Docks, Washington, D. C.

ORANGE CO.—**Peter Kiewit Sons Co.**, 650 So. Grand Ave., Los Angeles—\$293,321 for erecting barracks for convalescent hospital and misc. facilities at the Santa Ana Army Air Base—by U. S. Engineer Office, Los Angeles. 7-13

ORANGE CO.—**Peter Kiewit Sons Co.**, 650 So. Grand Ave., Los Angeles—\$101,360 for modification of quarters for officers at the Santa Ana Army Air Base, Santa Ana—by U. S. Engineer Office, Los Angeles. 7-6

RIVERSIDE CO.—**W. D. Haxton**, 515 Broadway Bldg., San Diego—\$99,853 for 35 portable family dwelling units at Indio—by Federal Public Housing Authority, San Francisco. 7-10

RIVERSIDE CO.—**Frank Pinkerton**, 108 SW. Blvd., Corona—\$181,903 for constr. of disciplinary barracks and appur. facilities at Camp Haan—by U. S. Engineer Office, Los Angeles. 6-20

SACRAMENTO CO.—**Trewhitt-Shields & Fisher**, Pacific Southwest Bldg., Fresno—\$166,673 for a motor repair shop at McClellan Field—by U. S. Engineer Office, Sacramento. 6-26

SAN BERNARDINO CO.—**M. S. Jepsen**, 1540 So. Robertson Blvd., Los Angeles—\$256,230 for fabrication and erection of 100 war dwelling units at Needles—by City Housing Authority, Needles. 7-5

SAN BERNARDINO CO.—**L. P. Scherer** and **T. C. Prichard**, 3964 Orange St., Riverside—\$92,165 for construction of welfare and office facilities at the U. S. Naval Convalescent Hospital, Arrowhead Springs—by Bureau of Yards and Docks, Washington, D. C. 6-21

SAN BERNARDINO CO.—**P. J. Walker Co.**, 3900 Whiteside Ave., Los Angeles—\$656,358 for the construction of a factory for the making of pottery, plumbing and bathroom fixtures at Mentone—by Universal Sanitary Manufacturing Co., Newcastle, Pa. 7-10

SAN DIEGO CO.—**Brunswick-Balke-Collender Co.**, 1225 So. Grand Ave., Los Angeles—for fabricating and installing 16 regulation bowling alleys at Mitchell Convalescent Hospital, Campo—by U. S. Engineer Office, Los Angeles. 7-30

SAN DIEGO CO.—**A. Farnell Blair**, 7052 Santa Monica Blvd., Los Angeles—\$615,973 for additional food storage bldgs. at Camp Pendleton, Oceanside—by Bureau of Yards and Docks, Washington, D. C. 7-31

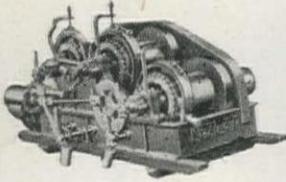
SAN DIEGO CO.—**Reuben C. Haas**, 9430 La Cuesta Dr., La Mesa—\$56,800 for a one-story classroom and cafeteria bldg. at Bostonia—by Cajon Valley Union School Dist., El Cajon. 7-19

SAN DIEGO CO.—**Haddock Engineers, Ltd.**, 605 W. Olympic Blvd., Los Angeles—\$117,277 for a recreation and bath house at San Onofre Beach, Camp Pendleton, Oceanside—by Bureau of Yards and Docks, Washington, D. C. 7-2

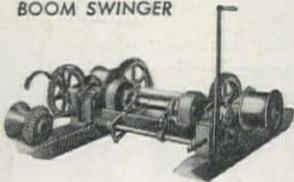
SAN DIEGO CO.—**Del E. Webb Construction Co.**, Box 4066, Phoenix, Ariz.—\$1,957,007 for additional new and converted bldgs. at Mitchell Convalescent Hospital, Camp Lockett, near Campo—by U. S. Engineer Office, Los Angeles. 7-6

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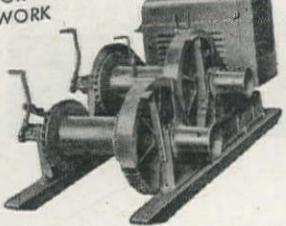
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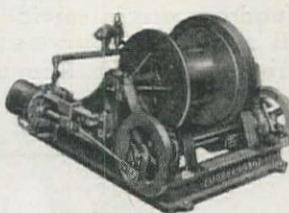


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SAN FRANCISCO CO.—S. J. Amoroso Construction Co., 2136 Alemany Blvd., San Francisco—\$83,742 for alterations to Adams Bldg., Eddy St., between Van Ness Ave. and Polk St., and for office alterations for Board of Education, Civic Auditorium, San Francisco—by Dept. of Public Works, San Francisco. 7-26

SAN FRANCISCO CO.—De Luca & Son, 1745 Filbert St., San Francisco—\$255,600 for 107 portable dwelling units at Hunters Point, San Francisco—by Housing Authority, City and County of San Francisco. 6-26

SAN FRANCISCO CO.—M. J. King, Inc., 231 Franklin St., San Francisco—\$68,939 for a supply service bldg. No. 146 at the Naval Dry Docks, Hunters Point—by Bureau of Yards and Docks, Washington, D. C. 7-19

SAN FRANCISCO CO.—Theodore G. Meyer, 200 Quint St., San Francisco—\$252,759 for erecting 117 family dwelling units at Hunters Point, San Francisco—by Housing Authority, City and County of San Francisco. 6-26

SAN FRANCISCO CO.—Moore & Roberts, 693 Mission St., San Francisco—\$405,452 for 205 portable dwelling units at Hunters Point—by Federal Public Housing Authority, San Francisco. 6-19

SAN FRANCISCO CO.—Parker, Steffens and Pearce, 135 S. Park, San Francisco—\$311,990 to construct a new two-story and basement structural steel Montrose Exchange telephone bldg. in San Francisco—by Pacific Telephone and Telegraph Co., San Francisco. 6-27

SAN FRANCISCO CO.—J. H. Pomeroy Co., 333 Montgomery St., San Francisco—\$176,210 for additional bldgs. and extensions to facilities at the U. S. Naval Receiving Hospital, San Francisco—by Bureau of Yards and Docks, Washington, D. C. 7-2

SAN JOAQUIN CO.—J. R. Armstrong Construction Co., Box 216, El Cerrito—\$108,733 for additional housing and alterations at Lathrop—by U. S. Engineer Office, Sacramento. 6-25

SAN MATEO CO.—Monson Brothers, 475 Sixth St., San Francisco—\$146,351 for construction of bachelor officers' quarters, SPAR barracks and second story addition for 100-man barracks at the USCG Station, South San Francisco—by U. S. Coast Guard, San Francisco. 7-3

SANTA BARBARA CO.—Robert E. McKee, 4700 San Fernando Rd. West, Los Angeles—\$4,040,850 for construction of maximum security disciplinary barracks at Camp Cooke—by U. S. Engineer Office, Los Angeles. 7-6

SANTA CLARA CO.—C. F. Parker, 1644 Monterey Blvd., San Francisco—\$66,426 for constructing a six-classroom elementary school bldg. at Campbell—by Union Elementary School District, Campbell. 7-10

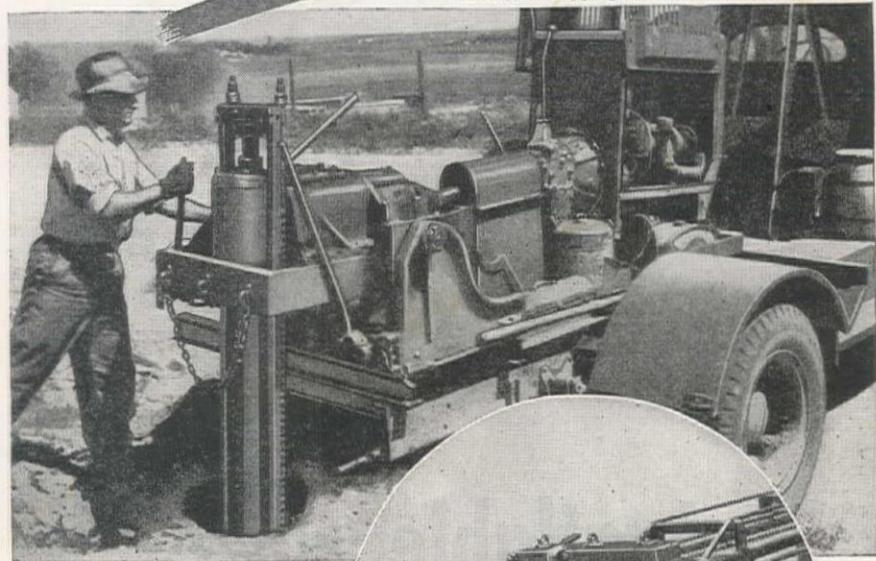
SOLANO CO.—Barrett & Hilp, 918 Harrison St., San Francisco—\$275,712 for ships barracks bldgs. at the U. S. Navy Yard, Mare Island—by Bureau of Yards and Docks, Washington, D. C. 7-13

SOLANO CO.—M. J. King, Inc., 231 Franklin St., San Francisco—\$126,867 for construction of barracks for hospital corpsmen, and other misc. work at the U. S. Naval Hospital, Mare Island—by Bureau of Yards and Docks, Washington, D. C. 6-26

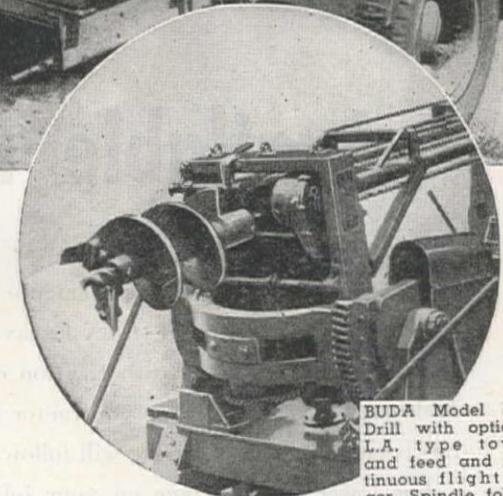
VENTURA CO.—Alco Construction Co., 5423 Flemish Village Lane, Los Angeles—\$145,663 for tire and tube storage facilities at Port Hueneme—by Bureau of Yards

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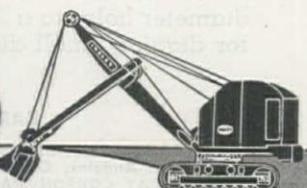
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and Docks, Washington, D. C. 7-13

VENTURA CO.—M. A. Imhoff and Associates, 1748 New Ave., San Gabriel—\$140,000 for an elementary school at 9th and C Sts., Oxnard—by Federal Works Agency, Washington, D. C. 6-28

VENTURA CO.—E. G. Martin, 1311 5th St., Santa Monica—\$96,300 for 36 portable family dwelling units, one laundry bldg., one management and maintenance bldg., and all site improvements, at Oxnard—by Federal Public Housing Authority, San Francisco. 6-20

VENTURA CO.—E. G. Martin, 1311 5th St., Santa Monica—\$96,300 for the construction of 144 dormitory units for women, one laundry bldg., and one management and maintenance bldg., together with complete site improvements and utility services at Oxnard—by Federal Public Housing Authority, San Francisco. 6-25

Colorado

DENVER CO.—Brown-Schrepferman & Co., 240 Washington St., Denver—\$300,000 for a new processing plant, reconversion of existing bldgs., dismantling and re-erecting fourteen bldgs. from Pando, painting and miscellaneous repairs at Ft. Logan, Denver—by U. S. Engineer Office, Denver. 6-25

DENVER CO.—Mead and Mount Construction Co., 422 Denver Natl. Bldg., Denver—\$109,227 for alterations and additions to bldgs. at the Fitzsimmons General Hospital, Denver—by U. S. Engineer Office, Denver. 6-20

PUEBLO CO.—Peter Kiewit Sons Co., 1024 Omaha Natl. Bank, Bldg., Omaha, Nebr.—\$439,688 for the construction of sheds at the Pueblo Ordnance Depot, Pueblo—by U. S. Engineer Office, Denver. 7-23

Idaho

CANYON CO.—Lewis Refrigeration Co., 431 Westlake Ave., Seattle, Wash.—\$60,000 for an ice plant at Caldwell—by J. R. Simplot Dehydrating Co., Caldwell. 7-18

LATAH CO.—Henry George & Son, Hutton Bldg., Spokane, Wash.—For constructing a conc. warehouse and storage bldg. at Moscow—by Washburn-Wilson Seed Co., Moscow. 7-12

Nebraska

CHEYENNE CO.—Olson Construction Co., 410 S. 7th St., Lincoln—\$190,000 for sheds at the Sioux Ordnance Depot, Sidney—by U. S. Engineer Office, Denver, Colo. 7-23

DAWES CO.—Olson Construction Co., 410 S. 7th St., Lincoln—\$83,549 for constructing a bldg. at Fort Robinson Quartermaster Depot—by U. S. Engineer Office, Denver, Colo. 7-23

Nevada

CLARK CO.—J. Walter Johnson, 5205 Hollywood Blvd., Hollywood—\$50,000 for construction of a mortuary bldg. of concrete block at 5th and Stewart Sts., Las Vegas—by Bunker-Burt Mortuary, Las Vegas. 6-28

New Mexico

CURRY CO.—Ramey-Mathis, Amarillo, Tex.—\$83,600 for 40 family war dwelling units at Clovis—by Federal Public Housing Authority, Fort Worth, Tex. 6-21

DONA ANA CO.—Robert E. McKee,

Box 217, El Paso, Tex.—\$218,069 for camp construction and electrical distribution at White Sands Proving Grounds, near Las Cruces—by U. S. Engineer Office, Albuquerque. 7-12

Oregon

DOUGLAS CO.—Max Dudley, Shelton, Wash.—\$143,967 for 60 family dwelling units at Roseburg—by Federal Public Housing Authority, Seattle, Wash. 7-30

KLAMATH CO.—The Austin Co., Dexter-Horton Bldg., Seattle—\$75,000 for a plant at Klamath Falls—by West-Hitchcock Corp., Klamath Falls. 7-30

LANE CO.—Halvorson Construction Co. and E. B. Halvorson, First Natl. Bank Bldg., Salem—\$91,249 for construction of 40 family dwelling units at Cottage Grove—by Federal Public Housing Authority, Seattle. 7-10

LINN CO.—L. H. Hoffman, 715 SW. Columbia Blvd., Portland—\$114,750 for construction of utilities and bldgs. at the AGF replacement Center, Camp Adair—by U. S. Engineer Office, Portland. 7-2

MULTNOMAH CO.—Donald M. Drake Co., Lewis Bldg., Portland—\$141,219 for construction of a 2-story reinf. conc. structure and installation of facilities at Portland—by Griffith Rubber Mills Inc., Portland. 6-23

MULTNOMAH CO.—Ross B. Hammond Co., 1241 Williams Ave., Portland—\$140,000 for a 2-story laundry-dormitory bldg. at the Providence Hospital, Portland—by Providence Hospital, Portland. 7-18

MULTNOMAH CO.—L. H. Hoffman, 715 SW. Columbia, Portland—\$130,000 for constructing a timber creosoting plant at St. Johns—by McCormick & Baxter Co., Portland. 7-13

MULTNOMAH CO.—W. J. Muir, 2209 SE. 98th St., Portland—\$100,000 for a casket factory at Portland—by Portland Casket Co., Portland. 7-16

South Dakota

FALL RIVER CO.—The Gordon Construction Co., 1900 31st St., Denver—\$301,305 for erecting sheds at the Black Hills Ordnance Depot, Provo—by U. S. Engineer Office, Denver, Colo. 7-23

Texas

BEXAR CO.—J. W. Bateson, 1103 Irwin-Keasler Bldg., Dallas—\$189,697 for conversion of bldgs. at Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-12

BEXAR CO.—C. L. Browning, Jr., Contractors, 812 Insurance Bldg., San Antonio—\$545,986 for conversion of barracks at Aviation Cadet Center, San Antonio—by U. S. Engineer Office, San Antonio. 7-23

BEXAR CO.—R. P. Farnsworth & Co., 508 Bankers Mortgage Bldg., Houston—\$315,089 for enclosing open sheds at the San Antonio Air Depot, Kelly Field—by U. S. Engineer Office, San Antonio. 7-12

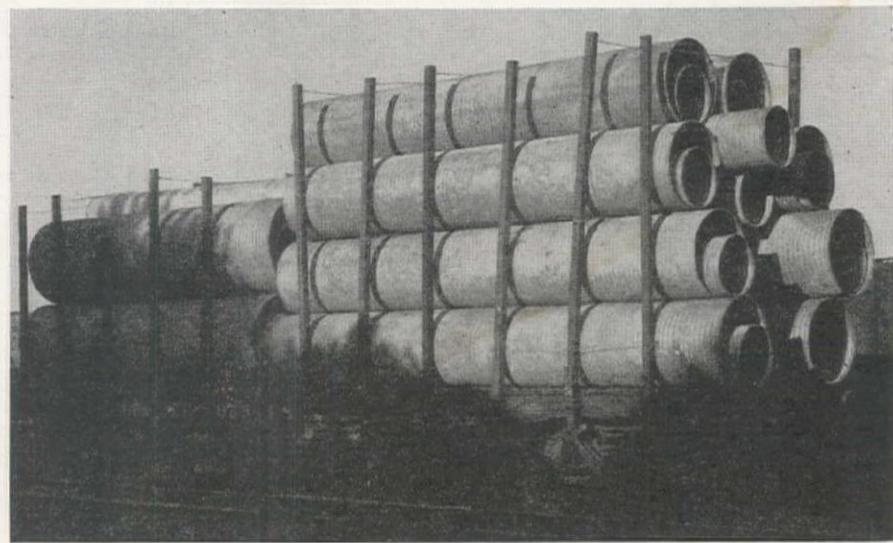
BEXAR CO.—R. P. Farnsworth & Co., Inc., Box 4187, Houston—\$150,465 for construction of facilities for school at Camp Bullis, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-23

BEXAR CO.—Hill & Combs, 312 Melrose Pl., San Antonio—\$490,663 for alterations to storage sheds at Normoyle Field, San Antonio—by U. S. Engineer Office, San Antonio. 7-12

BEXAR CO.—G. W. Mitchell, 612 Amer-

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ican Hospital and Life Bldg., San Antonio—\$339,000 for an administration bldg. at Brooke Hospital Center, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-18

BEXAR CO.—G. W. Mitchell, 612 American Hospital and Life Bldg., San Antonio—\$136,582 for construction of bowling alleys at Brooke Convalescent Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-12

BEXAR CO.—Port Construction Co., Brownsville—\$138,997 for construction of 3 recreation bldgs. at Brooke General and Convalescent Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-12

BEXAR CO.—A. P. Rheiner and Son, 409 Insurance Bldg., San Antonio—\$113,156 for construction of 2 recreational bldgs. at Brooke Hospital Center, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-4

BEXAR CO.—Walsh & Burney Co., Inc., 928 N. Flores St., San Antonio—\$798,086 for conversion of barracks at Brooke General Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-12

BEXAR CO.—J. C. Worcester, San Antonio—\$262,446 for construction of and alterations to bldgs. at Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-12

DALLAS CO.—Henger Construction Co., 1600 Dallas Bank and Trust Bldg., Dallas—\$350,000 for construction of wings for Hillcrest Mausoleum, Dallas—by Hillcrest Mausoleum, Inc., Dallas. 7-2

TARRANT CO.—James T. Taylor, First

Natl. Bank Bldg., Fort Worth—\$59,000 for a one-story business bldg. of brick and and tile and steel to be erected at Fort Worth—by Gaines Cadillac Co., Fort Worth. 7-26

Utah

SALT LAKE CO.—The Jacobsen Construction Co., 724 So. 3 E., Salt Lake City—\$1,000,000 for construction of a new store bldg. on 8th So., Salt Lake City. The bldg. will be 2 stories and basement—by Sears, Roebuck Co., Chicago, Ill. 7-25

TOOELE CO.—Chytraus Construction Co., 436 So. 4th St., Salt Lake City—\$112,577 for construction of firewalls and 14 warehouse bldgs., at the Tooele Ordnance Depot, Tooele—by U. S. Engineer Office, Salt Lake City. 7-5

TOOELE CO.—Jacobsen Construction Co., 724 So. 3rd East, Salt Lake City—\$66,949 for shed covers and ammunition building at Tooele—by U. S. Engineer Office, Salt Lake City. 7-16

Washington

COWLITZ CO.—Quidbach Construction Co., Longview—\$153,390 for construction of 11-room grade school at Longview—by Longview School Board. 7-10

KING CO.—J. C. Boesplug Construction Co., Securities Bldg., Seattle—\$259,140 for construction of Homoja housing at 28th Ave. W. and Elmore St., Seattle—by Bureau of Yards and Docks, Washington, D. C. 6-25

KING CO.—H. E. Carlstrom, 6718 22nd NW., Seattle—\$75,000 to construct a concrete block factory bldg. at Fifth So. and

Landers St., Seattle—by Stack Steel & Supply Co., Seattle. 7-12

KING CO.—Paul Nels Carlson, 1308 Madison St., Seattle—\$325,000 for the construction of a six-story nurses' home adjacent to the Swedish Hospital at Seattle—by Board of Directors, Swedish Hospital, Seattle. 7-10

KING CO.—Century Construction Co., 1917 First Ave., Seattle—\$82,057 for construction of a Civil Engineering Bldg. at the University of Washington, Seattle—by University of Washington, Seattle. 7-11

KING CO.—W. G. Clark Co., 408 Aurora Ave., Seattle—\$200,000 for construction of a 140x480-ft. steel distributing warehouse at Seattle—by A. M. Castle & Co., Seattle. 7-14

KING CO.—General Construction Co., 3840 Iowa St., Seattle—\$164,950 for an operations bldg. and control tower at the U. S. Naval Air Station, Seattle—by Bureau of Yards and Docks, Washington, D. C. 7-23

KING CO.—Hedeen Construction Co., 6273 19th Ave., NE., Seattle—\$69,299 for a six-room addition to the Lake City School at E. 125th St. and 27th Ave. No. Seattle—by Shoreline School Dist., Seattle. 7-17

KING CO.—B. H. Sheldon, 2022 3rd St., Spokane—\$549,000 for reconstruction of 250 additional family dwelling units in Seattle—by Federal Public Housing Authority, Seattle. 7-25

KING CO.—Strand & Sons, 3939 University Way, Seattle—\$314,750 to reconstruct 150 family dwelling units in Seattle—by Housing Authority, Seattle. 7-11

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PRODUCTS

KITSAP CO.—Nettleton & Baldwin, 1109 N. 36th St., Seattle—\$1,407,376 for moving 616 dwelling units from Vancouver and relocating them at Sinclair Park Housing Project, Bremerton—by Federal Public Housing Authority, Seattle. 7-26

KITSAP CO.—Nettleton & Baldwin, 1109 N. 36th St., Seattle—\$722,000 to construct 308 family dwelling units at the Sinclair Park Housing Project in Bremerton—by Federal Public Housing Authority, Seattle. 6-30

KITSAP CO.—B. H. Sheldon, 2022 3rd St., Spokane—\$639,000 for transporting 280 family dwelling units from the Vancourt Housing Project in the Portland area to Bremerton and constructing utilities and service bldgs. there—by Federal Public Housing Authority, Seattle. 7-7

PIERCE CO.—Sam Bergesen, Box 428, Tacoma—\$252,704 for swimming pool, gymnasium, bowling alley and heating plant to be constructed at Madigan General Hospital, Ft. Lewis—by U. S. Engineer Office, Seattle. 7-10

PIERCE CO.—Wick and Dahlgren, 2016 30th Ave., So., Seattle—\$717,480 for 300 family dwelling units to be erected at Tacoma—by Tacoma Housing Authority, Tacoma. 7-16

YAKIMA CO.—E. A. Erickson, Kennewick—\$59,367 for a one-story brick and hollow tile hospital bldg. at Sunnyside—by Valley Memorial Hospital, Sunnyside. 6-23

Canada

BRITISH COLUMBIA—Commonwealth Construction Co., Vancouver—\$125,000 for the construction of a grain sacking plant at Vancouver—by Vancouver Wheat Pool. 7-26

BRITISH COLUMBIA—Smith Brothers and Wilson, Ltd., Vancouver—\$70,000 for an addition to the fifth floor of the head office bldg. of the B. C. Electric Railway Company at Vancouver—by British Columbia Electric Railway Co., Vancouver.

Territories

HAWAII—James W. Glover, Honolulu—\$1,492,391 for construction of 482 family dwelling units on Oahu—by Federal Public Housing Authority, San Francisco. 7-12

HAWAII—Hayward Lumber & Investment Co., Box 1551, Los Angeles, Calif.—\$965,831 for fabrication and shipping of 1021 family dwelling units to Honolulu—by Federal Public Housing Authority, San Francisco. 7-24

HAWAII—Pacific Construction Co., Honolulu—\$1,755,281 for construction of 518 family dwelling units on Oahu—by Federal Public Housing Authority, San Francisco. 6-18

Miscellaneous...

Arizona

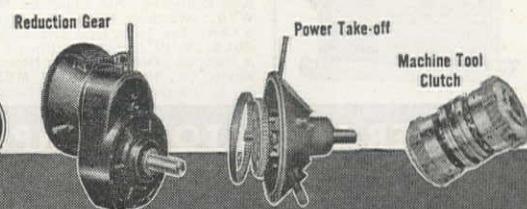
COCONINO CO.—G. E. Kerns, 5574 Atlantic Ave., Long Beach, Calif.—\$250,000 for the construction of open storage sites at the Navajo Ordnance Depot, Bellemont—by U. S. Engineer Office, Los Angeles, Calif. 6-21

California

ALAMEDA CO.—MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco—\$140,700 for construction of sprin-

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kler protection at Oakland Army Base, Oakland—by U. S. Engineer Office, San Francisco. 7-12

ALAMEDA CO.—Monson Brothers, 475 Sixth St., San Francisco—\$70,527 for additions to facilities at the U. S. Naval Hospital, San Leandro—by Bureau of Yards and Docks, Washington, D. C. 7-30

ALAMEDA CO.—Monson Brothers, 475 Sixth St., San Francisco—\$152,617 for drainage control, fencing, repainting and alterations to facilities at Oak Knoll Naval Hospital, Oakland—by Bureau of Yards and Docks, Washington, D. C. 7-2

ALAMEDA CO.—Parker, Steffens & Pearce, 135 South Park, San Francisco—\$171,275 for additional facilities, relocation of fire hydrants, additional parking area in corpsmen's quarters and misc. bldg. additions, Naval Hospital, Shoemaker—by Bureau of Yards and Docks, Washington, D. C. 7-2

ALAMEDA CO.—George M. Robinson, 451 Folsom St., San Francisco—\$200,751 for constructing sprinkler protection at the Oakland Army Base, Oakland—by U. S. Engineer Office, San Francisco. 7-23

ALAMEDA CO.—George M. Robinson & Co., 451 Folsom St., San Francisco—\$348,709 for sprinkler protection in warehouse area at the Oakland Army Base—by U. S. Engineer Office, San Francisco. 7-10

ALAMEDA CO.—Viking Automatic Sprinkler Co., 216 Pine St., San Francisco—\$91,690 for sprinkler protection for oil piers A and B, Intransit Shed, Oakland Army Base, Oakland—by U. S. Engineer Office, San Francisco. 7-27

CONTRA COSTA CO.—Fredrickson and Watson Construction Co., 873 81st Ave., Oakland—\$1,690,000 for additional car-holding facilities and related operating facilities, Inland Storage Area, Naval Magazine, Port Chicago—by Bureau of Yards and Docks, Washington, D. C. 6-27

LOS ANGELES CO.—Burkett Fence Co., 2419 So. La Cienega Blvd., Los Angeles—\$165,774 for removing the camouflage protection at Lockheed Air Terminal, Burbank—by U. S. Engineer Office, Los Angeles. 7-2

LOS ANGELES CO.—L. B. Colton Co., 1332 Wilshire Blvd., Los Angeles—\$132,000 for removing camouflage at Douglas Aircraft Co., Santa Monica—by U. S. Engineer Office, Los Angeles. 7-13

MARIN CO.—Peter Kiewit Sons Co., 1001 Atlas Bldg., San Francisco—\$739,720 for construction of a yard at California Point—by U. S. Engineer Office, San Francisco. 7-23

MARIN CO.—Pombo Brothers, 1571 Turk St., San Francisco—\$406,275 for the construction of a railroad at California Point—by U. S. Engineer Office, San Francisco. 7-12

MONTEREY AND SAN BENITO COS.—Granite Construction Co., 900 Beach St., Watsonville—\$139,600 to construct forward rocket firing facilities at auxiliary air stations at Hollister and Monterey—by Bureau of Yards and Docks, Washington, D. C. 7-12

RIVERSIDE CO.—Clifford C. Bong, 6 N. First Ave., Arcadia—\$105,894 for additional railroad trackage at the Mira Loma Quartermaster Depot—by U. S. Engineer Office, Los Angeles. 6-29

SACRAMENTO CO.—MacDonald & Kahn, Inc., and A. Teichert & Co., and John C. Gist, 200 Financial Center Bldg.,

San Francisco—\$6,214,000 for the construction of a new signal depot at Sacramento. Work will include 4 warehouses of reinf. conc., administration bldg., open storage area, railroad, hard standing area, reservoir, etc.—by U. S. Engineer Office, Sacramento. 7-17

SACRAMENTO CO.—Moore & Roberts, 693 Mission St., San Francisco—\$1,152,302 for construction of warehouses, paving, drainage, utilities, railroad trackage, etc., at the Sacramento Air Depot, Sacramento—by U. S. Engineer Office, Sacramento. 7-21

SAN BERNARDINO CO.—H. C. Warren, 3172 Lemon, Riverside—\$175,000 for a 44-mi. 33,000-volt high-tension electric power line from the power sub-station at Garnet to Twenty-nine Palms—by California Electric Power Co., San Bernardino. 7-27

SAN BERNARDINO CO.—Baruch Corporation, 625 So. Olive St., Los Angeles—\$129,669 for the construction of bomb loading facilities at the San Bernardino Chemical Warfare Service Plant, San Bernardino—by U. S. Engineer Office, Los Angeles. 7-12

SAN FRANCISCO CO.—Herman Lawson Co., 465 Tehama St., San Francisco—\$156,340 for installation of a sprinkler system at Fort Mason, San Francisco—by U. S. Engineer Office, San Francisco. 6-22

SAN FRANCISCO CO.—J. D. Proctor, Inc., Box 247 Point Richmond Station, Richmond—\$77,365 for sub-surface borings for foundation studies at Hunters Point—by Bureau of Yards and Docks, Washington, D. C. 7-19

SAN FRANCISCO CO.—Peter Sorensen, 927 Arguello St., Redwood City—\$97,446 for the construction of fire protection at San Francisco Port of Embarkation—by U. S. Engineer Office, San Francisco. 7-12

SAN JOAQUIN CO.—Beeson Brothers Engineering Co., 1400 N. Spring St., Los Angeles—\$198,875 for installation of sprinkler system in warehouses at Lathrop—by U. S. Engineer Office, Sacramento. 6-25

YUBA CO.—Lawrence Construction Co., 3020 V St., Sacramento—\$83,620 for evaporative coolers and exhaust ventilator system at Camp Beale, Marysville—by U. S. Engineer Office, Sacramento. 7-31

Colorado

PHILLIPS CO.—A. B. Reither, Englewood—\$407,870 for construction of 464.1 mi. of electric distribution line to serve 583 members—by High Line Electric Association, Holyoke. 7-19

Montana

STILLWATER CO.—Bennett & Lewis, Billings—\$77,980 for construction of 82.8 mi. of electric distribution line to serve 137 members—by Beartooth Electric Cooperative, Inc., Red Lodge, Mont. 7-16

YELLOWSTONE CO.—W. A. Bechtel Co., 155 Sansome St., San Francisco—\$368,000 for constructing 34 mi. of 12-in. natural gas pipeline in the vicinity of Billings—by Montana-Dakota Utilities Co., Billings. 6-25

Nevada

MINERAL CO.—Wm. P. Neil Co., Ltd., 4814 Loma Vista Ave., Los Angeles, Calif.—\$707,717 for constructing barricades at the loading docks and replacement of railroad rails at the Naval Ammunition Depot, Hawthorne—by Bureau of Yards and Docks, Washington, D. C. 6-21

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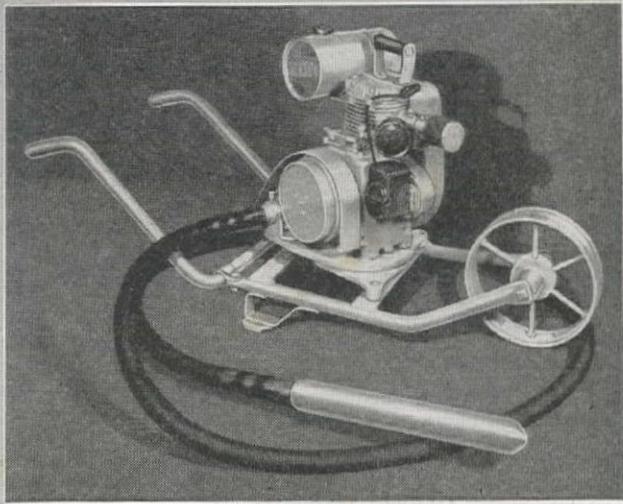


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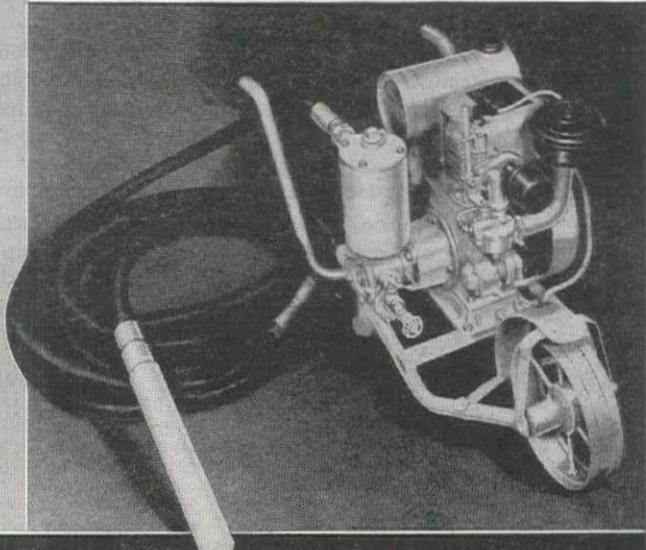
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Oregon

LINN CO.—P. S. Lord, 4507 SE. Milwaukee Ave., Portland—\$44,468 for rehabilitation of plumbing system and misc. existing bldgs. at the AGF replacement depot No. 4, Camp Adair—by U. S. Engineer Office, Portland. 7-11

LINN CO.—W. C. Thompson, 2801 3rd St., San Francisco—\$141,250 for clearing a 42-mi. right of way for the Albany-Toledo transmission line—by Bonneville Power Administration, Portland. 6-20

Texas

BEXAR CO.—Automatic Sprinkler Corp. of America—Jones and Britain Streets, Youngstown, Ohio—\$148,404 for installation of automatic sprinkler systems at San Antonio Air Depot, Kelly Field—by U. S. Engineer Office, San Antonio. 6-20

BEXAR CO.—Reliable Automatic Sprinkler Co. of Oklahoma, Oklahoma City, Okla.—\$162,777 for installation of an automatic sprinkler at the San Antonio Army Service Forces Depot, San Antonio—by U. S. Engineer Office, San Antonio. 7-12

BEXAR CO.—F. L. Scott and Son, San Antonio—\$93,810 for installation of fire exit doors and chutes at Brooke Hospital Center, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-4

BEXAR CO.—Nathan Wohlfeld, 5027 Willis Ave., Dallas—\$121,363 for construction of an enclosed swimming pool at Brooke Hospital Center, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 7-12

TARRANT CO.—Texas Automatic Sprinkler Co., Dallas—\$214,450 for installation of automatic sprinkler systems in warehouses at the Quartermaster Depot, Fort Worth—by U. S. Engineer Office, Denver. 6-20

Utah

BOX ELDER CO.—R. J. Daum, 6803 West Blvd., Inglewood, Calif.—\$87,326 for recreation facilities, occupational and therapy bldg. at Bushnell Hospital, near Brigham City—by U. S. Engineer Office, Salt Lake City. 7-26

Washington

KITSAP CO.—Scheumann & Johnson, 1011 Lloyd Bldg., Seattle—\$117,631 for construction of two storage tanks at the Naval Station, Middle and Orchard Points, Manchester—by Bureau of Yards and Docks, Washington, D. C. 7-24

PIERCE CO.—C. F. Davidson, 711 Broadway, Tacoma—\$127,279 for an enclosed swimming pool at the Madigan General Hospital, Fort Lewis—by U. S. Engineer Office, Seattle. 7-10

PIERCE CO.—MacDonald Building Co., 1517 So. Tacoma Way, Tacoma—\$150,772 for additional facilities at Madigan Convalescent Hospital, Fort Lewis—by U. S. Engineer Office, Seattle. 7-10

PIERCE CO.—Morrison-Knudsen Co., Inc., Hoge Bldg., Seattle—\$75,000 for repairing of bridges on the Snoqualmie branch of Northern Pacific railroad—by Northern Pacific Railroad Co., Seattle. 6-23

Territories

ALASKA—Morrison-Knudsen Co., Inc., Hoge Bldg., Seattle, Wash.—\$90,000 for construction of railroad, including bank widening and ditching from Anchorage to Fairbanks—by Alaska Railroad Co., Fairbanks. 6-23

PROPOSED PROJECTS

Building ...

Washington

KING CO.—Plans have been approved for construction of four mess halls and conversion of one existing warehouse at the Seattle Port of Embarkation, Seattle, at an est. cost of \$500,000. 7-21

PIERCE CO.—Plans are being prepared for a cold storage and food processing bldg. of reinforced concrete and frame construction at Puyallup for Farmers Cooperative Union to cost approx. \$100,600. 7-16

SPOKANE CO.—Six additional storehouses and two wings to the administration bldg. are soon to be erected at the Spokane Naval Supply Depot, Spokane. Estimated cost of the project is \$2,230,000. 7-16

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Wisconsin Engine connecting rod bearings are babbitted in our own plant, under our own complete control. A careful check is maintained to make sure that the metal is always what it should be and that it is applied the way it should be. This helps to make a better engine . . . designed to give better service to your equipment.

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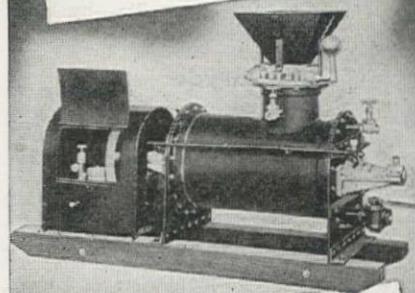
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World's Largest Builders of Heavy-Duty Air-Cooled Engines

For Grouting
use a
UNION!



The Union Grout Mixer and Ejector does a thorough job, whether for roadbed stabilization or any other type of grouting requirements. Send for bulletin No. 195.

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Established 1900

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NEW JERSEY

Export Office - 50 Church St., New York 7, N. Y.

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This Plant dedicated to accurate and precision gears

Since 1905 the Johnson Gear Company has been working with the steadfast purpose to improve the art of making fine gears. In step with this policy the J.G. plant is equipped with the most modern gear-cutting equipment. Some of our craftsmen have made gears their life work and their loyalty to this service contributes in a great part to the accuracy of our products. For special or standard gears, you will find complete satisfaction in Johnson Gear Company's service.



JOHNSON GEAR & MANUFACTURING CO., LTD.

MAIN OFFICE AND WORKS: BERKELEY, CALIFORNIA



Faster Handling OF PIPE, PLATE, STRUCTURALS

PLATE GRIPS — Safe, positive grips in a variety of sizes for handling vertical plates or upending horizontal plates and assemblies.

PIPE TONGS — Heavy duty tongs for easy handling of pipe, billets, bars, timber. Locks in open position. Picks up from floor surface.

PLATE HOOKS — Handle one or more horizontal plates. Used in sets of 2 or 4. Two styles.

RAIL TONGS — Handles large or small rail. Two sizes with 3" or 4½" jaw.

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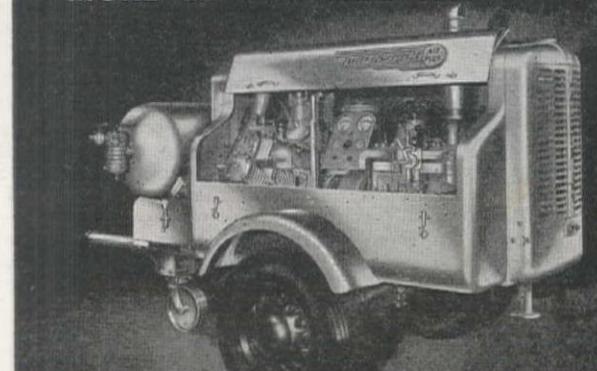
MECHANICAL ENGINEERS

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Electric Cranes • Hand Cranes • Jib Cranes • Sheaves • Sheave Blocks
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End Truck Units • Jib Crane Fittings • Automatic Mechanical Load Brake
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PLUS** **JAEGER COMPRESSOR**

on thousands of jobs,
Jaeger Compressors are delivering
MORE air with LESS fuel



Sizes 60 to 500 ft.



Let us show you how
these big-valved compres-
sors, built like aircraft
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• Edward R. Bacon, San Francisco 10, Calif. • Connelly Machinery Co., Billings, Great Falls, Mont. • Western Machinery Co., Salt Lake City 13, Utah, and Denver 2, Colo. • Hardin & Coggins, Albuquerque, N. M. • A. H. Cox & Co., Seattle 4, Wash. • Tractor & Equipment Co., Sidney, Mont. • Wortham Machinery Co., Cheyenne, Wyo. • Nelson Equipment Co., Portland 14, Ore., Spokane, Wash., and Twin Falls, Idaho. • Mountain Tractor Co., Missoula, Mont.

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Grout—Foundation —Exploration—

Our many years' experience, modern equipment and experienced crews will save you time and money.

For any drilling problems consult us.

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**DIAMOND DRILL
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3425 STONE WAY — SEATTLE 3, WASH.

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Recent changes and promotions in the organization of the CAPITOL TRACTOR & EQUIPMENT CO. at Sacramento, Calif., include **Harold King**, from service manager to industrial sales engineer; **Roy Westerfeld**, from assistant service manager to service manager; **W. J. Smith**, from sales engineer to agricultural sales manager. **Gordon Harris**, until recently with a San Francisco Bay area tractor distributor, has been made sales promotion manager. Capitol Tractor & Equipment Co. is the ALLIS-CHALMERS distributor in northeastern California. The firm is also representative for GENERAL MOTORS DIESEL, HARNISCHFEGER CORPORATION, BUFFALO - SPRINGFIELD ROLLER CO., WOOLDRIDGE MANUFACTURING CO., GAR WOOD INDUSTRIES, MIXERMOBILE MANUFACTURERS, PACIFIC CAR & FOUNDRY CO. and ISAACSON IRON WORKS.

☆ ☆ ☆

An agreement has been signed for the acquisition by DRESSER INDUSTRIES INC., Cleveland, Ohio, of the SECURITY ENGINEERING CO., INC., of Whittier, Calif., according to a joint announcement by **H. N. Mallon**, president of Dresser, and **W. E. Seivers**, executive vice president of Security, and now awaits approval of

the Commissioner of Corporations of California and stockholders of Security Engineering Co.

☆ ☆ ☆

HAYWARD INDUSTRIES of Los Angeles, Calif., has announced the acquisition of the SECURITY VALVE CORP., manufacturers of Sentinel earthquake operated gas shut-off valves and other safety and protective devices. There will be no change in the firm name. **F. W. McRae** will continue his association with the concern and will serve the new organization as sales manager. **R. W. Arnett** will be general manager.

☆ ☆ ☆

INDUSTRIAL EQUIPMENT CO. announces the following change in location of its northern California sales and service organization: Administrative and sales offices are now located in San Francisco, at 155 Sansome St. The general office, repair and service facilities are located at 10911 Russett St., Oakland.

☆ ☆ ☆

John Gronlund has recently joined the organization of PETTIBONE MULLIKEN CORP. as director of sales in the construction equipment division of the company. He has had many years of experience in the construction equipment field, including former connections with LA

PLANT-CHOATE CO. and the BUCK-EYE TRACTION DITCHER CO. The Pettibone company is now in full volume production on their PMCO line of shovel dippers, pullshovel dippers, drag line and clamshell buckets. Gronlund will make his headquarters at the company offices in Los Angeles, Calif.

☆ ☆ ☆

After several years of "Lustreless Olive Drab," the first diesel track-type tractor of the CATERPILLAR TRACTOR CO. has emerged from the company's paint shop at San Leandro, Calif., wearing a bright coat of "Highway Yellow," which in the past identified Caterpillar machines for many years. On hand to view the first of the machines to leave the factory under the familiar color, were Vice President **H. S. Eberhard**, Assistant General Sales Manager **W. K. Cox**, and **D. E. Bamber**, superintendent of painting and shipping.

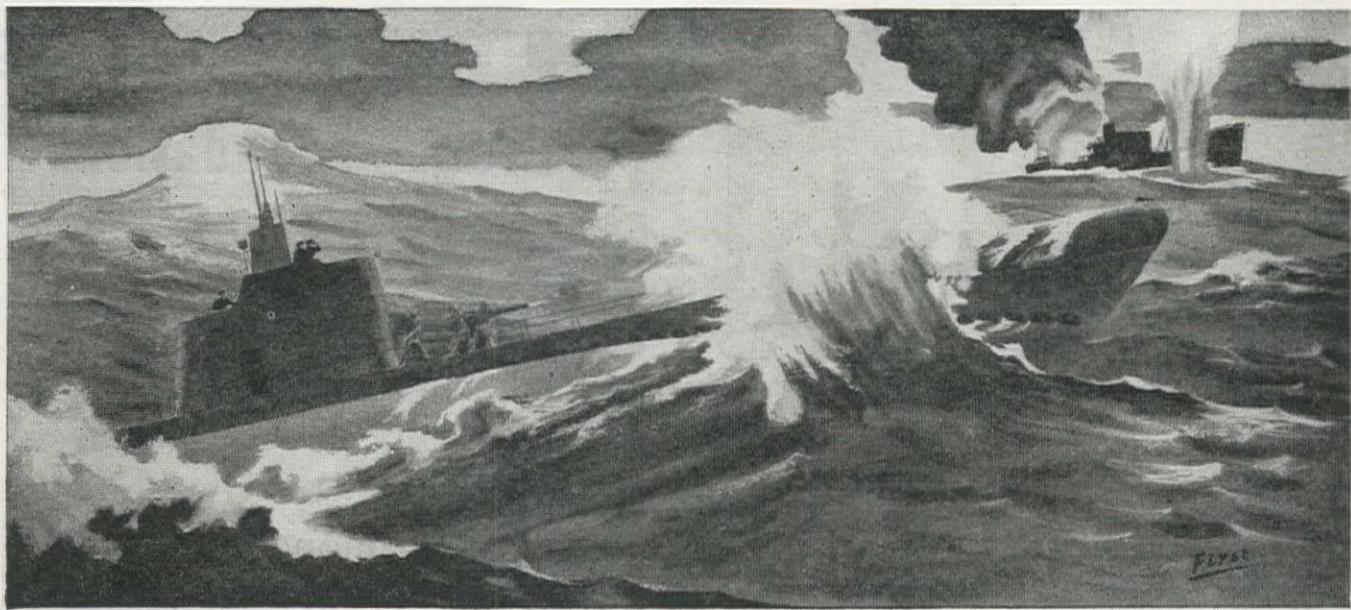
☆ ☆ ☆

INTERMOUNTAIN

G. A. Duemling, president of STEEL CONVERSION CORP., Las Vegas, Nev., recently announced that the production of 800 units per day in the pneumatic tool division at the Las Vegas plant will shortly be stepped up to 2,400 units daily. Duemling stated that this is the first time in the West that custom tools of this type have been manufactured, the great demand for such tools by construction, mining and other industrial operators making this step necessary. Facilities are now available for general repair on custom industrial tools.

☆ ☆ ☆

CUMMINS ENGINE CO., INC., Columbus, Ind., recently announced the sale



PRECISION

A synthetic rubber that surpasses natural rubber in resistance to heat, oils, acids, and other severe industrial conditions—that's Synalite, Pioneer's super-synthetic. • Like the submarine, precision instrument of war, and the plans that bring it to meet its quarry at precisely the place and moment designated, Synalite is the result of precision workmanship—precision in compounding, fabricating and vulcanizing.

A synthetic rubber that surpasses natural rubber in resistance to heat, oils, acids, and other severe industrial conditions—that's Synalite, Pioneer's super-synthetic. • Like the submarine, precision instrument of war, and the plans that bring it to meet its quarry at precisely the place and moment designated, Synalite is the result of precision workmanship—precision in compounding, fabricating and vulcanizing.

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Job Tailored BELTING • HOSE • PACKING
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353 SACRAMENTO ST., SAN FRANCISCO, 11
Branches in: LOS ANGELES • PORTLAND • TACOMA • SEATTLE
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SAVE MONEY—
TIME AND LABOR
with
SYNTRON

100% Self-Contained
Gasoline Hammer

PAVING BREAKERS

Busting Concrete, Breaking Rock,
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UNPRECEDENTED FEATS IN PILE DRIVING



"UNIVERSAL" LEVEL TRANSIT

For Greater Accuracy, Dependability and Precision



Especially designed for running levels and taking vertical angles on all survey and check-up operations . . . Patented Ball Bearing Race assures perfect adjustment under severest conditions . . . 25 power telescope . . . light, easy to operate . . . features of higher priced models. Write today for full information, prices and FREE booklet, "How to Lay Out Building Lots."

Expert Repairing—All Makes of Instruments

DAVID WHITE CO., 317 W. Court St., Milwaukee 12, Wis.

Streamlined INSIDE for Higher Efficiency and Lower Operating Costs

RUGGED SIMPLICITY OF
DESIGN ELIMINATES
RECIRCULATION—

DELIVERS
GREATER VOLUME
PER GAL. OF GAS

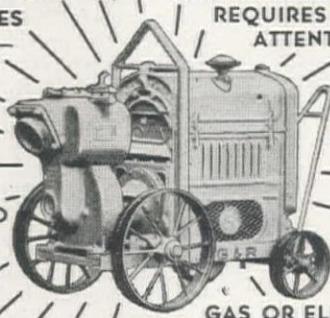
NO ORIFICE OR
PRIMING VALVES TO
CLOG OR JAM

CAPACITIES UP TO
125,000 GPH

NEVER LOSES PRIME
REQUIRES LITTLE
ATTENTION

CLOSE
COUPLED
TO
MOTOR

GAS OR ELECTRIC



Distributors

Pacific Hoist & Derrick Co., Seattle, Washington; Andrews Equipment Service, Portland, Oregon; Western Construction Equipment Co., Billings, Montana; The Sawtooth Company, Boise, Idaho; The Lang Co., Salt Lake City, Utah; Harron, Rickard & McCone Company of Southern California, Los Angeles, California; Francis Wagner Co., El Paso, Texas; Neil B. McGinnis Co., Phoenix, Arizona; Lomen Commercial Co., (Alaska Dis. exclusively) 327 Colman Bldg., Seattle, Wash.; Allied Equipment Co., Reno, Nev.; Wortham Mach. Co., Cheyenne, Wyo.



THE GORMAN-RUPP COMPANY, MANSFIELD, O.

GORMAN-RUPP
SELF-PRIMING CENTRIFUGAL PUMPS

McKiernan-Terry Pile Hammers have long been associated with outstanding construction projects . . . for example, the largest earth dam in the world at Fort Peck, the longest bridge in the world at San Francisco, the largest of all man-made things, Grand Coulee Dam.

But far transcending all these in importance are the many vital war-front jobs on which McKiernan-Terry Hammers have been engaged. Wherever ports or bridges have been built or repaired, and on many other front-line tasks such as building air fields, dams and advanced base sections . . . usually under fire . . . these speedy, sturdy machines have justified their selection by the War and Navy Departments.

Throughout the War, the large, well-equipped McKiernan-Terry plants at Harrison and Dover, N. J. have continued to deliver . . . promptly . . . ever-increasing numbers of hammers required by U. S. Army Engineers, "Seabees", and other war construction agencies. After the War these facilities will be available for peace time activities in the Marine Industry, Construction Industry and in other lines.

For Final Victory—Buy MORE War Bonds

McKiernan-Terry
CORPORATION

16 PARK ROW

NEW YORK 7, N. Y.



GATKE Brake Blocks and Frictions — Molded to machined accuracy in ALL shapes and sizes —

GATKE MAKES
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FOR smooth, positive, non-grabbing action for Starting, Swinging, Hoisting and Stopping — you want GATKE High-Heat-Resisting Asbestos Brake Materials.

They are specially engineered and service-proved for all brakes and clutches of Excavating, Road Building and Construction Equipment.



ATTENDING A REGIONAL meeting of American Concrete Pipe Association in Denver on July 13, were, Seated, l. to r.: WM. B. FREEMAN, Lock Joint Pipe Co., Denver; CARL BLUEDORN, Waterloo, Iowa; H. S. ALLEN, Kansas City, Mo.; CAPT. M. G. ROUX, Ampere, N. J.; H. M. CHADWICK, Armco Drainage & Metal Products Co., Inc., Denver; ROY GRANT, Armco, Denver; E. M. GARDNER, Sheffield Steel Corp., Denver; HOWARD F. PECKWORTH, Managing Director of the Association, Chicago. Standing: l. to r.: C. W. WEBB, Armco, Denver; EARL H. EBY, Elk River Concrete Prod. Co., Helena, Mont.; T. HASKILL, American Steel & Wire Co., Denver; PARDNER TELLYER, Albuquerque, N. Mex.; GEORGE R. JESSEN, Utah Concrete Pipe Co., Salt Lake City; GEORGE LILLIE, Scottsbluff, Nebr.; H. B. TELLYER, Albuquerque, N. Mex.; HOWARD J. DAVIS, Colorado Fuel & Iron Corp., Denver; T. J. KAUER, Assistant Director of the Association, Washington, D. C.

of the Denver dealer franchise for Cummins diesel engines to Jay B. Chambers, who has been a member of the Cummins organization for twenty years and since

1935 has been Cummins regional manager in the mid-continent area. The Denver dealership has been owned and operated by the manufacturer under the name of Cummins Diesel Sales of Colorado, Inc. Under the new ownership, the organization will be known as CUMMINS DIESEL SALES OF COLORADO COMPANY. Sales and service organization will continue at its present location at 2501 Champa St., Denver, with Lars O. Prestrud remaining as manager.

★ ★ ★

Arthur and Joe Lyon, co-founders of the BOISE-WINNEMUCCA STAGE LINE, have sold their holdings, practically the entire capitalization, to a group of Boise businessmen. The new president is J. B. Dollard, vice-president is E. D. Baird, R. B. Kading is secretary, Ray Trask is traffic manager, and R. R. West is a director. The company operates about 270 mi. of line over the I.O.N. highway, recently completed.

★ ★ ★

PACIFIC NORTHWEST

Construction by KENWORTH MOTOR TRUCK CORP. of a heavy-duty truck and bus manufacturing plant, said to be the largest, best equipped and most modern plant of its kind west of the Mississippi, will start immediately, according to a recent announcement by Paul Pigott, president of Kenworth and of PACIFIC CAR & FOUNDRY CO. The new factory will be erected on the properties of the Pacific Car & Foundry Co. in Renton, Wash., at an estimated cost of between \$250,000 and \$300,000. On completion, the Kenworth operations will be moved from Seattle to Renton, and will continue under the guidance of John Holmstrom, general manager.

★ ★ ★

John D. Richie has been named chief of the research department of DOUGLAS FIR PLYWOOD ASSOCIATION, succeeding J. D. Long, who is resuming his

MODEL 80

Fast, accurate single or multiple cuts with an Electric MallSaw that assure square board ends, save sawing and fitting time and speed up every carpentry job from form construction to general finishing. In addition, MallSaws are readily adapted to cutting metal, cutting and scoring concrete, tile and stone with an abrasive wheel. Ruggedly constructed for continuous hard use, light in weight, easy to handle and easily adjusted for depth and bevel cuts. Available for 110-volt A. C. or D. C.; 220-volt A. C. or D. C. Model 80 has 8" blade and 2½" cutting capacity. Model 120 has 12" blade and 4½" capacity.

Ask your Distributor or write direct for literature and prices.

MALL TOOL COMPANY, 7735 South Chicago Avenue, Chicago 19, Ill.
CALIFORNIA OFFICES: 1025 S. Santa Fe Avenue, Los Angeles; 925 Howard Street, San Francisco



Mall
REG. U. S. PAT. OFF.

**PORTABLE
POWER TOOLS**

Lightning RIBBED CENTER CONVEYOR BELT

LONGER LASTING!

The patented ribbed center tread on Lightning Conveyor Belt prevents load slippage, even with wet materials and high angle delivery. Conveyor belt life is shortened by load slippage...just as tire life is shortened when a wheel is out of alignment. With Lightning Conveyor Belt on the job, the result is less abrasion...longer life...money saved.

The AMERICAN RUBBER Mfg. Co.

PARK AVENUE AND WATTS STREET, OAKLAND 8, CALIF.

FOR A NEW WORLD OF WATER



PEERLESS now produces
HORIZONTAL as well as Vertical pumps

217 West Julian Street, San Jose 5, California

PEERLESS PUMPS

PEERLESS PUMP
DIVISION
Food Machinery Corp.



VERTICAL &
HORIZONTAL

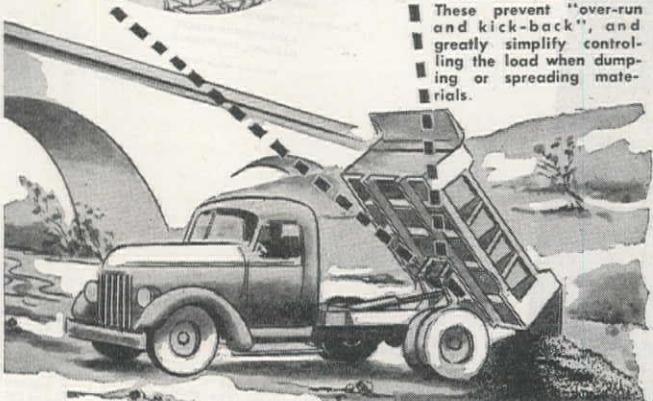
FACTORIES
LOS ANGELES 21, CALIFORNIA
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Why 'ANTHONY' HYDRAULIC

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TRUCK EQUIPMENT

Anthony Features of design and construction are the result of firsthand knowledge of job needs and customer requirements. For example: This X-ray illustration shows the DOUBLE ARM "POWER SPEED" LIFT of the SUPER Hoist. Proven in the field through years of service. The steady, constant change in movement of piston and lift leverage compounds the power to give Anthony hoists a tremendous lift advantage at the beginning of the lift, when LOAD IS HEAVIEST, and increasingly faster action as body goes up and load lightens—notice too, the "RUBBER RESTRAINING BLOCKS" inside of links. These prevent "over-run and kick-back", and greatly simplify controlling the load when dumping or spreading materials.



HOISTS and BODIES for ALL
Motor Trucks • 6 Wheelers • Semi-Trailers



SOLVES A
MANPOWER PROBLEM



ANTHONY COMPANY
STREATOR ILLINOIS



ANTHONY NATION-WIDE SALES & SERVICE

Phoenix, Arizona
Salt Lake City, Utah

Denver, Colorado
Portland, Oregon
Seattle, Washington

Los Angeles, California
Oakland, California

agricultural and education work. **George M. Williams** succeeds to the post formerly occupied by **Ritchie**. All three men will maintain offices at **Tacoma, Wash.**

☆ ☆ ☆

AMONG THE MANUFACTURERS

W. B. Elliott, president of **INSLEY MANUFACTURING CORP.**, Indianapolis, Ind., has announced the appointment of **Louis R. Russell** as chief engineer of the company's crane and shovel division, in charge of research, design and development of present and future models. Russell has a background of 38 years' experience in design engineering with such leading shovel companies as **BUCYRUS - ERIE CO.**, **MARION STEAM SHOVEL CO.**, **THE KOEHRING CO.**, and **ERIE SHOVEL CO.** His appointment permits

Frederick B. Ray, chief engineer of the concrete equipment division, to devote his entire time to research and development in the field of concrete equipment. Insley's concrete equipment line, developed under Ray's supervision, includes readymix concrete buckets, floor and receiving hoppers, rocker and standard dump hand carts and roller hoist buckets.

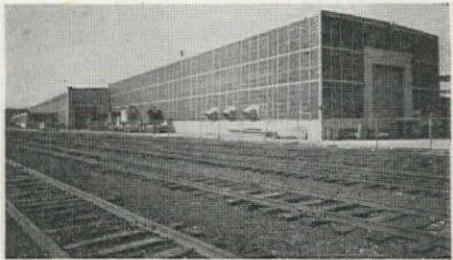
☆ ☆ ☆

Robert MacD. Jamison, a graduate of Colorado School of Mines, has been appointed chief engineer of **NOVO ENGINE CO.**, Lansing, Mich. He was for some years a member of the engineering staff of **KELVINATOR CORP.** and since 1940 has been a member of the faculty of Wayne University at Detroit, being now assistant professor of mechanical engineering.

George P. White has recently been appointed eastern sales manager of **THE BUFFALO - SPRINGFIELD ROLLER CO.**, Springfield, Ohio. Joining the company in 1909, White has done most of his work in the eastern states, testing, demonstrating and as a traveling roller expert. Transferred to the Philadelphia office in 1912 as service manager, he became Philadelphia branch manager in 1915, a position he has held until his present appointment.

☆ ☆ ☆

BAY CITY SHOVELS, INC., Bay City, Mich., has just completed a new plant, its third expansion since Pearl Harbor, to keep pace with the demands of the armed forces for mechanical aids. The new addition will increase the output of both crawler



TALK ABOUT PAYLOAD!

Enthusiastic owners of Cook Bros. Chain Drives comment on their experience.

Pacific Coast Aggregates, Inc.
General Building Materials
Concrete Aggregates • Transmix Concrete
3400 PERALTA STREET
OAKLAND, CALIFORNIA
Telephone Haight 6770

April 24, 1945

Cook Bros.,
1800 Pasadena Ave.,
Los Angeles, 31, Calif.

Attention: J. G. Sims

Gentlemen:

It might interest you to know that the three Model No. H692-CHD-2 Cook Attachments purchased from you July 29, 1944, and attached to E.Q.U. Mack two wheel chassis, enabled us to increase our pay load 35-1/3%, viz. from three cubic yards to four cubic yards of concrete. That in its self is, we believe, noteworthy. After our recent purchase of four additional units of the same type (giving us a total of seven units) we find ourselves able to carry five cubic yards of concrete with an ample margin of safety. This means a pay load increase of 66-2/3%. The change-over has certainly been gratifying to our company and to the writer in particular. It is evident that you have given a great deal of study to the engineering of these units as we have yet to have a road failure.

For your information and records, we have mounted with us.

You may feel free to refer anyone who might be interested in your attachments, to me, and I will gladly display my performance records.

Very truly yours,

James Gordon
James Gordon
Supt. of Transportation

3 SIZES
Available
in 10, 12
& 16 ton
capacities

JG:z

COOK BROS.

(C. B. EQUIPMENT CO. DIV.)

1800 Pasadena Ave., Los Angeles 31, Calif.

Distributors:

L. H. PIERCE AUTO SERVICE
1306 S. E. Ninth Ave., Portland, Ore.

INDUSTRIAL EQUIPMENT CO.
1301 - 59th Street, Oakland, Calif.



and pneumatic tired excavating and material handling equipment by 30 per cent. The product most in demand for the war against Japan is the rubber-tired Cranemobile in the 10, 16½, and 20-ton types.

☆ ☆ ☆

Employees of the Aurora, Ill., plant of **INDEPENDENT PNEUMATIC TOOL CO.**, manufacturers of the **THOR** portable pneumatic and electric tools, have been awarded their fifth Army-Navy "E" production banner, making the fourth renewal to the original flag awarded the company in October, 1943.

☆ ☆ ☆

Announcement of the appointment of **E. F. Bentley** as contractors' equipment sales manager of the **DETROIT DIESEL ENGINE DIV.** of **GENERAL MOTORS CORP.**, was recently made by **V. C. Genn**, sales manager. Bentley succeeds **A. N. Anderson**, now Detroit Diesel Engine dealer in Los Angeles, Calif.

☆ ☆ ☆

H. L. Vines, director of sales for **TYSON BEARING CORP.**, Massillon, Ohio, manufacturers of tapered roller bearings, has announced the appointment of **BORG-WARNER INTERNATIONAL CORP.** of Chicago, Ill., as their sales representatives in all export markets except Canada and Alaska.

☆ ☆ ☆

THE BAKER MANUFACTURING CO., Springfield, Ill., manufacturers of the Baker bulldozer, has been honored for its achievements in the war effort by receipt of a third star for its Army-Navy "E" pennant. Besides the bulldozer, the company has been furnishing snow plows to the military for use in northern latitudes, where they have prevented heavy snowfalls from impeding movement of war materials.

☆ ☆ ☆

Sidney E. McCrum, formerly assistant to the advertising manager of the Chicago Pneumatic Tool Co., New York, was named assistant advertising manager for the **WICKWIRE SPENCER STEEL CO.**, New York City, according to an announcement made recently by **C. B. Konselman**, Wickwire's advertising and public relations manager.

NEW EQUIPMENT

Mobile Power Shovel

Manufacturer: Byers Machine Company, Ravenna, Ohio.

Equipment: Full Circle, Mobile Shovel.

Features claimed: A practical full circle, mobile, one-man-operated power shovel of the one-half cu. yd. size. It is mounted on a four-wheel drive traction and steering



under the control of the same man who operates the unit as a shovel or crane. This one-man control and the short coupled chassis which permits 360 degree operation are acclaimed as the high point of this new design. The unit is known as the "Traveler," has speed of travel, traction effort, air braking and hydraulic steering,

Timken Detroit axles. Overall width of the lower chassis is 8 ft. to meet state highway regulations. Wheel base of 9 ft. approximates the ground bearing length of most $\frac{1}{2}$ -cu. yd. shovel crawlers and permits digging over front and rear of the machine.

New Electrode Grip

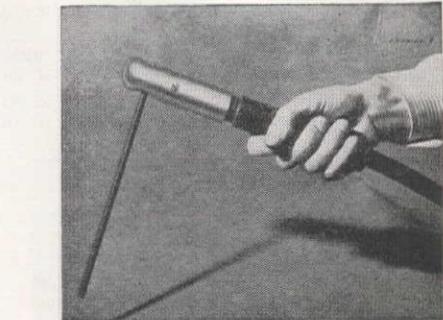
Manufacturer: General Electric Co., San Francisco, Calif.

Equipment: Armor-clad (screw type) electrode holder.

Features claimed: Designed from the operator's viewpoint the new holder is recommended for use wherever durability, maximum safety, and minimum operator fatigue are desired.

A feature of the new holder is its head, which is completely enclosed in a sheath of aluminum armor. This armor protects the insulation from weld spatter and eliminates the possibility of accidental contact with the welding circuit. Thus the holder remains clean while in use and lasts considerably longer than insulated holders without armor cladding.

Designed to accommodate electrodes up to and including $\frac{1}{4}$ in. in diameter, the holder is easy to use, light in weight (15 oz.), and unusually cool in operation. A slight twist of the hand tightens or releases the electrode. While in use, the holder firmly grips the electrode and good current contact is maintained. This keeps the holder cool, tends to prevent overheating of the



electrode, and maintains a uniform melting rate clear down to a stub end. A soldered cable connection also helps the holder to remain cool. The width of the electrode slot limits the size of the electrode which can be inserted, thus preventing overloading, one of the evils which materially shorten the life of electrode holders.

Surface Plates

Manufacturer: Ideal Commutator Dresser Co., Sycamore, Ill.

Equipment: Granite surface plates.

Features claimed: Accuracy to .0001 in. is now possible with the new Ideal Granite Surface Plates when gauging points, laying out drill jigs, dies and fixtures.

The surface plates are available in many standard sizes, ranging from 8 x 10 in. to 30 x 72 in. They have many advantages not obtainable in plates made of metal, including hardness, uniform cross section, smooth free action. The plates are made of seasoned Vermont granite free



KELITE pH CONTROL

**Key to a New Standard of Efficiency
In Chemical Cleaning and Processing**

By constant adherence to the pH chart, which accurately measures the cleaning power needed for every type of soil removal and shows the exact limits of safety for the surface being cleaned, Kelite has taken the guesswork out of cleaning... provided a reliable key to better cleaning for less.

Ask your local Kelite Service Engineer or write: Kelite Products, Inc., 909 E. 60th St., Los Angeles 1, Calif.

"Kelite" Reg. U. S. Pat. Off. Chart copyrighted 1942 by Kelite Products, Inc.



KELITE
pH
Control

Load Trucks 3 TIMES FASTER

1/2 TO 2 YARD
BUCKETS

**FLEETFOOT
JAEGER LOADER
CRANE and EXCAVATOR**

LIGHT EXCAVATING—
can dig outside its
wheels.

Digs, swings, dumps in one
fast movement—no maneuvering, 11 fewer clutch
moves. Powerful crowd—
can grade, backfill. Travels at 15 m.p.h. Ask for
Catalog JL-5.

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from all internal stresses, which makes it non-warping.

Granite is a hard natural occurring substance not easily damaged, as nicks or scratches will not raise a burr and affect the accuracy. Having a low co-efficient of



friction, tools and fixtures can be moved over the granite with ease.

Unlike steel plates, which must be protected against corrosion, the Ideal granite surface plates need no such protection. Being non-magnetic, it will not attract and hold iron chips or dust.

Milling Attachment

Manufacturer: Globe Products Manufacturing Co., Los Angeles, Calif.

Equipment: Milling Attachment for Lathe.

Features claimed: An improved milling head which converts a lathe in less than three minutes into a combination machine capable of doing the same precision work as a more costly milling machine. The

Globe Miller is an attachment which fits the ways of the lathe, and its operation is identical with that of a standard milling machine except that the spindle is moved into position to engage the work, rather than the work lifted to engage the spindle. This attachment increases the swing of a small lathe by almost double. For example, the swing of an 11-in. lathe can be increased to 19½ in., large enough to true up good-sized truck drums as well as drums for passenger cars. Costing only a fraction as much as a standard miller, the Globe can perform practically any milling operation such as gear cutting, slitting, gang-milling, cutting "T" slot in casting, cutting keyway in shafting.

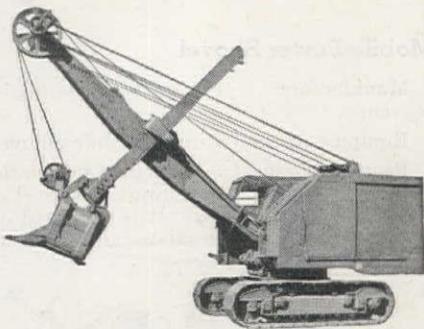
Shovel-Crane-Dragline

Manufacturer: Koehring Company, Milwaukee, Wis.

Equipment: One and one-half cu. yd. Shovel-Crane-Dragline.

Features claimed: Three basic requirements have been stressed in the design of the new Koehring 605 model: Ease of operation, basic strength and simplicity, quick convertibility. Main drum clutches of the 605 are of a new, improved design. Power engaged but manually released, they enable the operator to retain the feel of the load at all times. Frequent adjustments are unnecessary. Independent power or live boom control or a combination of both are available. The shovel dipper trip is the trigger-fast pawl-and-ratchet type that is exclusive on Koehring excavators. Crowd-retract and swing-traction clutch levers work easily because troublesome partial engagement of the unused clutch is eliminated by a new

double fulcrum linkage. Separate crawler frames give the lower assembly added flexibility. The 605 shovel boom has an im-



proved foot shock absorber and the simplified shipper shaft assembly is designed to be easily removable. The dragline fairlead is pin-mounted for quicker conversion.

Speed Clamp

Manufacturer: Grand Specialties Company, Chicago, Ill.

Equipment: Speed Clamp.

Features claimed: An extra deep throat, quick setting, instant trigger release, spatter proofed Dee-clamp. The clamp is said to release instantly by merely loosening the handle and pushing with the thumb or finger on the trigger release pawl which frees the ratchet screw so that the clamp is ready immediately for application to work of any other size or thickness. This new clamp is claimed to hold work with a firm tension grip on any surface, even slanting

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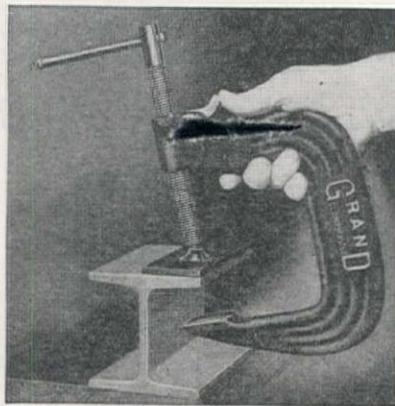
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or irregular, and is equipped with replaceable ball and socket swivel to prevent shifting or creeping. Additional features claimed are that the clamp is protected against damage from welding spatter by copper plating on all working parts as well as on the loose-proof handles, and that it is rust-proofed with baked enamel finish.



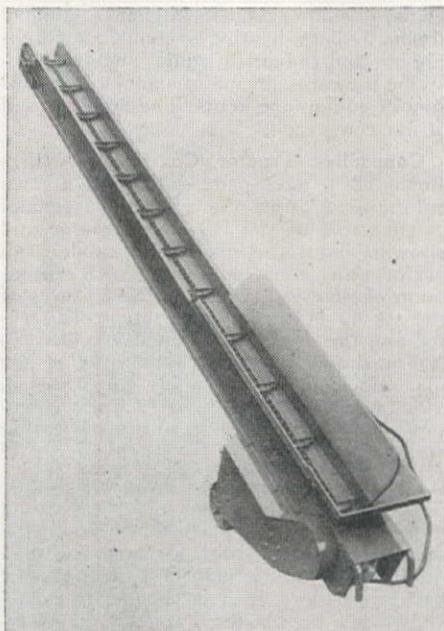
The Grand clamp is made in three sizes with extra deep throats as follows: 4 3/4-in. opening—4 1/4-in. throat; 6 3/4-in. opening—4 3/4-in. throat; 8 3/4-in. opening—6-in. throat. Claimed capacity of each size is 3,500 lbs.

Chain Conveyor

Manufacturer: American Conveyor Company, Chicago, Ill.

Equipment: Chain conveyor.

Features claimed: For raising bulk materials up steep pitches impractical for a belt, equipped with 1 3/4-in. chain-flights instead of a belt, it will handle almost any type bulk material. It is finding wide ap-



plication in unloading sand, moving metal parts, metal shavings, cinders, chemicals, clays, grains, salt and other similar bulk materials. Built in four sizes and two widths, 8 and 12 in.; two lengths, 13 and 20 ft. It lifts up to 14 ft. and is capable of delivering a steady flow of material at the rate of 160 ft. per min. All models are equipped with 40 ft. of heavy duty, rubber-covered cable. Power from the electrical

drive is transmitted through countershaft and roller sprocket chain drive. Adjustments are made through the use of 6-in. take-ups at the head pulley. The frame is fabricated of heavy gauge steel, welded throughout.

Alloy Electrode

Manufacturer: General Electric Co., San Francisco, Calif.

Equipment: Electrode for low alloy, high tensile steels.

Features claimed: Specially designed for the use on carbon-molybdenum steel in the high-pressure piping industry, this electrode may also be applied to vessels and structural weldments of innumerable kinds.

Known as type W-56, the new electrode

operates satisfactorily on either alternating current, or direct current, reverse polarity, and its range of current is sufficiently broad to cover a wide range of plate thicknesses. A medium-long arc is recommended for best results. It can be used in the flat, vertical, and overhead positions. Moreover, it produces a relative flat deposit, particularly in the vertical position.

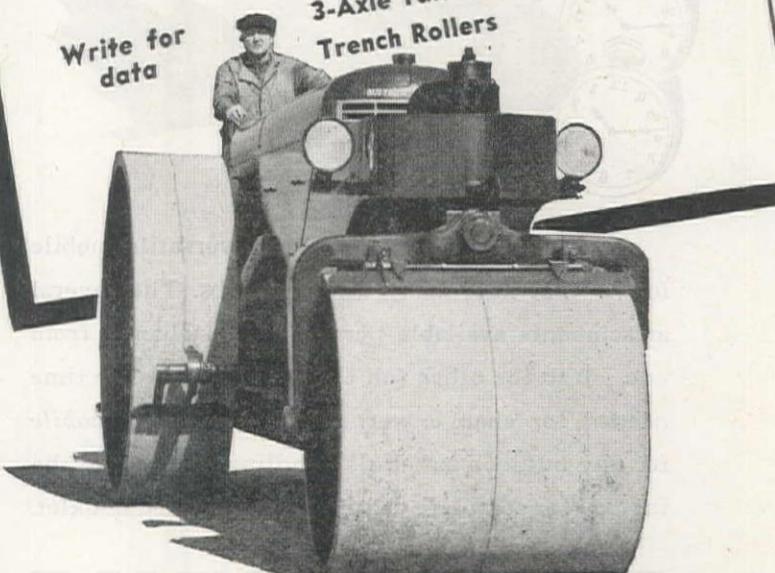
Features of the new electrode include a stable spray-type arc, deep penetration, and excellent creep-resisting qualities. In addition, the covering used produces an easily removed, light friable slag, which sets up fast, thus facilitating proper manipulation of the electrode. Available in sizes 1/8, 1/4, and 5/16 in. in diameter, the new electrode meets the requirements of AWS Classes E7010/E7011 and complies with the Navy Bureau of Ships specifications 46E2.

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LITERATURE FROM MANUFACTURERS...

John S. Barnes Corp., Rockford, Ill.—A 28-page illustrated booklet, No. 011-G, entitled "Hydraulic Circuit," explains Barnes engineering and manufacturing facilities, and how standard and special Barnes elements are integrated into compact unit type hydraulic circuits and application of these circuits for the improvement of machine performance with substantially increased output.

Jaeger Machine Co., Columbus, Ohio—Catalogue P-45 printed in three colors illustrates and explains Jaeger contractors' pumps, showing numerous applications and giving specifications of all types of

pumping equipment. Pumps of the centrifugal, diaphragm, jetting, and well point types are discussed. Also included are different types of power operations such as electric, gasoline, diesel and pneumatic.

Pioneer Engineering Works, Minneapolis, Minn.—Form 557 is a catalogue of quarry and gravel pit equipment manufactured by Pioneer. Specifications are described and photos of jaw crushers, roll crushers, apron feeders, grizzly feeders, cave belts, idler screens and dehydrators are shown. The 16-page booklet is attractively printed in two colors.

Caine Steel Co., Chicago, Ill.—A bulletin on corrugated steel sheet piling used in construction at flood control, check dam, sea wall and soil erosion structures. Numerous drawings are shown illustrating application of steel sheet piling and method

of interlocking the standard corrugated sections. Accessories such as driving caps and pulling tongs are also illustrated.

Chamber of Commerce, Portland, Ore.—An attractive loose leaf folder entitled "Let's Look At Portland," discusses in detail the industry of the Portland area including timber, agriculture, mining, manufacturing, transportation and power generation. It also suggests the future industrial opportunities of the area, recreation and cultural facilities and all facts of the city's life, illustrated with attractive photographs. Inserted in the folder graphically show the relation of the city of Portland to the northwest industrial area.

General Electric Co., San Francisco, Calif.—Booklet GEC-163 discusses electrical developments of 1944. The opening pages show unusual split-second photographs of rockets and bullets in flight. Succeeding pages show new developments in the electrical field as applied to aviation, railroads, shipping, radio, electronics, power generation, plastics, lighting, refrigeration and measurements. A brief history of the research involved in each of these new developments accompanies appropriate photographs.

R. G. LeTourneau Inc., Peoria, Ill.—Form No. N-104. A wall chart on the selection of proper wire rope requirements for LeTourneau equipment, and some hints for securing the maximum service from wire rope. Proper application for scrapers, rooters, cranes, bulldozers and other equipment is shown. The chart serves as an advertisement for "Tournarope" a cable manufactured by the company.

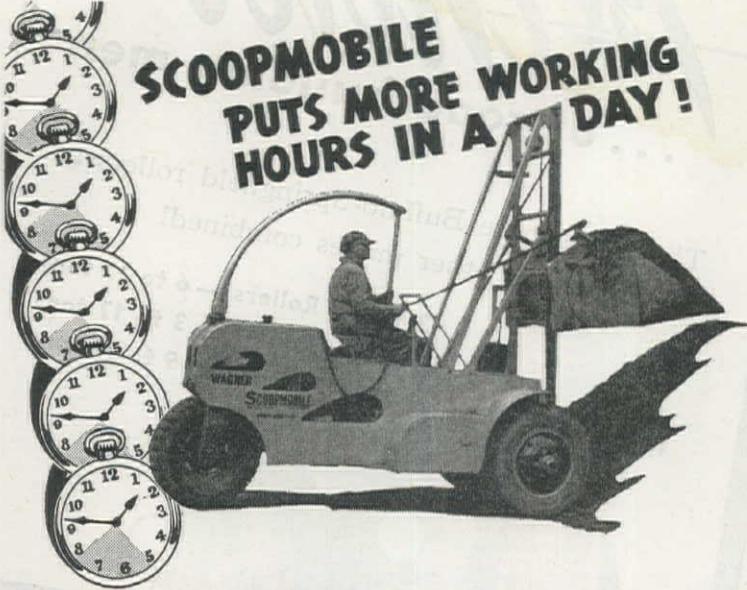
Plumbing & Heating Industries Bureau, Chicago, Ill.—Two booklets entitled "Choose a Heating Plant Wisely" and "What You Should Know About Plumbing," each containing 16 pages of pertinent information for prospective home builders. The books are illustrated with pictures and plans of bath rooms, kitchens, laundry rooms, boilers, heating systems, air conditioning and radiant heating. They also describe the care and maintenance of various special equipment items. The booklets sell at five cents each.

Caterpillar Tractor Co., Peoria, Ill.—Form 8869, a 32-page catalogue in two colors illustrating the efficient uses and construction of the D8 diesel tractor and showing how this particular model can perform any construction job with a minimum of time lost. Outstanding features of the sturdy 113 draw-bar horsepower tractor and the diesel engine which motivates it are shown along with pictures of the machine in action on many jobs. Special attachments are also listed. Cutaway sections show the operations of the lubricating and operating parts of the tractor.

Gypsum Association, Chicago, Ill.—File No. 39-B is an illustrated folder describing gypsum acoustical plaster, stressing the fact that it is fireproof, sanitary and economical and that it may be had in a great variety of colors. It gives specifications and shows how the plaster is applied, maintaining that with the material, noise—quiet is available much more cheaper than with the use of other materials.

Templeton, Kenly & Co., Chicago, Ill.—Catalogue No. 45. A new jack maintenance and repair manual gives practical help to users of lever and hydraulic jacks by illustrating and listing repair parts for various types of Simplex jacks as well as giving suggestions for maintenance, lubrication and repair of the jacks.

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Gatke Corp., Chicago, Ill.—A 68-page brochure listing the performance qualities of Gatke molded fabric bearings and describing the advantages of these bearings in meeting difficult and unusual service conditions. Performance reports under varying conditions are listed, and the numerous types and sizes in which Gatke bearings are molded to require dimensions for installation without machinery, are also illustrated.

National Truck Leasing System, Chicago, Ill.—A booklet to acquaint business executives with the availabilities inherent in truck leasing and with the services offered by the member companies of the system. The principal advantages suggested are time saving, known costs, elimination of maintenance worries, release of capital invested in trucks for smart and maintained delivery equipment. A map of the U. S. shows the location of system members.

Ideal Commutator Dresser Co., Sycamore, Ill.—A folder BB-345 describes the rechargeable flashlight battery, and lists its principal advantages as 40 per cent greater discharging capacity, a brighter and longer sustained light volume, a stronger, tougher case. An important financial saving is the fact that it can outlast 400 or more dry cells. Accessory listings include an auto-charger, a tester and gang charger.

B. F. Goodrich Company, Akron, Ohio—A two-page leaflet of data on size, prices, and weights of stock cast-iron, single and double groove FHP sheaves, also just published by the company, a new catalog section on the subject, which is available upon request.

Master Vibrator Co., Dayton, Ohio.—A recent leaflet, Form MV-710, is devoted to Master vibratory concrete finishing screens, a new method of finishing concrete on highways, parking areas, driveways, sidewalks, floors, etc. Several pictures of the equipment in action are shown.

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