WCNC-06-1945

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

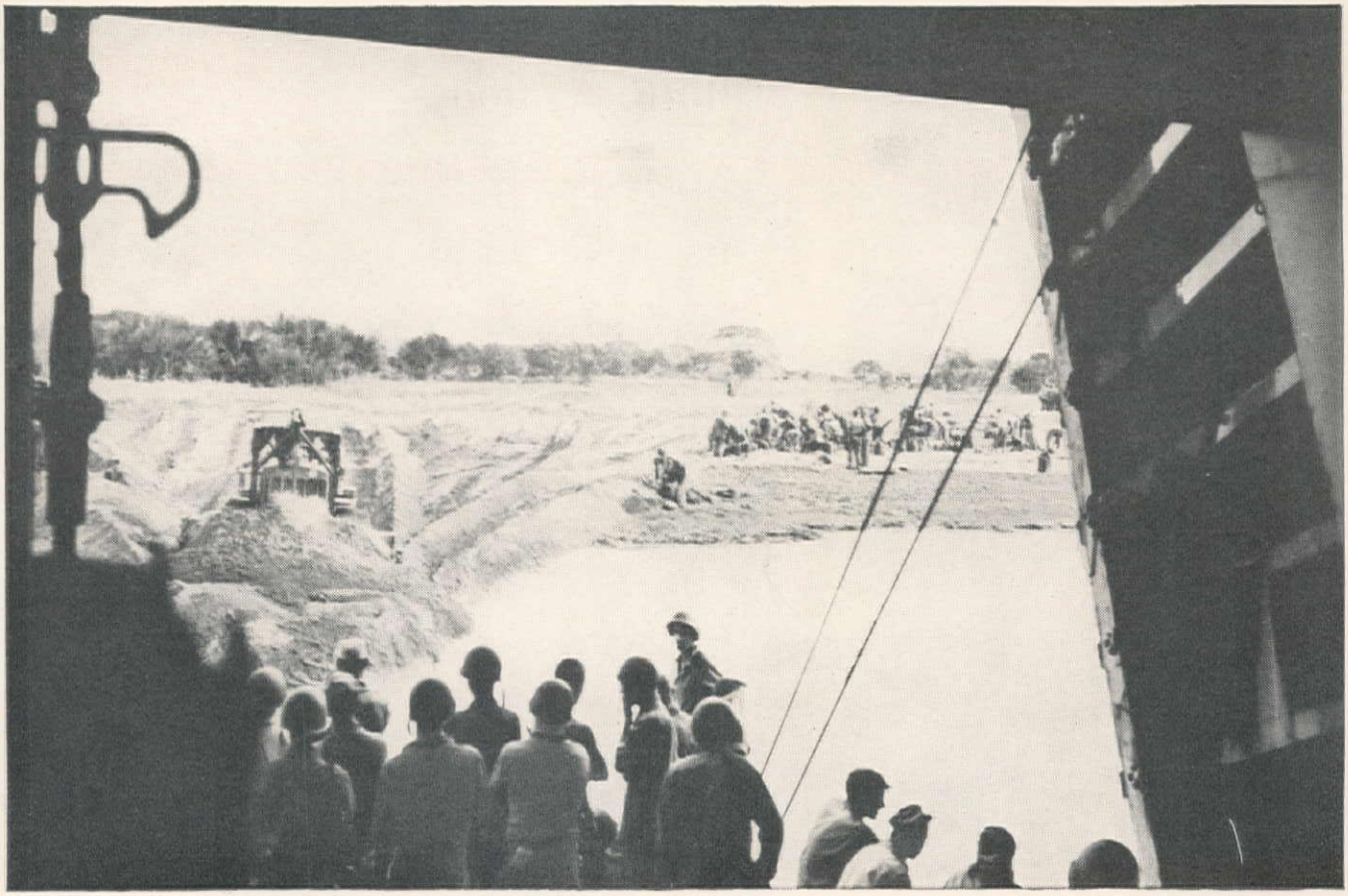
PUBLISHED MONTHLY
VOLUME XX, No. 6

JUNE • 1945

35 CENTS A COPY
$3.00 PER YEAR

BUY WAR BONDS

A COMPARISON of these two pictures indicates why the U. S. will win the war with Japan. Below, primitive hand-operated railway used by Japs for airfield excavation on Saipan; above, modern high-speed equipment, made possible by purchase of war bonds, used by U. S. Army to complete the same field. Increased purchases will speed the end of the war, assure a better peace.



Getting the Most Out of a Bulldozer

CARVING airstrips out of jungles and dozens of equally difficult assignments have proved how expert the Seabees are in getting the most out of a bulldozer. Here, on an "easy" job, one of them builds a causeway to enable the crew of an LST to unload supplies.

On a Pacific island or here at home, getting the most out of bulldozers—and other types of construction equipment—depends not only on the operator's skill but also on effective lubrication. Maintenance-wise contractors everywhere know effective lubrication is always assured when they use Texaco.

Texaco Ursa Oil X★★ for Diesels and heavy-duty gasoline engines, for example, assures better compression and combustion, greater fuel economy and more power because special additives give this heavy-duty oil the valuable properties of detergency and dispersion. Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until drained. *Ursa Oil X*★★ resists oxidation, protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco transmission and differential lubricants.

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

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ 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.

★ 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.

TEXACO

REG. T. M.

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

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

—A NEW DAY IS IN THE MAKING!

The immediate past has been a rush of business —contracts have been easy—machinery has been hard to get.

But a new day is in the making—a "tomorrow" with a new situation. Contracts won't come in bunches, machinery will be easy to get and machinery will play a more important part in the success and profits of your business than ever before.

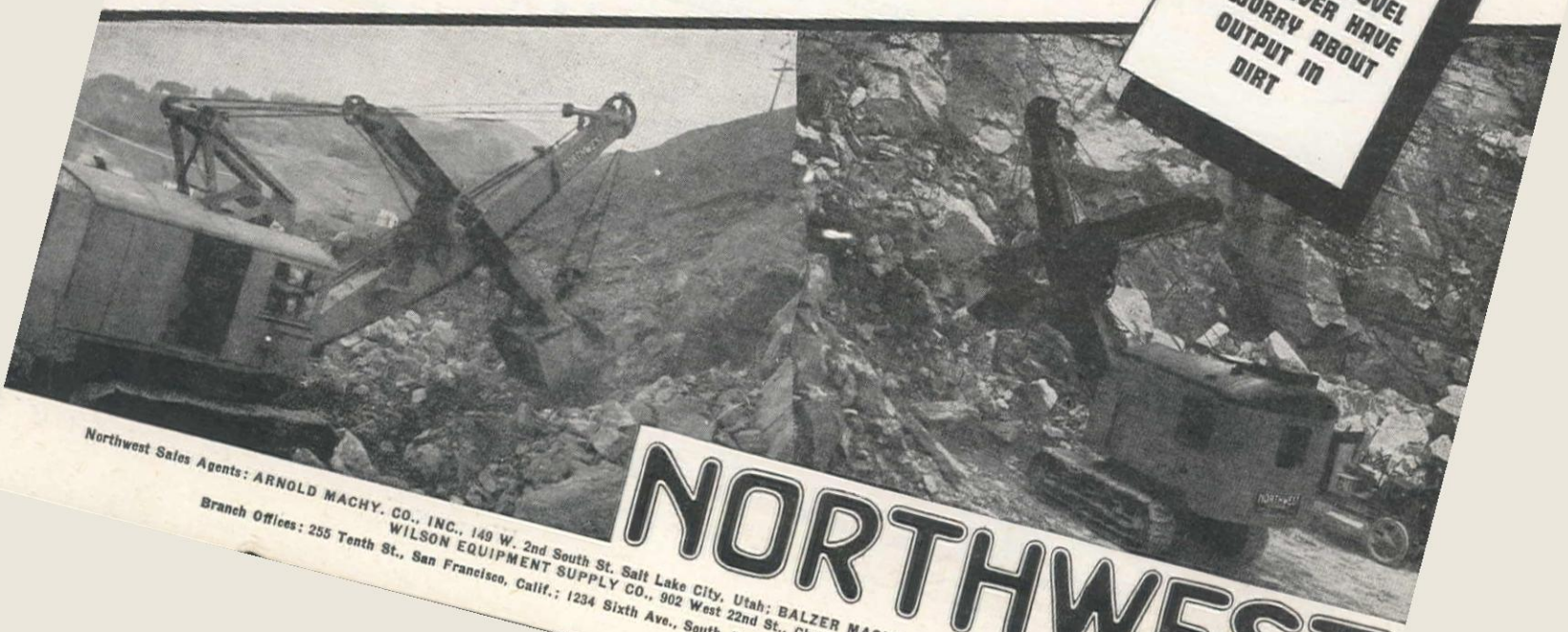
It is the *quality and the advantages* available in the machinery you buy that are going to establish profits on narrow bidding margins. It is not at all too early for you to make your plans.

Note the makes of Shovels, Cranes and Draglines in the hands of leading contractors. See them perform. Find out how they have stood up to the punishment of defense "highball" jobs and military service. Remember that such things as boom design, crowd design, steering, ease of upkeep, ease of control and other features can make or break the looks of a profit and loss sheet. Northwest believes that better machinery earns money, and this is *proved* by the number of successful contractors that have used Northwest for years.

Ask how the Northwests are doing and you'll plan for your peacetime profits on the amazing story of remarkable Northwest performance.

NORTHWEST ENGINEERING COMPANY

1736 Steger Building, 28 East Jackson Boulevard, Chicago 4, Illinois

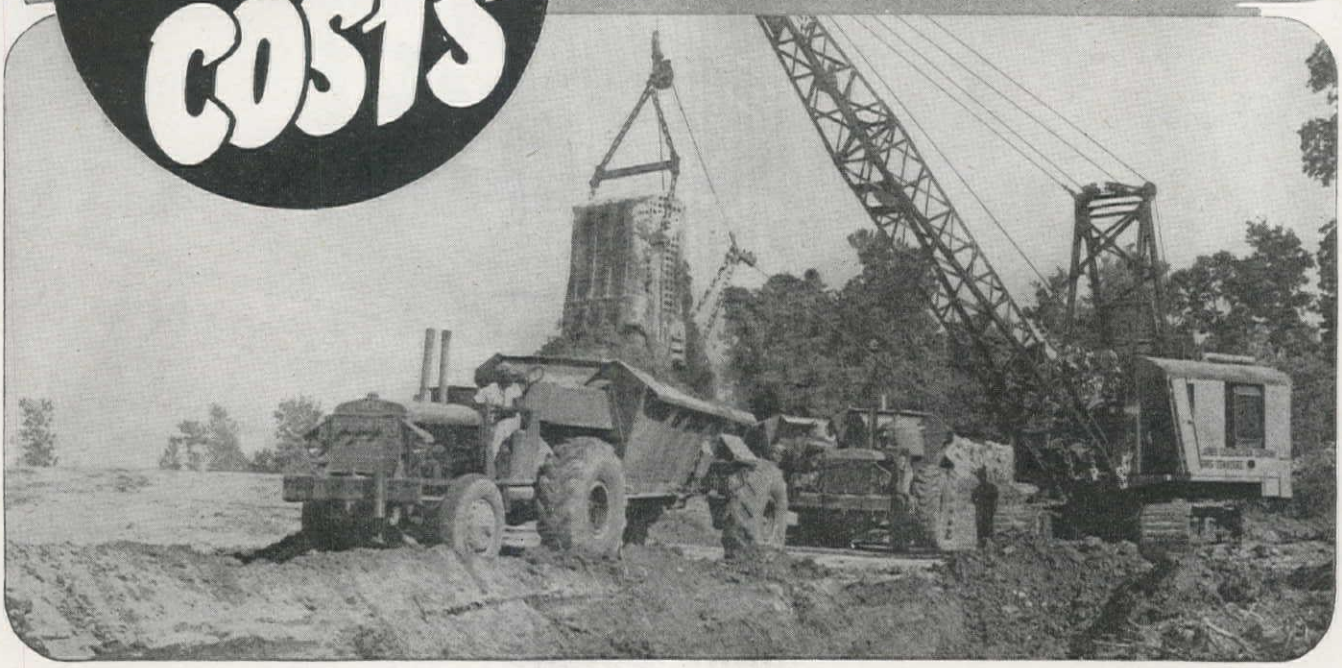


NORTHWEST

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; WILSON EQUIPMENT SUPPLY CO., 902 West 22nd St., Cheyenne, Wyoming;

Branch Offices: 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash.; 3707 Santa Fe Avenue, Los Angeles, Calif.

LOWER COSTS on ALL Lengths of Haul



Built for the specific job of heavy duty off-the-highway hauling, Rear-Dump and Bottom-Dump EUCLIDS are efficient on both short and long haul work. On hundreds of the toughest mining, construction and industrial jobs, Euclids have proved their dependable performance and ability to cut hauling costs.

Fast, easy loading with modern excavating equipment, combined with large capacity and speed on the haul road, results in more pay loads per day on short or long hauls. Rugged simplicity . . . ample power and speed . . . economy of operation . . . outstanding versatility and performance . . . these are but a few of the many features that cut hauling costs for leading users of off-the-highway equipment.

Your Euclid distributor or representative is at your service to provide helpful facts and figures.

The EUCLID ROAD MACHINERY Co. • • • Cleveland 17, Ohio

THE EUCLID ROAD MACHINERY CO.

3710 SAN PABLO AVENUE — PIEDMONT 8046 — EMERYVILLE, CALIFORNIA

Brown, Fraser & Co., Ltd., Vancouver; Columbia Equipment Co., Portland; A. H. Cox & Co., Seattle; Hall-Perry Machinery Co., Butte; Intermountain Equipment Co., Boise; The Lang Co., Salt Lake City; Lively Equipment Co., Albuquerque; Constructors Equipment Co., Denver. District Representative: J. K. Greer, 2350 Jasmine, Denver, Colorado.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for June, 1945

Editorial Comment 77

Marine Railway Serves Portland Shipyard 79
By B. F. DEAN

Navy Magazine Rises From Tidal Flats 83

Soil-Cement Paving on Inyokern Airfields 88
By F. J. SNYDER

Montana City Installs New Water System 91

Highway and Drainage Culverts of Precast Concrete . . 93
By H. F. COZZENS

Denver Plans North-South Freeway 96

Motor Fuel Tax Distribution in Washington 99

How It Was Done 103

News of Western Construction 104

Unit Bid Summary 114

Construction Contracts Awarded During May 126

New Equipment and News of Men Who Sell It 152

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

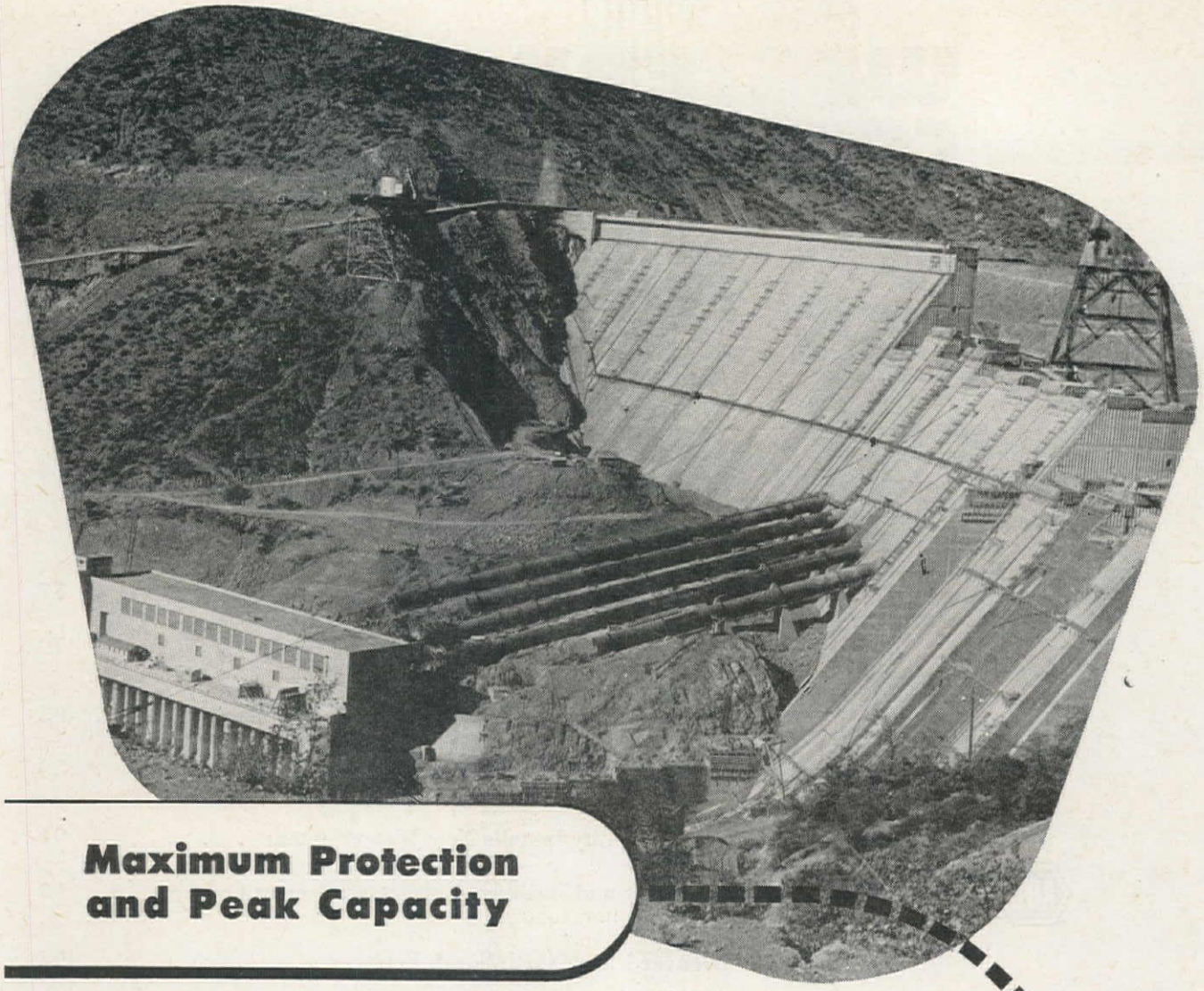
SOUTHWEST OFFICE
479 S. Holt Ave., Los Angeles 36, Calif. . . . . Telephone BRadshaw 2-3935
J. O. HODGES, District Manager

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

WASHINGTON OFFICE
1120 Vermont Ave., NW., Washington 5, D. C. . . . . Telephone District 8822
ARNOLD KRUCKMAN, Associate Editor

Please address correspondence to the executive offices, 503 Market St., San Francisco 5, California

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



SHASTA DAM

Maximum Protection and Peak Capacity

Time and again engineers specify Barrett Coal-tar Enamels.

They do so because they know from experience that Barrett Coal-tar Enamels prove their economic value.

They know too that pipe and penstocks lined with Barrett Coal-tar Enamel have smooth, mirror-like surfaces that increase the flow of water and maintain a peak capacity undiminished over a long period of years.

Barrett Coal-tar Enamels meet the American Water Works Association's Standard Specifications 7 A.5 and 7 A.6—1940.

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

Barrett
COAL-TAR ENAMEL

FIELD SERVICE—
Our Pipeline Service Department and Staff of Field Service Men are equipped to provide both technical and on-the-job assistance to engineers and construction men in the use of Barrett Enamels.

Speed Road-Mix Operations with ADAMS MOTOR GRADERS

Local Adams Dealers

ALASKA	—Glenn Carrington & Co., Fairbanks
ARIZONA	—O. S. Stapley Company, Phoenix
CALIFORNIA	—Lee & Thatro Equipment Co., Los Angeles Sutton Tractor & Equip. Co., Sacramento J. G. Bastain, Redding Valley Equipment Co., San Jose, San Francisco Brown Tractor Co., Fresno Thompson-Sage, Inc., Stockton Farmers Mercantile Co., Salinas Stevenson Farm Equip. Co., Santa Rosa Stanislaus Impl. & Hdwe. Co., Modesto Exeter Mercantile Co., Visalia Gallagher Tractor & Impl. Co., Merced
COLORADO	—McKelvy Machinery Co., Denver
IDAHO	—Intermountain Equipment Co., Boise, Pocatello
MONTANA	—Industrial Equip. Co., Billings, Missoula
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 Intermountain Equipment Co., Spokane
WYOMING	—Industrial Equip. Co., Billings, Mont. The Lang Company, Salt Lake City, Utah

★ THREE IMPORTANT FEATURES combine to make Adams Heavy-Duty Motor Graders outstanding favorites for all types of road-mix work—scarifying, mixing, spreading:

1. The abundance of power and traction it takes to move large windrows of heavy materials . . . easily!
2. 8 overlapping forward speeds which provide the proper speed for fast mixing action in any material.
3. The positive, rigid blade control needed for uniform spreading, insuring smooth surface finishes.

You'll find husky, high-speed Adams Motor Graders ideal for all manner of surface, ditch and bank work—providing fast, economical construction and maintenance operations on roads, airports and similar projects. See your nearest Adams dealer for complete details.

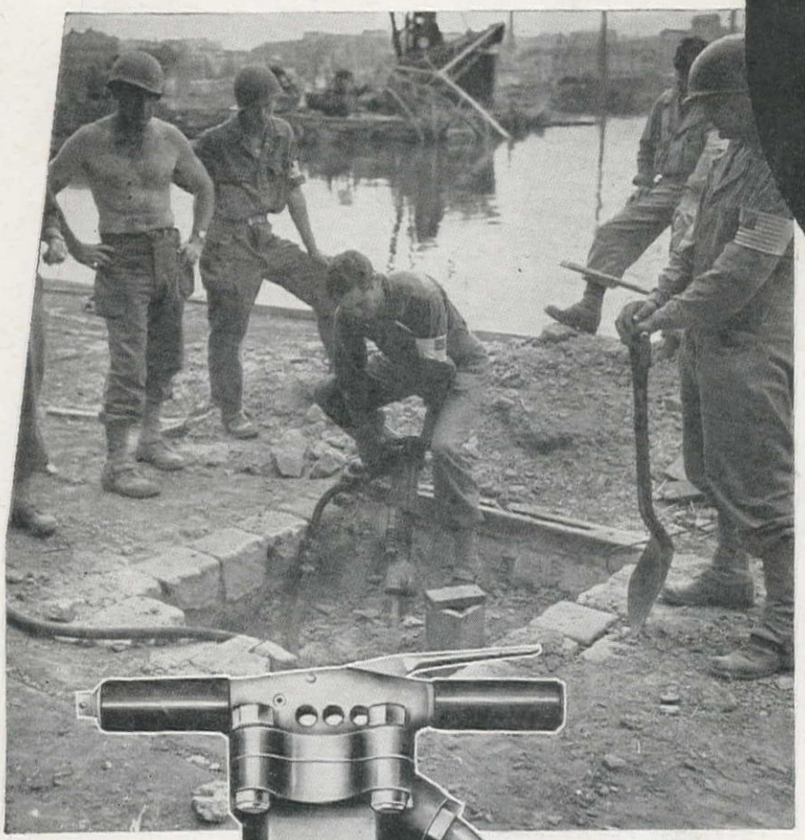
J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

JUST AS MUCH AT HOME "IN SERVICE"

Thor



Army Engineers dig for buried German mine somewhere in France

GET THE TOUGH JOBS DONE... *Faster!*

No. 25 PAVING BREAKER

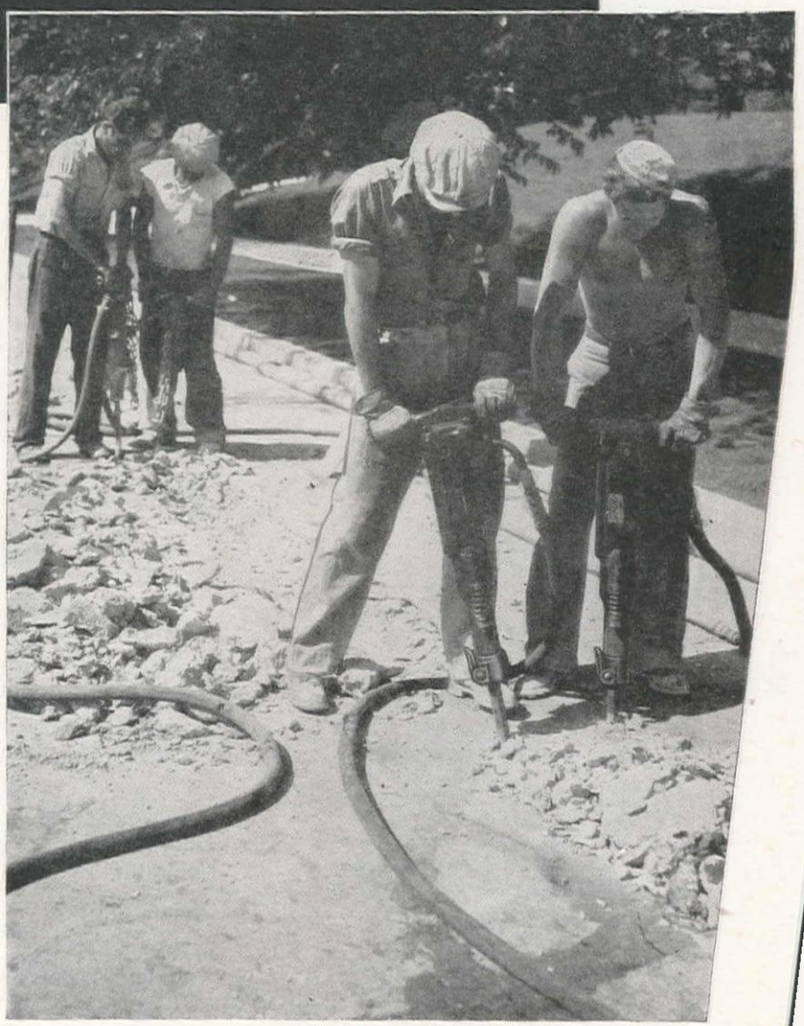
Super heavy duty—84 pound—extra powerful—for tough, rough going under all conditions—A rugged four-bolt back head, Thor positive, short-travel, tubular valve and new Thor latch type retainer all exclusive features,) are standout reasons why Thor Breakers turn out low-cost, high efficiency work so consistently.

Contractors and builders swear by—not at—their Thor Paving Breakers. Construction men on the home front have found through long years of on-the-job experience that Thor equipment has the stamina and work capacity to get tough jobs done faster, better, more economically. Now, Army engineers are using the same Thor tools to do even harder and more urgent work under the most difficult conditions.

Thor Paving Breakers provide more power due to "measured air"—an exclusive Thor feature. Operators appreciate the easy handling that results from improved balance. Thor Paving Breakers are built from alloy-steel drop forgings. This assures strength, rigidity, longer life and lower operating costs. Everything you want in speed and power for breaking concrete you'll find in Thor equipment.

AS THEY ARE IN SERVICE AT HOME

PAVING BREAKERS



WHAT *Thor* "MEASURED AIR" MEANS TO YOU...

1. Balanced Power—because only a precisely governed quantity of air is allowed behind the piston.

2. Smooth Performance—because every stroke is powered by the same measured quantity of air.

3. Air Economy—because every ounce of air which enters the machine provides a full measure of maximum power for peak efficiency performance.

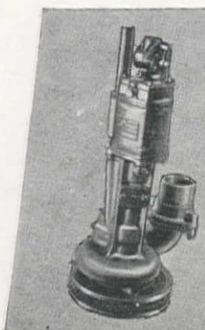
4. Low Maintenance Cost—because there are no separate parts of the patented Thor valve to become lost or wear out.

HOW THOR "MEASURED AIR" ECONOMY WORKS . . .

The shorter the travel, the more positive the action of the valve in admitting to the tool only the required amount of air—in instantly sealing the outlet against excess air.

Short travel of the Thor Paving Breaker valve action powers each stroke of the tool with the same quantity of air. Elimination of excess air keeps out of the channel the overload of power that staggers the stroke and causes vibration.

Thor Contractors' tools sold by leading Construction Equipment Distributors Everywhere.



Sump Pumps

Thor

PORTABLE *Electric & Pneumatic* TOOLS

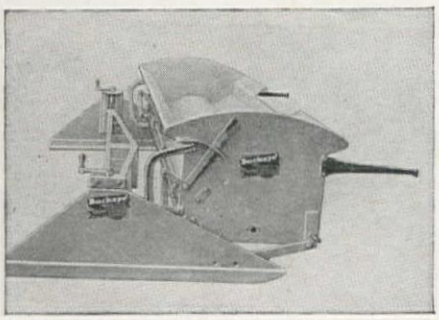
Branches in Principal Cities

For more detailed information about the powerful, easy-operating Thor Paving Breakers and other Thor contractors' air tools, write for Catalog 42-A.

INDEPENDENT PNEUMATIC TOOL CO.
600 W. Jackson Blvd., Chicago 6, Ill.
New York
Los Angeles

ACCURATE SPREADING-

the right amount — the right place



Strike-off attachment permits spreading of base courses of from 2" to 6" depth. Mounted on skids, it is easily adjustable by means of hand cranks.

BUCKEYE SPREADERS have an amazing record for accurately spreading material in a smooth, uniform layer, right where you want it, to any desired depth and width. In fact, the spread can even be tapered — thick on one edge and thin on the other. The secret of this accurate spreading is in the transmission-driven spiral feed roll which keeps a positive grip on the material, discharging it smoothly and in uniform quantities as the truck moves along. When the truck stops, the flow automatically stops so there's no waste. Sand, gravel, crushed stone, slag or cinders, whether wet, dry or sticky are spread with absolute uniformity, from a fine trickle to a 1½" layer of stone.

Users have reported savings of 50% and more on time and labor, more than 20% on material with 98-99% accuracy. Write for details.

Built by Buckeye

Buckeye Traction Ditcher Co., Findlay, Ohio

Convertible Shovels

Trenchers

Tractor Equipment

Road Wideners

R-B Finegraders

Spreaders

Write for this book

New TECO Services

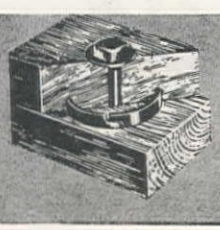
This new book will be very helpful to executives, plant superintendents, chemical engineers, structural engineers and others in the wood-working, wood-chemistry and building fields.

It emphasizes the importance to all industry, of wood and its by-products and its derivatives —tells of new things ahead.

The new TECO services, now available through the Wood Products Development Shop and the Wood Chemistry Laboratory, are described for the benefit of those who may have problems concerning the physical, mechanical and chemical properties of wood and wood products. Learn how to make use of TECO SHOP-LAB equipment and technical staff in solving some of your postwar problems. Write at once for your copy—fill in and mail the coupon.

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

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



SPECIFY TECO CONNECTORS
SPLIT RINGS • SHEAR PLATES
GROOVING TOOLS

KEEP ME POSTED

Alden K. Smith, WCN
Monadnock Building,
681 Market St., San Francisco

Send me a free copy of The Forest Industries Blaze New Trails.

Name_____
Firm_____
Business_____
Street_____
City_____ State_____

Photo courtesy Morrison-Knudsen

The most effective method of keeping over-worked and over-aged equipment running . . .

Contractors Endorse White Personalized Service

WHEN WAR BROKE OUT, White was in the unique position of having practically completed a nation-wide program to modernize the Service facilities of its Branches, Distributors and Dealers.

The past three years have proved how fortunate this was, because it enabled White to put into effect The Personalized Service Plan, which owners from coast-to-coast endorse as the industry's most effective method for keeping their over-worked and over-aged equipment running.

The Plan takes into account the three fundamentals of proper vehicle operation—correct maintenance, correct parts, and correct driving. Maintenance and Parts Manuals—personalized to the individual serial number of each White in the owner's service—are two unusual tools of the Plan.

Many trucks now in construction work on the Pacific Coast owe their very existence to White Personalized Service. If you are not now protecting your White Trucks by taking full advantage of this plan, your White representative will gladly give you the details.

THE WHITE MOTOR COMPANY • CLEVELAND

Pacific Coast Branches and Dealers in all the important cities

White

FOR MORE THAN 45 YEARS THE GREATEST NAME IN TRUCKS

YOU CAN PROFITABLY HANDLE Both Long & Short Hauls *with* TOURNAPULLS

Actual job time studies show you why the country's leading contractors are using Tournapulls to increase hourly production on ALL haul lengths:

4,000 FEET ONE WAY

Hourly pay yds. per unit	72
Tournapulls in fleet	4
Material	sandy loam
Job	Goleta, Calif., Airport
Contractor	A. Teichert & Sons

2,600 FEET ONE WAY

Hourly pay yds. per unit	84
Tournapulls in fleet	13
Material	dredged ocean sand
Job	Idlewild, New York, Airport
Contractor	Circle Construction Corp.

16,000 FEET ONE WAY

Hourly pay yds. per unit	25
Tournapulls in fleet	11
Material	wet pit-run gravel
Job	sub-base for Illinois Hwy.
Contractor	Raemisch-Madden Co.

1,800 FEET ONE WAY

Hourly pay yds. per unit	120
Tournapulls in fleet	6
Material	sandy gravel
Job	Janesville, Wisc., Airport
Contractor	Raemisch-Madden Co.

700 FEET ONE WAY

Hourly pay yds. per unit	112
Tournapulls in fleet	4
Material	shale, 40% voids in load
Job	relocation Pennsylvania Hwy.
Contractor	Potts & Callahan Contracting Co., Inc.

Like these successful dirtmovers, you, too, can handle both long and short hauls with fast, powerful rubber-tired Tournapulls. Let your LeTourneau distributor help you figure your next job on the basis of low-cost Tournapull performance. See him TODAY!

C21A

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 3100 Built and Shipped

TOURNAPULLS

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

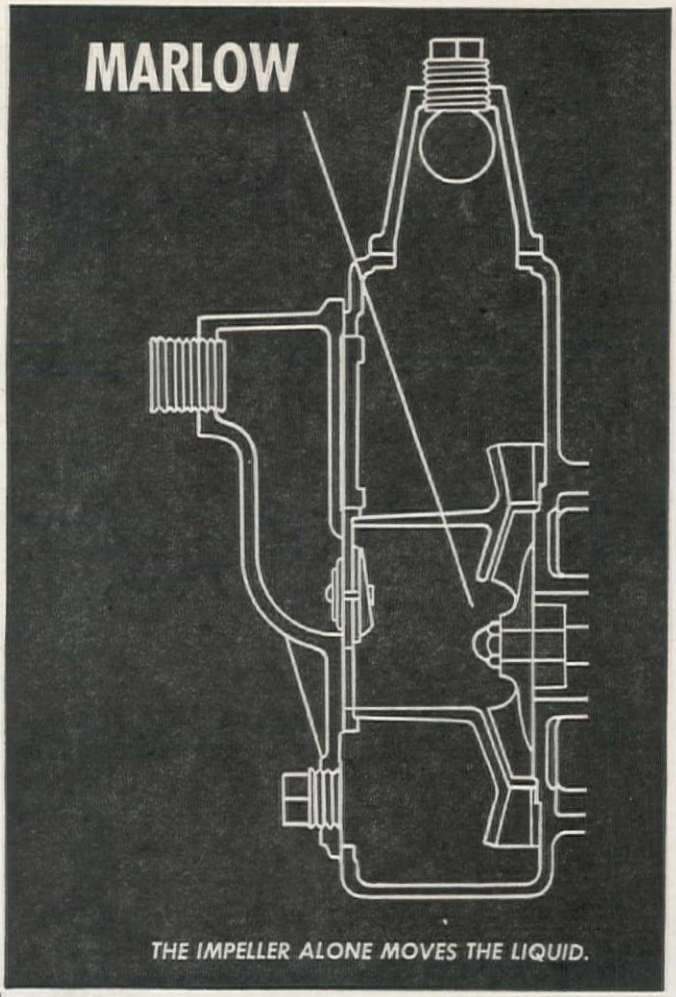
FOR LOWEST NET COST PER YARD

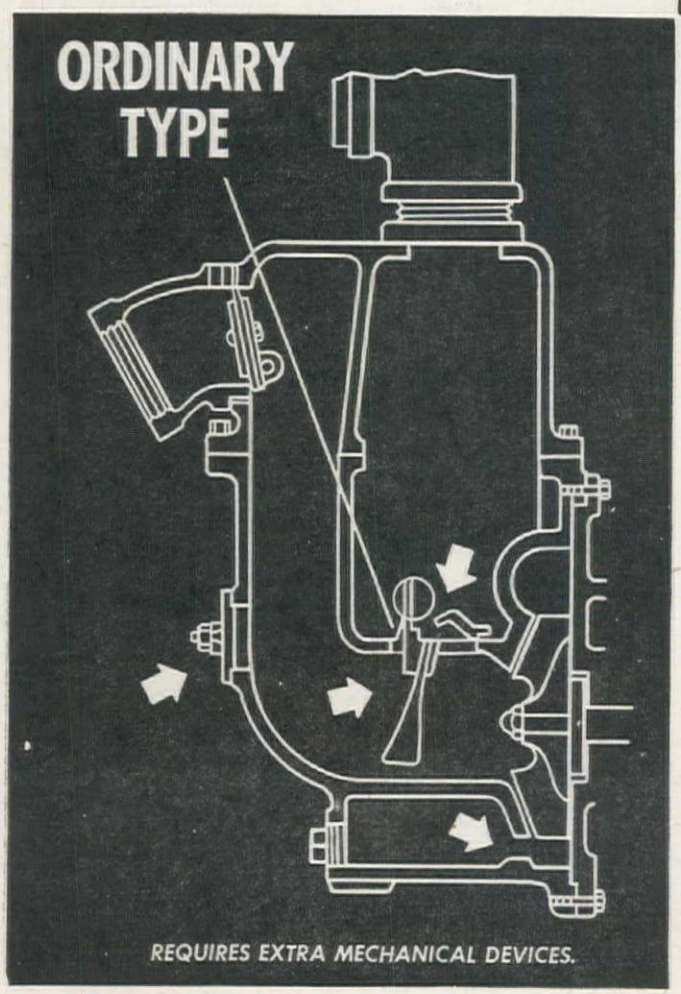
Why

MARLOW PUMPS

will not clog..

A Marlow Self-Priming Centrifugal contains no devices which can clog or jam. It operates with no more parts than a regular centrifugal. ➡





THE ABILITY to self-prime is inherent in the ingenious, exclusive, patented design of a MARLOW. It is not dependent on the uncertain action of any auxiliary mechanical device. That is why you can rely on a MARLOW for the utmost efficiency at all times—no dirt or grit can jam a priming valve and impair performance. MARLOW makes the largest line of self-priming centrifugal pumps in the world—sizes 1½ to 10-inch, capacities 50 to 3600 GPM. Next time get a MARLOW.

Marlow has just published the first authoritative treatise on self-priming centrifugal pumps. It tells, objectively, the superiority of the principle employed in Marlows. You should have a copy for your technical file. Write—it's free. MARLOW PUMPS, RIDGEWOOD, NEW JERSEY.

ENGINEERED BY MARLOW

MARLOW PUMPS • RIDGEWOOD, NEW JERSEY

CONSTRUCTION SPEEDED BY 2-CYCLE DIESELS

Each extra trip means that much more dirt moved! 2-cycle Diesel tractors gain those extra trips:

BY getting to work quick — electric starting on Diesel fuel gains minutes every day.

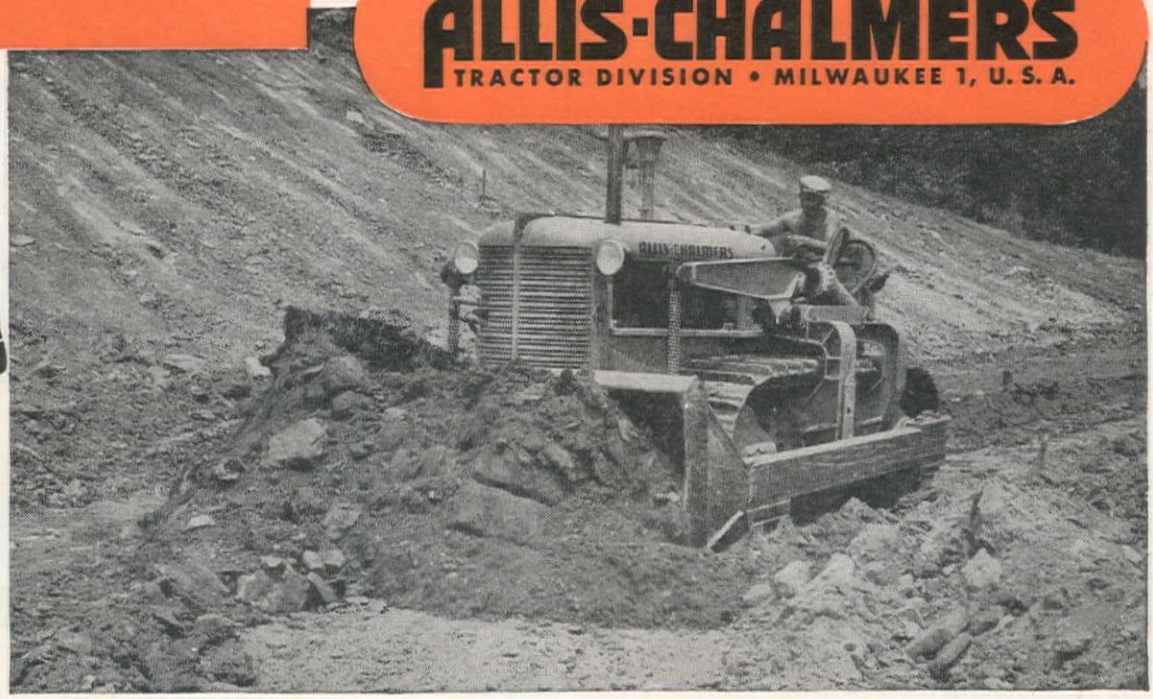
BY requiring less time out for lubrication — you save ½-hour lubricating time every shift with the 200-hour truck wheels and idlers.

BY working faster — smooth-operating, fast, 2-cycle Diesels speed bulldozing and hauling, provide greater flexibility in speed with less shifting.

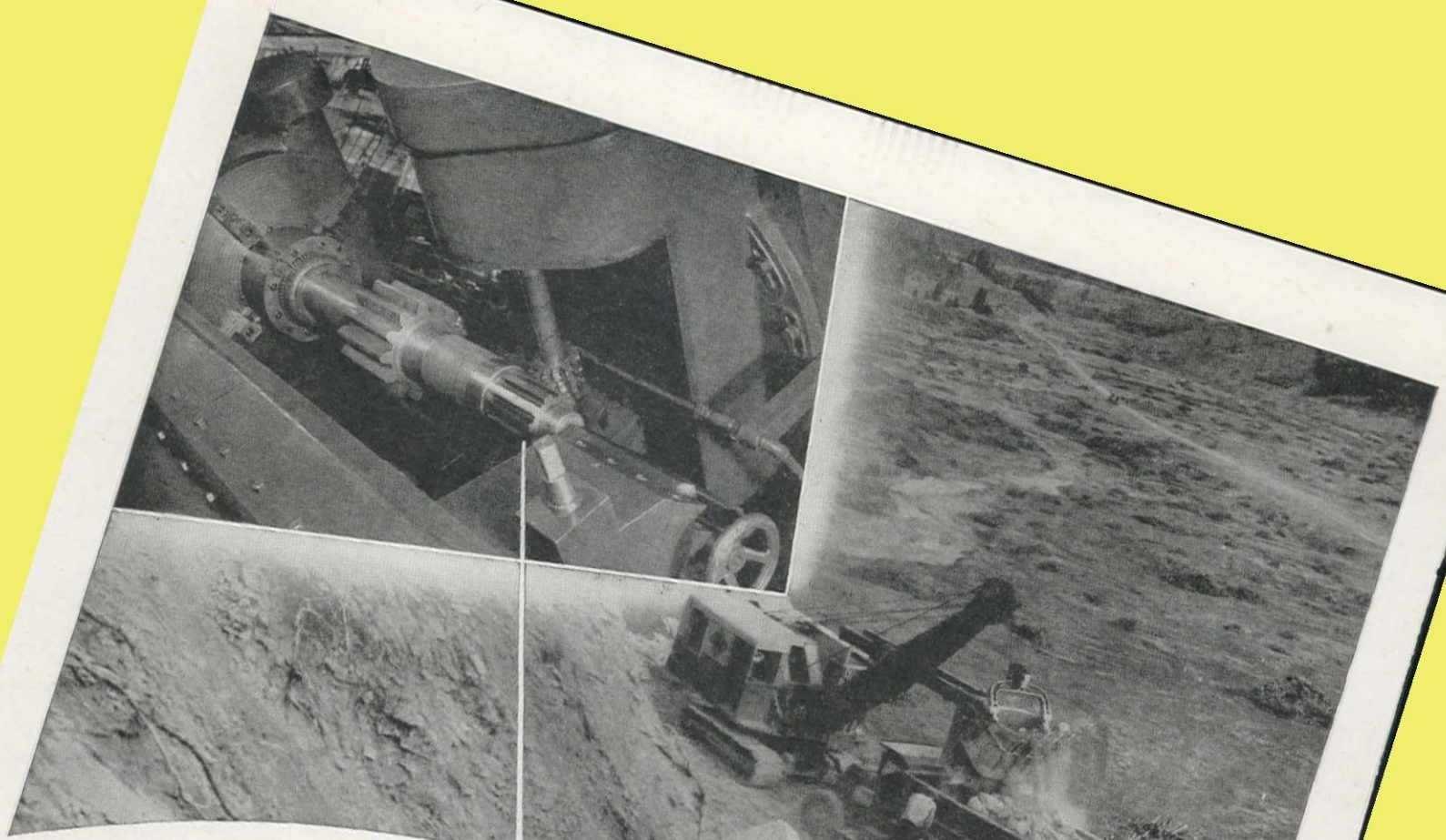
A further time- and money-gainer is convenient interchange of many engine parts between all models. Repairs are simplified, inventory reduced.

Speed construction with 2-cycle Diesels. Get the full story on this modern power from your Allis-Chalmers dealer.

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



Buy Bigger Bonds For The Bigger Seventh



The illustration above shows the cutting of a spline in a LIMA vertical swing shaft. Spline cutting requires costly precision equipment. It also requires longer time to complete the job—but when finished a more accurate fit, greater strength and longer life to the part is obtained. A keyway or a square shaft, would in a fashion, serve the the same purpose, but the reversing torques or repeatedly applied torque would rapidly weaken the keyed or square shaft, consequently delays and costly repair bills would result. Splines cut from the solid is standard practice with LIMA. Not only do splined shafts have greater strength, but they also assure a positive union between the driving and driven part. They also make it possible to separate the parts without damage to either part. Tomorrow when you will be buying new material handling equipment be sure it is a LIMA and get greatest value from your investment.

SPLINED SHAFTS

A good feature to have in a...
SHOVEL, CRANE or DRAGLINE

LIMA

CRANES, 13 TONS TO 100 TONS
DRAGLINES, VARIABLE
SHOVELS, ¾ YD. TO 5 YDS.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division
LIMA, OHIO, U. S. A.

NEW YORK, N. Y. · ST. LOUIS, MO. · SAN FRANCISCO, CALIF. · PHILADELPHIA, PA. · DALLAS, TEXAS · SEATTLE, WASH. · MONTREAL, QUEBEC, CAN. · NEWARK, N. J. · PORTLAND, OREGON · LOS ANGELES, CALIF. · VANCOUVER, B. C. · MEMPHIS, TENN. · MINNEAPOLIS, MINN. · SPOKANE, WASH.

Seattle Office, 1932 First Avenue South, Portland, Feenaughty Machinery Co., 112 S.E. Belmont St.; Boise, 600 Front St.; San Francisco, Garfield and Co., 1232 Hearst Bldg.; Los Angeles, Smith Booth Usher Co., 2001 Santa Fe Ave.; Denver, Held-McCoy Machinery Co., 3201 Brighton Blvd.; Phoenix, Smith Booth Usher Co., 1756 Grand Ave.; Helena, Montana, Steffeck Equipment Co., Main and Cutter Streets; British Columbia, Canada, Willard Equipment Limited, 860 Beach Ave.; Salt Lake City, Utah, Western Machinery Co., P. O. Box 2196 (748 W. 8th St.); Albuquerque, New Mexico, Contractors' Equipment and Supply Co., Springer Bldg., P. O. Box 456 and Wells Alaska Motors, Fairbanks, Alaska, and also Modern Machinery Co., Inc., N. 2417 Division St., Spokane, Washington.

Truck Operators—Send for this New Bulletin!

28 pages of information on Kelite cleaning materials and pH Control applied to the problems of Automotive Maintenance—steam cleaning, washing, degreasing, desludging, decarbonizing, rust removal and phosphatizing, radiator cleaning, paint stripping, parts reclaiming. Here in unretouched photos of actual operations—you can see the key to scientific cleaning . . . the key to easier, more satisfactory maintenance.

"Kelite" Reg. U. S. Pat. Off. Kelite Products, Inc. Mfg. Plants in Los Angeles, Dallas, Chicago, Perth Amboy. *Branches in Principal Cities.*

Just Mail Coupon

KELITE PRODUCTS, INC., 909 East 60th St., Los Angeles 1, Calif.

Please mail free copy of new Kelite Bulletin on Automotive Maintenance.

Name_____

Company_____

Street_____

City_____ Zone_____

State_____

1255A

then he said to himself

"Phooey on every good thing"

FEW men are more widely known, and more genuinely detested, than Fuehrer Vidkun Quisling.

. . . and yet few are his orations by which to measure him.

Recently, however, as the Church gained ascendency in Norway, he resorted to a three-word outburst which pictures his double-cross mentality to a T. Says he:

"Religion is outdated."

Well he knows in his stony heart and warped soul that the advance of religion is something that will undo him

. . . so he ridicules it rather than accepts it.

Since when has he ever TRIED religion?

Many men are all too prone to deride that which they do not know *from first-hand experience*

. . . when it is only from first-hand experiences that faith is developed

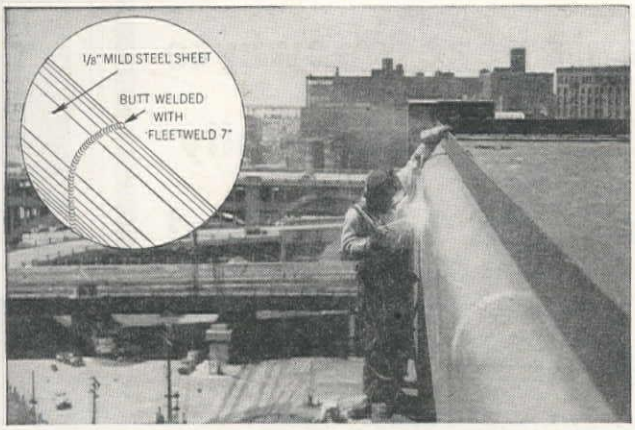
. . . and that goes for commercial faith as well.

"Outdated!" ... he cries

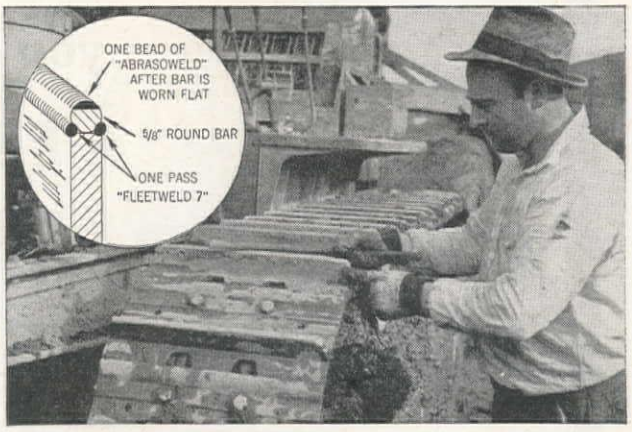
LOOK, VIDKUN, OUTDATING occurs only when men take recourse to

A BETTER WAY... ARC WELDING

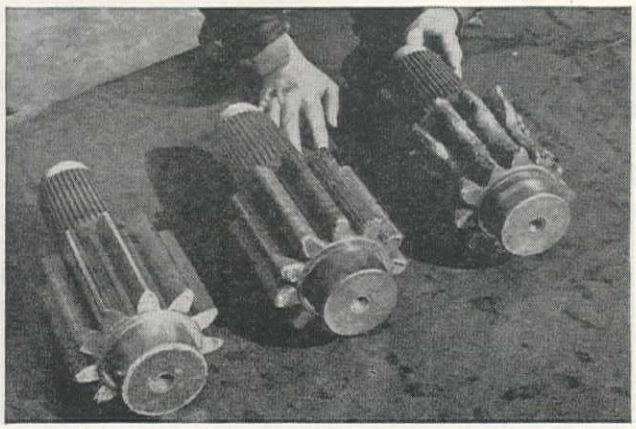
These Lincoln Electrodes simplify and improve hundreds of jobs in the construction industry:



"FLEETWELD." World's most popular electrode for mild steel jobs such as the erection of this lift bridge. Speedy. High strength joints. In 7 types.



"ABRASOWELD" is applied to the top of tractor grouser bars to resist impact and abrasion. Treads are built up by welding on round bars as shown.



"TOOLWELD" provides the wearing qualities in the build-up of these tractor pinion teeth. Worn, as shown on right, they are built up with "Fleetweld" then given a layer of "Toolweld" with results as shown in center. Then ground as shown at left.

HOW-TO-DO-IT MANUAL, describing and giving procedures for 38 Lincoln Electrodes is available, free. Write on your letterhead, asking for "Weldirectory," Bul. 402.

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

America's greatest natural **recourse**

ARC WELDING

● **Below are a few of the hundreds of "Caterpillar" Diesels that have already registered TWO TO FIVE TIMES "9999" working hours . . . and are still going strong.**

Owner*	Classification	Hours
TRACTORS and MOTOR GRADERS		
S. V. Christierson	Farming	59,000
Heber W. Glenn	Farming	54,000
H. M. Thompson & Co.	Oil Field	52,520
Barogar Bros.	Farming	45,000
E. C. Von Glahn	Farming	38,000
Frank Coit	Farming	36,000
R. M. Jensen	Contracting	33,950
R. M. Jensen	Contracting	32,880
Oahu Sugar Co.	Farming	32,000
Hawaiian Pineapple Co.	Farming	31,017
D. A. Kessler Constr. Co.	Contracting	31,000
Gilbert Courtright	Farming	30,000
W. D. Annis	Contracting	30,000
ENGINES		
A. J. Krecker & Co.	Industrial	65,000
Denwood Oil Co	Industrial	60,000
Rosenthal & Carter	Oil Field	46,525
Mt. Emily Lumber Co.	Logging	43,000
Fairview Lt. & Power Co.	Industrial	35,000
Capparell Stripping & Construction Co.	Mining	33,600
Bolton Hatchery	Industrial	32,272
S. A. Murphy	Oil Field	30,240
M. DeRomo	Contracting	28,000
W. E. Johnson	Industrial	26,616
Bridgeport Oil Co.	Oil Field	26,320
M. O. Weaver, Inc.	Contracting	25,600
Massaponax Sand & Gravel Co.	Industrial	25,000

**Addresses on request*

The HOUR-METER—standard equipment on every "Caterpillar" Diesel Engine, Tractor and Motor Grader—is witness particularly to their stamina and long life. And the testimony it has collected over the years is a revelation!

The "Caterpillar" hour-meter records full "work hours." Driven direct from the crankshaft, its dial registers up to 9999 hours (which at one time users of power equipment considered a liberal serviceable life-span for a heavy-duty unit). But through their inbuilt soundness, hundreds of "Caterpillar" Diesels have multiplied in work hours the capacity of the meter.

At the right are a few of the notable hour records—as taken from latest available reports. Behind these records for long, dependable and economical performance is the outstanding "Caterpillar" dealer inspection, mechanical and replacement-parts service . . . plus "Caterpillar's" 40-year bank of track-type tractor experience, which no other manufacturer in its field commands.

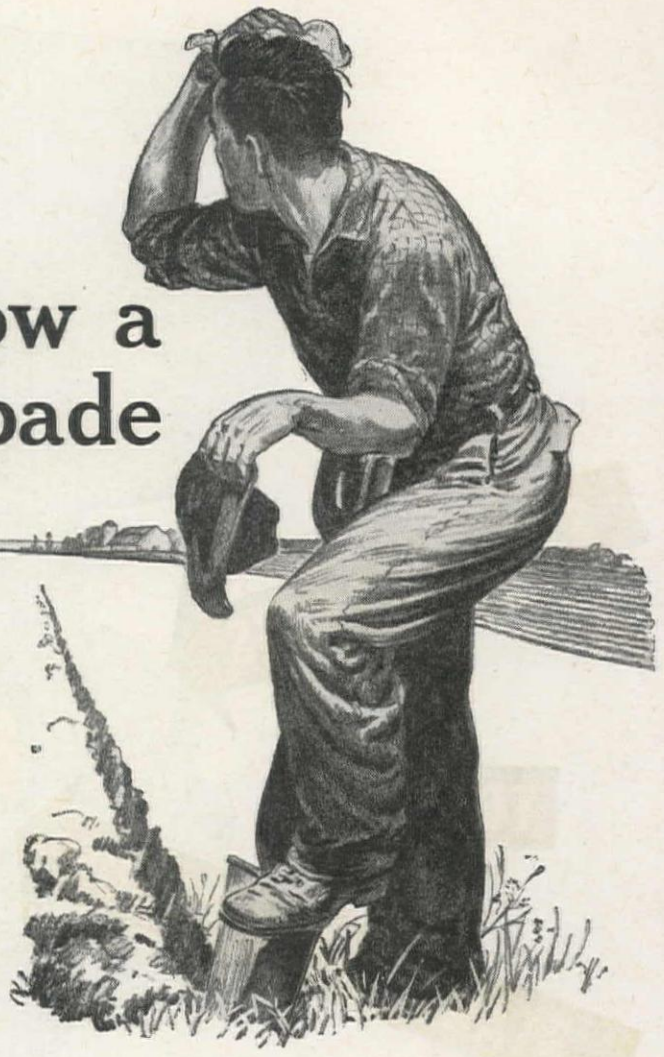
CATERPILLAR TRACTOR CO., SAN LEANDRO, CALIF.; PEORIA, ILL.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

You Wouldn't Plow a Field with a Spade



You can't expect one tool to be the right one for every job on a farm, nor one explosive for every type of blasting.

Like farm implements, explosives are tools made with differing characteristics to overcome job problems. One explosive may have the right properties for excellent results on a number of blasting operations, but as conditions change a new combination of explosive properties is needed. Using the right explosive, gets blasting returns that stretch equipment and manpower to reduce costs.

GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe. 1¼" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM, 10% MORE)
Canyon Bag	10	4600	5000	
Flo-dyn No. 2	20	5200	5800	1¼" 132
Flo-dyn No. 3	30	5200	5800	
Flo-dyn No. 4	40	5200	5800	Packed 4—12½-lb. bags
Flo-dyn No. 5	50	5300	6000	
Flo-dyn No. 6	60	5300	6200	per 50-lb. Case
Flo-dyn No. 7	65	5400	6300	

ATLAS FREE-FLOWING EXPLOSIVES

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

We would like to work with you in regard to your blasting problems. An exchange of ideas frequently produces blasting results far in excess of all anticipation.

Offices in Principal Cities

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

SAN FRANCISCO 4, CAL. ATLAS POWDER COMPANY SEATTLE 1, WASH.

BAKER *Hydraulic* BULLDOZERS

BEAR DOWN!

On many earthmoving, stripping and grading jobs, especially those involving tough dry clays and cemented gravels, the Baker's powerful, positive, direct down-pressure on the blade has been the determining factor in finishing on schedule—or ahead of time—highly important on war construction jobs.

The full weight of the tractor front end can be brought to bear on the blade forcing it to cut in—the operator need not depend upon the weight of the blade or gravity to force it into a cut.

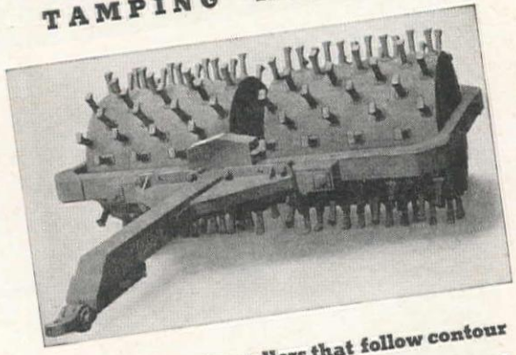
Baker hydraulics offer all the other desirable features—fast reaction, high moldboard lift, all-weather operation, ease of maintenance (what little is needed).

Why not figure on having Baker *hydraulic* Bulldozers "bear down" on your postwar jobs?

THE BAKER MFG. CO.
542 Stanford Ave., Springfield, Ill.
If it concerns Victory, it concerns us!

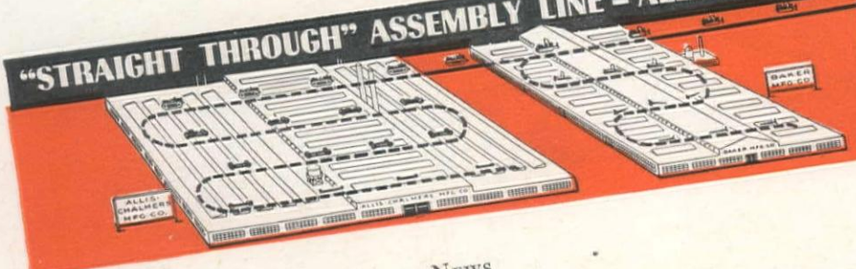
BAKER They Go Together A-C

BAKER SHEEPSFOOT TAMPING ROLLERS

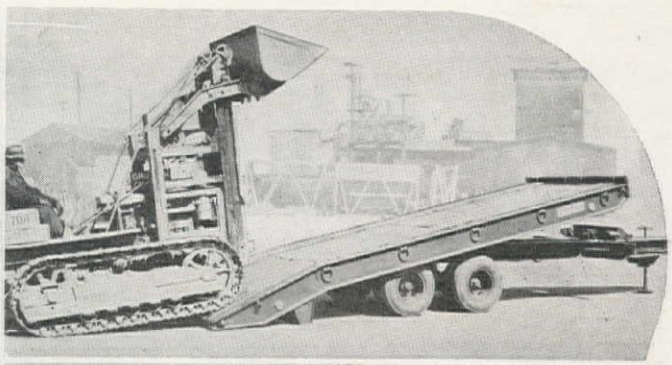


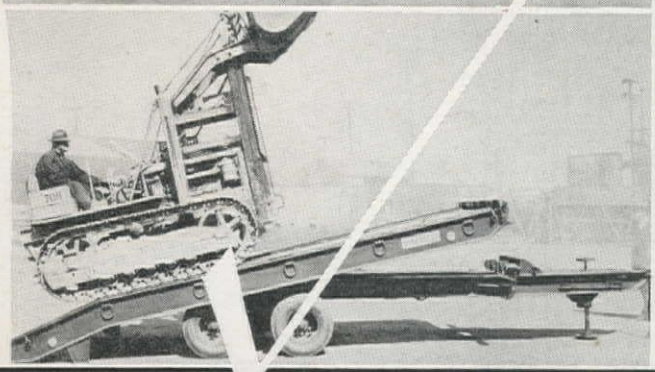
- **Full oscillating rollers that follow contour of ground.**
- **Rugged frame and rollers that withstand abuse.**
- **Tamping feet have replaceable weld-on toes.**

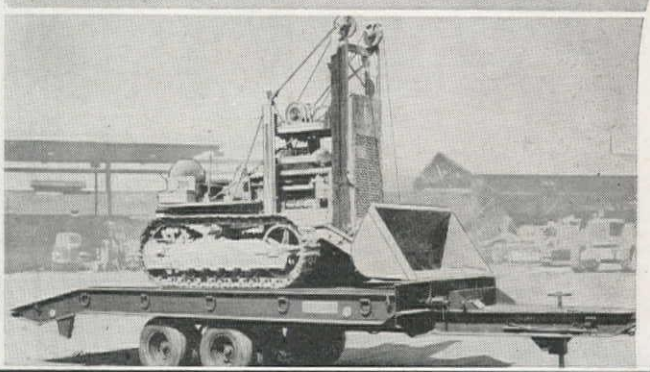
"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



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







The NEW FRUEHAUF *TILT*-DECK

THIS Tilt-bed Machinery Trailer... a development of Fruehauf "Engineered Transportation"... is the answer to the problem of quickly loading, hauling and unloading heavy and medium-heavy machinery. Here is a simple, one-man operation, with the bed so perfectly balanced that it only requires hand pressure to assume either loading or carrying position. Once the equipment is loaded, the bed locks automatically in place, yet it requires only finger pressure to release it again. Models engineered for any carrying capacity; made in both Semi-Trailer and Drawbar types.

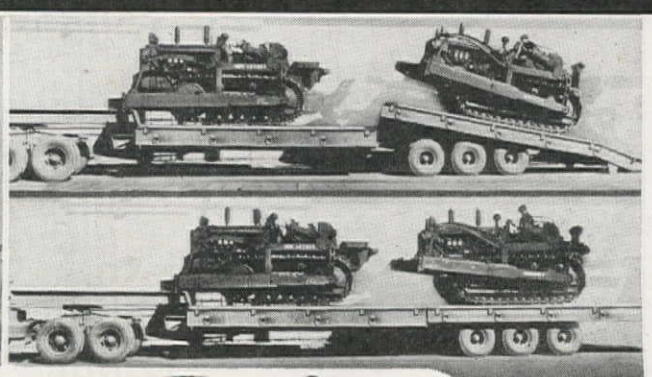
Get in touch with your nearest Fruehauf Branch and let them give you specifications and complete information on the advantages of this Fruehauf Trailer. No obligation.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant — Los Angeles

Sales and Service Branches: LOS ANGELES • FRESNO • PORTLAND
SAN DIEGO • PHOENIX • SPOKANE • SAN FRANCISCO
SEATTLE • DENVER • SALT LAKE CITY • EL PASO

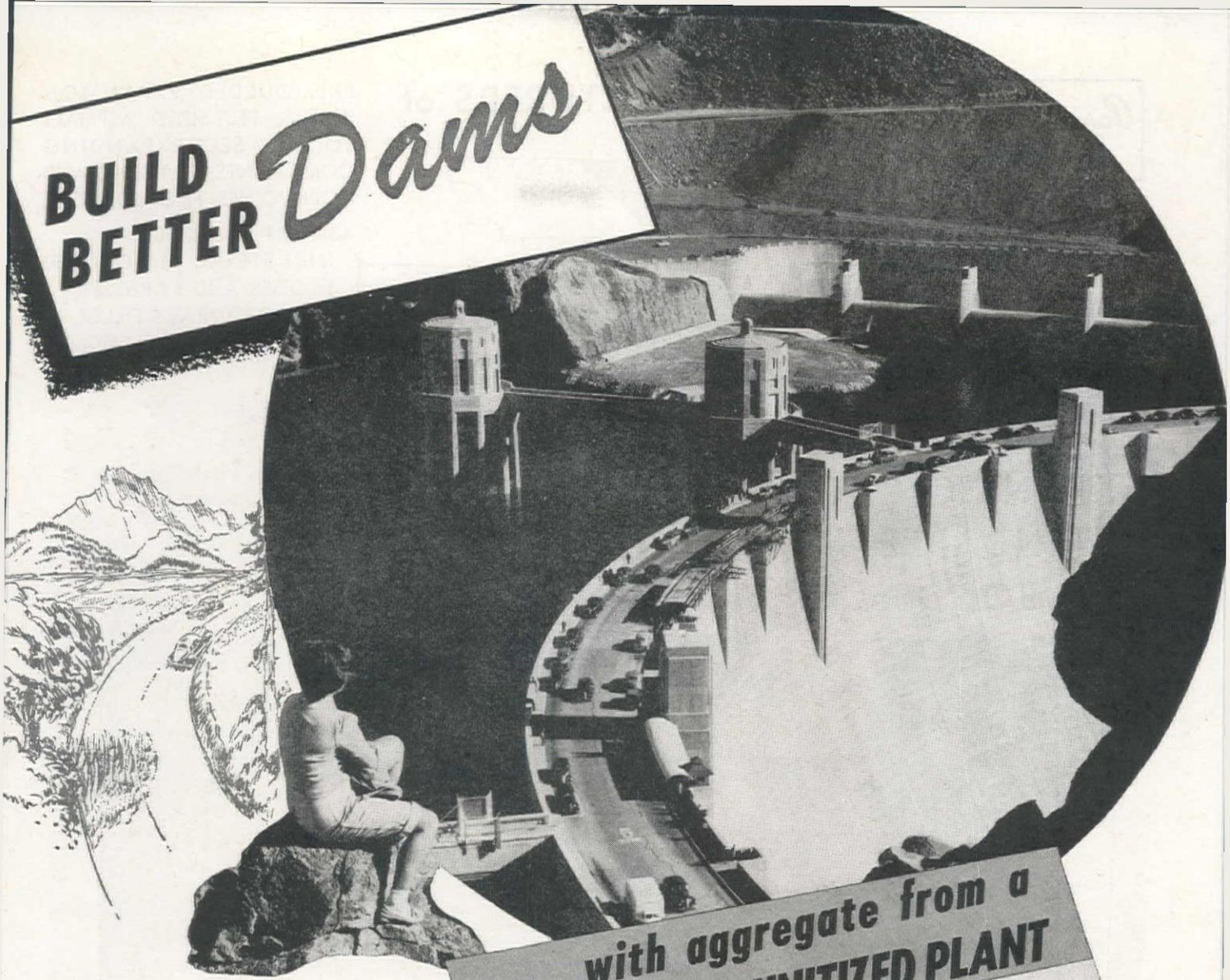


FRUEHAUF *Trailers*

Reg. U. S. Pat. Off

ENGINEERED TRANSPORTATION

BUILD BETTER *Dams*



. . . with aggregate from a CEDARAPIDS UNITIZED PLANT

On those big jobs where tonnage of aggregates runs into the hundreds of thousands, the difference of a few cents per ton in production cost may mean profit or loss to the contractor. That's where the big Cedarapids Unitized Plant with its high capacity and low operating costs pay big dividends.

This super crushing plant handles material in a continuous flow from quarried rock to delivery trucks at the rate of 150 to 200 tons per hour. The big primary with its 1000 sq. in. jaw opening sets the pace for the entire plant taking the biggest rock with ease. A smaller jaw crusher and roll crusher in the secondary unit then reduce the oversize to the wide range of sizes to meet all aggregate specifications. Each unit is mounted on a pneumatic-tired truck ready to attach to a truck-tractor. Costly dismantling and erecting time have been eliminated so idle time is kept to the minimum.

Get ready for those BIG postwar jobs now. With a Cedarapids Unitized Plant to produce the aggregate at lowest cost you'll be sure of getting your share.

IOWA MANUFACTURING CO.
Cedar Rapids, Iowa

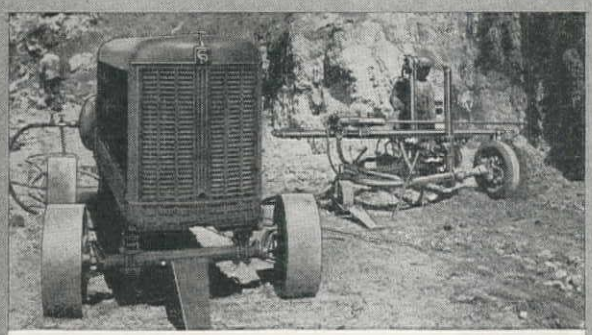
THE IOWA LINE
of Material Handling Equipment Distributed by:

HOWARD-COOPER CORP. Seattle, Wash. and Portland, Ore.	LUND MACHY. CO. Salt Lake City, Utah	ARIZONA CEDAR RAPIDS CO. Phoenix, Ariz.
HALL-PERRY MACHY. CORP. Butte, Mont.	BROWN-BEVIS MACHY. CO. Los Angeles, Calif.	EDWARD F. HALE CO. San Franciso, Calif.
INTERMOUNTAIN EQUIP. CO. Boise, Idaho and Spokane, Wash.	H. W. MOORE EQUIPMENT CO. Denver, Colo.	R. L. HARRISON CO., INC. Albuquerque, N. M.
WORTHAM MACHY. CO. Cheyenne, Wyo.		SIERRA MACHINERY CO. Reno, Nev.

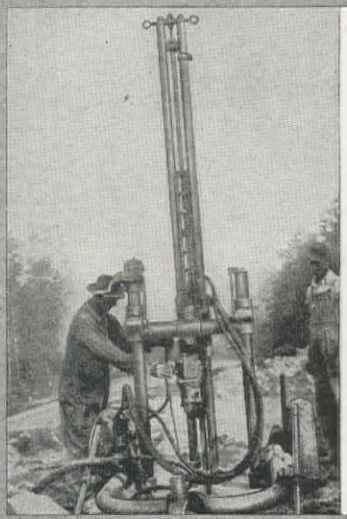
For prompt, efficient service

Call the CP Distributor nearest you!

Your CP Distributor brings you the benefit of his seasoned experience, plus the backing of one of the largest manufacturers of air compressors, rock drills, pneumatic tools and other contractors' equipment. You have only to write, phone or wire to secure his immediate assistance. Write today for Catalog 600, giving complete information on the extensive line of CP contractors' equipment.



Many refinements of design and manufacture, born of more than forty years' experience, give CP Two-Stage, Air-Cooled Portable Compressors exceptionally high efficiency, dependability and economy. They are available with Hercules gasoline engines in sizes of 60, 105, 160, 210 and 315 c.f.m.; with Caterpiller Diesel engines in sizes of 105, 160, 210, 315 and 500 c.f.m.



Bridging the gap between Hand Sinkers and Heavy-Duty G-500 Wagon Drill, CP G-200R provides one-man operation and faster, lower-cost drilling with the most powerful CP Drifter Drills. Easily moved, G-200R accommodates 6-ft. steel changes; 18 to 24 ft. steels are conveniently handled.

CP Sinker Drills are fully cushioned for low upkeep; valve operated, they maintain their drilling speed despite wear. CP makes a sinker drill for every contracting need, from the light 28-pound CP-22 to 119-pound heavy duty CP-60.

In trench work particularly, CP Backfill Tampers quickly earn their cost by saving the time and labor involved in hauling surplus excavated material. For general tamping, CP-3 is recommended; for heavy tamping CP-MM; for extremely heavy tamping CP-4 is preferred.

CHICAGO PNEUMATIC TOOL COMPANY

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

Distributors

BALZER MACHINERY CO., Portland, Oregon

WESTERN MACHINERY CO., Spokane, Wash.

HALL-PERRY MACHINERY CO., Butte, Montana

HYSTER
TRADE MARK REGISTERED
FOR ANY LIFT OR PULL

SOLD
INSTALLED AND
SERVICED
BY
"CATERPILLAR"
DEALERS
EVERYWHERE

645-59

WORLD'S LARGEST
MANUFACTURER OF
TRACTOR HOISTS
AND WINCHES

A HYSTER *on behind* will put you OUT IN FRONT . . .

You shouldn't be without a rugged HYSTER Winch on your "Caterpillar" tractor. It's "Johnny-on-the-spot" for husky towing jobs that call for all-out pull. With 'dozer on front, and HYSTER Winch behind, your tractor is equipped for any pushing or pulling service. It adds to the jobs you can do.

Typical winch applications include towing and hoisting of every description; using the long, powerful cable to reach into places inaccessible to the tractor; freeing tractor and equipment when bogged down; keeping things on the move. Saving time that saves you money.

Your "Caterpillar" dealer can advise you on requirements for getting a HYSTER Winch now. Winches have been made available on jobs classified as essential. HYSTERS save wear and tear on your tractor, step up your pulling power — and they'll PUT YOU OUT IN FRONT on any job.

HYSTER COMPANY

2951 N. E. Clackamas
PORTLAND 8, OREGON

1851 North Adams Street
PEORIA 1, ILLINOIS

There's NO ZIG—NO ZAG!

Full power at all times and positive two wheel steering control coupled with the floating oscillating pivot of the Wooldridge Terra-Cobra, high-speed, self-propelled Earthmover make it possible to operate on soft, sloping, or inclined surfaces. Both units can freely tilt in opposite planes at the same time—even while the engine unit turns in either direction—without any danger of tipping—or damage resulting from exerted strains. This permits a Wooldridge Terra-Cobra to work safely in spots where others might "fear to tread." True directional steering also allows the Terra-Cobra to spread close to the edge of soft fills. Full details furnished on request.

WITH POWER MAINTAINED ON BOTH WHEELS AT ALL TIMES

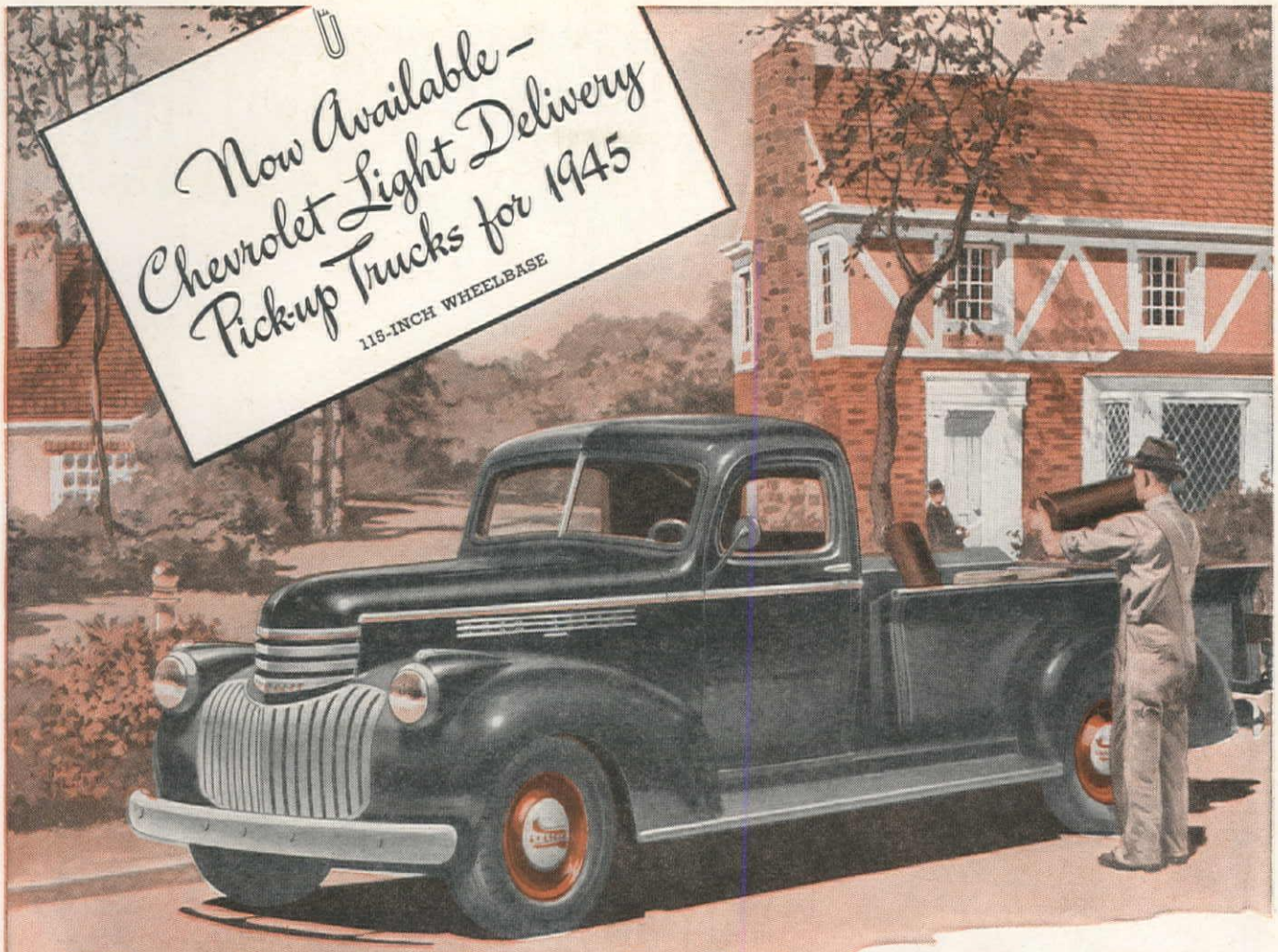
WOOLDRIDGE

TERRA COBRA

SELF-PROPELLED EARTHMOVERS

WRITE TODAY *for High Speed Earthmoving Bulletin No. TA-425—and for details on tractor earthmoving equipment get Wooldridge Scraper Bulletin W-210.*

WOOLDRIDGE MANUFACTURING CO.
SUNNYVALE • CALIFORNIA



The Right Truck for All Trades

There is a place for a pick-up in every business

Chevrolet's popular pick-up truck is in production again—because the Government recognizes the importance of this versatile vehicle to agriculture, industry and trade, and their need for replacements. . . . Of course, production is limited—still, thousands of essential users will be enabled to procure these high-utility units. (Better see your Chevrolet dealer now, if your business makes you eligible to purchase a new truck.)

There is hardly a farm or a tradesman or an industry that cannot use a pick-up to good advantage—especially a *Chevrolet* pick-up, with its unequaled combination of low price and high quality, plus its famous Chevrolet efficiency and economy of operation, its long life and durability.

These 1945 models are *all-Chevrolet*—with chassis, cab and pick-up box engineered and built by Chevrolet to meet Chevrolet's exacting standards of excellence.

Don't delay . . . see your Chevrolet dealer *now* and discuss your transportation and service requirements.

QUALITY FEATURES

STANDARD VALVE-IN-HEAD TRUCK ENGINE
SIX CYLINDERS
90 HORSE-POWER

CHASSIS
RECIRCULATING-BALL STEERING GEAR
SHOCK ABSORBERS
FULL-LENGTH BODY SUPPORT
6.50-16, 6-PLY TIRES
SYNCRO-MESH, 3-SPEED TRANSMISSION
HYPOID GEAR REAR AXLE
HYDRAULIC BRAKES
STABILIZED FRONT END
18-GALLON FUEL TANK
MONORAIL SPARE TIRE CARRIER

CAB: ALL-STEEL, STREAMLINED
FULL-WIDTH SEAT
ADJUSTABLE CUSHION AND BACK
V-TYPE VENTILATING WINDSHIELD
SAFETY GLASS ALL AROUND

BODY: INSIDE, 78 x 48 1/16 x 16 1/4 INCHES
MOISTURE-PROOF WOOD FLOOR
UNOBSTRUCTED FLOOR (NO WHEEL-HOUSINGS)
ANTI-RATTLE TAIL-GATE
TUBULAR STEEL SIDE FLARE BOARDS

ONE OUT OF EVERY THREE TRUCKS IS A CHEVROLET

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

BUY MORE WAR BONDS . . . HELP SPEED THE VICTORY

CHEVROLET *Pick-up* TRUCKS

ARE PLANNED —

...it's TRANSITE PIPE for efficient water transportation

PROVED IN SERVICE in thousands of American communities . . . backed by a time-tested record for dependable performance over the years . . . this asbestos-cement pipe is today being specified for water system improvement projects everywhere.

Here are some of the reasons why it will pay you to include Transite Pipe in your plans:

No Tuberculation. Tuberculating waters can never reduce the initial high flow rate of this non-metallic pipe—a factor that contributes to its low maintenance and continued high delivery capacity.

Highly corrosion-resistant—outside, inside and all the way through! Its stubborn resistance to corrosion has been proved in thousands of installations, in all types of soils, under a wide range of service conditions.

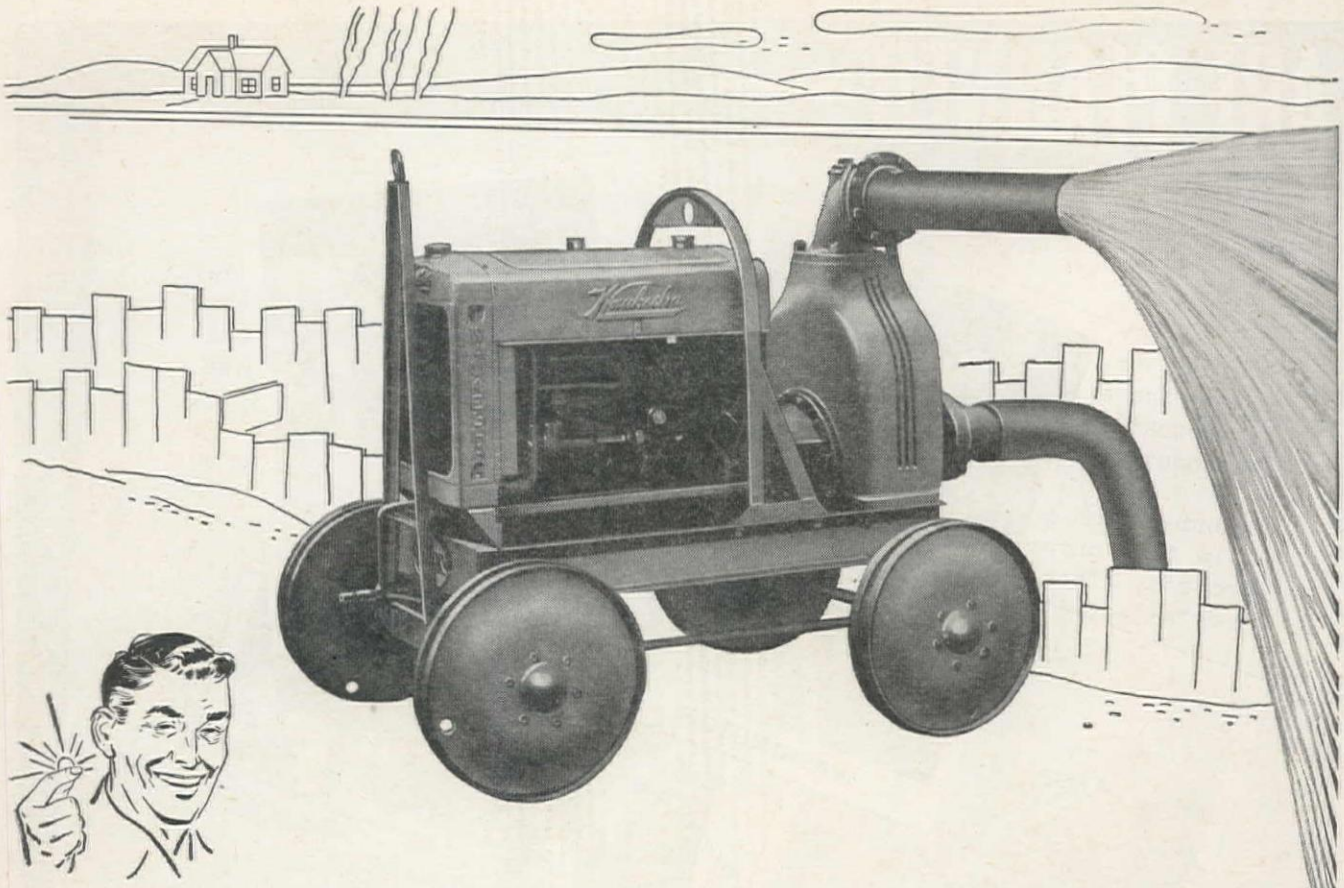
Easy Handling. Light in weight, Transite Pipe is easy to handle—an advantage that pays off in lower transportation and installation costs. Mechanical handling equipment is not necessary except for the larger sizes.

Rapid Assembly. Even unskilled crews can assemble Transite Pipe quickly and easily with the J-M Simplex Coupling, which stays tight even when the line is deflected as much as 5° at each joint.

* * *

These and other advantages of Transite Pressure Pipe are fully described in Booklet TR-11A. For your free copy, write Johns-Manville, 22 East 40th Street, New York 16, N. Y.

Johns-Manville *Asbestos* TRANSITE PIPE



"SPOT IT...START IT...FORGET IT!"

"Yes, sir, that's all you need to do with a Rex Speed Prime Pump," says the owner of a large construction company. "Just spot it on the job . . . start the motor and forget your pumping problems. You'll find that these self-priming centrifugal pumps are easy to transport and will operate dependably without care or trouble."

And you don't have any worries about priming or repriming. That's all handled automatically by the special Rex Recirculating Valve and the only adjustable "Air-Peeler" that literally peels air from the impeller and rushes it out the discharge line. This means that a Rex Pump starts moving water in the fastest possible time.

What's more, Rex Pumps are built for longer efficiency and service. The "Free Flow" design eliminates water "detours" . . . assures a straight-line flow in the shortest, most direct route to the impeller itself. That's why you pump more water, use less power, maintain pump efficiency longer.

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

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

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

ENGINEERED BY AUTOCAR!

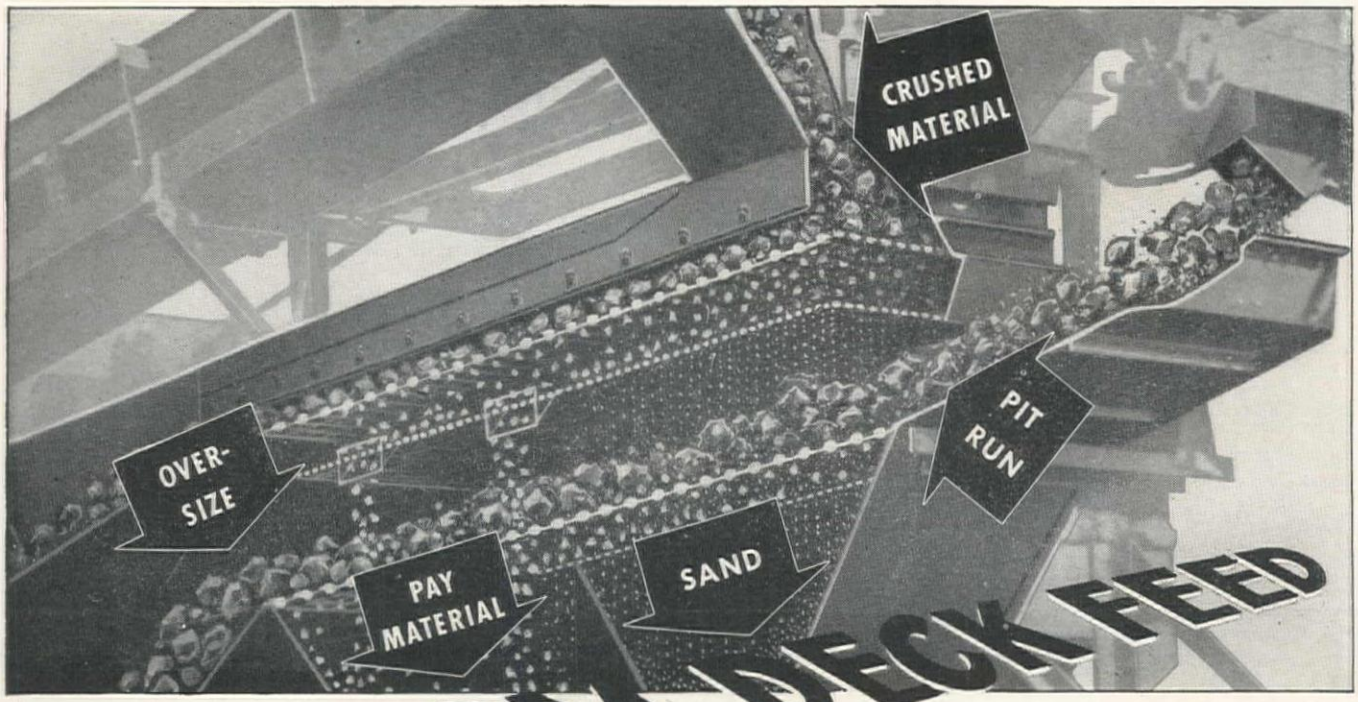
A limited quantity of new, heavy-duty Autocar Trucks are now being built by government authorization. A fortunate few haulers of essential loads can get them. Maybe you can qualify

Superbly engineered...and don't doubt that for a minute. Superbly engineered and precision-built for any man-sized job under any kind of going. Autocar Trucks are famous trucks for heavy-duty hauling. All our resources and resourcefulness go into their manufacture. Autocar Trucks cost more *because they're worth more.* Ask Socony-Vacuum. They buy many Autocars.

Follow the Leaders. for They Know the Way

AUTOCAR TRUCKS

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



BOTTOM DECK FEED

EXCLUSIVE PIONEER FEATURE

Doubles effective screen area-

YOU GET THESE ADVANTAGES:

1. **Balance the work of the two crushers without changing screens.**
2. **Produce "stone chips" in the main screen without extra screen equipment.**
3. **Control the gradation of the output to meet specifications.**
4. **Reject sand and control the percentage of sand rejected.**

Duplex screening is Pioneer's radical innovation to handle the extra gradation to be done where two crushers are used in a gravel or quarry plant.

Pioneer makes one vibrator screen do the work of two. Pit material is screened on the bottom deck and the crushed material on the top deck. Both decks produce specification or pay material and "chips" can be separated. The screen shown is a 4' x 12' unit whose two decks have a combined total working area of 96 sq. ft.

Only with this exclusive Pioneer bottom deck feed can you get all these advantages. Write or talk to Pioneer Plant users, or to Pioneer engineers and distributors for further information on how to handle large crushing capacity with a single screening unit.

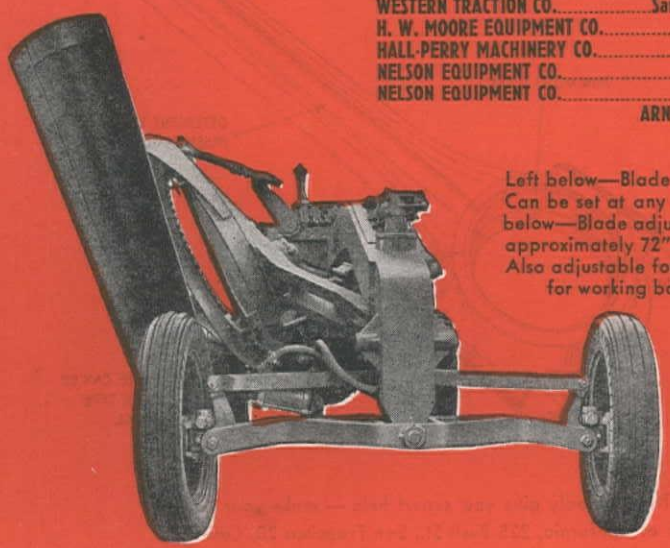
Pioneer
ENGINEERING WORKS
Jaw Crushers · Roll Crushers · Screens · Conveyors · Feeders · Washers
ENGINEERS and MANUFACTURERS of QUARRY-GRAVEL AND MINING MACHINERY
MINNEAPOLIS 13, MINN

GALION

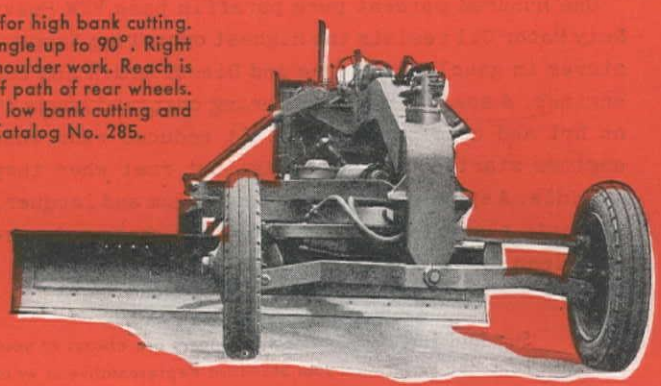
MEANS PLUS VALUE IN MOTOR GRADERS

Western Distributors

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



Left below—Blade adjusted for high bank cutting. Can be set at any desired angle up to 90°. Right below—Blade adjusted for shoulder work. Reach is approximately 72" outside of path of rear wheels. Also adjustable for ditching, low bank cutting and for working backward. Catalog No. 285.

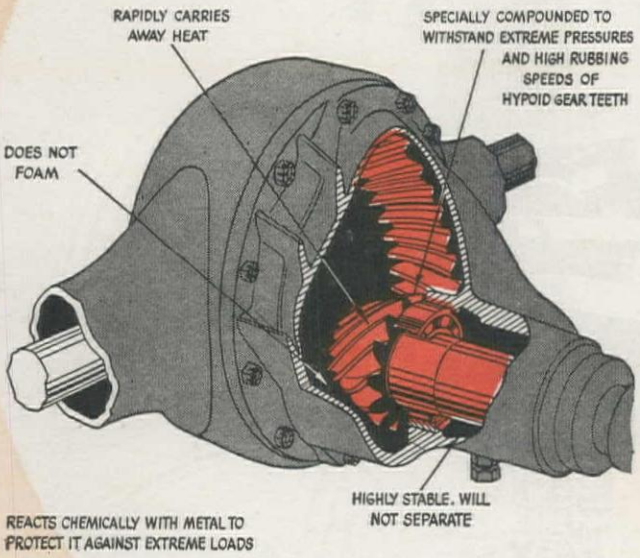


THE GALION IRON WORKS & MFG. CO., GALION, OHIO

STANDARD ENGINEERS NOTEBOOK

VOL. 2-T No. 5

New hypoid lubricant additive controls foaming



Excessive foaming of lubricants in hypoid differentials need no longer concern truck and bus operators. The use of RPM Hypoid Lubricant will eliminate this troublesome and costly condition.

RPM Hypoid Lubricant contains the most effective foam inhibitor known. This special inhibitor breaks up surface air bubbles caused by the whipping action of high-speed gears and thus prevents the formation of foam.

Made for all hypoid gears in both passenger cars and heavy equipment, RPM Hypoid Lubricant contains other compounds which assure complete protection against the extreme-pressure and rubbing speeds peculiar to these gears. No salts are precipitated, and the compounds will not separate from the oil in RPM Hypoid Lubricant, even after hard service.

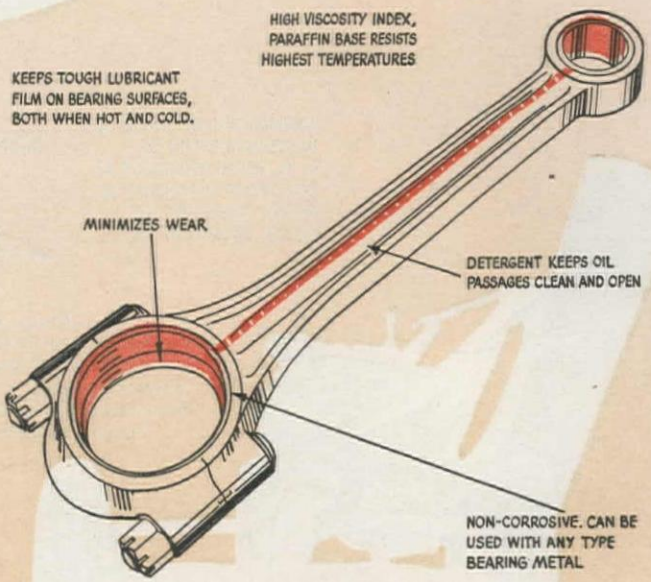
RPM Hypoid Lubricant is made in three grades: SAE 80, 90 and 140.

Heavy-duty oil prevents bearing corrosion

There is no danger of corrosion, pitting or honeycombing copper-lead, cadmium-silver or any other type bearings in heavy-duty engines if RPM Heavy Duty Motor Oil is used in crankcases.

RPM Heavy Duty Motor Oil is made from base stocks that are selected for their high stability. To these oils are added compounds that enhance this natural ability to resist oxidation and prevent the formation of sludge and acid in crankcases.

One hundred percent pure paraffin base RPM Heavy Duty Motor Oil resists the highest operating temperatures in gasoline, butane and Diesel truck and bus engines. A special metal-adhering compound keeps it on hot and cold parts alike. It reduces wear when engines start and protects against rust when they are idle. A special compound removes gum and lacquer, prevents ring-sticking and keeps the whole oil system clean.



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

STANDARD OF CALIFORNIA

BOILED DOWN

TO SIMPLIFY MOTOR SELECTION

● This new booklet gives ratings, sizes, characteristics, dimensions, where-to-use data, *and prices* of General Electric a-c and d-c motors, 1/16 to 75 hp. Everything you need to know to select these sizes—all in 16 pages!

Builders of TRI-CLAD Motors

Buy all the BONDS you can—*and keep all you buy*

GENERAL ELECTRIC

To Save Your Time Later Mail This Coupon Today—

General Electric Company, Schenectady 5, N. Y.

Please send me a copy of your Condensed Motor Catalog (No. GEA-4281).

Name.....

Company.....

Address.....

City..... **State**.....

750-258-488

Taking Heavy Strains in Stride...

ROPE REMINDERS

When you look at wire rope performance records it sometimes pays to remember that wire rope is part of a *team.*

The point is that the world's best wire rope can't give you lasting service when the machinery over which it is operating is off the beam.

Wire rope can't give full service with improper sheaves—drums—reeving . . . poor general operating conditions.

The answer is regular inspection not only of the rope but of everything that pertains to its efficient operation.

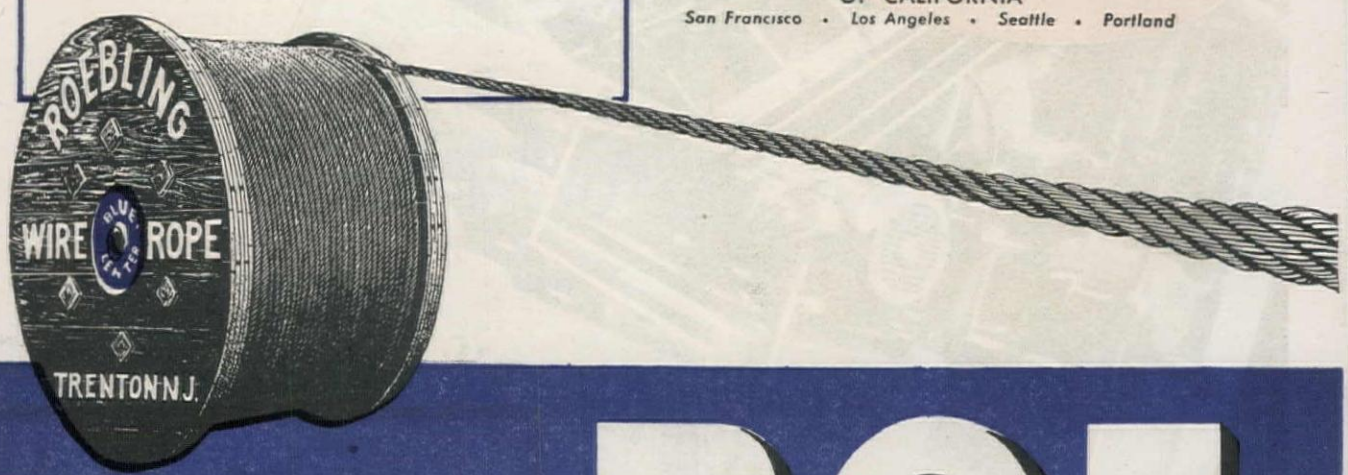
And if abnormal wear seems to be evidenced, call in a Roebling engineer. He makes tests and recommendations that will save you future rope worries and excessive costs.

AND WHERE'S THE CONSTRUCTION JOB that doesn't need tough lines on shovels and scrapers, hoists and draglines? Operating efficiency demands rope that can take extra heavy strains in stride . . . can stand up under sustained punishing service without faltering . . . Roebling "Blue Center" Wire Rope!

After all, the basis of good wire rope is in the steel in the wires, Roebling "Blue Center" Steel — the finest wire rope steel produced—is custom-made in our *small* open-hearth furnaces, where quality is closely controlled. Add 104 years of experience in rope-making . . . unsurpassed facilities for research—testing—manufacturing . . . and *you* get the utmost in wire rope value.

Roebling engineers are at your service . . . to help you select the rope most suitable for your particular need . . . and get maximum service from it. Call or write our nearest branch office.

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



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

ROE

PACEMAKER IN

EVERYWHERE DEPEND ON SHELL TRACROL LUBRICANT

They say a picture is worth 10,000 words. So above are "20,000 words" on tractor rollers and the tough life they lead. Dust grinds them. Muddy sand tries to scrape them to death. Heat, cold, dryness, dampness all make life miserable for the lubricant that is trying to do a job. But under *all* conditions you can depend on Shell Tracrol lubricant.

Shell builds a lot of extras into this rugged tractor roller lubricant. It has the extra adhesiveness to *stay* on the job . . . the stability for long service . . . exceptional resistance to heat and moisture. And Tracrol's excellent "pumpability" assures ease of application and complete coverage of bearing surfaces.

Shell makes TRACROL Lubricant in *four* grades — to meet all temperature and operating conditions. Ask the Shell man to recommend the right grade for your need . . . get the maximum in dependability with Tracrol! Shell Oil Company, *Incorporated.*

Help To Keep Our Country Strong
Buy More Bonds & Hold 'Em Long

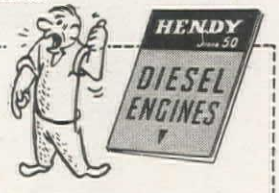
SHELL **TRACROL LUBRICANT**

Shellengineered for the job

You won't find high-pressure fuel lines or long push rods on a Hendy Series 50 Diesel. Although built for heavy-duty economical service, it's also designed for real convenience to the Diesel operating or maintenance engineer.

The overhead camshaft reduces maintenance on valve assemblies. Combination fuel pumps and injectors are easily accessible. Starting is easy—injector fuel lines need no bleeding. And there are many other features.

Now, for the first time, you can have the benefit of *all* these features in one tested and reliable Diesel. For complete information, mail the coupon today to Joshua Hendy Iron Works, Sunnyvale, California.



Send for NEW Diesel Booklet
No Obligation

JOSHUA HENDY IRON WORKS
SUNNYVALE, CALIFORNIA

Mail me your new booklet that completely describes the Series 50 Diesel, with photographs and cross-section cutaway drawings showing the design of all major parts.

Name_____ **Position**_____

Company or business_____

Address_____

I'm interested in Marine ☐ Stationary ☐ Diesel-electric ☐ models and in hp ranges from 190-250 ☐ from 250 up ☐

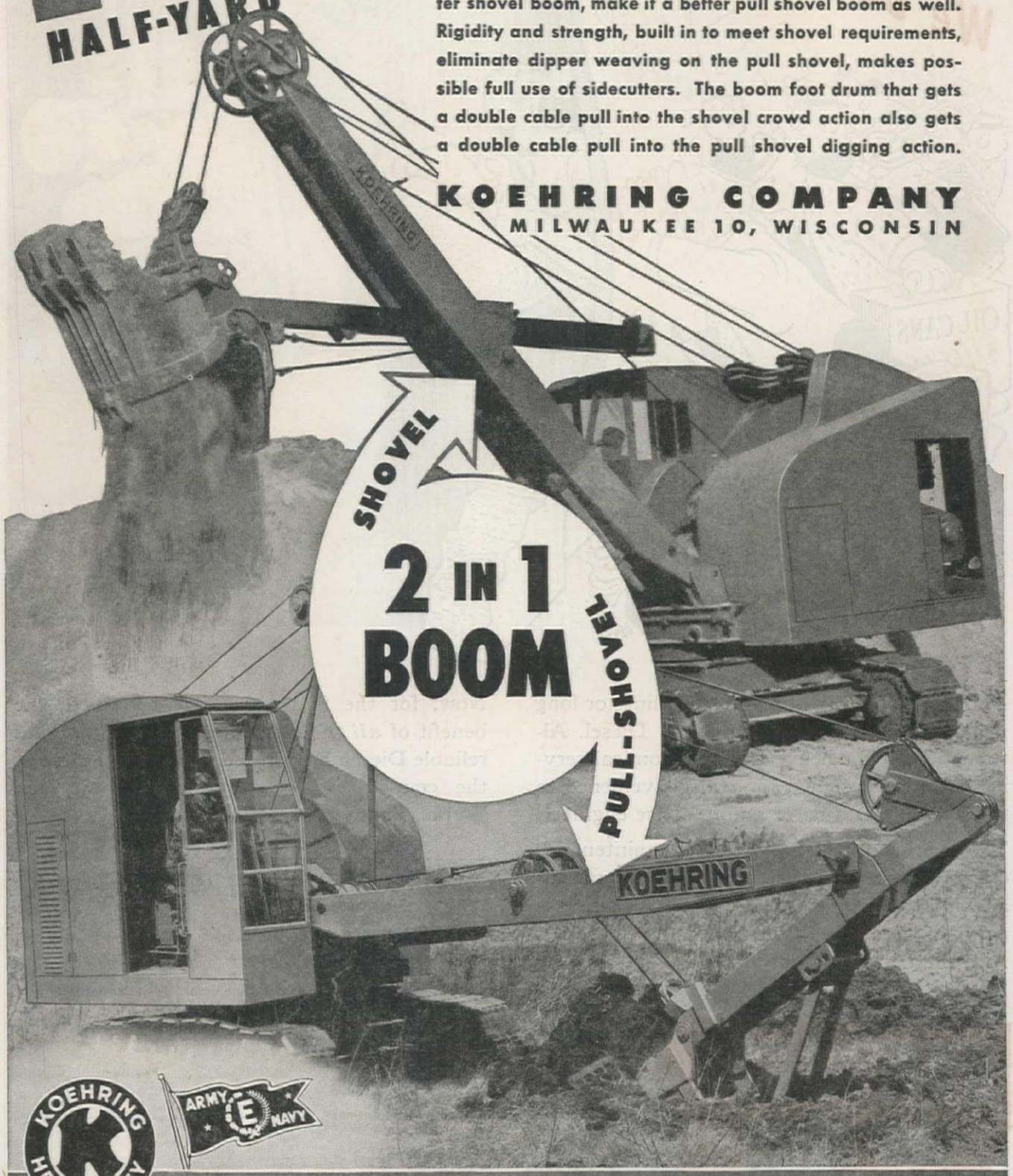
102-D-20

205 HALF-YARD

Saves ONE-HALF *the Cost* OF AN EXTRA PULL SHOVEL BOOM

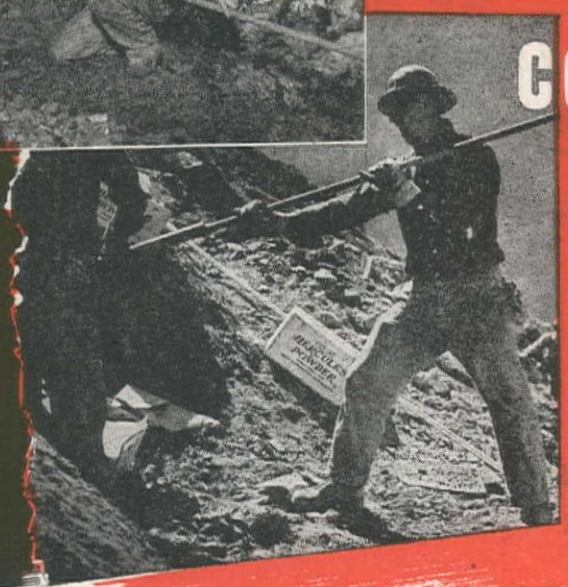
You save one-half the cost of separate pull shovel boom. The same features that make the Two-in-One boom a better shovel boom, make it a better pull shovel boom as well. Rigidity and strength, built in to meet shovel requirements, eliminate dipper weaving on the pull shovel, makes possible full use of sidecutters. The boom foot drum that gets a double cable pull into the shovel crowd action also gets a double cable pull into the pull shovel digging action.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN



HEAVY-DUTY CONSTRUCTION EQUIPMENT

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



QUARRYING
METAL MINING
CONSTRUCTION

IN quarrying, construction, metal mining, users of Hercomite* and Gelamite* are currently saving 10% to 15% of powder costs compared with older types of explosives.

Whenever their use is indicated, Hercomite and Gelamite give maximum breakage for every dollar. Proof of their efficiency and economy is to be found in their widespread use, both on the surface and underground. These high-cartridge count explosives are now more popular than ever before.

Originated by Hercules, Hercomite and Gelamite are only one example of many outstanding Hercules developments in the field of explosives.

HERCULES POWDER COMPANY
INCORPORATED
994 KING STREET
WILMINGTON, DELAWARE

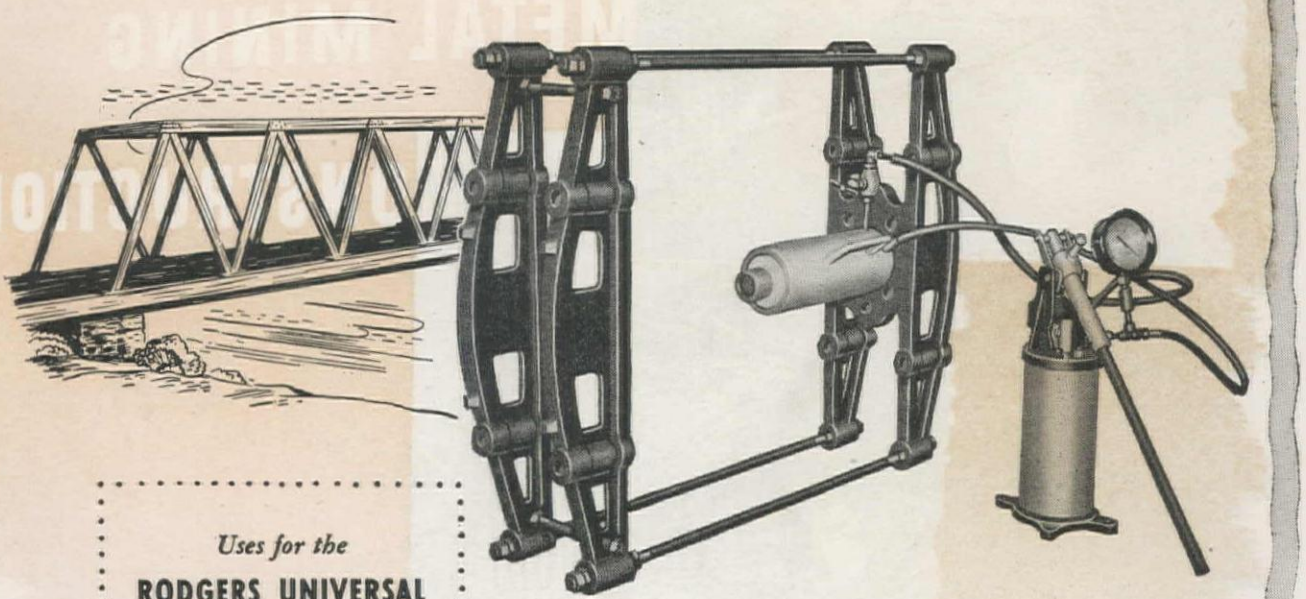
*Reg. U. S. Pat. Off. by Hercules Powder Company

XR-52

NO. 20 OF A "READY-WITH-A-RODGERS" SERIES

"We took a bridge apart with our RODGERS UNIVERSAL PRESS"

. . . states the superintendent of a construction firm.



Uses for the
RODGERS UNIVERSAL HYDRAULIC PRESS

- Gear Pulling
- Wheel Press Work
- Jacking Pipe
- Erecting Machinery
- Relocating Machinery
- All-Purpose Jack

THE PROBLEM... removing hinge pins on an old truss bridge.

"On one job alone, dismantling an old truss bridge, our Rodgers Universal Press paid for itself several times over. It enabled us to push out the hinge pins quickly and easily, effecting a tremendous saving in time, labor and material.

"In another instance we used our Rodgers Universal Press with a spread footer to push a concrete wall into proper alignment. That's adaptability—we originally bought this portable press equipment for overhauling and repairing our shovels and crawler-type tracks."

You can use the Rodgers Universal Hydraulic Press in any place or any position where pulling, pressing, or lifting power is needed. When emergencies arise, be ready with a Rodgers!

If it's a Rodgers, it's the best in Hydraulics.

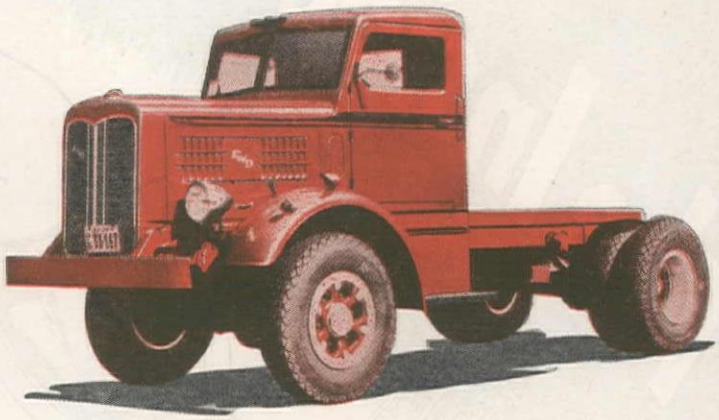
4 SIZES—*one for your job . . . write today for full information!*

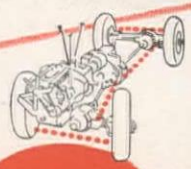
RODGERS HYDRAULIC, INC.

7419 Walker Street, St. Louis Park, Minneapolis 16, Minnesota.

SPEED with SAFETY....

Plus Ample Reserves of "Going Power" for Any Emergency





FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

Whether it's new highway construction or seasonal maintenance work — blading a road, hauling material, clearing snow — or an emergency job demanding better than usual truck performance, rely on an FWD to do the work with speed — safety — low cost.

The superior performance and stamina of FWDs in all classes of highway work originates in experienced, specialized four-wheel-drive engineering — engineering that provides the highest development of the true four-wheel-drive principle with center differential — engineering that equalizes power and load distribution — engineering that divides working strains over two driving axles — engineering that means a rugged, dependable highway "worker" in every detail.

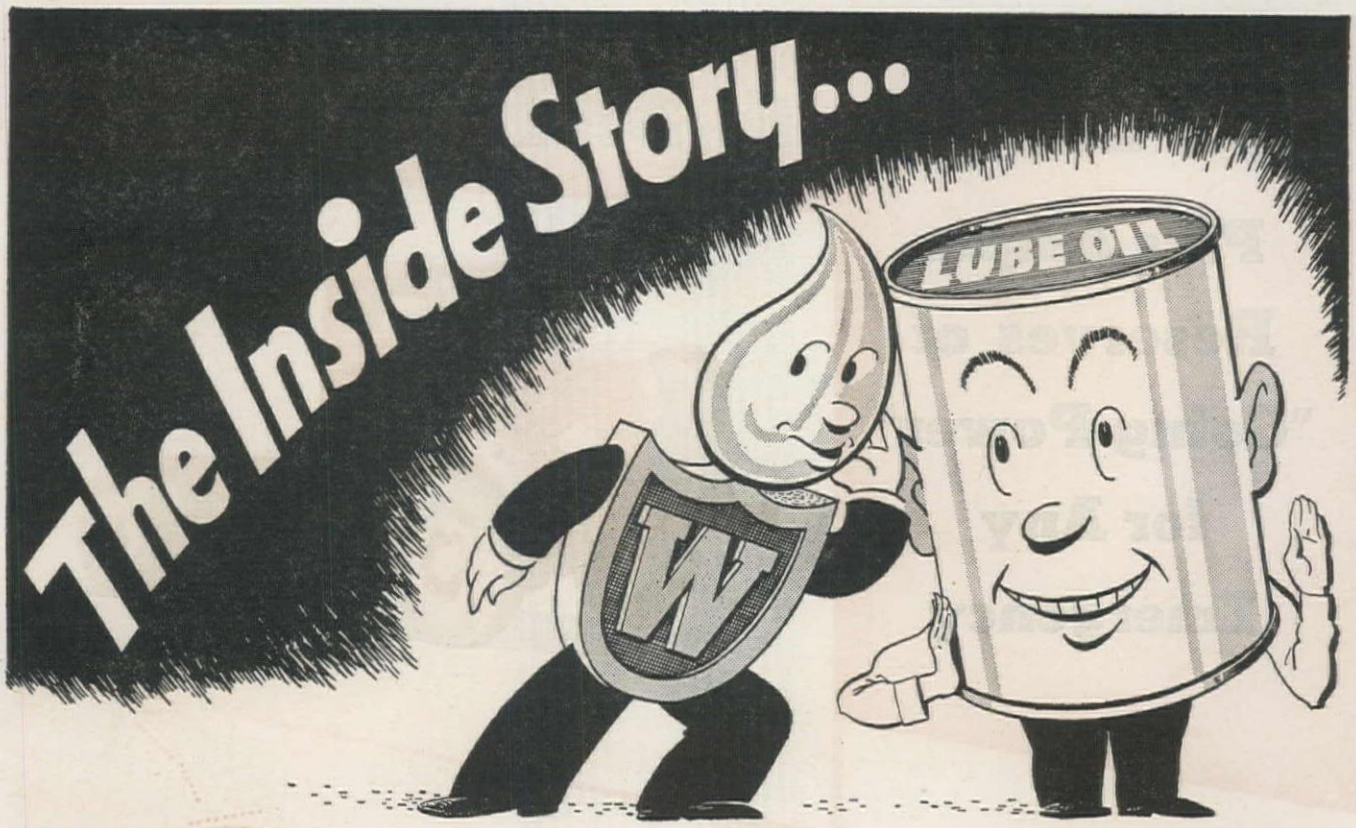
There are good reasons why FWD trucks are the first choice of highway men.

Write us or see your FWD dealer for information on available FWD trucks.

THE FOUR WHEEL DRIVE AUTO COMPANY
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ontario

FWD Distributors

ARIZONA—Arizona-Cedar Rapids Co., 401 N. 1st St., Phoenix, Ariz.; CALIFORNIA—The Four Wheel Drive Auto Co., 1337-39 Santa Fe Ave., Los Angeles 21, and FWD Pacific Co., 469 Bryant St., San Francisco 7, Calif.; COLORADO—Liberty Trucks & Parts Co., P.O. Box 1889, Denver 1, Colo.; IDAHO—Intermountain Equipment Company, Broadway at Myrtle St., Boise, Idaho; MONTANA—Steffeck Equipment Co., 11 E. Cutler St., Helena, Mont.; NEVADA—Allied Equipment Co., Reno, Nevada; NEW MEXICO—The Myers Company, Las Cruces, N. M.; OKLAHOMA—Halliburton Oil Well Cementing Co., P. O. Drawer 471, Duncan, Okla. and Oklahoma Road Mach. Co., Muskogee, Okla.; OREGON—Feenaughty Machinery Co., 112 S. E. Belmont St., Portland 14, Ore.; UTAH—Cate Equipment Co., 49 E. 9th So., Salt Lake City, Utah; WASHINGTON—Feenaughty Machinery Co., 1028 6th Ave., So., Seattle 2, Wash. and Feenaughty Mach'y Co., 715 N. Division St., Spokane, Wash.; WYOMING—Wortham Mach'y Co., 517 W. 17th St., Cheyenne, Wyo.

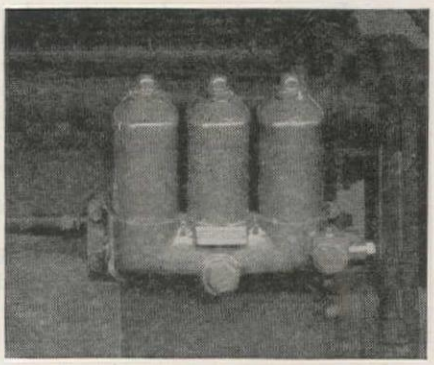


Clean oil is vital for efficient operation of those tough, rugged motors that power heavy construction machinery. Here's the *inside* story—for sustained efficiency the precision-machined parts of modern heavy-duty engines must be lubricated with *clean* oil—oil free of grit, acid and moisture. That's exactly the purpose for which Winslow Full-Flow *in line* Oil Conditioners and Winslow Free-Flo Replacement Elements were designed.

Winslow Replacement Elements—made in more than 130 different sizes to fit any standard make filter—embody exclusive, patented features. One of these features gives extra capacity to consistently pass and condition lube oil over a longer period of time . . . because the element *expands with use.* This means maximum porosity and oil cleaning ability long after ordinary filter elements become clogged.

In addition to the full line of lube oil Conditioners and Replacement Elements, Winslow also makes a wide range of fuel oil filters. Order from your jobber today.

PROOF IN USE



Winslow full-flow installation on Hall-Scott Model 400 heavy-duty truck motor.

For sustained efficiency the precision-machined parts of modern heavy-duty engines must be lubricated with *clean* oil—oil free of grit, acid and moisture. 23-C-3

Distributors—Jackson Implement Co., Portland; Wait Motor Supply Co., San Francisco; Rodman Company, Los Angeles; Dewalt Disher Corporation, Ltd., Vancouver, B.C.

WINSLOW ENGINEERING COMPANY · OAKLAND 8 · CALIFORNIA

WINSLOW

FUEL FILTERS · OIL CONDITIONERS · ELEMENTS

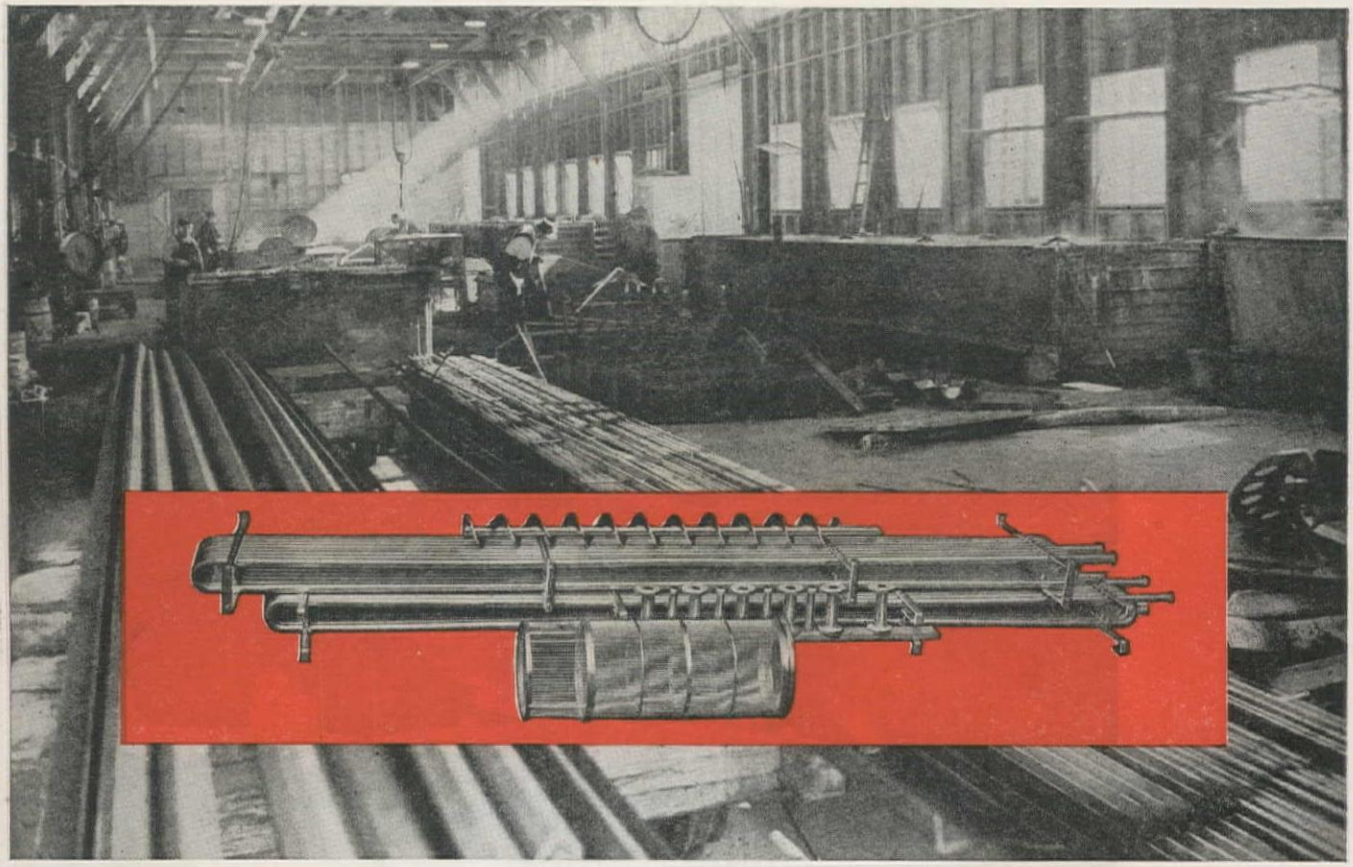
RESERVE...

Every Ingersoll-Rand machine is built to do more than just meet the specifications. High efficiency attained without sacrifice of durability, and strength far in excess of requirements, provide the reserves sufficient to meet any emergency.

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

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.



Galvanize against rust and corrosion

Rust takes a heavy toll here in the Pacific Northwest, due to excessive humidity and salt air along the coast. CARCO Hot Dip Galvanizing will give you protection against this ever-present enemy.

Heavy demand by shipbuilders has kept our Galvanizing Department on a 24-hour schedule for many months. Now, with the tapering off on ship construction, we hope once again to fill this department with commercial work, and we solicit your business.

You can't get a better galvanizing job than we turn out here at CARCO. All our work is done under the direct supervision of expert metallurgists. Only new, pure zinc is used. Because of our special processes, the quality of CARCO galvanizing exceeds the standards established by the N. E. L. A.

Extensive facilities enable us to handle large or small pieces—everything from structurals and complicated coils to bolts and nuts. Let us quote on your requirements.

PACIFIC CAR AND FOUNDRY COMPANY CARCO

SEATTLE AND RENTON, WASHINGTON, U. S. A.

If you've had difficulty obtaining delivery of certain LaPlant-Choate models, please remember that dozers and scrapers continue to rate top priority as essential weapons of war. Moreover, again this year, LaPlant-Choate is producing more dozers for the armed forces than any other company in the industry.

TRADE MARK

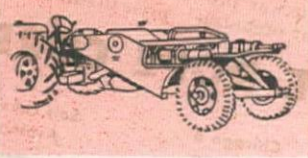
THIS MARK ON EQUIPMENT

means Lowest Possible Cost on the Job

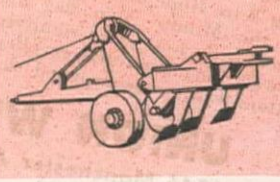
Ask any of the thousands of satisfied owners who have used LaPlant-Choate equipment for years—and they'll tell you that you can't beat a LaPlant-Choate rig for saving time and money on the job. This LaPlant-Choate record of performance and economy—proved on tens of thousands of jobs the world over—will be even more evident in the new improved LPC earthmovers now being engineered for thrifty mass production after Victory. So before you buy any new earthmoving or land clearing equipment, be sure to look for the new LPC trademark. Backed by 34 years of *specialized* engineering and manufacturing "know-how", this new mark is your assurance of lowest possible cost per yard . . . per ton . . . per acre. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

LAPLANT-CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT

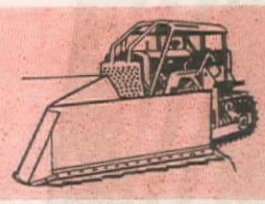
ALL TYPES OF DOZERS— Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS— Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.



CABLE OPERATED RIPPERS — For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.



LAND CLEARING TOOLS—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.

★★★★

FOUR STAR PERFORMANCE
is a peacetime MUST with Union Wire Rope

In the battle to keep Old Glory flying, the Union Wire Rope organization is proud of winning the Minute Man flag and the Navy E Burgee with four stars signifying the limit of renewals for maintained excellence in war production. With war-sharpened skill our organization is determined to render four star performance in the service of private industry postwar. In the meantime, our current advertising funds are devoted to furtherance of sound plans offering full opportunity for competitive private enterprise to survive and expand on a sound foundation.

UNION WIRE ROPE CORPORATION

2146 Manchester Ave. Kansas City 3, Mo.

Tulsa 3 Houston 11 Chicago 6 Salt Lake City 13 New Orleans 16

Monahans, Texas Portland 10, Oregon Ashland, Kentucky Atlanta 1

. . . ABOUT FACE !

About faced, the forces that generated the world's miracle of production can rebuild the economy, make jobs, combat inflation and postwar slump. To do this, however, private industry must have freedom of enterprise stimulated by fair and honest competition. To have this, private industry must see to it that sound plans are first made, then carried out without becoming hamstrung.

For example, legislation for a highway program has been passed by Congress. It calls for a great highway system to be built by efficient contract competition. Most states are far from ready to meet its requirements which call for completed, approved plans before contracts can be let. Definite action is being taken by many responsible officials, but it is a big job and every cooperation should be given them so that time will not be lost because of unprepared plans. Important information on this subject is available in the book "The Road Ahead" published by the American Road Builders' Association, Washington, D. C. It should be read by every person interested in keeping America the land of opportunity. Check the coupon for a copy of this book and send today.

Another project vital to the national economy is developing. The Civil Aeronautics Administration report to Congress included a plan for national airport development. "Put Your Town on the Air Map" is the title of a book published by Personal Aircraft Council of the Aeronautical Chamber of Commerce of America, Inc., Washington, D. C. Send coupon below for this book.

UNION WIRE ROPE CORPORATION, 2146 Manchester Ave., Kansas City 3, Mo.

☐ Send a Free copy of book entitled "The Road Ahead"

☐ Send a Free copy of book entitled "Put Your Town on the Air Map"

NAME_____

FIRM _____

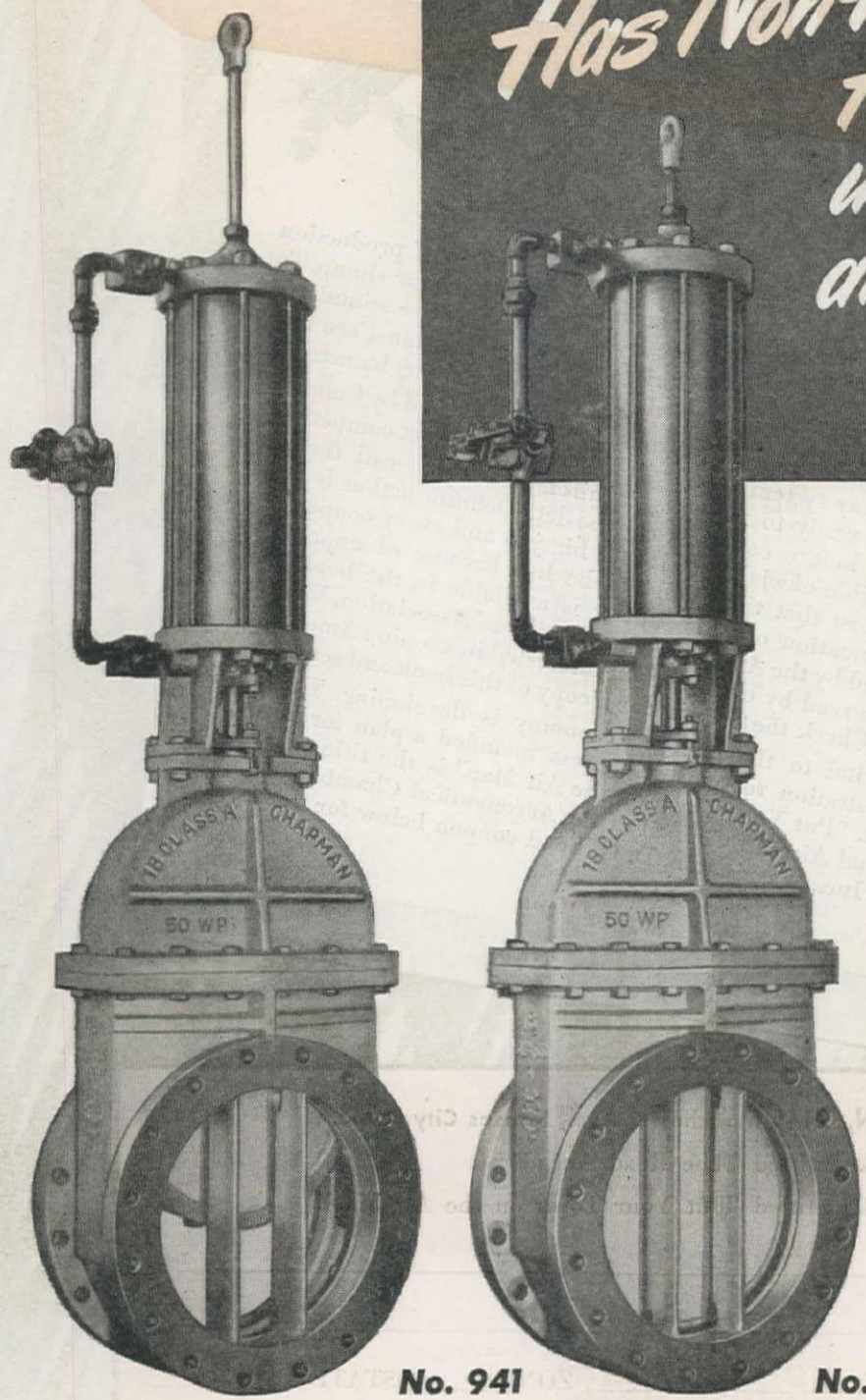
ADDRESS_____ CITY_____ ZONE_____ STATE_____

B-45

CHAPMAN

BEAMED WATERWAY GATE VALVE

Has "Non-Tipping" Disc to eliminate uneven wear and minimize leakage



Recognizing the need for a more efficient valve than the double disc, parallel seated gate valve used under throttling conditions, Chapman engineers developed the Beamed Waterway Gate Valve.

This valve is designed to provide sufficient bearing contact for the downstream disc to prevent its tipping into the waterway. This is effected by means of bronze-faced vertical beams in the downstream port, which contact bronze strips in the adjacent disc. The bronze facings are in the same plane with the seat and disc ring faces, thus increasing the bearing contact between disc and body seat facings from six to ten times when the valve is in the one-quarter or one-half open positions. There is no uneven wear on the seat rings to cause the valve to leak.

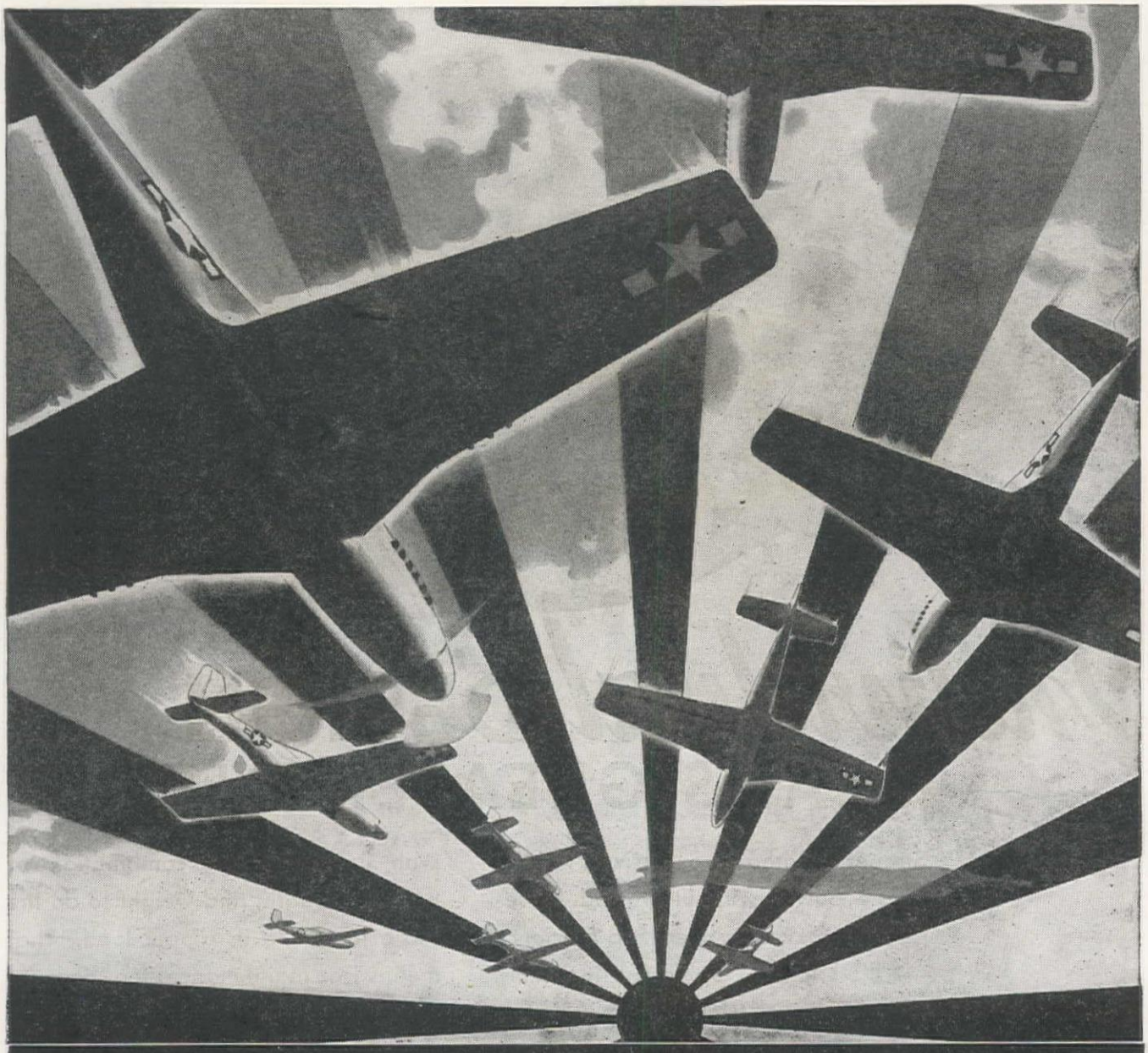
Beamed Waterway Gate Valves have been tested in actual operation for more than ten years, and conclusive reports from Water Filtration Plants are now available to engineers. Write to:

The Chapman Valve Manufacturing Co.

INDIAN ORCHARD, MASS.

No. 941 **No. 940**

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



The victory over Germany emphasizes the need of Power to Win to finish the job quickly and completely, concentrating on Japan until our war efforts bring total victory and unconditional surrender. Continental, producer of Power, continues to concentrate on

POWER TO WIN

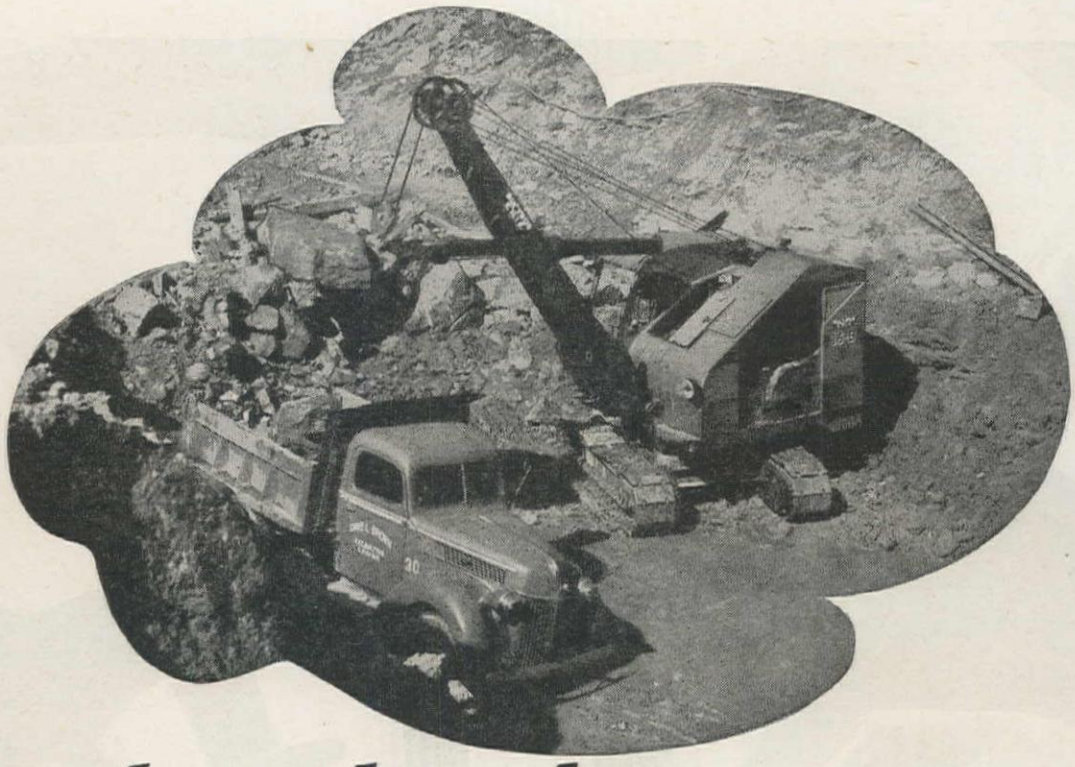
ARMY E NAVY

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

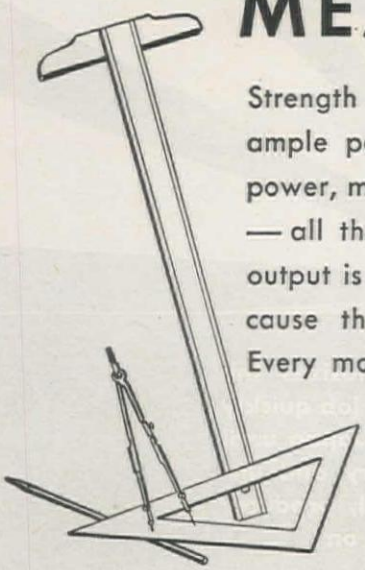
Continental
Red Seal
Engines

Charles W. Carter Company
SALES AND SERVICE
Continental Red Seal Engines and Parts
Los Angeles • Sacramento • San Francisco • Oakland • Fresno

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



Individual DESIGN MEANS GREATER OUTPUT



Strength without excessive weight, ample power without wasted horsepower, maximum speed, top efficiency — all that adds up to profit-making output is yours with Bucyrus-Eries because they're right for their work. Every model is individually designed, with just the right combination of power, strength, and weight to do the job of handling its dipper load. That means low maintenance, too, because there's no overstressing of gears and shafts — none of the excessive wear that comes with makeshift models.

2E45

Individual design of each model is just one of many reasons why Bucyrus-Erie excavators are setting outstanding records in the battle regions, why they are always tops in output. The full Bucyrus-Erie performance story will convince you.

SEE YOUR BUCYRUS ERIE DISTRIBUTOR

EXC-2

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

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

THERE'S no tougher job for air hose than service in quarries or on big construction projects. It's got to be plenty rugged to take the abuse of being yanked over jagged surfaces, smashed by falling rocks, dragged around razor-sharp corners. That's why Goodyear Redwing H Cord Air Hose is first choice for all heavy-duty jobs.

Here's an air carrier that's tough, willing and able to stand the gaff of the most punishing air hose jobs. Redwing has always been top quality—and now it's even better than it ever was before.

Why? Because Redwing is now built of a special synthetic rubber that is both oil- and weather-resisting. Its tube won't flake off and clog tools and its cover won't crack from exposure to heat or cold. What's more—the synthetic used in building Redwing is highly resistant to both abrasion and cutting—the kind of material that takes the heaviest-duty jobs right in its stride. And—while Redwing is extremely flexible, it won't kink, won't strangle tools or equipment.

Redwing H Cord Air Hose is doing yeoman duty in shipyards, steel mills, quarries, mines, heavy war industries of all kinds. Wherever it's in use, it is giving an outstanding account of itself, smoothing the flow of production and keeping maintenance costs and need for replacement at the minimum. Try it yourself—and you'll soon learn why users are so enthusiastic about this heavy-duty hose.

Made in continuous lengths, in seven sizes up to 1½" diameter. Order from the G.T.M.—Goodyear Technical Man—or phone your nearest Goodyear Industrial Rubber Products Distributor.

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

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

GTM-Specified

Redwing H Cord Air Hose for Heavy-Duty Service

A Highest quality synthetic rubber tube, non-porous, impermeable to oil

B Multiple braids of cabled cotton cord give high safety factor

C Heavy-gauge, high-tensile cover resistant to cutting; non-oxidizing

GOODYEAR

THE GREATEST NAME IN RUBBER

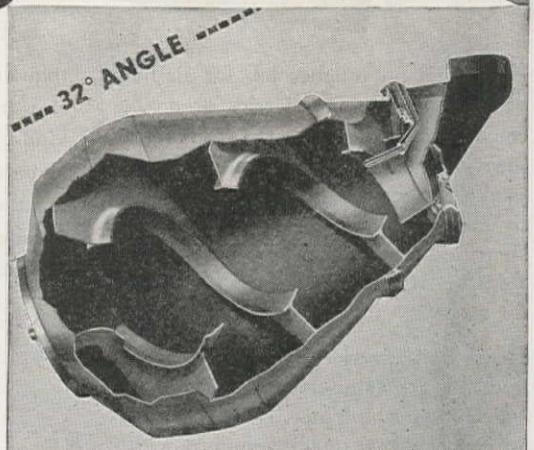
ALL OUT FOR THE MIGHTY 7TH — BUY MORE WAR BONDS!

POURING CONCRETE UP HILL!

● Smith-Mobile Truck Mixer provides a fast, controlled discharge *even when the machine is on a steep incline.* The patented T-shaped blades scoop up the thoroughly mixed concrete and carry it swiftly to the discharge opening, without segregation. The speed of the drum controls the speed of discharge and a smooth steady flow results, even on an up-grade.

Smith was the FIRST truck mixer manufacturer to introduce a HIGH DISCHARGE model, eliminating the need for a rear-end hoist with its original extra cost, dead load and maintenance expense. And Smith-Mobile pioneered many other time-tested truck mixer features. It will pay you to investigate. Write today for Catalog No. 198-C.

The T. L. SMITH CO., 2871 N. 32nd St., Milwaukee 10, Wis.



The illustration above shows a No. 4 Smith-Mobile, one of a fleet operated by Western Concrete and Equipment Company and used in the construction of a Southern California war plant. This Smith-Mobile is discharging concrete into a high floor hopper. The ramp is a 14° grade and the axis of the mixer drum is 18° from horizontal — yet the speed of discharge is NOT seriously affected by this steep incline.

SMITH-MOBILE

The ORIGINAL HIGH DISCHARGE Truck Mixer and Agitator

Sold and Serviced by:

Garfield & Co., San Francisco; Le Roi-Rix Machinery Co., Los Angeles; The Lang Company, Salt Lake City; The Sawtooth Company, Boise; Clyde Equipment Co., Portland & Seattle; The O. S. Stapley Co., Phoenix; F. W. McCoy Co., Denver; Francis Wagner Co., El Paso.

Get a grip on WET LOADS

LIGHTNING
Ribbed Conveyor Belts
PREVENT LOAD SLIPPAGE

A slipping load greatly shortens the life of a conveyor belt . . . just as a tire wears faster when the wheel is out of alignment. Slowly, but surely, this added abrasion wears the surface away. So, for longer belt life . . . prevent slippage.

Lightning Conveyor Belts have a patented raised "tread" that grips wet rocks and rubble and holds the load tight. That's why you will find them on so many gold dredges such as the Yuba dredge pictured here.

Whenever you have a wet load or difficult delivery situation, you'll find Lightning Conveyor Belt unequalled for the job. In fact, no matter what your conveying problem may be—wet or dry load—there's an American Rubber Conveying Belt engineered to fit the job.

Typical dredge-stacker belt showing wet gravel load on a Yuba dredge operating in a California placer gold field. Inset: Detail of patented Lightning Conveyor Belt . . . the belt with the "tread" that grips and holds the load, wet or dry.

The AMERICAN RUBBER Mfg. Co.
OAKLAND, CALIFORNIA
MANUFACTURERS OF RUBBER PRODUCTS FOR INDUSTRY

Build them Faster and Better with *Steel!*

POSTWAR road and bridge projects will approximate 3 billion dollars a year. That's worth going after in a big way.

By using modern construction methods and materials, you can handle a sizeable slice of it right in your own county or state. But, you'll have to be prepared to move along fast. The West is impatient for her better roads, bridges and super expressways.

Steel will help put you in position to pour more miles of good roadway, open more heavy-traffic bridges than you thought possible in pre-war days.

Why? Because of the lessons learned in bridging streams, laying landing strips, building docks close to the battle fronts as well as in the construction of contributing home front facilities. Steel's advantages over harder-to-handle, less efficient materials—re-emphasized by its wartime role—will be yours to profit by when your crews begin work on peacetime projects.

Columbia's engineers are ready now to discuss the application of U·S·S Structural Shapes, Reinforcing Bars, Wire Rods, Fabricated Structural Work, Plates, Sheets, Piling, I-Beam-Lok Flooring and other U·S·S Steel Engineering Products to your postwar road and bridge building plans.

A request will bring descriptive literature.

COLUMBIA STEEL COMPANY

San Francisco · Los Angeles · Portland
Seattle . Salt Lake City

Pacific Coast Distributors for

American Bridge Company · Carnegie-Illinois Steel Corporation
American Steel & Wire Company · National Tube Company
Tennessee Coal, Iron & Railroad Company
United States Steel Export Company, New York

Only Steel can give you these Six Structural Advantages:

- ★ High Strength-Weight Ratio
- ★ Highest Modulus of Elasticity
- ★ Extra Toughness and Shock Resistance
- ★ Versatility of Application
- ★ Great Durability
- ★ Ultimate Economy

USS STEEL — UNITED STATES STEEL

UNITED STATES STEEL

TILL THE JAPS SAY "UNCLE"

AMERICA bounced back hard in this war against the Japs, and the boys who led the rebound were *United States Marines.*

Ever since Guadalcanal the Marines have proved that boys from Kokomo, the Ozarks and the Bronx—when steeped in Marine Tradition, skilled with Marine training—are doggone good fighters. On beachhead after beachhead—then in jungle after jungle—they were far outnumbered by the Japs. But not outfought!

On they go, those Marines, on land and sea and in the air . . . outsmarting, outshooting, outkilling the enemy—till the Japs say "Uncle."

They have good equipment, sure. Most of the thousands of trucks they use, for example, are Internationals. And most of the thousands of bulldozing tractors they use are Internationals, too. Trucks and tractors—vital weapons in this grim, modern war!

But proud as we are that Harvester has been able to make equipment rugged enough to fight with the Marines, we know that the real fighting machine in this march to Tokyo is the Marine himself. What a machine! All speeds forward ...none reverse. Tough...rugged...smart. A superlative fighter. A superb citizen.

We proudly salute those boys from Kokomo, the Ozarks and the Bronx, who are *fighting* up to their glorious motto —Semper Fidelis.

INTERNATIONAL HARVESTER COMPANY
180 N. Michigan Ave. Chicago 1, Illinois

INTERNATIONAL
Industrial Power Distributors:

ARIZONA: O. S. Stapley Co., Phoenix; *CALIFORNIA*: J. G. Bastian, Redding; Brown Tractor Co., Fresno; Stanley J. Commerford, Eureka; Exeter Mercantile Co., Visalia; Farmers Mercantile Co., Salinas; Gallagher Tractor & Equipment Co., Merced; Lohman Tractor & Implement Co., Napa; North Valley Tractor & Equipment Co., Chico; Smith Booth Usher Co., Los Angeles; Stanislaus Implement & Hdwe. Co., Modesto; Stevenson Farm Equipment Co., Santa Rosa; Sutton Tractor & Equipment Co., Sacramento; Valley Equipment Co., San Jose and San Francisco; *COLORADO*: H. W. Moore Equipment Co., Denver; *IDAHO*: Intermountain Equipment Co., Boise and Pocatello; *MONTANA*: Industrial Equipment Co., Billings; *NEW MEXICO*: Hardin & Coggins, Albuquerque; *NEVADA*: Allied Equipment, Inc., Reno; Clark County Wholesale Mercantile Co., Inc., Las Vegas; *OREGON*: Howard-Cooper Corp., Portland and Eugene; *UTAH*: The Lang Co., Salt Lake City; *WASHINGTON*: Howard-Cooper Corp., Seattle; Glenn Carrington & Co., Seattle (for Alaska); *WYOMING*: Wilson Equipment & Supply Co., Cheyenne and Casper.

INTERNATIONAL HARVESTER

Power for Victory . . . Power for Peace

A Water-Resistant Lubricant for Track-Laying Rollers of All Makes

VEEDOL TRAC-LUBE

Into a high viscosity Base Stock, Tide Water Associated engineers have processed aluminum soap, to make Veedol Trac-Lube. The result is a lubricant ideally suited to the maintenance of track-laying tractors of all makes and types.* The aluminum soap gives Trac-Lube the maximum tackiness required to combat pounding, and make it especially effective on worn, loose fittings. Its stubborn resistance to water gives additional lastability on the tough wet-soil jobs.

Use Veedol Trac-Lube in your regular pressure guns, either power or hand operated. For your convenience, it comes in grades to meet all weather conditions: 80, for winter use; 90, for normal temperatures; 140, for extreme heat.

LET'S GET ASSOCIATED
FREE! TAX STAMP PROTECTORS AT ASSOCIATED

*Excepting only the new positive-seal assemblies. For these use Veedol Transgear Oil, Grades 90 and 140.

TIDE WATER ASSOCIATED OIL COMPANY
79 New Montgomery Street • San Francisco, 5

LET'S GET ASSOCIATED

SPECIALIZED LUBRICANTS
FOR EVERY INDUSTRIAL PURPOSE

☆ VICTORY ☆ ☆ ☆ ☆ ☆
still depends on you

We build all 4 Material Handling Buckets

ARMY-NAVY PRODUCTION AWARDS
1st award... July 20, 1943
2nd award .. Jan. 20, 1944
3rd award....July 20, 1944
4th award....Feb. 17, 1945

PMCO

ALL PURPOSE

- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

AMERICA'S MOST COMPLETE LINE OF MATERIAL HANDLING BUCKETS

● **WE BUILD A WIDER AND MORE COMPLETE LINE OF MATERIAL HANDLING BUCKETS THAN ANY OTHER MANUFACTURER.**

See your shovel engineer or equipment dealer about PMCO dippers and buckets.

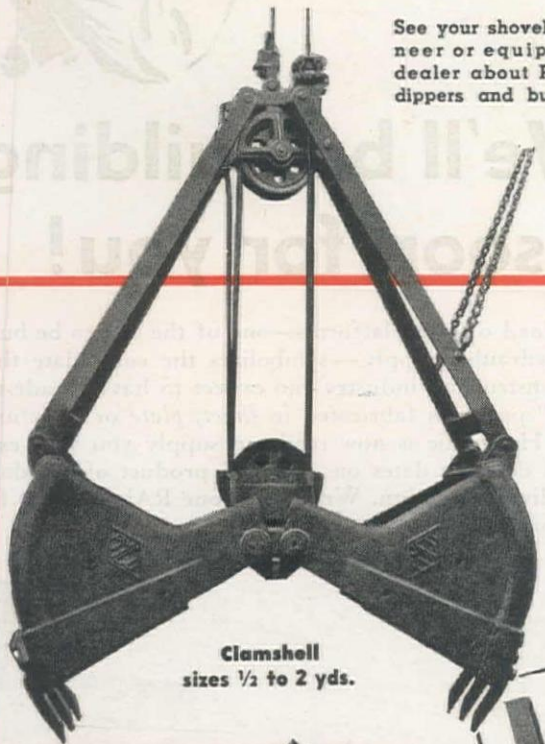
● **WE ARE THE WORLD'S LARGEST BUILDER OF WELDED SHOVEL DIPPERS**—sizes ½ yd. to 18 yds. In certain sizes our volume exceeds that of all other manufacturers combined.

● **EXPERIENCE COUNTS**

Pettibone Mulliken Corp.

"Quality Since 1880"

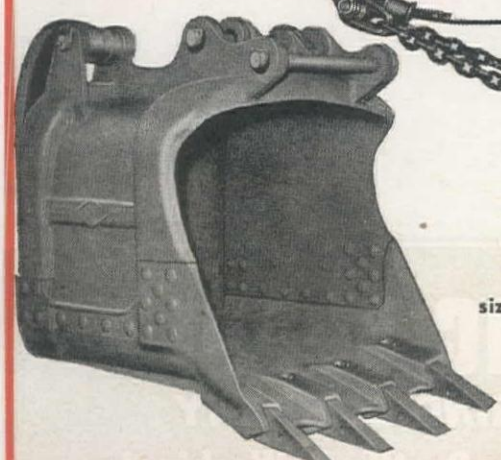
4700 WEST DIVISION STREET, CHICAGO 51, ILLINOIS



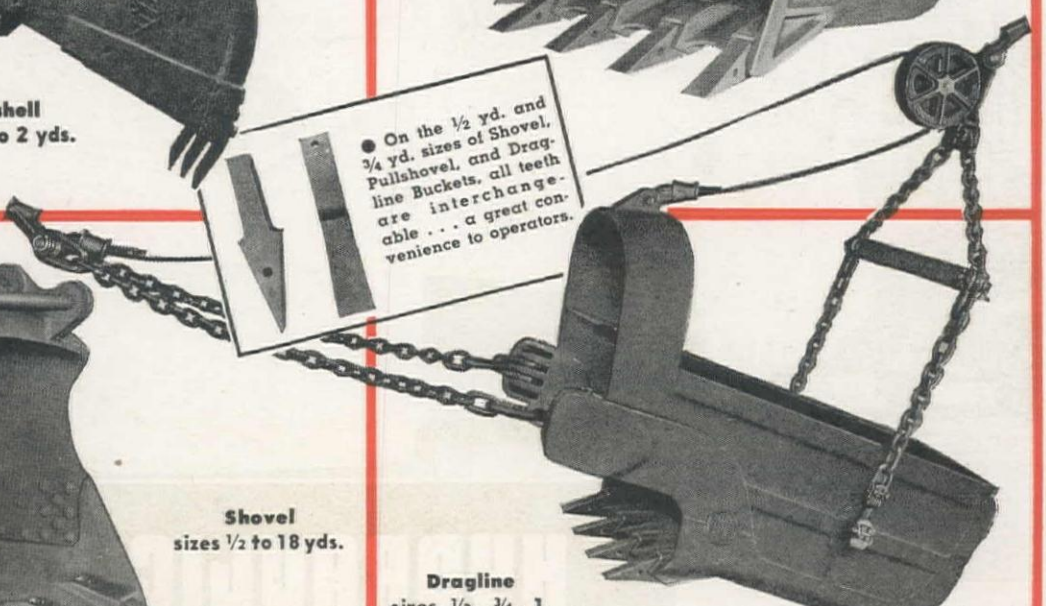
Clamshell
sizes ½ to 2 yds.

Pullshovel
sizes ½ and ¾ yd.

● On the ½ yd. and ¾ yd. sizes of Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable . . . a great convenience to operators.



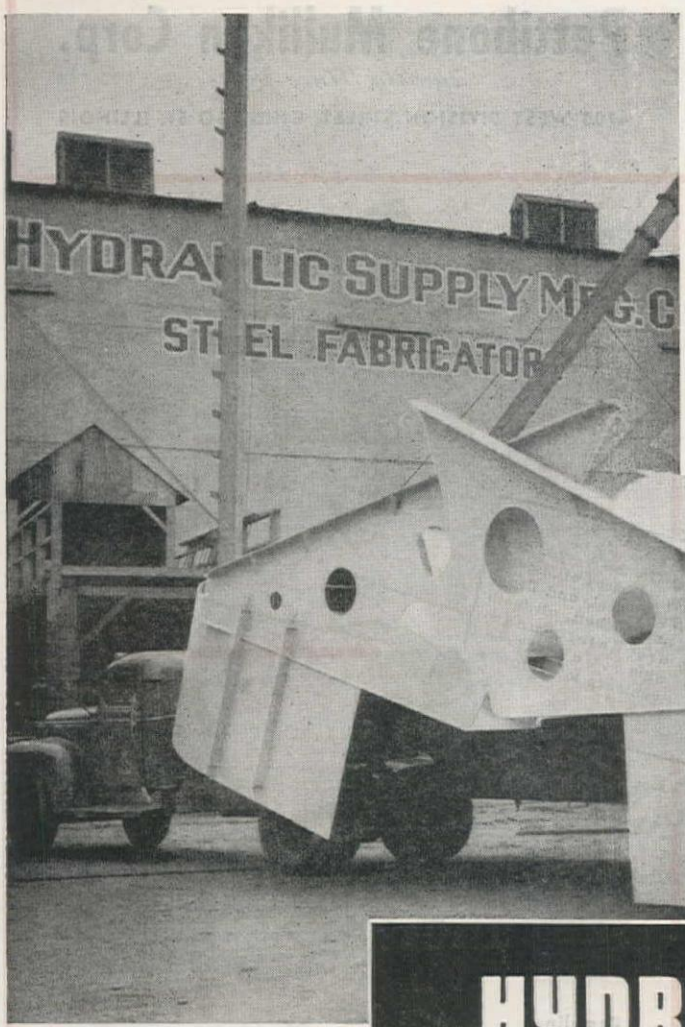
Shovel
sizes ½ to 18 yds.



Dragline
sizes ½, ¾, 1, 1½, 2, 2½ yds.

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

CUSTOM TAILORING in Steel

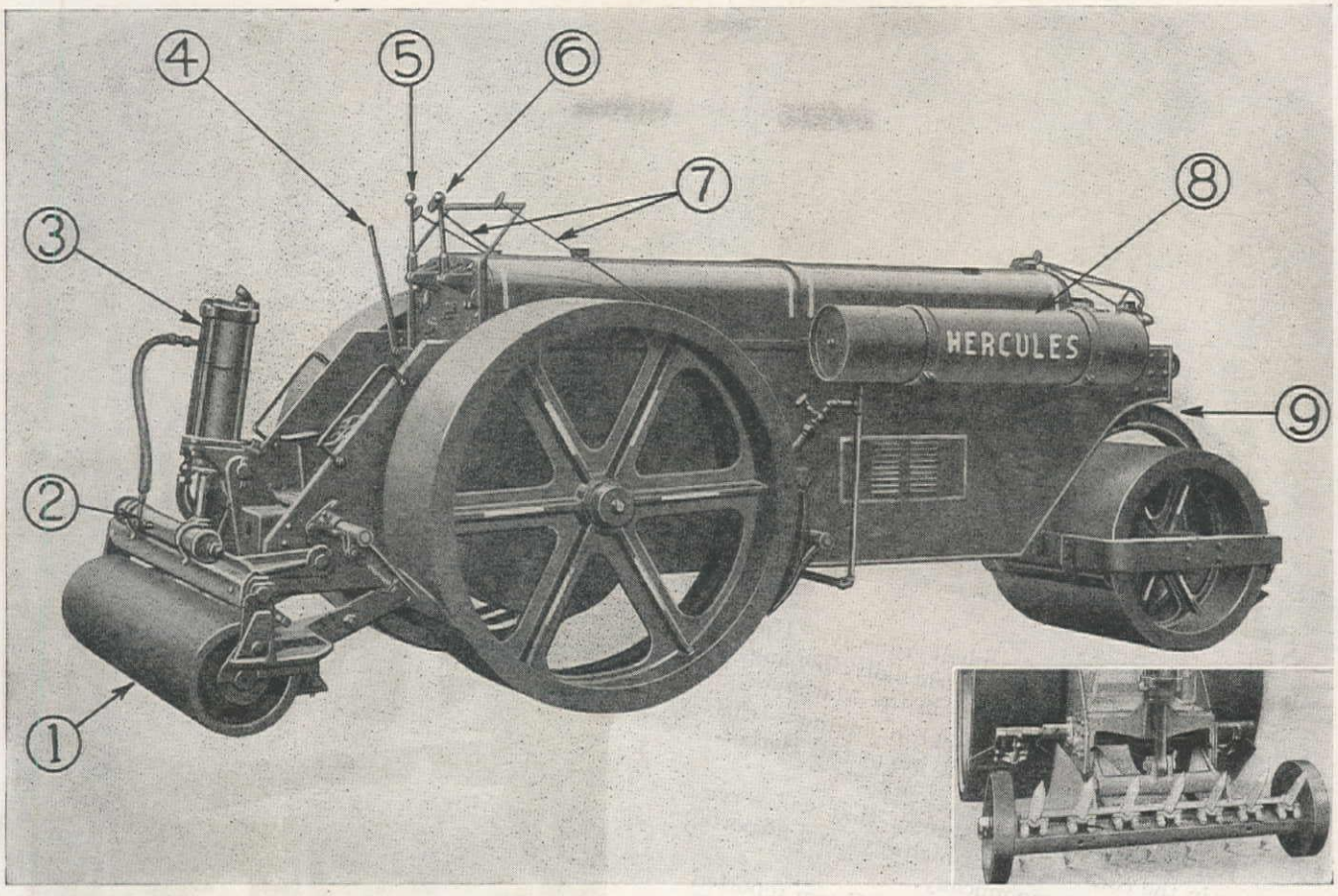


We'll be building soon for you!

This load of gun platforms—one of the last to be built by Hydraulic Supply—symbolizes the early date that the construction industry can expect to have "made-to-order" products fabricated in *sheet, plate* or *structural* steel. Hydraulic is now ready to supply you with estimated delivery dates on any steel product of standard or individual design. Write or phone RAinier 0670 for information.

INCORPORATED
1905

HYDRAULIC SUPPLY
MANUFACTURING COMPANY
7500 Eighth South • Seattle 8, Washington



The HERCULES *IRONEROLLER*

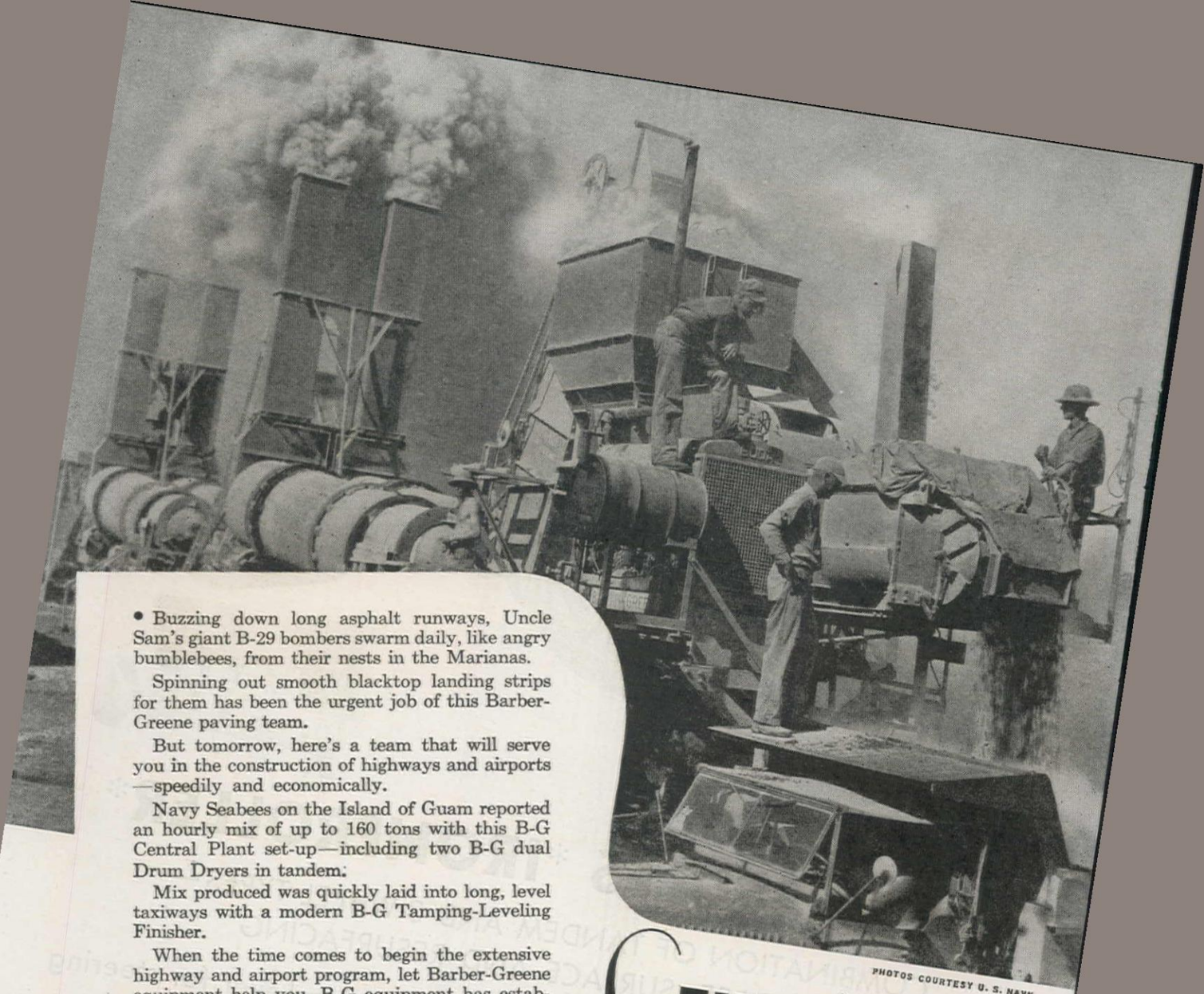
COMBINATION OF TANDEM AND 3-WHEEL TYPES — FOR BASE, SURFACE AND RESURFACING

1. *IRONEROLL* Attachment — Levels as it rolls
2. Automatic Equalizer prevents excessive compaction
3. Hydraulic Operating Cylinder
4. Reversing Lever
5. Operating Lever for *IRONEROLL*
6. Operating Lever for steering
7. Sprinkler Controls
8. Sprinkler Tanks (2)
9. Gyroscopic Yoke reduces weaving
10. Heavy Duty Scarifier — interchangeable with *IRONEROLL* (Shown in inset)

Sold and Serviced by

Neil B. McGinnis Co., Phoenix, Arizona
Le Roi-Rix Machinery Co., Los Angeles 11, Calif.
Sorensen Equipment & Supply Co., Oakland 1, Calif.
Power Equipment Co., Denver, Colo.
Westmont Tractor & Equipment, Missoula, Mont.
Tractor & Equipment Co., Sidney, Mont.
Howard-Cooper Corp., Portland-Seattle
Smoot Machinery Co., Salt Lake City, Utah
Equipment Supply Co., El Paso, Texas

Built by **Hercules Roller Company** ***Bucyrus, Ohio***



PHOTOS COURTESY U. S. NAVY

THE B-G TEAM THAT BUILT A "B's" NEST

• Buzzing down long asphalt runways, Uncle Sam's giant B-29 bombers swarm daily, like angry bumblebees, from their nests in the Marianas.

Spinning out smooth blacktop landing strips for them has been the urgent job of this Barber-Greene paving team.

But tomorrow, here's a team that will serve you in the construction of highways and airports —speedily and economically.

Navy Seabees on the Island of Guam reported an hourly mix of up to 160 tons with this B-G Central Plant set-up—including two B-G dual Drum Dryers in tandem.

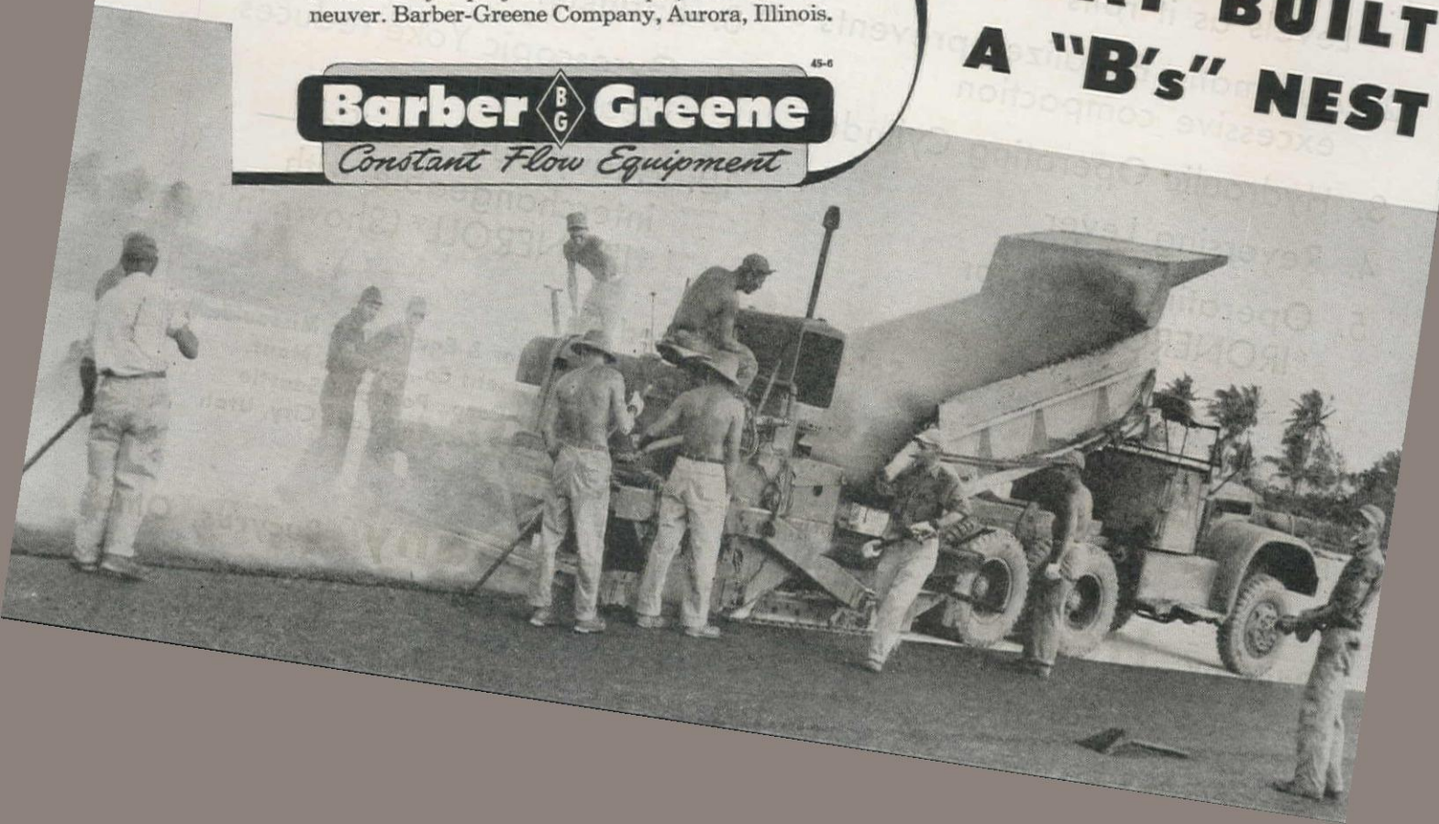
Mix produced was quickly laid into long, level taxiways with a modern B-G Tamping-Leveling Finisher.

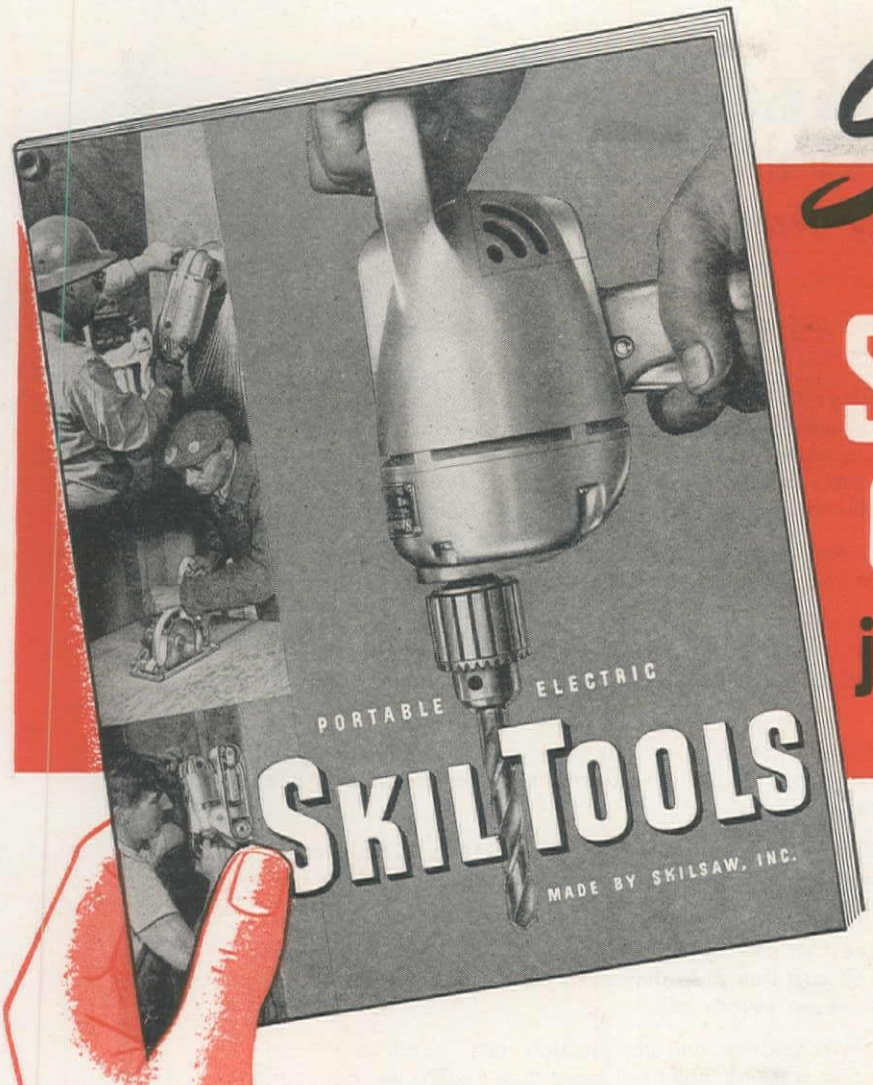
When the time comes to begin the extensive highway and airport program, let Barber-Greene equipment help you. B-G equipment has established new standards in accuracy of proportioning and homogeneity of mix . . . has provided a method of putting down a firm, ripple-free mat efficiently. Moving and erection has been changed from a major project to a simple, low-cost maneuver. Barber-Greene Company, Aurora, Illinois.

45-6

Barber B G Greene

Constant Flow Equipment





Send

FOR THIS NEW SKILTOOL CATALOG just off the press!

SPECIAL SECTION on Care and Operation of Electric Tools

Every owner, every operator of portable electric tools needs this manual to help make tools do their job better and last longer. The SKILTOOL Maintenance Manual in the SKILTOOL CATALOG is packed full of useful information on the care and economical use of *all* portable electric tools. Whether you use SKILTOOLS exclusively . . . or whether you also use other makes . . . you'll save money and delay the need for tool repair by reading and heeding the advice in the new SKILTOOL Maintenance Manual and Catalog. It's yours for the asking. Mail the coupon today!

Send Now for your Free copy!

PORTABLE ELECTRIC
SKILTOOLS
MADE BY SKILSAW, INC.

5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in All Principal Cities

SKILSAW, INC.
5033-43 Elston Avenue, Chicago 30, Illinois

Please send.....free copies of your new SKILTOOL Catalog with Special Tool Maintenance Section to:

Name.....

Address.....

City.....*State*.....

TEN REQUIREMENTS
FOR UNDERGROUND MAINS
under normal conditions

Long Life: In evaluating bids, the useful life of cast iron pipe is figured at 100 years minimum.

Carrying Capacity: The carrying capacity of standard tar-coated cast iron pipe remains practically unimpaired for centuries. For the certain areas where tuberculating water is encountered, cement-lined cast iron pipe is available. Under such conditions, no other material offers the combined long life and sustained carrying capacity of cement-lined cast iron pipe.

Tight Joints: For *ordinary* pressures, cast iron bell-and-spigot pipe—for *high* pressures, cast iron mechanical joint pipe—are known to be leak-proof.

Tensile Strength: When tested under hydrostatic pressure to destruction, the ultimate tensile strength of cast iron pipe is a minimum of 11,000 p.s.i. for pit cast pipe and a minimum of 18,000 p.s.i. for cast iron pipe made by other methods.

Beam Strength: Under beam stress tests, 10 ft. span, standard 6" cast iron pipe sustains a load of 15,000 pounds and bends approximately one inch before breaking.

Toughness: Under hydrostatic pressure and the impact of a 50 lb. hammer, standard 6" cast iron pipe does not crack until the hammer is dropped four feet.

Internal Pressure: An average of many internal hydrostatic pressure tests on standard 6" cast iron pipe shows this pipe withstands more than 2500 pounds pressure per square inch.

External Load: In regulation ring compression tests, standard 6" cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

Imperviousness: The walls of cast iron pipe are impervious to leakage, seepage, or sweating of water, gas or chemicals under internal pressure tests.

Tapping: Cast iron pipe can be tapped cleanly with strong, tough threads, losing little in structural strength.

Other pipe materials meet some of these requirements but only cast iron pipe meets them all.

Whether a pipe material is able to fulfill these requirements is a matter of experience rather than prediction. A page of history is worth a volume of sales claims. History proves that cast iron pipe has been meeting these ten requirements for generations.

Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3.

CAST IRON PIPE
SERVES FOR CENTURIES

CAST IRON

A heavy-duty Le Roi engine supplies dependable power for the operation of this huge crane

LE ROI Power

pays off in service and satisfaction

One of the most important factors in maintaining your reputation for "on-time" performance is to make sure the equipment you buy is "Le Roi-powered."

Le Roi engines have the weight and stamina to stand the punishment handed out to field equipment. They are proving it wherever tough conditions test soundness of design and quality of workmanship and materials.

Le Roi engines are popular not only for their dependability and economy, but also for special Le Roi features which speed field maintenance.

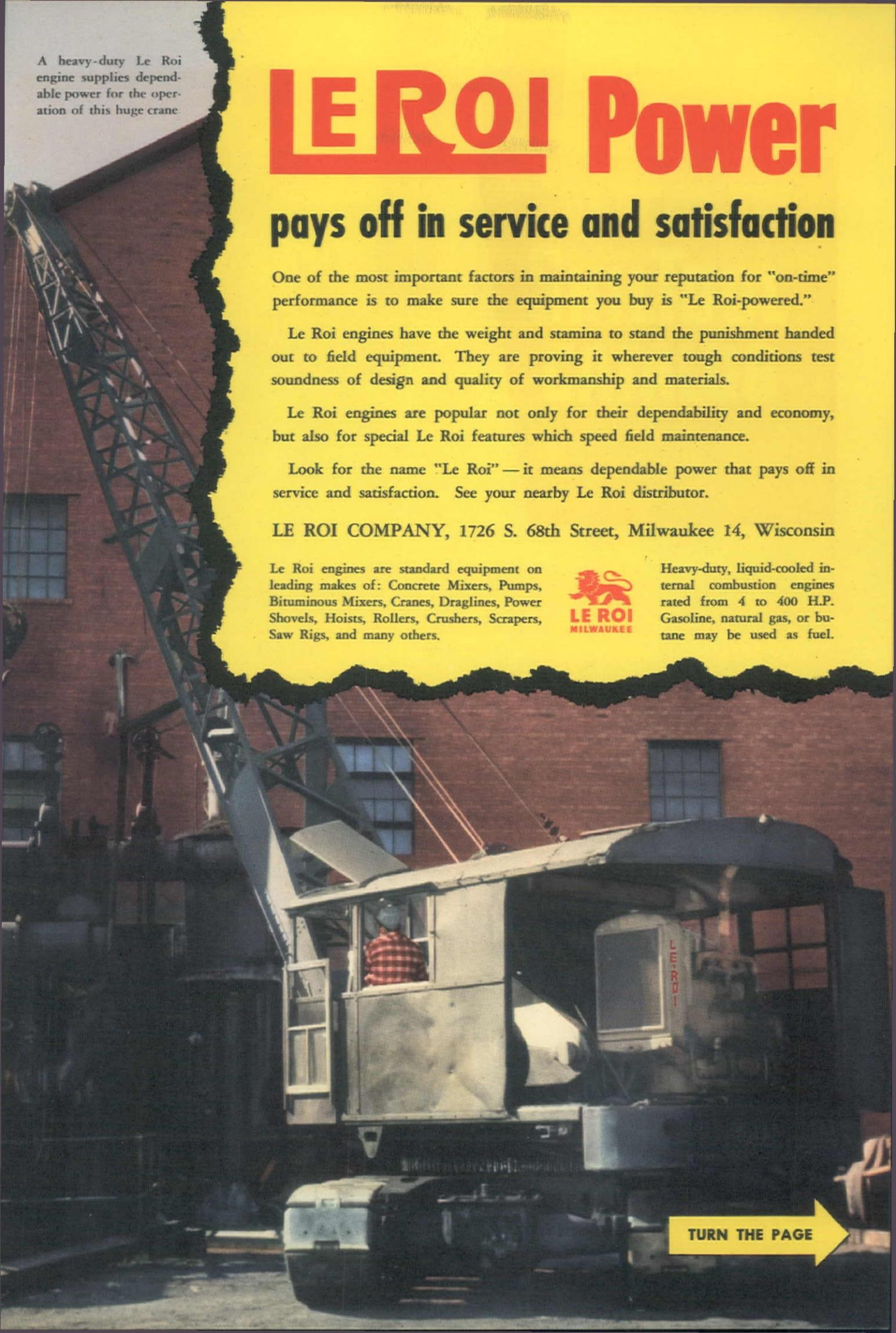
Look for the name "Le Roi" — it means dependable power that pays off in service and satisfaction. See your nearby Le Roi distributor.

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

Le Roi engines are standard equipment on leading makes of: Concrete Mixers, Pumps, Bituminous Mixers, Cranes, Draglines, Power Shovels, Hoists, Rollers, Crushers, Scrapers, Saw Rigs, and many others.

LE ROI MILWAUKEE

Heavy-duty, liquid-cooled internal combustion engines rated from 4 to 400 H.P. Gasoline, natural gas, or butane may be used as fuel.



TURN THE PAGE

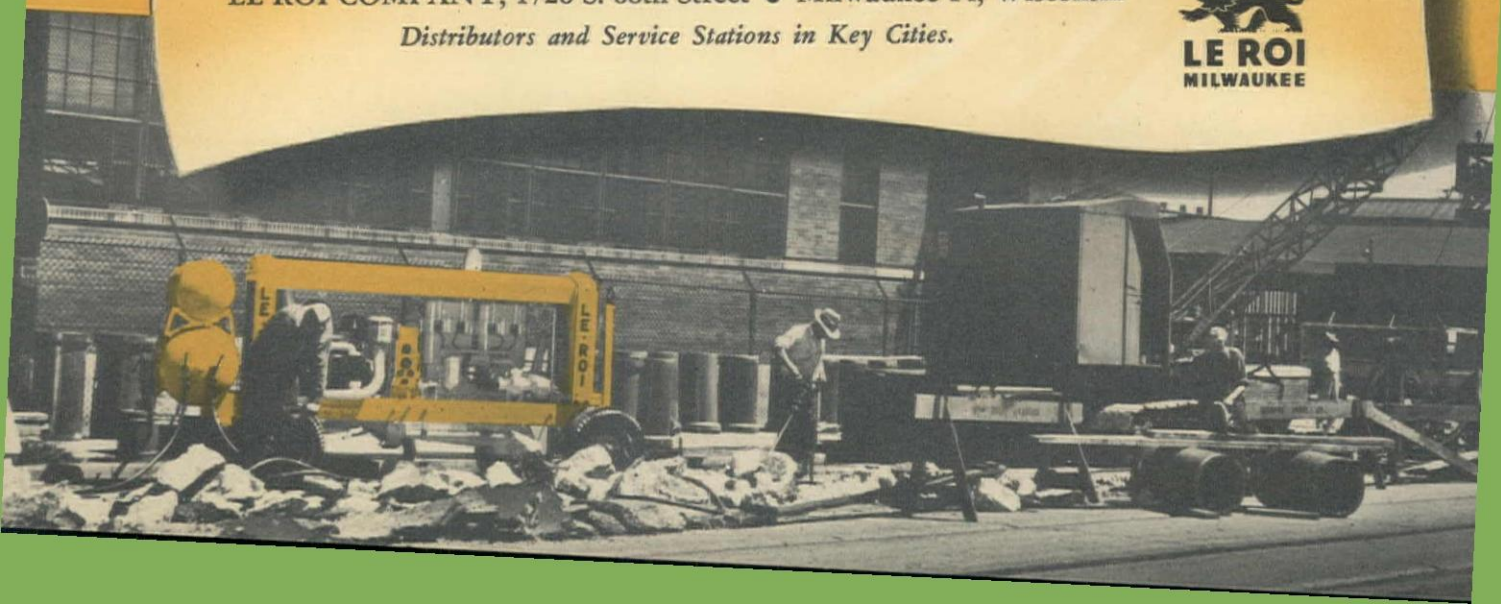
You can do the job *faster* . . . with extra savings in *time* and *money*. . . when you use a LEROI PORTABLE AIR COMPRESSOR

Le Roi Compressors are the only ones in which both engine and compressor are built by the same manufacturer. You get the benefit of "matched" performance, integral design, and smooth-running teamwork. Extra mobility and easy maneuverability get your Le Roi Compressor to the job faster and into working position sooner. Because both engine and compressor are built to the precision standards of an engine builder, incorporating many quick-maintenance features, you have less "down" time and more actual operating time to save you money. The thorough dependability of Le Roi Compressors, proved on thousands of jobs in war and peacetime, is your assurance of performance that keeps your schedules *on time*. See your Le Roi distributor or write for new bulletins.

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

Distributors and Service Stations in Key Cities.

LE ROI
MILWAUKEE



WHY A CUMMINS DIESEL ?..

In making a decision on the diesel you'll want for your heavy-duty earth moving and material handling equipment, consider *all* the "angles" . . . the men who build it . . . use it . . . service it.

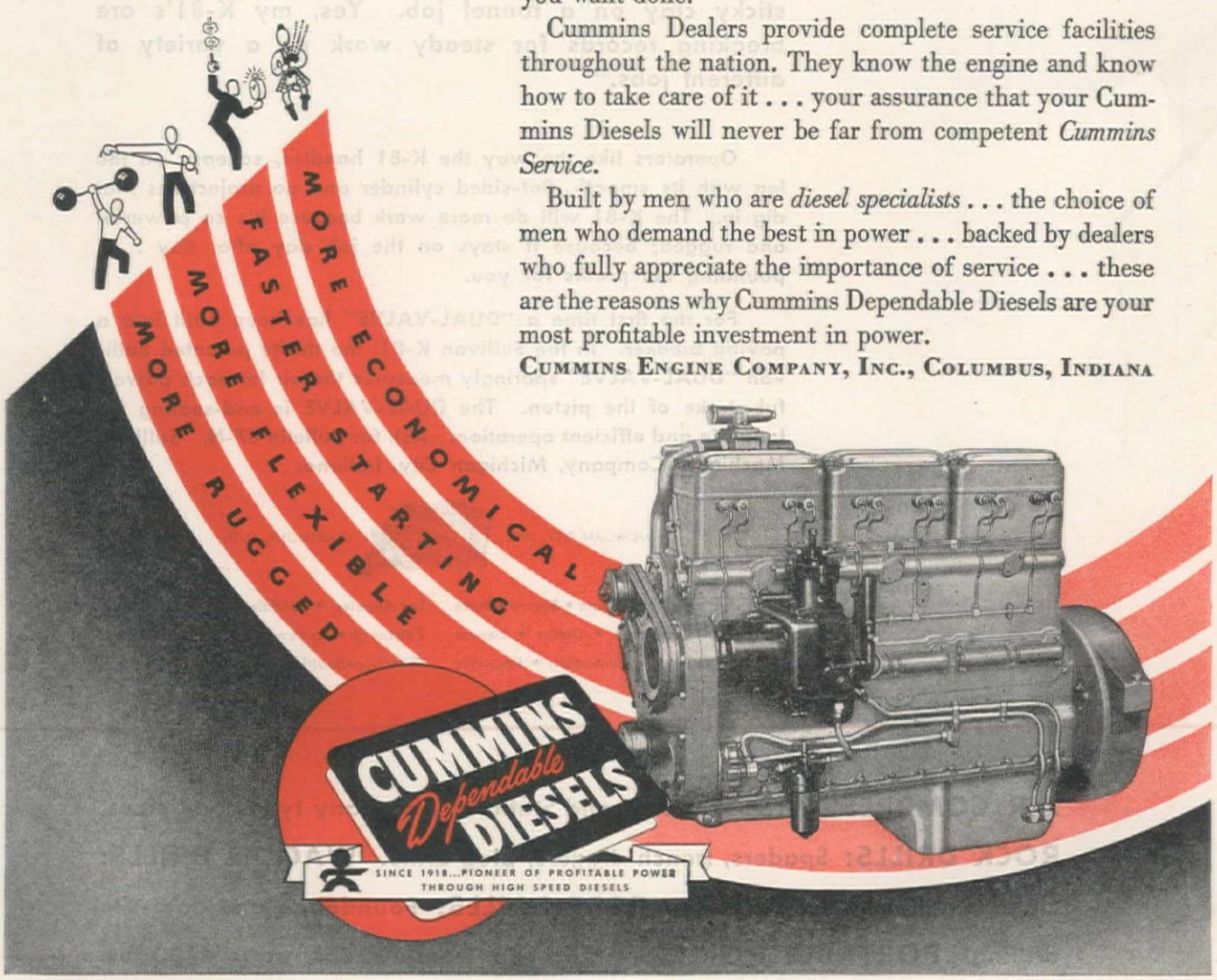
More than 26 years of manufacturing experience devoted wholly and exclusively to diesels are represented in the modern Cummins Dependable Diesel . . . your assurance of the most advanced design and construction.

The list of Cummins Diesel owners includes many of the best-known and most successful operators in the construction and aggregates industries . . . your assurance that Cummins Diesels have long been doing the very job you want done.

Cummins Dealers provide complete service facilities throughout the nation. They know the engine and know how to take care of it . . . your assurance that your Cummins Diesels will never be far from competent *Cummins Service.*

Built by men who are *diesel specialists* . . . the choice of men who demand the best in power . . . backed by dealers who fully appreciate the importance of service . . . these are the reasons why Cummins Dependable Diesels are your most profitable investment in power.

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA



"-AND I DISCOVERED MORE THAN

"I guess I'm like the average contractor when it comes to buying an air tool. I was simply looking for a breaker for demolition work . . . what I really got was more than I bargained for! With the proper tools, I find my Sullivan K-81 paving breaker is my "Jack of all Trades" . . . performing a variety of duties . . . from driving form stakes on my paving jobs to the heaviest kind of concrete demolition . . . and doing it economically and efficiently. Why, I even used a bunch of my K-81's for cleaning cars when hauling sticky clay on a tunnel job. Yes, my K-81's are breaking records for steady work on a variety of different jobs."

Operators like the way the K-81 handles, so easy on the leg with its smooth, flat-sided cylinder and no projections that dig in. The K-81 will do more work because it's so powerful and rugged; because it stays on the job day after day . . . pounding out profits for you.

For the first time a "DUAL-VALVE" has been built into a paving breaker. In the Sullivan K-81, the thrifty patented Sullivan "DUAL-VALVE" sparingly measures the air for each powerful stroke of the piston. The DUAL-VALVE is end-seating for long life and efficient operation. Ask for Bulletin 87-N. Sullivan Machinery Company, Michigan City, Indiana.

MICHIGAN CITY, IND. CLAREMONT, N. H.

OFFICES — Birmingham • Boston • Butte Chicago • Claremont • Dallas • Denver Duluth • El Paso • Huntington • Knoxville Los Angeles • Middlesboro • New York Pittsburgh • Portland • Salt Lake City • San Francisco • Seattle • St. Louis • Washington, D.C.

AIR COMPRESSORS: Portable and Stationary of many types and sizes. **ROCK DRILLS:** Spaders, trench diggers, plug drills. **WAGON DRILLS:** Light, medium, heavy weight. **CORE DRILLS:** Foundation and dam-site drilling. **PORTABLE HOISTS:** Lifting cap. from 600 lbs. up to 4700 lbs.

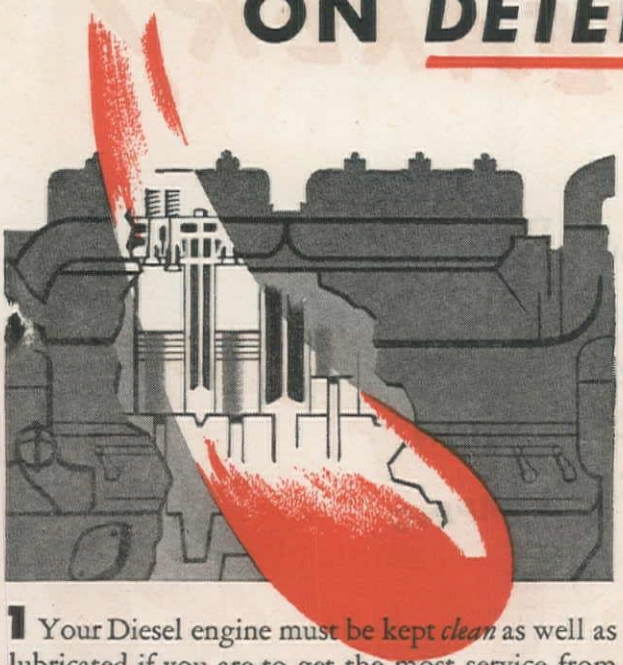
THE SULLIVAN K-81 WAS A PAVING BREAKER!"

SPIKE DRIVING
FORM STAKES
SHEET PILING
DEMOLITION
CAR TAMPING

SULLIVAN

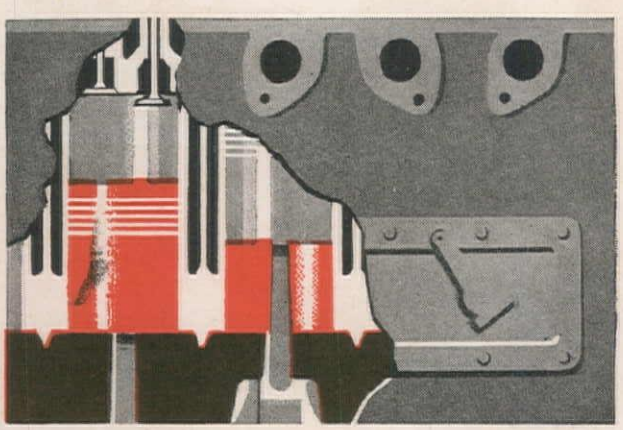
builds everything for the contractor!

DIESELS THRIVE ONLY ON *DETERGENT* OILS



1 Your Diesel engine must be kept *clean* as well as lubricated if you are to get the most service from it. That's why the Diesel lubricant you use should contain a detergent to cleanse vital engine parts.

2 Dieso-Life, Union Oil Company's quality Diesel lubricant, does this. It washes off gummy, unburned fuel residues and keeps these particles *afloat*—thus preventing scratching, blow-by and stuck rings.



3 The lubricating film of Dieso-Life is strong enough to resist severe loading at high operating temperatures. It will not burn off during the firing stroke or drain away when the engine stands idle.

4 It has been proved by laboratory tests, as well as by unsolicited testimonials from users, that Diesels thrive on Dieso-Life . . . giving you maximum service with extra savings in time and money.

You can get a supply of Dieso-Life by phoning your Union Oil representative.

DIESO-LIFE

UNION 76

Another UNION OIL *Success-Tested Product*

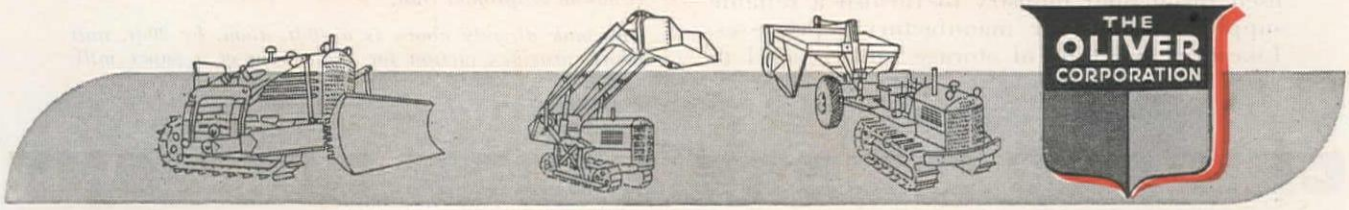
Affiliate Member, Associated General Contractors of America

• They're right at home in water or mud, these husky Oliver "Cletrac" crawler tractors. The positive sealed construction of the lower track wheels keeps mud and water out . . . keeps oil in to protect against damage and wear. Each end of the bearing is fitted with a double dirt-oil seal, another Oliver "Cletrac" feature, that materially prolongs the life of the lower track wheels.

And, Oliver "Cletrac's" *controlled differential steering* is a big help when operating in mud or water, especially when the tractor is equipped with front-end loading equipment such as the Drott Bull Clam shown here. This exclusive principle means greater traction . . . less wear on steering parts. Power is never disconnected from either track when turning, assuring a steady flow of pushing or pulling power plus greater safety on hills and turns.

Oliver "Cletrac" tractors are ruggedly built for long, dependable service. Drop forged and rolled steel construction eliminates excess dead weight . . . adds strength. Their unusual accessibility makes maintenance a simple task. Substantial numbers of Oliver "Cletracs" are now being released for essential service. Your Oliver "Cletrac" dealer will gladly assist you in making application for a new tractor. **The OLIVER Corporation,** Industrial Division, 19300 Euclid Avenue, Cleveland, Ohio.

OLIVER - Cletrac

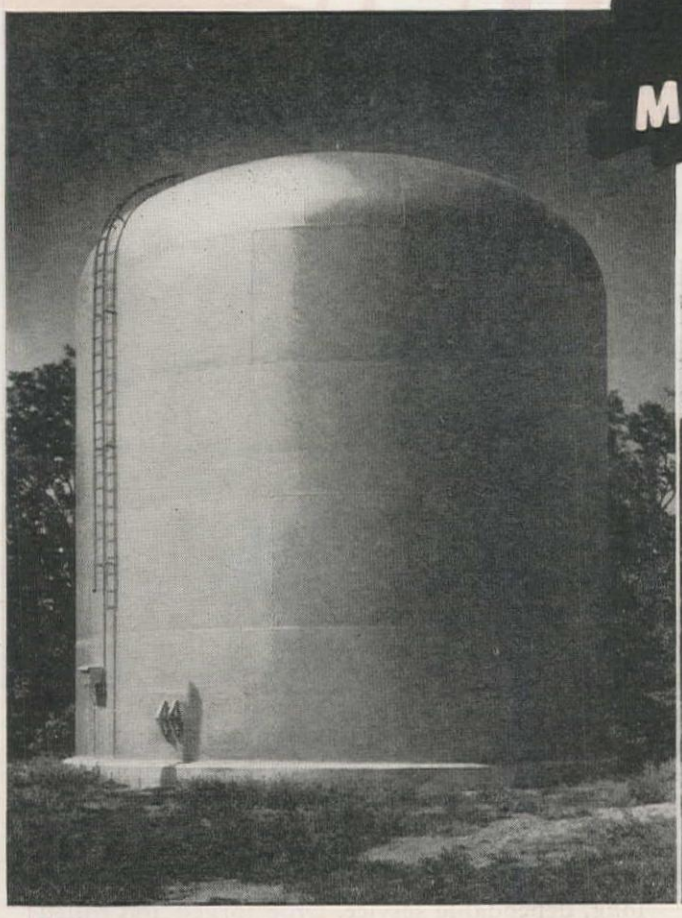


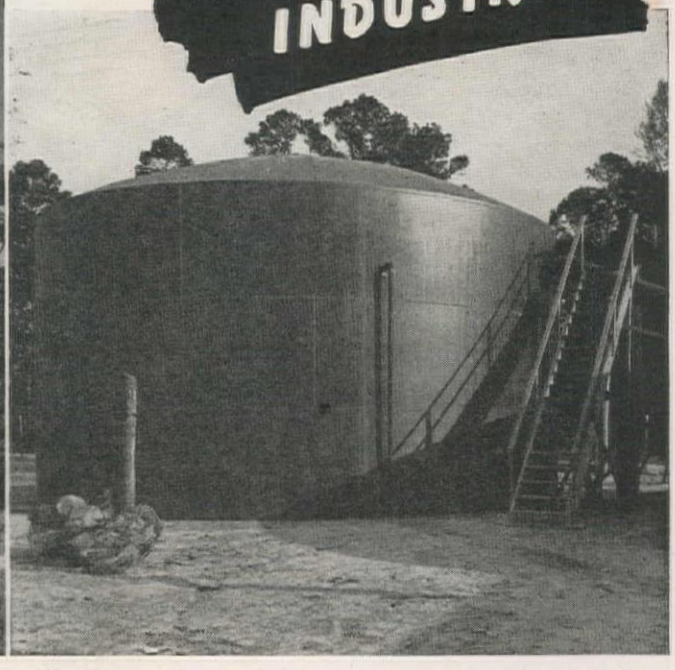
State of California: Gustafson Tractor Co., Eureka, Calif.; Mechanical Farm Equipment Dist., Inc., San Jose, Calif.; Comber & Mindach, Modesto, Calif.; Nelson Equipment Co., Los Angeles, Calif.; Tractor & Equipment Co., San Leandro, Calif.; Flood Equipment Co., Sacramento, Calif.; W. J. Yandle, Santa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

HORTON WATER STORAGE TANKS

FOR MUNICIPALITIES

FOR INDUSTRY





ENGINEERS responsible for the *water storage tank* requirements of both municipal service and industry can benefit from our 50 years' experience in designing, fabricating and erecting steel plate work.

In municipalities where there are nearby natural elevations, flat-bottom water storage tanks are often used to provide a gravity water pressure for domestic service and fire protection. We build flat-bottom water storage tanks for this type service in any diameter or height to meet requirements.

Flat-bottom water storage tanks are also widely used throughout industry to furnish a reliable supply of water for manufacturing processes. Likewise, this type of storage tank is used to provide suction for fire pumps, supplementing *elevated* steel tanks. They may be equipped with conical steel roofs or umbrella type roofs may be had on tanks under 41 ft. in diam.

When the job calls for flat-bottom, water storage tanks, call our nearest office . . . we will be glad to submit quotations and delivery dates.

The 250,000-gal. flat-bottom, water storage tank shown at the left above is located in the Kent, Ohio water system. It has an ellipsoidal roof.

The tank directly above is a 40-ft. diam. by 20-ft. unit which provides suction for fire pumps at a paper mill.

CHICAGO BRIDGE & IRON COMPANY

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

Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PENNSYLVANIA

June, 1945

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 20, No. 6

The Correct Curmudgeon

IN COMMON, WE THINK, with most Americans, *Western Construction News* has little sympathy or liking for that "old curmudgeon," Harold Ickes. But when the terrible tempered little man accidentally does a good deed, we're not above giving him due credit, even though his motives were centered in his overpowering hatred for private enterprise in any form.

His good deed consisted in calling attention of Sen. Murray's Small Business Committee to the huge contribution the U. S. had made to construction of the Shipsaw project in Canada, and the fact that huge quantities of aluminum were being purchased up there by our government, at the same time that U. S. plants in the Pacific Northwest and elsewhere were being shut down. As a result of his testimony, and that of others at the hearings, the Shipsaw contracts have been materially reduced, thus assuring the continuation of aluminum production in the Northwest.

Western Industry, leading industrial journal of the West, is authority for the statement that aluminum can be produced in the Northwest more cheaply than anywhere else in the country, and to have these plants discontinued, while our own government supports foreign competition, is completely unthinkable. With an abundance of electric power, fine plants, and a vast amount of research in the use of clays for aluminum ores, the Northwest is the logical place to manufacture the metal. Harold was right, for once.

Friant-Kern Should Proceed

IS THERE ANY LONGER any good reason for delaying construction of the Friant-Kern canal of the Central Valley Project? Of course, all reclamation projects must pass through a certain routine these days before construction may start—they must be approved by the War Food Administration, who must be assured that food can be produced within a reasonable time; then they are reviewed by various sections of the War Production Board, and finally by the Board itself, to make sure that no critical materials are being wasted; War Manpower Commission must be contacted to make arrangements for manpower on the job; the Bureau of Reclamation must have all plans and specifications ready.

Oddly enough, all this was done on the Friant-Kern job last year, and up until last October, it seemed that construction would commence soon. However, in October, WFA, from some unseen pressure, suddenly withdrew its approval, and hopes for early irrigation of thousands of the bleached acres of the San Joaquin Valley were destroyed.

Since V-E day, meetings of interested parties—farmers, engineers, Reclamation officials and water users—have been held throughout the valley to review the needs, labor supply, time required for construction, and other factors for preparation of recommendations to the government agencies involved. It appears as a result of testimony at these meetings, that men, machines, and money are all available NOW for the work, and that very little critical steel will be required.

That there is great need for the canal and its sister projects, the Delta-Mendota and Delta-Cross canals, there is no question, and that a tremendous volume of new food can be produced as a result of the construction is also a certainty. The only questions, those of interference with the war effort, are being effectively cleared up as a result of the meetings.

Cheating Our Good Neighbors

SENATOR CONNALLY, the fire-breathing, old-time senator from Texas, has managed to put across the infamous Mexican Water Treaty, to apportion between Mexico and the United States the waters of the Colorado and Tijuana rivers and the Rio Grande. Although probably 80 per cent of the water users of the entire Colorado basin, upper as well as lower basin states were opposed to it, it was put over on the basis of being a gesture of goodwill to our neighbor Mexico, and although it worked undenied hardship on California, Arizona, and Nevada, the most of the Senate overlooked this fact in order to further the "Good Neighbor Policy" and to do it before the San Francisco Conference.

Sober consideration, however, reveals the fact that far from making a great gift to our neighboring country, the treaty actually is unfair to them, and not the last to realize that fact are the Mexicans themselves, and there is now grave doubt whether the Mexican government will ratify the pact. It seems that Connally and his friends prated about being good neighbors, with not only their wads of chewing tobacco, but most of their tongues, too, in their cheeks.

The Chamber of Commerce of the State of Chihuahua is leading a fight to prevent ratification in Mexico, and organizations in Nuevo Leon and Tamaulipas, the other border states are also bringing pressure to bear. A great deal of the economy of these states is based on water from the Rio Grande, and under the terms of the treaty proposed, a very large proportion of the water which has historically been used by these states will be diverted to Sen. Connally's state of Texas. It is now clear why the old politician had so little regard for the water needs of the far Western states—HIS state would benefit by legally robbing Mexico.

The second point by which our good neighbor is being cheated, is in the matter of the Colorado river water. While the quantity of water assigned to Mexico is large indeed, and in the opinion of most people of the West, far more than is justified, proponents of the treaty in the U. S. Senate hearings, repeatedly stressed the point that there was no guarantee of **quality** in the document, and it would be perfectly OK to give to the farmers of Lower California return flow water, water of high salinity, or water heavy with silt, so long as the **quantity** was delivered. The Mexicans did not fail to notice these comments either!

Still further, water interests of Mexico are no more favorable than are those of the United States, to the inflexibility of the treaty, with its "in perpetuity" clause. Through it, these unfair apportionments to Mexico will be saddled on her forever, and she can never hope to improve her situation. Her border states will **always** be short of water; the quality of Colorado water will steadily decline with increasing utilization of the best water in the various U. S. states.

Most citizens and most senators are heartily in favor of a well-administered "Good Neighbor Policy." Apparently Sen. Connally is one of the few who do not, and still regard Mexico as merely a group of people to be exploited and hampered.

War's End in New York

PROBABLY NO BETTER example of regional differences in the United States can be found than the reaction of the country on V-E day. In every Western city, there was only quiet thankfulness, and continued devotion to duty in winning the Pacific war. Los Angeles, Seattle, Sacramento, Denver, Boise, El Paso, Phoenix, San Francisco, in none was there hilarious celebration. In New York, however, and other eastern cities, crowds celebrated for hours, work stopped, paper floated from office buildings. THEIR WAR WAS OVER!! In general, that section has never given full support to the Pacific war. The West recognizes the gravity of the situation and is girded to fight to the finish.

IT'S NOT IN THE CARDS

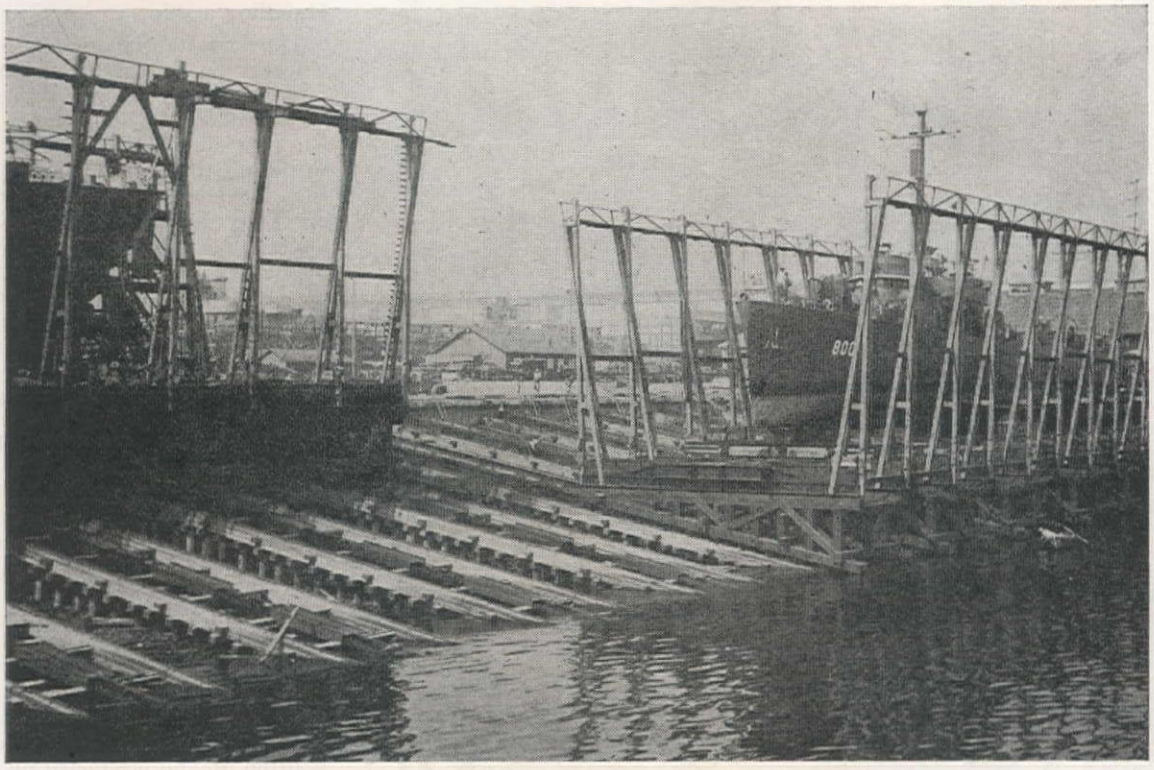
for any Motor Grader without all-wheel drive and all-wheel steer

to equal the all-around performance of the "99-M"

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

SMITH BOOTH USHER COMPANY . . . . . Phoenix, Arizona
EDWARD R. BACON COMPANY . . . San Francisco 10, California
SMITH BOOTH USHER COMPANY . . . Los Angeles 54, California
LIBERTY TRUCKS & PARTS CO. . . . . Denver 1, Colorado
WESTERN CONSTRUCTION EQUIPMENT COMPANY . Billings, Montana
C. D. ROEDER EQUIPMENT CO. . . . . Reno, Nevada
COLUMBIA EQUIPMENT COMPANY . . . . Portland 14, Oregon
WESTERN MACHINERY COMPANY . . . Salt Lake City 13, Utah
COLUMBIA EQUIPMENT COMPANY . . . . Seattle, Washington
WILSON EQUIPMENT AND SUPPLY CO. . . . Cheyenne, Wyoming
WESTERN STATES WELDING & PRESS COMPANY, 1304 North Fourth Street, Albuquerque, New Mexico

WESTERN CONSTRUCTION NEWS
JUNE • 1945



Marine Railway—
Inclined Ways Speed Ship Repair

Sidehaul slip proves to be flexible aid for wide variety of vessel repair work—The more complicated, time consuming repairs are handled on the remote shunt tracks, while several ships can be docked, in succession, either at the headwall or on the adjacent deck for minor repairs

By BRUCE F. DEAN
Commercial Iron Works
Portland, Oregon

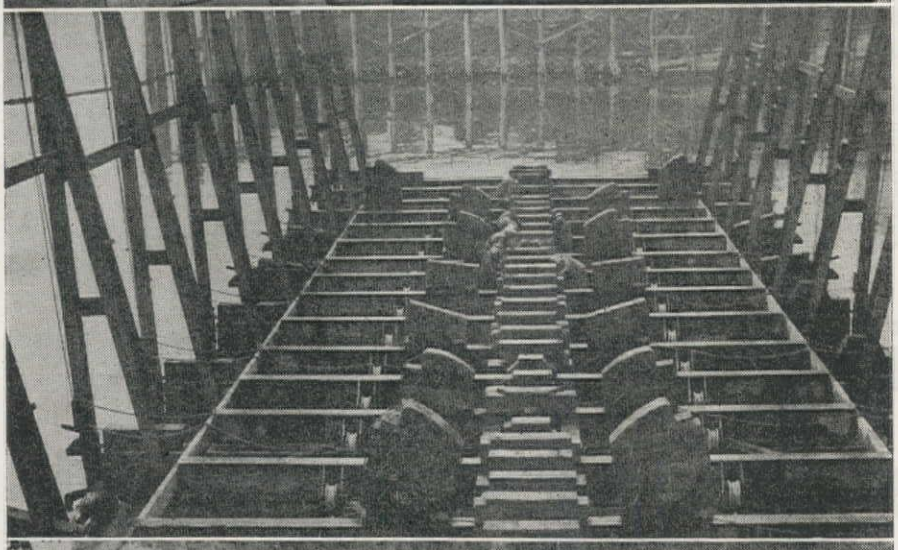
LARGEST SIDEHAUL marine railway in the world is that established at the Commercial Iron Works yard at Portland, Ore. Built for the Navy, this unusual ship construction and repair center covers 14½ ac. on the west bank of the Willamette river. The railway is the only one of this type on the Pacific Coast. Starting with the colorful launching of the ocean going Navy tug, U. S. S. Tawasa, a continuous stream of vessels has been built on the three transfer tracks, hauled onto the shunt area, and gracefully lowered into the river. Other vessels of many types have been brought up from the river for various kinds of repairs and once again sent on their way.

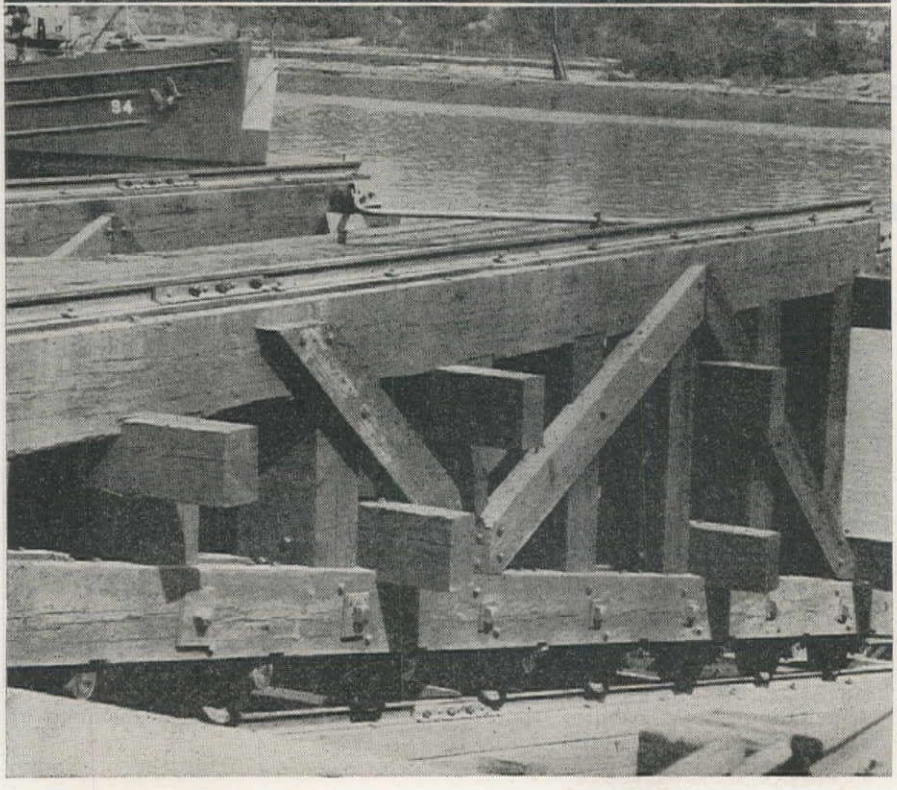
The hauling gear proved unsatisfactory during the early operations and changes were made to correct the observed defects, before the yard was officially accepted. Acceptance followed an inspection by Admiral E. L. Cochrane, Chief of the Bureau of Ships, during his year-end visit to Portland, when he declared the changes to be completely satisfactory. Accompanying Admiral Cochrane were several high ranking officers, including Rear Admiral Carl Trexel, and Comdr. J. R. Reside, both of the Civil Engineering Corps, U. S. N., who were in charge of testing the marine railway. Admiral Cochrane declared the project a complete success and announced that many big repair jobs were expected to be done on the railway in the near future.

Description of railway

The yard can accommodate as many as five vessels at a time and can dock vessels up to 400 ft. in length and 3,000 deadweight tons. The marine railway itself consists of three sections, the incline, the shunt area, and the transfer area. The incline, up and down which the ships are carried, consists of twelve pair of steel tracks extending 329 ft. out into the river on a 6-to-1 slope, reaching a depth of 40 ft. below mean low water level at the outer end. Mounted on these tracks are twelve heavy timber cradles supported by flanged wheels, so constructed that the top of the cradles are horizontal. In position at the top of the incline, the level top of the cradles is flush with the concrete apron of the shunt area, which extends westward from the headwall for a distance of 315 ft.

Large vessels nearing the maximum





length of 400 ft. require all cradles to be used simultaneously for the docking haul, however it is common practice to handle two smaller ships in separate shunts with six cradles supporting each one.

Handling a ship

The first step in docking a ship is to wheel a flat carriage, consisting mainly of fabricated I-beams, onto the tracks of a shunt in the shunt area. The shunt is a two sided frame, open at both ends to permit the entrance and exit of vessels. The length of shunt selected is governed by the length of the ship it will dock. Bilge blocks and keel blocks are positioned on the carriage to fit the particular shape of the vessel docking.

The shunt is wheeled from the shunt area to the tracks on the cradles and lowered into the river. The vessel to be repaired is then towed into position in the shunt, secured in the center by guy ropes, and the shunt is hauled up the incline.

Leaving the water, the ship settles firmly onto the blocks. The blocks can be moved in or out to assure perfect centering of the vessel on the carriage. Moved onto the shunt area, the tracks of the shunt are placed directly in line with the transfer tracks onto which the ship and carriage may then be towed. To reiterate the movement, the vessel enters the shunt with its longitudinal axis in a north and south line, thence it is lifted up and westward on the incline and through the level shunt area. From here it travels north on its carriage into one of the three parallel transfer tracks for final berthing, then conversly back to the river when the ship is ready for relaunching.

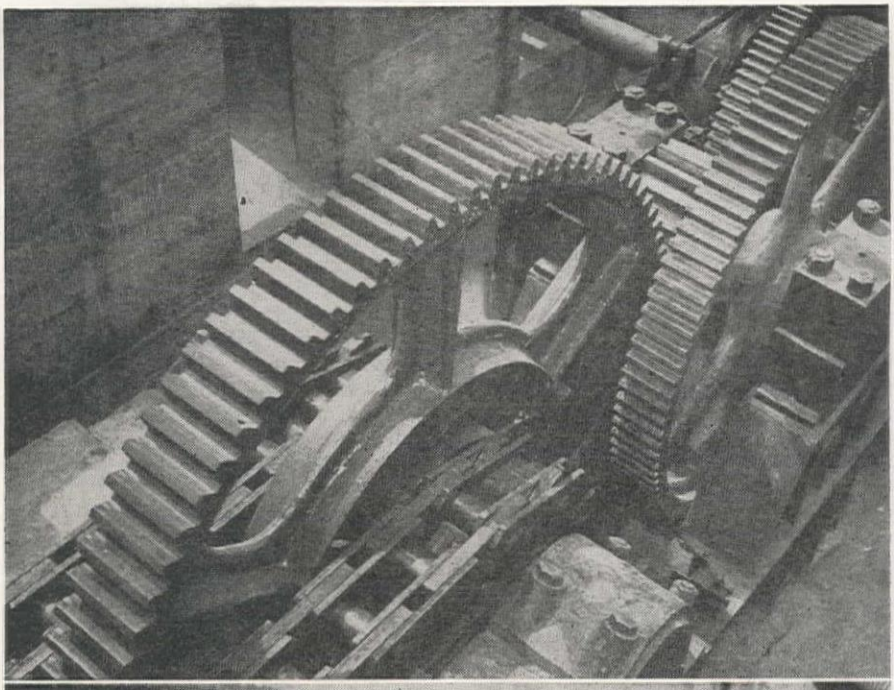
Most of the heavy repair work will be done on the three transfer tracks, but lighter repair and less time consuming jobs can be completed on the shunt area, or even without removing the ship from the cradles at the top of the incline. When the two shunts are used individually, one may be discharging a ship onto the transfer tracks, while the other is going down the incline to release or receive another vessel. Two way simultaneous motion on the incline, however, is not possible.

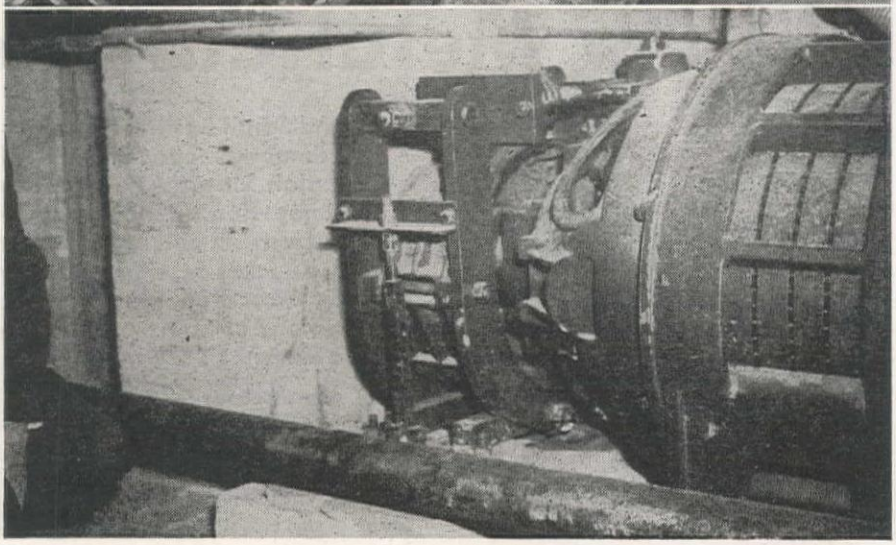
Operation

Haulage power is furnished by three 200-hp. General Electric motors mounted under the apron near the headwall of the incline. One, two, or all three motors, at the option of the operator, can be connected to the incline railway haulage, through a train of large gears. The gear train in turn is connected by a sprocket to link and pin type chains, weighing 100 lb. per ft., which furnish

BILL McDONALD, chief dispatcher, is responsible for all ship movements on the incline. He receives both visual and telephonic signals from the yard (top). Shunt, showing workmen setting keel blocks prior to docking a ship (center). One of twelve cradles used to lift ships from the channel, showing the inclined rail below and the level rail from which the shunt rolls onto the transfer area tracks.

HEAVY GEAR TRAIN transmits power through a link and pin type chain (top). One of three 200-h.p. motors used to move the gears (center). Below, transfer area, showing a docked vessel at the headwall. Note the cable rigged through a block, ready to haul ship from the cradles onto the transfer area. Shunt and its carriage are being prepared to receive another ship.



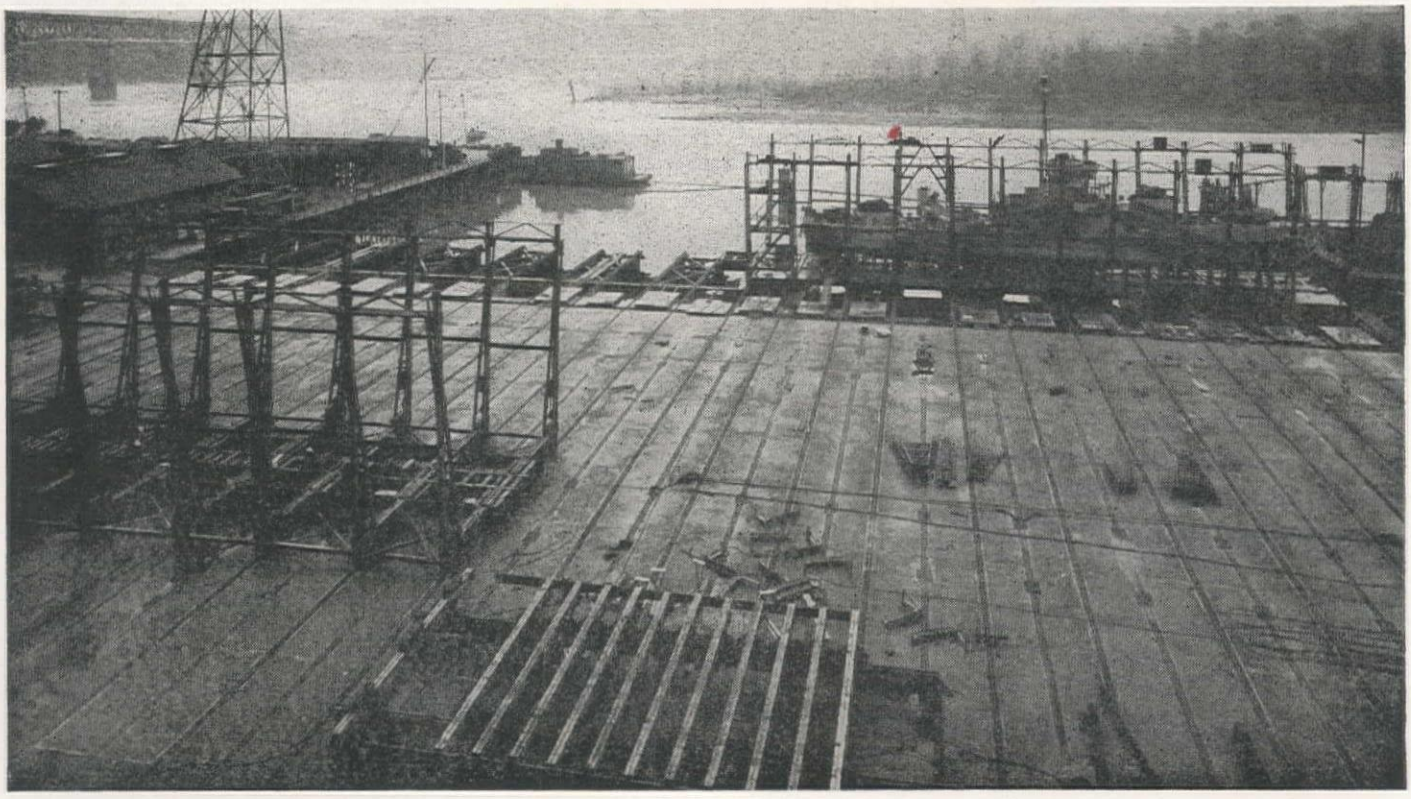


the means to raise or lower the cradles. Smaller conventional link chains pick up the slack and can exert a back haul when necessary. Power for all lateral movement on the shunt and transfer areas is provided by a donkey engine, which pulls cables rigged through snatch blocks attached to the decking.

To continue the railway analogy, Chief Dispatcher Charles McDonald directs all movements on the marine railway by remote control from the central tower. This control station is located at the north end of the headwall, where the operator has commanding view of the incline and the adjacent shunt areas. In addition to the visual command of the area, McDonald is in direct connection with the working area by telephone.

The control device is an interesting arrangement designed by General Electric Co., which allows the operator to connect from one to twelve carriage units to the motive power by closing the corresponding contractors, one for each carriage, so that it is possible to move one or any number of the twelve cradles up or down the incline.

In a like manner, one, two, or three motors can be connected to the winding shaft which traverses the full length of the headwall, each motor having sufficient power to lift four carriages. The transition of power from the motors to the gear-driven sprocket and chains is through remote controlled magnetic



clutches and solenoid released brakes. This interlocking arrangement contributes to the smooth operation and safe handling of ships on the incline. When the clutch is in, the brakes are automatically off, and likewise when the clutch is released the brakes automatically are applied. Electric power is necessary to release the brakes so that in the event of a power failure the brakes automatically stop all motion of the chains. Limit switches installed at the top of the incline cut off the power just before the carriages reach the headwall, thus preventing damage to the equipment in case the operator fails to shut off the power. The cradles can be raised at five different speeds and lowered at three speeds. The movement of the chains is geared down to travel an average of 8 ft. per min.

Additional facilities

Facilities are available anywhere on the shunt and transfer areas for lifting as much as twelve tons at a time. At the west end, extending the whole width of the shunt area and alongside transfer track No. 3, a gantry crane track is built, the crane having a capacity of 36 tons. The base of the shunt, which is of extremely strong construction, can itself be used for raising or lowering a ship without the necessity of the transfer carriage being used, the blocks being placed directly on the base.

In connection with the marine railway, Commercial Iron Works also operates the only sludge barge in the Columbia area. Operating on the vacuum pump principle, this barge is used for removing sludge, gas, and for cleaning ships' tanks.

The railway itself has handled several hundred dockings and relaunchings to date. In 1944 alone over 260 such movements were cleared through the yard. Many vessels needed only a new paint job, some others came in for a more extensive overhaul, while still others required serious and complicated repairs. It is expected that when new ship construction ceases on the railway, the facilities will be devoted entirely to repair work.

Built into this ship repair center are 20,000 lin. ft. of steel rail, 800,000 b. ft. of timber ranging up to 18 in. x 18 in. in size, and up to 82 ft. in length; 2,534 Douglas fir piles to support the inclined tracks and under-water portions of the slip; 10,000 ft. of 5/8-in. wire rope for hauling shunts and transfers; 8,600 ft. of 100 lb./ft. chain to lift the cradles up the incline, and proportionately large amounts of concrete and steel.

The $2,000,000 Tokyo Trolley, so nicknamed because of its imposing record of ships sent against the Japs, has proved a valuable asset in the war work and it is expected will prove equally valuable in the years of peace.

Shipsaw Metal Cut Aids Northwest

Senate Small Business Committee demands cancellation of Canadian Shipsaw contract to aid domestic aluminum production from Pacific Northwest plants—Ickes testifies priority given Canadian plant to the detriment of home production

AN INCREASE IN ALUMINUM production in the Pacific Northwest appears likely for the near future as a result of WPB's recommendation of a reduction in the so-called Shipsaw contract under which this country agreed to import 250 million pounds of aluminum from Canada during 1945. Sen. James E. Murray (Mont.), Chairman of the Senate Small Business Committee, said recently.

"WPB's recommendation calls for the reduction of the Shipsaw contract from imports totaling 250 million lbs. of aluminum for the second half of 1945 to 100 million lbs. for the same period," Senator Murray continued. The recommendation is expected to effect a saving of $21,000,000 to the U. S. taxpayers, since the metal imported under the Shipsaw contract cost this government between 14 and 15 cents per lb. These funds will not, under the revised contract, be spent in Canada, and U. S. industry will benefit from U. S. markets which will be freed by the action. At the same time it presents the possibility of U. S. domestic aluminum metal production being organized in such a manner as to meet all of the military and civilian requirements for the metal during the next few years.

It is expected that the reduction in the contract will be made by the Metals Reserve Company, in accordance with the WPB recommendation, however, it is impossible to cancel the complete contract in view of a clause requiring that the U. S. take at least 100 million lbs. of metal during the period.

In its investigation of the Shipsaw contract in connection with its light metals hearings, the Senate Small Business Committee found that domestic aluminum production, including certain plants in the Northwest whose pot lines are now shut down, will be ample to meet all of the aluminum requirements of this country.

Secretary of Interior Harold Ickes, in testifying before the Senate Small Business Committee, urged that the contract be cancelled, and that government plants in the Northwest be used to produce this metal. He said, "I see no excuse for keeping partly idle the government plants in the Northwest while we go ahead and take deliveries of Canadian aluminum and build up a surplus of metal, as we did in 1944, that will force the shutdown of government plants, and handicap the disposal of these plants. . . ."

The Secretary also told the Committee that he favors a policy of stockpiling aluminum metal, rather than the policy of storing bauxite now being followed. He indicated that a backlog order for aluminum, placed with independent producers who might seek to enter the aluminum production industry, might go far toward solving such producers' problems of immediate markets.

"Secondly, I urge that we view these government-owned aluminum plants as vital assets belonging to the people as a whole, to be disposed of for the purpose of strengthening post-war employment and the national defense," the Secretary added. He expressed the hope that government-owned aluminum producing facilities may be taken over by independent enterprises that will operate them and not shut them down.

Dr. Paul Raver, Bonneville Power Administrator, told the committee that he would sum up the case against the Shipsaw contracts as follows:

"(1) We (Bonneville) were not given equal priorities and other assistance to expedite the (aluminum production) program that we were finally authorized to develop.

"(2) The power that was wasted over Bonneville and Grand Coulee dams, would have produced a few hundred million pounds more aluminum in this country during 1941, 1942, and 1943.

"(3) The loss of aluminum that was not produced in this country during 1942, 1943, and 1944 because of delays and cutbacks, cited by the Secretary, far exceeded the amount of aluminum we obtained from Canada."

The Senate Small Business Committee is now preparing a report based upon its extensive investigation of the light metals situation, high-lighting both aluminum and magnesium aspects. The report will recommend policies for post-war utilization of more than 1 billion dollars of government-owned light metals plants and equipment.

Housing Shortage Solved by Seattle Construction Worker

A 43-YEAR-OLD construction worker in Seattle, Washington, was held recently without charge when he admitted stealing a five-room house piece by piece and spending his nights for three months putting it together for his family. J. J. Reynolds, construction foreman for the Skyway Park Housing project south of Seattle said that when he complained to the sheriff that three kitchen cabinets were missing, they were traced to the worker's cabin, where unexpectedly they also found other cabinets. Plumbing fixtures, roofing materials, windows and doors were also stored in the cabin. It took less than an hour for a wrecking crew to tear down what it took the worker 90 evenings of the preceding days to build. All of the materials were returned to the housing project, Reynolds said.

Seal Beach Ammunition Depot

Huge depot rises from mud flats in record time as result of efforts of host of contractors—Jetties, docks, igloos, buildings, railroads, and facilities included in $21,000,000 project—Depot is serving ammunition needs of Pacific war even while construction progresses

WITH CONSTRUCTION now practically completed and having been in use by the Navy during the last year of construction, the Naval Ammunition and Net Depot at Seal Beach, Calif., a $21,000,000 project, has already played an important part in the naval war in the Pacific. The depot was constructed by six major contractors and a host of subcontractors.

The 5,000-ac. base is located on what was formerly a shallow slough known as Anaheim Landing, a mile or two southeast of Seal Beach. The outer portion of the slough has been improved by dredging and construction of two jetties, while the inland mud flats have been filled and converted to useful land except for necessary drainage channels.

On this land have been built an extensive railroad system, 98 ammunition storage structures, shops, living quarters, warehouses, net buildings and a multitude of other buildings, protective barricades, 1,200 ft. of wharf, highways and all the necessary facilities.

The principal contractors on the job were: Guy F. Atkinson Co., wharves, jetties and earthwork; William Simpson Construction Co. and W. E. Kier Construction Co., a joint venture, magazines and required facilities; Shannahan Bros., Inc., railroad construction and relocation, also state highway relocation; Wm. P. Neil Co., personnel and industrial areas and ammunition overhaul facilities; P. J. Walker Co., personnel structures; and United Concrete Pipe Co., sorting and classification buildings, also barricaded railroad sidings.

Highway relocation

Because existing State Highway 101-Alternate and the Newport Beach line of Pacific Electric Railway crossed over a portion of the land to be dredged for the new harbor, the first operation was relocation of these facilities about 800 ft. northerly from their original position. This necessitated construction of a new trestle over the drainage slough and an overpass over the railroad and highway of the base, since it was not desired to cross these connecting links between the docks and the magazine area at grade, both safety and continuity of operation being considered. In construction of the highway overpass, 405 35-ft. wooden piling were driven to support the piers, and for the railroad overpass, about 200 additional were required.

The relocated highway bridge over the slough is supported on reinforced concrete piling. The steel girders of the center channel span were transferred from the old structure, being removed by mobile crane and placed on barges, floated to the new bridge, again picked up and set in their new location. After the new bridges and highway were completed, the original structures were demolished.

POWER SHOVEL loading rock from the Atkinson quarry, near Riverside, Calif., onto railway cars for use in the construction of harbor jetty, upper. A smaller shovel traversed the railway cars, unloading and placing the rock on the jetty.

Dredging

The key to the entire project was the waterfront work. It was necessary to dredge an entrance channel 400 ft. wide to a depth of 20 ft. below mean low low water, an 800 x 3,500-ft. harbor area to a similar depth, and two small boat docking areas to a depth of 8 ft. below mean low low water. About 2,750,000 cu. yd. of material were involved in this operation. Its importance was doubled by the fact that the dredged material was required for filling the naturally low area which covered most of the site, before surface construction could begin.

This work was carried out by the dredge "Los Angeles" owned by the Standard Dredging Corp. The "Los Angeles" was originally designed as a gold dredge and was operating in the placer fields of northern California at the time of its purchase by the firm. It was dismantled and reconstructed for ocean dredging. The dredged material was pumped through 27-in. steel pipe to the fill area, in some instances a distance of two miles. Power on the dredger was supplied by a 1,500-hp. motor, and for the longer pump lines, a booster pump was established at the dock area, which was also powered by a 1,500-hp. motor.

All land was filled to a level of 12 ft. above mean low low water. The relocated highway was constructed immediately upon placement of the fill, without allowing any settlement period. A uniform settlement has since been noted of 1.3 ft. in the highway grade.

The docks are built along the inner shore of the dredged harbor area, parallel with the coast line. The slope of the ground under the docks was paved with rock riprap, 2½ ft. thick on a slope of 3-to-1. Immediately behind the docks is a protective barricade of earth 20 ft. high. The ends and front of this barricade are constructed of 6 x 6 in. concrete logs 8 ft. long. The dock side is on a batter of 2 in. to 12, and on the back side the earth is graded to a 3-to-1 slope. The dock itself is built on creosoted wood piling, and has six elevators for loading ammunition onto lighter barges.

Ocean-going vessels do not enter the harbor for direct loading. To facilitate safety in handling the various types of ammunition, the transport vessels are anchored offshore and loaded from lighters.

The harbor is formed by two rock jetties, 3,600 ft. apart at their shoreward end and 600 ft. apart at the ocean end. The east jetty is 3,936 ft. long and the west 3,421 ft. long, the latter however, having only 2,300 ft. of new construction, this being added to the previously existing 1,121-ft. mole of the city of Seal Beach.

Harbor design

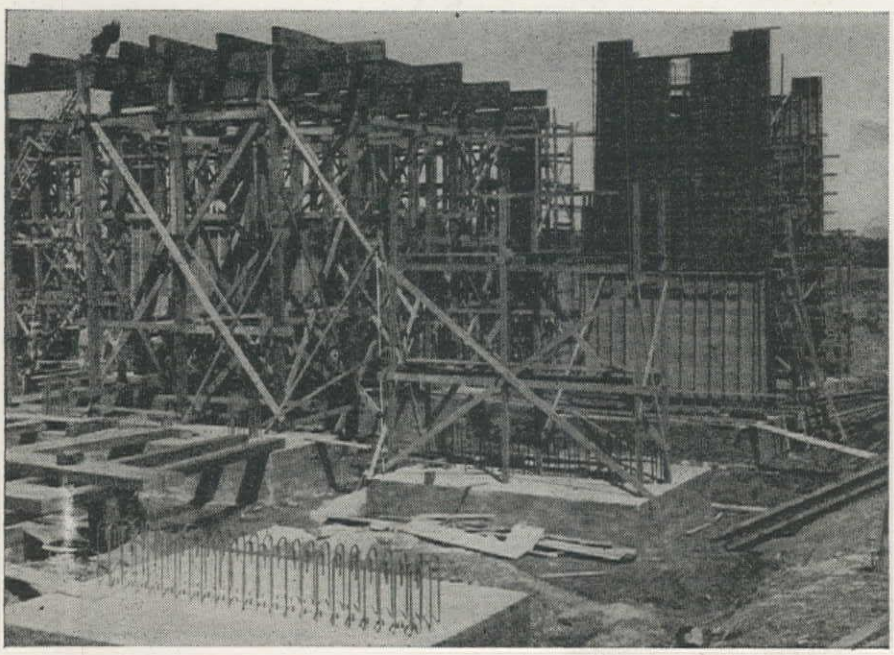
The jetties and harbor works were designed by Major Chas. T. Leeds of the Los Angeles consulting engineering firm of Leeds, Hill, Barnard and Jewett, and was planned so as to secure a maximum reduction in wave height at the dock, it being desirable that a minimum of movement be present during the loading of the lighters.

The formula employed was originally evolved by a British civil engineer, Thomas Stevenson. It is as follows:

$$h = H\left(\sqrt{\frac{b}{B}} - .02\sqrt[4]{D}\ (1+\sqrt{\frac{b}{B}})\right)$$

Wherein h = reduced height of wave
H = height of unrestricted wave
b = breadth of entrance
B = breadth of harbor
D = distance from harbor mouth

In the calculations a maximum wave height of 15 ft. at the harbor entrance was considered. With the harbor widening from 600 ft. to 3,600 ft., it was computed that at the shoreline, 3,200 ft. inside, the waves would be reduced to 2.9



SUCTION DREDGE "Los Angeles" at work on the harbor, upper. Discharge end of pipe where the built-up area was at times two miles from the boat, necessitating the use of an intermediate booster pump, center. Foundations and preliminary forms for the Pacific Electric Railway and highway grade separation, left.

ft., and because of the added effect of the small boat basins, the spreading of the inner basin, the slough channel and the riprapped slope under the dock, it would be further reduced to 1.46 ft. at the landward side of the inner basin. The shape of the harbor and orientation of the jetties was of course influenced by direction of storm winds, prevailing winds and littoral sand drift.

Jetty construction

The jetties were constructed by Guy F. Atkinson Co. from temporary wood pile trestles built for the entire length of the moles, of 4-pile bents, 15 ft. apart, and with their centerline 9 ft. off the centerline of the final jetty.

Rock was secured from the Atkinson quarry, a few miles northwest of Riverside, Calif. The cars of rock were transported by Union Pacific Railroad the 80 mi. to the point of placement. A maximum of 140 cars were delivered per day.

Railroad track was laid progressively on the trestles as the jetties took shape, the cars were shunted on to the extension and a small power shovel, operating from the car decks, pushed the rock into the water. Brake rods were removed so the shovel could move from one car to the next.

In general, three sizes of rock were used. The largest, weighing up to 15 tons, was dropped at each side to form the armor—or seaward wall. The core was of medium rock, from 4 to 15 tons, and was dumped between the armor, and smaller pieces were used to fill any gaps remaining. The seal rock was of less than 1,000-lb. chunks. The cars, therefore, had to be loaded alternately. Armor rock was carried on cars without sideboards, but voyage and chink rock was too small to be carried uncontained.

The rock was a good grade of granite, required by specification to weigh at least 135 lb. per cu. ft. for the core and seal rock, 150 lb. per cu. ft. for the armor.

Storage buildings

In the storage area are 80 magazines for storage of fuses and detonators, high explosives, and gun ammunition, and 18 buildings for inert storage. All of the magazines are of the igloo type, some single, some triple.

In erecting the igloos, standard steel forms for this type of work were furnished by United Concrete Form Products Co. They consist of steel I-beam girders in three sections, locked and braced, so that they can be easily removed after the concrete is set. Between them and locked into place with small wooden wedges are 24 x 36-in. steel plate panels. One panel is left open as long as possible so that the concrete can be poured through the opening.

Reinforcing in the igloos is of wire mesh only, and the sides are dowelled to the floor, which is poured separately. All steel is carefully and thoroughly grounded, so that no possibility of sparking will be present.

Concrete was all batched at a plant set up on the site by Consolidated Rock Products Co., and was transit-mixed.

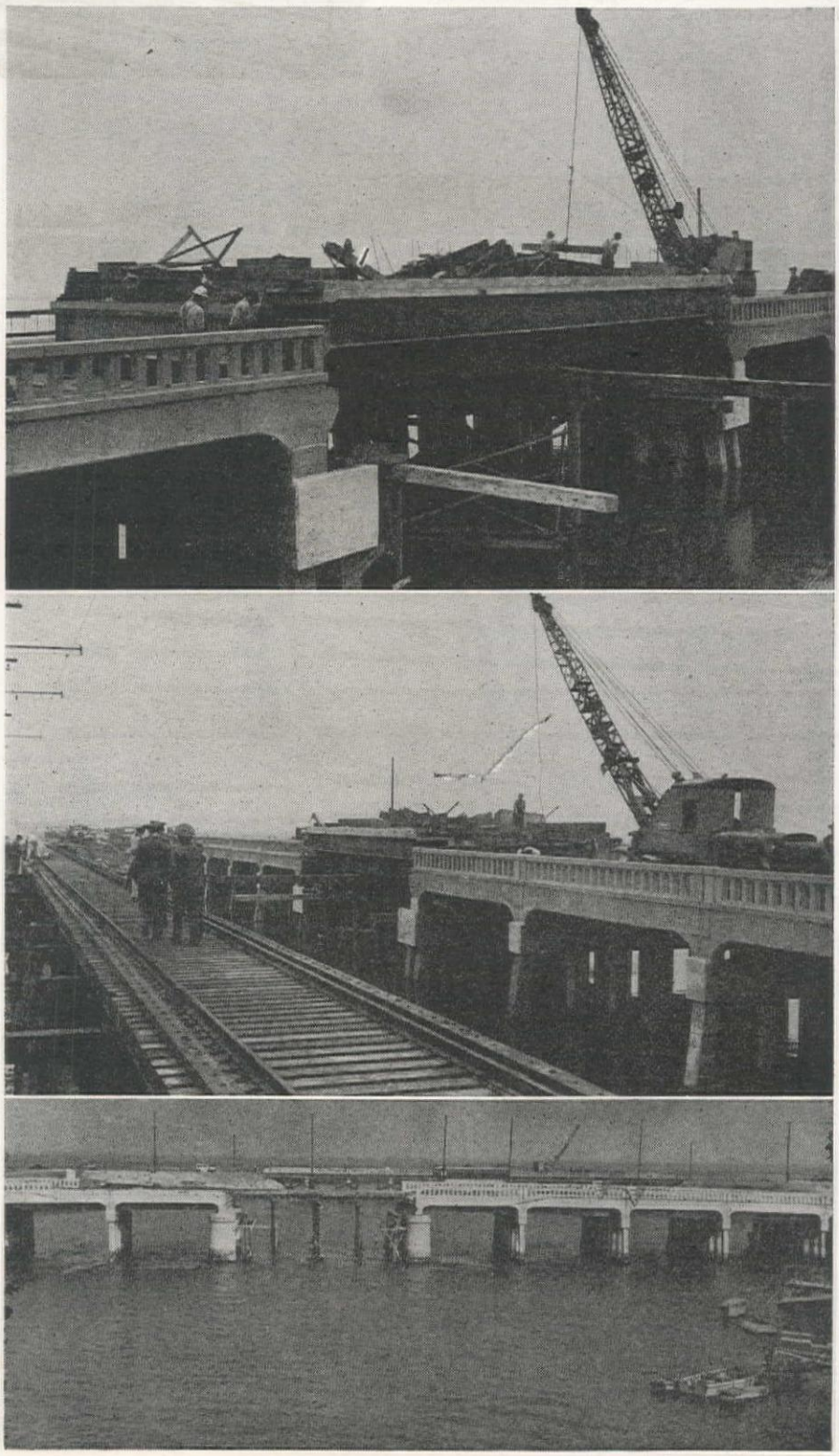
The base under all storage buildings was compacted to density of 2,250 lb. per sq. in.

Additional facilities

About 56 mi. of railroad has been built to serve the depot. This includes a spur into the site from Westminster, a classification yard large enough to accommodate 250 cars, spurs to each igloo and to the dock. The rail is all relay, most of it being 72-lb. rail secured from the Chicago & Northwestern Railroad near Shoshone, Wyo.

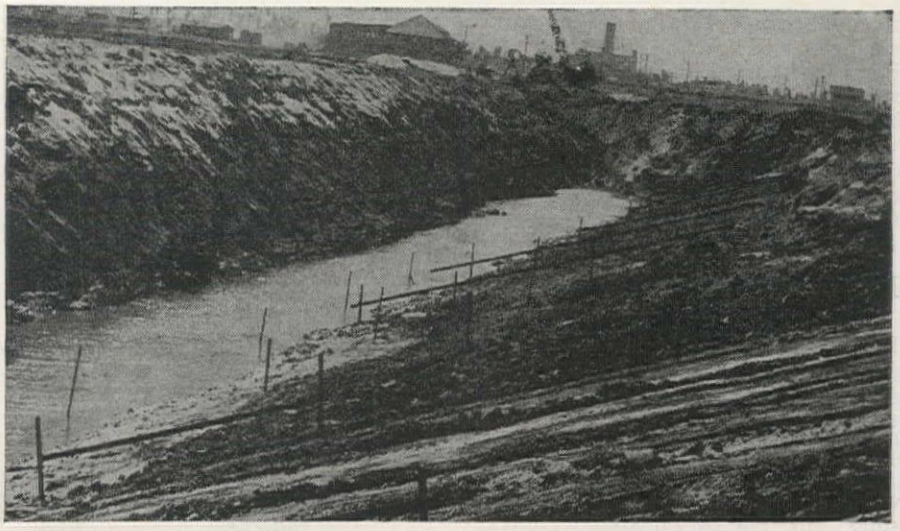
Water is supplied from wells on the property, and elevated tanks supply operating pressure for the elaborate fire fighting system.

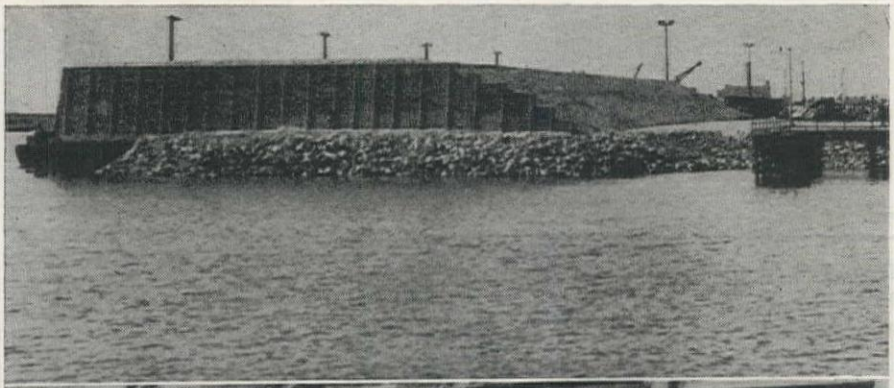
The base has its own sewage disposal plant located near the dock. It employs Dorr clarifier and flocculator units and sand filter beds.



PLACING MID-SECTION of highway bridge, after it had been floated into position on a barge, upper. Same section showing the relocated Pacific Electric Railway Bridge which runs parallel with Pacific Coast Highway, center. Old highway bridge showing the mid-span removed. The new bridges show farther inland, bottom.

INLAND HARBOR cut with grade templates on the sloping bank, and section of original ground retained until riprap was placed, right. Protective embankment at rear of ammunition dock, illustrating the use of concrete logs to form the retaining wall. Note the sloping revetment under the concrete crib, which is the same as the unfinished sloping section shown above. Center, section of exterior igloo form showing a series of steel panels clamped to the arched ribs. Concrete is poured between this and a similar interior form through an opening left near the top. Bottom, curing concrete piling, used for the footing of the bridge trestles; in the background a dragline is building the approach fill to the highway overpass.





Another huge earth barricade has been erected along the north side of the classification yard, containing 80,000 cu. yd. of material. In addition, standard concrete barricaded sidetracks have been built at the various magazines, and the igloos have all been covered by at least 2 ft. of earth blanket.

It was necessary to remove 275 beach homes from Anaheim Landing and Sunset Beach before construction could begin.

Organization

Commanding officer of the Seal Beach Naval Ammunition and Net Depot is Capt. A. B. McCrary, USN, who has been at the base since last May, and as construction has advanced, has kept a steadily increasing supply of munitions flowing to the fleet in Pacific waters.

In charge of construction for the Bureau of Yards and Docks was Lt. Comdr. Joseph White, USN, for the early part of the work, succeeded last September by his assistant, Lt. Comdr. John J. Morton, USNR. Assistants were Lt. Milton Shapiro, USNR, and Lt. (jg) Robert K. Boyd, USNR.

Plans for the depot were prepared by the architectural firm of Graham, Anderson, Probst & White, with Leeds, Hill, Barnard and Jewett in charge of harbor work.

For Guy F. Atkinson Co., A. H. Steiner was project manager; for Simpson-Kier, Carl Marquardt acted as general superintendent, and Aubrey Horn as project manager; for Wm. P. Neil Co., E. Archibald was project manager and G. P. Smallwood, general superintendent; and for United Concrete Pipe Co., C. C. DeArmond was in charge of operations.

Among the sub-contractors not already mentioned were Los Angeles Fencing Co., fencing; Newberry Electric Co., electrical work; Sharp & Fellows Contracting Co., railroad work; United Concrete Pipe Co., concrete pipe; California Corrugated Culvert Co., drainage and culvert pipe; Tom Gogo and Howe Bros., sewer and water lines; Summerbell Roof Structures, Arch Rib Truss Co., and Henry Mill & Timber Co., roof trusses.

Army Develops Pontons of Aluminum

Aluminum floating bridges, calling for a short construction time, now fill important need on Allied fronts of attack—50-ton capacity ponton spans are so buoyant that without one ponton the deck alone could withstand the weight of a loaded truck

A NEW ALL-ALUMINUM, 50-ton floating bridge, lighter, wider and capable of faster construction than any ponton bridge now in use, has been developed for Engineer units overseas.

Developed by the Corps of Engineers, Army Service Forces, to handle the increasingly larger and heavier loads on military bridges, the new M-4 bridge is being rushed from tests into action.

Comprising but three main parts, the bridge is so simple in design that a 301-ft. section was constructed in two hours and 12 minutes in its first service test, including the time needed to unload from the trucks. "And," says Lt. Col. Jack Singleton, Chief of the Bridging Equipment Section, Corps of Engineers, "we've since knocked 45 min. off that time."

Parts of the bridge

The three major bridge parts, each of aluminum, are: (1) a hollow deck balk, (2) removable gunwales, and (3) half pontons.

Two half pontons, each 30 ft. in length and weighing only 1,700 lb., are locked stern to stern with connector pins to form a complete ponton which alone will safely support 26 tons. The bow of each half-ponton has been designed to an "ideal curve" to enable it to ride swift currents.

Removable gunwales attached to each ponton provide a foundation for the deck balk which is fixed in place with lugs and pins.

The hollow aluminum deck balk, which replaces both balk stringers and chess flooring in the older type wooden-decked bridges, is in itself an innovation in bridge engineering. Fifteen feet in length, 9 x 9 in. in cross section, and 215 lb. in weight, a single deck balk may be carried easily by four men; yet afloat, it will support a 300-lb. load. Placed parallel to the flow of traffic, the balks are staggered to distribute the load, making the entire deck a continuous beam. The top surface of the balk is rubbed to minimize the skidding of vehicles. Disabled pontons may be unfastened from the deck with ease, towed out, and replaced. The decking itself is so buoyant that if every ponton were sunk, the deck alone could still support a loaded truck.

Uses of the bridge

One M-4 bridge set will provide approximately 436 ft. of floating bridge and 180 ft. of fixed bridge, or a total of 616 ft. A "set" is carried in 69 trucks and trailers, with each of 64 2½-ton trucks carrying sufficient equipment to build 15 ft. of bridge. Two six-ton trucks with semi-trailers transport D-7 tractors while three 4-ton trucks carry twin-screw power boats. In addition, five cranes accompany each bridge set.

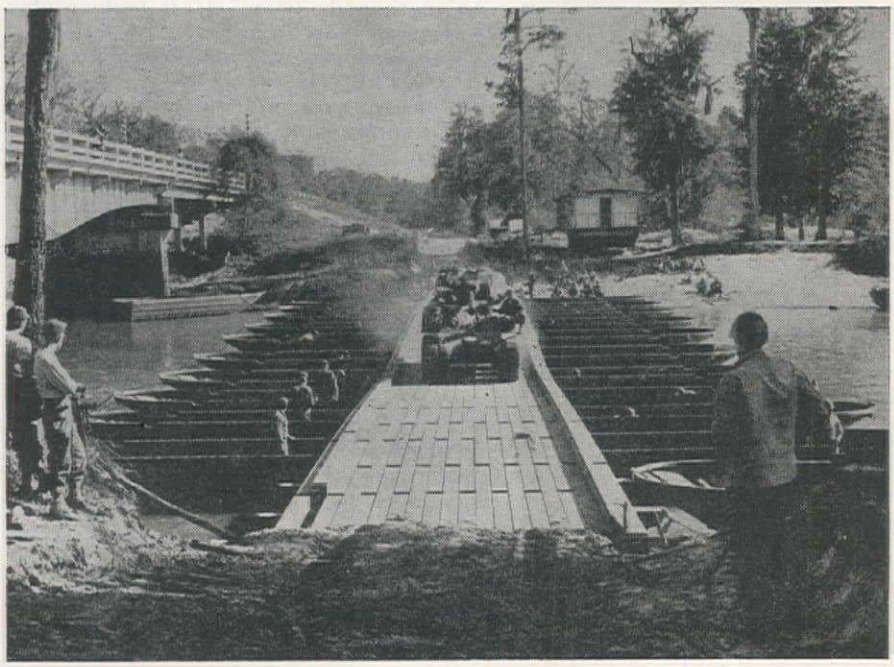
Tactically, the M-4 bridge will be used primarily in the attack, with Engineers constructing the bridge in a rapid follow-up to the assault-boat crossing. In theory, the M-4 will remain in place no longer than 4 to 5 days. It will be replaced by either a Bailey bridge or a timber trestle bridge so that it may be moved forward for new attack crossings.

No new types of engineer units will be needed to transport or erect the new bridge. Existing organizations, including Light and Heavy Ponton units, Engineer Combat Battalions, and Engineer General Service Regiments will be able to construct the M-4 bridge with a minimum of prior schooling.

The deck of the new bridge is 150 in. wide between curbs, nearly two feet wider than present military bridges. Designed and tested to carry with safety a 50-ton vehicular load in a current as swift as 10 ft. per sec., the bridge can carry even greater loads in slower currents.

The new bridge eventually will replace several older types. The use of the half-pontons alone allows the rapid building of a lighter bridge; and trestles and pneumatic floats in each set will permit the construction of bridges over narrow ravines, or in water too shallow to permit use of the aluminum pontons.

IN CONSTRUCTION, balks are placed parallel to the flow of traffic and staggered to distribute the load. The entire top surface of the bridge deck is roughened to minimize skidding of vehicles. Note half-ponton afloat in the water at extreme left.



War Captives Construct Internment Facilities

PRISONERS OF WAR are being used to construct a 300-man camp for their own housing facilities at Baxter General Hospital, Spokane, Wash., it is announced by Col. Conrad P. Hardy, Seattle District Engineer.

It is the Army Engineer policy, said Colonel Hardy's announcement, never to use prisoners of war in competition with free labor and to use them only on maintenance or construction of facilities for their own use.

To save time and money the majority of the prisoner of war camp is being moved from Camp Adair, Ore., where prisoners have dismantled buildings now being set up at Baxter. Prior to arrival of the main body of prisoners, an advance cadre is erecting buildings, constructing and installing sewage, water and electrical facilities.

The camp will include six barracks, each of 50-man capacity, and of loxstave prefabricated construction, as well as five buildings including military guard detachment building, administration and supply unit, messhall and kitchen, recreation and army exchange building, bath and laundry, all of CCC panel type prefabricated construction.

The camp is being constructed under a guard of Military Police and with technical supervision of the Spokane Project office of the Seattle Engineer District. John F. Bullard serves as Project Engineer.

Soil-Cement Paving—
Use at Inyokern Saves Money, Time

Special equipment designed by contractors laid an 8-in. layer of soil-cement base, without necessity for removing top soil and hauling in of aggregates, at a maximum rate of 18,400 sq. yd. per day —Compressive strength of 1,600 lb. per sq. in. attained after twenty-eight days

By F. J. SNYDER
Chief Carpenter, U. S. Navy, CEC.
Inyokern, Calif.

THE USE OF SOIL-CEMENT pavement for the construction of the Area "E" airfield at the Naval Ordnance Test Station near Inyokern, Calif., accomplished an economy in both construction time and project cost. Since the local soils were adaptable to this type of construction, the removal of top soil and its replacement with outside aggregates was not necessary, and resulted in an additional advantage of a mix-in-place technique through the use of readily available equipment. Construction was started in June 1944, with the initial plans including a 200 x 7,000-ft. runway with auxiliary taxiways and aprons.

Investigations made prior to construction showed that soil-cement base would have several distinct advantages in addition to its low cost. The tests proved this natural material provided a firm subbase for soil-cement without excessive compaction being necessary. Furthermore the speed with which this type of base can be constructed was a big factor in the always important available time. The overall investigation indicated the materials were consistent over the entire site for a depth of several feet. Screen analysis showed this material to be quite uniformly graded from No. 4 to No. 200 sieves, with about 5 per cent retained on the No. 4 and about 15 per cent passing the No. 200 screen.

Specifications

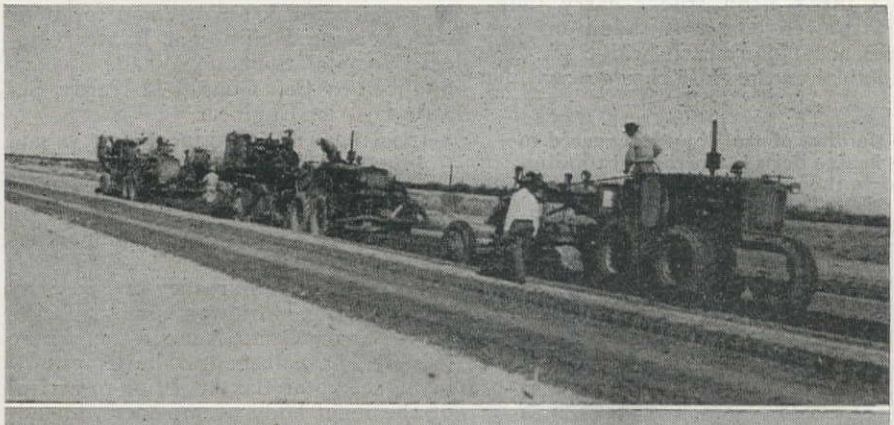
Pavement design based upon a wheel load of 75,000 lbs., resulted in the specification of an 8-in. soil-cement base overlain by a 2½-in. wearing surface.

Laboratory test specimens were made by mixing varying amounts of cement with the natural soil, ranging from 6 to 12 per cent of the dry weight of soil. Moisture density curves gave a maximum dry density of 135 lb. per cu. ft., and an optimum moisture content of 8 per cent. Compressive strength tests and wetting and drying tests indicated that a cement content of 8 per cent would be satisfactory. However it was decided to specify a cement content of 10 per cent, due to the increase in strength obtained with the additional cement and because of the extremely heavy wheel loads for this type of pavement. Compressive strength obtained from these 10 per cent specimens was approximately 1,600 lb. for 28-day cylinders.

Previous to starting soil-cement operations, cuts and fills were compacted to final grade. In order to secure proper surface drainage, the runways and taxiways were, in general, constructed on fill to a grade above the original ground. When cuts were encountered, it was necessary to remove sufficient additional material to permit the compaction of a minimum of 6 in. below the bottom of the future soil-cement base.

As construction of the 7,000-ft. runway progressed, plans were completed for two additional runways 200 ft. in width and approximately 6,000 ft. in length, and a 100 x 7,000-ft. taxiway plus several short taxiways. Also, an additional runway was added to the existing Area "A" (Harvey Field) airfield. An 8-in. soil-cement base was used in all the runway and taxiway pavements, except the new runway at Harvey Field, for which a 6-in. soil-cement base was used.

APPLYING WATER (top picture) to the final mix of a section of soil cement base at Harvey Field, part of the Naval Ordnance Test Station at Inyokern, Calif. The mix is being spread on the exposed subgrade. Below, blading the base for compaction.



Soil-cement methods

Soil-cement construction procedures used on this job were similar to those in common use, except for such variations as were found necessary to accomplish positive control and proper compaction of the full 8-in. depth. The contractor was Gardner-Byrne Construction Co., of Redlands, Calif., and they employed equipment specially developed by themselves for soil-cement work.

Sufficient compaction near the bottom of the 8-in. base could not be obtained with the use of the conventional type sheepsfoot rollers used in the normal 6-in. bases. For compaction near the

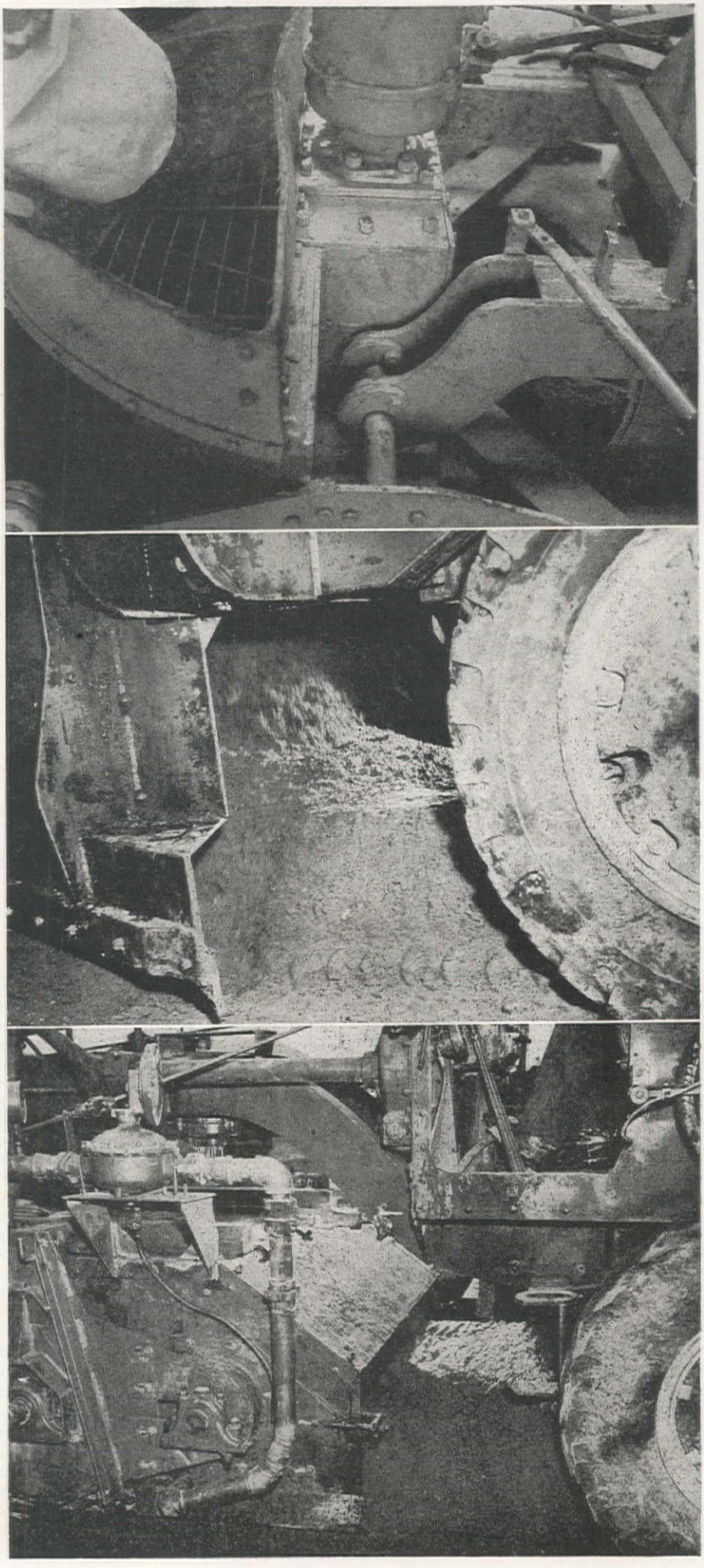
bottom, a double drum roller, having a weight of 15 tons per drum, with tapered tamping feet 11 in. long was used.

In order to accomplish positive control of thickness and mix, a strip 10 ft. wide, adjacent to one of the shoulders, was graded to subgrade elevation instead of finished grade. This provided sufficient working space for the mixing and placing operations. A length of 1,500 to 1,800 ft. for construction sections was most satisfactory for efficient operation. The interval between the mixing and the placing of successive 5 ft. construction strips was brief enough to make construction monolithic for the full width of pavement laid during each day's operation.

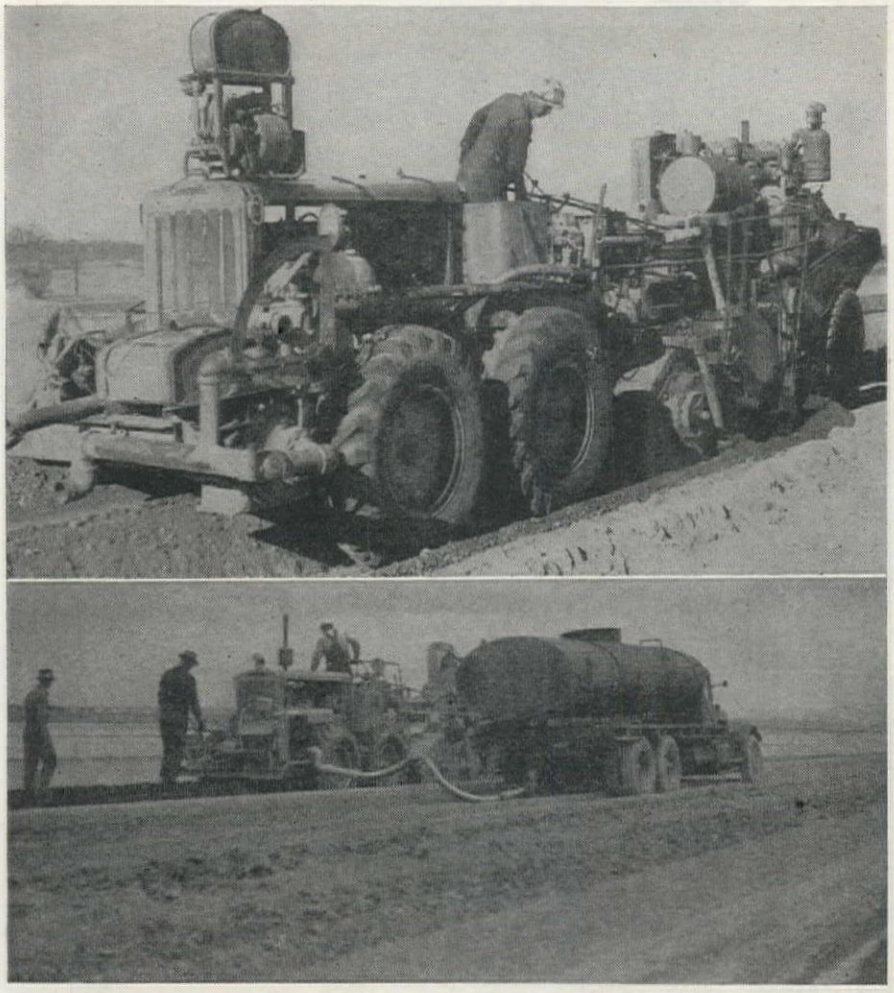
Bulk cement was spread for widths of 5 ft. with the use of a cement spreader developed by the contractor. The spreader was mounted on a motor patrol with special attachments for plowing a furrow and covering the cement as it was spread. Special blades on the spreader grooved the edges of each 5-ft. strip. Two bulk cement trucks were required to haul and deliver cement to the spreader. After the cement was spread, two Gardner traveling mixers moved in, the first unit mixing the dry cement and natural soil and the second unit adding the required amount of water to the mix. Two 5,000-gal. water tanks were used to furnish water to the mixer. Motor patrols following the two mixers moved the windrow of partly mixed material onto the exposed subgrade, where it was given the final mix by a third Gardner mixer. Additional mixing was seldom necessary. After reaching the end of each construction section, this procedure was repeated on the next 5-ft. lane, making the operation continuous in both directions.

Compaction

Mixed soil-cement was spread on exposed subgrade to such a depth that when compacted the surface would be slightly above the final grade. Compaction was started with the heavy roller, which made as many passes as necessary to compact the bottom 3 or 4 in. Rolling was continued with the conventional type sheepsfoot roller until they would "walk-out" no further. Final rolling was accomplished with the use of four pneumatic tired rollers, two of which were the heavy airplane tired type. After several lanes were mixed, spread and compacted, the surface of the compacted soil-cement mixture was cut to final grade with the use of motor patrols. Excess material was wasted or bladed into adjacent unmixed material for remixing. The objective in compacting an excess thickness of soil-cement and cutting to final grade was to eliminate the possible occurrence of compaction planes. In order to secure a smooth, closely knit surface, additional passes



MOBILE MIXING equipment developed by Gardner-Byrne Construction Co. for soil-cement work. Top, cement introduction hopper; center, dry mix being fed into pug mill; lower, dry mix leaving the pug mill, spread behind in flat-top windrow.



GARDNER MIXING machine in operation at Inyokern, manufacturing in transit the dry mix on the second windrow (top). In the lower picture, water is being added from a 5,000-gal. tank truck to the dry mix, this being the second time the material goes through a mixing machine. After the third and final mix, it is compacted in place.

were made with pneumatic tired rollers after the surface had been cut to final grade. Two water trucks equipped with fogging attachments were available at all times to furnish additional water needed to maintain the mixture at optimum moisture content during rolling operations.

Curing consisted of sealing the soil-cement surface with an application of emulsified asphalt applied at the rate of 0.20 to 0.25 gal. per sq. yd. The surface of the soil-cement was kept moist by spraying from the time it was finished until the emulsified asphalt seal was applied.

At the beginning of the job difficulty was encountered in securing uniform thickness. This was due to insufficient working space to properly handle the large amount of material necessary for the 8-in. depth. After providing the 10-ft. strip adjacent to shoulder, no further trouble in securing uniform thickness was encountered. Providing working space on the subgrade was also advantageous in that it provided a clean, smooth surface for making the final mix, which made it almost impossible for unmixed material to become incorporated in the base. The omission of the fill material in the strip left at subgrade elevation on one side of runway was compensated for by using shoulder fill on the opposite side to complete the full width of runway.

Testing

All soil-cement field and laboratory testing was done by the personnel of a soils laboratory which had previously been set up at the base. For convenience in making field moisture determinations, a small building was mounted on skids and towed to various locations as the work progressed. Under ordinary conditions, the correct moisture content was easily maintained; however, the hot, dry desert winds which often prevailed during the summer days made a close check and occasional adjustments necessary. Moisture-density curves were run in the laboratory at frequent intervals for checking or making whatever slight revisions were necessary to the standard density and optimum moisture content originally determined.

Not less than two field density determinations were made on each day's run. Sand was used to determine the volume of the hole in the soil-cement for density determination. With few exceptions, field densities were from 95 to 103 per cent of the standard density as determined in the laboratory. From material secured during compaction, two cylinders were molded each day for 7 and 28-day compressive strength determinations. Twenty-eight day specimens showed a maximum compressive strength of 2,000 lb. per sq. in. and an average of approximately 1,600 lb. per sq. in. was secured. Cores taken for checking thickness and strength showed compressive strength only slightly less than the 28-day cylinder.

The project, including the runway at Harvey Field, involved constructing approximately 600,000 sq. yd. of soil-cement. Construction progress did not establish any records, but was entirely satisfactory. Maximum daily production was 18,400 sq. yd. of 8-in. soil-cement base. Some delays were encountered due to other operations and on several occasions it was necessary to suspend operations due to dust and high wind. Often during these dust storms, visibility became so restricted that it was impossible to see the equipment across the runway.

Unit bid price for the 8-in. soil-cement base was 31.4c per sq. yd. in place, exclusive of the cost of the cement, which was furnished by the Government.

Personnel

Navy officers in charge of the construction at Inyokern are Capt. S. E. Burroughs, Jr., USN, Commanding Officer; Capt. O. A. Sandquist, CEC, Officer in Charge of Construction; Lt. L. Asbury, CEC, Design Officer; and Ch. Carp. F. J. Snyder, CEC, Construction Officer. E. Casaroli is civilian Navy laboratory technician, in charge of tests.

Macco-McKittrick-Morrison, a joint-venture firm, were general contractors on the Inyokern Ordnance Test station. F. W. Case was project manager for the firm and C. J. Haglund, general superintendent. Gardner Byrne Construction Co. was sub-contractor for the soil-cement, with Russell Byrne as project manager.

Engineer-architects at Inyokern were Stafford, Davis & Gogerty, J. T. Stafford acting as project manager.

Mining Men Reminded of Assessment Suspension

BECAUSE MANY construction men are also interested in mining, and to clarify the situation regarding claim assessments, the following data are published:

The Act of Congress signed May 3, 1943, suspends assessment work **for the duration,** defined as follows:

"Until the hour of 12 o'clock meridian on the 1st day of July after the cessation of hostilities in the present war as determined by proclamation of the President or concurrent resolution of the Congress; **Provided,** that every claimant of any such mining claim, in order to obtain the benefits of this Act, shall file, or cause to be filed, in the office where the location notice or certificate is recorded, on or before 12 o'clock meridian of July 1 for each year that this Act remains in effect, a notice of his desire to hold said mining claim under this Act."

Montana City Expands Water Storage

Wartime population increase at Great Falls, Mont. reduces water supply to dangerous level, so that municipal system is obliged to construct reservoir and extend distribution facilities — Circular prestressed concrete tank of five million gallon capacity erected in 13 vertical sections

A POPULATION INCREASE in the Great Falls, Mont., area from 29,828 in 1940 to 50,000 in 1944, with accompanying increased demands for domestic water, was cited as justification for a war public works allotment of $194,610 in Lanham Act funds to be used in construction of a new reservoir and distribution system for the city. The population increase was chiefly brought about by the location of two army air bases nearby.

The increased demands for domestic water frequently depleted storage and reserve to a point where there would have been inadequate protection against fire. Great Falls pumps its water from the Missouri river to a filtration plant. The waterworks system is municipally owned and operated.

The project now nearing completion included a 5 m.g. surplus water reservoir and the installation of approximately 12,200 ft. of mains, the total cost being estimated at $294,610.

Design of reservoir

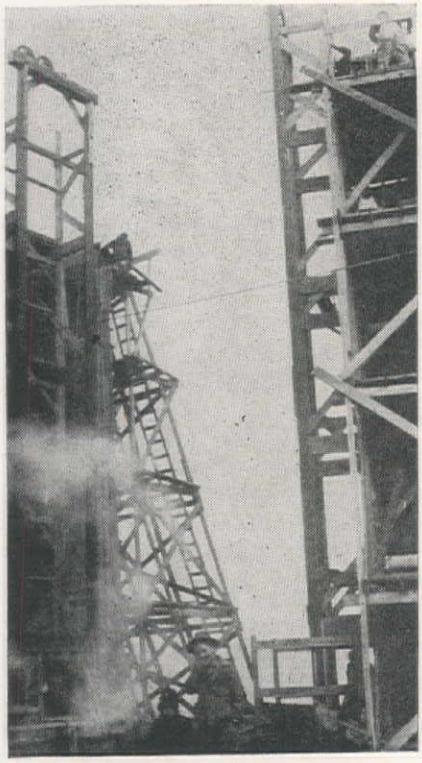
Corwin & Co., designing engineers for the project, decided on construction of a prestressed concrete reservoir. It has an internal diameter at the base of 154 ft. 10 in. and the base or floor has a diameter of 159 ft. 9 in. The height is 33 ft. 5 in. from the floor of the tank, and the spherical dome of reinforced concrete will rest upon and be restrained by the reservoir walls. It has a rise of 23 ft. and varies in thickness from 3½ in. to 4½ in. The floor varies in thickness from 9 in. at the center to 1 ft. 9 in. at the outside edge. The reservoir alone will cost approximately $149,000. It is being constructed by Dudley Anderson & Co., contractors of Great Falls.

The engineer's design for prestressing the tank included construction of an inner wall, varying in thickness from 19 in. at the base to 8 in. at the top. Around this inner wall, circumferential steel rods were placed, with turnbuckles at regular intervals. Steel dowels were left projecting from the concrete to support the circumferential steel, and recesses were left in the outer face of the inner wall in order to allow space for tightening the turnbuckles. Vertical rods were imbedded in the inner wall concrete. These were loosely wrapped in paper so that no bond developed after the concrete was set.

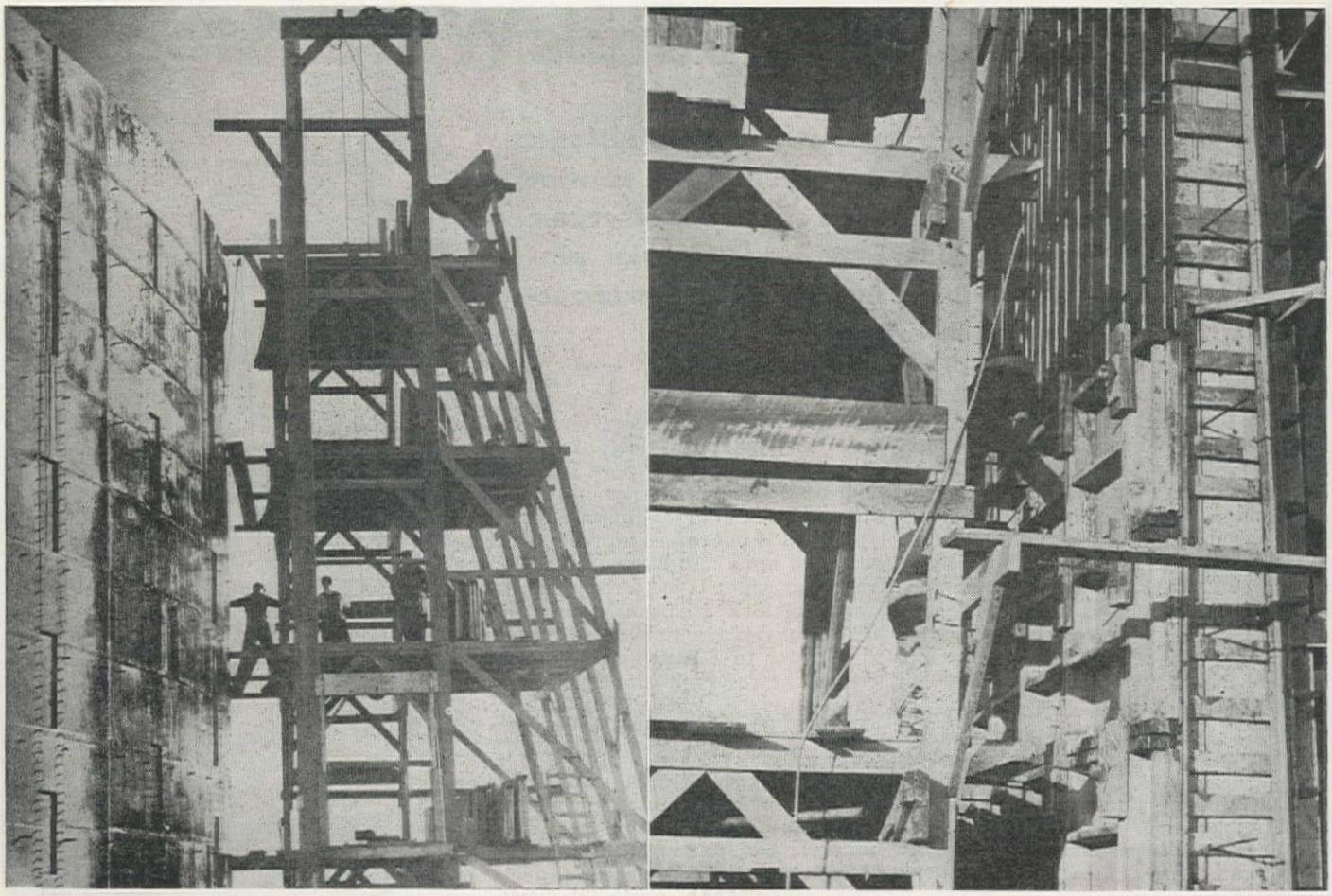
After all the circular steel was set in place the turnbuckles were tightened uniformly so that an impression was attained in the concrete at each elevation equal to the outward pressure which would be determined when the tank was filled with water. Thus the concrete of the walls will be in compression when the tank is empty and static when filled.

Because of the nature of the earth, which is a very light blow sand, it was necessary to remove the top soil and effect a proper bearing by laying an impervious asphalt mat upon which a gravel base was imposed. Concrete drains were placed beneath this base.

Two nets of reinforcing steel were laid in the tank floor, one slightly elevated above the gravel base, this being a right angular grid, and the other near the floor surface. In both cases periphe-



FLOOR PREPARATION under the 5,000,000-gal. tank. Right, top, ditching for sub-drains; center, concrete gutters under the sub-drains; lower, floor steel in place. Floor varied from 9 in. to 1 ft., 9 in. in thickness. Because of sandiness, top soil was removed, and asphalt mat laid under the tank. Left, opening of the last wall section, forms about to be set in place.



FORM PANEL SCAFFOLDS (exterior) after removing panels, left. Note iron pegs left to support circumferential hoops, and recesses for the turnbuckles. Pours were in 4-ft. lifts, and form panels were re-used. Right, details of wall forms in place, showing paper-wrapped vertical steel.

ral rods were spaced at regular intervals.

Construction methods

In construction of the tank, the Anderson Co. built a form which would conform to the inner surface of the inner wall. This was constructed as an integral part of a movable scaffold. A companion scaffold was built for the outer surface, but in this case the forms were not permanently affixed, but provision was made for holding the form panels in place. These panels extended the full width of the vertical section to be poured and were about 4 ft. high. A hoist was built in as a part of the outer scaffold. The panels were held in place by bolts extended through the wall.

The wall was poured in thirteen vertical sections, form panels being re-used. The concrete was poured from platforms of the outer scaffold and additional panels were added as pouring progressed upward.

The inner scaffold was kept in position until the curing period had elapsed, after which wedges under the base were removed and the whole permitted to tip toward the center of the reservoir. This stripped the forms and the scaffold was then moved laterally into position for the next pour.

Each section was poured monolithically and provision was made for caulking.

All aggregate in construction of the inner tank was proportioned by weight and the moisture content carefully controlled, with 1 per cent by weight of Pozzolith added to the cement. Numerous test cylinders were made of the concrete as it was placed. Mechanical vibrators were not used but each batch was carefully spaded.

Fred T. Evans, District Engineer of the Federal Works Agency office in Seattle, Wash., represented the agency on the project.

ODT Limits Movement of Road Surfacing Asphalt

IN ORDER to obtain the greatest possible utilization of railway tank cars, the Office of Defense Transportation has announced that permits must be obtained from ODT for the shipping and transportation, for 500 mi. or more, of asphalt and tar to be used for road surfacing.

The special direction became effective May 1. It does not apply when such products are to be used for industrial purposes; or for military purposes, if consigned on government bills of lading. Under the special direction, in the interest of the most efficient distribution the ODT has agreed to issue permits for the following territorial movements under an inclusive letter of certification from the Petroleum Administration:

A-1. Shipments from any shipping point in the State of California to destinations in the states of Washington, Oregon, California, Nevada or Arizona.

A-2. Shipments from any point in the states of Montana, Idaho, Wyoming, Utah or Colorado, to destinations in the states of Montana, Idaho, Wyoming, Utah, Colorado, North Dakota, South Dakota, Nebraska or Minnesota.

A-3. Shipments from any shipping point in the states of New Mexico, Texas, Arkansas, Louisiana, Alabama, or Mississippi to any destination between or within the same states.

A-4. Shipments from any shipping point in the states of New Mexico, Texas, Arkansas, Louisiana, Alabama, or Mississippi to destinations in the states of Nebraska, Kansas, Oklahoma, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Kentucky, Tennessee, Georgia, Florida.

The cause responsible for the special direction, it was said, was that PAW had informed ODT that more light petroleum products will have to be manufactured this year than last year. That, in turn, will mean that more asphalt will be manufactured and must be shipped in order to prevent the curtailment of refinery operations. With a limit on the number of tank cars for asphalt shipments, therefore, it is imperative that they be used most efficiently, that is, for short hauls whenever possible.

No applications for certification under this special direction, are necessary to cover shipments moving less than 500 mi.

Pre-cast Concrete Culverts

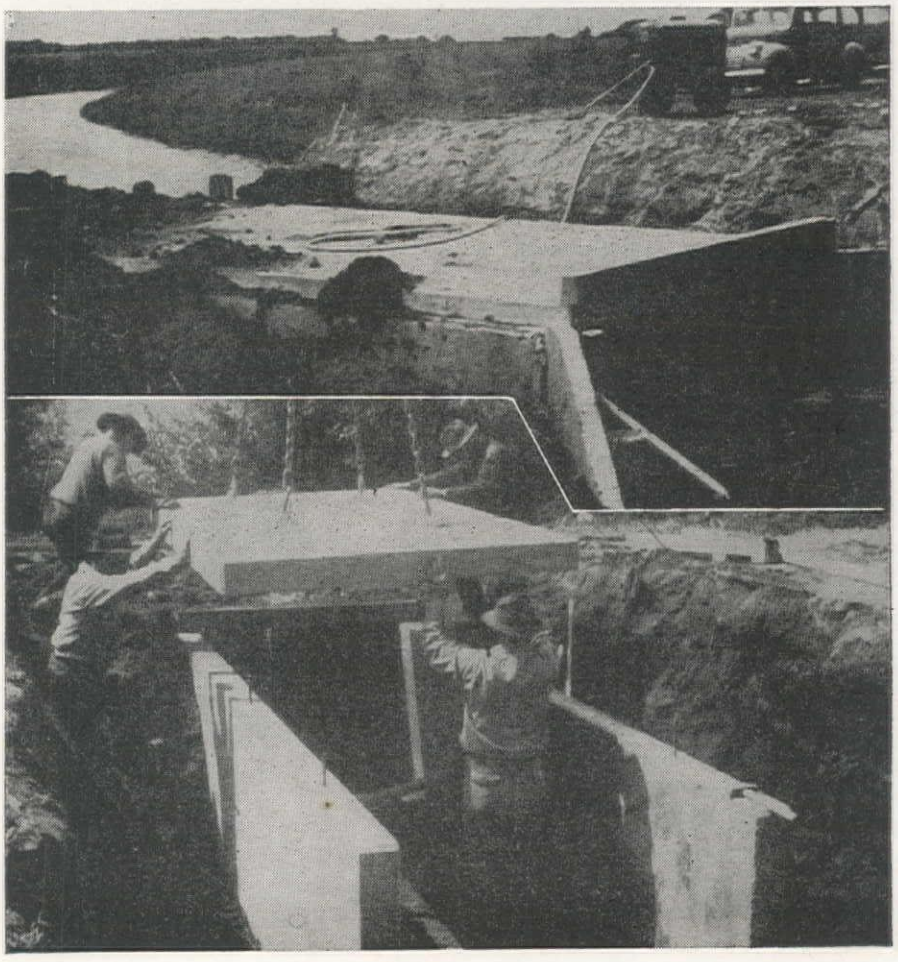
Monterey County Department of Highways uses mobile crane to assemble pre-cast deck sections, T-beams, and abutments in the economical and time saving construction of small bridges, culverts and pedestrian underpasses

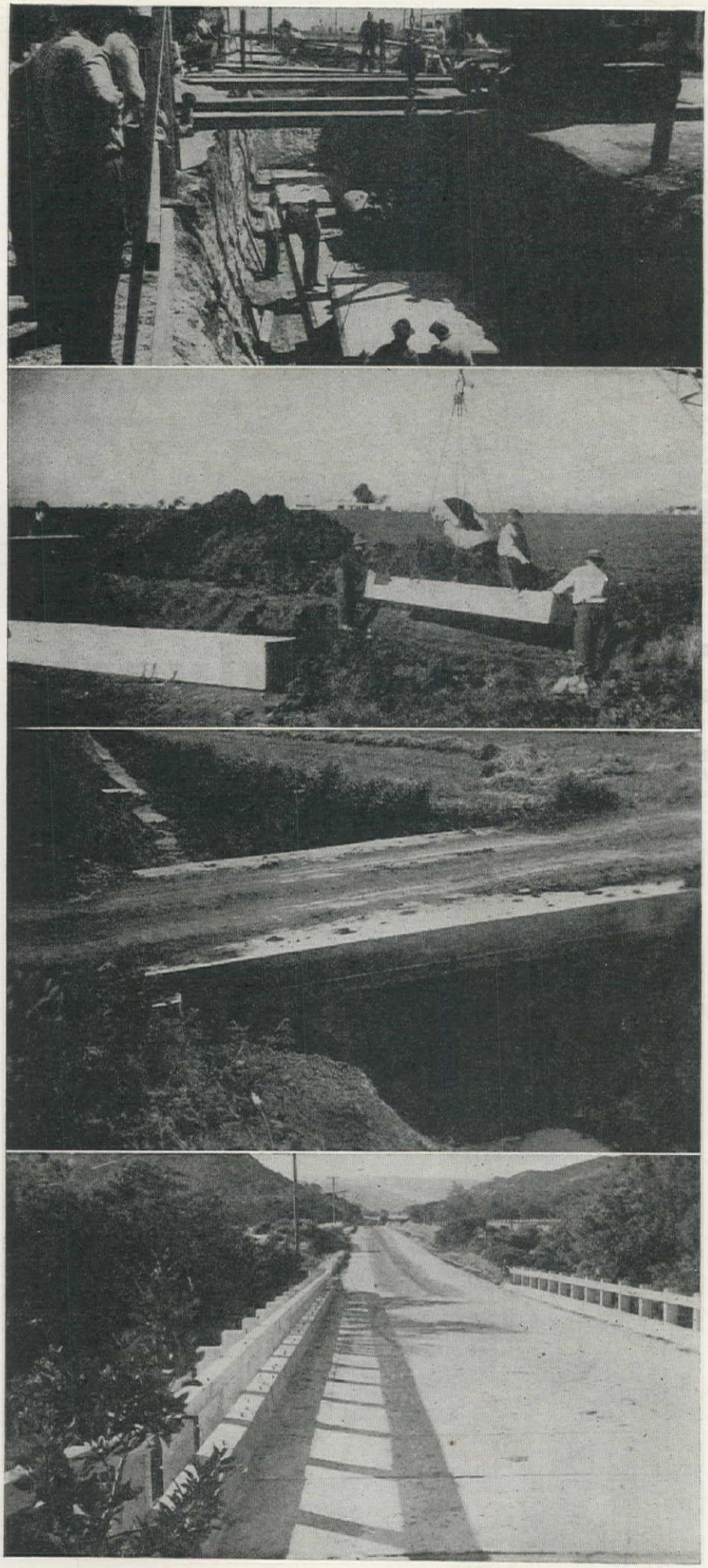
By H. F. COZZENS
County Surveyor, Monterey County
Salinas, California

PRECAST CONCRETE has been used by the Highway Department of Monterey County, California, for culvert and small bridge construction for the past eight years. The various types of structures made consist of rectangular box culverts, precast slab and "T" beam bridges with a maximum span of twenty feet, deck slabs on wooden and steel stringers, abutments for small bridges and a pedestrian underpass.

The box culverts have been constructed with various depths and spans from three and one-half to eight feet. They are installed at locations where it is possible to have a cover of not less than eighteen inches to prevent direct impact on the culvert and also at locations where the velocity of the water through the culvert may not exceed 15 ft. per sec. The slabs are lifted into place by a mobile crane, with hoist hooks lifting by means of loops of reinforcing steel protruding from the precast slab. The sections are bolted together.

POURING CONCRETE for reinforced deck sections of small bridges, above. Assembled canal culvert, before completing back filled impact cushion, below. Placing a deck slab on side wall sections, showing use of bolts to secure pre-cast sections, bot.





One design of a small bridge consists of concrete piles with a precast concrete cap, concrete abutments, wing walls and deck. This bridge was constructed on a reclamation ditch in a slough under a six-foot fill. The bridge was constructed in a period of eight days including the driving of piles by a crew of four men equipped with a three-quarter yard crane. No forming for concrete was required on the job and at least three weeks' time was saved in the opening of the road.

Bridges over drainage ditches are made up to twenty feet long and are cast in sections three feet wide. "T" beam design is used and the sections are bolted together in the field. Precast seats are set to receive the slabs and in case of settlement are easily jacked back into place.

Concrete decks to replace wooden floor systems are cast the full width of the roadway, with concrete curb either cast on the ends of the slab or cast separately and bolted in place, depending on local conditions. The slabs are cast in widths up to seven feet. All slabs are bolted in place. Concrete deck slabs have been placed on bridges up to one hundred feet long by this method.

Pedestrian underpass

One of the most interesting structures constructed by the County was a pedestrian pass. This pass was constructed on the main road through a business district, which carries a traffic of nine thousand vehicles per day, and it was of importance not to have the street closed for a long period. By using a precast structure, only six days were required for installation and the street was immediately opened for traffic.

This structure was designed with angle iron at the corners of all of the slabs. These angles were welded to the reinforcing bars before pouring the concrete. The slabs were installed and the adjacent angles welded, so that the structure is entirely waterproof. The entrances and stairs on this pass were not precast.

The structure was on Wood St. at the crossing of Alisal St. The length composed of the precast slabs was 75 ft. and 21 ft. additional was used at either end for stairs and entry. The passageway was 6 ft. wide, inside measurement, and the wall slabs were 7 in. thick. The floor was also 7 in. thick, but the roof slab was of 8 in. concrete. The interior surface of both the floor and ceiling slabs was cast on a curve of radius 54 ft. After welding the angle irons at the corners, the steel surface was plastered over.

Casting yard

All slabs for these structures are cast in the county yard at Salinas upon a concrete platform. The yard is equipped

PLACING FLOOR SLABS in an underpass, the construction of which interrupted traffic for only six days, top. Placing abutments for a single slab bridge, upper ctr. Same bridge with deck in place, lower ctr. Multiple slab deck on bridge supported by steel stringers. The curbing is pre-cast.

with a fifteen-ton crane and the bridge crew is equipped with a mobile crane of seven-ton capacity, which determines the maximum size of the slabs which may be used.

Close attention is paid to using well graded aggregate and early high strength cement in the concrete so that the slabs may be moved as soon as possible. When a large number of slabs are being poured, this is an important factor.

Lt. Commander Chester Dudley, Structural Engineer, now with the Sea Bees in the South Pacific, formerly of the County Surveyor's office, made the structural designs for the structures.

The advantages of precast work are that the time roads must remain closed and detours be maintained is greatly shortened, and a large saving is made in form lumber and in placing of reinforcing steel. Also, where an organization has equipment and personnel to properly handle the work, precast construction may be used in building a great many structures simultaneously at a considerable saving.

Runoff Unaffected by Late Snowfall

Latest runoff data predicts Pacific Coast Basin will be 80 per cent of normal, Columbia River Basin above 80 per cent normal, Intermountain states generally high except west slope of Sierras — Rocky Mountain area prospects generally good for a normal runoff

MAY SNOW SURVEYS throughout the West resulted in only minor changes in the runoff and storage forecasts released in April, according to the Division of Irrigation, Soil Conservation Service. Aside from some California basins where April precipitation was below average, and various portions of the Intermountain and Rocky Mountain states where low temperatures have postponed heavy runoff, the outlook is about as reported in these columns last month.

A summary of the notable changes follows:

Pacific Coast Basins

Oregon prospects are generally unchanged on the premise of normal precipitation and temperatures during the remainder of the runoff season, but reductions are now expected in Malheur, Chewaucan and Warner Lake drainages.

Some increases in stream flow over figures released last month are to be expected in the Grande Ronde, Umatilla-Walla Walla, Upper Willamette, and Deschutes basins. Although the net inflow to Upper Klamath Lake is now expected to be slightly less than last forecast, the inflow into Gerber and Clear Lake reservoirs will probably be greater than previously indicated.

In California some deterioration of previous expectations has been caused by low April precipitation and the runoff from the Sierra watersheds during the snow-melt season may not be as much as was expected a month ago.

For the Sacramento River watersheds the outlook now is for 71 per cent of normal runoff from the snowpack. However, this is better than last year when the runoff was 61 per cent of normal, and, with economy, should be sufficient for the usual demands. For the San Joaquin watersheds the runoff should average 93 per cent of normal. This promises ample water for irrigation and power with little likelihood of flooding from high river areas due to snow-melt water. For the Tulare Lake Basin the snow-melt runoff should average 103 per cent of normal. Some water has reached the lake during April from the Kings, Kaweah and Tule rivers. More was expected during May and perhaps in June, but the inflow will probably be taken care of without flooding additional tracts.

Columbia River Basin

Normal supplies previously forecast are still expected except in Northern Idaho and Western Montana, where increases ranging up to 10 per cent are looked for. Throughout the month of April there was little melting of the mountain snow cover, and streamflow was near minimum for the period. This condition may be expected to cause moderately high river stages with minor flood damage in some places. During peak flows in the irrigated sections some water will run to waste, though much of it will be applied to crops as the irrigation demand has been high since May 1. A mild late season shortage of water for irrigation in some areas in Southwestern Idaho is probable because of the unavoidable waste during the rapid late runoff that appears to be in prospect.

Intermountain States

Previous indications have been slightly improved in Utah, Nevada and Arizona. In Utah the prospect remains good. In Arizona, Salt River storages show normal levels, but San Carlos reservoir on Gila River has stored only half as much as last year. In Nevada, spring runoff from Humboldt watershed will exceed previous estimates but runoff from the Sierra will probably be reduced because of low April precipitation, unless May and June rainfall is liberal.

Rocky Mountain States

The general outlook continues good. In most watersheds of these states (Montana, Wyoming, Colorado, and New Mexico) the water content of the snow, especially in high altitudes, increased during April and is now better than last year. Storage is normal or above in most areas. In Montana east of Continental Divide, April precipitation was 10 per cent below normal, but cool weather, by retarding runoff, offset a light snowpack and the present outlook is for a normal runoff.

Bureau of Reclamation to Make Water Survey of California's Lake County

FORMAL REQUEST for the Bureau of Reclamation to make a survey of Lake County, Calif., looking to a solution of its water and land problems, has been received by Charles E. Carey, the Bureau's Regional Director in Sacramento, Calif. The request, signed by Thomas L. Garner, Clerk of the Board of Supervisors, asks that the investigation of Lake County water problems be made "as soon as funds and manpower will permit." Lake County is also interested in the Bureau's proposed Yolo-Solano Project, since under this plan Clear Lake recreation resorts would be protected from flood dangers by means of a tunnel draining excess waters into the proposed Monticello reservoir where it would be stored for irrigation use. This use of Monticello reservoir would eliminate the necessity for drawing Clear Lake to the low stages experienced in the past.

In a reply to the Board of Supervisors Carey promised a preliminary investigation of possible reservoirs on streams tributary to Clear Lake for irrigation and flood control. He said this investigation would take place "at an early date." In the meantime Engineer Howard Posz will visit the area for preliminary study.

Lake county's action is one of a number of similar official requests that have been made by various California counties and water users' organizations. So far this year, the Bureau has been asked to survey the water needs of El Dorado, Solano, and San Luis Obispo counties. A water resources survey has been completed for Santa Barbara county, reported in *Western Construction News* for May, and a county-wide basin report has been prepared by the Bureau. The Madera Irrigation District has also asked for survey of the Fresno and Chowchilla river basins, looking to their coordination with the Central Valley Project. A similar request came from the Oroville-Wyandotte Irrigation District.

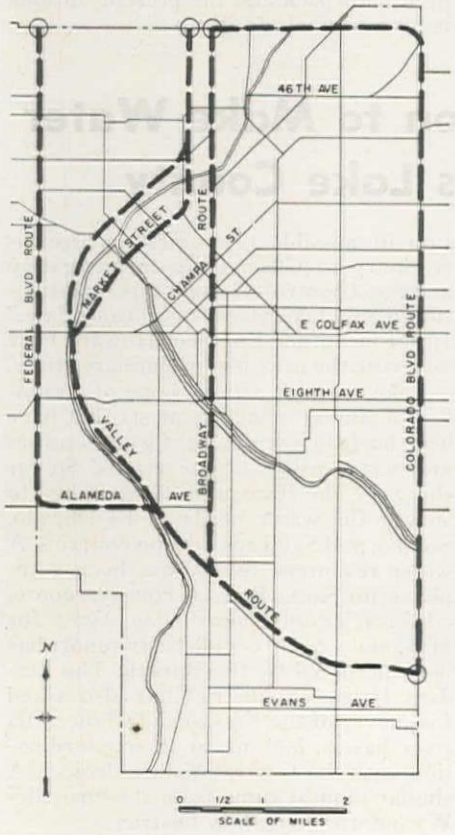
Denver's North-South Freeway

Engineering firm recommends freeway following the valley of the Platte river through the city of Denver, as link in the national inter-regional highway system—Alternate routes either too expensive or do not provide city access—Report prepared for State Highway Department

THE NATIONAL NETWORK of interregional highways proposed last year by the Public Roads Administration includes as one of its major north-south units the highway from Cheyenne, Wyo., through Denver, Colo., and Albuquerque, N. Mex., to El Paso, Tex., thus connecting four of the major east-west routes. The city of Denver is, according to traffic studies recently conducted, the point of greatest traffic concentration on this road, which is the only north-south thoroughfare in the system between Salt Lake City and the Missouri river.

Completion of this interregional system will, it is believed, seriously aggravate an already severe traffic situation within the Denver city limits, particularly acute in the dispatch of north-south traffic. On Sept. 9, 1944, State Highway Engineer Charles D. Vail, since deceased, commissioned the Denver engineering firm of Crocker & Ryan to make a study of the location, design, and construction of a limited-access highway extending through the city from the north city line near 52nd Ave. and Acoma St., to University and Buchtel Blvds. near the southern boundary. The report on the first phase of the study has been submitted, and as reported in *Western Construction News* for May, the firm has been relieved from continuation of the contract, which was to include sectional designs, quantities, grades, alignments, estimates and so forth. Phase one, included in the report, consists of field surveys, general plans, approximate location of structures, etc.

ALTERNATIVE ROUTES studied by the engineers for Denver's north-south freeway. Broadway and Market St. routes are too expensive, belt lines too remote from city.



Location

The engineers found the existing highway is built along the line that has designated the location of the larger cities of the region, namely the line that separates the agricultural and grazing lands of the plains from the mining and forest regions of the Rockies, and since the same factors will continue to exist, it is obvious that the route will maintain its significance as a communication course, for a considerable increase in traffic is anticipated with institution of the new interregional system and the availability of motor facilities for tourist travel.

It is pointed out that only by the construction of limited access freeways can genuine reductions of time and cost of transportation be secured on heavily-travelled highways. Merely widening and surfacing existing roads has not proved a satisfactory answer, because the free flow of traffic is inevitably impeded by left turns and conflicting streams of autos.

The study carried out by the engineering firm included the volume of traffic entering and leaving the city on the various state highways, the concentrations of traffic on existing city streets, industrial areas, topography, property values, architectural values and all other pertinent factors.

By-pass and belt line routes for the north-south freeway were considered, but found untenable for various reasons, the principal one being that a very considerable amount of the traffic which will be carried is either going to or leaving from the city proper, in other words, terminal traffic. The added cost to motorists of cross-movement, between such a belt-line highway and the business district renders such a program undesirable. Among such routes considered were Monaco Parkway, to the east, and Sheridan Blvd. to the west. Colorado Blvd. and Federal Blvd., both closer to the center of the city, were then considered, but were ruled out on more or less similar grounds. So far as traffic use is concerned, the transformation of Broadway into a through traffic artery might be the most feasible, as it is the most direct location. However, its high development as a business street, with street car lines, and tremendously expensive right-of-way costs, make it infeasible. It is estimated that the transformation of Broadway into a freeway, with the excessive right-of-way cost, would entail an expenditure of $55,000,000.

Selection of a route along the bottom land of the Platte river valley presents probably the most favorable topographic conditions. Because of the swing of the valley to the west of the business section of the city, the length would be somewhat increased over the direct Broadway route, but not critically so. On the east bank of the river, railroad and industrial occupancy block development of a satisfactory route, but the west slope was found not to be so restricted, and the road would pass through only minor railroad areas. Property values would not be excessive. At about Colfax Ave., the thoroughfare could cross to the east bank and follow the present River Drive to the southerly terminus of the project.

This route would afford direct connection to all important viaducts and bridges and thus provide many short access routes to the business and residential districts. Also it would in no way constitute a barrier to cross-city travel or city growth.

One possible variant of the valley route is to pass through the heart of the commercial section of the city by way of Market St. and its southward prolongation, Walnut St. This would cut off a portion of the curve of the valley, and make unnecessary construction of 2.6 mi. of the valley route, between 43rd Ave. and 14th Ave. Business use of Market and Walnut Sts. obviously precludes their use as a surface freeway, and it would be necessary to resort to viaduct or elevated construction. Also it would be necessary to acquire about a half block of commercial property on one side or the other to provide adequate width. These facts, combined with added cost for providing satisfactory traffic connections to the business center, would add materially to the cost of this alternate. Furthermore, the construction of an elevated roadway structure would very likely become a development barrier for future growth of the city. All things considered, the alternate route, even with the advantage of location nearer to the heart of the city, was discarded.

Cost estimates for the several principally-considered routes, including right-of-way and construction, are:

Route	Cost
Colorado Blvd.	$18,500,000
Broadway	55,000,000
Valley	14,500,000
Valley-Market St.	19,000,000

Exact location

Specifically described, the Valley Highway route extends south from the city line at 52nd Ave. along the block between Acoma and Bannock Sts., using these streets so far as possible as service roads for the territory adjoining to either side. Thence south and southwesterly it crosses 38th Ave. at Fox St. and continues southwesterly, passing under the 20th St. viaduct and along Central Ave. to an undercrossing of the 16th St. and 14th St. viaduct approaches. From 14th St. it curves to the south along the west bank of the river near Zuni St., and then crosses to the east bank near 17th Ave. Here it passes the westerly end of the market and freight district adjoining Walnut St., and for a short distance traverses an industrial and low-value dwelling district.

South of Walnut St. the route curves somewhat westward to the Platte River Drive along the east bank of the river, and swinging gradually southeastward near Eighth Ave. it crosses Alameda Ave. at Garden Park and parallels the Santa Fe and Colorado & Southern tracks to a crossing under three railway tracks near Exposition Ave. Thence it parallels the Falcon branch line of the Colorado & Southern Ry. to an undercrossing of Broadway and connects with Buchtel Blvd., continuing southeast along the latter to the terminus at University Blvd. The route so developed is 9¼ m. long between termini.

In its general course the Valley Highway has been designed as a surface road, locally depressed or elevated as made necessary by topographical and intersection conditions. It crosses and generally connects with all the valley viaducts and all major east-west arterials, for direct distribution of traffic to the principal objective areas as well as to all focal points of city activities and assembly. The highway circles the principal railroad lines, yards and shops, and requires only minor track changes to facilitate such detail location as is most favorable to efficient operation.

Where the highway crosses main thoroughfares, suitable traffic interchanges with non-crossing connections have been designed. The major interchanges proposed are at 46th Ave., 38th Ave. (with connections also to Fox St. and to Broadway), 14th St., Walnut St., Sixth Ave., Downing St., and University Blvd. Ramp connections are contemplated at 18th St. (for connection to the 20th St. and 16th St. viaducts), Alameda Ave., Santa Fe Dr., and Broadway. Access is provided at 50th Ave. Under or over-crossings are planned at a number of points to accommodate non-interchange cross traffic.

In making traffic studies, the effect of gasoline rationing and other temporary war influences was eliminated by using figures from a survey made in 1939. Based on these studies, it is estimated that the initial traffic on the Valley Highway at the north city boundary would be 2,000 cars per hour, that at the south city line would be 600 cars per hour, and that north of Santa Fe Ave., it would be 1,000 cars per hour. However, in view of an anticipated growth of traffic in years to come, it is necessary to provide for a capacity considerably increased over the initial requirements.

From figures of the Public Roads Administration and other sources, it is forecasted that by 1960, traffic volume in the Denver territory will be approximately 180 per cent of pre-war volume. Accordingly, then, the proposed freeway is designed with two traffic lanes in each direction, which will adequately serve present or pre-war traffic, and provision is included for addition of a third lane on each roadway, to care for the volume expected by 1960. However, it is stated the lane efficiency decreases markedly above three, and whenever volume reaches 230 to 250 per cent of the 1939 figure, that another freeway should be constructed.

BIRD'S EYE VIEW of the Valley Freeway proposed for Denver, showing various types of connections with cross highways. The view is toward the south. In foreground is the cloverleaf system at 46th Ave., next is 44th Ave. grade separation, the connection to Broadway and the Fox St. interconnection. Freeway then passes over railway and under 20th St. Next are 18th St. ramp system, two viaducts and Speer Blvd. cloverleaf.

General design

The Valley Highway suggested in the report is designed to provide efficient service and free traffic flow. It is a dual highway segregated from adjacent property, accessible only at special access or interchange points, and with opposing and conflicting traffic fully separated. It has 2-lane roadway, independent as to alignment and grade, and divided by a median strip 44 ft. wide, without connecting passages. When third lanes are added, the median strip will be reduced to an ultimate 20 ft. Full lighting is planned.

The basic elements of design have been established by Public Roads Administration, and have been followed throughout. A design speed of 50 m.p.h. is considered. The limit of curvature is 9 deg., with a desired maximum of 7 deg. The minimum permissible sight distance is 400 ft.

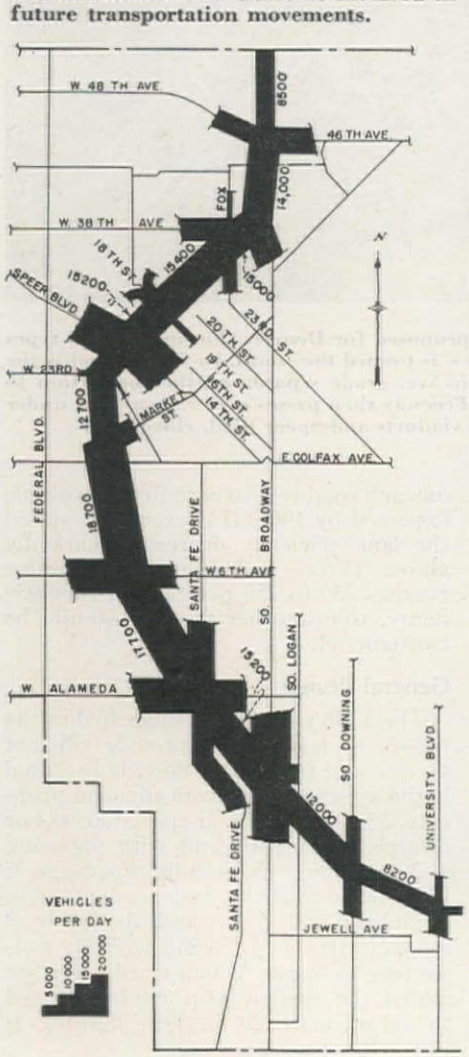
In the case of the Valley Highway, the maximum curvature is 5 deg., spiralled where more than 2 deg. and a minimum sight distance of 500 ft. is secured, except in one instance, where it is 450 ft. Grades on the main highway have been limited to 4 per cent, and the maximum grade is less than 500 ft. long. Up-ramps have a maximum grade of 4 per cent, down-ramps of 6 per cent.

Where the highway underpasses bridges, minimum horizontal clearance is 4 ft. from roadway edge. Vertical clearance in underpasses is 16 ft. minimum at edge of pavement and 14½ ft. at edge of roadway shoulder.

Where the highway overpasses railroad tracks, the lowest portion of the structure is kept 23 ft. above top of rail, and the faces of piers and abutments have a minimum horizontal clearance of 10 ft. from center line of track. Over main streets and highways passing under the Valley Highway the vertical clearance is fixed at 16 ft., over minor streets at 14 ft.

All structures are designed for adequate loadings: Cooper's E-72 loading for structures carrying railway tracks, and the loadings of the 1941 specifications of the American Association of State Highway Officials for street and highway structures.

FLOW CHART of anticipated initial traffic on the Denver Freeway, as forecast from pre-war and wartime traffic counts, and consideration of all elements involved in future transportation movements.



Roadway and pavement

A lane width of 12 ft. is used throughout on the main highway, without additional widening on curves. A speed-change lane is added outside the outer lane at the approach to an exit or an interchange. The roadways are superelevated on curves by the full amount required to compensate for centrifugal effect. A 3-ft. curb strip of pavement with non-mountable curb adjoins the inner edge of the pavement, while a 5-ft. lip gutter borders the outer edge.

Outside the gutter, a 5-ft. strip of the shoulder is consolidated to form with the gutter a refuge space 10 ft. wide for the use of disabled vehicles. No other parking facilities are included.

Concrete pavement with bituminous wearing surface has been adopted for the main roadway. The subgrade is to be reinforced with selected material to distribute the roadway loads, and a sand cushion is to be placed over this reinforcement as bed for the concrete slab. Where speed-change lanes diverge from the roadway, they are to be built of concrete without adding wearing surface, in order to give a color difference as a guide to traffic. Bridge decks are to have the same type of pavement as the remainder of the roadway.

Ramp roadways at interchanges and access points will be 16 to 20 ft. wide, superelevated for 30-mi. speed. They are to have bituminous surfacing.

Interchange structures at all crossings of major city thoroughfares will eliminate left turns and provide complete grade separation. Various designs of interchange have been worked out for the intersections considered as requiring them, depending on topography, probable volume of use and other factors.

Cost of the project

While right-of-way costs are hard to estimate in advance, independent appraisers have estimated that about $2,000,000 would be required. Construction costs, based on present prices of material and current wage rates, follow:

Grading	$ 2,395,000
Drainage	550,000
Structures	4,387,000
Paving	2,655,000
Appurtenances	405,000
Railroad and sewer changes	378,000
Landscaping	74,000
Engineering and contingencies	1,626,000
TOTAL CONSTRUCTION	$12,470,000
Right-of-way	2,000,000
TOTAL	$14,470,000

The final recommendation of the engineering firm in its report was that the northern half of the project, north from Tenth Ave. and Zuni St., be undertaken as the first postwar construction. Its cost would be approximately $6,200,000, plus $800,000 for right-of-way, and would take care of the most urgent needs.

Mexico High Octane Refinery Begins Production This Year

THE MEXICAN Government's new 100-octane aviation refinery at Atzcapotzalco, near Mexico City, which is being constructed with the aid of a $10,000,000 loan from the Export-Import Bank of Washington, is scheduled to begin production late this year, the Petroleum Administration for War announced.

The Administration, which assisted in the negotiations for the loan, reports the first new unit of the refinery is expected to be in operation by October, 1945, while completion of the entire project is scheduled for December, 1945.

The United States Government will have the first rights to purchase part of the output of aviation and certain other products of this refinery. This is the Mexican Government's first venture into the production of 100-octane aviation fuel. Until now, Mexican refineries have confined themselves to manufacturing automobile gasoline, kerosene and fuel oil to meet Mexico's internal requirements, as well as making offshore shipments of fuel and diesel oils.

The cost of the entire project will exceed $15,000,000, and arrangements have been made for the purchase of materials and equipment in the United States to be financed by the $10,000,000 Export-Import Bank loan. Thus far, however, no part of this credit has been used by the Mexican Government.

Orders for 60 per cent of the equipment and materials have been placed and engineering work is well along, the Petroleum Administration for War reports. Construction is being carried on by a United States engineering firm, under the general supervision of a United States oil company that has a contract as technical consultant to Petroleos Mexicanos, the Mexican Government organization that operates seven refineries in Mexico.

While Petroleos Mexicanos has been active since the start of the war in the purchase of operating, repair and maintenance materials for its refineries, it has been subject to wartime restrictions and has taken its turn along with the oil companies of other United Nations in importing equipment from the United States.

New County Road Aid Formula

Washington State Motor Fuel Tax distribution among the counties of the state, long a topic of controversy, was settled recently when the Legislature enacted into law recommendations offered by the Public Administration Service, based on a two-year survey of county road needs

IN ACCORDANCE with an order of the Washington State Legislature, 1943 session, the Public Administration Service of Chicago was employed to conduct a survey to determine, on the basis of relative road fund need, for each of the 39 counties of Washington, its equitable share of the total state motor fuel tax funds available to the counties. Field work of the study was begun in August, 1943, and the report was filed January 1, 1945.

The overall system of financing state and local government in Washington was treated generally in the report so as to provide a basis for a more detailed discussion of the problem of financing highways as one governmental service. Factors commonly used by other states in the distribution of motor fuel tax revenues were reviewed and appraised with respect to their general validity and appropriateness for use in Washington. A detailed analysis of all county road systems and their use, and of county road construction and maintenance cost, was necessary to discover and appraise the influence of variations on the relative needs of counties for road funds. Analyses of all these data and other relevant factors, supplemented by the actual inspection of many roads in all counties, led to the conclusions which provide the basis for the recommended formula. These same basic recommendations have been enacted into law by the Washington State Legislature in the 1945 session.

Ninety per cent of the revenues from motor fuel taxes available to the counties will be distributed on the basis of road fund needs. Factors comprising this 90 per cent are county trunk mileage, which is the best measure of present and future needs, and motor vehicle registration outside incorporated places, both weighted for variation in county maintenance and construction costs. Arithmetical equality will be used as a factor in the distribution only to the extent of 10 per cent of the overall formula. Assuming an annual total distribution of $6,500,000 this legislation will give each county approximately $16,000 as a base before distribution of the remaining 90 per cent of the fund is affected, thus providing a nucleus of road funds large enough to encourage even the smaller counties to organize and administer construction, maintenance, and operation of their road systems at an acceptable standard.

The Washington road system

The state of Washington has a well-integrated highway system of more than fifty-five thousand miles of road. Since community interests of the state overlap again and again, the 55,132 mi. of roads and streets are distributed among "systems."

There are 39,816 mi. of county highways which are maintained by the county governments. Comprising 72 per cent of the total road and street mileage in the state, county highways are an important and basic part of the total road system. Between the 39 counties there is a vast difference in the travel on such roads; not due to the character of county highways, the degree to which they have been improved or the service which they provide, but to the geography of the state.

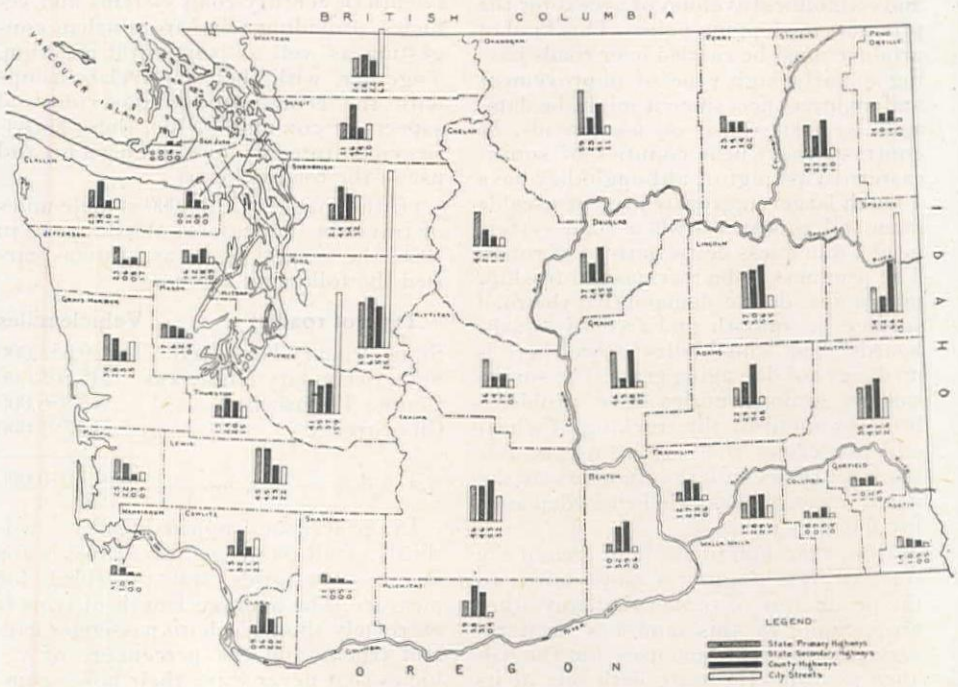
Comprising another section of the road system in Washington are state primary highways. These main arteries of travel connecting the larger centers of industrial and commercial population and the more important agricultural, forest and recreational areas of the state, totalled 3,761 mi. in 1941.

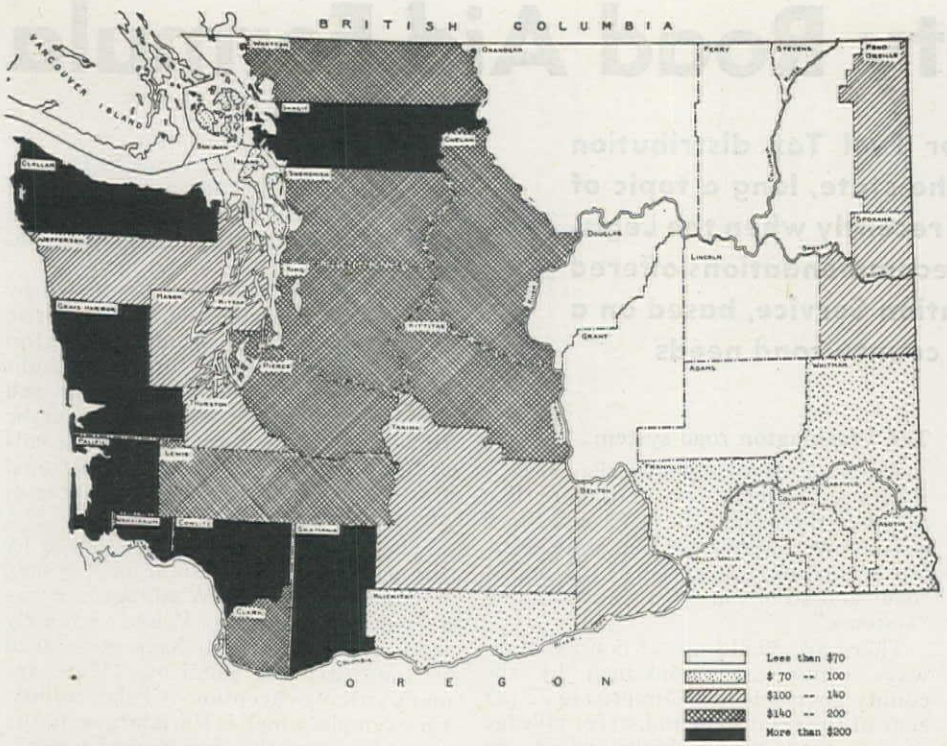
The state secondary highways are the more important feeder roads to the primary highways, and amount to a total of 2,222 mi. These thoroughfares were a part of the county highway systems until 1937.

Rural public roads are maintained by the federal government, and comprise the remaining 3,996 mi. of Washington State highways. When especially built for purposes of forest development and fire protection, they are closed to public travel, but the majority of these roads are located in national parks, national forests, and Indian reservations, free of any travel restrictions.

The total size of the area served by any particular road system may or may not be important. In Washington it has very little significance. While extremely large counties tend to have more road mileage than the small one, there are many striking exceptions. Chelan county, for example, which is third largest in the state, is sixteenth when ranked according to rural road mileage. Spokane county in contrast, only an average size, ranking nineteenth in that respect, has more mileage of rural roads than any other county except Yakima. Not all parts of the land area need the same amount of road mileage because not all parts are used for the same purposes. The state of Washington has a special problem in this respect, for as much as any other state in the Union, it has extreme variations in land form, soil structure, and climate. These three elements determine the possible use of the land. This varied land use is an important factor in the consideration of highway prob-

SHOWN IN map form, the relative amount of road mileage of each system in each county. The bar lengths represent the percentage which the number of miles of each road system in each county bears to the total number of miles of that system in the state.





THIS MAP SHOWS the counties grouped according to average annual maintenance expenditures for all types of roads except unimproved, and also includes that expended for ferries, wharves and structures. Wet climate tends to enlarge maintenance costs.

lems. The people of Washington are distributed in community units in accordance with the land use pattern, and road system needs bear a close relation to that pattern.

Development of the system

Highway development in Washington has been much influenced by agricultural activities. The parts of Kitsap, King, Pierce, and Snohomish counties, having mainly small poultry, truck and berry farms, and the sections of Yakima county devoted to fruit orchards, must be served by a very closely-spaced system of roads in order to provide safe and economical avenues of access for the products to shipping points. This kind of produce must be carried over roads having a fairly high type of improvement and maintenance, since it might be damaged by fast transit on poor roads. In contrast, the wheat counties of southeastern Washington, although they have a much larger aggregate area of useable farmland to cover with a road system need a much less dense pattern of roads. The products to be transported to shipping points do not demand that the road surface be smooth and free of "washboards" and "chuckholes" since there is no danger of damaging grain. The southeastern grain counties have problems brought about by the trucking of wheat and pea crops, in that the use of fast moving trucks in large numbers at the height of harvest season brings demands for dustless roads.

More than half of the land area of the state of Washington is more suited to the production of timber than any other crop. Some of this land has been reserved for recreational uses, but the balance provides the state with one of its greatest economic resources, merchantable timber. Roads giving access to all parts of forest areas are necessary for fire protection, for developmental purposes, and for removing cut timber. For the purposes of fire protection and development, roads need have only a low degree of improvement. For the trucking of logs, a better road is usually necessary.

Basic to the well-being of every community are the social, institutional, and recreational activities which make up what might be called the "cultural" life of the community. Access to these cultural benefits has been facilitated by twentieth century road systems and vehicles, providing relief from urban congestion as well as from rural isolation. Together, with their interrelationships with the economic and governmental aspects of community life, these activities constitute an important need for and use of the road systems.

Of the total 4,017,010,000 vehicle miles of travel in the state of Washington in 1936, the several highway systems carried the following amounts:

Type of road	Vehicle miles
State Primary Highways	1,720,855,000
State Secondary Highways	235,508,000
County Highways	545,856,000
City Streets	1,514,791,000
Total	4,017,010,000

In peacetime, approximately two-thirds of all passenger car travel is for business purposes and one-third for pleasure. The average length of trips is extremely short for both passenger cars and trucks and the percentage of vehicles that never leave their home community or visit only a very few other communities is large. Percentage of vehicles visiting other states is small.

History of Washington roads

The territory of Washington was created in 1854, and the first Legislative Assembly met at Olympia on February 27 of that year. From that time until the creation of the State Highway Department in 1905, highways and roads were considered primarily county responsibilities. Although the county was responsible for roads during this period, and jurisdiction remained with the county commissioners, the actual administration devolved on road district supervisors, who until 1890 performed all duties in connection with road operations. Road districts were in existence even before any legislation mentions them and have continued until this day, each district being a small local unit for road work. In 1890 the county commissioners were recognized as the directing heads of the road system, and were designated as ex-officio road commissioners of their respective county commissioner's districts, which were first established in that year. Up to that time in road matters, county commissioners had acted as a unit for the entire county.

From 1854, legislation directed all males between 18 and 50, excepting "ministers, the infirm, and public charges," to work on the roads for three days in each year. The 1857 Legislature authorized county commissioners to assess a road tax of $9 per person (this was still to be worked out if the person were able) and another road tax of 25 cents on each $100 of assessed property valuation. The first road fund was made up of moneys secured from these sources.

Washington became a state in 1889 and the legislatures since then have been increasingly conscious of the need for highway construction and maintenance. Private toll bridges formerly operating under franchises granted by the counties began coming under public ownership. This general shift from roads and bridges, developed and improved by private parties, for which tolls were charged, to the so-called free highway, was probably responsible, in part at least, for the development of the method of financing roads by bond issues, redeemed either by specific taxes levied for that purpose or, after 1893, in the case of certain roads called "Donahue Roads," by taxes and special assessments levied against property owners.

In 1905, the state highway department and state highways came into being, when the legislature made provisions for the appointment of a Highway Commission, and a State Highway Board, composed of the Commissioner, the State Auditor and State Treasurer. The Commissioner was to be appointed by the Governor for a term of 2 years. At the same time a State Highway fund was created for the construction of state roads.

Component highways

The present highway system of Washington is made up of the following com-

ponent parts, as defined by state and federal statutes and regulations:

1. Primary state highways: 3,761 mi. of state highways outside incorporated cities and towns designated as such, by number and name, by the state legislature. These highways are established, constructed, maintained, and improved by the state through the State Highway Dept.

2. Secondary state highways: 2,222 mi. of state highways outside incorporated cities and towns, and designated as such, by number and letter, by the state legislature. Secondary highways are established, constructed, maintained, and improved by the state through the State Highway Dept.

3. Connecting links: 288 mi. primary highways and 113 mi. secondary highways, comprised of streets within the limits of an incorporated city or town which have been designated as the through routes of primary or secondary highways but which are maintained by the city within which they are located.

4. County roads: 39,816 mi. of road, comprising all public highways or portions thereof outside incorporated cities and towns, not established as primary or secondary systems. County roads are administered by the county commissioners, as agents of the state, under the supervision of the State Highway Dept.

5. City streets: 4,936 mi. of streets within incorporated cities and towns which are not part of the state system. These streets, like connecting links, are administered by the governing bodies of the municipalities under the supervision of the State Highway Dept.

In addition to the above, there are 4,115 mi. of highways in federal parks, forests, and reservations.

The sources of revenue which have been used to finance expenditures for state highways are property taxes, motor fuel taxes, motor vehicle registration fees, federal aid and miscellaneous tolls, fees, and other charges.

Fund distribution factors

In considering what factors to include in a new formula for distributing the counties' share of the Washington motor fuel tax, it was necessary to consider factors used in the past, and factors now used in other states. These, and other elements were tested by certain criteria to determine their suitability for inclusion in the new formula. Of the factors in common use, four are general, having no direct relationship to highway use or need. These are equal division, area, population, and assessed valuation. Each item considered was analyzed and criticized in the light of 5 criteria:

1. Measurement of need for roads and road funds.
2. Measurement of changes in need.
3. Allowance for difference in highway costs.
4. Simple and accurate annual measurement.
5. Freedom from influence by county officials.

Result of the analysis was the conclusion that most of the factors were unsuitable for the designated purpose; that three of them have a measure of suitability; and that another, representing variations in standard unit costs of highway construction and maintenance had to be added.

The following factors were found unsuitable, for the reasons stated:

1. Equal division. For general application this factor failed to meet the two essential criteria, measurement of need and measurement of changes. Suitability for a very limited purpose is indicated below.

2. Area. Area, like equal division, failed to measure need or changes in need.

3. Population. This factor, although a partial measure of road use and to that extent, need, and a good measure of changes in road use, was rejected because accurate measurement is available to the state only once in ten years.

4. Assessed valuation. An inverse measure of need, and inflexible even to changes in real estate values, this factor is also highly susceptible to local influence.

5. Motor fuel revenues. These revenues are a reasonably good measure of total state highway needs, and reflect changes quickly and accurately, but accurate allocation to counties is virtually impossible.

6. Vehicle miles of road use. One of the best measures of highway use, this factor measures need less well than county trunk mileage, weighted by cost influences. Extremely complex and expensive in measurement, its results are not verifiable, are sure to be controversial, and may be subject to local influence.

The following factors were found suitable to the extent indicated:

1. Equal division. Suitable for encouraging proper administrative practices in all counties regardless of size and as an aid to those counties whose population and county trunk mileages are exceptionally low.

2. Motor vehicle registration. Not the best measure of need, motor vehicle registration is considered the best measure of changes in need, insofar as it is directly related to road use, is already compiled annually, and can be made very accurate for the rural area of each county. Suitable as a minor factor in conjunction with others.

3. Road mileage. In the special form of county trunk mileage, this is the best measure of road need, if weighted by cost influences, and is suitable for use as the major factor in the formula. Since it lags as a measure of changes in need, motor vehicle registrations combine well with it in the formula.

Conclusions

After two years of extensive research the Public Administration Service set down the following conclusions and recommendations for Legislative approval as to the distribution of motor fuel tax.

The recommended formula is based on three factors: County trunk mileage and motor vehicle registration at the place of residence in the ratio of 70 and 20 respectively, weighted for variations in costs of roads and having a combined weight of 90 per cent, and arithmetical equality with a weight of 10 per cent.

In order to eliminate the possibility of hardship on several counties arising from the necessity for large or movable span

EFFECT OF PROPOSED APPORTIONMENT OF MOTOR FUEL TAXES ON EACH COUNTY
STATE OF WASHINGTON

COUNTY	Apportionment Based on Proposed Formula Per Cent	Present Statutory Apportionment Per Cent	Apportionment to Each County Based on Distribution of $6,500,000				Gain or Loss in Per Cent of Present Statutory Percentages
			Proposed Formula	Present Statutory Ratios	Increase	Decrease	
Adams	1.50	1.90	$ 97,500	$ 123,500	$	$ 26,000	—21
Asotin	.65	.91	42,250	59,150		16,900	—28
Benton	1.97	1.84	128,050	119,600	8,450		+ 7
Chelan	2.18	2.32	141,700	150,800		9,100	— 6
Clallam	2.53	2.24	164,450	145,600	18,850		+14
Clark	4.23	3.11	274,950	202,150	72,800		+36
Columbia	.96	1.30	62,400	84,500		22,100	—26
Cowlitz	3.31	2.38	215,150	154,700	60,450		+39
Douglas	1.54	1.34	100,100	87,100	13,000		+15
Ferry	.87	.95	56,550	61,750		5,200	— 8
Franklin	1.06	1.24	68,900	80,600		11,700	—14
Garfield	.96	1.29	62,400	83,850		21,450	—25
Grant	1.30	1.29	84,500	83,850	650		+ 1
Grays Harbor	3.46	2.95	224,900	191,750	33,150		+17
Island	1.08	.77	70,200	50,050	20,150		+40
Jefferson	.90	1.26	58,500	81,900		23,400	—28
King	10.92	14.53	709,800	944,450		234,650	—25
Kitsap	2.36	2.26	153,400	146,900	6,500		+ 4
Kittitas	2.01	2.04	130,650	132,600		1,950	— 1
Klickitat	1.61	2.34	104,650	152,100		47,450	—31
Lewis	3.82	3.12	248,300	202,800	45,500		+22
Lincoln	1.54	2.35	100,100	152,750		52,650	—34
Mason	1.22	1.64	79,300	106,600		27,300	—25
Okanogan	2.21	1.55	143,650	100,750	42,900		+42
Pacific	1.59	1.94	103,350	126,100		22,750	—18
Pend Oreille	1.19	1.38	77,350	89,700		12,350	—14
Pierce	5.93	6.11	385,450	397,150		11,700	— 3
San Juan	.66	.68	42,900	44,200		1,300	— 3
Skagit	4.27	3.47	277,550	225,550	52,000		+23
Skamania	1.01	1.29	65,650	83,850		18,200	—22
Snohomish	5.08	4.91	330,200	319,150	11,050		+ 3
Spokane	6.03	3.84	391,950	249,600	142,350		+57
Stevens	1.72	1.84	111,800	119,600		7,800	— 6
Thurston	2.73	2.16	177,450	140,400	37,050		+26
Wahkiakum	.75	.89	48,750	57,850		9,100	—16
Walla Walla	1.76	2.29	114,400	148,850		34,450	—23
Whatcom	4.07	3.56	264,550	231,400	33,150		+14
Whitman	3.79	33.37	246,350	347,750	27,300		+12
Yakima	5.23	5.35	339,950	347,750		7,800	— 2
Total	100.00	100.00	$6,500,000	$6,500,000	$625,300	$625,300	

bridges it was recommended that provision be made for the construction of such structures by the state highway department and the sharing of a substantial portion of such construction costs with the state, even though such structures might be located on county roads.

It was also recommended that the law distributing motor fuel tax revenues among the counties incorporate only the formula and not detailed percentages for each county. The determination of the exact amounts going to each county then becomes a ministerial function which should be assigned to an augmented state-aid division in the state highway department. This division will be responsible for the annual determination of the mileage to be included in the county trunk system of each county.

It will also be the duty of the state-aid division to determine annually the registration of private cars and trucks outside incorporated places for each county. These data, compiled annually, will enable the determination, through application of the statutory formula, of the proper percentage of the whole to be allotted each county.

It was further recommended that the present duties and authority of the state-aid division be extended. It may not be necessary or desirable to check all vouchers for county road fund disbursements but some supervision over such expenditures should be exercised. The state-aid division is authorized to reestablish and perhaps extend the uniform accounting and reporting practices which were initiated several years ago. This division might well develop general standards for the maintenance and construction of county roads. This division might also attempt to develop a uniform policy as to the maintenace of roads in forests and give the counties some assistance in negotiating with the Indian Service with respect to the maintenance and construction of roads in Indian territory.

It was advised that the state-aid division be given some authority to require the counties to submit complete reports and accounts every year. A continuing study is to be made of road costs throughout the state and all the counties in order to determine whether the weights that have been given to the trunk system mileages continue to bear the same relationship year after year. It is possible that certain characteristics of road use may change to such an extent that the needs as expressed in variations in costs of maintenance and construction might be changed somewhat from county to county, even though climatic and topographic conditions have not changed and are not likely to. Only through a complete and uniform system of accounting and reporting will the state-aid division be able to obtain data to check these cost figures from year to year. It is vital to the continued operation of the proposed plan of distribution of the motor fuel taxes that this authority be given to the state-aid division.

Price Fluctuation and Index For Construction Machinery

PRICES OF THE MAJOR types of new construction machinery averaged about 11 per cent higher in December 1944 than in August 1939, according to the Bureau of Labor Statistics' newly developed price index for construction machinery. Prices began to advance shortly after the outbreak of the war in Europe and moved steadily upward through January 1942. The largest part of the price rise was concentrated in the first eleven months of 1941. After January 1942, prices remained relatively stable through 1944 except for slight increases in July and December of that year.

Price changes by individual groups of machines ranged from a decrease of 2.1 per cent in the case of portable air compressors to an increase of 14.4 per cent for track laying tractors as compared to the average increase of 10.7 per cent for all types. Prices for certain types of construction machines changed slightly during the period from January 1942 through June 1944 although the index of prices for all types remained unchanged. Thus small price increases were reported in February 1942 for tractor mounted equipment; in February and March 1942, and in November 1943, for specialized construction machinery; and in May 1944 for scrapers and graders. Price declines were reported for portable air compressors in March and February 1942, and again in April 1943. These changes were not sufficiently great to affect the overall average.

The index numbers shown below were developed recently by the Bureau of Labor Statistics and are published here for the first time. They are based on August 1939 as 100 per cent and will be maintained on a current basis and issued quarterly in the future.

The Bureau had the advice of industry representatives in the selection of the types of machines to be priced. This report is based on information obtained from seventy-one manufacturers of construction machinery located in the major producing areas of the country. Shipments of construction machinery by these companies during 1941 represented approximately 90 per cent of the total shipments of the industry for that year. A complete report containing more detailed information on individual types of construction machinery since 1939 will be available in the near future.

TABLE 1—INDEX NUMBERS OF PRICES OF CONSTRUCTION MACHINERY—AUGUST 1939-DECEMBER 1944

(August 1939 = 100)

	1939	1940	1941	1942	1943	1944
January	.....	100.6	103.2	110.5	110.5	110.5
February	.....	100.6	103.6	110.5	110.5	110.5
March	.....	100.6	104.2	110.5	110.5	110.5
April	.....	100.8	105.0	110.5	110.5	110.5
May	.....	100.9	105.5	110.5	110.5	110.5
June	.....	100.9	106.2	110.5	110.5	110.5
July	.....	101.3	106.5	110.5	110.5	110.6
August	100.0	101.2	108.3	110.5	110.5	110.6
September	100.0	101.4	109.3	110.5	110.5	110.6
October	100.1	102.3	110.0	110.5	110.5	110.6
November	100.4	102.3	110.4	110.5	110.5	110.6
December	100.5	102.3	110.4	110.5	110.5	110.7
Yearly Average	.....	101.3	107.0	110.5	110.5	110.6

TABLE 2—INDEX NUMBERS OF PRICES OF CONSTRUCTION MACHINERY BY GROUPS—AUGUST 1939-DECEMBER 1944

(August 1939 = 100)

	Aug. 1939	Dec. 1940	Oct. 1941	Dec. 1942	Dec. 1943	Dec. 1944
Construction Equip., Tractor Mounted	100.0	100.3	108.8	108.8	108.8	109.7
Construction Machinery, Specialized	100.0	101.1	110.8	111.5	111.8	111.8
Construction Material Mixers, Pacers, Spreaders and Related Equip.	100.0	100.5	106.3	106.4	106.3	106.8
Construction Material Processing Equip.	100.0	100.6	110.9	112.7	112.7	112.7
Power Cranes, Draglines, Shovels, and Related Equip.	100.0	101.4	110.5	110.9	110.9	110.9
Scrapers, Maintainers, and Graders	100.0	100.4	107.2	107.2	107.2	107.5
Drilling and Boring Machinery	100.0	100.0	100.0	100.0	100.0	100.0
Tractors, Track Type	100.0	106.0	113.4	114.4	114.4	114.4
Portable Air Compressors	100.0	100.7	100.0	98.4	97.9	97.9
Construction Machinery All Types	100.0	102.3	110.0	110.5	110.5	110.7

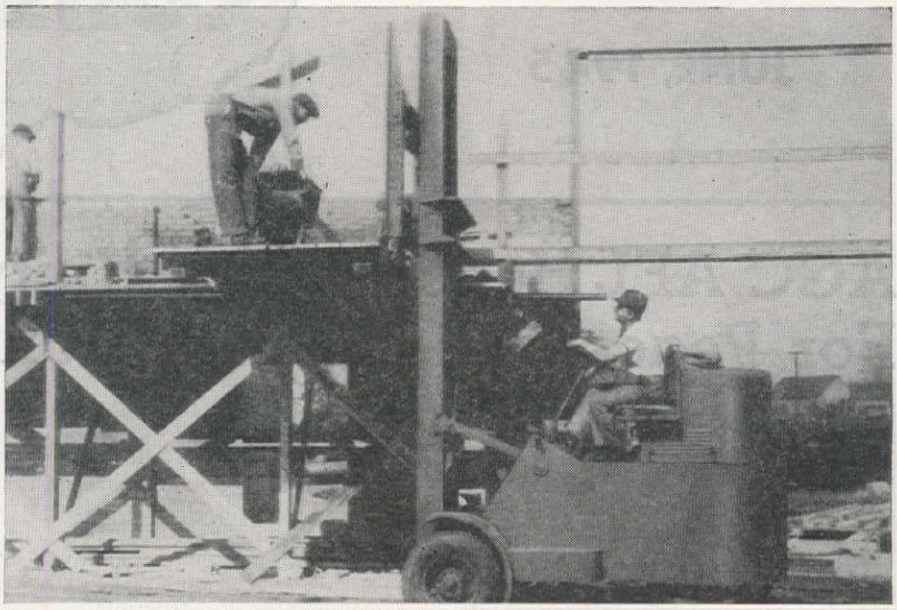
HOW IT WAS DONE

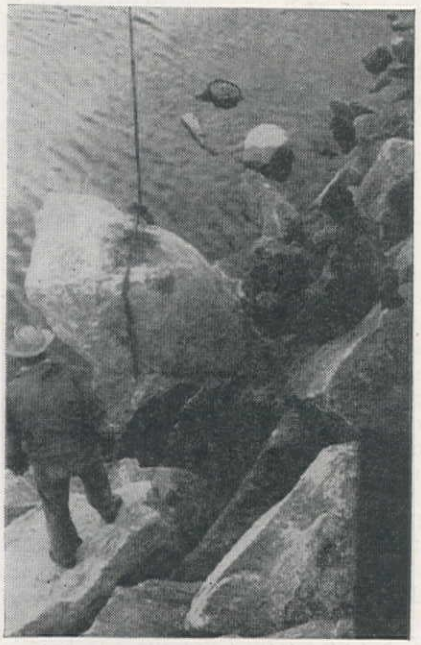
JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

Crane on Car Sets Jetty Armor Rock

FINAL FACE of the jetties at the Naval Ammunition and Net Depot, under construction at Seal Beach, Calif., by Guy F. Atkinson Co., contractors, was made by placing rocks individually from flat cars as described in an article elsewhere in this magazine. A crane mounted on the string of cars performed the required lifts. Incidentally, positioning the suspended rock by the workmen using their feet, as shown in the photo below, is hardly recommended as a safety measure.

Rock weighing up to 15 tons was used as armor on the seaward side of the levees, and from 4 to 8 tons on the inward side, shown in this photo.





Lift-Truck Used as Elevator Hoists Brick Onto Scaffold

THE ADAPTABILITY of lift-trucks to construction work is amply demonstrated in the photograph above, taken on a western factory construction job. Here a lift-truck does duty as an elevator for hoisting bricks and mortar to the bricklayers. A wheelbarrow is loaded on the ground with bricks or mortar and wheeled onto a plank platform resting on the forks of the lift-truck. Then, the entire load — bricks, wheelbarrow and workman—is elevated in a matter of seconds to the bricklayers' staging, where the wheelbarrow is dumped. This unusual use of a lift-truck has tremendously speeded up the bricklaying, as well as a variety of other work, and the entire job is moving rapidly toward early completion.

This item was sent to *Western Construction News* by Ross Carrier Co., manufacturers of the lift-truck employed by the sub-contractor for brick work on the job.

ROAD CULVERT OF NATIVE TIMBERS

PROBABLY the most difficult part of construction of the Canol project, constructed for the Army Engineers by Bechtel-Price-Callahan, was the transportation of necessary men, material, and equipment to the jobsite. A portion of it was hauled by water, some by air, and more by road. A discussion of the various methods employed appeared in *Western Construction News* for October, 1944. However, since no roads existed into isolated Norman Wells, eastern terminus of the project, the first essential was their construction. Most of them were built in the dead of winter under extremely difficult conditions. To clear a passageway, bulldozers were employed; tractors pulled the trains of equipment when the road was pushed through. For bridging the smaller gullies along the route, native timber was in many instances employed, as illustrated in the photo at the right, taken by Richard Finnie, historian of the project. Since the road was later abandoned, it was not necessary to design for permanence, but only for strength.

NEWS OF WESTERN CONSTRUCTION

JUNE, 1945

AGC, AFL Heads Pledge Unity For Peacetime Reconversion

THE ASSOCIATED GENERAL Contractors of America and the Building and Construction Trades Department, American Federation of Labor, have reached an understanding for the purpose of seeking to solve their mutual problems in the postwar period.

Harry A. Dick, Portland, Ore., President of AGC, issued the following statement explaining the understanding.

"The understanding reached between the Associated General Contractors of America and the Building and Construction Trades Department, American Federation of Labor, is the first of steps to be taken between management and labor with the aim of bringing about an orderly reconversion to peacetime construction work.

"Management and labor in the construction industry believe that with their intimate knowledge of the industry they are better qualified than anyone else to work out the problems which will arise in the postwar period between labor and management in construction.

"Representatives of the two organizations have met in Washington for the purpose of exploring the problems confronting the construction industry in the reconversion and postwar period and have arrived at a four point program. The points of this program are general in nature at the present time.

"Details of the program will be worked out by committees of the two organizations. Members of these committees will be announced at a later time."

Formal relations between the two organizations date from the fall of 1939 when the Executive Council of the Department met with the AGC Labor Relations Committee in Atlantic City and formulated a program for improvement in handling of jurisdictional disputes to prevent stoppages of work.

Construction is the largest major industry which will be able to turn quickly to peacetime work. It is being looked upon by the nation to furnish a large volume of employment during the reconversion period and to execute a volume of work in the postwar period of about 10 per cent of the national economy. The relationships between labor and management must be such that this work may be undertaken without any loss of efficiency.

Those facts form the background for the meeting which has been held and for the joint announcement which has been made. By taking this step both labor and management in construction in effect pledge to the public that they will take the responsibility for working out their joint problems efficiently and intelligently.

A statement of the accord arrived at follows:

1. Maintain and improve the present working relations in the industry.
2. Prepare a record of the points of agreement existing on a national basis.
3. Set up a joint Committee to handle within the industry the various problems arising which cannot be dealt with locally.
4. Retain within the industry control over its own problems rather than having to resort to Federal or State Legislation or administrative action.

PUBLIC WORKS ADVISORY COMMITTEE APPOINTED BY GEN. FLEMING

MAJ. GEN. PHILIP B. FLEMING, Federal Works Administrator, has appointed a Public Works Advisory Committee to assist him in planning postwar construction. Shown below, they are, l. to r., seated, F. STUART FITZPATRICK, U. S. Chamber of Commerce; E. LAWRENCE CHANDLER, A.S.C.E.; COL. WM. N. CAREY, chief engineer, FWA. Standing, EARL MALLERY, Municipal Association; MAJ. E. R. PURVES, Amer. Inst. of Architects; S. LOGAN KERR, A.S.M.E.; H. E. FOREMAN, AGC; FREDERIC BASS, Amer. Pub. Works Assoc.; J. W. FOLLIN, Producers' Council; B. E. CRIHFIELD, Council of State Governments; R. J. GRAY, AFL. Not shown are PAUL BETTERS, Conference of Mayors, and HAL HALE, A.A.S.H.O.

Friant-Kern Canal Obstacles Studied

THE FRIANT-KERN CANAL of California's Central Valley project appears to be moving nearer to realization. A series of meetings is being held in the San Joaquin Valley between representatives of irrigation districts in the service area and officials of the Bureau of Recla-

mation, looking toward the negotiation of contracts for the water which will be available for delivery.

When contracts are completed for a large percentage of the water which will be available through Friant-Kern Canal, an important obstacle will be removed to prompt initiation of construction. Another major obstacle will be removed when the War Production Board lifts its ban on labor and materials.

The Friant-Kern Canal is the chief uncompleted San Joaquin Valley feature of the authorized portion of the Central Valley Project. It is a key structure, designed to carry water stored behind Friant Dam southerly along the Sierra Nevada foothills a distance of 160 mi. to a point near Bakersfield and will serve as a main southern artery of the entire Central Valley Project system, which extends from the headwaters of the Sacramento River on the north to the drainage area of the Kern River.

Before a full supply of water can be delivered from Friant Dam for export to the south, its three sister structures—Delta-Cross Channel, Delta-Mendota Canal, and the Sacramento-West Side Transmission Line to bring Shasta power to the Tracy pumps—must also be built and put into operation. This assures a necessary replacement of San Joaquin River water diverted to the Friant-Kern Canal.

Friant-Kern Canal, which will be the longest and third largest canal in California, is exceeded in size only by the All-American Canal and the Delta-Mendota Canal. It will furnish water to lands not now irrigated, and supplemental water to lands inadequately supplied for a total irrigable area of 1,000,000 ac. in Fresno, Kings, Tulare, and Kern Counties.

The canal will cost approximately $23,500,000 at 1940 prices. The construction will involve heavy excavation work and numerous bridges, siphons, culverts, and other works. About 40 per cent of the canal will be concrete lined. The Bureau estimates that about 3 years will be needed to complete the project from the time of ground breaking.

Fairbanks New Water Supply To Be Pre-Heated by Steam

PLANS FOR A UNIQUE water supply system at Fairbanks, Alaska, are being prepared. Although the water will come from wells two miles outside the city, it will be heated by means of steam boilers, to raise the temperature from 34 deg. to 38 deg. F., before it can be distributed.

Some time ago the Federal Works Agency provided a $1,403,267 grant for the construction of the Fairbanks water supply system. Recently a $350,817 bond issue was voted by the city of Fairbanks to be used in connection with the Federal Works Agency appropriation.

In preparing the project plans, the engineering firm of Black and Veatch, Kansas City, Mo., have included a sewage pumping plant, storm sewers, and the installation of protected fire hydrants.

Reclamation Bureau Outlines a Vast Colorado Irrigation and Power Plan

IRRIGATION, FLOOD control and power development projects which would cost 525 million dollars are being planned for Colorado as part of the 4,792 million dollar postwar program of the U. S. Bureau of Reclamation.

Largest of the Colorado projects would be a 215 million dollar plan to divert Gunnison river water from the western slope through tunnels to the Arkansas river on the eastern slope. The project would bring 400,000 ac. of land under irrigation for the first time, furnish supplementary irrigation for 300,000 additional acres already under partial irrigation, provide for flood control and develop large amounts of electric power.

Of the 21 projects for Colorado outlined by the Reclamation Bureau, two already are under construction, three more have been authorized for construction and 16 are under study.

Next in size to the Gunnison-Arkansas project would be the Blue river-South Platte diversion project, which would cost 178 million dollars, provide electric power, furnish irrigation for 200,000 ac. of land in the Denver region and supplement the irrigation supply of 350,000 additional acres.

Projects already under construction are the Colorado river-Big Thompson diversion project, which calls for a total expenditure of $38,939,000, and the $1,098,000 Mancos project on the San Juan river in Montezuma county, which will furnish irrigation for 2,000 ac. and supplemental irrigation for 8,000 ac. and will involve erecting of a power plant.

Authorized but not yet under construction are the $1,373,000 Fire Mountain division irrigation project on the North Fork of the Gunnison river near Paonia, the $17,465,000 San Luis Valley flood control and supplemental irrigation project on the Rio Grande and the $3,800,000 La Plata irrigation project on the San Juan river west of Durango.

Under study is a 22-million-dollar project for the narrows of the South Platte river which would control floods, provide electric power and furnish water for 100,000 ac. of land and supplemental water for 100,000 additional acres.

Also under study are plans for 11 million dollars worth of electric transmission lines in the state and 5 million dollars worth of "miscellaneous" dams and canals which would irrigate 5,000 ac. and furnish additional water for 25,000 ac. already under partial irrigation.

Other projects under study are:

An $11,600,000 upper Dolores river project to irrigate 40,000 ac.

A $3,850,000 power and flood control project near Montrose, on the Uncompahgre river.

A $3,200,000 Purgatoire river project near Trinidad to control floods and irrigate 25,000 ac.

A $2,500,000 flood control and irrigation project on the Animas river south of Durango.

A $1,940,000 irrigation project on Plateau creek, near Collbran, in Mesa county.

A $1,835,000 extension of the Pine river project east of Durango.

Two irrigation projects to cost $1,500,000 each on the San Miguel river and at Hunter Mesa on the Colorado river.

A $1,300,000 irrigation project on West Divide creek near Silt.

A $1,320,000 irrigation project on Rifle creek, also near Silt.

A $797,000 project in the Minnesota region, on the Gunnison river, near Paonia.

Nevada Plans Freeway By-Pass For Las Vegas

ROBERT A. ALLEN, Nevada State Highway Engineer, announced that his office has recently obtained the rights of way for a 100-ft., four lane, divided highway on Route 95 south of Las Vegas through the Last Frontier area.

Allen also said the Charleston Ave. freeway around Las Vegas has been completed, and plans for a grade separation between the freeway and the Union Pacific Railway have been completed to make it one of the first post-war projects as soon as materials and manpower are available. Charleston Ave. was originally built to facilitate the shipment of magnesium ore around downtown Las Vegas to the B. M. I. plant situated southeast of that city, however, it will serve present and future traffic.

New Roofing Standards Suggested For Industry

A PROPOSED SIMPLIFIED Practice Recommendation for Asphalt and Tarred Roll Roofing and Saturated Felt Products has been submitted to producers, distributors and users of these products for approval or comment, according to an announcement of the Division of Simplified Practice, National Bureau of Standards.

The proposed recommendation, which was developed in co-operation with the industry, covers smooth and mineral surfaced roll roofing, roll siding, and saturated felt only. If approved, it will become effective on a voluntary basis, when war time restrictions are removed.

It is believed that the proposed recommendation includes all the items which will be required for regular needs. Its adoption by the industry for stock production and distribution should foster the efficiency needed to meet the anticipated heavy demands of the post-emergency period.

Mimeographed copies of the proposed recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

WASHINGTON NEWS
. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—About the only step taken by WPB to help the construction industry, now that V-E has passed, is the tentative plan to permit manufacturing industries to start perhaps after July 1 to make some few things after the MM (military priorities) and CC (essential priorities) have been served. And the only way these industries might get materials and men and facilities is to scramble for what is left after the MM and CC have been served. Spot authorization has virtually been ditched; and the post-July 1 plans are wholly conditional upon perhaps and if military and essential leave anything. It is even doubtful here if the July 1 promise is firm.

There have been cautious releases saying that L-41 may be much freer, and that some types of urgent civilian industry may be permitted to do some absolutely imperative very limited construction; but even this is all entangled with qualifications. They may mean it, but you cannot tell what they really mean until July 1 has passed, and until they show their hands more definitely. I am convinced the military together with Krug and his immediate top bracket brass hats intend to keep a very tight rein on construction and everything else until the war production program is much more definitely clarified, and until all civilian parts of industry can start from scratch. It still is not possible to tell what Truman has in mind, if anything; and we know Vinson, the highest in the hierarchy, has platitudinously said nothing except to shadow box.

Also, it must be borne in mind that the Russians still have us anxiously guessing, and we cannot be too free with civilian activities until that riddle is composed.

The mass of business men in WPB and other agencies think reconversion should go into top gear. They say unless we act with everything we've got, 4,000,000 men will be out of jobs by July, and that the slowdown will be a real slump for 18 months to 2 years.

The orders thus far revoked almost invariably revoke nothing. Even the promise to provide materials by July 1 are conditioned upon military and other possibilities. This revocation of orders is regarded in WPB as bait, and having no real meaning. Sheet and strip steel is still tight and there are no signs of release, though other forms of the metal are easier. No actual production under any of the revoked orders is yet in sight.

Authority arguments

The West and its future have been much in the limelight in Congress the past month. The first round in the Missouri Valley Authority battle was fought before the Senate Commerce Committee by 45 witnesses, about evenly divided for and against. The Committee apparently was not urgently sympathetic with the Authority idea. The next round begins before the Senate Irrigation Committee early in June. That committee is reported to be a little more in favor of Authorities.

The battle over the Authorities, in which the Missouri Valley hearings constitute the opening engagement, is part of the larger campaign which includes the conflict over the annual appropriations for the Department of the Interior, and, especially, for the Bureau of Reclamation. When the bill was recently reported to the House, it was found that almost every phase of Federal financing for activities in the 17 Western States had been sharply slashed. Government observers themselves remarked it appeared the members of the lower House appeared determined to hamstring the Interior Department and the Bureau of Reclamation. The Bureau of the Budget, which is a tough fiscal policeman to bypass, had approved $141,346,047 for the Department. The House Committee recommended a cut of almost $39,000,000, which, in essence, was approved by the House. Budget had allowed the Bureau of Reclamation $46,121,000 for expenditure in the West, which the House, in turn, clipped for another $15,000,000. The Senate Irrigation Committee will shortly hold hearings on the pinched bill, as passed by the House, and it is expected some of the slashed items will be restored.

The justification for expenditures was searched with a magnifying glass. Ickes was told he had no reason to employ 4,015 new help in Reclamation or elsewhere; his appeal for 947 new autos was denied and he was told he might buy a few used machines. Small incentive bonus payments offered to workers to suggest ideas that might save expenditures and increase efficiency, were cut out with a prolonged discussion whose recording was a greater expense than the sum slashed from the budget. Reclamation Commissioner Bashore came in for unpleasant and unfair criticism because it was charged the bookkeeping of the Bureau is vague and unintelligible, and because it was implied the Bureau had collected no interest on any of its projects except one. No one ever apparently tried to make clear the difficulty of coordinating one Government bookkeeping system with another, which is not due to any shortcomings in the Bureau of Reclamation; and finally some member of Congress offered a left-handed apology for the erroneous charge that interest charges had not been paid.

Dr. Raver of the Bonneville Power Administration appeared to have roused the special ire of Congressman Robert F. Jones, Republican, Ohio, member of the Appropriations Committee. He proceeded to make a Roman holiday by focussing a violent display of Congressional fireworks on Raver and the Bonneville Administration. He characterized Bonneville bookkeeping as "a stock promoter's statement with an Alice in Wonderland take-off." A little later he expressed respect for Dr. Raver in trying to build up the Northwest, "but a public official who demands a gangster contract for the purpose of watering his financial statement, 'out-Insulls' Sam Insull." Congressman Jones apparently had cultivated the technique of arousing much popular attention when he tried cases as Prosecuting Attorney of Allen County in Lima, Ohio. It is one of the great misfortunes in our public life that a Congressman may utter the most astrocious charges on the flimsiest grounds against any human being on the floor of either chamber without being held accountable for slander or for any other offense against the repute of the person who is mentioned. A Congressman may distort or misrepresent the facts, with every forensic professional skill, and get away with it.

House examines Mexico treaty

Congressman Ben F. Jensen of Iowa turned the spotlight on the relation of the Mexican Water Treaty and the Reclamation program. "I asked Commissioner Bashore," said Congressman Jensen on the floor of the House, "about the water supply of the Colorado river and the effect of the treaty upon it. It now appears if the United States makes good on its outstanding commitments, and on the treaty obligation to Mexico, the water deficit in a dry decade like 1931-40 will amount to 2,993,000 ac. ft. per year, or nearly 30,000,000 ac. ft. in all. Of this the Government proposes to find 1,500,000 ac. ft. by drawing down Lake Mead storage. During a ten-year drought the total amount drawn would be 15,000,000 ac. ft., or more than three-quarters of the whole active storage capacity of the reservoir. The remaining shortage, nearly 15,000,000 ac. ft. in the ten-year drought, would be borne in its entirety by the American users according to the Bureau of Reclamation, and the so-called escape clause would give us no relief, even during the decade when we are practically exhausting Boulder Dam storage to meet the Mexican obligation in full. I asked Commissioner Bashore how he would justify the exhaustion of three-quarters of Boulder Dam storage capacity. His answer was that plans contemplated sufficient storage on the river to enable this draw-down to be made. Senate Document No. 39, lists 14 reservoirs to cost $735,700,000. When the cost of this storage is added to the cost of Boulder Dam the United States will have invested $900,000,000 in storage works, and Mexico nothing; the United States will be bearing annual reservoir and evaporation losses amounting to 1,615,000 ac. ft. and Mexico none at all; and in a dry decade the delivery to Mexico would be sustained at the full guaranteed amount of 1,500,000 ac. ft. per

year, and the annual deliveries to American users would be 1,493,000 ac. ft. less than the amounts of their contracts.

"Who is to bear the cost of the $735,000,000 of reservoirs? On April 18, a few hours before the Senate approved the Treaty, there was introduced, on behalf of Senators O'Mahoney, Murdock, Hatch, Chavez, Johnson of Colorado, Millikin, Robertson, and Thomas of Utah, all of the upper basin, S.894, a bill to authorize the construction of the dams and reservoirs contained in the Reclamation Bureau's comprehensive report. There are 11 of these, accounting for about half of the $735,000,000. The bill contains this interesting provision:

" 'That the cost of construction of such reservoirs shall be borne by the United States as an expense of the administration of the water utilization treaty with Mexico.'

"If the cost of these reservoirs is written off, of course, the lower basin reservoirs, primarily Boulder Dam and the reservoirs on the Gila river system in Arizona, must receive like treatment.

"That is to say, the Appropriations Committees will be invited to approve new expenditures or write off existing costs, amounting to nearly a billion dollars, covering dams and reservoirs on which Mexican water users have the first lien.

Reclamationists must keep bargain

"S.894 foreshadows the breakdown of the whole Reclamation reimbursement policy, and seizes upon the Mexican Treaty as an excuse for writing off three-quarters of a billion Federal investment, and the construction of projects which do not conform to the standard set for the Boulder Canyon Project Adjustment Act. The Wall Street Journal for March 12, 1945, captioned an article, 'U. S. and Mexico plan a big public works program on the border; our costs, $167,000,000.' This story was credited to Boundary Commissioner Lawrence Lawson. It is clear this treaty will be used to pry out of the House approximately $1,000,000,000. I, for one, desire to give plain notice that the House of Representatives has not been consulted in making the commitments from which these huge financial consequences are said to flow, and that the House of Representatives is not obligated to appropriate money for works other than those specifically called for in the treaty. These works comprise three dams on the Rio Grande, and Davis Dam on the Colorado river.

"The reclamation States, and particularly the Colorado River Basin States, have had just and generous treatment from the Congress; but they will bring the whole reclamation structure crashing down about their ears if they try to use this treaty as a free ride to break down and to break through the provisions of the Reclamation Law, requiring the recovery of the Government's investment."

There is an impression growing among some members of Congress that the farmers of irrigated lands in the West are not eager there shall be much more development of reclaimed land in the 17 Western States, in the immediate future. Some of this sentiment is attributed to some members of Congress from Central California. The support of the Mexican Water Treaty, and its implications, by leading members of the National Reclamation Association, also is unhappily regarded as having the same significance. There is also an obviously mistaken tendency to regard the leadership of the National Reclamation Association, in the political operations of the recently organized national combination of powerful water-utilization bodies, in the same light. There seems more reason to feel some justification for the feeling that farmers of the South, the Plains States, and the East, consciously are girding themselves to oppose more reclamation.

The gathering conflict over the Missouri Valley Authority is patently focussed on how it shall be done, not **if** it shall be done. The basic issue involved in the whole Authority debate, down deep and only gradually coming to light, is whether Government shall go in business, or Business go in government. The global trend is taken here to mean that there is drift to more government in business. President Truman is neither radical nor conservative. He is fundamentally what we mean when we define a philosophy as American. Americans do not believe Government should totally control business, nor that business should totally control government.

Reclamation program

Secretary Ickes recently placed heavy emphasis on low-cost power for Western homes and industry, while discussing the Reclamation policies with the House Irrigation and Reclamation Committee. Commissioner Bashore said conservative estimates place the need for construction at 15 to 16 billion dollars annually, of which 4 to 5 billions a year would be a public works program. He submitted a program of 415 projects which would cost about $5,000,000,000. More than 100 projects, estimated to cost $1,338,000,000, already have been authorized by Congress. **They will be initiated as soon as men and materials are available.** Post-war **authorized** projects will irrigate 5,600,000 ac. of land in the West, providing 80,000 farms. Supplemental water will bring into existence over 20,000 additional farms. The additional developments still under study will bring water to an over-all total of 10,809,000 ac. which have never been irrigated, and which would create 154,700 farms. Supplemental water over-all will irrigate 10,617,000 ac., or 38,600 farms. That makes a total of 21,426,000 ac. providing 193,300 new farms. The total cost of construction is estimated at $4,729,372,000, based on 1940 prices. Bashore emphasized the sum involved is less than the cost of one month's munitions production during the war. He also drew attention to the fact that the projects would produce 2,423,000 kw. power.

The program embraces:

State	Projects	New acres	Supplemental	Cost
Arizona	19	383,050	602,800	$1,268,219.000
California	37	2,233,900	4,475,000	836,494,000
Colorado	21	797,385	1,981,740	525,017,000
Idaho	22	319,180	1,163,715	190,142,200
Kansas	11	202,948	674	78,322,000
Montana	96	1,127,526	294,500	265,273,000
Nebraska	16	337,922	57,430	77,955,000
Nevada	13	67,100	110,500	39,609,000
New Mexico	14	132,770	194,380	143,626,000
North Dakota	14	1,214,805	.....	137,438,500
Oklahoma	11	187,000	600	39,184,000
Oregon	21	486,515	167,500	97,353,200
South Dakota	11	934,690	25,300	125,406,000
Texas	13	442,530	430,270	135,797,000
Utah	23	100,760	272,969	181,472,000
Washington	5	1,116,000	252,000	411,488,000
Wyoming	68	743,000	587,700	239,576,000

Miscellaneous

Rep. Robinson of Utah has introduced a bill to provide further cooperation with the Central American republics in construction of the Pan-American Highway, by increasing the amount previously earmarked for expenditure on that road from 20 to 45 million dollars. Also inserted in the new bill, which is sure to pass, is the following clause: "of which amount not to exceed $17,500,000 may be expended without regard to matching provisions."

Also certain of passage is a proposal to appropriate $12,000,000 for emergency expenditure in the repair of levees, and other flood control works destroyed by recent floods, or threatened by future floods. There is no geographic limitation on this expenditure.

CITIZENS OF Roseburg, Ore., rose up in protest against the plans of the Federal Public Housing Agency to erect a unit of 60 demountable dwellings in the Bellows field locality of West Roseburg. Remonstrances were outlined in objection to the project for forwarding to the federal agency and to the Oregon delegation in Congress.

Local contingent claimed that if the project were carried out it would lower neighboring property values, add to prevailing traffic congestion and overcrowd the only grade school in the immediate area, which is taking care of a capacity number already. It was also pointed out that the city's housing need calls for permanent structures, built with private capital, instead of temporary shelters.

Central Valley Lake Use Guided by Park Service

DETAILS FOR ADMINISTERING the recreational features of the two big Central Valley Project lakes, Shasta and Millerton, by the National Park Service in behalf of the Bureau of Reclamation, are being worked out jointly by these two agencies. At the same time announcement was made of the appointment of George L. Collins as Recreational Administrator for the two project lakes, at Shasta and Friant dams, respectively. Collins, who will have his headquarters at Shasta dam, is a recreational planner with years of experience and was formerly located at Lake Mead (Boulder Dam).

It will be the policy of the National Park Service to work closely with local authorities and interested groups so that the lakes may be of greatest possible recreational usefulness to the communities which they serve as well as to the Nation at large. It was pointed out that supervision of these areas by the National Park Service does not make them a part of the National Park system. Not only will the lakes be administered for maximum recreational usefulness, but the lands of the area which are not used for recreation will be devoted to grazing, timber-production, and to the development of other resources.

Regional Directors Charles E. Carey of the Bureau of Reclamation at Sacramento, and O. A. Tomlinson of the National Park Service at San Francisco, said that their offices had been advised to enter into an inter-bureau agreement for National Park Service management of the lake areas. According to Tomlinson the lake areas will be developed to provide many recreational activities not permitted in National Parks which are established primarily for the protection of unique scenic, scientific, and historic phenomena. "We shall be guided by the recommendations of the committee of the Central Valley Project Studies in establishing policies for the management of the lake areas," said Tomlinson.

Names of all persons requesting information regarding concessions, leases and permits will be turned over to the National Park Service.

OBITUARIES . . .

George T. Seabury, secretary of the American Society of Civil Engineers, and widely known throughout the world for his work with that organization, died in New York on May 25, at the age of 65. He had served the society since Jan. 1, 1920.

* * *

Maj. Gen. Lansing Hoskins Beach, 84, died on April 2 at the Pasadena Army Regional Hospital in California. Born in Dubuque, Iowa, he was a graduate of West Point with the class of 1882, and in 1886 acted as United States Commissioner in the settlement of the Texas-Indian Territory boundary dispute. At the time of his retirement in 1926, he was commanding officer of the U. S. Army Engineers.

* * *

Peter Soo Hoo, civil engineer of Los Angeles, Calif., died on April 21 following a cerebral hemorrhage, at the age of 46. He was a graduate of the University of Southern California with a degree in civil engineering and was widely known as the secretary of the Chinese Benevolent Society.

* * *

Gerald Marsac, civil engineer of Los Angeles, Calif., died in that city on Apr. 22. He was one of the prime movers of the Engineers and Architects Association of Southern California, a professor of mathematics at several universities, and an engineer on numerous important projects.

Howard G. Huntley, 1944 president of the Northern California Chapter of Associated General Contractors, died May 12 in Woodside, Calif. at the age of 46. He was a partner in the highway and airport contracting firm of Piazza and Huntley, and was a director of the chapter from 1942 until his death.

* * *

J. M. Sharp, well-known for a half a century in Idaho contracting circles, died in Boise on May 9. He specialized in bridge construction and did numerous Idaho highway projects. He served two terms as Boise public works superintendent, and two years as superintendent of building construction for the State Department of Public Works.

* * *

George W. Forsyth, 64, senior supervisor in the city engineer's office in Seattle, Wash., died suddenly on May 12. He was a member of the Engineers Club of Seattle, as well as Local 17 of the Technical Engineers, and had been in the employ of the city for 42 years.

* * *

Oscar W. Lanzendorf died in Yuba City, Calif., on April 13 of a heart attack. He was chief civilian post engineer at Camp Beale, and had been county engineer of Sutter county for twenty years. He was 56 at the time of his death.

* * *

Thomas Walker Owen, administrative engineer of the Federal Works Agency in Seattle, Wash., died May 22 in that city. He was 58 years of age. He was particularly active in airport construction in the state of Washington.

* * *

Lt. George M. Rasque, Jr., architectural engineering graduate of the University of Washington, was killed in action on Okinawa. He was 30 years of age.

PERSONALLY SPEAKING

Lt. Col. Robert F. Herdman, who for the past seven years has been affiliated with the U. S. Army Engineers in the Denver District Office, has recently been placed on the inactive list and will resume a connection with the Bureau of Reclamation in Denver. Herdman's position with the Army Engineers was in the capacity of engineer in charge of engineering design. His new position with the Reclamation Service will be that of coordinator of engineering projects, a newly created office, connected with all projects. Prior to his service with the Army Engineers he was affiliated with the Bureau of Reclamation with the title of Project Engineer. He assumed his new duties on June 1.

* * *

Colonel Ross E. Windom, on leave from his position as City Manager of Portsmouth, Ohio, has been appointed Executive Officer, Los Angeles District Office of U. S. Engineers. He was one of a group of city managers commissioned primarily for the purpose of assisting and organizing repairs and utilities of Army posts, camps and stations, and along with other assignments spent some time in Panama as District Engineer.

* * *

Heading the newly reorganized field staff of Region II of the Bureau of Reclamation is **Richard L. Boke,** with the title of Regional Operation and Maintenance Superintendent. He will administer operations not only in the Central Valley Project, but also in the Bureau's two completed projects, Orland and Klamath.

* * *

Gordon Andrew Mowat, partner in the A. F. Mowat Construction Co., Seattle, Wash., has been commissioned an ensign in the Civil Engineering Corps of the Naval Reserve. He is at the Naval Construction Training Center, Davisville, R. I., from whence he will leave for overseas to serve with the Seabees. He is a graduate of the University of Washington and a member of A.G.C.

* * *

Ernest A. McMillan of San Francisco, Calif., has been named acting director of the Shipbuilding Stabilization Division, as well as acting chairman of the Shipbuilding Stabilization Committee, of the Office of Labor Production, W.P.B. He succeeds **Paul R. Porter,** who resigned to accept a position as adviser on labor affairs with the Allied Control Commission in Germany.

* * *

James H. Lyon is associated with the Department of Game of the State of Washington located in Seattle, in the capacity of chief engineer. Maintenance and repair on fish hatcheries and game farms come under this direction. Plans and specifications for postwar construction programs also come under his jurisdiction.

RICHARD ELLIS

W. R. Engstrom, vice-president and Pacific Northwest district manager of The Austin Co. since 1933, has been appointed manager of the newly formed Aviation Division of the company at Cleveland, Ohio. **Richard Ellis,** acting manager of the northwest district since 1940, has been named district manager, succeeding Engstrom. Ellis has been with the Austin organization at Seattle since 1924; is a member of the American Welding Society and the American Society of Civil Engineers, which he recently served as a Seattle Section president.

* * *

L. C. Hart of New York, vice-president of Johns-Manville Sales Corp., was elected president of The Producers' Council, Inc. of Washington, D. C., a national organization of manufacturers of building materials and equipment. He succeeds **Douglas Whitlock** who presided over the Council for the last two years. **Tyler S. Rogers** was elected first vice-president, **Frank A. Sansom** continues in the office of secretary and **Allen E. Pearce** was named treasurer.

* * *

J. H. McLaughlin, former chief electrical engineer for the Vancouver, Wash., housing authority, has been engaged as general superintendent of the Electrical Construction Co., Portland, Ore. He has been engaged in industrial electrical construction in the Portland area for the past thirty years.

* * *

Maj. Harold M. Martin, former executive officer at the Denver, Colo., office of the U. S. E. D., has been transferred to Fort Belvoir, Va., to attend a special engineering school. Upon completion of his studies at Fort Belvoir, he will go overseas. **Maj. W. C. Palfreyman** will succeed Major Martin as executive officer.

* * *

Charles D. Davis of Seattle, who was supervisor of safety on the Bonneville and Grand Coulee dams, is now chief safety engineer for the Washington State Department of Highways, following appointment to the position by Clarence Hickey, Director of the highway department.

Don A. Bell of Portland, Ore., has been appointed to the post of city engineer at Seaside, Ore. He is a graduate of Oregon State College, school of engineering, and has served with the State Highway Commission and U. S. Army Engineers in Portland and at Coos Bay.

* * *

G. R. Perry of Spokane, Wash., for the next few months will be located at Ellensburg, Wash., where he is supervising construction engineer for the well known Yakima architect, John W. Maloney, on the new Telephone Building in that city.

* * *

Robert H. Wilken has become associate engineer for the San Diego County Water Authority with headquarters at San Diego, Calif. His new assignment embraces engineering investigations relative to water to be supplied to the San Diego district from the Colorado river.

* * *

Paul Feltman and **W. J. Hergenrother** have opened a general contracting and building business under the name of Northern Construction Co., and are located at 141 S. Oak St. in Colville, Wash.

* * *

Guy W. Thaxton, recently Chief of the Design and Construction Division of Rural Electrification Administration, Department of Agriculture, and formerly division engineer with the Tennessee Valley Authority, has resigned to accept a position with the General Cable Corporation.

* * *

J. T. Lay, Jefferson County Engineer, has been named city engineer of Port Townsend, Wash. The city has not had an engineer since **William A. Bugge** resigned almost a year ago to accept a position with the Asphalt Institute of Portland, Ore.

* * *

T. E. Bokemeier, formerly with Tractor Training Service of Portland, Ore., is now associated with the Nicholson Service and Supply Co. of Ontario, Ore., distributors of Case and Cletrac equipment. His duties include both sales and the setting up of repair facilities.

* * *

Charles J. Bartholet, who has been supervisor of hydraulics in the Division of Water Resources of the state of Washington, has been promoted to the post of office engineer. **Clarence Shane** will succeed Bartholet as supervisor of hydraulics.

* * *

Captain George F. Nicholson, CEC USNR, was recently appointed Public Works Officer, as well as Officer in Charge of Construction, at Hunters Point Navy Yard, San Francisco, Calif.

* * *

Alvin F. Darland was recently appointed superintendent of the Tacoma, Wash., city light department. He succeeds **Verne Kent,** superintendent since 1933, who tendered his resignation.

* * *

Ernest T. Fukuda, previously hydraulic engineer in the Department of Water and Power, City of Los Angeles, is now surveying for Ayers and Graf, Civil Engineers in Cincinnati, Ohio.

JOHN LUCIAN SAVAGE, world-famed designer of the three mightiest concrete dams in the world, Grand Coulee, Boulder and Shasta, has retired as chief designing engineer for the Bureau of Reclamation. Member of the staff for 34 years, he has drawn plans for the construction of over a billion dollars worth of dams. Recently he returned to his home in Denver after an extended trip to China and India where he made preliminary surveys and studies for several reclamation projects under consideration for postwar development.

* * *

Dan S. Miller, former assistant city engineer of South Gate, Calif., became city engineer and superintendent of streets on the resignation of **Frank E. Alderman** who relinquished the post to accept a position with the firm of Holmes and Narver, consulting engineers on design and engineering at the Naval Ordnance Testing Station at Inyokern, Calif.

* * *

Maj. R. W. Harrison, formerly assistant to the engineer in charge of engineering design for the U. S. E. D. at the Denver District office, has been transferred to the petroleum department of the Chief Engineer's Office, Washington, D. C.

* * *

In connection with the new power line construction project, contract for which was recently awarded to them, the engineering firm of Stone & Webster has opened offices at 11 E. Citrus St., Redlands, Calif.

* * *

D. Arthur Lowe of Lowe-Stoddard Co., engineers and consultants of Los Angeles, Calif., has become consulting engineer for the Coos Electric Cooperative of Coquille, Ore.

* * *

A. V. Dienhart is serving as an ensign with the Civil Engineer Corps, U.S.N.R. at Camp Endicott, Davisville, R. I.

* * *

Lt. Floyd M. Holdaway, CEC, USNR, after seeing service in Iceland, England

and France, is now serving his country somewhere in the Pacific.

* * *

Bruce Brownson, city manager of Grand Junction, Colo., for the past five years, has resigned that position, effective June 18.

* * *

Ensign Marshall Gray, formerly of Dillon, Mont., is now overseas in the South Pacific Area with a dredging and salvaging battalion.

* * *

Lt. (j.g.) Arnold Z. Greenlaw, CEC, USNR, is now stationed at Camp Endicott, Rhode Island. His home is in Palo Alto, Calif.

* * *

James A. Davis has left for Olympia, Wash. to resume his duties as Assistant Director of State Highways.

* * *

After serving as city engineer for Fallon, Nevada, for the past 11 years, **A. C. Hahn** has resigned to enter private business.

* * *

Lloyd Leckenby is with the U. S. Army, Engineers Construction branch, working on construction layouts.

SUPERVISING THE JOBS

George A. Mashon is general superintendent for the Haddock Company on two new concrete dry docks in Washorn Basin, San Pedro, Calif., for the Navy. **Jack Arave** is concrete superintendent, and **Del Martin** is concrete foreman. **Ed Stones** is carpenter foreman, **Ody Kettering** office manager, and **William Atkinson** accountant. Other sub-foremen are **Art Anderson, Paul Frederickson** and **Ed Smith. Marvin Barrett** is superintendent and **Adiel Ulmer** is welding foreman for Luppen & Hawley of Sacramento who have the pipe work sub-contract on the project.

* * *

Louis Bodeen is superintending simultaneously two contracts for Wick and Dahlgren, Seattle, Wash. Key man on the $52,706 contract to construct 108 dormitories at Seattle is **Fred Frederickson,** while **Arnie Watten** will assist Bodeen on the $360,000 job of moving 864 dormitories from Vancouver to Seattle and converting them into 144 family units.

* * *

Seth Hudgins, who worked on the Navy project at Seal Beach, Calif., for Wm. P. Neil Construction Co., is now job superintendent for Imhoff and Associates, San Gabriel, Calif., on construction of 44 war housing units at Barstow, Calif. **Geo. A. Caldwell** is foreman; **Paul V. Birnbaum** is in charge of purchasing, and **W. C. Schumacher** is office manager. Imhoff received the contract on a bid of $120,000.

* * *

Edgar J. Lewis, recently in charge of shop and equipment for the Red River Lumber Co. of Westwood, Calif., is now project manager for the combination firm of Morrison-Knudsen Co., Jackson Implement Co. and Monarch Forge & Machine Works which will recondition government equipment at Walla Walla, Wash. **Kenneth Ahern** will be chief accountant for the project.

* * *

Supplementing the report of personnel on the Haddock Engineers, Ltd. contract at Inyokern Naval Ordnance Testing Station which appeared in *Western Construction News* for April, are the following: **Jess Smith** is assisting **Paul B. Young,** project manager; additional area superintendents are **H. W. Sherman, F. G. Holland, C. R. Crouch** and **L. P. Ronnenberg; Clifford H. Crates** is general carpenter foreman, and his assistants include **Lynn Kincaid, A. Zimmerman, Gordon Ratliff,** and **John Christenson; Mike Gee** is mill superintendent and **E. C. DeClue** is mill foreman; **Phil Briggs** is concrete superintendent; **Ray Fuller** is shop foreman; and **Ray DeMotte** is truck foreman.

* * *

Al Melcher is superintending the construction of barracks and messing at the Marine Air Station at El Toro in southern California. He is being assisted by **O. T. Moore** as general foreman and **Ernie Everman,** carpenter foreman. **Ruth H. Wallace** is office manager. This contract was recently awarded to the Allison Honer Company, Santa Ana, Calif., at a figure of $374,666.

* * *

The California Lead Cable Splicing Co., formerly located at 8733 So. Hobart Blvd., Los Angeles, Calif., has recently moved to 1202 So. Atlantic Blvd., Compton, Calif. **J. P. Neal** is proprietor of this well known company. **Harold (Clinton) Davis** is general foreman, and **C. R. Bauman** is cable splicing foreman.

* * *

L. H. Stephens, superintendent, **Joe Mangum,** labor foreman, and **DeMar J. McKinnon,** engineer, are employed by Robert E. McKee of Dallas, Tex., on the erection of buildings and electrical service connections at the Army Airfield at Fort Worth. Contract is for $247,900.

* * *

Jack E. Tulley is general superintendent for J. S. Barrett of Newport Beach, Calif., on underground work at Inyokern Naval Ordnance Testing Station. **Pete Price** is superintendent on steam and water lines, **William Phillips** carpenter foreman. **Bert Monaghan** and **Ned Elliott** are handling the details of the office.

* * *

Ed Pritchard is general superintendent and **Paul Harvey** foreman for Gilman & Gilman, building contractors of Lynwood, Calif., on hangar and other buildings at Muroc Air Base, Muroc, Calif. **N. W. Spencer** is general superintendent, **George Britton,** general foreman and **R. E. Webb,** office manager for R. J. Daum, general contractor on the project. Walterschied Electrical Co. of San Dimas, Calif., has the electrical contract, with **Everett Brooks** acting as superintendent for them.

* * *

Jack McPhee, superintendent for the Del E. Webb Construction Co., Phoenix, Ariz., is at present supervising the construction of 15 additional cottage units in Phoenix. **Earl Lake** is carpenter foreman, and **Frank Kerr** is in charge of the office. Contract is for $50,000.

* * *

Superintending General Electric Co.'s steam turbine installation and maintenance work in northern California is the genial **George Barr.** In addition to regular demands, the installation of G-E propulsion equipment on over 250 new ships of various types in the San Francisco Bay area shipyards since 1942 has been under his supervision.

* * *

James Horan is general superintendent for Morrison-Knudsen Co., Inc., Boise, Ida., on the $100,000 contract to steel-line a tunnel at the Portland General Electric Co. power plant at Estacada, Ore. **Noah E. Barker** is his assistant, **Charles E. Buck, Jr.** is steel erection superintendent, and **F. E. Robinson** is office manager.

* * *

W. Harcourt-Palmer has been named superintending engineer for J. D. Proctor, Inc., General Contractor of Point Richmond, Calif., on a sub-surface boring contract for $77,365. The work is to be performed at the Naval Drydocks, Hunters Point, San Francisco Bay.

* * *

Leroy Larson is superintendent for Alfred J. Hopper, San Francisco, Calif., on construction of boiler house, test building, etc., at the Port Chicago Inland Storage area which lies between Concord and Pittsburg, Calif. Contract manager is **V. L. Walker,** and acting as carpenter foreman is **George Sorum.** This is a $73,449 contract.

* * *

G. F. Massett is project manager for J. E. Haddock Co. on a $650,000 contract for additions to the Queen of Angels Hospital in Los Angeles. **Claude Patton** is general superintendent and **W. E. (Bill) Claypool** is general foreman. **H. A. Sturney** represents the architects, Barker and Ott.

* * *

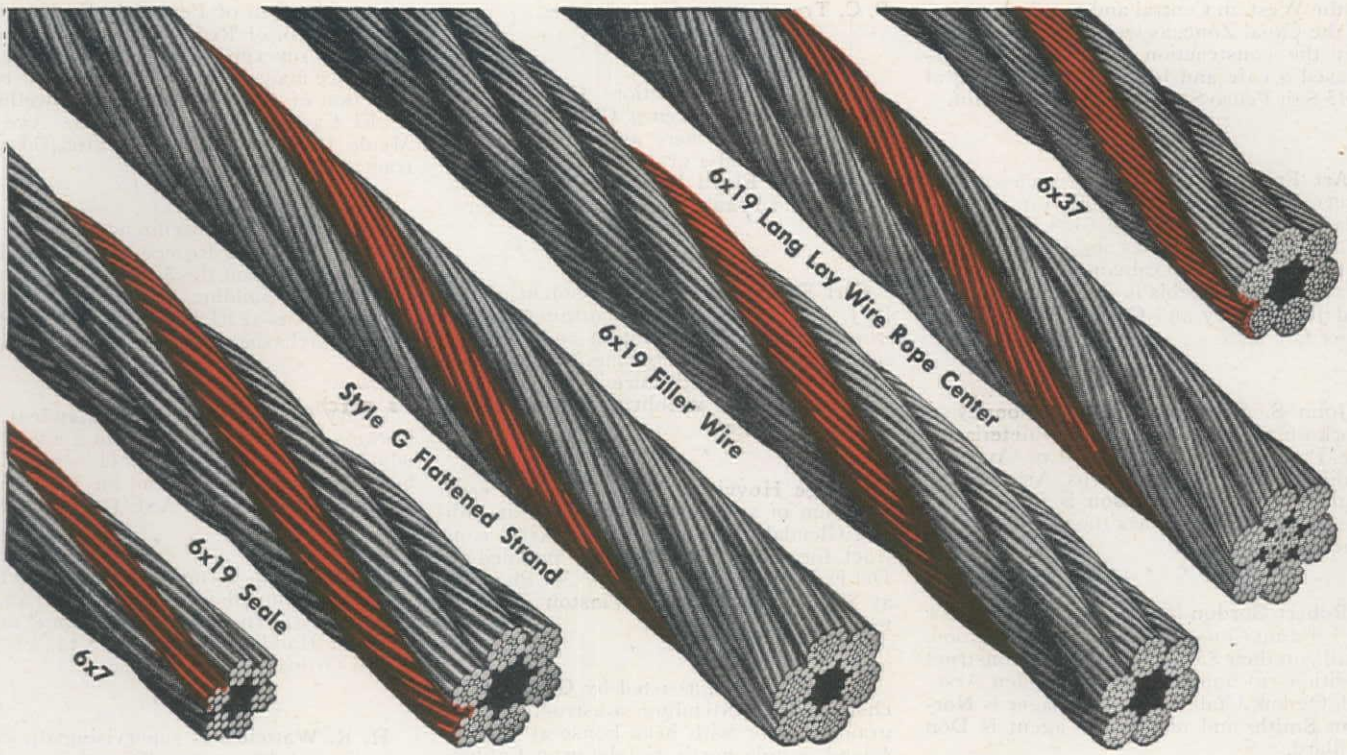
G. C. Schweser, formerly chief field engineer for Wm. P. Neil Company, Ltd. of Los Angeles, Calif., is now employed as project superintendent by Giffels & Vallet, Inc., Ottowa, Ill., on construction of a $7,000,000 tire and tube plant for the Inland Rubber Corp. of Chicago.

* * *

Sam Ball is superintendent on the $476,663 contract awarded to Marshall S. Hanrahan, Redwood City, Calif., for drainage, paving and other work at the Naval Air Base at Alameda, Calif. **E. V. McClure** is civil engineer on the same job, and **O. A. Semenza** is office manager.

* * *

E. R. Stokes, who during his twenty-six years in the construction business super-



"HERCULES" (Red-Strand) Wire Rope

For *Every* Heavy Duty Purpose

All wire ropes do not operate under the same conditions: Some must be extra flexible; some are subjected to excessive wear and stress; and there are many uses where a combination of severe conditions must be met.

In order to be suitable for every heavy duty purpose, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of constructions—both Round Strand and Flattened Strand—all of which can be furnished either Preformed or Non-Preformed. A "mis-fit" rope, either in type, construction or quality, will definitely increase operating cost.

Moreover "HERCULES" is made of carefully selected and rigidly tested materials. Modern facilities, long experience and advanced manufacturing methods insure correct fabrication.

When you adopt the Red-Strand as your wire rope guide, you are assured of dependable and economical results.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

vised the building of many large projects in the West, in Central and South America, in the Canal Zone, as well as in Persia, has left the construction field. He has purchased a cafe and bar and is operating at 8515 San Pedro St. in Los Angeles, Calif.

* * *

Art Freeman is job superintendent for Greer-Maurer Construction Co., Grand Island, Nebraska, on the $154,242 project to construct dormitories and a boiler house at the Cornhusker Ordnance Plant, Grand Island. **Henry Forbis** is carpenter foreman and **Jerry Curry** and **Gilbert Ignowski** are other key men.

* * *

John S. Parr is personally supervising work on the civilian cafeteria building, for the Parr Construction Co., Los Angeles, Calif., at the Marine Corps Air Station, Santa Barbara. **Al Wilson** is foreman on the project. **Jack Leo** has the plumbing contract.

* * *

Robert Gordon is job superintendent for R. J. Daum Construction Co. of Inglewood, Calif., on their $50,285 contract to construct additions to buildings at the Ogden Arsenal, Ogden, Utah. Project manager is **Norman Smith**, and purchasing agent is **Don Willard.**

* * *

E. O. McFarland is superintendent for Pugh Construction Co., Wilmington, Calif., on the $100,000 timber wharf under construction at Wilmington. **P. F. Pecar** is carpenter foreman on the job, and **D. B. Pugh** is in charge of purchasing.

* * *

Shumaker & Evans Co. and P. W. Womack of Los Angeles, Calif., are constructing 200 Navy dwelling units at Oceanside, Calif. Superintending the $462,249 job is **Bob Geisler,** while **Joe Hinch** is project purchasing agent and **S. E. Olson** is project accountant.

* * *

L. E. Gibson is superintending the construction of a dehydrator plant at Sunnyvale, Calif., contract for which was recently awarded his firm at a cost of $100,000. Foremen on the job are **Charles Warner,**

Robert M. Lassley and **C. F. Carmichael. P. C. Troutman** is office manager.

* * *

Mid-State Construction Co. of The Dalles, Ore., and Henry George & Sons, Spokane, Wash., were awarded a $96,813 contract to build a grain elevator annex at The Dalles. **Floyd Roblee** is job superintendent and **Frank Jones** is carpenter foreman.

* * *

Carl E. Larson is superintendent of the P. J. Walker Co. job at Torrance, Calif., where a naval redistribution and disposal center is being built by the Los Angeles company. **H. B. Rightmire** is project manager and **E. H. Doolittle** is purchasing agent.

* * *

George Hovvis is supervising the construction of a brick dairy building at 19th and Glendale Ave. in Phoenix, Ariz., contract for which was recently awarded to Del E. Webb Construction Co., of Phoenix, at $82,955. **Harold G. Winston** is office manager.

* * *

Henry Saorski, assisted by **George Gatchell,** is superintending construction of a grain elevator with head house at Andros Island, a mile north of Isleton in California. This is a $225,000 contract awarded to Barrett & Hilp, San Francisco.

* * *

Eddie Jockola is superintendent for R. J. Daum, contractor of Inglewood, Calif., on the construction of additional facilities at the Disciplinary Barracks at Terminal Island, San Pedro, Calif. Daum received this contract on a bid of $127,874.

* * *

C. W. Nash is job superintendent and **A. P. Himmelman** is general foreman for Highway Construction Co., Ltd., Vancouver, B. C., on a $50,000 contract to realign a portion of the Canadian Pacific Railway line four miles west of Grand Forks, B. C.

* * *

W. J. Widmer, assisted by **Al Lundeen** and **Dick Thomas,** is superintending the conversion of facilities at Mitchell Convalescent Hospital at Camp Lockett, Calif. This is a $600,000 job, contract for which is held by the Los Angeles firm of Del E. Webb Construction Co.

* * *

Job superintendent for Glade Construction Co. of Fort Worth, Texas, on the installation of the Holly pumping plant at Fort Worth is **John W. Ratfill. Charles Norman** is building superintendent on the $142,200 job.

* * *

Clyde Savery is superintendent on building being erected at the John Muir School site in Long Beach, Calif. **John Keith** of Los Angeles has the contract which was awarded on a bid of $138,449. **John Dahlin** is foreman on the job.

* * *

D. L. Taylor will superintend the building of a $149,746 Homoja housing project at the Naval Air Station, Klamath Falls, Ore., by Todd Bldg. Co., Roseburg, Oregon. **I. J. Neal** is general foreman and **J. A. Pooley** is assistant superintendent.

Harry L. Arnold and **David F. Day,** partners in the firm of Peninsula Pacific Construction Co. of Redwood City, Calif., are acting as superintendent-general manager, and office manager respectively, in the construction of 40 one-story family dwellings at El Camino Real and Middle Ave. in Menlo Park, Calif. This is a $168,000 contract.

* * *

Mel Evenson is superintendent for Lewis W. Hunt Co. and Roscoe & Land of Los Angeles, Calif., on the $599,468 contract to construct 43 buildings containing 280 war dwelling units at El Toro, Calif. **D. H. Pravitz** is purchasing manager for the project.

* * *

Henry M. Bell is job superintendent for Perkins Construction Co., Salt Lake City, which was awarded a $67,811 contract to build railroad trackage and an addition to a freight shed at Utah ASF Depot, Ogden.

* * *

S. Alexander, formerly with Swinerton, McClure, Vinnell in Central America, is now at Inyokern, acting as personnel manager for Haddock Engineers, Ltd., on the Naval Ordnance Test Station.

* * *

H. R. Wattelete is supervising the construction of 40 war dwelling units at San Pedro, Calif., for George B. Thatcher, contractor of North Hollywood, Calif., who was awarded the contract at $102,840.

* * *

Milo Stram is superintendent on construction of a reclamation building at the Benicia Arsenal in California. The Oakland contractors, Stolte, Inc., were awarded the contract at $143,514.

* * *

Milburn Easum, Jr. is job superintendent for Lawless and Alford, Corpus Christi, Texas, on a $60,640 contract to remodel the out-patients' clinic and construct additional facilities at the Naval Hospital, Corpus Christi.

* * *

Harry T. McCloy, for many years active in the construction field in key capacities, is now representing J. H. Pomeroy Co., Inc. on building construction in the San Diego area.

* * *

Edward M. Button, for twenty years with the Los Angeles County Flood Control District, is operating a Bucyrus-Erie 37 on channel work in Long Beach, Calif.

* * *

Frederick Van der Meer is job superintendent on 40 war dwelling units at Mojave, Calif. Structon, Los Angeles, was awarded the contract at $113,987.

* * *

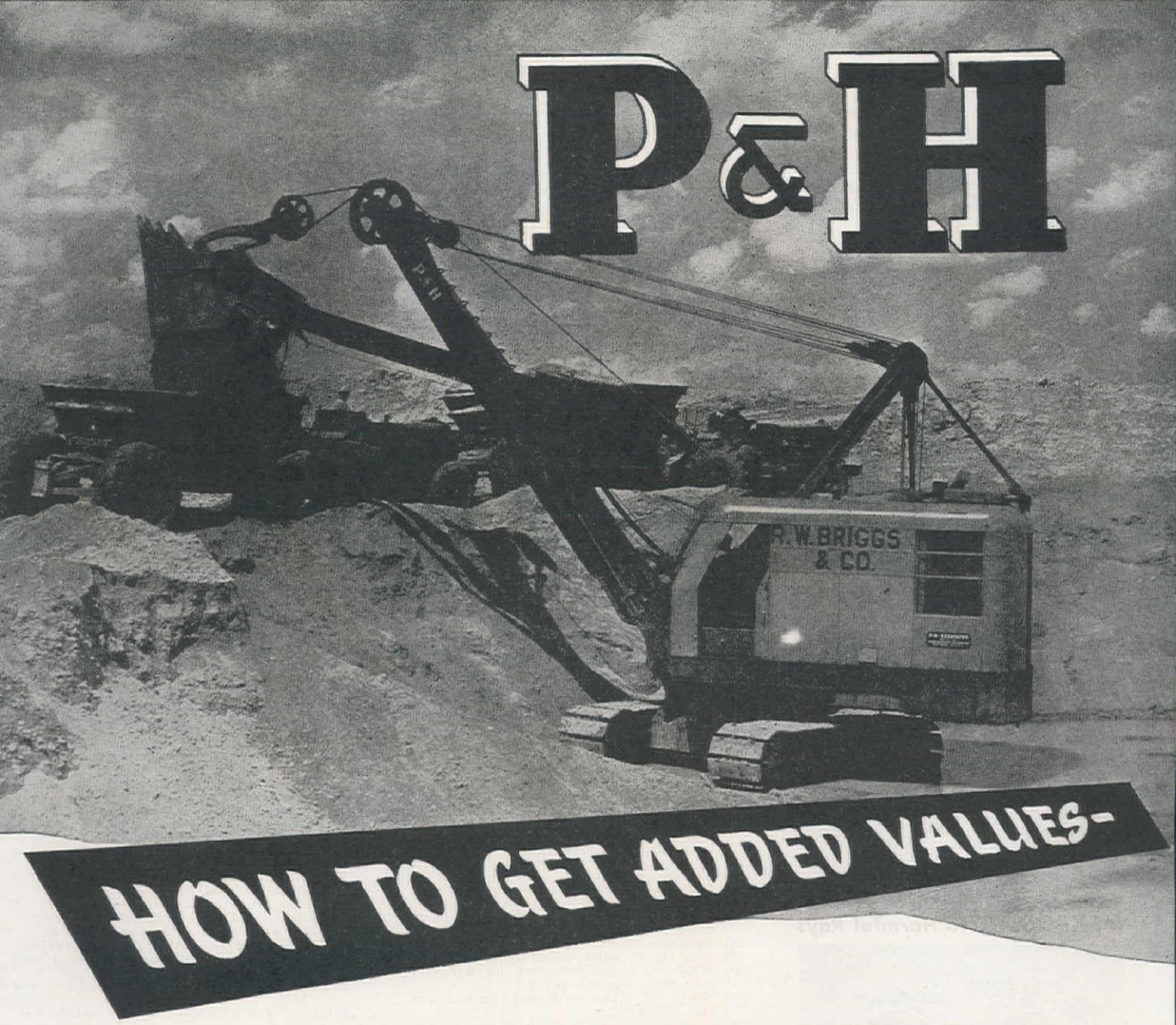
James L. Diggs is supervising operation for the Diggs Trucking Co. on their contract at Inyokern, Calif. **W. D. Hall** is superintendent.

* * *

J. R. Lloyd, formerly of Holbrook, Ariz., is supervising construction for the owner on the first motel being built at Inyokern, Calif.

* * *

K. C. Shepard is employed as master mechanic in the shop of the Utah Construction Co., in Hermosillo, Mexico.



HOW TO GET ADDED VALUES-

Freedom from Crawler Troubles. P&H's true rolling crawlers will save you time and trouble for years to come. Operating on the true roller chain principle, crawler belts roll smoothly with double sprocket drive. All driving wear is put on renewable pins; high replacement costs are eliminated.

Greater Strength with All-Welded Construction of Rolled Alloy Steels. Both upper and lower structures are all-welded . . . stronger, more rigid, more rugged. Entire units are jig-drilled and machined, assuring proper permanent alignment of shafting and bearings — interchangeability of repair parts. Greater strength and rigidity will save you many a repair bill.

P&H excavators are built in sizes up to 6 cubic yards capacity with gasoline, Diesel or electric power.

Smooth Hydraulic Control — Easier on Men and Machines. This proved low pressure system with independent controls gives you instant response — smoother, easier, with less effort. Wear and loosening common to shafts, reach rods, pins and toggles are eliminated. Fewer parts mean less wear, less maintenance. These are but a few of the added values that make P&H Excavators a more profitable investment.

P&H

EXCAVATORS

4490 West National Avenue,
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

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

HARNISCHFEGER CORPORATION: 82 Beale Street, San Francisco, Calif.
Warehouses Service Stations: Seattle, Los Angeles, San Francisco.
Portland, Oregon: Loggers & Contractors Machinery Co., 240 S.E. Clay St.; Willows, Calif.: Willows Motor Sales Co.; Napa, Calif.: Berglund Tractor & Equipment Co., 1224 Third Street; Salt Lake City, Utah: National Equipment Co., 101 West Second Street, So.; Boise, Idaho: Olson Manufacturing Company, 2223 Fairview Avenue; Spokane, Washington: F. M. Viles & Co., 1007 Second Avenue, West; Sacramento, Calif.: Capital Tractor & Equip. Co., 235 W.16th Street; Reno, Nevada: Dennison Tractor &Supply Company, 559 East Fourth Street.

UNIT BID SUMMARY

Dam . . .

California—Napa County—City—Earthfill

T. E. Connolly, San Francisco, Calif., was awarded the contract on the low bid of $530,194, by the City of Napa for the construction of the Conn Valley Dam, to create a water supply reservoir with a capacity of 30,500 acre feet. A summary of the unit bids received is as follows:

	(1a)	(1b)	(2a)	(2b)
(A) Morrison-Knudsen Co., Inc.	$549,905	$552,016	$537,767	$539,878
(B) T. E. Connolly, Inc.			541,754	530,194
(C) Bressi-Bevanda Constructors, Inc.	646,125	652,038	631,675	637,588
(D) C. Dudley DeVelbiss Co.	642,321	646,500	640,587	644,766
(E) N. M. Ball Sons	674,860	668,890	664,456	679,294
(F) Piombo Bros. & Co.			669,394	660,724
(G) Guerin Bros.	696,543	699,699	687,873	691,027
(H) Guy F. Atkinson Co.	715,415	717,860	711,947	
(I) Fredrickson Bros.	749,790	749,790	739,964	739,964
(J) Macco Construction Co.	742,197	747,895	739,297	744,995
(K) W. E. Kier Construction Co.		901,438		874,272
(L) Vinnell Co.—Submitted unit prices only.				

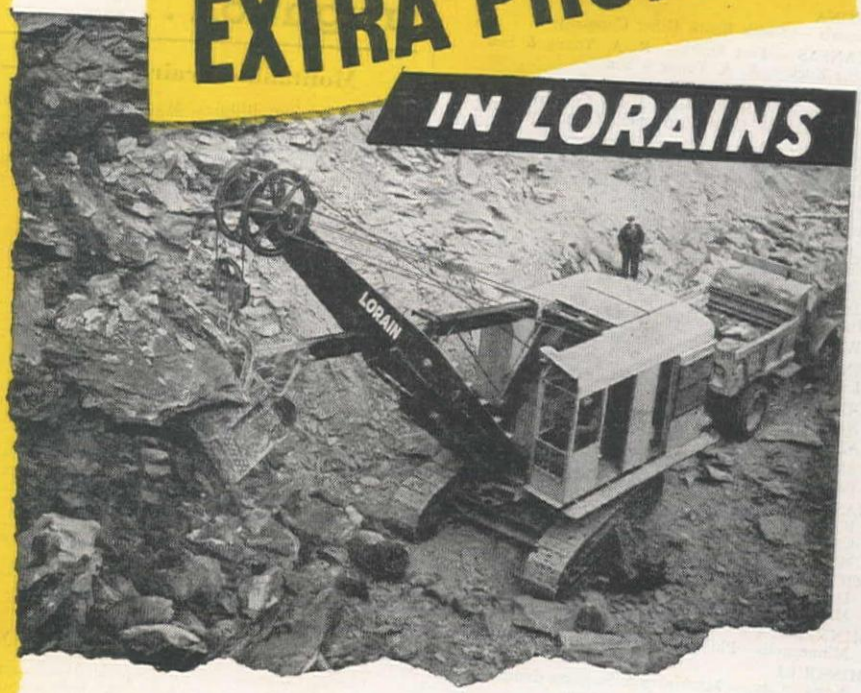
(1) 24,000 cu. yd. strip & prepare damsite, Area A
(2) 11,000 cu. yd. strip & prepare damsite, Area B
(3) 12,500 cu. yd. strip & prepare damsite, Area C north and south
(4) 5,800 cu. yd. cutoff trench excav.
(5) 178,000 cu. yd. embankment upstream impervious section
(6) 296,000 cu. yd. embankment downstream pervious section
(7) per cu. yd. incorporating into main embank. matl. excav. from stripped areas, Area A
(8) per cu. yd. incorporating into main embank. matl. excav. from stripped areas, Area B
(9) per cu. yd. incorporating into main embank. matl. excav. from stripped areas, Area C north and south
(10) 2,800 cu. yd. concrete slab and foot wall on upstream face of dam
(11) 2,800 cu. yd. concrete slab and foot wall on upstream face of dam (alt.)
(12) 190,000 lbs. reinforcing steel
(13) 55 cu. yd. outlet tower excav.
(14) 261 cu. yd. concrete in outlet tower
(15) 261 cu. yd. concrete in outlet tower (alt.)
(16) 27,000 lb. reinf. steel
(17) 4 ea. 24-in. outlet tower valves and fittings
(18) 4 ea. 30-in. outlet tower valves and fittings
(19) lump sum, outlet tower railing
(20) lump sum, outlet tower grating
(21) 4 ea. steel gate thimbles, brass fitgs., 34x24 in.
(22) 4 ea. steel gate thimbles, brass fitgs., 42½x24 in.
(23) 1 75x60 in. outlet tower conduit cast iron reducer
(24) lump sum, outlet tower ladders
(25) 2,000 cu. yd. outlet conduit trench excav.
(26) 578 lin. ft. welded sheet steel pipe, 2-in. spun conc. lining; outlet conduit
(27) 578 lin. ft. welded sheet steel pipe with 2-in. conc. lining (alt.)
(28) 2 ea. cast iron, flanged elbows
(29) 1 ea. cast iron special B
(30) 800 cu. yd. outlet conduit concrete casing
(31) 800 cu. yd. outlet conduit conc. casing (alt.)
(32) 144,000 lb. reinf. steel
(33) lump sum, manifold for outlet conduit dischg.
(34) 270 cu. yd. excav. for manifold and discharge basin
(35) 102 cu. yd. conc. in manifold casing, piers and basin lining
(36) 102 cu. yd. conc. in manifold casing, piers and basin lining (alt.)
(37) 16,400 lbs. reinf. steel
(38) 72,000 cu. yd. spillway entrance and channel excav.
(39) 370 cu. yd. excav. for erosion mat
(40) 1,410 cu. yd. conc. on bottom and side slopes of spillway
(41) 1,410 cu. yd. conc. on bottom and side slopes of spillway (alt.)
(42) 400 cu. yd. concrete in vertical side walls of spillway
(43) 400 cu. yd. concrete in vertical side walls of spillway (alt.)
(44) 66 cu. yd. concrete in covered section of spillway
(45) 66 cu. yd. concrete in covered section of spillway (alt.)
(46) 74 cu. yd. concrete in erosion mat
(47) 74 cu. yd. concrete in erosion mat (alt.)
(48) 308,600 lbs. reinf. steel
(49) clearing reservoir site, lump sum
Alternate bid prices on the following items:
(50) 4 ea. welded steel outlet valves, 34x24 in.
(51) 4 ea. welded steel outlet valves, 42½x24 in.
(52) 1 ea. 75x60-in. outlet conduit, welded steel plate reducer
(53) 2 ea. welded steel plate elbows "A-1" and "A-2"
(54) 130,000 cu. yd. excav., entrance and channel

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
1)	.67	.40	1.00	3.00	1.10	1.00	.50	.65	.50	.55	1.45	.60
2)	.38	.10	1.00	3.00	1.10	1.00	.50	.52	.40	.48	.90	.60
3)	1.00	1.00	1.00	6.00	1.80	1.00	.75	1.00	.80	1.00	2.20	.60
4)	1.00	1.50	2.00	6.00	2.00	3.00	1.50	4.50	4.00	1.40	1.10	1.10
5)	.35	.45	.43	.30	.43	.50	.59	.55	.68	.56	.50	.415
6)	.35	.31	.43	.25	.43	.50	.52	.58	.55	.56	.60	.415
7)	.13	.20	.25	.10	.43	.25	.20	.20	.10	.20	.50	.50
8)	.13	.20	.25	.10	.43	.25	.20	.20	.10	.20	1.00	.50
9)	.13	.20	.25	.10	.43	.25	.20	.30	.10	.20	1.00	.50
10)	20.60	.....	20.00	13.00	20.00	.....	12.00	26.50	19.50	20.00	.....	23.50
11)	22.95	18.00	21.00	14.00	20.75	17.00	14.00	27.50	19.50	21.50	20.00	23.50
12)	.055	.05	.07	.0475	.045	.048	.045	.055	.055	.06	.05	.065
13)	3.30	10.00	10.00	1.00	4.00	10.00	3.00	3.50	4.80	5.00	9.00	6.00
14)	41.57	.....	40.00	25.00	51.00	.....	38.00	65.00	45.00	54.00	.....	66.00
15)	43.80	60.00	41.00	26.00	51.75	57.00	40.00	66.00	45.00	55.00	50.00	66.00
16)	.052	.05	.09	.045	.045	.045	.045	.06	.054	.055	.05	.06
17)	750.00	880.00	700.00	240.00	$1,390	$1,200	$1,500	$1,000	$1,565	$1,200	750.00	$1,000
18)	$1,368	$1,420	$1,300	305.00	$2,020	$1,800	$2,000	$1,700	$2,295	$2,000	$1,350	$1,675
19)	104.00	100.00	200.00	154.00	345.00	250.00	250.00	200.00	370.00	200.00	175.00	190.00
20)	88.00	150.00	200.00	146.00	270.00	350.00	200.00	175.00	302.00	200.00	150.00	115.00
21)	255.00	385.00	800.00	360.00	670.00	450.00	600.00	800.00	720.00	500.00	400.00	355.00
22)	450.00	550.00	800.00	540.00	870.00	620.00	800.00	900.00	942.00	500.00	575.00	515.00
23)	$1,600	$2,000	700.00	907.00	$3,120	$1,940	$2,500	$2,200	$3,495	$2,000	$2,500	$1,700
24)	588.00	700.00	800.00	840.00	700.00	$1,010	$1,000	900.00	$1,345	750.00	950.00	$1,000
25)	.83	2.00	4.00	1.15	1.70	7.00	2.00	4.50	5.00	2.00	4.50	1.10
26)	63.00	65.00	65.00	43.00	60.00	55.00	50.00	53.00	64.00	60.00	68.00	68.30
27)	42.00	45.00	40.00	45.00	42.00	40.00	35.00	47.00	47.00	55.00	47.00	47.00
28)	814.00	$1,100	$1,200	786.00	$1,600	960.00	$1,300	$1,200	$1,576	$1,000	$1,100	825.00
29)	765.00	$1,000	$1,200	805.00	$1,800	960.00	$1,250	$1,200	$1,567	$1,000	$1,100	825.00
30)	13.20	.....	25.00	12.50	20.00	.....	11.50	15.50	19.80	16.00	.....	30.00
31)	16.50	15.00	26.00	13.50	20.75	17.60	13.50	16.50	19.80	17.00	30.00	30.00
32)	.052	.05	.07	.045	.045	.045	.045	.055	.054	.055	.05	.06
33)	$12,250	$10,000	$12,000	$5,766	$10,100	$11,875	$13,500	$12,000	$17,200	$12,500	$12,000	$14,900
34)	1.10	2.00	5.00	1.75	2.00	10.00	1.00	1.90	.90	5.50	4.50	6.00
35)	24.00	.....	30.00	17.70	30.00	.....	17.25	24.50	29.00	40.00	.....	30.00
36)	27.00	30.00	31.00	18.70	30.25	31.50	19.25	25.50	29.00	41.00	30.00	30.00
37)	.053	.05	.09	.045	.045	.045	.045	.06	.06	.055	.05	.062
38)	.84	.70	1.00	1.50	.90	1.10	1.50	.90	1.20	1.20	1.10	1.325
39)	.93	3.00	2.50	2.00	3.00	10.00	1.00	1.90	.90	5.50	3.50	1.35
40)	22.50	.....	20.00	14.75	22.00	.....	12.00	18.50	20.00	20.00	.....	23.50
41)	24.60	15.00	21.00	15.75	22.75	16.30	14.00	19.50	20.00	21.50	27.00	23.50
42)	50.60	.....	50.00	33.50	45.00	.....	32.00	48.00	38.00	40.00	.....	60.00
43)	52.70	25.00	51.00	34.50	45.75	31.15	34.00	49.00	38.00	42.00	35.00	60.00

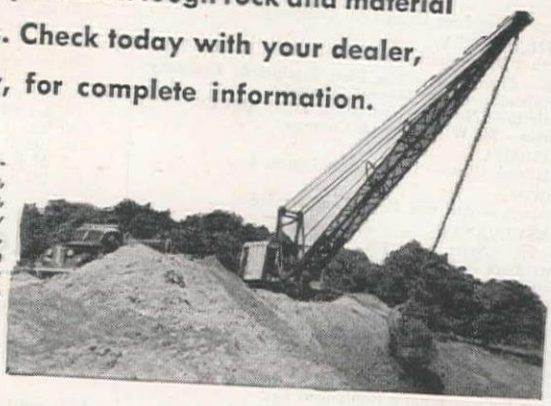
(Continued on next page)

25 EXTRA VALUES - EXTRA PROFITS IN LORAINS

1. Center Drive turntable design which—
2. Applies power directly—fully concentrated on any one operation—
3. Or spreads power for high-speed simultaneous operations.
4. Two piece swing drums, roller bearing mounted, designed to take the punishment of the hardest worked part of the shovel.
5. Crowd clutch, extra wide to deliver full digging power, mounted on roller bearings.
6. Hydraulic coupling (fluid clutch) used on Lorain 82, L-820—engine can't stall—eliminates impacts and shocks on machinery—no loafing.
7. Center "Chain" Drive Crawler.
8. Two travel speeds in either direction, standard equipment.
9. Steers either direction.
10. Safety travel and tread lock.
11. Propelling mechanism runs in oil bath.
12. Generous underneath clearances.
13. Centralized pressure lubrication to bearings.
14. Wider treads.
15. All-welded shovel boom.
16. All-steel dipper stick.
17. Dipper door stops to protect stick.
18. "Elbow action" power dipper trip.
19. Simultaneous hoist, swing and travel (or boom derricking) for cranes.
20. High-speed boom hoist—power and precision control of boom derricking and lowering.
21. "Cable-Miser" fairlead with interlocking, geared sheaves.
22. Bolted butt type of crane boom splice; easy and quick to assemble.
23. All-purpose boom head—no top block, more clearance.
24. 6-part cable reeving; greater vertical reaches.
25. Backdigger boom with controlled tilting dipper, digs a vertical wall, digs a level floor, dumps exactly where wanted.



25 hard facts and "reasons why" for Lorain superiority are listed at left.* Every one of them is a substantial reason why Lorains stand out in performance and profits on tough rock and material handling jobs. Check today with your dealer, shown below, for complete information.



All Lorains are fully convertible for use as shovels, cranes, clamshells, draglines, backdiggers—to handle any and all kinds of digging, material handling and lifting jobs. Don't buy a "single purpose" machine — keep one eye on future jobs.

**These points apply to Lorain models 1¼ yds. and up.*

CRANES • SHOVELS • DRAGLINES • CLAMSHELLS • MOTO-CRANES

See Your thew-Lorain Dealer

Le Roi-Rix Machinery Co., Los Angeles 11
Cate Equipment Co., Salt Lake City 4
Liberty Trucks & Parts Co., Denver 1
Coast Equipment Company, San Francisco 1
A. H. Cox & Co., Seattle 4, Wash.
Bunting Tractor Co., LaGrande, Ore., Boise and Twin Falls, Ida.
Connelly Machinery Company, Billings and Great Falls, Mont.
Sanford Tractor & Equipment Co., Reno, Nev.
The Mountain Tractor Co., Missoula, Mont.
The Tractor & Equipment Co., Sidney, Mont.
P. L. Crook & Co., Portland 10, Oregon

44)	35.00	.....	50.00	20.00	29.00	.....	20.00	33.00	46.00	33.00	.....	57.50
45)	37.20	30.00	51.00	21.00	29.75	39.50	22.00	34.00	46.00	34.00	38.00	57.50
46)	22.00	.....	25.00	15.90	20.00	.....	14.00	26.00	24.00	20.00	.....	23.50
47)	25.00	16.00	26.00	16.90	20.75	23.10	16.00	27.00	27.00	21.00	30.00	23.50
48)	.052	.05	.09	.045	.045	.045	.045	.055	.055	.055	.05	.062
49)	$44,000	$65,000	$33,000	$25,000	$82,700	$50,000	$102,000	$50,000	$63,146	$100,000	$180,000	$60,000
50)	550.00	300.00	500.00	350.00	600.00	450.00	550.00	$1,000	600.00	500.00	525.00	.....
51)	580.00	500.00	600.00	520.00	900.00	620.00	750.00	$1,700	820.00	500.00	725.00	.....
52)	$1,060	$1,000	900.00	780.00	$6,000	955.00	$2,400	$2,200	$1,300	$1,000	$1,875	.....
53)	680.00	600.00	800.00	720.00	700.00	$1,250	$1,200	$1,200	250.00	900.00	750.00	.....
54)	.84	.60	.95	1.30	.80	1.19	1.50	.88	1.10	1.00	1.10	1.00

Irrigation . . .

Montana—Prairie County—Bureau of Reclamation—Structures

M. G. Long, Billings, Montana, submitted the low bid of $24,806 to the Bureau of Reclamation, for the construction of the Intake pumping plant and laterals under specifications No. 1801-D, bids received at the office of the Intake Project, Terry, Montana. The following is a summary of the unit bids received:

(1) M. G. Long $24,806
(2) Barnard-Curtiss Co. 26,403
(3) Peter Kiewit & Sons $47,004
(4) Rue Construction Co. 47,684

		(1)	(2)	(3)	(4)
30,500	cu. yd. excavation for laterals	.40	.40	.83	.70
190	cu. yd. excavation for structures	2.00	3.50	3.00	6.00
40,000	sta. cu. yd. overhaul	.02	.03	.02	.03
175	cu. yd. backfill about structures	1.00	1.50	2.50	3.00
50	cu. yd. puddling or tamping backfill	2.00	1.50	4.00	6.00
102	cu. yd. concrete in structures	40.00	47.50	85.00	75.00
7,200	lb. placing reinforcement bars	.05	.05	.08	.07
90	sq. yd. dry-rubble paving	1.00	6.00	4.50	8.00
250	sq. yd. dry-rock paving	2.00	3.00	5.50	4.00
208	lin. ft. laying 15-in. concrete pipe	1.00	1.00	1.00	3.00
254	lin. ft. laying 18-in. concrete pipe	1.00	2.00	1.25	5.00
60	lin. ft. laying 24-in. concrete pipe	1.50	3.00	1.50	6.00
78	lin. ft. laying 30-in. concrete pipe	2.00	4.00	2.00	7.00
750	lin. ft. driving treated timber piles	2.00	1.50	3.00	5.00
Lump sum,	const. pump house, etc.	$1,000	950.00	$2,000	$3,000
7,500	lb. installing machinery	.10	.10	.10	.15
69	lin. ft. laying steel pipe 12-in. dia.	3.00	2.00	2.10	5.00
90	lin. ft. laying steel pipe 22-in. dia.	4.00	3.00	4.00	6.00
1,700	lb. installing gates and misc. metalwork	.10	.20	.15	.30
250	lin. ft. installing elec. metal conduit	.50	.50	.50	.50
3,500	lb. install. conductors, wires and appar.	.30	.10	.50	.20
Lump sum,	const. trans. station structure	250.00	250.00	250.00	400.00

Oregon—Deschutes County—Bureau of Reclamation—Structures

United Construction Co., Seattle, Wash., submitted the lowest bid of $36,698 to the Bureau of Reclamation for the construction of laterals, earthwork and structures under specifications No. 1,800-D. Bids were opened at Bend, Oregon. A resume of the unit bids follows:

(1) United Construction Co. $36,698
(2) Leonard & Slate Oregon Ltd. 41,540
(3) Blickle & Cater 46,001
(4) J. N. & M. J. Conley 47,795
(5) E. B. Bishop $49,720
(6) Harry I. Hamilton Co. 52,219
(7) C. J. Montag & Sons 65,315

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
36,500	cu. yd. excav., common, for laterals	.37	.45	.50	.55	.60	.60	.75
500	cu. yd. excav., rock, for laterals	2.50	3.00	3.00	5.00	2.50	3.00	3.00
1,700	sta. cu. yd. overhaul	.04	.05	.06	.05	.05	.10	.20
400	cu. yd. compacting embankments	.50	.50	.25	.50	1.00	1.00	1.00
870	cu. yd. excav., common, for structs.	.75	2.50	1.00	1.50	1.50	4.00	3.00
90	cu. yd. excav., rock, for structs.	4.00	10.00	5.00	5.00	5.00	5.00	3.00
1,480	cu. yd. backfill	.30	.50	.30	.50	.50	.30	.50
770	cu. yd. compacting backfill	.70	.50	2.00	1.00	1.00	1.00	1.00
380	cu. yd. concrete in structures	42.00	40.00	54.00	45.00	45.00	50.00	70.00
28,000	lb. placing reinf. bars	.04	.05	.03	.06	.06	.05	.05
60	sq. yd. dry rock paving	5.00	4.00	2.50	5.00	6.00	5.00	5.00
380	lin. ft. laying 18-in. diam. conc. pipe	1.50	1.25	.50	1.00	2.00	2.00	1.50
460	lin. ft. laying 24-in. diam. conc. pipe	2.00	1.75	.75	1.50	2.50	3.00	2.00
5	M.F.B.M. erecting timber in structures	60.00	100.00	38.00	100.00	150.00	100.00	100.00
5,100	lb. installing gates and misc. metalwork	.10	.10	.10	.20	.20	.15	.20

Bridge and Grade Separation . . .

California—Los Angeles County—State—Overhead, Pave and Surf.

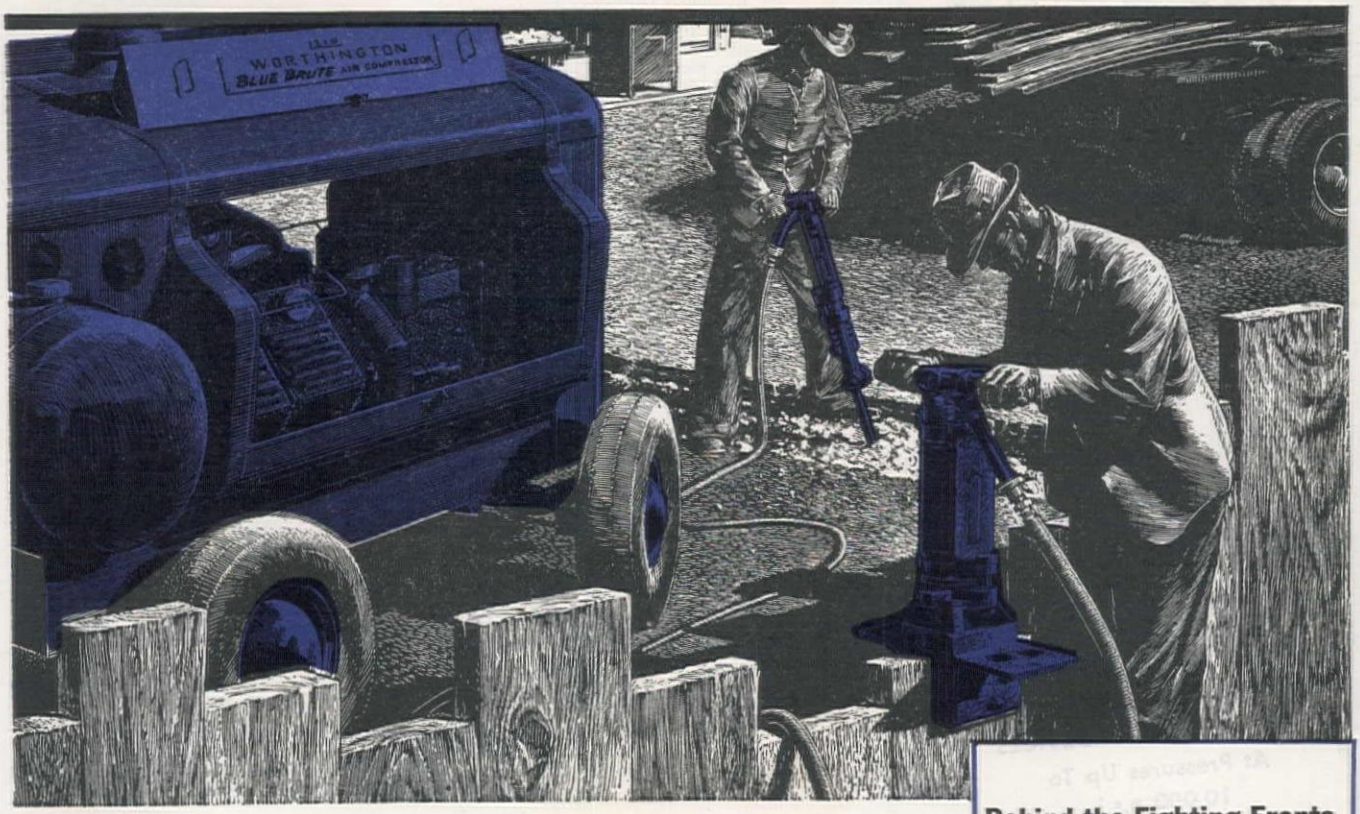
Griffith Co., Los Angeles, bid low at $86,094 to the State Division of Highways, Sacramento, for construction of a reinforced concrete overhead crossing and placing of asphalt concrete paving and plant mix surfacing on Anaheim and Gaffey Sts. at Vermont Ave., Los Angeles. The following unit bids were submitted:

(A) Griffith Co. ..... $ 86,094
(B) R. R. Hensler 92,152
(C) C. B. Tuttle 94,825
(D) Oberg Bros. 96,517
(E) J. E. Haddock, Ltd. 97,776
(F) Contracting Engineers Co. 99,662
(G) Mittry Bros. Constr. Co. 99,803
(H) Trewhitt-Shields & Fisher 99,991
(I) E. B. Bishop 101,650
(J) Byerts & Dunn 104,030
(K) Guy F. Atkinson Co. $108,419
(L) Ralph A. Bell 109,384
(M) Tomei Constr. Co. 115,834
(N) Baruch Corp. 117,751
(O) Modern Builders Constr. Co. 117,918
(P) Dimmitt & Taylor 118,458
(Q) Oswald Bros. 122,735
(R) Norman I. Fadel 125,082
(S) Carlo Bongiovanni Constr. Co. 136,173
(T) Fred E. Potts Co. 139,864

		(A)	(B)	(C)	(D)
(1)	Lump sum, remove exist. bridge	$2,300	$6,250	$5,410	$2,000
(2)	130 cu. yd. remove conc.	3.00	6.00	9.00	4.00
(3)	Lump sum, clear. and grub	120.00	$1,000	220.00	100.00
(4)	12,700 cu. yd. road. excav.	.60	.40	.66	.60
(5)	650 cu. yd. struct. excav.	1.60	1.70	3.00	1.00
(6)	2,500 sq. yd. prepare subgrade	.17	.07	.13	.15
(7)	Lump sum, develop water supply sys.	600.00	500.00	$1,155	300.00
(8)	350 M. gal. apply water	1.25	2.00	3.00	2.00
(9)	Lump sum, finish roadway	100.00	100.00	165.00	200.00
(10)	3,000 T. untr. rock base	2.10	2.90	2.60	2.00
(11)	5 T. liq. asph., MC-2	25.00	20.00	38.00	50.00
(12)	1,200 T. P.M.S.	3.65	4.00	4.62	5.00
(13)	7,000 sq. yd. asph. emuls.	.03	.03	.04	.04
(14)	1,550 T. asph. conc.	3.80	4.15	4.72	5.00

(Continued on next page)

DOLLARS DOWN TO EARTH



BUDGET-SAVERS—these Blue Brutes! When postwar construction plans come down to earth, they'll keep down costs on jobs like this:

> *Pittsburgh's $36,000,000 public works program including $4,719,550 for water mains, $9,142,500 for streets, $3,494,000 for sewers.*

Other cities, too, have made substantial plans. Blue Brute air-power teams will back your effort then — and they'll help you, right now, on those jobs that call for sure power, free from time-wasting trouble.

Compressors, like the 210′ model shown above . . . Diesel, gasoline or electric driven . . . all have Feather* Valves — strongest, lightest, tightest, *proved* good for a lifetime — 3-point suspension of engine and compressor for rigid alignment — full force feed lubrication — and other trouble-savers.

Air tools — clay diggers, sheeting drivers, paving breakers — tools for *every* construction purpose — are better designed for sturdier, smoother action, easier handling!

Look 'em over now; plan now to get more worth from air with Worthington. Your nearest Blue Brute distributor is listed on page 116.

*Reg. U. S. Pat. Off.

H5-3

Behind the Fighting Fronts with

BLUE BRUTES

Essential LST's for amphibious war are speeded through production in a famous shipyard with the help of round-the-clock Blue Brute air-power. Also at work in hundreds of Army camps, Navy yards, air bases . . . here at home and on fighting fronts.

***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.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division Holyoke, Mass.

(15)	915 cu. yd. Cl. "A" port. cem. conc. (struct.)	31.00	30.00	28.00	35.00		
(16)	3,000 lin. ft. furn. conc. piles	2.50	2.00	2.60	3.00		
(17)	82 each drive piles	55.00	75.00	35.00	60.00		
(18)	110 cu. yd. Cl. "A" port. cem. conc. (curbs and gutters)	17.00	20.00	14.00	30.00		
(19)	14 cu. yd. Cl. "C" port. cem. conc. (pipe reinf.)	14.00	30.00	15.00	25.00		
(20)	50 lin. ft. timber railing	3.00	3.50	2.00	3.00		
(21)	395 lin. ft. steel railing	8.40	8.00	9.00	8.00		
(22)	3 each F.A.P. markers	5.00	5.00	3.00	5.00		
(23)	620 lin. ft. 12-in. plain conc. pipe	1.15	1.00	2.50	1.00		
(24)	175,300 lb. furn. bar reinf. steel	.037	.035	.03	.03		
(25)	175,300 lb. place bar reinf. steel	.01	.015	.01	.02		
(26)	850 lb. misc. iron and steel	.13	.25	.20	.25		
(27)	1 each adj. manholes to grade	15.00	40.00	23.00	50.00		
(28)	410 lin. ft. elect. conduit	.50	1.25	1.00	.50		
(29)	Lump sum, misc. items of bridge work	950.00	500.00	$2,999	$1,000		

	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	$3,000	$7,000	$3,500	$4,500	$5,000	$2,500	$4,000
(2)	4.00	2.50	5.00	11.50	2.50	3.00	6.00
(3)	250.00	300.00	250.00	500.00	150.00	250.00	250.00
(4)	.70	.90	.55	.50	.60	.70	.50
(5)	2.50	1.10	2.00	3.25	1.50	3.50	2.50
(6)	.15	.20	.20	.20	.20	.15	.20
(7)	650.00	300.00	300.00	$1,200	400.00	500.00	250.00
(8)	1.50	2.50	1.50	1.50	1.00	1.00	2.00
(9)	400.00	250.00	500.00	400.00	250.00	300.00	900.00
(10)	3.00	2.00	2.25	2.00	2.75	3.00	2.50
(11)	50.00	50.00	17.00	20.00	25.00	40.00	30.00
(12)	4.80	5.00	4.00	4.00	4.00	4.00	4.50
(13)	.05	.05	.05	.15	.04	.10	.06
(14)	5.00	5.00	4.50	4.50	4.50	4.50	4.50
(15)	25.50	30.00	33.00	30.00	36.00	30.00	42.00
(16)	4.25	2.20	3.00	2.80	3.50	4.00	4.00
(17)	55.00	70.00	100.00	85.00	75.00	100.00	60.00
(18)	20.00	30.00	20.00	25.00	16.00	17.00	15.00
(19)	15.00	12.00	15.00	12.00	12.00	10.00	12.00
(20)	3.20	3.00	4.00	3.00	3.00	2.00	1.50
(21)	8.00	7.60	11.00	11.00	8.00	10.00	8.00
(22)	25.00	6.00	4.00	25.00	3.00	10.00	5.00
(23)	1.05	1.00	1.00	2.00	1.15	1.00	1.00
(24)	.033	.026	.04	.04	.035	.03	.035
(25)	.01	.014	.015	.02	.015	.02	.02
(26)	.14	.20	.30	.25	.30	.20	.25
(27)	50.00	100.00	50.00	100.00	75.00	25.00	40.00
(28)	.43	.70	.50	.50	.50	.50	.60
(29)	$3,500	$3,000	$1,200	900.00	800.00	$3,000	$1,441

Utah—Davis County—State— Concrete Underpass

Victor Newman, Salt Lake City, Utah, submitted the lowest of eight bids received by the Utah State Road Commission for the construction of the Ogden Arsenal Underpass. Newman was awarded the contract for $191,756. Summary of the unit bids follows:

(A)	Victor Newman	$191,756	
(B)	Young & Smith	193,921	
(C)	Gibbons & Reed Co.	199,638	
(D)	W. W. Clyde & Co.	206,413	
(E)	Reynolds Construction Co.	219,918	
(F)	Chytraus Construction Co.	$226,513	
(G)	Olof Nelson Construction Co.	255,846	
(H)	Ora Bundy	280,039	
(I)	Engineer's estimate	229,029	

(1) 100 sq. yd. 4-in. concrete pavement
(2) 8,625 sq. yd. 7-in. concrete pavement
(3) 135 T. natural rock asphalt
(4) 930 T. plantmix bitum. surf.
(5) 4,500 T. cr. rock or cr. gravel surf. course
(6) 3,700 gal. bitum. material, Type MC-1
(7) 10,500 gal. bitum. material, Type SC-4
(8) 2,050 gal. bitum. material, Type RC-4
(9) 85 T. cover material
(10) 103,500 cu. yd. unclassified excavation
(11) 720,500 sta. yd. overhaul, Class "A"
(12) 46,700 yd. mi. overhaul, Class "B"
(13) 75 hr. rolling
(14) 55,000 gal. watering
(15) 1,100 cu. yd. top soil
(16) 501 lin. ft. 8-in. underdrains
(17) 196 lin. ft. 10-in. underdrains
(18) 948 lin. ft. 12-in. underdrains
(19) 2292 lin. ft. 18-in. underdrains
(20) 6 ea. underdrain pipe reducers, 24 - 21-in.
(21) 6 ea. underdrain pipe reducers, 21 - 18-in.
(22) 2,940 cu. yd. excavation for structures
(23) 350 cu. yd. gravel backfill
(24) 3,235 lin. ft. curb, No. 1-B
(25) 600 lin. ft. Type 1-C special curb and gutter
(26) 2,600 lin. ft. Type 3-H curb and gutter
(27) 285 lin. ft. Type 3-F curb and gutter
(28) 37 cu. yd. concrete, Class "A"
(29) 4,800 lb. reinforcing steel
(30) 4,600 lb. structural steel
(31) 250 lin. ft. fence, Type "A"
(32) 12 ea. removal of intermittent dividers
(33) 70 sq. yd. removal of existing pavement
(34) 1,450 lin. ft. moving fence
(35) 5 ea. right of way markers
(36) 1 ea. F.A.P. markers

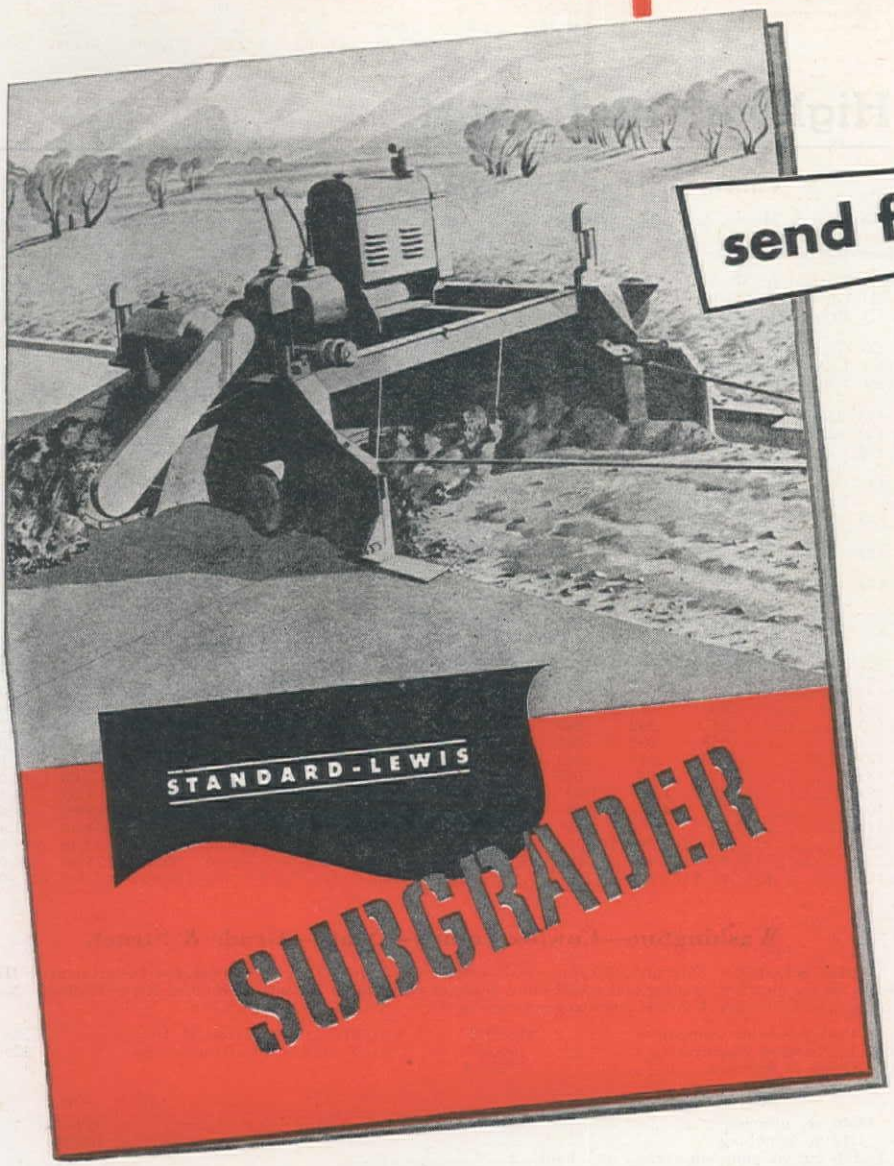
Steel I-beam and concrete underpass

(37) 850 cu. yd. excavation for structures
(38) 1,170 cu. yd. concrete, Class "A"
(39) 77,937 lb. reinforcing steel
(40) 489,300 lb. structural steel
(41) 913 sq. yd. waterproofing
(42) 10,800 lin. ft. piles (treated)
(43) 1 ea. furnishing pile driving equipment

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	2.34	2.25	2.90	1.75	2.25	1.70	2.00	2.50	2.40
(2)	2.50	2.40	2.40	2.00	3.00	3.77	2.80	3.00	2.80
(3)	13.40	11.00	14.00	13.00	15.00	13.50	15.00	14.00	15.00
(4)	7.00	5.00	2.95	2.25	4.00	5.00	3.00	6.95	6.00
(5)	.95	1.20	.90	.80	1.00	.85	1.00	1.50	1.50
(6)	.12	.11	.11	.115	.12	.10	.11	.15	.12
(7)	.075	.11	.10	.09	.12	.10	.09	.15	.11
(8)	.1075	.11	.115	.12	.12	.10	.11	.15	.12
(9)	2.70	3.00	4.00	3.00	4.00	3.00	4.00	5.00	4.00
(10)	.31	.22	.27	.38	.20	.23	.30	.60	.25
(11)	.015	.015	.005	.01	.01	.02	.02	.02	.02
(12)	.145	.16	.15	.12	.15	.15	.20	.16	.20
(13)	5.00	5.00	4.50	4.50	6.00	5.00	5.00	5.00	4.00
(14)	2.25	2.00	2.00	2.00	2.00	2.50	3.00	2.50	2.00
(15)	1.75	2.00	2.25	1.70	2.50	1.60	2.00	2.00	1.50
(16)	.50	.60	.55	.50	1.00	.80	.80	3.70	.55
(17)	.60	.70	.65	.60	1.25	.95	1.00	4.30	.65
(18)	.90	.85	1.00	.90	1.50	1.00	1.20	5.00	.75
(19)	2.00	1.90	2.20	1.80	2.90	2.00	2.10	5.50	1.60
(20)	25.05	25.00	25.00	25.00	25.00	21.00	20.00	20.00	18.00
(21)	19.45	23.00	20.00	20.00	25.00	17.00	16.00	20.00	15.00
(22)	1.22	1.20	1.75	1.00	2.00	.90	4.00	2.50	3.00
(23)	2.10	2.00	1.65	2.00	2.00	1.75	1.50	2.00	1.50
(24)	.67	1.00	1.43	.75	1.00	1.25	.80	1.00	1.00
(25)	1.50	1.50	2.15	1.50	2.00	1.60	1.75	2.60	2.50
(26)	1.50	1.50	2.05	1.75	2.00	2.65	2.25	2.00	2.50
(27)	1.50	1.50	2.05	1.75	2.00	2.60	2.25	2.20	2.50
(28)	47.00	35.00	50.00	35.00	40.00	39.00	35.00	33.00	35.00
(29)	.08	.10	.075	.07	.08	.06	.07	.07	.08
(30)	.16	.15	.17	.15	.20	.17	.25	.20	.20
(31)	.35	.30	.25	.20	.20	.18	.20	.15	.20
(32)	2.00	5.00	5.00	5.00	10.00	10.00	1.00	2.00	2.00

(Continued on next page)

For Complete Facts

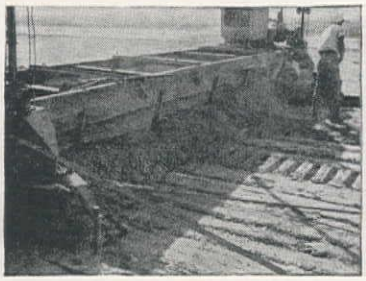


send for this folder

The many unique features embodied in the new Standard-Lewis Subgrader come as a result of design by practical paving equipment engineers. These men know well the problems encountered and have built into this machine many practical improvements that save contractors, time, labor and money.

The new Standard Steel 8-page folder covers in detail all information relating to the efficient operation and economy provided by this ingenious Subgrader.

A request on your letterhead will bring a copy promptly.



This is an example of deep cutting into tough material—gravel as large as 14" in diameter is handled with ease.

No chipped or broken edges of concrete pavement is experienced with the solid rubber tired wheels you can use on the STANDARD-LEWIS Subgrader.

OTHER STANDARD PRODUCTS

ASPHALT AND CONCRETE FINISHERS
TANDEM ROLLERS
TOW BROOMS
BINS AND BATCHERS
CONCRETE SPREADERS

STANDARD STEEL CORPORATION

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

(33)	2.50	1.00	1.00	1.00	2.00	.90	1.00	.70	1.00
(34)	.12	.10	.25	.15	.30	.15	.15	.15	.10
(35)	3.00	5.00	10.00	5.00	10.00	11.00	4.00	5.00	4.00
(36)	15.00	25.00	10.00	25.00	10.00	11.00	15.00	15.00	20.00
(37)	1.15	2.00	2.00	2.50	2.00	1.00	4.00	2.50	3.00
(38)	18.65	28.00	24.00	31.25	30.00	33.00	35.00	29.50	30.00
(39)	.06	.06	.075	.066	.065	.06	.07	.0675	.07
(40)	.06	.07	.08	.072	.08	.07	.11	.071	.08
(41)	3.85	3.50	5.00	4.00	5.00	3.50	4.00	.30	5.00
(42)	1.75	1.45	1.75	2.00	2.50	2.35	2.00	2.80	1.75
(43)	250.00	$2,000	400.00	500.00	$1,000	500.00	$1,500	300.00	$1,500

Highway and Street . . .

California—Los Angeles County—City—Pave & Sewers

Nathan A. Moore, Alhambra, submitted the low bid of $488,564 to the Los Angeles Board of Public Works, for the construction of sanitary sewers and storm drains in the Los Angeles Airport area, also fill, compacted base and paving at the airport. A summary of the unit bids called for in specification 138 is as follows:

(A) Nathan A. Moore $488,564
(B) Gunther & Shirley Co. 554,350
(C) Bryce Trucking & Construction Co., and Fred Chadwick 555,465
(D) Griffith Co. 560,352
(E) J. A. Thompson 589,243
(F) Warren Southwest, Inc. 592,507
(G) Guerin Bros. $596,310
(H) Macco Construction Co. 613,768
(I) Mike Radich & Co. 627,874
(J) Dimmitt & Taylor 644,585
(K) L. S. Chism 689,076
(L) Engineer's estimate 566,094

Morrison-Knudsen Co.'s bid was not declared.

(1) 220,000 cu. yd. compacted fill
(2) 42,000 cu. yd. select matl. compacted fill
(3) 612,150 sq. ft. of emulsified asphalt stabilized base 4 in. thick
(4) 667,350 sq. ft. of emulsified asphalt stabilized base 6 in. thick
(5) 602,900 sq. ft. conc. pave., 8 in. thick, with thickened edges
(6) 668,350 sq. ft. of asph. conc. wearing surface, 2 in. thick, including seal coat
(7) 10,500 sq. ft. asph. conc. wearing surf., max. thickness 4½ in., including seal coat
(8) 17,550 sq. ft. of asph. conc. wearing surface, average thickness 2½ in., including seal coat
(9) 2,684 lin. ft. 12-in. extra strength clay pipe sewer, including 52 wyes
(10) 1,010 lin. ft. 10-in. extra strength clay pipe, sewer, including 22 wyes
(11) 590 lin. ft. 10-in., standard strength clay pipe, sewer, including 14 wyes
(12) 15 manholes, including frame and cover
(13) 1 junction chamber, including frame and cover
(14) storm drain and appurtenances compl. in place

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	.70	.77	.77	.76	.725	.82	.95	.86	.96	.90	1.10
(2)	.75	.70	.77	.86	.85	.90	.915	1.22	1.70	1.00	1.76
(3)	.05	.05	.056	.04	.065	.047	.059	.065	.045	.065	.052
(4)	.06	.071	.078	.08	.09	.087	.083	.09	.07	.10	.083
(5)	.24	.282	.264	.29	.31	.275	.249	.29	.28	.31	.293
(6)	.055	.053	.061	.064	.066	.073	.063	.06	.0525	.0625	.0553
(7)	.065	.11	.083	.09	.145	.10	.083	.08	.055	.10	.0575
(8)	.085	.06	.068	.09	.09	.09	.075	.06	.065	.08	.0633
(9)	2.75	4.22	3.02	3.00	3.30	4.20	4.10	3.00	3.95	4.00	4.10
(10)	2.50	4.05	2.75	3.10	3.25	4.00	4.50	2.75	3.60	4.00	3.65
(11)	2.00	3.70	2.20	1.80	2.00	3.70	2.75	2.50	3.40	4.00	3.40
(12)	150.00	282.00	165.00	200.00	235.00	275.00	242.00	300.00	280.00	275.00	288.00
(13)	150.00	285.00	2.00	230.00	235.00	280.00	290.00	350.00	300.00	275.00	300.00
(14)	$35,000	$47,518	$51,150	$43,200	$43,000	$48,000	$41,500	$39,000	$44,000	$45,000	$48,590

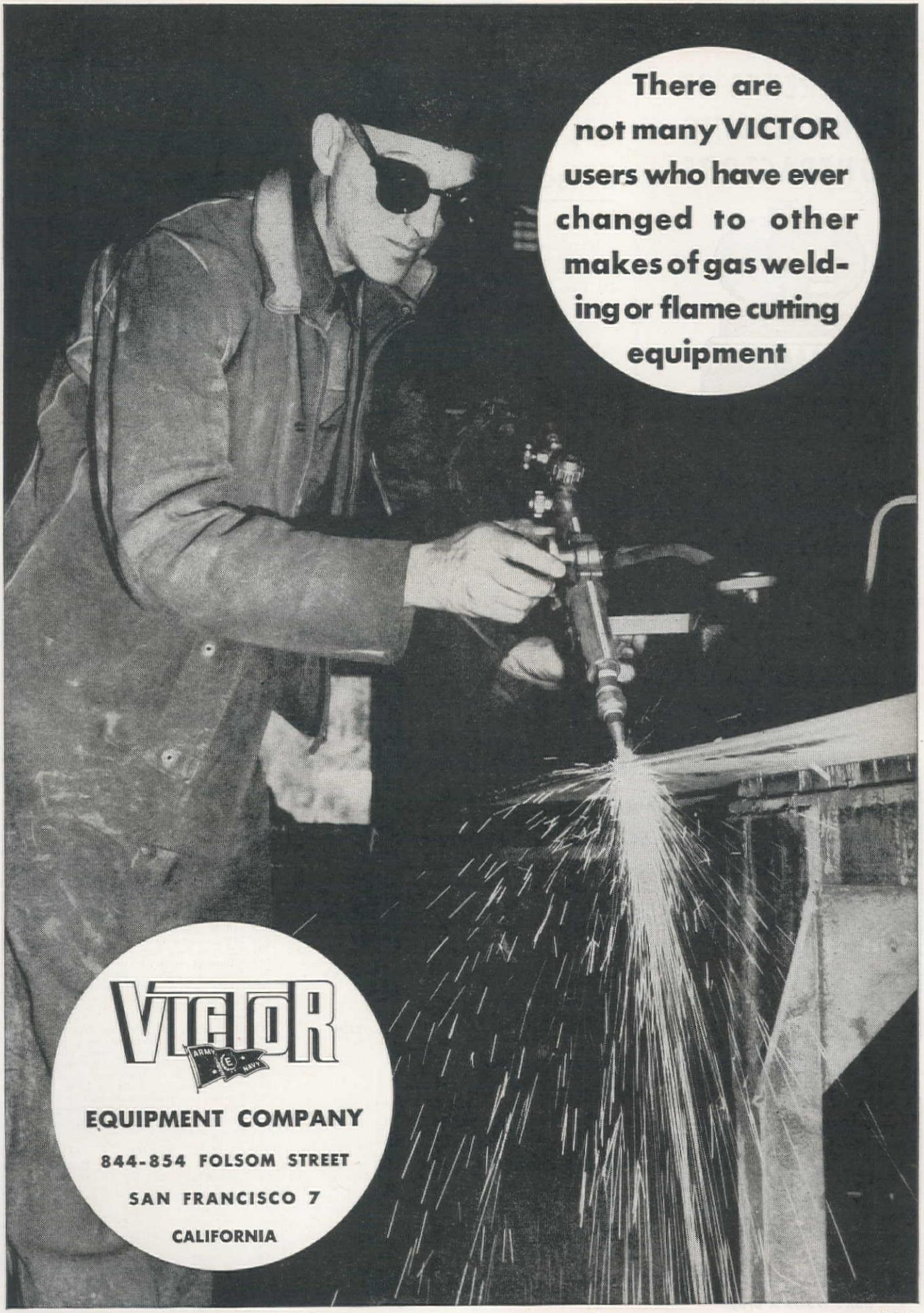
Washington—Cowlitz County—State—Grade & Struct.

Parker-Schram Co., Portland, Oregon, was low bidder, of $156,297.95, to Washington Department of Highways for the clearing, grading and establishing drainage culverts on Kalama to Kalama River Highway No. 1, a length of 1.59 miles. Unit bid summary is as follows:

(1) Parker-Schram Company $156,297
(2) L. Romano Engineering Co. 165,663
(3) Goetz & Brennan 172,589
(4) Strong & MacDonald, Inc. $205,506
(5) Northwest Construction Co. 229,489

SCHEDULE "A"	(1)	(2)	(3)	(4)	(5)
18.46 ac. clearing				500.00	
4.42 ac. grubbing				500.00	
15,190 cu. yd. common excav., incl. haul				.30	
2,920 cu. yd. solid rock excav., incl. haul				1.00	
240 cu. yd. common trench excav., incl. haul				1.00	
860 cu. yd. structure excav.				1.50	
384,270 cu. yd. hydraulic embankment				.46	
5,590 cu. yd. hydraulic matl. in stockpile				.50	
130 cu. yd. gravel backfill in place				5.00	
165 cu. yd. cr. stone surf. top course				7.50	
215 cu. yd. cr. stone surf. base course				7.50	
66.1 concrete, Class A, in place				55.00	
8,440 lbs. steel reinf. bars				.10	
24 lin. ft. standard open wood flume				5.00	
171 lin. ft. wrought iron water pipe 4-in. diam.				4.00	
96 lin. ft. pl. conc. or V.C. culv. pipe 12-in. diam.				1.25	
219 lin. ft. std. reinf. conc. culv. pipe 24-in. diam.				4.00	
99 lin. ft. std. reinf. conc. culv. pipe 30-in. diam.				7.00	
225 lin. ft. std. reinf. conc. culv. pipe 36-in. diam.				10.00	
165 lin. ft. std. reinf. conc. culv. pipe 48-in. diam.				12.00	

SCHEDULE "B"					
18.46 ac. Clearing	300.00	200.00	300.00	500.00	375.00
4.42 ac. Grubbing	300.00	200.00	300.00	500.00	400.00
15,190 cu. yd. common excav. incl. haul	.30	.30	.40	.30	.38
2,920 cu. yd. solid rock excav. incl. haul	1.00	1.00	1.10	1.00	1.50
240 cu. yd. common trench excav. incl. haul	1.00	2.00	2.00	1.00	1.50
790 cu. yd. structure excav.	2.00	2.00	2.00	1.50	2.00
307,790 cu. yd. embankment in place from borrow	.35	.41	.40	.50	.56
5,590 cu. yd. borrow material in stockpile	.35	.41	.40	.50	.70
18,610 cu. yd. sel. roadway borrow in pl., incl. haul	1.00	.60	1.00	.80	1.10
100 cu. yd. gravel backfill in place	2.50	4.00	4.00	5.00	5.25
165 cu. yd. cr. stone surf. top course	5.00	6.00	4.00	7.50	4.50
215 cu. yd. cr. stone surf. base course	5.00	6.00	4.00	7.50	4.50
62.0 cu. yd. concrete, Class A, in place	55.00	50.00	42.00	55.00	50.00
7,800 lb. steel reinf. bars in place	.10	.08	.08	.10	.10
24 lin. ft. standard open wood flume in place	2.00	2.00	3.00	5.00	3.00
171 lin. ft. wrought iron water pipe 4-in. diam.	2.25	1.00	2.00	4.00	3.00
78 lin. ft. pl. conc. or V.C. culv pipe 12-in diam.	1.40	1.00	1.10	1.25	1.50
219 lin. ft. std. reinf. conc. culv. pipe 24-in. diam.	3.50	4.50	3.40	4.00	4.25
57 lin. ft. std. reinf. conc. culv. pipe 30-in. diam.	6.50	6.00	6.00	7.00	6.40
225 lin. ft. std. reinf. conc. culv. pipe 36-in. diam.	9.50	10.00	9.40	10.00	8.70
135 lin. ft. std. reinf. conc. culv. pipe 48-in. diam.	12.50	12.00	11.60	12.00	14.00



Photograph by courtesy of Matson Navigation Company

AD 109

Oregon—Linn County—State—Resurfacing

Warren Northwest, Inc., Portland, submitted the low bid to the Oregon State Highway Dept., Portland, at $72,796, for pavement resurfacing of the Albany-Crabtree Corner section of the Santiam Highway. The following unit bids were submitted:

(1) Warren Northwest, Inc. $72,796
(2) J. C. Compton & E. C. Hall Co. 73,266
(3) Porter W. Yett 80,012
(4) Parker-Schram Co. ..... $ 94,125
(5) United Contracting Co. 101,229
(6) McNutt Bros. 123,199

	(1)	(2)	(3)	(4)	(5)	(6)
1.33 mi. side trenching	125.00	200.00	250.00	425.00	375.00	300.00
3,500 tons Class "B" asph. conc. in base and leveling course	5.20	5.00	5.60	6.45	7.15	8.75
9,300 tons Class "B" asph. conc. in wearing surface	5.10	5.00	5.60	6.45	6.85	8.75
4,000 cu. yd. ¾-in. - 0 material in shoulders	1.75	2.25	2.00	2.75	3.00	2.70

Miscellaneous . . .

Washington—Pierce County—State—Ferry Terminal

Hart Construction Co., Tacoma, Wash., submitted the low bid to and was awarded the contract at $41,692 by the Director of Highways, Olympia, for the construction of Point Fosdick Terminal for the Tacoma Narrows Ferry. The following unit bids were submitted:

(1) Hart Construction Co. $41,692
(2) M. P. Butler $42,539

	(1)	(2)
12 M.F.B.M. furn. timber and lumber (untreated) at site	88.00	80.00
24 M.F.B.M. placing timber and lumber (untreated)	110.00	159.00
21 M.F.B.M. timber and lumber (creo. treated) in place	237.50	264.00
1,280 lin ft. furnish timber piling (untreated) at site	.35	.30
18,160 lin. ft. furnish timber piling (creo. treated) at site	.98	1.19
321 ea. driving timber piles in place	29.00	15.80
Lump sum, wrapping batter piles and dolphins	960.00	680.00
Lump sum, elec. wiring and fixtures complete in place	245.00	530.00
Lump sum, remove portions of exist. structure	$3,600	$2,940
Lump sum, realign guide piles	650.00	$1,003

California—Placer County—U.S.E.D.—Bldg. & Utilities

H. W. Robertson, Sacramento, Calif., was awarded a $218,239 contract by the U. S. Engineer Office, Sacramento, to construct WAC and medical housing, place paving, ad install utilities at the DeWitt general hospital, Auburn. The following unit bids were submitted:

(A) H. W. Robertson $218,239
(B) James I. Barnes 219,981
(C) Stolte, Inc. 225,327
(D) Moore & Roberts 230,515
(E) Lawrence Construction Co. 232,015
(F) Guy E. Hall 232,797
(G) Trewhitt, Shields & Fisher $243,743
(H) Central California Constr. Co. 246,420
(I) MacDonald & Kahn, Inc. 246,999
(J) Alfred J. Hopper 250,856
(K) L. H. Hansen & Sons 254,025
(L) Peter Kiewit & Son 265,396

BUILDINGS
(1) 1 ea. admin. bldg. supply and recreational bldg.
(2) 2 ea. barracks, WAC type BCT.
(3) 5 ea. barracks, type BAT and LCT
(4) 1 ea. mess, type MVT.
(5) 1 ea. admin. bldg., type OB-AT.
(6) 1 ea. supply bldg., type OB-AT.
(7) 1 ea. recreation bldg., type RB-AT.

WATER DISTRIBUTION SYSTEM
(8) 1400 lin. ft. 6-in. cast iron pipe.
(9) 630 lin. ft. 4-in. cast iron pipe.
(10) 90 lin. ft. 3-in. black wrought iron pipe.
(11) 500 lin. ft. 2-in. black wrought iron pipe.
(12) 160 lin. ft. 1½-in. black wrought iron pipe.
(13) 3 ea. 6-in. gate valves.
(14) 1 4-in. gate valve.
(15) 1 3-in. gate valve.
(16) 1 12x6-in. tap. sleeve.
(17) 2 12x4-in. tap. sleeves.
(18) 1 10x6-in. tap. sleeve.
(19) 2 10x4-in. tap. sleeves.
(20) 2 6-in. tap. valves.
(21) 4 4-in. tap. valves.
(22) 4 indicator posts on tap. valves.
(23) 7 2-in. curb stops.
(24) 2 1½-in. curb stops.
(25) 5 fire hydrants.
(26) 1 sterilization of water distrib. sys.

SANITARY SEWER SYSTEM
(27) 1000 lin. ft. 8-in. vit. clay pipe.
(28) 600 lin. ft. 6-in. vit. clay pipe.
(29) 110 lin. ft. 4-in. vit. clay pipe.
(30) 1 stand. sewer manhole 5-ft. or less in depth.
(31) 2 junct. manholes 5-ft. or less in depth.
(32) 10 lin. ft. sewer manhole.
(33) 6 ea. surface cleanouts.
(34) 1 connection to exist. sewer line.

ELECTRICAL DISTRIBUTION SYSTEM AND STREET LIGHTING
(35) 2 poles, 45 ft.
(36) 6 each poles, 40 ft.
(37) 2 poles, 35 ft.
(38) 3 anchors and guys.
(39) 2 head guys.
(40) 1 alley arm, single.
(41) 1 crossarm, 6-pin, double.
(42) 2 crossarms, 6-pin, single.
(43) 2 insulator strains, 12 kv.
(44) 2 each insulators, 12 kv. type.
(45) 13 secondary racks, 3-wire.
(46) 5 secondary racks, 2-wire.
(47) 5 secondary racks, 1-wire.
(48) transformers.
(49) 1 transformer ground.
(50) 2 cutouts, 50A, 12 kv.
(51) 600 lin. ft. wire, No. 6 BC, MHD.
(52) 2000 lin. ft. wire, No. 2 WP, MHD.
(53) 2000 lin. ft. wire, No. 4 MHD.
(54) 1500 lin. ft. wire, No. 6 WP, MHD.
(55) 1200 lin. ft. wire, No. 8 WP, MHD.
(56) 1 raintight switch, 30A, SPNS.
(57) 1 mag. contactor, weatherproof, 30A, SPSN.
(58) 1 transformer, 40 watt, series to multiple.
(59) 4 street light units, 300 watt, multiple.
(60) 1 anchor and guy removed.
(61) 1 pole remove and reinstall.

STEAM DISTRIBUTION SYSTEM
(62) 1 steam distrib. pipe.
(63) 1 steam distrib. sys.

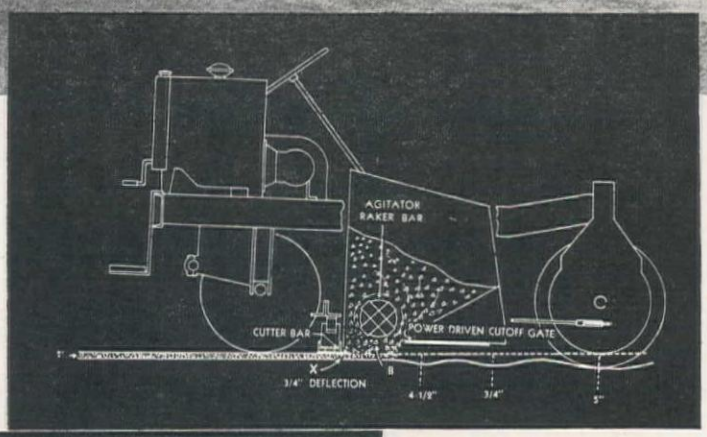
PAVING, DRAINAGE, SITE GRADING AND BACKFILLING
(64) 4500 cu. yd. excav.
(65) 50 roller hrs. compact. rolling with 8-ft. roller.
(66) 25 roller hrs. compact. rolling, 8-ft. tamp. roller.
(67) 20 roller hrs. compact. rolling, power roller.
(68) 440 M. gals. water for compact.
(69) 950 tons base crse. agreg., 1-in. maximum.
(70) 710 tons base crse. pit or bank run matl.
(71) 6 tons liq. asph. for prime coat.
(72) 4 tons liq. asph. for dust palliative.
(73) 6 tons pave. asph. for seal coat.
(74) 40 tons cover aggreg. for seal coat.
(75) 1525 sq. yds. shape, compact and finish sidewalks.
(76) 6850 lin. ft. side forms for sidewalks.
(77) 48 lin. ft. 6-in. nonreinf. conc. pipe.
(78) 6 lin. ft. 8-in. nonreinf. conc. pipe.
(79) 66 lin. ft. 12-in. thick wall, conc. pipe.
(80) 350 lin. ft. 24-in. thick wall, conc. pipe.
(81) 4 each conc. headwalls for 12-in. conc pipe.
(82) 1 conc. headwall for 24-in. conc. pipe.
(83) 100 sq. yd. grouted riprap lining.
(84) 1000 tons select backfill matl.
(85) 2 drop inlets.

	(A)	(B)	(C)	(D)	(G)	(H)	(I)	(J)
(1)	$8,736	$10,330	$9,237	$9,300	$9,918	$10,475	$9,700	$12,000
(2)	$17,649	$17,592	$18,654	$17,800	$20,110	$22,065	$19,000	$15,360
(3)	$16,273	$13,753	$17,000	$16,900	$18,170	$18,964	$18,900	$20,200
(4)	$23,117	$27,983	$23,512	$22,100	$26,000	$29,054	$26,000	$26,000
(5)	$3,735	$4,948	$4,569	$4,800	$5,100	$4,694	$4,150	$6,000
(6)	$4,610	$5,750	$5,041	$6,650	$6,000	$5,594	$5,050	$6,000
(7)	$4,495	$5,750	$4,247	$5,360	$5,100	$4,970	$4,750	$6,400
(8)	2.42	2.60	3.50	$3,650	2.63	2.30	2.70	2.50
(9)	2.14	2.25	2.65	$1,455	2.33	2.10	2.50	2.00
(10)	1.47	1.55	2.45	143.00	1.60	1.44	2.20	2.00
(11)	.99	1.15	2.00	535.00	1.08	.97	1.60	1.75
(12)	.92	1.10	1.95	160.00	1.00	.97	1.20	1.60
(13)	64.07	65.00	45.00	210.00	69.70	62.81	55.00	25.00

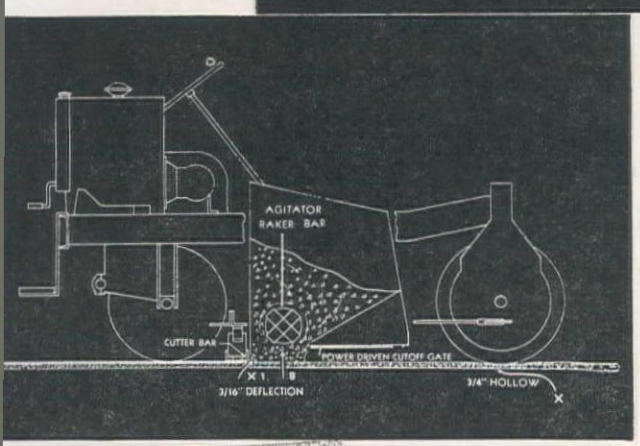
(Continued on next page)

The first course showing front wheel dropped into deep depression.

top course showing Continuous Course rrection has reduced le 5" deep to 3/16".



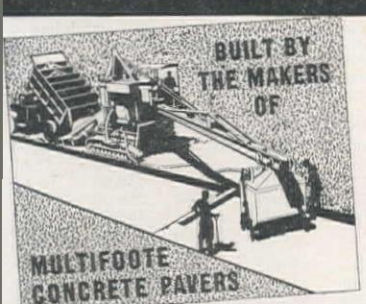
How TO RESURFACE OLD ROADWAYS with less subgrade preparation



Use the black top paver that automatically reduces the irregularities of the surface with each successive course laid! That's what Continuous Course Correction does in Adnun Black Top Pavers.

The Adnun rides on the finished course close to the cutter bar and well back from the front of the machine. The front wheels can drop into quite a deep depression without materially affecting the leveling action of the cutter bar. For example, a 5-inch drop of the front wheels will leave only a 3/4" depression at the point where the cutter bar is at that time. When the top course is laid, the resulting deflection is reduced to 3/16". Deep holes large enough to permit the wheel to drop the full depth are extreme cases. Generally subgrade irregularities are reduced to insignificance when the top course is laid.

You can lay any mix—hot or cold—any thickness—any width—with an Adnun. You'll be sure of maximum density for your black top paving, tight joints between strips, smoothest finished surface, and all-weather durability. Write today for details or see your Foote distributor.



ARMY E NAVY

ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER

With Continuous Course Correction

THE FOOT CO., INC.
1940 STATE ST.
NUNDA, N. Y.
The World's Largest Exclusive Manufacturers of Concrete and Black Top Pavers.

(14)	44.91	50.00	35.00	50.00	48.90	44.03	45.00	20.00
(15)	29.85	35.00	28.00	32.00	32.50	29.06	38.00	19.00
(16)	122.73	130.00	80.00	135.00	132.50	120.32	100.00	6.00
(17)	122.73	130.00	80.00	265.00	133.50	120.32	93.00	5.00
(18)	119.72	130.00	80.00	130.00	130.00	117.37	98.00	5.00
(19)	119.72	127.50	80.00	268.00	130.00	117.37	93.00	4.00
(20)	45.56	50.00	75.00	100.00	49.50	44.67	55.00	8.00
(21)	37.82	45.00	70.00	153.00	90.70	37.08	43.00	6.00
(22)	55.27	60.00	75.00	240.00	60.15	54.19	93.00	14.00
(23)	33.35	35.00	35.00	250.00	36.30	32.70	13.00	9.00
(24)	51.82	35.00	30.00	115.00	56.40	50.80	9.00	70.00
(25)	198.16	200.00	165.00	$1,070	215.60	194.27	120.00	195.00
(26)	51.00	60.00	100.00	55.00	55.50	50.00	110.00	$1,300
(27)	2.14	2.35	2.45	$2,310	2.33	2.10	3.80	2.00
(28)	1.38	1.50	2.25	890.00	1.50	1.35	2.70	1.60
(29)	1.26	1.35	2.15	150.00	1.38	1.24	1,10	1.40
(30)	200.91	205.00	150.00	215.00	218.60	196.97	130.00	120.00
(31)	207.58	220.00	165.00	450.00	225.90	203.51	190.00	140.00
(32)	27.80	30.00	20.00	300.00	30.50	27.25	16.50	20.00
(33)	10.56	12.00	15.00	68.00	11.50	10.35	13.00	30.00
(34)	24.91	35.00	35.00	26.00	27.10	24.02	40.00	120.00
(35)	30.60	27.50	28.00	56.00	27.75	30.00	27.00	55.00
(36)	18.36	27.00	28.00	168.00	27.75	18.00	27.00	50.00
(37)	18.36	40.00	27.00	56.00	27.75	18.00	27.00	45.00
(38)	38.76	43.00	44.00	135.00	44.40	38.00	43.00	12.00
(39)	31.62	23.00	22.00	44.00	22.20	31.00	22.00	14.00
(40)	8.67	12.50	11.00	11.00	11.10	8.50	11.00	8.00
(41)	15.30	15.00	16.00	15.00	15.54	15.00	15.00	12.00
(42)	8.67	10.00	10.00	20.00	10.00	8.50	10.00	9.00
(43)	7.14	8.00	7.00	16.00	7.77	3.50	8.00	18.00
(44)	3.57	5.50	6.00	11.00	5.55	3.50	5.50	13.00
(45)	3.57	5.00	5.00	65.00	5.00	3.50	5.00	20.00
(46)	3.57	4.50	5.00	23.00	4.44	3.50	4.50	15.00
(47)	2.04	3.30	3.30	17.00	3.33	2.00	3.50	10.00
(48)	116.28	126.00	130.00	135.00	132.20	114.00	130.00	300.00
(49)	9.18	15.00	15.00	15.00	15.54	9.00	15.00	60.00
(50)	22.44	22.50	22.00	44.00	22.20	22.00	22.00	15.00
(51)	.05	1.12	.07	42.00	.07	.05	.065	.10
(52)	.14	.097	.09	200.00	.10	.13	.0875	.06
(53)	.12	.087	.09	180.00	.09	.11	.0875	.04
(54)	.075	.077	.08	120.00	.08	.07	.075	.08
(55)	.055	.067	.06	84.00	.07	.05	.065	.06
(56)	7.14	11.50	11.00	11.00	11.10	7.00	11.00	2.00
(57)	28.56	30.00	27.00	28.00	27.75	28.00	27.00	8.00
(58)	10.20	15.00	11.00	11.00	11.10	10.00	11.00	400.00
(59)	6.12	14.00	11.00	44.00	11.10	6.00	11.00	300.00
(60)	12.24	12.00	11.00	11.00	11.10	12.00	11.00	15.00
(61)	38.76	18.00	16.00	31.00	16.65	38.00	16.50	30.00
(62)	$3,799	$4,020	$2,603	$4,100	$2,489	$3,725	$2,150	$2,500
(63)	$22,024	$23,345	$19,040	$24,000	$24,000	$21,593	$25,850	$4,000
(64)	1.10	1.10	.80	$5,400	1.22	1.10	1.36	2.75
(65)	8.70	9.00	8.00	480.00	9.66	8.70	9.00	11.00
(66)	1.00	2.00	1.10	28.00	1.11	1.00	1.00	6.00
(67)	9.50	10.00	7.50	210.00	10.54	9.50	7.50	11.00
(68)	1.00	1.25	1.75	528.00	1.11	1.00	1.10	3.00
(69)	3.00	3.25	3.40	$3,135	3.33	3.00	3.80	5.50
(70)	3.00	3.25	2.10	$2,343	3.30	3.00	2.10	3.50
(71)	30.00	32.50	39.00	198.00	3.31	30.00	44.00	40.00
(72)	30.00	32.50	41.00	132.00	33.30	30.00	44.00	30.00
(73)	30.00	32.50	44.00	198.00	33.30	30.00	49.00	35.00
(74)	4.30	4.50	4.95	190.00	4.77	4.30	5.50	10.00
(75)	.12	.15	.30	198.00	.13	.12	.27	.35
(76)	.09	.10	.17	685.00	.10	.09	.22	.20
(77)	1.25	1.50	1.50	67.00	1.38	1.25	2.20	2.00
(78)	1.50	2.00	2.00	10.00	1.67	1.50	2.20	2.25
(79)	2.00	2.50	3.00	145.00	2.22	2.00	2.70	3.50
(80)	7.00	7.40	5.50	$2,695	7.77	7.00	4.40	9.50
(81)	25.00	27.50	60.00	112.00	27.75	25.00	82.00	100.00
(82)	75.00	80.00	116.00	83.00	83.25	75.00	110.00	100.00
(83)	1.80	2.25	3.51	200.00	2.00	1.80	3.30	3.00
(84)	1.40	1.54	1.95	$1,550	1.55	1.40	2.10	3.00
(85)	100.00	170.00	314.00	500.00	111.00	100.00	106.00	175.00

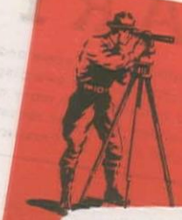
California—San Francisco County—City—Storm Drain

Healy-Tibbitts Construction Co., San Francisco, was awarded the contract on the low bid of $174,892 for the construction of the Lincoln Way storm drain, Great Highway System of the City of San Francisco. The award was given by the Department of Public Works, San Francisco. Unit bids are as follows:

(A) Healy-Tibbitts Construction Co.....$174,892
(B) Stanley Koller 185,896
(C) Carrico & Gautier 196,109
(D) MacDonald & Kahn, Inc..... 207,702
(E) Eaton & Smith..... 218,856
(F) M. J. Lynch $236,694
(G) Peter Sorensen 238,792
(H) Chas. L. Harney 255,145
(I) A. Soda & Son..... 266,267
(J) Clinton Construction Co..... 287,428

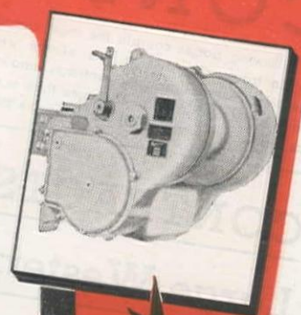
(1) Lump sum, overflow structure at 48th Ave.
(2) 48 ea., 10-ft. conc. pile.
(3) 52 ea., 15-ft. conc. pile.
(4) 132 ea., 22-ft. conc. pipe.
(5) 7 ea., conc. sheet pile.
(6) Lump sum, conc. cap.
(7) 903 lin. ft. 3 compartment sewer.
(8) Lump sum, overflow struct. at La Playa
(9) 29 lin. ft. 4-ft. conc. sewer.
(10) Lump sum, outlet structures.
(11) 17 ea., M. H. on conc. sewer and structs.
(12) 1 ea., M. H. on VCP.
(13) 200 lin. ft. 15-in. VCP culvert.
(14) 215 lin. ft. 10-in. VCP culvert.
(15) 7 ea., catch basin with multiple curb inlet.
(16) 1 ea., multiple curb inlet for exist. catch basin.
(17) 2,900 lin. ft. 12-in. VCP subdrain.
(18) 1,000 tons rock fill.
(19) Lump sum, flushing system and tidegates.
(20) Lump sum, traffic control work.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	$22,000	$28,967	$37,763	$28,500	$23,000	$25,000	$20,000	$26,000	$22,000	$38,000
(2)	90.00	38.80	60.00	70.00	60.00	129.00	90.00	56.00	100.00	87.00
(3)	100.00	51.23	67.50	105.00	70.00	137.00	124.00	85.00	150.00	99.00
(4)	110.00	70.18	83.50	140.00	108.00	147.00	198.00	125.00	210.00	109.00
(5)	150.00	263.00	90.00	250.00	182.00	159.00	300.00	250.00	400.00	214.00
(6)	$1,000	921.00	872.00	$1,200	$1,113	624.00	$1,000	$1,000	$1,000	600.00
(7)	109.00	109.65	118.00	115.00	155.00	154.00	156.25	175.00	160.00	192.00
(8)	$3,500	$2,704	$2,632	$3,800	$4,521	$4,062	$3,602	$6,000	$3,500	$6,900
(9)	50.00	115.00	70.00	80.00	56.00	80.00	83.00	58.00	40.00	117.00
(10)	$4,500	$7,340	$4,311	$10,753	$4,588	$8,552	$9,483	$10,500	$21,271	$6,700
(11)	100.00	214.24	266.00	210.00	110.00	190.00	122.40	150.00	250.00	290.00
(12)	150.00	290.00	689.00	250.00	189.00	240.00	200.00	220.00	100.00	$1,700
(13)	8.00	13.00	11.50	8.00	6.00	9.60	10.00	13.00	6.00	23.00
(14)	5.00	12.38	6.40	7.60	4.00	8.40	3.50	8.00	5.00	23.00
(15)	200.00	432.00	276.00	360.00	270.00	250.00	250.00	350.00	250.00	500.00
(16)	150.00	215.00	276.00	310.00	236.00	175.00	250.00	300.00	300.00	280.00
(17)	1.50	2.80	.90	1.50	2.50	1.80	1.50	1.60	1.40	1.10
(18)	3.50	4.23	3.00	3.65	2.50	3.50	4.00	3.00	4.00	5.00
(19)	$4,000	$2,477	$4,437	$6,850	$4,000	$4,400	$4,818	$6,000	$7,000	$3,200
(20)	$1,000	724.00	$2,763	$3,500	$2,000	$1,000	$2,000	$2,000	$6,000	$1,900



Quiet Operation is

Smooth POWER at Work...
Isaacson WINCHOISTS are QUIET



The powerful gear-driven reversible Isaacson WINCHOIST

Quiet power . . . great power . . . are instantly apparent when you see the NEW, improved Isaacson WINCHOIST for International in action.

Operation is QUIET because spiral gears provide a maximum amount of teeth in mesh at one time . . . evenly distributed pressure and indirect contact lines . . . highly accurate, sturdy, precision-built mechanism. Great POWER means handling of large loads. Quicker hookup is possible. 50% faster reverse action allows unspooling at just the right speed for a man walking with cable end. Better balance due to closer mounting of winch to tractor, distributes load, properly saving equipment.

There is only one adjustment—the easily accessible brake takeup. All moving parts are enclosed yet easy to get at. Finger tip control brake, self-energizing on either over or under wind. Oversized bearings, shafts and gears.

AVAILABLE NOW . . . *See your International dealer for further details or write us direct*

Note how close WINCHOIST hugs rear of tractor.

ISAACSON

Tractor Equipment

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

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 . . .

Macco Construction Co. and **Morrison-Knudsen, Inc.**, San Francisco, Calif., were awarded a $939,635 contract for paving and lighting facilities at Mills Field, Calif., by the U. S. Engineer Office, San Francisco.

M. B. Killian and Co. and **E. B. Darby,** San Antonio, Tex., have received a $433,387 contract for construction of additional airfield facilities at Randolph Field, Tex., by the U. S. Engineer Office, San Antonio, Tex.

Nathan A. Moore, Alhambra, Calif., was awarded the $488,564 contract for grading, paving, sanitary sewers and storm drains and appurtenances in a portion of the Los Angeles Airport, Calif., by the Los Angeles Board of Public Works, Calif.

T. E. Connolly, Inc., San Francisco, Calif., was awarded a $540,-194 contract for construction of the Conn Creek dam and appurtenances near Napa, Calif., by the City Council, Napa, Calif.

Shumaker and Evans, Los Angeles, Calif., have received a $560,-049 contract for the construction of 152 war dwelling units at El Centro, Calif., 48 war dwelling units at Holtville, Calif., and 8 war dwelling units at Salton Sea, Calif., by the Federal Public Housing Authority, San Francisco, Calif.

McNeil Construction Co., Los Angeles, Calif., has been awarded a $3,000,000 contract to construct a group of administrative buildings at the Union Oil Co. refinery at Wilmington, Calif., by the Union Oil Co., Los Angeles, Calif.

P. J. Walker Co., Los Angeles, Calif., received a $1,609,513 contract for the construction of a new naval material redistribution and disposal center at Torrance, Calif., by the Bureau of Yards and Docks, Washington, D. C.

W. E. Callahan Construction Co. and **Gunther & Shirley,** Los Angeles, Calif., at $878,536, have been awarded the contract for three tunnels, first work on the San Diego Aqueduct, by Bureau of Yards and Docks, Washington, D. C.

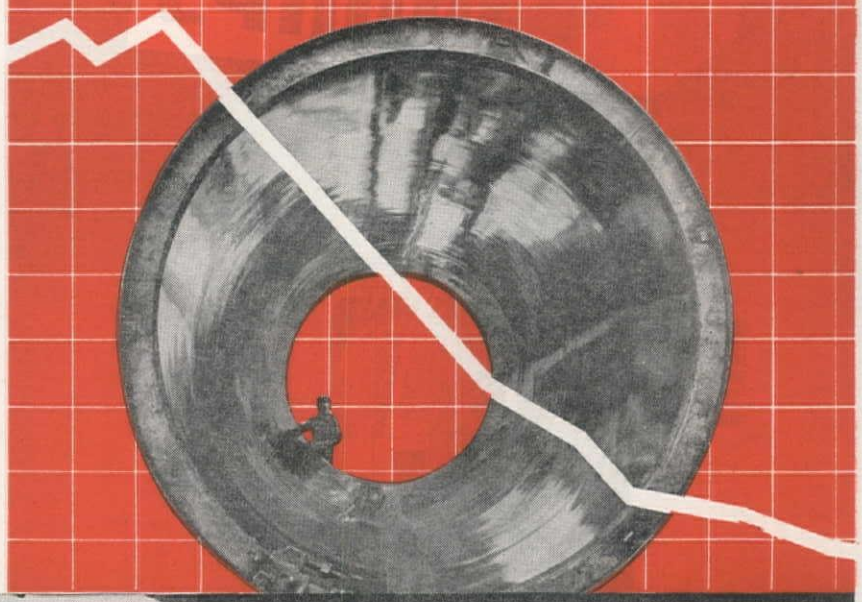
J. H. Collins and Co. and **R. L. Bair and Co.,** Walla Walla, Wash., were awarded a $566,480 contract for constructing open storage pads complete with barricades and approaches at the Umatilla Ordnance Depot near Hermiston, Ore., by the U. S. Engineer Office, Portland, Ore.

Inge Construction Co., Inc., and **Austin Bridge Co.,** Dallas, Tex., have been awarded the $924,575 contract for construction of additional facilities for the manufacture of dry yeast at Dallas, Tex., by Standard Brands, Inc., Dallas, Tex.

E. C. Nickel, Arcadia, Calif., was awarded a $534,000 contract for the construction of a shale laboratory on the campus of the University of Wyoming at Laramie, by U. S. Department of the Interior, Bureau of Mines, Laramie, Wyo.

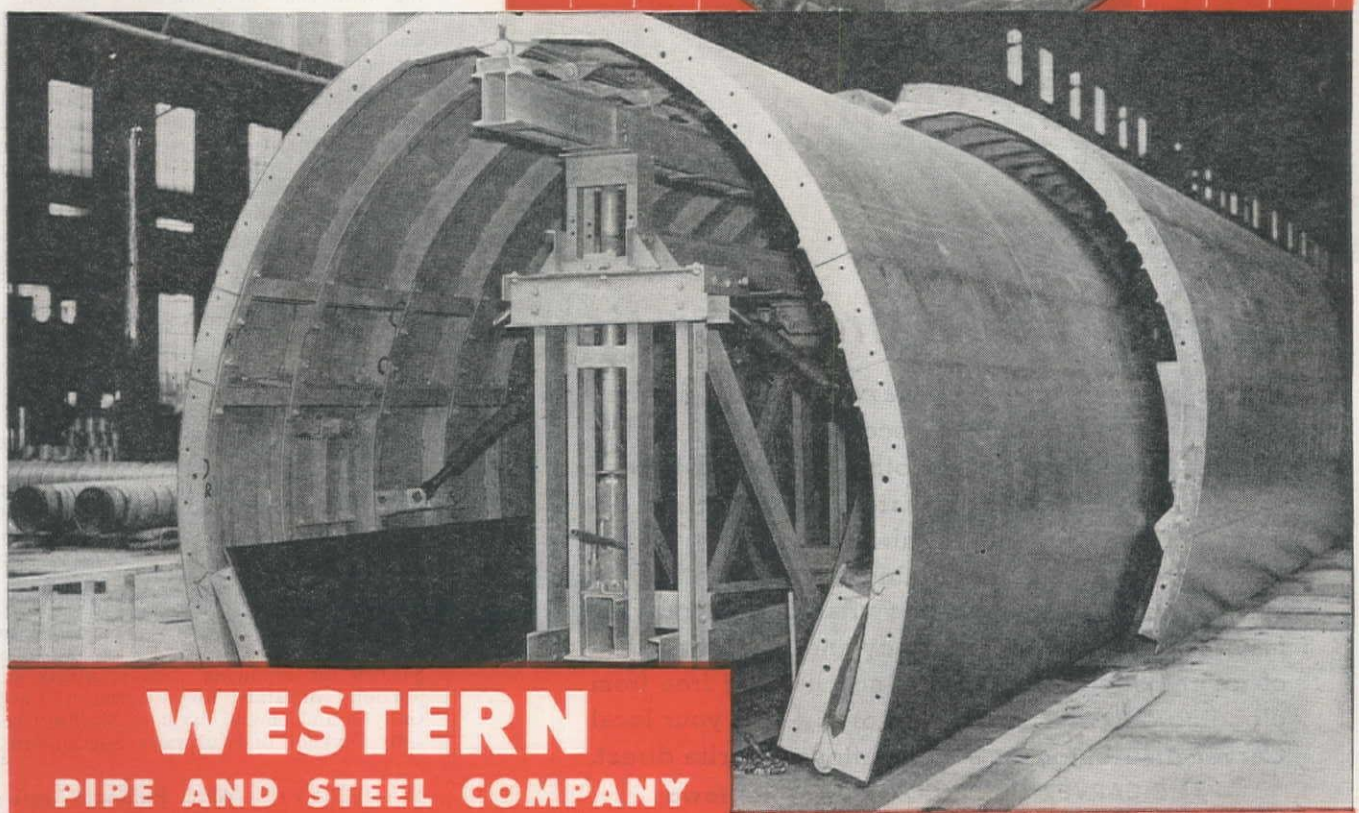
Northern Construction Co. and **J. W. Stewart Ltd.,** Vancouver, B. C., have received a $863,300 contract for construction of a three-story Veterans' Hospital at Victoria, B. C., by the War Department, Ottawa, Canada.

EXPENSES DROP WITH STEEL INSTALLATION



● Because there is only one installation cost, and because upkeep is at a minimum, steel makes the ideal installation for sewers, culverts, water towers, water mains, penstocks, tanks, boilers, as well as pipe for oil, gas and water.

Western Pipe and Steel Company has full facilities to build and fabricate the job from start to finish. Our highly specialized personnel can furnish you with vital construction data if you are planning a job that calls for steel. A letter or phone call is all that is necessary.



WESTERN
PIPE AND STEEL COMPANY OF CALIFORNIA

Fabricators and Erectors

5717 Santa Fe Avenue
Box 2015, Terminal Annex
Los Angeles 54, California

200 Bush Street
San Francisco 6
California

WESTERN BUILT PRODUCTS INCLUDE:

Absorbers	Gas Cleaners	Refinery Equipment
Agitators	Gas Separators	Tanks
Boilers	Pipe	Bolted
Casings	Oil	Riveted
Oil and Water	Gas and Water	Welded
Culverts	Penstocks, Steel	Walkways
		Structural

PLANTS AND OFFICES: **FRESNO, BAKERSFIELD, TAFT, CALIFORNIA AND PHOENIX, ARIZONA**

MacDonald & Kahn, Inc., G. Pollock, and **A. Teichert and Son, Inc.,** San Francisco, Calif., were awarded a $1,814,345 contract for the construction of precast reinforced concrete piles, riprap fender work, dolphins, concrete deck, railroad tracks and gantry crane tracks and beds, track bumpers, etc., at the Naval Supply Annex, Rough & Ready Island, Stockton, Calif., by the Bureau of Yards and Docks, Washington, D. C.

J. A. Terteling and Sons, Boise, Ida., received a $7,300,430 contract to construct 115 slab type projectile magazines, 12 black powder magazines and 54 inert storehouses at McAlester, Okla., by the Bureau of Yards and Docks, Washington, D. C.

Highway and Street...

California

ALAMEDA CO. — **Macco Construction Co.,** Freight and Ferry Sts., Oakland—$206,200 for filling and grading for new fleet post office bldg., West Terminus, 34th St., Oakland—by Bureau of Yards and Docks, Washington, D. C. 5-4

COLUSA CO. — **R. A. Westbrook,** 204 23rd St., Sacramento—$16,329 for repairing with road mix surfacing portions of state highway between Yolo county line and Grimes about 3.8 mi. in length—by Division of Highways, Sacramento. 5-4

IMPERIAL CO.—**Arthur A. Johnson,** 421 Pearl St., Laguna Beach—$15,364 for highway improvements between the south gate of Seeley Airport and Rte. 12, to be repaired with road mix and between Route 187 and Holtville Airport, about 5.4 mi. of bituminous surface treatment to be applied to shoulders—by Division of Highways, Sacramento. 5-4

KERN CO.—**Gillum and Barnes,** Bakersfield—$12,067 for improvement with road mix to Inyo St. at Mojave — by Kern County Board of Supervisors, Bakersfield. 4-27

LASSEN & MODOC COS.—**A. A. Tieslau,** 1220 Eastshore Highway, Berkeley—$126,125 for about 60 mi. in net length repairing with plant mix surfacing and seal coat, portions of hwy. between Horse Lake Rd. and Lakeview Junction, and between Alturas and Stronghold — by Division of Highways, Sacramento. 4-25

LOS ANGELES CO. — **Schroeder and Company,** 8140 Tujunga Ave., Roscoe—$43,070 for repairing with plantmix surf. portions of state hwy. between Latigo Canyon and one mi. west of Malibu Creek —by Division of Highways, Sacramento. 5-3

MADERA CO.—**W. C. Railing,** 27 Lowell St., Redwood City—$42,697 for about 4.8 mi. repairing with plantmix surf. between 6.7 mi. north of Madera and Merced county line — by Division of Highways, Sacramento. 4-25

MARIN CO. — **Fredrickson & Watson Construction Co.,** 873 - 81st Ave., Oakland —$44,973 for the construction of roads, parking areas and fencing at Hamilton Field—by U. S. Engineer Office, San Francisco. 4-27

MARIN CO.—**A. G. Raisch,** 2048 Market St., San Francisco—$41,768 for about 0.3 mi. of grading, surfacing with Portland

cement concrete pavement and asphalt concrete pavement at entrance to Hamilton Field—by Director of Public Works, Sacramento. 5-9

PLACER CO.—**R. A. Westbrook,** 204 23rd St., Sacramento—$25,430 for repairing with plantmix surfacing portions of state highway between Auburn and Bear River, about 3.2 mi. in length—by State Director of Public Works, Sacramento. 5-4

RIVERSIDE CO.—**R. R. Hensler,** 816 Allen Ave., Glendale—$41,965 for highway improvements on State Highway Route 64, between Dessert Center and Black Butte, about 12.7 mi. in length, to be repaired with road mix—by State Director of Public Works, Sacramento. 5-4

SAN LUIS OBISPO CO.—**Brown, Doko & Baun,** Pismo Beach—$21,840 for about 2.9 mi. repairing by placing plant mix surfacing over existing pavement and borders between 0.8 mi. west of Pennington Creek and junction with Rte. 125—by Director of Public Works, Sacramento. 5-15

SOLANO CO.—**Fredrickson & Watson Construction Co.,** 873 - 81st Ave., Oakland —$169,688 for construction of hard standing area at Benicia Arsenal—by U. S. Engineer Office, San Francisco. 5-1

Colorado

EL PASO CO.—**Brown Construction Co.,** 1530 E. Abriendo, Pueblo—$167,803 for 4.2 mi. of gravel surfacing between Colorado Springs and Penrose on State Highway No. 115—by State Highway Dept., Denver. 5-10

Kansas

FINNEY CO.—**San-Ore Construction Co.,** McPherson—$13,810 for 20.2 mi. of bituminous sealing on State Highway—by State Highway Commission, Topeka. 5-9

GRANT CO.—**Broce Construction Co.,** Dodge City—$19,038 for 24.1 mi. bituminous sealing on State Highway—by State Highway Commission, Topeka. 5-9

GRANT CO.—**Broce Construction Co.,** Dodge City—$11,216 for 13.5 mi. of bituminous sealing on State Highway—by State Highway Commission, Topeka. 5-9

HAMILTON CO.—**Broce Construction Co.,** Dodge City—$11,933 for 4.5 mi. bituminous mat surface on State Highway—by State Highway Commission, Topeka. 5-9

HAMILTON CO.—**Broce Construction Co.,** Dodge City—$33,061 for 11.3 mi. of bituminous mat surface to State Hwy.—by State Highway Commission, Topeka. 5-9

KEARNY CO.—**San-Ore Construction Co.,** McPherson—$16,777 for 25.6 mi. of bituminous sealing on State Highway—by State Highway Commission, Topeka. 5-9

NESS CO.—**Dan Scherrer Construction Co.,** Kansas City—$13,220 for 17.2 mi. of bituminous sealing on State Highway—by State Highway Commission, Topeka. 5-9

SCOTT CO.—**San-Ore Construction Co.,** McPherson—$21,086 for 30.0 mi. of bituminous sealing on State Highway—by State Highway Commission, Topeka. 5-9

STAFFORD CO.—**Stuart Simpson,** McPherson—$12,605 for 15.8 mi. of bituminous sealing on State highways—by State Highway Commission, Topeka. 5-9

STAFFORD CO.—**Stuart Simpson,** McPherson—$20,656 for 24.4 mi. of bituminous sealing on State highways—by State Highway Commission, Topeka. 5-9

STEVENS CO.—**Broce Construction Co.,** Dodge City — $10,986 for 13.1 mi. of bituminous sealing on State Highway — by State Highway Commission, Topeka. 5-9

Montana

BROADWATER, GOLDEN VALLEY, MEAGHER & MUSSELSHELL COS.—**Chas. Shannon and Son,** 2400 - 2nd Ave., No., Great Falls—$48,902 to stockpile maintenance materials on various highways—by State Highway Commission, Helena.

CASCADE, LEWIS & CLARK AND TETON COS. — **McLaughlin, Inc.,** 431 Ford Bldg., Great Falls—$38,595 to stockpile maintenance materials on various highways—by State Highway Commission, Helena. 4-27

DEER LODGE CO.—**R. P. Herrick Co.,** 208 Lewisohn Bldg., Butte—$21,240 for 12.7 mi. of seal coat and cover on Georgetown Lake Hwy.—by State Highway Commission, Helena. 4-27

JEFFERSON CO. — **S. Birch and Sons Construction Co.,** 314 Ford Bldg., Great Falls—$29,365 for 21.4 mi. of seal coat and cover on Helena-Boulder Highway — by State Highway Commission, Helena. 4-27

New Mexico

SANTA FE CO.—**Walter L. Denison,** 207 S. Hermosa Ave., Albuquerque—$23,690 for the constr. of Federal Aid project, located between Santa Fe and Santa Fe Airport. Work consists of minor grading, preparation of base, base course surfacing and oil treated top course surfacing—by State Highway Dept., Santa Fe. 5-2

North Dakota

DUNN CO.—**Northwestern Engineering Co.,** Box 1392, Rapid City, South Dakota —$28,993 for 0.2 mi. structural and incidental improvements to State highway, east of Marshal—by State Highway Dept., Bismarck. 4-20

DUNN CO.—**Rue Construction Co.,** Bismarck—$16,037 for structural and incidental improvement to 0.3 mi. of State Highway west of Halliday—by State Highway Dept., Bismarck. 4-20

GRANT CO.—**Rue Construction Co.,** Bismarck—$12,264 for structural and incidental improvements on 0.3 mi. of State Highway north of Shields—by State Highway Dept., Bismarck. 4-20

GRANT, HETTINGER, McLEAN, MORTON & SIOUX COS.—**W. H. Noel Co.,** Jamestown—$113,843 for 7.1 mi. of grading, gravel and incidental improvement on State Highways—by State Highway Dept., Bismarck. 4-20

GRANT AND SIOUX COS. — **Northwestern Engineering Co.,** Box 1392, Rapid City, So. Dak.—$34,577 for structural and incidental improvements on 0.7 mi. of State Highway west of Porcupine — by State Highway Dept., Bismarck. 4-20

OLIVER CO. — **T. M. Swingen,** Grand Forks—$11,700 to construct 0.2 mi. of structural and incidental improvement to State Highway northwest of Center—by State Highway Dept., Bismarck. 4-20

OLIVER CO. — **T. M. Swingen,** Grand Forks—$10,949 for construction of structural and incidental improvements on 0.5 mi. of State Highway, west of Center—by State Highway Dept., Bismarck. 4-20

Texas

ANDREWS CO. — **Plains Construction Co.,** Pampa—$124,184 for constructing road improvements—by Andrews County Commissioners, Andrews. 4-26

COLEMAN CO. — **Harry L. Campbell,** 2435 Winton Terrace West, Fort Worth—$288,663 for 9.9 mi. of grading, and applying flexible base and double asphalt surface treatment from Taylor county line south to 3.1 mi. east of Novic, on U. S. Hwy. 84—by State Highway Dept., Austin.

Utah

WASATCH CO.—**W. W. Clyde and Co.,** Springville—$10,265 for the construction of gravel surface and cover material stockpiles for State Highways—by State Road Commission, Salt Lake City. 5-9

Washington

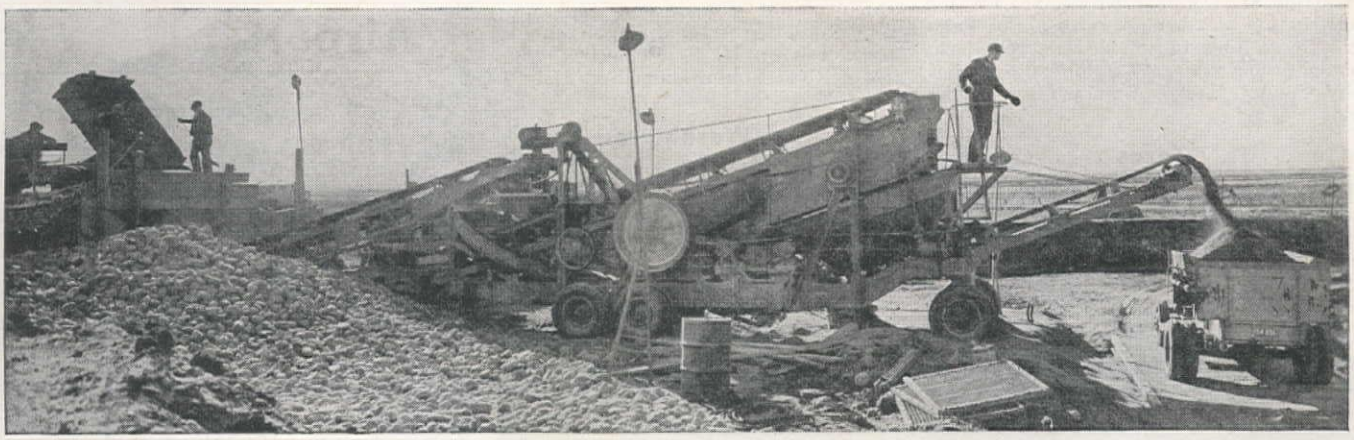
COWLITZ CO.—**Parker Schram,** Couch Bldg., Portland, Ore.—$156,297 for grading, draining and construction of embankment of 1.6 mi. of primary state hwy. No. 1, Kalama to Kalama river—by Director of Highways, Olympia. 4-18

KING AND PIERCE COS.—**L. Coluccio,** 512 - 21st Ave., So., Seattle — $18,741 for stockpiling, crushed stone surfacing and mineral aggregate on primary state hwy. No. 5, between Enumclaw and The Dalles —by Director of Highways, Olympia. 4-18

KITSAP CO.—**R. L. Moss,** Zenith—$36,073 for the cement paving of Sidney hill at Port Orchard — by City Council, Port Orchard. 4-25

WHITMAN CO.—**Nyberg Construction Co.,** Yardley—$28,579 for surfacing along 11 mi. of Lubben road — by Whitman County Commissioners, Colfax. 4-24

DIAMOND *the yardstick of* CRUSHER PERFORMANCE



9 YEARS OLD!

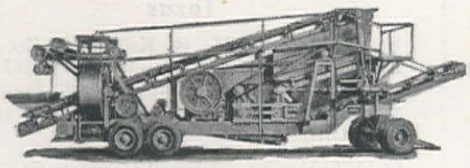
and still going strong — 24 hours every day

This veteran Diamond operates on a 24-hour schedule, as the overhead lights will testify. We have it first hand that production is tops, repairs and maintenance are at a minimum. There's nothing tougher than a DIAMOND!

All Diamond plants consistently turn out volume production of true-to-size aggregate because there's no by-passing, and every unit is of proper size for balanced output.

The whole machine is compact—not an extra foot of material travel. The main conveyor takes pit-run material in a straight line through the center of the Rotor-Lift up to the top deck of the vibrator. Crushed oversize is distributed evenly by the Rotor-Lift onto the main conveyor, preventing overloads.

With a Diamond on the job, your output will be uniform and continuous, your costs low. See your Diamond Dealer, or write us.



DIAMOND makes everything you need

Portable and Stationary Plants, Washing and Screening Plants, Jaw Crushers, Roll Crushers, Hammermills, Screens, Conveyors, Bins, Feeders.

★

FREE:

Write for Gravel Plant Bulletin D-43-G, or Quarry Plant Bulletin D-45-A.

DIAMOND DEALERS

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

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

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINNESOTA

Bridge . . .

California

SOLANO CO. — **S. Friedenburg,** 1717 Garibaldi St., Temple City — $13,408 for construction of a bridge southeast of Fairfield, 189 ft. long, 16 ft. wide; concrete deck, treated timber piles, 300-ft. long approaches —by County Board of Supervisors, Fairfield. 5-8

Texas

TRAVIS CO.—**Richard Schmidt,** 59 East Ave., Austin—$11,620 for improvements to three wooden bridges in precinct Nos. 1 and 2. Work consists of replacement of wood floors with concrete spans, replacement of wooden bulkheads with concrete and other misc. work—by Commissioners Court of Travis County, Austin. 4-27

Utah

DAVIS CO.—**Victor Newman,** 508 McIntyre Bldg., Salt Lake City—$191,756 for the construction of underpass and approach road to Ogden Arsenal and channelized intersection on U. S. 91, near Ogden—by State Road Commission, Salt Lake City. 5-9

Washington

COWLITZ CO.—**R. A. Heintz Construction Co.,** 8101 N.E. Union Ave., Portland—$86,261 for replacing 14 ft. of wooden approach to the Longview-Rainier bridge and an earth and crushed rock culvert fill at Longview—by Directors of the Longview-Rainier bridge, Longview. 5-4

SKAGIT CO. — **MacRae Brothers,** 2733 4th So., Seattle—$41,589 for a reinforced concrete girder bridge and grading and surfacing bridge approaches on Secondary State Hwy. No. 17-A, at Jackman Creek—by Director of Highways, Olympia. 5-4

Airport . . .

Arizona

MARICOPA CO. — **Arizona Sand and Rock Co.,** Box 1522, Phoenix—$101,415 for seal coating and patching landing mat at Luke Field, Phoenix—by U. S. Engineer Office, Los Angeles. 5-15

California

SAN FRANCISCO CO. — **Macco Construction Co.** and **Morrison-Knudsen, Inc.,** 111 Sutter St., San Francisco—$939,635 for paving and lighting at Mills Field—by U. S. Engineer Office, San Francisco. 5-9

SOLANO CO.—**Marshall S. Hanrahan** and **H. Earl Parker,** Box 429, Redwood City—$68,670 for repairs to runways, taxiways and aprons at Fairfield-Suisun Air Base—by U. S. Engineer Office, Sacramento. 5-1

Colorado

DENVER CO.—**Peter Kiewit Sons Co.,** 1950 S. Colorado Blvd., Denver—$63,758 for the constr. of a parking apron and taxiway at the Modification Center, Denver—by U. S. Engineer Office, Denver. 4-27

Texas

BEXAR CO.—**M. B. Killian & Co.** and **E. B. Darby,** San Antonio—$433,387 for construction of additional airfield facilities at Randolph Field—U. S. Engineer Office, San Antonio. 4-26

DENTON CO.—**Farrell Construction Co.,** St. Paul, Minn.—$224,775 for construction of an airport at Denton—by Civil Aeronautics Administration, Fort Worth. 4-13

TARRANT CO.—**Bitulithic Co.,** Box 5297, Dallas—$154,018 for grading, paving and utilities at Fort Worth Army Airfield—by U. S. Engineer Office, Denison. 4-30

Water Supply . . .

California

ALAMEDA CO.—**Freethy & Fogelberg,** 1432 Kearny St., San Francisco—$51,535 for installing approx. 4,565 lin. ft. of 24-in. cast iron water main in Grand Ave., between Sunnyside Ave. in Piedmont and El Embarcadero in Oakland — by East Bay Municipal Utility Distr., Oakland. 5-4

LOS ANGELES CO. — **Edward Green,** 3001 Coolidge Ave., Los Angeles—$51,918 for furnishing and laying pipe lines including the necessary fittings and appurtenances from Freeman Blvd. along Manchester Blvd. to Prairie Ave., and along Prairie Ave. from Manchester Blvd. to Arbor Vitae St., at Inglewood—by City Council, Inglewood. 4-27

Montana

BELL CO.—**W. G. Cullum and Company,** Dallas—$147,640 for the construction of water facilities at Temple—by City Council, Temple.

COLLIN CO.—**Layne Texas Co., Ltd.,** 3903 Main St., Dallas—$38,000 for drilling

AVAILABLE IN 1945...

- A limited number of Mack trucks are now in production.
- They will, of course, be made available under priority to essential users only.
- We will gladly give you any help you may need with your applications. Just let us know.

Mack

TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

MACK-INTERNATIONAL MOTOR TRUCK CORPORATION

Los Angeles, Sacramento, Salt Lake City, San Francisco, Seattle, Portland. Other factory branches and dealers in principal cities throughout the country.

a water well for the city of McKinney—by City Council, McKinney. 4-13

DALLAS CO.—**F. S. Oldt Co.**, 403 So. Haskell St., Dallas—$14,273 for construction of an 8-in. cast iron water line along Coit Rd., from Alley south of Southwestern Blvd. to Northwest Hwy. and along Greenville Ave. to Pecan Rd. in Vickery—by City Council, Vickery. 4-25

LAMB CO.—**Panhandle Construction Co.**, Box 1500, Lubbock—$36,708 for constructing surface reservoir, pumping equipment, etc., at Littlefield—by City Council, Lubbock. 4-18

LEWIS AND CLARK CO.—**Montana Engineering and Construction Co.**, Helena—$4,700 for enlarging Hale reservoir in Helena—by City Council, Helena.

TARRANT CO.—**J. L. Myers & Son**, Denton—$19,590 for pump and drilling a water well at Fort Worth—by Burris Mill & Elevator Co., Fort Worth.

Washington

CHELAN CO.—**Goodfellow Brothers**, Wenatchee—$77,501 for construction of concrete reservoirs, furnishing and laying pipes and appurtenances thereto—by City Council, Chelan. 5-4

Sewerage . . .

California

LOS ANGELES CO.—**Nathan A. Moore**, 2951 W. Valley Blvd., Alhambra—$488,564 for grading, paving, sanitary sewers and storm drains and appurtenances in a portion of the Los Angeles Airport—by Los Angeles Board of Public Works, Los Angeles. 4-27

LOS ANGELES CO.—**Mike Ramljak**, 3931 Olive St., Huntington Park—$25,987 for the construction of sanitary sewers and rock and oil roadway and sidewalls in Gateway Blvd. and Barrington Ave. Sewer Distr., Los Angeles—by Board of Public Works, Los Angeles. 5-4

SAN FRANCISCO CO.—**M. J. Lynch**, Barneveld and Oakdale Ave., San Francisco—$4,350 for repairing the sewer in Pierce St., between Pacific Ave. and Jackson St., San Francisco—by Dept. of Public Works, San Francisco. 4-30

SAN JOAQUIN CO.—**R. Goold and Son**, Box 190, Stockton—$17,185 for the construction of a sanitary sewer in Hazelton Ave., from Pilgrim St. to Wilson Way and a sewer branch from the storm sewer in Main St. to Stockton St. at Stockton—by City Council, Stockton. 5-4

SANTA CRUZ CO.—**J. L. Kruly**, 1785 No. Eastern Ave., Los Angeles—$89,955 for construction of the Twin Lakes sanitary sewer, at Twin Lakes—by County Board of Supervisors, Santa Cruz. 5-9

SOLANO CO.—**Stolte, Inc.**, 8451 San Leandro St., Oakland—$150,440 for the construction of interceptor and outfall sewer in South Vallejo—by Federal Works Agency, Berkeley. 4-24

Oregon

LANE CO.—**Harry I. Hamilton Co.**, Rt. 5, Box 34, Eugene—$20,846 for construction of sewers in the Outlook district, Eugene—by City Council, Eugene. 4-14

Texas

DALLAS CO.—**J. G. Bartholomew**, Construction Bldg., Dallas—$29,500 for install-

FACTORY AND GENERAL OFFICES
LOS ANGELES, CALIF. BRANCHES:
SAN FRANCISCO HOUSTON PORTLAND

ing 2 sewage pumps, motors, wiring and building modification at Cadiz St. sewage pumping station—by City Council, Dallas. 4-18

JOHNSON CO.—**City Construction Co.,** 4711 Livingston St., Dallas—$8,484 for the construction of a sewage disposal system at Cleburne State Park—by Texas State Board of Control, Austin. 4-30

Washington

FRANKLIN CO.—**Matt Malaspina and Co.,** 1901 - 23rd Ave. So., Seattle—for improvements to the sewerage system at Pasco—by City Council, Pasco. 4-19

PIERCE CO. — **Industrial Engineers & Contractors,** 711 Middle Waterway, Tacoma—$17,715 for extension of the Division Ave. sewer outfall to deep water, at Tacoma—by City Council, Tacoma. 4-27

Waterway . . .

California

ALAMEDA CO. — **Olympian Dredging Co.,** 525 Market St., San Francisco—$15,855 for redredging adjacent to Port of Oakland piers at the Outer Harbor Terminal —by Board of Port Commissioners, City of Oakland. 4-25

MARIN CO. — **Macco Construction Co.,** Freight and Ferry Sts., Oakland—$38,120 for repairs and additions to east breakwater, Fort Baker—by U. S. Engineer Office, San Francisco. 5-17

SAN DIEGO CO.—**Hull, Smale & Robinson,** 1033 No. Avalon Blvd., Wilmington—$19,450 for the construction of a boat landing for naval personnel at Harbor Dr. and 5th Ave., San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-4

SAN FRANCISCO CO.—**Healy-Tibbitts Construction Co.,** 1100 Evans Ave., San Francisco—$21,400 for repairing damaged concrete deck and fender line along the north side of Pier 31 on the waterfront—by Board of State Harbor Commissioners, San Francisco. 4-19

Idaho

ELMORE CO.—**Smith & Wildman Construction Co.,** Baugh Bldg., Twin Falls—$19,803 for reconstruction of the right and left banks to the Boise river—by U. S. Engineer Office, Portland, Ore. 4-20

Oregon

MULTNOMAH CO.—**Allyn and Bingham,** Builders Exchange Bldg., Portland—$72,287 for the reconstruction of the Port of Portland's Drydock No. 1 — by Port Commission, Portland. 4-19

MULTNOMAH CO. — **Gilpin Construction Co.,** 4850 N.W. Front St., Portland—$92,965 for the reconstruction of Port of Portland Drydock No. 1, at Portland—by Port Commission, Portland. 5-12

Texas

NUECES CO.—**Standard Dredging Co.,** Galveston—for dredging of North Seaplane Basin and other areas, and planting at U. S. Naval Air Station, Corpus Christi—by Bureau of Yards and Docks, Washington, D. C. 4-25

Washington

KING CO.—**Dicus & Miller,** 4938 Beacon Ave., Seattle—$11,480 for reconstruction of a portion of overhead ramp at the Bell St. terminal, Seattle—by Seattle Port Commission. 4-23

SNOHOMISH CO.—**Puget Sound Bridge & Dredging Co.,** 2929 - 16th Ave., S.W., Seattle—$28,000 for dredging an 8-ft. channel from deep water to 14th St., and the rehabilitation of the present settling basin at Everett—by City Council, Everett. 4-13

WHATCOM CO.—**C. B. Croy,** Bellingham—$11,816 for reconstruction of a drift barrier on the Nooksack river, near Lawrence—by U. S. Engineer Office, Seattle. 5-5

Canada

BRITISH COLUMBIA—**Northern Construction Co.** and **J. W. Stewart Ltd.,** 736 Granville St., Vancouver—$197,777 for the construction of harbor improvements, and a wharf at Westview—by Dominion Dept. of Public Works, Ottawa. 5-17

Irrigation . . .

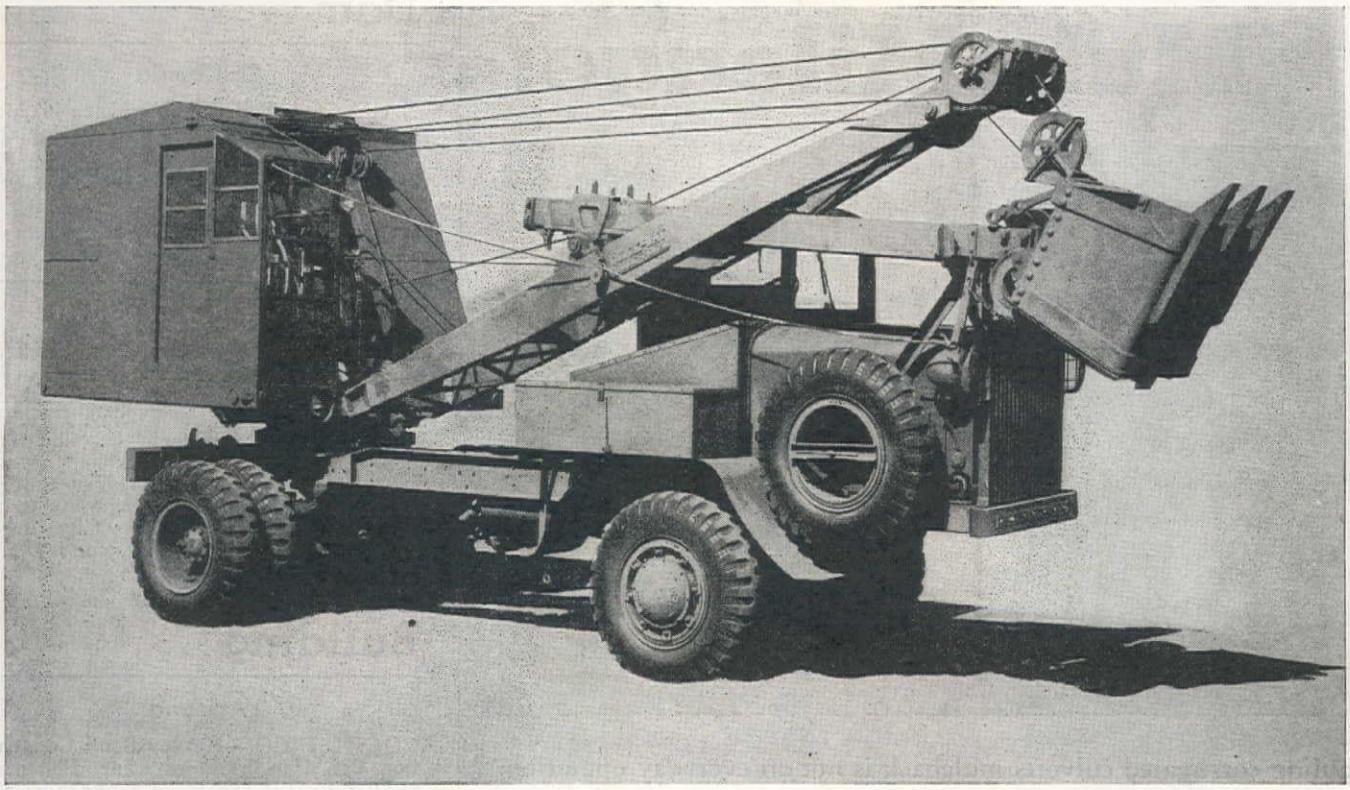
Idaho

KOOTENAI CO.—**Northwestern Engineering Co.,** 1311 St. Joe St., Rapid City, So. Dakota—$110,395 for earthwork, concrete lining, pipe lines and structures on the canal lat. sys., Post Falls unit, Rathdrum Prairie project near Coeur d'Alene—by Bureau of Reclamation, Washington, D. C. 5-3

Montana

DAWSON CO.—**M. G. Long,** Billings—$24,806 for earthwork, pipe lines and structures, Intake pumping plant and laterals,

DO *EVERY JOB* WITH THE RIGHT EQUIPMENT



The *original* truck-mounted shovel designed and balanced specifically for truck operation, fast road travel between projects, and maximum performance on the job. This unit eliminates the need of single purpose equipment for excavating and construction. Interchangeable attachments make possible quick conversion of shovel into crane, dragline, trench hoe, clamshell, orange peel or pile driver—in less than two hours —right on the job.

Rugged steel construction thruout, positive spur gear drive, quick-acting hydraulic clutches controlled from compact lever bank in wide vision cab enables operator to do efficient work at any angle. Two engines for better performance — heavy duty, low torque, lugging-type engine for greater power on the job—standard truck engine for fast road travel and easy maneuverability on the job.

THE "*QUICK-WAY*" TRUCK SHOVEL FEATURES...

- Portability plus speed—Goes anywhere as fast as a truck will travel.
- Adaptability—Opens up new fields for profitable power shovel work; replaces expensive, undependable methods.
- Convertibility—From shovel to crane, dragline, clamshell, orange peel, trench hoe, or pile driver.
- Useability—Practically unlimited. Ample power and endurance for continuous work and a real job anywhere with any attachment.
- Interchangeability of parts.
- Low clearance—Goes under all standard underpasses without dismantling.
- Mounting—On any standard 5-ton truck chassis.
- Operation—All types of equipment mentioned above function efficiently without counter weight or outriggers.

The "*QUICK WAY*" *is the ideal way* to do excavation and construction work for the greatest profit.

** Write for Detailed Information . . .*

SALES REPRESENTATIVES
George L. Meffley & Co.
820 UNIVERSITY BLDG., DENVER 2, COLO.

QUICK-WAY
TRUCK SHOVEL CO. DENVER 1, COLO., U. S. A.

Intake project, approx. 18 mi. northeast of Glendive—by Bureau of Reclamation, Washington, D. C. 5-8

Dam . . .

California

NAPA CO.—**T. E. Connolly, Inc.,** 461 Market St., San Francisco—$540,194 for construction of the Conn Creek dam and appurtenances—by City Council, Napa. 5-1

Tunnel . . .

California

SAN DIEGO—**W. E. Callahan Construction Co.** and **Gunther and Shirley,** 714 W. Olympic Blvd., Los Angeles—$878,536 for the construction of the Poway, Fire Hill and San Vicente tunnels, first section of the San Diego Aqueduct Project, to be constructed from the west portal of the San Jacinto tunnel in Riverside county to the San Vicente reservoir of the City of San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-17

Building . . .

Arizona

COCHISE CO.—**Harvey Scull Construction Co.,** 1114 E. Palm Lane, Phoenix—$61,038 for the constr. of a one-story and basement store bldg. at Douglas—by S. F. Meguire Estate, Douglas. 4-23

MARICOPA CO.—**Andy Womack,** 1360 Grand Ave., Phoenix—$150,000 for the construction of 9 four-unit and 2 three-unit apartment bldgs. at Phoenix—by self. 5-4

California

ALAMEDA CO.—**Christensen & Lyons,** 3454 Harlan St., Oakland—$52,000 for the construction of a 1-story steel warehouse addition at 25 Eighth St., Oakland—by George R. Borrmann Steel Co., Oakland. 5-4

ALAMEDA CO.—**Equity Construction Co.,** 2287 Telegraph Ave., Berkeley—$138,350 for the construction of nine bldgs. to contain 56 family dwelling units at Oak Knoll Hospital, Oakland, to serve the San Leandro and Oakland Naval Hospitals—by Federal Public Housing Authority, San Francisco. 4-27

ALAMEDA CO.—**Stolte, Inc.,** 8451 San Leandro St., Oakland—$192,744 for the construction of a housing project consisting of 40 Pacific Huts at 98th Ave. and San Leandro St., Oakland—by Bureau of Yards and Docks, Washington, D. C. 5-4

ALAMEDA CO.—**C. H. Thrams,** 1100-6th Ave., Oakland—$66,000 for the construction of a one-story concrete warehouse at 801-98th Ave., Oakland—by Gerber Products Co., Oakland. 5-15

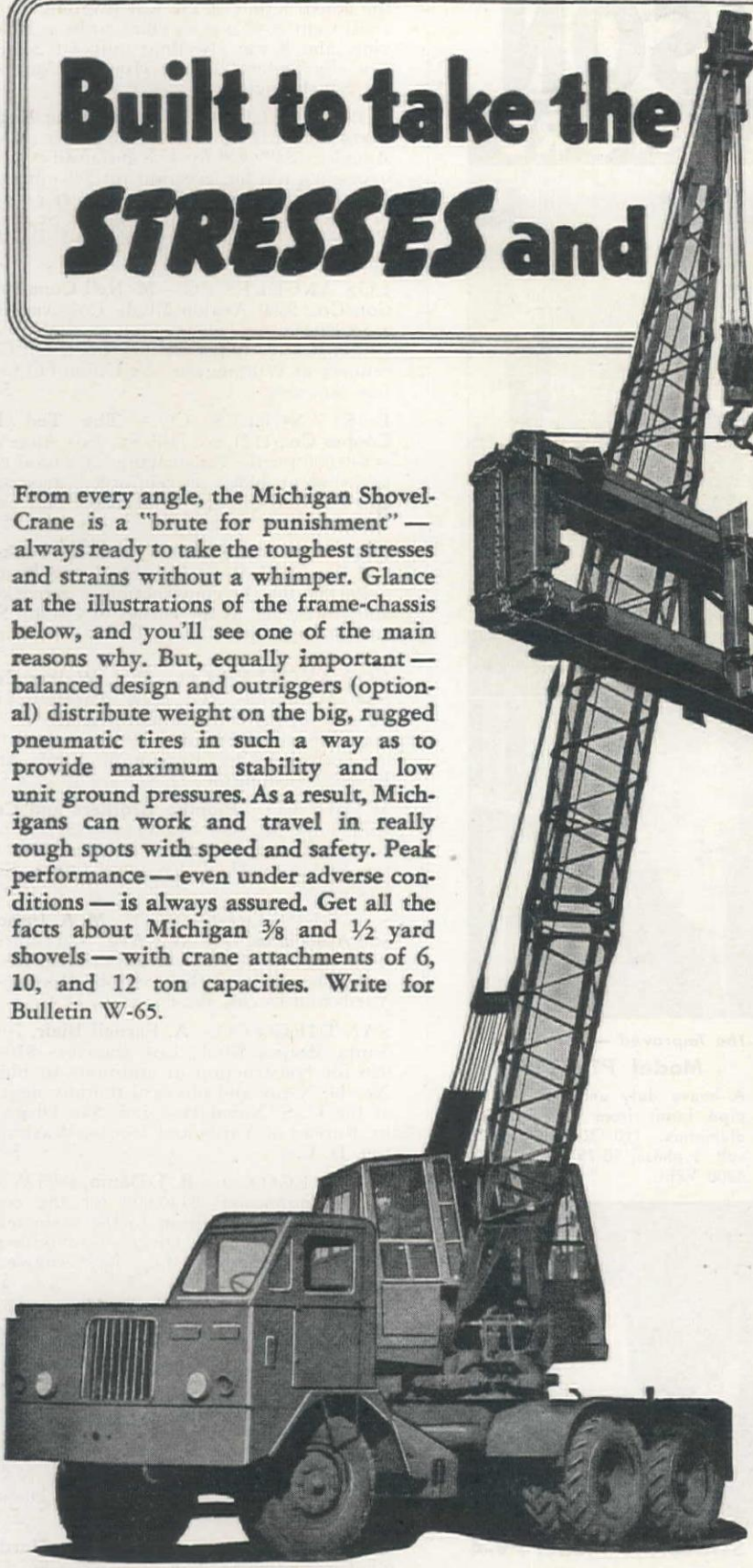
ALAMEDA CO.—**Ray Towers,** 631 Bergedo Dr., Oakland—$126,000 for the construction of 36 dwellings on Catron, Bergedo, Novelda and Estepa Drives, Oakland—by McGah & O'Shea, Oakland. 5-4

ALAMEDA CO.—**G. W. Williams Co.,** 10 California Dr., Burlingame—$399,775 for the construction of 188 family dwelling units at Pleasanton—by Federal Public Housing Authority, San Francisco. 4-30

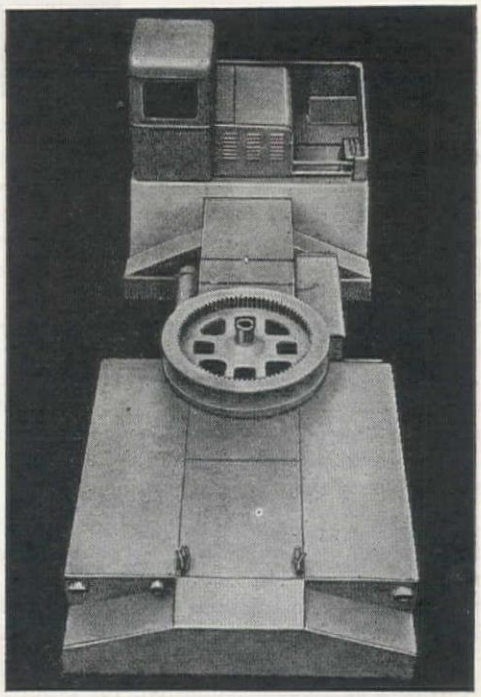
IMPERIAL CO.—**Shumaker and Evans,**

Built to take the TOUGHEST STRESSES and STRAINS

From every angle, the Michigan Shovel-Crane is a "brute for punishment" — always ready to take the toughest stresses and strains without a whimper. Glance at the illustrations of the frame-chassis below, and you'll see one of the main reasons why. But, equally important — balanced design and outriggers (optional) distribute weight on the big, rugged pneumatic tires in such a way as to provide maximum stability and low unit ground pressures. As a result, Michigans can work and travel in really tough spots with speed and safety. Peak performance — even under adverse conditions — is always assured. Get all the facts about Michigan ⅜ and ½ yard shovels — with crane attachments of 6, 10, and 12 ton capacities. Write for Bulletin W-65.



Rugged chassis and frame of box type members, fabricated of high-tensile alloy steel, riveted and welded to provide maximum strength and minimum weight. Easily withstands stresses and strains.



MICHIGAN

POWER SHOVEL COMPANY

BENTON HARBOR, MICHIGAN

4007 W. 6th St., Los Angeles—$560,049 for the construction of 152 war dwelling units at El Centro, 48 war dwelling units at Holtville, and 8 war dwelling units at Salton Sea—by Federal Public Housing Authority, San Francisco. 5-3

LOS ANGELES CO.—**Contracting Engineers Co.,** 2310½ W. Vernon Ave., Los Angeles—$399,900 for site and utility work necessary for the erection of 200 units of Homoja housing at the southwest corner of Palos Verdes Dr. and Gaffey St., San Pedro—by Bureau of Yards and Docks, Washington, D. C. 4-25

LOS ANGELES CO.—**McNeil Construction Co.,** 5860 Avalon Blvd., Los Angeles—$3,000,000 for construction of a group of administrative bldgs. at the Union Oil Co. refinery at Wilmington—by Union Oil Co., Los Angeles. 5-4

LOS ANGELES CO.—**The Ted R. Cooper Co.,** 1121 So. Hill St., Los Angeles—$40,000 for the construction of a food establishment bldg. of reinforced masonry and concrete constr.—by Reliable Nut Co., Los Angeles. 5-4

LOS ANGELES CO.—**Fred E. Tucker and Son,** 1225 West 14th St., Long Beach—$90,000 for the construction of a market and store bldg. at the corner of Carson St. and Orange Ave., Long Beach—by self. 4-30

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$1,609,513 for the construction of a new naval material redistribution and disposal center at Torrance—by Bureau of Yards and Docks, Washington, D. C. 5-7

MARIN CO.—**Piombo Brothers and Co.,** 1571 Turk St., San Francisco—$51,600 for construction of a storage area, near Hamilton Field—by U. S. Engineer Office, San Francisco. 5-9

SAN BERNARDINO CO.—**M. A. Imhoff and Associates,** 1748 New Ave., San Gabriel—$294,314 for the conversion of bldg. No. 2 into a shop bldg. at Barstow—by Bureau of Yards and Docks, Washington, D. C. 5-15

SAN DIEGO CO.—**A. Farnell Blair,** 7052 Santa Monica Blvd., Los Angeles—$104,026 for construction of additions to bldg. No. 14, X-ray and physical therapy depts., at the U. S. Naval Hospital, San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-15

SAN DIEGO CO.—**R. J. Daum,** 6803 West Blvd., Inglewood—$140,000 for the construction of an addition to the main telephone office at San Diego—by Southern California Telephone Co., Los Angeles. 5-4

SAN DIEGO CO.—**W. D. Haxton,** 515 Broadway Bldg., San Diego—$211,000 for the construction of 96 units of portable family dwellings at Frontier, San Diego—by Federal Public Housing Authority, San Francisco. 4-24

SAN DIEGO CO.—**Scherer & Prichard,** 208½ Orange St., Redlands—$59,682 for the construction of a chapel at the NAS, San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-15

SAN FRANCISCO CO.—**A. M. Hardy,** 736 Clementina St., San Francisco—$47,136 for conversion of existing barracks to enlisted men's housing at Letterman General Hospital—by U. S. Engineer Office, San Francisco. 4-23

SAN FRANCISCO CO.—**Theodore G. Meyer,** 200 Quint St., San Francisco—$494,543 for the construction of 250 temporary family dwelling units at Hunters Point—by Federal Public Housing Authority, San Francisco. 5-9

"NO DELAYS ON THIS JOB"

"Yes—the job's moving right along, and we expect to finish ahead of schedule. One reason is we ordered all the steel for the job from one concern—Bethlehem. Everything arrived right on the dot—not a minute's delay while we were held up for material. The time and trouble that saved! We sure are sold on Bethlehem Road Steel Service, after this experience!"

Here's something to think about in planning postwar highway-building:

To keep the job moving fast, contractors can count on Bethlehem to supply all the material, and supply it fast. Bethlehem makes all the steel needed to build a highway, street or any type of bridge. When a contractor buys all the steel for a job from Bethlehem he obtains everything he needs on a single order, with most of the items shipped from one of Bethlehem's handy warehouses. The entire order is carefully co-ordinated, handled as a unit, with shipments scheduled so that he gets each item of steel as he needs it.

It pays—in time, money and trouble saved—to make Bethlehem your headquarters for all the steel products used in building highways, streets, roads and highway bridges.

Bethlehem highway products are built for rugged performance. The nearest Bethlehem district office can give you full information.

BETHLEHEM STEEL COMPANY

On the Pacific Coast—*District Offices:* San Francisco, Los Angeles, Portland, Seattle; *Steel Plants:* So. San Francisco, Los Angeles, Seattle; *Fabricating Works:* So. San Francisco, Alameda, Los Angeles; *Shipyards:* San Francisco, Alameda, San Pedro.

Bethlehem Steel for Highways

ROAD JOINTS • DOWELS • DOWEL BAR SUPPORTS • CENTER STRIP • WIRE ROPE AND STRAND • BAR MATS • BAR TIES • ANCHOR RODS • GUARD RAILS • GUARD POSTS AND BRACKETS • PIPE • HOLLOW DRILL STEEL • DIGGING BARS • STRUCTURAL STEEL • MOLD BOARDS • CONCRETE REINFORCING BARS • BRIDGE FLOOR REINFORCING • CORRUGATED SHEETS • BAR SUPPORTS • TURNBUCKLES • TIE RODS, SPIKES, BOLTS AND NUTS • RIGHT-OF-WAY FENCE AND POSTS • TIMBER BRIDGE HARDWARE • SHEET AND H-BEARING PILING

BETHLEHEM STEEL

SAN FRANCISCO CO.—**Midstate Construction Co.,** 1299 Bush St., San Francisco—$309,483 for the construction of 144 family dwelling units at Hunters Point, San Francisco—by Federal Housing Authority, San Francisco. 4-20

SAN JOAQUIN CO.—**Thomas C. Buck,** Box 407, Stockton—$80,852 for construction of three hangars, conversion of barracks and utilities at Stockton Air Field—by U. S. Engineer Office, Sacramento. 5-9

SAN LUIS OBISPO CO.—**Close and Lewis,** 721 C St., Hayward—$83,634 for construction of 32 war dwelling units to be built on South St., in the old Exposition Park grounds, San Luis Obispo—by Federal Public Housing Authority, San Francisco. 5-1

SAN MATEO CO.—**Adam Arras and Son,** 116 New Montgomery St., San Francisco—$50,489 for the construction of Sunnybrae elementary school bldg., of structural steel and reinforced masonry construction at San Mateo—by San Mateo Elementary School Distr., San Mateo. 4-27

SAN MATEO CO.—**Claude T. Lindsay,** 564 Market St., San Francisco—$344,587 for the construction of 152 temporary family dwelling units in San Bruno—by Federal Public Housing Authority, San Francisco. 4-25

SAN MATEO CO.—**Peter Sartorio,** 262 Clementina St., San Francisco—$56,225 for the construction of a 1-story elementary school bldg., of structural steel and stone construction at San Carlos—by San Carlos Elementary School Distr. 5-3

SANTA BARBARA CO.—**Ellis G. Martin,** 1311 - 5th St., Santa Monica—$181,988 for the construction of 76 war dwelling units and one community bldg., at Santa Barbara—by Federal Public Housing Authority, Los Angeles. 4-30

SANTA CLARA CO.—**L. E. Gibson Construction Co.,** 4806 Macdonald Ave., Richmond—$100,000 for construction of hollow tile, frame and corrugated steel dehydrator plant at Sunnyvale—by Freemont & Cupertino-Saratoga Cooperative Dryer, Inc. 5-7

SOLANO CO.—**Alfred J. Hopper,** 243 Langton St., San Francisco—$92,948 for construction of a new one-story reinforced concrete branch jail bldg. to contain 48 cells at Vallejo—by County Board of Supervisors, Fairfield. 5-8

SOLANO CO.—**Midstate Construction Co.,** 1299 Bush St., San Francisco—$45,317 for construction of five cottages; one-story wood frame structures at Maritime Academy, Carquinez Straits, Vallejo—by State of California. 5-9

STANISLAUS CO.—**Harris Construction Co.,** Fresno, Calif.—$78,916 for the construction of WAC housing, conversion of barracks, enclosing walks, etc., at Hammond General Hospital, Modesto—by U. S. Engineer Office, Sacramento. 4-17

VENTURA CO.—**Jensen and Jepsen,** 9th St. and Ventura Rd., Oxnard—$162,313 for the construction of 80 portable family dwelling units, consisting of 27 one-bedroom units and 53 two-bedroom units, etc., at Oxnard—by Federal Housing Authority, San Francisco. 4-19

Colorado

DENVER CO.—**Walter H. Harris,** 4245 Grove St., Denver—$250,000 for the construction of housing units on Leyden and Locust Sts., between 12th and 13th Sts., in Denver—by Colonial Gardens, Inc., Denver. 4-19

Montana

LEWIS AND CLARK CO.—**Caird Engineering Works,** Helena—$150,000 for building ramps to be used on army trailers to load and unload equipment—by U. S. Engineer Office, Portland, Ore. 5-12

Nevada

CHURCHILL CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco, Calif.—$249,711 for construction of physical training bldg., and additions to welfare bldg., N. A. A. S., Fallon—by Bureau of Yards and Docks, Washington, D. C. 5-3

MINERAL CO.—**Wm. P. Neil Co.,** 4814 Loma Vista Ave., Los Angeles, Calif.—$311,961 for constr. of addit. personnel and office facilities at the Naval Ammunition Depot, Hawthorne—by Bureau of Yards and Docks, Washington, D. C. 4-23

Oregon

COOS CO.—**Donald M. Drake Co.,** Lewis Bldg., Portland—$69,020 for the construction of 17 Homoja huts for dependents of transient naval personnel at the North Bend Naval Air Station—by Bureau of Yards and Docks, Washington, D. C. 5-4

HOOD RIVER CO.—**Donald M. Drake Co.,** Lewis Bldg., Portland—$81,000 for the construction of a cold storage warehouse at Van Horn—by American Fruit Growers, Hood River. 5-3

UMATILLA CO.—**J. H. Collins & Co.** and **R. L. Bair & Co.,** Box 687, Walla Walla, Wash.—$566,480 for the construc-

Lithographed on stone by Edward A. Wilson

Illustration shows installation of cast iron flexible joint subaqueous pipe line specified for the required service conditions. How to do it when you get the go-ahead is a problem we are always glad to help out on if it involves pipe design, or recommendations as to pipe and fittings which have successfully met similar problems. To see that our product is correctly specified for the purpose intended is an important function of our sales engineering and technical staffs. Forty-five years' experience as largest producers of cast iron pipe is behind them and always at your service.

U.S.
cast iron
PIPE

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

tion of open storage pads complete with barricades and approaches at the Umatilla Ordnance Depot near Hermiston—by U. S. Engineer Office, Portland.

Texas

BELL CO.—**Taylor Construction Co.,** Box 648, Taylor—$46,693 for construction of housing for prisoners of war at McCloskey General Hospital, Temple—by U. S. Engineer Office, San Antonio. 4-16

BEXAR CO.—**C. L. Browning, Jr.,** 812 Insurance Bldg., San Antonio—$48,847 for orthopedic, occupational therapy and brace shop at Fort Sam Houston—by U. S. Engineer Office, San Antonio. 5-4

BEXAR CO.—**Cunningham and Dinn,** San Antonio—$128,087 for the construction of a mess hall at Brooke Convalescent Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 4-17

BEXAR CO.—**Henderson Brothers,** 7051 Chocolate Bayou Rd., Houston—$57,499 for construction of a war trailer project at San Antonio—by Federal Public Housing Authority, Fort Worth. 4-16

BEXAR CO.—**H. H. Moeller,** Box 35, Grayson St. Station, San Antonio—$116,654 for construction of two storage warehouses on Centennial Ave., and Aviation Blvd. and Missouri Pacific spur in San Antonio—by U. S. Engineer Office, San Antonio. 5-10

BEXAR CO.—**J. C. Worcester,** Box 5066, Beacon Hill Station, San Antonio—$52,762 for alterations, additions and remodeling of 28 existing mobilization type bldgs. to convert into use by Brooke Convalescent Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 4-18

CAMERON CO.—**Henry W. Duerson,** 405 No. L St., Harlingen—for the construction of a Parish Hall, 1-story, hollow tile and brick constr. and a recreation center, at Harlingen—by St. Alban's Episcopal Church, Harlingen. 5-1

COLLIN CO.—**T. C. Bateson Co.,** 623 Irwin-Keasler Bldg., Dallas—$86,000 for the construction of occupational therapy and physiotherapy facilities and library at Ashburn General Hospital, McKinney—by U. S. Engineer Office, Denison. 4-26

CORYELL CO.—**McClellan-Brown-McClellan,** Waco—$53,375 for construction of a recreation bldg. at U. S. Disciplinary Barracks, Gatesville—by U. S. Engineer Office, San Antonio. 4-17

DALLAS CO.—**Cedric Burgher Construction Co.,** 3027 Main St., Dallas—$50,000 for the construction of a steel frame addition to plant at Dallas—by Diamond Alkali Co., of Texas, Dallas. 4-10

DALLAS CO.—**Inge Construction Co., Inc.,** and **Austin Bridge Co.,** Dallas—$924,575 for construction of additional facilities for manufacture of dry yeast at Dallas—by Standard Brands, Inc., Dallas. 4-20

NUECES CO.—**Lawless & Alford,** Box 1248, Corpus Christi—$60,640 for remodeling of out-patients clinic and additional dependents hospital facilities at Naval Hospital, Corpus Christi—by Bureau of Yards and Docks, Washington, D. C. 4-18

TARRANT CO.—**McClellan, Brown and McClellan,** Waco—$43,000 for the construction of a 2-story packing plant addition at Fort Worth—by Swift and Company. 4-13

TARRANT CO.—**Robert E. McKee,** Box 2848, Dallas—$247,900 for the construction of Section A buildings and electrical service connections at Fort Worth Army Airfield—by U. S. Engineer Office, Denison. 4-30

Utah

DAVIS CO.—**J. H. Haslam,** 4212 Highland Dr., Salt Lake City—$115,437 for the construction and equipping of an elementary school at Clearfield—by Board of Education of Davis County. 4-19

GARFIELD CO.—**H. J. McKean,** Dooly Bldg., Salt Lake City—$52,699 to remodel a partially complete clubhouse into a hospital and complete facilities at Panguitch—by City Council, Panguitch. 4-23

WEBER CO.—**Lym Engineering Co.,** Salt Lake City—for the constr. of boiler house, laundry shop and garage hospital facilities, at Ogden—by Sisters of the Order of St. Benedict, Ogden. 4-26

WEBER CO.—**Earl S. Paul,** 1463 - 32nd St., Ogden—$88,580 for the construction of a brick and concrete one-story and basement dairy processing building at Ogden—by Weber Central Dairy Assn., Salt Lake City. 4-23

Washington

FRANKLIN CO.—**B. H. Sheldon,** 2022 Third St., Spokane—$312,000 for the construction of 115 frame row-type family dwelling units at Pasco—by Federal Public Housing Authority, Seattle. 4-27

FRANKLIN CO.—**W. C. Smith, Inc.,** 216 Board of Trade Bldg., Portland—$210,875 for the construction of ATC Birchwood hangar at the naval air station, Pasco—by Bureau of Yards and Docks, Washington, D. C. 4-27

KING CO.—**Nettleton and Baldwin,** 1109 No. 36th St., Seattle—$303,566 for construction of 100 apartment units at Magnolia Bluff for naval personnel—by Federal Public Housing Authority, Seattle. 4-20

KING CO.—**Rainier Construction Co.,** American Bldg., Seattle—$110,791 for the construction of camp facilities for Italian Service Units, Seattle ASF Depot—by U. S. Engineer Office, Seattle. 5-5

KITSAP CO.—**John H. Sellen Construction Co.,** 228 - 9th Ave. N., Seattle—$104,600 for construction of additional barracks and extension to mess hall at the Naval Ammunition Depot, Bremerton—by Bureau of Yards and Docks, Washington, D. C. 4-24

PIERCE CO.—**Macdonald Building Co.,** 1517 So. Tacoma Way, Tacoma—$50,000 for constructing modifications to existing facilities and essential construction to provide a convalescent hospital at Fort Lewis—by U. S. Engineer Office, Seattle. 4-17

PIERCE CO.—**Macdonald Building Co.,** 1517 So. Tacoma Way, Tacoma—$217,538 for construction of a convalescent hospital, Madigan Hospital Center, Ft. Lewis—by U. S. Engineer Office, Seattle. 5-5

Wyoming

ALBANY CO.—**E. C. Nickel,** Box 765, Arcadia, Calif.—$534,000 for the construction of a shale laboratory on the campus of the University of Wyoming, Laramie. Bldg. will be of reinforced concrete, with stone facing—by U. S. Department of Interior, Bureau of Mines, Laramie. 4-30

Territories

ALASKA—**Lytle and Green,** Gowman Hotel, Seattle—$321,000 for construction of

50 frame row-type family dwelling units at Fairbanks — by Federal Public Housing Authority, Seattle. 5-12

CANAL ZONE—**Tucker McClure,** 711 W. 7th St., Los Angeles—$549,288 for the construction of an engine test bldg. at U. S. Naval Air Station, Coco Solo—by Bureau of Yards and Docks, Washington, D. C. 5-9

Canada

BRITISH COLUMBIA—**Armstrong and Monteith Construction Co., Ltd.,** 1383 Hornby St., Vancouver—$61,200 for the construction of a new plant at Pender and Burrard Sts., Vancouver — by Canadian Marconi Company, Vancouver. 5-17

BRITISH COLUMBIA—**Coast Construction Company,** 510 W. Hastings St., Vancouver — $65,000 for the construction of a warehouse and barrel shed at 4475 McGill St., Burnaby—by Standard Oil Co., Burnaby, B. C. 4-25

BRITISH COLUMBIA—**Northern Construction Co.** and **J. W. Stewart Ltd.,** 736 Granville St., Vancouver—$863,300 for the construction of a three-story Veterans' Hospital at Victoria. Bldg. will be of reinf. concr., with accommodation for 200 patients—by War Dept., Ottawa.

Miscellaneous . . .

California

LOS ANGELES CO.—**Gayton Engineering Co.,** 2728 E. Florence Ave., Huntington Park—$94,509 for interior painting at the William Mead Homes Housing Development, No. Broadway, Los Angeles — by Housing Authority, Los Angeles. 5-9

MARIN CO.—**Underground Construction Co.,** 75th Ave. and San Leandro Blvd., Oakland — $117,687 for gasoline pipeline at Hamilton Field—by U. S. Engineer Office, San Francisco. 5-8

SAN FRANCISCO CO.—**MacDonald and Kahn, Inc.,** 200 Financial Center Bldg., San Francisco—$89,432 for installation of automatic sprinkler system at Sixth and Channel Sts., San Francisco—by U. S. Engineer Office, San Francisco. 4-27

SAN JOAQUIN CO. — **MacDonald & Kahn, Inc., G. Pollock, A. Teichert & Son, Inc.,** Financial Center Bldg., San Francisco —$1,814,345 for construction of precast reinforced concrete piles, riprap fender work, dolphins, concrete deck, railroad tracks and gantry crane tracks and beds, track bumpers, etc., at the Naval Supply Annex, Rough & Ready Island, Stockton—by Bureau of Yards and Docks, Washington, D. C. 4-23

SAN LUIS OBISPO CO. — **Harold C. Geyer,** 787 Munras Ave., Monterey—$93,457 for construction of a standard training pool at Camp Roberts—by U. S. Engineer Office, San Francisco. 5-15

Oklahoma

COMANCHE CO. — **Ditmar - Dickmann Construction Co.,** 804 Barnes Bldg., Muskogee—$75,000 for construction of training swimming pool at Fort Sill—by U. S. Engineer Office, Denison, Texas. 5-11

PITTSBURG CO. — **J. A. Terteling & Sons,** Box 1428, Boise, Ida.—$7,300,430 for the construction of 115 slab type projectile magazines, 50x100 ft. each, 12 black powder magazines and 54 inert storehouses at McAlester—by Bureau of Yards and Docks, Washington, D. C. 5-7

Oregon

LINCOLN CO.—**City Electric Co.,** 1007 Broadway, Boise, Ida.—$56,053 for construction of 49 mi. of line to serve 111 members—by Lincoln Electric Cooperative, Corvallis. 4-19

Texas

BEXAR CO.—**C. L. Browning, Jr., Contractors,** 812 Insurance Bldg., San Antonio—$299,425 for the construction of hospital mess halls and elevators in the annex at Brooke General Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 4-17

BEXAR CO.—**Century Sprinkler Corp.,** 305 Graham St., Richmond, Va.—$95,000 for installation of automatic sprinkler systems in 105 ward-bldgs. at Brooke Convalescent Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 4-30

BEXAR CO.—**F. L. Scott & Son,** 123 Beal St., San Antonio—$41,971 for installation of mechanical ventilation systems in approx. 110 two-story barracks at Brooke Convalescent Hospital, Fort Sam Houston—by U. S. Engineer Office, San Antonio. 4-16

GONZALES CO.—**Sisco Electric Co.,** Conroe—$49,825 for the construction of 70 mi. of line to serve 156 members—by Guadalupe Valley Electric Cooperative, Inc., Cost. 4-10

KARNES CO.—**Lowe Electric Co.,** Corpus Christi—$82,899 for the construction of 112 mi. of line to serve 200 members, and the conversion from one to two phase of 19 mi. of line—by Karnes Electric Cooperative, Inc., Karnes City. 4-21

MARTIN CO.—**Eugene Ashe Electric Co.,** 415 Jones St., Fort Worth—$72,647 for construction of 100 mi. rural electric lines near Stanton—by Cap Rock Electric Cooperative, Stanton. 5-2

Utah

WEBER CO.—**Chytraus Construction Co.,** 436 So. 4th West, Salt Lake City—$39,051 for the construction of office space and the installation of a sprinkler system at Utah ASF Depot, near Ogden—by U. S. Engineer Office, Sacramento, Calif. 4-17

WEBER CO.—**R. J. Daum,** 6803 West Blvd., Inglewood—$45,220 for repairs to sub-depot and road paving at Utah A.S.F. Depot, near Ogden—by U. S. Engineer Office, Salt Lake City. 5-10

WEBER CO.—**The Viking Automatic Sprinkler Co.,** Salt Lake City—$488,797 for the installation of sprinkler systems in 19 bldgs. at the Ogden air depot, Ogden—by U. S. Engineer Office, Sacramento, Calif. 4-19

Washington

KING CO.—**Viking Automatic Sprinkler Co.,** 1120 Eighth Ave. So., Seattle—$57,722 for installation of automatic sprinklers in hangar at the naval air station, Seattle—by Bureau of Yards and Docks, Washington, D. C. 4-19

SPOKANE CO.—**W. E. Beggs,** 234-9th No., Seattle—$63,716 for installation of additional automatic sprinkler systems in 5 bldgs. at the Spokane Army Air Depot—by U. S. Engineer Office, Seattle. 5-5

SPOKANE CO.—**Gus J. Bouten Construction Co.,** Spokane—$156,444 for dismantling, salvaging or demolition and removal of certain government owned bldgs. and facilities at Felts Field, Spokane—by U. S. Engineer Office, Seattle. 4-17

Construction Plant and Equipment From Shasta Dam, California

Available For Sale **Immediate Delivery**

CABLEWAYS AND HOISTS

3—Lidgerwood, 3-drum electric hoists with 500 H.P. G.E. Motors. Ward Leonard control, complete with controls and all electric equipment.

3—Lidgerwood, 3-drum electric hoists with 500 H.P. Westinghouse motors complete with controls and all electrical apparatus.

5—Cableway towers, structural steel, 3—125 ft.; 1—75 ft. and 1—45 ft., complete with travel mechanism.

6—Complete sets of carriages, main and auxiliary, fall and dump blocks, fall rope carriers, buttons, takeup bars and takeup sheaves.

1—American pillar crane. Cap. 5 T. at 48½ ft. and 15 T. at 25 ft. radius.

1—Colby elevator hoist, double drum, 75 H.P., equipped with brakes and emergency equipment including one hoist cage. 15 ton capacity.

1—1790 ft. pcs. of 3" dia. locked coil cable, new.

12,000 lin. ft. of used 3" dia. locked coil cable in length from 500 to 2600 lin. ft.

Misc. lot of sheaves, jewels, blocks, etc.

CEMENT PLANT

1—Dual #265 Fuller Fluxo cement pump, duplex type complete with gravity feed and automatic control equipment. 400 bbls. per hr. capacity. Pumping distance 3300 ft.

2—Fuller-Kinyon Pumps—type "D" 125 h.p. complete with air hose power control cable, control cabinets.

1—C-200 Fuller single stage rotary compressor Westinghouse motor 100 h.p.

CONVEYORS

500 troughing rolls for 36" belt.

150 return idlers for 36" belt.

2—Complete sets, including 42" tandem drive pulleys, 42" head pulleys, 36" tail pulleys.

3—150 h.p. Westinghouse gear motors, 144 r.p.m., 2300 volts, 3-phase, 60 cycle.

16—White Dump Trucks Model 1580-691, 24 cu. yd. capacity in good condition.

2—75 h.p. Westinghouse gear motor, 194 r.p.m., 2300 volt, 60-cycle.

1—Telepoise conveyor scale for 36" belt.

1—Airplane tripper for 36" belt with two 17' wing belts, capacity 1,000 T per hour, complete with pulleys, drives and gear motors.

DRILLING EQUIPMENT

5—I-R paving breakers.

8—I-R drifters DA35.

2—I-R Wagondrills—pneu. tires, hoists, X71 drifters mounted.

1—I-R-54 Drill Sharpener.

10—I-R Jackhammers.

TANKS & RECEIVERS

1—9500 bbl. all welded water tank, 48' dia., 30' high.

1—5400 bbl. all welded water tank, 36' dia., 30' high.

1—200 bbl. steel water tank.

10—Sandblast tanks 24" x 96" with hoppers and fittings.

10—Lubricator tanks 14" x 30"; 24" x 48"; and 24" x 60".

PUMPS

2—Byron-Jackson 400 h.p. 12 in. deepwell.

3—Bingham type SVD submersible pumps.

1—Byron-Jackson 150 h.p. 10 in. deepwell.

1—Gardner-Denver grout pump model FD-FS, 10" x 2½" x 10", with case-hardened liners and Calmex pistons and rods, 1,000 lb. pressure at 90 lb. air.

10—I-R #25 Sump Pumps.

MIXING PLANTS

1—3000 cy. bin with 5 compartments for aggregates, 2 compartments cement, incl. turnhead, gates.

1—Complete set C. S. Johnson fully automatic batching equipment for 5 aggregates, cement and water for 4 cy. batchers.

5—4 cy. Koehring Concentric zone mixers, incl. batchmeters, timers, consistency meters.

1—100-ton steel bin.

MISCELLANEOUS

1—Robbins Contractor Screen 16" x 36".

1—Bodinson 60" x 16' trommel screen complete with motor drive, feed chutes.

Valves—1, 2, 3, 4, 6, 8, 10, 12, 16-inch.

10,000 ft. Type S rubber covered cable.

Pole line hardware.

Floodlites—500 to 1500 w.

1—LeTourneau Heavy Duty 3-Point Rooter.

1—1¼ cu. yd. Heavy Duty Clamshell Bucket.

12—Muck Skips, 7—14 cu. yds.

50—Chicago Pneumatic concrete vibrators, Nos. 417, 518 and 519.

MACHINERY AND SUPPLIES

1—125 KW. motor generator set, 275 volts DC.

1—Sand drier, 24" dia. x 10' long, with motor, speed reducer, feed & discharge chutes, oil burner & stacks.

5—Blowers; American and Buffalo.

Complete stock of Warehouse supplies.

Complete line of transformers and electric motors.

ALL ITEMS SUBJECT TO PRIOR SALE

PACIFIC CONSTRUCTORS, INC.

GENERAL CONTRACTORS — BOX 898, REDDING, CALIFORNIA **Phone 512 REDDING**

PROPOSED PROJECTS

Highway and Street . . .

Oregon

JOSEPHINE CO.—Federal authorization of a $300,000 program of highway construction, prior to the construction of Detroit dam, has been announced. The new 15-mi. hwy. will be located southeast of Salem, starting a mile east of Mill City and running east to two miles beyond Detroit. 4-23

Bridge . . .

Oregon

CLATSOP CO.—The Oregon-Washington bridge board has passed a bill authorizing construction of a toll bridge across the Columbia river at Astoria. The bill has been approved by the senate commerce committee. 4-30

Building . . .

California

ALAMEDA CO.—The War Dept. has authorized the construction of additional facilities at the Alameda Intransit Depot, and the WAC Housing Area at Berkeley. Construction includes housing of 1,100 men capacity, gate houses, perimeter fence reinforcement, office bldgs., cafeteria, bridges, roads, open storage areas, and additional housing for WAC personnel. Expenditure is in the amount of $2,749,000. 5-10

ALAMEDA CO.—Proposal has been approved for the construction of a bldg. for use as Postal Concentration Center containing 300,000-sq. ft. of floor space; relocate present Motor Pool of Camp John T. Knight; and provide utilities, including railroad tracks, roadways, street lighting, etc. Authorized expenditure for the project is $2,000,000. 4-25

SAN JOAQUIN CO. — Plans are being prepared for the construction of six new transit sheds, eight storehouses, steel storage area, roads and railroads at the Naval Supply Depot, Rough and Ready Island. No estimate of the cost has been announced. 5-8

SANTA BARBARA CO. — Construction of a manufacturing plant for the production of carbon black at Santa Maria, to cost approx. $750,000, has been approved by the War Production Board. 5-9

SANTA BARBARA CO.—Authorization has been announced on a $4,620,000 project at Camp Cooke, Lompoc, to consist of disciplinary barracks, temporary housing, industrial bldgs. and unessential utilities. Work will be supervised by the U. S. Engineer Office, Los Angeles. 4-20

Oregon

KLAMATH CO.—The Bureau of Yards and Docks has authorized an expenditure of $586,200 for the construction of additional barracks and facilities at Klamath Falls. 5-15

MARION CO.—The Oregon Flax Textiles, Inc., will soon begin construction of a $90,000 plant at Salem, for which priorities have been granted. 4-3

MULTNOMAH CO. — Priorities have been granted for the construction of a $93,000 warehouse addition at S. E. Water and Pine Sts., Portland, for Hudson-Duncan & Co. 3-16

MULTNOMAH CO.—Approval has been granted by the Federal Works Agency, Berkeley, Calif., for the constr. of two elementary schools in Portland, to cost approx. $98,000. 3-16

MULTNOMAH CO. — Plans are being completed for the construction of a Valley Community Church at West Slope District, Portland. The site already purchased is on the corner of Multnomah Club Road and Brenton. Planned brick structure will cost $80,000. 3-24

UMATILLA CO.—Plans and specifications are being prepared for the construction of a warehouse at Freewater for the Continental Can Co. The estimated cost of the project is $120,000. 3-14

Miscellaneous . . .

California

SAN DIEGO CO.—Plans have been approved for the construction of four storehouses, commissary bldg., gas station and other bldgs., sewer, water and electrical services, railroad trackage and misc. improvements at Camp Pendleton, Oceanside. Est. cost is $3,775,000. 5-8

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

CALIFORNIA METAL TRADES ASSOCIATION, a body representing 250 manufacturers, recently held its annual election of officers. New president is **J. E. Holland,** manager of the PACIFIC ELECTRIC MANUFACTURING CORP., San Francisco. **P. A. Hoyt** is the new vice-president; he is executive vice-president of OLIVER UNITED FILTERS, INC., Oakland. **George F. Bont,** president of CALIFORNIA STEEL PRODUCTS CO. was re-elected as treasurer and **Max F. Lowe** as secretary-manager. Holland outlined the problems facing the Association in preserving the brilliant industrial gains made in the past three years, which has transformed California from a predominantly agricultural state to an industrial empire. He also stressed urgently the need for the continued sincere cooperation between management and labor in order to preserve these gains and furnish full employment and production.

☆ ☆ ☆

C. G. Cox has been appointed to the executive staff of the JOSHUA HENDY IRON WORKS, as recently announced by **A. A. Browne,** manager of engineering and sales. Cox will serve as administrative assistant to Browne, aiding in the formulation and execution of company sales and engineering policies. He will make his headquarters at Sunnyvale, Calif. Cox was formerly vice-president and general manager of the ENTERPRISE ENGINE AND FOUNDRY COMPANY of San Francisco.

☆ ☆ ☆

Arthur D. Bragg who transferred to the Los Angeles office last July, has returned to San Francisco to become Pacific District Manager, central station-transportation department for the GENERAL ELECTRIC COMPANY. Bragg replaces **Allen G. Jones,** who recently became manager of apparatus sales in the Pacific district. Bragg is well known in the Bay Area and has been associated with General Electric for a number of years. A graduate of Leland Stanford University, he took the G. E. Test Course in 1925, working for 18 months in the Schenectady office before transferring to the West Coast.

☆ ☆ ☆

J. C. Rowold, vice-president of MACK-INTERNATIONAL MOTOR TRUCK CORP., has been appointed manager of Mack's Pacific Coast Division according to **A. C. Fetzer,** Mack vice-president. Rowold will make his new headquarters at 1501 S. Central Ave., Los Angeles.

☆ ☆ ☆

The men and women of STEEL TANK AND PIPE COMPANY of California were recently awarded the coveted Army-Navy Production Award for their excellent war production record.

☆ ☆ ☆

CALIFORNIA BRASS MFG. CO. of Los Angeles, manufacturers of Calco Valves for plumbing, industrial and marine uses, announces the appointment of RAYBURN-JUDD COMPANY as their sales representatives for California, Washington, Oregon, Arizona and Idaho. Offices for Rayburn - Judd Company serving these areas are located at Los Angeles, San Francisco, Seattle and Portland.

☆ ☆ ☆

Francis R. MacNamara, Manila representative for GARDNER-DENVER CO., was one of the fortunate business executives rescued by the Army from Los Banos Internment Camp, south of Manila. Also liberated with MacNamara was **Frank C. Bennett,** sales manager, ATLANTIC GULF AND PACIFIC COMPANY, Gardner-Denver distributor in the Islands. Bennett writes in part: "The Atlantic Gulf and Pacific Co. will start up again as soon as possible, and we expect to be bigger and stronger than ever. Mr. Fitzsimmons, our president, died last year from a heart attack, and Cliff Larson was shot by the savages in January this year due to mistaken identity. Our vice president, Mr. Garnezy, will become active head of A. G. and P. Co."

☆ ☆ ☆

Expansion of plant facilities and consolidation of sales offices were recently accomplished by RUCKER-VAUGHN COMPANY in their Oakland, Calif. location at 4228 Hollis St. The Company manufactures the Vaughn line of pressure regulating valves and gas and oil burning equipment, as well as the Arnold lubricator, an air tool specialty. According to **Clark E. Rucker,** who is in charge of sales, the company has stepped up its production capacity, both through plant expansion and improved production methods. Production is headed up by **Clifford Vaughn.**

☆ ☆ ☆

Walter Dorwin Teague, long known in the field of industrial design, has extended the services of his organization to the Pacific Coast with offices in the Title Guarantee Building, Los Angeles, Calif. "The present expansion of West Coast Industry," says Teague, "not only can be made permanent, but can serve in addition as the basis for more intensive industrialization of this area and for all of the countries facing the Pacific Ocean."

☆ ☆ ☆

I. G. Stewart, who has had 22 years' experience in the heavy chemical industry, was appointed manager of the new San Francisco office of the PITTSBURGH PLATE GLASS COMPANY'S Columbia Chemical Division, **W. I. Galliher,** executive sales manager of the Division, has announced. The new district sales office is being opened to serve buyers of heavy chemicals on the West Coast, as a result of the increasing importance of West Coast

activities in the Nation's industrial economy. The Columbia Chemical Division recently acquired the PACIFIC ALKALI COMPANY of Bartlett, Calif.

☆ ☆ ☆

G. F. Maughmer has been appointed assistant manager of the GENERAL ELECTRIC COMPANY'S Los Angeles office. Maughmer comes to Los Angeles from San Francisco where he was assistant to **Raymond M. Alvord,** commercial vice-president and former manager of G. E.'s Apparatus Department, Pacific District. **S. E. Gates** is manager of the Los Angeles office.

☆ ☆ ☆

PACIFIC NORTHWEST

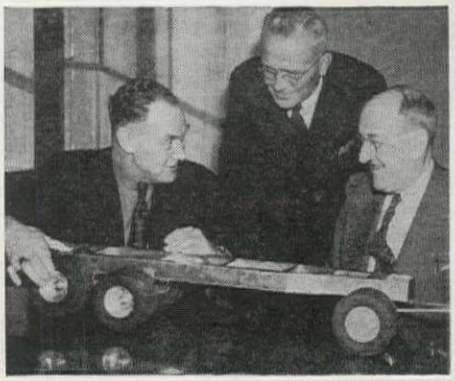
Roy Wills, advertising manager for LIMA LOCOMOTIVE WORKS announced the appointment of MODERN MACHINERY CO. as a new distributor for Lima shovels, cranes and draglines. The new agency headquarters is North 2417 Division Street, Spokane, Washington; their territory embraces Eastern Washington, Northern Idaho and extreme Western Montana.

☆ ☆ ☆

Chet Manship, is a newcomer to Washington District staff of TIDE WATER ASSOCIATED OIL CO., who takes over as Assistant to **J. M. Shea,** District Sales Manager. He replaces **Elton Brown,** transferred to Southern California as Sales Agent at Vernon.

☆ ☆ ☆

R. W. Pointer, Henry Ketel and **Col. H. A. Geerds,** nationally known figures in the trailer business, recently formed a new corporation, which will become a world-wide manufacturer and selling factor in the truck-trailer industry. The new concern is to be known as FEATHER RIDE, INCORPORATED, with general offices in the Terminal Sales Building, Portland, Oregon. Sales representatives are being sought in twenty-five metropolitan areas



ROBERT W. POINTER, left, COL. H. A. GEERDS, and HENRY KETEL, members of the new corporation formed to manufacture and market the Feather Ride trailer, shown examining a scale model of the vehicle.

throughout the United States. The new Company claims to offer many weight-saving components for trailer operators, manufacturers, conversion shops and automotive parts distributors.

☆ ☆ ☆

Ivan E. L. Eide was appointed district manager in charge of Oliver "Cletrac" industrial business in the Pacific Northwest, as announced by the OLIVER CORP., Cleveland, Ohio. Eide is well known in the industrial field with twenty years experience in the construction and automotive industry. He was formerly district representative for J. D. Adams Company, in charge of industrial equipment at Billings, Mont.

☆ ☆ ☆

W. H. Stover is representative for GENERAL ELECTRIC COMPANY'S newly established air conditioning department, with offices in the Dexter-Horton Building, Seattle, Wash. Stover's territory consists of Washington, Oregon, Montana, Idaho and Utah. **E. W. Howes** is G. E.'s representative in the territory including California, Arizona and part of Nevada, with headquarters in the Russ Building, San Francisco.

☆ ☆ ☆

R. J. (Bud) Clasby, formerly assistant superintendent with the WIRE ROPE & MANUFACTURING CO., Seattle, was recently appointed assistant manager in charge of sales of the PACIFIC WIRE WORKS COMPANY, Seattle.

☆ ☆ ☆

F. J. (Joe) Miller, newly appointed Oregon District Sales Supervisor for TIDE

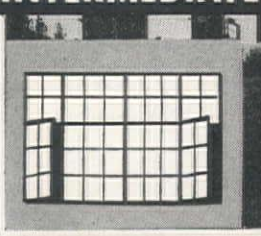
HATS OFF DEPARTMENT

HATS OFF TO . . .

Harry A. Thomsen, Architect
Dinwiddi Construction Co.,
Contractor for the Spreckels Sugar Co.
Building, Woodland, California.

An interesting example in which a California Architect combines plant and office building into one unified structure. Here Ceco steel windows are used to excellent advantage in both office building and plant. Ceco furnished intermediate casements, fixed sidewall, pivoted sidewall, mechanical operators, screens and commercial projected steel windows.

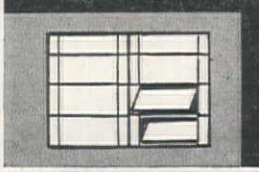
CECO INTERMEDIATE



HATS OFF TO . . .

Alfred S. Alschuler
Architect and Contractor
for the Pheoll Manufacturing Co.
Building, Chicago, Ill.

CECO ARCHITECTURAL



Here you find a fine treatment of entrance with long continuous steel windows serving both manufacturing space on first floor and office space on second floor. A nice solution to the problem of resolving various units into a dignified pleasing facade. Ceco furnished pivoted sidewall, fixed sidewall, and architectural projected windows.

HATS OFF TO . . .

Joseph W. Radotinsky, Architect
Universal Construction Co., Contractors
for the Argentine High School Addition,
Kansas City, Missouri.

CECO COMMERCIAL P

The use of continuous steel windows give maximum lighting for classrooms harmonious with the modern treatment of the entrance. In this high school you can see that lines of continuous steel windows are particularly applicable to school room use. Ceco furnished commercial projected windows, with the vertical muntins omitted.

CECO STEEL PRODUCTS CORPORATION

MANUFACTURING DIVISION
5701 WEST 26th STREET, CHICAGO, ILL.
Concrete Engineering Division, Sheet Steel and Wire Division, Highway Products Division

ENGINEERING MAKES THE BIG DIFFERENCE I

at transfer, temperature, trumentation, exhaust and pressure charging and tor-

☆ ☆ ☆

Woods, recently joined the ff of LINCOLN ELEC- eveland, Ohio, as research ls will devote a major part the development of elec- or which he is well qualified nany years of experience in mistry and metallurgy.

☆ ☆ ☆

ond, vice-president of GAR STRIES, INC., announced t of two new distributors s of its hoist and body and They are GENERAL MA- MPANY, Spokane, Wash-

ington, and EQUIPOS HOBBS S. A., Mexico City.

☆ ☆ ☆

Maynard E. Montrose was elected president and general manager of the MARION STEAM SHOVEL COMPANY, at a meeting held recently at the company's offices in Marion, Ohio. Montrose was formerly associated with General Electric Company and later with the Lane-Wells Company of Los Angeles before joining Marion. At the same meeting the Board of Directors appointed **J. M. Strelitz** as chairman of the Board and General Counsel, **Alec Gibson** as vice-president and treasurer, **John P. Courtright,** vice-president in charge of sales, **Harvey T. Gracely,** vice-president, and **M. Virden,** secretary and assistant treasurer.

☆ ☆ ☆

Maj. Edward E. Greiner, executive vice-president, BUFFALO-SPRINGFIELD ROLLER CO., Springfield, Ohio, is now back with the company after more than two and a half years' service with the U. S. Army Air Forces. His return to inactive status was announced by Col. Walton M. Modisette, Camp Atterbury. A company spokesman pointed out the timeliness of this development in view of Buffalo-Springfield's expansion program designed to increase production of rollers 60 per cent at "the urgent request of the U. S. Army Engineer Corps."

☆ ☆ ☆

Commander John J. Bergen, USNR (Inactive), chairman of the executive committee of GAR WOOD INDUSTRIES, INC., Detroit, has been elected chairman of the board of directors, as announced by **Glen A. Bassett,** president. Commander Bergen is chairman of the ST. PAUL HYDRAULIC HOIST CO., a subsidiary. He was called to active duty early in 1942, when he served as chief staff officer at the Naval Air Center, Espiritu Santo, New Hebrides and subsequently as chief staff officer of the Naval Air Base, Seattle, Wash.

☆ ☆ ☆

B. F. Lease was elected to the presidency of ATHEY TRUSS WHEEL CO., at a meeting of the Board of Directors in Chicago, Ill. Lease, who, since July, 1944, has been vice president in charge of sales, succeeds the late **C. Kier Davis,** killed in an automobile accident in March.

☆ ☆ ☆

Appointment of **C. F. Larsen** as service manager of Mack's General Service Department has been announced by **C. T. Ruhf,** president of MACK TRUCKS, INC. Mr. Larsen joined Mack in 1920 as a flat rate clerk, and prior to his present appointment he had been in charge of the firm's parts pricing department. **S. H. Bridges** has been named manager of Mack's Poughkeepsie, N. Y., branch. Bridges was

FEATURES — (Turbine Type)

Water-cooled head bearings • Choice of oil or water lubrication • Double Bearings in each bowl • Fully-enclosed impellers • Double Seal impellers.

ARMY E NAVY
PEERLESS PUMP

Capacities—10 to 220,000 gallons per minute

PEERLESS PUMPS

PEERLESS PUMP DIVISION
Food Machinery Corporation

TURBINE
HI-LIFT
HYDRO-FOIL

217 W. JULIAN ST.
San Jose, California
301 W. Ave. 26 Los Angeles 31, and Fresno 16, Calif.
Eastern Factory: Canton 6, O.

Shunk

GRADER AND SCARIFIER BLADES

For any type or make of machine—Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls, Snow Plows. Also—

CUTTING EDGES, WEARING BOOTS, BACK SLOPERS, EXTENSION BLADES, MOLDBOARDS and SCARIFIER TEETH

50 years of specializing in the manufacture of Construction Equipment Blades has developed for your benefit a quality of special steel, milled through our own rolls and forged at the edges to give that extra cutting and wearing quality you need.

Furnished in various widths, lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

ASSOCIATED EQUIPMENT DISTRIBUTORS

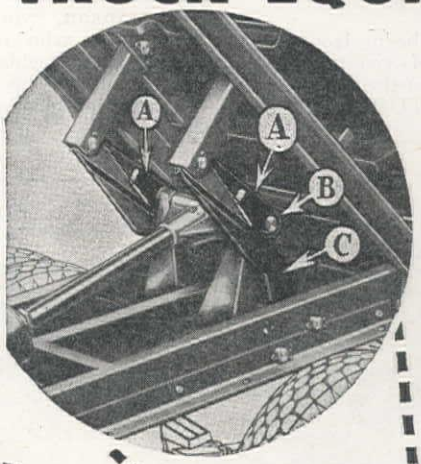
Shunk

MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO

Why ANTHONY HYDRAULIC

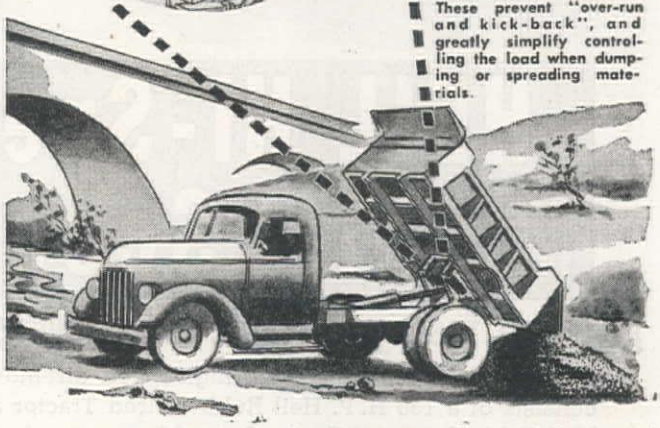
REG. U.S. PAT. OFF.

TRUCK EQUIPMENT



Anthony Features of design and construction are the result of firsthand knowledge of job needs and customer requirements.

For example: This X-ray illustration shows the DOUBLE ARM "POWER SPEED" LIFT of the SUPER Hoist. Proved in the field through years of service. The steady, constant change in movement of piston and lift leverage compounds the power to give Anthony hoists a tremendous lift advantage at the beginning of the lift, when LOAD IS HEAVIEST, and increasingly faster action as body goes up and load lightens—notice too, the "RUBBER RESTRAINING BLOCKS" inside of links. These prevent "over-run and kick-back", and greatly simplify controlling the load when dumping or spreading materials.



HOISTS and BODIES for ALL
Motor Trucks • 6 Wheelers • Semi-Trailers

ANTHONY LIFT GATE HYDRAULIC

SOLVES A MANPOWER PROBLEM


OLD WAY


NEW WAY

ANTHONY COMPANY

STREATOR ARMY E NAVY ILLINOIS

ANTHONY NATION-WIDE SALES & SERVICE

Phoenix, Arizona
Salt Lake City, Utah
Denver, Colorado
Portland, Oregon
Seattle, Washington
Los Angeles, California
Oakland, California

formerly manager of the Utica, N. Y., branch, and is succeeded there by **G. L. Murphy,** who joined the Mack organization in 1923. **R. J. Meinert** has returned to Mack as manager of national account sales on the central division with headquarters in Chicago. During his two-year leave of absence Meinert has served as an assistant automotive advisor with the Sixth Armored Force at Camp Chaffee, Arkansas.

☆ ☆ ☆

J. L. Mullin, newly appointed vice-president in charge of operations for the AMERICAN MANGANESE STEEL DIVISION of the AMERICAN BRAKE SHOE CO., will carry on his new duties from the Amsco headquarters at Chicago Heights, Ill.

☆ ☆ ☆

John L. Young has been elected to the newly created post of vice-president in charge of engineering of the United States Steel's NATIONAL TUBE CO., as announced by **C. R. Cox,** president. Young has been vice-president in charge of industrial research and development of the UNITED ENGINEERING & FOUNDRY CO. of Pittsburgh.

☆ ☆ ☆

Ernest C. Low, general manager of sales of JOHN A. ROEBLING'S SONS CO., Trenton, N. J., who has been associated with the company since 1910, has been named vice-president in charge of sales; **John D. Thompson,** works manager, who has been with Roebling since 1940, becomes vice-president in charge of production; and **Charles M. Jones,** manager of engineering and connected with Roebling organization since 1926, is now vice-president in charge of engineering. **Archibald W. Brown,** treasurer of Roebling's and with the company since 1902, has been elected a member of the Board of Directors.

☆ ☆ ☆

Thomas Bayard McCabe has been named Commissioner of the Office of Army-Navy Liquidation, a joint military and civilian disposal organization for the disposal of overseas surplus property. McCabe is on leave from duty as chairman of the board of the Federal Reserve Bank of Philadelphia and president of the SCOTT PAPER COMPANY in order to assume his new assignment. He has already served the government as executive assistant to E. R. Stettinius, Jr., in the advisory commission for the council of National Defense, deputy director, division of priority, Office of Production Management, and numerous other capacities.

☆ ☆ ☆

E. Peerce Lake, veteran of the automotive industry has been appointed as general sales manager of GRAHAM-PAIGE MOTORS CORP., it was recently announced by **Raymond J. Hodgson,** president. Lake will assume his new post immediately and will expand the auto concern's division of sales to handle Graham-Paige's proposed nationwide network of 3,500 distributors and dealers.

☆ ☆ ☆

J. R. Van Fleet, president of UNITED STATES VANADIUM CORPORATION, a unit of UNION CARBIDE AND CARBON CORPORATION, announced the formation of a new division to be known as the Metal Chemicals Division. This division will manufacture and market inorganic compounds of certain metals including tungsten, molybdenum, vanadium and others in the industrial field. **J. A. Holladay,** newly elected vice-president, will be in charge of the new division with headquarters in New York. Production and sales will be under the direction of **A. J. Gailey.**

☆ ☆ ☆

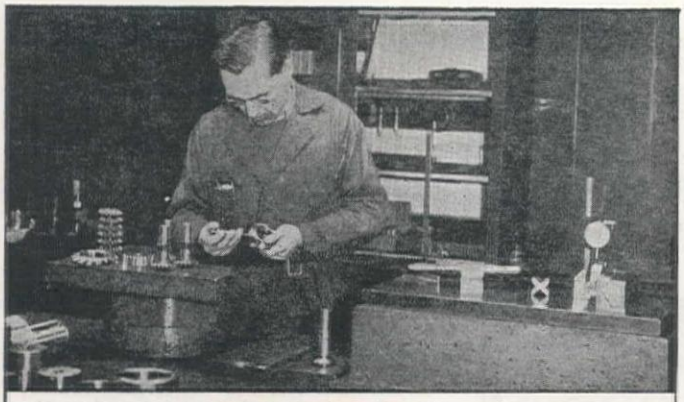
F. S. Elfred, Jr., has been appointed general manager of the Explosives Division of OLIN INDUSTRIES, INC., and its subsidiaries, it was announced by **John M. Olin,** president. Elfred will also assume duties as general manager of the EQUITABLE POWDER MANUFACTURING CO., East Alton, Ill.; and its affiliates, the COLUMBIA POWDER CO., Tacoma, Wash.; EGYPTIAN POWDER CO., Pollard, Ill.; and the TEXAS POWDER CO., Dallas, Tex. Products of these companies include all grades of blasting powder and dynamite and a complete line of blasting supplies and of signal fuses and torpedoes for railroad and bus transportation.

☆ ☆ ☆

THE UNITED STATES PLYWOOD CORPORATION announces that its executive offices have been moved to the Weldwood Building, 55 West 44th Street, New York 18, N. Y. The new telephone number is MUrray Hill 2-1900. The company's warehouse at 616 West 46th Street will continue in operation.

☆ ☆ ☆

William F. Humphrey, president of the TIDE WATER ASSOCIATED OIL CO., at the annual meeting of the stock-



Inspection and testing
the control center of the J. G. Plant

With minute precision measuring devices and special tools the Johnson Gear Company inspection department controls each gear through its various stages of manufacture. This insures exactness—*the one word that means perfection.* And thus the finished gear comes to your production line OK'd in every conceivable manner. For quiet, smooth and full-power operation you can depend on J.G. Gears to give smooth performance. No machine is ever better than its gears.

JOHNSON GEAR & MANUFACTURING CO., LTD.

MAIN OFFICE AND WORKS: BERKELEY, CALIFORNIA

GOODALL AIR HOSE....

Tough to beat on Tough Jobs!

INDUSTRIAL RUBBER PRODUCTS

Hose — Belting — Packings

Rubber Clothing — Boots — Specialties

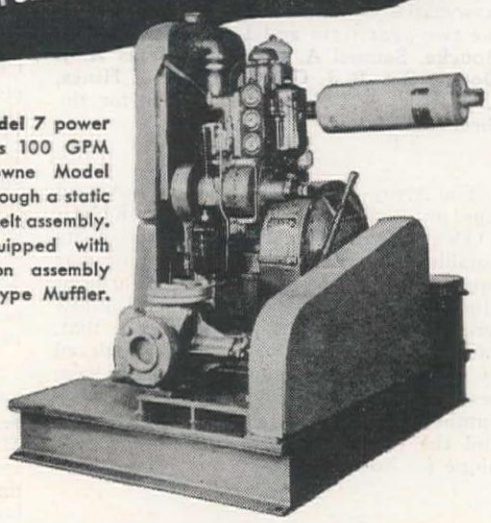
GOODALL RUBBER COMPANY

(CALIFORNIA)

LOS ANGELES	SAN FRANCISCO	SALT LAKE CITY	SEATTLE
510-514 E. 4th St.	678-A Howard St.	251 W. South Temple St.	524½ First Ave., So.
Michigan 2207	SUtter 7944	Phone 3-8021	Elliott 7043

Mills—Trenton, N. J., established 1870

Diesel Power
Reduces Fire Hazards
WHEN PUMPING INFLAMMABLE LIQUIDS



Sheppard Model 7 power unit drives this 100 GPM Yale and Towne Model 100C Pump through a static dissipating V-belt assembly. Engine is equipped with clutch reduction assembly and Burgess Type Muffler.

Special YALE pumping unit, designed to handle aviation gasoline, powered by a Sheppard Diesel

DIESEL POWER is "safety" power because it has no electrical ignition system . . . no dangerous explosive fumes.

The Yale and Towne Manufacturing Company's Engineers designed the pump assembly shown above to be driven by a Sheppard Diesel. This unit is used for pumping highly inflammable high octane aviation gas. Every safety factor in its operation is of primary importance.

Sheppard Diesels were used because they are designed to "work for their living" . . . they're not built to be pampered. That's why Sheppard Diesels were specified for hundreds of other installations . . . for 24-hour duty, seven days a week . . . thousands of miles from spare parts and service. They don't need a Diesel expert to operate them—because Sheppard Diesel experts have simplified their design and construction.

Don't overlook the safety features of Diesel when buying a power unit. Sheppard Diesels are now available. We will be glad to give advice on obtaining WPB approval. Mail coupon for *free* file folder showing other Sheppard pumping installations.

POWER UNITS; 8 TO 50 HP • GENERATING SETS; 3 TO 30 KW

Sheppard
ALL AMERICAN DIESEL POWER UNITS

R. H. SHEPPARD COMPANY, 1733 Middle St., Hanover, Pa.

Please send me *free* folder showing other Sheppard Diesel pumping installations.

*Name*_____

*Firm Name*_____

*Address*_____

holders recently announced that the company's net income for the first quarter of 1945 was $4,322,929, after provision for estimated Federal taxes of $4,194,400 and reserve of $450,000 for the wartime uncertainties, compared with net income of $3,580,018 for the corresponding period in 1944. The Company's production of crude oil for the first three months of 1945 totaled 8,164,000 bbl., this being at the rate of 90,700 bbl. a day, the highest daily production for a three months' period in the history of the company. The following men were elected Directors of the Tide Water Associated Oil Co.: **Herbert S. Chase** for the two-year term and **L. F. Bayer, U. B. Boucke, Samuel A. Bishop, Thomas A. J. Dockweiler, B. I. Graves, Drew L. Hines, L. D. Jurs** and **Edward H. Salrin** for the three-year term.

☆ ☆ ☆

The Army-Navy "E" Production Award was granted to MARMON-HERRINGTON CO. in formal recognition of its notable record in the production of war equipment. In congratulating Marmon-Herrington, Congressman Louis Ludlow wrote that official records reveal that, "among the outstanding services rendered by the Marmon-Herrington Company have been the designing and engineering of a number of pilot models of military vehicles and the development of a welding technique for homogeneous armor."

☆ ☆ ☆

The annual report of the R. G. LeTOURNEAU, INC., for the year 1944 indicates that the total sales for the year were $42,209,624.23, of which $2,151,738.96 were net earnings. Sales for 1944 were 16.7 per cent greater than for 1943 and earnings were 1.6 per cent less. The earnings were 5.1 per cent of 1944 sales compared to 6 per cent earnings for 1943 sales. Although the percentage of net earnings to sales is less the increased volume of business has enabled the company to earn about the same profit as in former years. Lower net income reflects the higher tax rates paid and the necessity of large reserves for the greater volume of business subject to the renegotiation act.

☆ ☆ ☆

Alfred Kauffmann, retired president of LINK BELT COMPANY, was elected a director of the GARDNER-DENVER COMPANY at the annual stockholders' meeting held in the company's Quincy offices. Kauffmann succeeds **P. H. Gardner,** who has resigned his directorship because of ill health.

☆ ☆ ☆

On Good Friday the last Marauder was delivered by **Glenn L. Martin,** president of MARTIN COMPANY, to the Army Air Force, represented by **Col. Kenneth Collins.** Last of the proud line of medium bombers, this Marauder was officially designated merely as 44-68254, but Martin employees fondly dubbed it "Tail-End Charlie," a slang expression for the last airplane in any combat formation. They also inscribed the insignia "30" on this final production model.

Tracy V. Buckwalter, who for the past twenty-five years has served as chief engineer and vice-president of the TIMKEN ROLLER BEARING CO., was retired last April 30th. Buckwalter will, however, be retained in a consulting capacity by the company. He came to Timken Company in 1916 as Chief Engineer after sixteen years service with the Pennsylvania Railroad Company, where he developed among other things a motor-driven baggage truck.

☆ ☆ ☆

S. L. (Sid) Meyers, formerly vice-president in charge of export sales for LA-PLANT-CHOATE MFG. CO., INC., of Cedar Rapids, Iowa, has been appointed Vice-President and General Sales Manager, succeeding **H. H. Buchanan,** who resigned.

☆ ☆ ☆

H. C. Akerberg, Atlantic Coast district manager of the MACMILLAN PETROLEUM CORP., has been appointed general sales manager for the company's Ring-Free Motor Oil division, it was announced by **R. S. Macmillan,** president.

☆ ☆ ☆

J. Reagan, export manager of KOEHRING COMPANY of Milwaukee, manufacturer of heavy construction equipment, recently completed a 4-month survey trip through Latin America. Among the post war construction projects that impressed Reagan are housing plans at Guayaquil, a relocation project at Quito, Colombia's plans for highways and water power development. La Paz is planning sanitation projects and Sao Paulo proposes housing plans and city street construction similar to the Avenida de Vargas in Rio.

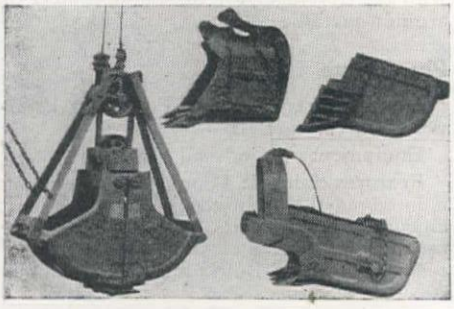
NEW EQUIPMENT

Dippers and Buckets

Manufacturer: Pettibone Mulliken Corporation, Chicago, Ill.

Equipment: Material handling dippers and buckets.

Features claimed: A Big 4 line of interchangeable buckets, including clamshell equipment. The dippers in ½ and ¾-cu. yd. sizes are equipped with detachable teeth. At



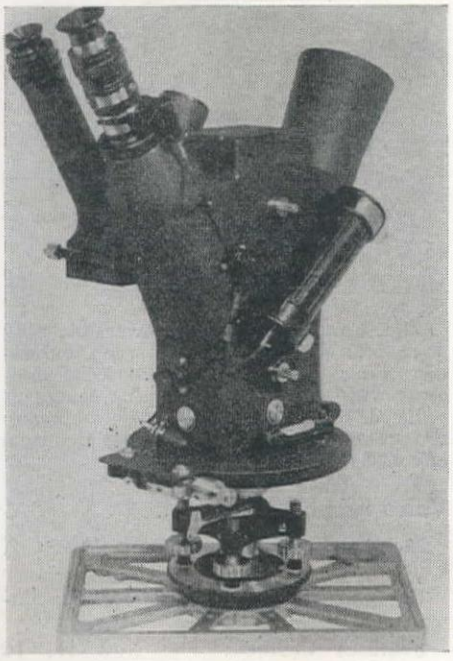
present, almost entire production is going to the armed services, but a few buckets are available. With cessation of hostilities, these buckets will be available for all material handling equipment. The dippers are all-welded, and the smallest in the new line has a capacity of ⅜-cu. yd.

Astrolabe

Manufacturer: David White Co., Milwaukee, Wis.

Equipment: Willis Pendulum Astrolabe, for determining longitude and latitude.

Features claimed: The pendulum astrolabe is an optical instrument having a glass reticle with 5 curved lines which represent 5 circles of constant altitude over which images of stars may be observed to transit.



Stars brighter than about the 7½ magnitude may be observed.

By the appropriate arrangement of a mirror on a pendulum with spring suspension and air damping, the effective altitudes of the reticle lines (which are not pendulous) are made to be constant within about a tenth of a second of arc even when the non-pendulous parts of the instrument are out of level a minute of arc. When not in use, the pendulum is held by four clamping thumb screws.

If the Greenwich times or standard-zone times of the transits of three or more identified stars over one of the reticle lines are observed, the longitude and latitude of the observing station may be computed.

Attainable instrumental accuracy is 0.1 second of arc (less than 10 ft. of longitude or latitude). The astrolabe is furnished with a split leg tripod, and carrying case. The total weight of instrument, tripod and carrying case is 40 lbs.

Safety Hook Latch

Manufacturer: Thomas Laughlin Company, Portland, Maine.

Equipment: Improved latch for safety hook.

Features Claimed: This improved latch gives 80 per cent of the full throat opening and its proper operation decreases the possibility of overloading and overcrowding. Wider throat opening is obtained by an ingenious latch assembly, which, when open, straddles the neck of the hook. Hoisting lines are easily slipped into the hook but cannot be removed until the operator's fin-

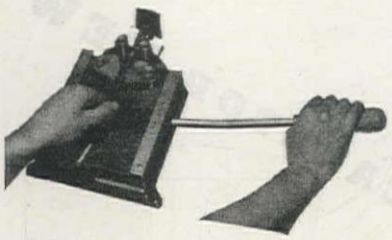
gers release the latch, thus preventing accidental dropping of loads, which might endanger nearby workmen or materials. If the hook is overcrowded, the latch will not snap into place, and if the hook spreads because of excess loading, the latch pops up as a warning signal. The latch is actuated by a stainless steel wire spring, which coils around the hub of the cam on each side and extends down inside of the latch. Safety hooks with this new latch are available with safe working load capacities from one-half to fifteen tons.

Wire Stripper

Manufacturer: Ideal Commutator Dresser Co., Sycamore, Ill.

Equipment: Cable and wire stripper.

Features claimed: Primarily designed for production, this tool will strip the synthetic plastic, glass and cambric insulations from wire or cables up to 5/8 in. in diameter. The



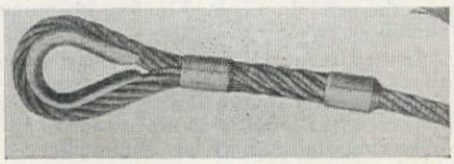
stripper is operated by introducing the wire into a pair of clamping jaws and pulling a handle which develops a straight line pull through oscillating blades. The blades are quickly interchangeable, furnished in 15 plain and grooved sizes.

Cable Slings

Manufacturer: American Chain and Cable Co., Inc., Bridgeport, Conn.

Equipment: Safety tested wire rope cargo slings.

Features claimed: Registered slings made by both the American Cable Division and the Hazard Wire Rope Division will be



made from preformed wire rope of improved plow steel, and will incorporate the use of the new ACCO-LOC safety splice developing 100 per cent of the rated wire rope strength. Each sling will carry a metal tag which shows registry number, sling type, and maximum load rating.

Printer-Developer

Manufacturer: Charles Bruning Co., Inc., Chicago, Ill.

Equipment: Black and white printing and developing machine.

Features Claimed: Simple, economical printing and developing facilities for black and white prints in medium quantities. This new Model 41 combines individual printing and developing units in a sturdy steel cabinet. Printing speed ranges up to 6 ft. per min., depending on the transparency of the original, and will operate on either roll stock or cut sheets, with a printing width of 46 in. The light source is a 2,000-watt glass mercury vapor lamp within a 6-in. diameter cylinder, which assures uniform distribution of light over the entire area of the cylinder. Uniformity of print exposure and minimum machine temperature are assured by a new method of pulling cooling air through the cylinder. Suction through the bands simplifies feeding of tracing and sensitized paper and the tangential method of feeding assures safety to the tracings. A front pedal located at floor level and at the center of machine, instantly releases band tension so that mis-feeding of roll stock can be readily corrected. Speed, contact and developer controls are quickly removed for cleaning. All parts in contact with the developer are of stainless steel or are non-metallic.

Plug Gage

Manufacturer: United Precision Products Co., Chicago, Ill.

Equipment: Cylindrical plug gage.

Features claimed: Tough, light, enduring colored plastics are used to make important changes in plug gages. Metal collets are replaced by colored plastic, green for "Go," red for "No Go." Both plugs are contained

in the same handle of the reversible plug gage, and either may be removed without disturbing the other. The material does away with scratching of the plug, weight is reduced, the plastic is dielectric, adding to the protection of the gage against electrical effects.

Voice Amplifier

Manufacturer: Talk-A-Phone Mfg. Co., Chicago, Ill.

Equipment: Power booster for plant inter-communication system.

Features Claimed: The New HP-16 Power Booster enables the busy executive to have both his office and plant at his fingertips without going through the central switchboard. This power booster is adaptable to most communication systems; however, it is designed to become an integral part of certain Talk-A-Phone models.

Faster Handling

OF PIPE, PLATE, STRUCTURALS

PLATE GRIPS – Safe, positive grips in a variety of sizes for handling vertical plates or upending horizontal plates and assemblies.

PIPE TONGS – Heavy duty tongs for easy handling of pipe, billets, bars, timber. Locks in open position. Picks up from floor surface.

PLATE HOOKS – Handle one or more horizontal plates. Used in sets of 2 or 4. Two styles.

RAIL TONGS – Handles large or small rail. Two sizes with 3" or 4½" jaw.

Write for Illustrated Catalog

DOWNS CRANE & HOIST CO.

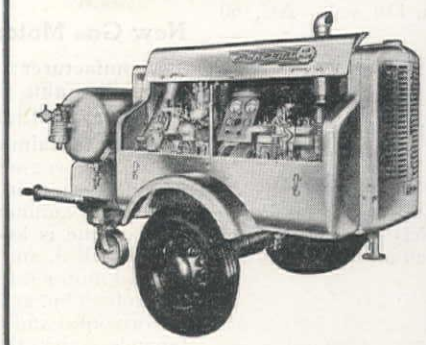
MECHANICAL ENGINEERS

540 W. VERNON AVENUE
LOS ANGELES 37, CALIF.

Electric Cranes ● Hand Cranes ● Jib Cranes ● Sheaves ● Sheave Blocks
Plate Grips ● Plate Hooks ● Crane Trolley Hoists ● Crane Wheels ● Crane End Truck Units ● Jib Crane Fittings ● Automatic Mechanical Load Brake Crane Hook Blocks

---

AIR PLUS JAEGER COMPRESSOR



60 to 500 ft. sizes
•
75% to 100% larger valve area
•
20% slower piston speeds
•
100% efficient intercooling
•
50% larger air receivers

YEARS AHEAD — in Compressor Design and Performance

Built to aircraft engine standards of precision in a balanced design that operates without vibration, the big-valved, force-feed-lubricated Jaeger "AIR PLUS" offers you a notably smoother, cooler running compressor that sets new standards for fuel economy and low upkeep cost. Sold and serviced by Jaeger distributors in over 100 cities, coast to coast.

Ask for your copy of this new catalog showing trailer, truck, tractor and skid-mounted models with gas, diesel and electric power.

THE JAEGER MACHINE CO.
Columbus 16, Ohio

Distributors Throughout the West

PUMPS • MIXERS • PAVING MACHINERY • HOISTS • LOADERS

RUGGED . . . Rugged and stripped of excess weight are Industrial Rubber Goods made of *Synalite*– Pioneer's super-synthetic. Every ounce of this compound helps build belting, hose and packing that whip severe operating conditions.

937C

PIONEER

Job Tailored BELTING · HOSE · PACKING

PIONEER RUBBER MILLS
353 SACRAMENTO ST., SAN FRANCISCO, 11

Branches in: LOS ANGELES · PORTLAND · TACOMA · SEATTLE
SALT LAKE CITY · DENVER · CHICAGO *and* ST. LOUIS

The HP-16 Power Booster is capable of delivering 15 watts "Voice Range" power, and is contained in a cabinet 6x12x6¼ in. high. The unit is equipped with "On-Off" switch, "Pilot Light," and variable "Volume Control," and operates on 110 volts AC, 60 cycles.

Concrete Batcher

Manufacturer: C. S. Johnson Co., Champaign, Ill.

Equipment: Concrete batching plant.

Features claimed: Known as the Porto Batcher, the machine may be easily towed from job to job. No foundation or pits are

required for erection. No crane is required for handling aggregates. The plant has a 5-cu. yd. truck receiving hopper, and a 90-ton per hour aggregate elevator. One-man control is provided. The machine will batch into truck, stationary, or paver batch trucks. The batcher is particularly suitable for construction jobs where transportation from a central plant would not be feasible, or where quantities are not sufficient to justify setting up of a large stationary plant.

New Gas Motor

Manufacturer: Kinner Motors, Inc., Glendale, Calif.

Equipment: Light-weight gasoline motor.

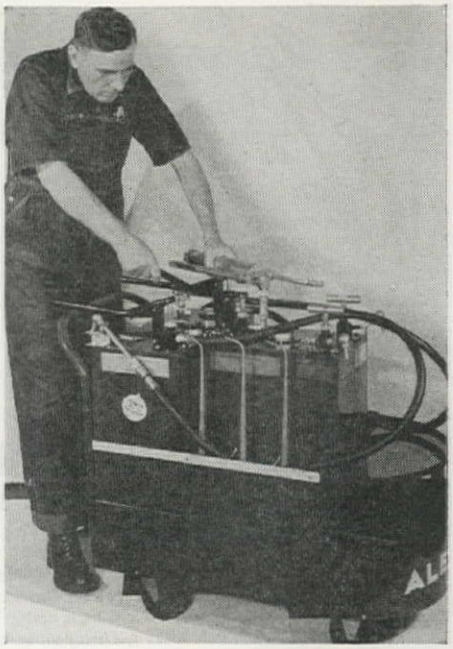
Features claimed: A revolutionary, 5-hp., all-purpose engine that embodies principles which are new in small engine design, has just been announced by Kinner Motors. The engine is known as the "Busy Bee," Model AB-3, and is an air-cooled, 4-cycle, L-head motor rated 5 hp. at 2,600 rpm., but develops 6 hp. at 3,250. The single cylinder is horizontal and detachable, making maintenance easier. Bore is 2¾ in., stroke 3 in. The unit is compact, requiring only 2.4 cu. ft. of space. Aluminum alloy is used in the manufacture of crankcase, piston, head and rear cover, making this model one of the lightest engines on the market in its horsepower class.

Lubrication Cart

Manufacturer: Alemite Divn., Stewart-Warner Corp., Chicago, Ill.

Equipment: Portable lubrication equipment.

Features claimed: Designed to provide complete, compact, portable lubrication service, with the ability to transport and dispense a variety of types of lubricants, this new unit is mounted on 5-in. ball-bearing casters, and is only 21 in. wide. It is 31 in. long and 37½ in. high. It is pushed like a perambulator and is designed for one-man operation. The basic model has five



tanks of various sizes for handling lubricants, and numerous oil cans and handguns. Space is also provided for waste, fittings, small tools, etc. A second model includes a special high-pressure grease pump.

Hose Swivel

Manufacturer: Dixon Valve and Coupling Co., Los Angeles, Calif.

Equipment: Dixon hose swivel.

Features claimed: Design of the product is based upon a completely new and patent-

ed sealing principle which offers the minimum of resistance to turning. It has been exhaustively field-tested, and proved to be both a practical labor-saving and safety device. The swivel is usually connected at the inlet end of the hose. It turns so freely, even under full pressure load, that it responds to the slightest twist or turning of the hose, thus preventing loops and kinks from forming in the hose.

High Voltage Test Set

Manufacturer: General Electric Co., Schenectady, N. Y.

Equipment: Portable testing set.

Features claimed: Portable a-c test set, mounted on a three-wheeled truck, so that it can be easily moved and plugged into any

convenient 115 or 230-volt, 60-cycle outlet. It is capable of supplying smooth, stepless test voltages from 0 to 15,000 volts. Small in dimension—36 x 49 x 30 in.—it has a capacity of 5,000 volt-amperes. All controls are mounted on an inclined control panel, except for a safety foot switch. It can be used to test generators, motors, transformers, power cable, insulators and other electrical equipment.

Self-Propelled Loader

Manufacturer: Jaeger Machine Company, Columbus, Ohio.

Equipment: Self-propelled, swinging boom, power loader.

Features Claimed: This "Fleetfoot" Loader is equipped with 180-deg. swinging boom which enables it to load trucks from

either side without backing and turning. Crowding, hoisting, swinging and dumping are accomplished in one rapid, continuous movement. Power controlled bucket enables the operator to control dumping as

desired and to close the bucket while it is being returned to loading position. Two speeds for boom operation are available, independent of traction. As no maneuvering is required, the machine can work close alongside trucks in alleys or crowded spaces. This loader is powered with 65-h.p. gas or diesel engine, has front-wheel drive through big pneumatic-tired wheels which carry 80 per cent of the load to assure positive traction. Six forward and six reverse travel speeds up to 15 m.p.h. enable this machine to operate over a wide area and travel to and from the job. Vickers power steering is standard equipment. This mobile unit can be equipped with quickly interchangeable buckets of ½ to 2-cu. yd. size, which enables a single machine to handle a wide range of work and materials. Crane booms up to 25-ft. length can be installed as an attachment, which enable the loader to be used for laying pipe, form handling, pole setting and light steel erection.

Self-Locking Pins

Manufacturer: The Driv-Lok Pin Co., Chicago, Ill.

Equipment: Self-locking Driv-Lok pins.

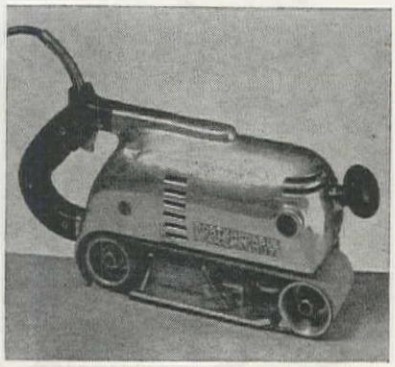
Features claimed: These standard and special self-anchoring, vibration-proof pins are designed to replace taper pins, keys, cotter pins, set screws, and rivets. The pins, which have 4 flutes on the surface parallel to the axis, are pressed or driven into standard drilled holes. The raised, work-hardened edges of these flutes provide an expanded diameter of a few thousandths of an in. greater than the actual diameter of the pin. When the pin is inserted in a drilled hole, these raised edges are compressed inwardly. This resilient, self-locking element will hold indefinitely under vibration or shock conditions. Pins are available in sizes from $\frac{3}{64}$ to ½ in. diam. and from $\frac{1}{8}$ to 4½ in. in length, in any material, and in a wide variety of types. Widely used in the automotive industry, these new pins are designed to meet all types of industrial applications.

Sanding Machine

Manufacturer: Portable-Cable Machine Co., Syracuse, N. Y.

Equipment: Portable, belt, sand surfacer.

Features claimed: A well balanced, light weight sand finisher and surfacer designed as a "Take-About" tool useful in either



woodworking plants or metal shops. The driving motor is rated ¾ hp., universal DC-AC, 25-60 cycle, single phase either 115 or 220 volt. Belt size is 3 in. x 24 in., belt speed 1,600 S.F.P.M., overall size 5⅛ in. x 16 in. x 7¾ in., weight 14 lbs.

Rechargeable Battery

Manufacturer: Ideal Commutator Dresser Co., Sycamore, Ill.

Equipment: Improved rechargeable flashlight battery.

Features claimed: Forty per cent greater capacity and higher sustained bright light is the result of five years research since the battery was first introduced. Ideal battery can either be charged from any AC electric outlet by means of a rectifier type charger or from the DC ignition system of automobile, truck or bus.

Lubricant for Air Tools

Manufacturer: W. C. Walters Co., Glendale, Calif.

Equipment: "Air Luboil" for air-operated equipment.

Features Claimed: Greater economy results from the exclusive use of this lubricant for air-driven motors and tools. Air Luboil combines oiliness and high film strength with detergent, dispersive and inhibitive qualities. The basic oil combined with several chemicals maintains its strength at all temperatures and speeds regardless of the type of air-powered equipment.

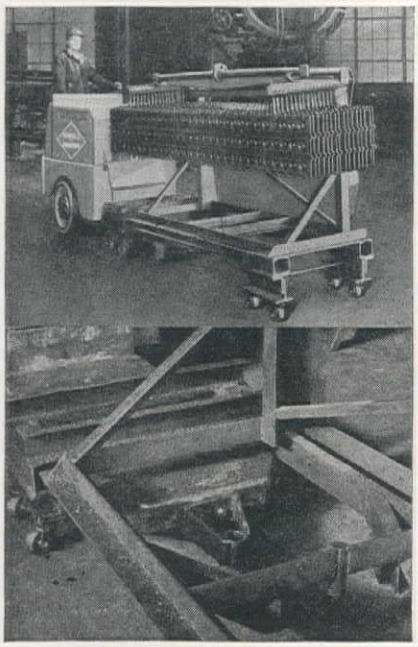
Dolly for Electric Truck

Manufacturer: The Elwell-Parker Electric Co., Cleveland, Ohio.

Equipment: Dolly to facilitate handling long material with electric truck.

Features Claimed: An auxiliary dolly mounted on casters, which can be readily engaged by a steel fitting bolted to the forward end of an Elwell-Parker power truck,

which enables it to either pull or push hard-to-handle long material through narrow passages. The pin connection enables the truck to be readily disengaged for use on other types of loads or skids. The dolly



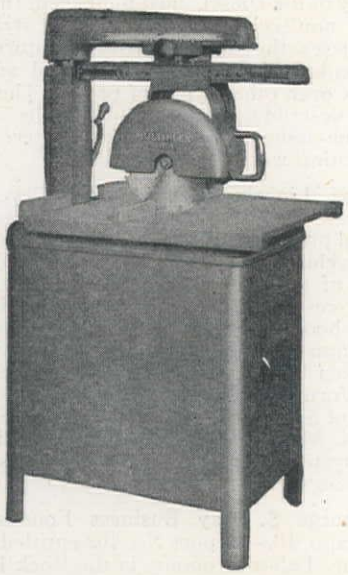
was originally designed to move landing mat strips, but could be adapted to handling long lengths of tubing, bars, or small trusses.

Table Saw and Accessories

Manufacturer: Red Star Products, Inc., Cleveland, Ohio.

Equipment: "Multiplex-30A" radial arm saw.

Features Claimed: This saw is distinctive in its versatile elbow which permits cutting a greater number of miters than possible with any other saw; also in its radial arm



high speed drill attachment that affords three drill speeds, including the high speed of 10,000 r.p.m. Additional attachments provide for the machine's use as a plough, rabbeter, shaper, and router. The adjustable ball-bearing track and saw mounting enable the operator to make bevel cut-off, compound miters and bevel rip cuts with this versatile tool. Specifications are as follows: Motor ¾-h.p. intermittent, 110-volt, 60-cycle, single phase, capacity start induction motor, speed 3,600 r.p.m.; saw diameter 10 in., maximum vertical adjustment 9½ in.; miter range 360 deg.; bevel adjustment 90 deg.; table 24x24 in.; maximum depth of cut, with 10-in. saw, 2⅜ in.; net weight 220 lb.

Portable Desk

Manufacturer: Lyon Metal Products Co., Aurora, Ill.

Product: Metal shop desk.

Features claimed: Especially suitable for foremen, clerks, inspectors, dispatchers, and others in busy shops, stands on 3-in. casters, has positive brake attachment. Overall size 34½ in. wide, 30 in. deep, 53 in. high. Contains spacious drawer with lock, and spa-

cious paper storage hood. Illustrated at right.

Fingertip Steering

Manufacturer: The Heil Co., Milwaukee, Wis.

Equipment: Steering device for heavy equipment.

Features claimed: Constant ration fully hydraulic steering mechanism makes it possible to eliminate the jack-knifing tendency of present multiple axle construction equipment. Has no mechanical connection between steering wheel and axles, impetus being transmitted through hoses. A metering pump gives a constant ration between steering wheel movement and vehicle wheel movement. Applicable to front wheel, rear wheel, or multiple wheel steering equipment.

LITERATURE FROM MANUFACTURERS . . .

Los Angeles Chemical Co., Los Angeles, Calif.—Catalog for 1945 covering chemical products manufactured and handled by the company for use in industry, agriculture and in the laboratory, is now released. This handy booklet contains 56 pages, contains an alphabetical listing of the company's products, with special pages devoted to their use and manufacture. Also included are many tables of interest to chemical users, and pictures serve to illustrate the company plant and products.

Chain Belt Co., Milwaukee, Wis.—In a recently issued bulletin, No. 465, the newest Rex plaster and mortar mixer is described and illustrated. This new mixer has a capacity of 6 cu. ft. of mixed material. The bulletin describes its features and gives specifications and dimensions.

Pioneer Engineering Works, Inc., Minneapolis, Minn.—The two types of Pioneer washing plants, portable and semi- portable, are described in a new catalog. The several operations for the efficient handling of material through a washing plant are enumerated. The booklet also contains many fine illustrations of the equipment and two pages are devoted to pictures of accessories.

The Euclid Road Machinery Co., Cleveland, O.—"Euclid Trucks in Mines and Quarries" is now available to users of off-the-highway equipment for moving earth, iron ore, rock or coal. This 32-page book highlights typical applications of rear-dump and bottom-dump Euclids in open pit mining of iron ore, bauxite, titanium, cinnibar, manganese, phosphate, anthracite and bituminous coal, and in dolomite and limestone quarries. Sixteen mine and quarry operations are depicted by means of beautiful natural color pictures, as well as in black and white.

Hercules Powder Co., Wilmington, Del.—Twenty-one "Hercules Land" advertisements issued during the critical war years have been bound and are available in book form. They describe in part the work the company has been doing in supplying the industrial front, giving specific examples of product war services, at the same time suggesting postwar applications of war-born chemical developments.

Diesel Engine Manufacturers Assn., Chicago, Ill.—A large postwar demand for diesel engines is being built up—first, because engines are wearing out at an abnormal rate due to overtime work necessitated by the war effort, and second, because of the fact that practically all diesel engine manufacturers have been one hundred per cent in war work and have not been in position to meet civilian demand. These are but two of the facts pointed out in "The Story of the Diesel," just published. In concise, non-technical, easy-to-read style, it discusses the diesel's postwar future, its present fields of application, and advantages over other types of power. The section describing opportunities in the diesel engine industry is of special interest to returning war veterans.

The Lincoln Electric Co., Cleveland, Ohio—One of the ways the machinery and metal products user can profit with electric arc welding is discussed in the revised edition of the book "101 Welding Ideas for Low-cost Maintenance," just published. The book is divided into four chapters—Reclamation of Worn Parts, Repair of Broken Parts and Structures, Replacement of Worn or Broken Equipment, Construction of Special Shop Equipment and Structures. All of the 101 ideas are graphically illustrated by means of photographs and drawings.

George S. May Business Foundation, Chicago, Ill.—Report No. 162 entitled "Effecting Labor Economy in the Rock Products Industry" cites examples wherein up to $150,000 has been added to yearly profits in rock products operations through applying job evaluation, wage incentives and time-saving methods. This study is not only of interest to business executives, but useful in schools and libraries as well.

W. R. Carnes Co., Madison, Wis.—The model 20-T sump tank cleaning machine recently developed by this company is de-

scribed and illustrated in a new brochure. The actual operation of the equipment is shown by means of a drawing accompanied by text, and a complete table of specifications is given.

The Baker Manufacturing Co., Springfield, Ill.—Catalog No. 849 contains complete details and specifications on the company's new line of cable controlled bulldozers and gradebuilders designed especially for use with A-C crawler tractors. Many pictures illustrate the booklet, including cuts of Model 511 and 511-A, and 515 bulldozer, Models 510 and 510-A, and 514 gradebuilder.

The Flexicore Co., Inc., New York, N. Y. —Ten important advantages obtained with Flexicore floor and roof slab for postwar construction are set forth in a new booklet. Advantages noted include a description of the product, where it is used, how installation time may be saved, application, and other vital points necessary in efficient construction work. The booklet likewise sets forth basic details for applying the product in all types of buildings.

The Buckeye Traction Ditcher Co., Findlay, Ohio—Buckeye Model 1 drainage ditcher, recently back in limited production, is pictured and described in Bulletin 4B-114. Specifications of this model, as well as Model 14, are also included in the brochure.

LaPlant-Choate Mfg., Inc., Fruehauf Trailer Co., Highway Equipment Co., Iowa Manufacturing Co., Link-Belt Speeder Corp., Universal Engineering Corp., all of Cedar Rapids, Iowa—A new 24-page booklet just published by these six manufacturers features the city of Cedar Rapids as "one of the world's leading manufacturing centers of road building machinery," points out the city's many advantages as a manufacturing center, with emphasis on the plants and products of the construction equipment manufacturers located there, including aggregate-handling equipment, crushing and screening plants, asphalt plants, dozers of every kind, scrapers for all types of road construction, land clearing tools, spreaders, shovels, draglines, etc. Booklet is printed in both English and Spanish editions and is titled "Cedar Rapids."

Hall-Scott Motor Car Co., Berkeley, Calif. — Latest bulletin has just been released on Series 400, a unit designed for power, dependability and efficiency in heavy transportation service. Many installations of the equipment appear in the booklet, besides a fine installation drawing of the Model 400 gasoline engine.

Victor Equipment Co., San Francisco, Calif. — A clearly-written and well-illustrated 32-page booklet, describing the Ampco-Trode welding technique is now available. The book, known as Bulletin W-2, is divided into four parts, under the titles—Bronze, Metallic Arc Welding, Carbon Arc Welding and Oxyacetylene Welding. Much beneficial information for the welding shop or department is contained in this new publication.

Caterpillar Tractor Co., Peoria, Ill.— "Pipelining with Caterpillar" is the title of a new color booklet just published. The booklet's eight pages are filled with dramatic views of pipeline construction from the first clearing of the right-of-way to the final back-filling of the trenches, under conditions that call for rugged equipment to perform a tough job. The publication is known as Form 8902.

The Thomas Laughlin Co., Portland, Me.—Catalog No. 135, first industrial and marine hardware catalog issued by the company since 1942. This up-to-date catalog illustrates, describes, charts and lists prices on all available items in the wire rope and chain fittings line. Typical of the wealth of new engineering data is a comprehensive chart, showing at a glance the fourteen vital dimensions of hoist hooks, specifying by hook number the safe load and proper size for proof coil and BBB chains, plow steel and improved plow steel wire ropes. Similar charts cover swivel hooks, turnbuckles, jaws, eyes, shackles and sockets.

Blaw-Knox Co., Pittsburgh, Pa.—Bulletin No. 2035 contains practical suggestions for the economical adaptation of steel forms. It discusses when and where steel forms should be used, and when they should not be used. Details concerning the assurance of close tolerances in completed concrete construction, advantages of obtaining smooth concrete surfaces, the element of safety, and other profitable suggestions are included. The bulletin is conveniently arranged for filing and quick reference.

H. W. Porter & Co., Inc., Newark, N. J. —Bulletin 451 entitled "Therm-O-Tile, the Conduit for Underground Pipe Lines," has just been published. This 4-page, 2-color, well-illustrated bulletin covers the four main advantages of this conduit, namely: it keeps underground pipe insulation dry, holds the grade of the piping permanently, has greater strength than is required by A. S. T. M., and it is competitive in initial cost. In addition it shows a modified design of the product for use in exceptionally wet or in submerged locations.

The White Motor Co., Cleveland, Ohio—An informative and interesting booklet has recently been compiled by the company to depict its part in the present war. This piece of literature is titled "White Reports on Its Five Wartime Assignments," and the products of these assignments as outlined in the book are combat vehicles, supply line trucks, vital home front trucks, essential bus transportation, and White personalized service plan. Dramatic pictures taken in Italy, Belgium, France and in the Pacific, portray the role the motor vehicle has played in World War II.

The B. F. Goodrich Co., Akron, Ohio—Two new catalog sections have recently been published by the company. Catalog Section 4800 contains data on sizes, number of plies, weight per 100 ft., outside diameters and working pressures applicable to the company's line of water hose for industrial plants. Catalog Section 4600 describes the construction of each of the six grades of suction hose for excavating and general utility service. Featured is the Spiralock hose, and details on Type 44, Type 33, and Type 81 are also given. Sizes of each of the six grades are listed, together with outside diameters and net weight in lb. per ft.

The Lincoln Electric Co., Cleveland, Ohio—"Lincolnweld" is the name of a fine new publication describing the new automatic shield arc welding process, a method whereby the weight of flux consumed as slag covering is approximately equal to the weight of electrode metal, allowing the use of still higher current with the assurance of complete protection of deposited metal for higher speeds and lower costs. Designs and pictures help to explain the advantages of the process, and "Lincolnweld" procedures are graphically illustrated by means of several charts and tables. Typical installations are also portrayed in this 25-page booklet.

Hercules Powder Co., Wilmington, Dela.—"Hercules Chemist" No. 14, contains interesting information on materials created by the company's chemist to meet the chemical needs of industry. Such products as Clorafins, pine oil, glycol ester resins and other useful creations and their application are described. A 27-page book, in color, it contains a store of information of use to manufacturers.

The Jaeger Machine Co., Columbus, Ohio—Catalog JC-5 recently published is a complete catalog on Jaeger "Air Plus" compressors. It contains 25 pages in two colors, and with the aid of cuts and many tables of specifications and dimensions, describes such interesting things as "Tough Swedish Twin" valves, "Automatic Air Conditioning," "More Air from Less Fuel," and many other advanced features in the Jaeger line of air compressors.

J. H. Williams & Co., Buffalo, N. Y.—In Bulletin No. 4, recently issued, the manufacturers list seven reasons why they believe the Saxe Welded Erection System to be superior to all others. On the inside pages are reproduced letters from many users testifying to the economical features. Pictures and drawings illustrate the equipment.

OPPORTUNITY SECTION

INDEX TO ADVERTISERS

	Page
Adams, J. D., Company	7
Air Compressors Rental Co.	167
Aircraft & Diesel Equipment Co.	118
Allis-Chalmers Manufacturing Co.	15
Alloy Steel & Metals Co., Inc.	132
American Chain & Cable Co., Inc.	3rd cover
American Rubber Manufacturing Co.	59
Anthony Company, Inc.	153
Atlas Powder Company	22
Austin-Western Company	78
Autocar Company, The	35
Baker Manufacturing Company, The	23
Barber-Greene Company	66
Barnes Manufacturing Co.	126
Barrett Division, Allied Chemical & Dye Corp.	6
Beall Pipe & Tank Corp.	156
Bethlehem Steel Company	141
Buckeye Traction Ditcher Co.	10
Bucyrus-Erie Company	56
Buda Company	134
Buffalo-Springfield Roller Co.	142
Byers Machine Company	157
California Corrugated Culvert Co.	138
Carver Pump Company	128
Cast Iron Pipe Research Co.	68
Caterpillar Tractor Company	21
Ceco Steel Products Corp.	151
Chain Belt Company	34
Chapman Valve Manufacturing Co.	54
Chicago Bridge & Iron Company	76
Chicago Pneumatic Tool Company	28
Cleveland Trencher Company	152
Columbia Construction Company	167
Columbia Steel Company	60
Continental Motors Corp.	55
Cook Bros.	136
Cummins Engine Company	71
Diamond Iron Works, Inc.	131
Downs Crane & Hoist Co.	159
Duff's "Cottage Home" Trailers	149
Dulien Steel Products, Inc.	167
Edwards, E. H., Company	148
Electric Tamper & Equipment Co.	140
Euclid Road Machinery Co.	4
Foote Company, Inc., The	123
Four Wheel Drive Auto Co., The	47
Fruehauf Trailer Company	24
Galion All Steel Body Co.	129
Galion Iron Works & Mfg. Co.	37
Garlinghouse Bros.	166
Gatke Corporation	124
General Electric Company	39
General Motors Corporation, Chevrolet Motor Division	31
Goodall Rubber Company	155
Goodyear Tire & Rubber Company	57
Gorman-Rupp Company	162
Gray Company, Inc.	165
Harnischfeger Corporation	113
Heil Company, The	154
Hendy, Joshua, Iron Works	43
Hercules Powder Company	45
Hydraulic Supply Manufacturing Co.	64
Hyster Company	29
Independent Pneumatic Tool Co.	8 and 9
Ingersoll-Rand Company	49
Insley Manufacturing Co.	146
International Harvester Co., Inc.	61
Iowa Manufacturing Company	25
Isaacson Iron Works	125
Jaeger Machine Company	159 & 165
Johns-Manville Corporation	32 and 33
Johnson, C. S., Company	120
Johnson Gear & Mfg. Co., Ltd.	155
Kelite Products, Inc.	17
Koehring Company	44
LaPlante-Choate Mfg. Co., Inc.	51
Le Roi Company	69 and 70
Leschen, A., & Sons Rope Company	111
LeTourneau, R. G., Inc.	13
Lidgerwood Manufacturing Co.	163
Lima Locomotive Works, Inc.	16
Lincoln Electric Company, The	18 and 19
Lynch Bros.	165
Mack Manufacturing Corporation	133
Macwhyte Company	20
Mall Tool Company	160
Marion Steam Shovel Company	27
Marlow Pumps	14
Master Vibrator Company	156
McDonald, B. F., Co.	114
Michigan Power Shovel Company	139
Northwest Engineering Company	3
Novo Engine Company	144 and 145
Oliver Corporation	75
Oscar's Iron & Metal Co.	167
Owen Bucket Company	149
Pacific Car & Foundry Co.	50
Pacific Constructors, Inc.	147
Pacific Wire Rope Company	135
Pacific Wire Works, Inc.	124
Peerless Pump Division, Food Machinery Corp.	153
Pettibone-Mulliken Corp.	63
Pioneer Engineering Works, Inc.	36
Pioneer Rubber Mills	159
Quick-Way Truck Shovel Co.	137
Raymond Concrete Pile Company	4th cover
Riddell, W. A., Corporation	65
Rock Road Construction Co.	167
Rodgers Hydraulic, Inc.	46
Roebling's, John A., Sons Co.	40 and 41
Rucker-Vaughn Company	130
Seaside Oil Company	122
Servicised Products Corp.	26
Shannon, Charles, & Sons	167
Shell Oil Company	42
Sheppard, R. H., Company	155
Shunk Manufacturing Co.	153
Simplicity Engineering Co.	164
Skilsaw, Inc.	67
Smith, T. L., Company	58
Standard Oil Company of California	38
Standard Steel Corporation	119
Stevens Bros. Coal Co.	167
Sullivan Machinery Co.	72 and 73
Texas Company	2nd cover
Thew Shovel Company, The	115
Tide Water Associated Oil Company	62
Timber Engineering Company	11
Twin Disc Clutch Co.	161
Union Iron Works, Inc.	160
Union Oil Company	74
Union Wire Rope Corporation	52 and 53
U. S. Pipe & Foundry Company	143
United States Steel Corporation	60
Universal Tool Company	167
Victor Equipment Company	121
War Surplus Bulletin	167
Wellman Engineering Co., The	150
Western Pipe & Steel Co.	127
White, David, Company, Inc.	165
White Motor Company	12
Wisconsin Motor Corp.	158
Winslow Engineering Co.	48
Wooldridge Company	30
Worthington Pump & Machinery Corp.	116 and 117