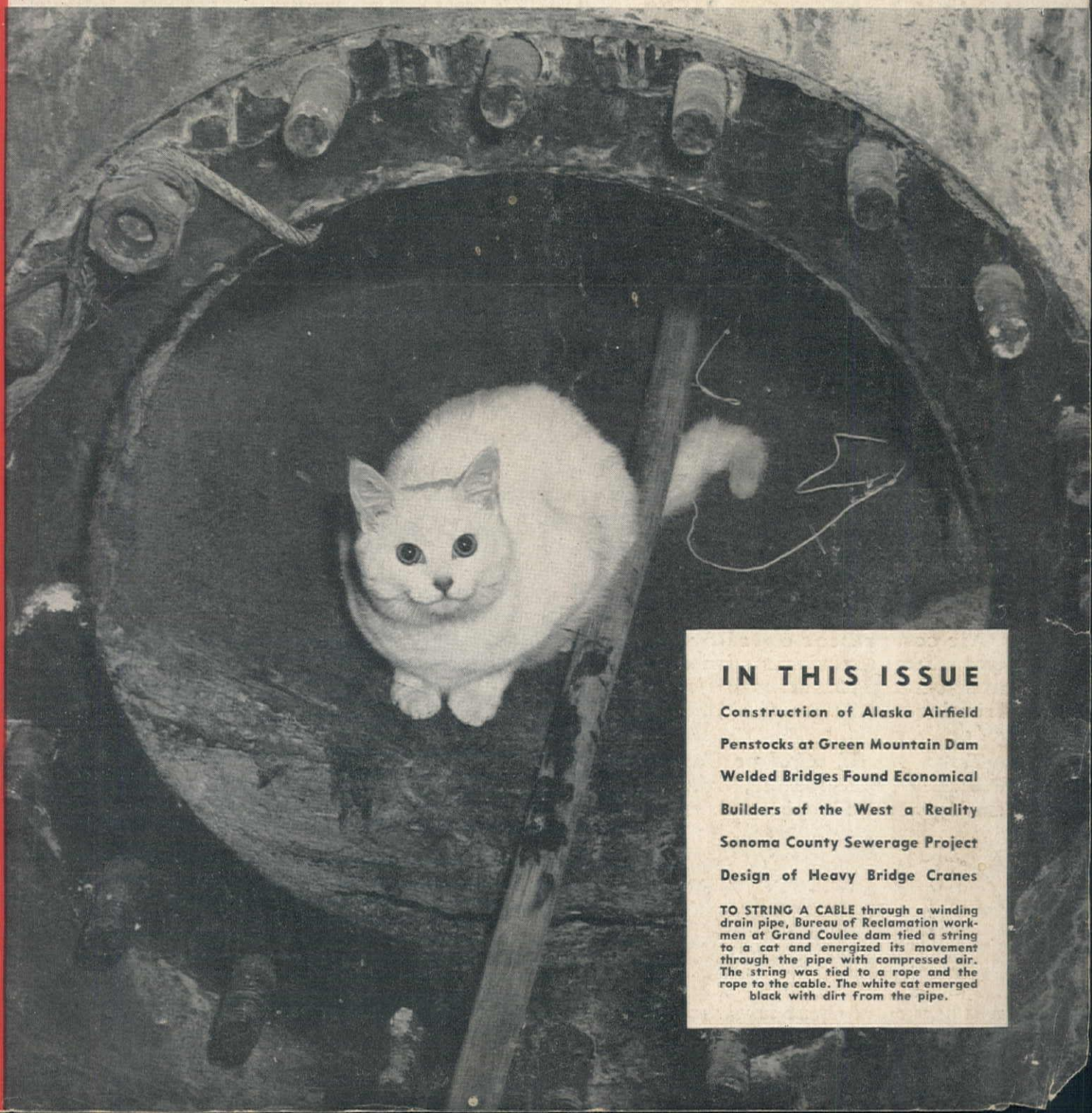
# WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XIX, No. 4

APRIL • 1944

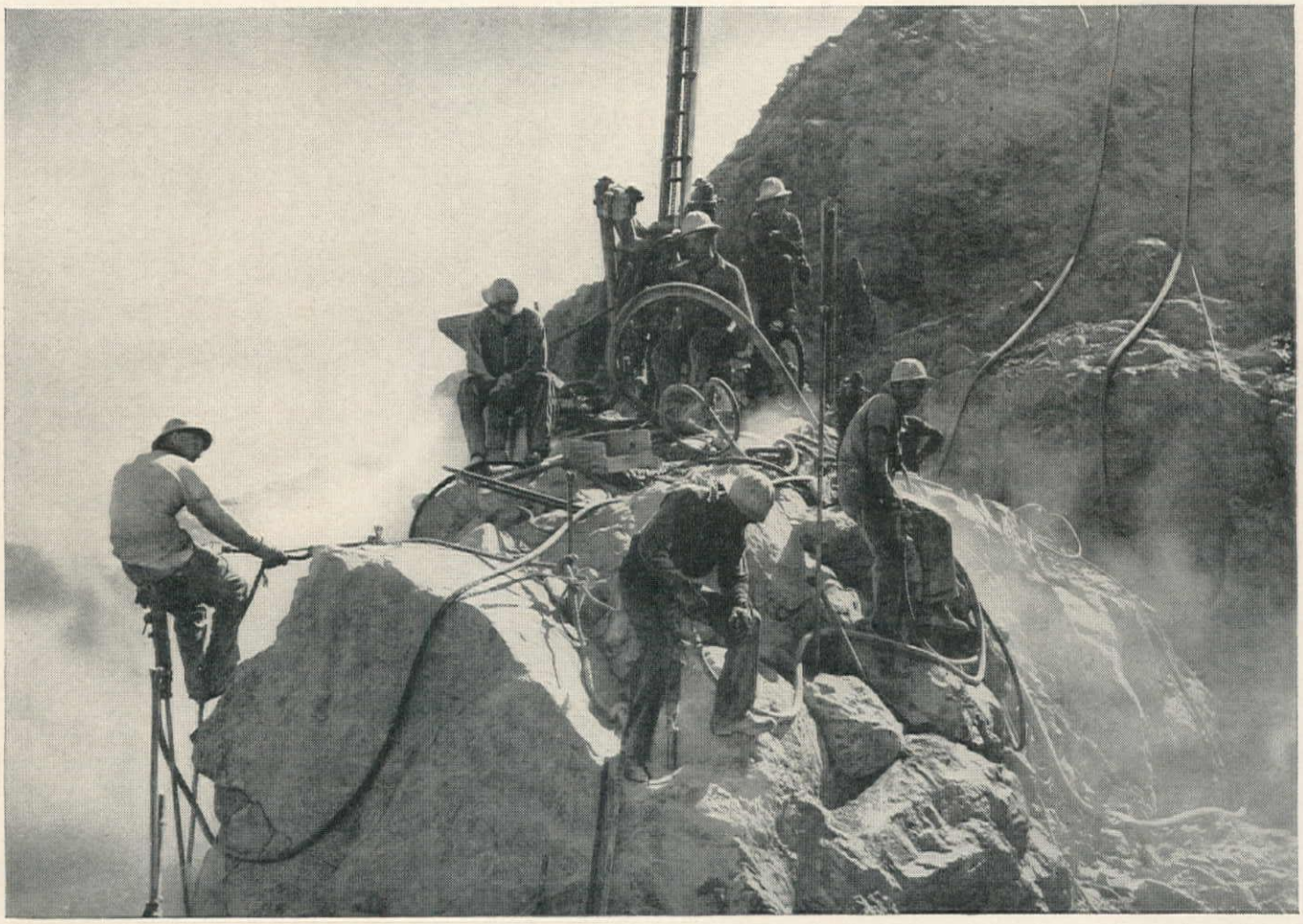
35 CENTS A COPY
$3.00 PER YEAR



## IN THIS ISSUE



**TO STRING A CABLE** through a winding drain pipe, Bureau of Reclamation workmen at Grand Coulee dam tied a string to a cat and energized its movement through the pipe with compressed air. The string was tied to a rope and the rope to the cable. The white cat emerged black with dirt from the pipe.



# FACE LIFTING

WHETHER "lifting" the face of a mountain, boring a tunnel, building Army and Navy bases or airport runways, one of a contractor's first considerations is Compressed Air.

Air compressor operators everywhere are getting continued trouble-free performance by lubricating with *Texaco Alcaid, Algol* or *Ursa Oils.*

*Texaco Alcaid, Algol* or *Ursa Oils* assure wide-opening, tight-closing valves, free piston rings, open ports, clear lines. Their use assures maximum service life between overhauls, fewer repairs and replacements.

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

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

## THEY PREFER TEXACO

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

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

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

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

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

TEXACO

# TEXACO Lubricants and Fuels

## FOR ALL CONTRACTORS' EQUIPMENT

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


"EQUIPMENT that can't work under these conditions needn't apply!"
THIS IS NO PICNIC
WORKING AND LIVING CONDITIONS ON THIS JOB ARE AS DIFFICULT AS THOSE ENCOUNTERED ON ANY CONSTRUCTION JOB EVER DONE IN THE UNITED STATES OR FOREIGN TERRITORY. MEN HI
THIS JOB WILL BE REQUIRED
E UNDER THE MOST EXTRE
TIONS IMAGINABLE. TEMPERATUR
ANGE FROM 90° ABOVE ZERO TO 70
RO. MEN WILL HAVE TO FIGHT S
IVERS. ICE AND COLD. MOSQUITOS.
AND GNATS WILL NOT ONLY BE ANNO
BUT WILL CAUSE BODILY HARM.
IF YOU ARE NOT PREPARED TO WORK
UNDER THESE AND SIMILAR CONDITION
DO NOT APPLY
Bechtel-Price-Callahan
LOOK at that sign! • 800 miles of the world's worst wilderness—mud, snow, water, bitter cold, danger! Equipment that can't work under these conditions need not apply. • Whether it's man or machine, the conditions are the same, and dependability is absolutely paramount for success. Only the best survive the wilderness. • Northwests proved themselves long ago in the Canadian "Bush." • They have seen service from Alaska to Labrador on Canada's biggest rock jobs and they have met the cold and muskeg above the Arctic Circle. • The Canol Pipe Line is another one of the many rush jobs that proves the old Northwest axiom that better machinery means dependability, lower cost operation and greater output. Talk to the men who, in this emergency, are using all types of equipment. It's the machinery that is built to do a job—not built to a price—that is coming through.
NORTHWEST ENGINEERING CO., 1727 STEGER BLDG., 28 E. JACKSON BLVD., CHICAGO 4, ILLINOIS
NORTHWEST
SHOVELS • CRANES • DRAGLINES • PULLSHOVELS
Branch Offices: 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash; 3707 Santa Fe Avenue, Los Angeles, Calif.
Northwest Sales Agents: ARNOLD MACHY. CO., INC., 149 W. 2nd South St., Salt Lake City, Utah; BALZER MACHY. CO., 2136 S.E. Eighth Ave., Portland, Oregon.
ASK how the NORTHWESTS are doing!
-and when you have a real Rock Shovel you won't have to worry about output in dirt

# WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

*The National Magazine of the Construction West*

## Contents for April, 1944



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.

**Published by King Publications**

OFFICE OF PUBLICATION
503 Market St., San Francisco 5, Calif. . . . . Telephone YUkon 1537

SOUTHWEST OFFICE
479 S. Holt Ave., Los Angeles 36, Calif. . . . . Telephone BRadshaw 2-3935
J. O. HODGES, District Manager

EASTERN OFFICE
5833 So. Spaulding Ave., Chicago 29, Ill. . . . . Telephone PRospect 1685
A. C. PETERSEN, District Manager

WASHINGTON OFFICE
1120 Vermont Ave., NW., Washington, D. C. . . . . Telephone District 8822
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Please address correspondence to the executive offices, 503 Market Street
San Francisco 5, California

Entered as Second Class Matter at the Post Office at San Francisco, California, under the Act of March 3, 1879. 

# The Bucyrus-Erie DOZERSHOVEL GETS IN... AND DIGS!

There's plenty of room all around as this Dozershovel moves into the low, narrow archway to pick up a big load of bricks . . .

. . . It carries the load to the spoil pile, dumps, then returns to repeat the operation — in a profitable hurry.

Low clearance . . . close quarters . . . tough digging . . . The job of cleaning out an open hearth furnace was painfully slow and expensive, for it had to be done by hand — until a Bucyrus-Erie Dozershovel went to work on it. Then things were different, because the Dozershovel's low over-all height allowed it to move right in under the arch, its powerful digging action let it take big bucket loads, its maneuverability permitted easy going from furnace to spoil pile. This important war job could now be done fast, economically, profitably.

This is just one of the many unusual jobs, hitherto done by hand, that the versatile Dozershovel handles efficiently. In addition to the unit's use as a shovel, a quickly interchangeable dozer blade permits full-fledged dozer service, and a hook on bucket or blade provides for utility crane application. Get the complete story of this new unit for T9 and TD9 International TracTracTors from your International distributor.

N-65

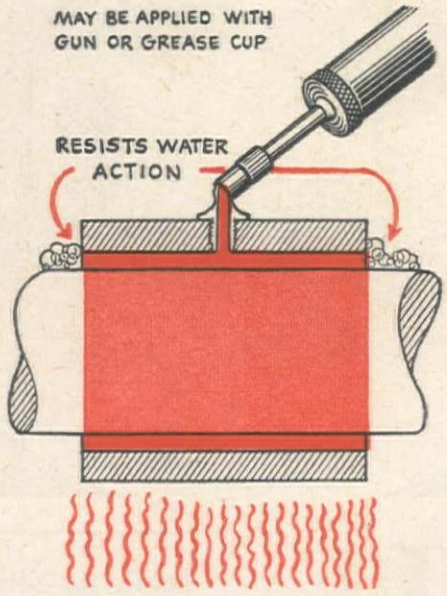
BACK THE ATTACK!
BUY WAR BONDS

BUCYRUS ERIE
TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

# STANDARD ENGINEERS NOTEBOOK

VOL. 1-CO NO. 2




## Waterproof grease has many uses

Wherever bearings are subjected to temperature conditions in the presence of water, Calol W. P. Grease will solve the most severe problems. This grease is a smooth homogeneous mixture of low cold test mineral oil and odorless aluminum stearate containing no fillers. It is very adhesive, with a melting point of approximately 240°F. It may be used with regular pressure gun fittings.

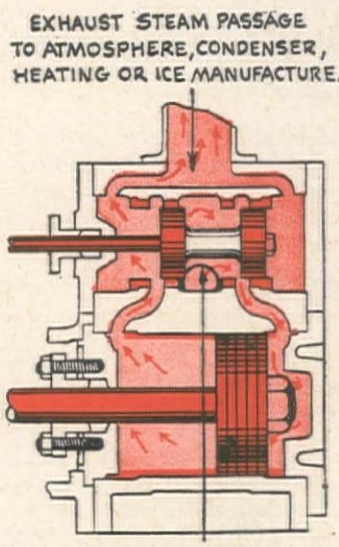
## Compounded Paint Thinner for better penetration

Because of excellent solvent qualities, Standard Compounded Paint Thinner assures the correct paint consistency for application and firm adherence to all surfaces, thus providing a strong foundation for succeeding coats. It evaporates completely, leaving only the preserving oils and color of the paint. It is not to be used for thinning lacquer. Like turpentine, Standard Compounded Paint Thinner will not "burn" or impair the life of the paint.

## Choosing the correct Steam Cylinder Oil

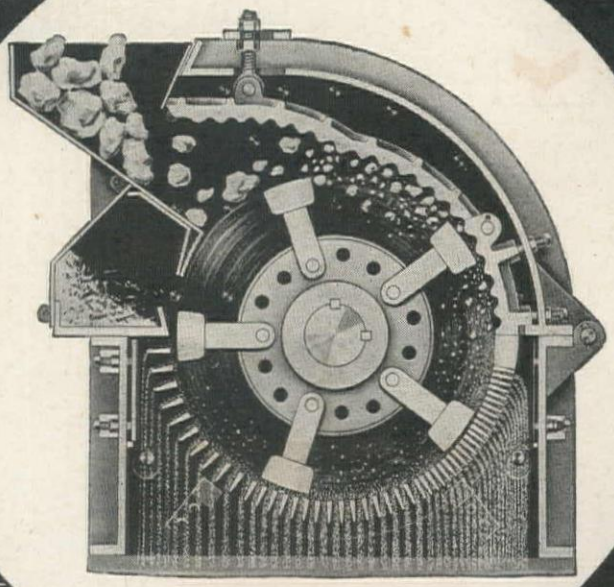
In choosing Steam Cylinder and Valve Oils, the following engine operating conditions should be considered:

1. Throttle steam pressure.
2. Throttle steam temperature.
3. Whether non-condensing or exhaust steam will be re-used for feed-water, refrigeration or heating. To correctly lubricate steam cylinders where temperatures range from 240°F to 800°F and pressures as high as 650 lbs., Standard of California makes 17 different grades of Calol Cylinder and Valve Oils. A handy reference guide to their use is contained in "Vital Protection for Industrial and Marine Equipment" – a free booklet available from your Standard Representative.




STANDARD OF CALIFORNIA

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



# HAMMERMILL

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

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

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

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

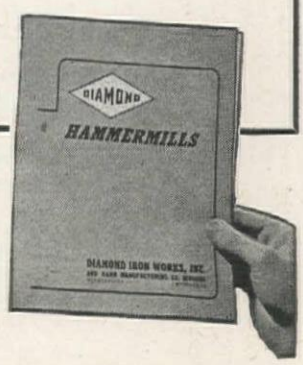
**WIRE, PHONE or WRITE** for Bulletin No. D-44-L on DIAMOND Hammermills or contact any DIAMOND Dealer.

**DIAMOND DEALERS:**

**COAST EQUIPMENT CO., San Francisco, California**
**GARLINGHOUSE BROS., Los Angeles, California**
**A. H. COX & CO., Seattle, Washington**
**LOGGERS' & CONTRACTORS' MACHY. CO., Portland, Oregon**
**CONSTRUCTION EQUIPMENT CO., Spokane, Washington**
**CONTRACTORS' EQUIP. & SUPPLY CO., Albuquerque, N. M.**
**WESTERN EQUIPMENT CO., Boise, Idaho**
**C. H. JONES EQUIPMENT CO., Salt Lake City, Utah**

## Look at This List of Features---

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




**DIAMOND IRON WORKS, INC.**
ESTABLISHED 1880
AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH — MINNEAPOLIS 11, MINN.

# HERE'S PROFITABLE PLANNING HELP FOR YOU

**LeTourneau rigs have literally hundreds of profitable uses. To help you determine where they fit into your work, we've developed this chart of major and secondary applications. Study it. If you're not using LeTourneau rigs on the checked applications (every one proved practical by actual use), see your LeTourneau dealer.**

## . . STUDY THIS CHART . . SEE WHERE LeTOURNEAU EQUIPMENT CAN HELP YOU MAKE MONEY ON EARTHMOVING AND MATERIALS HANDLING

★ MAJOR APPLICATIONS
● SECONDARY APPLICATIONS

| | CONSTRUCTION | | | | | | | | | | GOVERNMENTAL | | | RAILROADS | | | INDUSTRY | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EARTHMOVING | BRIDGE | PAVING | HIGHWAY | LEVEE | BUILDING | PIPE LINE | FEDERAL | STATE | COUNTY | TOWNSHIP | CITIES | CONSTRUCTION | MAINTENANCE | OPERATION | FACTORIES | DOCKS & WHARFS | COAL HANDLING |
| **SUPER C TOURNAPULL**** (Capacity-15 heaped yards) | ★ | | ● | ★ | ★ | | | ★ | ★ | ★ | | ● | ★ | | | | | ★ |
| **SUPER C TOURNACRANE**** (Lifting Capacities up to 20,000 lbs.) | ● | ● | ● | ★ | | ★ | ★ | ★ | ● | ● | | ● | ● | ● | ★ | ● | | |
| **SUPER C TOURNATRAILER**** (Capacity-17 heaped yards) | ★ | | ● | ★ | ★ | ● | ● | ★ | | | | ● | | | | | | ★ |
| **MODEL D TOURNAPULL**† (Capacity-2.3 heaped yards) | ● | | ★ | ● | | | | ★ | ★ | ★ | ★ | ★ | ★ | ★ | | | | ● |
| **MODEL D TOURNACRANE**† (Lifting Capacities up to 10,000 lbs.) | | | ★ | ● | | ★ | ● | ★ | ● | ★ | ★ | ★ | ● | ● | ★ | ★ | ★ | |
| **MODEL D TOURNATRUCK**† (Capacities-5 tons) | ● | | ★ | ● | | ★ | ● | ★ | | ★ | ★ | ★ | ● | | ● | ★ | ★ | |
| **POWER CONTROL UNITS** (for all "Caterpillar" tractors; Allis-Chalmers L, L-O, HD-10, HD14, S, SO; International TD40, TD18, TD14, Cletrac FD, FG, DD, DG, CG) | ★ | ★ | ★ | ★ | ★ | ● | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ |
| **CARRYALL SCRAPERS** (for all tractors fitted with PCU's) | ★ | ● | ● | ★ | ★ | ★ | | ★ | ★ | ★ | ★ | ● | ★ | ★ | | | | ★ |
| **ROOTERS** (for all tractors fitted with PCU's) | ★ | | | ★ | ★ | | ● | ★ | ★ | ★ | ● | | ★ | ● | | | | |
| **TRACTOR CRANES** (for all tractors fitted with PCU's) | ● | ★ | ● | ● | | ★ | ★ | ★ | ● | ● | | ● | ● | ● | ★ | ★ | ★ | |
| **DOZERS** (for all "Caterpillar" tractors) | ★ | ★ | ★ | ★ | ★ | ● | ★ | ★ | ★ | ★ | ● | ● | ★ | ★ | ★ | ● | | ● |
| **SHEEP'S FOOT ROLLERS** (for all tractors) | ★ | | ★ | ★ | ★ | | | ★ | ★ | ★ | | | ★ | | | | | |

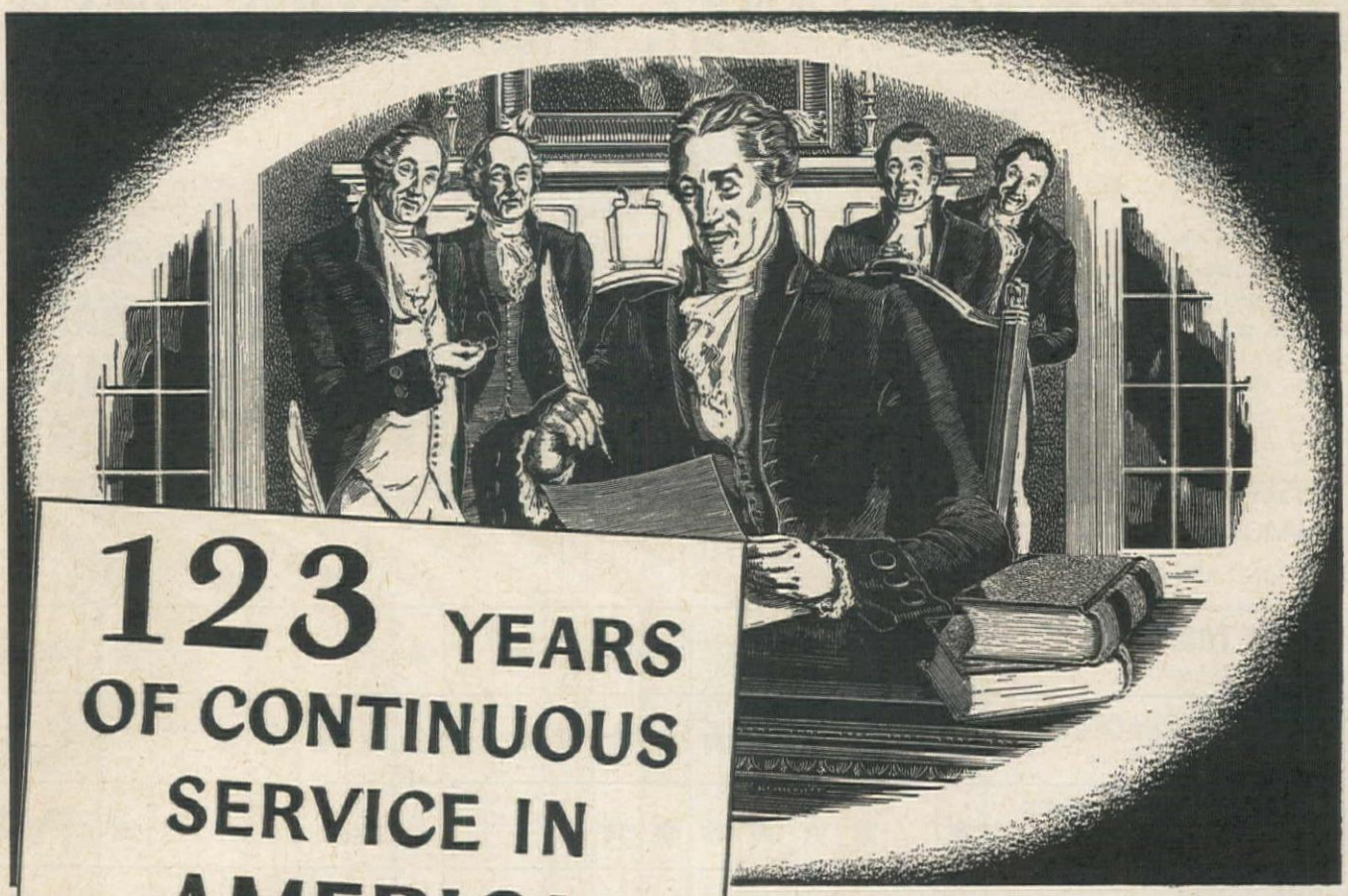
**Don't take a chance of going into the "red" with slow, out-dated equipment on your postwar projects. Ask your LeTourneau dealer how the rubber-tired power of Tournapulls and the big capacity of LeTourneau rigs can get your jobs done faster and put more money in your pocket. See him NOW.**

**15-yd. Carryall Scraper, 17-yd. Tournatrailer and Tournacrane (20,000 lb. lifting capacity) interchangeable on same Super C Tournapull prime mover.

† 2.3-yd. Carryall Scraper, Tournacranes (4,000 to 10,000 lbs. lifting capacities) and 5-ton Tournatruck interchangeable on same Model D Tournapull prime mover.

**LETOURNEAU**
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

LeTOURNEAU (Aust.) Pty. Ltd., Rydalmere, New South Wales, Australia.



# 123 YEARS OF CONTINUOUS SERVICE IN AMERICA

PRESIDENT MONROE SIGNING MESSAGE TO CONGRESS DECLARING THE MONROE DOCTRINE IN 1823.

[Here is America's oldest cast iron water main, now in its 124th year of continuous service in the water distribution system of the city of Philadelphia.]

THE first cast iron water main installed in America was laid in 1821 in Philadelphia. It is still in service. Today, nearly a century-and-a-quarter later, the methods by which cast iron pipe is produced have undergone revolutionary changes. Metallurgical, laboratory and production controls have been developed. Extensive product and field research projects have been carried out by our Association, independently and in cooperation with Associations representing users of pipe. A recent and fundamental forward step is the new Law of Design for cast iron pipe in underground service, approved by the American Standards Association and sponsored by official organizations representing pipe users.

Thus, you can take it for granted that the cast iron pipe made today by our members, has not only *long life* as proved by generations of service the world over, but is more economical than ever.

CAST IRON

Cast Iron Pipe Research Association
Thomas F. Wolfe, Engineer, Peoples Gas Building, Chicago, Ill.

# CAST IRON PIPE SERVES FOR CENTURIES

# GALION No. 101 MOTOR GRADER ON ALASKA HIGHWAY

*Remember* **GALION** *Graders & Rollers on Post-War Planning*

*Western Distributors:*

| | |
|---|---|
| BROWN-BEVIS EQUIPMENT CO. | Los Angeles, California and Phoenix, Arizona |
| F. RONSTADT HARDWARE CO. | Tucson, Arizona |
| H. W. MOORE EQUIPMENT CO. | Denver, Colorado |
| HALL-PERRY MACHINERY CO. | Butte, Montana |
| MORROW & CO. | Albuquerque, New Mexico |
| ARNOLD MACHINERY CO. | Salt Lake City, Utah |
| NELSON EQUIPMENT CO. | Portland, Oregon, Seattle, Washington and Twin Falls, Idaho |
| WESTERN TRACTION CO. | San Francisco, California |
| ORMANDE C. BELL | Reno, Nevada |

The **GALION** IRON WORKS & MFG. CO.
GALION . . . . . OHIO

# PATHFINDERS OF THE DIESEL ERA

*The original Burlington Zephyr which inaugurated a new era in American transportation history in 1934. After more than 1,650,000 miles it still is assigned to its daily round trip of 465 miles between Lincoln and McCook, Nebraska.*


*Latest of the illustrious descendants of the original Zephyr—one of the sixteen 5400-horsepower General Motors Freight Locomotives being put into wartime service by the Burlington Lines.*

IT is just ten years since the famous Burlington Zephyr introduced new ideas in railroad travel. It was the world's first Diesel-powered streamlined train. Its power plant was General Motors Diesel. Today hundreds of General Motors Diesel Locomotives are hauling passengers and freight on 75 American railroads. They operate many millions of miles annually with astounding dependability and economy. Day by day additional GM Locomotives are entering that honored field of more than one million miles of operation. Every day brings new records of performance. And this performance, highlighted by its invaluable contribution to the astonishing war record of the railroads, is providing a glimpse of the greater day of railroading which lies ahead.


GM
GENERAL MOTORS
DIESEL POWER

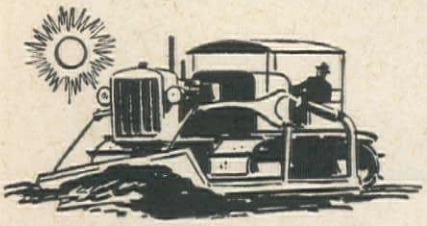
**LOCOMOTIVES** . . . . . ***ELECTRO-MOTIVE DIVISION,*** *La Grange, Ill.*

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

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

# The tacky, two-fisted grease that guards track rollers *on every job*

Track roller grease has a mighty difficult task to perform. It has to battle heat, cold, dust, and water—in addition to the pressure exerted by the weight of a tractor. It has to be *tough,* or it won't give track rollers the kind of protection they need.



And that's why so many tractor owners today won't use anything but Red Line Tractor Lubricant. Union Oil Company's research men made this grease so tough and versatile that it will guard track rollers under every operating condition.

Red Line Tractor Lubricant is thick enough so that it won't leak out in hot weather—yet is thin enough so that it will flow readily when the weather turns cold.

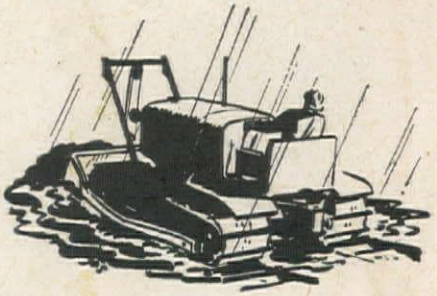
It's so tacky it will not dissolve in water. It adheres tightly to metal, forming a strong seal that resists penetration by dust and grit.

In other words, Red Line Tractor Lube *sticks*—it protects track rollers on *every* job.

Red Line also makes an excellent heavy duty grease for general tractor

chassis lubrication. It does the same wear-saving job there as in track rollers.

Red Line Tractor Lubricant is one of a complete line of *quality* petroleum products made for the construction industry by Union Oil Company. So for a top-notch tractor lube—or any other product you need—call your Union Oil Resident Manager today.



**RED LINE TRACTOR LUBRICANT**

# Peterbilt

## The TRUCK FOR HEAVY HAULERS

**If your hauling job** is in the "heavy weight" class—logging, cross country freight, cattle hauling, excavating,—then PETERBILT is the truck for you. PETERBILT trucks are designed and built to meet specialized heavy hauling requirements—that is why they are universally successful. We never try to adapt a standard model to a special purpose. We engineer the truck to the job and build it to meet all of the known requirements. You can therefore depend upon a PETERBILT to give top performance under conditions that would wreck a lighter truck.

If you are now faced with any heavy hauling problem, directly connected with the war effort, consult with us and we will tell you how to proceed to get a new PETERBILT through the Pool for Civilian Defense.

Peterbilt Motors Company

07th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORNIA

# Get worn equipment back to work

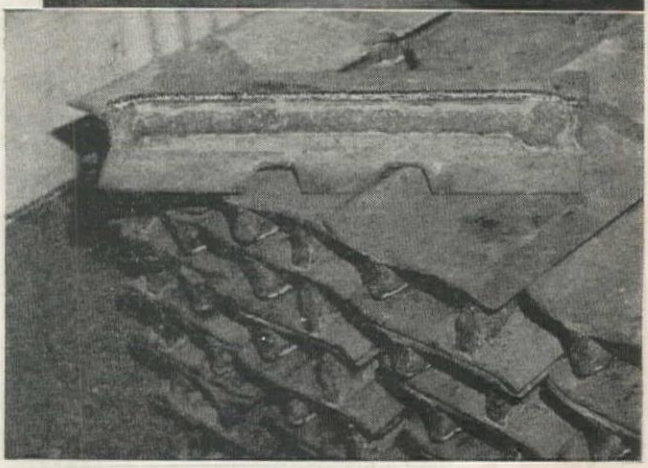
# —Quickly

## by hard-facing with Stoody Alloys

WORN bulldozer tips, tractor grousers and sprockets — in fact, construction equipment of all kinds — can be restored to serviceable order quickly by hard-facing with Stoody Alloys. These alloys possess exceptional resistance to abrasive wear and when they are applied to the wearing surfaces of construction machines, the service life of such equipment *is increased two, three or more times.*

For example, the bulldozer end plate (tip) shown to the right above was hard-faced with 2 lbs. of 3/16" diameter Coated Self-Hardening; applied in stringer beads parallel to the edges rather than in a solid layer. The hard-facing material keeps the tips out to size and maintains their cutting efficiency. *Moreover, a bulldozer end plate so treated will usually last at least twice as long as a plain steel one and in the majority of cases about three times longer.*

For complete details on Stoody Hard-Facing Alloys, address your inquiry to Department ENR, Air Reduction Sales Co., 60 East 42nd Street, New York 17, N. Y. By an early return mail, you will be sent a copy of "Stoody Specification Sheets for Repairing and Maintaining Construction Equipment".



*Service Life Doubled* — These worn tractor grousers were reclaimed by welding on ¾" x 1" steel bars and hard facing cleat tops with Coated Self-Hardening. This increased the service life of the grousers by 100%.

AIRCO WILSON

**AIR REDUCTION**

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON 1, TEXAS

*Offices in all Principal Cities*

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

# ADAMS MOTOR GRADERS

# Pack Plenty of Power

*One of a series of ads on Adams motor grader features*

TURNING a capacity load of heavy oil-mix material at 3 to 5 m.p.h. (as pictured above) takes plenty of power . . . and traction . . . but Adams heavy-duty motor graders have what it takes. All models of Adams motor graders pack plenty of power for their size enabling you to get out of any model the capacity built into it. When you get into an extraordinary load the engine has the torque reserve or lugging ability to hang on where some engines would stall. The operator never experiences the feeling that his machine is under-powered . . . Incidentally the Diesel engines used in Adams motor graders are started easily in any kind of weather and are very economical to operate and maintain.

Yes . . . their abundance of power, their long life, ease and economy of operation, their wide adaptability to all kinds of work . . . surface, ditch and bank . . . make Adams motor graders favorites among the several thousands of highway officials and contractors who own and know them. They will be your best buy when again you can purchase new machines. In the meantime, use the services of your local Adams dealer to keep your present equipment rolling.

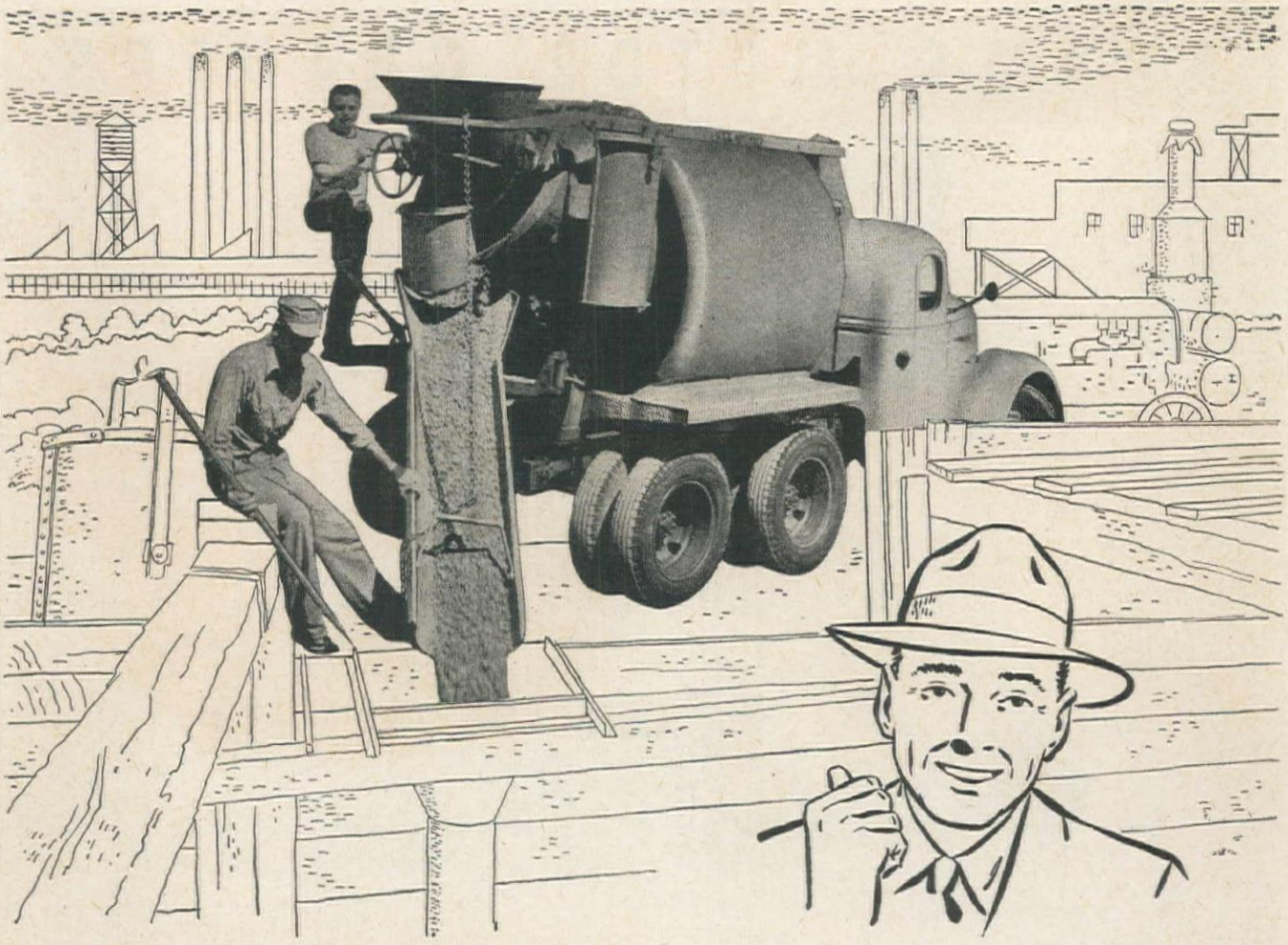
**J. D. ADAMS COMPANY · INDIANAPOLIS, IND.**

Granted a second Army-Navy Production Award for continued proficiency in the production of grading machinery for our armed forces

*Let These Distributors Service Your Equipment*

ALASKA—Glenn Carrington & Co., Fairbanks
ARIZONA—O. S. Stapley Company, Phoenix
CALIFORNIA—J. D. Adams Co., San Francisco, Los Angeles
Sutton Tractor & Equip. Co., Sacramento
J. G. Bastain, Redding
COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equipment Co., Boise, Pocatello
MONTANA—Industrial Equipment Company, Billings
NEVADA—Allied Equipment, Inc., Reno
NEW MEXICO—Hardin & Coggins, Albuquerque
OREGON—Howard-Cooper Corp., Portland, Eugene
UTAH—The Lang Company, Salt Lake City
WASHINGTON—Howard-Cooper Corp.,
Seattle, Spokane, Walla Walla
WYOMING—Industrial Equip. Co., Billings, Mont.
The Lang Company, Salt Lake City, Utah

**ADAMS** ☆ ROAD-BUILDING AND EARTH-MOVING EQUIPMENT ☆



# That drum gets a real "cushioned" ride!

THIS new Rex Moto-Mixer of mine has road shocks licked. You know the kind of roads our equipment has to travel . . . the rough ground we bounce over to reach a job. Well, that jouncing and shaking can be pretty rough on a truck mixer. It "jars" the life out of the transmission and gears of the ordinary truck mixer . . . but not a Rex Moto-Mixer.

My Rex Moto-Mixer has a chain drive that goes completely around the drum . . . acts just like a cushion and absorbs the shocks and bounces. I've traveled over some pretty tough going, and maintenance costs have been mighty low. It's sure "aces" with me.

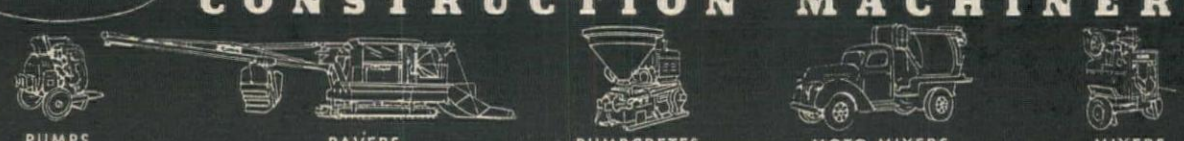
• • •

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

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

REX

CONSTRUCTION MACHINERY




**INTERNATIONAL Industrial Power Dealers**

**Arizona**—O. S. Stapley Co., Phoenix; **California**—Smith Booth Usher Co., Los Angeles; J. G. Bastian, Redding; Brown Tractor Co., Fresno, Madera, Reedley; J. H. Degnan, Inc., Hanford; Exeter Mercantile Co., Visalia and Exeter; Farmers Mercantile Co., Salinas, Hollister, Watsonville; Gallagher Tractor & Implement Co., Merced; Lohman Tractor and Implement Co., Napa; North Valley Tractor & Equipment Co., Chico; Stanislaus Implement & Hdwe. Co., Modesto; Stevenson Farm Equipment Co., Santa Rosa; Sutton Tractor & Equipment Co., Sacramento; Thompson-Sage, Inc., Stockton, Lodi, Tracy; Valley Equipment Co., San Jose and San Francisco; **Colorado**—H. W. Moore Equipment Co., Denver; **Idaho**—Intermountain Equipment Co., Boise; **Montana**—Industrial Equipment Co., Billings; **Nevada**—Allied Equipment, Inc., Reno; Clark County Wholesale Mercantile Co., Inc., Las Vegas; **New Mexico**—Hardin & Coggins, Albuquerque; **Oregon**—Howard-Cooper Corp., Portland and Eugene; **Utah**—The Lang Co., Salt Lake City; **Washington**—Howard-Cooper Corp., Seattle, Spokane, Walla Walla; Glenn Carrington & Co., Seattle (for Alaska); **Wyoming**—Wilson Equipment & Supply Co., Cheyenne.

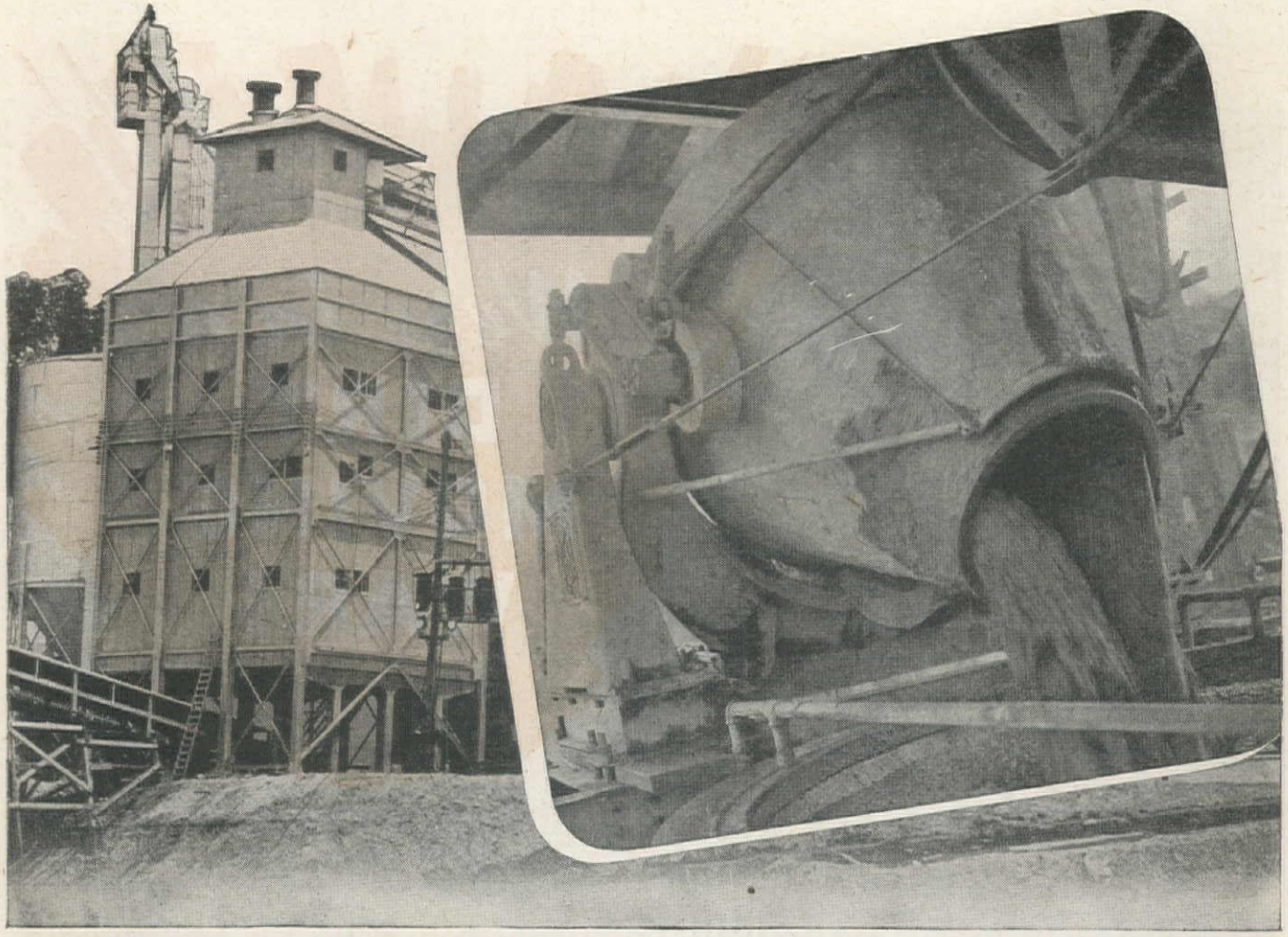
THIS is a dirt-moving war . . . *a tractor war*. As a two-star general of the Army Engineers puts it: "Victory seems to favor the side with *the greatest ability to move dirt*."

Everywhere our fighting forces go you'll find dirt-moving crawler tractors at work, building roads, smoothing shell-torn landing fields, pulling heavy guns, handling aircraft bombs.

The Armed Forces have first call on International TracTracTors today. That's why so few new ones are available for civilian use and why those on the job must be kept in fighting trim. Let the International Industrial Power dealer help you keep your TracTracTors working . . . plugging away on the home front, backing up the military TracTracTors on the battle front.

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

**INTERNATIONAL POWER**



# RECORD POURING WITH KOEHRING

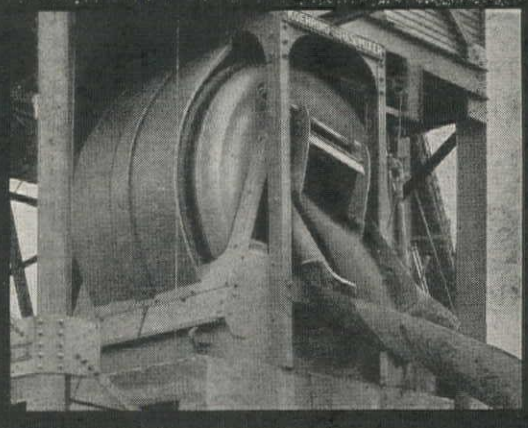
## OF CERTIFIED QUALITY CONCRETE

Koehring Tilting and Non-Tilting Mixers have established pouring records on many large volume concrete jobs . . . dams, spillways, locks, bridges, power plants, drydocks, etc. for both peace and wartime projects. Koehring Construction Mixers have specially designed non-clogging drums and drum interiors to produce thoroughly mixed, quality concrete. They are substantially constructed to operate day and night continuously for maximum yardage production.

*Plan now* for a Koehring Mixer for postwar construction. Consult our distributor or write to us for information.

**KOEHRING COMPANY**
*Milwaukee 10, Wisconsin*

MEMBER MIXER BUREAU
AFFILIATED WITH A. G. C.



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

ARMY E NAVY

KOEHRING HEAVY DUTY

## HEAVY-DUTY CONSTRUCTION EQUIPMENT

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


# A GOOD MAN TO KNOW

*— when you're buying synthetic rubber industrial products*

Now with the mandatory conversion of industrial rubber products to synthetics, you need expert counsel more than ever in selecting the correct grades and constructions for your particular service.

That is why more and more operating men are guided by the recommendations of the G.T.M. — Goodyear Technical Man. An expert in industrial rubber, he is backed by Goodyear's twenty years' experience in developing synthetics and by the authority of the world's finest rubber research laboratory.

Long before the war, Goodyear was building many industrial products from synthetic rubber, based on knowledge that goes back to the granting of Goodyear's first synthetic patents in 1927.

As a result, the G.T.M. today is able to specify synthetic rubber products of standout quality. Some, especially for service where exposure to oil, gasoline or solvents is involved, set new performance standards.

Others, like the new Goodyear Style SS Conveyor Belt for abrasive conditions, are comparable to the best prewar quality. And still others, like our new Resoweld tank lining, perform tasks never handled satisfactorily by natural rubber.

Yes, it will pay you to consult the G.T.M. — if you want industrial rubber products that will maintain your speeded-up production schedules. To bring him to your office, phone the nearest Goodyear Industrial Rubber Goods Distributor — or write Goodyear, Akron 16, Ohio or Los Angeles 54, California.

Resoweld—T.M. The Goodyear Tire & Rubber Company

GOODYEAR INDUSTRIAL RUBBER PRODUCTS
are tested and proved in the
WORLD'S FINEST RUBBER RESEARCH LABORATORY

The new Goodyear Research Laboratory, where 20 years' experience in synthetics and 46 years' skill in rubber engineering combine to produce better industrial rubber products.

GOODYEAR
THE GREATEST NAME IN RUBBER

Let's all Back the Attack with War Bonds

# 9 Items to Check When Ordering Wire Rope

(Note: Every day, several orders are received which require correspondence and delay because of insufficient information.

Listed below are items which can be used as a wire rope specification check list. Because wire rope is a controlled material, CMP allocation or symbol, also certification, must be included before orders can be entered.)

**WIRE ROPE CHECK LIST**

| *Item* | *Example* |
|---|---|
| 1. Length | 120 Feet |
| 2. Diameter | ¾ Inch |
| 3. Number of Strands | 6 |
| 4. Number of Wires per Strand | 19 |
| 5. Lay | Right Lang Lay |
| 6. Core | IWRC |
| 7. Kind of Fabrication | PREformed |
| 8. Grade | (Improved Plow Steel) Monarch Whyte Strand |
| 9. Use . . Make, Model of Equipment | |

*(Plus . . . CMP allocation or symbol, also certification.)*

Here are all these items for this order.

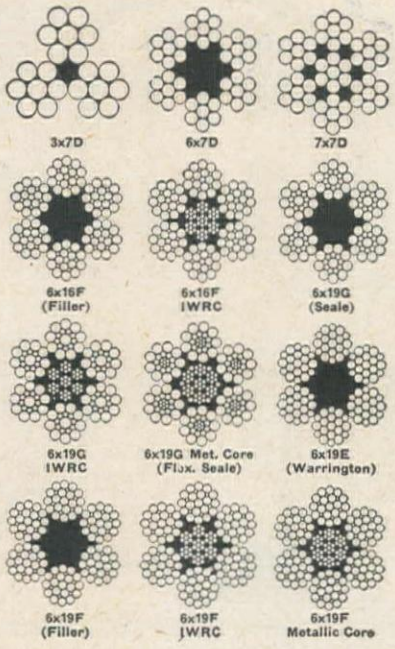
120 feet ¾-inch 6 x 19 Right Lang Lay with IWRC PREformed Monarch Whyte Strand Wire Rope, to be used for hoist line on Model 45 Lorain Skimmer.

*Note: For more complete detailed information on how to specify wire rope, refer to Macwhyte G-15 Wire Rope Catalog, pages 89 to 101.*

**The above check list is normal and complete as to the specifying of wire rope in peacetime, but it is more important than ever in wartime when it is so difficult to get wire rope.**

**STATE USE FOR ROPE—IT HELPS**

Always include the type of service for which the rope is wanted. Then if an error is made in listing the proper construction, or if our experience has shown a different construction gives better service for this purpose, we may be able to help you obtain a better rope. In some cases such information today, makes possible your getting a wire rope to meet your needs when the rope you specify is not available but a similar one is available that might do an even better job for you at no additional cost.




**These are but a few wire rope constructions taken from our G-15 Wire Rope Catalog to indicate the vast number of types and constructions of wire rope that are made. As wire rope manufacturers, we are in a position to help wire rope users obtain the correct rope for their specific needs.**

**HOW TO MAKE SURE OF CORRECT ROPE FOR YOUR EQUIPMENT**

There are hundreds of different sizes, grades, and constructions of wire rope. For many years we have cooperated with wire rope users to get the correct ropes for all kinds of equipment. We have watched these ropes give outstanding service on equipment like yours.

The benefit of that experience may help make your wire ropes last longer, or may help you in specifying what we believe is the finest wire rope you can buy — the *correct* rope for *your* equipment: Monarch Whyte Strand PREformed.

Monarch Whyte Strand PREformed has recorded outstanding service records because:

*It's made from selected steels.*

*It's PREformed to reduce internal stresses and to fight rope fatigue.*

*It's internally lubricated to protect wires and strands against corrosion and friction.*

**MACWHYTE**
**PREformed**
**WIRE ROPE**
***Plus* Internal Lubrication**
**Selected Steels**
**Tested—Proved**
*The correct rope for your equipment*

NO. 709

# MACWHYTE COMPANY

ARMY E NAVY

WIRE ROPE MANUFACTURERS

*The correct rope for your equipment*

*2909 Fourteenth Avenue, Kenosha, Wisconsin*

*Mill Depots:* New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

# Ground Crew

Next time you see a bomber overhead—stop and think for a minute of what it took to put it up there.

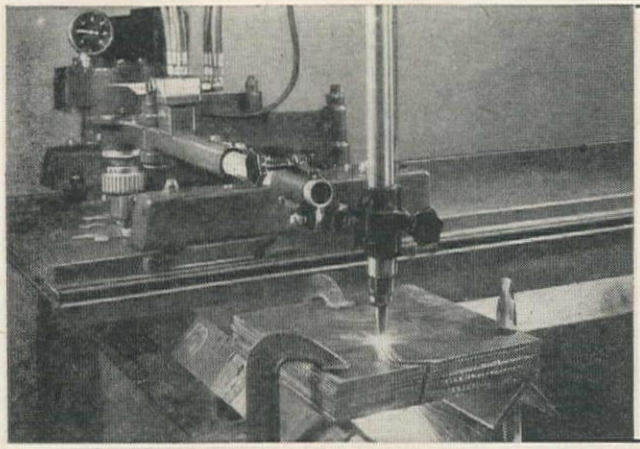
Think of the aluminum that sheathes its sleek lines . . . aluminum from a plant that was only a blueprint yesterday. Think of the propellers and the engines that drive it . . . propellers and engines from factories that were only corn fields the summer before. And think of the men who fly it and fight it . . . men schooled at air fields and training stations which were created virtually overnight.

All of these facilities and more were required to put that bomber up there . . . and all of them were provided by a vast ground crew that numbers its men and machines in the millions—America's Construction Industry.

Here, again, is a job that called for the best in every man and every piece of equipment . . . a job that required power of proven stamina, economy and dependability . . . a job that demanded nothing less than *Cummins Diesel Power*. CUMMINS ENGINE COMPANY, Columbus, Indiana.

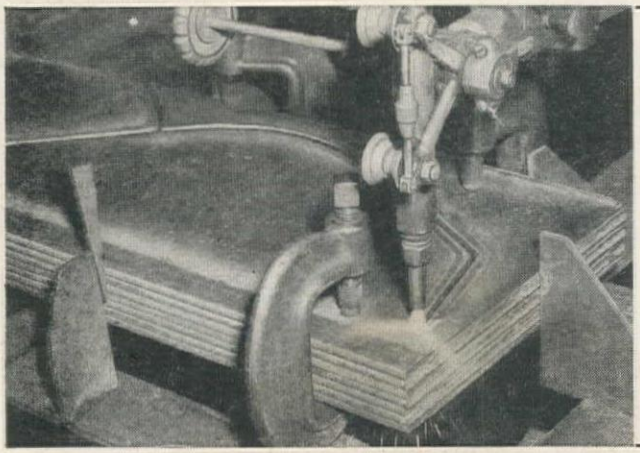
*This is the sixth and last in a series of advertisements depicting the war-time role of Cummins Diesel Power in the nation's basic industries. In the construction field, Cummins Dependable Diesels are used to power all types of heavy-duty dirt moving and material handling machinery—trucks, shovels, draglines, tractors, compressors and many other kinds of equipment. The giant 60-yard Tournapull illustrated here is powered by a pair of 200 hp. (Supercharged) Cummins Diesels.*

# OXY-ACETYLENE STACK-CUTTING Quickly Produces Identical Parts from Stock Steel



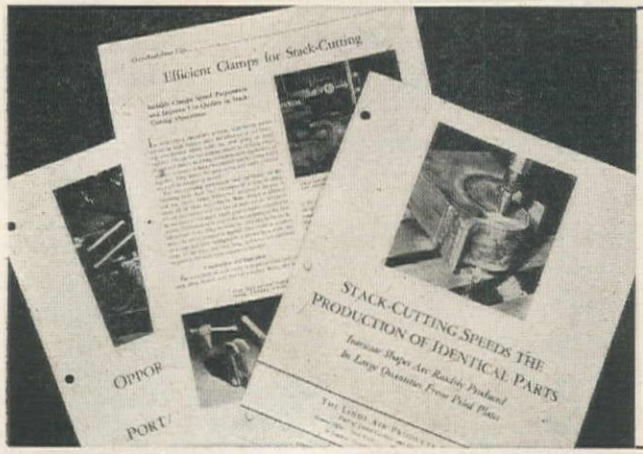
## 1. What it is

Oxy-acetylene stack-cutting produces quantities of identically shaped parts from clamped piles of steel plates or sheets. Steel ranging in thickness from 16 gage to 1 inch can be cut with good results —in piles as thick as 5 inches. If the plates are correctly clamped, the cut edges are clean and smooth. Stack-cutting can be done with either portable or stationary flame-cutting machines. In the illustration at the left, an Oxweld cutting blowpipe is slicing through 8 plates, each ¼-in. thick.



## 2. How it saves

Oxy-acetylene stack-cutting produces needed parts from stock steel quickly, and usually at lower cost than parts already shaped can be obtained. Stack-cutting is usually a faster and cheaper method than shaping single parts by mechanical means, and it also helps to conserve steel because it reduces scrap losses. Additional savings result when machining operations are done on the flame-cut stacks before the parts are separated. The uniformity of stack-cut parts facilitates fabrication and assembly.




## 3. Linde can help you use it

Linde can help you determine where and how you can profitably use Oxweld flame-cutting equipment for the shaping of parts by stack-cutting. In addition to supplying the oxygen, the acetylene, and other essential materials, Linde also makes available to its customers, motion picture showings, how-to-do-it literature, and other services that help operators do a consistently good stack-cutting job.

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

**THE LINDE AIR PRODUCTS COMPANY**

*Unit of Union Carbide and Carbon Corporation*

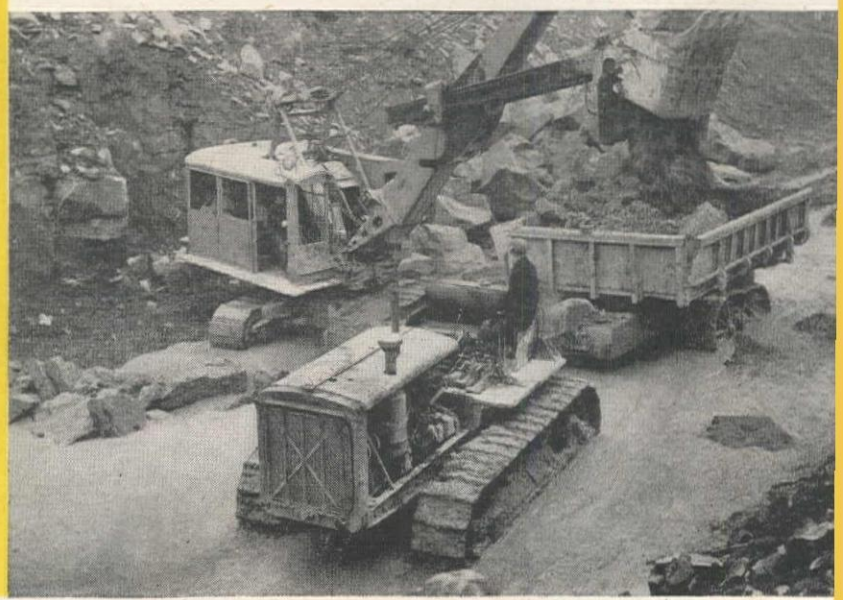
30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

**LINDE OXYGEN . . . PREST-O-LITE ACETYLENE . . . UNION CARBIDE**
**OXWELD, PUROX, PREST-O-WELD APPARATUS . . . OXWELD SUPPLIES**

words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks.

# All-Weather Friend



## YOUR "CATERPILLAR" DEALER

WHEN the going gets tough you find who your real friends are. In these war days you can count on the loyal friendship of your "Caterpillar" dealer.

He knows what you're up against. Your problems are his own, for it's his job to make your job more profitable. And he hasn't stopped for a minute.

He has kept his business going — expanded his shop facilities and kept them up to "Caterpillar" standards—the highest in the heavy machinery field. He has kept his factory-trained service men on the job — night and day if necessary — to maintain hard-worked "Caterpillar" Diesel equipment in good working order.

Like a family doctor, he knows the background and the condition of every machine in his territory, and he's in a position to prescribe for it when trouble starts, or *before* it starts.

When the war is over at last, your "Caterpillar" dealer will be even better qualified to serve you. Not only will he have modern, war-proved "Caterpillar" Diesels and genuine parts, but a complete line of matched equipment.

Until that time comes, rely on him to keep your machines in working trim. Proper care is doubly important now, and preventive maintenance will save time, money, breakdowns and critical war materials. Follow your "Caterpillar" dealer's advice about care and lubrication. Have his service men make a regular inspection check-up. Enlist the "Fighting Four" for the duration.

If you must have a new machine and are qualified by your work to get one, your "Caterpillar" dealer will give you sound counsel.

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

### THE "FIGHTING FOUR"

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

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

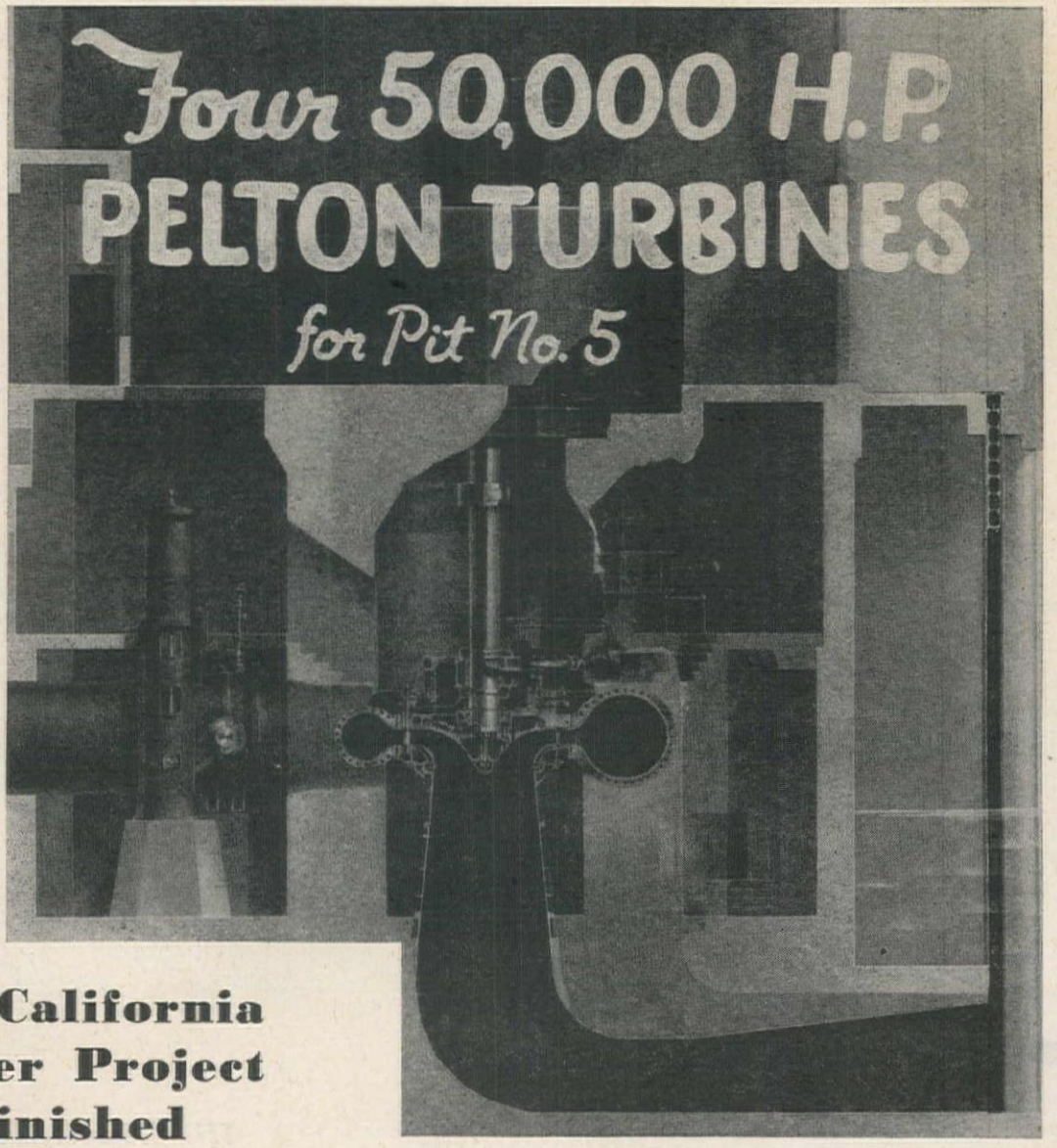
**ADJUST** Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work. He'll do it well.

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

**CATERPILLAR DIESEL**

REG. U.S. PAT. OFF.

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




## Big California Power Project Finished

Soon four Pelton Turbines, each 50,000 h.p., will turn electric generators at Pacific Gas and Electric Company's Pit No. 5 hydro-electric achievement on the Pit River, California.

A cut-away-view of one of these turbines is pictured here. It shows the runner, scroll casing and auxiliary equipment—all designed and built by Pelton for more reliable and more efficient operation.

All of Pelton's 64 years of turbine-building experience is incorporated into the design of these big fellows. Certainly Pelton is proud of its contribution of more kilowatts at less cost.

**THE PELTON WATER WHEEL COMPANY**

***Hydraulic Engineers***

**2929 NINETEENTH STREET SAN FRANCISCO, 10**

BLW THE BALDWIN GROUP

**PELTON**

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

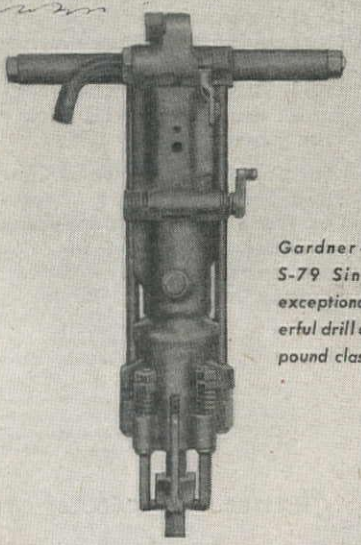

POWER TO WIN
America has learned to build with even greater speed than heretofore. There has been so much to do and so little time in which to do it.
Construction engineers cannot take a chance on inferior or problematical equipment. They must, to make sure that jobs will be finished on time, use only time-tested equipment that has proved itself through the years.
For power, the choice of Continental Red Seal Engines is a natural one as these dependable engines have conclusively proved for more than 42 years that Red Seal Power means Dependable Power.
Your Dollars are Power, Too!
Buy War Bonds and Keep Them.
ARMY
E
NAVY
Awarded to the Detroit and Muskegon Plants of Continental Motors for High Achievement.
Charles W. Carter Company
SALES AND SERVICE
Continental Red Seal Engines and Parts
Los Angeles • Sacramento • San Francisco • Oakland • Fresno
Continental
Red Seal
Engines

# NOBODY LIKES ROUGH RIDING

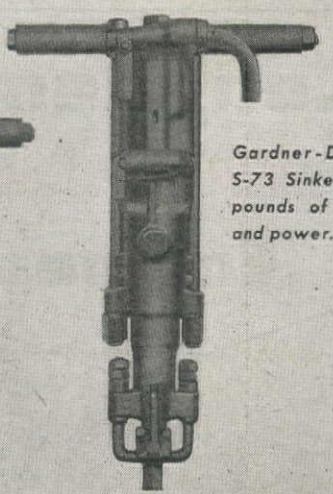
WHO likes rough riding on a construction job—nobody! The men can't do their best work with rough-riding rock drills—and contractors can't make satisfactory progress under such conditions.

Gardner-Denver Sinkers are *popular* drills because they are especially designed for easy riding and balanced performance. And because they permit more footage per shift, they're preferred by contractors, and quarry operators too!

Noted for their powerful four-pawl rotation—for their thorough hole cleaning—and for their low air consumption—Gardner-Denver Sinkers can increase output on your workings. For full information, write Gardner-Denver Company, Quincy, Illinois. Western Branch Offices: Butte, Mont.; Denver, Colo.; Los Angeles, Calif.; Portland, Oregon; Salt Lake City, Utah; San Francisco, Calif.; Seattle, Wash.; Wallace, Idaho.

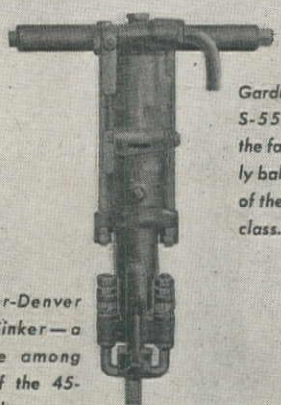


*Gardner-Denver S-79 Sinker—an exceptionally powerful drill of the 80-pound class.*



*Gardner-Denver S-73 Sinker—67 pounds of speed and power.*

*Gardner-Denver S-55 Sinker—the fast, perfectly balanced drill of the 55-pound class.*



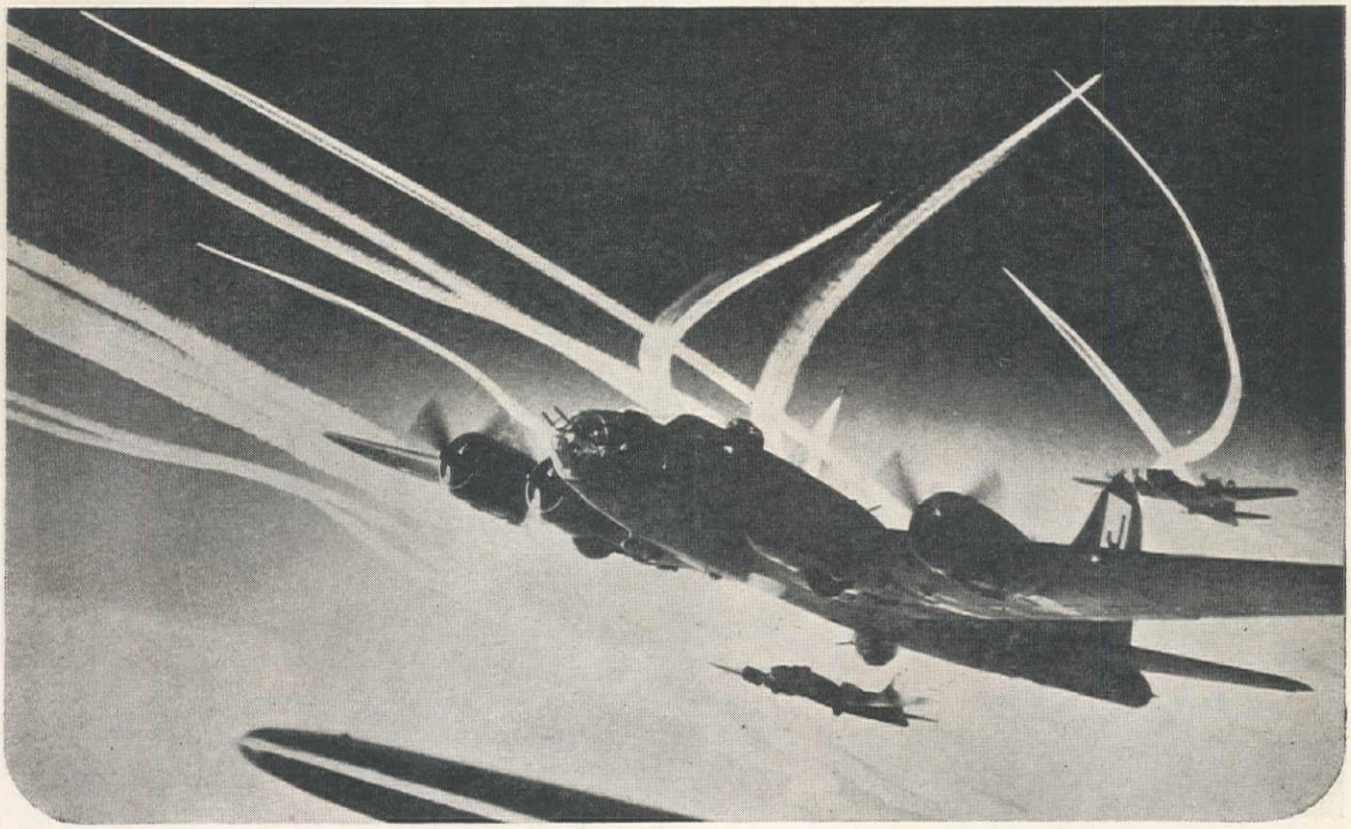
*Gardner-Denver S-45 Sinker—a favorite among users of the 45-pound class.*

*Gardner-Denver S-33 Sinker—an outstanding performer for its weight class.*


GARDNER-DENVER

*Since 1859*

# from the experience of war comes AN AIR COMPRESSOR BUILT TO THE PRECISION OF AN AIRCRAFT MOTOR



## AIR PLUS JAEGER COMPRESSOR

Building machines in which ***the quality of performance*** often decides victory or men's death, America's production lines have learned to work to standards of precision undreamed of yesterday.

Today, these same micro-precision standards are being applied to the manufacture of an air compressor.

The special characteristic of this compressor is the high efficiency obtained with a simple, accessible mechanism.

With parts micro-honed and lapped to equal precision, it functions as smoothly as a bomber's motors. Demands are met without effort. Reserve power is always present. High levels of performance can be maintained for years.

These qualities are identified in a name you will come to know and remember — "AIR PLUS."

All the equipment Jaeger produces today is for war. Please be patient. Our experience and greatly improved facilities will be available to help you to win your battles tomorrow.

THE JAEGER MACHINE CO., COLUMBUS 16, OHIO

**JAEGER** *Engineered* **EQUIPMENT**

"AIR-PLUS" 2-STAGE AIR-COOLED COMPRESSORS, 60 TO 500 FT. — "FLEET-FOOT" CRANE-LOADERS — "SURE PRIME" CENTRIFUGAL PUMPS — "SPEEDLINE" BUILDING MIXERS — "DUAL-MIX" TRUCK MIXERS — "JAEGER" HOISTING ENGINES AND TOWERS — "JAEGER-LAKEWOOD" PAVING EQUIPMENT


**"Now, I don't mean purchase price...LUBRIPLATE probably costs a lot more per pound than the grease you are now using... what I'm getting at is the over all costs.**

**"LUBRIPLATE lasts longer...yes, it does. You see the film is tougher...it stands up longer. A lot of fellows who use LUBRIPLATE tell me they have been able to stretch their lubrication schedules. This in itself is a saving.**

**"But the big thing is LUBRIPLATE arrests progressive wear and prevents rust and corrosion. Sure you save on parts replacement and machine shutdown...and as to lubrication...LUBRIPLATE is the slipperiest stuff you can put on a bearing. Of course it saves on power. All and all LUBRIPLATE is the most economical lubricant you can use."**

• • •

**Don't take our salesman's word for the economy and efficiency of LUBRIPLATE. Let us send the "LUBRIPLATE FILM" written especially for your industry. Read the case histories and unsolicited testimonials of other users. Write for a copy today.**

• • •

**WEST COAST DISTRIBUTORS**

Miller & Stern Supply Co., San Francisco Calif.
Hudson Tucker, Inc., San Diego, Calif.
Cannon & MacLean, Los Angeles, Calif.
Chas. H. Harden Co., Seattle, Wash.
Nott Atwater Co., Spokane, Wash.
Fleck Bros., Ltd., Vancouver, B.C.
Industrial Supply Co., Salt Lake City.
Montana Hardware Co., Butte & Great Falls, Mont.
M. L. Foss, Inc., Denver, Colo.
McConkey Docker Co., Phoenix, Ariz.
Car Parts Depot, Inc., El Paso, Texas
Inter-Mountain Equip. Co., Boise, Idaho
Good Year Rubber & Asbestos Co., Portland, Ore.

**Rx FOR YOUR MACHINERY**

**No. 3**—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

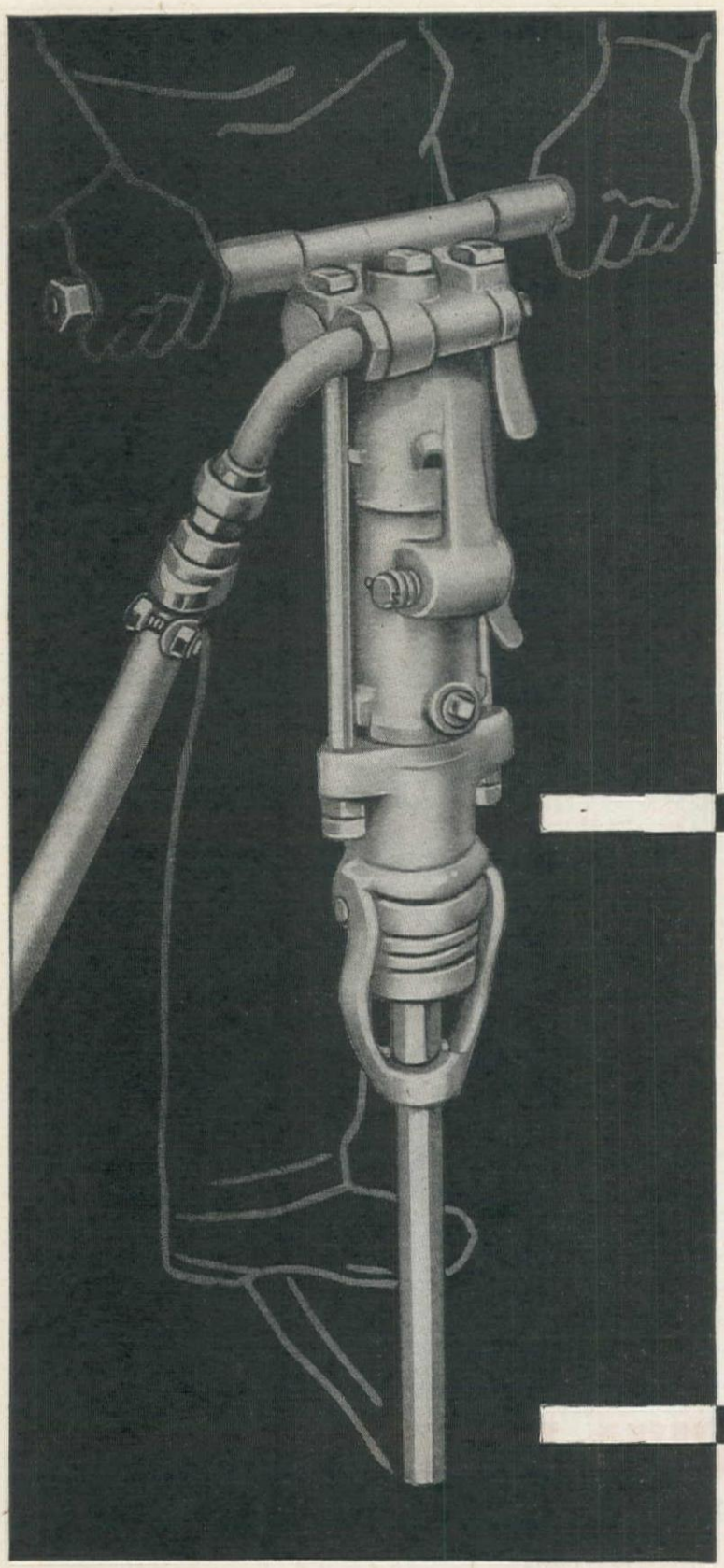
**No. 8**—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

**No. 107**—One of the most popular grease type products for general application by pressure gun or cups.

**No. 70**—For a wide range of grease applications, especially at temperatures above 200 degrees F.

**No. 130-AA**—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

**BALL BEARING**—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.



# *Check it*

# AGAINST ANY SINKER IN ITS CLASS

**THE fast drilling speed and powerful rotation of the CP-42 Sinker make it ideal for general excavation, road work, and quarry drilling. Its air blow keeps even the deeper holes free of cuttings.**

**Check the air consumption — and the low maintenance. Try the 56-pound CP 42 Sinker, job for job, against any sinker in its class; you'll find there isn't a better all-around performer. The CP office nearest you will be glad to arrange for a demonstration of CP-42 or any other Sinker on your own work, under your own conditions. Write for demonstration.**

*There's a CP Sinker for every purpose, from the 28-pound CP-22 to the 119-pound, heavy duty CP-60. All are convertible to wet machines.*

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

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

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

# *Here is the* Cheapest, Best Way TO BUILD FILLS





In starting a fill, it is always best to build up the two outer edges first to conform with the desired slope line.

Then spread one extra lift on both sides, compacting the material as close to the outer edges as possible.

Next fill the center and repeat the cycle, keeping the sides high and the center low as you carry the fill upward.

When you reach the top, fill in the center, level off by dragging your scraper blade and finish to required grade.

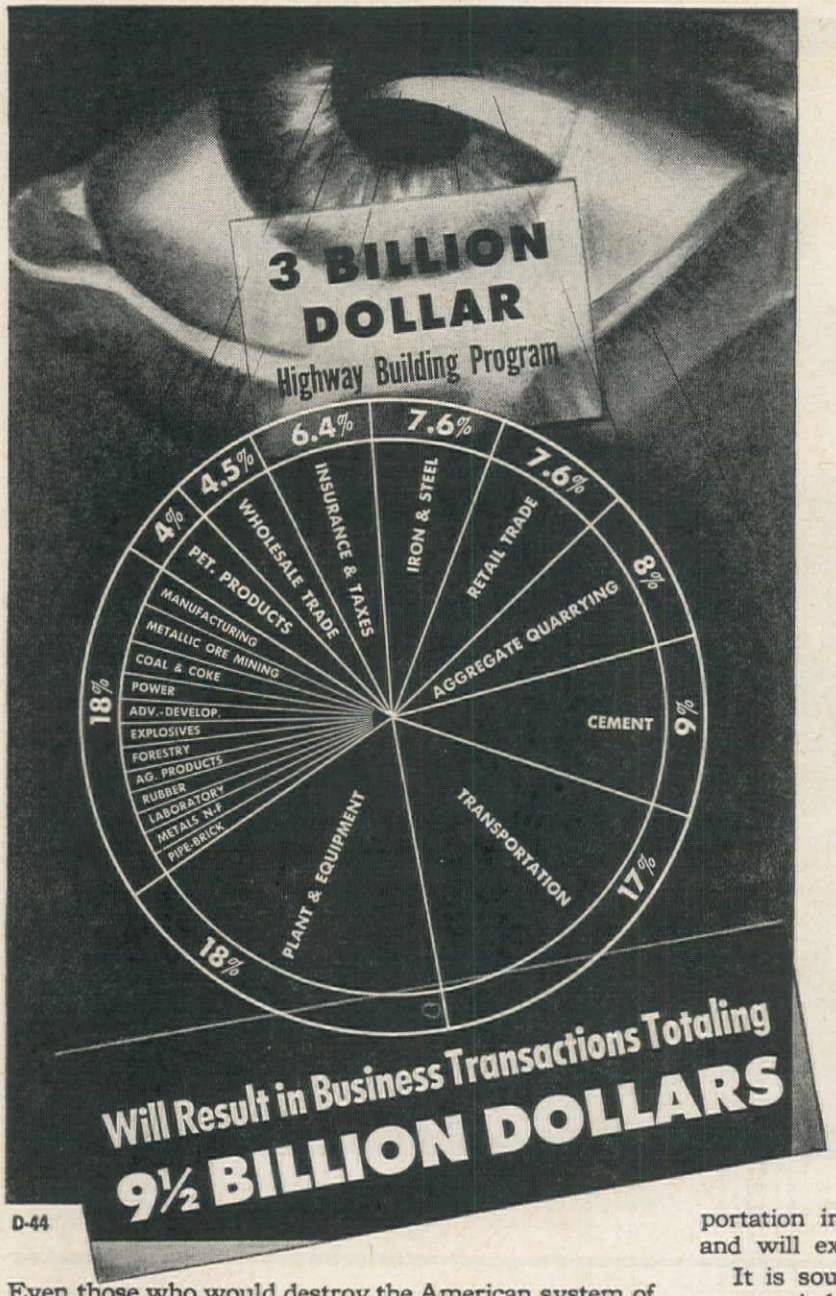
### *Don't Be Fooled By "Gypo" Parts!*

Our job—and yours—is to keep your present LaPlant-Choate equipment working efficiently until final Victory is won. Therefore, don't be fooled by substitute, makeshift parts being offered today through questionable sources. For your own protection, use only Certified LaPlant-Choate parts available through your LaPlant-Choate "Caterpillar" distributor.

★ Remember when the only way to build fills was to dump dirt in a pile with one kind of equipment—and spread it with something else? Now the complete job—digging, hauling, dumping and spreading—is done entirely by LaPlant-Choate "Carrimor" Scrapers. It's faster, cheaper, better because you can carry lifts to any desired depth . . . compact the fill and carry the slope at the same time. In addition, you can use "Carrimors" for leveling and rough finishing—thus releasing less adaptable equipment for other work. See your LaPlant-Choate "Caterpillar" distributor or write: LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

**LaPLANT-CHOATE**

*Earthmoving and Land Clearing Equipment*




D-44

**$s × $s = Worthwhile Jobs**

# Giant Stride to Keep Free Enterprise FREE

**PROPOSED BY AMERICAN ROAD BUILDERS' ASSOCIATION**

Even those who would destroy the American system of free enterprise must credit it with the greatest war production record the world has ever known.

But, that is not enough to keep free enterprise free. No segment of industry can afford to relax when the pressure of war is off. Nothing short of full employment will make freedom of enterprise secure through many difficult post-war years.

Because it is a basic and a giant stride toward this "must" goal, we urge all industry to get behind and push forward the planned peacetime program of the American Road Builders' Association.

It is sound because its proposed 3 billion dollar annual investment in highways multiplies to eventually result in business transactions totaling 9½ billion. (See chart above based on studies by U. S. Public Roads Administration.)

It is sound because it is capable of directly employing 3 million persons quickly and of contributing indirectly to the supporting of many more million jobs. (The highway transportation industry alone normally employs 7,000,000 and will expand with highway construction.)

It is sound because the economic structure of the country is built around the motor vehicle and will become more dependent upon it. Gasoline rationing forcibly brought this fact home.

It is sound because our highway system is inadequate, has suffered from heavy war traffic, weathering and limited maintenance.

It is sound because registration fees, gasoline taxes, municipal and county taxes, Federal user taxes, personal property taxes and tolls, if all used for highway purposes, would eventually be sufficient to build and maintain the highway system.

It is sound because it provides for competitive bids by contractors of experience. This insures higher efficiency, better construction at lower costs than can be obtained by the force account system of work relief.

*The American Road Builders' Association, 1319 F St. N. W., Washington 4, D.C., has made a fourth printing of a 64-page book entitled "A Sound Plan for Postwar Roads and Jobs." We suggest that every American write for it—to the Association direct or to—*

**union Wire Rope corporation**

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M-4 MILITARY TRACTOR

Cooperating with the Army Ordnance Department, Allis-Chalmers Tractor Division designed and is building M-4 Military Tractors.

# "FUSTEST WITH THE MOSTEST"

Carrying on in the legendary tradition of Lt. Gen. Nathan Bedford Forrest, Allied military commanders today are "gittin' thar fustest" with their big guns to smash enemy resistance.

New, track-laying M-4 Military Tractors enable our Field, Coast and Antiaircraft Artillery to accelerate the sizzling pace of mechanized warfare. Where in previous wars men and mules tugged and strained to pull heavy guns into position . . . now these powerful "battle-wagons" have taken over. They look like giant steel bugs, race with the speed of trucks . . . have the pulling power of a track-type tractor — haul the heaviest artillery over shell holes and ditches . . . through loose sand or muck and mud...up mountainous hillsides.

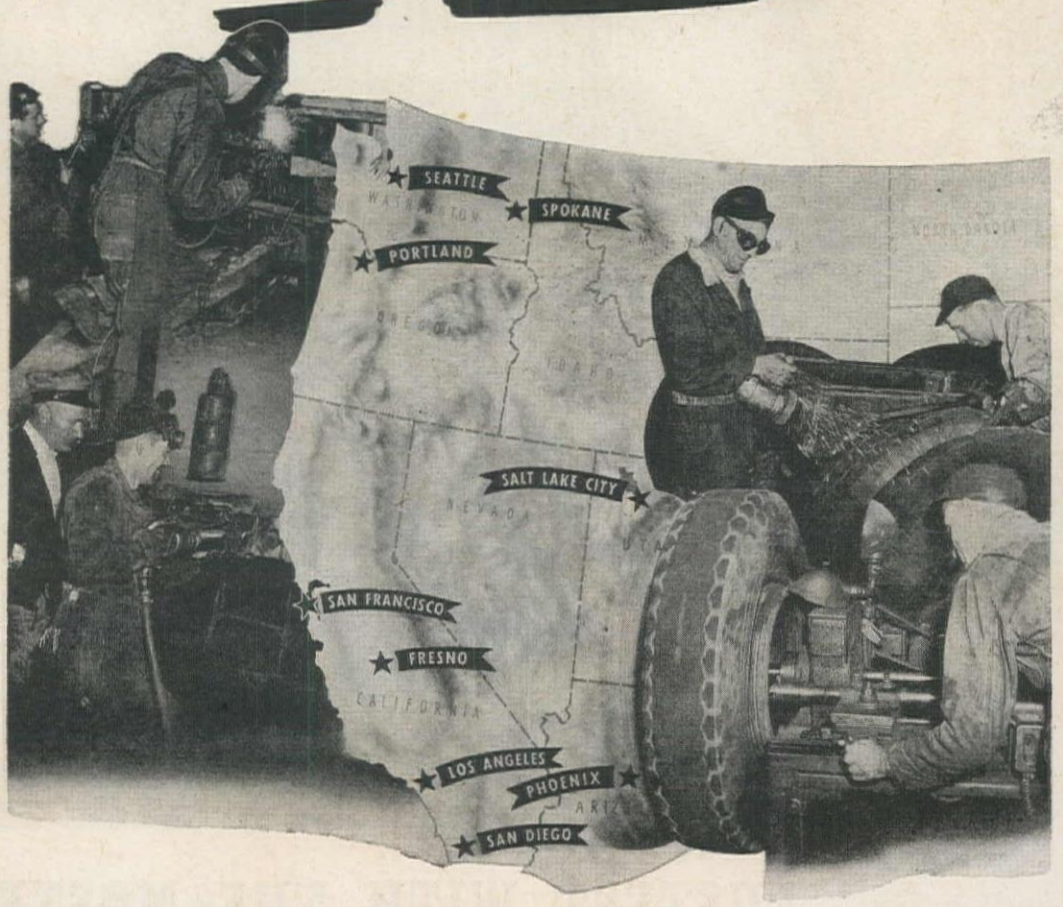
This new weapon of movement not only pulls the artillery but carries the gun crew of eleven men and initial rounds of ammunition, is equipped with a machine gun, ammunition compartments, shell hoist and towing winch.

Built for combat service, the M-4 is a development of the coordinated effort of the Army Ordnance Department and the Allis-Chalmers Tractor Division organization. It is a tool we are mighty proud to place in the hands of our armed forces . . . for it helps give United Nations' fighting men the important advantage of getting there *first* with superior fire power.


**ALLIS-CHALMERS**

TRACTOR DIVISION • MILWAUKEE, U. S. A.

# When We've Built Your Trailers We're Only HALF THROUGH




BUILDING GOOD TRAILERS to help you do your important work is only the first half of our responsibility to you. The second half—helping you to keep them running profitably and efficiently—goes on as long as there's a mile of work left in them.

**PREVENTIVE MAINTENANCE BEST.** Preventive maintenance—the service-in-advance that keeps equipment from breaking down—is, of course, the desirable way to keep Trailers running. But war-time pressure frequently compels you to run your vehicles until they just won't go any farther without service.

Either way—preventive maintenance or emergency job—you can look to Fruehauf Factory Branch service to carry out the second half of our responsibility to you.

It's true that Fruehauf shops can't always turn out your work these days as quickly as you'd like—or as we'd like. As in so many businesses, it's simply a case of too much work, too little manpower.

But whatever the conditions, we're obligated to give you the best service available. That's why our Branches are given the benefit of up-to-date equipment and parts stocks, the best-trained personnel available and the full resources of our factory organization.

*World's Largest Builders of Truck-Trailers*

**FRUEHAUF TRAILER COMPANY**

*Western Manufacturing Plant—Los Angeles 11*

*Sales and Service Branches* Los Angeles • Fresno • Phoenix • Seattle • Spokane • San Diego • San Francisco • Portland • Denver • Salt Lake City

**FRUEHAUF TRAILERS**

"ENGINEERED TRANSPORTATION" REG. U.S. PAT. OFF.

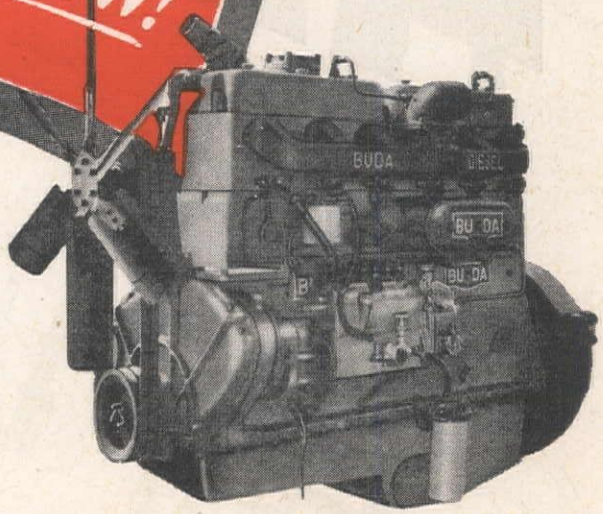
A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

# DON'T WAIT

## . . . for costly breakdowns

# BUDA

## . . . start regular engine maintenance NOW!




**Never was the old phrase "A Stitch in Time" more appropriate than it is today, in regard to engine care. A definite, periodic maintenance schedule will not only increase the life of your BUDA engine, but will also serve as a guide to indicate the need for minor adjustments which forestall costly breakdowns.**

**ORDINARY DIESELS**

. . . High cylinder pressures produce sledge-hammer blows that punish pistons, rods and crankshaft every power stroke.

**BUDA Low-Pressure DIESELS**

Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.

# BUDA

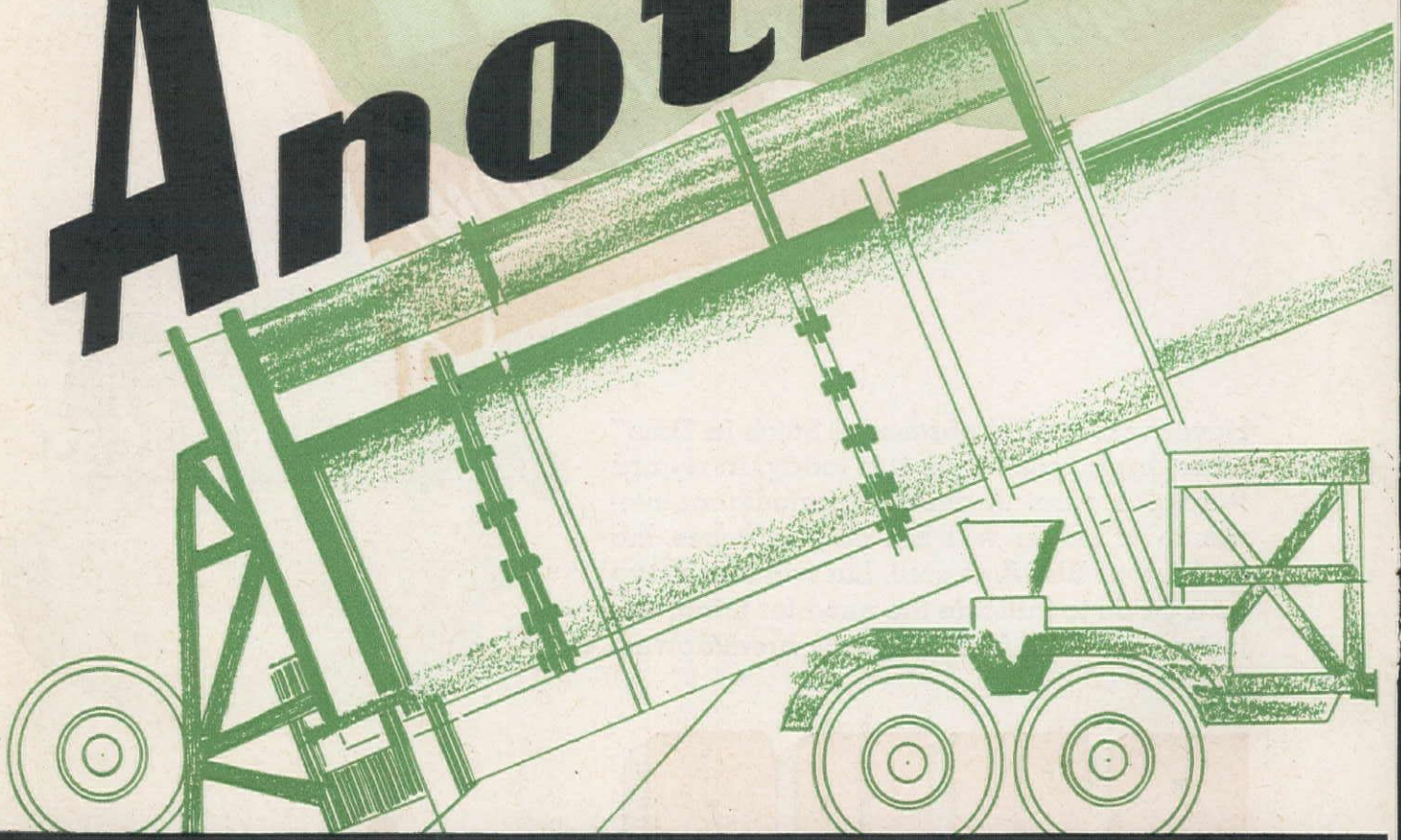
**THE BUDA COMPANY**

15424 Commercial Avenue

HARVEY (Chicago Suburb) ILLINOIS

# DON'T TELL TOJO!

# Another



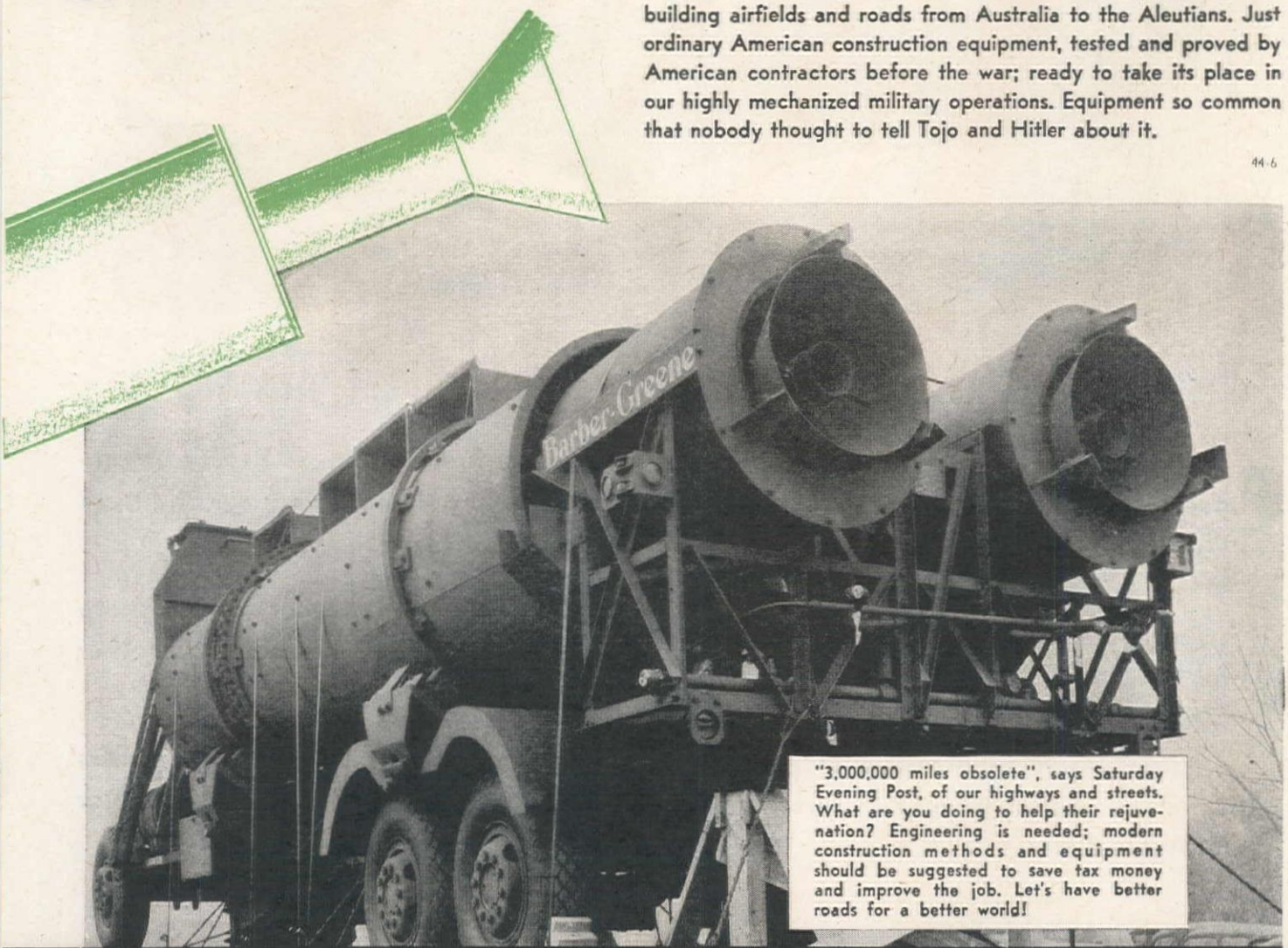
# BARBER

AURORA, ILLINOIS, U. S. A.

# Secret Weapon

Hitler and Tojo don't know it, but they have caught more hell through American construction equipment and methods than any secret weapon their evil minds can dream up. This is a Barber-Greene Dual Drum Dryer, not a rocket gun—one of the units of the B-G Army Airport Asphalt Plant. These plants built the runways that made possible the successful invasion of Sicily and Italy. They are resurfacing R.A.F. and American runways in England, building airfields and roads from Australia to the Aleutians. Just ordinary American construction equipment, tested and proved by American contractors before the war; ready to take its place in our highly mechanized military operations. Equipment so common that nobody thought to tell Tojo and Hitler about it.

44-6




"3,000,000 miles obsolete", says Saturday Evening Post, of our highways and streets. What are you doing to help their rejuvenation? Engineering is needed; modern construction methods and equipment should be suggested to save tax money and improve the job. Let's have better roads for a better world!

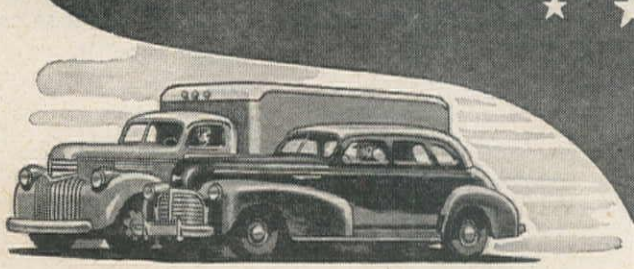
BARBER-GREENE

AURORA, ILLINOIS, U. S. A.

AMERICA MEASURES ITS LEADERS BY THEIR CAPACITY TO SERVE

# CHEVROLET
# First in Service

★ ★ ★




## CHEVROLET CARS AND TRUCKS

. . . provide wartime transportation and haulage service for more workers and industries than do cars and trucks of any other make.

. . . carry one-fourth of all passenger car and truck traffic for a working nation at war.

. . . lead every other make of car and truck in number of car owners throughout the United States.

## CHEVROLET DEALERS

. . . were first among all dealer organizations to provide wartime car and truck conservation service.

. . . provide wartime service for more cars and trucks than does any other automotive dealer organization.

. . . service cars and trucks of all makes to maintain America's wartime motor transportation system.

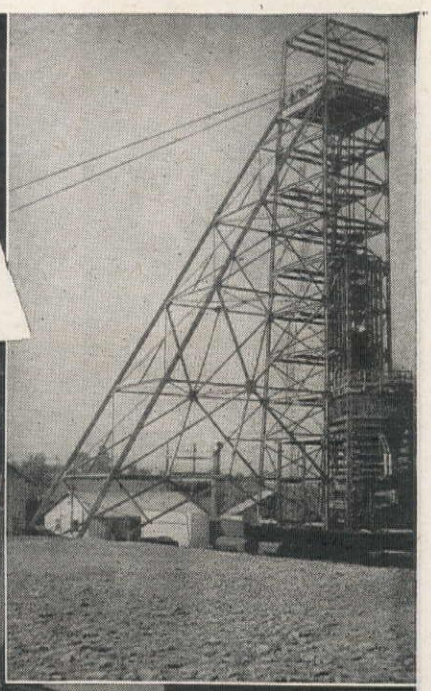
CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT, MICHIGAN

**"SAVE THE WHEELS** SUPER CHEVROLET SERVICE **THAT SERVE AMERICA"**

Every Sunday Afternoon, GENERAL MOTORS SYMPHONY OF THE AIR, NBC Network

*TO SPEED VICTORY . . . BUY WAR BONDS*

# Solving Problems on the Delaware Aqueduct



Headframe — Delaware Aqueduct job

Lidgerwood hoist employed in construction of Delaware Aqueduct

BUILDING the longest tunnel of all time posed some tough problems for engineers. On the 85 mile route of the aqueduct, running 300 to 2,000 feet below the surface from the west slope of the Catskills to New York City, fault zones and areas of porous rock were encountered — mud was forced into the tunnel in 1,000 yard lots, under water pressure up to 290 lbs. per square inch. Liberal grouting was called for; in some cases, extensive bulkheads as well. And, of course, all the materials to meet these problems had to be passed through shafts.

It is a compliment to the engineers, and a tribute to the reliability of the hoisting equipment, that these situations were overcome *without* delaying the scheduled progress of the aqueduct. On several of the contracts, Lidgerwood hoists were used to operate the shafts — Lidgerwood-modified or overhauled equipment was used on various other portions of the project. As engineers and contractors have come to expect, the Lidgerwood hoists performed their vital function day-in and day-out, without causing expensive tie-ups.

Lidgerwood hoists have a 70-year record of dependable, efficient operation in mine, quarry and construction service. Built to *fit the job,* there's a Lidgerwood steam, electric, gasoline or Diesel hoist to meet every construction requirement.

ARMY E NAVY

**LIDGERWOOD**

ESTABLISHED 1873

*Manufacturing Company*

MAIN OFFICE AND WORKS · ELIZABETH, NEW JERSEY

# EVERYTHING FOR PIPING...

# *Everywhere!*

As specialists in piping supplies, Grinnell maintains completely stocked warehouses in principal cities. You can get materials for any piping requirement from these warehouses or you can buy Grinnell piping products from your local Grinnell jobber.

At each of these nearby Grinnell branches, experienced engineers are ready to assist you in finding the solution to any unusual piping requirement.

Send for catalogs and remember Grinnell "whenever Piping is involved."

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Executive Offices: Providence 1, R. I.

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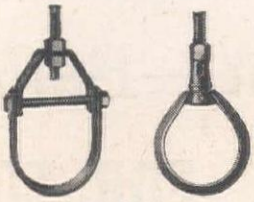
Cast Iron, Malleable, Bronze and Steel Pipe Fittings



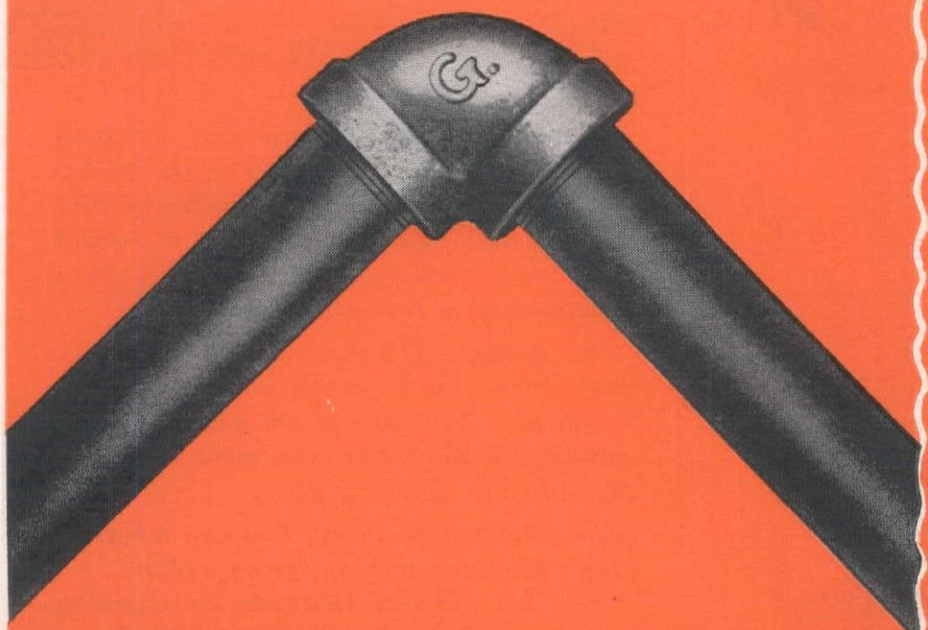
Pipe Hangers

Welding Fittings

Pre-Engineered Spring Hanger

Grinnell-Saunders Diaphragm Valve

**PIPE FITTINGS**



*Also* Pipe, Valves, Specialties for Heating, Water Works, Fire Protection and Pulp and Paper Mills.

# GRINNELL

WHENEVER *Piping* IS INVOLVED

Grinnell Company, Inc.
Providence 1, R. I.

Please send copy of Catalog describing
Pipe Fittings....., Welding Fittings.....,
Pipe Hangers....., Spring Hangers.....,
Grinnell-Saunders Valves.....

Name..... Title.....
Company.....
Address.....
.....

# Get Wise TO THE IMPORTANCE TO YOU OF CLETRAC Tru-Traction

1. Power on *both* tracks at all times.
2. Move smoothly around curves.
3. Consume less power on turning.
4. Steer the same downhill as on the level.
5. Turn shorter with full loads.
6. Maneuver on side hills parallel to slopes.
7. Stop and hold larger loads on hills.
8. Handle off-center loads with least trouble.
9. Operate with power always applied.

ONLY CLETRAC *Tru-Traction* GIVES YOU THESE ADVANTAGES

CLETRAC Tru-Traction—controlled differential steering—was designed and developed by Cletrac more than 25 years ago. It is an advantage exclusive with Cletrac tractors but has been employed by the armed forces in high-speed, track-laying military vehicles where its value has been proved on countless military operations in which other types of equipment would have lacked the necessary maneuverability or might stall and bog down.

Isn't it sensible, then, to apply this same kind of power—Cletrac Tru-Traction—on your jobs?

**GET THE FACTS FROM THIS BOOK**

*Ask for Bulletin No. 937 for complete details of Cletrac Tru-Traction and how it operates.*


**THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO**

ARMY E NAVY

**CLETRAC *Tru-Traction* TRACTORS**

GASOLINE OR DIESEL

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

# Memo for Men Who Plan for Postwar

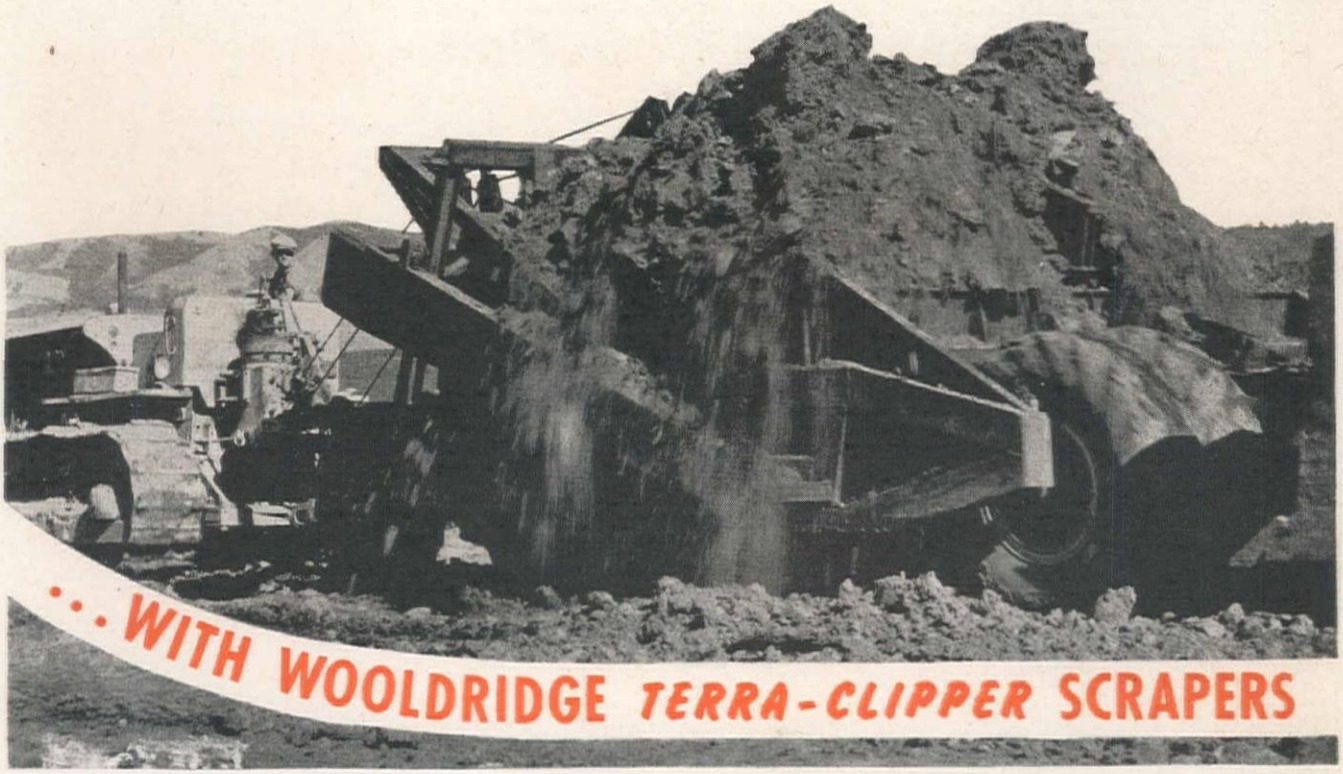
MONOTUBE tapered pile castings can help you do a better job of building a new America after the war. Their fluted, all-steel construction permits speed with safety in the installation of concrete piling. They are easy to handle. They allow quick, sure inspection prior to concreting. And their lightness (despite their remarkable strength and stability) permits you to drive them with average job equipment. Extendible Monotubes are available for the installation of varying pile lengths. Write today for your copy of the Monotube catalog—be ready when peace gives the go signal to the construction of new buildings, bridges, highways. The Union Metal Manufacturing Company, Canton 5, Ohio.

**Sound Construction Begins with MONOTUBES**

# UNION METAL

*Monotube Pile Castings*

# LEVELING OFF FOR A LANDING FIELD



## . . . WITH WOOLDRIDGE TERRA-CLIPPER SCRAPERS

Today's plans become tomorrow's realities. With the tremendous advance in aircraft development airports, landing fields, and landing strips along super highways will honeycomb not only this nation but every country in the world. This means that veritable continents of dirt must be moved—leveling the high spots and filling the low ones. Wooldridge Scrapers have kept apace and ahead of the needs of heavy-duty earth-moving requirements. They are designed and built to handle more yardage per load and more heaping yardage loads per shift. In starting tomorrow's plans today, plan to employ Wooldridge Scrapers and equipment on projects where time, yardage and cost are the essence of your contract. Before you buy any heavy-duty earth-moving equipment investigate the reasons why Wooldridge is best suited to your demands.

**WOOLDRIDGE Heavy Duty Earth-moving Scrapers are built in sizes ranging from 4 to 30 cu. yd. capacities. They are supplied to the United States Government for essential war jobs, for two line operation permitting two drum power units to be used. WOOLDRIDGE Scrapers operate on pivot-tilt forced load ejection principle.**

# WOOLDRIDGE

MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

BOILING BOWL TERRA CLIPPER PRINCIPLE

SCRAPERS

# IT'S NOT SO EASY—

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

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

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

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

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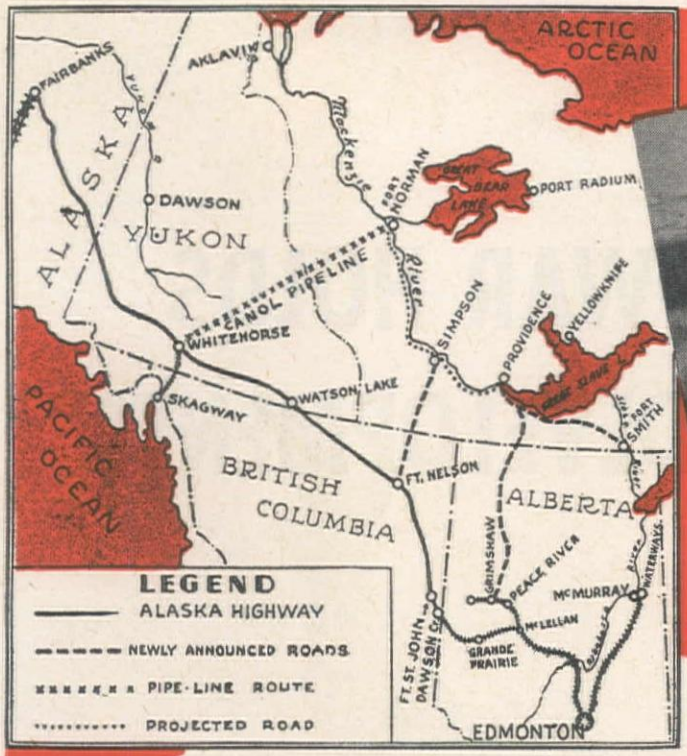



The trek of the crew and equipment to Fort Norman.

Section of right-of-way cleared by Baker Bulldozers.

Baker overhead tie rod protects cab and operator against falling timber.

# Bakers Clear Right-Of-Way for Pipe Line on Rim of Arctic!

Asphalt to extend and maintain the Alaska Highway, high octane gas for Japan-bound bombers and post-war cargo planes and diesel fuel for power in far north mines, canneries, pulp mills and fisheries will be made available by completion of the 600 mile long Canol pipe line in northern Canada.

This line will bring oil from wells at Fort Norman, Northwest Territory — trading post on the Mackenzie River — to a refinery under construction near Whitehorse, Yukon Territory.

Baker bulldozers are being used to doze trees, brush and rocks, fill gullies, level and grade, and to otherwise clear a right-of-way for the pipe line. This project was made necessary by the war and will pay off after the war, too. It will be unnecessary to haul petroleum products from the United States.

Baker hydraulic bulldozers with their direct lift and full down pressure on the blade are proving ideal for work in the frozen forest and wastelands.

The full weight of the tractor front end can be brought to bear on the blade—tough, frozen sub-arctic soils find their master in the Baker.

Send for Catalog 839.

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


*Awarded the Army-Navy "E" flag for proficiency in production.*

**BAKER**

*The Modern Tractor Equipment Line for*
**EARTH MOVING**
**LEVELING AND GRADE BUILDING**
**SNOW REMOVAL**
**ROAD MAINTENANCE**

*Then he said to himself*

# "THIS WAR HOLDS UNPREDICTABLE DEVELOPMENTS"

FOR once Premier Mussolini was right when, just a year ago, he warned the Fascist Directorate that "This war still holds unpredictable developments, which will not all be on the political plane."

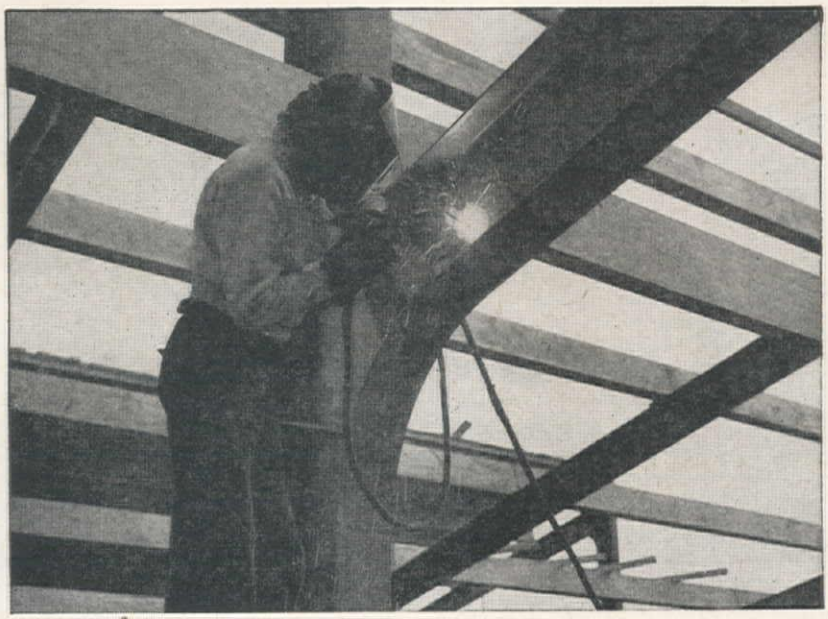
But there was enough on the "political plane" to slam his chin back in his collar, and if one wishes to read a moral into his statement, it could well be:

**You always lead with your chin when you team up with the wrong working partner.**

It is then you get unpredictable results of a DESTRUCTIVE nature.

# "Unpredictable Developments" he says

**Look, Benito** (*wherever you're hiding*), how men achieve predictable developments of a CONSTRUCTIVE nature when through recourse to Arc Welding they team up with a CONSTRUCTIVE partner:



A builder changed a factory design from conventional construction to welded rigid frame.

**PREDICTABLE DEVELOPMENTS:** Saving of 30% in weight of steel. Greater strength. Improved appearance (no trusses).

**CONSTRUCTIVE RESULTS:** The above advantages plus a reduction in fabrication cost from $15 to $8 per ton.

Studies in Structural Arc Welding will be sent you free on request.

**THE LINCOLN ELECTRIC COMPANY • CLEVELAND 1, OHIO**

*America's greatest natural* **recourse**

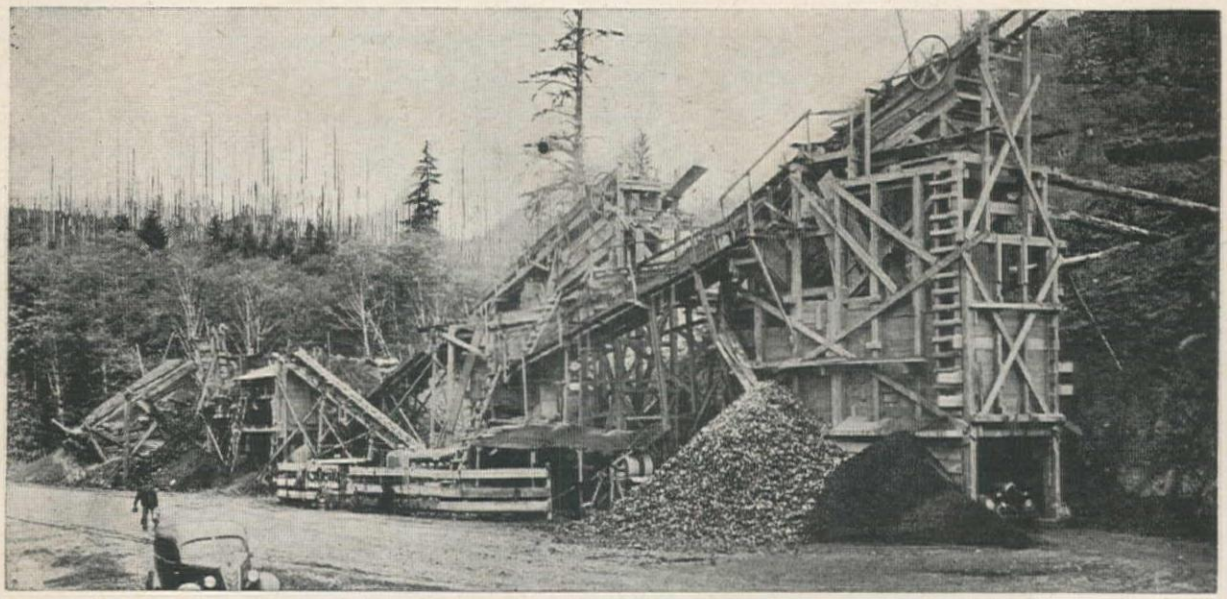
**ARC WELDING**

# 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."

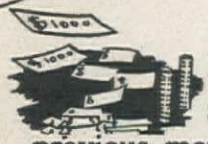
To secure a recommendation and quotation covering Simplicity Gyrating Screens for your job, contact the factory or one of our listed dealers.

**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.


## *Would Pay for Quite a few* BUCKEYE SPREADERS



In answer to a direct question on what his Buckeye Spreader had saved him over previous methods of spreading, one contractor wrote, "Quite a few thousand dollars."* Other users made the comments listed at the right.

*Accuracy* is the keynote behind Buckeye Spreader success. A spirally fluted, transmission-driven, adjustable speed feed roll grips the material and distributes it positively through a measured gate opening. This insures a "metered" flow that spreads material within a variation from calculated volume of as little as 1% to 3% on many jobs. The Buckeye Spreader is far more than a truck tailgate attachment — it is a *Spreading machine* from the ground up. Complete data in 8 PAGE BULLETIN. Write for copy.

**BUCKEYE TRACTION DITCHER CO.**
***Findlay, Ohio***

"Save 30 to 50% on materials."

"Saves approx. $25.00 per mile."

"This is the best spreader I ever used."

"Saves at least 20% on material."

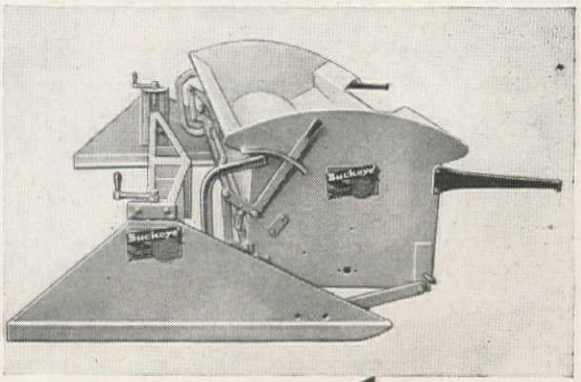
"Saves $32.00 per mile."

"Accurate within 2%."

*Signed statements on file. Photostatic copies available.

### STRIKE-OFF ATTACHMENT

This attachment permits spreading base coarses to 6 inches depth. Blade is mounted on skids and is adjustable by hand cranks.



Convertible Shovels
Spreaders
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# 3,200 HOURS!

## From One VELVETOUCH Master Clutch Facing

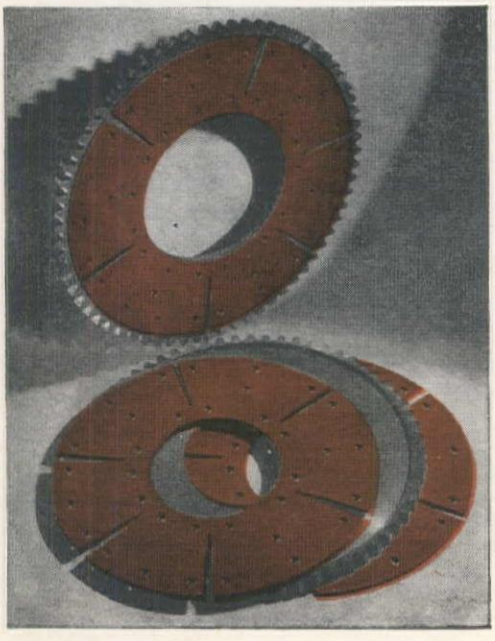
### Excavating Contractor Reports Complete Satisfaction With Velvetouch in D-4 Caterpillar

Two and one-half years of dependable, smooth performance . . . and still good for many additional trouble-free operating hours! That's the story of the Velvetouch facing installed in the master clutch of a D-4 Caterpillar tractor, owned and operated by Gerl Bros. Excavating Company of Euclid, Ohio.

Andrew Gerl, Jr., head of the firm, sums up his opinion of Velvetouch in one sentence: "We are now using Velvetouch facings exclusively in all of our earth-moving equipment."

**VELVETOUCH IS ALL METAL**... made entirely from compressed powdered metals, welded to steel backing plates. And because Velvetouch is all metal, it wears longer . . . requires less adjustment . . . is little affected by oil or water.

*Below:* These Velvetouch Bimetallic clutch facings are the type used in the master clutch of the D-4 Caterpillar tractor.



Equipped with a Trackson Traxcavator, this D-4 Caterpillar, owned and operated by Gerl Bros. Excavating Company, really digs into this pile of frozen earth . . . a punishing test for its Velvetouch clutch facing.

*For complete details write to:*

**THE S. K. WELLMAN CO.**

1374 EAST 51st ST. • CLEVELAND 3, OHIO

FOR BRAKE AND CLUTCH

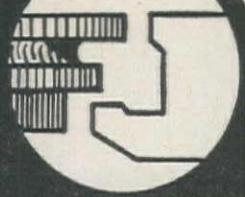
USE Velvetouch

BIMETALLIC FRICTION MATERIAL—TRADE MARK REGISTERED

# For Air Economy USE Thor ROCK DRILLS

**AIR INPUT Measured to .00025 of an inch for Balanced Power and Smooth Performance.**

Spaces between the flanges and chest shoulders of this patented Thor Valve are controlled to a tolerance of .00025 of an inch to turn into power ALL air that enters the tool.



• Thor Rock Drills develop rock-smashing power and speed from every ounce of air that enters the machine through the patented Thor Positive Short-Travel Tubular Valve which controls air power by tolerances of .00025 of an inch!

*Balanced power* is one feature of such fine control—because only a precisely governed quantity of air is allowed behind the piston.

*Smooth performance* is another feature—because every stroke is powered by the same measured quantity of air.

And *air economy* is assured throughout the life of the Thor Rock Drill—because there are no separate parts of this patented Thor valve to lose or wear.

Thor Rock Drills offer many more features of design and construction—features providing complete control of drilling speeds, assuring dependable rotation, preventing clogging, and absorbing shock. For complete details about Thor Rock Drills and a wide range of associated air tools write today for Thor Catalog 42-A.

**OTHER THOR AIR TOOLS**

*PAVING BREAKERS • CLAY DIGGERS • TAMPERS • SUMP PUMPS • GRINDERS • SAWS*

Thor *Portable Pneumatic and Electric Tools*

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*Branches in Principal Cities*

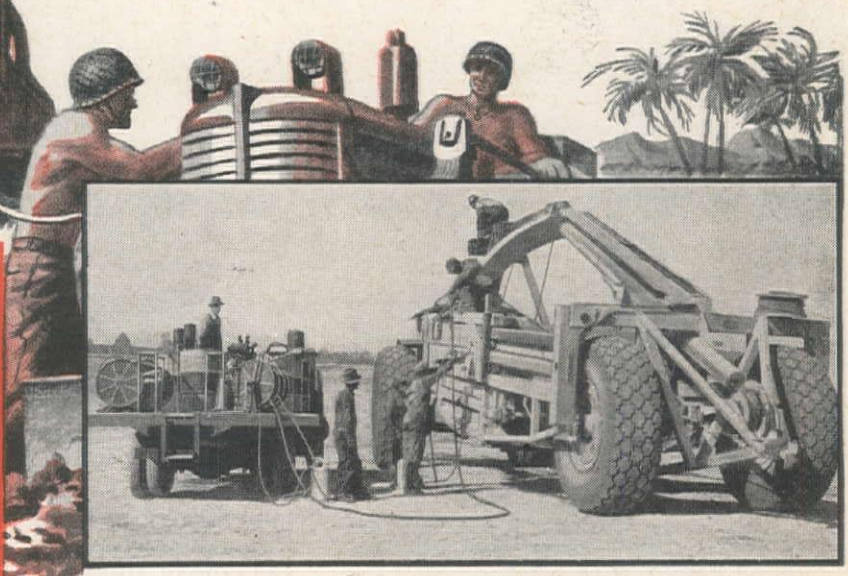
## Out of the Pacific Come

# NEW WAYS TO CUT YOUR CONSTRUCTION COSTS!

OUT where the heat's on, they're hewing tropical islands into stepping stones to Tokio. It's a tough job, 24 hours a day, 7 days a week. Yet in the doing American ingenuity is finding new ways to cut construction time and costs that *you* can put to good use right now!

From the word "go" the job called for continuous production from every machine. In this battle lost minutes could mean lost men. These machines required the dependable lubrication provided by modern maintenance centers. Such facilities were usually located far from them.

So they brought power lubrication *to* the machines via modern Alemite Portable Service Stations! The savings in machines, man hours and lubricants were so outstanding that, today, the practice is followed on scores of similar jobs.



### FACTS FROM THE PACIFIC THAT YOU CAN PROFIT BY!

During an 18 month check, wear on track rollers on "cats" has been reduced by 32% over hand-type greasing.

Due to "barrel to bearing" dispensing, oil and grease consumption has been reduced by 19%.

The equipment serviced includes tractors, bulldozers, caterpillars, shovels, mobile cranes, light plants, trucks, carry-alls, and other machines too numerous to mention.

In one Pacific area, comprising a number of projects, 43 Alemite Portable Service Stations are in continual use.

The equipment is mounted on trucks ranging from one ton to seven ton capacity.

The Alemite Portable equipment includes high and low pressure pumps, gas-driven air-compressors, reels and 50 feet of air hose and light plants for night operation.

All units were assembled on the job according to plans produced by Alemite.

**In the Pacific, the jobs had to be done the hard way. Yet here's conclusive proof of savings in manpower, time and machines—a cutting of costs all down the line!**


**FREE!** New catalog illustrating and describing Alemite Portable Service Stations. Write for your copy today!

## How the Alemite Portable Service Station Saves Time, Machines and Money!

CONSTRUCTION projects on the home front frequently require irreplaceable equipment to work without let-up far from maintenance centers. Breakdowns for lack of accurate lubrication are plenty costly in lost time, manpower and machines!

That's why more and more contractors are protecting their vital equipment with Alemite Portable Service Stations. They meet any lubrication need, anywhere, quickly and dependably. And it's a far easier method, saves many man-hours . . . helps get jobs done faster!

The Alemite Portable Service Station is a complete power mobile lubrication department—includes high and low pressure Alemite Barrel pumps, Alemite Motor Oil dispenser, hose reels, and gas engine equipped air-compressor.

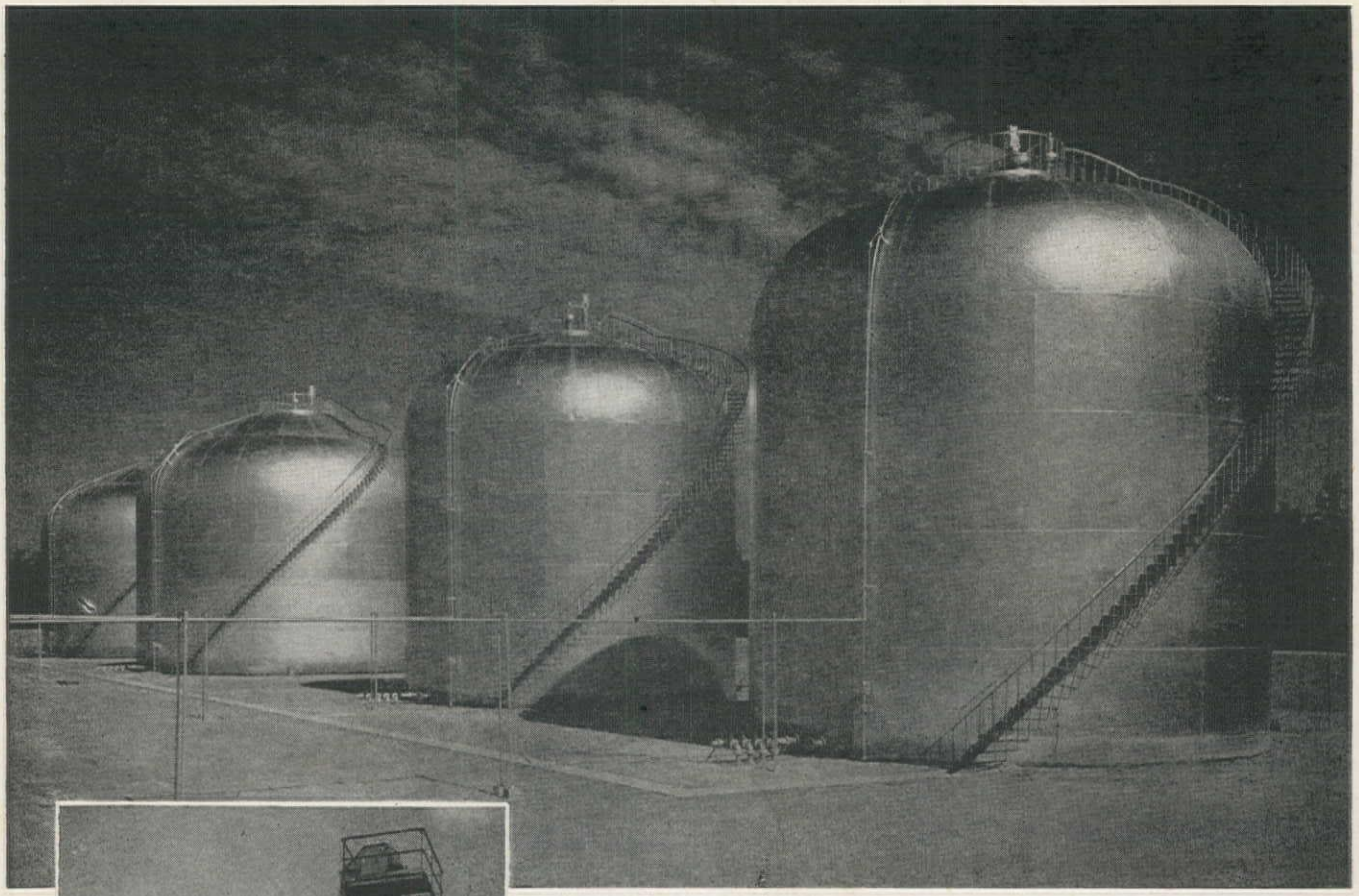
For complete information on both standard and custom built Alemite Portable Service Station models . . . for proof of how this equipment *can actually pay for itself in days*, send for your FREE copy of the new Alemite Portable Service Station catalog.

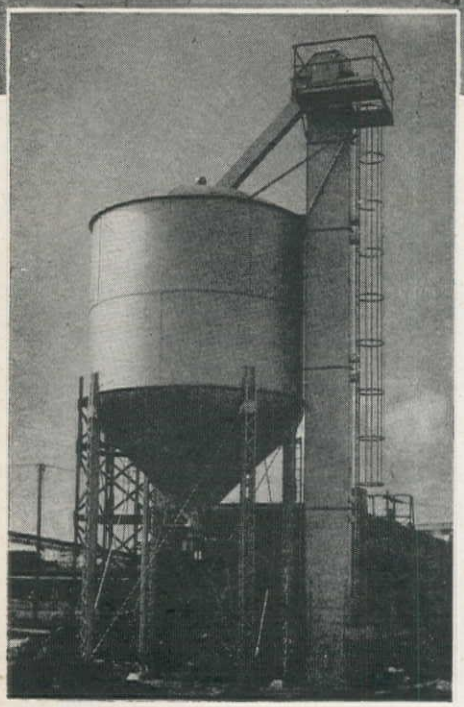
# ALEMITE

*First in Modern Lubrication*

1819 Diversey Parkway, Chicago, Ill. • Belleville, Ontario

Another Product of STEWART WARNER





# TANKS THAT SOLVE

## *Today's Storage Problems*

**Industrial concerns today are faced with many plain and complicated storage problems. The production of various kinds of wartime materials have brought about the need for the type of storage facilities provided by the tanks shown on this page.**

**The four tanks above are Hemispheroids. They are used for the storage of distillate under 5 lbs. per sq. in. pressure at a petroleum recycling plant. The two tanks to the right in the picture have a capacity of 10,000 bbls. each, and the other two hold 20,000 bbls. each. Pressure storage such as this protects the products stored from vapor loss as well as deterioriation.**

**At the left is another type of storage tank. It is a typical conical-bottom steel tank of 5,000 cu. ft. capacity. A paper mill uses it for the storage of lime.**

***The tanks shown here are but two of many types designed and fabricated at our plants. Others include pressure vessels, Hortonspheres, Hortonspheroids, various types of storage bins and steel reservoirs. If you are confronted with a storage problem, write our nearest office, outlining your needs. There is no obligation.***

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WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
April, 1944 Vol. 19, No. 4



## Manpower Bunk

WHEN THE PRESIDENT, some months ago, proposed a universal service law, it was generally discounted and in fact ridiculed, because of the tardiness of the proposal. Had it come early in the war effort, when much time was lost in organizing and orienting our work army, the suggestion might have had real value, but because it was not offered for consideration until after our great industrial production machine was running smoothly and in high gear, it became ridiculous, even ludicrous, and Congress naturally took no steps whatever toward implementing it.

It was assumed that this civilian regimentation idea was dead and buried, but recently the War Department and Administration spokesmen have unearthed it and propped it up in its grave clothes under the title "4F labor draft."

The same contra-argument still holds, of course. While calling in one breath for such service, the Army is closing munitions plants and cutting back other contracts. Pacific Coast labor shortage areas, among the most critical of the nation some months ago, are now rapidly becoming labor availability centers.

But even more ridiculous, is the idea that men rejected by the Army for physical or mental deficiencies would be suitable for work in modern, high-speed industrial plants, or at the back-breaking labor of the farms. Men with sight handicaps, missing members, defective hearing, hernias, or mental deficiencies, simply do not make suitable operators for high-speed machinery. Generally speaking, they are detriments to the operations of more capable workers. In their desk assignments, in industry essential to either the war or civilian life, they are doing good jobs, and both their present work and the men themselves would suffer unnecessarily if forced into jobs for which they are unsuited.

It appears that there is a political angle back of the proposition. Some unruly unions have gotten out of the control of the Administration, and because their activities have received much publicity, there is anxiety and unrest among the armed forces. Rather than adopting any firm labor policy, which might antagonize either the unions or management, Washington seeks this action to pacify the soldiers.

## Taxes Needn't Go Up

CANDIDATES FOR PRESIDENT in the 1944 election are rushing about the country announcing that taxes must be raised still further. Those of us who have just passed through the March 15 and April 15 tax wringers ask when it shall end.

Of course, everyone knows that tax income is not sufficient to pay all the war expenses. Everyone also knows that the total war cost approximates the total income of the nation, without including the cost of local government, and it is simply impossible to expect current payment of the war bill. After all, if any benefits are to come from this war, they will accrue to our descendants, and it is only fair that theirs should be a portion of the fiscal responsibility.

When there is a discrepancy between income and expense, there are always two answers: (1) increase the income, (2) reduce the expenses. In this case, it appears that the first possibility has been exhausted, possibly even overdone, but in the second case there is a nearly unlimited opportunity for action. All of us have heard, and probably actually know, of flagrant and inexcusable cases of waste in connection with the war effort. These should be corrected wherever possible, of course, but it is likely that considerable waste is inevitable in meeting the exigencies of war.

However, the continued and continuing growth of bureaucracy in civil affairs, as reported by Lawrence Sullivan in "Bureaucracy Runs Amuck," are utterly staggering. To quote a few figures, there are right now in the federal government 3,300,000 civil employees, more than are employed in any other single industry in the country.

The monthly payroll for these 300 divisions is $522,000,000, an average of only about $160 each. Not a high rate of pay, but that is approximately the yield to the Treasury from two $100 war bonds. In other words, for every one of the 3,300,000 not absolutely essential, two $100 war bonds from the sweat and tears of the citizens are being wasted each month.

Sullivan states that OPA has grown from 84 in April, 1941, to 8,000 in April, 1942, and 90,000 in April, 1943. Fortunately for our sanity, figures are not available for 1944.

The great army is divided into 205 departments, commissions, boards and agencies with 1,594 branch offices scattered about the country. The amount of money spent for rent alone must make a sizeable pile.

Clear, positive and visible efforts must be made toward reducing this overhead in civil government before appeals can be fairly made for increased taxes and bond purchases. When people who think they are supporting their boys in the field, realize that a considerable proportion of the money goes to support a host of unnecessary and overstaffed agencies, there is apt to be serious trouble.

In addition, a recent study by Professor William Anderson shows that in 1942 there were 155,147 units of state or local government within the boundaries of the nation. All of these cost money to run. They vary from irrigation districts with one employee to states with 30,000 or more.

A great many of these could be eliminated, or combined. With the minor part played by county government nowadays, it is sheer waste for Texas to continue to operate 254 separate and distinct counties and for California to preserve mountain counties with less than a thousand voters. Adjoining school and other districts could easily be combined, reducing administrative and operating expense, while giving not less, but generally more efficient service.

Often taxpayers' committees go wild in demanding cuts in expense. *Western Construction News* recognizes the importance and desirability of government. It demands, however, efficiency and order in administration. Readers of this magazine are contractors and engineers, to whom waste and inefficiency are sickening. Our government structure can be and must be reorganized both for better operation and tax relief. What better time for it than now, when men released from government jobs could with no trouble whatsoever find employment with industry or the armed forces.

## Western Disunity Again

THEY'VE DONE IT AGAIN! Western Congressmen have put aside Western good for personal, political, or some other reasons. The sad story may be read in Arnold Kruckman's Washington letter on page 90 of this magazine. The vote was on the best use of water, which we had assumed was unanimously agreed upon in the West as being domestic and farm use.

Various road bills before Congress will also demand unity by Western Congressmen. Every Westerner interested in proper allocation of highway funds had better read Kruckman's letter, then communicate with his Congressman.

**Water Ballast Saves Money . . .** by making it possible for the roller to handle a wider variety of jobs. A-W variable weight Tandem Rollers are made in two sizes . . . 5 to 8 ton and 8 to 10½ ton.

# Does a LOT of rolling jobs a LOT faster

HERE'S a roller you can count on for fast, economical performance . . . season after season. Its many refinements in design make this smooth performing A-W Tandem a preferred machine for accurate work.

With an A-W Tandem your operator can work closer to curbs because visibility is better, there is less frame over-hang, and more ground clearance under side plates. More convenient controls, with reversing clutch lever mounted on steering column, combine with effortless hydraulic steer to save time and increase efficiency. It changes direction—forward or backward—with that vibration-less smoothness that means a better job and less wear and tear on the machine itself. A lower center of gravity prevents side sway.

A-W variable weight Tandem Rollers are built in 5 to 8 ton and 8 to 10½ ton sizes. Write for complete information on advantages they'll give you on the wide variety of jobs a tandem is called upon to handle.

**AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.**

**ARIZONA:** Smith Booth Usher Co., Phoenix
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**OREGON:** Columbia Equipment Co., Portland
**UTAH:** Western Machinery Co., Salt Lake City
**WASHINGTON:** Columbia Equipment Co., Seattle
**WYOMING:** Wilson Equipment & Supply Co., Cheyenne

# Alaska Construction—
# Elmendorf Field Becomes Great Base

**Largest Alaska airbase built by civilian and military personnel under the direction of the Corps of Engineers, overcoming tremendous handicaps of rain, snow, tundra, and lack of equipment—Work begun in 1940, and recently concluded includes runways, hangars, gasoline and ammunition storage, and facilities for personnel**

BUILDING THE vast chain of military airfields in Alaska and the Aleutian Islands has added an historic chapter to American engineering. The chapter is not yet finished. Its most colorful pages are being written today when Alaska, hanging like a giant arm over the North Pacific, provides the bases for an offensive movement against Japan.

The Alaskan airfield of not many years back was a small clearing leveled off to accommodate the tiny privately owned planes of the Alaskan "bush pilots." With the coming of the commercial airlines, the size and equipment of the airfields increased, but they were still not large.

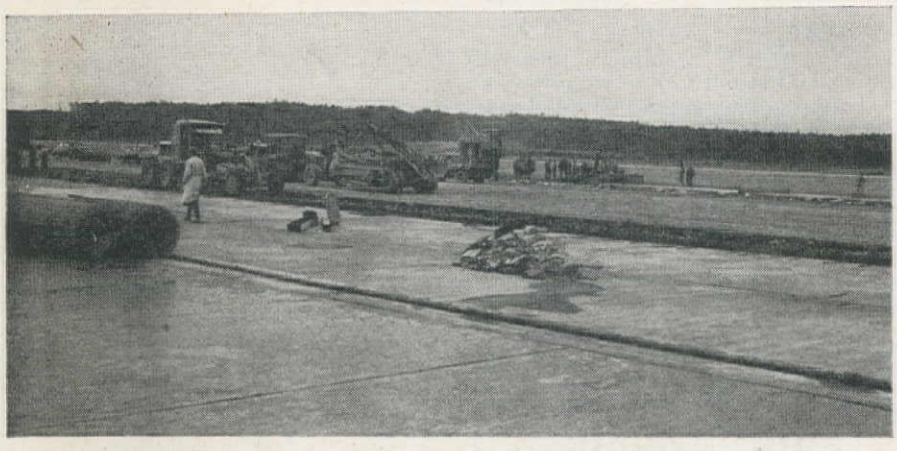
### Modern requirements

But modern war and the Army Engineers have changed the very land from which planes take wings. Bombers that weigh as much as a railroad locomotive —and land at speeds faster than streamliners—need wide, long and tough runways if they are to remain intact for combat. The immediate vicinity of the airfield must be cleared of trees and other obstacles. Light and water plants, laboratories and innumerable shops must be built. Gasoline storage tanks and pipe lines are required. Enormous quantities of ammunition and bombs must be stored and sheltered. Hundreds of men must be housed and fed. This is the modern Alaskan military airfield. Such an installation is Elmendorf Field, largest airfield in Alaska and hub of the air activity in that region. Located in southwest Alaska near the town of Anchorage, it was hailed by the press of the nation as an "advance outpost for the defense of the North American continent." This was in mid-year of 1940, a year and a half before Pearl Harbor. It was the springboard from which was launched the string of airbases on the Alaskan mainland, the Alaskan Peninsula and the Aleutian Chain.

**PAVING MACHINE continues to pour concrete at Elmendorf Field, despite winter conditions. Aggregates, water and machines were heated, and extensive precautions were taken to prevent freezing of the green concrete during curing period.**

### The beginning

Named in honor of Captain Hugh M. Elmendorf, who was killed in an aircraft accident at Wright Field, Dayton, Ohio, in 1933, Elmendorf Field had a small, rude beginning. Four men, hired locally and equipped with a caterpillar tractor and carryall, a concrete mixer and a few dump trucks, began work in June, 1940, under the Quartermaster Corps. It should be said, however, that the establishment of a major air base in Alaska had been advocated and planned for several years before this time. In May of 1939, by Executive Order of the President, this land was withdrawn from public use.



**PAVING RUNWAYS at Elmendorf Field. It was necessary to remove from 3 to 12 ft. of spongy tundra and replace with stable material. TOP, rolling subgrade; CENTER, wire mesh was used by Army Engineers as reinforcement of runway surface, dowels were used between blocks; BELOW, completed slabs, and grading for further extensions.**

A clearing was started and a field office and repair shed constructed when the initial Alaska Defense Force of slightly more than 500 officers and men, under the command of Lt. Colonel Earl Landreth, arrived 19 days later. No barracks or other facilities were available. The men pitched tents and used water from a nearby creek. Headquarters was established in an old farmhouse on the land. The barn was converted into an ordnance warehouse.

With the arrival of the troops and additional equipment, clearing and construction work was greatly speeded up. Most of the difficulties experienced were due to the tundra, a soft, spongy layer of earth and moss, from three to 12 feet in thickness, which soaks up the summer rains and is very unstable. Much of the land was marshy and had to be drained. Rain fell frequently. Equipment bogged down and men worked in muck over their knees. There was a constant fight against hordes of mosquitoes. Life was primitive. Empty oil tins were much in demand as receptacles; bathing was difficult and the inconveniences were many. However, the troops still managed to stage a military parade in Anchorage on the Fourth of July, a week after their arrival.

The runways of Elmendorf Field were located under the personal direction of Major General Henry H. Arnold, now General, chief of the Army Air Forces, who arrived in July, 1940, with Lt. Colonel Ira C. Eaker, now Lt. General, 8th A. A. F., and other high ranking Air Corps officials to inspect the work. In the same month, Colonel Simon B. Buckner, Jr., now Lieutenant General, came and assumed command of the Alaska Defense Forces; Colonel Landreth, later Brigadier General, remaining in command of Fort Richardson, the military post adjacent to the airfield.

Construction of Elmendorf Field was transferred to the Corps of Engineers January 16, 1941. Majority of construction was by hired labor, and during 1940 and 1941 construction was performed entirely by civilian labor. During 1942 and 1943 civilian labor was augmented by soldier labor. Captain A. C. Welling was the first Resident Engineer, and was succeeded in turn by Colonel Craig Smyser and by Colonel Maybin H. Wilson, present Resident Engineer.

The first permanent Air Corps personnel to arrive at Elmendorf Field were Major Everett S. Davis and two enlisted men, Staff Sergeant Joe Grady and Sergeant Edward Smith, in a Martin bomber. Major Davis later became the first commanding officer of Elmendorf Field and won promotion to Colonel.

Since no landing or other Air Force facilities were yet available, this "Air Force" made its headquarters at Merrill Field, the nearby Anchorage Municipal Airport. A one-room wanigan (Alaskan cabin on sled runners) served as headquarters, operations and engineering sections, general storage and sleeping quarters. Major Davis and his crew made trips to many points in Alaska to become familiar with operating conditions.

It was not uncommon to find large game animals near the construction work. Frequently black bears or their brown cousins, attracted by the smell of food, would wander into the camp area itself. A typical case was the big "brownie" that invaded the privacy of a lieutenant's tent one night, causing considerable commotion. However friendly might have been the brownie's intentions, he soon found he was not at all welcome as guards prodded him out of the officer's abode with their rifles.

Clearing operations continued to the whine of bulldozers as engineers tore through mud, stone, brush and trees. Construction became a race against winter and short daylight hours. Freezing snow came in October, about a month before the troops moved from the tent area into the first wooden barracks. Extreme cold weather slowed but did not halt construction. The ground had to be broken by drilling with jackhammers

and thawing with steam jets. Stoves provided the heat while newly poured cement foundations set.

### Expansion program

Early in 1941, larger groups of Air Force personnel arrived by air and boat. Normal activity in Anchorage was frequently disrupted when its inhabitants craned their necks skyward from windows or rushed outdoors to watch the arrival of bomber or fighter airplanes.

Work was spurred to the utmost by the outbreak of war in December, 1941. By then Elmendorf Field could feel its strength. During this time work was also progressing on other fields that gradually spread out over the mainland, peninsula and chain. This expansion program was directed by the Alaska Defense Command from Elmendorf Field, and as new bases were born, personnel was sent from Elmendorf by the Air Corps to organize them. Thus it was that Elmendorf Field was still in its formative stage when it became a rear base and headquarters of the Army Air Forces activities in Alaska.

Largely because of the construction of the huge army installations of which Elmendorf Field is a part, Anchorage became a boom town. It is an Army town in every sense of the word, having been planned and laid out by Army Engineers around a small defense project that was started during the last war.

The soldiers coming from the states were often surprised to find that Alaska was not a desolate, snow-covered waste, but a land of unsurpassed natural beauty, whose climate in many ways resembles that of our northern states. True, it was at first hard to get accustomed to the "time of big sleep" as the natives called winter, because it is dark much of the day. Old Sol would peep down from behind the mountains, but he never got up before nine in the morning and was in bed by three in the afternoon. Lights burned in the hangars, shops and offices during the entire day. In contrast, summer, the "time of no sleep," daylight reigned for the greater part of 24 hours. The sun set about ten p. m. and rose at two a. m. The old familiar "lights out" at nine in the evening didn't mean much to these Alaskan soldiers and the Charge of Quarters just didn't bother about it.

Recreation, too, was a problem in the early days at Elmendorf Field. Facilities, such as were enjoyed in the states, were almost non-existent. As a means of using their leisure time, the men formed clubs, organized athletic teams, hunted and fished, and even gold mining became popular as well as profitable with some of the men. Building of the Air Corps "Kashim" provided a place for indoor amusements. "Kashim" in the language of the Eskimo means "Our Home." Work on this log building was done by the soldiers, largely in off-duty hours.

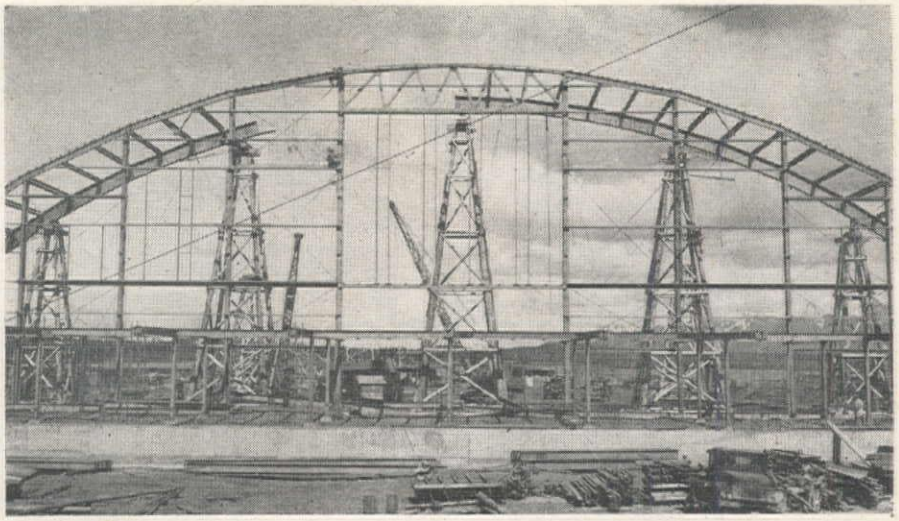
### Its importance

Since it became a rear base, the importance of Elmendorf Field has increased rather than diminished. Next to the problem of building a chain of airfields, keeping them supplied is of prime importance. Continued effectiveness of an air force is limited by its supply organization. An airplane without bombs, ammunition or gas is useless. Moreover, the modern airplane carries equipment at the right place and at the right time.

In the short time of three years, Elmendorf Field has grown from a wilderness spot to a base that handles a traffic load comparable to that of a large rail terminal and has the shops, installations and housing of a fair sized city. When the last round in this war has been fought, and Japan is ready to fall face down on her own sword, it will not be surprising to find the hilt braced squarely and solidly against the land bridge of Alaska and the Aleutians. Elmendorf Field and other Alaskan bases are due to go into the history of World War II as having played a big role and played it well.

Nor is there any reason to believe that the importance of this base will decline after the war. Air navigation has made it an important station on the crossroads of the world. The old explorers' dream of opening a northwest passage to Asia has become real. Alaska's historical development, due to the type of difficulties of transportation connecting it with the world, has largely been pioneer, island-like, end-of-the-road character. The new Alaskan air bases, aided by the recently completed Alcan Highway will, in a sense, engineer the end of this pioneer civilization.

Many men stationed at Elmendorf Field and throughout Alaska have recognized and caught a glimpse of the rich future slowly unfolding in this empire on top of the world. These men are studying Alaska's natural wealth and its possibilities in industry and trade, with the intentions of participating in its post-war growth. To them, these possibilities hold the key for the forming of a self-sufficient, immensely rich territory.



**STEEL TRUSS hangar under construction by Army Engineer workers at Elmendorf Field. Pre-fabricated truss section may be seen in the foreground, prior to erection from timber falsework pylons. Elmendorf is thoroughly modern, complete military airbase, largest of the chain of defense installations in the territory.**

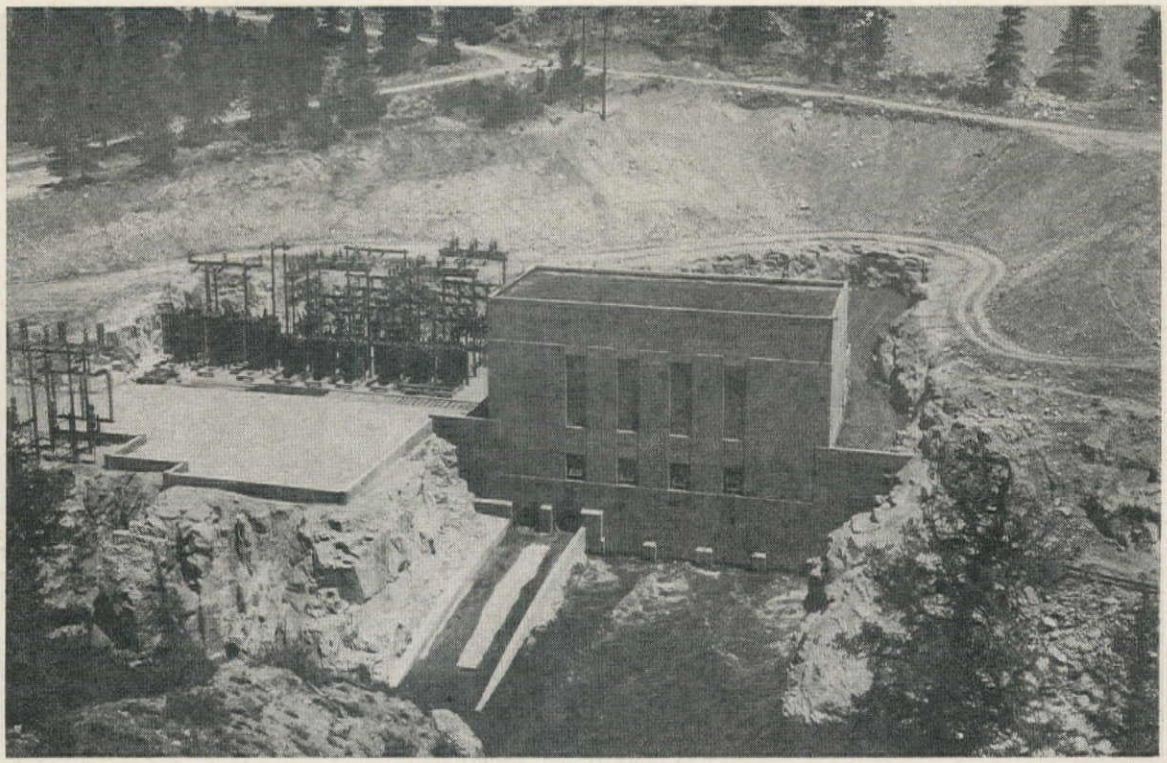
# Report on Capacity Loss From Silt in California Reservoir

A REPORT has been issued by the Soil Conservation Service on the sedimentation surveys at Little Rock reservoir in Los Angeles County, Calif. It was written by Carl B. Brown, head of the sedimention section and is based on surveys conducted by E. M. Flaxman and assistants.

It states that the reservoir was built in April, 1924, had an original capacity of 4,217 ac. ft., and serves as a source of water supply for irrigation of about 2,500 ac. in the Palmdale and Little Rock farm districts bordering Mohave desert.

Prior to the severe storm of March 1-3, 1938, the reservoir had lost less than 2 per cent of its capacity, but this one storm carried approximately 480 ac. ft. of sediment into the basin, causing loss of 11.4 per cent of its capacity. Between June, 1938, and October, 1943, an additional 244 ac. ft. of detritus was deposited in the reservoir, causing a present capacity loss of 19.3 per cent. Much of this later material came from deposits left in channels above the reservoir by the 1938 storm.

The report recommends several control methods. These include: removal of sediment now in the basin, either by dredging or sluicing, the retention of potential additional deposits through the construction of debris dams in approach channels, and increased watershed protection by fire control, re-seeding, and check dams on small tributaries.



OUTLET WORKS and power plant at Green Mountain dam of the Colorado-Big Thompson Project, including the switchyard. Power plant consists of two 15,000-h.p. Francis-type turbines and two 12,000-kva. alternating current generators. Head, 203 ft.

# Penstocks at Green Mountain

**Installation of 102-in. penstocks through Green Mountain dam of the Colorado-Big Thompson Project presented interesting design problems—Irrigation release passes through 50-in. pipes branching off penstock tubes—Pipes welded, and tested by X-ray to eliminate faulty joint sections**

By P. J. BIER
Senior Engineer
Bureau of Reclamation, Denver, Colo.

DESIGN, FABRICATION, testing and installation of the 102-in. penstocks and outlet pipes at the Bureau of Reclamation's Green Mountain dam, a recently-completed unit of the Colorado-Big Thompson project, presented engineering problems which were solved by the Bureau's engineers and the contractors for the work. Material shortages and priority difficulties slowed down the operation and made necessary some changes in design, but the power plant was put in operation last summer. The penstocks deliver water both for power generation and irrigation.

### General features of the project

Green Mountain dam, located on Blue River, about 110 mi. west of Denver, Colo., was constructed by the Bureau for the purpose of protecting water users of the Colorado River Basin against a depletion of their water supply due to the transmountain diversion required by the Colorado-Big Thompson project. The dam is an earth and rockfill structure, 274 ft. above stream bed, with a crest length of 1,150 ft., containing about 4,500,000 cu. yds. of compacted material and providing a storage capacity of 152,000 ac. ft. Its design conforms, in general, to the accepted practice for structures of this type. A spillway of 25,000 sec. ft. capacity is located at the left abutment and is controlled with three 25-ft. by 22-ft. radial gates operated with electric-motor-driven hoists and automatic float mechanism.

The outlet works consist of a 15-ft. 5-in. vertical intake shaft protected by a trashrack tower within which can be installed a 20-ft. 5-in. timber cylinder for the emergency unwatering of intake shaft and tunnel. The shaft connects through a 90-deg. bend with an 18-ft. outlet tunnel terminating at a gate chamber under a 20-ft. vertical shaft and hoist house located on top of the dam near its axis.

In the gate chamber are two 102-in. ring-seal gates which control the flow of water into two 102-in. penstocks installed in a modified horseshoe tunnel. Two 50-in. outlet pipes connect to the penstocks and terminate in 42-in. tube valves which control the irrigation release. The downstream ends of the penstocks are reduced to 84-in. for connection to the turbines.

During construction, the outlet tunnel was connected with diversion channels at both ends for diverting the river flow. Shortly before completion, however, the intake of the upstream diversion channel was bulkheaded to permit the construction of a concrete plug at its lower end, thus connecting the 18-ft. tunnel to the trashrack intake shaft. During the same time the ring-seal gates were installed in the gate chamber, and the diversion channel below the tunnel portal was removed.

### Power development

The 67x97-ft. reinforced concrete powerhouse is located on the east bank of the Blue River, immediately below the dam. The generating equipment consists of two 15,000-h. p., 257-r. p. m., vertical-shaft, single-runner, Francis-type hydraulic turbines with two oil-pressure, actuator-type governors, and two 12,000 kva. 6,900-volt, 6-cycle, 90 per cent p. f. alternating-current generators, with direct-connected main exciter and pilot exciter. The transformers and oil circuit breakers are located in a switchyard adjacent to the powerhouse. The plant is operated under a variable head of from 120 ft. to 255 ft., and the turbine rating is based on a net effective head of 203 ft.

The turbine scroll cases are of riveted plate steel construction designed for a

pressure of 170 p. s. i. The governors are adjustable for a rate of turbine gate movement between 4 and 10 sec. for a full gate-opening or gate-closing stroke. An automatic shut-down device was provided for automatic closure of the turbine gates and shut-down of the turbine during an overspeed condition, failure of oil pressure in governor, or excessive temperatures in the main shaft bearings. The annual power output is estimated at 71,000,000 k.w. hr., most of which is furnished to the Public Service Company of Colorado, to be used for war production and commercial purposes. The remainder of the power is used by nearby towns and for the construction of the transmountain diversion tunnel which is a principal feature of the Colorado-Big Thompson project. After completion of the entire project, a portion of the power will be used for pumping water from Granby reservoir into Shadow Mountain lake for diversion through the transmountain tunnel.

### Design of penstocks and outlet pipes

The penstocks and outlet pipes were designed for the dual purpose of supplying water for power production and for irrigation. The tunnels and penstocks are on a slight slope downstream, except the penstock sections below the tunnel, which are level. In plan they turn 45 deg. left below the portal. Penstock No. 1 is 830 ft. long, penstock No. 2 is 847 ft. long, and the two outlet pipes are 275 ft. long. All pipes below the tunnel portal are encased in reinforced concrete. The outlet pipes branch off at 45 deg., then run parallel with the penstocks to the tube valves discharging into a concrete channel leading to the tailrace below the powerhouse.

With the two valves at the same elevation, it was necessary to raise outlet pipe No. 1 sufficiently to pass over penstock No. 2, then lower it again to the elevation of the valves. An automatic air and vacuum relief valve was provided at the high point.

The upstream ends of the penstocks were provided with forged steel flanges for a bolted connection to cast iron conduit liners embedded in the concrete below the ring-seal gates. The downstream ends of the penstocks are connected to the turbine scroll cases, with double butt-riveted joints, using an outside butt strap and rivets countersunk on the inside.

An expansion joint was provided in the center of the 660-ft. tunnel portion of each penstock to permit free temperature movements in the pipe. It consists of a 1¼-in. thick outer sleeve reinforced with two stiffeners and a 1-in. inner sleeve machined on the outside. The outer sleeve has a machined recess at its upper end to form a stuffing box for 8 rings of ⅝-in. square lubricated flax packing, which are backed up with a steel seat ring and are compressed with galvanized steel studs and packing gland. Naval brass seat rings and stainless-clad inner sleeves were originally specified, but due to a wartime scarcity of the metals, steel was substituted for these parts.

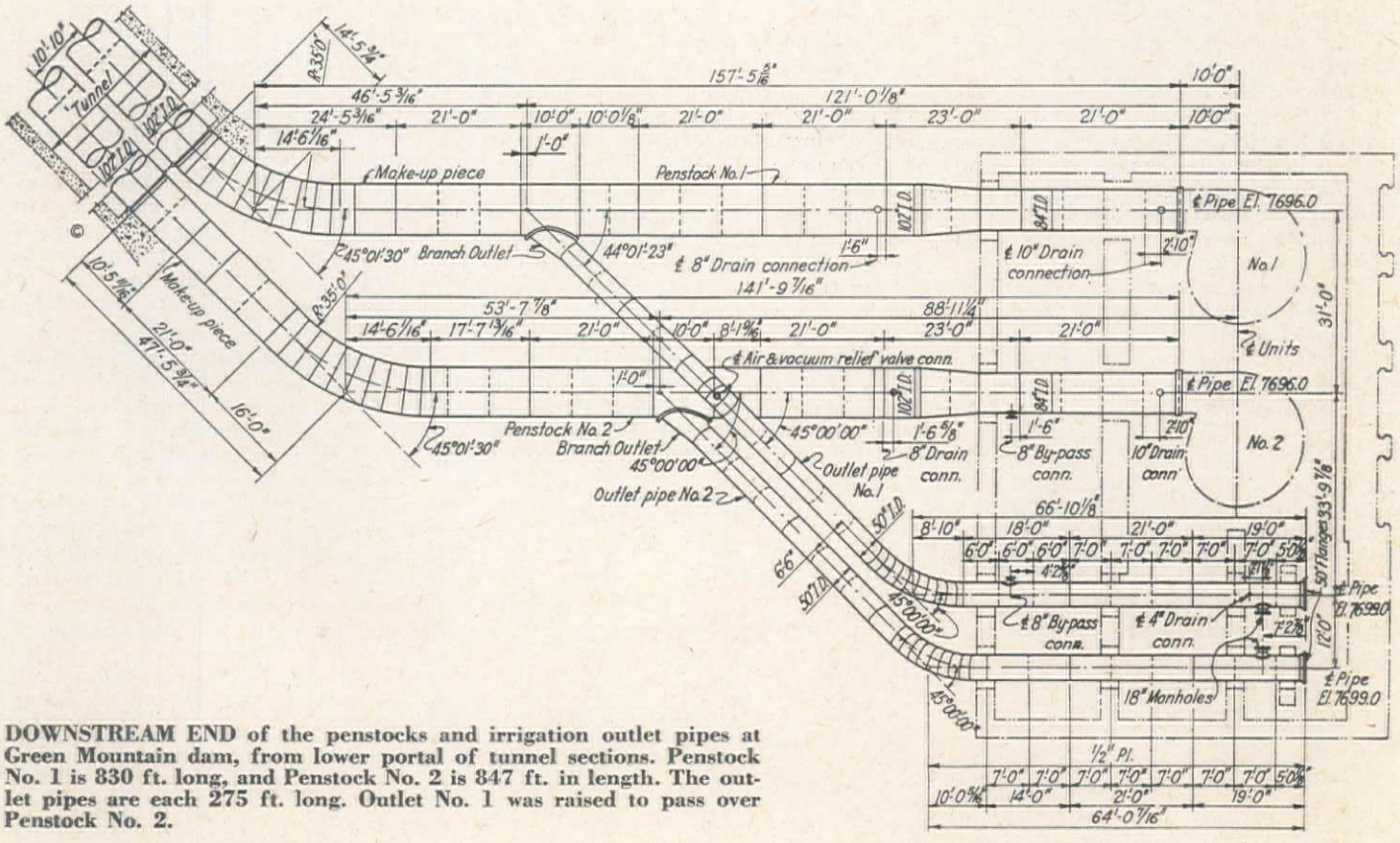
The penstocks were designed for a maximum static head of 260 ft. and a water hammer head of 197 ft., based on a normal operating condition, with the governor adjusted for changes in operating head so as to effect closure from ⅛ gate in 1 sec. Under this condition a design stress of ½ of the yield point of the steel was used and the plate thicknesses were proportioned accordingly.

The penstocks and outlet pipes were made of low tensile strength carbon steel plates of structural quality for welding, designated as ASTM A78-40, in accordance with the American Society for Testing Materials. This material has the following physical and chemical properties.

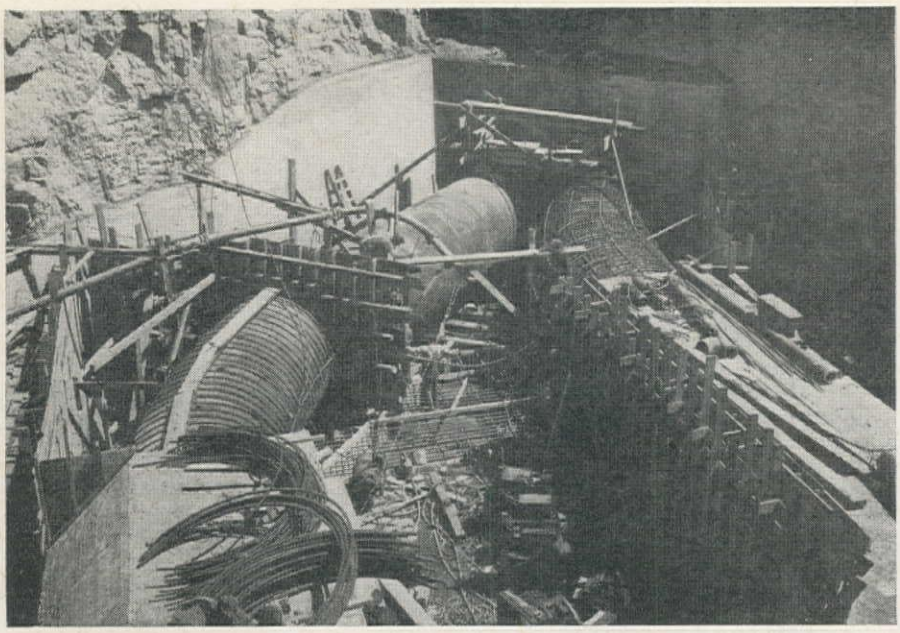
| | |
|---|---|
| Tensile strength, min. | 50,000 p. s. i. |
| Yield point, min. | 27,000 p. s. i. |
| Elongation in 8-in. min. | 25% |
| Carbon, max. | .22% |
| Manganese, max. | .60% |
| Phosphorus, max. | .06% |
| Sulphur, max. | .055% |

The computed plate thicknesses vary from 11/16-in. to ⅞-in. for 102-in. pipe, are 11/16-in. for the 84-in. pipe and ½-in. for the 50-in. pipe. A joint efficiency of 90 per cent was used, based on radiographed welds, all shop- and field-welded joints being radiographed for their entire length to insure the removal and repair of faulty welds.

Over the points of support a slightly heavier plate was used for a width of 5 ft., which was stiffened with a double ring girder, to prevent deformations in the shell due to concentrated pipe and water loads. Columns of 8-in. I-beams welded between the stiffener rings on each side carry the load to cast-steel base plates which are anchored and trouted to concrete support piers for the tunnel portions of the penstocks. A bronze bearing plate attached to the bearing shoes on the support columns will reduce the frictional resistance at the supports due to temperature movements. Supports were placed 40 ft. apart




**DOWNSTREAM END of the penstocks and irrigation outlet pipes at Green Mountain dam, from lower portal of tunnel sections. Penstock No. 1 is 830 ft. long, and Penstock No. 2 is 847 ft. in length. The outlet pipes are each 275 ft. long. Outlet No. 1 was raised to pass over Penstock No. 2.**



**CONCRETE ENCASEMENT of penstocks below tunnel portal. Because much of this work was done in periods of very low temperature, artificial heating with steam pipes, salamanders and electric heaters, was resorted to to prevent temperature stresses.**

except at the ends and near the expansion joints.

The pipe bends were designed with large radii and small deflection angles to reduce hydraulic losses. Substantial concrete anchors were placed at the bends to absorb the static and dynamic forces during operation. The branch outlet connection fitting for the 50-in. pipe is made from 1-in. plate with a 1¼-in. reinforcement around the outlet opening. The outlet is coneshaped, with a T-shaped curved girder and two 6-in. tie rods at the crotch, to carry the unbalanced load due to internal pressure concentrated at that point. The ends of the plates were tapered to the thickness of the adjoining lighter plates as required by the code.

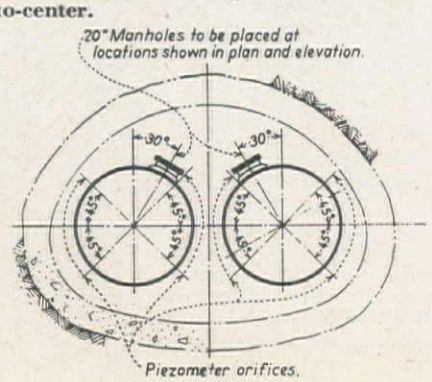
Penstock No. 2 and the 50-in. outlet pipe connected to penstock No. 1 are provided with 8-in. by-pass connections, located in the powerhouse, to be used for filling the pipes. Drains are provided both at the upstream ends and above the reducers near the downstream ends of the penstocks.

The pipes were made accessible by a steel walkway placed in the center of the tunnel about 7 ft. below its ceiling. This walkway can be reached from the powerhouse by a tunnel and stairway. It is also connected at its upper end to the gate chamber. The inside of each penstock is accessible through five 20-in. manholes located in the tunnel, and the outlet pipes through 18-in. manholes placed near the tube valves. All manhole openings are lined with light gage steel fillers or plugs and are closed with hinged plate steel covers, faced to produce a watertight joint on forged steel nozzles welded to the pipe shell.

Each penstock was provided with 2 sets of piezometer plugs spaced at 100-ft. centers, each set consisting of 4 orifices around the pipe, for the purpose of making flow and pressure determinations in connection with the turbine performance tests. The orifices were to be made from copper-nickel-alloy, which was changed to steel due to wartime scarcity of the alloy.

The specifications required that all pipes be fabricated in sections approximately 20 ft. long to facilitate shipment and handling, further, that all sections be normal to the axis of the pipe within ⅛-in. on the radius; that the net lengths be equal to the laying lengths without allowance for weld-shrinkage; and that the ends be properly prepared for field-welding and match-marked for field assembly. It was further specified that after radiographing, all pipe sections, including expansion joints, be hydrostatically tested in the contractor's shop, at a pressure producing a hoop stress of 20,000 p. s. i. in the pipe shell. Because of inadequate testing facilities in the fabricating shop and the necessity for speeding up the delivery of pipe, this requirement was subsequently modified by substituting a field test for sections from the upper end to and including the horizontal bends. To make this possible, temporary test heads were welded into the upstream and downstream ends of the length to be tested.

**TUNNEL PORTION of the 102-in. penstocks, showing relative positions of manholes and piezometer openings. Pipes were supported in tunnel by steel support rings mounted on concrete piers, 40 ft. center-to-center.**




## Shop fabrication

Only two bids were received for the fabrication of the penstocks and outlet pipes: Chicago Bridge & Iron Co. and Thompson Pipe & Steel Co. of Denver, Colo., the latter submitting the low bid at $216,485. The contract was awarded to Thompson Pipe & Steel Co. on July 26, 1941. Failure to obtain favorable priorities from the War Production Board for steel plate allocation, however, delayed shop production for nearly a year. When sufficient material was finally secured to warrant fabrication, it became necessary to use, for a portion of the work, the more easily obtained Universal Mill plates of 46-in. width in place of the 84-in. sheared plates specified. This substitution increased the amount of welding and other shop work, and raised the contract price by $28,208.

The 50-in. outlet pipes were fabricated first, then the 84-in. end sections of the penstocks, followed by the reducers, branch connections and the 102-in. pipe sections up to the make-up pieces, when fabrication was started on pipe sections for the upstream ends, proceeding downstream to the make-up pieces. The plates were first flame-cut to the required size and shape using one plate around the circumference, then the edges were beveled at 30 deg. for automatic welds and at 45 deg. for manual shop welds. The edges for the field-welded seams were beveled at 30 deg. from the inside of the pipe so that most welding could be done from the inside due to close tunnel clearances. In the next step the edges of the plate were pressed to the proper curvature, then rolled into a pipe course from 46 in. to 84 in. long, which was tack-welded and placed on the Unionmelt welding machine, on which one pass was applied at each side of the joint. Several pipe courses were then tacked together and welded into shipping lengths up to 26 ft. long. The girth seams were first manually welded on the inside, applying two passes, then the weld deposit was chipped or flame-gouged to clean metal from the outside and the seam was completed on the Unionmelt machine. The bend sections and some of the seams in the branch outlets, stiffener rings, and supports were manually welded by individual passes and were peened between passes.

Before radiographic inspection of the butt-welded joints the welds were ground to a maximum projection ⅛ in. above the plate surface. A portable X-ray machine of 200,000-volt capacity was used. The films were of the slow-burning type, 4½ in. wide x 17 in. long. A separate exposure was made of each 15 in. of welded seam, which allowed an overlap of 1 in. at each end. Defects disclosed in the radiographs were removed by chipping or flame-gouging to sound metal, then they were rewelded and reradiographed to check the quality of the repair welds. At the beginning of welding operations the number of radiographs showing welding defects was very high and shop production was slowed down due to the many weld repairs necessary. As the welding opera-

tors became more familiar with this type of welding the percentage of defective welds was progressively decreased. Approximately ⅓ of the films indicated weld defects subject to removal and 5 per cent of the repaired welds were repaired the second time.

The laying out, fitting, and welding of the branch outlets and expansion joints required careful workmanship. Some of the welds in the branch outlets were inaccessible for radiographic inspection although the difficulty of securing a close fit for the three plates at the point of intersection made it necessary to deposit a great amount of weld metal. The expansion joints were stress-relieved after welding and before machining. This was done by heating the structure to a temperature of between 1100 and 1200 deg. F., holding it at that temperature for about two hours, then allowing it to cool slowly in the furnace to 600 deg. before removal for further cooling in still atmosphere. After stress-relieving, the expansion joints were machined to the specified dimensions.

In welding the supporting columns between the two stiffener rings, care was taken to properly aline the two columns, with respect to the vertical and horizontal centers of the pipe, to assure a uniform bearing and load transfer to the base plate set in the concrete pier. This was accomplished by use of a special fixture adjusted to the outside of the pipe which gave the proper setting for the bearing shoes in both directions.

### Pressure testing

Following the revised scheme, all pipe sections below the horizontal bends were pressure-tested in the shop. The 50-in. outlet pipes were tested in a testing machine and the larger pipe and branch outlets were welded together into several test units, the ends bulkheaded with dished heads, and a pressure applied to suit the plate thickness in accordance with the formula

$$p = \frac{40{,}000t}{d}$$

, where $t$ = min. plate thickness in test unit, and $d$ = diameter of pipe in inches. This produced a stress of 20,000 p. s. i., which was considered adequate for disclosing objectionable defects. The pressure was applied and relieved three successive times and then held for a sufficient length of time to permit a thorough inspection of the unit for leakage. After the test the pipe sections were separated by flame-cutting, the bulkheads removed, and the bevels at the ends of sections restored for field welding.

When testing the branch outlets, strain-gage readings were taken at critical points on the web and flange of the ring girder, to determine the stresses developed, for comparison with calculated stresses. A 2-in. Olson strain gage was used and readings were taken at 100-, 200-, and 300-lb. pressures. The ring girder was whitewashed to render yielding visible on the surface. The results of strain-gaging under 300 p. s. i. pressure indicated a maximum stress of 9,900 p. s. i. in the web between the tie rods and a maximum stress of 21,400 p. s. i. in the flange of the girder. The measured stresses at most points showed poor agreement with design stresses, which presumably was due to the fact that in the calculations the ring girder was assumed to be circular, although at the 45-deg. deflection angle of the outlet it showed considerable deviation from the circle. As the branch outlets had not been stress-relieved, the residual welding stresses were not eliminated, and their presence no doubt influenced the test results. However, as the structure did not indicate permanent deformations at any point, including the tie rods, which were not accessible for stress reading, it was considered safe.

After testing, each section was marked for field assembly in accordance with an erection diagram and was shipped, unpainted, to the dam by truck and trailer.

### Installation

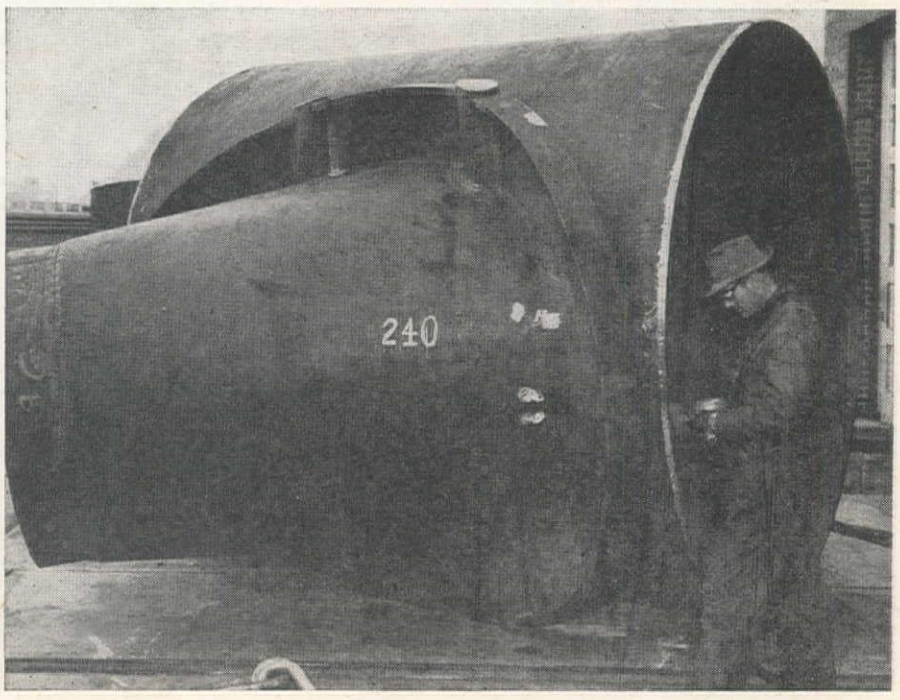
The installation of the penstocks and outlet pipes was included in the specifications for the construction of the dam and power plant, contracted to the Warner Construction Co. of Chicago. J. D. Fogg was general superintendent in charge of all field operations during the greater part of the construction period. The hauling, handling, and placing of the penstock sections was sublet to the Weicker Transfer & Storage Co. of Denver, Colo., and the field-welding to Teleweld, Inc., of Chicago, which in turn sublet the radiographic work to Industrial X-Ray Laboratories of Seattle, Wash.

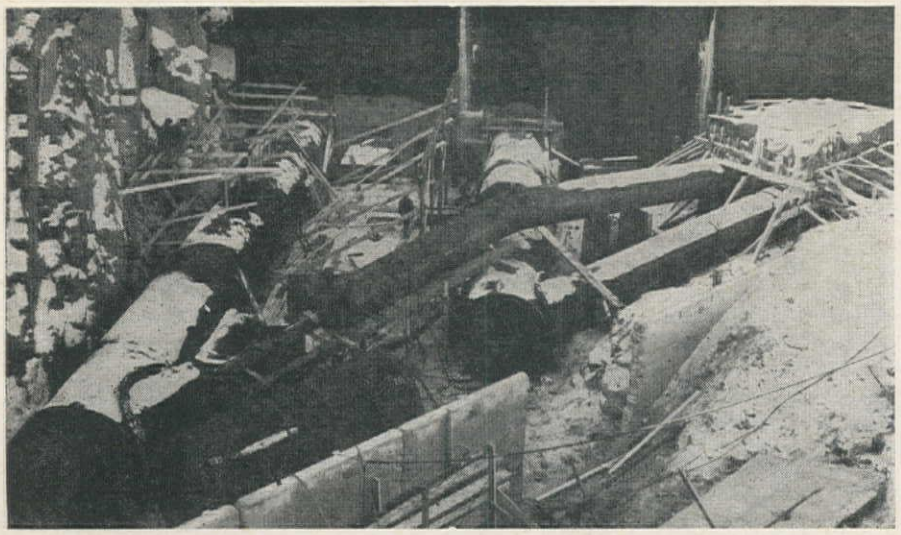
Installation work was started on August 25, 1942, and proceeded from the powerhouse toward the tunnel, placing first the 50-in. outlet pipes, then the 84-in. end sections of the penstocks, followed by the 102-in. penstock sections and branch outlets, up to the two bend sections. Upon delivery at the project, each pipe was sandblasted to bright metal both inside and out, and painted with one coat of cold-application coal-tar paint, except the outside of embedded pipe which was cleaned by hand-brushing, but not painted. During painting the pipe temperature was maintained at 60 deg. by salamanders and electric heaters. A narrow band of metal around the field joints was left unpainted until after the welding was completed. Painting the penstock before the pressure test constituted a departure from the specifications which was permitted to expedite installation.

After painting, the pipe was lowered to the tunnel portal with a guyed derrick and moved into position with electric winch and steel rollers. Supported on temporary supports, each pipe was fitted to an adjoining section with a fitting-up ring placed on the inside, which was expanded until a good fit was obtained around the circumference. The pipe sections were then tack-welded together, after which the fitting-up ring was removed and the joint was completely welded, using $\frac{3}{32}$-in. electrodes for the first pass and $\frac{1}{16}$-in. electrodes for the succeeding passes. For the tunnel sections, usually four passes were applied from the inside of the pipe, then the weld was cleaned by flame-gouging and two or three passes were applied from the outside. All welds were peened to relieve residual stresses. On the inside of the pipe the welds were ground to a maximum projection of ⅛ in. to improve hydraulic efficiency and facilitate radiographic work.

All butt-welded joints were subjected to radiographic inspection by a rubber-tired portable X-ray machine on the inside of the pipe, except for a few inaccessible closing joints, which were

**FABRICATED BRANCH OUTLET at the shop. The workman is polishing the beveled edge to simplify welding. Branches were bulkheaded and pressure-tested before installation.**





**FINAL WELDING OPERATIONS were delayed until winter weather, when temperature was sometimes 30 deg. below zero. Work was done only on sunny days, and artificial heating was used in order to avoid excessive differences in temperature.**

inspected by gamma-ray, using radium. The films exposed to gamma-ray showed less definition for the plate thickness involved than the X-ray films. The radiographs of the first half of the field welds disclosed a high percentage of weld defects, due to interruptions of the work in waiting for pipe deliveries and later resumption with a less experienced crew. As the work progressed, the radiographs showing weld defects decreased in number, but the overall average of 37 per cent was still too high. Although a few weld repairs included the entire length represented by the radiograph, most required the removal of only a few gas pockets or inclusions. Thus the percentage of repairs based on length of welded seams is estimated at 13 per cent. About 8 per cent of the repaired welds contained defects and were repaired the second time.

Due to the various delays it became necessary to carry on welding operations during the winter months with temperatures as low as 30 deg. below zero. The work was then so scheduled that the few joints remaining to be welded in the pipe below the tunnel were welded during sunny days when temperatures were comparatively high. In the tunnel the minimum temperature was held at 40 deg. with the use of steam pipes, salamanders, and electric heaters. Artificial heating was also resorted to for the concrete work in anchors and pipe encasement.

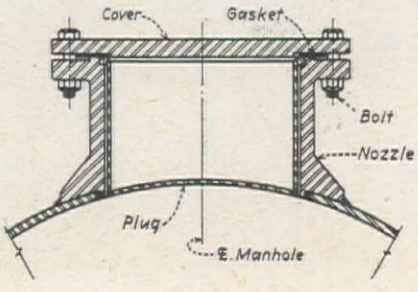
When installation had progressed to the 102-in. bends, deliveries were made of pipe sections for the upstream end and installation was started at that point proceeding downstream. During erection, the pipe was supported on previously constructed concrete piers, and after erection the base plates were grouted into the piers at the correct elevation and station. Penstock No. 1 was completed first and was pressure-tested while installation work proceeded on penstock No. 2. The plans provided that the concrete for the common bend anchor should be placed after the test, leaving the bend uncovered during the test to disclose possible defects and permit their repair. This provision made it necessary to join the two sleeves of the expansion joint with temporary tie plates to prevent the penstock from pulling apart and subject the unprotected bend to excessive bending stresses. Computations showed that the 2½-in. elongation anticipated in the penstock by the bulkhead load due to the test pressure would be balanced by the contraction of the pipe due to Piosson's ratio stress and due to a temperature drop in the steel of at least 10 deg. when filling the pipe with water.

The pressure-test was performed on April 9, 1943, with the reservoir water surface at elev. 7,860. The penstock was filled through the upstream manhole with an 8-in. supply line connected to the tunnel. A 1¼x4-in. triplex pump was connected to the supply line and to the 3-in. drain in the bottom of the penstock. After filling, the manhole was closed and the pump was cut in to produce the required test pressure. The pump was in the gate chamber and a calibrated pressure gage was placed in its discharge line. After reaching a mean pressure of 275 p. s. i., a leak in the pump packing prevented a further increase. This test pressure, producing a hoop stress of 18,700 p. s. i. in the ¾-in. shell, was maintained for 3 hrs., during which all plates, welds, and connections of the penstock were thoroughly inspected, and, with the exception of some seeps through a manhole, piezometer plug and expansion joint, were found watertight. After eliminating all leaks the penstock was considered satisfactory. The temperature of the water was 36 deg. and of the pipe 48 deg., which caused a 12-deg. drop with corresponding contraction in the penstock as anticipated in the computations mentioned above. After draining the penstock, the expansion joint tie plates were removed by flame-cutting, and the test heads were cut into small pieces to pass through the 20-in. manholes, then the welded areas were ground smooth and painted.

Penstock No. 2 was pressure-tested on May 2, 1943, by a similar arrangement. A pressure of 300 p. s. i. was built up in the pipe and maintained for three hours. Only a small leak was found, in a fillet weld of the expansion joint, which was sealed up by welding after the test. Before this penstock was tested the concrete was placed in the common bend anchor, except the downstream end around bend No. 2. This left the bend section open to view during the test for the detection and repair of defects. After the test the bend anchor was completed and the test heads and expansion joint tie plates removed.

Both penstocks were cleaned after the test, and painted inside and out with two coats of cold-applied, coal-tar paint (CTP #3). A concrete deck slab was placed over the lower ends of the penstocks and the area between the tunnel and powerhouse was backfilled with earth. After the usual generator drying out operations, performance tests showed maximum efficiencies of 91.2 per cent and 97.4 per cent for turbines and generators, respectively. Unit No. 1 was placed in commercial operation on May 18, and unit No. 2 on June 1, 1943.

**HINGED STEEL covers and light gage liners are used on forged steel nozzles to produce a watertight hole opening. The manholes are 20 in. in diameter.**




### Tests and inspections

The steel plates used in the fabrication of the pipes were subjected to physical tests and chemical analyses from each heat and certified copies of the results were furnished to the Government. The steel was furnished by the Carnegie Illinois Steel Corp. Typical properties for the steel plates were as follows:

| | |
|---|---|
| Carbon | .14 to .18% |
| Manganese | .40 to .50% |
| Phosphorus | .015 to .018% |
| Sulphur | .030 to 0.40% |
| Tensile strength | 55,000-60,000 p. s. i. |
| Yield point | 35,000-37,000 p. s. i. |
| Elongation | 28 to 30% |

All welding operators engaged in the fabrication and installation of the pipe were qualified in accordance with the API-ASME Code. Control of production welding in the shop was maintained by the requirement of furnishing production test plates for every 200 ft. of welded joint, from which test specimens were prepared and tested for physical properties. All qualification and production tests were required to meet the following minimum requirements for the deposited weld metal:

| | |
|---|---|
| Tensile strength | 55,000 p. s. i. |
| Yield point | 30,000 p. s. i. |
| Elongation | 20% |

The tests included reduced section tension specimens, for the ½-in. and ¾-in. plates, requiring a minimum tensile strength of 50,000 p. s. i., also free-bend, reverse-bend, and nick-break specimens, which were to meet the requirements of the code.

All shop and field work and all tests were subject to inspection by Government inspectors, who also examined all radiographs, to determine the acceptability of the weld or the repairs necessary. Defective portions of the welds were traced on strips of paper and transferred to the pipe seam. Records were maintained by the inspector of all radiographs and weld repairs. The principal design and shop inspection work was performed by V. F. Wetmore and W. H. Strange, and the principal field inspection by H. L. P. Stewart.

### Organization

The steel penstocks and outlet pipes were designed under the supervision of the author and the concrete work under the supervision of S. E. Rockwell. All mechanical design is under the general supervision of W. C. Beatty, Mechanical Engineer, and L. N. McClellan, Chief Electrical and Mechanical Engineer. All engineering designs are under the general direction of J. L. Savage, Chief Designing Engineer. The field work was started under the supervision of Construction Engineer S. F. Crecelius and completed under Construction Engineer R. B. Ward. All engineering and construction work is under the general direction of S. O. Harper, Chief Engineer. All activities of the Bureau are under the general charge of the Commissioner of Reclamation, Harry W. Bashore.

# Value of Emulsified Asphalt For Paving Use Is Protested

The material in this article came in the form of a letter to the editor, in reply to an article contributed by Stanley M. Hands on the use of emulsified asphalt pavement on the clayey soils of Oakland, Calif. It is the desire of *Western Construction News* to present both sides of this matter, and an effort will be made to secure additional data from other cities, as suggested in Mr. Harsch's letter.—**Editor.**

Dear Mr. Server:

The illustrations accompanying the article "Emulsified Asphalt Pavement" by Stanley M. Hands in the February, 1944, issue of Western Construction News recalls to mind the original report on this construction by Mr. L. H. Taylor at the December, 1937, Asphalt Paving Conference. The construction represents a short stretch of park drive 1,800 ft. in length and 40 ft. in width, not including concrete curbs and 8 ft. width concrete gutters. It consisted of a 13-in. emulsion stabilized base course spread in layers 2 inches in thickness in strips 16 ft. wide and tamped by 16 ft. strike off tamper operated by two men. After 24 hours, compaction was obtained with a six ton three wheel roller and final rolling accomplished with a 10 ton roller after 3 to 7 days of drying. A week or 10 days would elapse between layers of the stabilized base course. The work was started late in 1936 and completed in the summer of 1937.

As Mr. Taylor reported the construction in December, 1937, he could not include a description of the failures which occurred the following spring, requiring patching and later resurfacing.

The failure of the stabilized base to properly support the 3 inch penetration macadam wearing surface under traffic limited to 4½ tons maximum, makes it difficult to understand why Mr. Hands selected this construction to illustrate his article. The accompanying photographs taken in the spring of 1938 show the load limit signs erected on each end of this 1,800 ft. section and the type of surface failure caused by lack of base support.

Although Mr. Hands' article does not specifically claim that results are equal or superior to the more standard types of asphalt construction, this is implied by certain statements. For example, it is stated that "differences in the preparation for use (between emulsified asphalt and other forms of asphalt) are more in the nature of economics than in the resulting quality of work." This would imply that emulsified asphalt construction is more economical than construction with other forms of asphalt such as cutbacks and paving cement or the use of granular stabilized bases. No supporting data was advanced to support this contention.

Another statement which should be mentioned and emphasized is "This wet fine material added a week to the drying back and necessitated the use of thin compression courses for stable compaction." An analysis of the time required for the construction of emulsion stabilized bases of adequate thickness to support modern traffic, when it becomes necessary to place the stabilized mixture in two inch layers to allow for drying, will quickly demonstrate the practical and economic limitations of this type of construction.

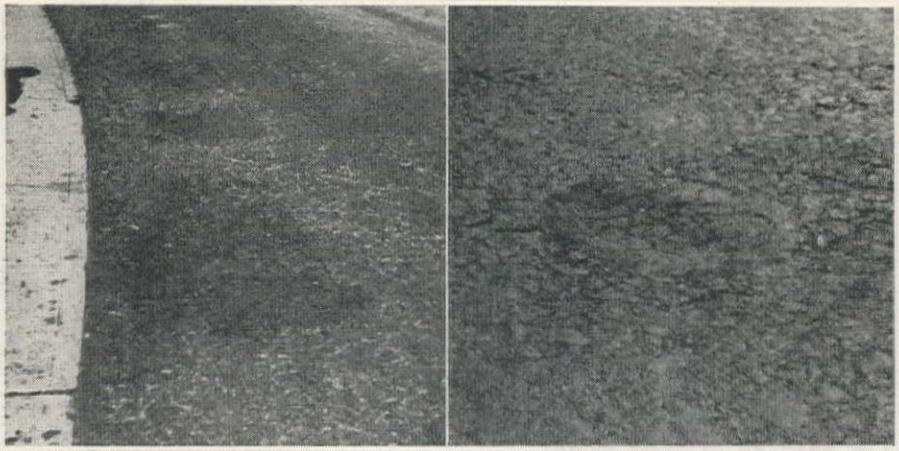
The article in two places refers to "investigations instigated by the Public Roads Administration suggesting a field in which such a product (emulsified asphalt) could be used" and "in regard to the entire situation the Public Roads Administration reports two important facts:

"1. Crushed rock or gravel containing clay binder and moisture enough to obtain maximum compaction will when consolidated and dry support very heavy traffic loads.

"2. Clay binders become lubricants when wet. The soil in Oakland is such and has brought the problems related thereto."

This mention of the Public Roads Administration gives an authenticity to the article which is not warranted by the facts. In the above, there is no question that crushed rock or gravel containing clay binder and moisture enough to obtain maximum compaction will, when consolidated and **dry**, support very heavy traffic loads. A similar statement can be made for crushed rock and gravel containing **no clay binder** plus the additional claim that it will support very heavy traffic loads both **dry** and **wet.** An obvious conclusion would, therefore, be to restrict the amount of clay present in the aggregate. This is confirmed by the last sentence in the article which states "It is possible to get very good

**LOAD LIMIT SIGNS on the 1,800-ft. section of Lakeshore Drive paved with emulsion. No similar posting is necessary on asphaltic concrete at either end of the section.**



**FAILURES of emulsified asphalt pavement on Lakeshore Drive in Oakland, California. The section at the left was on the inside of a curve, and was apparently caused by water which had penetrated the porous emulsion surface and been trapped on the stabilized base by the concrete gutter. The disintegrated section at the right occurred near the centerline, probably caused by insufficient resiliency for heavy traffic. It is claimed that many of these failures occurred within a year of the time the pavement was laid, and finally necessitated patching and eventual resurfacing.**

pavement from local materials but not with water and clay."

It is appreciated that you or your staff cannot personally check the facts upon which all of the many articles submitted to you for publication are based. Being a resident of the East Bay and familiar with the condition of Oakland's streets, I think you will agree that they are not of a standard of excellence which would recommend them as a pattern for other cities. Considering the cheapness and availability of asphalt supplies to the City of Oakland, the resurfacing and maintenance work does not compare favorably with the work of Seattle, Tacoma or Portland, where asphalt costs are almost double.

Articles describing this latter work might prove quite illuminating and helpful to "open-minded" engineers of cities and towns faced with resurfacing problems, both immediate and postwar.

Very truly yours,
RAYMOND HARSCH.

# "Builders of West" Launched

**Contractors postwar planning organization officially started on career by engagement of Rex L. Nicholson as Managing Director—Goal is an effective program of planning to meet anticipated victory depression, on an all-West basis**

BUILDERS OF THE WEST has officially been launched as a war and postwar agency of the western construction industry. Rex L. Nicholson, formerly Western Regional Director for the Federal Works Agency and contributor to *Western Construction News* on the subject of postwar planning, has resigned that post and on April 1 became Managing Director of Builders of the West.

The enterprise has been in the formative process since March, 1943, and has now entered a period of intense activity, according to the announcement of B. F. Modglin, President. At the present time the San Diego, Central California, Northern California, Arizona, and Mountain Pacific (Seattle) Chapters of A. G. C. have endorsed the movement and it is anticipated that it will spread to the other areas of the West.

Primary objectives have been defined by the Directors as coordination of the industry's present large-scale war construction operations, the creation of a gigantic reservoir of postwar jobs for returning service men and discharged defense workers, and the promotion of western industrialization through the recovery of western resources. It is planned to open regional and field offices in cities throughout the West, also to maintain close liaison with the national legislative scene in Washington.

Proud of construction's record of performing the impossible since Pearl Harbor, the new organization states as its first postwar objective the creation of a very large reservoir of employment, not relief, to absorb returning service men, released war workers, and the desirable majority of the thousands who have come West since 1941. The program is stated as follows:

1. Gather all available information in one centralized and capable organization covering war construction and all postwar construction plans formulated or proposed up to date; including factual studies and surveys of various phases of the present war economy, population changes, industrial developments, conversion problems, and needed public works.

2. Disseminate, accurately and fully, postwar construction information to the public at large.

3. Establish a headquarters office, and field offices as needed, adequately staffed to carry forward the program in each region of each of the 11 Western States.

4. Assist, consult and advise private and public agencies to facilitate the completion of engineering studies and plans through to the blueprint stage, and to aid in securing rights-of-way and other properties requisite to the prompt start of construction.

5. Develop means of financing projects of every meritorious kind and nature, both public and private.

6. Perpetuate the private enterprise system and its attendant opportunities for the American worker, as opposed to work relief.

7. Cooperate with and aid all groups concerned with the problems of industry, and employment following the close of the war, including Federal departments, and such groups as the Western Conference of Governors, various State Commissions on Interstate Cooperation, and similar bodies.

**REX L. NICHOLSON, formerly western regional director of Federal Works Agency, now manager of "Builders of the West." He has been a construction manager, structural engineer, and government official, knows public relations.**

Officers of Builders of the West are: President, B. F. Modglin, San Francisco; Vice-President, James Roberts, San Francisco; Vice-President, M. H. Golden, San Diego; Secretary, E. S. McKittrick, Los Angeles; Treasurer, Wm. C. Tait, San Francisco.

The Executive Committee is composed of Modglin, Roberts, Golden and Arthur Atherton, Seattle; A. Teichert,

Jr., Sacramento; A. S. Vinnell, Los Angeles; and Charles L. Harney, San Francisco.

### Editorial Comment

*Western Construction News* is happy to see that the Builders of the West program is at last actively under way. Regular readers will recall the editorial in the January issue criticizing the contractors for their delay in launching the new organization and certain deficiencies which seemed inherent in the program.

Inasmuch as the essentials of the program as outlined in President Modglin's announcement now coincide very closely with the proposals of the January editorial, and since it is apparent through the engagement of a competent and non-political managing director that constructive action is about to begin and that such action is to be on an all-western basis, this publication actively supports the movement.

Because of our deep interest in the future of the construction industry, our desire to promote the growth of the western empire and our concern for the welfare of Americans returning from military service, the Editors will watch the development and activities of Builders of the West very critically. So long as the organization is dedicated to unselfish promotion of needed and worthwhile construction projects, and so long as sectional jealousies or disunity are not permitted, the editorial support of the magazine will be whole-hearted. Should these unhappy conditions arise, however, they will immediately be called to the attention of our readers and the directorate of the organization for appropriate action.

Believing thoroughly in the ideals of Builders of the West, and trusting the sincerity of its organizers and manager, *Western Construction News* wishes the new organization well.

# Oregon ASCE Plans Postwar Planning

**Confronted with the regrettable fact that many communities are not ready to meet postwar emergencies, and do not know procedures to follow in getting ready, Oregon Section, A. S. C. E. and Oregon Technical Council have prepared a guide to be followed in pre-emergency planning**

DURING THE LAST several months *Western Construction News* has attempted to make a tabulation of projects planned for post-war construction by localities and agencies of the western United States. The result has been disheartening. Many communities have no plans at all, and many others have only voluminous and nebulous lists of desirable projects, and have devoted no effective thought to planning, financing or right-of-way.

Organized activities looking to a complete preparation of workable plans are starting now in a number of directions. Most promising is "Builders of the West, Inc.," sponsored by Associated General Contractors. As noted in recent issues of *Western Construction News*, however, this well-conceived program has been slow to start, and after more than a year of effort and fund-raising, has just emerged from the organizational stage, and has not yet produced any effective work on the problem for which it is set up.

Meanwhile, the Oregon Chapter of American Society of Civil Engineers, deeply concerned about this lack of detailed planning, established a committee to outline the proper method of procedure for such work, with Col. Ralph Tudor, U. S. District Engineer at Portland, as chairman. The committee's report was turned over to the Oregon Technical Council, which is distributing it to cities and other agencies, as a guide to the post-war planning work.

Believing the report to be the most adequate and clear-sighted plan for planning yet produced, *Western Construction News* has asked permission of the Oregon section to reproduce it in full as an aid to planning bodies in other parts of the West. It follows:

THE NEED for providing employment for soldiers returned to civil life and for civilians now occupied in war production industries is generally apparent to everyone. Just when that need will arise is not yet evident. It may not be until Germany, Japan and their satellites have surrendered and the shooting war throughout the world is concluded. On the other hand, it is possible that long before such a time, our industrial production for war will be reduced to the point where some employment must be provided for many of those who are thus released.

It would appear that a realistic program of needed public works should be set up as soon as possible by communities, states, and the Federal Government. This program should be designed to provide employment as the need arises and to continue on an accelerated basis until private industry can return to normal production and employment.

There is presented herein a plan of procedure which is suggested for any community desiring to set up such a public works program. This plan is feasible and can be varied to suit circumstances. While it is stated in terms applicable to a city or similar community, it would also apply, with but minor modifications, for larger or smaller bodies. The plan is first stated in brief outline form. There then follows an amplified discussion of each step.

### PLAN OF PROCEDURE

1. Organize a small but effective committee of interested and qualified persons.

2. List all projects that have been suggested or can be thought of.

3. Critically examine the foregoing list and eliminate the following:

a. Projects that should properly be sponsored by some other agency.

b. Projects that are not actually needed.

c. Projects that are obviously beyond the means of the community.

d. Projects that are for work relief only.

e. Projects that are highly controversial and are likely to be delayed.

4. Roughly estimate the total cost of each project and the cost of preparing necessary plans and specifications.

5. Determine the method of financing each project.

6. Determine the legal steps necessary to permit accomplishment of each project.

7. Review the list of projects and eliminate any remaining that now appear impossible or unlikely of accomplishment.

8. List the remaining projects in the order that they should be undertaken.

9. Provide money to make any necessary engineering investigations and prepare plans and specifications for those projects where this is necessary. Have this work done.

10. Review and revise the cost estimates for each project in the light of more detailed information and engineering analysis.

11. Accomplish necessary legal steps to clear projects.

12. Complete financing.

13. Obtain right-of-way where this is necessary.

14. Build in an orderly way and in accordance with good engineering practices.

### DISCUSSION

There follows a discussion of each of the fourteen points above outlined.

1. **Committee Organization:** This committee should be small but representative and composed of individuals unsel-

fishly interested in the community. They should be willing to undertake the arduous and thankless task involved. There should preferably be an engineer and an attorney included.

2. **List of Projects:** This initial list should include everything that can be suggested and which might be undertaken within the geographical limits of the community. Organizations and individuals should be encouraged to submit suggestions. The elimination of the absurd and inappropriate follows.

3. **Elimination:**

a. Many good projects will undoubtedly be suggested that should be accomplished by some other agency. For example, a new highway bridge might not be appropriate for a city but would be a proper job for the state. These should be eliminated.

b. No project should be included that is not actually needed either immediately or at some time in the future by the community. Triumphant arches, oversize stadiums and the like should be seriously questioned.

c. The community should not undertake anything that is beyond its means. For example, a small community should seriously consider the obligations involved in the maintenance and operation of a large and expensive airport before they obligate themselves to sponsor such a project.

d. The entire purpose of a large, well-thought-out post-war program is to avoid purposeless work for relief only.

e. Some projects that are otherwise entirely sound should be eliminated from this program if through misfortune, or otherwise, they have, or are likely to become, very controversial in the community. If they remain, they may threaten the entire program.

4. **Rough Cost Estimates:** It is essential at this stage to make a rough cost estimate of each project. Without this, neither the individual projects nor the program as a whole can be adjusted to meet the capabilities of the community. It is also essential to determine the cost for preparing the necessary plans and specifications and other things that must be accomplished before the project can be put under way. The engineering member of the committee will be in a position to assist in this matter.

5. **Financing:** There are several ways of financing projects and it is not at all unlikely that a combination of methods may be adopted for a single project. The following should be considered:

a. **Taxation:** Any project such as street repairs, utility repairs, and the like, may be directly financed from current taxes. In some instances, with proper forethought, taxes may be collected over a period to provide a block of money to finance new construction. A sewage plant or water treatment plant might be such an example.

b. **Bond Issues:** Within certain restrictions, communities are generally in a position to issue bonds for sale either to the public or to some such agency as the Reconstruction Finance Corporation. These bonds may either be secured by taxation or by revenues from the project being financed.

c. **Public Grants:** There is a general feeling that the Federal Government may be in a position to grant money to communities for certain types of post-war projects. It is impossible, at this time, to foresee what types of projects and under what circumstances this may be applied. Communities should not put their entire faith on such a possibility. On the other hand, they should be in a position to take advantage of this offer if and when it is made. It will be necessary to watch developments closely. If public grants are not available, the community should go just as far on its own account in development as its resources will permit.

6. **Legal Steps:** Each project will present legal problems. In some instances it may be necessary to hold elections to authorize bond issues, to adjust the tax rate, or clarify other matters which will permit the community to undertake the project under consideration. The legal member of the committee should be helpful in these matters.

7. **Review of Projects:** At this stage additional information is available which will permit a further review and possible elimination of some projects before money is uselessly spent upon them. Financial or legal difficulties may be so great that one or more projects should be separated from the program.

8. **Priority of Projects:** In establishing the order in which the various projects should be undertaken, there are two principles that should be borne in mind. They are:

a. Early in the program there should appear several of those projects which can be undertaken quickly and which will provide employment for an appreciable number of individuals with the least possible delay. These will generally be projects involving the least engineering and probably of maintenance or repair nature.

b. Projects should be programmed wherever consistent with subparagraph (a) above, so that those things needed first by the community will be provided in that order.

9. **Engineering:** On those projects requiring engineering investigation, and the preparation of plans and specifications, such work should be accomplished as early as possible. It should precede the actual need for providing employment in the community. To this end, some funds should be made available and the engineering accomplished. An estimate of the cost of engineering could probably be obtained from the engineering member of the board.

10. **Cost Estimates:** During preparation of engineering plans and specifications it will be possible to prepare a more exact estimate of cost for each of the projects. This should be done as early as possible.

11. **Legal Clearance:** While the engineering is proceeding, and for the same reasons, all legal hazards should be eliminated. In many instances it will be advisable and even necessary to accomplish this legal clearance prior to any engineering.

12. **Financing:** The financing should now be completed so that money is in hand for the work. The procedure that this will follow is governed by the source from which the money comes.

13. **Right-of-way:** Obtaining right-of-way very frequently delays a project. Because of this, right-of-way should be obtained early. This phase is, of course, not a part of the employment relief program.

14. **Construction:** When the foregoing program has accomplished its purpose, a list of projects will be ready to be put under construction when the need arises. There should, therefore, be no excuse for anything other than orderly procedure. Except for that work which is of a maintenance nature, it is recommended that work be accomplished by contract and that awards be based upon competitive bids. Unjustified, restricted contract clauses should be avoided, and in general, the spirit of American competitive enterprises should be encouraged.

## British Columbia Cannot Keep Up Alaska Highway

THE MINISTER of Public Works of British Columbia has informed the Canadian Government that the province refuses to bear the cost of upkeep on the 600 mi. of the Alaska Highway which passes through its territory. He estimates that the annual maintenance cost would be between $4,000,000 and $5,000,000 and he states that the highway would not return equivalent value to the province. Title to the highway, which was built by the U. S. Government as a military road, will revert to Canada six months after cessation of the war. One member of the Provincial Cabinet is reported to have said that if the highway is maintained it will be by American funds.

## Oil Line to Puget Sound Planned by New Company

A FIRM has been incorporated in Billings, Mont., to construct a pipeline from Thermopolis, Wyo., to Puget Sound. Members of the new organization are: Lt. Gov. Ernest T. Eaton of Montana, E. A. Beeler, L. R. Hines, Ernest E. Murray and P. J. McKay, all residents of Billings. The line will run from Thermopolis through the Elk Basin oil fields near Frannie to Harlowton, Mont. A secondary line from Great Falls, Mont., will pass through Lewistown and connect with the main line at Harlowton, from which point the combined line would run to Seattle.

The company is incorporated for $1,000,000 and in the articles of incorporation it is stated that the line will be used to conduct salt, sulphur, oil, gas and other minerals.

# Colorado Plans for Post-War

**After victory program for Colorado includes extensive highway and water conservation development — Colorado-Big Thompson, Mancos, and John Martin projects proceeding now, but will also extend into post-war**

POST-WAR PLANNING in Colorado includes numerous highways, flood control, irrigation and power dams, sewers, bridges and municipal improvements.

### Public Roads program

An extensive highway system is planned by the Public Roads Administration. Work is now under way on the actual preparation of plans and specifications for the following projects: completion of Loveland pass tunnel and bridges, length 3.2 mi.; a 4-lane limited access highway east of Colorado Springs, length 26 mi.; an alternate route with limited access through Rifle, length 3 mi.; five bridges and enlargement of 3 tunnels in Clear Creek canyon between Golden and Forks Creek, length 12 mi.; an alternate north-south route, with one bridge and elimination of two railroad grade separations at Aquilar, length, 11.5 mi.; north-south limited access highway through Pueblo, with bridges and grade separations, length 7.5 mi.; a new north-south highway east of Greenhorn, length 7 mi.; a freeway north from 38th and Fox Sts., Denver, length 6.2 mi.; reconstruction of Buchtel Blvd. in Denver and southerly, length 18 mi.; relocation of U. S. 285 from Denver city limits to east of Morrison, length 4.8 mi.; a limited access highway through Trinidad, including a 2,000-ft. viaduct, length 1 mi.; development of east entrance to Fort Collins, including a grade separation, length 2 mi.; an alternate route limited access highway through Palisade, length 1 mi.; relocation of U. S. 85 through Greeley, length 3.2 mi.

### City of Colorado Springs

The city of Colorado Springs is planning post-war improvements valued at $1,082,200. These include: the Templeton Gap flood prevention project, estimated to cost $749,500, of which the United States government is to pay $505,500; storm sewers, estimated to cost $286,000, for which plans are 50 per cent completed; and three small steel bridges, estimated to cost $46,700, for which only preliminary surveys have been made.

### Federal Works Agency

War public works projects authorized for construction in Colorado have a total value of $1,327,628, of which sponsors will contribute $506,351, and the balance will be financed by Federal grant. The largest item included is a sewage disposal plant at Lakewood to cost $496,750. Other large projects are: a school at Denver, costing $248,583; a sewage disposal plant at Denver, costing $256,157; and a school addition at Fort Logan, costing $62,793.

### Colorado Water Conservation Board

A program roughly estimated to cost $300,000,000 is proposed by the Colorado Water Conservation Board, to include irrigation, flood control and power projects. This list includes some projects now authorized, but curtailed or stopped because of the war, and others which have been reported upon but not yet authorized.

The largest of the authorized projects is the Colorado-Big Thompson development calling for diversion of 320,000 ac. ft. of water from the headwaters of the Colorado river to the east slope of the Rockies. The total estimated cost is $54,000,000, of which about one-third has been expended.

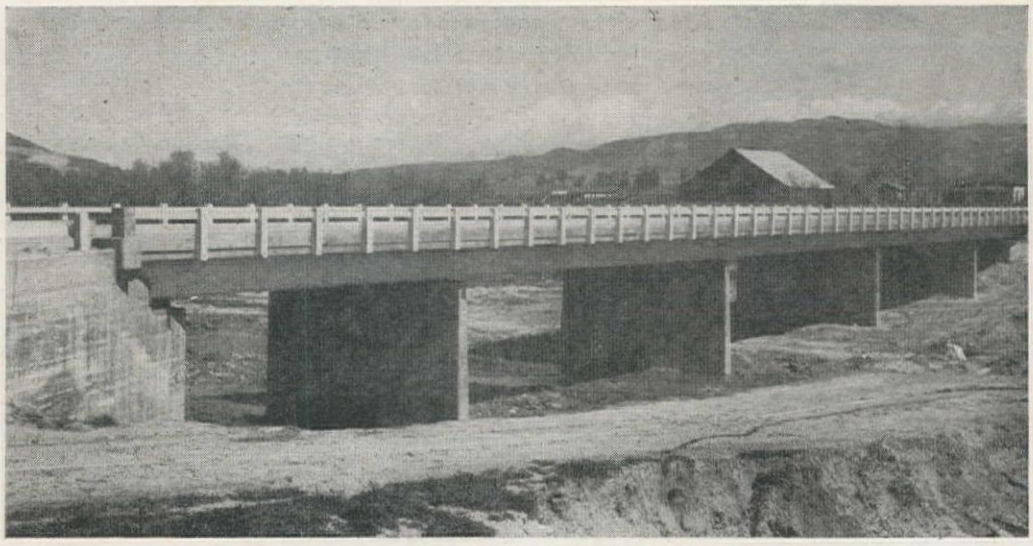
Construction is also proceeding on the Mancos project, costing $1,500,000. The John Martin dam (formerly known as Caddoa dam), a $14,500,000 flood control and irrigation project, is 90 per cent completed, the remainder to be done as a post-war project. The Paonia project on the Gunnison river has been authorized. This includes an earthfill dam and canal extensions. The estimated cost is $1,500,000. The San Luis Valley project in the Rio Grande basin will provide flood control and furnish supplemental water to 400,000 ac. of irrigated land, which includes the Wagon Wheel Gap concrete dam on the Rio Grande and one or two earth dams on the Conejos river, as well as a diversion canal. Total estimated cost is $17,000,000.

The Cherry Creek flood control project to protect the city of Denver will cost $10,500,000, and involves construction of an earthfill dam and reconstruction of Castlewood reservoir.

Additional projects under investigation, or already reported but not authorized, are summarized below:

| Name | Location, Near | Stream | Acreage Served | Work Involved |
|---|---|---|---|---|
| Blue River South Platte | Denver | Colorado and South Platte Rivers | 400,000 | Reservoir system in Blue watershed, tunnel through continental divide, conduits and power plants on eastern slope and regulatory reservoirs on South Platte tributaries. |
| Collbran | Collbran | Plateau Creek | 21,000 | Earthfill dam at Vega site and main canal along mesa south of Collbran. |
| Florida | Durango | Florida River | 20,000 | Earthfill dam and some canal extension. |
| Hunter Mesa | Rifle | Buzzard Creek | 21,000 | Earthfill dams and canal to carry water from Buzzard Creek to Mam Creek. |
| La Plata | La Plata, Colorado | La Plata River | 24,000 | Earthfill dam and inlet and outlet canals. |
| Minnesota Div. | Paonia | Beaver Creek | 3,000 | Earth dam to supplement supply for existing irrigation. |
| Montrose Power | Montrose | Uncompahgre River | ..... | Three power plants and conduits and earth dam for power and flood control. |
| Pine River | Bayfield | Pine River | 15,000 | Canals to permit full use of Pine River storage. |
| Silt | Rifle | Rifle | 7,000 | Earth dam on Rifle Creek and repair of existing canal. |
| Trinidad | Trinidad | Purgatoire | 15,000 | Earth dam will also provide flood control. |
| West Divide | Rifle | West Divide | 8,000 | Earth dam and canal system to supplement supply for existing irrigation. |
| Dolores | Dolores | Dolores River | 40,000 | Earthfill dam below McPhee on Dolores River, Canyon conduit and canal system to develop new lands in Dove Creek area. |
| Gunnison-Arkansas | Pueblo | Gunnison-Arkansas | 500,000 | Dams in Gunnison watershed, tunnel through continental divide to Salida, power plants on eastern slope between Salida and Canyon City. Regulating storage near Canyon City. |

# Economies in Welded Bridges



OBLIQUE VIEW of "Structure B" discussed below. It is 260 ft. long and 30 ft. 4 in. in width. Span lengths are 58 ft. It contains 410 cu. yd. of concrete, 60 tons of steel.

**Composite design of short span bridges, which feature steel beams and concrete slabs used to resist stress, are found 19 per cent more economical than structures in which the slab is not a structural member. Welded shear keys, pier assemblies and cross diaphragms aid economy**

By GLENN L. ENKE
Assistant Chief Engineer
Utah—Pomeroy—Morrison
Provo, Utah

MODERN BRIDGE design demands strict adherence on the part of the designer to the economical use of materials, in order that increased demand for new highways and wider highways by the users of these facilities may be handled within the limits of the highway gasoline tax funds available for such purposes. As bridges are a necessary part of any highway building program, it is necessary to make the available bridge construction funds stretch over as many projects as possible.

Present war production demand for bridge building materials makes it even more necessary that structures be designed to meet the essential load-carrying requirements with the most effective use of materials.

The majority of bridges are in the short span range between 20 and 100 ft. and, individually, attract little attention from engineers at large. On occasion, it is necessary to construct a bridge of major proportions across an important waterway. Considerable attention is focused upon these structures because of their size; yet in terms of financial expenditures per year, the small bridge of short-span length deserves real attention, because, in the two-year period covering 1940 and 1941, approximately 30 million dollars was spent in the United States by various agencies on bridges with spans of 40 to 80 ft. Very few individual bridge projects exceed this expenditure but require considerably more than two years to construct.

A 19 per cent reduction in expenditure for bridges in the 40 to 80-ft. span range is worth approximately $2,800,000 annually. It can be shown that an all-welded composite steel beam and concrete slab bridge of 60-ft span will save 19 per cent of the cost of the ordinary type of steel beam and concrete slab bridge, which does not utilize the concrete slab to resist stress.

## Specific examples

Two all-welded highway bridges, featuring use of the concrete roadway slab as an integral part of the steel girder section were designed by the writer and constructed by the California Division of Highways during the two-year period, 1940 to 1942. These bridges, referred to hereinafter as Structure "A" and Structure "B," were designed and constructed to conform to American Welding Society specifications which, however, were not at that time and are not now recognized by the American Association of State Highway Officials for main stress carrying members.

The A. A. S. H. O. viewpoint on welding is stated in their 1941 Specifications as follows:

"Welding is not permissible in main members or their connections where the failure of the weld would endanger the stability of the structure."

As the two bridges mentioned did not lie on Federal Aid Highway routes, it was possible to construct them without adherence to the welding restrictions set forth in the A. A. S. H. O. Specifications.

By coincidence, Structure "A" was adjacent to, but on a different highway route, than another bridge to be referred to as Structure "C." Both bridges cross the same river, are within 2 mi. of each other, and were advertised for bids within a three-months period. Structure "C" is on a Federal Aid Highway route, and did not employ welding for main members.

The concrete slab on Structure "C" was not allowed for composite action to resist dead load, as welded shear keys were used. The Bureau did, however, permit its consideration for live load only in view of the relative improbability of maximum live loads ever being on the structure.

It is therefore possible to show comparative costs of the all-welded design with full composite action of concrete slab versus a similar riveted design, with a limited amount of welding on secondary members, and relatively little use of the slab in composite action.

## Composite girders

Welding offers large economies in the design of composite steel beam and concrete slab bridges, in which the concrete slab is used as the top flange of a "tee" girder section.

Very few composite steel and concrete bridges have been built, because, among other reasons, the expense of an adequate riveted shear connection between slab and girder is prohibitive. The writer has developed satisfactory construction details for this type of bridge, using

an all-welded design in steel with butt welded field splices in heavy rolled beams and welded shear keys. The two structures of this type discussed here are believed to be the first of their particular kind.

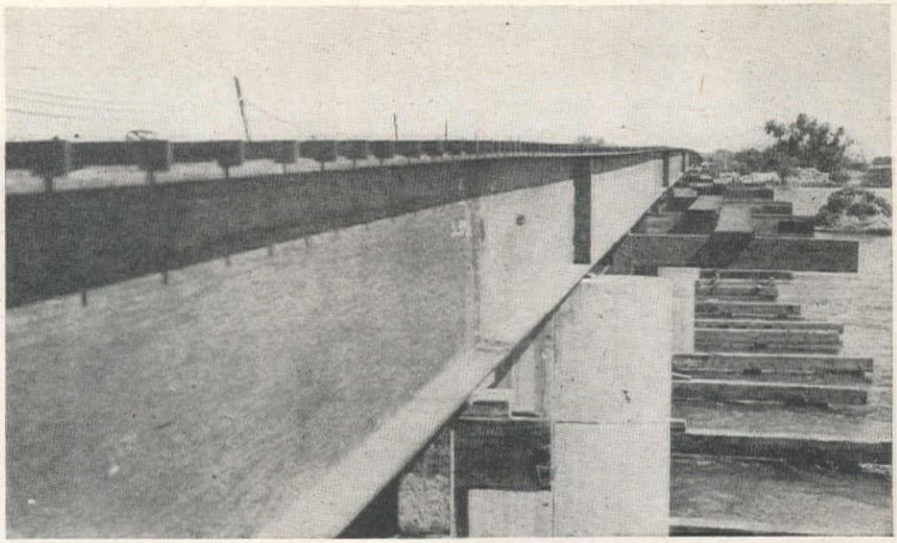
Rolled steel beam and riveted steel plate girder spans represent one of the earliest modern types of bridges. Scientific development of design and construction of reinforced concrete to its present high standard of quality has led to the use of a concrete deck slab supported upon longitudinal steel beams or girders. This highway bridge type is the most successful ever developed, as "time" deflection of the concrete slab due to plastic flow produces transverse deformation only and does not affect the surface riding qualities of the bridge.

Very few bridges of this type, however, have used the concrete slab as a top flange. This has been due primarily to the expense of developing a good riveted shear key to resist the horizontal shearing stresses created between the top girder flange and the concrete slab that occur whenever the girder section receives load and is deformed by the resulting bending moment. To ignore this stress is to assume that the slab will slip along the top flange of the steel beam. Actual results show an undetermined amount of friction. Because it is undetermined, two bad effects result:

1. The ability of the slab to resist stress is neglected, resulting in the use of an excessive amount of steel in the girder.

2. Dead load deflections cannot be accurately determined, frequently resulting in undesirable riding qualities of the finished deck.

When an estimated (rather, an assumed) deflection fails to materialize, or is excessive, a positive shear connection permits an accurate determination of deflection of the composite section, subject only to the usual variation in modulus of elasticity of the concrete. Welding is ideal to overcome this condition as it permits practically any type of key to be connected to the flange, using fillet welds of proper length and size to develop the horizontal shearing stresses.



**OUTSIDE GIRDER in Structure A, showing a completed field splice. The girder is a 33-in. I-section, and the spans are 61 ft. long. Temporary timber staging is employed during field welding of the splice and during the pouring of the concrete slab.**

### Shear keys

A riveted shear key on a rolled beam requires the drilling of holes in an otherwise blank top flange. An angle shear key is probably the only satisfactory type using rivets, but it requires a horizontal leg of sufficient length to accommodate a line of rivets. The vertical angle leg, however, is the only useful part of the key, the vertical area in contact with the concrete times the permissible unit bearing stress against concrete in a confined area determining its value. As this vertical leg is subjected to heavy bending stress a fairly thick leg is necessary to permit any reasonable height of angle. As the horizontal leg must be equally thick and of sufficient width to accommodate rivets, 50 per cent or more of the angle weight is wasted in engaging rivets rather than resisting bearing shear.

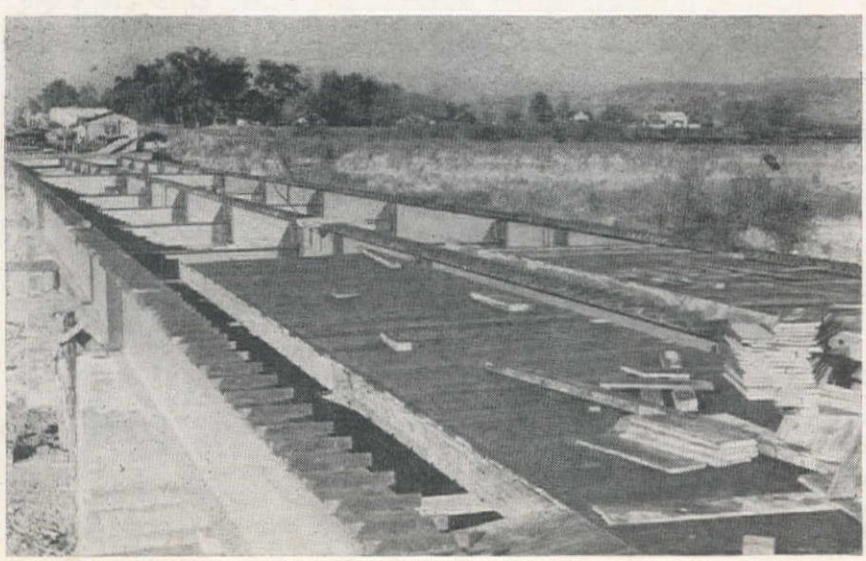
Zee shapes have been used for this purpose but are difficult to obtain due to infrequent rolling schedules and require even more metal. They do serve to lock the slab down to the beam, which, however, is an advantage more apparent than real, because bending stresses in a beam do not cause vertical separation of beam elements.

A welded shear key comparable to a riveted angle is a single bar of proportionate height and thickness **welded** to the flange. No metal is wasted; all of the key is used to resist bearing. A welded key therefore weighs 50 per cent or less than a riveted key of equal shear value.

From a practical standpoint further economies appear. Rivets in an angle must be arranged symmetrically in pairs to secure equal loading. This means that the shear key value changes by increments of 12,000 or 16,000 lb. (for ¾ or ⅞ in. rivets). Welded shear keys may be proportioned to any shear key value, using a size and length of fillet weld to meet exact requirements.

Considerable waste is therefore present in the riveted arrangement, as it is unusual for equal strengths to result in both rivets and angles; further, angle widths in the desired range vary by ½-in. units, whereas flat bars for welding may be obtained from stock in ¼-in. increments. Extreme flexibility in design is therefore obtainable with the welded key in addition to the initial weight saving.

**STEEL AND FORM arrangement for deck on Structure B. Shear keys are welded on top flange of girders. Also visible are cross diaphragm members with gusset plates welded between the beam flange and the girder web. The beams are 14-in. I-sections.**

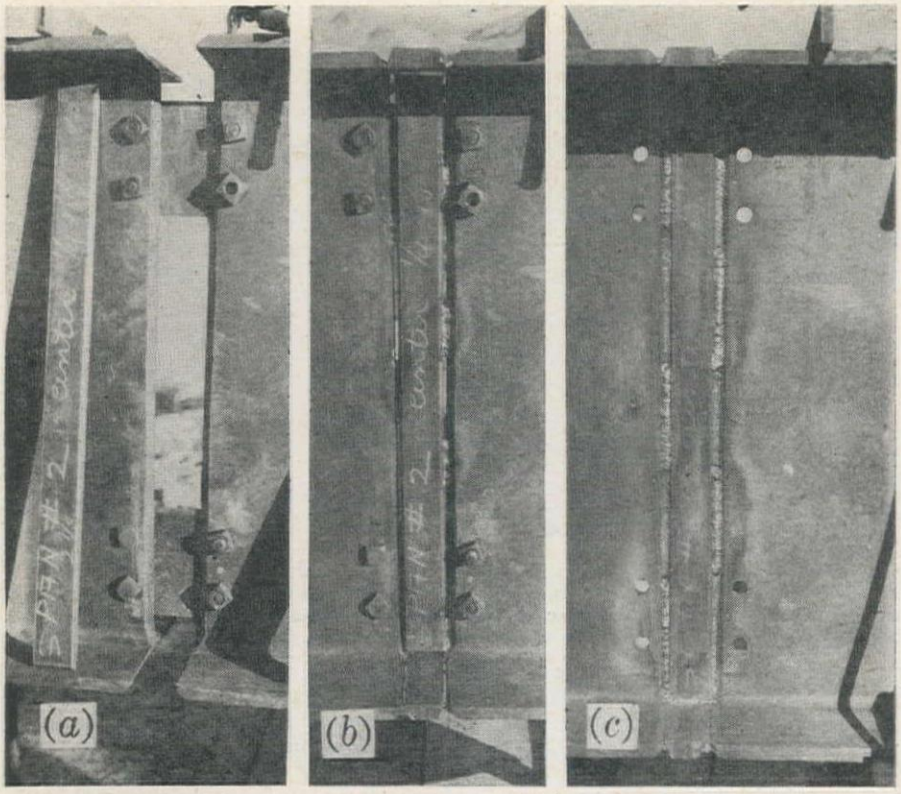


### Girder splices

A butt welded field girder splice is used with the following essential characteristics: (a) A nominal 2-in. field clearance between ends of girders is provided for erection purposes.

(b) Ends of beams are square cut (either hot sheared at the mill or flame cut in the fabricating shop).

(c) Flanges and webs are scarfed for welding. Flanges are scarfed from the top only with single Vee to permit down hand welding. Webs are scarfed from both sides for a double Vee weld.




**CONSECUTIVE STEPS in field welding of main girders. The opening is about two inches wide; both flanges and web are scarfed, flanges on top only, web on both sides; a filler bar is cut to fit and tack welded in place; finally the weld is completed.**

(d) Filler bars of proper width are inserted into the opening, and field welded to each end of each girder.

Allowable stresses on this type of joint are 85 per cent of the full section in conformance with American Welding Society specifications because of the single Vee flange weld. This is ample, however, as the splice is always located near the quarter point in the span where maximum positive or negative moments for dead plus live load rarely exceed 40 per cent of the beam strength. The advantage of down hand welding is considerable, as overhead welding from staging hung on the beam is difficult and expensive. A final overhead pass is necessary on the flanges after cleaning out the root of the first down hand pass.

The nominal 2-in. field clearance requires filler bars 1¾ in. wide and of thicknesses equal to beam flange and web for proper butt welding of the splice. As the nominal 2-in. clearance may vary considerably, due to mill cutting tolerances if hot sheared, and temperature at time of erection, stock lengths of bars in widths varying by ¼ in. are made available to the job, thus insuring a field welding clearance on each side of the filler bars of not greater than ⅛ in. These bars are readily flame cut to length in the field. In the event a tapered filler bar becomes necessary due to vertical curve, camber or inaccurate beam cutting, a suitable bar can be flame cut to proper shape at the job with little trouble.

For greatest economy composite beam and girder spans should be supported at their third points with temporary bents until the slab has been poured, as it permits the composite section to resist full dead load, as well as live load. It also furnishes false work for steel erection which affords opportunity to jack the beam into exact position at the splice and requires a bar minimum of splicing material for fitting up purposes.

In the two completed structures described herein, two small splice plates fastened on one side of the web, with 2 bolts in each plate were sufficient to rigidly hold the splice in position for field welding. These were removed as soon as tack welding of the filler bars was completed.

Temperature and shrinkage stresses in the splice during the welding process were largely eliminated by providing for a temporary sliding connection on each pier. This also assured an accurate control of temperature stresses in the finished structure. Girders were welded down to the piers, only after all splices were welded, concrete deck poured, and at an average air temperature for the region.

### Pier bearings

The pier bearing is a compact welded plate assembly using a 2½ in. rocker bar resting upon a base plate. The edges of the rocker are chamfered to prevent excessive edge stresses when beam rotation occurs due to deflection. This construction is much less costly than machining the rocker bar to a large radius and serves the same purpose in a practical way, as the singular deflections at this joint, due to live load and temperature, are extremely small. Small keeper bars prevent lateral and longitudinal slippage and effectively transmit temperature and earthquake stresses to the pier, yet do not interfere with the hinging action of the joint for rotation.

The pier assembly is field welded to a small beam set flush into the top of the concrete pier. This beam contains less steel, is more rigid than a base plate, requires no anchor bolts, and is therefore less costly, and more satisfactory.

The absence of anchor bolts in the welded assembly is particularly helpful during construction, as a slight misalignment in any direction is of no consequence. The bearing beams must be held to proper grade, which, however, is not difficult, as the beams bolt through the top flange to cross struts directly to the pier forms.

A similar bearing assembly design in riveting would involve expensive countersinking of rivets and in general produce a weak joint. For this reason, other types of bearings such as a steel pin between two steel castings, have been more satisfactory than a riveted bearing. The total cost of this welded bearing plate assembly is approximately 20 per cent of a steel assembly, and is distinctly more compact.

### Cross diaphragms

Intermediate cross diaphragms between longitudinal girders in a bridge serve two purposes:

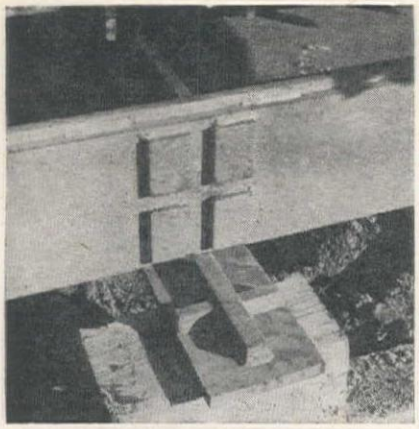
(1) Distribution of live loads between girders when live load is applied eccentrically to the bridge in the central portion of the span. This eccentricity results in unequal girder deflections, and creates severe shearing and bending stresses in the intermediate diaphragms.

(2) Provide rigid edge support to the roadway slab at slab expansion joints. A rigid diaphragm is very important at these locations, as the passage of live load across an open slab joint causes high impact and a rough riding surface unless both edges of the slab are at the same elevation and rigidly supported.

The all-welded diaphragm used in this design is shop fabricated from a 14-in., 30-lb. I-beam and two gusset plates, one at each end, butt welded against the beam flange parallel to the beam web.

The intermediate diaphragms are erected with the 14-in. beam supported upon the bottom flange of the girders with gusset plates lap welded against stiffener plates on the girder webs. The roadway slab does not rest upon these diaphragms, as it is important that transverse slab supports be eliminated as far as possible in the interests of a good riding surface, for reasons described earlier. End diaphragms at expansion hinges are identical to the intermediate diaphragms, but lap under the girder top flanges, with gusset plates underneath.

The diaphragm design described herein has proven very satisfactory in the finished structures. The decks are noticeably more rigid than similar riveted structures under passage of live load in spite of the high ratio of length to span depth and show a marked reduction in vibration due to live load impact. While the rigidity is accomplished principally by making full use of the slab with a good type of welded shear key, the all-



**PIER BEARING assembly for the welded composite bridges. The 2½-in. rocker bar rests on a base plate which is in turn welded to a beam set flush in the top of the concrete pier. Rocker bar edges are slightly chamfered to prevent edge stresses when the girder rotates.**

welded diaphragms play their part in reducing the live load impact vibration that is noticeable to a marked degree in all-riveted span.

### Girder expansion joints

Girder expansion joints, necessary to relieve temperature stresses, are located near the quarter point of a span to avoid disrupting the continuous girder arrangement. Distances between joints are dependent upon the flexibility of the concrete piers supporting the girders, which, in the two structures described, were made as slender as possible and attached with a hinged connection, described earlier, to each girder.

In one of the structures described, pier heights were sufficient to permit a distance between expansion joints of 390 ft. This distance creates a total change in length of 3 in. over 100 deg. temperature range, requiring a normal joint opening of 1½ in. + 1 in. clearance, or 2½ in.

The tension hanger plates, suspended from a steel pin through the web on the cantilever side of the expansion joint, support the span on the other side of the joint by a similar pin. The girder webs must be reinforced with pin plates for bearing against the pin.

These plates are welded to the girder webs prior to boring the pin holes. As welding produces a rigid connection, in contrast to the considerable slippage necessary to cause a riveted joint to act, welded pin plates are definitely more satisfactory.

Lateral motion of the span beyond the expansion hinge, due to wind or seismic forces, is prevented by two small guide bars welded on one side of one joint to the girder flange and bearing against guide bars on the other flange. The detail is readily put together and field welded after the girders are assembled and adjusted to line and grade.

### Supporting data

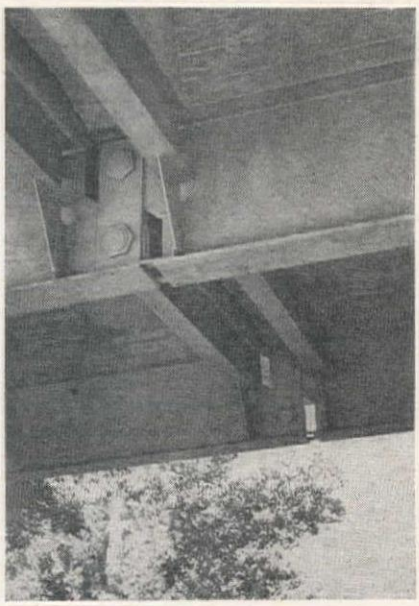
1. Proportionate cost saving in percentage per complete unit produced by arc welding over that produced by the previous method:

Two types of savings may be demonstrated for the all-welded composite steel and concrete slab highway bridge over similar or competitive types:

(a) Difference in cost between all-welded and all-riveted construction, both types making full use of the concrete slab as an integral part of the section.

(b) Differences in cost between all-welded composite type of construction, usual riveted steel type of construction not utilizing the slab as an integral part of the section, and usual reinforced concrete tee beam and slab type of construction.

Saving (a): Total cost of Structure "A," an all-welded composite design, was $169,920. Additional cost in materials, fabrication and erection if this



**EXPANSION JOINT assembly viewed from underside. The hanger plates are suspended from a pin in the cantilever side of the joint, and the other pin goes through the suspended section. Pin holes in the girder are reinforced with plates welded in place for greater bearing surface. Normal opening is 2½ in.**

structure were redesigned as an all-riveted composite design would have been $31,840. This represents an increase in cost of 19 per cent, or a saving of approximately 16 per cent.

Saving (b): Unit square foot cost of Structure "A," an all-welded continuous composite steel and concrete design, was $3.45. Unit square foot cost of Structure "C," an ordinary riveted type of continuous steel beam and concrete slab design, not using the concrete deck slab to resist bending stresses, but similar in all other respects to Structure "A," was $4.35.

Relative cost of structure is 81 per cent of "A" "C," or a saving of 19 per cent in favor of the all-welded composite design.

Relative costs of Structure "A" and a reinforced concrete bridge which had a unit square foot cost of $3.94, indicate a saving of 10 per cent in favor of the all-welded composite design.

Relative costs of Structure "C" and the reinforced concrete bridge show a saving of approximately 10 per cent in favor of the reinforced concrete design.

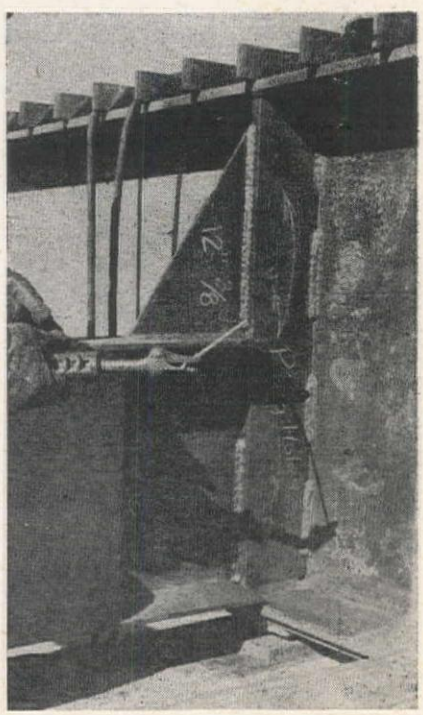
2. Estimated total annual gross cost savings:

Cost saving (a): Approximately $2,000,000 was spent by this highway's organization in the two year period 1940 and 1941 for construction of short span bridges in the 40 to 80-ft. span range. Of this amount, approximately three-fourths, or $1,500,000, was spent on reinforced concrete bridges. The use of all-welded composite steel and concrete for all of the structures in the reinforced concrete group would have produced a saving of 10 per cent of $1,500,000, or an annual saving of $75,000. This same type of construction substituted for the riveted steel design without composite action would have saved 19 per cent of $500,000, or an annual saving of $48,000. A total annual saving of $133,000 is therefore possible.

Cost saving (b): Written inquiries sent to all of the state highway organizations in the United States, and to selected municipalities that had an appreciable amount of bridge construction, revealed the fact that approximately $30,000,000 was spent during the period 1940 and 1941 on bridges of all types in the 40 to 80-ft. span range. Construction seemed fairly equally divided between reinforced concrete and structural steel bridge types, and for purposes of this analysis may be taken as 50 per cent for each type.

Total annual savings possible, therefore, by the adoption of the all-welded composite steel beam and concrete slab bridge in the short span range would

**CROSS DIAPHRAGM members are shop-fabricated and gusset plates are welded to girders in the field. This design produces noticeably stiffer deck, with reduction in vibration under live load.**



amount to 19 per cent of $15,000,000 plus 10 per cent of $15,000,000 or a total of $2,200,000.

3. Increased service life, efficiency and social advantages accruing from the use of arc welding in producing all structures of the type treated:

Detailed descriptions appearing above show the increased structural rigidity and better riding qualities of the bridge deck achieved through the use of all-welded composite steel beam and concrete construction. These advantages are not definable in terms of cost; yet contribute measurably to a more satisfactory bridge structure from the highway users' standpoint. Further, the service life of an all-welded bridge with composite slab construction is definitely greater than other structural steel types, due to the increased structural rigidity. Unfortunately, the two structures described herein have not been in operation for a long enough time to determine their maintenance cost. The writer feels, however, that they will fully justify his expectations for long and continued service.

NOTE: Data and illustrations are from a study submitted by the author to The James F. Lincoln Arc Welding Foundation in its recent Industrial Progress Award Program for reports of advancements and improvements made by the application of arc welding in design, fabrication, construction and maintenance.

# New Compound Developed for Making Soil Waterproof and Eliminating Mud

MUD WILL NO LONGER present a hazard in the construction of roads, airplane landing fields and other projects here and abroad. The Hercules Powder Company has just announced their development of a chemical method of making soil waterproof. The compound is known as Stabinol.

This announcement is good news to motorists because it means the end of muddy streets and roads. If properly used, Stabinol should be a great help, too, to the men who make the roads. Where mud delays progress in road construction work the chemical will be a time saver. And in rural areas where traffic is light it can be used to stabilize unsurfaced dirt roads or, mixed with soil, it will serve as the base on main highways with hard wearing surfaces.

Stabinol serves as a "raincoat" for roads. It is a resin compound which, when mixed with the top few inches of soil, makes a waterproof surface. Water cannot seep through the treated soil and turn it into mud. Rather, the water drains off or evaporates. The producers of the compound say that treated soil will not only resist penetration of surface water but also the capillary rise of moisture from below.

A rainstorm has no effect on a Stabinol-treated dirt road. Pedestrians need no longer jump for cover to keep from being mud-splattered by a passing truck or automobile. Trucks move along without churning up mud or digging ruts; and a car splashing through a "puddle" will kick up dry dust, not mud, behind it.

This "soil stabilization" climaxes several years of laboratory and field tests with various resin compounds. The chemical company states that Stabinol does not increase the load-bearing capacity of soil but will prevent soil from getting wet and thereby losing its strength. To "stabilize" soil only fractional amounts of Stabinol are required, usually about 1 per cent of the total soil to be treated. Oddly enough, soil so treated looks just like the original dirt.

The treatment is by no means a temporary measure. The manufacturer states that soil stabilization will last for years. Evidence is given in roads which are still waterproof though they were laid down more than five years ago.

The company did not mention the location of military projects such as airplane landing fields but did state that resin-stabilized roads have been put down in various eastern states with the cooperation of city and state highway departments.

Stabilization work has not been confined to the United States. Panama and French Guiana are two of the territories where experimental work has been carried on.

In the company's soil laboratory in Wilmington, Del., there are many examples of the phenomenon of waterproof soil. Here complete soil studies are made. Test cylinders of stabilized soil which have been totally submerged in water for 90 days or more, still show no signs of softening into mud. By submerging these test cylinders the chemists are able to chart moisture absorption. Many stabilized soil cylinders, compacted to maximum density and only about two inches in diameter and not more than two inches high, will support the full weight of a man after having been totally submerged for long periods.

# Plans for Post-War Housing Must Come From Communities

POST-WAR HOUSING will be primarily a job for private enterprise and the responsibility for planning should rest with communities themselves, according to National Housing Administrator John B. Blandford, Jr.

The main post-war undertakings of the Federal Government in relation to housing should be in a fiscal, insurance and credit framework, with any aid given to publicly financed housing made a part of "the whole housing picture", Blandford said.

"If our housing future is shaped in these terms, a program of 1,000,000 to 1,500,000 houses a year for a 10 to 20-year period, becomes clearly an attainable goal. This might mean a capital investment, preponderantly private, running up as high as $8,000,000,000 a year and a volume of employment running up to 4,000,000 or 5,000,000 workers—taking no account of the indirect economic benefits of such a program."

NHA does not regard the war experience as any guide whatsoever as to the relative amounts of private housing and public housing that should be built. During the war, private enterprise provided about half of the new construction. But in the few years before the war, more than 95 per cent of all the housing in the country was privately financed, and NHA is confident that the post-war situation will be very much more like the pre-war situation than like the situation during wartime.

Undoubtedly, for the lowest income groups and for some of the slum clearance jobs, public aid in whatever forms prove most desirable will continue to be necessary to carry forward a balanced housing program for all groups. But it is not believed that public housing is a part of public works. Determinations with regard to public housing should be coordinated with the stimulation and encouragement of private housing—and that the two must be handled together, insofar as activities of the Federal Government are concerned.

NHA believes also that any public housing after the war should be local projects, with maximum feasible local aid, representing maximum feasible community agreement, and with only such Federal aid as is necessary to serve the need. Even where the Government extends aid to housing in the form of mortgage insurance, or loans, or other forms of aid, the Government should not involve itself in determining peacetime community housing needs. These needs should be worked out at the community level, through the voluntary cooperation of all groups in the community interested in housing—builders, real estate people, labor organizations, consumer and local public agencies.

# Arizona Water Users OK Horseshoe Dam Project

SHAREHOLDERS of the Salt River Valley Water Users' Association, on April 4 voted by a majority of 4½ to 1 to accept the proposal of the Phelps Dodge Corporation for diversion of water from the Black River to the Corporation's plant in Morenci, Ariz., and construction of a dam on the Verde river to replace the diverted flow. Bids have already been received for construction of the dam, and will be found in the Unit Bid Summary in this issue of *Western Construction News*. It is anticipated that contract for construction will be awarded soon. Preliminary tunnel and access road construction is already under way.

Leeds, Hill, Barnard and Jewett of Los Angeles, Calif., are the engineers in charge of the construction for Phelps Dodge.

# Quonset Huts for California Camp

CONSTRUCTION CREWS of Barrett & Hilp, general contractors of San Francisco, Calif., recently completed the building of Camp Parks, Seabee replacement center near Pleasanton, Calif., with the erection of some 1,000 Quonset huts, together with streets, sidewalks and utilities.

The job was a rush order from the beginning and it was mainly on the strength of Barrett & Hilp's reputation for speedy construction performance, including completion in a bare 180 days of a city of 5,000 workers' homes near Portsmouth, Va., that the Navy awarded the $4,000,000 Camp Parks contract without the necessity of calling for bids. Less than four months after breaking ground, Camp Parks was completed and turned over to the Navy.

The Quonset hut, originally designed for our fighting forces in the Arctic, is an odd-appearing structure resembling a section of a huge culvert half-buried in the ground. But despite its peculiar appearance, it has many virtues. It is, among other things, easily shipped and can be quickly assembled, once the "hang" of the work is mastered. It makes snug, comfortable quarters and has yet to be disturbed by even the severest gales of Greenland or the Aleutians, where many of them are serving well.

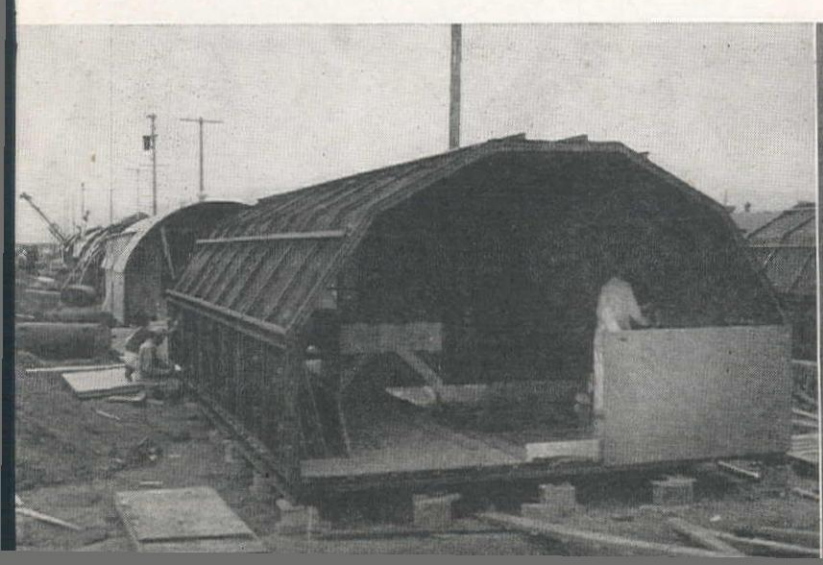
Ranging in size from the 16 x 36-ft. living quarters to the 50 x 100-ft. mess halls, the Quonset huts were delivered to the contractors in pre-fabricated form. The huts, although of the same basic design, come in two types. One of these has a framework resembling a gambrel roof and is used for the smaller huts. The other is composed of quarter-circular ribs which are set up in opposing pairs. All structural members of the huts are of light steel fitted with slots into which the insulation and interior panels are fitted. The members are secured by bolting together in assembling.

So simple is the assembly of the Quonset hut that a crew of eight men can easily complete one of the small units in a working day. The sills are laid on wood block footings, the sectional plywood floors laid and the framework set up. The Masonite interior panels are next installed by securing the panels to metal splines on the frames. Insulating batts are then inserted between the frame members outside the interior panels. The exterior is then covered with sections of corrugated iron which come curved to fit the job. Pre-fabricated front and back sides, or end panels, fitted with necessary doors and windows, are bolted to the frames.

Because of the elliptical design of the huts, the ribs themselves act as trusses and no cross-members are required to give complete support. The wooden horses used in setting up the frames are removed after the frames are secured and moved on to the next hut.

From every indication, the Quonset hut will probably vie for post-war popularity with the jeep. Being readily knocked down and shipped, the huts have taken the fancy of all who have worked with them. In their various sizes, Quonset huts will evidently find a ready post-war market for uses ranging all the way from summer homes to barns, small warehouses, implement sheds and other peace-time conversions.

The Camp Parks job was accomplished under the direction of Harry Tuck, project manager, and James Lindsay, general superintendent, assisted by Al Retzlaff and John Miller, superintendents, respectively, of the two construction areas.



# Preliminary Design Chart . . . XII

# Selection of Bridge Cranes

**Two types of bridge cranes, those used constantly, as in a factory or foundry, and those used intermittently, as in a powerhouse or pumping station, are discussed, their cost given with relation to span and lifting capacity in each case**

By A. E. NIEDERHOFF
Design Engineer
Oregon Shipbuilding Corp., Portland, Ore.

EFFICIENT WEIGHT LIFTING in our shipyards, powerhouses, factories and other war production plants has been one of the outstanding factors in achieving heretofore unheard of production goals. One of the tools most used is the overhead traveling bridge crane.

The preliminary selection of an overhead bridge crane based upon class of duty, capacity and span is a problem that confronts the industrial engineer. When planning new developments or retooling a plant for new processes it is decidedly helpful to have some idea of the cost of bridge cranes without reference to the manufacturers of this equipment. An inquiry addressed to the manufacturer is usually answered by a request to the engineer for much detailed information. If the project is in a preliminary and formative stage only, these data are not available, the engineer being only interested in establishing boundary or limiting factors for his job. Also, since a broad field of final competitive bidders is always desirable when a purchase is to be made, the planning engineer does not relish the thought of being restricted to one manufacturer because of information furnished. It is to aid these engineers that this article is written.

### Duty classification

Bridge cranes can be broadly classified as (1) operating constantly, twenty-four hours per day and seven days per week and, (2) those having only intermittent duty. Each of these two groups can be broken down further into indoor service and outdoor service. In either group or sub-group the important elements affecting cost are the lifting capacity of the crane and the span between crane rails. When either increases, the cost increases. The increase, however, is not directly proportional. It will be shown just how cost varies with these factors and also some of the minor considerations that influence the price of the delivered cranes.

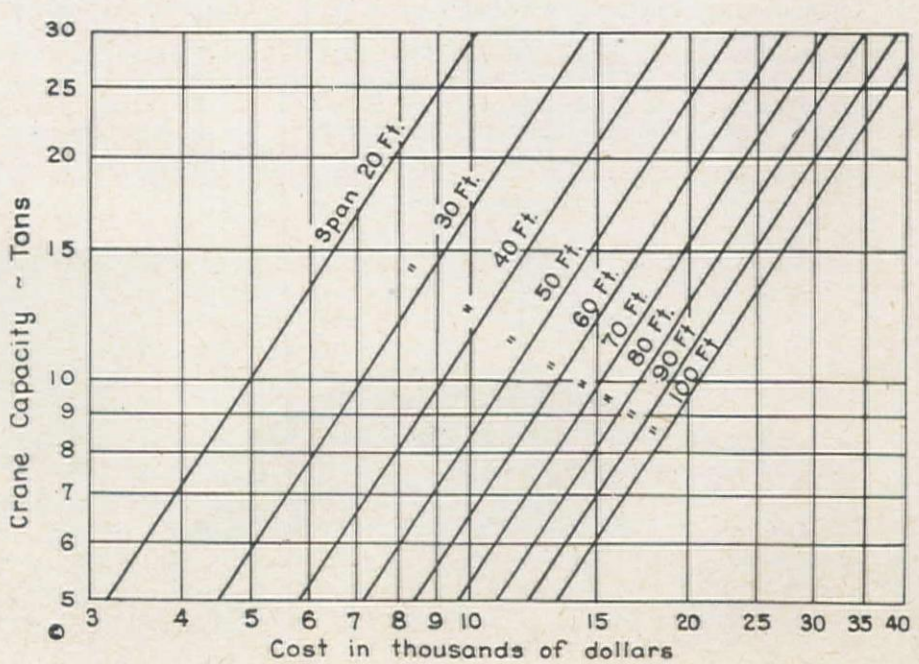
The question of cost is so vital and essential that the designer must keep it constantly in mind. The variation in cost with load, span, and type of duty is a major problem for the planner of industrial layouts; it outranks the minor details of construction that are subsequently covered in specifications for the machine. Cost analysis comes even before the drawing of plans and specifications and remains as a function and responsibility of the designer until the crane is actually in place. Assurance must be given the owner that the equipment is not only the best that can be built for the money but also that varying the span or load capacity of the crane will affect the cost in a determinate amount. Having settled upon the span, load capacity and duty classification, the engineer should know enough about the details of good crane design to insist upon a machine that will have a low operating and maintenance cost.

New cranes subject to only intermittent duty are used in powerhouses, pumping stations, storerooms, and warehouses. In the case of powerhouse cranes it is necessary to have a large capacity weight lifter that will function for only a short interval. After it has served its initial purpose it remains idle until repairs or replacements of generating machinery are required. In the event that only a portion of the generating machinery is installed at one time the crane does useful work during subsequent installations and additions. In the meantime, however, the crane just sits idle on the rails representing a large capital investment on which there is no return. Faced with this possibility, the engineer finally selects a crane which is usually a slow moving device having great lifting power but devoid of the niceties incorporated in a heavy duty weight lifter.

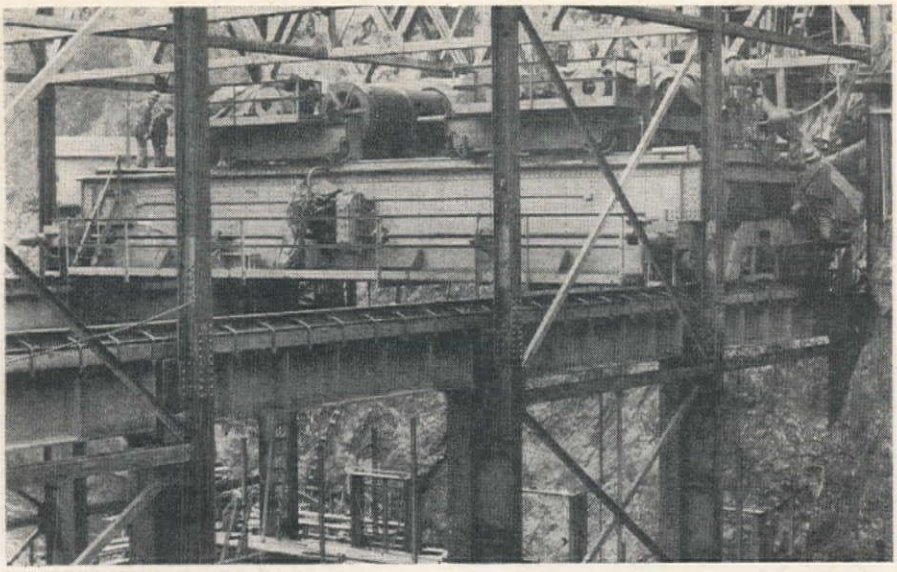
Heavy duty cranes give constant service in shipyards, foundries and factories, frequently operating 24 hours per day. They must be high speed machines having endurance, reliability, easy accessibility to repair points, and a large factor of safety to resist shock loads. Production must not suffer because a crane is out of service so the normal procedure is to operate cranes constantly until they break down. If temporary repairs can be quickly made and the machine placed in limited service until parts can be shipped by the crane manufacturer the maintenance man and factory manager know they have a good machine. Such cranes cost more than those of like capacity and dimensions but having only intermittent duty.

### Crane dimensions

Selecting the load capacity for a powerhouse crane is not difficult if the turbine and generator manufacturers will give information on the weights of their products. About the heaviest piece that must be lifted into place is the rotor of the generator. Two bridge cranes using an equalizing lifting beam form an efficient team in power house lifting. In the absence of known weights the formula given below has been used successfully in preliminary estimates of re-




**COST CHART for heavy-duty, high-speed, continuous-use type of bridge cranes suitable for shipyards, factories or foundries.**



**DOUBLE-HOOK, 200-ton capacity bridge crane during assembly in the LaGrande powerhouse addition of the city of Tacoma, Wash. This type crane is for intermittent duty and will lift very heavy generating units.**

quired crane capacity at hydro-electric stations:

$$\text{Capacity in tons} = .73\sqrt[1.9]{\frac{P}{H}} \quad \text{..... (1)}$$

Where $P$ = the rated horsepower of the largest turbine.

$H$ = the rated head for that turbine.

To establish the validity of the above statement Table I has been prepared comparing formula (1) values with actual figures for four modern, representative hydro plants. These plants have heads ranging from 60 ft. to 190 ft. and turbines from 15,000 to 80,000 h. p.

No such generalization can be made for heavy, constant duty cranes. The machines used in West Coast shipyard plate shops, sub-assembly buildings, machine shops and pipe shops have capacities ranging from 5 to 15 tons. These are high speed machines and are confined to lifting single plates or small subassemblies. Larger weights are lifted by two cranes using an equalizing beam or by special rigging involving auxiliary hoist engines. As an example, the 37-ton stern frame of a Victory ship had to be hoisted about 3 ft. onto a working slab in the machine shop of the Oregon Shipbuilding Corp. The machine shop bridge crane had a rated capacity of only 10 tons. By lifting one end of the stern frame at a time, placing rollers underneath it and working it up an improvised ramp by use of a haulage engine on a truck, the casting was finally skidded into position. This operation was time-consuming but it illustrates the ability of bridge cranes to stand overloads.

Shocks and overloads are anticipated by designers of heavy duty cranes and a large factor of safety is built into the machines. Naturally, this added strength costs more but the expenditure is warranted because of the extreme variation in type of load and the constant, uninterrupted service demanded of the crane.

The span of cranes is fixed by considerations of cost, flexibility of operation, maintenance and duty. Each project has a peculiar set of conditions that govern the span, and no adequate guide can be given that has universal applicability. On power house cranes for large projects a formula sometimes used is:

$$\text{Span in feet} = 2.5\sqrt{\frac{P}{H}} \leq 40 \text{ ft.} \quad \text{..... (2)}$$

This formula is purely informative in character and is not to be construed as a hard and fast proposition contradicting more reliable and specific data.

The total weight of a bridge crane is a function of the span and the lifting capacity. Based upon studies of 20 representative high speed cranes with capacities of 5 and 10 tons for spans ranging from 37 to 90 ft., an empirical formula was developed. This formula is an average for products made by four different manufacturers.

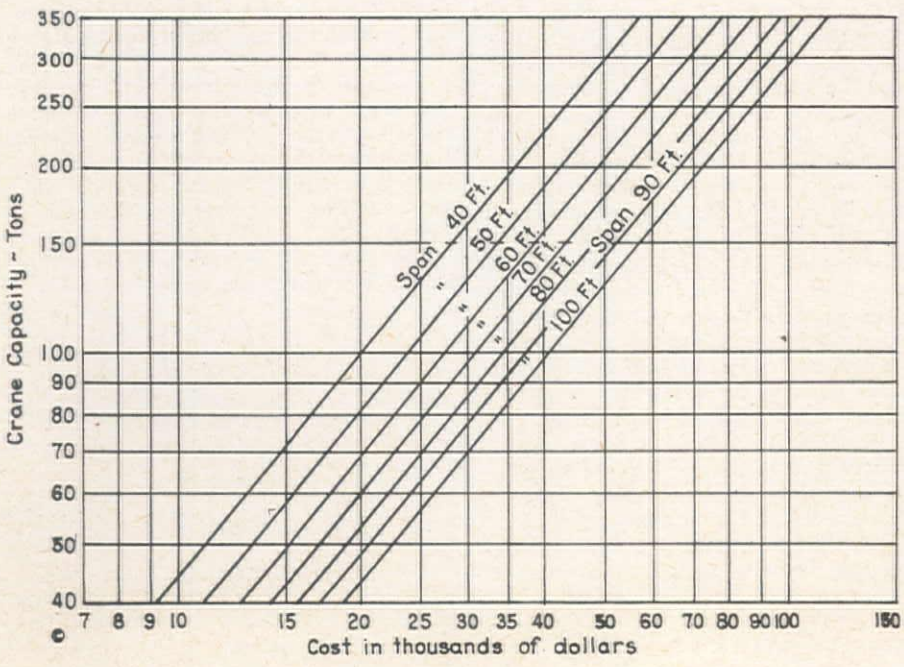
$$\text{Weight in kips} = \frac{(C+S)^{4/3}}{5} \quad \text{..... (3)}$$

Where $C$ is the crane capacity in kips and $S$ is the span in feet.

Checking this formula against recent crane installations at Oregon Shipbuilding Corp. showed a maximum variation of 6 percent from weights carried on the bills of lading.

**Table I**

| Name of Plant | $P$ Horsepower | $H$ Feet | Actual Crane Capacity, tons | Capacity per formula (1), tons |
|---|---|---|---|---|
| Bonneville | 74,000 | 60 | 2@300 = 600 | 600 |
| Norris | 66,000 | 165 | 250 | 222 |
| Seminoe | 15,000 | 171 | 50 | 51 |
| Hiwassee | 80,000 | 190 | 275 | 228 |

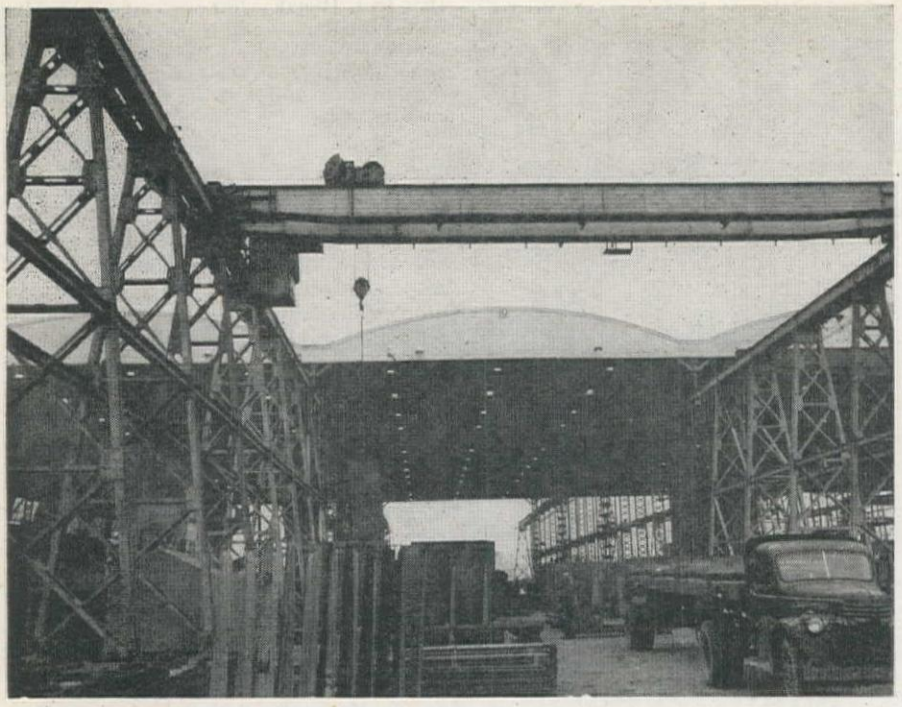



**COST CHART for intermittent-duty, large capacity bridge cranes, suitable for use in powerhouses or pumping stations.**

### Crane costs

**Chart I** has been prepared to show at a glance the cost of bridge cranes when the capacity and span have been determined. This chart has been prepared for heavy duty, high speed cranes made in the Mid-West and used on the West Coast. Prices have been adjusted to current levels.

**Chart II** gives identical information for intermittent duty cranes. The cost index has been adjusted in the same way but the use of the crane is not confined to the West Coast and the places of



**TEN-TON BRIDGE CRANE with span of 74 ft. 8½ in. in assembly room of Oregon Shipbuilding Corp., Portland, Ore. This crane has a 40-hp. hoisting motor turning at 1170 r.p.m. The rail motor is 5 hp. and bridge motor is 15 hp. This crane is in 24-hr. operation, and is a typical installation of the lighter type overhead machine.**

manufacture are unknown. The figure given by both charts is an f. o. b. cost at the factory. Cost of freight can be estimated based on distance hauled for weight given by formula (3). Erection labor can also be estimated from the weight of the cranes.

To use the charts, enter the left hand side with the capacity in tons and proceed horizontally to the intersection with the proper diagonal line representing the span in feet. Turn down vertically and read the cost of the crane in dollars on the lower horizontal line. As an example, suppose a heavy duty crane with a capacity of 5 tons and a span of 40 ft. is desired. The cost is obtained by entering the left hand edge of Chart I at 5 and passing to an intersection with the diagonal line labeled "Span 40 ft." Going vertically downward, the cost is given as $5,900.

### Specifications for bridge cranes

A description of a high speed, heavy duty bridge crane may be of some use to specification writers. The data given below should not be considered the acme of perfection in cranes, neither are they the only sizes of component parts that will perform the required service. However, it is information on a crane that has actually been in use and has been found satisfactory.

The capacity of the crane is ten tons with a lift of 20 ft. and a span of 90 ft. The cost of this 70,000-lb. crane in 1941 was $13,000, exclusive of freight and erection expense. The earliest delivery date was one year. Comparing these data with the chart and formula (3) values it will be noted that current price levels indicate a cost of $18,000 and an estimated weight of 75,000 lbs.

Hoisting speed of 36 ft. per min. was specified for a 15-in. drum using a 4-part line consisting of ⅜ in. flexible steel cable. The motor geared to the hoisting drum was a 25 h. p. 1050 r. p. m. direct current motor operating at 250 volts. A smaller 3 h. p. motor controlled the trolley with its speed of 150 ft. per min. Trolley wheels are only 10 in. in diameter, producing a headroom clearance above the top of the 60-lb. A. S. C. E. crane rail of 5 ft. 8 in.

### Truck wheel data

Bridge truck wheels are 15 in. in diameter with a maximum travel speed of 300 ft. per min., actuated by a 20 h. p. motor. Symmetry in design of the double flange wheels and the bearings equalizes the load and reduces wear on the moving parts of the wheel as well as on the stationary crane rail. The wheel tread is slightly tapered which keeps the crane lined up on the runway. Crane wheel replacement time is a matter of less than one hour—an important consideration for a crane that is used constantly. Two wheel trucks having a wheel base of 13 ft. yield a maximum load per wheel of 33.3 kips.

For long span, heavy load cranes a four wheel truck consisting of 2 bogies is necessary. In this case, pin connected equalizing bogies compensate for lack of rail alignment or smoothness. Truck frames usually consist of a couple of channels and cover plates forming a box section that provides strength and rigidity in a horizontal as well as vertical direction. Roller bearings are always specified for wheels in the interest of smoothness of operation and reducing power consumption. Rail sweeps on both ends of the truck are good insurance against derailment or damage to hose, electric leads or other material that may fall across the rail.

The above description will serve as an indication of what one particular bridge crane was like. Specifications for new cranes should also include the type of bridge girder desired or more particularly the vertical and horizontal deflection allowable under maximum load. Such items as an open or closed operator cage, type of control equipment, footwalks and handrails are items that affect the final cost and the general convenience when operating and maintaining the crane. Perhaps the most essential consideration for a heavy duty crane is the accessibility and ease of replacement of any parts that may wear out.


### Acknowledgments

Data for this article was accumulated over several years and represents studies on 66 different bridge cranes. Information on power house cranes in the West and in the Tennessee River Valley was obtained as an essential tool when planning hydro-electric power stations on the Columbia River and its tributaries for the U. S. Army Engineers. Industrial crane data comes from personal observation and from the records of the Oregon Shipbuilding Corporation. Grateful acknowledgment is made to the Office Engineer of that Corporation and to the other engineers and mechanics who have made valuable suggestions. From their combined offerings it was possible to plot charts for bridge cranes having spans of 25 to 90 ft. and a carrying capacity ranging from 5 to 350 tons.


# Mathematical Error In Water Hammer Article Corrected

*Western Construction News* expresses regret for two unfortunate errors which occurred in the article written by Oscar Goldman of the San Francisco, Calif., Water Department on the subject of Water Hammer, and which was published in the March issue of the magazine.

Because of the interest of hydraulic engineers in this subject, and because they may wish to make a pencil correction in the original article, for preservation among their other technical articles, the two corrections are noted, as follows:

On page 84, equation (7a) should read: The surge pressure is:

$$P = \frac{Swv}{g}\left\{1 - \left(\frac{S_2}{S_1}\right)^{0.84}\right\} \quad \text{.....(7a)}$$

On the same page, equation (10) should read:

$$l_1 = y\left(\frac{P_1}{p_2} + 1\right) \quad \text{.....(10)}$$

It is anticipated that, in future issues, Mr. Goldman will contribute additional discussions on important phases of hydraulic engineering.

# Consulting Engineer Reports On Sonoma County Sewerage

SONOMA COUNTY, one of California's original 27 counties, holds a prominent place in the early history of the state. It is the leading non-irrigated agricultural county in California and is noted for its poultry, dairy and delicious fruit products. Sonoma County is easily accessible from the congested Bay Region and its clear streams and beautiful valleys have long been popular recreational attractions.

The epidemic of poliomyelitis (infantile paralysis) which occurred throughout much of California during the summer of 1943 was at the start more severe in Sonoma County than in any other part of the state. In response to popular demand for remedial action, the Board of Supervisors on July 19, 1943, passed a resolution recognizing the emergency and authorized the County Health Officer to survey and investigate sanitary conditions throughout the county and to take such measures as necessary to correct conditions disclosed by the survey to be inimicable to public health. A fund of $10,000 was appropriated for carrying out the terms of the resolution and all county departments were authorized and directed to cooperate with the Health Department in eradicating unhealthy conditions found to exist.

### Sanitary engineer engaged

On July 23, 1943, Charles H. Lee, consulting sanitary engineer of San Francisco, was engaged as sanitary engineering advisor. He made recommendations for immediate action in improving unsanitary conditions which might have relation to the current epidemic. These first recommendations, submitted in the form of a preliminary report, were:

1. Continue the sanitary survey of stream banks being made at the time under the direction of Dr. Barnett, County Health Officer, to locate septic tank, cesspool or privy outlets which permit the discharge of sewage or sewage effluent down the bank, through highly permeable sand or gravel, or directly into the stream.

2. Fill up standing pools of water in the creek channel between Santa Rosa water works dam and the east city boundary.

3. Remove floating moss or vegetation from water flowing in Santa Rosa creek within the boundaries of the City of Santa Rosa and spray with distillate all slowly moving or standing water and shallow margins to destroy breeding places of mosquitoes.

4. Spray with distillate or other effective liquid all standing or slowly moving moss-filled water along Santa Rosa creek outside of the city from N. W. P. Ry. bridge to Willow Lane.

5. In the continuously flowing section of Santa Rosa Creek between N. W. P. Ry. bridge and Stoney Point Road remove obstructions to low water flow from the channel, and where there are several channels, divert all flow into one channel, trenching in wide shallow runs where necessary to concentrate the stream — for the purpose of draining areas covered by stagnant and slowly moving water.

6. Burn all accumulations of combustible rubbish and dry vegetation along the banks of Santa Rosa creek within the city boundary, particularly below Main Street bridge, which serve as shelter for rats.

7. Clean up all important breeding places for flies in the City of Santa Rosa and adjacent county and in particular destroy fly larvae in the under portion of the scum on the septic tanks at the Santa Rosa city sewer farm. Also screen and systematically wash down with pressure hose the division box at the end of the sewer main and the inlets into the septic tanks.

8. Remove accumulated ripe sludge from the bottom of septic tanks at the Santa Rosa city sewer farm so as to increase the cross-sectional flowage area and detention volume. Crust should also be removed as soon as practical. Both crust and sludge should be deposited upon sludge drying beds prepared for this purpose.

9. Prepare plans and construct appropriate seepage ditches and contour basins to dispose of the effluent from the septic tanks at the County Hospital center.

On February 1, 1944, there was published a report with accompanying illustrations summarizing and analyzing the findings of the field survey and Lee's investigations. Accompanying the report are specific recommendations for the permanent improvement of sanitary conditions in Sonoma County, having in view particularly the eradication of conditions favorable to the spreading of communicable diseases.

### Recommended correctives

The cause, transmission and control of communicable diseases together with the legal aspects of disease control are set forth. The report further describes the existing sanitary units contained within the county and gives the results of the field survey. Finally presented are recommendations covering the entire county, and in addition, each of the various cities and towns within the county. The following are recommendations of action to be taken by the appropriate governing bodies for the purpose of prevention and more effective control of future epidemics. The recommendations are based upon a study of the data assembled in the course of the survey and the information presented in the report.

1. A Code of Health and Sanitation should be adopted by the Board of Supervisors. This code should include all applicable provisions of codes adopted by other counties which have proved workable and effective and any additional provisions which conditions in Sonoma County require. Provisions for licensing of septic tank service men is suggested as a means of curbing the unnecessary pumping out of septic tanks now prevalent.

2. The formation of a joint County-City Health Department for Santa Rosa and any other incorporated city of the county desirous of such service.

3. Formation of the Central Sonoma Mosquito Abatement District should be encouraged to include the thickly populated portion of the county from Healdsburg to Petaluma and from Santa Rosa to Sebastopol and all adjacent contiguous areas where mosquitoes breed.

4. County or joint city and county garbage dumps should be acquired at appropriate locations in various parts of the county and an ordinance adopted prohibiting the dumping of refuse in unincorporated territory at points other than the officially provided community garbage dumps. Prohibit the feeding of hogs on any but wet garbage.

5. Formation of County Sanitary Districts at Guerneville and Bodega Bay is recommended at this time rather than incorporation. This will provide for sewage collection and disposal, which is the most urgent community need, without the cost of complete municipal service.

6. Maintenance of an adequate number of qualified sanitary inspectors on the staff of the County Health Department for systematic inspection of food handling establishments, sewage disposal on recreational streams and in thickly populated unincorporated areas, housing conditions, transient labor camps, garbage disposal, public water supply and other potential fields of disease transmission.

7. Preparation of pamphlets for distribution by the County Health Department on practical subjects such as small septic tank installation and operation, rat catching, control of house fly, flyproof privies etc.

8. Educational campaign under the guidance of the County Health Department presenting the importance of sanitary living conditions free from insects and rats, the danger of using untreated water from natural streams for domestic purposes, the importance of protection of shallow well waters from pollution, etc.

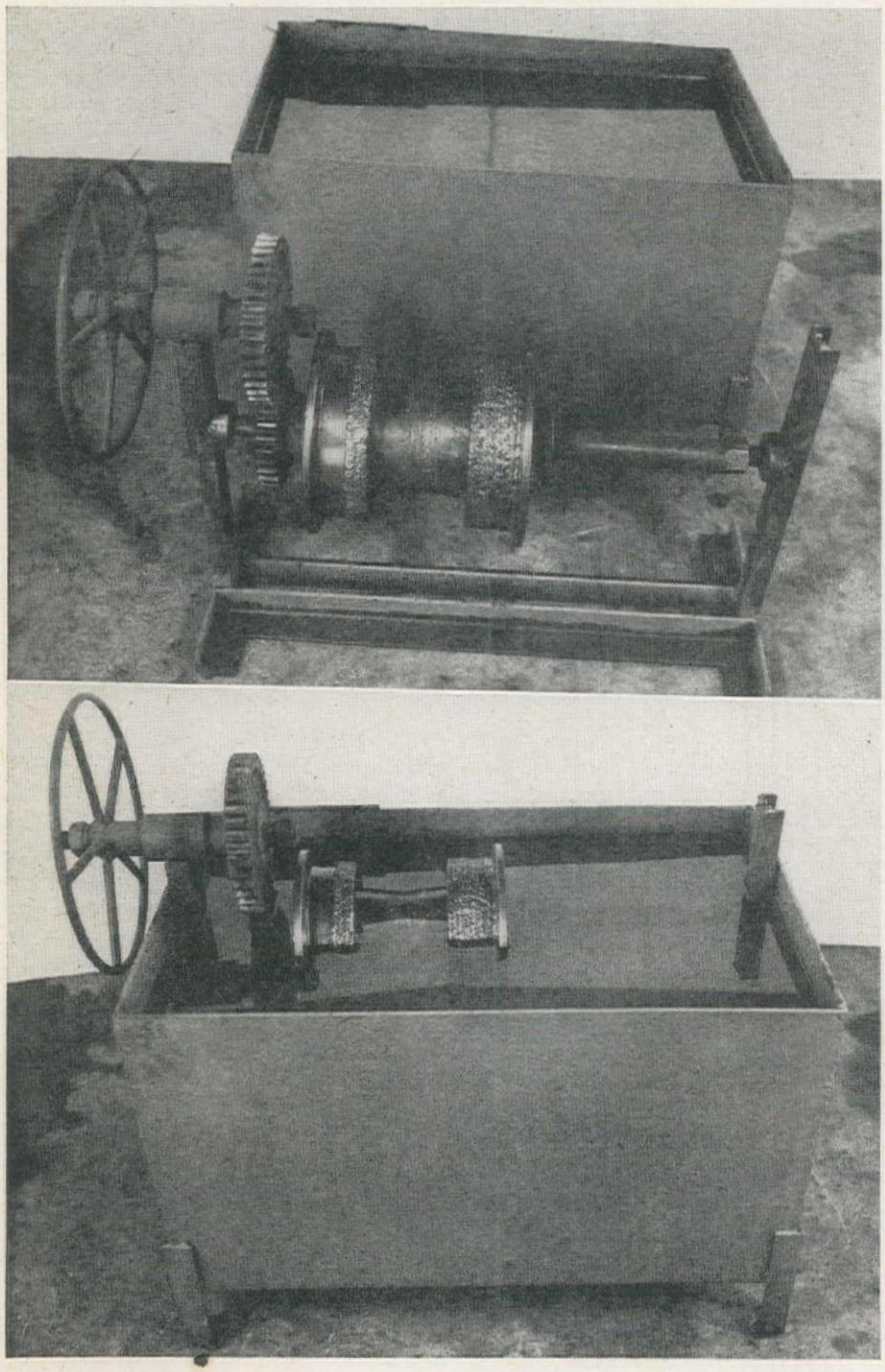
9. Studies should be made in cooperation with the State Health Department to devise methods for handling the voluminous sludge carrying effluent from fruit and vegetable dehydrating plants. Primary sedimentation with removal of sludge at least daily and disposal of effluent by irrigation or seepage ponds is suggested.

10. Drainage channel improvements designed to prevent spread of sewage polluted storm water over farm and meadow lands southwest of Santa Rosa and adjacent to and along the Laguna should be planned. Such improvements will also serve to protect government and private as well as county property from flood inconveniences and damage.

# HOW IT WAS DONE

## JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

# Navy Rebuilds Track Rollers For Construction Equipment



**QUENCHING TUB used in connection with rebuilding surface of equipment rollers. After the old worn roller is cleaned and wire brushed, it is mounted on a trunnion shaft, and the whole unit immersed in the tub of water, so that less than half of the periphery of the roller is exposed. The shaft is rotated slowly during the process of welding. The immersion keeps the roller cool, so as to prevent expansion and unnecessary stresses, and retains the temper in the flanges and hub. No peening is required.**

TRACK ROLLERS and idlers are presently being rebuilt at the Navy's Construction Equipment Repair Depot at Vernon, California, where the Dahlstrom Company are contractors.

In order to facilitate and speed up the work, as well as to maintain quality control, a quenching tub, and a grinding machine, both illustrated in the accompanying photos, have been developed by the shop forces.

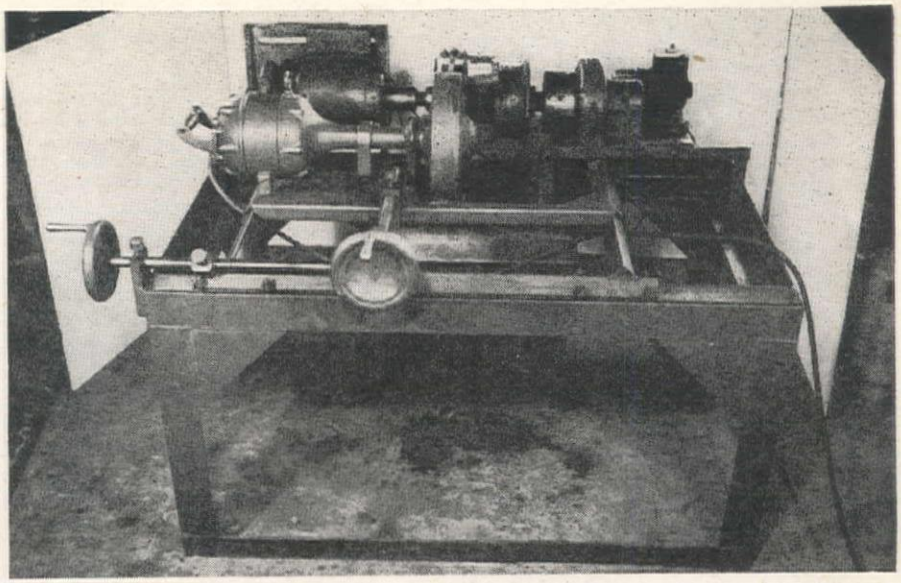
The procedure in rebuilding rollers has been to clean and wire brush the old rollers, after pressing out shafts and bushings. The rollers are then mounted on the trunion shaft, immersed in the quenching tub, and welding carried on while rollers are immersed over the hubs. Initial build-up is performed with a high carbon bare rod and all welds are "stringer" beads placed peripherally and continuously, the roller being rotated in the tub to permit flat welding. The continuous tank quench keeps the roller cool, preventing expansion and retaining temper of flanges and hub. No special peening or other treatment, except routine cleaning of slag, is necessary.

The first bead of each half of roller is laid on the inside of the tread with successive beads being laid in the direction of the outside flange. By tightening or loosening the beads, the ruts in the center of the tread can be built up to the original shape of the roller. The last bead, laid alongside the flange, is run with high tensile strength coated steel rod. This prevents arc interference and undercut evidenced with bare rod. It further provides for a ductile metal against the flange, to assist in maintaining roller shape under wear.

Application of base weld is made to within ⅛-in. of the desired finished diameter. After completion of the base weld, a surface hardening bead is then applied, such bead being again placed peripherally. A self-hardening weld metal rod is used which is moderately ductile after application and is self-hardening under use. The surface hardening bead is laid to a thickness of approximately $\frac{3}{16}$ in. to allow grinding down to finished dimensions. Track idlers are similarly built up, however without use of the quenching tub, air cooling having been found sufficient to maintain even temperature conditions. All rollers and idlers are ground to finished dimensions. Grinding is practiced to obtain true outside diameter and to give a smooth operating surface to minimize rail wear.

The grinding machine was assembled by using the head stock from an old pipe threading machine which was powered by a ½-h. p. electric drill. A port-

**PIPE THREADING MACHINE remade to serve as a grinding machine to finish the rebuilt track rollers and idlers. An electric grinder did actual work, and as in welding, parts were kept wet to reduce temperature strains.**



able 2-h. p. electric grinder was utilized for grinding power. These units were assembled on a shop fabricated frame having hand actuated feed screws for both direct and transverse feed. Parts are wet ground. It should be noted that sufficient latitude was allowed to permit mounting of track idlers as well as rollers upon the grinding machine.

Hal Everitt, track shop foreman, designed and built the quenching tub; the grinder was shop designed and fabricated. Les Thomas is mechanical superintendent, H. E. McCloskey is general foreman, and Hal Everitt, track shop foreman.

# Refinements Added to Windrowing Machine

IN THE FEBRUARY, 1940, ISSUE of *Western Construction News* there was a description of a windrowing machine developed by N. E. Parson. At that time the machine was being used by Carl E. Nelson of Logan, Utah, on a plant-mix job in Southern Nevada. Consisting of a metal hopper, open at the bottom, with an inverted V opening at the rear, it was connected by means of chains to the rear of a dump truck containing the material to be placed. As the material from the moving truck was emptied into the hopper it was deposited in a windrow at the rear. The unit proved to be very satisfactory on that job. However, since then Parson has made several changes and improvements which are illustrated in the accompanying photos showing the outfit as it was used by Nelson to place gravel base material on an airport job at Winnemucca, Nevada.

First, wheels have been added so that it is actually a hopper on wheels with the bottom of the hopper just clearing the surface of the ground, and it is no longer dragged. As originally designed the windrow formed was of a constant size and volume because the opening was not adjustable. In the improved model, adjustable strike-off blades, or shutters, capable of being raised or lowered by means of a screw device located directly above the opening, have been installed. The object of the blades is to provide a means of regulating the shape of the windrow, thus controlling the amount of material being released from the hopper, by decreasing or enlarging the size of the opening. The screw device is easy and simple to operate, and the blades can be lowered to the point where the windrow is only a few inches in height, providing a wide variation in the amount of material laid down at one time.

Both strike-off blades are actuated with but one adjusting screw, and there

**WINDROW BUILDER devised by Utah contracting firm. It distributes hot plantmix surfacing evenly and accurately. Wheels and a guide bar have been added since it was previously reported in these pages. Also added is a screw adjustment for changing position of the strike-off blades, thus varying height and volume of the windrow.**

is a calibrated marker to give the exact amount of material to be distributed. These blades are also enclosed so that materials being distributed cannot bind them.

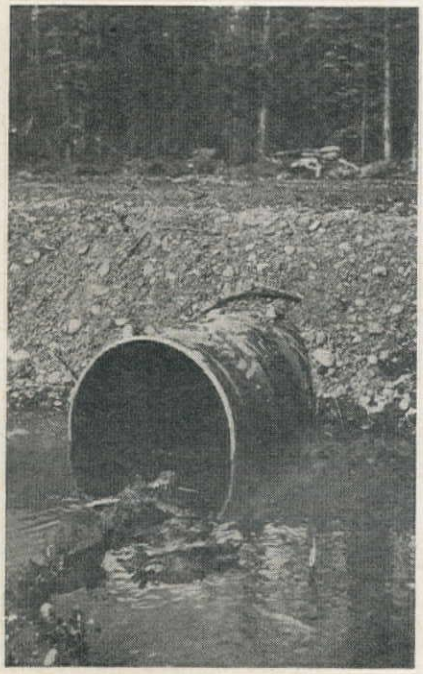
The rear wheels, as may be noted in the photo, are of the caster type arrangement, mounted on swivels, and connected by a crossbar which keeps them in parallel alignment. A steering device, consisting of a long bar attached to the swivel of one of the wheels makes it possible for one man to control the rear end of the unit, steering it either right or left.

The lightness and flexibility of the unit, the ease with which it can be maneuvered, and the accuracy that may be obtained in measuring the amount of material placed, are all factors that have greatly improved the original machine and make it a valuable piece of equipment for this type of work.

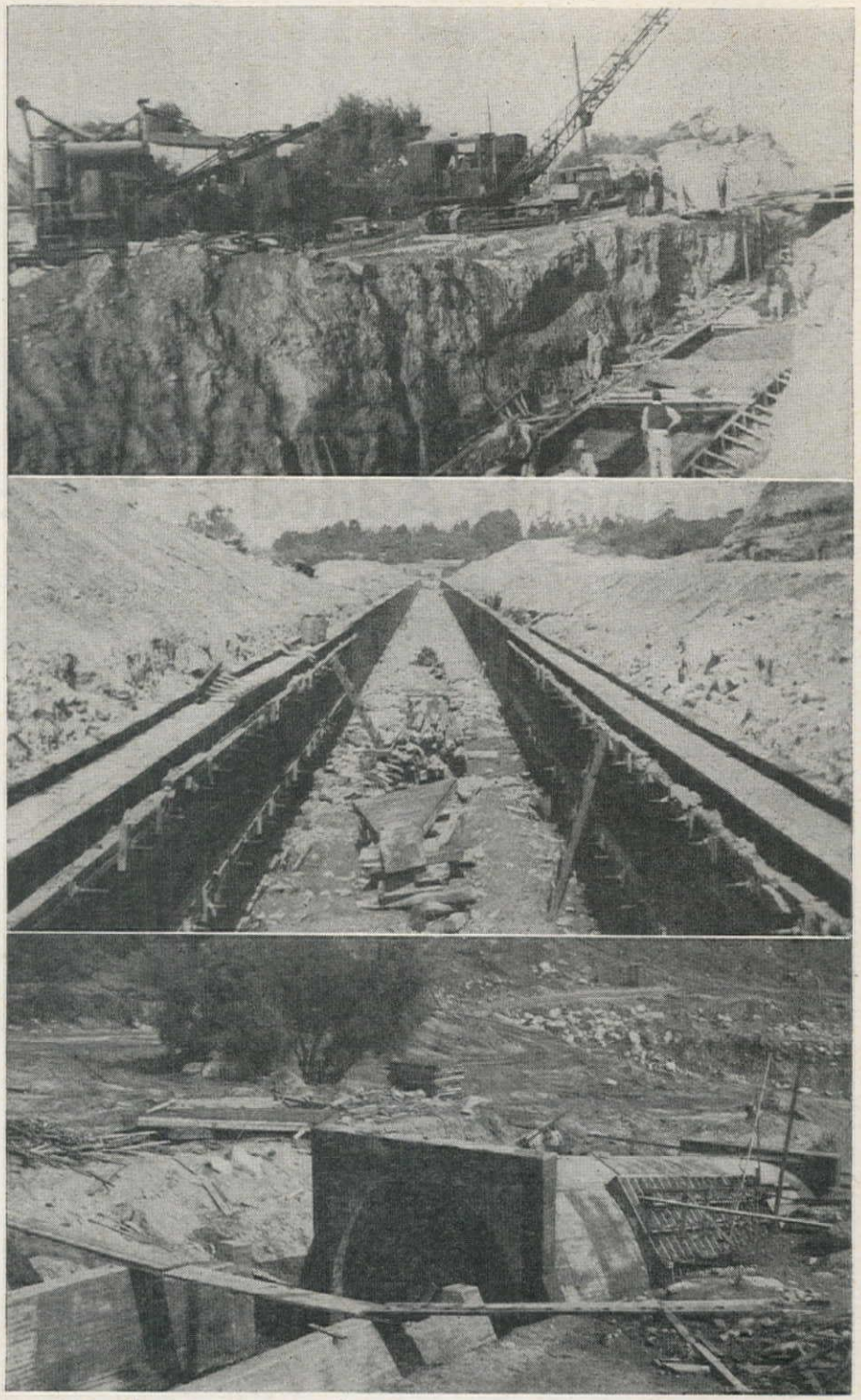
The Lang Company of Salt Lake City, Utah, have the rights to build this machine, and they will be available for purchase after the war.

## Oil Drums Welded For Temporary Road Culvert

WHEN CONSTRUCTION on the Alaska military highway was under way through the swampy country west of Whitehorse, work on the road was being held up because culvert pipe which had been ordered had not yet been delivered. It was useless to continue work on the roadbed without making some sort of provision for proper drainage, especially of an equalizing nature. As a temporary expedient, 50-gal. oil drums were welded together end to end to make the necessary culvert, of sufficient length that headwalls would not be required. These culverts were installed as the work progressed, and they served the purpose for which they were made until they were later replaced by the previously ordered pipe.



# Concrete Placing on Rubio Flood Channel Construction



DURING CONSTRUCTION of the Rubio flood control basin and two concrete channels in connection with it, completed three months ago, and reported in the January issue of *Western Construction News*, concrete was placed by different methods for the two channels. In the case of the channel linking the Rubio basin with the Las Flores basin, concrete was poured by a paving machine on the bank, which dumped into 2-cu. yd. buckets, which were in turn picked up by a crane with 65-ft. boom and lifted to point of placement. This method is illustrated in the upper picture. On the outlet channel below the Rubio basin, cliffs prohibited this type of operation and the paver worked in the floor of the channel.

The center illustration above indicates the wall forms used on the 1,300-ft. Las Flores diversion channel, and the lower shows a covered section at its lower end.

The work was performed by J. E. Haddock, Ltd., for Los Angeles County Flood Control District.

NEWS OF WESTERN CONSTRUCTION

APRIL, 1944

# California, Nevada Plan for Development of Tahoe Water

THE GOVERNORS of California and Nevada met March 20 at Bijou, Calif., on the shore of Lake Tahoe, to discuss a $17,000,000 multiple purpose water project involving Lake Tahoe and the Carson, Truckee and Walker rivers.

The plan, for which preliminary surveys have been completed by the Sacramento District of the U. S. Army Engineers, calls for reduction of the maximum water level of Lake Tahoe and the coordinated operation of the outlet weir of the lake between elevation 6223.3 and 6228.0, so as to provide a usable irrigation and power storage capacity of 579,500 ac. ft. and a flood control pool reservation of 255,000 ac. ft. The present maximum water level of the lake has been fixed at 6629.1. Other changes on the Truckee river are the modification of operation in Independence lake so as to provide a usable storage capacity of 20,000 ac. ft. and a flood control reservation and modification of the operation of Boca reservoir so that its entire capacity of 40,000 ac. ft. may be devoted to flood control.

Improvements on Carson river include construction of Watasheamu reservoir on the east fork, so as to provide a maximum flood control pool of 45,000 ac. ft. and modification of Lahontan reservoir so as to provide a maximum flood control reservation of 89,000 ac. ft. This would not interfere with its present irrigation capacity.

On the Walker river, it is proposed to construct the Pickle Meadow reservoir on the west fork. This structure would be operated so that 58,500 of its 60,000 ac. ft. capacity would be devoted to flood control purposes.

It is estimated that the entire project would cost about $17,000,000 and that the annual benefit to the two states would amount to about $1,000,000 annually. Of the estimated cost, $11,720,000 was proposed for reservoirs, $4,762,000 for hydroelectric works and $312,000 for channel improvements. About 35 per cent of the flood benefit would accrue to California and about 65 per cent to Nevada.

A portion of the hydroelectric output would be required to replace that lost by existing privately operated plants on the Truckee river, resulting from the changes in operation of Lake Tahoe and Boca reservoirs.

Col. R. C. Hunter is District Engineer of the Sacramento District, and was in charge of the necessary surveys and preparation of the report, which had been authorized by Congress, and which will be presented to that body soon. The report itself was actually prepared by Frank Kochis, chief of the water resources division of the District Engineers office, and F. G. Christian, chief of the planning section.

# Plates Rolled at Geneva Steel Mill

LESS THAN TWO YEARS after ground was broken on 1,600 ac. of farm land, the plate mill of the new $180,000,000 Geneva steel plant near Provo, Utah, went into operation Mar. 24, when the first trial rolling of plates was made. Geneva Works, largest integrated steel plant west of the Mississippi river, is being operated by Geneva Steel Co., United States Steel Corp. subsidiary, under contract with the Defense Plant Corporation for the war period. No operating fee or other compensation is paid to Geneva Steel Co. or U. S. Steel for their services in directing the wartime operation of this large plant.

First rolling of plates for the Pacific Coast shipbuilding industry culminates a series of operating steps over the past few months which began with the charging of the first battery of coke ovens on Dec. 13, 1943. Two of four batteries of by-products coke ovens, two of three blast furnaces, three of nine open hearth furnaces, the slabbing mill and auxiliary facilities are now in regular production.

In April, 1942, U. S. Steel's West Coast subsidiary, Columbia Steel Co., began clearing the plant site of small farmsteads which dotted the area. Today an entirely new and complete source of steel production, with an annual ingot capacity of 1,280,000 tons, has been created.

Thousands of men and women from all sections of the country contributed their efforts to moving 3,000,000 cu. yd. of dirt, pouring 550,000 cu. yd. of concrete, erecting 85,000 tons of structural steel, laying 70 mi. of railroad track and 15 mi. of roadway.

To supply coal for the new mill, the new Geneva Mine was developed in Horse Canyon, 130 mi. southeast of the plant. In full operation it will produce 8,500 tons daily.

Iron ore is furnished from the open pit mine of Columbia Iron Mining Co., a subsidiary of Columbia Steel Co., located in southwestern Utah, approximately 250 mi. from the Geneva steel plant. Twenty-five miles from the plant, near Payson, Utah, limestone and dolomite are secured from the newly developed Keigley Quarry.

# Morrison-Knudsen Employees Awarded Navy Citation for Pocatello Work

SEVEN EMPLOYEES of the Morrison-Knudsen Co., Boise, Idaho, contractors, received the meritorious civilian service award of the Navy Bureau of Yards and Docks at public ceremonies in front of the company's main office April 1.

The men honored—Wallace H. Puckett, vice president; John B. Otter, project manager; Wesley Barker, project office manager; Harry B. Olson, general superintendent; Walter Albrethsen, project engineer; Clarence (Dugan) Graham, project superintendent at Arco, and C. F. Dunn, the company's chief engineer—were cited for "services rendered over and above those normally required in connection with their duties" in the construction of the naval ordnance plant at Pocatello, Idaho, and the nearby proving ground at Arco.

J. F. Cromwell acted as master of ceremonies. Welcoming addresses were given by Gov. Clarence A. Bottolfsen of Idaho and Mayor Austin A. Walker of Boise. The main address of the day was given by Capt. Walter E. Brown, U. S. N., commanding officer at Pocatello, and the awards were presented by Lt. Comdr. R. W. Hooper, U. S. N. R., who

was in charge of the construction for the navy.

Karl Paine, secretary of the company, responded on behalf of the men cited. Pictures of the men honored will appear in the May issue of *Western Construction News.*

## Bidders Uninterested in Santa Monica Dredging

NO BIDS WERE RECEIVED on the dredging of the yacht harbor at Santa Monica, Calif., and attendant filling of badly eroded beachland southerly from the yacht harbor when the project was submitted to bid recently by the California Department of Public Works. The estimated cost of the project was $325,000 and the work was scheduled as a joint project of the state and the cities of Los Angeles and Santa Monica.

Erection of the rock breakwater parallel with the beach in 1934 has resulted in interruption of the normal littoral drift to the southeastward and a deposit of 1,000,000 cu. yd. of sand has accumulated behind the barrier. The interruption has further resulted in cutting off the normal beach deposit to the southward and extensive erosion.

# Shea Wins Contract for Continuation Of Work on All-American Canal Branch

AWARD OF THE CONTRACT for work under the Bureau of Reclamation's war food program on 22 mi. more of the Coachella Canal in Southern California has been approved. The J. F. Shea Company, Inc. of Los Angeles, with a bid of $1,660,681.90, was low bidder among eleven contractors.

The figure is more than $500,000 under the engineers' wartime estimate and it was also more than a quarter of a million dollars under the next low bid.

Work on the Coachella Canal, part of the All-American Canal System, under the Bureau's Boulder Canyon project authorized in 1928, was halted by the War Production Board in December, 1942, after 86½ mi. had been completed. Resumption of the work followed recommendations of the War Food Administration and clearance by the WPB for immediate construction. Ultimate length of the canal is 130 mi.

Four hundred days will be allowed for completion of this 22-mi. extension which will bring the Coachella Canal to a point a few miles north of the town of Coachella. The Bureau is planning to call for bids for completion of turnouts and distribution systems in the near future so that they also may be ready in time to provide a full supply of irrigation water for about 10,000 ac. of new land and a supplemental supply to over 16,000 ac. now faced with shortages.

Because of wartime restrictions on the use of steel, un-reinforced concrete will be used to line those sections of the canal which must be protected. Numerous by-pass canals, diversion channels, dikes, highway bridges, wash overchutes, and other structures are included in the contract.

The Coachella Canal skirts the northern edge of the Imperial Valley, going north of Salton Sea which is 250 ft. below sea level, and will end near Indio in the upper Coachella Valley. There are about 16,000 ac. now under cultivation in this region but it is estimated that nearly 150,000 ac. can be furnished with a stable source of irrigation water when the entire canal system is completed.

### SUNKEN DRAGLINE RAISED BY AID OF DIVER IN ALASKA

**WHEN A DRAGLINE operating on the shore of the frozen Chena River, near Fairbanks, Alaska, toppled in, it was necessary to enlist the services of a professional diver to extricate it. After a hole was chopped in the ice surface of the river, diver Walter Metz of Shelbyville, Ill., descended to the machine and attached cables, by which it was dragged to the surface. Metz is a civilian Army Engineer employee.**

## Oregon Plant Will Make Alcohol From Sawdust

MORE THAN 100,000,000 additional gallons of industrial alcohol, wholly from sawmill wastes, may be made available annually, according to a statement by the War Production Board, which announced approval of the first American plant to produce wood-sugar by an adapted German process.

The Defense Plants Corporation has been asked to provide $2,247,000 to construct a wood-sugar and ethyl alcohol plant at Springfield, Ore., designed to produce 4,100,000 gal. of alcohol a year. It would utilize about 200 tons of dry sawdust and other mill wastes daily and is expected to be in operation within a year.

The project was sponsored by the Willamette Valley Wood Chemical Co., composed of Oregon lumbermen.

The program calling for 100,000,000 gal. or more a year would entail construction of many similar plants in softwoods regions of the West and South.

Technical assistance has been given the project by the Timber Engineering Co., subsidiary of the national lumbermen's organization. Consulting experts have included Erwin M. Schaefer, former head of the first industry of this type in Germany; Dr. Eduard Farber, noted wood chemist, and Carl Levy, former superintendent of the Schaefer plant.

The process, according to results obtained by the Forest Service in pilot plant tests last year, will produce approximately 1,100 lb. of sugar from a ton

of dry waste wood, from which between 50 and 60 gal. of 190-proof alcohol can be made. The government has been paying an average price of about 90 cents a gallon for alcohol, needed chiefly for synthetic rubber and munitions, while the wood-sugar process is expected to produce it for less than 30 cents a gallon.

## Canol Branch of Alaska Phone Line is Finished

FINAL SPANS of the 2,600-mi. telephone system installed in Canada and Alaska by the U. S. Army have been joined on the 595-mi. circuit from Norman Wells to Whitehorse, it is announced by Brig. Gen. Ludson D. Worsham, commanding general of the northwest service command.

This line from the oil wells of the Canol project to the refinery at Whitehorse is the last link in the northwest telephone system.

Completion of the line follows closely announcement that the pipeline from the oil fields at Norman Wells to the refinery at Whitehorse has been completed for the development and distribution of oil and gasoline in northwest Canada and Alaska.

The line parallels the pipeline for the most part and is connected with a 2,026-mi. telephone system that extends from Edmonton to Fairbanks, completed by the army last fall.

Men who built the telephone line experienced the same hardships as those who built the Canol road and pipeline. Temperatures ranged from 80 deg. above zero to 60 below. Men and machines fought swamps, unpredictable changes in river beds, ice that buckled and changed its location overnight, muskeg in which horses and machines often foundered.

## Willamette Channel Contract Is Awarded to Kuckenberg

A CONTRACT has been awarded to Kuckenberg Construction Co. of Portland, Ore., for straightening of the Willamette river channel at Wheatland Ferry, 12 mi. north of Salem. The contract was for the amount of $178,535 and the work involves 900,000 cu. yd. of cut through granite gravel bars.

The new channel will be about 8,500 ft. long, have a bottom width of 110 ft. and a depth of 3½ ft. at low water. Maximum depth of gravel cut will be 23 ft.

## Fibre Drain and Sewer Pipe Standards Are Established

THE NATIONAL BUREAU of Standards has established a Commercial Standard for bituminized-fibre drain and sewer pipe, which became effective for new production on March 10.

The Standard covers dimensions, physical and chemical properties, and methods of testing such drain and sewer pipe, including bends, couplings and angles. The range of sizes covered varies from 2 to 8 in. in diameter and 5 and 8-ft. lengths. The Standard was established to provide a national recognized specification for the guidance of producers, distributors and users, to promote fair competition and to provide a basis for guarantee of quality.

## Seattle Sewer Ordered Over Resident Protests

A MUNICIPAL SEWERAGE system has been ordered for the View Ridge District of Seattle, Wash., a recently annexed addition. The extension of the municipal system was protested by residents along Lake Washington because an emergency overflow is proposed which will discharge into the lake.

City Engineer Charles L. Wartelle explained to the protestants that the system is a combination type designed to carry both sanitary and storm sewage and that the overflow will not operate oftener than four or five times a year, and then only at the most severe storm periods when flow through Lake Washington is also at a maximum, so that the discharge will be rapidly carried away. There are approximately thirty other emergency outlets into the lake.

The main trunk of the new extension will be a 42-in. line. This will discharge into the 30-in. Laurelhurst trunk sewer, which is adequate for the sanitary sewage, but will not accommodate the entire storm flow.

Total cost of the project is estimated to be $248,504.

# Eastern Opposition May Halt Removal Of British Columbia Shipping Hazard

FEAR THAT OPPOSITION from eastern members of parliament may force permanent abandonment of the plan to remove Ripple Rock, dangerous navigation obstruction in Seymour Narrows, a project upon which the federal government already has spent more than half a million dollars, was expressed recently by shipping and engineering interests in Vancouver.

Some eastern members of parliament are known to oppose completion of the project, and granting by Ottawa of the additional half to one million dollars required for the work is far overdue.

Even if the money is granted, action has been so long delayed that it is now fairly certain the removal could not be completed before the spring of 1945. Engineers had previously estimated that an early start on the work this year would see it completed by the end of 1944.

Work on the removal of the rock was halted last fall, when the contractors—British Columbia Bridge & Dredging Co.—ran into unexpected difficulties and had to seek additional funds from the Federal Government.

Engineers went to Ottawa in December partly to discuss a new means of anchoring the drill barge being used in the work, after securing of the barge by underwater cables had proven impossible, due to swiftness of the current in Seymour Narrows. British Columbia and Puget Sound shipping interests informed Ottawa they had no objection to temporary obstructions and urged the Federal department of public works to go ahead with the project.

B. C. Bridge & Dredging Co. engineers estimated that $500,000 would complete the project, but the department of public works favored asking for twice that amount, to ensure having sufficient money.

# WASHINGTON NEWS

## . . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—The irrigated West, which means the West which depends upon reclamation, suffered one of its sharpest defeats in the recent action of Congress, when the House overwhelmingly adopted the Rivers and Harbors bill. This Act of Congress specifically by vote refused the amendment which would have protected the use of water for agricultural and industrial purposes against navigation. Rep. J. W. Robinson, of Utah, offered the amendment:

> "In connection with dams or works authorized by this act, any use of the waters of any stream or tributary thereof, having its source west of the ninety-seventh meridian, shall be subordinate to and shall not interfere with use west of the ninety-seventh meridian of such waters for domestic use, irrigation, mining or industrial purposes whenever established under State law."

The amendment was voted down after two days' debate by a vote of 70 to 45. It is peculiarly significant that the Rivers and Harbors bill, without the amendment, was adopted by a vote of 213 against 46. The significance particularly lies in the fact that many members of the Western delegation absented themselves from the House when the amendment came up for vote, and were present in force when the final bill was adopted by the overwhelming majority of 167 votes. The vote has special unhappy import to the West slope because it is obvious the Western delegation still is bereft of the leadership and the unity which would enable its members to agree affirmatively upon such fundamental objectives as the maintenance of water rights, the very life force of the arid West. The action reflects the urgent need for the organization which recently was suggested in *Western Construction News*.

It is doubtful Congressman Robinson's amendment could have been voted down if there had been unity on primary goals in the West itself. The details of the proceedings are illuminating. The amendment was offered for action on the afternoon of March 20. At the time it was apparent the amendment might be adopted. There appeared to be a clear sentiment of approval among the Westerners themselves. On the other hand, the floor organization of the Administration just as clearly supported the Chairman of the Rivers and Harbors Committee who opposed the amendment. It was patent the Speaker felt the Committee should have the assistance of the floor organization, which unquestionably could not muster a majority. Debate was halted and the House adjourned.

During the intervening night at least 25 votes were influenced to change. It is responsibly reported that one of the most active campaigners during the night was Congressman Homer D. Angell of Portland, Oregon. He is credited with the defeat of the amendment. And it is asserted most of the defections came from the California delegation. California has such preponderant voting strength that its delegation can control the fate of legislation which is chiefly a Western problem. Rightly or wrongly the California delegation in this instance is credited with voting almost solidly against the amendment. There was a scattering of opposing votes in Oregon and less in Washington. The States back of the coastline voted solidly for the amendment.

One of the most unhappy aspects of the proceeding was the successful effort to hide the identity of the voters. The final action was rushed through so skilfully that no poll was recorded. This makes it necessary at the Fall elections for the voters in each Congressional district to ask each incumbent candidate how he voted on the reclamation amendment to the Rivers and Harbors Act.

### Who opposed the amendment?

The larger aspect of the incident also brings home impressively the worth of over-all organization. For the bill naturally were marshalled all the great rivers associations such as the Mississippi River System Carriers' Association, the Mississippi Valley Association, and similar inland waterway transport organizations, as well as other transportation and warehousing associations. Their representatives were present in the Capitol in numbers. After these shock troops came the representatives of the commercial organizations of various Eastern cities, and their industrial organizations. All these interested observers naturally made their views clear to the members of Congress.

The issues in the conflict are complex. But the chief collision is between the Corps of Engineers and the Bureau of Reclamation. The Engineers represent navigation and flood control and funds provided by Congress which do not have to be repaid. Bureau of Reclamation represents water for food and fibres and for power and western industry, and chiefly represents funds that must be repaid to the Treasury by those who benefit. The inland waterways have had a tremendous boom for transport of bulky freight during these war years. The effort to set limitations therefore touches the industries that transport coal, oil, steel, cotton, rock products, lumber, and many similar products, which move over the rivers and the 6,000 mi. of inter-connecting canals.

As we see it here, this effort to secure definition of the use of water, in the broadest national implication, must be clarified in a permanent sense. Westerners in Washington feel the issue is now joined for a decisive struggle. The next round will be fought in the Senate when the Rivers and Harbors bill is considered there. Sen. Joseph O'Mahoney of Wyoming will lead the reclamation fight in the Senate. The fight will unquestionably be notable. But it is doubted if an approving vote can be secured for the Robinson amendment.

Thereafter the issue will be joined in a bigger way when Sen. Carl Hayden of Arizona starts hearings on the bill for the great post-war program to reclaim Western lands. The program will demand convincing justification, and we Westerners here think the justification will be adequate. But again we are painfully conscious of the lack of strong, organized support back home. Apparently Sen. Hayden will proceed on the assumption there are 40,000,000 acres to be reclaimed in the West. They are capable of being developed as 250 projects. The acreage will produce the best level of food, feed, and fibre required for our economy. We need new acreage for the irrefutable reason that we are now a debit food nation, importing more than we export.

Incidentally, the Rivers and Harbors Act does not appropriate any funds; it authorizes the appropriation of funds, presumably after the war. The total, so far as can be determined at the moment, is approximately $500,000,000. Another $500,000,000 is said to be provided in the Flood bill, yet to be discussed in public. The items are so impermanent at this writing that it would serve no good purpose to enumerate them. There have been no Rivers and Harbors bills since 1939. This legislation therefore is called the Omnibus Bill, and is generally regarded as the biggest pork barrel of civil items for many years.

### Highway hearings

HR 4170, the highway bill satisfactory to American Association of State Highway Officials, as well as the original HR 2426, has been considered in the hearings by the House Committee on Roads during March. Some claim the bill provides $4,000,000,000, others say $3,000,000,000. The money is to be spent at the rate of $1,000,000,000 annually for three years. The earlier bill would apportion one-half according to population, one-fourth on area and the other fourth on post-roads. The second bill, HR 4170, allocates $600,000,000 among the states on the basis of demobilization from the military and industrial services in each state, and the relation of this demobilization to the total number demobilized in all states. Another $200,000,000 would be apportioned under provisions of Section 21, Federal Highway Act of 1921, equal consideration for population area and post-road mileage. The final $200,000,000 would be distributed in accord with total motor vehicle registration in each state in relation to registration as totalled in all states. The greater sum—$600,000,000—would be

spent on interregional highways, the first $200,000,000 on Federal-Aid systems, and the second $200,000,000 on roads or streets not in Federal-Aid systems and under state or local jurisdiction. The Federal share would be 50 per cent, except that it would contribute more in States with public lands exceeding 5 per cent of the total area of all lands in the State. The hearings have been distinguished for the proclivity of some Eastern states to clamor for an abnormal quantity of pie.

### Westerners testify

On March 2, the Committee heard California State Director of Public Work C. H. Purcell. He said California is getting its plans ready. California's present total planned is $16,000,000, and year-end's objective is $35,000,000. Deficiencies in Federal Aid highway system in California increased the past three years. Deterioration is so great it will require nine years' effort to bring it up to present requirement. On March 8, Montana State Highway Commission Planning Engineer M. J. Steere frankly told the Committee the State could not do the necessary highway work on the suggested Federal Aid basis. On March 9, Oregon's Chief Highway Engineer, R. H. Baldock, told the Committee Oregon needs $200,000,000 for its program, needs Federal aid, and is satisfied with HR 2426, particularly if 30 per cent is provided for urban roads. He asked for a separate fund for forest highways in the amount of $50,000,000, and $25,000,000 for undeveloped roads. Colorado's State Highway Engineer, Charles D. Vail, insisted his State has suffered great injury by reason of military use of the highways, and that Colorado could not match Federal funds except on a basis of 75 per cent Federal and 25 per cent State funds. New Mexico's Highway Engineer, Fred J. Healey, made the Committee sit up by the declaration that his State required $130,530,000 Federal aid. Rep. Frank A. Barrett, of Wyoming, asked that the program be spread over five years instead of three.

President Sam C. Hadden, of the American Association of State Highway Officials, summarized the testimony on March 16, insisting it was a $4,000,000,000 bill, and stressing that this would be the third great milestone in the history of highway development in the United States. He regards the 1916 Federal Aid Act as the first great step, the establishment of the Federal Aid system in 1921 as the second step, and this great regional evolution of 1944 as the third step. He reported that all but two States of the Union approved HR 2426, but that the overwhelming majority would be obliged to insist on the 25-75 per cent adjustment between the States and the Federal Government, even though the States might be able to carry more of the load later. The AGC formally approved the program of American Association of State Highway Officials at the meeting in Chicago last February, and its officials appeared at hearings. Managing Director H. E. Foreman asserted the contractors are able to undertake a highway program at least twice the size of the one planned in HR 2426. Equipment on hand would enable the contractors to do highway work valued at $2,244,000. They need, however, 34 per cent new equipment during the first postwar year. Foreman estimated at the peak as many as 500,000 men may be employed at the site. He estimated the program under HR 2426 represents an annual construction schedule as follows: California, $52,300,000; Colorado, $19,200,000; Idaho, $12,500,000; Montana, $20,200,000; Oregon, $18,600,000; Utah, $11,900,000; Washington, $19,000,000; Wyoming, $11,600,000. Multiply these figures by three and you have an approximation of the total that may be expended.

### Power and irrigation

Power production in 30 Reclamation power plants last year soared to the record high of 11,900,000,000 kw. hrs., an increase of 275 per cent since Pearl Harbor. Gross operating revenues of privately-owned electric utilities in 1943 reached an all-time high of $2,969,475,000. Peak demands of 1943 for the nation aggregated 36,756,746 kw., an increase of 11.7 per cent. Francis N. Dlouhy, Los Angeles, applied for a Federal preliminary permit for 36 months for a hydroelectric project on Kings River and its tributaries in Fresno County, Calif. Development is planned from the confluence of the North Fork with the Kings River to the boundary of Kings Canyon National Park. There will be 13 dams, and reservoirs creating storage capacity of 366,100 ac. ft. Power will be developed in four powerhouses on the North Fork, at the junction of Kings River and North Fork, and at the junction of the South and Middle Forks, with 950,000 hp. Power is to be used for public utility purposes.

Rep. White of Idaho introduced HR 4328 which would permit the Government to extend the time for Reclamation Project Act payments, and to make amendatory contracts. Sen. Hayden introduced S 1783, which would enable the Government to accept prepayments of reclamation contracts, and to discount such prepayments on terms equal to the average rate of interest on long term indebtedness of the United States.

Reclamation Bureau has made or adjusted land withdrawals at Hassayampa, Ariz.; Minidoka, Idaho; Sun River, Mont.; Vale, Oregon; Colorado-Big Thompson; Salt River, Ariz.; Bruneau, Idaho; Cave Creek, Ariz.; Gooding, Idaho; Klamath, Oregon, and Shoshone, Wyoming.

Bureau of Reclamation suit against placer-claimants on the east bank of the Columbia River, 1½ mi. below Grand Coulee dam, was decided in favor of the Government by U. S. Court of Appeals in the District of Columbia. The case was brought to the District of Columbia by Secretary Ickes after it had been decided against the Government in a District Court in Washington State.

### Miscellaneous

Navy will shortly receive an appropriation of $1,019,000,000 to be spent on advance bases in the Pacific, and $625,000,000 to expand shore facilities. Independent Offices and Executive Agencies, including many establishments on the West slope, will receive an appropriation of $8,557,993,978. Another appropriation provided $130,000,000 for the construction of Navy fleet facilities. Another appropriation bill now in process of validation provides $1,500,000,000 for public works for the Navy. Another Navy bill for similar purposes provides $1,644,373,024.

Recent meeting of the WPB Power Crane and Shovel Industry Advisory Committee revealed that practically all power cranes and shovels produced this year will be needed by the armed services. Manufacturers are building only few models and are not able to meet delivery schedules promptly. . . . Peru has validated an irrigation and hydroelectric program which will cost over $15,000,000, over a period of from three to eight years. . . . HJR 251 authorizes a survey of Anchorage Harbor, Alaska, preliminary to its improvement, and for harbor facilities. . . . AGC, at its Chicago meeting, formally went on record opposing "federal grants to states, counties, cities or other government units, for the construction of public improvements of local benefit only." . . . HJR 229 authorizes a survey of Valdez Harbor, Alaska, to improve its facilities.

### Personalities

Dr. Frederick Gardner Cottrell, world-famous chemist, who gave his name to the Cottrell Precipitation System, finally is leaving the Capitol to return permanently to California. He hails originally from Oakland, but will make his home in Palo Alto. It is reported he will do some work in connection with the Kaiser enterprises. Two other Californians received honors at the hands of Donald Nelson here for time-saving in war work: Donald C. Mullett came from Hawthorne, and Roy Sheldrick from Sausalito. . . . Henry M. Robert, original explorer of the military route from Vancouver to Puget Sound, 80 years ago, and author of Robert's Rules of Order, was chosen to be honored by the naming of a Liberty ship now building at Richmond, California. . . . Maj. James A. Burkholder, Corps of Engineers, of Riverside, California, was decorated for conspicuously outstanding services in the Southwest Pacific. . . . Pay raises and citations for excellent service were awarded by the Interior Department to John S. Ball, petroleum chemist, and Walter I. R. Murphy, petroleum chemist, Bureau of Mines, both at Laramie, Wyoming; Mrs. Adeline D. Grossman, Bureau of Reclamation; Mrs. Minnie E. Murphy, Bureau of Reclamation, Denver; Mrs. Barbara E. Van Pelt, Geological Survey, Los Angeles. . . . Rex B. Nicholson has been relieved of his responsibilities as Western Regional director for FWA by Gen. Fleming, in order to serve as Manager of Builders of the West, contractors' post-war organization.

## NEW BOOKS...

ENGINEERS' DICTIONARY—By Louis A. Robb. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 423 pages, 8 x 6. Price $6.00.

This book fills the need that has existed for a comprehensive dictionary of Spanish and English equivalents designed to meet the needs of engineers of the two Americas.

The field of the present volume is the vocabulary of civil engineering in all its branches, both in the office and on the job. Many mechanical and electrical terms are necessarily included, as well as some of the terms of geology, chemistry and other sciences.

There is considerable variation in the use of words in the eighteen Spanish-speaking republics. For example, "hormigonera" and "mezcladora" are the usual words everywhere for concrete mixer, but in Venezuela it is sometimes "terceadora" and in Mexico it is sometimes "revolvedora." Local terms are qualified by abbreviations indicating countries where they are common.

* * *

DENSITY OF SEDIMENTS DEPOSITED IN RESERVOIRS, Report No. 9—By E. W. Lane and Victor A. Koelzer. Published at St. Paul U. S. Engineer District Sub-Office Hydraulic Laboratory, University of Iowa. 60 pages, 10 x 8. Report can be obtained by addressing The District Engineer, U. S. Engineer Office, St. Paul, Minn.

In order to determine the rate at which reservoirs will fill with sediment it is often necessary to estimate the weight per unit volume of the deposited sediment, because the quantity of sediment carried by a stream is usually expressed in terms of weight rather than volume. A thorough study of this subject has never been undertaken and consequently the estimated densities used cover a wide and indiscriminate range of values. All available data have been compiled in this report. The results and conclusions drawn from an analysis of the data are summarized in a form applicable to the needs of organizations or individuals interested in reservoir design.

* * *

THE SPEED PROBLEM—By The Eno Foundation for Highway Traffic Control, Inc. 71 pages, 6 x 9. Copies may be obtained by writing The Eno Foundation for Highway Traffic Control, Saugatuck, Conn.

There are many conflicting records and a great diversity of opinions on the subject of speed of highway vehicles and its control. It has been the object of the publishers of this booklet to obtain the benefit of the practical experience of others who have studied the subject with care from its different angles, and to present the important basic principles involved and the findings of some of the best qualified investigators. It is left to the reader, in the light of the facts and various recommendations of others, set forth in the booklet, to decide for himself what the proper speed should be. The preparation of this booklet has entailed a considerable amount of research. It is well written, highly informative and should be of great benefit to those interested in the subject.

* * *

AIRCRAFT SHEET METAL WORK—By Clarence Allen LeMaster. Published by American Technical Society, Chicago, Ill. 388 pages, 9 x 6. Price $3.75.

This book is planned to serve as a basic course of instruction for apprentices and other students of aircraft sheet metal work, and as a refresher for mechanics who are more or less experienced in the work of this trade.

The first chapters in the book have to do with safety rules, personal and shop-furnished tools and blueprint reading. The remaining chapters progress from simple to more complicated processes and operations. Emphasis is placed on how to do the work—how to do all the things the sheet metal man must be able to do before he can be classed as a full-fledged mechanic.

* * *

CALIFORNIA JOURNAL OF MINES AND GEOLOGY, State Mineralogist's Annual Report (Vol. 39, No. 2, April, 1943)—Issued by Division of Mines, Department of Natural Resources, Ferry Building, San Francisco 11, Calif. 292 pages, 9 x 6. Price 60 cents.

Geological reports and geologic maps occupy most of this volume. Also included is a colored geological map and report of an area northeast of Visalia in the Sierra Nevada, with a supplemental economic geologic report on new tungsten deposits found in the area.

Another report describes a new rock found in the San Gabriel Mountains called mylonite.

## Rio Grande Levee Work Is Cooperative Venture

THE U. S. ENGINEER Department and the Middle Rio Grande Conservancy District will cooperate in the restoration of flood control levees and other works southerly from Belen, N. M., according to an agreement recently reached between the two agencies. Under the terms of the agreement, the Engineers will provide the necessary materials and the Conservancy District will actually perform the work.

Similar work is at present under way on other sections of the river and the newly planned construction will afford adequate protection in the Socorro reaches of the Rio Grande. The work at present under way is being done by private contract under District supervision and it is presumed that the additional work will be performed in a similar manner. Little, if any, new construction is proposed, the operation being almost entirely the repair of facilities damaged in floods of recent years.

## Propose 975-mi. Oil Pipeline From Texas to California

A PROPOSAL TO CONSTRUCT a 20-in. oil pipeline 975 mi. long to carry west Texas crude oil to the Pacific Coast has been made by Texas oil men. The suggested conveyor would begin at Monahans, Tex., and end at Beaumont, Calif. At the present time, oil fields in west Texas are operating only seventeen days out of every month because of inadequate transportation facilities. On the other hand, Pacific Coast war needs have made deep inroads into storage and production capacity in California fields.

The pipeline could be built either with Government funds or as a cooperative venture by independent operators in the west Texas fields. The representatives of the operators who presented the suggestion to the petroleum Administration of War were Angus G. Wynne, L. N. Glasco and Jerry C. Hawkins.

## Water Supply Provided To Farmers of Montana

THE SUM of $304,000 was spent by the farmers of Montana during 1943 in construction of more than 1,800 local irrigation, water conservation and livestock watering facilities. Very few of these projects were contract jobs, mainly being provided by the farmers themselves or by the forces of local irrigation districts. These extensions will provide new or improved irrigation facilities for more than 20,000 ac. of land and make range water supplies available to a considerable number of previously dry areas.

Included in the construction projects were 19 pumping developments which will supply water for 860 new acres, 1,520 stock water projects, chiefly ponds or small reservoirs; 135 local flood regulating works, intended to retard and spread run-off water on 7,634 ac., and 184 irrigation projects which will furnish a dependable water supply to 13,410 ac.

## Equipment Repair Part Purchase Eased by WPB

THE WAR PRODUCTION BOARD has eased restrictions on the purchase of repair parts for construction machinery and equipment. Parts for current use may now be purchased by certification by the purchaser instead of through application for WPB authorization, with the exception of purchase orders of more than $1,000 for parts for shovels, cranes, and draglines of less than 2½ cu. yd. capacity. Such purchase orders are subject to WPB authorization.

This change is effected by Order L-192 as amended Mar. 7. Approximately 85 per cent of all new construction equipment is needed to fill military requirements, which means that used equipment must take care of civilian needs. It has therefore been found advisable to facilitate the purchase of repair parts required to keep the equipment in operation by relaxing restrictions insofar as possible.

Shovels, cranes, and draglines are the most critical items covered by order L-192, which controls production and distribution of specified types of construction equipment. The authorization required for repair parts' purchase orders of more than $1,000 is designed to conserve parts for the most essential uses.

Certification of purchase orders in all other cases is in substantially the following form: "Authorized under order L-192—current use." This certification means that the repair parts ordered are required to replace worn out parts within 30 days after receipt and are not for stock; that the purchaser does not have other parts on hand or on order for this purpose; and that he has complied with the provisions of order L-196.

## Correlate Masonry With New Building Standard

THE AMERICAN STANDARDS ASSOCIATION has prepared a proposed standard basis for the coordination of masonry to supplement the proposed standard basis for the coordination of dimensions of building materials and equipment. Manufacturers of structural clay products and concrete masonry products have approved the supplement and have agreed to make coordinated sizes of units available as quickly as new dies and manufacturing equipment can be secured.

The coordination of masonry involves methods which apply to all masonry products, but not usually to other structural materials. The principal objective of the new standard is the coordination of different masonry products, facilitating their use in various combinations and with lay-out correlated with their unit dimensions, both horizontally and vertically, and establishes principles which apply to and are sufficient for such coordination.

## Congressman Looks for Bay Area Building Boom

When the war is over, and materials are again diverted into civilian channels, San Francisco is due for a tremendous building boom, in the opinion of Congressman Tom Rolph, expressed on his return from Washington, D. C.

Congressman Rolph points out that since 1940 the population of San Francisco Bay Area has increased 300,000, one of the largest population increases in any metropolitan area of the nation. He feels that many of these people will remain to make their homes. Building activities, which have been curtailed by essential war projects, will then come into their own.

Congressman Rolph reports that action is being taken to have the name of the Hunters Point Navy Yard changed to the San Francisco Naval Base. The suggestions may not be acted upon until after the war.

## Marinship to Specialize on Tanker Building and Repair

THE MARINSHIP Corporation, composed of W. A. Bechtel Co. and other construction contractors, operators of a shipyard at Sausalito, Calif., has been informed that its facilities will be devoted to ship repair work in addition to construction of tankers for the Maritime Commission. The yard was built and commenced operations in 1942. Its first contract was for the construction of a number of Liberty ships. Later, the entire facilities were devoted to tanker production, and this new program is regarded as a mark of approval for the construction men included in the organization.

## Manufacture of Jacks Standardized by Order

THE WAR PRODUCTION BOARD has issued an order simplifying and standardizing the models and sizes of mechanical, hydraulic, air and electrically operated jacks.

The Automotive Division of the WPB, under whose jurisdiction this new order, L-322, will be administered, will thus reduce the number of jack models from 403 to 225 and the number of sizes from 1,825 to 864. There are approximately 40 jack manufacturers in the industry with an annual dollar sales volume of approximately $30,000,000.

Two new schedules of permitted models and sizes are included in the order, which restricts manufacture after November 1, 1943, to the simplified and standardized capacities, sizes and models set forth. In order to ensure equitable distribution to essential civilian users, it is also ordered that 25 per cent of each month's non-military production of 3, 5, 8, 13 and 20-ton portable, upright hydraulic jacks is to be set aside and held available for delivery against orders rated on forms WPB-541 and WPB-547.

## *OBITUARIES . . .*

**Frank A. Kennedy,** assistant general superintendent for Morrison-Knudsen Co., Inc., on their large railroad contract in Brazil, S. A., was killed February 10 in the crash of an American Airlines plane near St. Louis. He was en route to the Brazilian project at the time of his death. Kennedy began his career as a consultant on large open pit mining in northern Minnesota. Later his consultant duties led him from Alaska to Mexico. After the outbreak of the war he was assistant superintendent of the California Shipbuilding Corp. at Los Angeles. He had been associated with Morrison-Knudsen since November, 1943.

* * *

**Frank E. G. Berry,** 74, engineer in the materials department at Douglas Aircraft's Long Beach Plant, died in Pasadena, Calif., recently. Born in India, Berry had worked as a civil engineer for the British government. He worked as engineer for the Alaska Railroad Commission for 15 years, and was prominent in engineering projects throughout southern California for about 25 years.

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**A. R. Kirkwood,** 93, pioneer California mining and civil engineer, died in Pasadena, Calif., March 5. During his lifetime he had been active throughout California, Arizona, Nevada, Montana, and Mexico, where he also held mining interests.

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**D. F. Runyon,** publisher and editor of Pasadena, Calif., who campaigned vigorously through the press for many major freeway and construction projects in southern California, and who was one of the major supporters of the Colorado Aqueduct project of the Metropolitan Water District, died recently in Southern California.

* * *

**Fred E. Ammann,** engineer of the Public Roads Administration, died March 16 in his automobile on a highway north of Rawlins, Wyo. He was 46 years old, apparently suffered a heart attack while attempting to release his car from a snowdrift.

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**Thomas R. Brown,** chief engineer of the Stearns-Rogers Manufacturing Co., Denver, Colo., died March 16 in that city. He had been with the company since 1924, had been chief engineer since 1937. He was 56 years of age.

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**George L. Richards, Jr.,** 36 years of age, road construction engineer and geologist, died March 20 in Pasadena, Calif.

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**Francis A. Sparks,** retired electrical engineer with the Public Service Company of Colorado, died March 16 in Denver, at the age of 74.

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**Irvin B. Walker,** 79, retired electrical engineer and contractor of Pasadena, Calif., was buried March 13 in Los Angeles.

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**Lucene H. Diggins,** 53, retired engineer of Pasadena, Calif., was buried in that city on March 10.

# PERSONALLY SPEAKING

The State of California has just issued certificates of registration to 62 civil engineers, land surveyor licenses to three surveyors, and 10 civil engineers were authorized to use the title "structural engineer". Those to whom certificates were issued are: Civil engineers—**K. T. Atwell, Jean B. Balcomb, John D. Bascom, William Henry Brady, Dominic John Bressi, Ignacio P. Chavez, R. W. Cummins, C. M. Coffland, John W. Conley, William Wallace Dunlop, R. W. Folkins, Allen M. Fortney, James William Greathead, Theodore R. Gregory, R. E. Halter, Clarence Dayton Hamma, Warren T. Hannum, Stanley M. Hands, Clarence A. Hart, John Sherman Heilmann, Alton S. Heyser, A. Lyall House, Burton A. Jastram, Donald C. Johnson, Edward P. Johnson, Albert August Kambeitz, Ira S. Kessey, Walter Landers, L. Howard Lowe, Herbert L. Lyell, Dee Lynch, James A. Lynch, Jack H. MacDonald, Gillette G. McGinness, Harold W. McGowan, E. Kenney McKesson, Louis A. Molnar, John R. Morgan, Charles William Mors, Verner R. Muth, T. A. Nichols, Jr., Robert Paul O'Brien, Loren F. Phillips, Wright M. Price, Herbert Davis Richards, Weldon L. Richards, John F. Richardson, Robert Llewellyn Richardson, Donald T. Robbins, Einer Rosenkjar, Robert L. Sanks, Fremont W. Slattery, Garfield Stubblefield, Robert L. Stuckey, Howard G. Taylor, Roland Triay, Jr., C. R. Tumblin, Walter Edison Wagner, Melvin H. Ware, Robert H. Weight, Vallery White, Richard A. Wilson**

Land surveyors—**Rufus S. Camp, H. R. Little, George R. Psomas Jr.**

Structural engineers—**K. Bardizbanian, William A. Giddings, Edgar A. Griswold, Bernard S. Harder, Merrill T. Knox, Milton Kosman, Charles W. B. McCormick, John Kachig Minasian, F. A. Sayler** and **Justin A. Shjarback.**

* * *

**H. F. Bahmeier,** formerly construction engineer on the San Luis Valley Project, Colorado, for a period of eight months, has been transferred by the Bureau of Reclamation to the Anderson Ranch Dam, Boise Project, Idaho, to fill the vacancy caused by the retirement of **John A. Beemer.** Between May, 1942, and July, 1943, Bahmeier was construction engineer on the Davis Dam Project, Arizona-Nevada. The 1944 construction program at Anderson Ranch Dam calls for the placement of 3 million cu. yd. of earth and rock fill, together with excavation and lining of another tunnel and construction of outlet works, etc.

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The New Mexico State Board of Registration for Professional Engineers and Land Surveyors granted 10 applicants permission to practice in New Mexico. The applicants, who were approved as both professional engineers and land surveyors unless otherwise noted, were: **August P. Holzworth,** Carlsbad; **R. A. Estes,** Midland, Tex.; **Oscar H. Koch,** professional engineer, Dallas, Tex.; **Waldo W. Ports,** Artesia; **Maj. William F. Turney,** Mesilla Park; **David R. W. Wager-Smith,** Albuquerque; **Joseph A. Noble,** Amarillo, Tex.; **Alton A. Register,** land surveyor, Albuquerque; **John Edmond,** Las Vegas; **Ashley G. Classen,** professional engineer, El Paso, Tex.

**R. J. Finch,** Ogden, Utah, district engineer for the U. S. public roads administration for the last 25 years, has retired from service. Finch came to Ogden in 1919, as district engineer, from a similar position in San Francisco, Calif. Since that time he has witnessed the development of the Utah and Idaho state road systems from the dirt roads of that day to the high class surfaced, dustless roads that exist on practically the whole mileage of the state highways in both states today. Finch's successor has not been officially named, but **L. M. Huggins,** senior highway bridge engineer, will be in charge at the Ogden office.

* * *

**Mac Short,** formerly vice-president in charge of engineering at Lockheed Factory A in Los Angeles, Calif. is now in charge of large navy projects for Lockheed. **R. E. Reedy** will be chief preliminary design engineer under the consolidated engineering departments, while **J. J. Bloomfield** will be chief development engineer. **A. G. Meyer** will be promoted to the position of assistant to Short. **Hall L. Hibbard** is chief engineer under the new program and **J. B. Wassall** will continue in charge of operations within Factory A, where he is chief engineer.

* * *

**Alex Robertson** of the Macco-Robertson Co., Clearwater, Calif., has been elected vice-president at large of the Southern California Chapter of the Associated General Contractors of America. In this capacity he will head up the fourth or miscellaneous division of the Chapter, which includes all specialty contractors not included in the Building, Highway and Engineering groups.

* * *

**T. R. Smith** has been transferred by the U. S. Bureau of Reclamation from Rock Springs, Wyo., to Hamilton, Montana, where he is now construction engineer on the Bitterroot Project, recently approved for increased food production. Preparations are being made for approximately 50 mi. of canal construction.

* * *

**E. Paul Ford** has been appointed city engineer of El Centro, Calif., to fill the position vacated by the resignation of **Walter Heinecke.** Ford has been associated with contracting and engineering work for many years. During the past five years he has been job manager and superintendent on various projects for Guy F. Atkinson Co.

* * *

**Major Ernest J. Riley,** serving with the Seattle District U. S. Army Engineers, has been promoted to the rank of lieutenant colonel. Lt. Col. Riley, who heads the supply division of the Seattle Engineer District, was graduated from the U. S. Military Academy at West Point in 1919. He served in the regular army until 1922, when he resigned to enter business in Seattle. He was associated with Henry Broderick, Inc., Graham and Riley, Inc., and was a vice president of Norris, Beggs and Simpson, Pacific Coast property management firm, when called to active duty in 1942.

* * *

**Richard D. Davis, Jr.,** has resumed his position as a partner in the construction firm, Davis-Baker Co., in Pasadena, after serving 1½ years active duty as a lieutenant in the Amphibian Force of the Atlantic Fleet with landing craft operations.

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**Lt. Com. Charles C. Morgan, U. S. N. R.,** former industrial engineer at the Pittsburg, Calif. works of Columbia Steel Company, has been awarded the Legion of Merit, his second decoration in the past five months, for gallantry as commanding officer of a destroyer transport in the South Pacific.

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**Col. William J. Fox,** formerly chief engineer of building and safety for Los Angeles County, California, has been chosen to be

**HELEN BAKER, girl draftsman in the office of the U. S. Engineer Department area office at Fairbanks, Alaska, finds a tracing just a little hard to reach.**

District Marine Corps Aviation Liaison Officer. Until recently he was commander of the El Toro station. His new duties will include coordination of Marine Corps air stations at Mojave, El Centro, Santa Barbara, El Toro and Miramar, Calif.

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The following officers and directors have been elected for the 1944 term by the Engineer's Club of Fresno, Calif.: **Earl T. Scott,** president; **J. P. Price,** vice-president; **John W. Armstrong,** secretary-treasurer; **Roy V. Hall, V. C. McKim, J. P. McElroy** and **Lyman Olson,** directors.

* * *

**Master Sgt. Edmund A. Vogel** of Kremlin, Mont., has been awarded the Legion of Merit for his work as a mechanic, equipment supervisor and shop foreman of an aviation engineer unit during construction of important airfields in Alaska. A diesel mechanic and machinist in civilian life, Sergeant Vogel joined the army in 1939.

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**Lt. Col. James M. Wild, C. E.,** is contracting officer for the Seattle District U. S. Army Engineers. As contracting officer, Col. Wild is in charge of military and civil construction contracting activities for the local Engineer District comprised of most of the state of Washington, northern Idaho and the state of Montana.

* * *

**Second Lt. Carol Gresham** of San Gabriel, Calif., formerly employed by J. E. Haddock, Ltd., of Pasadena, Calif., has been awarded the Air Medal at the Eighth Army Air Force Bomber Station in England, where he is a pilot of a Flying Fortress bomber.

* * *

**Lloyd Y. White,** former member of the Structural Engineer's Association of Northern California, who has been living in Washington, D. C., and New York City for the past three years, has returned to San Francisco.

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**Brigadier General Warren Thomas Hannum** of the U. S. Army Engineers, who recently retired as army division engineer for the states west of the Rockies, has been named California state director of natural resources to succeed **William H. Moore.**

* * *

**Kenneth F. Vernon,** engineer with the U. S. Bureau of Reclamation, has been transferred to Washington, D. C., where he is doing engineering work in the office of "Engineering Assistant to the Commissioner."

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**Arthur Thomasin,** engineer recently graduated from the College of the City of New York, is now employed in the construction and planning department of the Douglas Aircraft Corp., Santa Monica, Calif.

* * *

J. W. Whiting Construction Co., Salt Lake City, Utah, has been changed to Whiting-Haymond Contractors. The firm is comprised of **H. J. Whiting, T. Melvin Haymond** and **W. Verl Whiting.**

* * *

**O. K. Smith,** city engineer of Martinez, Calif., for the past 10 years, has submitted his resignation to the city council with the request that he be retired. He is 71 years of age.

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**S. Che Tang** of Canton, China, and the University of Michigan has joined the engineering staff of the Lockheed Aircraft Corp. in Burbank, Calif.

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**Alf R. Palm** recently left the U. S. Engineer Office in Sacramento, Calif., to accept a position with Don Warren, consulting engineer of San Francisco and Los Angeles.

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**Clarence W. Poy** has resigned his position of assistant superintendent for the Alaska Road Commission on the Glenn Highway between Gulkana and Anchorage and is now located in Oakland, Calif.

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Ted F. Merrill & Sons, general contractors, are now located at their new offices and yard at 911 E. Redondo Blvd., Inglewood, Calif.

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Sound Construction & Engineering Co. announces the new location of their general office at 1403 West 45th St., Seattle 7, Wash.

* * *

**R. Franklyn Burgan** has recently accepted the position of assistant land agent for the Los Angeles City School District, Los Angeles, Calif.

# SUPERVISING THE JOBS

**Earl Pursel** is supervising the grading and paving of runways and parking areas and the installation of a field lighting system at the Marine Corps air station, El Toro, Calif., for Macco Construction Co. of Clearwater Calif., to whom the $1,398,136 contract was recently awarded. **Joe Seabury** is assistant superintendent, **Harry Porter** is the contractor's engineer, **Jack Palo** has charge of equipment and **Bob Whistler, Jr.,** is office manager.

* * *

**Leslie Pratt,** well known western construction superintendent, is general superintendent for Macco-Robertson Co. of Clearwater, Calif., on a $133,385 contract for installing additional facilities for the Hackberry Water System at the A. A. F. Gunnery School, Kingman, Ariz. **Leonard Gowdy,** registered civil engineer, is the estimator and **Burt Fitzgerald** is purchasing agent for the project.

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**Claud Emerson** has been named general superintendent for J. H. and N. M. Monaghan, contractors of Denver, Colo., on the 4.8-mi. grading and surfacing job recently awarded them between Ridgeway and Placerville, Colo. **L. H. Kilgore** will be structure superintendent on the $175,099 job.

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**Neal L. Foulger** is supervising the grading and filling for site preparation at the A. A. F. Intransit Depot, Alameda, Calif., for Macco Construction Co., who hold a $168,500 contract on the work. Other key men on the project are **C. A. Prosser,** purchasing agent; **Bob Poss,** paymaster; **Robert Snodgrass,** master mechanic, and **M. E. Schmidt,** foreman.

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**Alford Giordano** is supervising construction of additional buildings and utilities at Fort Lyon, Colo., for Bridges & Welcer of Portland, Ore., who hold a $424,500 contract for the work. **Roy Bridges** is project manager, **F. W. Riddle** is assistant project manager, **R. Ellison** is engineer, **W. S. Sterling** is purchasing agent, and **Inez Schiffman** is field clerk. The company recently completed work on the Sweet Home Housing Project in Oregon.

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**E. H. Bruntlett** is general superintendent for A. Guthrie & Co., Inc., of St. Paul, Minn., at Belton Canyon, Flathead County, Mont., where the company has a $1,500,000 contract for excavating a 2,100-ft. tunnel and two 700-ft. tunnels, and locating about 1½-mi. of track for the Great Northern Railway Co.

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**Frank P. Smith** is master mechanic and **Henry Smith** is assistant at the equipment repair shop of Stolte Inc. in San Leandro. **Lee Roberts** is welding foreman, **Harold Hunt** is truck repair foreman, **Ed Adams** is trencher equipment expert, **Jim Gallon** is gas engine expert, and **Ralph Thomas** is shovel and crane expert.

* * *

**Royal A. Motley,** formerly with Kaiser Permanente Co. and Eaton & Smith Co. of San Francisco, Calif., is now general superintendent for Waale-Camplan Co. of Portland, Ore., on a school facilities project at the Burton Homes Addition in Vancouver, Wn.

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**George A. Thatcher** is general superintendent and purchasing agent and **H. R. Wattelet** is construction superintendent on the 180 dormitory accommodations being erected in Riverside, Calif. The $89,714 contract was recently awarded to George B. Thatcher of North Hollywood, Calif.

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**Harry L. Arnold** is superintendent, **Ross H. Chamberlain** is project manager, and **I. L. Walker** is purchasing agent for Bohannon & Chamberlain of San Mateo, Calif., on construction of 1329 dwelling units at San Lorenzo, Calif., for the Greenwood Corp., San Francisco. The project will cost $6,844,350.

**E. R. Stokes** has returned to the U. S. A. from the Canal Zone, where he had been general superintendent for the Frederick Snare Corp. on the construction of dry docks. He is now general superintendent for Macco Construction Co. of Clearwater, Calif., on the Sweetwater Falls Dam, located about 35 mi. east of San Diego.

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**Forrest Leinenwever** is general superintendent and **Ray Christian** is assistant superintendent for W. S. Ford of Kingman, Ariz., on construction of buildings and utilities at the army airfield, Yucca, Ariz. The contract price of the work was $90,518.

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**K. B. Weirum,** formerly general superintendent during construction of the Santa Maria Airbase and more recently in charge of work on a housing project in San Luis Obispo, Calif., is now supervising construction of the Imperial Courts Housing Project at Watts, Calif., for Denzel & White of Los Angeles.

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**Louis Bodeen** is general superintendent for Bergerson, Wick & Dalgren of Tacoma, Wash., on their contract for federal housing in the Duwamish project in Seattle. Assisting him are **Fred Frederickson** and **Charles Wolt,** foremen and **Clarence Ellington,** timekeeper.

* * *

**Gus Olson,** well known highway and bridge superintendent, is supervising the construction of a concrete and steel highway bridge over the Muddy River near Logandale, Nev., for Vegas Rock & Sand Co. of Las Vegas, Nev., recently awarded the $79,502 contract.

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**Frank Nichol** is project manager and **Jim Culler** is breakwater superintendent on construction of a 10,000-ft. mole type breakwater at the Naval operating base, Terminal Island, Calif. The contract, which amounted to about $3,500,000, was recently awarded to Guy F. Atkinson Co. of Long Beach.

* * *

**Ed Hamilton** is supervising work on the new Biltmore Homes project, consisting of 126 units, located at Atlantic and Artesia Blvds. in North Long Beach, Calif. **C. C. Slayton** is in charge of all concrete work. The Sanitary Construction & Engineering Co. of Long Beach has the excavation contract.

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**A. W. "Bill" Poulton** is general superintendent for the Austin Co. on construction of a brick parts building at the North American Aircraft plant in Los Angeles, Calif. **John Richmond** is assistant superintendent.

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**Maurice McClure** has been selected by Stolte, Inc., of Oakland, Calif., to supervise their $102,397 contract for installing vitrified and concrete sewer mains on Fairmont and Central Avenues, Richmond Annex, Calif.

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**Fred Jordan** is supervising construction of an electrical and optical shop at the U. S. Navy drydocks, Terminal Island, Calif., for Guy F. Atkinson Co. of Long Beach, Calif. The contract price of the work is about $628,000.

**HAL CRINER, superintendent of guniting for Vinson & Pringle, Phoenix, Ariz., on the canal lining project of the Salt River Valley Water Users' Association, discussed in the March issue of *Western Construction News*, 6 mi. from Phoenix.**

**Joseph V. Vidlak** is supervising the erection of 112 family dwelling units in Pioche, Nevada, for O. J. Scherer Co. of Las Vegas, Nev., recently awarded the contract on a bid of $318,650. **S. H. Kerwin** is the project manager.

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**John Allen,** construction worker captured by the Japanese on Wake Island in 1942, has been heard on a broadcast of war prisoners from Tokyo. He was from Arcadia, Calif.

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**W. H. Fullen** is in charge of a tire repair shop located at 7519 Santa Fe Ave., Huntington Park, Calif., and owned by Morrison-Knudsen Co. Inc. **Mac McAdams** and **Shorty Padilla** are assisting.

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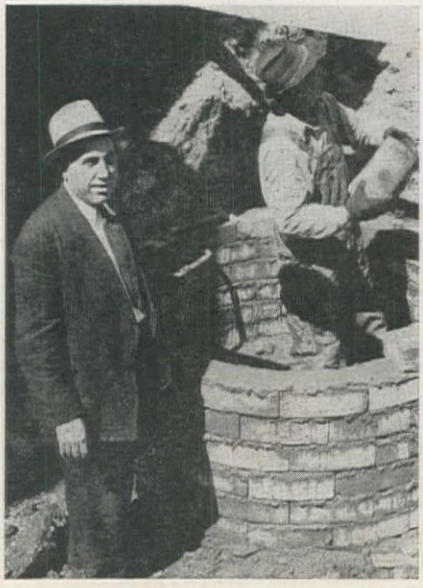
**Joe Congiusta** is superintendent, **D. Coluccio** is assistant superintendent and **Wm. C. Hammond** is purchasing agent on a $96,317 contract for installation of the Beacon Hill reservoir discharge and overflow pipe lines in King County, Wash., recently awarded to Superior Construction Co. of Seattle, Wash.

**JOE CONGIUSTA**



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**Oscar T. (Tom) Moore** is general superintendent and **Bill Crane** is job superintendent for Allison Honer of Santa Ana, Calif., on a building contract at the Marine Corps air station, El Toro, Calif.

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**Guy S. Sutter** is in charge of the construction work for Latisteel Corp. of California on their contract to construct an industrial building in Pasadena, Calif., for California Institute of Technology.

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**Wm. E. Bryan** is superintendent and **Theo E. Smith** is foreman for Robert H. Parr of Salt Lake City, Utah, and Los Angeles, Calif., on a $70,300 building contract at the Ogden Air Depot, near Ogden, Utah.

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**Andy Jensen** is superintendent for R. E. Campbell of Los Angeles, Calif., at Terminal Island, where Campbell has an $86,275 contract to construct officers' quarters at Small Craft Training Center, Roosevelt Base. **C. Drinkward** is the project purchasing agent.

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**R. W. "Bob" Hampton,** formerly superintendent of construction with Barrett & Hilp at Hunters Point, Calif., is now superintendent of heavy construction on a large project in southeastern Washington.

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**Gill Bissell** is general superintendent for Summerbell Roof Structures and **Trout Glenn** is superintendent on construction of a recreation building on Terminal Island, Calif.

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**F. Jackson** is supervising the installation of stabilizers in the channel of the Los Angeles River for the Guy F. Atkinson Co. of Long Beach, recently awarded the $157,293 contract.

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**Wm. F. Jackson** is superintendent and **R. W. Cannon** is project manager for Jackson Bros. of Los Angeles, Calif., on a $611,000 housing project in Venice, Calif.

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**Harry Kreiter** is superintendent for C. Courtney Jones of Burbank, Calif., on a $400,000 contract to build 100 dwellings in Burbank.

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**Dan Pace** is superintendent on rock jetty work at Seal Beach, Calif., for Shannahan Bros., Inc., of Huntington Park, Calif. **Jim Kelly** is foreman.

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**C. B. Pellard** is mechanic and foreman for Jack H. Harley of Long Beach, Calif., on an excavating contract at the Naval ordnance testing station now under construction at Inyokern, Calif.

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**F. C. Nugent,** formerly on construction work at Apartudo, Nicaragua, is now foreman with Robert E. McKee at Wilmington, Calif.

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**Lester Low,** well known shovel operator for Tanner Construction Co. of Phoenix, Ariz., is now in charge of Tanner's maintenance shop in Phoenix.

# UNIT BID SUMMARY

## Irrigation . . .

### California—Imperial County—Bureau of Reclamation—Canal

J. F. Shea Co., Inc., Los Angeles, bid low at $1,660,681, to the Bureau of Reclamation, Yuma, Ariz., and was awarded the contract for furnishing labor and materials and performing all work for construction of earthwork, concrete lining, and structures, station 4562 + 67 to station 5726 + 83, of the Coachella Canal, All-American canal system, Boulder Canyon project. The government will furnish all material that will become a part of the finished construction. The following total and unit bids were submitted:

| | Schedule 3 | Schedule 4 | Total |
|---|---|---|---|
| (A) J. F. Shea Co., Inc. | $ 887,664 | $ 773,017 | $1,660,681 |
| (B) L. E. Dixon Company | 1,058,213 | 689,836 | 1,948,049 |
| (C) Morrison-Knudsen Co., Inc. | 1,105,204 | 959,517 | 2,064,722 |
| (D) Winston Bros. Company | 1,100,627 | 975,436 | 2,076,063 |
| (E) W. E. Kier Construction Co. | 1,188,022 | 909,712 | 2,097,735 |
| (F) L. M. White Contracting Co. & N. H. Hasler | 1,171,421 | 1,008,307 | 2,179,728 |
| (G) Ralph A. Bell, United Concrete Pipe Corp. & Baruch Corp. | 1,197,602 | 998,679 | 2,196,281 |
| (H) Piombo Bros. & Co. and Louis Biasotti & Son | 1,205,265 | 1,009,735 | 2,215,000 |
| (I) Bressi & Bevanda Contractors | 1,327,792 | 1,113,724 | 2,441,516 |
| (J) MacDonald & Kahn, Inc. and Frederickson & Watson Construction Co. | 1,384,913 | 1,160,795 | 2,545,709 |
| (K) Mittry Bros. Construction Co. | 1,508,912 | 1,312,006 | 2,820,918 |

**SCHEDULE 3**

(1) 1,694,000 cu. yd. excav. for canal
(2) 285,500 cu. yd. excav. for diver. channels and dikes and for parallel drains
(3) 80,400 cu. yd. excav. for bypass canals
(4) 13,000 sta. cu. yd. overhaul for bypass canal
(5) 6,000 cu. yd. compacting embankments
(6) 8,600 cu. yd. excav. for structs.
(7) 337,500 sq. yd. trimming foundtns. for conc. lining
(8) 5,300 cu. yd. backfill about structs.
(9) 17,100 cu. yd. backfill at top of conc. canal lining
(10) 1,940 cu. yd. compacting backfill
(11) 442 cu. yd. concrete in structs.
(12) 227 cu. yd. conc. in drainage inlets
(13) 32,850 cu. yd. conc. in reinf. canal lining
(14) 55,600 lb. placing reinfmt. bars in structs.
(15) 986,000 lb. placing reinfmt. fabric in canal lin.
(16) 490 sq. ft. placing elastic filler mtrl. in joints
(17) 28 lin. ft. placing rubber water stops in joints
(18) 35,570 cu. yd. riprap
(19) 2 M.F.B.M erecting timber in structs.
(20) 156 lin. ft. laying 18-in. diam. concrete pipe
(21) 100 lin. ft. laying 24-in. diam. concrete pipe
(22) 96 lin. ft. laying 30-in. diam. concrete pipe
(23) 152 lin. ft. laying 36-in. diam. concrete pipe
(24) 9,400 lb. installing slide gates and gate hoists
(25) 730 lb. installing miscel. metalwork

**SCHEDULE 4**

(1) 918,000 cu. yd. excav. for canal
(2) 326,000 cu. yd. excav. for diversion channels and dikes and for parallel drains
(3) 94,000 cu. yd. excav. for bypass canals
(4) 10,000 sta. cu. yd. overhaul for bypass canals
(5) 6,700 cu. yd. compacting embankments
(6) 7,500 cu. yd. excav. for structs.
(7) 310,400 sq. yd. trimming foundtns. for conc. lining
(8) 3,500 cu. yd. backfill about structs.
(9) 15,500 cu. yd. backfill at top of conc. can. lin.
(10) 1,940 cu. yd. compacting backfill
(11) 500 cu. yd. concrete in structs.
(12) 32 cu. yd. concrete in drainage inlets
(13) 30,200 cu. yd. conc. in reinf. canal lining
(14) 59,000 lb. placing reinfmt. bars in structs.
(15) 901,000 lb. placing reinfmt. fab. in canal lin.
(16) 470 sq. ft. placing elastic filler matl. in joints
(17) 29 lin. ft. placing rubber water stops in joints
(18) 45,000 cu. yd. riprap
(19) 2 M.F.B.M. erecting timber in structs.
(20) 292 lin. ft. laying 18-in. diam. concrete pipe
(21) 352 lin ft. laying 24-in. diam. concrete pipe
(22) 288 lin ft. laying 30-in. diam. concrete pipe
(23) 100 lin. ft. laying 36-in. diam. concrete pipe
(24) 10,000 lb. installing radial gates & gate Hoists
(25) 17,800 lb. installing slide gates and gate hoists
(26) 1,650 lb. installing miscellaneous metalwork

**SCHEDULE 3**

| | (A) | (B) | (C) | (D) | (E) | (F) | (G) | (H) | (I) | (J) | (K) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | .155 | .20 | .18 | .22 | .25 | .21 | .25 | .25 | .28 | .27 | .27 |
| (2) | .17 | .30 | .18 | .20 | .20 | .21 | .144 | .27 | .18 | .25 | .27 |
| (3) | .18 | .20 | .18 | .22 | .15 | .20 | .144 | .28 | .20 | .25 | .27 |
| (4) | .06 | .06 | .01 | .03 | .01 | .03 | .029 | .02 | .02 | .05 | .10 |
| (5) | .27 | .20 | .40 | .55 | .75 | .40 | .65 | .50 | 1.00 | .64 | 1.00 |
| (6) | .33 | .25 | 1.20 | .60 | 1.35 | .50 | 1.23 | .50 | 2.00 | 2.00 | 1.50 |
| (7) | .14 | .35 | .30 | .29 | .50 | .33 | .208 | .25 | .35 | .27 | .40 |
| (8) | .96 | .20 | .26 | .30 | .25 | .25 | .58 | .50 | .50 | 2.00 | .20 |
| (9) | .26 | .50 | .40 | .50 | .30 | .25 | .43 | .40 | .50 | .64 | .30 |
| (10) | 1.28 | 1.00 | 2.90 | 2.00 | 3.50 | 1.60 | 1.44 | 2.00 | 1.00 | 3.00 | 2.00 |
| (11) | 38.50 | 45.00 | 40.00 | 35.00 | 43.00 | 42.00 | 50.00 | 50.00 | 42.00 | 61.00 | 60.00 |
| (12) | 12.00 | 45.00 | 40.00 | 17.00 | 27.00 | 42.00 | 28.80 | 50.00 | 42.00 | 60.00 | 40.00 |
| (13) | 10.50 | 9.50 | 12.50 | 10.65 | 10.00 | 12.55 | 12.97 | 12.00 | 13.00 | 14.40 | 15.00 |
| (14) | .03 | .03 | .04 | .035 | .04 | .035 | .043 | .025 | .03 | .07 | .08 |
| (15) | .02 | .03 | .037 | .035 | .04 | .03 | .043 | .03 | .025 | .05 | .05 |
| (16) | .70 | 1.00 | .60 | .30 | 1.50 | .65 | .72 | .50 | 2.00 | 1.30 | 2.00 |
| (17) | 2.00 | 1.50 | 1.00 | 1.00 | 1.50 | 2.00 | 1.44 | 1.00 | 2.00 | 1.30 | 1.00 |
| (18) | 3.05 | 3.00 | 3.60 | 3.50 | 2.75 | 3.85 | 3.36 | 3.25 | 4.00 | 3.55 | 5.60 |
| (19) | 128.00 | 150.00 | 75.00 | 70.00 | 100.00 | 100.00 | 173.00 | 100.00 | 150.00 | 77.00 | 100.00 |
| (20) | 1.30 | 2.50 | 1.00 | 1.00 | 2.00 | 2.00 | 2.88 | 1.25 | 1.50 | 1.10 | 2.00 |
| (21) | 2.50 | 3.00 | 1.50 | 1.50 | 2.35 | 3.00 | 3.60 | 1.75 | 2.00 | 1.50 | 4.00 |
| (22) | 3.25 | 3.50 | 2.50 | 2.00 | 3.00 | 4.00 | 4.32 | 2.25 | 2.50 | 1.80 | 5.00 |
| (23) | 3.85 | 4.00 | 3.00 | 3.00 | 3.75 | 5.00 | 4.32 | 3.50 | 3.00 | 2.15 | 7.00 |
| (24) | .10 | .12 | .08 | .10 | .15 | .12 | .144 | .10 | .50 | .11 | .25 |
| (25) | .13 | .20 | .15 | .10 | .30 | .25 | .216 | .15 | .50 | .15 | .50 |

**SCHEDULE 4**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | .155 | .20 | .18 | .22 | .20 | .21 | .25 | .25 | .28 | .27 | .27 |
| (2) | .17 | .30 | .18 | .20 | .20 | .21 | .144 | .27 | .18 | .25 | .27 |
| (3) | .18 | .20 | .18 | .22 | .15 | .20 | .144 | .28 | .20 | .25 | .27 |
| (4) | .06 | .06 | .01 | .03 | .01 | .03 | .029 | .02 | .02 | .05 | .10 |
| (5) | .27 | .20 | .40 | .55 | .75 | .40 | .65 | .50 | 1.00 | .64 | 1.00 |
| (6) | .33 | .25 | 1.20 | .60 | 1.35 | .50 | 1.23 | .50 | 2.00 | 2.00 | 1.50 |
| (7) | .14 | .30 | .30 | .29 | .40 | .33 | .208 | .25 | .35 | .27 | .40 |
| (8) | .96 | .20 | .26 | .30 | .25 | .25 | .58 | .50 | .50 | 2.00 | .20 |
| (9) | .26 | .50 | .40 | .50 | .30 | .25 | .43 | .40 | .50 | .64 | .30 |
| (10) | 1.28 | 1.00 | 2.90 | 2.00 | 3.50 | 1.60 | 1.44 | 2.00 | 1.00 | 3.00 | 2.00 |
| (11) | 38.50 | 45.00 | 40.00 | 35.00 | 43.00 | 42.00 | 50.00 | 50.00 | 42.00 | 61.00 | 60.00 |
| (12) | 12.00 | 45.00 | 40.00 | 17.00 | 27.00 | 42.00 | 28.80 | 50.00 | 42.00 | 60.00 | 40.00 |
| (13) | 10.50 | 9.50 | 12.50 | 12.00 | 10.00 | 12.55 | 12.97 | 12.00 | 13.00 | 14.40 | 15.00 |
| (14) | .03 | .03 | .04 | .035 | .04 | .035 | .043 | .025 | .03 | .07 | .08 |
| (15) | .02 | .03 | .037 | .035 | .04 | .03 | .043 | .03 | .025 | .05 | .05 |
| (16) | .70 | 1.00 | .60 | .30 | 1.50 | .65 | .72 | .50 | 2.00 | 1.30 | 2.00 |
| (17) | 2.00 | 1.50 | 1.00 | 1.00 | 1.50 | 2.00 | 1.44 | 1.00 | 2.00 | 1.30 | 1.00 |
| (18) | 3.05 | 3.00 | 3.60 | 3.50 | 2.75 | 3.85 | 3.36 | 3.25 | 4.00 | 3.55 | 5.60 |

*(Continued on next page)*


# SCORE

## WITH McNAMARA CONST. CO.

## Lorains 27

IT'S a fact! The McNamara Construction Company, Toronto, Ontario, has bought 27 Lorains—including shovels, cranes, draglines, and backdiggers. These Lorains were purchased at different times—over a considerable stretch of years.

Repeat orders, in volume like this, are not based on sentiment. They're based on past experience . . . on actual performance records of Lorains on all kinds of jobs, under *all sorts of conditions.* We think you'll agree that 27 "repeats" by a single company is pretty conclusive evidence of Lorain ability to work most any type of job—at a profit to the owners.

That's why—when planning your postwar equipment setup, you owe it to yourself to get the full story on Lorains from your Lorain distributor. There's one nearby. You may find that his recommendations will mean big money to you on postwar jobs that come your way. So, see him soon.

**THE THEW SHOVEL COMPANY • Lorain, Ohio**

***LORAIN DISTRIBUTORS:***

***LeROI-RIX MACHINERY CO., Los Angeles; CATE EQUIPMENT CO., Salt Lake City; *LIBERTY TRUCK & PARTS CO., Denver; *COAST EQUIPMENT CO., San Francisco; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyo.; *A. H. COX & CO., Seattle 4, Wash.; *COLUMBIA EQUIPMENT CO., Portland, Ore., Spokane, Wash.; BUNTING TRACTOR CO., LaGrande, Ore., Boise and Twin Falls, Ida.; STATE TRACTOR & EQUIPMENT CO., Phoenix, Ariz.; CONNELLY MACHINERY CO., Billings and Great Falls, Mont.; SANFORD EQUIPMENT CO., Reno, Nevada.**

***Carries a representative stock of spare parts.***

Reg. Trade Mark

**thew Lorain** DRAGLINES

**CRANES • SHOVELS • MOTO-CRANES**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (19) | 128.00 | 150.00 | 75.00 | 70.00 | 100.00 | 100.00 | 173.00 | 100.00 | 150.00 | 77.00 | 100.00 |
| (20) | 1.30 | 2.50 | 1.00 | 1.00 | 2.00 | 2.00 | 2.88 | 1.25 | 1.50 | 1.10 | 2.00 |
| (21) | 2.50 | 3.00 | 1.50 | 1.50 | 2.35 | 3.00 | 3.60 | 1.75 | 2.00 | 1.50 | 4.00 |
| (22) | 3.25 | 3.50 | 2.50 | 2.00 | 3.00 | 4.00 | 4.32 | 2.25 | 2.50 | 1.80 | 5.00 |
| (23) | 3.85 | 4.00 | 3.00 | 3.00 | 3.75 | 5.00 | 4.32 | 3.50 | 3.00 | 2.50 | 7.00 |
| (24) | .12 | .12 | .08 | .20 | .20 | .12 | .144 | .10 | .50 | .11 | .20 |
| (25) | .10 | .12 | .08 | .15 | .15 | .12 | .144 | .10 | .50 | .11 | .25 |
| (26) | .13 | .20 | .15 | .30 | .30 | .25 | .216 | .15 | .50 | .15 | .50 |

# Dam . . .

## Arizona—Maricopa County—Phelps-Dodge Corp.—Earth & Rock Fill

Mittry Bros. Construction Co., Los Angeles, Calif., bid low at $1,365,750 on Alternate "A", and $1,680,400 on Alternate "B", to the Phelps-Dodge Corporation, Phoenix, for the construction of the Horseshoe Storage Dam, on the Verde River, 14 mi. above the Bartlett reservoir, near Phoenix. The proposed dam will be 180 ft. high, 350 ft. wide at the base, and will have a crest length of 1,100 ft. The top of the dam will be 30 ft. wide and it will extend 45 ft. above the waterline. When completed, the dam will provide an impounding reservoir of 60,000 acre ft. capacity. Bids were accepted on two types of construction. Alternate "A" consists of a rolled earthfill structure with a rock blanket; Alternate "B" is a rockfill structure faced on the upstream side with a concrete slab. A spillway, 350 ft. in width, will be cut through the rock to divert floodwaters around the dam. The outlet will be located in the right abutment, where a 12-ft. tunnel will be constructed. The design and engineering of the project is being handled by the firm of Leeds, Hill, Barnard and Jewett of Los Angeles, Calif. The following total and unit bids were submitted:

| | Alternate A | Alternate B |
|---|---|---|
| (1) Mittry Bros. | $1,365,750 | $1,680,400 |
| (2) L. E. Dixon | 1,892,119 | 2,179,594 |
| (3) Winstron Bros. Co. | no bid | 2,167,000 |
| (4) Bowen & McLaughlin | 2,130,000 | 2,432,000 |
| (5) Morrison-Knudsen Co., Inc. and W. A. Bechtel Co. | $2,241,000 | no bid |
| (6) Peter Kiewit Sons' Co. and Western Contracting Co. | 2,438,000 | $3,490,000 |

| | (1) "A" | (1) "B" | (2) "A" | (2) "B" | (3) "A" | (3) "B" |
|---|---|---|---|---|---|---|
| Lump sum, camp construction | $60,000 | $60,000 | $60,000 | $60,000 | $ ..... | $60,000 |
| Lump sum, diversion of river | 62,000 | 72,000 | 101,770 | 101,770 | ..... | 50,000 |
| 280,000 sq. ft. stripping abutments | .10 | .15 | .05 | .10 | ..... | .15 |
| 60,000 cu. yd. excavation in river bed | .50 | .50 | .75 | .75 | ..... | 1.00 |
| 500 cu. yd. cutoff wall excavation in rock | 8.00 | 5.00 | 6.85 | 6.85 | ..... | 6.00 |
| 2,000 cu. yd. concrete in dam cutoff walls | 19.00 | 16.00 | 22.00 | 15.00 | ..... | 15.25 |
| 3,000 lin. ft. drilling grout holes | 5.00 | 5.00 | 2.00 | 2.00 | ..... | 2.50 |
| 1,500 lin. ft. grout pipes, furn. and inst. | 1.00 | 1.00 | 1.00 | 1.00 | ..... | .90 |
| 10,000 cu. ft. pressure grouting | 2.00 | 2.00 | 2.00 | 2.00 | ..... | 2.00 |
| 290,000 cu. yd. rolled earth fill in dam | .42 | ..... | .90 | ..... | ..... | ..... |
| 75,000 cu. yd. "fines" in dam | .40 | ..... | .70 | ..... | ..... | ..... |
| 710,000 cu. yd. dumped rock fill in dam | .30 | ..... | .10 | ..... | ..... | ..... |
| 560,000 cu. yd. dumped and sluiced rock fill | ..... | ..... | .30 | ..... | .25 | ..... | .60 |
| 165,000 cu. yd. semi-placed rock fill | ..... | ..... | 1.20 | ..... | 1.30 | ..... | 1.00 |
| 6,300 cu. yd. concrete face | ..... | ..... | 21.00 | ..... | 15.00 | ..... | 30.00 |
| 540,000 cu. yd. spillway channel excavation | 1.00 | 1.00 | 1.85 | 2.00 | ..... | 1.60 |
| 1,000 cu. yd. spillway cutoff excavation | 8.00 | 8.00 | 15.00 | 15.00 | ..... | 8.00 |
| 1,000 cu. yd. concrete in spillway pavement | 16.00 | 16.00 | 15.00 | 15.00 | ..... | 15.00 |
| 1,380 cu. yd. concrete in T-Section | 30.00 | 30.00 | 24.00 | 24.00 | ..... | 25.00 |
| 2,300 cu. yd. concrete in spillway cutoff | 21.00 | 19.00 | 14.00 | 14.00 | ..... | 17.00 |
| 205 cu. yd. concrete in outlet works | 60.00 | 60.00 | 260.00 | 260.00 | ..... | 70.00 |
| 300,000 lb. reinforcing steel, fabr. & place | .05 | .04 | .03 | .03 | ..... | .025 |
| Lump sum, trashrack bars and sockets | $8,500 | $8,500 | $7,638 | $7,638 | ..... | $8,000 |
| Lump sum, structural steel | $7,500 | $7,500 | $7,009 | $7,009 | ..... | $6,000 |
| Lump sum, cylinder gate assembly | $30,750 | $30,750 | $30,215 | $30,215 | ..... | $30,000 |
| Lump sum, hoisting assembly | $6,500 | $6,500 | $4,672 | $4,672 | ..... | $4,500 |
| Lump sum, road and parking areas | $7,500 | $7,500 | $4,320 | $4,320 | ..... | $23,000 |
| Cost plus, headquarters building—fixed fee | 250.00 | 250.00 | 750.00 | 750.00 | ..... | 750.00 |
| Cost plus, water supply system—fixed fee | 350.00 | 350.00 | 500.00 | 500.00 | ..... | $1,000 |
| Cost plus, pressure tubing—fixed fee | 100.00 | 100.00 | 200.00 | 200.00 | ..... | 250.00 |

# Bridge and Grade Separation . . .

## California—San Diego County—State—Reinf. Concrete

Ralph O. Dixon, Los Angeles, submitted the low bid of $151,914, to the California Division of Highways, Sacramento, for a reinforced concrete bridge to be constructed across the San Diego River in the City of San Diego. The contractor will furnish all labor and materials. The following total and unit bids were received:

| | | | | | | |
|---|---|---|---|---|---|---|
| (1) | Ralph O. Dixon | $151,914 | (9) | Bent Construction Co. | $192,485 |
| (2) | Griffith Co. | 161,970 | (10) | Carlo Bongiovanni | 199,999 |
| (3) | M. H. Golden | 164,499 | (11) | Vinnell Co. | 203,057 |
| (4) | Kiss Crane Co. | 176,531 | (12) | L. E. Dixon | 207,152 |
| (5) | R. R. Hensler-Heuser & Garnett | 177,854 | (13) | Byerts & Dunn | 217,810 |
| (6) | B. G. Carroll | 183,345 | (14) | Shannahan Bros., Inc. | 219,491 |
| (7) | Oberg Bros. | 183,730 | (15) | W. J. Disteli | 224,767 |
| (8) | Ralph A. Bell | 184,480 | (16) | J. E. Haddock, Ltd. | 229,379 |

| | | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|---|
| (A) | Lump sum, removing existing bridge | 535.00 | 750.00 | $1,000 | $9,500 | $3,100 | $1,000 |
| (B) | 2,200 cu. yd. structure excavation | .70 | 1.35 | 1.50 | 1.00 | 1.50 | 3.00 |
| (C) | 2,300 cu. yd. Cl. "A" P.C.C. (structure) | 28.00 | 30.30 | 38.00 | 33.00 | 35.00 | 38.50 |
| (D) | 111 cu. yd. Cl. "A" P.C.C. (railing) | 55.00 | 70.00 | 75.00 | 70.00 | 60.00 | 80.00 |
| (E) | 6,000 lb. misc. iron and steel | .25 | .24 | .25 | .30 | .20 | .20 |
| (F) | 10,080 lin. ft. furnishing concrete piles | 2.05 | 2.00 | 1.70 | 1.70 | 1.80 | 1.75 |
| (G) | 210 ea. driving piles | 45.00 | 52.50 | 58.00 | 110.00 | 60.00 | 50.00 |
| (H) | 2,200 cu. yd. riprap | 7.60 | 8.20 | 3.00 | 5.00 | 8.00 | 8.00 |
| (I) | 675,000 lb. bar reinforcing steel | .045 | .043 | .04 | .035 | .05 | .045 |
| (J) | Lump sum, misc. items of work | 625.00 | $1,100 | 550.00 | $4,500 | $1,000 | $1,000 |

| | | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (A) | ..... | $1,000 | $1,000 | 600.00 | 200.00 | $1,500 | $1,500 | $3,500 | $1,100 | 500.00 | 900.00 |
| (B) | ..... | 2.00 | 1.00 | 1.00 | 3.00 | 2.00 | 1.80 | 3.00 | 3.85 | 2.00 | 1.85 |
| (C) | ..... | 40.00 | 37.50 | 44.00 | 40.00 | 39.50 | 46.00 | 43.00 | 38.17 | 50.00 | 55.00 |
| (D) | ..... | 60.00 | 70.00 | 75.00 | 80.00 | 85.00 | 72.50 | 80.00 | 88.00 | 70.00 | 75.00 |
| (E) | ..... | .25 | .30 | .30 | .30 | .30 | .27 | .25 | .275 | .20 | .205 |
| (F) | ..... | 2.00 | 2.00 | 2.00 | 1.65 | 2.15 | 2.50 | 2.25 | 3.41 | 3.40 | 2.05 |

*(Continued on next page)*

# TO TAME A POST-WAR FLOOD


Blue Brutes that help air-blast the Army's way through hell and high water now*, are going to be just as good and tough and easy-breathing when they go to work for you on post-war jobs like this:

*An $8,210,000 flood control plan for the upper reaches of the French Broad River in western North Carolina . . . calling for seven detention dams and a levee on the Asheville, N. C. waterfront.*

Saving money on post-war flood control projects is only one of many jobs Blue Brutes can help you do. Slum clearance. Plant construction. Removing street car trackage. Super-highways . . .

The plans are ready now. So are Blue Brutes. Find out today what makes these air-masters of the future world a better buy. Their Feather Valves,** (simplest, strongest valves for air compression ever made) and full force feed lubrication assuring oil under pressure to every working part through positive pump located in sump of crankcase — give you your money's worth by saving downtime, repair time, lost time, all around the clock.

The Blue Brute Compressor line is complete as well. Portable. Semi-portable. Diesel, gasolene or electric-driven. With Blue Brute Rock Drills and Air Tools to match their easy-breathing strength with easy handling. Check our improved Blue Brutes on wartime jobs today. Then bid to get your money's worth tomorrow!

**Behind the Fighting Fronts with**

## BLUE BRUTES

Blue Brutes helped build our giant Western dams, now supplying power to those light metal industries that give our aircraft wings. Columbia and Bonneville. Helped put up the power plants, too. Blue Brutes perform on 24-hour shifts in shipyards, bases, ordnance plants today — good proof of competence to help tomorrow's builders. Buy War Bonds now. Then buy Blue Brutes to get your money's worth! Your nearest distributor is listed on page 100.

*Blue Brute Compressors and Air Tools are painted olive drab for the Army. **Reg. U. S. Pat. Off.

PC 4-2

## Get more WORTH from air with WORTHINGTON

# BUY BLUE BRUTES

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTH BEHIND THE NAME WORTHINGTON

Worthington Pump and Machinery Corporation Harrison, N. J. Holyoke Compressor and Air Tool Department, Holyoke, Massachusetts

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (G) | 53.50 | 85.00 | 60.00 | 49.00 | 95.00 | 65.00 | 70.00 | 88.00 | 45.00 | 64.00 |
| (H) | 7.00 | 6.00 | 8.00 | 12.00 | 8.50 | 7.50 | 9.00 | 5.50 | 9.00 | 9.25 |
| (I) | .045 | .05 | .04 | .04 | .05 | .045 | .05 | .066 | .045 | .048 |
| (J) | $1,000 | 500.00 | $1.000 | $10,197 | $1,000 | 500.00 | $7,500 | $1,210 | $2,000 | $1,500 |

## Nevada—Clark County—State—Conc. & Steel

Vegas Rock & Sand Co., Las Vegas, submitted the low bid of $79,502 to the Nevada State Highway Department, Carson City, and was awarded the contract for constructing a concrete and steel bridge near Logandale, between Jct. Route No. 6 and Overton. The following total and unit bids were received:

(1) Vegas Rock & Sand Co. ..... $79,502
(2) Olof Nelson Construction Co. ..... 92,393
(3) Isbell Construction Co. ..... $ 95,283
(4) A. S. Vinnell Co. ..... 115,320

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Lump sum, signs | 300.00 | 400.00 | 500.00 | 500.00 |
| Lump sum, special detours | $1,000 | $1,000 | $1,000 | $1,000 |
| 256 cu. yd. selected detour surfacing | .50 | 1.00 | .75 | .75 |
| 126 yd. mi. haul, selected detour surfacing | .50 | .30 | .25 | .10 |
| Lump sum, remove timber bridge | $1,500 | $1,000 | $1,000 | $1,000 |
| 4,251 sq. yd. remove and relay exist. surf. | .40 | .20 | .15 | .25 |
| 22,800 cu. yd. channel excavation | .40 | .50 | .50 | .35 |
| 23 cu. yd. drainage excavation | 1.00 | 2.00 | 2.00 | 2.00 |
| 4,825 cu. yd. borrow | .30 | .50 | .60 | .48 |
| 24,125 yd. sta. overhaul | .015 | .013 | .01 | .002 |
| 1,509 cu. yd. mi. overhaul | .15 | .30 | .10 | .06 |
| 485 cu. yd. structure excavation "A" | 1.00 | 1.00 | 2.00 | 1.50 |
| 578 cu. yd. structure excavation "B" | 2.00 | 5.00 | 8.00 | 10.00 |
| 682 cu. yd. backfill | .50 | 1.00 | .50 | .50 |
| 0.38 mi. subgrade Type "B" | 300.00 | $2,000 | $1,000 | $1,200 |
| 362 M. gal. water | 1.00 | 1.50 | 2.00 | 2.00 |
| 3 T. liquid asph., M-2, seal | 25.00 | 35.00 | 30.00 | 34.00 |
| 20 T. liq. asph., MC-2, roadmix | 25.00 | 35.00 | 30.00 | 34.00 |
| 319 cu. yd. "A" concrete | 32.00 | 35.00 | 35.00 | 40.00 |
| 690 cu. yd. "D" concrete | 32.00 | 35.00 | 40.00 | 59.50 |
| 137 cu. yd. "D" concrete (seal) | 32.00 | 40.00 | 30.00 | 30.00 |
| 496 lin. ft. concrete rail | 4.00 | 8.00 | 6.00 | 10.00 |
| 183,510 lb. reinf. steel | .06 | .075 | .07 | .06 |
| 2,270 lb. structural steel | .25 | .20 | .20 | .30 |
| 2,820 lin. ft. untreated timber piles | .50 | .10 | .15 | .20 |
| 35 ea. salvaged timber piles | 25.00 | 30.00 | 10.00 | 35.00 |
| 2,120 lin. ft. treated timber piles | .50 | .10 | .50 | .20 |
| 182 ea. drive timber piles | 30.00 | 30.00 | 33.00 | 68.50 |
| 134 cu. yd. grouted hand-laid riprap | 10.00 | 10.00 | 15.00 | 20.00 |
| 4 ea. move pipe culvert headwalls | 10.00 | 25.00 | 25.00 | 25.00 |
| 45 lin. ft. 24-in. plain conc. pipe | 4.00 | 5.00 | 8.00 | 5.00 |

## California—Kern County—State—Concrete Culvert

F. Fredenburg, South San Francisco, bid low at $9,317, to the California Division of Highways, Sacramento, for a reinforced concrete box culvert to be constructed across Rag Gulch, about 1.5 mi. south of the Tulare County line. The State will furnish 17,700 lb. of bar reinforcing steel. The following total and unit bids were submitted:

(1) F. Fredenburg ..... $ 9,317
(2) Wm. E. Thomas ..... 9,804
(3) Trewhitt Shields & Fisher ..... 10,769
(4) J. E. Haddock Ltd. ..... 11,433
(5) Vinnell-Engineers Ltd. ..... 11,983
(6) Rand Construction Co. ..... 11,733
(7) James B. Allen ..... $12,380
(8) C. B. Tuttle ..... 12,780
(9) Rexroth & Rexroth ..... 14,585
(10) Griffith Co. ..... 14,914
(11) Kiss Crane Co. ..... 16,620

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,250 cu. yd. structure excav. | 1.00 | 1.65 | 1.10 | 1.00 | 1.25 | 1.00 | 1.00 | 1.60 | 2.00 | 2.15 | 3.50 |
| 700 cu. yd. ditch excav. | 1.00 | .75 | .65 | .50 | .75 | .60 | 1.00 | 1.50 | 1.50 | 1.20 | 1.00 |
| 225 cu. yd. Class "A" P.C.C. | 26.00 | 25.00 | 30.50 | 34.00 | 39.50 | 33.60 | 36.60 | 35.00 | 40.00 | 40.00 | 40.00 |
| 16,100 lb. bar reinforcing steel | .06 | .06 | .09 | .08 | .04 | .10 | .08 | .07 | .066 | .085 | .10 |
| 17,700 lb. placing State furnished bar reinf. steel | .03 | .035 | .035 | .05 | .02 | .05 | .05 | .04 | .054 | .057 | .05 |
| 2 ea. culvert markers | 10.00 | 3.00 | 4.00 | 5.00 | 5.00 | 4.00 | 11.00 | 10.00 | 8.40 | 5.00 | 25.00 |

## California—Marin & Sonoma Counties—State—Cattle passes

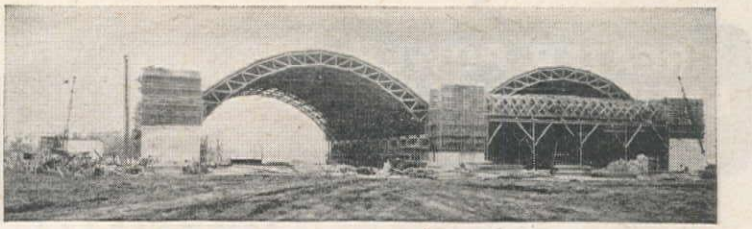
Wm. E. Thomas, Maricopa, submitted the low bid of $24,334 to the California Division of Highways, Sacramento, for replacing five existing timber cattle passes with new reinforced concrete sections, between 1.5 and 12.5 mi. south of Petaluma. The State will furnish all bar reinforcing steel for the work. The following total and unit bids were submitted:

(1) Wm. E. Thomas ..... $24,334
(2) Earl W. Heple ..... 25,958
(3) Kiss Crane Co. ..... 27,885
(4) Mercer, Fraser Company ..... 28,376
(5) Stolte, Inc. ..... 31,425
(6) W. Lenkeit ..... 31,954
(7) James B. Allen ..... 33,370
(8) A. A. Tieslau & Son ..... 33,461
(9) Lord & Bishop ..... $33,891
(10) Helwig Construction Co. ..... 36,500
(11) Peter Sorenson ..... 37,116
(12) Trewhitt, Shields & Fisher ..... 37,576
(13) A. Soda & Son ..... 38,722
(14) Stockton Construction Co. ..... 39,760
(15) Moore & Roberts ..... 44,444
(16) E. A. Forde ..... 51,135

| | | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|---|
| (A) | Lump sum, removing existing structs. | $1,500 | $2,375 | $2,500 | $2,000 | $1,500 | $2,000 |
| (B) | 220 cu. yd. removing concrete | 4.00 | 5.50 | 1.50 | 5.00 | 5.00 | 5.00 |
| (C) | 1,700 cu. yd. struct. excav. | 1.50 | 1.50 | 1.25 | 1.50 | 1.80 | 3.00 |
| (D) | 420 cu. yd. roadway excav. | 1.00 | 1.00 | 1.00 | 1.00 | 1.25 | 1.50 |
| (E) | 800 cu. yd. imported borrow | 2.00 | 1.50 | 1.25 | 2.00 | 2.00 | 1.00 |
| (F) | 450 T. min. aggregate (P.M.S.) | 5.40 | 5.00 | 6.00 | 5.30 | 6.70 | 6.00 |
| (G) | 23 T. liq. asph. MC-5 (P.M.S.) | 22.00 | 10.00 | 20.00 | 25.00 | 21.00 | 6.00 |
| (H) | 5 T. liq. asph. MC-2 (Pr. Ct.) | 25.00 | 40.00 | 40.00 | 30.00 | 60.00 | 24.00 |
| (I) | 75 cu. yd. Class "A" P.C.C. (pav't) | 12.00 | 16.00 | 20.00 | 20.00 | 18.00 | 20.00 |
| (J) | 360 cu. yd. Class "A" P.C.C. (struct.) | 24.00 | 24.00 | 31.00 | 27.50 | 32.00 | 30.00 |
| (K) | 46,500 lb. placing bar reinf. steel | .035 | .03 | .03 | .05 | .03 | .03 |
| (L) | 530 lin. ft. remove and replace tim. gd. rail | 1.25 | 1.00 | 2.00 | 1.00 | 1.50 | 2.00 |
| (M) | 1,235 lin. ft. temp. tim. guard rail | 1.25 | 1.10 | 1.00 | .60 | 1.20 | 1.75 |
| (N) | 60 ea. portable tim. barricades | 10.00 | 20.00 | 25.00 | 20.00 | 18.00 | 20.00 |
| (O) | Lump sum, reconst. fences and gates | 100.00 | 200.00 | 200.00 | 400.00 | 220.00 | 250.00 |
| (P) | Lump sum, misc. items of work | 250.00 | $1,000 | 100.13 | $1,000 | $2,000 | $1,000 |

| | | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (A) | | $1,320 | $2,500 | $4,000 | $2,000 | $3,000 | $4,000 | $5,304 | $2,500 | $1,800 | $1,250 |
| (B) | | 5.20 | 8.00 | 5.00 | 7.00 | 20.00 | 25.00 | 5.00 | 10.00 | 20.00 | 6.00 |
| (C) | | 1.35 | 2.25 | 2.00 | 2.50 | 2.50 | 3.65 | 3.00 | 3.00 | 3.00 | 5.00 |
| (D) | | 2.20 | 1.25 | 1.50 | 1.50 | 1.00 | .75 | 3.00 | 1.00 | 1.00 | 1.75 |
| (E) | | 3.25 | 1.50 | 2.00 | 3.00 | 3.00 | 1.40 | 2.00 | 2.00 | 2.00 | 3.00 |
| (F) | | 8.50 | 6.10 | 8.13 | 7.00 | 4.50 | 5.80 | 9.00 | 7.00 | 3.50 | 5.00 |

*(Continued on next page)*



Timber Hangars for the Navy's war planes.

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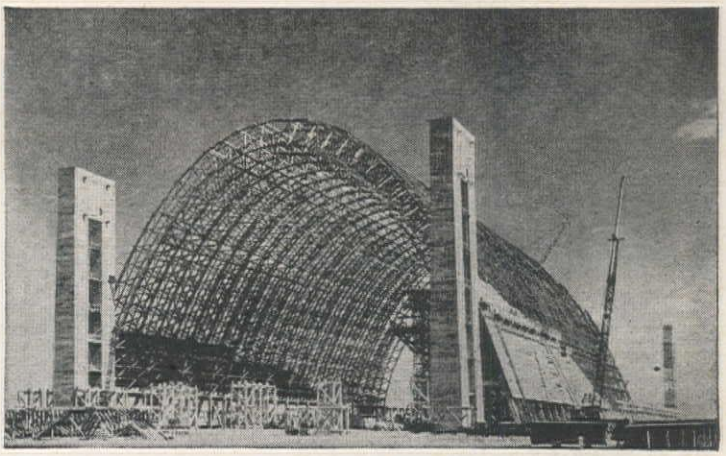

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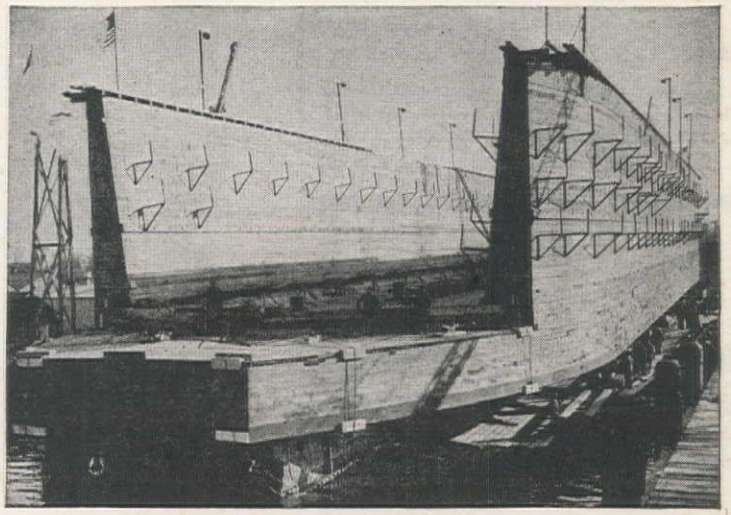
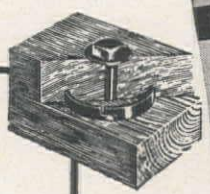


Floating Drydock. Timber connectored structure for vessel repair at sea.

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (G) | 23.00 | 17.00 | 25.00 | 25.00 | 30.00 | 10.00 | 25.00 | 20.00 | 40.00 | 25.00 |
| (H) | 90.00 | 50.00 | 30.00 | 40.00 | 30.00 | 30.00 | 60.00 | 50.00 | 40.00 | 50.00 |
| (I) | 16.00 | 25.00 | 17.00 | 20.00 | 20.00 | 23.00 | 15.00 | 20.00 | 20.00 | 16.00 |
| (J) | 36.00 | 26.50 | 35.00 | 35.00 | 35.00 | 29.00 | 30.00 | 38.00 | 29.00 | 65.00 |
| (K) | .04 | .035 | .03 | .05 | .04 | .03 | .03 | .05 | .025 | .05 |
| (L) | 1.30 | 1.50 | 2.00 | 1.50 | 1.50 | .80 | 2.00 | 1.00 | 2.00 | 2.50 |
| (M) | 1.40 | 1.50 | .50 | 1.00 | .75 | 1.20 | 1.50 | 2.00 | 2.00 | 3.00 |
| (N) | 20.00 | 25.00 | 18.00 | 25.00 | 15.00 | 18.00 | 20.00 | 25.00 | 15.00 | 15.00 |
| (O) | 270.00 | 250.00 | 250.00 | 800.00 | 200.00 | 300.00 | 500.00 | 500.00 | 500.00 | 500.00 |
| (P) | 375.00 | $2,825 | 500.00 | $1,000 | $1,000 | 600.00 | $1,500 | $1,575 | $10,396 | 500.00 |

# Airport . . .

## California—Orange County—Navy—Runways & Pave.

Macco Construction Co., Clearwater, bid low at $1,398,136, to the Bureau of Yards & Docks, Washington, D. C., and was awarded the contract for grading and paving runways and parking areas, and installing field lighting, at the Marine Corps Air Station, El Toro. The following total and unit bids were submitted on the work:

(1) Macco Construction Co. ..... $1,398,136
(2) MacDonald & Kahn, Inc. ..... 1,487,974
(3) Casson & Ball ..... 1,514,812
(4) Basich Bros. ..... 1,520,080
(5) Morrison-Knudsen Co., Inc. ..... 1,577,938
(6) Bressi-Bevanda, Contractors ..... $1,582,450
(7) Haddock-Engineers, Ltd. ..... 1,594,125
(8) A. Teichert & Co. ..... 1,646,637
(9) Westbrook & Bing ..... 1,647,233
(10) Western Contracting Corp. ..... 1,791,442

(A) 175,000 cu. yd. excav.
(B) 338,000 T. select base material
(C) 30,000 T. crusher run base
(D) 13,600 T. asph. cem. concrete
(E) 60 T. emuls. oil
(F) 94,000 cu. yd. cement concrete
(G) 1,725 cu. yd. cem. concrete, culverts
(H) 130 cu. yd. cem. concrete, catchbasins
(I) 800 lin. ft. 33-in. reinf. conc. pipe
(J) 1,000 lin. ft. 18-in. extra str., reinf. conc. pipe
(K) 525 lin. ft. 21in. extra str., reinf. conc. pipe
(L) 175 lin. ft. 27-in. extra str., reinf. conc. pipe
(M) 1,400 lin. ft. 30-in. extra str., reinf. conc. pipe
(N) 420 lin. ft. 33-in. extra str., reinf. conc. pipe
(O) 150 lin. ft. 36-in. extra. str., reinf. conc. pipe
(P) Lump sum, rem. and relay 450 lin. ft. conc. pipe culv.
(Q) Lump sum, sewer line compl. with manholes
(R) Lump sum, remove and reconst. 2-truck fill stds.
(S) Lump sum, remove and relay 10-in. water line
(T) Lump sum, elec. lighting system.
(U) Lump sum, building construction

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| (A) | .42 | .27 | .30 | .31 | .44 | .45 | .58 | .40 | .75 | .57 |
| (B) | .56 | .74 | .76 | .78 | .81 | .65 | .67 | .85 | .86 | .80 |
| (C) | 1.50 | .80 | 1.55 | 1.20 | 1.10 | 1.60 | 1.67 | 1.60 | 1.75 | 1.84 |
| (D) | 4.50 | 4.00 | 3.70 | 4.50 | 4.05 | 4.50 | 3.93 | 3.90 | 3.83 | 3.85 |
| (E) | 20.00 | 18.00 | 21.00 | 25.00 | 20.50 | 30.00 | 26.60 | 20.00 | 25.00 | 32.30 |
| (F) | 8.32 | 9.85 | 9.70 | 10.00 | 9.60 | 10.35 | 10.20 | 10.30 | 9.72 | 11.75 |
| (G) | 32.00 | 30.00 | 33.00 | 27.00 | 44.00 | 35.00 | 39.30 | 42.00 | 37.50 | 36.00 |
| (H) | 75.00 | 34.00 | 60.00 | 30.00 | 50.00 | 60.00 | 48.50 | 50.00 | 37.50 | 61.00 |
| (I) | 7.50 | 6.70 | 9.00 | 6.00 | 10.00 | 7.50 | 7.60 | 7.50 | 8.00 | 8.03 |
| (J) | 5.75 | 3.80 | 5.60 | 4.00 | 6.20 | 4.00 | 4.50 | 4.65 | 4.75 | 3.87 |
| (K) | 6.75 | 4.40 | 6.50 | 4.50 | 6.80 | 5.00 | 5.40 | 5.30 | 5.40 | 4.58 |
| (L) | 9.50 | 5.70 | 9.00 | 5.50 | 9.60 | 8.00 | 7.15 | 7.00 | 6.70 | 6.68 |
| (M) | 9.75 | 6.60 | 9.20 | 6.25 | 10.35 | 9.00 | 7.75 | 7.90 | 7.50 | 8.00 |
| (N) | 8.50 | 7.60 | 10.00 | 7.00 | 11.40 | 10.00 | 8.50 | 9.00 | 8.25 | 9.07 |
| (O) | 11.00 | 8.70 | 12.00 | 8.00 | 13.00 | 12.00 | 10.25 | 10.00 | 9.00 | 9.92 |
| (P) | $5,000 | $2,000 | $2,750 | $2,500 | $4,480 | $2,700 | $2,700 | $4,150 | $2,300 | $4,200 |
| (Q) | $3,100 | $1,300 | $2,700 | $2,000 | $3,765 | $2,300 | $2,550 | $3,000 | $3,300 | $2,100 |
| (R) | $3,700 | $1,000 | 500.00 | $1,000 | 635.00 | $1,000 | $1,900 | 900.00 | $2.200 | $1,300 |
| (S) | $2,800 | 750.00 | $1,500 | $1,500 | $1,400 | $1,300 | $1,850 | $1,500 | $2 200 | $1,300 |
| (T) | $61,000 | $67,800 | $60,900 | $61,000 | $73,920 | $67,000 | $59,000 | $65,000 | $68,000 | $73,000 |
| (U) | $22,500 | $30,000 | $24,450 | $20,000 | $28,470 | $25,000 | $29,500 | $25,000 | $27,500 | $25,000 |

## Arizona—Navajo County—Civil Aeronautics Admin.—Runways & Pave.

Silver State Construction Co., Fallon, Nevada, bid low at $437,119 to the Civil Aeronautics Administration, Santa Monica, Calif., for the construction of runway extensions, taxiways, concrete warm-up apron, and related work at Winslow Airport, near Winslow. The following total and unit bids were submitted:

(A) Silver State Construction Co. ..... $437,119
(B) M. N. Sundt Construction Co. ..... 450,762
(C) Lowdermilk Bros. ..... 507,074
(D) W. W. Clyde & Co. ..... 543,370
(E) L. M. White Construction Co. & M. H. Hasler ..... 553,373
(F) Wallace & Wallace ..... 558,898
(G) Owl Truck & Construction Co. ..... 577,938
(H) Morrison-Knudsen Co., Inc. ..... $596,813
(I) Guerin Bros. ..... 636,543
(J) Tanner Construction Co. ..... 638,641
(K) E. B. Bishop ..... 644,385
(L) Peter Kiewit Sons' Co. ..... 644,780
(M) Bowen-McLaughlin ..... 650,574
(N) Basich Bros. ..... 670,530
(O) J. A. Terteling & Sons Co. ..... 750,333

| | | (A) | (B) | (C) | (D) | (E) |
|---|---|---|---|---|---|---|
| (1) | 154 acre clear and grub | 10.00 | 10.00 | 20.00 | 18.00 | 12.50 |
| (2) | Lump sum, rem. windmill, cable, bldg., etc. | $1,000 | 500.00 | 500.00 | $2,400 | $1,250 |
| (3) | 230,000 cu. yd. unclass. grading | .35 | .33 | .49 | .47 | .50 |
| (4) | 25,000 cu. yd. borrow excavation | .20 | .20 | .30 | .30 | .50 |
| (5) | 9,000 cu. yd. borrow excavation | 1.50 | 1.68 | 1.50 | 1.85 | 2.00 |
| (6) | 3,707 lin. ft. 12-in. reinf. conc. drain pipe | 2.00 | 2.30 | 2.25 | 3.25 | 2.85 |
| (7) | 338 lin. ft. 15-in. same | 3.00 | 2.78 | 3.00 | 3.25 | 3.45 |
| (8) | 1,120 lin. ft. 18-in. same | 3.50 | 3.67 | 4.00 | 3.90 | 4.25 |
| (9) | 666 lin. ft. 21-in. same | 4.00 | 4.08 | 4.25 | 4.70 | 4.70 |
| (10) | 654 lin. ft. 24-in. same, extra str. | 5.00 | 5.20 | 5.75 | 7.70 | 6.00 |
| (11) | 1,158 lin. ft. 30-in. same | 7.00 | 7.07 | 7.50 | 9.60 | 8.00 |
| (12) | 66 cu. yd. conc. catchbasin, headwall, etc. | 35.00 | 27.50 | 60.00 | 45.00 | 45.00 |
| (13) | 34 ea. catchbasin, grating, wood | 20.00 | 7.50 | 35.00 | 18.00 | 22.00 |
| (14) | 2,520 cu. yd. struc. excavation | 1.00 | 1.75 | 1.00 | 2.25 | 2.00 |
| (15) | 67,500 cu. yd. drainage ditch excav. | .45 | .285 | .35 | .70 | .65 |
| (16) | 700 sq. yd. erosion protection, 3-in. AC | .50 | 2.50 | 1.00 | 2.00 | 1.30 |
| (17) | 50 sq. yd. same, grouted riprap | 5.00 | 3.00 | 7.50 | 2.50 | 6.00 |
| (18) | 11,780 lin. ft. fence, 5-wire, wd. posts | .30 | .10 | .25 | .21 | .30 |
| (19) | 7,640 lin. ft. fence, relocate exist. | .10 | .10 | .20 | .20 | .25 |
| (20) | Lump sum, cattle guard, wd. & conc., gate | 300.00 | 250.00 | 600.00 | 350.00 | 380.00 |
| (21) | 166 lin. ft. 6-in. vitr. clay pipe | 1.00 | 1.00 | 2.00 | .90 | 2.00 |
| (22) | Lump sum, rem. ex. conc. range lights, etc. | 500.00 | 850.00 | 300.00 | 300.00 | 500.00 |
| (23) | 6,000 lin. ft. furn. & inst. 3-in. fiber duct | 1.00 | .835 | 2.00 | 1.50 | 1.00 |
| (24) | 4 ea. relocate ex. flush lights | 100.00 | 100.00 | 50.00 | 25.00 | 125.00 |
| (25) | 6,666 sq. yd. pl. conc. pave., apron | 3.00 | 2.70 | 3.50 | 4.00 | 3.50 |
| (26) | 144 T. tiedown anchors, Govt. furn. | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| (27) | 70,000 T. gravel subbase course | .90 | .85 | .80 | .90 | .81 |
| (28) | 2,000 M. gal. watering | 1.50 | 1.68 | 1.50 | 1.85 | 2.00 |
| (29) | 45,000 T. gravel base course, 2-in. | 1.00 | 1.00 | 1.00 | 1.05 | 1.15 |

*(Continued on next page)*

# "CARCO HOISTS ARE *Unsurpassed* IN THEIR FIELD"

IT'S the man on the job who *knows*. And often, the tougher the construction job, the more sold the man on the job is on Carco Hoists.

Take R. W. Sleight of the Sleight Construction Company of Portland, Oregon, who has several tractors equipped with Carco Hoists. Says he, "We find Carco Hoists unusually sturdy, efficient and free from trouble. Over long periods of severe service, we have learned to depend on Carco products and regard them as being unsurpassed in their field."

Mr. Sleight is only one of many boosters for Carco Hoists who have learned their worth the hard way. The smooth, efficient performance, long life and economical operation of Carco Hoists have won them a top spot with hundreds of Pacific Coast Contractors.

Today, Carco Hoists are proving their sturdy dependability on crucial wartime jobs at many of our fighting fronts, and on jobs at home. Carco Hoists are tough because they're made with Carcometal, which has an elastic strength almost twice that of ordinary cast steel. Carcometal is a patented alloy steel product of Pacific Car and Foundry.

Naturally, with such important wartime assignments, Pacific Car production is mainly turned to making Hoists and other war equipment. Nevertheless, because of almost tripled production, Carco Hoists are still available for many war-essential jobs.

## PACIFIC CAR AND FOUNDRY COMPANY

SEATTLE, WASHINGTON

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

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (30) | 30,800 T. gravel leveling course | | | | | 1.20 | 1.10 | 1.10 | 1.25 | 1.35 |
| (31) | 2,000 M. gal. watering | | | | | 1.50 | 1.68 | 1.50 | 1.85 | 2.00 |
| (32) | 98,000 gal. liq. asph., MC-1 | | | | | .10 | .127 | .13 | .12 | .13 |
| (33) | 20,020 T. asph. concrete | | | | | 2.00 | 3.26 | 2.75 | 2.50 | 3.00 |
| (34) | 1,620 T. asph. conc. (special) cr. rock | | | | | 4.00 | 4.40 | 4.80 | 6.00 | 7.00 |
| (35) | 1,290 T. paving asph. (120-150 pen.) | | | | | 20.00 | 23.50 | 30.00 | 24.00 | 27.50 |
| (36) | 49,000 gal. liq. asph., RC-2, seal coat | | | | | .10 | .131 | .13 | .12 | .13 |
| (37) | 1,450 T. min. aggr., seal coat | | | | | 2.00 | 2.60 | 4.00 | 4.00 | 3.00 |
| | | (F) | (G) | (H) | (I) | (J) | (K) | (L) | (M) | (N) | (O) |
| (1) | | 10.00 | 20.00 | 13.00 | 25.00 | 15.00 | 17.00 | 20.00 | 20.00 | 15.00 | 25.00 |
| (2) | | $1,000 | $1,500 | $1,300 | $2,000 | $2,000 | 700.00 | $1,000 | 750.00 | $1,000 | $1,000 |
| (3) | | .60 | .51 | .525 | .45 | .75 | .65 | .76 | .58 | .70 | 1.06 |
| (4) | | .55 | .45 | .35 | .71 | .70 | .45 | .48 | .38 | .70 | .40 |
| (5) | | 1.75 | 1.90 | 1.58 | 2.00 | 1.40 | 1.75 | 2.75 | 2.00 | 2.00 | 2.00 |
| (6) | | 2.85 | 2.75 | 3.75 | 2.50 | 2.70 | 2.25 | 2.78 | 2.00 | 3.50 | 2.65 |
| (7) | | 3.80 | 3.40 | 4.55 | 3.00 | 3.20 | 2.75 | 3.27 | 2.50 | 4.00 | 3.40 |
| (8) | | 5.00 | 4.30 | 5.57 | 4.00 | 4.00 | 3.75 | 4.03 | 3.25 | 4.75 | 4.30 |
| (9) | | 5.90 | 4.75 | 6.30 | 4.50 | 4.30 | 4.75 | 4.37 | 4.00 | 5.50 | 4.80 |
| (10) | | 7.25 | 6.00 | 7.70 | 6.00 | 6.20 | 5.75 | 5.45 | 5.00 | 8.00 | 6.15 |
| (11) | | 9.50 | 8.60 | 10.70 | 8.00 | 8.20 | 7.75 | 7.37 | 7.50 | 11.00 | 8.50 |
| (12) | | 40.00 | 55.00 | 74.00 | 60.00 | 75.00 | 40.00 | 35.00 | 50.00 | 40.00 | 40.00 |
| (13) | | 25.00 | 14.50 | 14.30 | 15.00 | 7.50 | 17.00 | 15.00 | 20.00 | 40.00 | 20.00 |
| (14) | | 2.50 | 4.05 | 2.90 | 2.50 | 5.00 | 3.00 | 3.58 | 3.00 | 4.00 | 3.50 |
| (15) | | .55 | .56 | .43 | .75 | .75 | .90 | .69 | .85 | .70 | .75 |
| (16) | | 1.25 | 1.50 | 3.85 | 3.00 | 1.00 | 1.15 | .85 | 1.50 | 1.50 | 1.30 |
| (17) | | 4.00 | 3.00 | 5.15 | 10.00 | 2.50 | 2.00 | 15.00 | 5.00 | 5.00 | 3.60 |
| (18) | | .25 | .18 | .23 | .35 | .20 | .35 | .20 | .24 | .30 | .20 |
| (19) | | .20 | .10 | .25 | .40 | .15 | .25 | .15 | .18 | .25 | .15 |
| (20) | | 600.00 | 250.00 | 600.00 | 200.00 | 500.00 | 225.00 | 350.00 | 400.00 | 500.00 | 275.00 |
| (21) | | 1.50 | 1.50 | .90 | 2.00 | 1.10 | 1.75 | 1.55 | 1.00 | 2.00 | .90 |
| (22) | | 700.00 | $1,300 | 275.00 | 425.00 | 500.00 | 450.00 | 150.00 | 600.00 | 400.00 | 500.00 |
| (23) | | 2.00 | .90 | 1.40 | 2.00 | 1.00 | 1.75 | .50 | 1.00 | 1.10 | 1.00 |
| (24) | | 150.00 | 125.00 | 200.00 | 100.00 | 150.00 | 55.00 | 25.00 | 125.00 | 300.00 | 100.00 |
| (25) | | 3.25 | 2.95 | 3.00 | 2.50 | 3.00 | 3.50 | 3.94 | 3.75 | 3.00 | 4.25 |
| (26) | | .75 | 1.50 | .90 | 2.50 | 1.00 | .60 | .50 | 2.00 | 1.00 | 1.00 |
| (27) | | .80 | 1.06 | 1.05 | 1.15 | .95 | 1.00 | .99 | 1.30 | 1.10 | 1.20 |
| (28) | | 1.75 | 1.90 | 1.65 | 2.00 | 1.40 | 1.75 | 2.75 | 2.00 | 2.00 | 2.00 |
| (29) | | 1.05 | 1.25 | 1.33 | 1.75 | 1.20 | 1.40 | 1.16 | 1.57 | 1.50 | 1.35 |
| (30) | | 1.20 | 1.44 | 1.46 | 2.00 | 1.40 | 1.60 | 1.21 | 1.70 | 1.60 | 1.45 |
| (31) | | 1.75 | 1.90 | 1.65 | 2.00 | 1.40 | 1.75 | 2.75 | 2.00 | 2.00 | 2.00 |
| (32) | | .12 | .12 | .125 | .123 | .12 | .11 | .135 | .12 | .12 | .13 |
| (33) | | 2.50 | 3.17 | 3.45 | 3.00 | 2.75 | 3.25 | 2.77 | 2.90 | 3.30 | 3.35 |
| (34) | | 6.30 | 3.41 | 8.50 | 5.10 | 10.00 | 7.00 | 8.90 | 10.00 | 6.50 | 10.00 |
| (35) | | 25.00 | 20.50 | 28.00 | 30.00 | 25.00 | 25.00 | 36.66 | 25.66 | 23.66 | 26.00 |
| (36) | | .11 | .125 | .12 | .12 | .12 | .11 | .135 | .12 | .12 | .13 |
| (37) | | 4.25 | 5.00 | 3.35 | 3.50 | 6.00 | 4.50 | 4.00 | 4.00 | 4.50 | 3.00 |

# Highway and Street . . .

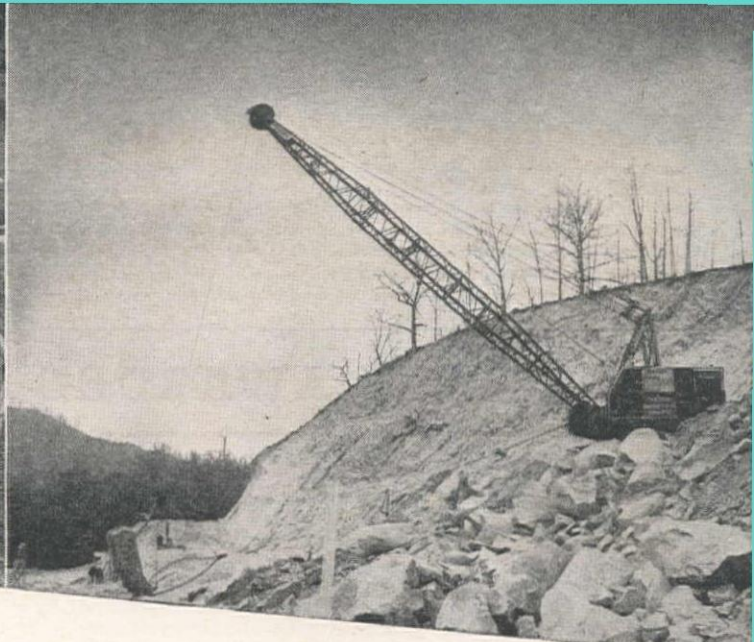
## Arizona—Navajo County—State—Grade & Surf.

Wallace & Wallace Contractors, Phoenix, bid low at $163,325 to the Arizona State Highway Department, Phoenix, and were awarded the contract for grading, draining, placing aggregate base course and applying road mixed bituminous surfacing on approximately 10.0 mi. of access road extending from Winslow southwesterly. The following total and unit bids were submitted:

| | | | |
|---|---|---|---|
| (A) | Wallace & Wallace, Contractors | $163,325 | |
| (B) | M. M. Sundt Construction Co. | 173,770 | |
| (C) | N. G. Hill & Co. | 182,983 | |
| (D) | Phoenix-Tempe Stone Co. | 187,452 | |
| (E) | P.D.O.C. | 190,824 | |
| (F) | W. J. Henson, Contractor | 192,005 | |
| (G) | Tiffany Construction Co. | $192,010 | |
| (H) | L. M. White Contracting Co. | 208,182 | |
| (I) | Tanner Construction Co. | 214,067 | |
| (J) | Martin Construction Co. | 215,237 | |
| (K) | Arizona Sand & Rock Co. | 217,869 | |
| (L) | J. E. Skousen, Contractor | 232,430 | |

(1) 34,822 cu. yd. roadway excav. (unclass.)
(2) 11,228 cu. yd. drainage excav. (unclass.)
(3) 46,125 lin. ft. grader ditches
(4) 1,749 cu. yd. structural excav. (unclass.)
(5) 49,419 sta. yd. station yard overhaul
(6) 1,494 cu. yd. mi. cubic yard mile haul
(7) 53,137 cu. yd. imported borrow (CIP)
(8) 12,093 T. select material (CIP)
(9) 49,781 T. fine aggregate base course (CIP)
(10) 4,517 M. gal. sprinkling (CIP)
(11) 1,174 hr. rolling
(12) 1,110 cu. yd. Cl. "A" conc. (including cem.)
(13) 101 cu. yd. Cl. "B" conc. (including cem.)
(14) 157 cu. yd. Cl. "D" conc. (including cem.)
(15) 85,900 lb. reinforcing steel (bars) (CIP)
(16) 2,320 lb. structural steel (CIP)
(17) 72 lin. ft. 18-in. plain conc. pipe (CIP except excav.)
(18) 1,598 lin. ft. 21-in. plain conc. pipe (CIP except excav.)
(19) 155 cu. yd. plain riprap (CIP)
(20) 8 ea. guide posts (CIP)
(21) 71 ea. R/W markers (Type "B") (CIP)
(22) 2,459 T. mineral aggregate (CIP on road)
(23) 127 T. cutback asphalt (MC-2 or MC-3) (CIP on road)
(24) 1.481 mi. processing road mix
(25) 243 T. screenings (CIP on road)
(26) 34 T. emulsified asphalt (Class "A") (for seal coat) (CIP on road)
(27) 110 sq. yd. placing intersections

| | (A) | (B) | (C) | (D) | (E) | (F) | (G) | (H) | (I) | (J) | (K) | (L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | .36 | .24 | .50 | .71 | .40 | .50 | .52 | .50 | .75 | .75 | .51 | .88 |
| (2) | .40 | .28 | .40 | .44 | .40 | .50 | .40 | .75 | .50 | .60 | .48 | .90 |
| (3) | .07 | .05 | .02 | .04 | .06 | .03 | .04 | .05 | .04 | .03 | .01 | .07 |
| (4) | 2.00 | 2.50 | 2.50 | 1.25 | 2.00 | 2.50 | 4.00 | 2.00 | 2.50 | 3.00 | 1.50 | 4.00 |
| (5) | .02 | .035 | .01 | .025 | .03 | .02 | .02 | .02 | .02 | .02 | .015 | .03 |
| (6) | .20 | .40 | .40 | .31 | .30 | .16 | .35 | .25 | .12 | .25 | .24 | .40 |
| (7) | .36 | .34 | .54 | .37 | .45 | .40 | .30 | .50 | .55 | .50 | .72 | .47 |
| (8) | .65 | .75 | .65 | .71 | .50 | .90 | .90 | .75 | .85 | .70 | .79 | .80 |
| (9) | .80 | 1.10 | .90 | .94 | 1.00 | 1.20 | 1.10 | 1.25 | 1.20 | 1.30 | 1.26 | 1.15 |
| (10) | 1.75 | 2.50 | 1.50 | 2.50 | 2.00 | 2.50 | 2.60 | 2.25 | 1.50 | 2.00 | 2 50 | 2.50 |
| (11) | 4.00 | 2.50 | 4.00 | 4.00 | 6.00 | 4.00 | 3.50 | 4.50 | 4.50 | 4 00 | 3.75 | 5.00 |
| (12) | 26.00 | 25.00 | 29.00 | 27.50 | 29.00 | 22.00 | 27.00 | 26.00 | 27.50 | 25.00 | 26 50 | 29.00 |
| (13) | 25.00 | 24.50 | 35.00 | 27.50 | 38.00 | 22.00 | 26.00 | 26.00 | 25.00 | 24.50 | 25.50 | 40.00 |
| (14) | 26.50 | 26.00 | 33.00 | 37.50 | 35.00 | 23.00 | 27.00 | 26.00 | 35.00 | 27.00 | 27.00 | 30.00 |
| (15) | .065 | .075 | .065 | .06 | .065 | .06 | .08 | .08 | .075 | .07 | .075 | .08 |
| (16) | .25 | .18 | .25 | .22 | .25 | .20 | .25 | .15 | .20 | .15 | .24 | .25 |
| (17) | 3.60 | 2.90 | 3.00 | 2.50 | 3.50 | 3.00 | 2.30 | 3.50 | 3.60 | 4.00 | 4.80 | 5.00 |
| (18) | 4.10 | 3.25 | 3.25 | 3.20 | 5.00 | 4.00 | 2.70 | 4.50 | 3.90 | 5.50 | 6 00 | 5.50 |
| (19) | 7.50 | 3.50 | 4.25 | 6.25 | 8.00 | 3.00 | 15.00 | 7.00 | 7.50 | 5 00 | 7.00 | 10.00 |
| (20) | 5.00 | 2.50 | 5.00 | 4.35 | 4.00 | 3.00 | 3.00 | 4.00 | 7.50 | 5.00 | 4.00 | 5.00 |
| (21) | 5.00 | 4.90 | 4.25 | 5.00 | 5.00 | 7.50 | 4.00 | 5.00 | 5.00 | 5.00 | 4.00 | 5.00 |
| (22) | 1.00 | 1.15 | 1.00 | 1.00 | 1.40 | 1.50 | 1.40 | 1.25 | 1.20 | 1.25 | 1 26 | 1.60 |
| (23) | 26.00 | 33.30 | 24.00 | 29.50 | 30.00 | 24.50 | 24.50 | 30.00 | 30.00 | 30.00 | 28 00 | 29.00 |
| (24) | 500.00 | 500.00 | 600.00 | 625.00 | $1,000 | 800.00 | 800.00 | 600.00 | 500.00 | 500.00 | 600.00 | 600.00 |
| (25) | 5.00 | 2.60 | 4.00 | 5.00 | 4.00 | 6.00 | 5.00 | 4.00 | 5.00 | 4.00 | 3.00 | 4.50 |
| (26) | 30.00 | 33.00 | 29.00 | 32.50 | 30.00 | 34.00 | 36.00 | 40.00 | 40.00 | 35.00 | 40.00 | 33.00 |
| (27) | .50 | 1.00 | .30 | .65 | 1.00 | .30 | .40 | .60 | .50 | .50 | 1.00 | 1.00 |

# MARIONS *have* STAMINA

## FOR THE TOUGHEST ROAD BUILDING AND HEAVY CONSTRUCTION PROJECTS

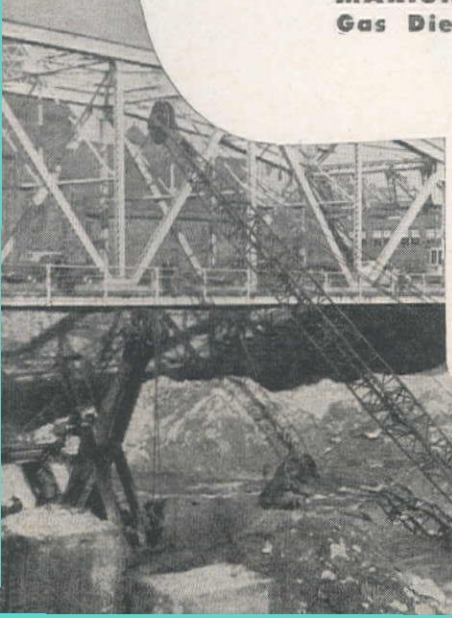
*IT PAYS TO MODERNIZE WITH MARIONS*

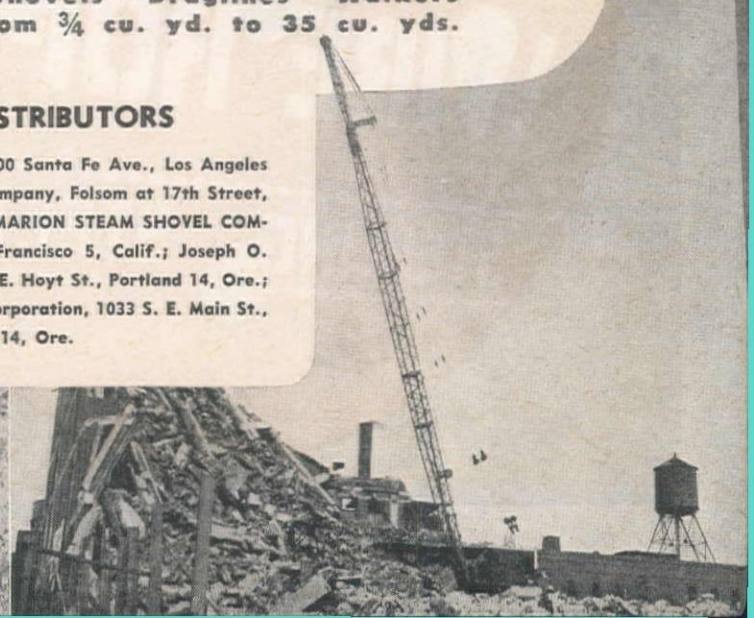
**THE MARION STEAM SHOVEL CO.**

**MARION, OHIO, U. S. A. • Shovels • Draglines • Walkers**
**Gas Diesel • Electric • From ¾ cu. yd. to 35 cu. yds.**

### MARION DISTRIBUTORS

Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Los Angeles 11, Calif.; Edward R. Bacon Company, Folsom at 17th Street, San Francisco 10, Calif.; THE MARION STEAM SHOVEL COMPANY, 571 Howard St., San Francisco 5, Calif.; Joseph O. Reed, Parklawn Apts., 2504 N. E. Hoyt St., Portland 14, Ore.; Walling Tractor & Equipment Corporation, 1033 S. E. Main St., Portland 14, Ore.





# CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information 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 . . .

**P. D. O. C.**, Phoenix, Ariz., received a $396,679 contract for concrete pavement and taxiway and runway extensions at Army Air Field, Datelan, Ariz., by U. S. Engineer Office, Los Angeles, Calif.

**Macco Construction Co.**, Clearwater, Calif., was awarded a $1,398,136 contract for grading and paving runways and parking aprons, installing field lighting at Marine Corps Air Station, El Toro, Calif., by Bureau of Yards & Docks, Washington, D. C.

**A. D. Drum, Jr.**, Fallon, Nev., bid low at $624,116 and was awarded the contract for additional landing field facilities and roads at Indian Springs, Nev., by U. S. Engineer Office, Los Angeles, Calif.

**H. B. Zachry Co.**, San Antonio, Tex., was awarded a $354,996 contract for runways and taxiway at Randolph Field, San Antonio, Tex., by U. S. Engineer Office, San Antonio.

**Thomas Bate & Son**, Denver, Colo., received a $375,667 contract for installing a sanitary sewer line in Lakewood, Colo., by the Lakewood Sanitary Sewer District, Lakewood.

**J. F. Shea Co., Ltd.**, Los Angeles, Calif., at $1,660,681, was awarded a contract for Schedules 3 and 4 of the Coachella Canal System, Boulder Canyon Project in Southern California, by Bureau of Reclamation, Denver, Colo.

**Guy F. Atkinson Co.**, Long Beach, Calif., was awarded a $628,000 contract for an electrical and optical shop at U. S. Naval Drydocks, Terminal Island, Calif., by Bureau of Yards & Docks, Washington, D. C.

**J. D. Thomas** and **Beyer Construction Co.**, Los Angeles, Calif., were awarded a $1,883,739 contract for 1,000 dwelling units on Santa Fe Ave., near Willow St., Long Beach, Calif., by FPHA, San Francisco.

**Nilson Smith Construction Co.**, Great Falls, on a bid of $371,393, was awarded a contract for grading, placing base course and plantmix surf. and drainage structures on the Tarkio-Missoula Road, Missoula County, Mont., by State Highway Commission, Helena.

**Zoss Construction Co.**, Los Angeles, Calif., at $1,268,299, a contract for buildings and electrical distribution system at A. A. F. Supply Depot, Maywood, Calif., by U. S. Engineer Office, Los Angeles.

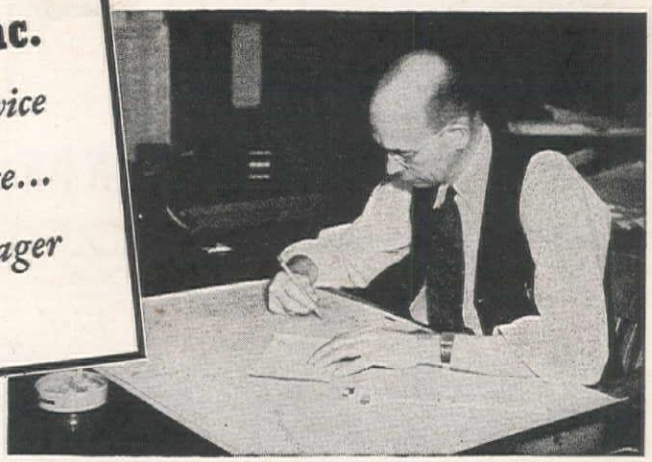
**Hodges & Karn**, Los Angeles, Calif., about $3,500,000 for buildings at Coronado, Calif., by Bureau of Yards & Docks, Washington, D. C.

**Dinwiddie Construction Co.**, San Francisco, Calif., was awarded a $917,900 contract for additional barracks at Yerba Buena Island, Calif., by Bureau of Yards & Docks, Washington, D. C.

**MacDonald & Kahn, Inc.**, San Francisco, Calif., at $995,300, a contract for 528 dwelling units on Army and Vermont Sts., in San Francisco, by FPHA, San Francisco.

# TIMBER STRUCTURES, Inc.

*extends Pacific Coast & Export Service with opening of San Francisco office... Arthur P. Cramer, Engineer-Manager*



In order to establish complete co-operation and quick contact with industry in the coast and mountain states on their current and postwar building plans, Timber Structures, Inc. has opened a sales-engineering office in San Francisco.

### *Cramer in Charge*

Arthur P. Cramer, Timber Structures engineer, is in charge of the office. Mr. Cramer is well known to contractors, architects and engineers on the Pacific Coast. A consulting engineer in his own right, he has been associated with Timber Structures for the past three years and has been identified with many outstanding timber construction projects, one of which is the navy blimp dock at Moffett Field, California.

To building men responsible for erecting new plant structures of various kinds, Mr. Cramer and his staff can be of special service. Through Timber Structures' policy of "Engineering in Wood" it has been our privilege to work closely with various industries and with governmental agencies.

### *"Engineering in Wood"*

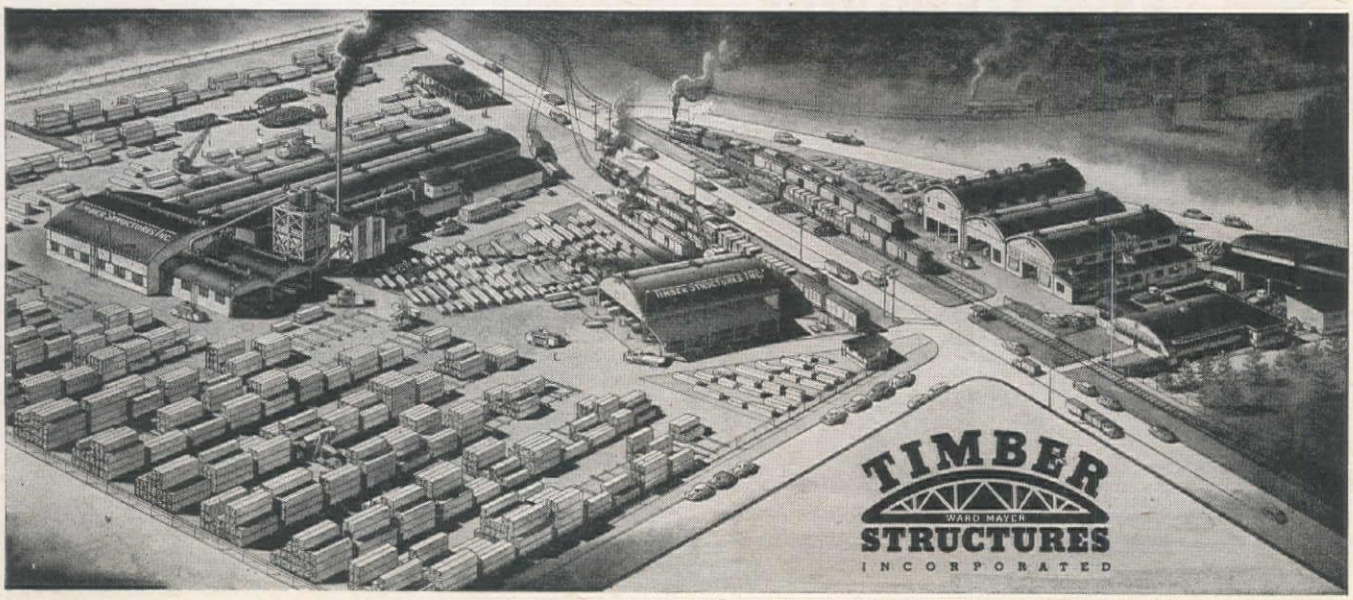
"Engineering in Wood" covers many things. Research, design, engineering, prefabrication, transportation, erection. All are part of our service to architects, plant management, engineers and contractors. All are responsible for the construction speed, economy, strength and permanence of roof trusses and other timber structures and items furnished by us.

### *Inquiries Invited*

We invite inquiries as to work performed and as to our ability to serve you in timber and allied structural materials. For evidence of work we have done write direct for literature.

**TIMBER STRUCTURES, INC.**
Portland 8, Oregon
Seattle, Eugene, San Francisco, New York, Trenton

**TIMBER STRUCTURES PLANT,** Portland, Ore. *(below).* Located in the heart of the nation's structural timber area. Yearly production in excess of 80 million board feet of prefabricated lumber.



**The Austin Co.**, Seattle, Wash., about $3,774,000 on a contract for barracks at Smith Cove, Island County, Wash., by Bureau of Yards & Docks, Washington, D. C.

**Howard S. Wright & Co., Inc.**, Seattle, Wash., has a contract for about $1,000,000 for constructing a plant to produce ethyl alcohol from waste sulphite liquor, in Bellingham, Wash., by Puget Sound Pulp & Timber Co., Bellingham.

**M. N. Sundt Construction Co.**, Tucson, Ariz., was awarded a $2,118,000 contract for additional aviation facilities and warehouses at Marine Corps Air Station, El Centro, Calif., by Bureau of Yards & Docks, Washington, D. C.

**Guy F. Atkinson Co.**, Long Beach, Calif., was awarded a $3,444,400 contract for rock jetty and dredging at Naval Magazine & Net Depot, Seal Beach, Calif., by Bureau of Yards & Docks, Washington, D. C.

## Highway and Street...

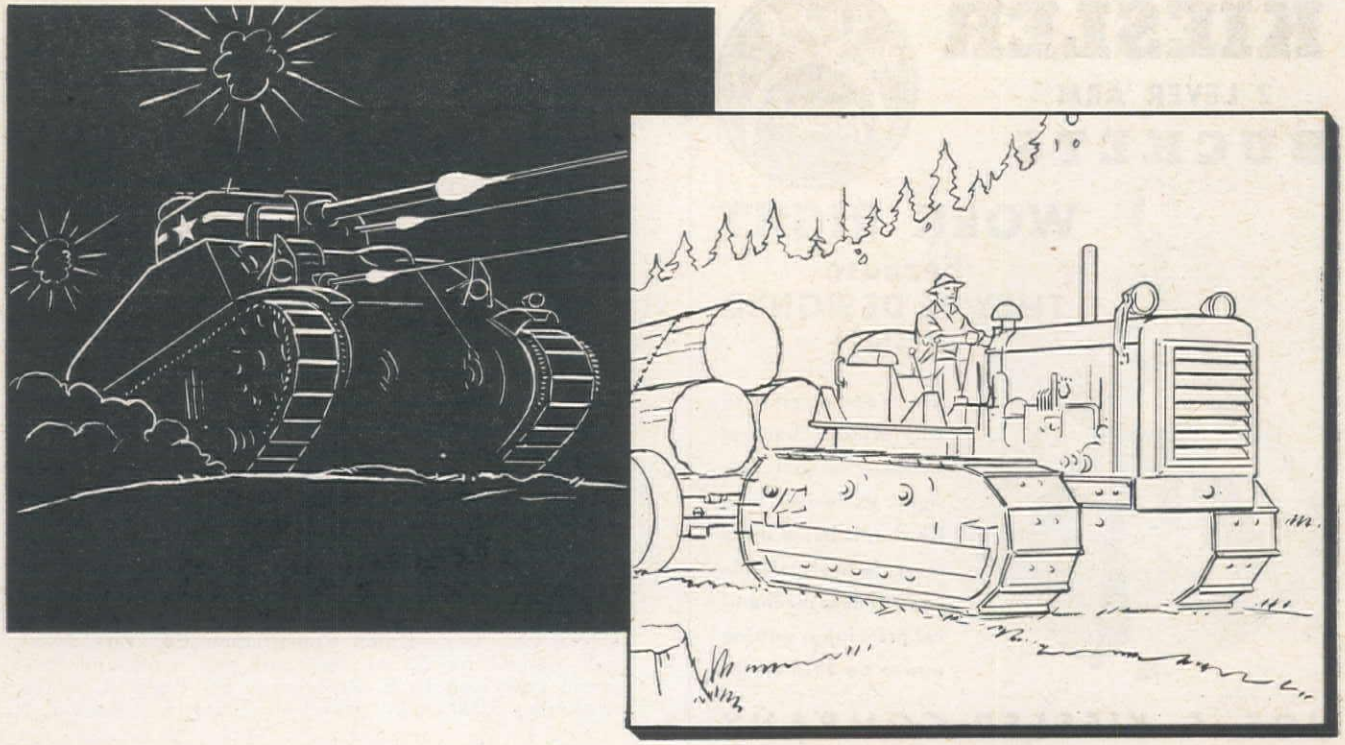
### California

CONTRA COSTA CO.—**E. E. Lowell**, P. O. Box 148, Vallejo—$100,072 for asph. conc. paving, conc. curb and gutters in Vista de Vallejo Assessment District, Vallejo—by City of Vallejo. 3-8

IMPERIAL CO.—**Brown, Doko & Baum**, Dolliver St., Pismo Beach—$69,196 for grading and roadmix surf. of 5.41 mi. of access road project—by Public Roads Administration, San Francisco. 3-14

MARIN CO.—**A. G. Raisch**, 46 Kearny St., San Francisco—$17,985 for 0.9 mi. grading portions, placing plantmix material on graded areas and existing surf. and apply seal coat between San Rafael Viaduct and California Park overhead bridge—by Calif. Div. of Hwys., Sacramento. 3-27

SAN DIEGO CO.—**Griffith Co.**, Box "G," Hillcrest Station, San Diego—$40,600 for parking area for radar equipment, Ma-



# Warfare TO Welfare!

HYDRAULICS Rodgers KEEP THE WORLD MOVING

*Manufacturers of:*

UNIVERSAL HYDRAULIC PRESSES
TRACK PRESS EQUIPMENT
HYDRAULIC KEEL BENDERS
HYDROSTATIC TEST UNITS
POWER TRACK WRENCHES
HYDRAULIC PLASTIC PRESSES
PORTABLE STRAIGHTENER
FOR PIPE AND KELLYS

RODGERS EQUIPMENT is now doing yeoman service on our fighting fronts. Its duties vary from repair of embattled tanks to servicing equally vital crawler type tractors building roads, airfields, bridges and army camps.

We hope it will not be long before Rodgers Track Presses will be giving the same yeoman service to tractor equipment engaged in work here at home for human Welfare. We are looking forward to a tremendous construction development immediately after the war, and we wish to assure tractor owners and distributors everywhere that we will be ready to take care of their track press service requirements when that time comes. Rodgers Track Presses are available now on priority for essential construction jobs.

*If it's a Rodgers, it's the best in Hydraulics.* Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minnesota.

## Rodgers HYDRAULIC Inc.

rine Corps Base, San Diego—by Bureau of Yards & Docks, Washington, D. C. 3-24

SAN DIEGO CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$75,316 for grading and surf. with P. C. conc. pavement and plantmix about 1.1 mi. of highway between Mission Valley Road and Linda Vista Housing Project—by Calif. Div. of Hwys., Los Angeles. 3-6

### Colorado

ADAMS CO.—**Edward Selander,** 2309 S. Federal Blvd., Denver—$19,128 for 0.512 mi. oil surf. on Peoria St., in Aurora—by State Hwy. Engineer, Denver. 3-13

### Idaho

BANNOCK CO.—**H. A. Gardner,** Boise—$47,886, for 1.04 mi. roadbed drainage struct. and roadmix bitum. surf. on Kraft Cheese Factory Road, from U. S. Hwy. No. 30 to Kraft Factory—by Commissioner of Public Works, Boise. 3-21

### Montana

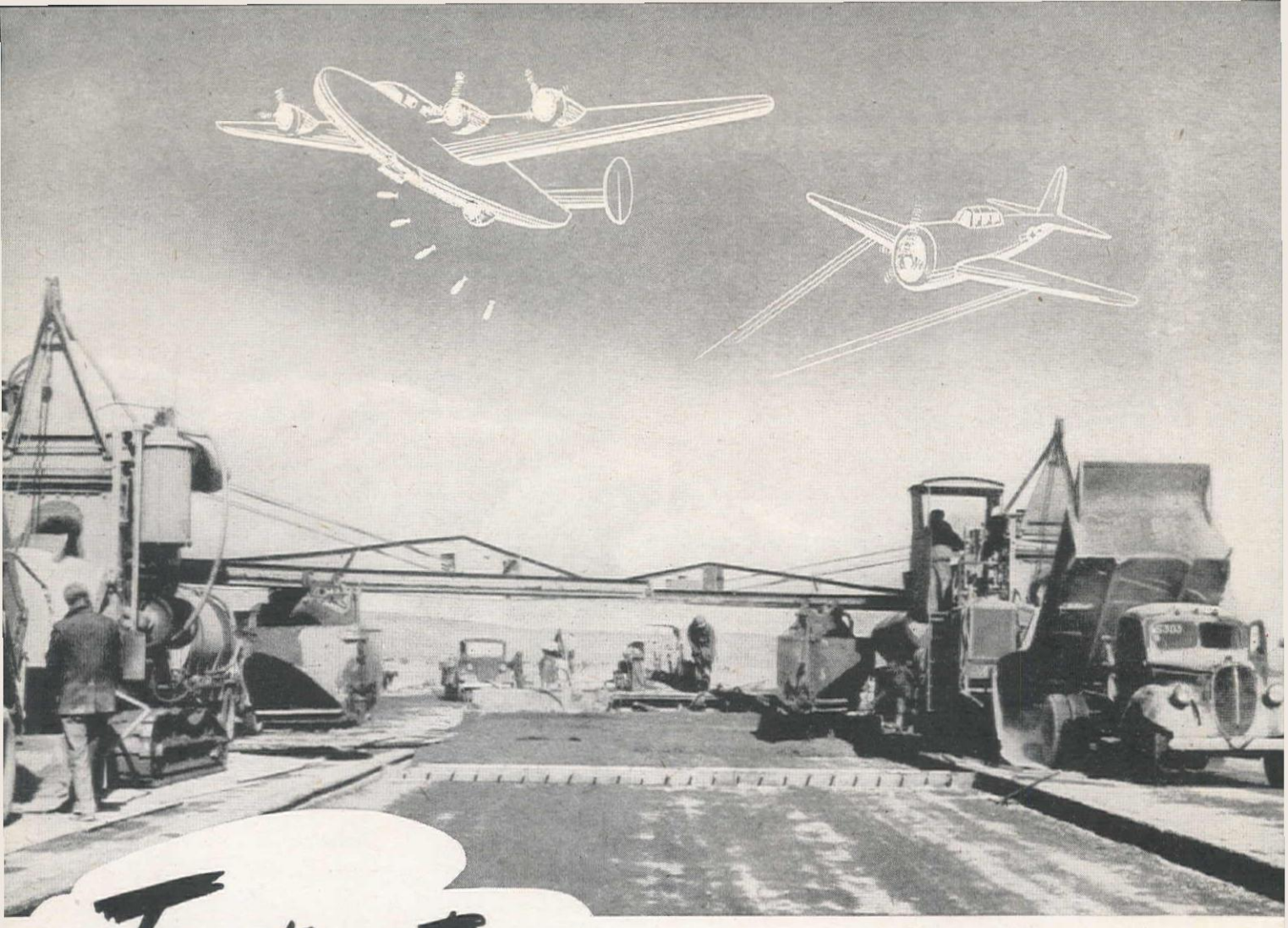
CARBON CO.—**Barnard-Curtiss Co.,** 808 Phoenix Building, Minneapolis, Minn.—$22,441 for 4.46 mi. surf. with crush. grav. and bitum. treat. on Sec. A and B, Red Lodge-Belfry Road—by State Hwy. Comm., Helena. 3-28

CASCADE & TETON COS.—**Bighorn Construction Co.,** Sheridan, Wyo.—$43,970 for stockpiling cr. grav. surf.—by State Hwy. Comm., Helena. 3-28

MINERAL CO.—**Union Construction Co.,** Box 1845, Great Falls—$9,060 for 2.3 mi. seal. with pen. asph. and cover with crush. gravel on U. S. 10 between St. Regis & Saltese; and stockpiling 5,000 cu. yd. gravel—by State Hwy. Comm., Helena. 3-28

MISSOULA CO.—**Nilson Smith Construction Co.,** P. O. Box 1147, Great Falls—$371,393 for grading, crush. grav. base course and plantmix oil surf. and drainage structures on Tarkio-Missoula Road—by State Hwy. Comm., Helena. 3-28

SANDERS CO.—**Union Construction Co.,** Box 1845, Great Falls—$52,593 for 1.99 mi. of grading, surf., bitum. treatment and drainage structures on Perma-Dixon Road—by State Hwy. Comm., Helena. 3-28



# Foote steps to a Paving Record

Under the urgency of war, Multi Foote Pavers, leaders in peacetime production, are setting new records for high speed paving, for rugged dependability, and for cooperation. Recently on a rush job in the Nevada Desert two contractors teamed up a pair of 34E Multi Foote Pavers to pour a record of 111,406 cu. yds. of 9 in. slab in a period of 27 days—ahead of schedule, working against sand, wind, cold, and other tough conditions. An average of 4,000 cu. yds. per day was maintained. In one 24-hr. period, 6,890 cu. yds. were placed!

Part of the time the pavers worked side by side as shown. At other times they were separated by more than a mile, pouring at intersections, turning points, and spots provided for warming up. Adaptability and cooperation got the job done. Contractors were J. A. Carson Co. and N. M. Ball Sons. The field was being rebuilt to speed up training of Air Force bombardiers and gunners.

In planning for postwar construction, consider the importance of selecting equipment now that will enable you to meet all competition — that will not be obsolete after the firing ceases, that will provide big production, dependable service free of excessive repair charges and delays, that will show low costs. Multi Foote Pavers led the field before the war. Multi Foote Pavers are hanging up new records in rush construction now. Multi Foote Pavers will be available, adaptable, dependable and economical when the postwar battle for business begins. Make sure you stay competitive by getting the Paver which is still setting records.

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ARMY E NAVY

**MULTI FOOTE**
**CONCRETE PAVERS**

### Oregon

DESCHUTES CO.—**H. C. Suhre,** Portland—$15,696 for stockpiling approx. 4,800 cu. yd. cr. rock or gravel, Bend-Lava Butte Rock Prod. Project—by State Hwy. Commission, Portland. 3-30

HARNEY & LAKE COS.—**T. W. Thomas,** Imperial Hotel, Portland—$18,275 for stockpiling 7,500 cu. yd. cr. rock or gravel on Juniper Ridge-Alkali Lake Rock Prod. Project—by State Hwy. Commission, Portland. 3-30

KLAMATH CO.—**Babler & Conley,** 4617 S. E. Milwaukie Ave., Portland—$42,975 for stockpiling 11,200 cu. yd. cr. rock on Beaver Marsh-Fort Klamath Rock Project—by State Hwy. Commission, Portland. 3-30

LAKE CO.—**T. W. Thomas,** Imperial Hotel, Portland—$23,960 for stockpiling approx. 10,000 cu. yd. cr. gravel on Valley Falls Rock Prod. Project—by State Hwy. Commission, Portland. 3-30

LINN CO.—**Warren-Northwest, Inc.,** Box 5072, Portland—$57,975 for 6.2 mi. paving on Crabtree Corner-Crabtree Creek Sec. of Albany-Lyons Secondary Hwy.—by State Hwy. Commission, Portland. 3-30

MALHEUR CO.—**Russell Olson,** Box 390, Hayward, Calif.—$40,388 for 33.4 mi. reoiling on the Owyhee River-McDermitt Sec. of I. O. N. Hwy.—by State Commission, Portland. 3-30

### Texas

BEXAR CO.—**J. O. Mack, Jr.,** Corpus Christi—$44,862, for 2.04 mi. grading sts., flexible base and asph. conc. pave. from east right of way Missouri Pacific Railroad to Frio City Road—by State Hwy. Dept., Austin. 3-23

MIDLAND CO.—**Ernest Loyd,** Fort Worth—$26,955 for 2.78 mi. grading, struct. flexible base and asphalt base preser. on Hwy. MR and MR spur—by State Hwy. Dept., Austin. 3-23

REEVES CO.—**Uvalde Construction Co.,** 920 Santa Fe Bldg., Dallas—$10,532 for roads and dust palliative treatment at Pecos Army Air Field—by U. S. Engineer Office, Albuquerque, New Mexico. 3-1

### Washington

ADAMS & FRANKLIN COS.—**F. R. Hewett Co.,** 420 W. 22nd St., Spokane—$35,100, for 6,000 cu. yd. of top course surf., 2,000 cu. yd. cr. stone, & 2,600 cy. yd. mineral aggr. on Primary State Hwy. No. 11—by State Hwy. Dept., Olympia. 3-20

GRAYS HARBOR CO.—**Quigg Bros. Construction Co.,** Hoquiam—$72,771 for 1.3 mi. clearing, grade, draining surf. and roadmix oiling, Primary State Hwy. No. 9, Forest Boundary to Quinault River—by Director of Highways, Olympia. 3-15

KING CO.—**Washington Asphalt Co.,** 309 W. 39th St., Seattle—$25,652 for approx. 2 mi. surf., curbs, drainage, etc., on main arterial through Kirkland—by City of Kirkland. 3-23

KING CO.—**Washington Asphalt Co.,** 309 W. 39th St., Seattle—$10,465 for grading, surf. and plantmix widening on about 1.7 mi. of access roads, Seattle to Renton—by Director of Highways, Olympia. 3-8

KITSAP CO.—**Argentieri & Colarossi,** 1819 Weller St., Seattle—$159,700 for soil stabilization work at Bremerton—by FPHA, Seattle. 3-9

SNOHOMISH CO.—**Erickson Paving Co.,** 1550 N. 34th, Seattle—$67,738 for grade, drain, surf., and oil about 0.5 mi. of S. S. H. No. 1-I Pigeon Creek Fill, in Everett—by Director of Highways, Olympia. 3-8

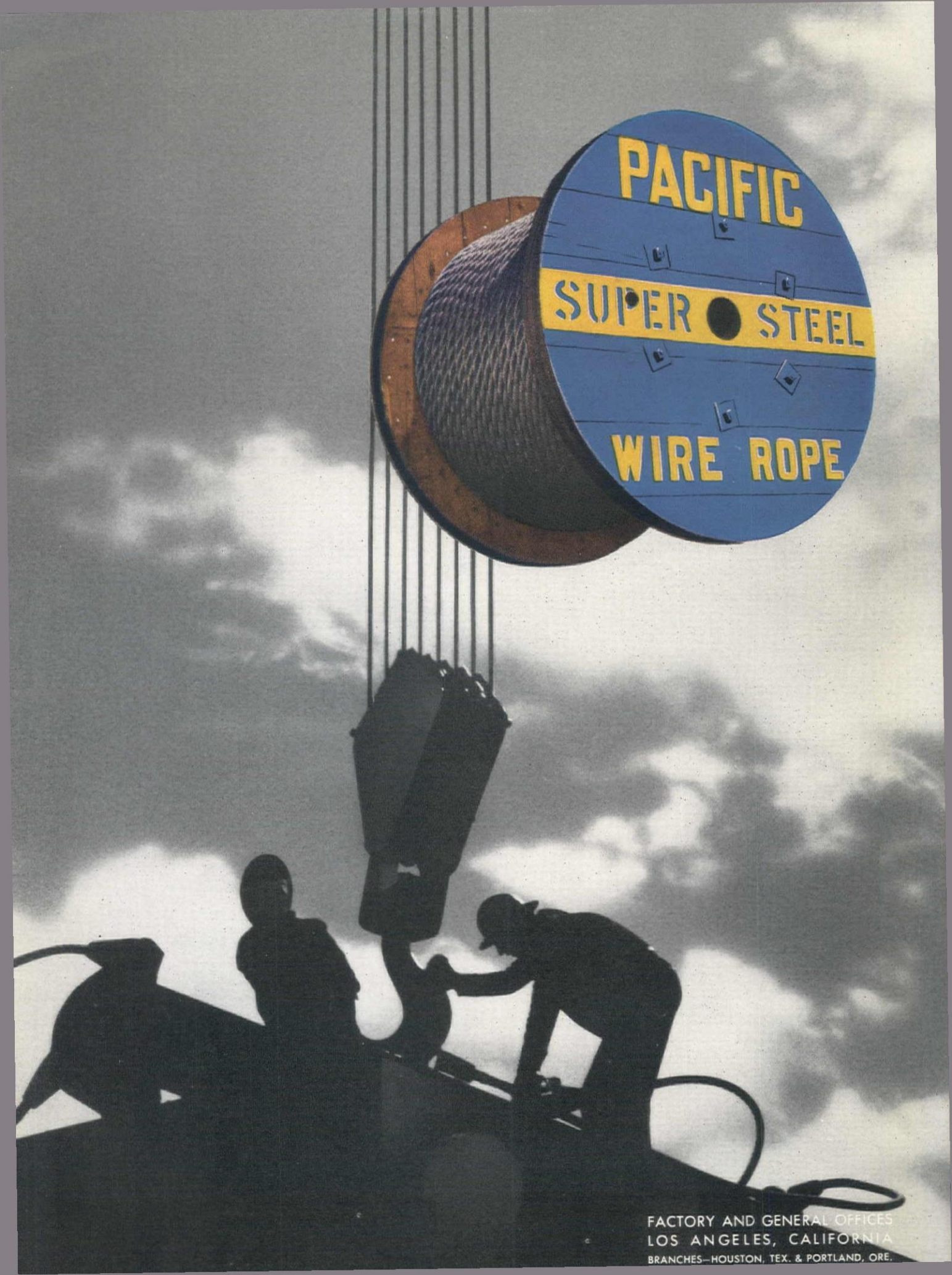
### Wyoming

TETON CO.—**Woodward Construction Co.,** Rock Springs—$57,100 for 0.8 mi. grade, drain, base course surf. and oil treatment and 16.31 mi. stone chip seal coat on the Jackson-Moran Road—by State Highway Commission, Cheyenne. 3-16

## Bridge . . .

### Arizona

PIMA CO.—**Martin Contracting Co.,** Box 934, Tucson—$10,482

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LOS ANGELES, CALIFORNIA
BRANCHES—HOUSTON, TEX. & PORTLAND, ORE.

for reinf. conc. box culvert and approaches at Ajo—by State Highway Commission, Phoenix. 3-21

### California

LOS ANGELES CO.—**W. E. Kier Construction Co.,** 1462 N. Stanley Ave., Los Angeles—$20,815 for Sanowen St. bridge at Vassar Ave., and the Topanga Canyon Blvd. bridge, south of Vanowen St.—by Board of Public Works, Los Angeles. 3-29

LOS ANGELES CO.—**C. J. Paradis,** 2320 Idell St., Los Angeles—$24,727 for Reseda Blvd. bridge and the Lindley Ave. bridge over the Los Angeles River—by Board of Public Works, Los Angeles. 3-28

SAN DIEGO CO.—**Ralph O. Dixson,** 3901 Medford, Los Angeles—$151,914 for reinf. conc. bridge across the San Diego River in San Diego—by Calif. Div. of Hwys., Los Angeles. 3-24

### Nevada

CLARK CO.—**Vegas Rock & Sand Co.,** Tenth and E. Fremont Sts., Las Vegas—$79,502 for a conc. and steel bridge over the Muddy River near Logandale—by Nevada State Hwy. Dept., Carson City. 3-14

### Washington

GRAYS HARBOR CO.—**M. P. Munter,** 1810 Bigelow N., Seattle—$41,795 for reconstructing timber approaches of the West Bridge in Aberdeen on P. S. H. No. 13—by Dir. of Hwys., Olympia. 3-8

### Wyoming

TETON CO.—**Blanchard Bros.,** 1641 S. Logan St., Denver, Colo.—$16,437 for two timber bridges and misc. work on the Jackson-Moran Road—by State Hwy. Commission, Cheyenne. 3-16

## Airport . . .

### Arizona

MOHAVE CO.—**Tiffany Construction Co.,** Box 846, Phoenix—$289,209 for conc. paving and taxiway exten. at Yucca Army Air Field—by U. S. Engineer Office, Los Angeles. 3-24

YUMA CO.—**Arizona Sand & Rock Co.,** P. O. Box 1522, Phoenix—$207,687 for taxiway and runway extensions, turning pads and warming-up pads at Yuma Army Air Field—by U. S. Engineer Office, Los Angeles, Calif. 3-24

YUMA CO.—**P. D. O. C.,** Luhrs Bldg., Phoenix—$396,679 for conc. pavement and taxiway and runway extensions at Army Air Field, Datelan—by U. S. Engineer Office, Los Angeles. 3-14

### California

KERN CO.—**Bressi-Bevanda Constructors, Inc.,** 208 W. Eighth St., Los Angeles, and **United Concrete Pipe Corp.,** Box 1, Station H, Los Angeles—$119,405 for parking apron at Muroc—by U. S. Engineer Office, Los Angeles. 3-28

MODOC CO.—**Larsen Bros. & Harms Bros.,** Rt. 4, Box 2220, Sacramento—$851,391 for a municipal airport, 8 mi. northwest of Alturas—by Civil Aeronautics Adm., Santa Monica. 3-28

ORANGE CO.—**Macco Construction Co.,** 815 Paramount Blvd., Clearwater—$1,398,136 for grading and paving runways and parking areas, field lighting, Marine Corps Air Station, El Toro—by Bureau of Yards & Docks, Washington, D. C. 3-10

### Nevada

CLARK CO.—**A. D. Drum, Jr.,** Fallon—$624,116 for additional landing field facil. and roads at Indian Springs—by U. S. Engineer Office, Los Angeles, Calif. 3-23

CLARK CO.—**Gibbons & Reed Co.,** 259 W. Third So. St., Salt Lake City, Utah—$244,592 for addtl. landing field facil. and roads at Las Vegas Airfield—by U. S. Engineer Office, Los Angeles, Calif. 3-30

### Texas

BEXAR CO.—**Cage Brothers, Palmer & Winters,** Bishop—$30,000 for substitution of hot mix asph. conc. pave. in lieu of rock asph. pave. for runways at Clear Springs Auxiliary Field

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—by U. S. Engineer Office, San Antonio. 3-7

BEXAR CO.—**H. B. Zachry Co.**, P. O. Box 596, San Antonio —$354,996 for east runway and taxiways at Randolph Field, San Antonio—by U. S. Engineer Office, San Antonio. 3-17

DALLAS CO.—**Texas Bitulithic Co.**, Box 5297, Dallas—$91,690 for additional facil. and paving at Love Field—by U. S. Engineer Office, Denison. 3-16

TOM GREEN CO.—**Holland Page**, Georgetown Road, Austin —$141,516 for E. W. runway at air field near San Angelo—by U. S. Engineer Office, San Antonio. 3-7

### Canada

BRITISH COLUMBIA—**Dufferin Paving Co., Ltd.**, Toronto —over $500,000 for the Namao Airport at Edmonton, Alberta —by U. S. Engineer Office, Edmonton.

## Water Supply . . .

### Arizona

MOHAVE CO.—**Macco-Robertson Company**, 811 Paramount Blvd., Clearwater, Calif.—$122,500 for additional facilities for Hackberry Water System, A. A. F. Gunnery School, Kingman —by U. S. Engineer Office, Los Angeles, Calif. 3-7

### California

CONTRA COSTA CO.—**Pacific Pipeline Construction Co.**, 2128 San Pablo Ave., El Cerrito—$3,527 for an 8-in. main for sprinkler system at Richmond Municipal Wharf No. 3, Richmond—by the City of Richmond. 3-8

SAN DIEGO CO.—**American Pipe & Construction Co.**, 4635 Firestone Blvd., South Gate—$100,062 for Dyke pipe line, San Diego, using 24-in. pipe—by Federal Works Agency, Los Angeles. 3-29

SAN DIEGO CO.—**Wonderly Construction Co.**, 2694 Lime Ave., Long Beach—$33,208 for improv. in the dist., in connection with San Luis Rey Water System—by Public Utility District, Fall Brook. 3-24

SAN FRANCISCO CO.—**W. J. Tobin**, 5708 Glenbrook Drive, Oakland—$3,680 for 6 and 8-in. water mains in Brookdale Terrace—by City of San Francisco. 3-8

SOLANO CO.—**Stolte Inc.**, 8451 San Leandro Blvd., Oakland —$29,562 for relocation of water lines, Benicia Arsenal—by U. S. Engineer Office, San Francisco. 3-23

### Montana

LEWIS & CLARK CO.—**Otis Williams & Co.**, Helena—$17,250 for a municipal pumping plant in Helena—by City of Helena. 3-29

### Oregon

CLACKAMAS CO.—**Grosbeck & Lovett**, Walla Walla, Wash. —$6,376 for a well at Canby—by the City of Canby. 3-8

MULTNOMAH CO.—**Oscar Butler & Sons**, Couch Building, Portland—$13,880 for water supply lines on piers 1 and 2 at the Port of Portland—by U. S. Engineer Office, Portland. 3-27

### Texas

GRAYSON CO.—**Layne-Texas Company**, 6931 Harrisburg, Houston—$33,894 for drilling a water well in Sherman—by the City of Sherman. 3-7

### Utah

WEBER CO.—**Wheelwright Construction Co.**, Ogden—$9,444 for addtns. to local water works system, Ogden—by City Council, Ogden. 3-23

### Washington

FRANKLIN CO.—**B. H. Sheldon**, 174 Post St., Spokane—$59,977 for wet well pumping station in Pasco—by City of Pasco. 3-14

KING CO.—**M. Moschetto**, 5501 13th Ave. S., Seattle—$5,225 for cast iron water mains in Waterford Ave. from N. 8th St. to N. 85th St.—by Board of Public Works, Seattle. 3-28

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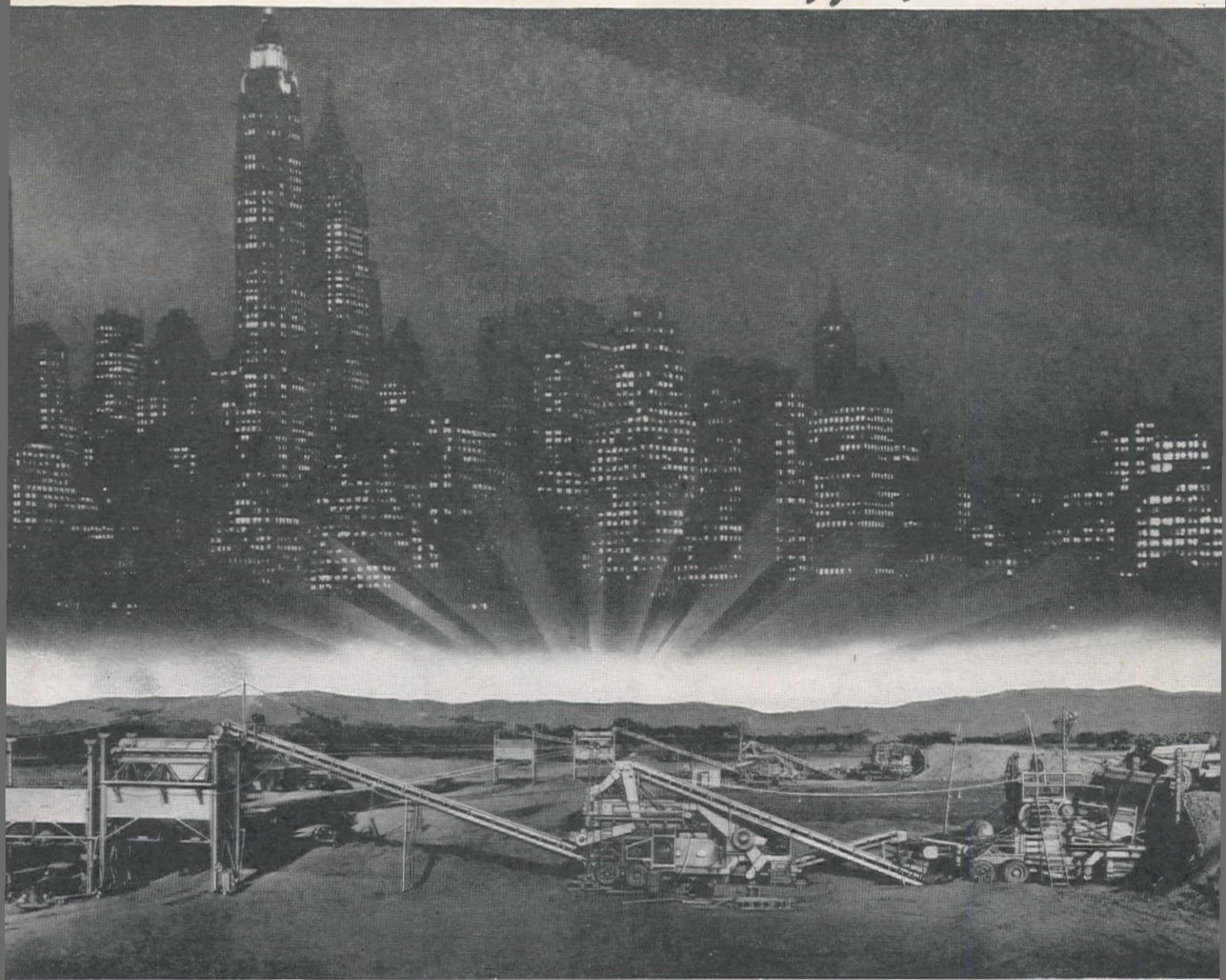

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# Sewerage . . .

### California

CONTRA COSTA CO.—**Stolte, Inc.**, 8451 San Leandro Blvd., Oakland—$102,397 for vitr. and conc. sewer mains on Fairmont and Central Aves., Richmond Annex—by City of El Cerrito. 3-15

LOS ANGELES CO.—**Holmes Construction Co.**, 5636 Matilija Ave., Van Nuys—$22,707 for underground utilities, inc. gas, water, elec., and sewers at Figueroa Street Cantonment, Wilmington—by Post Engineer, Los Angeles Port of Embarkation. 3-8

LOS ANGELES CO.—**Sanitary Construction & Engineering Co.**, 439 W. 20th St., Long Beach—$16,625 for sewer in Dist. 13-E-2, Long Beach—by City Council, Long Beach. 3-30

LOS ANGELES CO.—**Sanitary Construction & Engineering Co.**, 439 W. 20th St., Long Beach—$31,796 for lateral sewers in Long Beach—by City of Long Beach. 3-16

LOS ANGELES CO.—**Robert Vlacich**, 2314 Carlyle Place, Los Angeles—$2,247 for vitr. sewer in Laurel Lane, between its easterly terminus and Laurel Canyon Blvd.—by City of Los Angeles. 3-23

LOS ANGELES CO.—**Ivan M. Metkovich**, 143 E. 81st St., Los Angeles—$2,008 for sewer in 7th Ave., between Adams Blvd. and 27th St.—by Board of Public Works, Los Angeles. 3-28

LOS ANGELES CO.—**Edward Green**, 3001 Coolidge Ave., Los Angeles—$49,392 for sewer in Compton Blvd., Gardena—by City of Gardena. 3-24

LOS ANGELES CO.—**Tom L. Gogo**, 10024 S. Figueroa St., Los Angeles—$38,059 for sewer in Hartsook St. and Cadros Ave. sewer district—by Board of Public Works, Los Angeles. 3-27

LOS ANGELES CO.—**Tom L. Gogo**, 10024 S. Figueroa St., Los Angeles—$21,771 for sewer in District 13-C, Long Beach —by City of Long Beach. 3-10

MONTEREY CO.—**Harold C. Geyer**, 787 Munras Ave., Monterey—$22,444 for sanitary sewers and appurts. at N. A. A. S., Monterey—by Bureau of Yards & Docks, Washington, D. C. 3-13

RIVERSIDE CO.—**Shipyard Construction Co.**, 2609 Cherry Ave., Long Beach—$59,445 for sewage treatment plant alter. at Camp Anza, Arlington—by U. S. Engineer Office, Los Angeles. 3-24

SAN DIEGO CO.—**B. G. Carroll**, 2260 Main St., San Diego—$68,270 for a portion of Trunk Sewer No. 4 in W. Point Loma Blvd. and Frontier St., San Diego—by City Council, San Diego. 3-31

### Colorado

JEFFERSON CO.—**Thomas Bate & Son**, 2311 Tenth St., Denver—$375,667 for sanitary sewer line in Lakewood—by Lakeword Sanitary Sewer District, Lakewood. 3-17

### Texas

DALLAS CO.—**W. G. Cullum Co.**, Great National Life Bldg., Dallas—$17,992 for sanitary sewer exten. and appurt. in Grand Prairie—by City of Grand Prairie. 3-7

### Washington

KITSAP CO.—**Martin Anderson**, Lloyd Bldg., Seattle—$30,560 for a sewage treatment plant at Poulsbo—by the Town of Poulsbo. 3-8

# Waterway . . .

### California

ALAMEDA CO.—**Ben C. Gerwick, Inc.**, 112 Market St., San Francisco—$16,015 for driving test piles at the Alameda intransit depot, Alameda—by U. S. Engineer Office, San Francisco. 3-31

ALAMEDA CO.—**Raymond Concrete Pile Co.**, 333 Montgomery St., San Francisco—$11,170 for driving test piles at Alameda intransit depot, Alameda—by U. S. Engineer Office, San Francisco. 3-31

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PRODUCTS

ALAMEDA CO.—**Clinton Construction Co.**, 923 Folsom St., San Francisco—$24,100 for barge anchorage, dolphins and catwalk at Naval Supply Depot, Oakland—by Bureau of Yards & Docks, Washington, D. C. 4-7

SAN FRANCISCO CO.—**Nielsen, Erbentraut & Summers**, 446 Sixth St., San Francisco—$760,000 for breakwater pier and ammunition storage facil. at Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 4-7

### Idaho

BONNEVILLE CO.—**W. C. Burns**, 150 11th St., Idaho Falls—$39,127 for flood control work on the Snake River, inc. stone revetment at Bannock and Sunnydell Canal, near Idaho Falls—by U. S. Engineer Office, Portland, Ore. 3-9

### Oregon

YAMHILL CO.—**Kuckenberg Construction Co.**, 11104 N. E. Holman, Portland, Ore.—$178,547 for clearing channel excav. in the Willamette River, Wheatland Bar—by U. S. Engineer Office, Portland. 3-27

### Washington

COWLITZ CO.—**R. A. Heintz Construction Co.**, 8101 NE. Union Ave., Portland, Ore.—$23,882 for repairing existing levee and const. embankments and stone revetments on the Cowlitz River—by U. S. Engineer Office, Portland, Ore. 4-10

### Territories

HAWAII—**Hawaiian Dredging Co.**, Honolulu—for dredging Kewalo Basin, Honolulu—by Bureau of Yards & Docks, Washington, D. C. 4-7

## Irrigation . . .

### California

IMPERIAL CO.—**J. F. Shea Co., Ltd.**, 617 S. Olive St., Los Angeles—$1,660,681 for Schedules 3 and 4 of the Coachella Canal System, Boulder Canyon Project, about 100 mi. northwest of Yuma, Ariz.—by Bureau of Reclamation, Denver, Colo. 3-14

STANISLAUS CO.—**L. W. Terrell**, 221 9th Ave., Turlock—$8,964 for inst. conc. piping in District No. 358—by City of Turlock. 3-16

### Washington

YAKIMA CO.—**H. H. Walker, Inc.**, Ellensburg—$32,002, for earthwork, pipelines & struct., on extens. of laterals & diversion channels, near Sunnyside, on the Roza division, Yakima project—by Bureau of Reclamation, Yakima. 3-21

## Building . . .

### Arizona

MARICOPA CO.—**Shumaker-Evans**, 3000 N. Central Ave., Phoenix, Ariz.—$335,865 for 340 family portable shelter units—by Federal Public Housing Authority, San Francisco. 3-15

MARICOPA CO.—**P. W. Womack Construction Co.**, 1712 S. Central Ave., Phoenix—$29,113 for 62 standard trailer units, maintenance bldg. and site work at Glendale—by FPHA, San Francisco, Calif. 3-9

MARICOPA CO.—**Del E. Webb Construction Co.**, 302 S. 23rd Ave., Phoenix—$27,808 for 69-unit trailer camp at Mesa—by Federal Public Housing Authority, San Francisco, Calif. 3-27

MOHAVE CO.—**J. E. Burrell & Sons**, 518 W. 17th St., Long Beach, Calif.—$100,615 for bldgs. and utilities at Kingman Army

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Air Field, Kingman—by U. S. Engineer Office, Los Angeles, Calif. 3-7

MOHAVE CO.—**W. S. Ford,** Box 928 Kingman—$90,518 for bldgs. and utilities at Army Air Field, Yucca—by U. S. Engineer Office, Los Angeles, Calif. 3-14

NAVAJO CO.—**C. C. Gammill,** P. O. Box 1261, Prescott—$243,590 for 100 standard trailer units, site work, etc., at Winslow—by Federal Public Housing Authority, San Francisco, Calif. 3-21

PIMA CO.—**M. N. Sundt,** 440 S. Park Ave., Tucson—$76,436 for housing and facil. for service detachment at Tucson Municipal Airport, Tucson—by U. S. Engineer Office, Phoenix. 4-10

## California

ALAMEDA CO.—**Twaits-Morrison-Knudsen,** 111 Sutter St., San Francisco—$650,000 for two temporary storehouses, Oakland—by Bureau of Yards & Docks, Washington, D. C. 4-7

ALAMEDA CO.—**Ford J. Twaits Co.** and **Morrison-Knudsen Co., Inc.,** Box 3159 Terminal Annex, Los Angeles—$814,850 for five temp. storehouses, Naval Supply Depot, Oakland—by Bureau of Yards & Docks, Washington, D. C. 4-3

ALAMEDA CO.—**John E. Branagh,** 105 Sheridan Ave., Piedmont, Calif.—$29,057 for three barracks bldgs. at San Leandro Prison Farm—by Alameda County Clerk, Oakland. 3-29

ALAMEDA CO.—**Oliver M. Rousseau,** 725 Tehama St., San Francisco—$90,973 for clothing impregnation plants, Oakland—by Bureau of Yards & Docks, Washington, D. C. 3-24

ALAMEDA CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco—$130,340 for depot for storage and maint. of landing craft, Albany Race Track—by Bureau of Yards & Docks, Washington, D. C. 3-20

ALAMEDA CO.—**Stolte, Inc.,** 8451 San Leandro Blvd., Oakland—$85,000 for standard celestial navigation bldg. and refrigerated L. P. altitude bldg., Navy Air Station, Alameda—by Bureau of Yards & Docks, Washington, D. C. 3-20

ALAMEDA CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$399,459 for housing facil., six ship barracks at Navy Yard, Mare Island—by Bureau of Yards & Docks, Washington, D. C. 3-21

ALAMEDA CO.—**DeLuca & Son,** 1745 Filbert St., San Francisco—$35,300 for covered shed for automotive equipment, Oakland—by Bureau of Yards & Docks, Washington, D. C. 3-21

BUTTE CO.—**Ellis W. Barker,** Ness Bldg., Salt Lake City, Utah—about $50,000 for addtn. to roundhouse at Oroville—by Western Pacific Railroad Co., San Francisco. 3-8

CONTRA COSTA CO.—**MacDonald & Kahn, Inc.,** Financial Center Bldg., San Francisco—$62,000 for mess hall, Naval Hospital, Mare Island—by Bureau of Yards & Docks, Washington, D. C. 3-7

CONTRA COSTA CO.—**MacDonald & Kahn, Inc.,** Financial Center Bldg., San Francisco—$149,549 for addtl. barracks and quarters at Port Chicago—by Bureau of Yards & Docks, Washington, D. C. 3-13

FRESNO CO.—**Trewhitt, Shields & Fisher,** Pacific Southwest Bldg., Fresno—$30,767 for 80 trailer units in Fresno—by Housing Authority of City of Fresno. 3-17

KERN CO.—**Weymouth Crowell Co.,** 2104 E. 15th St., Los Angeles—$103,223 for housing facil. at Army Air Field, Muroc—by U. S. Engineer Office, Los Angeles. 3-24

LOS ANGELES CO.—**Robert E. McKee,** 4700 San Fernando Road W., Los Angeles—$936,900 for three class "A" buildings, totaling 448 additional beds, at Vets. Admin. Facil., Los Angeles—by Vets. Admin., Washington, D. C. 4-5

LOS ANGELES CO.—**Frederick Fischer Construction Co.,** 6367 Yucca St., Hollywood—$500,000, for 120 six-room frame & stucco dwel. in the Del Rey area—by self. 3-24

LOS ANGELES CO.—**Guy F. Atkinson Co.,** 310 Heartwell

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Bldg., Long Beach—$628,000 for an electrical and optical shop, U. S. Naval Drydocks, Terminal Island—by Bureau of Yards & Docks, Washington, D. C. 3-9

LOS ANGELES CO.—**C. Courtney Jones,** 2817 W. Victory Blvd., Burbank—about $400,000 for 100 dwellings, frame and stucco construction, in Burbank—by Paramount Builders, Los Angeles. 3-7

LOS ANGELES CO.—**Alfred L. Dawson,** 1902 Shell Ave., Venice—about $250,000 for 11 apartment buildings in Inglewood —by Golden State Land & Investment Co., Los Angeles. 3-29

LOS ANGELES CO.—**R. E. Campbell,** P. O. Box 3186, Terminal Annex, Los Angeles—$298,327 for 302 prefabricated family portable shelter units—by Federal Public Housing Authority, San Francisco. 3-15

LOS ANGELES CO.—**Escherich Bros.,** 234 W. 37th Place, Los Angeles—$22,096 for end walls and facil. for hangar doors at Long Beach Army Air Field—by U. S. Engineer Office, Los Angeles. 3-24

LOS ANGELES CO.—**R. E. Hazard** and **W. E. Hall,** 4548 Kettner Blvd., San Diego—$124,998 for instal. 300 standard trailers and 18 util. trailers, landscaping and site work, Long Beach—by Federal Public Housing Authority, San Francisco. 3-27

LOS ANGELES CO.—**Modulok, Inc.,** 605 Architects Bldg., Los Angeles—$353,646 for 358 prefabricated family portable shelter units — by Federal Public Housing Authority, San Francisco. 3-15

LOS ANGELES CO.—**J. K. Thomas** and **Beyer Construction Co.,** 611 Chamber of Commerce Bldg., Los Angeles—$1,883,739 for const. 1,000 family dwelling units on Santa Fe Ave., near Willow St., Long Beach—by FPHA, San Francisco. 3-3

LOS ANGELES CO.—**Baruch Corp.,** 625 S. Olive St., Los Angeles—$427,131 for new const. and alts. to exist bldgs. at West Los Angeles Station Hospital, Sawtelle—by U. S. Engineer Office, Los Angeles. 3-7


Owners and operators of convertible MICHIGAN Mobile SHOVELS-CRANES are urged to solicit the advice of MICHIGAN engineers and distributors to keep these fast-stepping machines working at peak efficiency for the duration, and after . . . Write today for Bulletin W-44.

UNDER the stress and strain of war-time operation, machines and equipment are wearing out faster than ever before. And, after Victory, it may be some time before new equipment will be available for the "business battles" of peace. When the firing ceases, the condition your machines are in may well determine your ability to successfully handle your share of post-war business. No doubt you have a machinery conservation program in effect now, but remember, its ultimate success or failure depends upon how well your operators and mechanics carry it out. Therefore, impress upon them the importance of keeping present machines and equipment in top-notch condition—for their *own* post-war well-being and security.

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# MICHIGAN
## POWER SHOVEL CO.
## BENTON HARBOR, MICHIGAN

LOS ANGELES CO.—**Ford J. Twaits Co.,** 451 S. Boylston St., Los Angeles—$319,960 for site work and util. bldg. at Wilmington—by Federal Public Housing Authority, Los Angeles. 3-31

LOS ANGELES CO.—**Griffith, Walker & Lee,** 2124 Marber St., Lakewood Village—for 235 dwel. in Lakewood Village district—by self. 3-27

LOS ANGELES CO.—**Joshua Marks Co.,** 816 W. 5th St., Los Angeles—$400,000 for reinf. conc. and brick hospital addtn. at the Motion Picture Country House—by Motion Picture Relief Fund, Inc., Los Angeles. 3-28

LOS ANGELES CO.—**C. B. Bagnall,** 112 W. 9th St., Los Angeles—$42,452 for strengthening and reconst. science and home economics bldgs. at Torrance High School, Torrance—by Board of Educ., Los Angeles. 3-29

LOS ANGELES CO.—**Baruch Corp.,** 625 S. Olive St., Los Angeles—$104,959 for site improv. for prefab. housing units on Boyle Ave., Los Angeles—by Housing Authority, Los Angeles. 3-31

LOS ANGELES CO.—**Drycemble Houses, Inc.,** and **Wesco Construction Co.,** 605 Architects Bldg., Los Angeles—$353,647, for 358 portable dwel. units, at 2 sites in the Los Angeles area—by Federal Public Housing Authority, San Francisco. 3-21

LOS ANGELES CO.—**Beliveau Co.,** 720 S. Palm Ave., Alhambra—$509,600, for 144 five & six room frame & stucco dwel. in the vicinity of Imperial Hwy. & Central Ave., Watts—by self. 3-24

LOS ANGELES CO.—**William Curlett & Co.,** 112 S. La Brea Ave., Los Angeles—$200,000, for 32 double dwel. in Long Beach—by Continental Bldg. Co., Long Beach. 3-22

LOS ANGELES CO.—**Zoss Construction Co.,** 137 N. Cole Ave., Los Angeles—$1,268,299 for bldgs. and electrical distrib., A. A. F. Supply Depot, Maywood—by U. S. Engineer Office, Los Angeles. 3-7

PLACER CO.—**D. W. Nicholson Corp.,** 1701 San Leandro Blvd., San Leandro—$31,031 for recreation bldg. at Dewitt General Hospital, Auburn—by U. S. Engineer Office, Sacramento. 3-20

RIVERSIDE CO.—**George B. Thatcher,** 4074 Laurel Canyon Blvd., North Hollywood—$38,500 for 60 dormitory units at Arlington—by Housing Authority, Riverside. 3-24

RIVERSIDE CO.—**Weymouth Crowell Co.,** 2104 E. 15th St., Los Angeles—$27,239 for trainer bldgs. at March Field—by U. S. Engineer Office, Los Angeles. 3-21

RIVERSIDE CO.—**George B. Thatcher,** 4074 Laurel Canyon Blvd., North Hollywood—$89,714 for 180 dormitory accommodations in Riverside—by Housing Authority of the County of Riverside. 3-6

SACRAMENTO CO.—**Harris Construction Co.,** P. O. Box 109, Fresno, $83,689 for bldgs. and paving at McClellan Field—by U. S. Engineer Office, Sacramento. 3-13

SAN DIEGO CO.—**Anderson & Johnson,** 4745 Hawley Blvd., San Diego—$35,410 for addtn. to George Dewey Elem. School, San Diego—by FWA, Washington, D. C. 3-9

SAN DIEGO CO.—**Hodges & Karn,** 4816 W. Pico Blvd., Los Angeles—$3,500,000 for bldgs. at Coronado—by Bureau of

# Shunk Manufacturing Company

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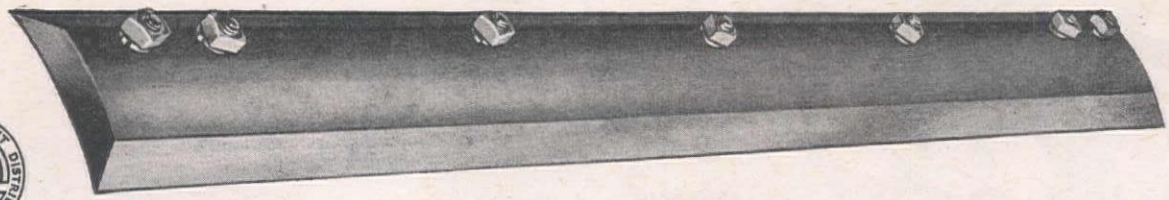

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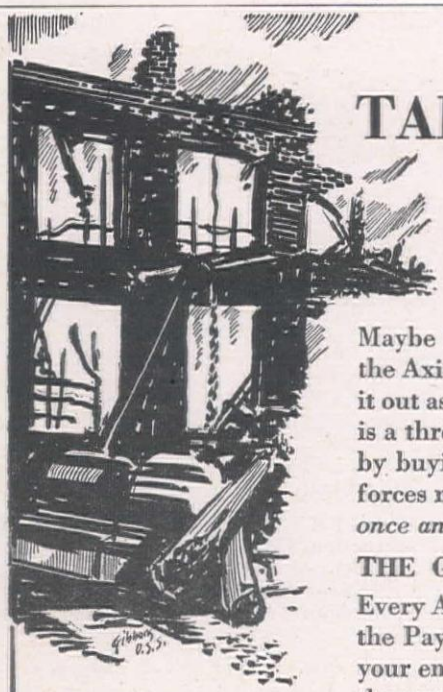

# TARGET FOR TONIGHT

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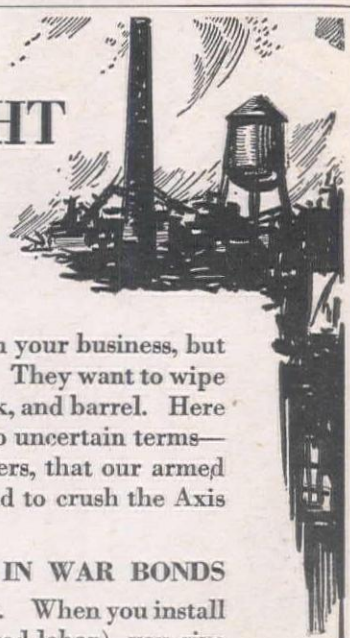

Maybe they won't actually come and drop a *bomb* on your business, but the Axis war lords have their eye on it, just the same. They want to wipe it out as a competitive force—or take it over lock, stock, and barrel. Here is a threat that you can reply to *now*, today, and in no uncertain terms—by buying War Bonds to the very limit of your powers, that our armed forces may have the guns, tanks, and planes they need to crush the Axis *once and for all.*

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503 Market St., San Francisco, Calif.

Yards & Docks, Washington, D. C. 3-8

SAN DIEGO CO.—**Scherer & Prichard,** 208½ Orange St., Redlands—$38,910 for a chapel, Marine Corps Aviation Depot, Miramar, San Diego—by Bureau of Yards & Docks, Washington, D. C. 3-17

SAN DIEGO CO.—**Scherer & Prichard,** 208½ Orange St., Redlands—$167,566 for recreation bldgs. at Naval Hospital, San Diego—by Bureau of Yards & Docks, Washington, D. C. 3-23

SAN DIEGO CO.—**Scherer & Prichard,** 3964 Orange St., Riverside—$38,910, for a chapel at the Marine Corps aviation depot, San Diego—by Bureau of Yards & Docks, Washington, D. C. 3-21

SAN FRANCISCO CO.—**Christensen & Lyons,** 3454 Harland St., Oakland—$24,600 for emplacements and install. at Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 3-20

SAN FRANCISCO CO.—**Nielsen, Erbentraut & Summers,** 446 Sixth St., San Francisco—$189,000 for fire fighters' school at Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 3-15

SAN FRANCISCO CO.—**MacDonald & Kahn, Inc.,** Financial Center Bldg., San Francisco—$46,718 for barracks for Marine Guard Naval Training Center, Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 3-14

SAN FRANCISCO CO.—**Dinwiddie Construction Co., Inc.,** Crocker Bldg., San Francisco—$917,900 for addtl. barracks, Yerba Buena Island—by Bureau of Yards & Docks, Washington, D. C. 3-16

SAN FRANCISCO CO.—**MacDonald & Kahn, Inc.,** Financial Center Bldg., San Francisco—$995,300 for 528 dwel. units on Army and Vermont Sts., San Francisco—by FPHA, San Francisco. 3-16

SAN FRANCISCO CO.—**H. E. Rahlman & Co.,** 251 Kearny St., San Francisco—$32,333 for remodeling warehouse bldg., 15th and Kansas Sts., San Francisco—by Bureau of Yards & Docks, Washington, D. C. 3-24

SAN FRANCISCO CO.—**Dinwiddie Construction Co., Inc.,** Crocker Bldg., San Francisco—$74,600 for conversion of bldg. at 500 Howard St., San Francisco—by Bureau of Yards & Docks, Washington, D. C. 3-21

SAN FRANCISCO CO.—**Alfred J. Hopper,** 243 Langton St., San Francisco—$59,630 for addtl. office space at Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 3-7

SAN FRANCISCO CO.—**Dinwiddie Construction Co., Inc.,** Crocker Bldg., San Francisco—$161,181 for addtl. bldgs. at U. S. Naval Hospital, Treasure Island—by Bureau of Yards & Docks, Washington, D. C. 3-14

SAN FRANCISCO CO.—**Parker Bros.,** 135 S. Park St., San Francisco—$47,675 for post office bldg. at Hunters Point, San Francisco—by Bureau of Yards & Docks, Washington, D. C. 3-30

SAN MATEO CO.—**Wells P. Goodenough,** 49 Wells Ave., Palo Alto—$55,337 for recreation bldg. and addtn. to Post Exchange at Dibble General Hospital, Menlo Park—by U. S. Engineer Office, San Francisco. 3-29

SAN MATEO CO.—**Empire Construction Co.,** 344 Harriet St., San Francisco—$65,000 for a steel frame factory bldg. in South

# Waterboy

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Another Chapman goes to work!

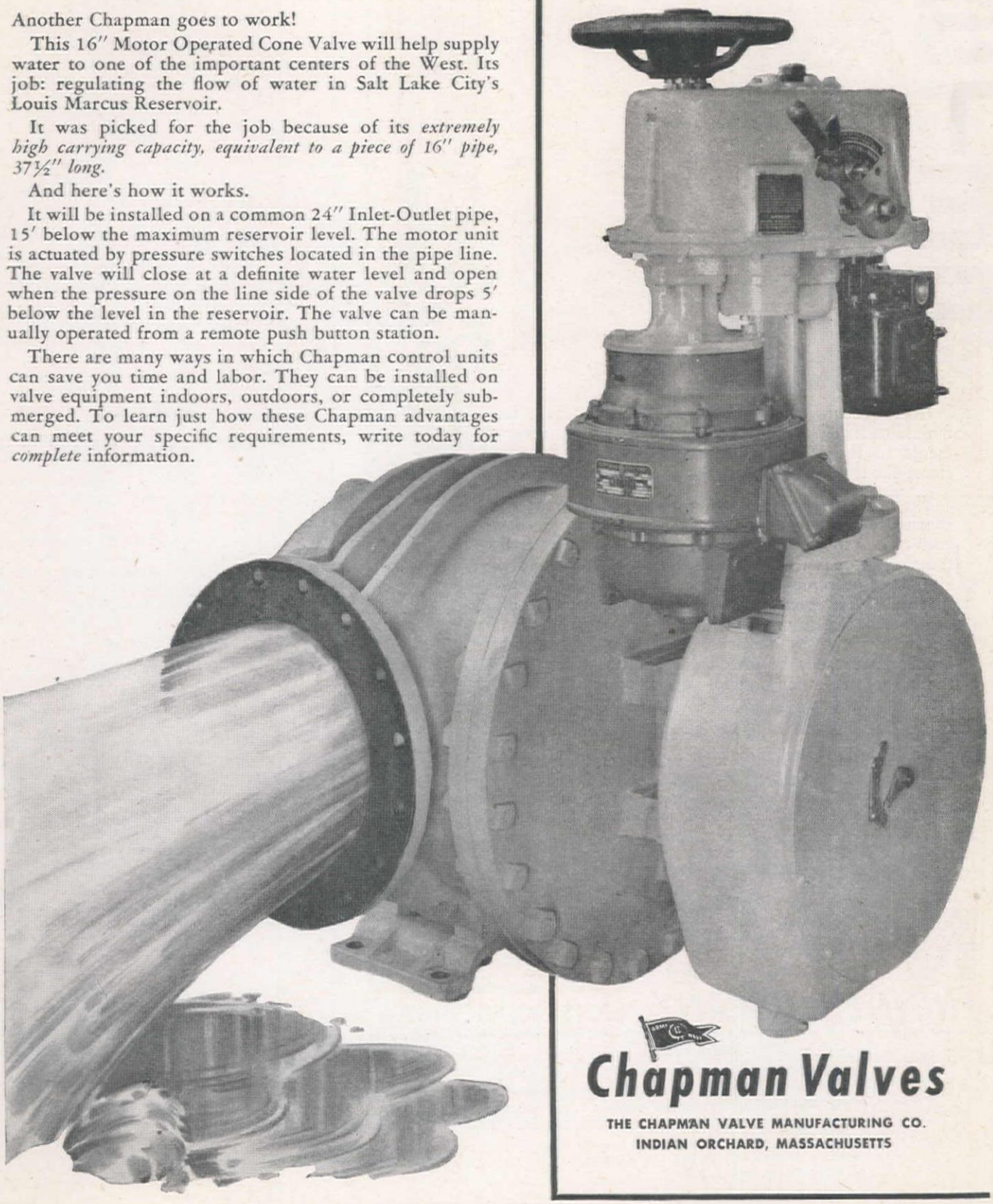
This 16″ Motor Operated Cone Valve will help supply water to one of the important centers of the West. Its job: regulating the flow of water in Salt Lake City's Louis Marcus Reservoir.

It was picked for the job because of its *extremely high carrying capacity, equivalent to a piece of 16″ pipe, 37½″ long.*

And here's how it works.

It will be installed on a common 24″ Inlet-Outlet pipe, 15′ below the maximum reservoir level. The motor unit is actuated by pressure switches located in the pipe line. The valve will close at a definite water level and open when the pressure on the line side of the valve drops 5′ below the level in the reservoir. The valve can be manually operated from a remote push button station.

There are many ways in which Chapman control units can save you time and labor. They can be installed on valve equipment indoors, outdoors, or completely submerged. To learn just how these Chapman advantages can meet your specific requirements, write today for *complete* information.



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**WESTERN OFFICES: San Francisco, Los Angeles, California, and Seattle, Washington.**

San Francisco, by Hammond Aircraft Co., South San Francisco. 3-7

SANTA CLARA CO.—**Carl N. Swenson Co.**, 355 Stockton Ave., San Jose—$96,324 for an equipment bldg. at Moffett Field, Sunnyvale—by Bureau of Yards & Docks, Washington, D. C. 3-9

SOLANO CO.—**Alfred J. Hopper**, 243 Langton St., San Francisco—$37,437 for addtl. facilities at Benicia Arsenal—by U. S. Engineer Office, San Francisco. 3-7

## Colorado

DENVER CO.—**Short & Bungaard**, 11 E. 4th St., Denver — about $150,000 for a garage and office bldg. at 8th and Wazee Sts., Denver—by Rio Grande Motor Way, Inc., Denver. 3-28

## Idaho

ADA CO.—**Northwest Fabricator**, Boise, —$1,940,445 for 1,000 prefabr. family portable shelter units—by Federal Public Housing Authority, San Francisco. 3-15

BONNER CO.—**Peter Kiewit Sons' Co.**, Northern Life Tower, Seattle — $149,750 for fighters' school, N. T. S., Farragut—by Bureau of Yards & Docks, Washington, D. C. 3-7

CANYON CO.—**J. R. Simplet**, Caldwell, has begun work on const. of a superphosphate plant at Pocatello for self. Estimated cost, $1,000,000. 3-8

## Oklahoma

CARTER CO.—**A. J. Rife Construction Co.**, 2808 Inwood Road, Dallas, Tex. — $49,890 for celestial navigation trainer bldgs. in Ardmore—by U. S. Engineer Office, Denison, Tex. 3-27

CURRY CO. — **Ramey & Mathis**, 229 Paramount Bldg., Amarillo, Tex.—$212,989, for 100 family dwel. units & 62 dormitory units at Clovis—by Federal Public Housing Authority, Fort Worth, Tex. 3-22

## Oregon

COOS CO.—**A. Ruud**, Railway Express Bldg., Portland—$48,483 for a recreation bldg. at naval auxiliary air station, North Bend—by Bureau of Yards & Docks, Washington, D. C. 3-9

LANE CO.—**Todd Building Co.**, Roseburg —$77,786 for 30 family dwelling units at Eugene—by FPHA, Seattle, Wash. 3-14

MULTNOMAH CO. — **Lewis Construction Co.**, Seattle, Wash.—$138,950 for the Guilds Lake School at Portland—by FWA, Washington, D. C. 3-9

MULTNOMAH CO.—**West Coast Construction Co.**, 8401 N. E. Sandy, Portland —have started work on a $247,500 housing project, consisting of 45 five-room dwellings, in Portland, for self. 3-3

MULTNOMAH CO.—**E. E. Settergren**, 414 Couch Bldg., Portland—$142,202 for three commercial bldgs. in Vanport City—by FPHA, Portland. 3-7

MULTNOMAH CO.—**Arthur Hansen**, 305 S. E. 45th St., Portland—$82,000 for a 20-unit apt. bldg., brick exterior, in Portland. 3-14

## Texas

DALLAS CO.—**W. L. Wyman**, 1038 Hendricks, Dallas—$34,264 for housing facil. for student nurses, Methodist Hospital—by Methodist Hospital, Dallas. 3-9

HIDALGO CO.—**Valley Vitamins, Inc.,** McAllen—about $200,000 for four bldgs., brick and reinforced conc., one-story, built-up roof, etc.—for self. 3-20

HUTCHINSON CO.—**L. K. Stout,** Pampa — $31,000 for a two-story church bldg., brick and tile, in Borger—by Church of Christ, Borger. 3-10

TARRANT CO.—**B. B. Adams,** First National Bank Bldg., Fort Worth — about $33,000 for remodeling hospital at 1300 W. Cannon, Fort Worth—by Memorial Methodist Hospital, Fort Worth. 3-15

UNANNOUNCED CO.—**Robert E. McKee,** El Paso—$44,097 for addtl. bldgs. and facil.—by U. S. Engineer Office, Albuquerque, New Mex. 3-7

### Utah

WEBER CO.—**R. H. Parr,** Beason Bldg., Salt Lake City—$70,300 for bldg. at Ogden Air Depot—by U. S. Engineer Office, Sacramento, Calif. 3-13

### Washington

CLARK CO.—**Waale-Camplan,** 2100 S. W. Jefferson, Portland, Ore.—About $200,000, for apartment project on E. 28th St., Vancouver—by Heights Garden Court, Vancouver. 3-22

ISLAND CO.—**Austin Co.,** Dexter Horton Bldg., Seattle—$3,774,000 for barracks for 5,000 men at Smith Cove—by Bureau of Yards & Docks, Washington, D. C. 3-20

KING CO. — **Associated Builders, Inc.,** 4519 California Ave., Seattle—About $120,000, for 24 dwel. on 37th Ave. S. W., Seattle—by self. 3-22

WHATCOM CO.—**Howard S. Wright & Co., Inc.,** 407 Yale N., Seattle 9—about $1,000,000 for a plant to produce ethyl alcohol from waste sulphite liquor, in Bellingham —by Puget Sound Pulp & Timber Co., Bellingham. 3-29

### Alaska

ALASKA—**C. S. Lytle and Green Construction Co.,** Hoge Bldg., Seattle, Wash. $370,000 for ten 72-dorm. units at Fairbanks—by FPHA, Seattle, Wash. 3-24

ALASKA—**C. W. Hufeisen Construction Co.,** Anchorage—$772,000 for 105 units at Anchorage — by Federal Public Housing Authority, Seattle, Wash. 3-24

### Canada

BRITISH COLUMBIA — **Marwell Construction Co., Ltd.,** 410 Seymour St., Vancouver—about $38,500 for conversion of the Eburne Hotel, Vancouver, into a 27-suite apartment block—by National Housing Administration, Vancouver.

BRITISH COLUMBIA—**Smith Bros. & Wilson, Ltd.,** 1267 Richards St., Vancouver —about $125,000 for a new junior-senior high school and combination gymnasium and auditorium, Prince George—by Prince George School Board.

BRITISH COLUMBIA—**Dominion Construction Co., Ltd.,** Vancouver—$25,000 for a bldg. at Raymur Ave., Vancouver—by General Paint Corp. of Canada, Ltd., Vancouver.

BRITISH COLUMBIA—**James L. Galloway,** 1011 Richelieu St., Vancouver — about $40,000 for a new bleach plant bldg. to improve the quality and color of pulp, Ocean Falls—by Pacific Mills, Ltd., Vancouver.

# Miscellaneous . . .

### Arizona

COCHISE CO.—**J. Herman Co.,** 1349 E. Vernon Ave., Los Angeles, Calif.—$25,965 for air conditioning and evaporating cooling systems in hospital bldgs. at Fort Huachuca—by U. S. Engineer Office, Los Angeles, Calif. 3-7

### California

ALAMEDA CO.—**M. A. Little,** 1 Grandview, San Francisco — $180,000 for fire safety measures on 38 dormitory bldgs., Vallejo—by FPHA, San Francisco. 3-24

ALAMEDA CO.—**Macco Construction Co.,** Freight and Ferry Sts., Oakland — $168,500 for grading and fill for prep. of site, A. A. F. Intransit Depot, Alameda—by U. S. Engineer Office, San Francisco. 3-7

HUMBOLDT CO. — **Fred J. Maurer & Son,** 3031 E St., Eureka—$29,500 for ext. to B. O. Q. section base, Eureka — by Bureau of Yards & Docks, Washington, D. C. 3-21

IMPERIAL CO.—**M. N. Sundt Construction Co.,** Box 2244, Tucson, Ariz.—$2,118,000 for addtl. aviation facil. and warehouses at Marine Corps Air Station, El Centro—by Bureau of Yards & Docks, Washington, D. C. 3-16

KERN CO.—**Stratton Construction Co.,** 3537 E. Colorado Blvd., Pasadena—$30,513 for an oil storage system at Army Air Field, Muroc—by U. S. Engineer Office, Los Angeles. 3-24

KERN CO.—**John A. Klarquist,** 618 S. Western Ave., Los Angeles—$26,174 for gasoline fueling system at Muroc Army Air Base, Muroc—by U. S. Engineer Office, Los Angeles. 3-21

LOS ANGELES CO. — **P. A. Weeger,** 4565 Santa Monica Blvd., Los Angeles—$27,168 for motor repair facil. at Army Air Field, Long Beach—by U. S. Engineer Office, Los Angeles. 3-22

LOS ANGELES CO.—**Hoagland-Findlay Engineering Co.,** 3254 Cherry Ave., Long Beach — $28,061 for hospital car storage facil., utility bldg. and spur track at Birmingham General Hospital, Van Nuys—by U. S. Engineer Office, Los Angeles. 3-24

LOS ANGELES CO.—**William Crowell Co.,** 170 E. California St., Pasadena — $315,300 for site improv., including water dist. system, sewer system, etc., Long Beach—by FPHA, Los Angeles. 3-27

LOS ANGELES CO.—**O'Neal & Hedberg,** 825 S. Robertson Blvd., Los Angeles —$241,626 for roads, underground util. and fences at Army Air Forces Supply Depot, Maywood—by U. S. Engineer Office, Los Angeles. 3-24

LOS ANGELES CO.—**Ansco Construction Co.,** 2725 Atlantic Ave., Long Beach —$72,815 for filling and paving at Berths 19 and 27, Long Beach Outer Harbor—by Port Manager, Long Beach. 3-20

LOS ANGELES CO.—**Ivan Wells,** 201 S. Linden Dr., Beverly Hills — $30,725 for recreation facilities at Wilmington—by U. S. Engineer Office, Los Angeles. 3-9

LOS ANGELES CO.—**R. E. Hazard & Sons,** 2548 Kettner Blvd., San Diego and **W. E. Hall Co.,** 1025 Westminster Ave., Alhambra—$182,000 for improvement of trailer camp sites in Long Beach—by Fed-

eral Public Housing Authority, Los Angeles. 3-8

LOS ANGELES CO.—**T. E. Sherlock,** 1103 W. 40th Pl., Los Angeles—$250,000 (approx.) for roads and facils. for 300 dwels. in Tract 10980, on Sepulveda Blvd., in Torrance—by Murphy Bros., Beverly Hills. 3-27

MARIN CO.—**Frederickson & Watson Construction Co.,** 873 81st Ave., Oakland —$46,284 for barricades for ordnance igloos Hamilton Field—by U. S. Engineer Office, San Francisco. 3-7

ORANGE CO.—**Morrison-Knudsen Co., Inc.,** 411 W. Fifth St., Los Angeles—$345,060 for bldg. foundations, grading and filling at Marine Corps Air Station, El Toro—by Bureau of Yards & Docks, Washington, D. C. 3-28

ORANGE CO.—**Guy F. Atkinson Co.,** 310 Heartwell Bldg., Long Beach—$3,444,400 for rock jetty and dredging at Naval Magazine & Net Depot, Seal Beach—by Bureau of Yards & Docks, Washington, D. C. 3-24

SAN BERNARDINO CO.—**Frontier Construction Co.,** 2043 Orange Drive, Whittier—$30,900 for paving open storage area, Barstow—by Bureau of Yards & Docks, Washington, D. C. 3-23

SAN DIEGO CO.—**Paddock Engineering Co.,** 9060 Santa Monica Blvd., Los Angeles—$64,850 for swimming pool and athletic field at Naval Ammunition Depot, Fallbrook—by Bureau of Yards & Docks, Washington, D. C. 3-28

SAN DIEGO CO.—**Bryans & Larsen,** 3401 Granada, San Diego—$26,202 for installing night lookout training facil. at Naval Training Station, San Diego—by Public Works Office, San Diego. 3-16

SAN DIEGO CO.—**Walter Trepte,** 631 Ninth Ave., San Diego—$24,875 for clearing of site and const. of foundations, Radio & Radar Repair Bldg., Naval Air Station, San Diego—by Bureau of Yards & Docks, Washington, D. C. 3-21

SAN DIEGO CO.—**M. H. Golden,** 3485 Noell St., San Diego—$37,200 for foundations and mountings for instructional equipment for Fleet Service Schools Repair Base, San Diego—by Bureau of Yards & Docks, Washington, D. C. 3-21

SAN FRANCISCO CO.—**Duncanson Harrelson Co.,** 1404 de Young Bldg., San Francisco—$22,400 for repairing 800 lin. ft. of fender line on south side of pier 35, San Francisco—by Board of State Harbor Commissioners, San Francisco. 3-30

SAN FRANCISCO CO.—**Charles L. Harney,** 625 Market St., and **MacDonald & Kahn, Inc.,** 200 Financial Center Bldg., San Francisco—$371,200 for site improvements for 800 family trailers and 48 utility trailers at three locations in San Francisco—by Federal Public Housing Authority, San Francisco. 3-31

SAN FRANCISCO CO.—**Carl N. Swanson,** 355 Stockton Ave., San Jose—$58,000 for toilet and locker room and wharf remodeling, Pier 62, San Francisco—by U. S. Maritime Commission, San Francisco. 3-17

## Idaho

BANNOCK CO.—**Tice Electric Co.,** 908 S. E. Hawthorne, Portland, Ore.—$53,786 for an airport night lighting system at Army Air Field, Pocatello—by U. S. Engineer Office, Portland, Ore. 3-20

### Montana

CASCADE CO.—**Utility Builders,** 431 Ford Bldg., Great Falls—$148,700 for night lighting system at Great Falls—by U. S. Engineer Office, Seattle, Wash. 3-20

### Oregon

COOS CO. — **Woodward & Barklow,** Arago—$31,058 for soil stabilization work at North Bend Naval Auxiliary Air Station —by Bureau of Yards & Docks, Washington, D. C. 3-23

MARION CO.—**Halvorson Construction Co.,** First National Bank Bldg., Salem—$43,280 for clearing and grading work necessary for an alumina clay reduction plant in Salem—by Columbia Metals Corp., Seattle, Wash. 3-16

### Texas

TAYLOR CO. — **Holland Page,** Georgetown Road, Austin—$31,708 for bombing and gunnery range at Abilene army airfield —by U. S. Engineer Office, San Antonio. 3-27

### Washington

DOUGLAS CO.—**Lynch Bros. Diamond Drilling Co.,** 3635 Woodland Park, Seattle —$55,525 for core drilling on the Foster Creek dam site on the Columbia River near Bridgeport—by U. S. Engineer Office, Seattle. 3-8

FRANKLIN CO.—**Frank Lohse,** Marcus Whitman Hotel, Walla Walla — $172,000 for fire protection facil. at the Naval Air Station, Pasco — by Bureau of Yards & Docks, Washington, D. C. 3-14

KING CO. — **Superior Construction Co.,** 3281 36th Ave. S. W., Seattle—$96,317 for Beacon Hill reservoir discharge and overflow pipe lines—by Board of Public Works, Seattle. 3-14

SPOKANE CO.—**Clyde M. Ludberg,** West 326 First Ave., Spokane—$28,513 for motor maintenance facil. at the Spokane depot—by U. S. Engineer Office, Seattle. 3-15

## PROPOSED PROJECTS

## Highway and Street...

### Texas

DALLAS & TARRANT COS.—Application has been approved for the Texas Hwy. Depart., Austin, to pave 10-mi. gap in the Dallas-Fort Worth Hwy. No. 183. 3-27

## Airport . . .

### California

LOS ANGELES CO.—The Long Beach City Council has authorized engineer to prepare plans for a taxiway, 100 x 1,200

ft., of asph. conc., at municipal airport. Estimated cost, $45,000. 3-28

### Colorado

PUEBLO CO.—The U. S. Engineer Office, Denver, has authorized the construction of loading and parking apron and taxiway connections at the Pueblo Municipal Airport, Pueblo. Estimated cost, $65,000. 3-14

### New Mexico

COLFAX CO.—The U. S. Engineer Office, Albuquerque, has authorized apron, landing strip, taxiway, drainage work at Crews Field Airport, Raton. Estimated cost, $218,550. 3-14

### Wyoming

LARAMIE CO.—Plans are being prepared by C. A. A. for extens. to exist. conc. runways in Cheyenne. Estimated cost, $250,000. 3-28

## Water Supply . . .

### Texas

McLENNAN CO.—City of Mart plans construction of a water purification plant. To cost approximately $35,000. 3-7

TAYLOR CO.—City of Abilene has preliminary plans in progress for improvements to present water system. To cost $155,000. 3-13

### Utah

DUCHESNE CO.—A complete survey of the water works system has been authorized, for 3.5 mi. of new pipe lines and const. of another large reservoir, in Roosevelt. 3-23

## Sewerage . . .

### California

ORANGE CO.—City Engineer is to proceed with plans for a sewer proj. to include Temple Hills & all adj. unsewered areas for the City of Laguna Beach. Estimated cost, $30,000. 3-24

ORANGE CO.—Plans are under way for a sewage disposal plant at Los Alamitos for the Bureau of Yards & Docks, Washington, D. C. Estimated cost, $80,000. 3-31

SAN DIEGO CO.—The Navy has approved the improv. of a sewage plant at the Marine Corps training area in Oceanside, at a cost of $75,000. 3-30

SAN DIEGO CO.—Plans have been completed for the new Mission Valley sewer line in San Diego. Estimated cost, $387,434. 3-24

### Colorado

Garden Home Sanitation District, Garden Home, is applying to the Federal Works Agency for funds to be used for about 24 mi. of sanitary sewer line in Garden Home. Estimated cost, $350,000. 3-17

### Idaho

BONNER CO.—The Navy Department has allocated $170,000 for addtn. and improvement to the sewage disposal system at the Naval training school, Farragut. 3-23

## Waterway . . .

### New Mexico

BERNALILLO CO.—The U. S. Engineer Office, Albuquerque, has received an addtl. allocation of $50,000 for emergency control work on the Middle Rio Grande Conservancy District. 3-28

## Tunnel . . .

### Colorado

DENVER CO.—The Board of Water Commissioners, Denver, has allocated $206,000 for development work on the Moffat Tunnel and Williams Ford diversion project. 3-17

## Building . . .

### California

ALAMEDA CO.—The Navy has approved expenditure of $1,650,000 for barracks, two brigs, a subsistence bldg., housing and mess and other facilities at Shoemaker. 3-30

ALAMEDA CO.—Architect is preparing plans for a warehouse & office bldg., at East Shore Hwy. & Powell St., Emeryville, for John Deere Plow Co. Estimated cost, $500,000. 3-24

IMPERIAL CO.—Plans are underway for the rebuilding of the Alamo Hotel in Holtville. To cost $45,000. 3-22

LOS ANGELES CO.—The Los Angeles County Board of Supervisors has approved the proposed plan for 25 units of fully equipped modern army type barracks bldgs. to provide overnight housing for visiting soldiers. Estimated cost, $425,000. 3-20

LOS ANGELES CO.—Preliminary plans have been prepared for a class A hospital in Montrose for the Retired Nurses Foundation, Glendale. Estimated cost, $500,000. 3-16

SAN BENITO CO.—The Navy Department, Washington, D. C., has approved the construction of a training building at the Naval Air Station, Hollister. Estimated cost, $840,000. 3-6

SAN DIEGO CO.—The Bureau of Yards & Docks, Washington, D. C., has approved construction of additional housing and training facilities at Camp Pendleton, Oceanside. Estimated cost, $2,025,000. 3-9

SAN DIEGO CO.—The Bureau of Yards & Docks, Washington, D. C., has approved construction of combat training tank, 50 temporary instruction buildings, and other facilities at Camp Pendleton, Oceanside. Estimated cost, $754,500. 3-9

SAN DIEGO CO.—The Bureau of Yards & Docks, Washington, D. C., has approved construction of a hostess house and other buildings and facilities at Camp Elliott, San Diego. Estimated cost, $157,000. 3-9

SAN DIEGO CO.—The Bureau of Yards & Docks, Washington, D. C., has approved construction of recreational facilities, roads, walks and services at Camp Mathews, San Diego. Estimated cost, $68,500. 3-9

SAN DIEGO CO.—The Navy has approved a small craft dock, service bldgs., floats and anchor piles at the San Diego Naval Operating Base, at a cost of $86,720. 3-30

SAN DIEGO CO.—Plans are being prepared for a high explosive magazine at Camp Pendleton, Oceanside, for the U. S. Navy. To cost $75,000. 3-21

SAN DIEGO CO.—Plans are underway for six bachelor officers' quarters bldgs. at Camp Kearney, San Diego. To cost $150,000. 3-21

### Colorado

PUEBLO CO.—Architect is preparing plans for a cadet nurses' dormitory for St. Mary's Hospital, Pueblo. Estimated cost, $125,000. 3-16

### Idaho

BONNER CO.—The Navy Department allocated $250,000 for addtl. school bldgs. at the Naval training school, Farragut. 3-23

### Utah

DAVIS CO.—The Bureau of Yards & Docks, Washington, D. C., is preparing

plans for new barracks bldgs. for Waves at the Clearfield Naval Depot, Clearfield. 3-27

DAVIS CO. — The Bureau of Yards & Docks, Washington, D. C., has set aside $3,600,000 to be used for eight storehouses and several new shipping and receiving bldgs. at Naval Supply Depot, Clearfield. 3-27

PROVO CO.—The Rio Grande Trailways, Burlington & Santa Fe bus lines have authority for construction of a bus terminal at the corner of First North St. and University Ave., Provo. 3-23

WEBER CO.—Architect has completed plans for a large permanent type hospital building in Ogden. To cost about $1,129,000. 3-16

### Washington

KING CO. — The Navy Department, Washington, D. C., has approved expenditure of $4,220,000 for addtl. naval facilities at the Naval Station, Seattle. 3-9

PIERCE CO.—The U. S. Veterans Administration, Washington, D. C., is planning to construct a 492-bed addition to the neuro-psychiatric hospital at American Lake. 3-3

### Wyoming

SHERIDAN CO.—The U. S. Veterans' Admin., Washington, D. C., has approved two new bldgs. in Sheridan. Estimated cost, $750,000. 3-28

## Miscellaneous . . .

### California

ALAMEDA CO.—The War Department announced authorization for the Alameda Intransit Depot at Alameda. Estimated at $4,000,000. 3-15

LOS ANGELES & SANTA BARBARA COS.—Southern Counties Gas Co. and the Southern California Gas Co., 810 S. Flower St., Los Angeles, plan construction of a new natural gas pipe line from Goleta to Los Angeles, 150 mi., at an estimated cost of $4,000,000. 3-9

LOS ANGELES CO. — The Navy has approved an outdoor swimming pool especially designed to treat Navy personnel in need of certain types of rehabilitation at the Long Beach Naval Hospital, to cost $135,000. 3-30

VENTURA & LOS ANGELES COS.—Engineers of Southern California Gas Co. are preparing plans for a pipe line to be laid betw. Ventura & Los Angeles. Estimated cost, $2,368,900. 3-20

VENTURA & SANTA BARBARA COS.—Plans are being prepared for a pipe line to be laid betw. Goleta & Ventura, by Southern Counties Gas Co., estimated to cost $1,083,290. 3-20

### Colorado

BENT CO.—The Veterans Administration, Washington, D. C., is contemplating addtl. bldgs. at Fort Lyon, to cost an estimated $1,000,000. 3-22

### Washington

KING CO.—The City of Seattle plans to increase the capacity of the south substation at a cost not to exceed $850,000. 3-8

KITTITAS CO.—Plans and specifications are being completed by the Northern Pacific Railway Co., Smith Tower, Seattle, for realignment and straightening of approximately 6 mi. of railroad track east of Cle Elum, involving construction of three tunnels of a total length of about 5,200 ft. Estimated cost, $2,000,000. 3-10

KITSAP CO.—Bureau of Yards and Docks, through Public Works Officer, Puget Sound Navy Yard, Bremerton, has plans ready for 30-mi. Bremerton-Shelton railroad line. Cost of first section estimated at $3,000,000, balance at $9,000,000. 4-1

# TRADE WINDS

## News of Men Who Sell to the Construction West

### CALIFORNIA

**Arthur P. Cramer** is engineer-manager of the new office recently opened at 220 Montgomery St., San Francisco, by TIMBER STRUCTURES, INC., manufacturers of prefabricated timber and glued assemblies. The new office will take care of domestic business in the San Francisco trade territory and the development of certain types of export business. Cramer is widely known to contractors, engineers and architects of the Pacific Coast. He is a graduate of Oregon State College, was formerly a consulting engineer in Portland and for the past three years has been associated with Timber Structures.

☆ ☆ ☆

The heads of some of southern California's largest war plants have banded together to buy out the business of the HERCULES FOUNDRIES of Los Angeles, manufacturers of plumbing supplies and soil pipe fittings for the Pacific Coast. The war plant executives are **Lawrence A. Harvey**, chairman of the board, Harvey Machine, Inc.; **Alex Deutch**, president of American Screw Corp.; and **Louis Warschaw**, president of Warmac Company. Associated with them is **Victor Halperin**, formerly with General Fireproofing Company of Youngstown, Ohio, who will be in charge of consumer sales and research. Plans are now being worked out by the new management for expanding the production facilities of Herco so that it will be in a position to supply the very large demand for plumbing in industrial buildings, homes and other new constructions at the end of the war.

☆ ☆ ☆

**Dr. John M. Schweng** has recently been appointed to the staff of Turco Products, Inc. Dr. Schweng will serve as chemical research engineer, and director of bacteriological research. He was chemical research engineer at Lockheed for 2½ years and before that he was chief chemist at Imperial Laboratories in Los Angeles for three years. He has to his credit advances in the catalytic cracking of petroleum crude, and in the development of protective coatings for aluminum and magnesium alloys.

☆ ☆ ☆

**John N. Barker**, formerly district accounts supervisor for the Westinghouse Electric Appliance Division in San Francisco, Calif., has been named Northern California District appliance manager for the WESTINGHOUSE ELECTRIC SUPPLY CO. **William C. Miles**, formerly an appliance supervisor for the Supply Company, has been promoted to the post of district application data manager. Barker joined Westinghouse in 1938. He left the company the following year to become appliance buyer for a large Philadelphia department store, then in late 1940 rejoined Westinghouse at San Francisco as supervisor of major accounts for the Electric Appliance Division. Miles joined the company in 1929, and has served the company continuously since that time, in various capacities at Seattle, Wash., Portland, Ore., and San Francisco.

☆ ☆ ☆

**Stuart E. Yeaton** has been made manager of sales of the electrical wire and cable division of the JOHN A. ROEBLING'S SON'S CO., Trenton, N. J. He was employed as a salesman in the Seattle branch from 1934 to 1941, when he was made assistant to **W. G. Marks**, president of the California Corp. of the Roebling Co. at San Francisco. In May, 1943, he was transferred to the main office at Trenton as manager of sales of round, flat wire and specialties.

☆ ☆ ☆

**W. F. Rhodehamel** has been appointed to head the asphalt and road-oil sales of the SEASIDE OIL COMPANY, according to announcement by H. B. Kellogg, president of the company. Rhodehamel, who was formerly Merchandise Manager and Lubrication Engineer, will retain his position as Lubrication Engineer in addition to his new duties.

Rhodehamel is a Registered Civil Engineer in the state of California, a member of the Society of Automotive Engineers, is on the Advisory Board of Engineers of the Chek-Chart Corporation, and is also a member of the Maintenance Advisory Committee of ODT.

☆ ☆ ☆

**H. T. Reishus** has been appointed assistant domestic sales manager in charge of the industrial power equipment program of INTERNATIONAL HARVESTER CO., INC. He will devote his full time to furthering the development and sales of this line. He started with Harvester in 1925 as a clerk at Minot, N. Dak., and through the years worked his way up to the position of Eastern district manager to which he was appointed in 1941. In 1942 he was temporarily assigned to the war materials division.

☆ ☆ ☆

**F. Lowell Garrison**, former sales manager for GENERAL ELECTRIC SUPPLY CORP. at Butte, Mont., has been appointed public relations manager for G. E. on the West Coast, with headquarters in the Russ Building, San Francisco. He succeeds **Paul C. Wilmore**, who has been transferred to the company office at Cincinnati.

☆ ☆ ☆

### AMONG THE MANUFACTURERS

A major change in the sales policy of R. G. LeTourneau, Inc., providing for exclusive representation of its line of heavy earthmoving equipment by its own distributors throughout the world instead of through Caterpillar Tractor Co. dealers, was announced recently. The change will be gradual, probably requiring several months before the new policy is in complete operation. LeTourneau and Caterpillar will continue to work together on equipment for the government. At the time of the announcement, the LeTourneau company also issued a denial to the rumor that there have been any negotiations of any kind between LeTourneau and Adams Grader Co., Cleveland Tractor Co., Cummins Engine Co., and Allis-Chalmers, or vice versa.

☆ ☆ ☆

**Howard L. Stilley** has been named central sales manager after a brief period as LeTourneau's chief field engineer. **John F. Johannsen**, long LeTourneau's export general manager, has been named export assistant general sales manager to advise on export sales, **Robert D. Evans**, formerly assistant, has succeeded Stilley as chief field engineer. **Bruce Royer**, formerly with the U. S. Engineers Office in Chicago, is assistant to Evans. Already added to the district representatives' staff, with assignments forthcoming soon, are **John Ralls**, long widely known in the Memphis, Tenn., construction area, and **C. W. Scholvin**, another construction veteran, who has been with WPB in Washington, D. C.

☆ ☆ ☆

**Benjamin Franklin Affleck**, 75, who rose from an obscure office position to president of the UNIVERSAL ATLAS CEMENT COMPANY, a United States Steel Corp. subsidiary, from which he retired in 1936, died suddenly of a heart attack February 13 at his home in Winnetka, Ill. Affleck joined the Illinois Steel Company, now Carnegie-Illinois Steel Corp., as a stenographer in St. Louis in 1896. In 1901 he was made branch manager of the company's cement department there. When the Universal Portland Cement Company became a subsidiary of United States Steel Corp. in 1906, he was elevated to the position of General Sales manager in Chicago. In 1915, he was elected president of Universal Portland Cement Company. When it joined with the Atlas Portland Cement Company in 1930 to become the Universal Atlas Cement Company, he continued as president until his retirement in 1936, and remained a director until his death.

☆ ☆ ☆

THE KOEHRING COMPANY, Milwaukee, Wisc., was recently presented with the Army-Navy "E" award for excellence in the production of war materials.

☆ ☆ ☆

**Walter G. Hildorf**, formerly Timken's chief metallurgical engineer, recently became director of metallurgy. He joined the company in 1928 and is nationally known for his numerous articles and lectures on many metallurgical subjects. **Ralph L. Wilson** is now chief metallurgical engineer.

☆ ☆ ☆

**George B. Doner** is the new sales manager of the Rock Drill Division of the CHICAGO PNEUMATIC TOOL COMPANY. He comes to this position from the Mining Department of the subsidiary company, the Canadian Pneumatic Tool Company, Montreal, Canada, with whom he has been associated for the past 19 years as Branch Manager at Timmins and Kirkland Lake. He will make his headquarters at the executive offices in New York City.

☆ ☆ ☆

BURGESS-MANNING COMPANY was incorporated January 26, 1944, and, as a subsidiary of BURGESS BATTERY COMPANY, assumed the activities of the Acoustic Division of Burgess Battery Company on January 31. The newly elected officers are **W. L. Manning**, president; **D. W. Day** and **R. L. Leadbetter**, vice presidents; **J. E. Lutz**, treasurer; **H. H. Darbo**, secretary; **E. D. Woisard**, assistant treasurer and assistant secretary. Offices

**LETOURNEAU EXECUTIVES study the announcement of the formation of the new company sales distribution organization. Seated: E. R. GALVIN, general sales manager, reading; HARRY L. VINES, western sales manager. Standing: l. to r.: PAUL FULFORD, export sales manager; HOWARD L. STILLEY; and H. R. CONN, eastern sales manager.**

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will be located at 2815 West Roscoe St., Chicago 18, Ill. The transfer involves no change in either personnel or policy, and Burgess-Manning Company will continue to develop, design, and supply all of the products formerly associated with the Acoustic Division.

☆ ☆ ☆

**Henry Rowold** has been appointed vice-president of MACK-INTERNATIONAL MOTOR TRUCK CORP., according to a recent announcement. Rowold joined the Mack organization in 1919 in a clerical capacity and later became executive assistant to the president. He was placed in charge of national account sales in 1939, and as vice-president will continue in that capacity. He is also a committee member of the Central Truck Tire Rating Board of OPA.

**H. B. Lilley**, formerly assistant chief inspection engineer, has been promoted by the Steel and Tube Division of THE TIMKEN ROLLER BEARING COMPANY, to the position of sales development engineer, where he will specialize in the application of mechanical tubing to machine tool products and other engineering applications. Since 1924 he has been employed by The Timken Steel and Tube Division in various capacities connected with the inspection of tubular products. In recent years, he has specialized in the development of tubing applications to the aircraft industry.

☆ ☆ ☆

**William J. Filbert**, 78, a director of the UNITED STATES STEEL CORP., and a member of the Finance Committee and formerly chairman of the this Committee, died early today at his home in New York City after a brief illness. Filbert became assistant auditor of Federal Steel Company in 1898. He was made auditor of the concern in 1899, remaining in that position until 1901, when this company was merged with others and formed the United States Steel Corp. He then commenced his long and important term of service as an official of that company. At the time of his death he had served almost 25 years as a director.

☆ ☆ ☆

**Alan C. Sweetser**, for 18 years with the STANLEY TOOL DIVISION OF THE STANLEY WORKS, has recently been appointed West Coast

manager of THE FAFNIR BEARING COMPANY, with headquarters at Los Angeles. Both the San Francisco and Seattle branches are also under his direction.

☆ ☆ ☆

The "Shovel News," a pictorial news bulletin on important activities and developments in the field of modern excavators, will continue to be published periodically by HARNISCHFEGER CORPORATION during this year. The first 1944 issue high-spotting the Alaska Highway construction job, has been mailed to contractors and shovel operators throughout the country. Names will be added to the mailing list on request to the Excavator Division, Harnischfeger Corp., Milwaukee 14, Wis.

☆ ☆ ☆

**H. H. Buchanan**, formerly assistant general sales manager and acting export manager for the THEW SHOVEL COMPANY, Lorain, Ohio, has been appointed general sales manager of LAPLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Iowa, manufacturers of earth-moving and land clearing equipment for Caterpillar-built tractors. He succeeds **H. N. Graves**, who resigned last June. Buchanan began his administrative career as a sales representative for Bucyrus-Erie Company in 1923. In 1928 he was promoted to district sales manager in charge of the St. Louis office, and three years later was made assistant central sales manager with headquarters in Chicago. In 1936 he joined the Caterpillar Tractor Company, as a special representative, in which capacity he served until 1939, when he became western district sales manager in San Francisco for Thew-Lorain.

☆ ☆ ☆

**William A. Patterson**, president of United Air Lines, Inc., has been elected a member of the board of directors of STEWART-WARNER CORP., filling the place left vacant on the directorate by the death of **Frank A. Ross**, senior vice president. **Frank A. Hiter**, vice president and director, was designated senior vice president. In this capacity he will act as chief executive officer of the corporation in the absence of **James S. Knowlson**, chairman of the board and president.

☆ ☆ ☆

The manufacturers of membranous compounds for curing concrete met recently in Chicago to perfect an organization for the purpose of unification and betterment of the industry. Officers elected at the

meeting were **Gloster P. Hevenor**, of the JOHNSON-MARCH CORP., chairman, and **Clark Moots**, of BATTENFELD GREASE AND OIL CORP., secretary. Others on the executive committee are: **George W. Whitesides**, SOLVENTS AND PLASTICS COMPANY, **R. W. Madison**, TRUSCON LABORATORIES, and **A. F. Penny**, of G. F. STERNE & SONS, LTD. The companies represented at the meeting produce more than ninety per cent of all the membranous curing compound used in the United States and Canada. Beside the companies listed above the following were represented: MASTER BUILDERS; FEDERAL WATERPROOFING COMPANY; INDUSTRIAL PRODUCTS MANUFACTURING COMPANY; HUNT PROCESS COMPANY; WALL PRODUCTS CO.; and L. SONNEBORN SONS.

☆ ☆ ☆

DOUGLAS FIR PLYWOOD ASSOCIATION OF TACOMA, WASH., has announced the appointment of **Donald M. Crooks** as midwest representative for their association, succeeding **David S. Betcone**, now representing the fir plywood industry at Washington, D. C. Crooks will be located at Chicago. A third field man, **Joseph Weston**, is located at Los Angeles.

Crooks' long and wide experience in the manufacture and marketing of prefabricated structures and in engineering and architectural work qualifies him as a consultant on plywood applications in the industrial and prefabrication fields.

☆ ☆ ☆

**Deane K. Mitchell** has been appointed sales manager of THE NOVO ENGINE COMPANY of Lansing, Mich., replacing **R. B. Harvey**, resigned. Mitchell has been a sales executive for nearly 25 years. He came to Novo in 1937 as manager of export sales. Prior to that he was with the Niagara Sprayer and Chemical Company, Inc., of Middleport, N. Y., having been employed by them since 1919. His experience and his knowledge of distributor's sales problems should be an asset in his new position.

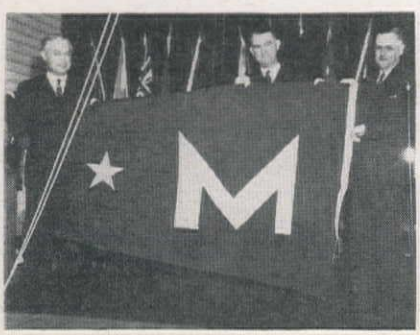
☆ ☆ ☆

Paul C. Wilmore, GENERAL ELECTRIC Public Relations Manager for the West Coast, is being transferred to Cincinnati, Ohio, to head up the new G. E. household appliance distributing branch being established there.

Wilmore, well known in public relations and advertising circles, has spent the past five years on the West Coast, the first three of which he was manager of General Electric refrigerator sales in the Western Region, later becoming Public Relations Manager for the company, with headquarters in San Francisco.

☆ ☆ ☆

**THE MARITIME "M" was awarded to the Monarch Forge and Machine Works, Portland, Oregon, on February 16. Holding the pennant are, l. to r.: CARL W. FLESHER, Maritime Commission regional director; FRANK J. FITZPATRICK, secretary-treasurer of the company; and CHARLES J. HIRSHBUHL, president of the company.**




The merging of the MONSANTO CHEMICAL COMPANY of St. Louis, Mo., and I. F. LAUCKS, INC., of Seattle, Wash., large manufacturers of industrial glues, marks the entry of another large eastern factor into the West, and gives this well known eastern chemical concern a position of importance in the rapidly growing Pacific Coast plywood industry.

THE MONSANTO CHEMICAL COMPANY has been in existence since 1901, and at the present time operates 19 plants in the United States, as well as plants in Great Britain, Canada, Australia, and in South America. The company also maintains several research laboratories, the resources of which will be used to the even greater development of the plywood adhesives industry.

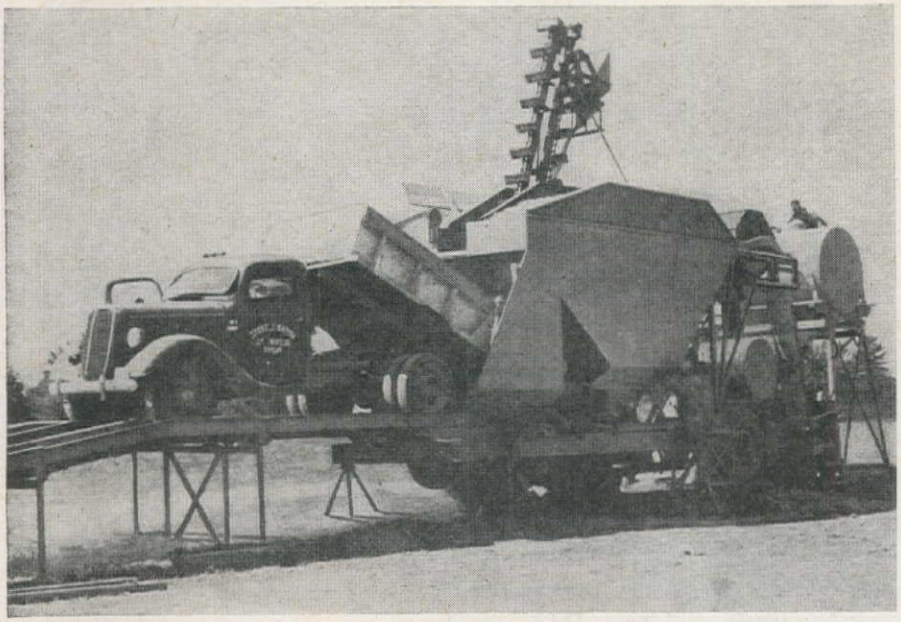
The firm of I. F. LAUCKS, INC., was founded in Seattle in 1920, and under the same management has attained the high place in the field of industrial glues it enjoys today. They pioneered in the production of soybean glues and are manufacturers of synthetic resin glues used so largely in the manufacture of plywood.

The combined companies will be operated as a unit, and no changes in the Laucks personnel are contemplated. Officers of I. F. Laucks, Inc., are: President, **I. F. Laucks**; Vice-President, **H. P. Banks**; Secertary-Treasurer, **Leo W. Eilertsen**. **Charles Belknap** is President of Monsanto, and other officers of the company are, **Edgar M. Queeny**, Chairman of the Board; **William M. Rand** and **Gaston DuBois**, Vice-Presidents and members of the Executive Committee; and **John F. Brooks**, Vice-President and General Manager of Plastics Division.


**DAVE KENNEDY, center, accepted the Army-Navy "E" pennant from officials at the presentation ceremony awarding the honor to Foote Company, manufacturers of concrete machinery, recently.**

# NEW EQUIPMENT

MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, *Western Construction News*, 503 Market Street, San Francisco 5, California.



## Batching Plant

**Manufacturer:** C. S. Johnson Company, Champaign, Ill.

**Equipment:** Portable batching plant.

**Features claimed:** This complete highway portable batching plant can be towed behind a truck to the most advantageous point in the pouring area, and quickly set up for operation. Among the advantages claimed for the unit, which is called the Johnson Porto-Batcher, are (1) elimination of considerable handling equipment, (2) reduction of the number of mixing units per concrete yard mile. A unique feature of the Porto-Batcher is the Johnson charging skip. By providing proper intermingling of aggregate with cement when discharged into the mixer, this charging skip provides pre-mixing and pre-shrinkage which compares favorably with the best results of the best fixed batching plants. This feature prevents cement from touching wet mixer opening and walls, thus eliminating gumming and excessive wear. The charging skip has a capacity of 43 cu. ft., 33 cu. ft. for aggregate and 10 cu. ft. for cement. The aggregate from the three storage compartments reaches the skip through three fill valves. The cement and each size aggregate is weighted on a separate weight beam. The cement compartment is completely sealed to avoid contact with wet aggregate. The Johnson Porto-Batcher is easily towed behind a truck on its own pneumatic tired wheels. One man controls all batching operations by the ingenious grouping of all levers in one central location. The batching cycle is 90 seconds.

## Electrode Holder

**Manufacturer:** General Electric Co., San Francisco, Calif.

**Equipment:** New helium-shielded arc-welding electrode holder.

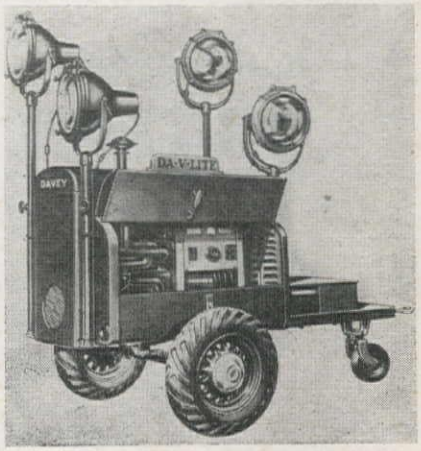
**Features claimed:** The new holder, which may be used with either helium or argon gas, is specially designed for use in the welding of light metals, such as magnesium and its alloys, where precise heat control and protection from the oxidizing effect of the air are required. It can also be used in the welding of other hard-to-weld metals, such as aluminum and stainless steel. A feature of the new holder is the tapered friction joint between the electrode clamp assembly and the handle, which facilitates rapid change of electrode size without using tools or making threaded connections. Electrodes of various sizes may be left in their respective clamps and substitution made merely by removing one assembly from the handle and slipping on another.

## Portable Light Unit

**Manufacturer:** Davey Compressor Co., Kent, Ohio.

**Equipment:** Portable Da-V-Lite Unit.

**Features claimed:** The Da-V-Lite portable light and power unit solves the problem of light and power on thousands of jobs—construction projects, utility emergency repairs, mine operations, logging, quarrying, airfield-lighting — wherever dependable light and power are needed. A heavy-duty, four-cylinder, V-type, air-cooled engine operates a Westinghouse single-phase, 60-cycle, 120-volt generator




delivering 5 Kw. for lighting or power. The unit is available in four models, any of which may be obtained with either skid mounting or spring mounted on two wheels. The power unit on all models is enclosed in sheet-steel, weather-proof body. Illuminated Westinghouse control panel makes operation safe and trouble-free. Two 30-amp double receptacles for operating power tools are furnished.

## Concrete Gun

**Manufacturer:** Construction Machinery Co., Waterloo, Iowa.

**Equipment:** Pneumatic concrete gun.

**Features claimed:** The CMC Concrete Gun has been developed as a post-war product. It is designed for the purpose of building, protecting and repairing and has a wide variety of uses. It is built in one size, but with two variable speeds. In low speed 1¼ inside diameter material line is used, and 105 cu. ft. of free air per minute at 60 lb. pressure is required. Capacities in low speed can be varied from 1 to 2½ cu. yd. per hour with engine throttle. In high speed a 1½-in. inside diameter material line is used, and 210 cu. ft. of free air per minute at 60 lb. pressure is required. Capacities in high speed can be varied from 2 to 5 cu. yd. per hour. When

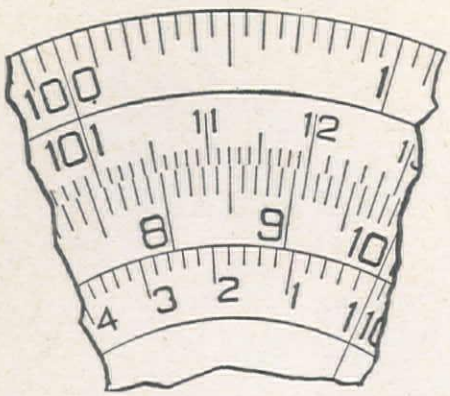
compressed air is wanted for concrete breakers or any other purpose, the air can be cut off from the Gun, the Gun clutch disengaged and the compressor used alone.

## Slide Rule

**Manufacturer:** Tavella Sales Co., New York City.

**Equipment:** Monitor circular slide rule.

**Features claimed:** The Monitor slide rule is especially adapted for carrying in a brief case. It is small in size (6 in. diameter), light in weight and accurate. It is grease and water proof, and should the instrument become soiled, it can easily be cleaned by washing with soap and water. Tests have proven that the average accuracy of the Monitor slide rule in making rapid slide rule calculations is within ¼ of 1 per cent. It can be dropped, trampled on or immersed without being injured. The scales are




finely graduated on white vinylite, accurately ruled, and are guaranteed to last for years. Multiplication, division, square root and problems involving the use of logarithms and functions of angles are quickly solved with this slide rule. The front side has four scales, Log, C. D. and CI or C inverted scale. The reverse side has sine and tangent scales and A and D scale for finding squares and square roots. It is listed at $2.95 without case. The leatherette case is 75 cents extra. Instructions are supplied with each rule.

## Filters

**Manufacturer:** Mines Safety Appliance Company, Pittsburgh, Pa.

**Equipment:** Colored filters for respirators.

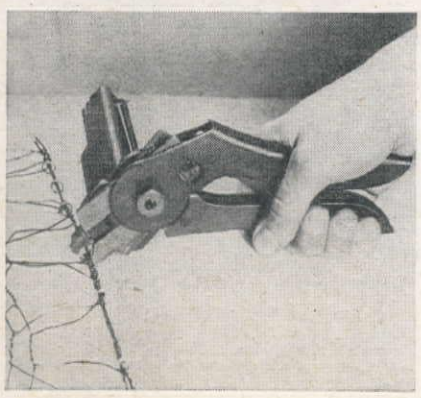
**Features claimed:** A new development in respiratory safety by the company is their M. S. A. Colored Filters for M. S. A. Comfo and Dustfoe Respirators. Designed for use with these modern dust respirators, each of the three types of filters has its own distinctive color. The color shows through the transparent filter containers and permits inspection at a glance of the filter-type employed, without removal from the respirator. Workers are able to quickly associate color of filter with its dust and fume protective classification. Light red in color indicates protection against all dusts (including toxic dusts, lead, cadmium, magnesium, etc.). Light green indicates protection against fibrosis-producing (silica, asbestos) and pneumoconiosis-producing dusts and mists. Grey is the color of the filter for protection against toxic fumes from molten metals.

## Stapling Plier

**Manufacturer:** Bostitch, East Greenwich, R. I.

**Equipment:** Magazine-fed hog-ring type plier.

**Features claimed:** A newly developed tool for post-war civilian use has just been announced. It is a magazine-fed stapling plier which wraps the staple around the work in much the same manner as the conventional hog-ring plier but many times as fast. It applies 60 to 70 rings with one loading. Narrow jaws enable it to get into small spaces; rapid, one-hand operation speeds the work. It weighs less than 2 lb.; the ring diameter is ¼ in.; the ring overlap is ¼ in., and the wire size is No. 16. Developed for the armed forces for attaching strips of wire netting, fence wires, etc., this Bostitch Plier is now available in limited numbers to civilian industries engaged in important production.



## Etcher and Demagnetizer

**Manufacturer:** Ideal Commutator Dresser Company, Sycamore, Ill.

**Equipment:** New combination etcher and demagnetizer.

**Features claimed:** This new tool is ready for instant use as either an etcher or demagnetizer. It is enclosed in an attractive case with a removable, hinged cover. To etch small tools and parts, simply place them on the work-plate, turn switch "On" to proper heat and start etching. A ground clamp is provided for etching parts too large for the work-plate. Fourteen heats are provided by "Hi-Lo" tap and 7-point switch. This gives a wide range for marking all iron, steel and their alloys from small delicate parts up to large smooth castings. To demagnetize, it is only necessary to turn the switch "On" to either No. 1 or No. 2 position and proceed as with ordinary demagnetizer. Maximum rating is 5.5 amp. The overall dimensions are 8¼ in. x 11½ in. x 8⅝ in. The work-plate is 8¾ in. x 7¾ in.

## Templates

**Manufacturer:** The A. Leitz Co., San Francisco, Calif.

**Equipment:** Precision-cut ellipse templates.

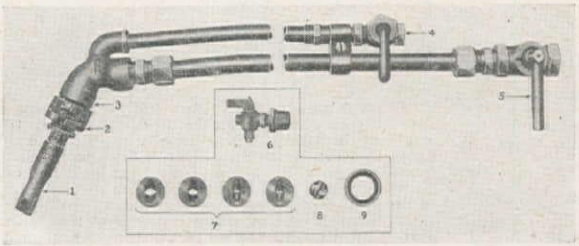
**Features claimed:** Savings up to 50 per cent in time on production illustration jobs (visuals) are being effected through the use of a new series of precision-cut ellipse templates. Meeting professional accuracy requirements, these guides are .02 in. thick celluloid templates and are made in a set of 10, with angles from 15 degrees to 60 degrees by 5 degree increments. Templates of 60, 55, 50, 45 and 40 degrees have ellipses from ⅛ in. to ⅜ in. increasing by 32ds, then by 16ths to 1 in., then by 8ths to 2 in. Templates of 35, 30, 25, 20, and 15 degrees progress the same, but start with sizes of 1/32, 1/16, 3/32, ¼ and ⅜ in., respectively. Equally efficient for either pencil or ink, they eliminate the time-consuming geometrical development of ellipses by the plot method. They enable the untrained as well as the professional to draw ellipses with equal accuracy and speed. Vertical and horizontal axes are clearly indicated for ready location and adjustment to position. They are furnished either as a set of 10 or separately.

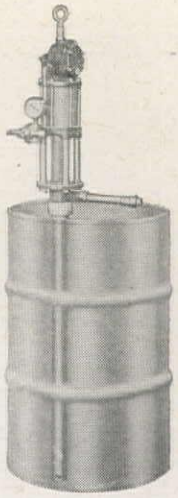
## Spray Gun and Pump

**Manufacturer:** Stephenson Air Brush Paint Co., Oakland, Calif.

**Equipment:** R. M. S. Fibre-Gun and R. M. S. pump.

**Features claimed:** Delivering a 6 to 8-ft. "fan", the Fibre-Gun sprays on sealing, waterproofing, insulating and similar compounds —including heavy fibrated asphaltic materials—at the rate of 4 to 6 gallons per minute. Replacing hand brushing or troweling methods, use of the gun not only offers important savings in time and labor, but also provides a more thorough and uniform application on





steel, concrete or brick work. The non-clogging Fibre-Gun is light (less than 5 lb.), easy to handle, and easy to clean after use. It is sturdily constructed to withstand rough usage. Although designed primarily to handle heavy materials and fibrated compounds, it may quickly be adapted for spraying lighter paints or other liquids. The F. M. S. pump, companion to the Fibre-Gun, is an air-operated unit which pumps all liquids handled by the gun directly from barrels or other containers, delivering the material to the spray gun under uniform, controllable pressure. The pump may be used with any type of spray gun. It eliminates the need for a pressure pot; containers may be refilled at any time without stopping the pump or interrupting spraying operations. It is a non-clogging unit that is easy to clean and use.

## Stretcher

**Manufacturer:** E. D. Bullard Company, San Francisco, Calif.

**Equipment:** Folding stretcher.

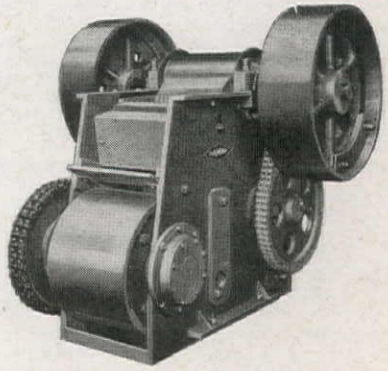
**Features claimed:** A compact folding stretcher has been developed that can be carried readily in most any vehicle, small plane, or carried as a pack on the back of a person, using the leg straps for a harness. The stretcher is so constructed that it can utilize an ordinary sedan as an emergency ambulance, by placing the stretcher on the tops of the front and back seat. There are no loose parts to assemble; simply unfold and lock into position. The hinge is so designed that should the four fasteners fail to be secured, the stretcher still remains rigid without danger of collapsing. The stretcher is 6 ft. 2 in. in length, and weighs 16 lb.

## Crusher

**Manufacturer:** Diamond Iron Works Inc., Minneapolis, Minn.

**Equipment:** Diamond Dual-Action Crusher.

**Features claimed:** This new crusher successfully combines the functions of the jaw and roll crushers into one machine—one machine that gives primary and secondary crushing in only one operation. Many advantages become immediately apparent to the quarryman and contractor. First, is a material saving in weight. Instead of a jaw weighing perhaps five and a half tons and a roll weighing perhaps six tons, the Diamond Dual-Action crusher will weigh about six tons. It occupies the same space as a large jaw crusher, and uses about half the horsepower consumed by the average jaw and roll. In actual use it will usually outproduce any combination of jaw and roll of comparative size without plugging, and without flats or slivers.



## Rivet

**Manufacturer:** Cherry Rivet Company, Los Angeles, Calif.

**Equipment:** Cherry blind rivets.

**Features claimed:** Cherry blind rivets are now being supplied with an important new feature. The addition of a notch in the pulling mandril of the self-plugging type rivet provides several advantages.

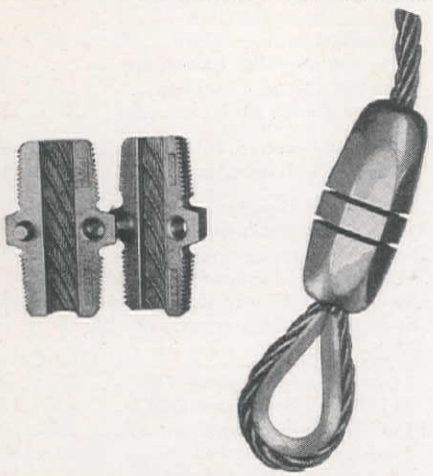
This notch serves to inhibit the flow of the metal in the upsetting process employed in forming the pulling head. As a result, Cherry Rivets are now more uniform. Another important advantage is that a shorter mandril is required, thus effecting a saving in material as well as providing for a shorter drawbolt movement, making possible the use of the gun for longer grip lengths. Cherry blind rivets are designed to speed up production by making it easier to handle riveting jobs in difficult places where there is access to only one side of the work. They are headed-up by a hand gun (G-10) or power gun (G-15) operated from one side of the work only.

## Clamp

**Manufacturer:** National Production Co., Detroit, Mich.

**Equipment:** Safe-Line wire rope clamp.

**Features claimed:** The clamp is made in two halves of high tensile strength steel. The inside of each half is made to fit the rope; the large grooves pocket the large spiral strands; the small grooves pocket each small wire that makes up the strands; the large grooves hold the rope from end-wise slippage and the small grooves prevent the rope from spiral winding out of the clamp. Every strand, every surface wire, contacts the full length inner surface of the clamp. The two halves are gripped tightly on the rope with strong alloy steel nuts. The holding contact is firm and complete the full length and



circumference of the clamp. The simplicity of the clamp is an important feature. It consists of but four parts and may be easily assembled and installed by unskilled workmen. The two taper threaded sections, which are placed on the exposed sides of the wire rope, are squeezed together in a vise-like grip when the two taper nuts are tightened. No special tools are required. By eliminating splicing and serving, the Safe-Line Clamp materially reduces the cost of a loop or sling because it takes much less time to make up and does not require the services of skilled workmen.

# LITERATURE . . .

**Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the Advertising Manager, *Western Construction News*, 503 Market Street, San Francisco 5, California.**

**The National Board of Fire Underwriters,** New York City—Recommendations for modernizing building and fire prevention codes in small and medium-sized communities are contained in a new expanded and modernized edition of the "Code of Suggested Ordinances for Small Municipalities" which has just been issued by the National Board of Fire Underwriters. Based upon the revised editions of the National Board's Building Code and the Suggested Fire Prevention Ordinance issued last year as recommended standards for the 500 larger cities of the nation, this code contains provisions which experience indicates are not only desirable but in many cases necessary for the safeguarding of lives and properties against fire.

**Douglas Fir Plywood Ass'n.,** Tacoma 2, Washington—A new booklet showing actual tests, which prove the advantages of using plywood boxes for shipping, storing, etc. These tests, which were made in the Research Laboratory of the Douglas Fir Plywood Ass'n., apply only to specific boxes tested, but they are believed to be fully representative. Graphic charts and photographs show effects of the tests and ultimate failure.

**The B. F. Goodrich Co.,** Akron, Ohio—A folder featuring the exclusive development of wire grommet V-belts for application where high power transmission, with a minimum of belting, is necessary. It describes the advantages of grommet construction of V-belts over standard belting. This new type construction produces a belt of great strength, assures lower permanent stretch, better shock absorption and greater flexing ability.

**Victor Equipment Co.,** San Francisco, Calif.—A new Victor bulletin using color photographs, and entitled, "Victor Welding and Cutting Apparatus Unit Bulletin, Form 20", conveys a pictorial impression of how Victor equipment may best serve the user. Included in the bulletin are prices and sizes of the various Victor welding torches.

**The Euclid Road Machinery Co.,** Cleveland, Ohio—A handbook for Euclid operators has been prepared to aid new operators and experienced men in the proper care and operation of Euclid machinery. This book is designed especially for owners, operators, and mechanics working with rear dump and bottom dump Euclid equipment. It is complete with five charts, including lubrication charts and schedules, and has many helpful hints as to operating instructions, travel speeds, standard tool equipment, etc.

**Cannon Electric Development Company,** Los Angeles, Calif.—"Cannon Signal Systems" for the modern hospital is the title of the new 16-page catalog just issued. Covering many leading items, the catalog describes and illustrates Nurses' Call Systems, Doctors' Paging Systems, Registers, Time Recorders, Special Switches and Lights. Two pages are devoted to architects' typical specifications for such systems. Other pages include comparative catalog numbers on the equipment, complete wiring layout for a signal system, with numbers and symbols.

**Andrew C. Campbell Division, American Chain & Cable Company, Inc.,** Bridgeport, Conn.—Abrasive milling is the subject covered by the new "Horizontal" catalog just issued. Each page in this catalog is a complete unit giving necessary data and specifications of the No. 302 Campbell Horizontal Wet Abrasive Cutting Machine. A typical job is explained and described in detail, and pictures are used to illustrate the key points. A special chart on the back page outlines the standard models, telling what it cuts, how it cuts, and the features.

**The Cartwright Asphalt Equipment Co., Inc.,** Galion, Ohio.—Bulletin No. 843 describes Cartwright's new full circulating hot asphalt spray bar now offered as the solution to the problem of "after-shut-off-drip," non-uniform distribution, leaky valves, fat and lean streaks, and clogged orifices. A chart is included comparing the features of this bar with those of other bars, and in addition specifications are given.

**American Steel Band Co.,** Pittsburgh, Pa.—A catalog showing the use of new Ventilators for industrial buildings. Diagrams and charts show the advantages of Fan and Continuous Ridge Ventilators, recently put on the market by this company.

**General Electric Co.,** Schenectady, N. Y.—A 24-page illustrated booklet entitled, "The Story of the Turbine", has recently been released. This booklet is not a technical discussion, but is designed to explain the importance the turbine is now playing in war production and will later play in peacetime living.

**Reading-Pratt & Cady Division of American Chain & Cable Company, Inc.**—A new simplified valve "Selection Chart", size 11½ in. x 17 in., is now available on heavy cardboard for tacking up. By a simplified breakdown of conditions to consider when selecting, and an explanation of what these conditions determine in the operation of a valve, this chart offers the valve buyer a "slide-rule" for valve selection. The chart is ideal for shop training, and for a refresher on valves.

**Keystone Asphalt Products Co.,** Chicago, Ill.—A 12-page booklet describes and illustrates the various Keystone products designed to the specifications and requirements of the paving industry. The booklet covers mastic board longitudinal and transverse tongue and groove joints, fibre expansion joints, premoulded asphalt expansion joints, asphalt sealing compound, sewer joint compound, and gives expansion joint list prices.

**Pneu-Hydro Road Machinery Co.,** Cadillac, Mich.—A 4-page bulletin illustrates and describes the new Pneu-Hydro Road Planer. Complete specifications are given for the improved Model "D" road planer. In addition the pneumatic snowplow cylinders and model A compressor are illustrated and described.

**Basic Refractories, Inc.,** Cleveland, Ohio.—Bulletin PI-44 describes the uses of 695 Plastic, a highly refractory, strong magnesia plastic for taphole construction and hot repairs. Mixing instructions are also given.

**The Buda Company,** Harvey, Ill.—The new Buda Chore Boy, the platform type shop truck of half-ton capacity for industrial use, is described in a 6-page leaflet just issued. It gives the truck's construction features and specifications and illustrates with pictures its many uses.

**George S. May Business Foundation,** Chicago, Ill.—Report No. 145, "Representative Cost Finding Systems in the Plastics Industry" is an article prepared by the George S. May Business Foundation. It was originally issued by Modern Plastics for distribution exclusively within the industry and is reprinted by permission.

**American Brake Shoe Company.**—Bulletin No. 1243-CP describes the use of manganese steel in machinery manufactured for the clay products industry. The properties of AMSCO manganese steel are listed and in addition numerous questions concerning the metal are thoroughly answered.

# INDEX TO ADVERTISERS

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