WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXIV, No. 2

FEBRUARY 15 • 1949

35 CENTS A COPY
$4.00 PER YEAR

Another 22-ton link is lowered into place for the 42-mi. long Salt Lake Aqueduct, feature of the project that will bring more water to half of Utah *(Story on page 63)*

Greater Engine Efficiency

Use the oil that keeps engines clean Texaco Ursa Oil X★★

Lower Operating Costs

YOU'LL get more power, more efficiency, out of your heavy-duty gasoline and Diesel engines . . . and reduce your maintenance and operating costs at the same time . . . when you lubricate with *Texaco Ursa Oil X★★*.

Here's an oil that *keeps engines clean! Texaco Ursa Oil X★★* is fully detergent, dispersive and resistant to oxidation. It keeps rings free and valves active . . . protects parts against wear and bearings against corrosion. *Texaco Ursa Oil X★★* keeps your engines on the job longer between overhauls . . . keeps fuel costs low.

For chassis parts of trucks, tractors, shovels and other equipment, lubricate with *Texaco Marfak*. It lasts longer, protects parts better. In wheel bearings, use *Texaco Marfak Heavy Duty* to seal out dirt and moisture, give full protection. Lubricate crawler track mechanisms with effective *Texaco Track Roll Lubricant*.

Texaco has lubricants for all your needs. Use the Texaco Simplified Lubrication Plan. It assures both economy and improved performance. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Tune in . . . TEXACO STAR THEATRE presents MILTON BERLE every Wednesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

Here goes a 6th NORTHWEST to the heart of a Parker-Schram Job!

PARKER-SCHRAM of Portland, Oregon, know what it means to handle rock. They have proved Northwests in all kinds of going. They are one of the many repeat order buyers that will tell you it is worthwhile to plan ahead to have Northwest advantages in the heart of your job.

Northwest Shovels, Cranes, Draglines and Pull-shovels bring you a combination of advantages that is hard to equal. Easy operation without fear of shut-down due to control failure comes with the "Feather-Touch" Clutch Control. Uniform Pressure Swing Clutches take the grabs and jerks out of swinging and reduce delays in spotting. The Cushion Clutch reduces the effect of shock overloads to parts under power and saves wear and tear on machine and cable. The Northwest Dual Independent Crowd utilizes force other independent crowd shovels waste. Northwest Simplicity of Design makes upkeep easier.

You can't afford anything but the best in the heart of your job. Plan on a Northwest for those *Key Spots* where the profit begins. Let us tell you how to have one. It pays to plan ahead.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street Chicago 3, Illinois

cal NORTHWEST sales agents

MEDFORD, OREGON
Cal.-Ore. Machinery Co., Inc.

PHOENIX, ARIZONA
State Tractor & Equip. Co.

BUTTE, MONTANA
Hall-Perry Machinery Co.

PORTLAND, OREGON
Balzer Machinery Co.

CHEYNNE, WYOMING
Wilson Equip. & Supply Co.

SIDNEY, MONTANA
Northland Machinery Co.

SALT LAKE CITY, UTAH
Arnold Machinery Co., Inc.

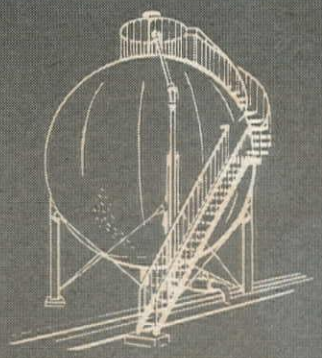
DENVER, COLORADO
Construction Equipment Co.

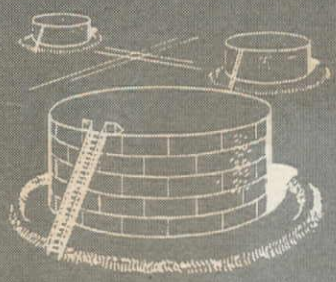
LOS ANGELES, CALIF.
3707 Santa Fe Ave.

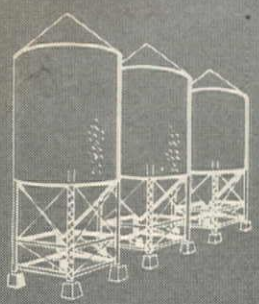
NORTHWEST SALES OFFICES:

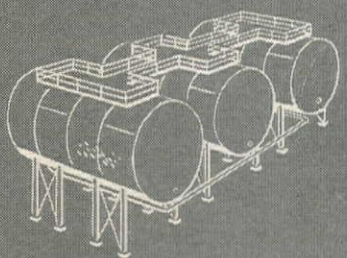
SAN FRANCISCO, CALIF.
255 Tenth Street

SEATTLE, WASHINGTON
1234 Sixth Ave., South



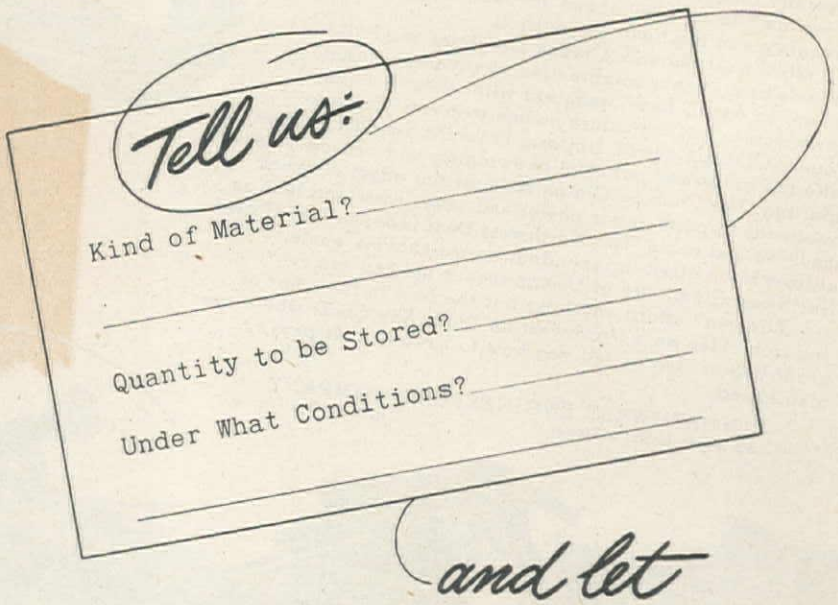






How to Solve

YOUR MATERIALS STORAGE PROBLEM!



PITTSBURGH · DES MOINES

Research

develop the answers for you

Finding the *right answers* to questions of efficient materials storage is a primary Pittsburgh-Des Moines activity.

Our research engineers, and our Chemical Storage Fellowship at Mellon Institute for Industrial Research, conduct a continuous program of study on storage problems from many fields, which is translated into better design, materials and methods by our fabricating divisions for the customer's benefit.

We will be glad to help with your own storage problem, if you will send us an outline of the factors involved.

PITTSBURGH • DES MOINES STEEL CO.

Santa Clara, Cal.

Plants at SANTA CLARA, PITTSBURGH and DES MOINES

Sales Offices at:

SANTA CLARA, CAL.	627 Alviso Road	SEATTLE	928 Lane Street
PITTSBURGH	3420 Neville Island	DES MOINES	921 Tuttle Street
NEW YORK	Room 919, 270 Broadway	DALLAS	1225 Praetorian Bldg.
CHICAGO	1224 First National Bank Bldg.		

Editor
J. M. SERVER, JR.

Managing Editor
J. J. Timmer

Assistant Editor
R. C. Clark

Editorial Assistant
M. A. Carroll

Staff Correspondents
R. E. Livingston
A. E. Niederhoff
B. Thompson
O. N. Malmquist
F. H. Fullerton

Published Monthly by
KING PUBLICATIONS
503 Market Street
San Francisco 5, California
Phone YUkon 6-1537

Arthur F. King . . . . . President
L. P. Vrettos . . V.-P. & Treasurer
L. B. King . . . . . Secretary
V. C. Dowdle . Advertising Mgr.
J. H. Gregory,
Mgr. of Marketing Service
A. J. Eagen . . . Circulation Mgr.
R. J. Kamlade . Production Mgr.

Please address all communications to the San Francisco Office

Advertising Offices

NEW YORK OFFICE
Franklin B. Lyons, District Manager
Weston Road, Georgetown, Conn.
Telephone Georgetown 374

CLEVELAND OFFICE
Richard C. Burns, District Manager
6675 Greenleaf Ave.
Cleveland 9, Ohio
Telephone PRospect 2020

CHICAGO OFFICE
A. C. Petersen, District Manager
3423 Prairie Ave., Brookfield, Ill.
Telephone Brookfield 532

SAN FRANCISCO OFFICE
R. C. Williams, District Manager
503 Market St., San Francisco 5, Calif.
Telephone YUkon 6-1537

LOS ANGELES OFFICE
C. G. Beardslee, District Manager
3757 Wilshire Blvd., Los Angeles 5
Telephone FItzroy 9462

ABC

Subscription Rates

The annual subscription rate is $4 in the United States and countries in the Pan American Postal Union. To Canada, England, Australia and New Zealand, $5 per year; all other countries, $11.00 per year. Single Copies, 35¢

Entered as Second Class Matter at the Post Office in San Francisco, California under the Act of March 3, 1879.
Copyright, 1949 by King Publications.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Volume 24 **FEBRUARY 15 • 1949** Number 2

TABLE OF CONTENTS

Covering Construction in the Western Half of the United States

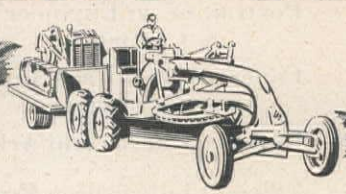
HD-5 TRACTOR

HD-5 TRACTOR with Tracto-Shovel and its interchangeable attachments—1 cu. yd. standard bucket, ¾ cu. yd. narrow bucket, 2 cu. yd. snow loader bucket, 1 cu. yd. rock bucket, bucket teeth, heavy-duty bulldozer blades, V-type snowplow.

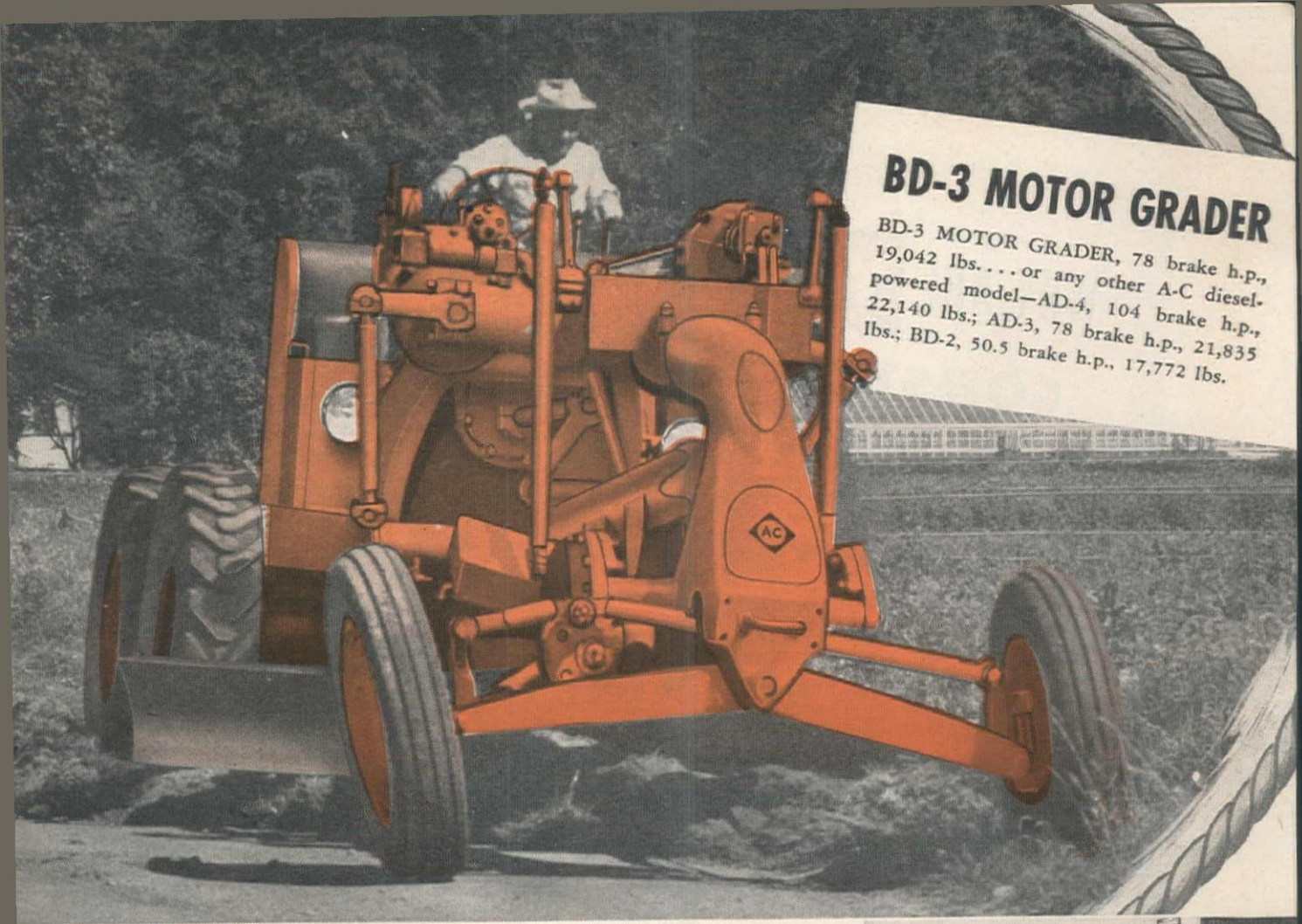
Wrap up

YOUR YEAR 'ROUND PROBLEMS *with this*

EQUIPMENT PACKAGE



Reduce your equipment investment with this equipment package. No need to have a number of specialized machines for various jobs. Any maintenance work . . . and much of your construction . . . material handling . . . snow removal and loading are quickly, efficiently done with this versatile combination—AT BIG SAVINGS. Let your Allis-Chalmers dealer tell you all about this LOW COST, BUDGET STRETCHING PLAN . . . NOW!



BD-3 MOTOR GRADER

BD-3 MOTOR GRADER, 78 brake h.p., 19,042 lbs. . . . or any other A-C diesel-powered model—AD-4, 104 brake h.p., 22,140 lbs.; AD-3, 78 brake h.p., 21,835 lbs.; BD-2, 50.5 brake h.p., 17,772 lbs.

OME OF THE JOBS YOU CAN DO WITH JUST THESE TWO MACHINES

- Clean and shape-up ditches
- Cut and smooth backslopes
- Handle regular maintenance
- Widen and reshape roads
- Make driveways and bridge approaches
- Build berms
- Scarify roads and streets
- Backfill pipe, culverts, bridges
- Take out cuts
- Remove and load sod
- Load surplus dirt from shoulders and ditches
- Remove and load topsoil
- Make fills
- Handle bulldozing
- Make channel changes
- Plow, move and load snow from roads and streets, alleys, parking lots, cemeteries, institutions
- Skid trees
- Load rocks and stumps
- Dig and load dirt
- Load sand, gravel and other material
- Mix black-top
- Do crane work
- Handle all types of hauling or pulling
- Straighten out curves
- Open and rebuild alleys and streets
- Build parking lots
- Cut away embankments obstructing sight

SEE YOUR ALLIS-CHALMERS DEALER

RIZONA
IOENIX—Neil B. McGinnis

ORTHERN CALIFORNIA
KLAND—Buran Equipment Company
CRAMENTO—Capitol Tractor & Equipment Co.
DDESTO—J. M. Equipment Company
ESNO—Food Machinery and Chemical Corp.
SO ROBLES—E. C. Livingston Company
OCKTON—Moore Equipment Company, Inc.
OUNTAIN VIEW—Redwine Tractor Company
SALIA—Tulare County Tractor Company

OUTHERN CALIFORNIA
KERSFIELD—Kern Tractor & Equipment Co.
S ANGELES—Shaw Sales & Service Company

IDAHO
BOISE—Olson Manufacturing Company
IDAHO FALLS—Southern Idaho Equipment Co.

MONTANA
MISSOULA—Mountain Tractor Company
SIDNEY—Northland Machinery Company
BILLINGS—Seitz Machinery Company, Inc.

NEVADA
RENO—Dennison Tractor & Supply Company
ELKO—C. W. Paul Hardware and Machinery

OREGON
EUGENE—Farm and Industrial Equipment Co.
THE DALLES—Mid-Columbia Supply & Equipment Company
LA GRANDE—Oregon Tractor Company
MEDFORD—Tractor Sales and Service, Inc.
REDMOND—Tri-County Equipment Co., Inc.
KLAMATH FALLS—West Hitchcock Corporation
PORTLAND—Wood Tractor Company

UTAH
SALT LAKE CITY—Cate Equipment Co., Inc.

WASHINGTON
SEATTLE—A. H. Cox & Company
WALLA WALLA—Northern Harris
SPOKANE—Fred M. Viles and Company
YAKIMA—Wikstrom Motors, Inc.

WYOMING
CASPER—Studer Tractor & Equipment Company

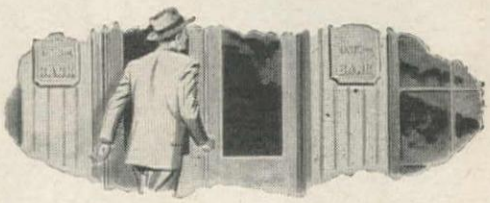
WHY ARE YOU IN THE CONSTRUCTION BUSINESS?

THE *real* reason you're in the construction business is to make money . . . isn't it?

Well, do *you* know any better way to *make* money than to *save* money?

You can save *plenty* of money with trucks that fit your job . . . Dodge "*Job-Rated*" trucks.

It stands to reason that you waste money with a truck that's too big for its job; and you're in for plenty of costly maintenance expense if your trucks are too small.



From 248 basic chassis models, your Dodge dealer can specify a truck that will be "*Job-Rated*" exactly for your hauling job.

Such a truck will have the right one of seven great truck engines . . . for top efficiency and maximum economy. It will have the right units throughout . . . to haul *your* loads, over *your* roads.

And remember . . . only Dodge builds "*Job-Rated*" trucks. Talk to your Dodge dealer!

For the good of your business—

Switch to DODGE "Job-Rated" TRUCKS

C. I. P. Century Club now has 23 Members!

The Cast Iron Pipe Century Club is probably the most unique club in the world. Membership is limited to municipal, or privately-owned, gas and water supply systems having cast iron mains in service for a century or more.

Although the Club is formally established, there are no dues, no regular meetings, and no obligation other than to inform the Recording Secretary if and when the qualifying gas or water main is taken out of service, or, sold for re-use.

In spite of the unique requirement for membership, the Club roster grows, year by year. And why not, when answers to a questionnaire, mailed to gas officials in 43 large cities, show that *original* cast iron mains are still in service in 29 of the cities. And a survey sponsored by three water works associations, reported that 96% of all 6-inch and larger cast iron water mains ever laid in 25 representative cities are still in service.

If your records show a cast iron main in service, laid a century or more ago, the Club invites you to send for a handsome framed Certificate of Honorary Membership. Address Thomas F. Wolfe, Recording Secretary, Cast Iron Pipe Century Club, Peoples Gas Bldg., Chicago 3, Illinois.

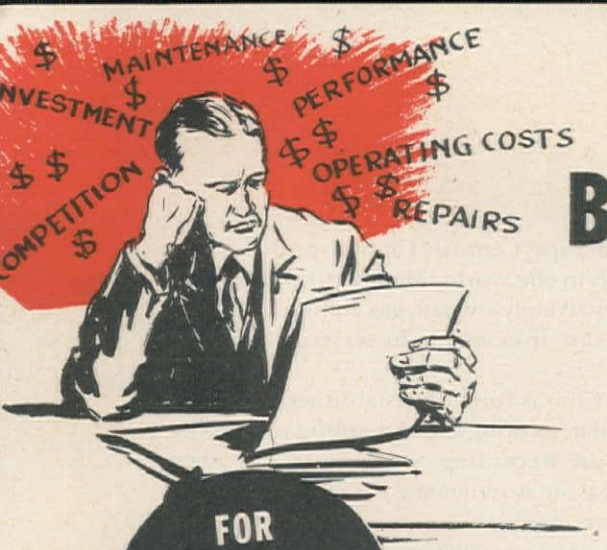
96% OF ALL 6-INCH AND LARGER CAST IRON WATER MAINS EVER LAID IN 25 REPRESENTATIVE CITIES ARE STILL IN SERVICE.

Based on the findings of a survey conducted by leading water works engineers.

CLUB ROSTER

BUREAU OF WATER, DEPT. OF PUBLIC WORKS
Baltimore, Maryland
CONSOLIDATED GAS ELECTRIC LIGHT & POWER CO.
Baltimore, Maryland
PUBLIC WORKS DEPT., WATER DIVISION
Boston, Massachusetts
BOSTON CONSOLIDATED GAS CO.
Boston, Massachusetts
BOARD OF WATER COMMISSIONERS
Detroit, Michigan
CITY OF FREDERICK WATER DEPT.
Frederick, Maryland
THE HARTFORD GAS COMPANY
Hartford, Connecticut
BUREAU OF WATER
Lancaster, Pennsylvania
LOUISVILLE GAS & ELECTRIC CO.
Louisville, Kentucky
CITY OF LYNCHBURG WATER DEPARTMENT
Lynchburg, Virginia
MOBILE GAS SERVICE CORP.
Mobile, Alabama
NEW ORLEANS PUBLIC SERVICE, INC.
New Orleans, Louisiana
DEPT. OF WATER, GAS & ELECTRICITY
New York, New York
DEPT. OF PUBLIC WORKS, BUREAU OF WATER
Philadelphia, Pennsylvania
PHILADELPHIA GAS WORKS CO.
Philadelphia, Pennsylvania
BUREAU OF WATER
Reading, Pennsylvania
DEPT. OF PUBLIC UTILITIES
Richmond, Virginia
DEPT. OF PUBLIC UTILITIES, WATER DIVISION
St. Louis, Missouri
THE CONSUMER'S GAS CO. OF TORONTO
Toronto, Ontario
DEPT. OF PUBLIC WORKS
Troy, New York
WILMINGTON WATER DEPT.
Wilmington, Delaware
CITY OF WHEELING WATER DEPT.
Wheeling, West Virginia
YORK WATER COMPANY
York, Pennsylvania

CAST IRON PIPE SERVES FOR CENTURIES



For every type o

BASE YOUR QUOTATION O

Here's a profit tip . . . on any job you handle! There's LaPlant-Choate Scraper engineered to put you yards ahe of schedule. You can finish jobs faster and make high profits, because LPC Scrapers consistently get bigger p

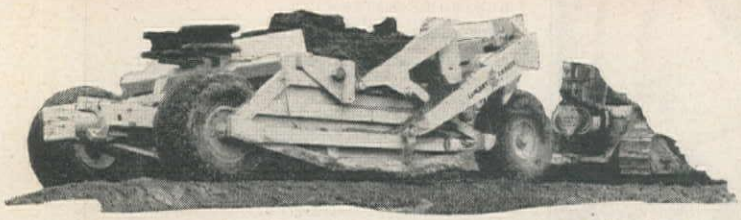
FOR HIGH SPEED, LONGER HAULING

BIG LPC MOTOR SCRAPERS

Here's an earthmoving powerhouse designed to work at high speeds on every earthmoving job . . . in all kinds of material, on level or uneven ground, up and down steep grades. It's the LaPlant-Choate rubber-tired tractor-scraper combination that is big all over—Big capacity permits hauling 17½ heaped yards each trip . . . Powerful 225 H.P. supercharged diesel engine for fast acceleration and extra power . . . Big interchangeable tires for extra traction and flotation . . . Big 22" x 7" 4-wheel air brakes for maximum safety.

In addition, these other advantages make the LaPlant-Choate Motor Scraper first choice with operators and contractors alike — Easier loading . . . faster, cleaner, smoother spreading . . . high clearance . . . positive forced ejection. With positive steering, greater stability, effortless operation and easy servicing, the LPC Motor Scraper provides greater comfort and convenience for the operator. In competitive tests, LaPlant-Choate Motor Scrapers consistently out-perform competitive models . . . that's your assurance of greater yardage, faster, at lower cost with this job-proved unit.

For Short Hauls with Track Type Tractors
LPC CABLE SCRAPERS
in 14, 8 and 6 yd. sizes



Here are a few features that mean high production at low cost—Low, wide bowl with curved, offset cutting edge for easy loading; open-top design permits loading with shovel or dragline; positive forced ejection; high lifting front apron; low center of gravity and low overall weight, plus proper weight distribution and proper size tires for maximum flotation and stability; interchangeable parts and tires; easy accessibility for servicing.

For Smaller Jobs with Industrial Rubber-Tired or Track Type Tractors
LPC HYDRAULIC SCRAPERS
in 2 and 4 yd. sizes

LaPlant-Choate Hydraulic Scrapers have *all* the features for moving more dirt at less cost. Ideal for ditching and shoulder work, digging stock ponds, filling in and hundreds of other light excavation, stripping, hauling, spreading and grading jobs. Improved, single-unit hydraulic system provides direct and instantaneous control of bowl and ejector, and down pressure on the cutting edge. Simple, inexpensive adapter assembly allows use of either rubber-tired or track-type tractor.

LAPLANT-CHOATE MANUFACTURING CO., INC.
Cedar Rapids, Iowa • 1022 77th Ave., Oakland, Calif.

LAPLANT CHOATE

arthmoving job . . .

APLANT-CHOATE PERFORMANCE!

ads with less power . . . get rid of them faster at the ımp . . . cut travel time to and from fills . . . save hours of ›wntime for maintenance and repairs. Big LPC Motor rapers give *big* production . . . more yards at lower cost.

Get the Facts From Your Nearest LaPlant-Choate Distributor

ENGINEERING SALES SERVICE, INC.
410 Capitol Boulevard
BOISE, IDAHO

GENERAL EQUIPMENT COMPANY
1201 East 2nd Street
RENO, NEVADA

HEINER EQUIPMENT & SUPPLY CO.
501 W. Seventh Street South
SALT LAKE CITY, UTAH

INDUSTRIAL EQUIPMENT COMPANY OF SOUTHERN CALIFORNIA
4441 Santa Fe Avenue
LOS ANGELES 11, CALIFORNIA

INDUSTRIAL EQUIPMENT COMPANY OF ARIZONA
720 S. 19th Avenue
PHOENIX, ARIZONA

WESTERN CONSTRUCTION EQUIPMENT CO.
505 N. 24th Street
BILLINGS, MONTANA

Stephens & Mount Ave.
MISSOULA, MONTANA

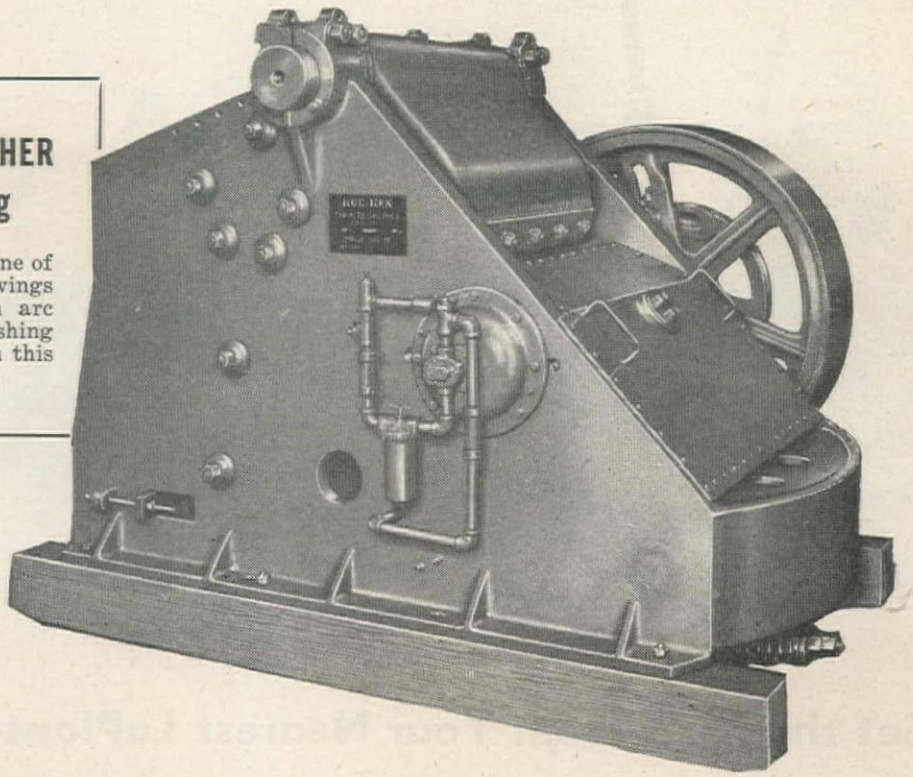
N. C. RIBBLE CO.
1304 N. Fourth Street
ALBUQUERQUE, NEW MEXICO

LONGER CRUSHING LIFE

Higher Production with Less Power

*KUE-KEN SIMPLEX CRUSHER
Crushes without rubbing

THE hinge pin is on the center line of the crushing zone. As the jaw swings back and forth it describes an arc which is normal to both crushing faces. *Rubbing* is impossible with this motion.



Illustrated: Rear view of a #80 36" x 12" KUE - KEN Simplex showing oil pump and filter. Perfect lubrication of all mechanism in oil-tite housing stops wear. Crushes 50 to 60 tons per hour at 1" setting.

Here's why Kue-Ken Simplex gives higher production at lower cost: Balanced mechanism permits 50% to 60% more crushing strokes per minute. Crushing done by compression alone, less power required. Jaw plates last 5 to 10 times longer. Less wear means fewer shut-downs for repair . . . more production, higher profits. Crushing without rubbing gives minimum metal contamination, vital in some industries.

1. Has simple safety device which protects crusher against tramp iron and overload.
2. Only light foundation required because of built-in smooth running features of Kue-Ken design.
3. Automatic oil pressure switch stops crusher and motor if oil pressure drops below normal setting.
4. All mechanism sealed in oil. Lubrication required only twice a year.

KUE-KEN CRUSHERS are operating throughout the world. Write today for Bulletin No. 605. You, too, can *pulverize* your crushing costs.

*Pronounced Q-Ken

U. S. and Foreign Patents pending

OREGON-WASHINGTON DISTRIBUTORS

P. L. CROOKS & COMPANY, INC.

2145 N. W. PETTYGROVE ST. PORTLAND, OREGON

528 CHESTNUT STREET OAKLAND 7, CALIFORNIA

STRAUB MFG. CO.

Kue-Ken Balanced Crushers	Rib Cone Ball Mills	Overflow Classifiers
Kue-Ken Simplex Crushers	Concentrating Tables	Feeders
Kue-Ken Gyratory Crushers	Overhead Eccentric Crushers	Screenwheel Classifiers

DAY in and day out, more and more yards are moved on Goodyear Earth Mover All-Weather tires. Experienced equipment operators know that this great tire is *right* for rolling yardage — right on schedule at rock-bottom cost!

Designed to carry maximum loads over all kinds of terrain, the large diamond pattern of the Earth Mover All-Weather distributes the load evenly to the carcass. The rounded diamonds reduce cutting and snagging, and the flat wide tread gives maximum flotation in soft going and even wear on firm surface roads — the nearest to an all-purpose tire that can be built.

That's why Earth Mover All-Weather tires — like *all* Goodyear work tires — are first choice with users everywhere. They stay *first* choice year after year because they keep on delivering low-cost, long-life performance.

This tire moves the earth on time!

A RIGHT TIRE FOR EACH JOB!

BUY and SPECIFY GOODYEAR — it pays!

EARTH MOVER SURE-GRIP
for maximum traction
on drive wheels

HARD ROCK LUG
for super-stamina
in all rock work

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

GOODYEAR

All-Weather, Sure-Grip—T.M.'s The Goodyear Tire & Rubber Company

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND

2 sizes *twinbatch** PAVERS
TO FIT ALL YOUR JOBS

34-E MIXES UP TO 90 BATCHES PER HOUR

Koehring 34-E *twinbatch* Paver has plenty of reserve operating speed to keep your big-production paving jobs on schedule . . . can hit top output of 90 batches per hour, depending on engineer specifications and job conditions. Gains valuable seconds every batch, because big, 10'-wide skip hoists in only 8 seconds . . . large throat discharges almost complete load before skip is in elevated position. Positive air control by Batchmeter actuates transfer and discharge chutes . . . saves more seconds. Paver travels by power as skip raises . . . double-door boom bucket dumps full batch instantly . . . at any point along boom.

Full accessibility of every maintenance point on the Koehring heavy-duty 34-E *twinbatch* protects your profits against costly down time . . . keeps production on schedule.

*Trademark Reg. U. S. Pat. Off.

RUBBER-TIRED 16-E *twinbatch*

HIGHLY MOBILE . . . EARNS BIG PROFITS ON SMALL PAVING AND CONSTRUCTION JOBS

- Gives you 60° elevating boom . . . discharges bucket at 21' height
- Mixes up to 50 cu. yds. per hour (based on 60-second specifications)
- Travels on 6 (11 x 20) pneumatic tires
- Moves job-to-job at speeds to 8¼ m.p.h.
- Charges fast . . . has 7-second skip hoist
- Has all exclusive operating features of big 34-E *twinbatch*, including: split-second Autocycle mixing controlled by Batchmeter . . . accurate syphon-type water tank for consistent, maximum-strength concrete. Write for complete facts.

SEE YOUR KOEHRING DISTRIBUTOR FOR COMPLETE FACTS

Bay Cities Equipment, Inc., *Oakland*
Columbia Equipment Co., *Portland, Boise*
Harron, Rickard & McCone Co. of Southern California, *Los Angeles*
Kimball Equipment Co., *Salt Lake City*
McKelvy Machinery Co., *Denver*
Moore Equipment Co., *Stockton*
Neil B. McGinnis Co., *Phoenix*
Pacific Hoist & Derrick Co., *Seattle*
The Harry Cornelius Co., *Albuquerque*
Western Machinery Co., *Spokane*

KOEHRING HEAVY-DUTY PAVERS

PARSONS

SMALL, UTILITY-SIZE MODEL 80

TRENCHMOBILE

Built to fill the need for small, mobile, self-contained trench digging machines, this Parsons Model 80 Trenchmobile offers a fast new method of excavating off-street connections for conduit, gas pipes, water systems, etc. Digs as fast as 13.22 ft. per min. . . . up to 48″ deep . . . 5″ and 7½″ wide. Travels job-to-job at road speeds to 18.5 m.p.h. See us for complete information . . . ask too about the 4 larger heavy-duty Parsons Trenchliners.*

*Trademark Reg. U. S. Pat. Off.

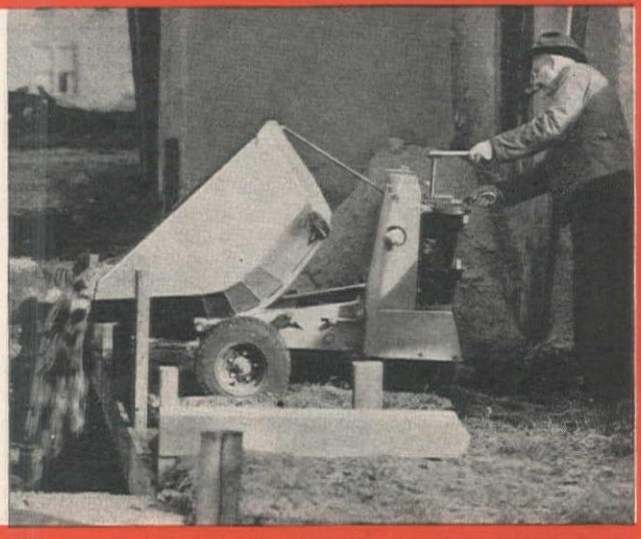
Bay Cities Equipment, Inc.	Oakland
Columbia Equipment Company	Portland, Boise
Harron, Rickard & McCone Co. of So. Calif.	Los Angeles
Kimball Equipment Company	Salt Lake City
McKelvy Machinery Company	Denver
Moore Equipment Company	Stockton
Neil B. McGinnis Company	Phoenix
Pacific Hoist & Derrick Company	Seattle
The Harry Cornelius Company	Albuquerque
Western Machinery Company	Spokane

KWIK-MIX

EASY HANDLING IN FORWARD AND REVERSE

MOTO-BUG

Here's the low-cost, extra capacity, highly maneuverable power wheelbarrow you want . . . Kwik-Mix Moto-Bug. You get forward *and reverse* speeds from 2 to 4 m.p.h. . . . easy steering direct to rear wheel . . . *standard make* 3.9 h.p. air-cooled gasoline engine. Moto-Bug has 10 cu. ft. (1200 lb.) capacity. Dump can be controlled by operator. Handy 33″ width for close quarters . . . turns in own length. Platform body available.



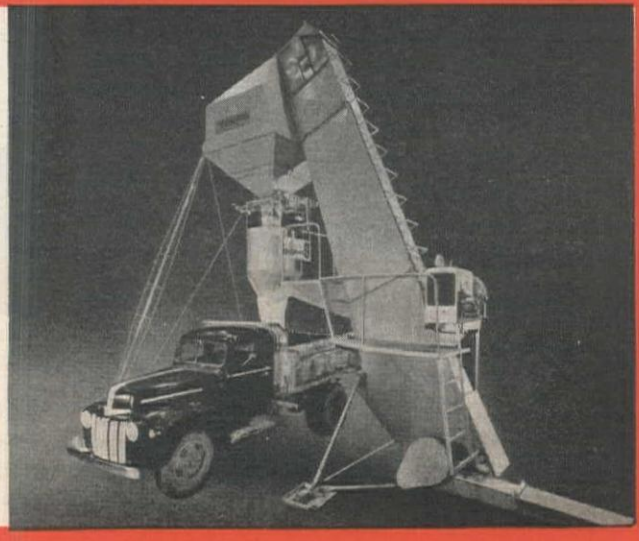
Bay Cities Equipment, Inc.	Oakland
Columbia Equipment Company	Portland, Boise
Harron, Rickard & McCone Co. of So. Calif.	Los Angeles
Kimball Equipment Company	Salt Lake City
McKelvy Machinery Company	Denver
Moore Equipment Company	Stockton
Neil B. McGinnis Company	Phoenix
Pacific Hoist & Derrick Company	Seattle
The Harry Cornelius Company	Albuquerque
Western Machinery Company	Spokane

JOHNSON

PORTABLE ROADBUILDERS

ELEVATING CHARGER

Standard Elevating Cement Charger has size 14, 1000-lb. capacity cement weigh batcher, hung under a 33-barrel capacity overhead storage hopper. Upper hopper can also be equipped with two 1000-lb. weigh batchers, for charging dual batch trucks. Quickly adaptable from batch to transfer plant by adding 50 bbl. extension section. Extremely portable, no crane needed, easily moved and erected by standard dump truck.



Cramer Machinery Company	Portland
Edward R. Bacon Company	San Francisco
Harron, Rickard & McCone Co. of So. Calif.	Los Angeles
McKelvy Machinery Company	Denver
Neil B. McGinnis Company	Phoenix
Pacific Hoist & Derrick Company	Seattle
The Harry Cornelius Company	Albuquerque
Western Machinery Company	Spokane
Western Machinery Company	Salt Lake City

CK901

Built to take a beating

Economical operation at full or partial load.

CP Sinker Drill at Benson Mines, Star Lake, N.Y. Photograph through courtesy of Jones & Laughlin Steel Corp.

No priming is necessary with CP Sump Pump.

CP compressors, drills, demolition tools, vibrators, tampers, clay diggers, sheeting drivers, impact wrenches, etc., stand up on tough jobs because of their simplicity of design and sturdy construction. Write for a copy of SP-2083.

15% to 35% fuel savings is an outstanding feature of CP Portable Compressors, thanks to the CP gradual speed regulator—that adjusts engine speed exactly to air demands—and other CP features. Gasoline-driven portables range from 60 to 315 c.f.m. actual capacity; Diesel-driven, from 105 to 500 c.f.m. Illustrated is the Diesel-driven CP-500.

You'll find just the right sinker in the complete CP line of Sinker Drills, ranging from the light CP-14 (14-pound) to the heavy-duty CP-60N (119-pound).

To remove water from manholes, ditches, tanks, pits, CP Pneumatic Sump Pumps are the answer. Just turn on the air, lower the sturdy pump into the water, and pumping starts immediately.

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

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Distributors

WESTERN MACHINERY CO., 760 Folsom St., San Francisco Calif., Phone: EXbrook 2-4167; WESTERN MACHINERY CO., 500 North 16th St., Sacramento, Calif., Phone: 2-1211; WESTERN MACHINERY CO., 5722 So. Santa Fe Ave., Los Angeles, Calif., Phone: LOgan 3371; BALZER MACHINERY COMPANY, 2136 S.E. Eighth Ave., Portland, Oregon; WESTERN MACHINERY CO., N. 808 Division St., Spokane, Washington; HALL-PERRY MACHINERY CO., 812 E. Iron St., Butte, Montana; YUKON EQUIPMENT, INC., Seattle-Alaska. HONOLULU IRON WORKS COMPANY, Nuuana and Queen Streets, Honolulu 2, T. H.

"EUCS" MAKE THE DIRT FLY

AT ATLANTA AIRPORT!

Loads of 15 cu. yds. are dumped non-stop on the fill. Note the even windrow which makes for easy spreading.

YES, SIR! MacDougald Construction Company depends on Euclid equipment to keep Atlanta's Candler Field extension project ahead of schedule. The contract specifies that the job be completed in 240 working days.

Twenty-three Bottom-Dump Euclids working with two Euclid Loaders and six Rear-Dump Euclids loaded by 3 cu. yd. draglines are moving all of the 2,300,000 cubic yards of excavation on this project. Average hourly production of each Loader is 800 bank yards, with between 15,000 and 18,000 cubic yards overall being moved in an eight-hour day. The average haul from cut to fill is approximately 1,800 feet.

Widely used for heavy construction and mining work, Euclids provide extra power and capacity . . . fast travel speeds . . . quick, clean dumping . . . low maintenance costs . . . and efficient, long-life performance.

"Eucs" are built for dependable service that cuts your hauling costs. For information on the complete Euclid line or help with your equipment problems, see your Euclid distributor or factory branch.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

This International TD-18 Diesel Crawler and matched 10-yard scraper is improving a 2-mile stretch of farm-to-market road for its owner—Wayne County, Nebraska, County Highway Commission. The TD-18 is digging ditches, sloping banks and leveling roadway.

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

INTERNATIONAL

CO$T-CON$CIOU$ COUNTY COMMISSIONERS *Choose* INTERNATIONALS

Stretching county road construction and maintenance money to do the job takes a bit of doing. That's why cost-conscious county highway commissioners select International tractors and International-powered road machines. International's power-packed performance for every penny of fuel consumed pays off in work done. That means more earth moved and more miles of road built for every dollar invested.

International tractors and engines are built to stand up under the roughest going—to give you more for your money. Contractors and county boards alike, are finding Internationals pay for themselves in a hurry and then continue to pay dividends for a long time to come.

It's good to know your International Industrial Power Distributor is always on hand to help you select International equipment for your needs and to service your equipment, keeping it in top-notch operating order.

INTERNATIONAL HARVESTER COMPANY
Chicago

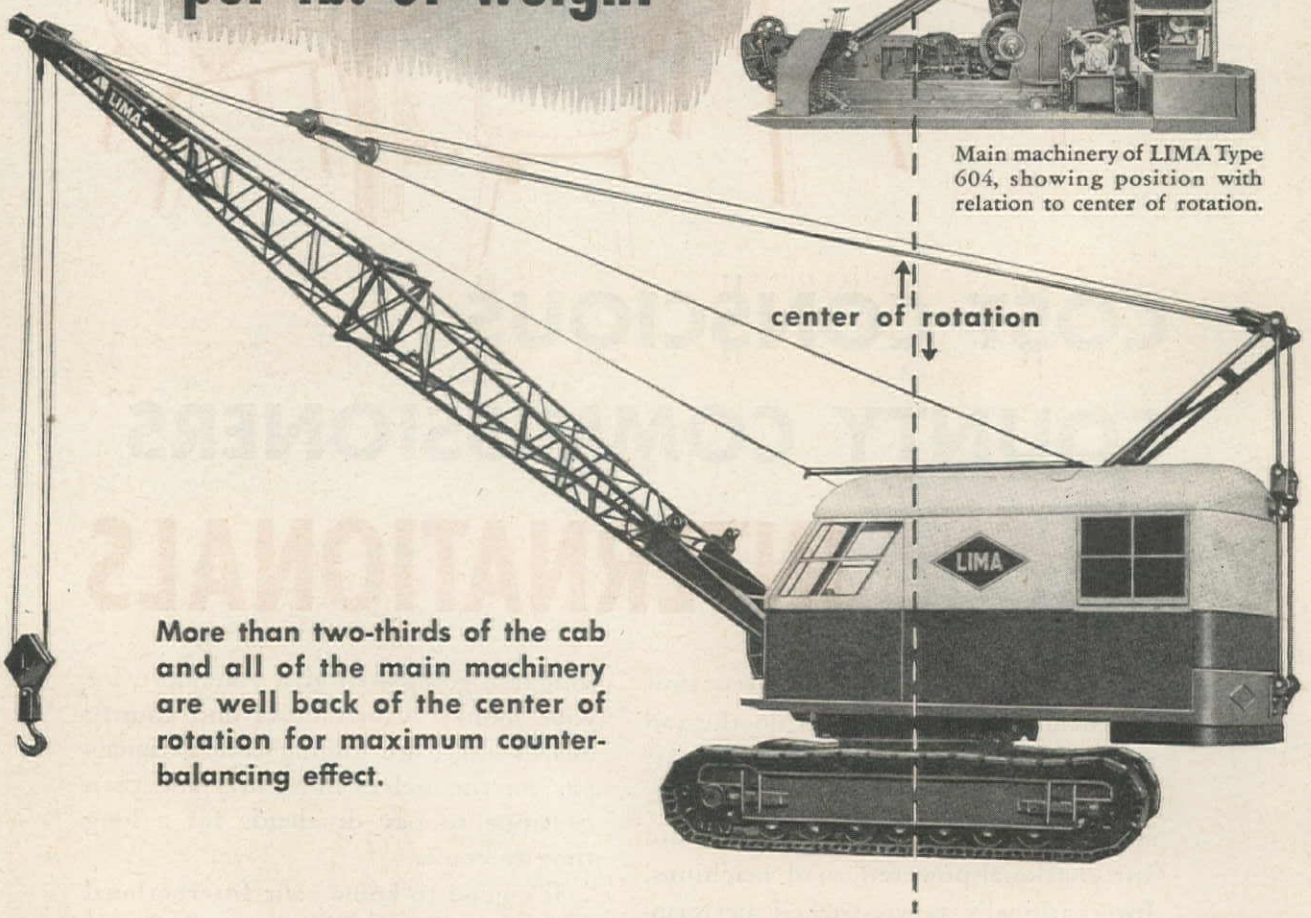
Listen to James Melton on "Harvest of Stars" every Wednesday evening—CBS

INTERNATIONAL HARVESTER

Industrial Power

Why the LIMA Type 604 develops the greatest capacity per lb. of weight

Main machinery of LIMA Type 604, showing position with relation to center of rotation.



More than two-thirds of the cab and all of the main machinery are well back of the center of rotation for maximum counter-balancing effect.

● The LIMA Type 604 shovel, crane and dragline is engineered to produce greatest capacity with minimum weight. This is achieved by placing as much weight as possible *behind* the center of rotation—eliminating the need for excessive counterweight. Hook rollers on which the machinery base revolves eliminate strain from the center pintle—permitting continuous, safe operation at full capacity.

The simple, compact design of the main machinery, using the fewest number of shafts to accomplish the various operations, further contributes to efficient, trouble-free service.

These are only a few of the features which make the LIMA 604 a favorite with owners and operators. The Lima Line includes shovels ¾ to 6 yards, Cranes 13 to 110 tons and Draglines variable.

LIMA EQUIPMENT SOLD AND SERVICED BY:

Our Seattle Office: 1932 First Avenue So., Seattle 4, Washington

Our San Francisco Office: 1315 Howard Street, San Francisco 3, California

Sales Agents:

Feenaughty Machinery Co., 112 S. E. Belmont St., Portland 14, Ore.
Feenaughty Machinery Co., 600 Front St., Boise, Idaho
Smith Booth Usher Co., 2001 Santa Fe Ave., Los Angeles 43, Calif.
McCoy Co., 3201 Brighton Blvd., Denver 5, Colo.
Contractors' Equipment & Supply Co., Springer Bldg., Albuquerque, N. M.
Modern Machinery Co., Inc., 4412 Trent Ave., Spokane 2, Wash.
Jameson Engineering Sales, Fairbanks, Alaska
Foulger Equipment Co., Inc., 1361 South Second Street West, Salt Lake City 8, Utah
Thompson-Sage, Inc., 400 South Wilson Way, Stockton, Calif.
Acme Iron Works, Culebra Ave. at Expressway, N.W., San Antonio, Texas

Lima Shovel and Crane Division

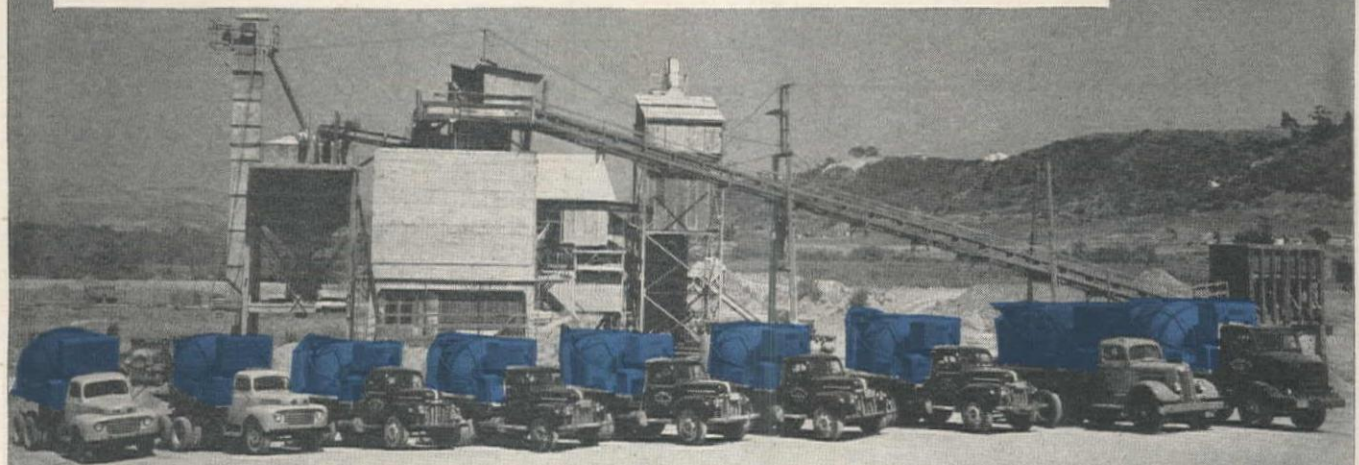
LIMA, OHIO

OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*

LIMA HAMILTON CORPORATION

"We Like Their High Discharge Speed And Low Maintenance Costs!"

D. B. CLARKE



The Fenton Fleet of Ransome Blue Brute Hi-Up Truck Mixers

Mr. D. B. Clarke, V. P. and Sales Manager of the H. G. Fenton Material Company, San Diego, Cal., writes in as follows:

"We purchased our first Ransome Hi-Up machine two years ago and have since added eight more. We have been well pleased with the performance of these mixers both from a standpoint of producing quality concrete and low maintenance costs, but particularly impressed with the speed that they discharge concrete with a slump as low as 1½ inches."

Note Mr. Clarke's last sentence about fast discharge with practically no slump. It means no time lost at the job, more hauls per day, and steady cost-cutting throughout the long life of every Ransome Blue Brute Hi-Up Truck Mixer.

In fact, speed is the keynote of Hi-Up performance — time- and money-saving speed based on the lasting efficiency of Blue Brute advanced design and construction. The non-jamming sealing door, quick-charging hopper and Ransome's famous mixing action shorten the time of every trip — while the trouble-free water system, easy accessibility of parts and strain-absorbing flexibility of design mean lowest possible maintenance costs and down-time.

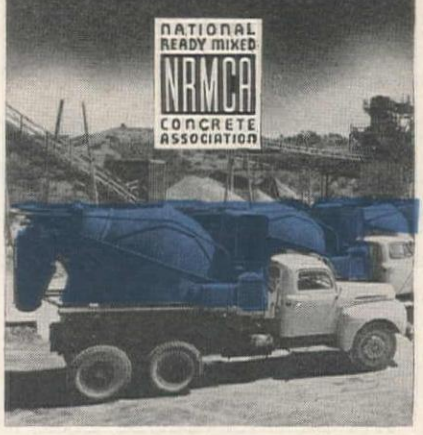
You've read how H. G. Fenton Company's original purchase of two Ransome Hi-Ups was soon followed by expansion into a Hi-Up fleet. That's an old familiar story among Hi-Up users — and it will pay you to find out why. Get further proof that *there's more worth in a Blue Brute* from your Worthington-Ransome Distributor. Or write for Bulletin 221.

R9-3

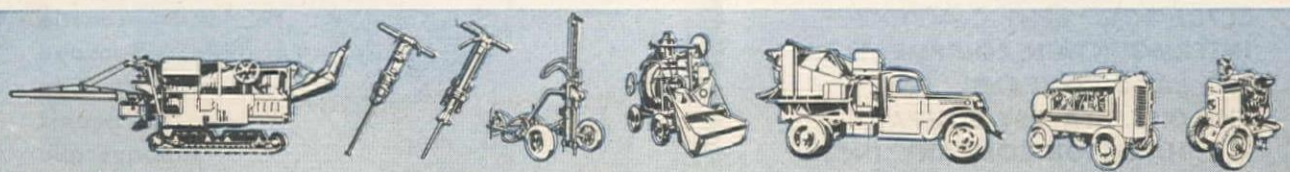
WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION
Construction Equipment Department, Harrison, New Jersey
Distributors in all principal cities

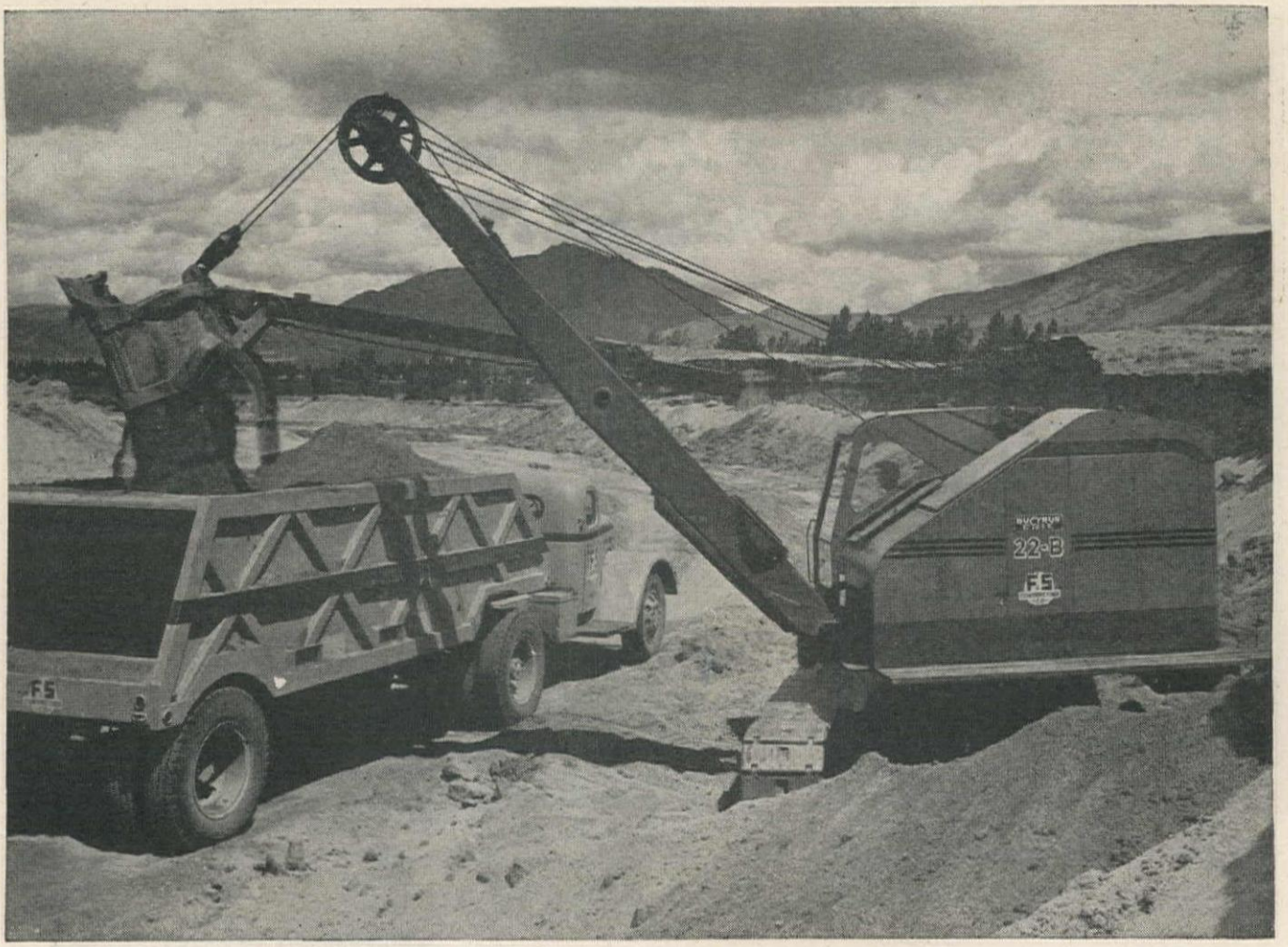
It's a battery of cost-cutters! Nine Blue Brute Hi-Up Truck Mixers owned by the H. G. Fenton Material Company, lined up at the firm's batching plant in San Diego, Cal. Machines are serviced by a Ransome 84S (3 yd.) Big Mixer. Fleet purchased through the Golden State Equipment Company, Los Angeles.



BUY BLUE BRUTES



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB



Follow the lead of the leaders

Take a look at the excavating industry. Notice how consistently the leaders are Bucyrus-Erie equipped.

That's no accident.

One reason they're leaders is that they recognize good equipment. They know it pays to choose machines that deliver steady high production . . . machines that stay on the job and out of the shop.

So follow the lead of the leaders. You'll find that for sustained output in rock or dirt your best buy is Bucyrus! *Bucyrus-Erie Company, South Milwaukee, Wisconsin.*

The BEST buy Bucyrus, the best BUY in excavators

137E48

SEE YOUR BUCYRUS ERIE DISTRIBUTOR

EXC-2

THE MERRILL-BROSE COMPANY	San Francisco
CROOK COMPANY	Los Angeles
CLYDE EQUIPMENT COMPANY	Portland — Seattle
INTERMOUNTAIN EQUIPMENT CO.	Boise — Pocatello — Spokane
THE LANG COMPANY	Salt Lake City
THE O. S. STAPLEY COMPANY	Phoenix
R. L. HARRISON COMPANY, INC.	Albuquerque
NEVADA EQUIPMENT SERVICE	Reno

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

BAKER HD-5 BULLDOZER

SMALL BUT PLENTY *TOUGH*

Here's a rugged little bulldozing team that can really turn out a tremendous amount of work on any job. The HD-5 and Baker Bulldozer is small and compact, easily maneuvered, easily transported, easily operated. It's fast on its tracks, but packs a powerful punch when the going gets tough.

Direct hydraulic lift on the blade means faster action, more accurate control, and positive down pressure — for easier penetration in tough digging.

Simplified tractor mounting maintains tractor balance — saves wear and tear on the tractor, converts full tractor power into push on the blade.

There's no better bulldozing team in the 40 HP class. Try one on your next job and see the difference — compare performance, costs, output and you'll be way ahead with Baker. See your Baker Allis-Chalmers dealer today for delivery schedules.

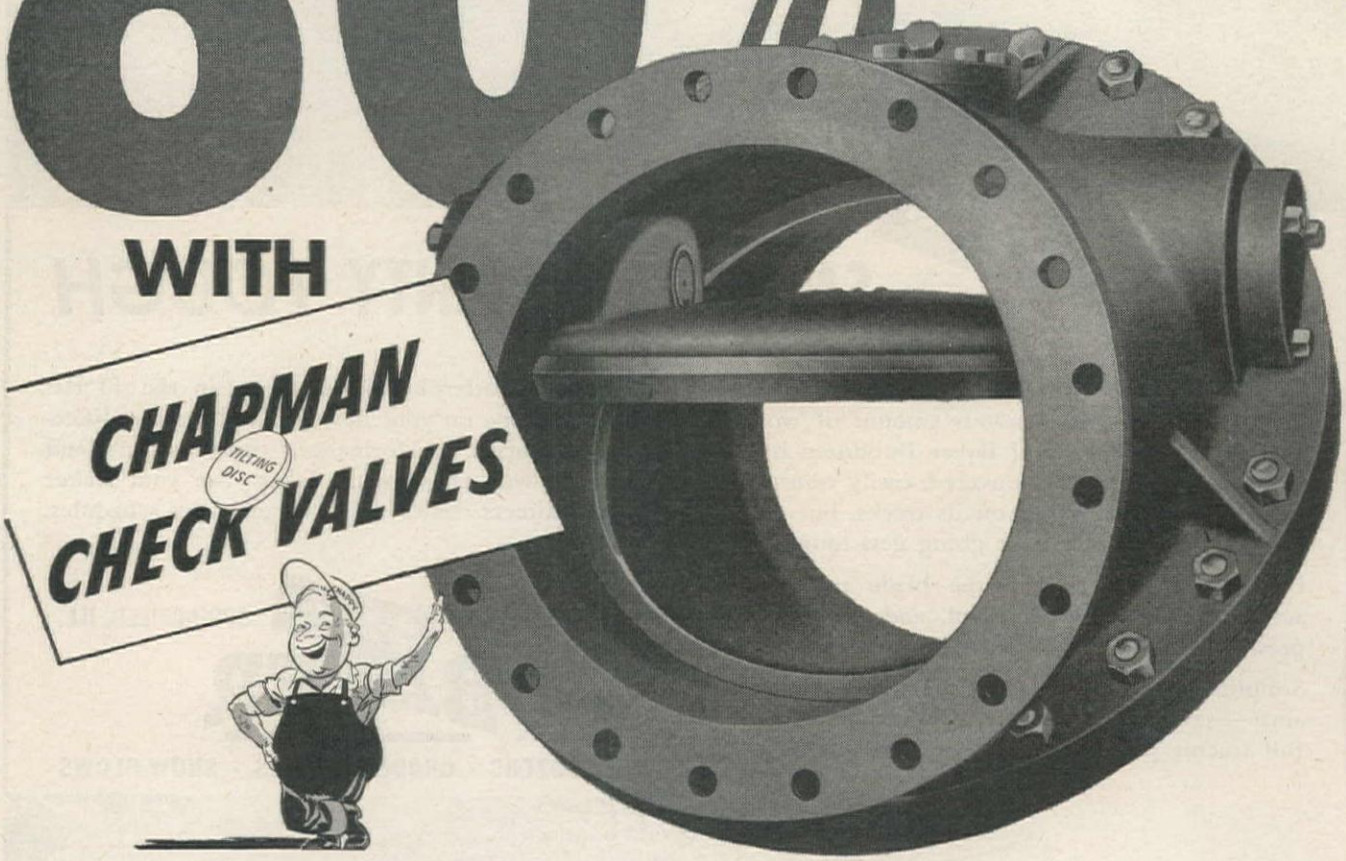
BAKER MFG. CO. They do it Together! **SPRINGFIELD, ILL.**

BAKER

BULLDOZERS • GRADE BUILDERS • SNOW-PLOWS

SAVE UP TO 80% IN HEAD LOSSES

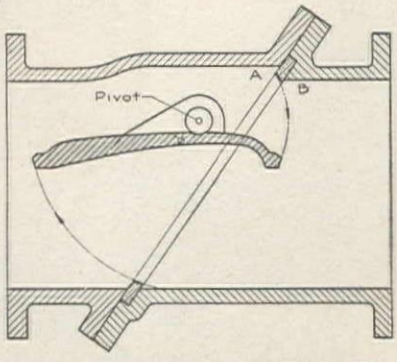
WITH CHAPMAN TILTING DISC CHECK VALVES



Because of its free-flow design and balanced streamlined disc, head losses are reduced to a minimum in Chapman Tilting Disc Check Valves. Actual experience has shown savings of from 65% to 80% in head losses over conventional type check valves.

There's only *one moving part* in Chapman Tilting Disc Check Valves—the balanced hinge-pinned disc. When opening, this disc lifts away so that there is minimum wear on the seat. And once opened, it rides smoothly on the flow, minimizing wear on bearings and pins. It closes quickly and quietly because of the effect of the stream on the short flap. Hammering and consequent strains on pipe lines are eliminated.

Chapman Tilting Disc Check Valves are available in either iron or steel. Send for bulletin containing engineering data and reports of tests.



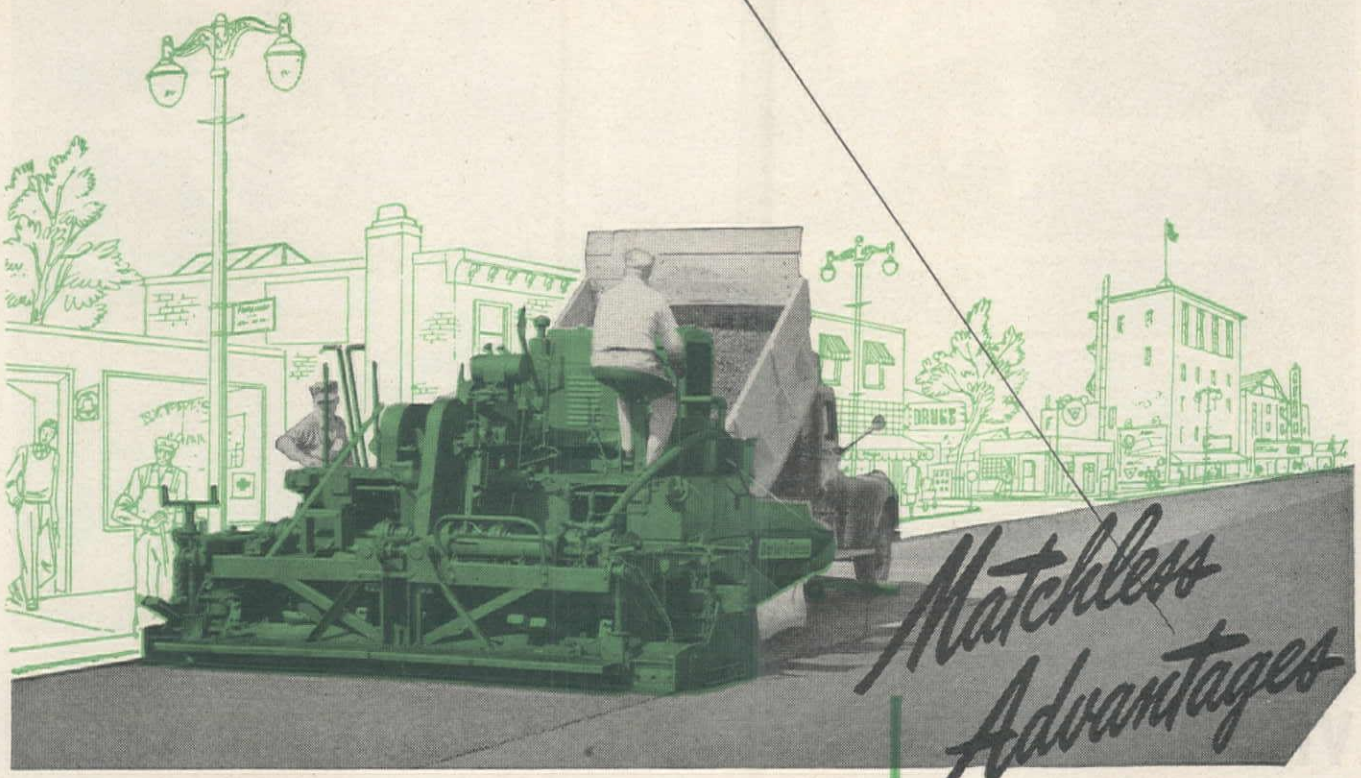
Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

The Chapman Valve Mfg. Co.

INDIAN ORCHARD, MASS.

Barber-Greene

• the finisher that offers



Matchless Advantages

Built into the B-G Tamping-Leveling Finisher are advantages that combine to assure superior performance on the widest variety of bituminous paving jobs. For instance . . .

The B-G Finisher *tamps, levels* and *"strikes off"* simultaneously — automatically measures the correct amount of compacted material for the depressions — leaves a level surface that is maintained under rolling and traffic. The B-G Finisher *automatically* adjusts to differences in the sub-grade and lays to the established grade.

There are other important advantages. For the whole story of B-G Finisher performance, see your Barber-Greene distributor.

Positive Traction

Crawlers have the traction to push loaded trucks up grades while unloading . . . plus adequate control of steering necessary on any job.

Large Hopper

Five-ton hopper saves delays, allows Finisher to operate between truck loads.

Dual Controls

The B-G Finisher may be operated from either side — for easier control while matching previous mat.

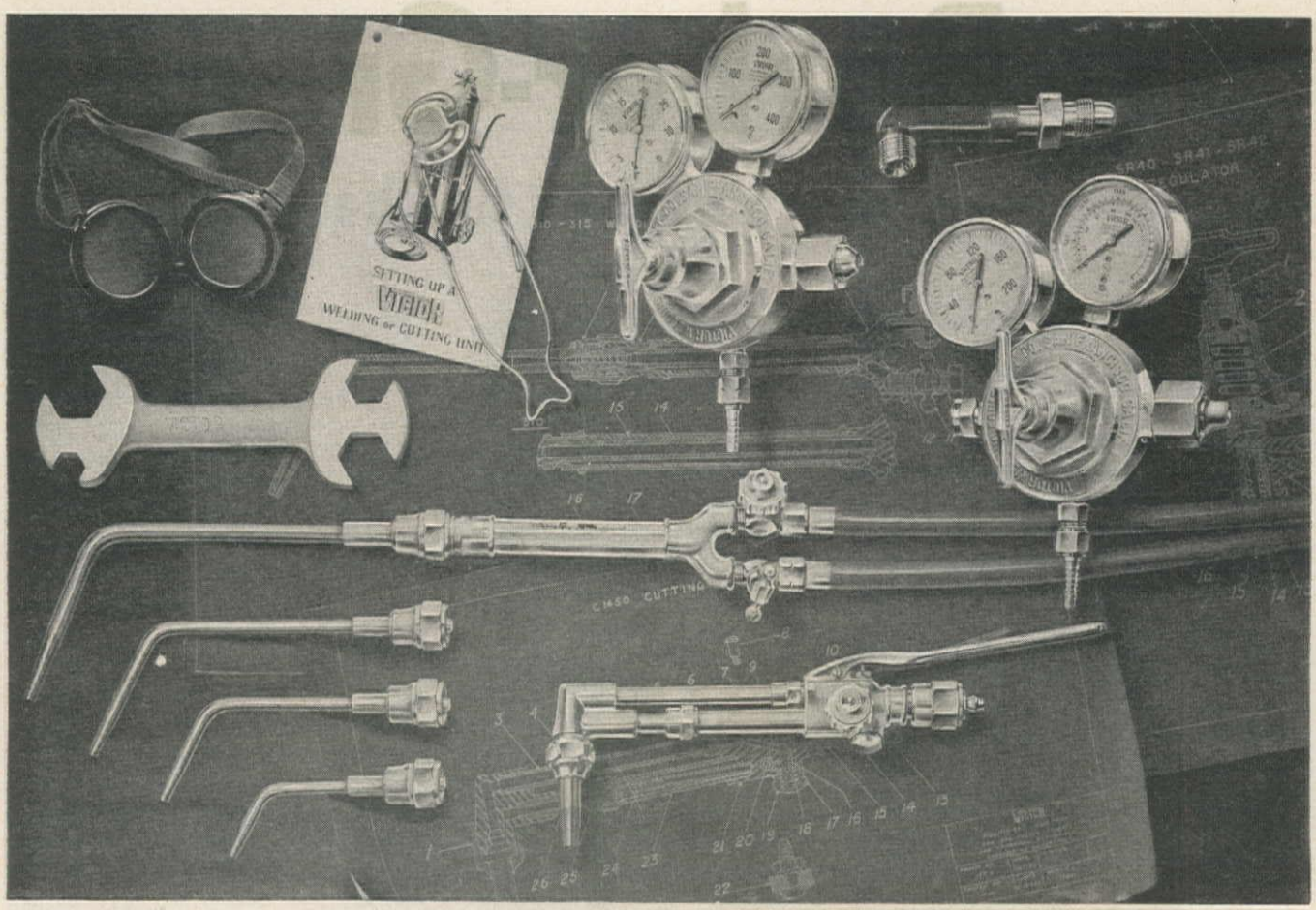
Wide-Range Utility

For all bituminous jobs — from sheet asphalt to stabilized mixes — the B-G Finisher is economical, efficient and adds to the quality of the road.

BARBER · GREENE COMPANY · AURORA, ILLINOIS

FOR SALE BY:

BROWN-BEVIS EQUIPMENT CO., Los Angeles 11, California; COLUMBIA EQUIPMENT CO., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyoming, Casper, Wyoming; CONTRACTORS EQUIPMENT & SUPPLY CO., Albuquerque, New Mexico; RAY CORSON MACHINERY CO., Denver 9, Colorado; JENISON MACHINERY CO., San Francisco 7, California; WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Montana, Missoula, Montana; KIMBALL EQUIPMENT COMPANY, Salt Lake City 10, Utah; STATE TRACTOR & EQUIPMENT CO., Phoenix, Arizona.



VICTOR'S BASIC WELDING & CUTTING UNITS EASILY EXPAND TO FIT NEW NEEDS

VICTOR

FOR BETTER WELDING

Regulators for all gases • Machine and hand torches for welding, preheating, cutting, flame hardening, and descaling • Cylinder manifolds • Cylinder trucks • Emergency pack-type flame cutting outfits • Fluxes • Write today for free descriptive literature.

You Simply Add Attachments, As Required

This combination welding and cutting unit is one of many adaptable to construction, logging, and mining operations. With it you can handle all ordinary welding jobs. For special work, you use this same basic VICTOR unit, adding to it only such other tips, nozzles, or attachments as are required. Thus you are able to handle the smallest to the heaviest job with one welding and cutting unit.

Save money. Ask your nearest VICTOR distributor to demonstrate one of these precision-built, practically-indestructible VICTOR units on your job NOW.

VICTOR EQUIPMENT COMPANY • SAN FRANCISCO • LOS ANGELES • CHICAGO

844 FOLSOM STREET, SAN FRANCISCO 7, CALIFORNIA — PHONE GARFIELD 1-3000
3821 SANTA FE AVENUE, LOS ANGELES 11, CALIFORNIA — PHONE LAFAYETTE 1286

***There's a Branch or Distributor to serve you in* Portland, Spokane, Seattle, Salt Lake City, Casper, Great Falls, Anchorage, Boise, Denver, Tucson, Phoenix, Albuquerque, Oakland, San Diego, Fresno, Ventura, Sacramento.**

One Man

with One Machine

Accomplishes MORE work!

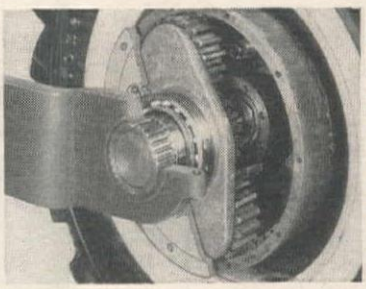
the NEW WAGNERMOBILE SCOOP

Labor cost can take a drop with the new WAGNERMOBILE SCOOP on the job. It's the most practical front end loader available . . . but more than that it will do a lot of jobs NO OTHER ONE MACHINE can do. By quickly changing attachments it becomes a 4000-lb. LIFT TRUCK, a CONCRETE HANDLER, or a LIGHT CRANE. Standard lifting height of 7-ft. 9-in. can be increased with track extensions.

Power steering, enclosed cab, easy operating hydraulic controls, and simplified control system eliminate need for "specially trained" operators . . . a real boost for contractors trying to get things done with help at hand.

Let the Mixermobile dealer nearest you show how this new machine can pay for itself on just a few jobs!

MANY NEW FEATURES



PLANETARY DRIVE to each of the drive wheels takes 66% of the torque off the axle! Operating and maintenance costs are greatly reduced even with inexperienced operators. OTHER FEATURES include, Mono-Stick control, short turning radius, roomy cab, large hoist cable drum, many others.

MIXERMOBILE MANUFACTURERS

BOX 5107 • PORTLAND, OREGON

Manufacturers of:

WAGNERMOBILE SCOOP	TOWERMOBILE-CRANE
SCOOPMOBILE	DUO-WAY LIFT
MIXERMOBILE	DUO-WAY SCOOP
TOWERMOBILE	FOLDAWAY LIFT

See your nearest dealer for amazing demonstration!

- **Constructor's Equipment Co.**
  3707 Downing St.
  Denver, Colorado
- **Rhodes and Jamieson, Ltd.**
  333-23rd Avenue
  Oakland 4, Calif.
- **Heiner Equipment and Supply Co.**
  501 West 7th So. St.
  Salt Lake City, Utah
- **Lively Equipment Co.**
  2601 N. Fourth St.
  Albuquerque, N. M.
- **Equipment Sales Co.**
  407 West Washington St.
  Phoenix, Arizona

LINK-BELT SPEEDER

SERVICE

PROTECTS YOUR INVESTMENT

Zack Laws, who has had 25 years' experience as an operator, recently made this brief, to-the-point comment on the K-370: "It's easy to handle. It's dependable. It gives greater quantity output because it's stronger on the crowd and faster on the swing compared with other machines."

•

The Link-Belt Speeder line includes twenty-five models, ranging up to 3 yard in capacity, some wheel-mounted, some on crawlers. In every size and type, Link-Belt Speeder advanced engineering is clearly seen in every detail, making for freer action, lower upkeep, long-life and profitable operation.

•

See our distributor today. Let him show you a size and type to meet your exact needs. Or write for latest catalog.

•

GEARED TO ASSURE FULL PRODUCTIVITY AT ALL TIMES

Keeping every Link-Belt Speeder Shovel-Crane in tip-top operating condition is one of the main objectives of Link-Belt Speeder and its far flung distributor organization. In every principal city in United States and Canada, and in foreign lands, a stock of parts and men trained in the servicing of Link-Belt Speeder products are in readiness to meet the needs of the user wherever located.

Link-Belt Speeder advanced engineering, honest construction and quickly available service add up to more profitable machine hours and greater returns on your investment. Your distributor will gladly show you the Link-Belt Speeder line of shovels, cranes and draglines, up to 3 yard capacity and explain the features which contribute to their outstanding performance. For instance—

SPEED-O-MATIC CONTROL

"Speed-O-Matic" hydraulic control permanently eliminates all "lost motion" — actuates clutches faster and more smoothly. Operators will tell you the "Speed-O-Matic" control relieves manual effort and there is little or no fatigue after a good day's work. Get the facts today—find out how you, too, can greatly increase your output.

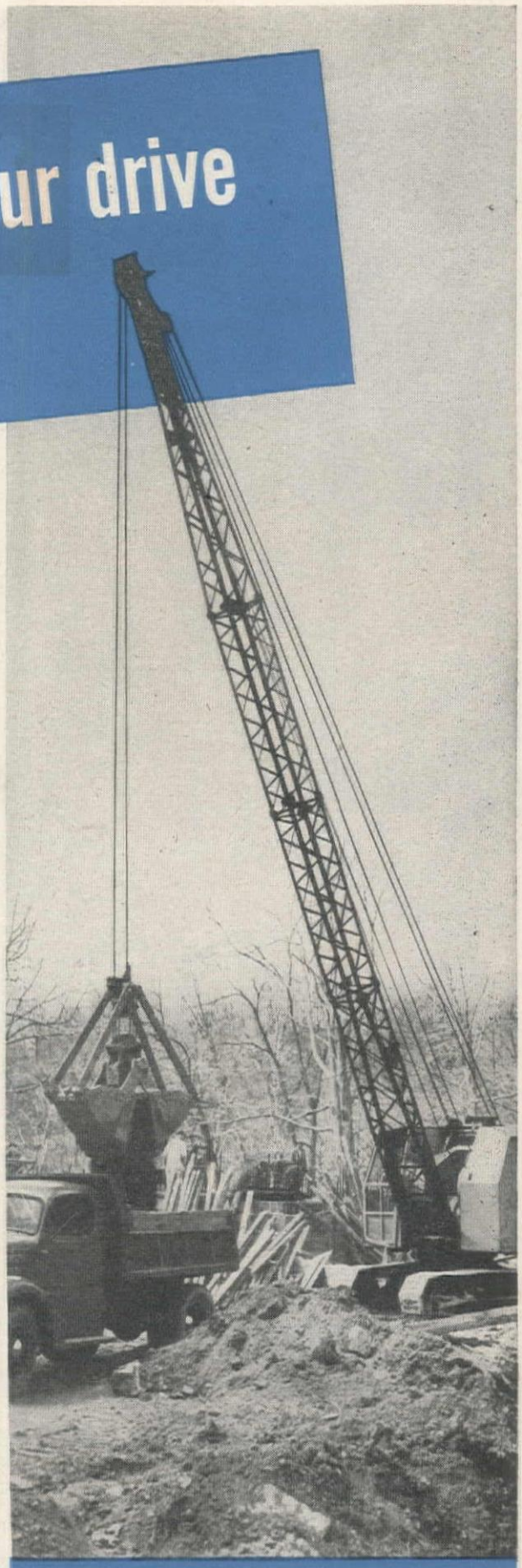
11,328

LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA

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

Here's help in your drive for lower costs



Preformed "Blue Center" Wire Rope lasts longer . . .

ROPE THAT STAYS on the job longest saves you wire rope dollars; brings fewer shut-downs; cuts down replacement time. And Roebling Preformed Lang Lay "Blue Center" Steel Wire Rope gives you exactly these money-saving features . . . One big reason for this superiority is "Blue Center" Steel specially developed for wire rope and made only by Roebling. Another big reason is the Roebling Preformed construction with its unique service advantages.

WHY PREFORMED IS ECONOMICAL

Roebling Preformed is easy to handle and install because it is relatively inert and doesn't tend to set or kink. It can be cut without seizing, and fittings are more easily applied. In operation, Preformed gives outstanding life despite severe bending, and particularly where small sheaves and reverse bends occur.

FREE ENGINEERING SERVICE

Call on your Roebling Distributor for help in selecting the *right* wire rope for longest service and rock-bottom cost. If you have specially tough problems in wire rope selection, installation or maintenance, your Distributor will secure the assistance of a Roebling Engineer. John A. Roebling's Sons Co. of California, San Francisco—Los Angeles—Seattle—Portland.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

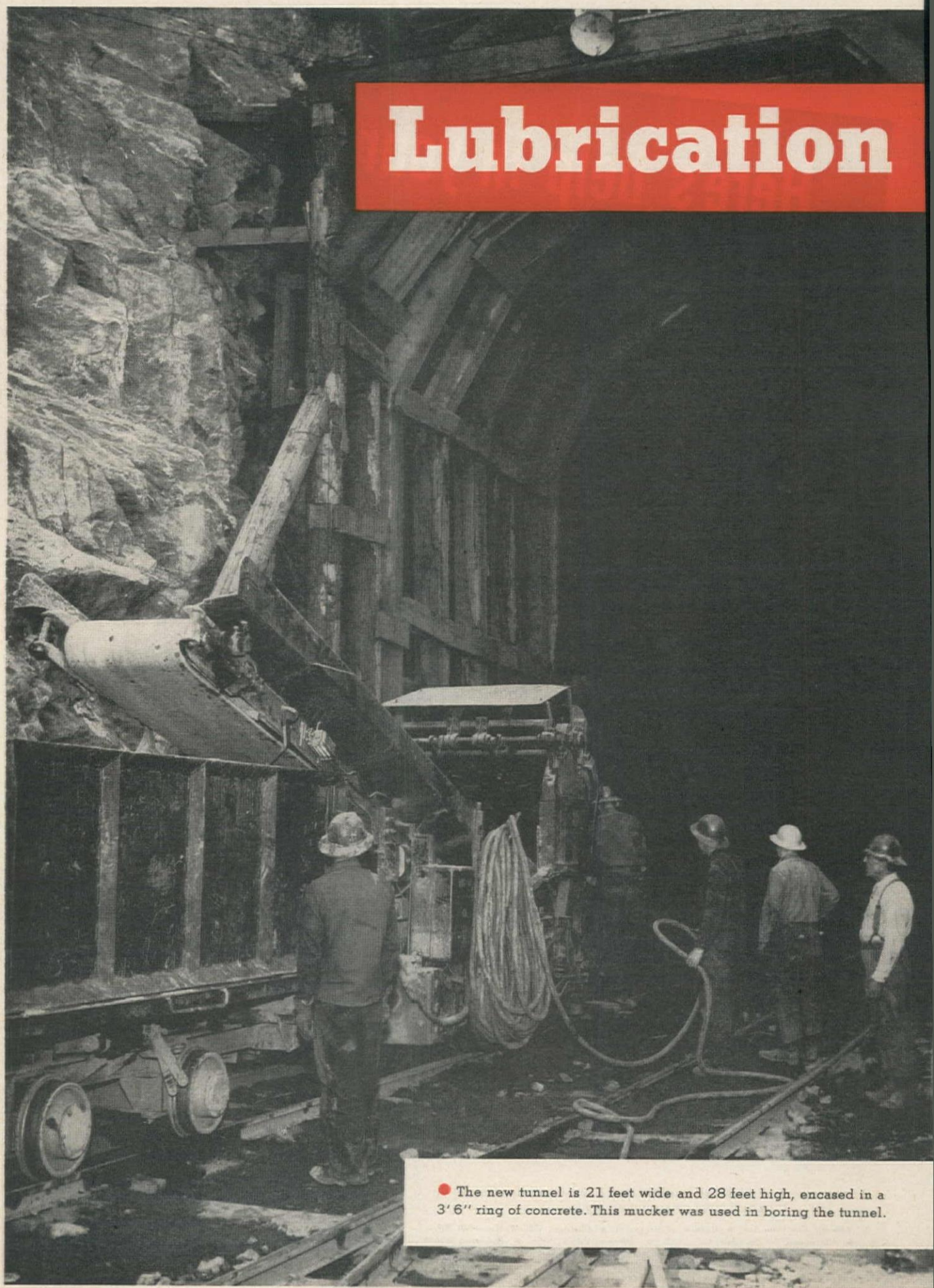
Atlanta, 934 Avon Ave. ★ ***Boston,*** 51 Sleeper St. ★ ***Chicago,*** 5525 W. Roosevelt Rd. ★ ***Cleveland,*** 701 St. Clair Ave., N. E. ★ ***Denver,*** 1635 17th St. ★ ***Houston,*** 6216 Navigation Blvd. ★ ***Los Angeles,*** 216 S. Alameda St. ★ ***New York,*** 19 Rector St. ★ ***Philadelphia,*** 12 S. 12th St. ★ ***Pittsburgh,*** 855 W. North Ave. ★ ***Portland, Ore.,*** 1032 N. W. 14th Ave. ★ ***San Francisco,*** 1740 17th St. ★ ***Seattle,*** 900 First Ave.

ROEBLING

JAR ROEBLING

A CENTURY OF CONFIDENCE

Lubrication



● The new tunnel is 21 feet wide and 28 feet high, encased in a 3' 6" ring of concrete. This mucker was used in boring the tunnel.

Engineering

helped set this Job Record

Morrison-Knudsen's work on the Stevens Pass job was finished in record time, according to Superintendent Lee Nevius, and G. P. Lubricants and Engineering Service were a big help in keeping ahead of schedule, because they maintained equipment performance in spite of adverse conditions.

Nearly a mile of new track eliminates nine curves, bores through a 700 foot tunnel and crosses a 650 foot bridge on the Great Northern Railway, high in the Cascade Mountains west of Merritt, Washington.

Here G. P. engineers set up a schedule of preventive maintenance which was closely followed by operators of the mucker diesel shovel, tractors, dump trucks, compressors and light plant. All fuel and lubricants had to come in by rail, which required precision timing.

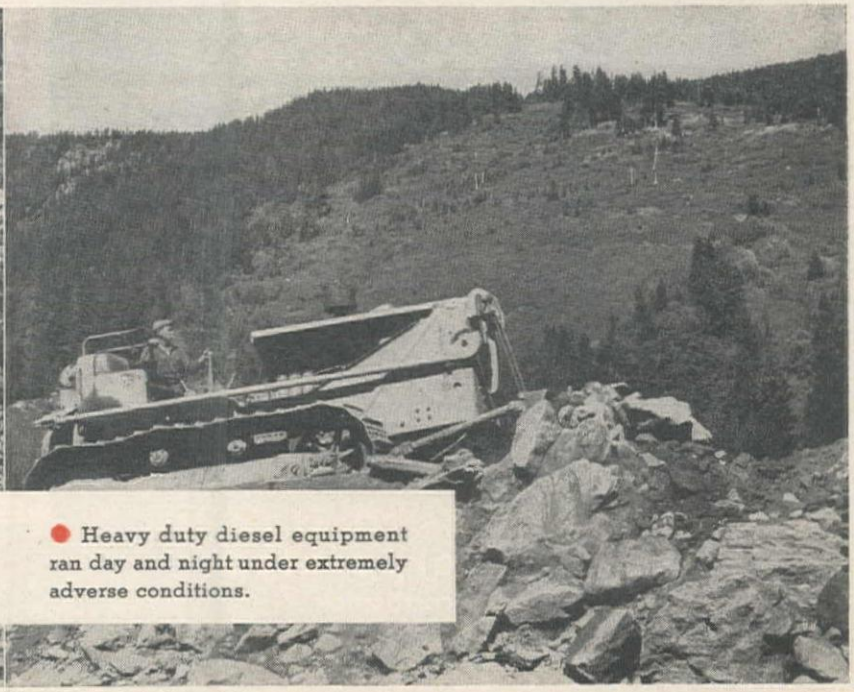
Increased efficiency and profits, such as gained by Morrison-Knudsen from G. P. service and products, are also available to other contractors throughout the West. For helpful suggestions from our experienced lube engineers, just call your nearest G. P. distributor.

General Petroleum Corporation

AN ENTERPRISING MEMBER OF THE PROGRESSIVE PETROLEUM INDUSTRY

Mobilgas
SOCONY-VACUUM

● Heading the crew on the Stevens Pass job were Lee Nevius, Gen. Sup't., A. M. Brown, Ass't. Tunnel Sup't. Burt Shultis, Gen. Foreman, and A. O. Oberson, Bridge Sup't.

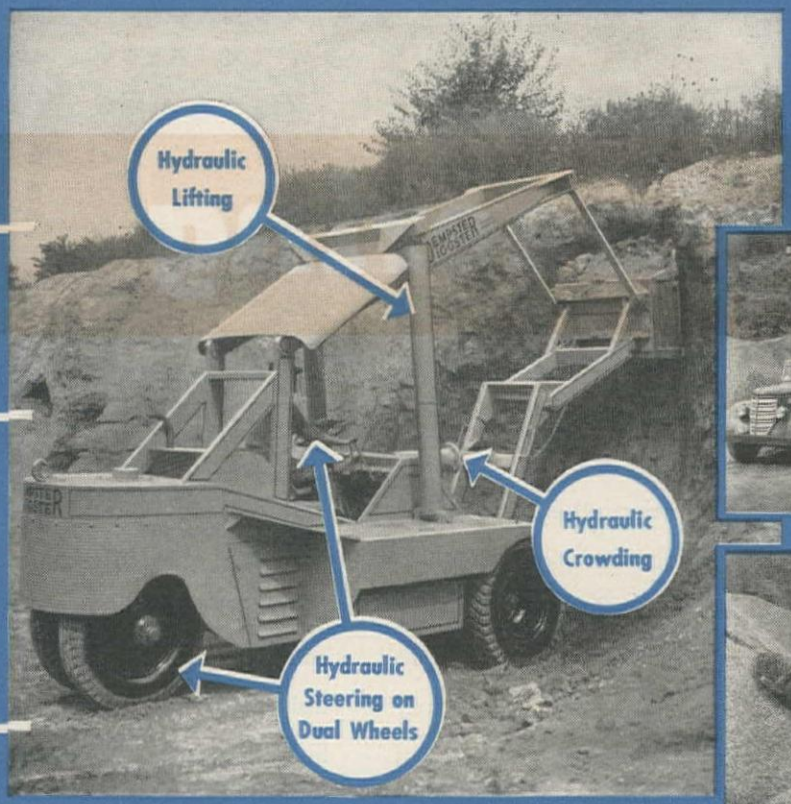


● Heavy duty diesel equipment ran day and night under extremely adverse conditions.

fast

mobile

easy to operate



Dempster-Diggster

Has VICKERS HYDRAULIC CONTROLS

High speed versatility (as exemplified by the Dempster-Diggster) is characteristic of Vickers Hydraulic Controls.

Vickers Hydraulic Power Steering Booster makes it easier to steer the Dempster-Diggster over rough terrain, than a passenger car on smooth pavement. Steering load is carried by hydraulic cylinder . . . not by the driver.

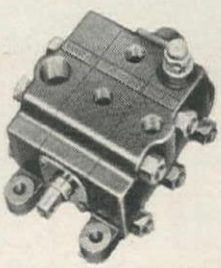
Vickers Balanced Vane Type Pumps supply oil under pressure also for actuating cylinders that lift and crowd the dipper. These pumps are exceptionally efficient and dependable; their exclusive hydraulic balance construction prolongs pump life by entirely eliminating pressure-induced loads and consequent wear.

Overload protection for the machine is provided by relief valves integral with Vickers Steering Booster and Valves. Write for descriptive bulletins.

Vickers Improved Hydraulic Steering Booster with integral overload relief valve. See Bulletin 47-30a.

Vickers Balanced Vane Type Pumps are engine driven. See Bulletin 36-12.

Vickers "Multiple Unit" Valves include relief valve for overload protection. See Bulletin 40-13.



VICKERS Incorporated
DIVISION OF THE SPERRY CORPORATION
1498 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices:
ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DETROIT
LOS ANGELES • NEWARK • PHILADELPHIA • PITTSBURGH • ROCHESTER
ROCKFORD • ST. LOUIS • SEATTLE • TULSA • WASHINGTON • WORCESTER

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Only GMC DIESELS GIVE YOU ALL THESE FEATURES

SPECIALLY ENGINEERED DIESEL CHASSIS

- Wide track front axle
- Straight frame side rails
- Heavy duty clutch and cast 2-shoe air brakes
- Syncro-Mesh transmissions
- Two-speed, double reduction and dual drive rear axles
- Weight ratings up to 90,000 pounds

FAMOUS GM 2-CYCLE DIESEL ENGINES

- Direct triple duty injectors
- "Uniflow" scavenging
- Full-Flo lubrication
- Triple-cooled pistons
- Pressurized water circulation
- Thermostatic water by-pass and radiator shutters

Why are GMC Diesels handling an increasing number of heavy hauling jobs in many industries?

First, because GMC builds the widest range of 4- and 6-cylinder Diesel trucks available today . . . with a choice of eight basic models . . . with axle and transmission ratios to meet every type of hauling, over-the-road and off-the-highway.

Second, because GM 2-cycle Diesel engines provide *twice* the number of power strokes as conventional 4-cycle types. This means less engine weight . . . greater payloads . . . smoother performance and increased efficiency.

For all that's new and best in Diesels, look to GMC . . . pioneer in Diesel truck and coach production.

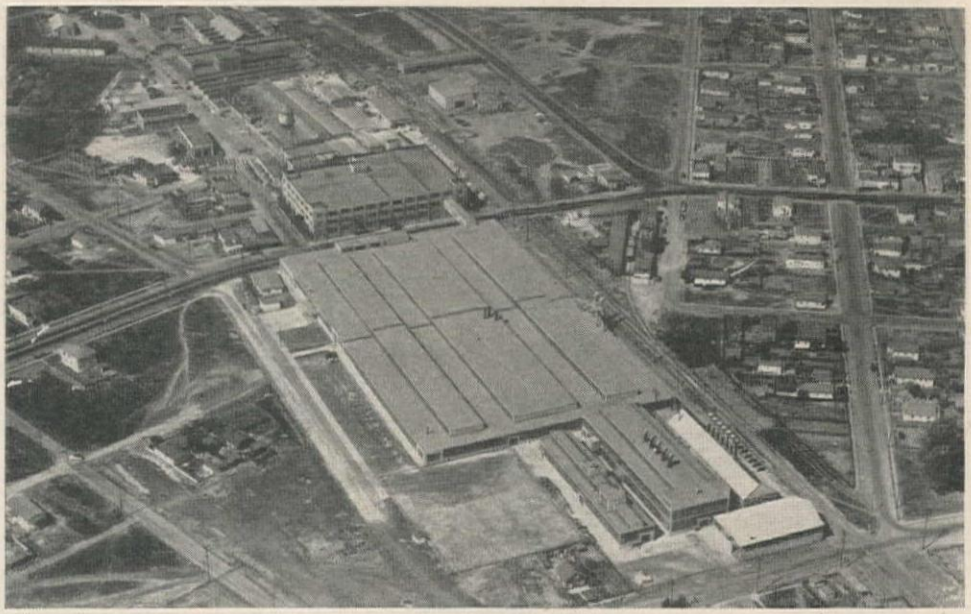
GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

THE TRUCK OF VALUE

GMC TRUCKS

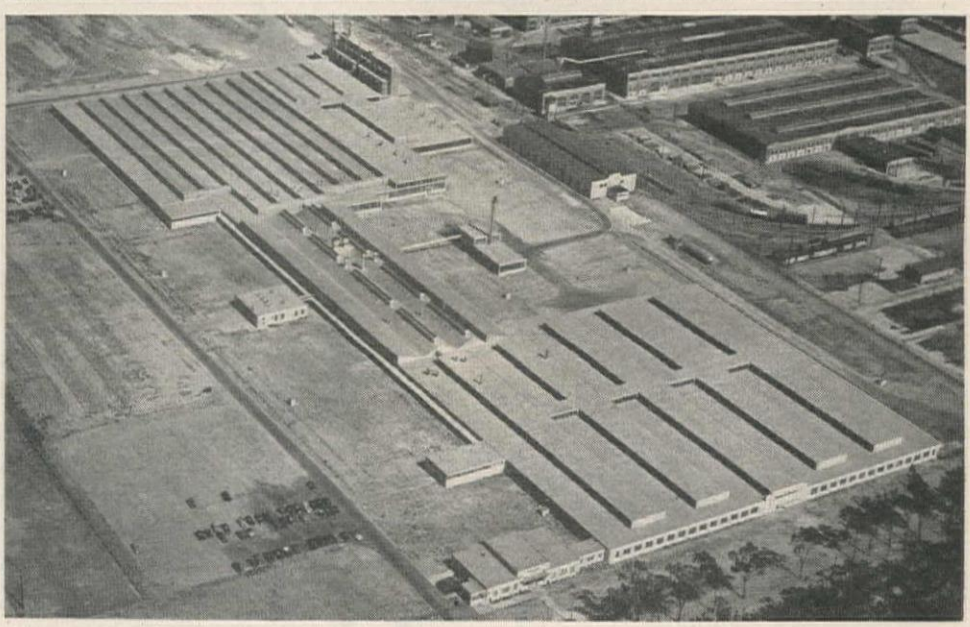
GASOLINE • DIESEL

Steel Construction for AMERICAN-Standard



AT RICHMOND

American-Standard plant at Richmond, Calif., where brass plumbing fixtures are manufactured. The buildings cover 5 acres, and all of the steel used in their construction was fabricated and erected by the Alameda Works of Bethlehem Pacific.



AT TORRANCE

11-acre plant of American-Standard at Torrance, Calif., where vitreous china plumbing equipment is made. Bethlehem Pacific's Los Angeles Works fabricated and erected all of the framework for these buildings.

The construction of these two large manufacturing plant buildings for American Radiator & Standard Sanitary Corporation indicates the tremendous expansion of industry in the West. And again it demonstrates Bethlehem Pacific's ability to handle efficiently steel fabrication and erection contracts of any size.

Bethlehem Pacific Coast Steel Corporation operates fabricating works at Alameda, South San Francisco and Los Angeles, also structural shape mills at Seattle, South San Francisco and Los Angeles.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
Fabricated Steel Construction
Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM PACIFIC

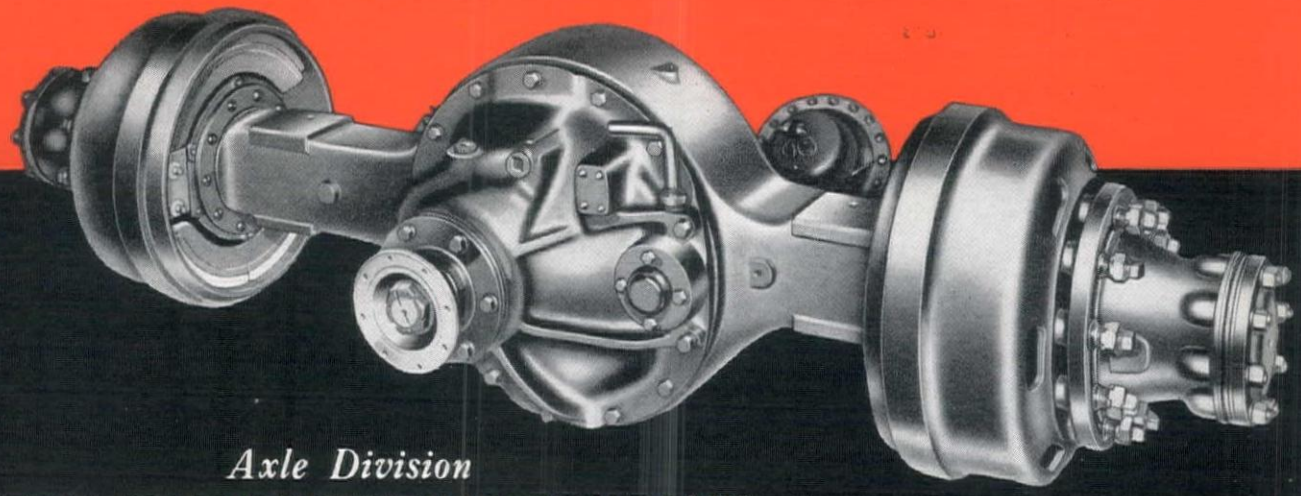
BETHLEHEM STEEL

High-balling Down the Main Pike or Pulling Out of the Tough Spots

EATON
2-Speed Truck
AXLES

. . . give you the *exactly-right* gear ratio for every road, load, and type of service. There is no need to sacrifice speed for power—or power for speed. Eaton gives you BOTH—in the same vehicle with the same axle, available at finger touch to meet every specific operating need. And Eaton Axles actually pay for themselves, because they permit engines to operate at most efficient and economical speeds, reduce stress and wear on the entire vehicle, hold operating and upkeep costs to a minimum —and add miles to vehicle life. Eaton 2-Speed Axles are available for most trucks of the 1½ ton class and larger. See your truck dealer.

More Than a Million Eaton 2-Speed Axles in Trucks Today



Axle Division

EATON MANUFACTURING COMPANY

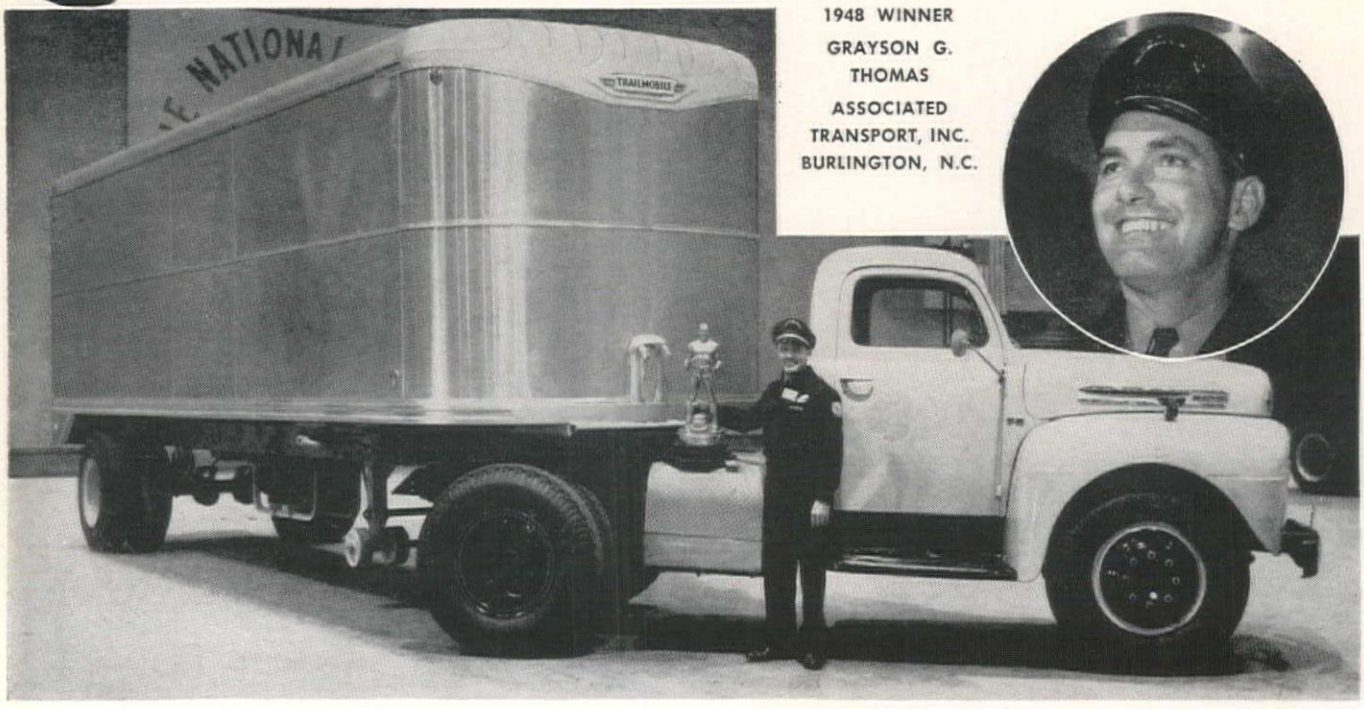
CLEVELAND, OHIO

OTHER EATON PRODUCTS

SODIUM COOLED VALVES • POPPET VALVES • FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • PERMANENT MOLD GRAY IRON CASTINGS • ROTOR PUMPS

SPRING LOCK WASHERS • SNAP RINGS • COLD DRAWN WIRE • HEATER-DEFROSTER UNITS • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, AND DYNAMOMETERS

THIRD WIN FOR TRAILMOBILE



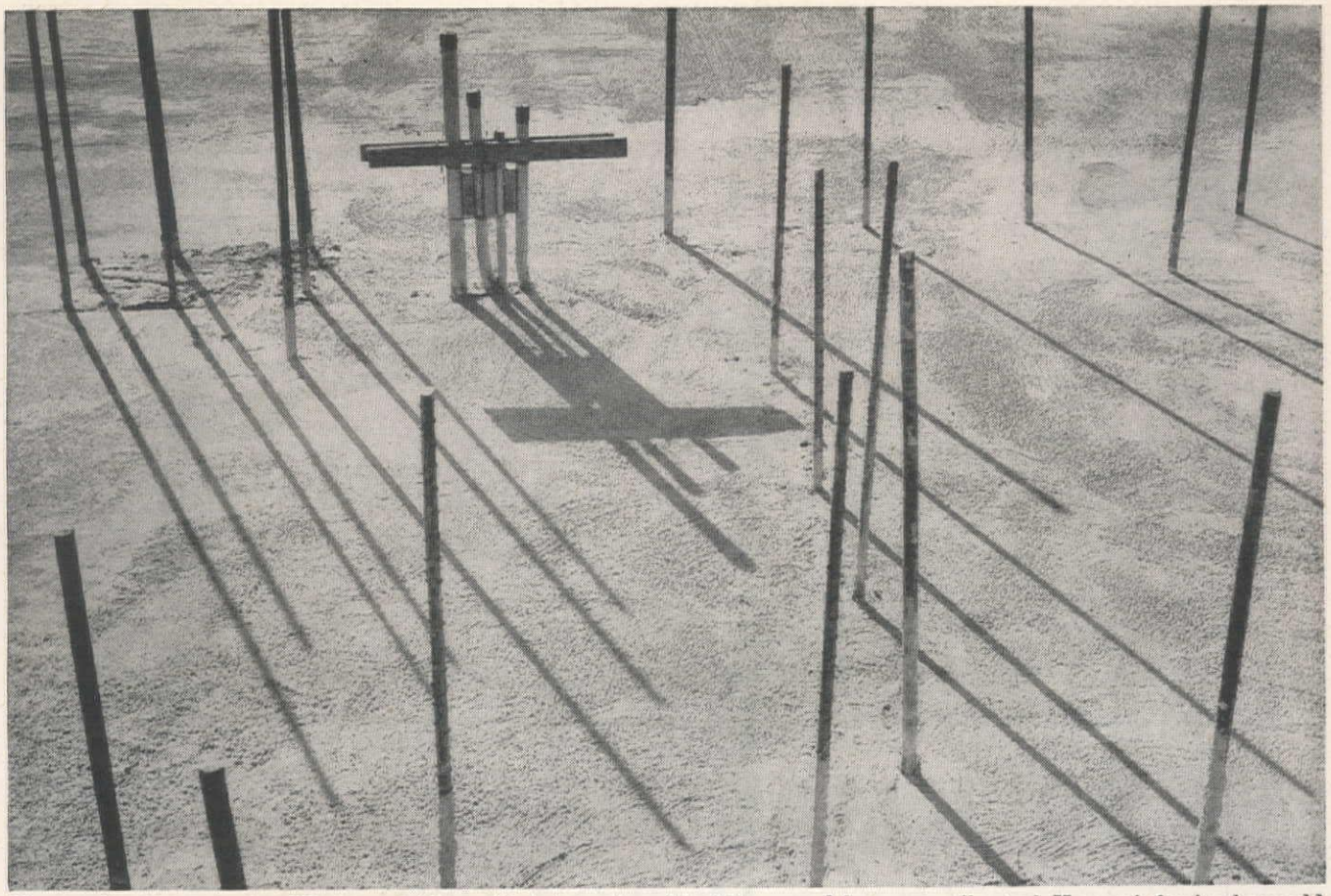
For the third successive year, TRAILMOBILE was chosen by the winning driver of the American Trucking Association's annual ROADEO. When you know just how carefully champions in any field prepare for a national event, we believe that here is proof positive that TRAILMOBILE is recognized by those who know as the easiest pulling and maneuverable trailer on the American scene. In this great annual event which holds the attention of truck drivers from Coast to Coast, contestants exercise a free choice of the trucks and trailers with which they wish to enter this gruelling contest.

Naturally, TRAILMOBILE is proud that its trailers have been picked by the winners of THREE SUCCESSIVE ROADEOS, because they say that ONCE is an accident, TWICE is a coincidence, but THREE TIMES is **HABIT.** Why don't you get the HABIT also—choose TRAILMOBILE—the choice of National Champions—and you know that you are placing in the hands of YOUR drivers the easiest pulling and most maneuverable trailer that money can buy.

THE TRAILMOBILE COMPANY
BERKELEY, CALIFORNIA

TRAILMOBILE

LOS ANGELES · VENTURA · SAN LUIS OBISPO · BERKELEY · SACRAMENTO · SANTA ROSA · FRESNO · SAN JOSE · BAKERSFIELD · STOCKTON
EUREKA · SAN DIEGO · SEATTLE · SPOKANE · PORTLAND · HONOLULU



Homes for the growing West are getting added strength and building speed from versatile steel. Here, reinforcing bars add stamina to the floors in homes built in Hillsdale, San Mateo, California... one of the nation's model residential areas.

Steel is building the West

for today—for the future

New owners of Hillsdale homes can feel the security that comes from U·S·S steel reinforcing bars and mesh . . . steel sash, flashing, gutters, downspouts and nails. Mrs. Owner, too, will appreciate the beauty of the modern kitchens with their U·S·S stainless steel counters.

Homes and office buildings . . . bridges and power line towers . . . all over the West you'll see the signs of steel's contribution. Large or small, these jobs are being helped by steel's fabricating speed and its great strength and durability.

Columbia, as Western producing member of United States Steel, combines its own facilities with those of others in the U·S·S family to supply the West with everything in steel. For information, contact the Columbia Steel Company office nearest you.

Free Illustrated Booklets: The many uses of steel in homes . . . from foundation to roof . . . are described in two beautifully illustrated booklets—"Let's Build a Home" and "Let's Furnish a Home." They're yours just by dropping a card to Columbia Steel Company, 1422 Russ Building, San Francisco, Calif.

Only STEEL can give you all 7 of these structural advantages: Extra toughness and shock resistance • Incombustibility • High strength-weight ratio • Highest modulus of elasticity • Versatility of application • Great durability • Ultimate economy

Help boost steel production—TURN IN YOUR SCRAP

Columbia Steel Company

San Francisco Los Angeles Portland Seattle Salt Lake City

UNITED STATES STEEL

The **ROCKMASTER** Blasting System Holds Down Costs In Spite of Rising Expenses!

In quarries, mines, stripping operations, and on construction projects the cost of drilling, labor, and supplies has increased—but *over-all* costs have been knocked down through the use of the ROCKMASTER Blasting System!

By switching to ROCKMASTER, one limestone quarry effected a reduction of more than 50% in drilling and dynamite costs! Now, instead of drilling on 4-foot centers, holes are spaced on 8-foot centers—sometimes even greater. Breakage is exceptionally good . . . objectionable noise and vibration has been cut to a minimum. This is not an isolated case! More and more users of explosives are using ROCKMASTER to get better breakage . . . save wear and tear on equipment . . . cut *over-all* costs.

When Atlas pioneered ROCKMASTER, it introduced a new concept of blasting. ROCKMASTER is a blasting *system* based on the right explosive and method of loading . . . the proper spacing of holes . . . the selection of the right millisecond delays—all based on the kind of rock being blasted.

Call in your Atlas representative. He'll be glad to show you how the ROCKMASTER Blasting System can be adapted to *your* job.

ROCKMASTER GIVES YOU THE GREATER SAFETY OF MANASITE DETONATORS

Less Bark . . . More Bite

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

Offices in Principal Cities

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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

A Million Yards a month

When you
SPECIFY CUMMINS
you get:

- Fast work cycles
- Fuel savings
- Low maintenance
- Minimum down-time
- Long engine life
- Warranty—100,000 miles or one year
- 'Round-the-clock service

CUMMINS Dependable DIESEL
SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

A million yards a month for six months—that's the earth-moving record of C. J. Langenfelder and Son, Inc., on the Baltimore, Md., Friendship International Airport job. And 23 Cummins Diesels helped set this record.

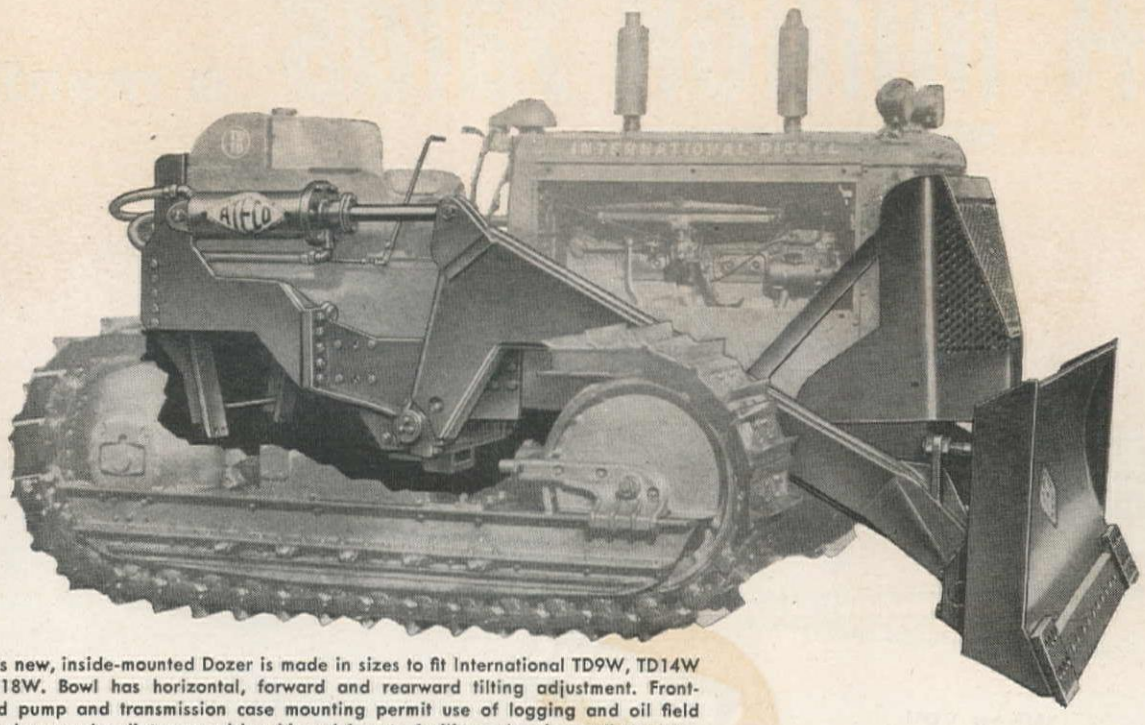
For example, 11 Cummins-Powered Super C Tournapulls made seven round trips an hour on a $1\frac{7}{8}$-mile haul, carried 15-yard loads at top speed on soft sand. Cummins Power also proved itself on this job in Wooldridge Terra-Cobras, Euclid Bottom Dumps, Mack tractors, a Lima shovel, and a Euclid loader.

Write for more information about the proved performance and economy of Cummins Diesels.

CUMMINS ENGINE COMPANY, INC., • COLUMBUS, INDIANA

We'll bet you a new hat...

ATECO's Inside-Mounted Dozer will outwork any Dozer you've seen



ATECO's new, inside-mounted Dozer is made in sizes to fit International TD9W, TD14W and TD18W. Bowl has horizontal, forward and rearward tilting adjustment. Front-mounted pump and transmission case mounting permit use of logging and oil field winches. Improved radiator guard has hinged face to facilitate cleaning radiator core.

ATECO

Mounts free of tracks . . . extra fast bowl action . . . no permit required for highway transport . . . built to stay out of repair shops and lengthen tractor life.

Take a look at the compact, snug fit of this ATECO heavy-duty Dozer. It mounts rigidly to the transmission case on both sides, also at rear, and is tied together underneath the tractor. This unique inside mounting does away with belcranks and sloppy linkage; the hydraulic jacks act directly on the Dozer pusharms to give you a fast bowl raise of one foot per second. You get more H.P. at the bowl, too, because bowl is only 7′ 11¾″ long. This bowl speed and horsepower, plus a high lift of 48″ and low drop of 12″ (for TD9W and TD14W) to 18″ (for TD18W) makes the ATECO a performing fool on tough stumping, bank sloping, trench and slush pit building, hillside and close excavating jobs.

OPERATORS AND SERVICEMEN LIKE THESE FEATURES

Right distribution of weight eliminates nose diving, reduces wear on front idlers and lower track wheels.

Mounted on sprung part of tractor: shock loads, vibration practically eliminated, less operator fatigue.

7′ 11¾″ bowl eliminates side draft and fighting clutches.

Dozer does not interfere in any way with servicing of any part of tractor.

SEE FOR YOURSELF

Ask your International distributor to let you try this ATECO inside-mounted Dozer on your toughest Dozer job. If it doesn't outwork any Dozer you've got or seen, we'll buy you a new hat. Call your International distributor or phone us direct . . . NOW.

AMERICAN TRACTOR EQUIPMENT CORPORATION

9131 SAN LEANDRO BLVD.
OAKLAND 3, CALIFORNIA

CABLE ADDRESS: ATECO, OAKLAND
TELEPHONE SWeetwood 8-2466

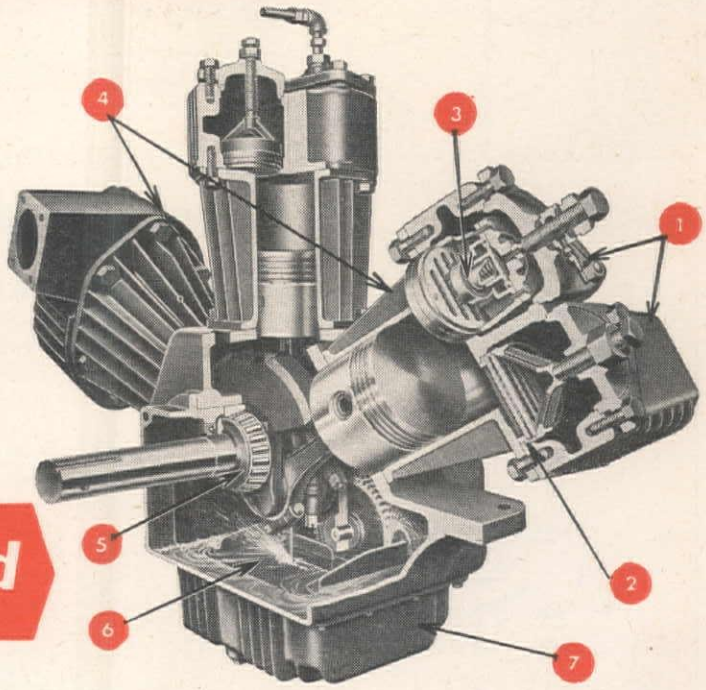
Mack Wooldridge
PRESIDENT

DARREL WOOLDRIDGE
Vice President

BULLDOZERS • ROADBUILDERS • SCRAPERS
TAMPERS • RIPPERS • FARM IMPLEMENTS
FRONT LOADERS

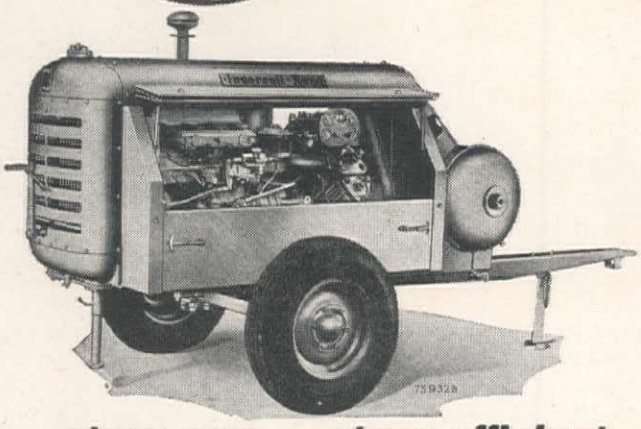
SUBSOILERS • VALVES • HYDRAULIC MOTORS
CYLINDERS • OIL HOSE AND FITTINGS
TRACTOR CRANES • PUMPS

the FINEST COMPRESSOR you can buy in a PORTABLE



two-stage air-cooled

Ingersoll-Rand MOBIL-AIR AIR POWER



stays new... stays efficient

Fifteen years of continuous development and refinement in design and manufacturing methods have been put into this compressor since Ingersoll-Rand originated the first *Two-Stage Air-Cooled* portable . . . the machine that changed the whole trend in portable compressor design.

This fine, rugged compressor is just one of the many cost-saving features in Ingersoll-Rand's new KA-Series MOBIL-AIR.

1. **DIVIDED HEADS** minimize heat transfer from discharge to intake air . . . cooler valves, longer life, higher efficiency.
2. **CHANNEL VALVES** give high efficiency . . . controlled cushioning prevents valve impact . . . valves stay flat and tight . . . last longer.
3. **ALL-METAL FREE-AIR UNLOADERS** eliminate troublesome diaphragms.
4. **TWIN LOW-PRESSURE CYLINDERS** give better balance . . . better cooling.
5. **TIMKEN TAPERED-ROLLER MAIN BEARINGS** provide anti-friction and permanent alignment.
6. **CONSTANT-LEVEL LUBRICATION** is simple, non-clogging, dependable.
7. **FINNED OIL RESERVOIR** helps maintain low oil temperature.

* **TWO-STAGE COMPRESSION** is 15% more efficient than single-stage . . . lowers discharge temperature, avoids carbonization . . . maintains nearly full capacity at altitude.

** **COMPLETE AIR-COOLING** eliminates all water joints . . . simplifies construction, saves weight . . . compressor cooling system is independent of engine.

331-2

DON'T STOP WITH A GOOD COMPRESSOR!

Use the CONTRACTORS' COMBINATION

- Everything you need for rock drilling.
- Top quality machines that work as a team.
- Machines designed, built, sold and serviced by men who know rock excavation . . . application "know how".

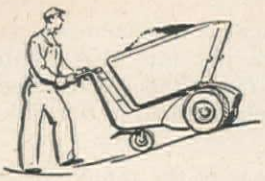
Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

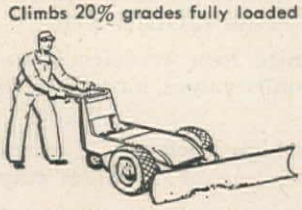
Bucket holds 10 cubic feet . . . 18 with sideboards

Mechanically dumped . . . operates by foot pedal

9-square-foot steel platform takes half-ton loads



Climbs 20% grades fully loaded



50-inch steel blade makes Prime Mover an efficient snow plow

FEATURES:

- gear driven . . . no belts or chains
- fully enclosed engine protected against dirt and moisture
- clutch, engine, transmission all run in oil
- switch from bucket to platform without tools . . . in less than a minute
- turns in its own length (63½"); width 31½"
- 3-gallon tankful of fuel gives 8 hours continuous service

A PRODUCT OF

BELL *Aircraft*

CORPORATION

*Patents & T. M. Reg. Pending Copyright, 1949

The BELL *Prime Mover*

- eliminated cars, track, and skip hoist on tunnel job at Wright Field

VEST & BARTELL, Cincinnati contractors have discovered that Prime Movers not only save time and manpower, but frequently substitute for costlier equipment. This was clearly demonstrated on a 4′x 5′ rock tunnel beneath the gun range at Wright Field. Here Prime Movers functioned right in the tunnel itself . . . hauling broken rock out of the tunnel and up a steep ramp to the surface, and from there to a disposal dump several hundred feet away.

● Combining the features of a giant motorized wheelbarrow, a 9- or 14-square-foot platform truck, and a powerful snow plow, the Bell Prime Mover is an ingenious answer to the problem of cutting costs and reducing labor on construction projects.

With Prime Movers on the job . . . pouring concrete and doubling the productive capacity of wheelbarrow or "buggy" gangs . . . work can be expedited on almost any job. You can take some of the guesswork out of figuring labor costs, for Prime Mover savings provide a cushion against increased labor rates.

All of these facts can be proved conclusively by an on-the-job demonstration. *It took only half an hour at one of these demonstrations for a contractor to sideline six concrete buggies in favor of two Prime Movers on a 160-yard pour. Two men finished the job in 7½ hours.*

If you would like to see a Prime Mover . . . or a "fleet" of them in action, we'll gladly make the arrangements. For more information, please attach this coupon to your letterhead and mail it to us at once.

SEND COUPON NOW

Bell Aircraft Corporation
P. O. Box 1WC2, Buffalo 5, N. Y.

Please send me facts on the Bell Prime Mover. Who is the nearest distributor?

Name.....

Address.....

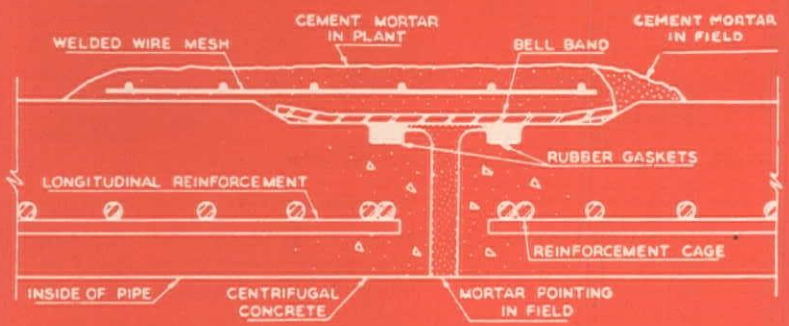
Company.....

City, Zone & State.....

5 BASIC REASONS

why this superior pipe helps reduce the cost of delivered water...

CENTRIFUGALLY SPUN REINFORCED CONCRETE PRESSURE PIPE
with double rubber gasket joints



FOR MODERATE OPERATING HEADS

SIZES 12" TO 48" INCLUSIVE
50 FT. TO 150 FT. HEAD
20# TO 65# PRESSURE

SIZES 51" TO 84" INCLUSIVE
50 FT. TO 100 FT. HEAD
20# TO 45# PRESSURE

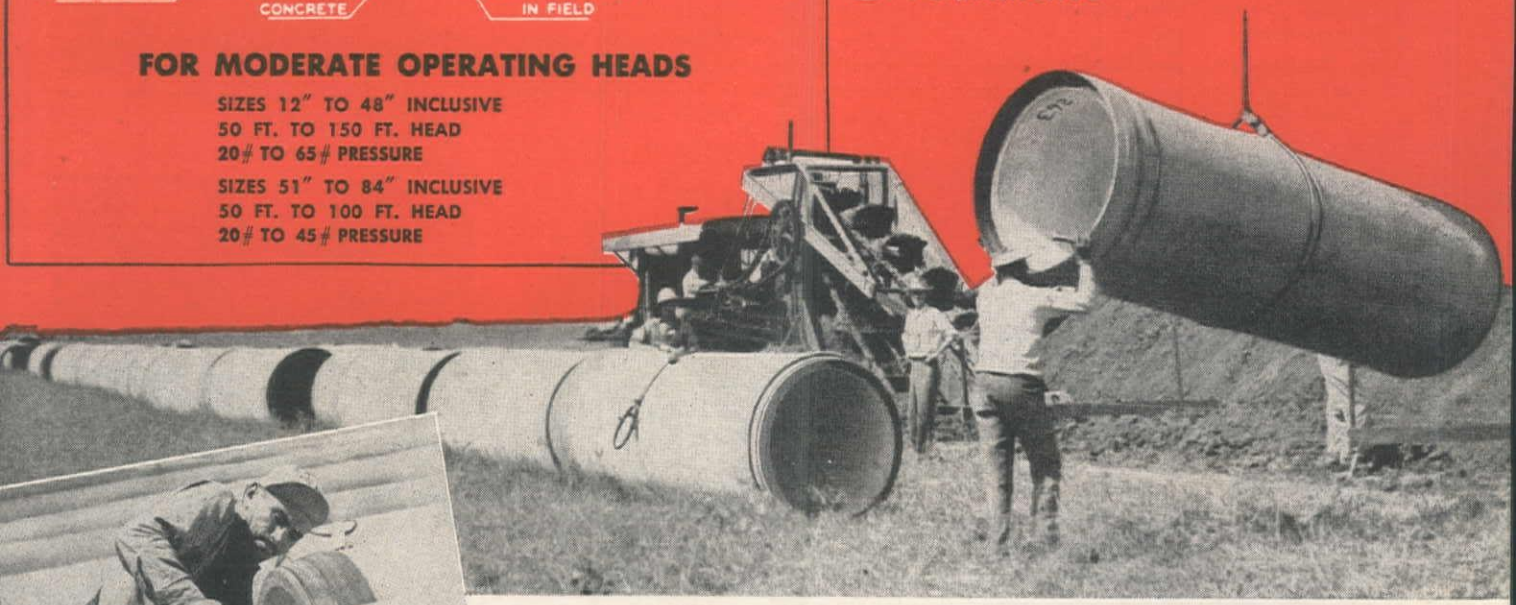
1 *LOW FIRST COST*

2 *EASE OF INSTALLATION*

3 *SUSTAINED MAXIMUM PERFORMANCE*

4 *FREEDOM FROM MAINTENANCE*

5 *PERMANENCE*



The advantages of centrifugally spun reinforced concrete pressure pipe for moderate operating heads (generally under 150') have become well established in this country during the past twenty-five years. High initial and sustained carrying capacity, permanence, and economy are some of the proven characteristics of Hume Centrifugal Concrete Pressure Pipe.

In recent years, development by this company of the Double Rubber Gasket Joint for centrifugally spun pipe has greatly increased its versatility and adaptability. It is proving outstandingly successful in a wide variety of installations throughout the West.

This joint is another example of American's ingenuity and skill in the development of better products for water supply lines. Further information is available upon request.

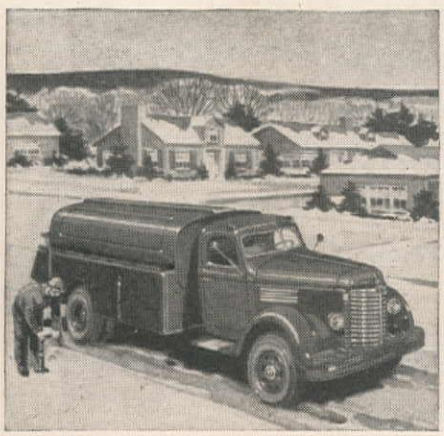
American
PIPE AND CONSTRUCTION CO.

Concrete Pipe for Main Water Supply Lines, Storm and Sanitary Sewers, Subaqueous Pipe Lines.

P. O. Box 3428, Terminal Annex • Los Angeles 54, California

QUALITY PIPE LINE PRODUCTS MANUFACTURED AND INSTALLED BY AMERICAN INCLUDE HUME CENTRIFUGAL CONCRETE PRESSURE PIPE, AMERICAN CONCRETE CYLINDER PIPE, PRESTRESSED LOCK JOINT CONCRETE CYLINDER PIPE, LOCK JOINT CONCRETE CYLINDER PIPE.
Main Offices and Plant — 4635 Firestone Boulevard, South Gate, California — District Offices and Plants — Oakland — San Diego — Portland, Oregon

What it takes to stay heavyweight champ 17 years



1. Real heavy-duty truck reputation!

To haul lots of oil, you pick a he-man truck that's made for the job. You pick a truck with a record of performance that shouts "TOUGH!" You pick an International Truck.

Registration figures show that for 17 straight years Internationals have led the heavy-duty truck field.

2. Real heavy-duty power!

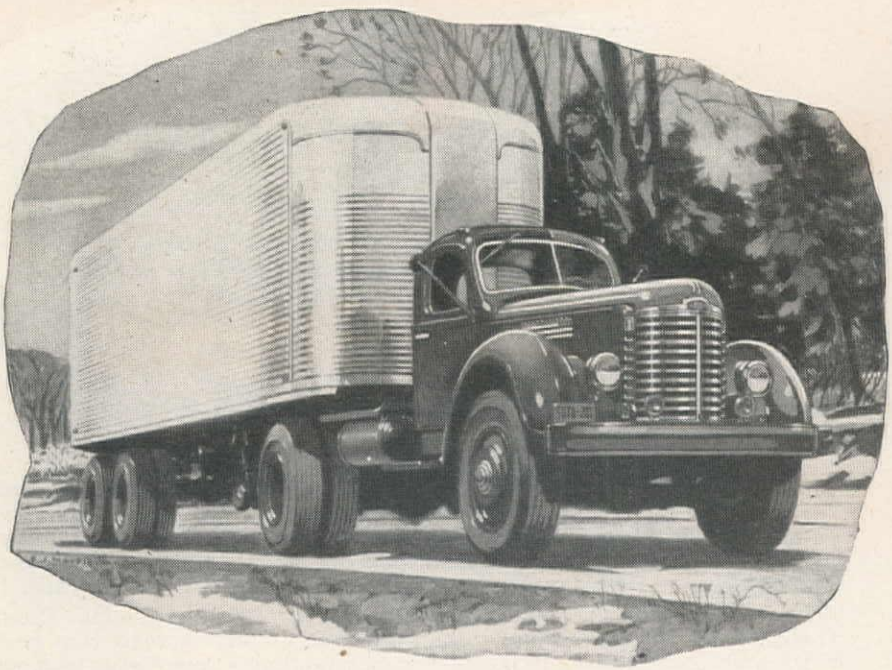
On construction jobs you need a truck that can take a pounding . . . a truck with a powerful engine, a rugged frame, sturdy strength through and through.

You find trucks like that at International Harvester . . . a builder of truck power for 42 years, a manufacturer who knows what tough trucks need.

3. Real heavy-duty truck engineering!

On big logging jobs you need size, brute strength and power . . . *specialized* by people who know your job in terms of trucks.

International heavy-duty trucks are big, tough, powerful—and *specialized* to handle the toughest hauling jobs. That's our engineering tradition.

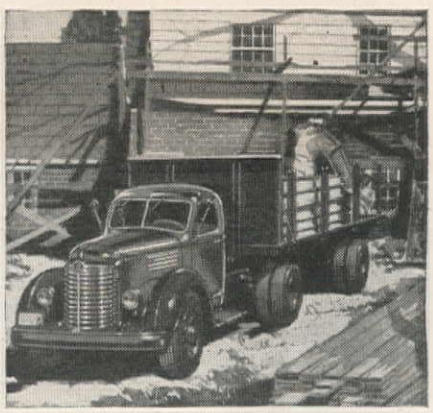


5. That's why International trucks are heavyweight champs for heavy-duty jobs—

For 17 straight years, International heavy-duty trucks have been America's first choice for heavy-duty work. Registration figures prove it. In trucks having gross weight ratings over 16,000 pounds, Internationals are so far ahead of the field that the heavyweight crown carries a Triple Diamond emblem.

Right now, International Dealers and Branches can give you quick delivery on International heavy-duty trucks . . . specialized trucks, engineered and powered for your job.

Your nearest International Truck Dealer or Branch will be glad to send a qualified transportation engineer to analyze your hauling problem, to give you facts and figures on equipment to meet your specific needs, to answer any questions you may have. Call him soon.



4. Real heavy-duty truck stamina!

Housing is a big job where you measure truck toughness by years of getting the work out and keeping the costs down on all hauling operations.

You can count on years of service from International heavy-duty trucks. The nation's largest exclusive truck service organization is set up to keep Internationals operating at peak efficiency, over the long haul.

Other International Harvester Products
Farmall Tractors and Machines
Industrial Power . . . Refrigeration

Tune in James Melton and "Harvest of Stars"
CBS, Wednesday evenings

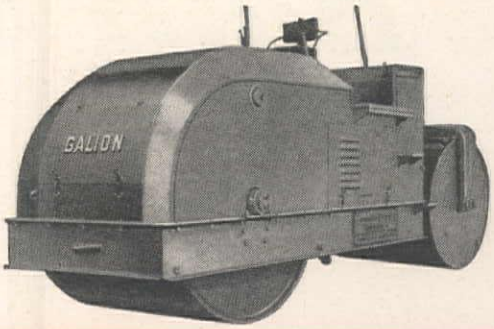
INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY · CHICAGO

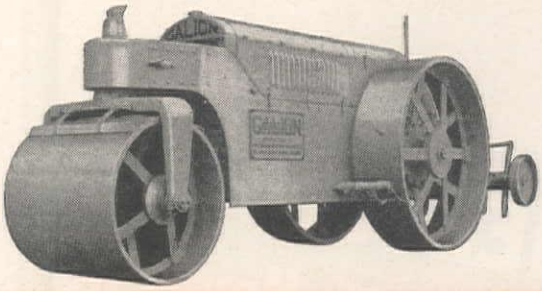
GALION

-an Old Name that Stands for the Newest and Best in

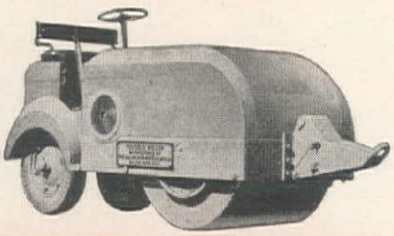
ROLLERS and GRADERS



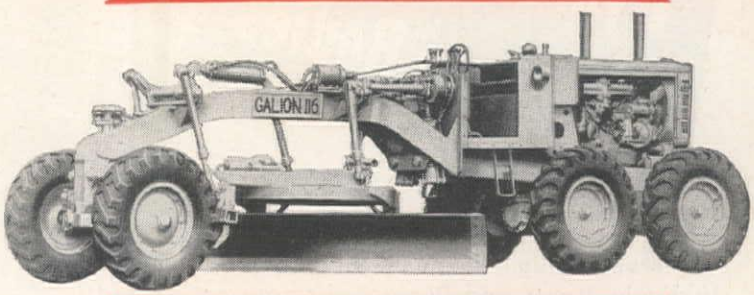
TANDEM ROLLERS, Four Sizes—
variable in weight from 3 to 14 tons.



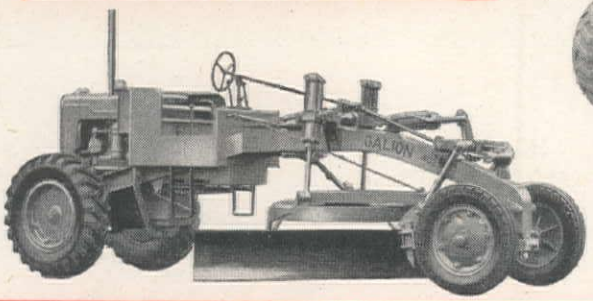
THREE-WHEEL ROLLERS, Five sizes—
6, 7, 8, 10 and 12 tons.



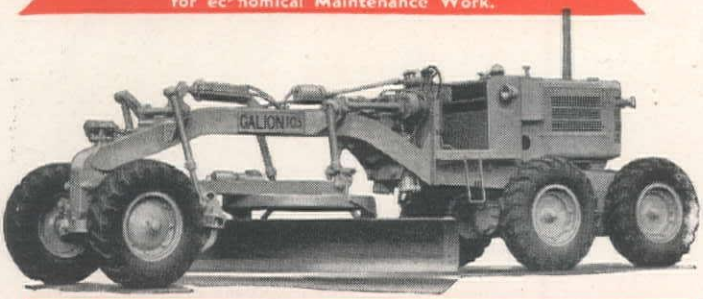
PORTABLE ROLLERS
for Patching and Odd Jobs.



NO. 116 MOTOR GRADER, 100 H. P.
for Extra Heavy-Duty Service.



NO. 402 MOTOR GRADER, 31 H. P.
for economical Maintenance Work.



NO. 103 MOTOR GRADER, 76 H. P.
for Heavy-Duty Service

GALION DISTRIBUTORS

ARIZONA
Phoenix ..... State Tractor & Equipment Co.
Tucson ..... F. Ronstadt Hardware Co.

CALIFORNIA
Los Angeles 11 ..... Brown-Bevis Equipment Co.
San Francisco 7 ..... Western Traction Co.

COLORADO
Denver 1 ..... H. W. Moore Equipment Co.

IDAHO
Boise ..... Idaho Machinery Co.
Salt Lake City 1 ..... Arnold Machinery Co.
Spokane, Wash. ..... Modern Machinery Co., Inc.

MONTANA
Butte ..... Hall-Perry Machinery Co.

NEVADA
Reno ..... General Equipment Co.

NEW MEXICO
Las Vegas ..... Hilton's Incorporated

OREGON
Portland 14 ..... Loggers & Contractors Machinery Co.
Boise, Idaho ..... Idaho Machinery Co.

UTAH
Salt Lake City 1 ..... Arnold Machinery Co.

WASHINGTON
Seattle ..... Pacific Hoist & Derrick Co.
Spokane ..... Modern Machinery Co., Inc
Portland, Ore. ..... Loggers & Contractors Machinery Co.

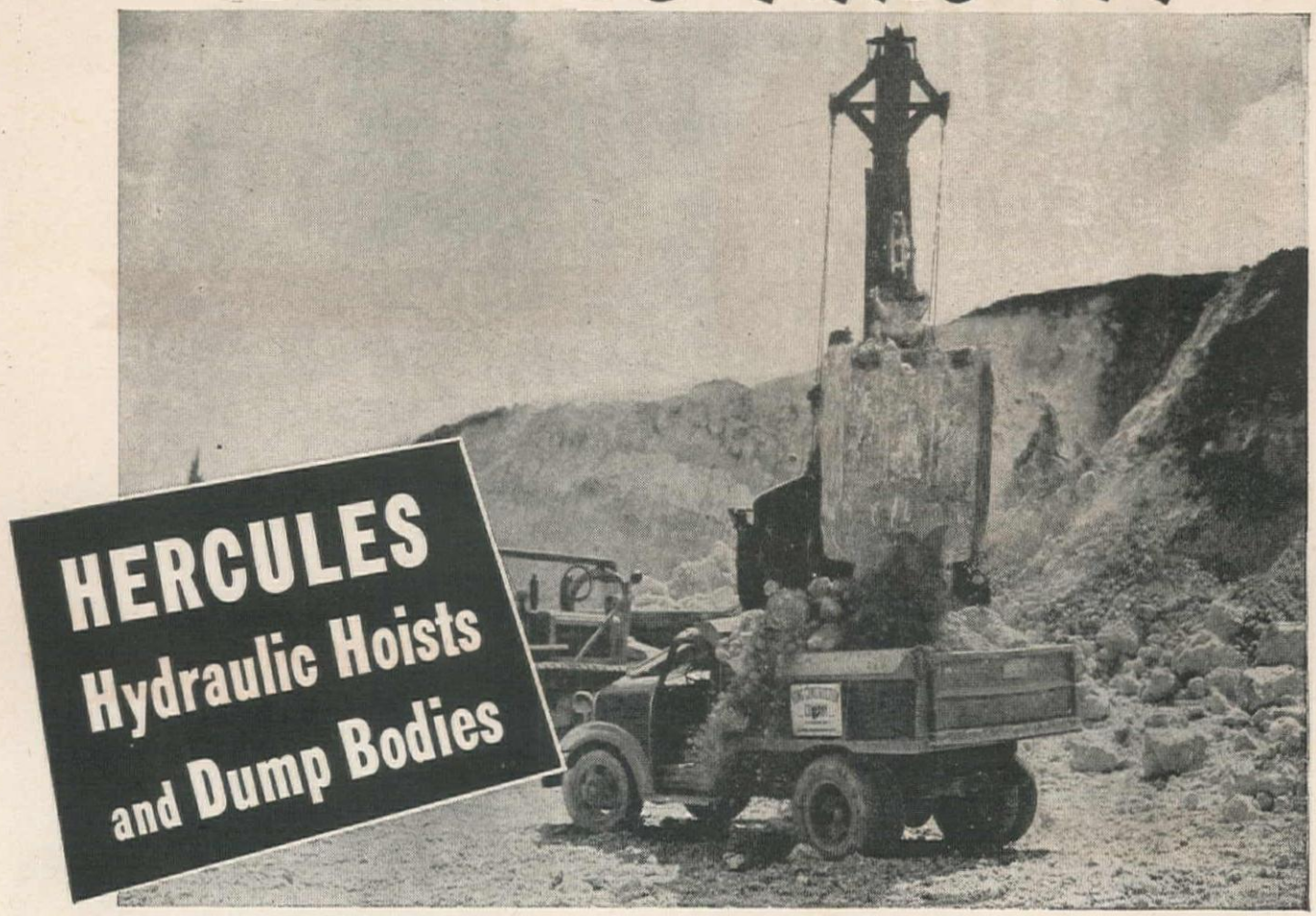
WYOMING
Rapid City, S. D. ..... J. D. Evans Equipment Co.

THE GALION IRON WORKS & MFG. CO.
***General and Export Offices*—GALION, OHIO, U.S.A.**

GALION Estab. 1907

GRADERS · ROLLERS

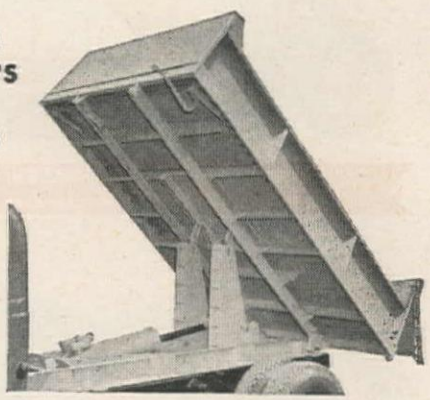
Built to take it!



Built to slug it out on the toughest jobs, Hercules Hydraulic Hoists and Dump Bodies are engineered to provide dependable, economical performance that pays off in profitable operation. Hercules "Center-Lift" Hoists are scientifically designed for maximum lifting capacity, precision-built for smooth, easy operation. And Hercules Dump Bodies, built for the hard usage that's part of any construction job, can take the toughest punishment and come back for more.

If you're up against a difficult hauling and dumping assignment, you'll want to learn more about Hercules Hoists and Bodies . . . built to take it . . . and built to give you the low-cost, maintenance-free performance that means profitable operation. Complete specifications are available without obligation; write today for Bulletin 1-48—your free copy will be sent by return mail.

HERCULES MODEL D-12 CONTRACTOR'S BODY *with Hercules 100CD Hoist*



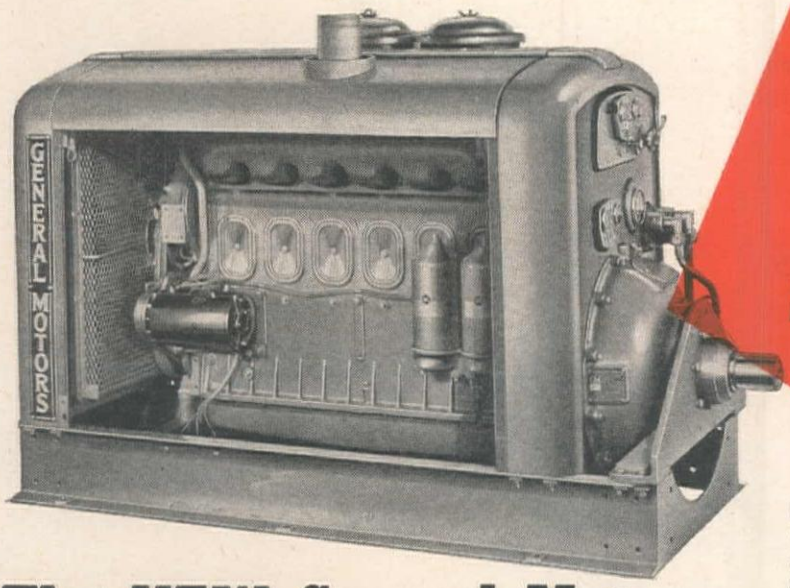
Sturdy, all-around unit built for heavy-duty service. Pyramid type enclosed steel side braces; full length running boards; sturdy underbody construction, with cross-members and longitudinals welded into an integral unit. Capacities to meet individual job requirements.

LIFT WITH EASE— USE

Hercules

STEEL PRODUCTS CORPORATION • GALION, OHIO

General Truck Equipment Co., 746 South Central, Los Angeles 21, Calif.; A. Pasteris Co., 2200 Wood St., Oakland 7, Calif.; The Colorado Builders' Supply Co., 324 S. Broadway, Denver 9, Colo.; Western Construction Equipment Co., 505 North 24th St., Billings, Mont.; Western Construction Equipment Co., Stephens & Mount Aves., Missoula, Mont.; The Harry Cornelius Co., 1510 N. Second St., Albuquerque, N. M.; Newell Truck Equipment Co., 316 N. Russell St., Portland, Ore.; Wagstaff Co., 1755 Beck St., Salt Lake City 3, Utah; South Tacoma Welding Equipment Co., 7047 S. Tacoma Way, Tacoma 9, Wash.; Western Equipment Co., 4009 Fairview Ave., Boise, Idaho; Western Equipment Co., P. O. Box 96, Lewisville Road, Idaho Falls, Idaho; Western Equipment Co., 3400 Olive Street, Spokane, Washington; Glendale Motors, Inc., 165 E. Grant Ave., Glendale, Ariz.

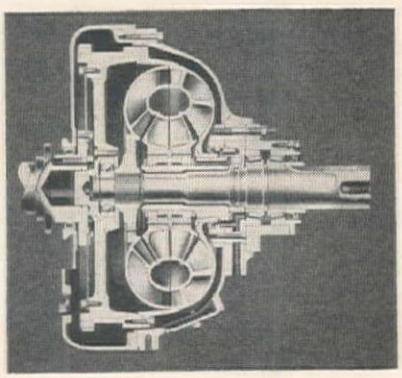


A Combination Torque Converter and Fluid Coupling *Integral with the Engine*

General Motors 71 Diesels equipped with the new GM Torque Converter take up no more space or weight than the same engines with conventional friction clutch and power take-off. Available in 3-, 4-, and 6-cylinder single engine units, Twin 4 and Twin 6 models having engine ratings from 75 to 300 H.P.

The NEW General Motors DIESEL ENGINE-TORQUE CONVERTER UNIT

HERE is a complete, integrated Diesel engine-torque converter unit that combines the inherent efficiency of the GM 2-cycle Diesel engine with the features and advantages of *both* torque converter and fluid coupling. It provides *torque multiplication up to 4 to 1* for starting variable heavy loads. It also provides *highly efficient transmission of power* during light load periods by *automatically shifting to fluid coupling* in the upper speed range.



In the new GM Torque Converter, oil does the work. Automatic transition from torque multiplication of 4:1 at stall to 1:1 in upper speed range.

A smooth, uninterrupted flow of power, delivered through a liquid, *prevents engine stalling* under any load and *protects both engine and driven machinery from sudden shocks.*

One Manufacturer—One Responsibility

Up to now most engines and hydraulic drives have been separate units. The result—compromise designs and divided responsibility. Now General Motors offers a new torque converter specifically designed and manufactured as an integral part of the General Motors Series 71 Diesel engine. It is a self-contained unit built by one manufacturer providing a long needed saving in space and weight as well as certain desirable operating characteristics not available before.

This new power unit will get the most work done in the least time because the engine operates in its most efficient speed range at all times—delivering maximum engine horsepower regardless of the speed of the load. *Maximum torque to start heavy loads PLUS maximum horsepower to keep the load moving.*

Everyone with a hard job to do in the oil fields, in construction, in mining or in logging should have all the facts about this compact, flexible GM Diesel Engine Torque Converter unit. *Write today for a complete description.*

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES . Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS.. Up to 800 H.P.

GENERAL MOTORS

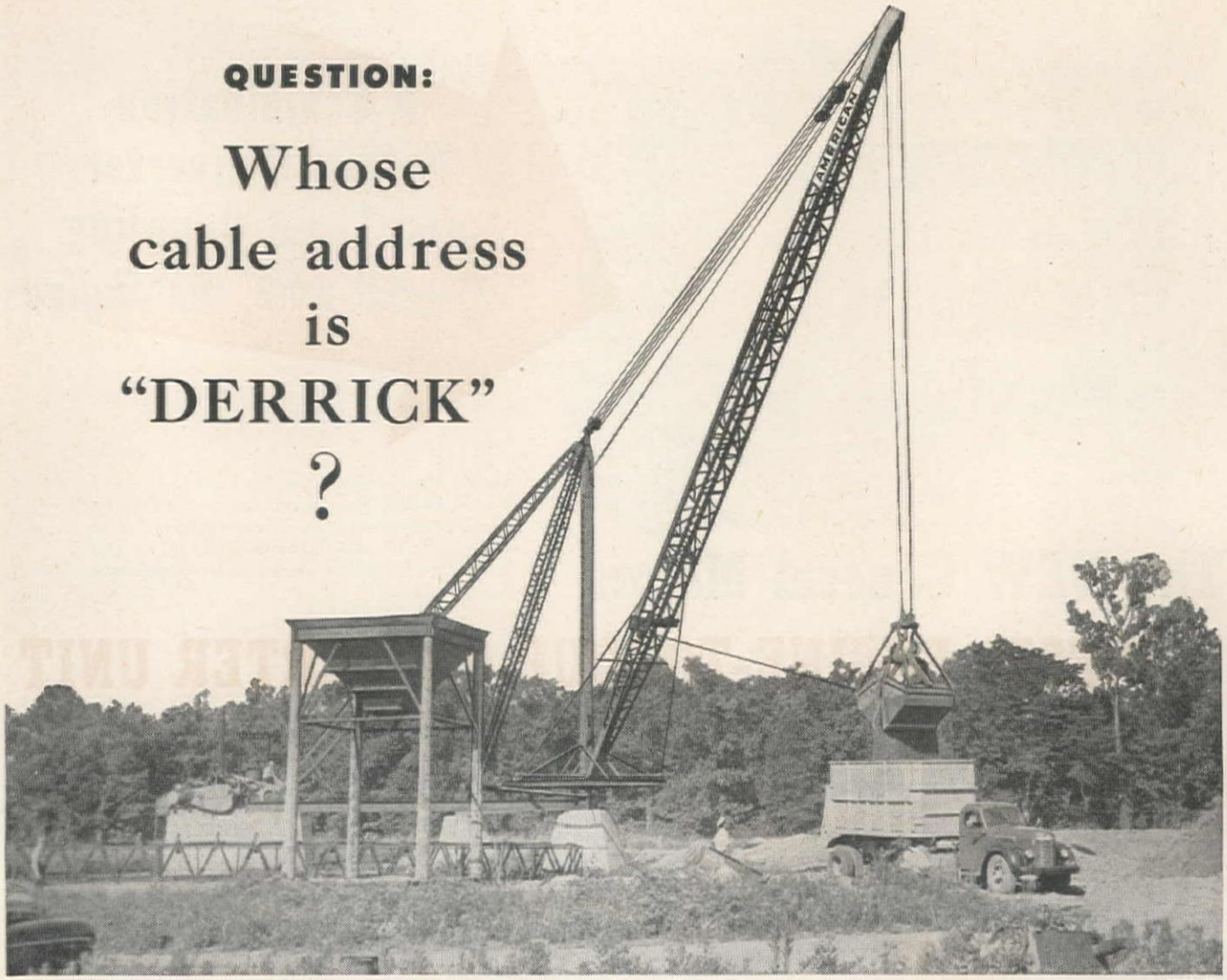
GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

Evans Engine & Equipment Co. SEATTLE 9, WASH.
Cate Equipment Co. SALT LAKE CITY, UTAH
Fred M. Viles & Company SPOKANE 8, WASH.
Mountain Tractor Co. MISSOULA, MONT.
Gunderson Bros. Equipment Corp. PORTLAND 9, ORE.
Olson Manufacturing Co. BOISE, IDAHO
Capitol Tractor & Equipment Co. SACRAMENTO, CALIF.
Anderson-O'Brien Co. LOS ANGELES 21, CALIF.

QUESTION:

Whose cable address is "DERRICK" ?



9201-D

From Johannesburg, South Africa or Point Barrow, Alaska . . . from Brisbane, Australia or Copenhagen, Denmark . . . if you want the best possible help in moving materials at lowest cost, just send a cable message with the simple address "DERRICK"!

All over the world, construction men know that "DERRICK" is the cable address of American Hoist and Derrick Company, at St. Paul, Minnesota or South Kearny, New Jersey. And that's an easy way for you, too, to remember that this organization has had more derrick experience than you'll ever need in a lifetime.

What kind of a derrick will you need next? Perhaps a stiff-leg, of the type shown here, for handling loose materials. Perhaps a steel erector. Perhaps something special—a big gallows frame, or gin pole, or a barge derrick. Whatever it may be, you can be sure that American Hoist has built it before, and knows how to build it *right*.

Your inquiry addressed to "DERRICK" brings you quick, intelligent service backed by a large staff of engineering specialists, and the facilities of derrick shops second to none. Our line is the most complete offered anywhere—derricks of all types, all sizes, from 3 to 250 tons capacity. Would you like more information? Write today for catalog.

ANSWER:

American Hoist

and DERRICK COMPANY

St. Paul 1, Minnesota

Plant No. 2: So. Kearny, N. J.

Distributed by—

COAST EQUIPMENT CO. ..... **San Francisco, Calif.**
CONSTRUCTORS EQUIPMENT CO. ..... **Denver, Colo.**
CONTRACTORS EQUIPMENT & SUPPLY CO., **Albuquerque, New Mexico**
HALL-PERRY MACHINERY CO. ..... **Butte, Mont.**
HARRON, RICKARD & McCONE CO., of Southern California ..... **Los Angeles, Calif.**
THE LANG CO. ..... **Salt Lake City, Utah**
NEIL B. McGINNIS CO. ..... **Phoenix, Arizona**
STAR MACHINERY CO., Spokane, Seattle, Yakima, Wash.; Portland, Ore.

Digging . . . Loading . . . Mowing . . .

Holes for posts or plantings are dug in a jiffy with earth auger mounted on the Model "VAI."

IT'S A MAN SAVER

▲ This "VAI" tractor is equipped with scarifier, scraper, and loader—a complete earth-working outfit.

◀ Mowing more miles per man-hour with new hydraulic-control Case highway and airport mower.

See your Case Industrial Dealer

State Tractor & Equipment Co.....Phoenix, Arizona
Brown-Bevis Equipment Co.....Los Angeles, Calif.
Coast Equipment Co.....San Francisco, Calif.
Mitchell's .....Bakersfield, Calif.
Liberty Truck & Parts Co.....Denver, Colo.
Western Equipment Co.....Boise, Idaho, and Spokane, Wash.
Hilton's Inc.....Las Vegas, New Mexico
Nelson Equipment Co.....Portland, Ore. - Seattle, Wash.
Robison Machinery Co.....Salt Lake City, Utah
Wortham Machinery Co.
Cheyenne, Sheridan and Greybull, Wyo. - Billings, Mont.

CASE

You can pretty well forget spades, shovels and scythes when you have a Case "VAI" tractor with equipment such as shown here. Compact and nimble-footed the "VAI" works swiftly in spots too snug for ponderous machinery. Low in cost, such an outfit . . . both tractor and its mounted equipment . . . bring the economy of complete mechanization to smaller jobs and smaller operators. It makes clean work so easy that there's little hand finishing left.

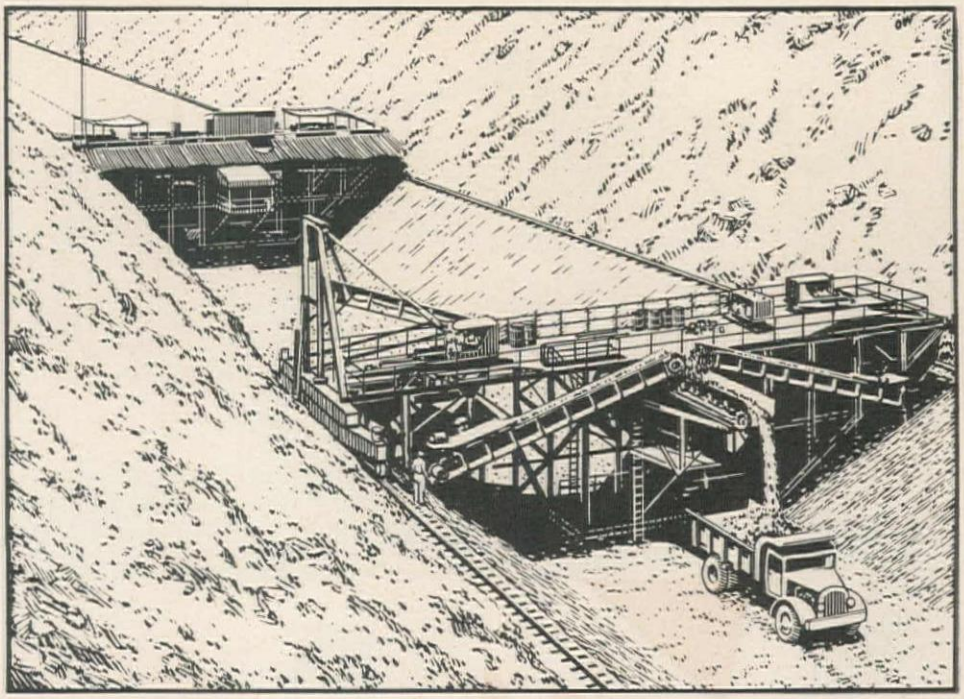
Like the larger Case tractors, the "VAI" has a heavy-duty, Case-built engine. The way it pulls stronger when slowed down is an advantage in picking up heavy loads and getting around in close quarters. It saves a lot of clutching and gear shifting. It is a main reason for Case ENDURANCE—the ability to run long hours without faltering, long years with little maintenance.

Case industrial tractors are built in four basic sizes, from 2500 to more than 10,000 pounds. All have extra strength, stamina and stability for sustained performance under mounted equipment.

SPECIAL PURPOSE CEMENTS

Case No. 175

THE DELTA-MENDOTA CANAL



STANDARD PORTLAND

MODIFIED PORTLAND

HIGH EARLY

LOW HEAT

SULPHATE RESISTANT

PRONTO

PORTLAND POZZOLAN

BRICK MIX

PLASTIC CEMENT

OIL WELL CEMENT

Permanente Low Alkali, MODIFIED PORTLAND CEMENT

Aggregates available for use during the construction of the 120-mile Delta-Mendota Canal, in California, showed evidence of being reactive, if used with high alkali content cements. Also the ground in which the concrete was to be laid, contained moderate amounts of soluble sulphate salts. Good construction practice, therefore, indicated the use of Low Alkali, Modified Portland Cement.

MORRISON-KNUDSEN CO., Inc., & M. H. HASLER; STOLTE, Inc., The DUNCANSON, HARRELSON CO., RALPH A. BELL and UNITED CONCRETE PIPE CORPORATION, General Contractors for various segments of the Canal, selected PERMANENTE LOW ALKALI, MODIFIED PORTLAND CEMENT as the cement best suited for use under these conditions. To date, more than 300,000 barrels have been used on the project.

PERMANENTE LOW ALKALI, MODIFIED PORTLAND CEMENT is recommended for use in areas where ground waters contain sulphate salts, which slowly disintegrate ordinary concrete. Concrete made with this special type Permanente Cement, resists such corrosive action; eliminating costly protective measures and excessive maintainence work.

Permanente Low Alkali, Modified Cement conforms to ASTM and Federal Specifications for Type II cement.

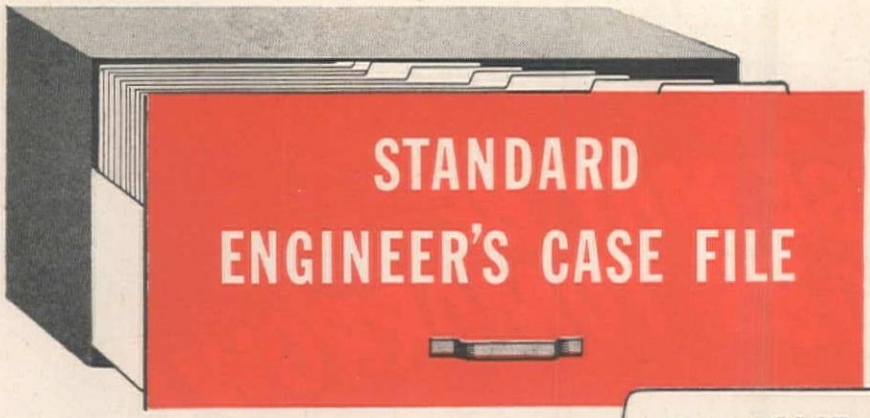
PERMANENTE CEMENT COMPANY

On the job - On time

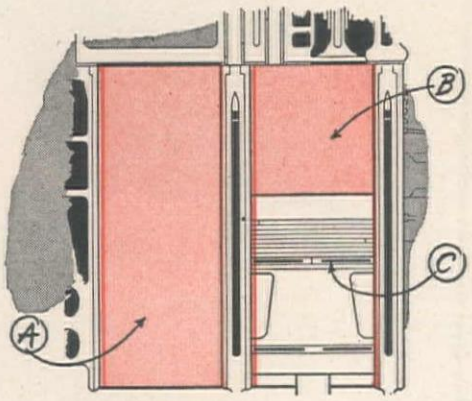
PERMANENTE CEMENT COMPANY

PERMANENTE, SANTA CLARA, DIAMOND, YOSEMITE AND KAISER BRANDS OF PORTLAND CEMENT AND PERMANENTE LIME PRODUCTS

OAKLAND · SEATTLE · HONOLULU



Case D119E--Reducing Wear on Liners in Diesels



DIESEL ENGINE LINERS AND PISTON

In high-speed Diesel engines lubricated with RPM DELO Diesel Engine Lubricating Oil, wear on liners was held to a minimum with little variation over their entire areas. A constant lubricating film was maintained on them even in high-temperature belts. RPM DELO Oils are recommended for all types of Diesels. Come in all viscosity grades necessary for your engines.

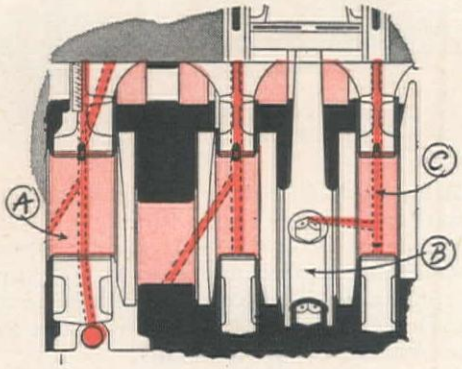
A. Special additive provides metal-adhesion qualities...keeps oil on all parts whether hot or cold, running or idle.

B. An anti-oxident resists formation of lacquer—resistance to extreme heat provides lubrication in the toughest conditions.

C. Contains detergent which keeps rings clean and operating freely...prevents scratching and gouging of liners.

RPM DELO Diesel Oil will not corrode any bearing.

Case D119F--Prolonging The Lives of Diesel Bearings



SECTION OF DIESEL ENGINE CRANK AND CAM

No bearing failures occurred between overhaul periods in Diesel engines used in the toughest service when they were lubricated with RPM DELO Diesel Engine Lubricating Oil.

A. Non-corrosive to all types of bearing metal...inherent ability of base stocks and added compound resist oxidation and formation of acid which is common cause of bearing corrosion.

B. Maintains a tough lubricating film which withstands excessive shocks and pressures.

C. Special detergent compound keeps oil passages clean and open - allows free flow of lubricant to vital points.

Another compound in RPM DELO Oil prevents foaming of the oil. An accurate measurement of crankcase levels can always be obtained.

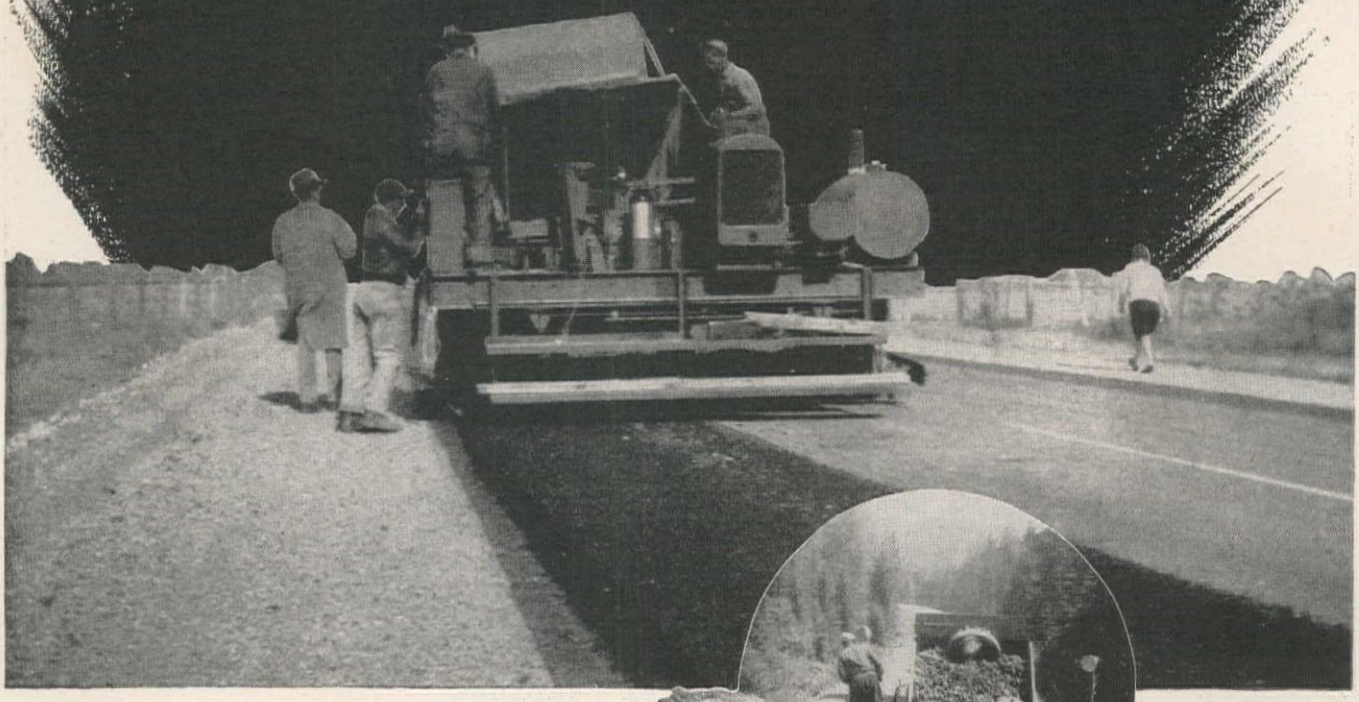
STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20, California.

STANDARD OF CALIFORNIA

DIESEL ENGINE RPM DELO LUBRICATING OIL

Trademark Reg. U. S. Pat. Office

THESE MAY BE YOUR JOBS TOMORROW!



WHEN you buy a Black Top Paver remember if it is going to make money it must be kept busy. Look at these jobs!

The top one was a widening job with hot mix. Note the "feathered edge" at the right, which allowed rolling right into the old crown without worrying about excess. This is one of the advantages of the Adnun Cutter Bar adjustment and the Divided Hopper.

Look at the other job — handling trucks at 6500 ft. elevation and laying 2 to 4 in. rock on grades. These are just some of the advantages that make the Adnun a better buy—it has the versatility that permits you to fit it into a wide variety of work and keep it busy.

The Adnun will take the punishment of heavy work without constant rebuilding. It has the power to handle heavy trucks. Hydraulic controls make operation smooth and easy. It lays stone, cinder, clinker, sand, soil cement and hot or cold asphalt. Don't tie yourself up with a "one-job" machine. Ask for complete details.

THE FOOTE COMPANY, INC.

1940 State Street — Nunda, New York

Subsidiary of Blaw-Knox Co.

ADNUN

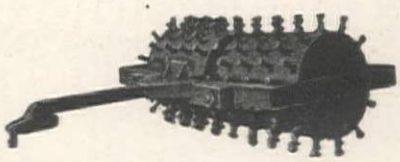
TRADE MARK REGISTERED

BLACK TOP PAVER

BULLDOZERS & TRAILBUILDERS

LOADERS

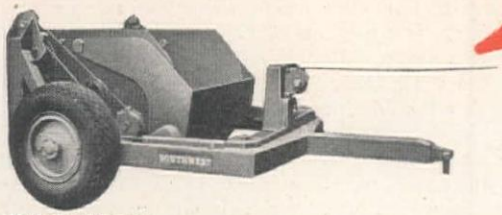
RIPPERS



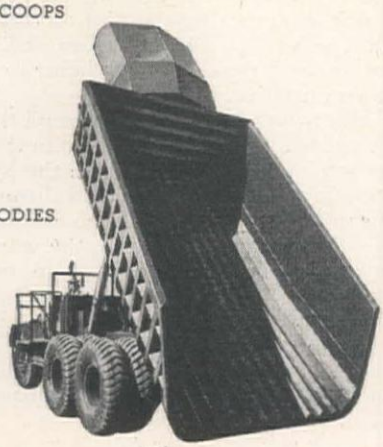
TAMPERS

SOUTHWEST Construction Equipment *for every job!*

POWER CONTROL UNITS



HAULING SCOOPS



DUMP BODIES

Southwest's complete, standardized line affords construction men an opportunity to fill their needs from one dependable source. From start to finish, no matter whether Allis-Chalmers, Caterpillar, International or Cletrac tractors are used, an economical Southwest unit is available to bring you increased profits.

In addition to the standard line, special Southwest Dump Wagons, Tampers, Heavy Duty Compaction Units, etc., are giving outstanding performance on out-of-the-ordinary jobs all over the country . . . Why not let Southwest help solve YOUR problems?

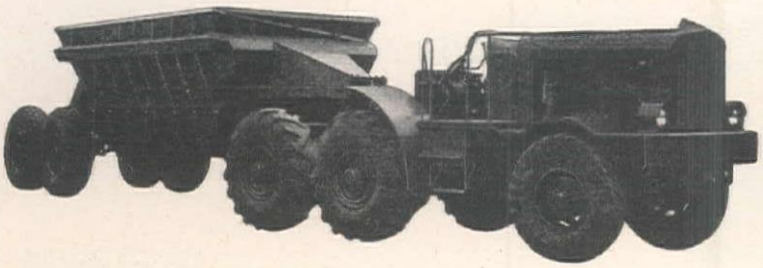
FOUR WHEEL SCRAPERS

CONSTRUCTION MACHINERY DIVISION

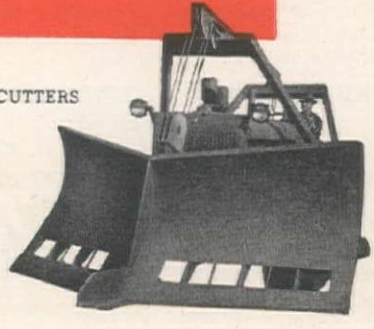
Southwest Welding & Manufacturing Company

ALHAMBRA, CALIFORNIA

BOTTOM DUMP WAGONS



BRUSHCUTTERS



LONG TIMBER PILES Driven Under Water

McKiernan-Terry No. 9-B-3 Double-Acting Hammer drove 894 fir piles 72 to 78 feet long, under water, for the foundation of a concrete lock through the East Atchafalaya Basin protection levee at Bayou Sorrel, La. *R. Thomas McDermott & Co., Inc., contractors.*

This lock, cut through a levee, forms a link that permits uninterrupted navigation between the Mississippi River and the Gulf Intracoastal Waterway, lying west.

In telescopic leads the 9-B-3 McKiernan-Terry Double-Acting Hammer, submerged, drove 78-foot piles to 29-foot cut-off below water, or until the point of pile was within one foot of the bottom of the excavation. Later, this hammer drove steel sheet piling for cut-off walls. The hammer and pile driving rig were powered by two Lambert-National Engines and oil fired boilers—products also of McKiernan-Terry Corporation.

This difficult project is typical of countless jobs for which engineers and contractors unhesitantly select McKiernan-Terry Pile Hammers. For the standard McKiernan-Terry line of ten double-acting hammers, five single-acting hammers and two double-acting extractors gives a choice in size and power to meet any specific needs.

FURTHER INFORMATION — Send for latest literature giving specifications, etc. on McKiernan-Terry Double-Acting and Single-Acting Pile Hammers.

McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
16 PARK ROW, NEW YORK 7, N. Y.

MK-263

McKiernan-Terry
PILE HAMMERS AND EXTRACTORS

The Editor's Mail . . .

Reclamation Convention Repercussions

Dear Mr. Server:

I have just read your article in the December, 1948 "*Western Construction News*," entitled "Indecisiveness at Reclamation Meet" and want to commend the forthright and objective manner in which you treated this subject. I think you have done a fine service to the Reclamation Association and speaking as one member, that service is appreciated.

Very truly yours,

W. L. CHADWICK,
Manager of Engineering Department,
Southern California Edison Co.

Los Angeles, Calif.

Dear Mr. Server:

I feel that you have made a contribution to a sound approach to the reclamation program by your comment on the convention of the National Reclamation Association at Oklahoma City, not only in this issue, but several times previous during the past year, as I have been a careful follower of your writings.

I am sure you agree with me that the Straus outburst at Oklahoma City, in the most tolerant interpretation, was entirely uncalled for. First of all, he was our guest. Second, he was talking to the organization which has been, at least in a considerable measure, responsible for the great success in expanding the program of reclamation through the agency he heads; and finally, of course, the statements he made, especially with the conclusions he undoubtedly wanted to convey to his listeners, were wholly unjustified from the standpoint of veracity.

The unfortunate situation is that up to this time, at least, it has served no useful purpose. If our Association is to continue to function constructively we must have our membership and our directors united and furthermore, it is inescapable that we work with the Bureau of Reclamation. Both of those came dangerously close to being tossed overboard at Straus's own initiative.

I have been trying desperately through the past few weeks to get this situation corrected without in the slightest degree sacrificing any of the integrity which the National Reclamation Association has earned for itself through years of service, and I can assure you that it is no easy task. Progress has been made, however, and I believe the way is now open for our enlarged legislative committee to proceed constructively with the consideration of proposals to be laid before the 81st Congress. We are having an organization meeting in Denver the first three days of next week, in which officials representing the Bureau from Washington will participate. I am hopeful that out of that conference will come some real constructive determinations.

Let me thank you again for your interest in western development. I sincerely hope that we may continue to count on you to work with the National Reclamation Association in a manner which will contribute to sound development of our western natural resources, and at the same time preserve our American way of life. I shall be glad to hear from you at any time, and may this message carry with it my sincere good wishes for a most happy and prosperous new year.

Sincerely yours,

HARRY E. POLK,
President, National Reclamation Assn.

Williston, N. Dak.

Thank YOU!

Dear Sirs:

Inclosed you will find our check for $7 for a two-year subscription to your magazine, which we think is a wonderful magazine in every respect.

Thanking you once again, we remain,

Yours truly,

New Castle, Colo. ADAIR RIPPY.

NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM!

CHOOSE . . . as others have — THE MODEL THAT BEST FITS YOUR NEEDS!

There's a Schramm Air Compressor, size and model, to meet your specific needs!

Below are listed nine of the many Schramm models, portables ranging from 20 to 420 cu. ft. of actual air, the stationary ranging from 2 to 600 cu. ft. displacement.

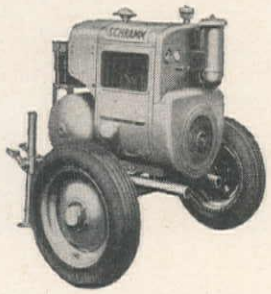
On all models performance records are evidence of their high quality. You will find the name Schramm written on every important page in compressor history.

Features you get in Schramm are: 100% water cooled, assuring ideal performance summer and winter; mechanical intake valve, forced feed lubrication, and electric-starter starting. All Schramms are compact, lightweight, easy to operate.

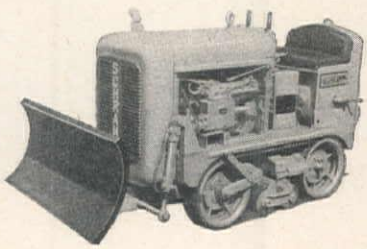
We invite you to write today for fully illustrated catalog describing in detail each of the Schramm Air Compressors shown here . . . plus a wide range of other models. We feel the Schramm story is a good one, and offers you a sure way to get your many compressed air jobs done quickly, efficiently, and economically.

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA



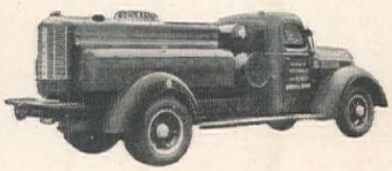
20/35 Model Compressor



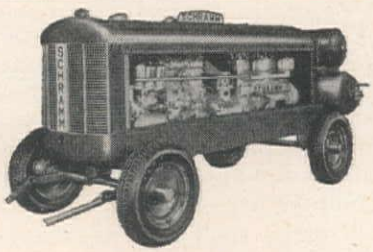
Self-Propelled With Hydraulic Backfill Blade

Two-Wheel Trailer Mounting with Tool Boxes

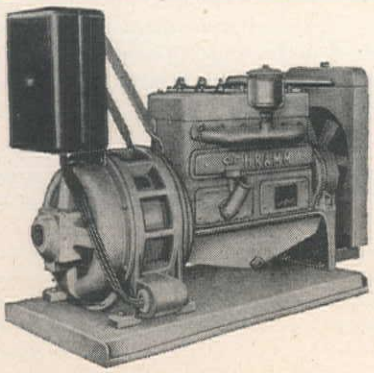
Skidded for Truck Mounting



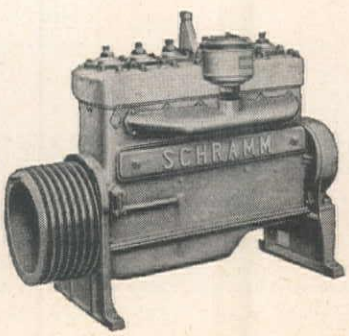
Truck Mounted



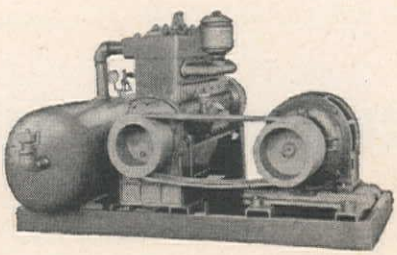
Diesel Engine Drive



Built-in Motor Drive with Cooling Unit and Starter

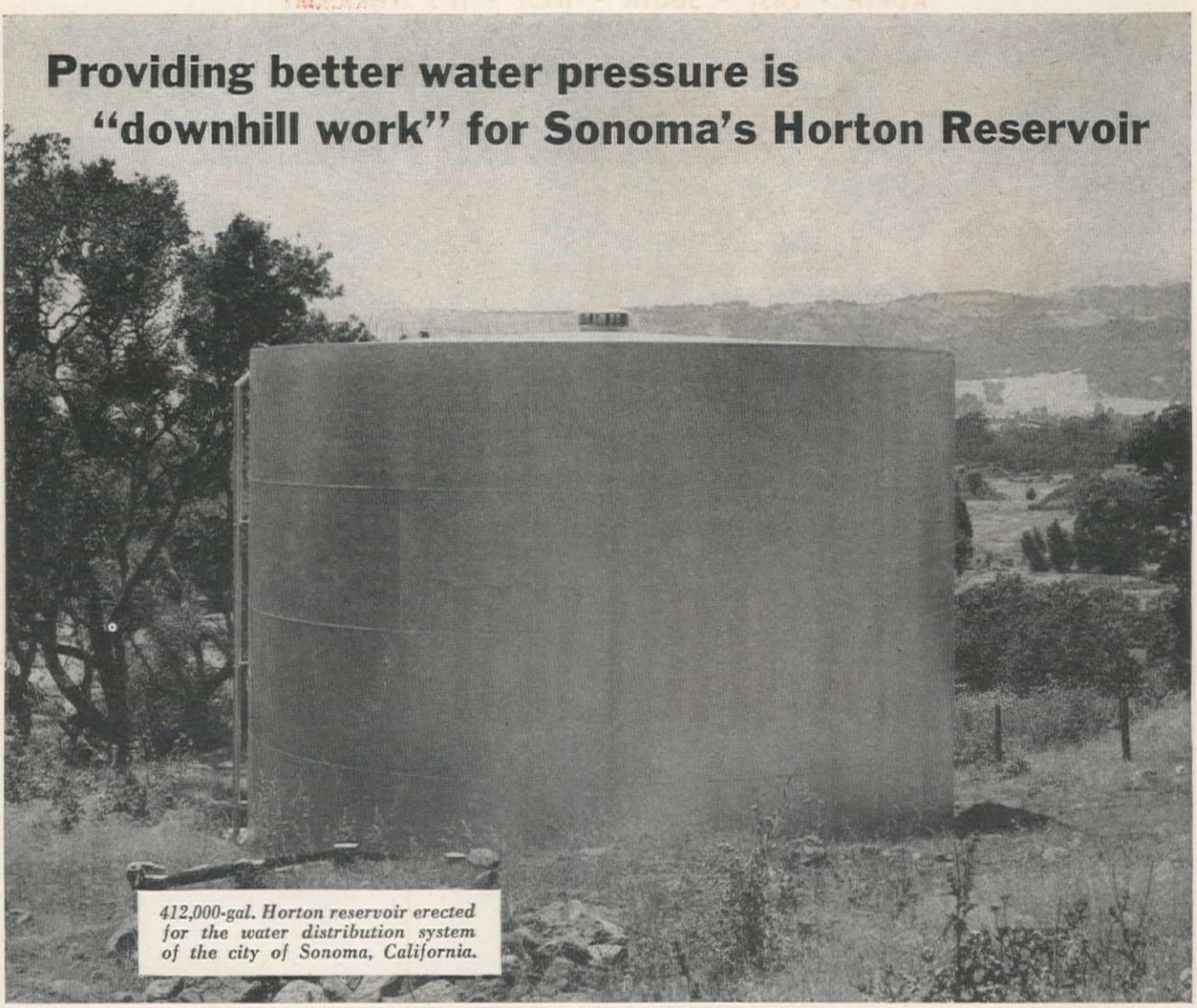


"V" Belt on Flat Pulley Drive



"V" Belt Drive with Air Receiver

Providing better water pressure is "downhill work" for Sonoma's Horton Reservoir



412,000-gal. Horton reservoir erected for the water distribution system of the city of Sonoma, California.

WHEN A natural elevation is available, Horton welded steel reservoirs can be erected to improve a water distribution system by providing the same benefits as elevated storage. The gravity water supply will maintain more uniform pressure in the mains, will help the pumping equipment to meet peak loads, and will reduce power costs by spreading a part of the pumping over hours when electrical rates are lowest.

Welded steel reservoirs mean lower maintenance costs, too—their smooth surfaces are kept in good condition by regular painting. The welded seams are made water tight and stay water tight even though uneven settlement takes place.

Ask our nearest office for estimating figures.

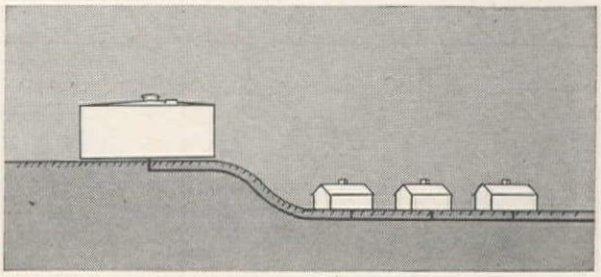


Diagram showing how a ground-level reservoir can be located to provide gravity water pressure for a municipal distribution system. Horton reservoirs for this kind of service are built with capacities up to 10,000,000 gallons.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2183 Healey Building	Detroit 26.....Lafayette Building	Philadelphia 3.....1700 Walnut Street Building
Birmingham 1.....1598 North Fiftieth Street	Houston 2.....National Standard Building	Salt Lake City 1..1555 First Security Bank Building
Boston 10.....201 Devonshire Street	Havana.....402 Abreu Building	San Francisco 11.....1213-22 Battery Street
Chicago 4.....McCormick Building	Los Angeles 14.....1444 Wm. Fox Building	Seattle 1.....1355 Stuart Building
Cleveland 15.....Guildhall Building	New York 6.....165 Broadway Building	Tulsa 3.....Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

February 15, 1949

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 24, No. 2

J. M. SERVER, JR. . . . . Editor
J. J. TIMMER . . . . . Managing Editor
R. C. CLARK . . . . . Assistant Editor

Totalitarianism Threatens the West

HALF-WRITTEN, we're discarding the editorial we began in what were supposed to be "scholarly terms," analyzing the new Truman term as President. When we're not thinking "scholarly" thoughts, it's hard to write in scholarly words.

Instead, we want to go on record expressing our complete disgust at the Washington spectacle today, where we see the President (in respect for the office we still capitalize the word) reduced to the position of errand boy for the CIO and AF of L. It is an undenied fact that leaders of these unions called on him just prior to the delivery of his State of the Union address, and laid on his table a series of matters they wished him to include in his statement of policy. **And those points appeared in his message.**

Among them was the socialization of industry, following England's example and starting with the steel business. The fact that England is a destitute country, begging for handouts and military aid, seems not to matter. Then federalization of housing, in spite of the fact that since the war the private building industry has produced nearly 3,000,000 new city and farm homes. Too, he asks re-imposition of rationing and price controls, the weapons with which the iron grip of dictatorship is implemented.

But as we write this, Mr. Truman has just instructed Charles S. Murphy to write a Columbia Valley Authority bill. It would be the first of a series covering every American basin. Of course he does this contrary to a statement he made to the 1945 convention of the National Reclamation Association, but then politicians, particularly those who seek autocratic power, seldom remember such things. He does so, too, against the judgment of the Senate committees of the 79th Congress (Democratic) who vigorously exposed the fallacies of the Authority issue after MVA hearings.

He does so, too, against the wishes of the governors of Idaho, Oregon and Washington, the states most concerned; against the opinion of the National Reclamation Association and the state associations, who are familiar at first hand with the problems and needs of the area; against the judgments of Army Engineers, Chambers of Commerce, farmers, and Americans.

Somebody must favor it, of course. Who? Well to start with (and nearly to end with), the CIO of the northwestern states and the state Granges. Sen. Taylor of Idaho, of course —he was Henry Wallace's running mate in the last election —and Congressman Mitchell of Washington. It seems odd that the supporters of the Authority are those who generally support all of the Communist "party line."

Although Govs. Robins of Idaho, Langlie of Washington and McKay of Oregon have all spoken out against such an Authority, the latter expressed it most succinctly when he said, "What's the matter with the way we're doing it now? That's the American system. We don't need to delegate authority to a board or commission to regulate the economy of the northwestern states."

WITHOUT AN AUTHORITY, under the American system, the Northwest has built the biggest dam in the world, the largest hydroelectric generating plant in the world, the great atomic energy plant that won the war, a great aluminum industry, one of the world's largest irrigation projects, and other landmarks of free enterprise.

In the words of W. Otto Born, president of the Spokane Chamber of Commerce: "No part of the United States has developed more rapidly or more soundly . . . due in a great extent to the high caliber of its citizenship, which has believed in the American way of life and supported and maintained the American principles of freedom."

Why should development like this be dragged down to the level of an impotent England or, even worse, a totalitarian Russia?

More Power Politics

AND WHILE we're talking about the power of government bureaus to hold back or hamper development, or to seek greater authority for Federal agencies and to break up the authority of local agencies, we just want to call attention to the Jan. 19 ruling of the Federal Power Commission that the Grand River Dam Authority, a state agency of Oklahoma, may not build a 45,000-kw. hydroelectric plant at the Markham Ferry site on the river, because a flood control project was authorized for Army construction at the site in 1941.

Although no action has been undertaken by the Army Engineers, the FPC concluded that "there is no evidence that construction of the power generating facilities will **not** be carried out by the United States as authorized, and the commission would not be justified in authorizing development by non-Federal interests."

The state may need the power, the local agency may have the money to build and the know-how to do so, but it is, the Power Commission appears to argue, more important than all of that, to keep control of the river in Federal hands.

Tell us, readers, do **you** think so?

The Counties Step Out

WHILE WE'RE all so hot under the collar about the encroachment of the Federal octopus on the lives of the plain citizen, it is well to observe one sign in the opposite direction and to heap praise upon it. We refer to the outstanding job county engineers and road commissioners are doing in California and other Western states that have junked the Supervisorial District road work system, which was pure spoils politics in administration, and adopted the non-political unit system, with adequate state and federal fund participation. This is an example of DEcentralization and it's working amazingly well. Wish President Truman would observe it a little more carefully as he seeks to impose Authorities! Or perhaps it's better if he doesn't—he may try to spoil a splendid advancement!

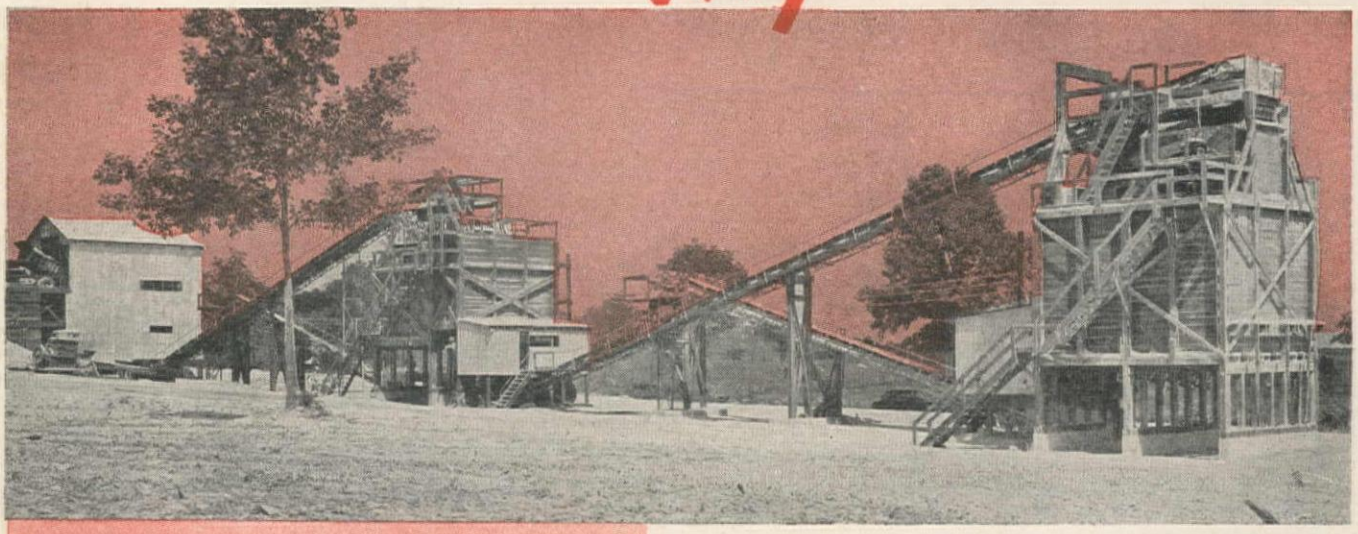
Gas Goes West

IN CASE another example is needed in support of the evidence of Western growth, it is only necessary to observe the network of gas and oil lines recently built, now under construction, or being planned to bring fuels to various rapidly expanding Western areas.

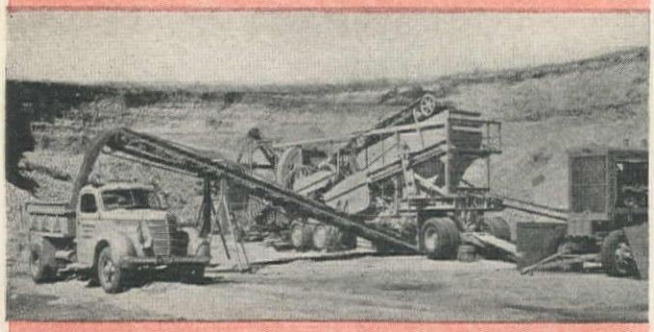
In operation for over a year now is the line from West Texas to Los Angeles. A branch is currently being built to San Diego. Pacific Gas & Electric Co. and associates will soon be building a similar line from Texas to the San Francisco Bay area. Just completed is the oil line from Rangely, Colo., to Salt Lake City. Contemplated are gas lines from Wyoming and Colorado to the Pacific Northwest. In Canada, a similar line from Alberta to Vancouver, B. C. is under consideration. Thousands of millions of dollars are involved.

You don't bring fuel in like that if the economy is insecure or about to topple.

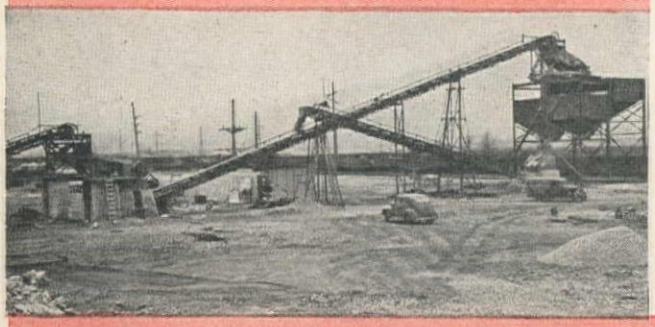
ENGINEERED FOR *High Output*



STATIONARY PLANT, producing agricultural limestone and several sizes of crushed rock.



"101" PORTABLE PLANT, capable of producing well in excess of 7 tons per minute.



STATIONARY PLANT, producing railroad ballast from slag.

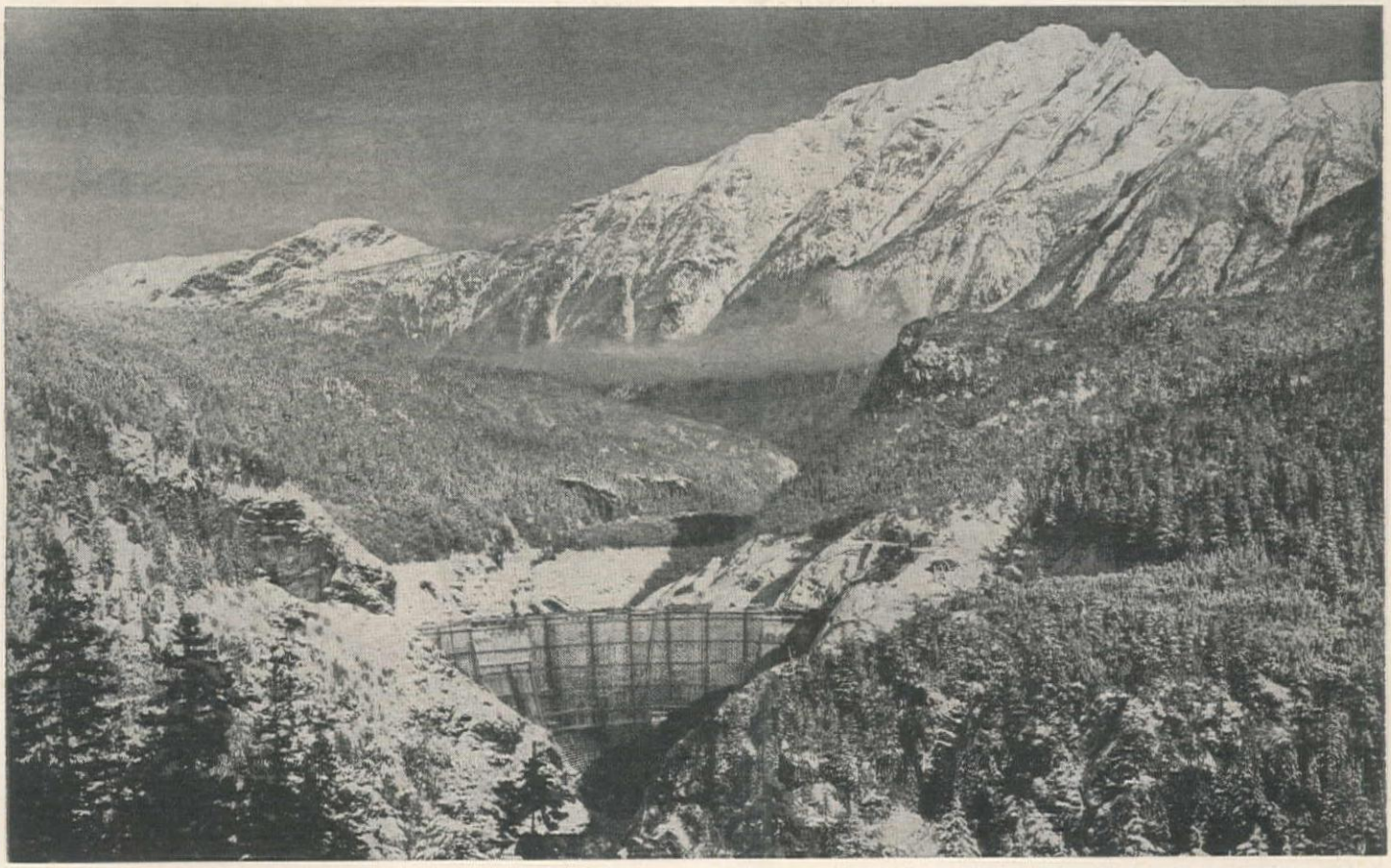
The Austin-Western line includes Jaw Crushers and Roll Crushers in many sizes; plus matching Screens, Elevators, Conveyors and Bins. Exclusive design features and high operating speeds increase crusher output. Continuous operation and minimum maintenance expense are assured by the skilled engineering and sound manufacturing that characterizes every Austin-Western Crushing and Screening Plant. Each plant is designed to solve a particular production problem. We would welcome the opportunity to discuss yours.

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

SEMI-PORTABLE PLANT, producing agricultural limestone and road rock.

ARIZONA—SHRIVER MACHINERY COMPANY.....*Phoenix*
CALIFORNIA—EDWARD R. BACON COMPANY.....*San Francisco 10*
CALIFORNIA—SMITH BOOTH USHER COMPANY.....*Los Angeles 54*
COLORADO—LIBERTY TRUCKS & PARTS COMPANY.....*Denver 1*
IDAHO—COLUMBIA EQUIPMENT COMPANY.....*Boise*
MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Billings*
MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Missoula*
NEVADA—C. D. ROEDER EQUIPMENT COMPANY.....*Reno*
NEW MEXICO—N. C. RIBBLE COMPANY.....*Albuquerque*
OREGON—COLUMBIA EQUIPMENT COMPANY.....*Portland 14*
UTAH—WESTERN MACHINERY COMPANY.....*Salt Lake City 13*
WASHINGTON—COLUMBIA EQUIPMENT COMPANY.....*Seattle*
WYOMING—WILSON EQUIPMENT & SUPPLY COMPANY.....*Cheyenne*

WESTERN CONSTRUCTION NEWS
FEBRUARY 15 • 1949



Seattle's Ross Dam— Steps Up Among the World's Tallest

Third step of construction carries Ross Dam on Washington's Skagit River to a height of 540 ft. and rank as country's tallest concrete arch-type structure — Mechanical refrigeration process speeds concreting schedules

FULL UTILIZATION of the power of Washington's Skagit River for electric generation is nearer realization with completion of the third step of construction of Ross Dam. Nestled between the rugged and steep walls of the Skagit's canyon in the remoteness of the scenic Cascade Mountains, the concrete arch dam now towers 540 ft. from its bedrock base to the roadway across its top. At that height, it ranks first among the country's concrete arch-type structures and fourth among the country's concrete dams (Hoover at 727 ft. high; Shasta, 602 ft.; and Grand Coulee, 550 ft., are all gravity-type dams).

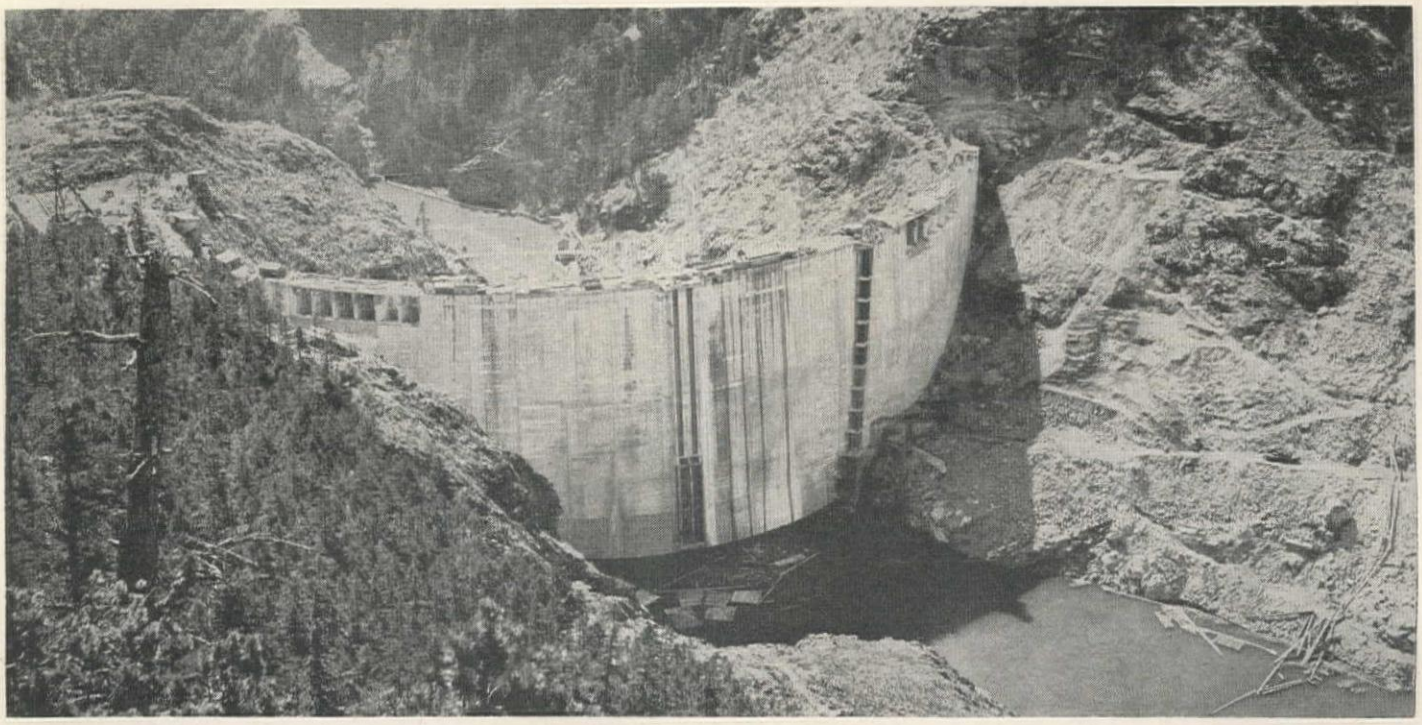
Many lessons of great value to Western constructors have been learned since 1943 when the second step of the $28,000,000 dam went under construction. New methods of mechanical refrigeration for the cooling of concrete have been introduced, careful control of aggregates and concrete mixes has resulted in an excellent quality of concrete, and difficulties in transporting cement, aggregate and materials to the remote dam site were efficiently circumvented. These factors have combined to enable completion of the third step approximately one year ahead of schedule.

Reservoir second to Coulee

A complete story of the second-step construction was presented in *Western Construction News* for August, 1945, along with a description of the full program of power generation planned on the Skagit River by the Seattle, Wash., City Light Department. Briefly, the program includes three dams and three powerhouses. First constructed and lowest on the river is the Gorge plant, whose small dam was constructed in 1924. Here, three generators, plus one 2,000 kw. generator at the Newhalem Creek powerhouse, produce 62,000 kw. Upstream 7 mi. from Gorge is Diablo dam and power plant, completed in 1936 and now producing 132,000 kw.

Ross Dam, 5 mi. further upstream at the headwaters of Diablo Lake and representing the third development in the program, was completed in 1940 to a crest elevation of 1,365 ft. The second step of construction on Ross Dam carried its elevation to an approximate 1,550 ft., and the recently completed step-three construction brought the spillway crest to elevation 1,582 ft. with radial gates lifting maximum reservoir level to 1,600 ft.

At the 1,600-ft. elevation, Ross Dam will have the second largest storage reservoir in the Northwest Power Pool area, being exceeded only by the reser-



THE GREAT ARCH of Ross Dam is seen clearly in this view downstream. Both abutments are in extremely hard granite. Spillway intakes are visible at both ends of dam.

voir at Coulee Dam on the Columbia River. Until a powerhouse and power generating facilities are constructed at Ross Dam, the reservoir capacity of 1,400,000 ac. ft. (equivalent to 700,000,000 kw. hr.) will all be usable through the Diablo and Gorge powerhouses down the river. These kilowatt-hours, plus energy obtainable from a yearly average stream flow of 3,200 sec. ft. at Ross Dam in the Skagit River, will supply a large amount of energy for the power-hungry Pacific Northwest area.

Present plans for power facilities at Ross Dam call for four generating units of 90,000 kw. rating each. Each of the two 24-ft. diameter tunnels around the left abutment of the dam will supply water to two of the units. The first unit is scheduled for operation in late 1952, with another two scheduled for operation in 1953. The fourth unit will be installed at a later date.

When the Ross Dam powerhouse is completed, water from the dam's 24 mi. long reservoir will be used three times; first through Ross powerhouse, then through the Diablo plant and finally through the Gorge powerhouse. This triple use of the water can produce a total of 640,000 kw. This block of power coupled with Federal developments along the Columbia River and the City of Tacoma's development on the Cowlitz River, will be a welcome addition to the Northwest's power supply.

Redesigned for four steps

Originally, the complete construction of Ross Dam was planned in three steps, the third step to consist of supplying additional thickness over the entire downstream face of the dam and some additional height. Excellence of the concrete aggregate along with the phenomenal concrete strengths developed under the direction of Herbert Faulkner, City Light's resident engineer (retired in 1947), made it possible to raise the second step 35 ft., and to insert the present third step without any thickening of the base.

A fourth step of construction and ultimate development of the dam to a roadway elevation of 1,733 ft. will necessitate placement of a large amount of concrete bonded to the downstream face of the dam as it exists today. The building of this portion of the dam is not contemplated soon, and will depend on the power requirements of the Seattle area coupled with the economic feasibility of the undertaking.

A grid surface has been provided on the entire downstream face of the dam, excepting the spillway faces, to more adequately bind the fourth step blanket to the earlier portions of the structure. The "waffle keys" are trapezoidal, being 5 ft., 9 in. square at the outside, 2 ft. deep and 4 ft., 3 in. square at the inside. They succeed in giving the dam a waffle-like appearance, suprising to the uninitiated.

MEMORY OF J. D. ROSS, "Father of Seattle's City Light Department," will be perpetuated by the giant structure now bearing his name. Deceased in 1939, he had been superintendent of the department since 1911 and had taken a large part in the planning and development of the Skagit power system. During his 29-year tenure, the department business increased ten-fold.

Negotiated contract

Contract for the second step of construction was awarded early in 1943 to the joint firm of General Construction Co.-J. F. Shea Co.-Morrison-Knudsen Co., Inc. At the war's end, with power demands continuing to climb, City Light decided to proceed immediately with the third step construction.

General-Shea-Morrison's construction plant for the second-step construction represented an investment of nearly $2,000,000, so to save considerable time, a "negotiated contract" or "change order" was arranged with G-S-M in September, 1947, allowing that firm to proceed uninterrupted with third-step construction. A bid figure of $5,298,965 was determined, and this figure was approved by a board of three consulting engineers. Thus, there was no work stoppage during new contract negotiation, and construction procedure for both steps was integrated. G-S-M continued with the same methods for obtaining and transporting aggregates and materials to the damsite as those described pictorially and graphically in the August, 1945, article mentioned previously.

Outstanding among the new construction methods developed at Ross Dam was the mechanical refrigeration process used to remove heat generated by the concrete during the settling and

curing processes. The successful system of refrigeration was one of the major factors contributing to the early completion date of the structure, since it circumvented the curtailment of concreting schedules while awaiting specified temperature of concrete blocks in place.

Since initial experiments by the Bureau of Reclamation on Owyhee Dam, concrete cooling has been employed on practically all major dam construction in the West. Various methods used have been cold-water spraying, cooling towers, ice plants and running cold water through embedded coils. Mechanical refrigeration, employing embedded coils carrying a flow of calcium chloride brine, came into its own during the Ross Dam construction.

Mechanical refrigeration

A plant was designed by the City Light engineering department consisting of 14 manifolded Freon units of 60-ton capacity each. Each unit consisted of two radial-type compressors direct-connected to both shaft ends of a 60-hp. electric motor. Each unit, including a chiller and condenser, was enclosed in a rectangular box-type, welded steel framework. The design of the plant into separate units facilitated transportation into the rugged area and allowed units to be prefabricated in Seattle shops. These units were mounted on top of the dam and were ready for service in January of 1948.

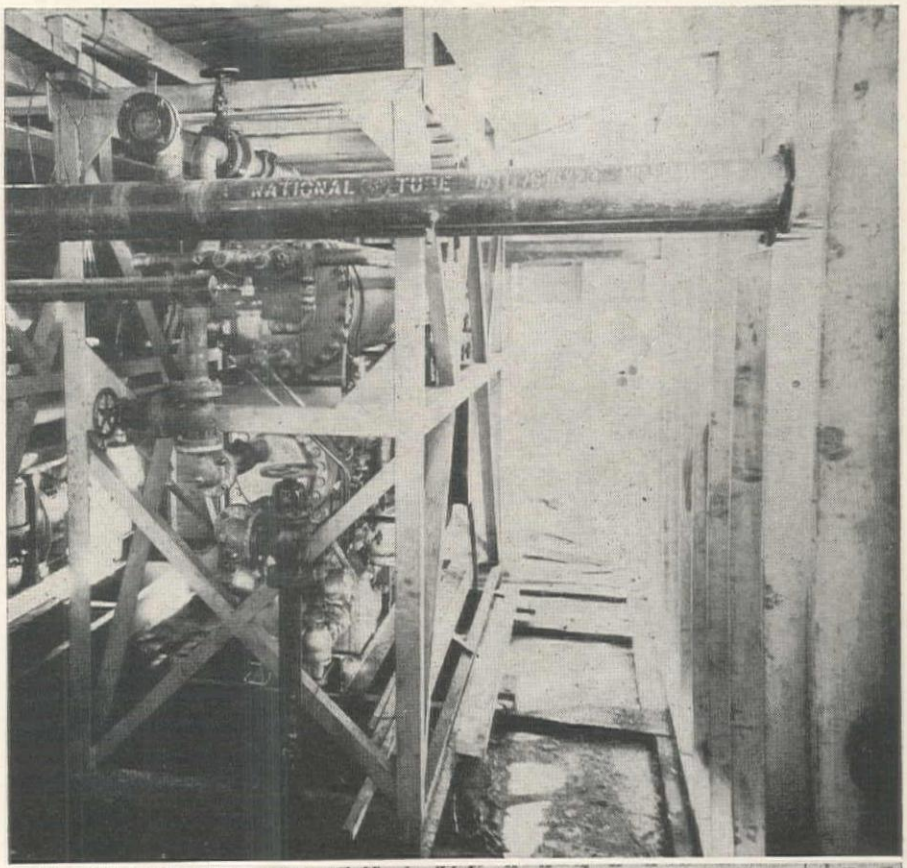
A steel gravel barge was reconverted to act as a brine barge, and was moored at the downstream foot of the dam. Two high-head pumps, totaling 4,000 gal. per min. capacity, were mounted on this barge. River water was pumped from Diablo Lake and mixed at the barge into a 1.09 specific gravity brine solution inhibited with 0.25 per cent of potassium dichtomate and alkalized with soda ash to a pH of 8 to 9 to prevent corrosion.

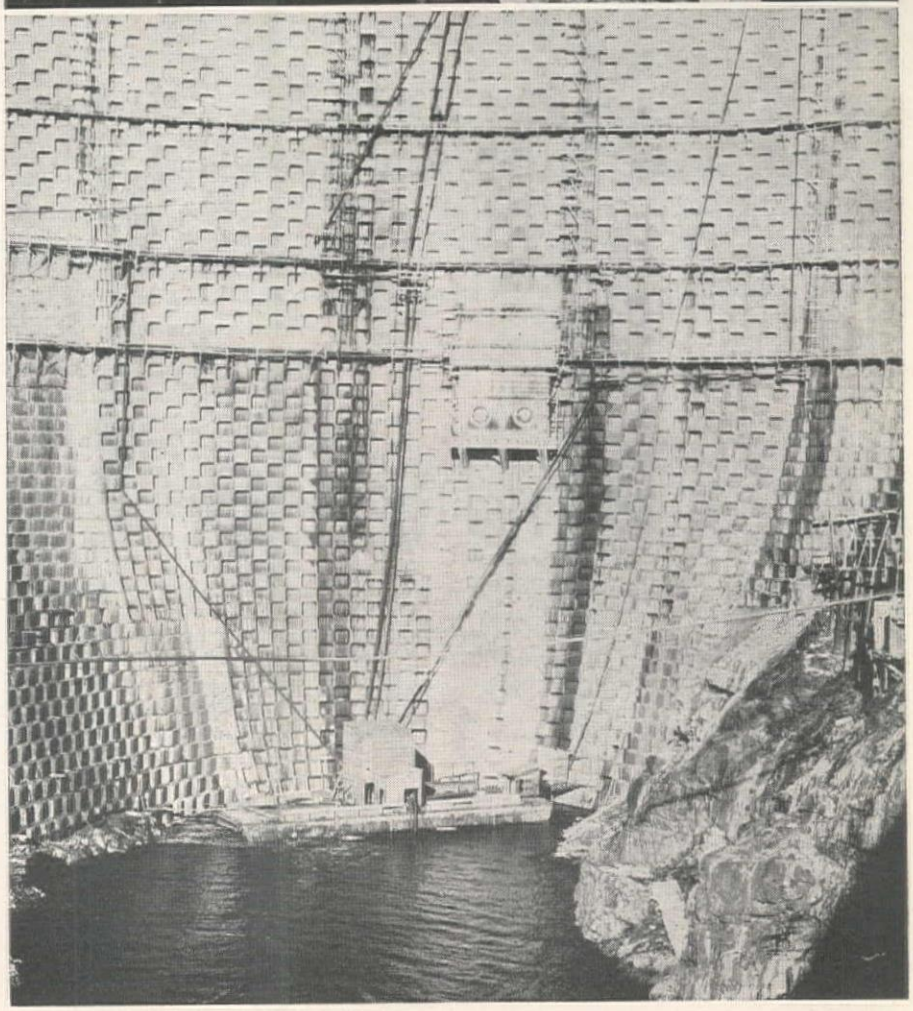
This solution was pumped up to the refrigeration units on top of the dam, and thence circulated in a closed cycle through the chillers and embedded coils in the dam. Embedded tubing consisted of 1-inch O.D. thin wall piping placed at 5-ft. centers horizontally and vertically. Brine was circulated through the tubes at a velocity of 2 ft. per sec. Heat passed into the condensing water which was discharged over the upstream face of the dam into Ross Lake.

Saved $1,000,000

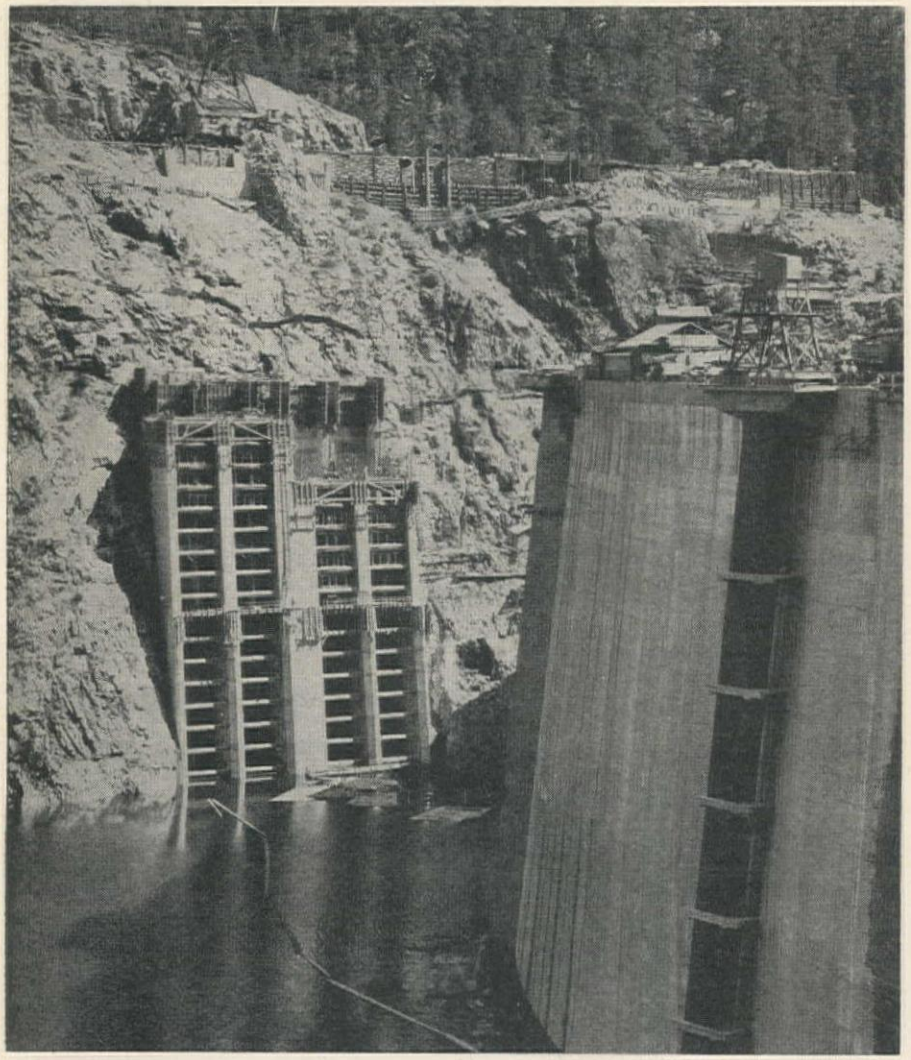
Cooling effect of the plant was observed by two methods; electrical resistance units placed at salient points in the concrete as construction progressed, and by actual movement of the joints as they widened due to shrinkage of the individual blocks. Use of both methods enables the securing of thermal and dimensional control of both grouting and cooling requirements for optimum conditions of joint opening.

Operation of the mechanical refrigeration system brought temperatures through the dam below 40 deg. F., with an average daily drop of about ½ deg. F. during the period of plant operation. Immediate grouting of the contraction joints was thus made possible and it was possible to store last season's above





REFRIGERATION SYSTEM at Ross Dam, although necessitating high initial expense, paid for itself many times. A gravel barge mounting high-head pumps was moored at dam's downstream toe. Brine was pumped up to 14 refrigeration units (one shown).



TWO TUNNELS of 24-ft. diameter, paralleling each other on a radius around the dam's left abutment, will carry water for power. One trashrack structure is visible.

average run-offs in Ross Lake. Value of the additional water storage in terms of power which will be available through the Diablo and Gorge plants during this year is estimated conservatively at $1,000,000.

The negotiated contract with General-Shea-Morrison for the third-step construction occurred before completion of the second step. This resulted in some third-step blocks being poured before other blocks of the second step were completed. Specifications allowed a maximum differential elevation of 20 ft. between adjoining blocks, but this allowance was increased in some instances to 30 ft. to speed construction.

Water past the dam

Chief reason for the slowdown of some blocks was the meticulous form work required for the spillway faces. A spillway is being provided at each side of the dam with each curving in at the bottom so their flows will meet midway to mutually dissipate their energy. Spillway capacity is 127,000 cu. ft. per sec. Four 72-in. valve outlets with a total capacity of 10,000 cu. ft. per sec. are also being provided through the dam to maintain downstream flow in the Skagit for the other power plants. The two valves through the center of the dam are Pelton butterflies, the remaining two at either side near the bottom of the dam being Howell-Bunger valves of the conical type.

The two 24-ft. diameter tunnels, to eventually supply Ross powerhouse with flow, parallel each other on a radius around the dam's left abutment. Tunnel No. 1, opening 187 ft. upstream from the dam, has a trashrack structure with pier extending in 50 ft. and a transition section 56 ft. long. This tunnel is lined with concrete 150 ft. in, the remainder of the completed portion of the tunnel passing through the same hard granite which forms the dam's abutments. Tunnel No. 2 takes off 62½ ft. upstream from the dam, paralleling Tunnel No. 1, 150 ft. center to center. Design of the two tunnels is similar. Future development of power at Ross Dam will include the driving and concrete lining of both tunnels from their lower end below the dam.

Waffle forms popped out

The difficulty of removing forms from the trapezoidal waffle keys fostered an interesting innovation. The forms often were damaged, and frequently were almost impossible to remove. Forest Jones, G-S-M superintendent, developed an anchored diaphragm to "blow" the forms out of place. The diaphragm consisted of two sheets of metal welded together around the edges with a hole drilled through one sheet. A ¾-in. nipple was welded to the hole, and two bolts were attached to either side of the nipple to bolt the diaphragm to the form, and this was covered with plywood. A short air line was all that was needed to inflate the diaphragm and pop the key form out of place.

Floating community

Another interesting feature of the construction is the clearing of the reservoir above the dam as the water level rises. A veritable floating community accommodates the 80-man crew engaged in this work. Light plants, compressors, galleys, dining rooms and bunks for all the men are provided in housing floated on a series of pontoons. Power is provided by 25-kw. generators driven by Caterpillar Diesel engines, so electric lights and refrigeration are available as well. Lake water from Ross Lake is chlorinated for the floating colony's use. Work boats 42 to 55 ft. long, are used in the clearing operations. Original estimates indicated that 100 m.b.f. of usable timber would be stripped from the reservoir area. It now appears that 350 m.b.f. is nearer the probable yield.

Ross Dam builders

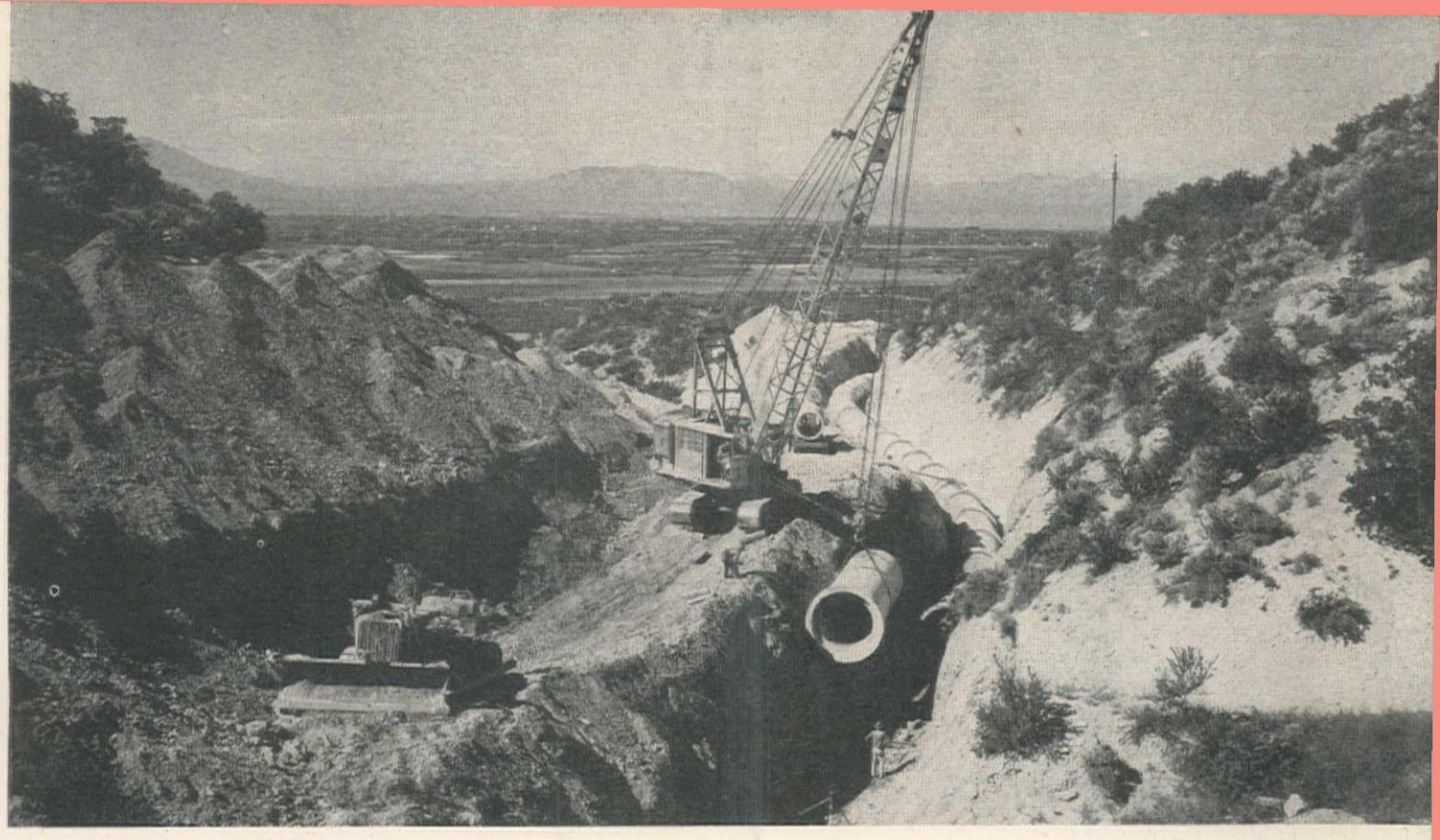
For the Seattle City Light Department, builders of Ross Dam, E. R. Hoffman is superintendent of the department, and W. B. Wolfendale is project engineer. H. F. Faulkner was resident engineer until his retirement in 1947 when his assistant, C. E. Shevling, took over the position and R. P. Sonntag was named assistant resident engineer. E. R. Schindler is design engineer for the department.

C. W. "Smoky" Wood was superintendent for the contractors until he moved to the Hungry Horse Project when the General-Shea-Morrison combine was awarded that contract. For the final phases of the work, Ted Harris was the superintendent.

Gorge Powerhouse Bids Will Be Requested Soon

BID ADVERTISEMENT will be made soon for an addition to Seattle City Light's Gorge Powerhouse near Newhalem on the Skagit River northeast of Seattle, Wash. The work will include enlarging of the existing powerhouse to house a 92,500-h.p. generator, grouting work in the power tunnel, work on the tunnel intakes and installation of penstock liner.

The powerhouse addition, approximately 95 x 106 ft., will be constructed on the upstream end of the structure. General Construction Co. of Seattle now holds the contract for excavation of the 600-ft. long penstock tunnel and excavation of the building foundations. The proposals will be accepted on two schedules, one for construction of the powerhouse addition, surge tank and tunnel between the powerhouse and tunnel elbow, and the other from the tunnel elbow to the intake.



Provo River Project— More Water for Half of Utah

Utah's largest reclamation project will benefit more than half the state's residents—Important feature of the project is the 41.68-mi. Salt Lake Aqueduct, now 70 per cent completed

By L. R. DUNKLEY
Project Engineer
U. S. Bureau of Reclamation
Provo, Utah

LARGEST reclamation project development now under construction in Utah, the Provo River Project, includes as one of its important features a 41.68-mi. aqueduct to convey water from Deer Creek Reservoir in Provo Canyon to Salt Lake City. This will assure the city an adequate water supply in times of drought and will meet the rapidly increasing demands of its growing population and its industrial expansion. The project will directly benefit residents of Utah, Salt Lake, and Wasatch counties, or more than half the population of the state. It will provide for the storage and delivery of a supplemental water supply for 100,000 ac. of farm lands and will furnish additional municipal and domestic water for cities and communities adjoining the irrigated agricultural areas.

Deer Creek Dam (*Western Construction News*, Nov., 1939), on the Provo River about 16 mi. northeast of Provo, Utah, has been completed. It rises to a maximum height of 235 ft. above its foundation and extends 1,300 ft. between the canyon walls at crest elevation. The dam creates a reservoir 6½ mi. long with a capacity of 152,000 ac. ft. In addition to storing surplus Provo River waters, the reservoir impounds surplus flood waters diverted from the Weber River by the Weber-Provo Diversion canal. On completion of the 6-mi. Duchesne Tunnel, surplus flood water from the Duchesne River (Colorado River watershed) will also be stored in the reservoir. Water from Deer Creek Dam also irrigates 100,000 ac. on the west side of Jordan Valley (*Western Construction News*, Oct., 1947).

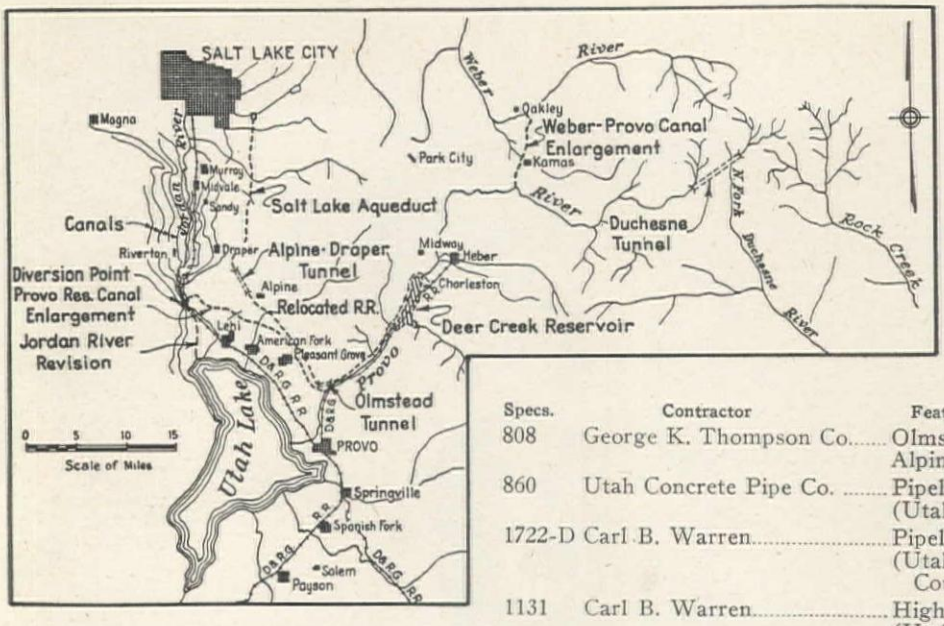
Eight contracts involved

Since work began on two tunnels (Olmsted and Alpine-Draper) in 1939 the Salt Lake Aqueduct has been more than 70 per cent completed although work was curtailed during the war years. The aqueduct consists of 41.68 mi. of 69-in. diameter concrete or steel conduit, 4.42 mi. of which are in tunnel. Contracts for the Aqueduct have been awarded and completed, or will have been completed, as shown in the table on page 64.

The Salt Lake Aqueduct will divert water from the outlet basin of Deer Creek Dam at Elev. 5276, extend down Provo Canyon to Olmsted Tunnel, then proceed northwest to the Sam Park reservoir terminus located in southeast Salt Lake City.

Concrete pipe—manufacture and placing

Design of the pipe line calls for reinforced concrete pipe units (bell and spigot type) with 7½-in. shell thickness



Specs.	Contractor	Feature and Length	Miles	Date Awarded	Date Completed
808	George K. Thompson Co.	Olmsted Tunnel	0.68	12-31-38	3-10-41
		Alpine Draper Tunnel	2.85		
860	Utah Concrete Pipe Co.	Pipeline & Structures (Utah County)	9.16	11- 1-39	11- 3-41
1722-D	Carl B. Warren	Pipeline & Structures (Utah and Salt Lake Counties)	10.55	2- 5-44	5-20-46
1131	Carl B. Warren	High-head Steel Pipe (Utah and Salt Lake Counties)	4.51	2- 1-46	3-19-47
1813 (Sched. 2)	United Concrete Pipe Corp.	Pipeline & Structures (Salt Lake County)	7.27	6-30-47	12-15-49*
2206	United Concrete Pipe Corp.	Tunnels 1, 2 and 3, Provo Canyon	0.81	6-28-48	5-15-49*
2330	Provo Foundry & Machine Company	High-head Steel Pipe (Salt Lake County)	0.98	9-13-48	10-17-49*
2344	United Concrete Pipe Corp.	Pipeline & Structures (Provo Canyon)	4.79	10-22-48	7-15-50*
		Total under contract	41.60		
		Small tunnel in Provo Canyon, government forces	0.08		
		Grand Total	**41.68 mi.**		

* Contract completion date.

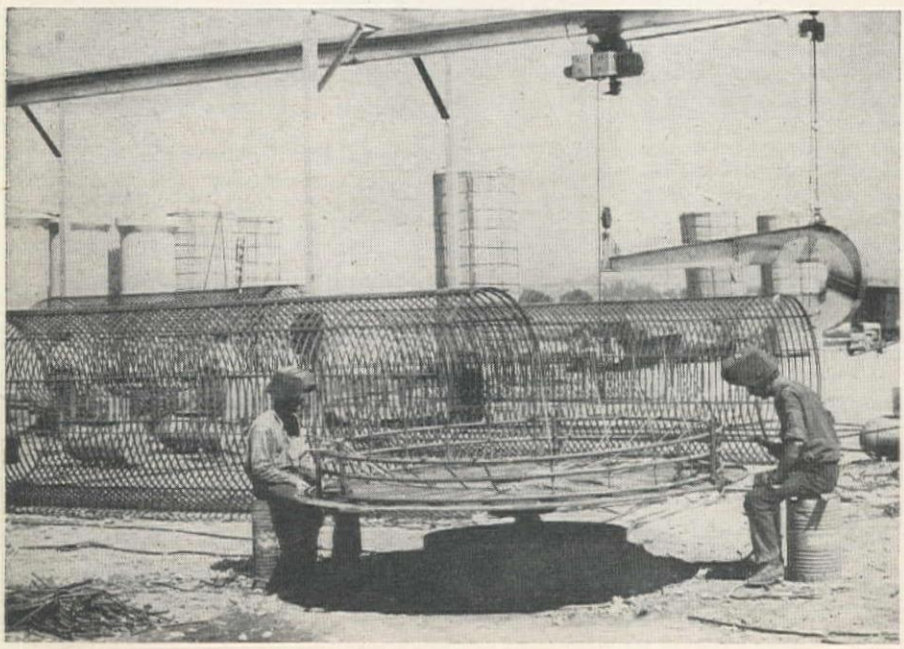
and a rubber gasket-sealed joint as assurance against leakage in case of movement from temperature changes or slight earth disturbances. Outside grouting and inside mortar calking complete the joint. In field tests this joint has been tested under a longitudinal movement exceeding 1 in. without leakage.

The specifications provide for manufacture of pipe in 20-ft. lengths except for special units required.

Steel reinforcement cases are fabricated in the required inner and outer diameters to make up the two layers of reinforcement specified. The steel bars for the transverse reinforcement are wound on a mandrel, electrically driven, and the bars are tack welded to the longitudinal bars in the cage. The inner and outer cages are then assembled with the prefabricated reinforcement required for the bell of the pipe and tied together by tack-welding. The cages are then placed on the pallet bases by a travelling railroad crane which also sets the steel forms for concreting operations.

Concrete is batched automatically and mixed in a 2-cu. yd. mixer. It is then discharged into a bucket having a capacity of 6 cu. yd. The loaded bucket is handled and swung over the pipe forms by the crane. The rate of discharge of concrete into the vertically placed forms is controlled by a concrete bucket operator who manipulates an air-operated discharge gate. The operator rides the bucket in a safety platform. Each 20-ft. unit of 69-in. diameter pipe requires approximately 10 cu. yd. of concrete. On completion of the concrete pour, each pipe is covered with a steam curing enclosure and live steam is pumped in. Forms are stripped when concrete reaches a compression strength of 750 p.s.i. which usually takes from 8 to 10 hr. After the forms are stripped the pipes are recovered and steam cured until the concrete reaches strengths of 3500 p.s.i., after which the pipes are tipped and placed in yard storage ready for hauling to the line. The pipe units are hauled in specially built low bed semitrailers powered by Diesel tractor-trucks.

TRANSVERSE BARS of the reinforcing cages for the 69-in. diameter concrete pipes are wound on an electrically-driven mandrel, then tack-welded to longitudinal bars.



After being hauled to the line the 69-in. diameter pipe units, weighing approximately 22 tons, are laid in the trench by a drag-line used as a crane. Pipe units are lowered in the trench and supported by the crane while they are being joined to the preceding unit. Each successive unit laid is fitted with a rubber gasket on the spigot end of the pipe and the pipe pulled into place by a portable hand winch of sufficient capacity installed inside the previously laid pipe by means of a line attached to a buckstay on the pipe being laid. A vegetable oil soap lubricant on the rubber gasket and all its contact surfaces in the bell of the pipe is used to facilitate the pipe joining operation.

Outside grouting of the joints prior to backfilling the pipe trenches, inside mortar caulking which follows backfill operations, and cleanup work, complete the pipe-line construction operation. The completion of all appurtenant blow-off, air valve, and other structures usually precedes backfill operations in the structure areas.

ALL STEPS of the pipe concrete work are illustrated in this one view. A traveler railroad crane places and strips steel forms, the pipes are covered for steam curing and then tipped for yard storage.

Steel pipe for high heads

The steel pipe sections of the aqueduct call for fabrication of the pipe (70-in. diameter) in 30-ft. lengths, with inside coal tar enamel lining and outside gunite coating. Stiffener rings are provided for all pipe on 10-ft. centers except within limits of concrete structures and concrete encasements. All joints will be welded in the field as the pipe is installed. Expansion joints are provided where necessary. The steel pipe sections are used where static heads on the pipeline exceed 150 ft. and involved in this type of construction are 5.49 mi., or 13 per cent of the total length of the aqueduct.

One remaining contract for 2 short sections of high-head steel pipe (0.98 mi.) in the Big Cottonwood area in Salt Lake County has not been awarded.

Present aqueduct construction

With reference to the above table, the section of aqueduct under specifications No. 1813, schedule 2, is now under construction. About 45% of the pipe has been manufactured and the contractor is proceeding with and has completed 2.5 mi. of pipe laying and some related structure work. The major part of the aqueduct construction parallels and is within sight distance of the Wasatch Boulevard along the base of the mountains on the east side of Salt Lake Valley. Contract completion date is Dec. 15, 1949.

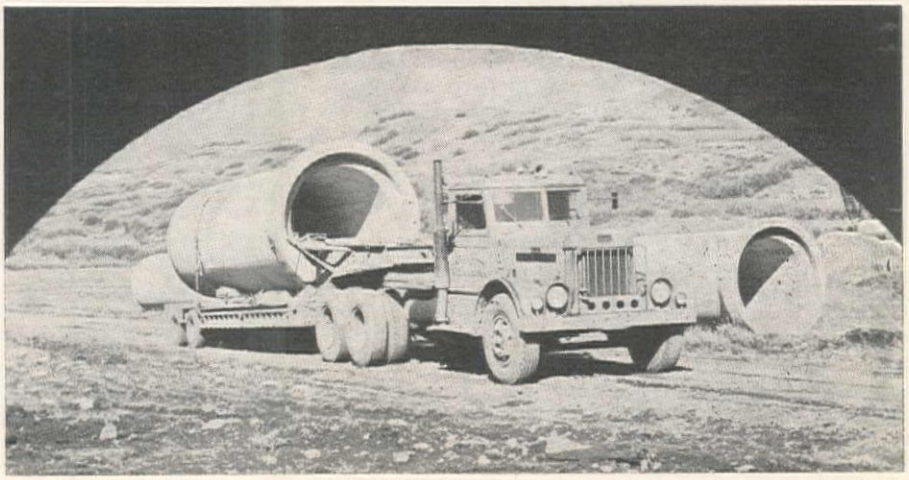
Special problems involved in the construction of the Salt Lake Aqueduct include its crossings under the existing Little and Big Cottonwood conduits, the major supply lines for Salt Lake City's water from the Little and Big Cottonwood sources. There are four such crossings involved, two on each conduit. It will be necessary to support the conduits without restricting the flow of water during construction operations. One crossing on the Big Cottonwood conduit (3½ x 4½ ft., arched on top) has been completed. The city's engineering department approved a method of supporting the conduits with longitudinal steel beams supported by bents (4 required) consisting of steel piling (H-beams driven to a point below aqueduct trench grade) with 12 x 12-in. timber caps. The steel beams run parallel to, and are used on each side of, the conduit with the bottom of the beams being set to the same elevation as the bottom of the conduit. Then 12 x 12-in. timber cross beams are bolted with 4 bolts to the bottom of the steel beams so as to hang on 5-ft. centers along the beams for direct support of the conduit.

Over and under obstructions

A span of 23 ft. was necessary at the completed crossing, which was on an approximate 30-deg. skew, to provide clearance for construction operations. The temporary construction work necessary to support the conduits has to be installed to take the full load of the conduits prior to making any trench excavation for the aqueduct construction below the bottom elevation of the conduits. No difficulty was encountered in constructing the one completed crossing nor are any anticipated on the three remaining ones.

The aqueduct will cross under the

COMPLETED PIPE units, weighing 23 tons, are hauled to their place in the aqueduct line by specially built low bed semi-trailers powered by Diesel tractor-trucks.



THE PIPELINE skirts mountains on the east side of Salt Lake Valley, paralleling Wasatch Blvd. Motorists on the highway have observed the work off and on for 8 years.

Provo River at two locations in Provo Canyon, one crossing about 1 mi. below Deer Creek Dam, the other several hundred feet upstream from the branch canyon "loop road" near Wildwood Resort. The details of the problem of providing a by-pass for the river and unwatering the foundations for the trench before laying and completing the joints of the 69-in. diameter concrete pipe line for the river crossings are now under study.

An unwatering problem also exists in some of the reaches in Provo Canyon where the grade line for the aqueduct will be below the river water surface elevation. From experience gained in two completed river crossings farther downstream in the canyon no serious difficulties are contemplated.

Remaining operations

The contractor for the three small tunnels in Provo Canyon (Specifications No. 2206) is proceeding with construction and recently "holed through" on Tunnel No. 2. Concrete lining of the tunnel will follow immediately. All open cut excavation has been completed on Tunnel No. 1 and underground excavation is now under way. No work, except some preliminary preparations by the contractor, has been accomplished to date on Tunnel No. 3. Contract completion date is May 15, 1949.

The contract for construction work for the two short sections (0.98 mi.) of high-head steel pipe was recently awarded, under Specifications No. 2330, to the Provo Foundry and Machine Co., Provo, Utah. This work is located in the Big Cottonwood area in Salt Lake County. The contractor at present is preparing to fabricate the steel pipe at the company's plant in Provo, Utah, and no work has been accomplished to date at the field locations. Contract completion date is October 17, 1949.

The last remaining section of the aqueduct to be placed under construction contract is located in Provo Canyon. The work under Specifications No. 2344 was awarded to the United Concrete Pipe Corp. of Baldwin Park, Calif. Some preliminary work has been accomplished and recently excavation for the pipe line was initiated adjacent to the three short tunnels already mentioned. Completion date for all contract work is July 15, 1950.

Personnel

The construction program for the Bureau of Reclamation is being carried out under the general direction of the Bureau's Denver and Regional offices. L. N. McClellan is Chief Engineer at the Denver, Colorado, Office, E. O. Larson is Regional Director at Salt Lake City, Utah. Construction operations on the Provo River Project are under the general charge of the writer as Project Engineer, with the following field assistants: C. G. Bargeron, Arnold M. Marston, R. C. Borden, W. F. Gentry, and Wade F. Nielsen.

United Concrete Pipe Corporation's field representatives are Roy Chinnici, Project Superintendent; Sam Rogers, Assistant Project Superintendent; and M. S. Ross, Engineer.

Design for Best Welded Bridges Will Win Money

FORESEEING a tremendously expanded application of welded design to bridge construction, the Trustees of The James F. Lincoln Arc Welding Foundation are sponsoring a new Award Program to advance the progress of welded bridge design.

The "Welded Bridges of the Future" Award Program offers awards to bridge or structural engineers for the best designs of a specified, welded highway bridge. The first award is $3,000; the second award $1,500; third award $750. In addition to the awards for the three best designs there will also be ten honorable mention awards of $100 each for the next best designs.

The competition opened Jan. 1, 1949, and closes June 30, 1949. Any engineer or designer who feels himself qualified to enter the Program is eligible for participation.

The bridge to be designed is a two-lane deck highway bridge supported on two end piers 120 ft. apart. The bridge is to be designed for ASTM-A7-46 steel and for H20-44 loading. While the size, steel and loading for the bridge are specified, other than these specifications the designer is completely free to exercise his ingenuity. If he wishes, the designer may conceive and use new structural shapes not now available, providing only that the new shape or shapes can be readily produced if and when a demand for them develops. Moreover, he may assume availability of fabricating facilities other than those now in existence.

The Foundation, according to Dr. E. E. Dreese, Chairman of the Board of Trustees, wishes to give designers an opportunity, free from the present limitations and restrictions on design practice, to apply their knowledge and experience to the problem of designing a bridge expressly for arc welding fabrication. It is felt that considerable progress in design will result when designers are not restricted to using the present structural shapes and fabricating methods which were conceived before welding was generally available.

Complete details of the Rules and Conditions of the Program are available in a printed brochure which can be secured upon application from The James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio.

Need Water? — Start Saving Drops!

The West cannot afford to half use its water and land resources — Something definite should be done about decreasing water losses in both the irrigation water delivery systems and on the farms — Here are some ways it could be done

By KARL O. KOHLER, Jr.
U. S. Soil Conservation Service
Portland, Oregon

A CHANGE IN THINKING with regard to irrigated agriculture is overdue in the West. For more than a century, our major concern has been to bring more water to more land. Remarkable achievements have been made. But in devoting our energies and enthusiasm to new irrigation projects, we have neglected to care properly for the land and water resources previously developed. As a direct consequence of this neglect, **grave problems now confront farmers in most of the irrigated areas of the West. It is time for a serious stock-taking.**

Today there are many localities where there is more irrigable land than there is water. There are areas where the unbalanced development of the water and soil resources is causing a rapid depletion of the water supplies which in turn is presenting the farmers with a questionable future for their farms. In much of the West there are excessive losses of the precious water resources through evaporation, transpiration, system seepage, and the careless application of the water on farm lands. The latter condition is also resulting in the loss of the shallow fertile top soil through erosion, the loss of use of some of the land through salt accumulation and water logging, and in a reduction of soil fertility by the leaching out of some of the soluble plant foods. **The West can wait no longer for the control of these hazards to its basic agricultural resources if it is to maintain its place with the rapidly expanding economy of the country.**

FARMERS sometimes get over-enthusiastic when irrigating. This field got too much water too fast with the resulting flood and deposit of top soil at the lower end.

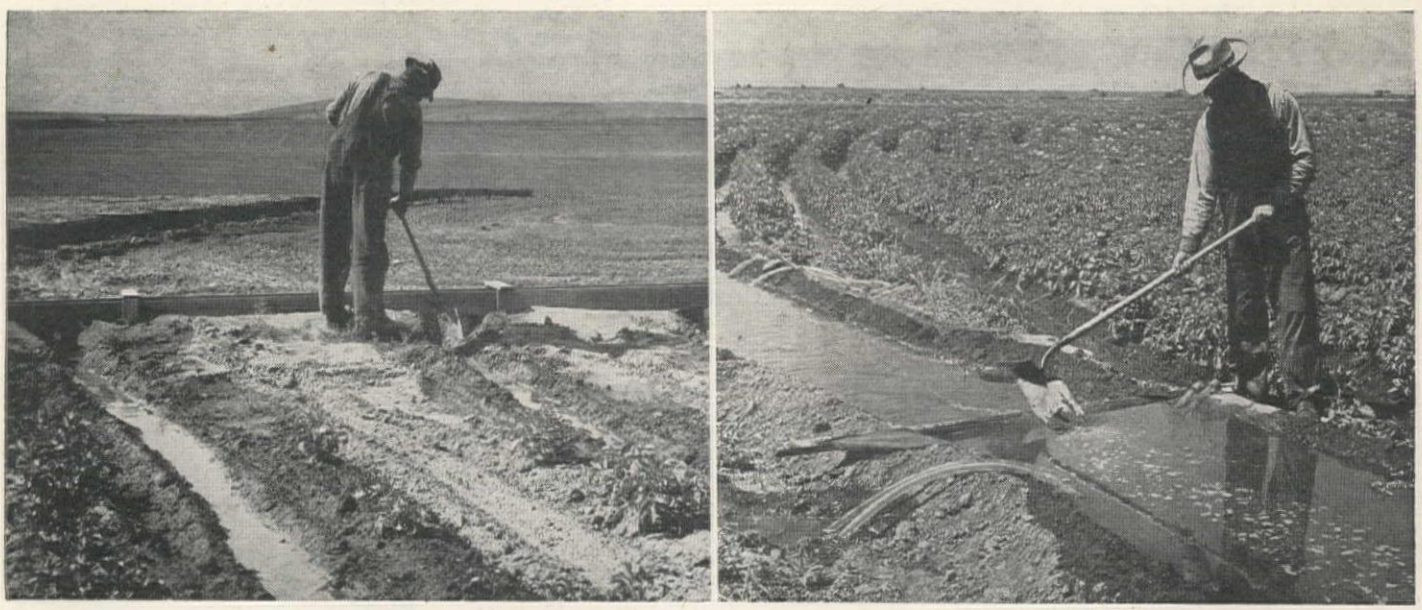
Lost drops add up

From the time that water is stored or diverted for irrigation until it is made available in the root zone of the plants, it is susceptible to losses through evaporation, transpiration, seepage and misuse. The losses through evaporation and transpiration are relatively small compared to those from seepage and poor water application. Evaporation losses are often only a small per cent of the total system losses. They are most pronounced in shallow flows of slow moving water. Transpiration losses can be high for small flows where there is heavy vegetation growing around natural springs, or where the water channels are filled with heavy aquatic growth.

The irrigation system losses between the point of diversion and the point of delivery to a farm will vary greatly according to local conditions. In using the 1940 census figures for the 17 western states, the water delivery losses are shown to vary from as high as 67% in Wyoming to as low as 17% in Colorado, with an average loss for all of the states of 38%. Approximating this total system loss at 34,000,000 ac. ft. a year and by assuming that **a minimum of ⅓ of the loss could be prevented by linings,** there would be a saving of 11,000,000 ac. ft. of deliverable water. It is also recognized that some of the water lost by seepage is regained by return flow and put to beneficial use.

One quart from one gallon

After the water arrives at the headgate on the farm and it is distributed to the fields and then over the crop lands,



THE RIGHT WAY. Farmer at left has a well designed step flume. A canvass dam with gate is being used in irrigation ditch at right. The portable dam prevents too swift movement of water and keeps the level up.

the "farm irrigation efficiency" will vary from as low as 15% to as high as 90%. The term "farm irrigation efficiency" is used to denote the percentage of irrigation water delivered to the farm headgate, or pipe valve, that is made available for consumptive use by the crop. The remainder of the water that comes onto the farm is lost through non-crop transpiration, evaporation, surface runoff, and as deep percolation through the soil profile. Considering the average farm irrigation efficiency of 40%, this would mean that 60% of the water delivered to the farm was lost as far as crop growth on the farm was concerned.

With a canal loss of 38% and then a loss of 60% of the remaining water delivered to the farm, one gallon of water turned into a canal at an irrigation headworks would bring only one quart of usable water to the farmer's crops. **Faced with such losses in water conveyance systems, it would seem that every feasible method would be used to increase the efficiency of delivery to the farms. Yet the fact remains that of the 125,000 mi. of irrigation canals and laterals shown in the 1940 census, only 4,600 mi. of these were lined.**

How reduce losses?

There are many methods of reducing major canal seepage losses. The canals can be converted into pipe conduits or they may be lined as open channels, with oil impregnations, asphalt surfaces, concrete, masonry, bentonite, clay, and at times wood and other materials. They can also be kept free of heavy growths of aquatic vegetation which reduce the velocity and tend to increase the system losses.

Canal seepage is usually measured in cubic feet of water lost in 24 hours per square foot of wetted area of the canal, which can then be expressed in units of per cent loss per mile, or c.f.s. loss per mile. This loss in earthen channels can vary from less than .10 cubic feet per square foot in 24 hours for heavy clay soils to over 25 cubic feet per square foot in very sandy soils.

The United States Bureau of Reclamation has been carrying on intensive canal lining studies over a period of years, and they have been trying all types of lining materials for this work. On the Vale Project in Eastern Oregon where sections of the canal were cut through gravel or porous rock, the visible seepage areas were blanketed with selected surface soil. In other locations on the system the earth was dumped into the running water where it was then deposited over the wetted sections of the canal. This simple type of earth lining reduced seepage from 75% to 40%.

A 5-mi. section of the All-American Canal in the Imperial Valley of California was blanketed with a layer of clay soil 4 in. thick on the bottom and 6 in. thick on the slopes. This reduced the seepage to about .22 cubic feet per square foot of wetted perimeter, which is very low seepage loss for water flowing through sandy soils.

The Imperial Irrigation District has been experimenting with the use of light penetrating oils which are sprayed on the wetted sections of the smaller canals at a rate of from 1½ to 2 gal. per sq. yd., and giving a penetration of from 2 to 2½ in. This oil spray has eliminated a major portion of the seepage losses in the sections of the canals treated.

Concrete is coming more and more into the picture for canal lining, even though the first cost is relatively high. Seepage in concrete canals can be as low as .05 cubic feet per square foot, although it may go over .5 cubic feet per square foot in some instances. Asphaltic linings, both of plant mix and site mix types are being tried in a number of canals in the West.

The Soil Conservation Service is investigating low cost canal linings and is also working with farmer organizations in many soil conservation districts throughout the West in the revision of the irrigation systems for the reduction of water losses and the improvement of water delivery conditions. This usually includes an engineering analysis of the existing irrigation project, in view of fitting the water deliveries to the farm requirements and for getting the system into a satisfactory operating condition.

In the Butte Valley Soil Conservation District in Northern California, Soil Conservation Service engineers assisted the irrigation district in the revision of portions of their main water distribution system, which included the relocation and design of portions of the main canals. New canals were made smaller and placed on a new grade with the result that water deliveries could be made from the pumps to the takeouts in 5 hours. With the old system it required 2 days of pumping before the water could be raised to the takeout elevation.

In the West Side Soil Conservation District in southeast Idaho, Soil Conservation Service engineers worked on the redesign of the 18-mi. canal system. When this work was completed and with no increase in the amount of water turned into the canal, it was possible to deliver water to lands at the lower end of the irrigation system in the middle and latter part of the irrigation season, a condition that had never been possible under the old water delivery system.

Careless use kicks back

After water is delivered through a canal system to a farm it is the farmer's responsibility to convey it to his fields and apply it to his crops. If he is careless with his water it will result in a poor irrigation and high surface runoff and percolation losses. He damages not only his own soil but possibly his neighbor's soil. The careless use of water was recognized as far back as the days of the Babylonians. The laws under which these people lived in about 2300 B. C. include the following:

Section 55: If anyone opens his dikes to water his crops, but is careless and the water floods the field of his neighbor, then he shall repay his neighbor with corn for his loss.

The earliest irrigation in the United States was developed by simple diversions of water from creeks and rivers onto the adjoining lands. Since that time it has been necessary to develop irrigation systems that would store or divert the water to bring it onto less accessible lands and also to find ways of bringing water from the underground reservoirs to the surface for irrigation use.

Too many farmers who apply irrigation water to their crops do not thoroughly understand the basic fundamentals of irrigation. Theoretically, it is necessary only to wet the root zone of a plant and to maintain a satisfactory amount of moisture in that zone during the growing season to bring about the desired crop production. This would mean that only enough water should be applied on a field to wet the root zone. There should be no waste water through surface runoff or deep percolation through the root zone. This, of course, would be the ideal situation, and cannot be attained in the field under the average methods of water application. However, through the proper use of the correct method of water application the irrigator may be able to raise his field irrigation efficiency up to as high as 90%.

Too much isn't enough

There are several conditions that must be understood by an irrigator if he is to use his irrigation water efficiently. The first is that each soil profile has a certain storage capacity of water available for the crops which will vary from less than .5 in. to over 2 in. per ft. of soil profile, depending upon the physical and chemical conditions of the particular soil. When more water is placed in the soil profile than the soil can hold, it will percolate on through the profile and be lost, or it will run off the surface. There is a common fallacy among many farmers that in the spring when there is a prolonged flood runoff they should irrigate heavily and extensively to store water in the soil for the plants that will be growing later on in the season.

Every soil has a definite rate of water intake which varies according to its texture, the crops growing on the soil, the condition of the surface and the degree of moisture already in the soil profile. If the rate of intake for the soil is only .3 of an inch an hour and the water is applied at the rate of 2 in. an hour, it is obvious that a major portion of the excess will have to run off the surface of the soil since it cannot be taken into the profile.

For each crop there is a certain total water requirement necessary to bring the crop through the growing season. When more than this amount is applied it is not used by the plants, and unless the excess is used to flush harmful salts through the root zone, the extra water is not needed as far as plant growth is concerned. Similarly, each type of plant has a certain root zone depth that should be wetted for satisfactory growth. For alafalfa it could be from 36 to 60 in., while for cabbage it would only be 24 inches. Irrigation water, therefore, should be applied in such a way that it will keep the root zone wetted since that is the only part of the soil profile that actually gives water to the plant. With this understanding of the fundamentals of soils and water application, a farmer can arrange his irrigation system and method of water application in such a way that he can efficiently do these things during his irrigation, which in turn will give him the highest possible efficiency in his water application.

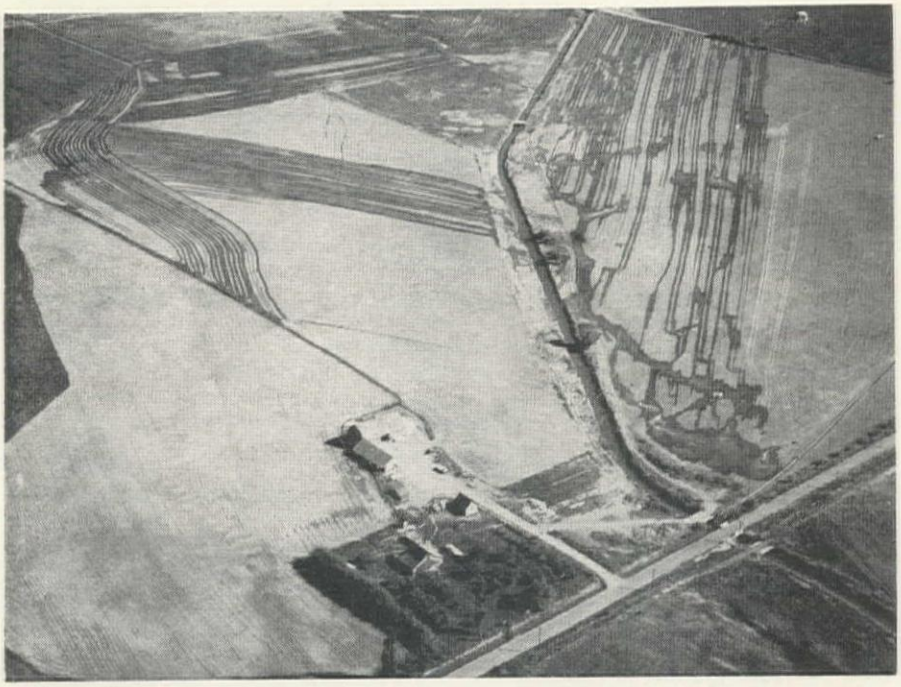
The careless use of water is apparent in many places in the West where it is found that erosion on cultivated fields has resulted in the filling of highway borrow pits, the covering of farm roads, and at times ruining fields for future cropping. The excessive use of water has also brought on harmful accumulations of salts that have greatly reduced production. It has also allowed the growth of many water grasses and weeds that have often restricted the use of the land to pasture and hay crops.

Thinking ahead

In recent years, interest has developed rapidly in many localities in what is known as "conservation irrigation." In brief, conservation irrigation is simply the efficient use of irrigable soils and the irrigation water in a way that insures high production without waste of either soil or water resources. The Soil Conservation Service, through its work with soil conservation districts, has made this one of its major contributions to irrigated agriculture. On request, engineers, soils men, agronomists and other technicians of the Soil Conservation Service are assigned to a district. They work up a table called an irrigation guide covering recommended irrigation practices in the area. From this guide all the soils within the soil conservation district are segregated into groups. The various crops that can be grown safely under these segregations are shown with the methods of irrigation that should be used, the rate of water application, the total amount of water required for the season, and the anticipated efficiency that will result from this combination of conditions.

Farmers in these soil conservation districts obtain direct assistance from the

PLENTY OF WATER, but in the wrong place. Inefficient irrigation eroded the furrows in this field and resulted in a pond of silty waste water at the lowest point.



RIGHT AND WRONG. Water is distributed poorly in the field at upper right because the runs are too long and the head controls inadequate. Better distribution of water on the field at lower left was made possible by irrigation along contours.

technicians on the district staff who make a land use capability map for each farm. This map shows the soils on the farm grouped according to texture, profile, slope, irrigability, drainability, and potential cropping limitations. Technicians also help farmers lay out their cropping program and the best farm water distribution system. The farmer is then shown how to develop these practices on his farm. Very often this requires some land leveling and many times requires a change in the method of water application. Proper water application, together with soil building crop rotations, is a major step in bringing the lands to maximum production and maintaining them for agricultural use.

Some have done it

A good example of the practical value of this kind of conservation irrigation is in the Tehachapi Soil Conservation District in Southern California where there is a large annual production of seed potatoes. For many years the common practice was to irrigate up and down the 3% to 8% slopes with furrow runs as long as 1300 ft. Farmers were having a great deal of difficulty in getting moisture penetration into the potato hills. Waste water from the furrows was causing a great deal of serious erosion damage. During 1948, Service engineers assigned to the soil conservation district assisted the farmers in changing the irrigation on 1200 ac. from down slope irrigation to contour irrigation, with a .5% grade in the furrows. This change in method of irrigation has resulted in a big increase in production and a definite increase in the quality of the potatoes. Waste water has been greatly reduced and erosion effectively controlled.

In Big Valley near Kelseyville, Calif., in the Lower Lake Soil Conservation District, one farmer had been irrigating a 30-ac. pear orchard with tree basins fed by contour furrows. Under this system of irrigation it took 10 days of 12 hours a day water application to irrigate the orchard. His irrigation system was revised to fit the particular soil situation on his farm, so with some land leveling the basins were eliminated and a border system installed. He now irrigates the entire 30 ac. in three days, using the same amount of water.

Near Los Banos, Calif., in the Los Banos Soil Conservation District, a 15-ac. field was laid out on the contour in 1948, to compare downslope with contour irrigation. The farmer had previously been irrigating mellons on a 1½% slope with furrow runs up to ½ mi. long and using cross blocks in the furrows to get a better penetration. He had great difficulty in getting satisfactory irrigation on these fields; his irrigation efficiency was only about 30%. On the adjoining field where he used contour furrows on a 2%-slope, he had 800-ft. runs and was able to completely irrigate the field in 11 hours with an increase of efficiency of about 50%. On his downslope system of irrigation, where he left the water in the furrows as much as 20 days, he was troubled with alkali. With contour irrigation no alkali problem has appeared.

In the Antelope Valley Soil Conservation District in Southern California, farmers faced a serious water shortage with the local water table being lowered by excessive pumping. The soil conservation district decided to direct a major part of its program toward increasing irrigation efficiencies from 40% to 70% on the irrigated lands. It asked for voluntary revision of farm irrigation systems, land leveling, and more careful application of irrigation water. One of the first farmers to cooperate increased his irrigation efficiency 50%. Others achieved similar results. Although the district has not yet reached its final goal, it has definite proof that it is on the right track.

A rancher in the Okanogan Valley in Washington had been irrigating 30 ac. of alfalfa on light river bench soils overlaying gravels with a poor crop production. His irrigation layout was inspected by a Soil Conservation Service engineer who found that too much water was being applied to the crop. By showing the farmer how to determine when he should irrigate and how much water he should use for each irrigation it was possible to reduce the amount of irrigation water by 65%, and to show a noticeable improvement in the crop production.

In Nevada a farmer was helped to reorganize his cropping plan so that he could establish a seasonal balance between his crops and his water. By doing this he was able to extend his irrigation water to irrigate 24 ac. more than he had ever been able to irrigate before.

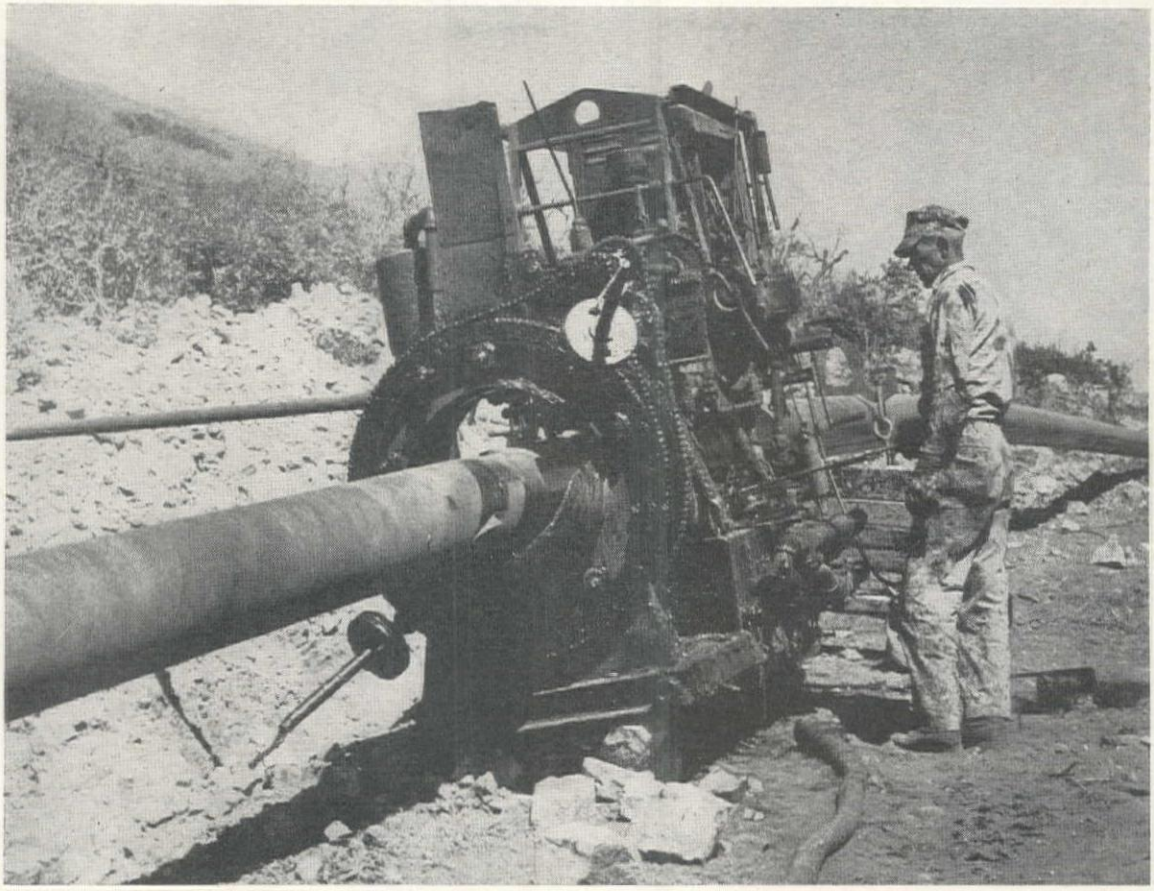
A peach orchardist in the West Benton Soil Conservation District near Kenewah, Washington changed over from furrow irrigation to sprinkler irrigation on his 14 ac. of soft fruits, and he increased his water application efficiency by 30%.

Many must take initiative

The examples cited show that something can very definitely be done about decreasing the water losses in both the irrigation water delivery systems and on the farms. It is up to people who live on the irrigated lands to take the initiative in doing something about these conditions if they are to utilize every soil and water resource in the West to its best advantage, and to maintain them in production to help meet the ever increasing population pressures on the land. It is equally as important that in areas under consideration for new irrigation projects the soil and water resources be carefully analyzed and their development be guided towards a land use that will result in a permanent irrigated agriculture.

The population of the United States is increasing at a rapid rate, and it is necessary that food production keep pace with it if we are to maintain the standard of living we are enjoying now. At the present time there are approximately 390,000,000 ac. of land in this country suitable for crop production, with adequate conservation practices, of which about 22,000,000 ac. are irrigated. We have available for development by drainage, clearing and irrigating another 70,000,000 ac. which will include from 8 to 10,000,000 ac. that should be irrigated. It is estimated that by 1970 all of these acres will have to be in a satisfactory production in addition to all of the lands being farmed today if we are to meet the needs of the nation at that time. **We cannot afford to half use our water and land resources** or to misuse the lands we are farming today if we as a nation are going to maintain our standard of living and also our place in the world economy.

One Short Summer, One Long Pipeline



WRAPPING of asphalt, fibre-glass and felt was applied by machines, where level terrain allowed, as corrosion protection.

Standard of California's 181-mi. long, 10-in. steel pipeline from Rangely, Colo., oil fields to refinery at Salt Lake City completed in three summer months—Entire line arc-welded in the field and examined immediately by a jeep-mounted X-ray testing machine

By O. N. MALMQUIST
Salt Lake City, Utah

BIGGEST CHALLENGE to builders of Standard of California's new 181-mi. pipeline from the Rangely, Colo., oil field to the company's North Salt Lake City refinery in Utah was weather at above 8,000-ft. elevations. Trouble from that source could be avoided by doing the job during the short summer, when the high altitude area would provide construction crews with an attractive summer-resort climate.

So the contractors, Pacific Pipeline & Engineers Limited of San Francisco, began trenching about July 1 and completed the 181-mi. pipeline by Oct. 1, just ahead of the early snows on the high passes and plateau country between the Salt Lake valley and the Uintah Basin. Thereafter, until next summer, long stretches of the line could be reached only by air or machines designed for traveling on top of snow.

Highest point on the line is 9,560 ft. at Wolf Creek summit. Starting point at Rangely is 5,200 ft. in elevation and the terminus at the refinery is 4,300 ft.

While the pipeline is similar to any other soundly designed and well constructed job, it will be put to a unique use sometime next summer: the transportation of gilsonite, a solid hydrocarbon. The gilsonite, of course, will be pulverized and liquefied and then fed into the line at Bonanza, Utah, to flow along with the crude oil from Rangely. The dissolving and proportioning plant will be constructed by American Gilsonite Co., which is jointly owned by Standard of California and the Barber Oil Corp. of New York City.

If the scheme works out on a commercial scale, as it has experimentally on a laboratory scale, the gilsonite deposits in the Uintah basin will provide a substantial addition to the oil supply which can be delivered to refineries through the line.

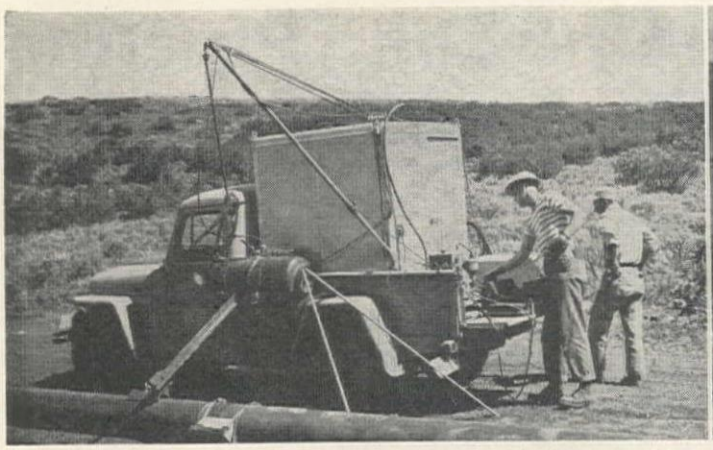
The 10-inch welded steel pipeline runs down the White River from Rangely, which is only about 12 mi. in Colorado, crosses Eureka ridge and intersects the Green River near Ouray, Utah. Thence it runs south on Myton bench, crosses Duchesne valley on Blue bench, runs up the valley through Wolf creek pass, the highest point on the line, and down the Kamas valley, across Alta summit and into Salt Lake valley by way of Emigration canyon.

It is all high strength grade B and C steel with a .307-in. wall for high pressure sections and a quarter-inch wall for the remainder. It was tested to 92 per cent of yield and the operating design is for 62 per cent, providing a wide safety margin.

It is presently designed to carry 22,000 bbl. daily, but will pump enough more to permit maintenance of that average after allowing for necessary shutdowns for repairs. The capacity, of course, can be increased by the addition of pumping stations. The line is now equipped with two such stations, one at Rangely and the other at Hanna, Utah. The contractor for these units was the Brown-Lane Co. of Palo Alto, Calif.

Hauled by trucks, when possible

The pipe, delivered in 40-ft. lengths at base points, was carried on trucks and dollies over access roads bulldozed near the trench. When the roads reached such steep sections that the trucks could



X-RAY MACHINE mounted on a jeep, left, examined welds while they were fresh. Blasting and a backhoe, upper right, excavated trench through hard rock, while a Buckeye ditcher dug trench elsewhere. On steep grades, the ditcher had some help, right.

no longer pull their loads, they were assisted by two tractors, and when this added power could no longer move the loads up the steep slopes, the pipe sections were unloaded and conveyed by side-boom tractors to the point of placement. Dollies were used with the trucks rather than trailers, because of the greater ease of turning around on the narrow mountain access roads.

Completely field welded

The entire line was arc-welded in the field. In the very rough sections, west of Hanna, the welding machines were set up on the hilltops and as the side-boom tractors delivered the pipe, the line was welded in long strings and pushed or dragged down the slopes and laid on the trench bank adjacent to its final position. These strings ran usually around 1,000 ft. in length, but were occasionally as much as 2,500 ft. long.

The first operation, of course, was excavation of the trench for the pipe. Whenever feasible this was done with a Buckeye ditcher. On flat sections, or where grades were not too heavy, these machines operated under their own power. As grades became steeper, they were held by two 1⅛-in. steel cables attached to tractors anchored at the tops of the slopes. In some cases, however, even this was insufficient, and after the ditcher had been lost down one or two slopes, the procedure in such cases was changed to hand-drilling and blasting, with excavation by a backhoe, also anchored to tractors above. The hard rock through which the ditch was dug also eliminated use of the ditcher in many sections, and blasting was necessary.

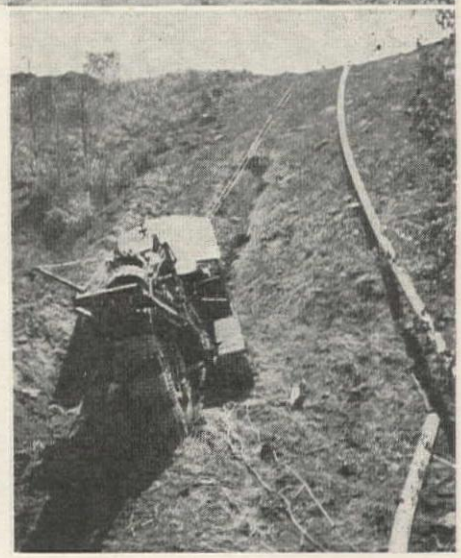
LENGTHS of the line passing through critical areas were Somastic-coated as special protection against corrosion. Here, the Somastic covering is applied in the field to a joint already welded.

Joints tested, corrosion fought

Following excavation, the pipe was strung out along the trench and welded. Following the welding crew was an X-ray testing machine, mounted on a jeep (which also received tractor aid in negotiating the sharper grades), which examined enough of the welds to provide a safe control. X-ray examinations were performed by Industrial X-ray Engineers of Seattle, Wash.

Special attention was given to protection against corrosion. Through critical areas, aggregating about 65 mi., the line was Somastic-coated, the covering being applied at a yard in Charleston, Utah. The balance of the line was protected with a wrapping of asphalt, fibre-glass, and felt, applied with machines on about 50 per cent of the remainder of the pipe, and by hand on the balance, where slopes and rugged terrain made operation of the machines impractical. On the section from Rangely to Hanna, a Perault Bros. wrapping machine was used and on the section from Hanna to Salt Lake City, a Crutcher-Rolfs-Cummings machine.

After wrapping, the pipe was lowered by side boom tractors into the trench and these were backfilled by bulldozers. The cover varies, but averages about 24 in.



Hydrostatic tests were applied after the whole line had been laid, the pipe being filled with water and pressure of 1,000 to 2,300 lb. per sq. in. applied, and maintained for 48 hours. In the whole 181 mi., only six faults were discovered as a result of the tests. These consisted of one bad weld and five splits in pipe units.

No overhead crossings

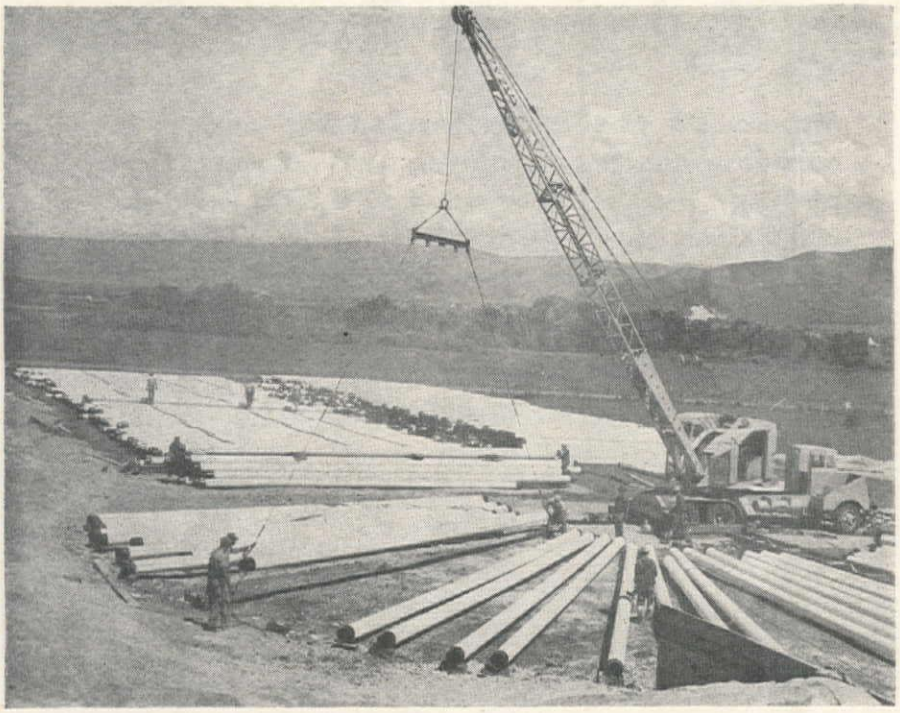
Numerous river and gully crossings were included in the 181 mi., the two longest being those across the White, Green and Duchesne Rivers and Wolf creek. However, in all cases, the pipe was buried under the stream bed rather than being suspended. For the White and Green Rivers, which were wide, but shallow, draglines operating from mats excavated the trench to a depth of 10 ft. below the bed of the stream, and after the pipe was laid, the same machines were used to backfill.

On the Duchesne River and Wolf creek, the trench was dug 6 ft. deep by draglines and backhoes, and was backfilled with bulldozers.

Cost of the line and pumping stations was in excess of $5,000,000. The pipeline, new refinery and incidental construction involved an investment of close to $15,000,000.

Personnel

In charge of the pipeline construction for Standard Oil Co. of California was F. G. Hampton, a member of the engineering department of the company. The



SOMASTIC COATING was applied to 65 mi. of the pipe at a yard in Charleston, Utah. A mobile crane was strategically spotted at the yard to handle the 40-ft. lengths.

line and pumping stations were designed by that department.

For the contracting firm, Pacific Pipeline & Engineers, Ltd., the work was broken into two sections, east and west from Hanna, Utah. The eastern section was constructed under the supervision of G. W. (Bill) Abernathy, project manager, and Louis Robertson, superintendent. West from Hanna, Roy Price was project manager, and six different spreads worked simultaneously. The six superintendents were: Larry Webb, J. D. Jones, Henry Ray, George Chapin, Ralph (Pee Wee) Ungles, and William Johnson.

Over-Crowded Roads Goading Highway Departments to Accelerate Programs

THERE WERE more cars on the highways in 1948 and the volume of travel was greater than in any preceding year, with the result that a large portion of the main highways—particularly those in and approaching urban areas—were carrying more vehicles than the roads were designed to serve.

Traffic congestion on principal rural and urban routes throughout the United States is likely to continue for some time, but State highway departments made substantial progress in 1948 in the improvement of primary and secondary roads in all sections of the country.

Reviewing highway construction activities during the year, Public Roads Commissioner Thomas H. MacDonald said contracts awarded by State agencies for all classes of road work in the 12-month period reached an estimated total of $1,150,000,000. This figure does not include the cost of right-of-way, engineering services and contingencies. The contracts called for improvements on approximately 40,000 mi. of primary and secondary roads and urban thoroughfares.

Contract awards for Federal and Federal-aid projects, including primary and secondary roads and urban extensions of the Federal-aid system, amounted to about $746,000,000. Of this sum, approximately $15,000,000 was for Federal improvements on roads in national park and forest areas.

Latest available reports from State highway departments show that Federal-aid and non-Federal projects costing $1,056,442,000 were placed under contract between Jan. 1 and Dec. 1 and involved work on 37,422 mi. of road, as compared with a total construction cost of $832,033,000 for improvements on 42,422 mi. of road during the same period in 1947.

Commissioner MacDonald explained that the increase in total construction cost, with a decrease in the mileage of improvements during the past year, reflects two important factors in highway development — steadily increasing construction costs for all types of road work and a greatly accelerated program of urban improvements involving contract prices ranging up to millions of dollars.

Practically all of the big jobs placed under contract in 1948 were on sections of the new National Interstate Highway System, which comprises the most heavily traveled routes in the Federal-aid primary system, including extensions of the system through metropolitan areas.

In nearly every large city action of some kind was taken during the year to promote the development of expressways to speed up the movement of traffic and relieve congestion on downtown streets. In a number of cities, expressways designed to carry large volumes of traffic safely at speeds of 40 to 50 miles an hour through crowded districts were under construction at the end of the year.

The need for extensive improvement of the Nation's highways, Commissioner MacDonald pointed out, is accentuated by the fact that highway usage has increased steadily since the war. The estimated total of motor vehicle registrations during the past year is expected to exceed 41,000,000, topping all previous records. Total volume of travel during the year is estimated at 395 billion miles, as compared with a total of 370 billion miles in 1947.

New Buildings Blossom On New Mexico's Campus

EXTENSIVE construction of new campus buildings has begun at the University of New Mexico in Albuquerque. The expansion program includes a $1,200,000 men's dormitory, central heating plant, library facilities and a journalism building. Low bidders on the various projects include Bradbury Construction Co., for the dormitory and publications building, Lembke Construction Co. for the library work, and L. M. Mauldin Construction Co. on the heating plant. All are Albuquerque firms. Cost of the entire project will near $3,000,000.

The dormitory, being built to accommodate 600 students, will be of the modified Spanish pueblo-type architecture exemplified in all of the other permanent structures on the campus. Special features of the 4-story building will be parlors, lounges and study rooms on each floor, a large game room on the fourth floor, a spacious dining room, and a pent house with sun decks and balconies on the roof. The journalism building will provide room for printing presses and University and student publication offices.

Million-Dollar Power Plant Planned by New Mexico Firm

THE 1949 BUDGET of the New Mexico Public Service Co. calls for an expenditure of approximately $3,100,000. Expansion plans of the company include construction of a new million-dollar power plant at Santa Fe, another dam at Las Vegas to provide more storage capacity for that city's water system, and enlargement of distribution and transmission facilities for electricity and gas in Albuquerque.

Money for the improvements will come from the sale of new stocks plus proceeds from the recent sale of some bonds, according to Arthur Prager, president of the company. The company spent close to $3,400,000 during 1948, chiefly for a new 11,500-kw. generator in Albuquerque.

Mexico Building Colorado River Dam

Morelos Dam being constructed just south of the border under terms of the 1944 Water Treaty between the United States and Mexico—The $7,000,000 barrier will divert the Lower Colorado River for irrigation of Mexican lands

By J. F. FRIEDKIN
Engineer
International Boundary and Water Commission
San Diego, Calif.

IN SEPTEMBER, 1948, construction began on the Morelos diversion structures located in the boundary section of the Lower Colorado River, one mile below the point where the northernmost international land boundary intersects the Colorado River and about 8 mi. downstream from Yuma, Ariz. Total cost of the project is estimated at $7,000,000.

This construction is being undertaken by the Government of Mexico in accordance with the provisions of Article 12 of the 1944 Water Treaty between the United States and Mexico. Its purpose is to provide an assured means of diverting from the Colorado River the major portion of the water allocated by the treaty for irrigation of lands in Baja California and in the State of Sonora, Mexico. It was similarly to provide an assured means of diverting water from the Colorado River for irrigation of lands in Arizona and California that the United States constructed Laguna dam and later Imperial dam, 21 and 27 mi. respectively, upstream from the location of the Morelos structure.

The joint engineering investigation leading up to, and the decisions reached by the International Boundary and Water Commission in approval of the location and type of structure adopted exemplify the cooperation and good will of the two countries in carrying out the provisions of the 1944 treaty.

Article 12 of the Treaty provides that Mexico shall construct at its expense by November 1950, a main diversion structure on the Colorado River, below the point where the northernmost land boundary line intersects the river, and that if such structure is located in the limitrophe section of the river, its location, design and construction shall be subject to the approval of the International Boundary and Water Commission, and that Commission shall thereafter maintain and operate the structure at the expense of Mexico.

At Mexico's expense

Article 12 further provides that regardless of where such diversion structure is located, there shall simultaneously be constructed such levees, interior drainage facilities, and other works or improvements to existing works, as in the opinion of the Commission shall be necessary to protect lands within the United States against damage from such floods and seepage as might result from the construction, operation and maintenance of this diversion structure; and those protective works shall be constructed, operated and maintained at the expense of Mexico by the respective Sections of the Commission, or under their supervision, each within the territory of its own country.

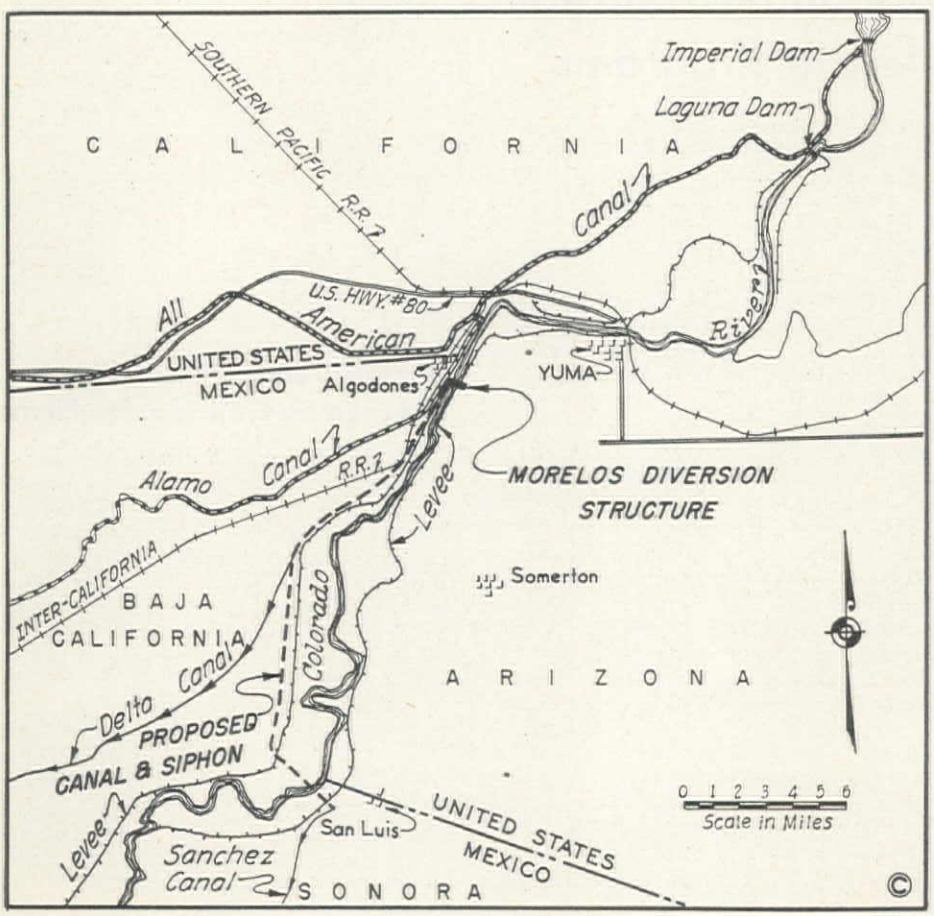
In accordance with those provisions, the Mexican Government began preparation of plans for the structure in 1946, and from time to time joint conferences were held between the Commissioners, engineers, and consultants of the United States and Mexican Sections of the Commission for consideration of alternate plans developed, the objective being to select the location and type of structure which would both permit diversions at the required elevations to serve the needs of Mexico, and minimize effects and hence the protective works required in the United States.

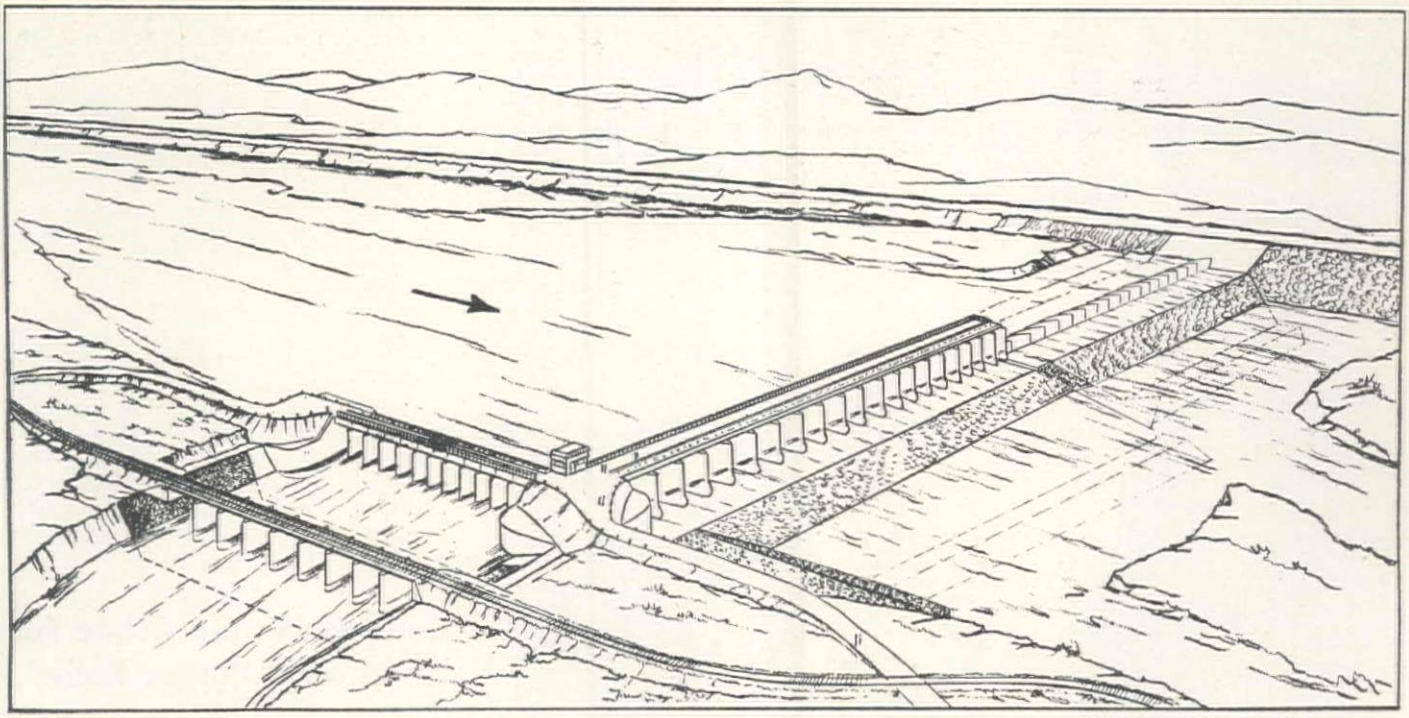
In developing the plans and final design for the structure, the Mexican Commissioner and the Secretary of the Ministry of Hydraulic Resources employed eminent engineers as consultants. In reviewing those plans and in the studies of the protective works which may be necessary in the United States, the Commissioner for the United States consulted freely with the Chief Engineer and Regional Director, Region III, Bureau of Reclamation, as well as with his other regular consultants.

Diversion elevations chief factor

In consideration of the location, foundation and abutment conditions were not prime factors. There was little choice in this regard inasmuch as throughout the river below the northernmost boundary the bed and banks are comprised of recent alluvial fill. The important factors were the length and grade of connecting canals required to deliver water to existing and proposed irrigation systems, the height to which ordinary river stages would be raised to meet required diversion elevations and incident thereto, the extent of protective works required in the United States.

Two locations were given serious consideration. The first was entirely in Mexico, about 0.5 mi. below the point where the southernmost international land boundary intersects the Colorado River, near San Luis, Sonora. A structure at that location would permit direct diversions for the irrigation of lands on the Sonora side as well as for lands on the Baja California side. To meet re-





quired diversion elevations there, ordinary river stages would have to be raised about 10 ft., which studies showed would create a critically serious seepage and flood problem for lands upstream in the United States.

The second location considered was about 20 mi. upstream from the San Luis location, in the boundary section of the river about one mile downstream from the northerly international boundary, near Algodones, Baja California. Appurtenant to a structure at this upper location would be a connecting canal about 18 mi. long and a siphon across the river near San Luis to permit delivery of diverted water to the Sonora lands. At this location, however, it was found that required diversion elevations could be obtained with no rise in ordinary river stages. Hence, this location would permit construction and operation of a dam which would have minimum effects upstream as well as adequately serve the needs of Mexico.

Following joint reviews of the alternate plans, the Mexican Government selected the upper location as being the more favorable.

Levee and gates adopted

In the early plans for the main diversion structure, consideration was given to an overflow type dam, similar to Laguna dam. Joint reviews, however, of the surveys of channel siltation which has occurred upstream from that dam led to the preparation of plans for a structure extending from levee to levee about 1,400 ft., which would include in addition to an overflow section, a gated section having a net opening 600 ft. long, which approximates the natural width of the channel. Such a plan, which would provide facilities for maximum possible sluicing of the channel upstream, was determined to be the most favorable.

By Minute No. 189 of the International Boundary and Water Commission dated May 12, 1948, the Commission approved construction of the main diversion structure, named Morelos dam, at the upper location in accordance with that plan. That Minute was approved by the two Governments the following month.

Design factors

The gated section is designed to have a total length of about 700 ft., and will consist of 20 electrically operated gates, 11 ft. in height and 30 ft. in width. The floor of that section will be set at an elevation two to four feet below the elevation of the river bed. The elevation of the top of the gates in their closed position, about 8 ft. above the average river bed, will correspond to existing river stages for a flow of 8,000 to 9,000 sec. ft. That elevation is 10 to 12 ft. below the top of the channel banks. The floor of the superstructure over the gated section will be 38.5 ft. above the sill of the gates so as to permit drawing the gates high enough to pass with 2 ft. of freeboard, a flood flow of 350,000 cfs.

The overflow section, about 600 ft. in length, will consist of a weir section 9.8 ft. in width and 7.55 ft. high supported on a concrete floor 2.6 ft. thick, and the elevation of the crest will be the same as that of the top of the gates in their closed position.

Designed as a floating type structure, it will be built of reinforced concrete and protected by concrete aprons and steel sheet piling at the upstream and downstream ends of the aprons. Above and below the aprons, the river bed will be excavated and heavily armored with riprap to protect against scour. The plan provides further that the levees on both sides of the structure will be adequately protected with rock.

The heading for the diversion canal will also be a reinforced concrete structure of the floating type, with steel sheet piling at the upstream and downstream ends. A reinforced concrete curtain wall will be provided to prevent uncontrolled flow into the canal. The openings into the canal will consist of 12 orifices, 6½ by 20 ft., which will be controlled by radial gates. The elevation of the sill of those gates will be within one foot of the elevation of the average channel bed. The design diversion elevations in the canal, immediately below the heading, are about one foot lower than existing river stages for corresponding flows.

Morrison-Knudsen gets contract

In June of 1948, the Mexican Government awarded the contract for construction of Morelos dam to Morrison-Knudsen Co., of Sonora, Mexico. Since the start of operations in September, the work has involved principally stripping operations on the right bank.

The program calls for construction of the dam in two stages, first the west half, which includes most of the gated section and the diversion headworks, and second, the remaining part of the gated section and the overflow section. The cofferdam for the first stage of construction was completed early in November and dewatering and excavation operations are in progress. Pouring of concrete in structures will probably begin next month.

Protective works in U. S.

Inasmuch as the design diversion elevations are somewhat lower than existing river stages for corresponding flows, with proper operation no material rise in ordinary stages upstream is anticipated. Notwithstanding this, the United States Section has for some time had under study the drainage protective works which may be required in the event operation of the structure should cause a material rise in ordinary stages upstream.

Depletions of the river flow by diversions at the Morelos structure are ex-

ARROW points downstream toward Morelos Dam site, where river cofferdam for the structure's west half and stripping operations on the right bank are completed.

pected in time to effect deterioration of the channel downstream, just as depletions at Imperial dam are expected to effect deterioration of the channel downstream therefrom. The most feasible means of solving this problem appears to involve rectification of the Colorado River from Imperial dam to the Gulf of California. Authority for study and preparation of plans for such a project was also included in the Treaty of 1944, in Article 13.

As regards anticipated effects of the structure on flood flows, even though the structure will not cause any material reduction in the ordinary channel cross-section, it will prevent such scour at the site as would otherwise occur during extreme flood flows, and to that extent it will form an obstruction. Estimates of such obstructive effects indicate that stages upstream may be raised from 1.3 ft. for a flood flow of 140,000 cfs. to 3.2 ft. for 310,000 cfs.

In 1947, surveys were initiated of the existing protective levees in the United States below Laguna dam to ascertain their adequacy and to determine what additional levee work might be necessary because of construction and operation of the Morelos diversion structure. Examination of results of those surveys indicated that the levees are not of sufficient height under existing conditions. A program is therefore under development in cooperation with the Bureau of Reclamation for (1) rehabilitating the existing levees to the section and grades required without the Morelos diversion structure, which is the responsibility of the United States, and (2) raising those levees as may be necessary because of that structure, which is the responsibility of Mexico, the two to be undertaken as a single project. It is expected that the necessary levee work will begin during 1949.

Levees depend on Painted Rock

To be considered in connection with the question of height of levees required, and as an important part of the overall flood problem of the Lower Colorado River, is the need for a flood control dam on the Gila River at the Painted Rock site, about 120 mi. above Yuma, which the Corps of Engineers now has under consideration.

The results of recent studies by the Bureau of Reclamation and the Corps of Engineers indicate that without that dam the levee design flood may be as high as 310,000 cfs.; with that dam, only about 140,000 cfs.

With the proposed rehabilitation and raising of the existing levees, greater security will be afforded the Yuma Valley against floods than exists today, and if the Gila flood control dam now under construction is built, the maximum feasible protection will be provided.

Directing construction of the Morelos Dam is Engineer Adolfo Orive Alba, Secretary of the Ministry of Hydraulic Resources of Mexico. Field engineers representing the Secretary are Eligio Esquivel Mendez, Manager of the Colorado River District, Baja California, and J. Ramos Magana, Resident Engineer. Supervision of the construction by the International Boundary and Water Commission, in accordance with the Treaty provisions, is being carried out by Commissioner L. M. Lawson and Principal Engineer C. M. Ainsworth for the United States; and Commissioner D. Herrera J. and Principal Engineer Jesus Franco Urias for Mexico. Field engineers representing the Commission include for the United States Section, J. F. Friedkin, Engineer-in-Charge, San Diego, California, and D. C. Caylor, Engineer-Inspector, Yuma, Arizona; for the Mexican Section, Jose G. Valenzuela, Chief of that Section's office in Mexicali, B. C., and Engineer-Inspector. James D. McClary, Vice-President of the Morrison-Knudsen Company of Sonora, S. A., is the project manager for that company, and Charles S. Bradley is the assistant manager.

Canada Water Asked for Northwest Power Relief

WASHINGTON'S Columbia Basin Commission has asked international study of a proposal for storage of water in Canada to help relieve the Northwest power shortage, specifically in British Columbia's Arrow Lakes. Recipient of the proposal is the International Joint Commission, composed of three American and three Canadian members.

Storage of water in Arrow lakes would provide supply to keep the generators at Grand Coulee Dam operating during the winter months. At present, a dam is contemplated at Castlegar that would store nearly 7,000,000 ac. ft. of water in the lakes. The Bonneville and Grand Coulee power plants would be able to produce an additional 500,000 to 700,000 kw. of power during the winter months. An earth-rock dam could probably be built at Castlegar within a year. British Columbia would get half the additional power and would be paid from $2,500,000 to $3,500,000 annually for the storage.

Specific assignment for the international commission would be to determine the amount of storage it will approve in the Arrow lakes. Castlegar and the Arrow lakes are 50 mi. north of the Canadian-United States border and the headwaters of the Columbia River.

Crane Rescues Steel Worker Marooned on Flaming Ledge

A CONSTRUCTION CRANE provided something new in fire rescue technique in Los Angeles, Calif., when two steel workers were marooned on a second-story ledge with flames licking about their feet. Finis Bryant, one of the workers jumped and suffered various injuries. But Blackie Mihalek hung on. It was then that J. D. Grundon, crane operator on the same project, swung its big steel hook toward Mihalek. He grabbed the cable, got on the hook, and was lowered to the ground with nothing worse than minor hand burns.

Bulletin Board Cuts Job Accidents

Red, blue, gold; job accidents told—Safety record at shops of California irrigation district improves rapidly with use of special safety bulletin board and a few colored stars

THE LA MESA, Lemon Grove and Spring Valley Irrigation District serves a very rapidly growing area located easterly of and adjacent to San Diego, California. During the war years the organization was quite small due to lack of materials and man power, but with the tremendous growth taking place since 1945, the organization has mushroomed. The result has been that many employees have been hired who have not had previous experience in the water works field or industrial plants where they would have had a part in an active safety program. Even with such odds, the accident record of the District was not serious, but it was deemed advisable to establish a definite program hoping to train the men in safety as well as certain phases of their daily work.

Meetings were held in 1946 and 1947 and all employees were brought in early from their work, allowing an hour at the close of the day, on District time, for the meetings. The District was fortunate in being located within a few miles of San Diego, where the City Water Department has for years carried on a most satisfactory safety program under the direction of George A. Fish. He was made available to the District for its safety meetings and has been a valuable aid in carrying out the program. However, early in 1948, the need was felt for something "eye-catching," which would give all employees an idea of their personal record as well as that of everyone else. The result is shown in the accompanying photograph of the Safety Bulletin Board which was constructed and placed in the shop where all the men congregate before and after work.

Lively interest

The first evening the board was on display actually served the purpose for which the board was designed. Men stood before it, looking for their name and studying the record shown for them. When a red star was observed opposite a man's name, he became the butt of a friendly razzing. The crowd was there for about an hour, which is something of a record in itself for a gang at the close of a working day. But the interest remained at a high pitch for days and there was plenty of discussion on the job about the board, accidents, and their causes.

Very little work is involved in maintaining the board up-to-date. As one of the girls in the main office makes up individual accident reports, she posts the necessary data on a "blotter" and at the end of the month this is sent to the shop office where the clerk posts the bulletin board by putting opposite each name the correct star. Red denotes a lost time accident; blue denotes a reportable accident but where the employee returns to work without lost time; gold indicates the employee had no accident. In addition to the individual record of all employees, the board is also used for the posting of safety bulletins, but no subject other than safety is permitted.

The District plans the construction of a large shop building within the next year or two and plans for the building to incorporate a meeting room which will seat approximately 100 men. The main use to be made of this room will be for the safety meetings, where the men can be comfortable and where the room may be darkened for the showing of films.

New Repayment Contract Will Benefit Water Users on Reclamation Projects

APPROVAL of an amendatory contract for repaying the costs of the Bureau of Reclamation's Uncompahgre project in Western Colorado has been reported.

The stockholders of the Uncompahgre Valley Water Users' Association voted more than 30 to 1 in favor of a new repayment contract upon whose terms Association officers and the Department of the Interior have agreed for relieving the water users of financial difficulties.

Farmers on the project, which has headquarters at Montrose, Colo., have fallen behind schedule in paying annual installments of project costs that have accrued under existing contractural arrangements. This situation was largely the result of the fact that only 70,828 ac. of the project, on which construction was begun in 1904, turned out to be productive. The project, when authorized in 1903, was designed to serve approximately 140,000 ac.

The proposed new contract, as approved by the water users, would provide for the repayment of the Uncompahgre Valley Water Users' Association's obligation as adjusted in light of the reduction in project acreage. Also, it would adjust the annual installments to the ability of the water users to make the payments.

The Reclamation Project Act of 1939 provided an avenue through which amendatory repayment contracts could be negotiated with water users' organizations which encountered financial problems, by giving the Secretary of the Interior authority to work out contracts which would come within the repayment ability of the water users. In cases where a revised payment period in excess of 40 years would be required in light of the water users' ability to repay project costs, authorization to execute the contracts must be obtained from the Congress in each individual instance.

The proposed Uncompahgre contract is one of four instances where similar agreements have been reached, validated in a water users' election, and will be ready for submission to the next session of the Congress. The three other instances include the Okanogan Irrigation District, on the Okanogan project in north-central Washington; the Bitterroot Irrigation District of the Bitterroot project in western Montana; and the Shasta View Irrigation District of the Klamath project, on the Oregon-California line. All of these are early reclamation developments where financial difficulties in keeping up with repayment installments have been encountered.

Work Rolling at Texas' Whitney Dam

Multiple-purpose, $40,000,000 structure on the Brazos River near Waco, Texas, will be more than 3 mi. long — Work proceeding under final contracts with completion scheduled for 1951

NOW UNDER construction by the Galveston District of the Corps of Engineers is the $40,000,000 Whitney Dam and Reservoir project.

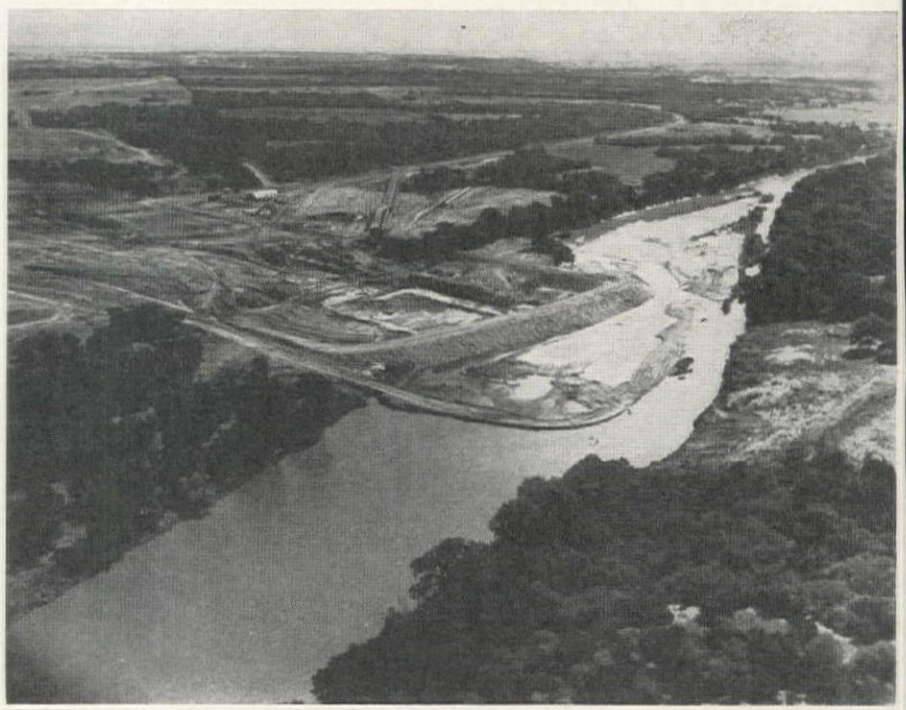
Located on the Brazos River approximately 38 mi. above Waco, Tex., this multiple-purpose project has been designed for flood control, generation of hydroelectric power, and other beneficial water uses. It was authorized by the Flood Control Acts of August 18, 1941, and December 22, 1944.

Planning and construction of this project is under the immediate supervision of Col. B. L. Robinson, District Engineer of the Galveston District. Mark Haima is resident engineer directing the activities at the construction site.

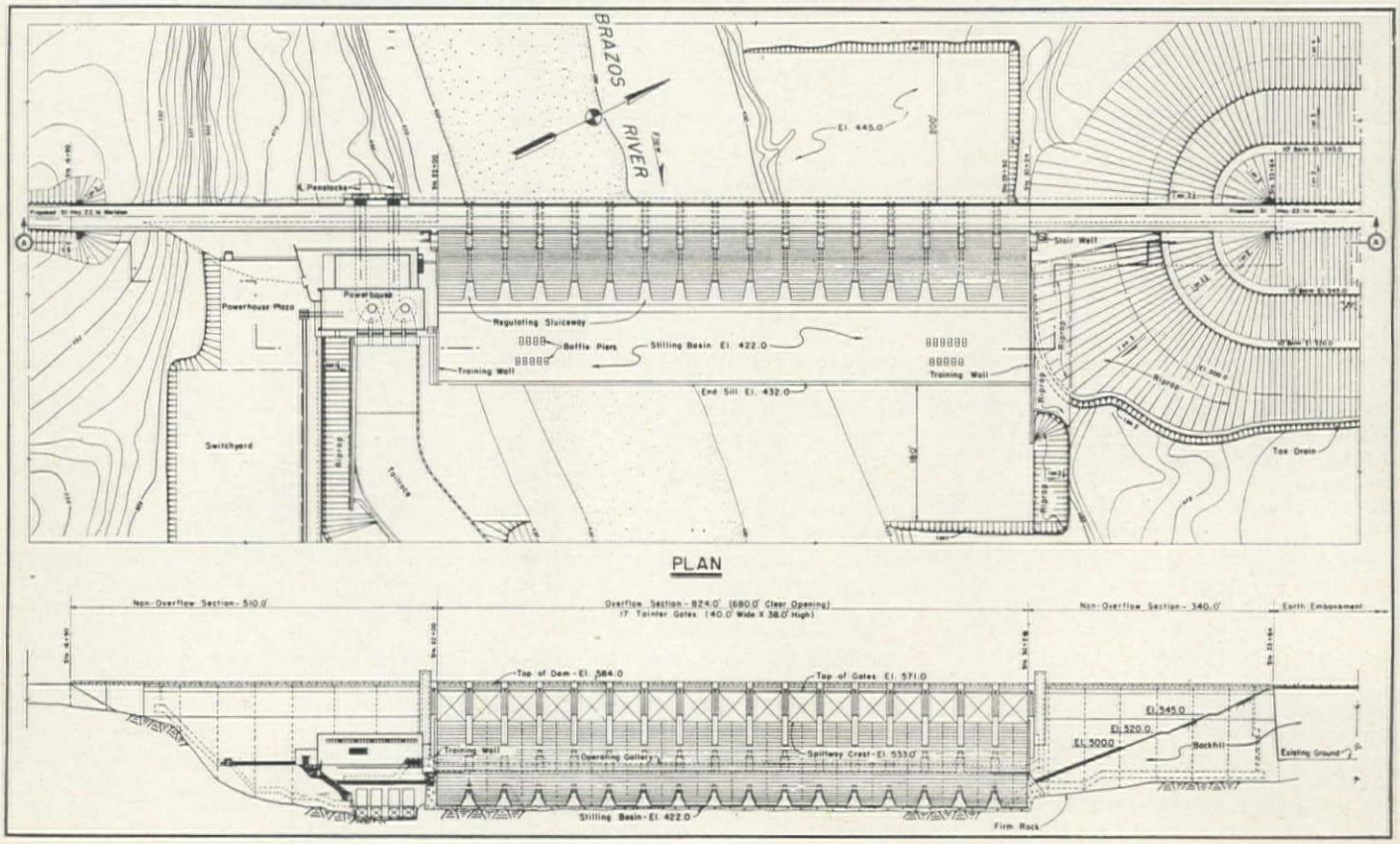
Design features

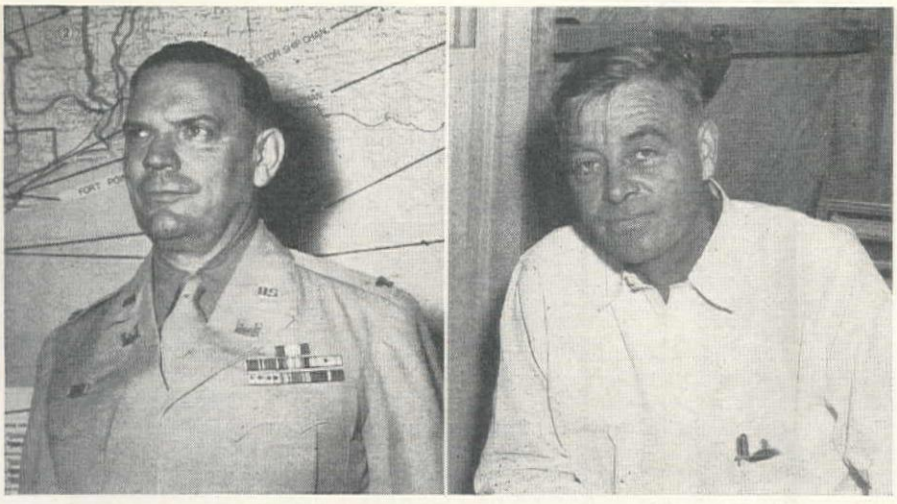
The Whitney Dam when completed will be of concrete gravity construction, flanked on both ends by compacted earth embankments. The concrete section of the dam will be approximately 1,600 ft. long; the earth embankment will have a total length of approximately 16,000 ft. The dam will have a maximum height of 167 ft. above the existing stream bed. The structure will consist of two non-overflow sections, an overflow spillway section with stilling basin, and a power intake section containing two penstocks 16 ft. in diameter, to divert the water to the turbines for the generation of hydroelectric power.

The power plant will house two vertical shaft type, 15,000-kw. generating units with controls, switching, transferring, and operating equipment. This



EARTH COFFERDAM was provided on the left bank of the Brazos River to protect the work area from floods and high water while outlet works for the dam were being constructed. Future plans call for construction of another cofferdam on the opposite bank to divert river flow. Plan and cross-section of the outlet works are shown below.





COLONEL B. L. ROBINSON, left, Galveston District Engineer, is directing construction of Whitney Dam and Reservoir, and MARK HAIMA is the resident engineer.

powerhouse will be an independent structure located on the right bank of the river adjacent to the spillway and immediately downstream from the power intake section.

The dam will control the run-off from 17,656 sq. mi. and will impound a lake covering approximately 15,800 ac. at the top of the power storage pool, elevation 520. At flood control level, elevation 571, the reservoir will cover an area of 49,710 ac.

The Whitney Reservoir will have a total storage capacity of 2,017,500 ac. ft., of which 131,700 ac. ft. are allocated to power storage, while 255,300 ac. ft. are allocated to dead storage. The construction of this project will necessitate the relocation of about 24 mi. of railroads, as well as 5 mi. of State highway, local roads, power and telephone lines. Seven cemeteries within the limits of the reservoir will also be relocated.

Construction contracts

Construction of the dam began on May 12, 1947 when the Standard Paving Co. of Tulsa, Okla., started construction of a portion of the earth embankment. This contract was completed on March 31, 1948.

The L. P. Reed Construction Co. of Meridian, Tex., has been awarded a contract for construction of the spillway and completion of the embankment.

The Government has also entered into a contract with the Treadwell Construction Co. for delivery of tainter gates, trunions, anchorages, and guides.

Other contracts have been made with the Westinghouse Electric Corp. for emergency generator controls and power distribution boards; with the Buda Engine and Equipment Co. for standby gasoline-electric generator units.

The Allis-Chalmers Manufacturing Co. will build and install two alternating current generators while the Newport News Shipbuilding and Drydock Co. will deliver the hydraulic turbines.

Additional contracts have been awarded to the Goslin-Birmingham Manufacturing Co., Inc., for hydroelectric slide gates and hoists; Consolidated Steel Corp. for intake gates; and the Premier Gear and Machine Works for intake gate hoists; and the Otis Elevator Co. for a passenger elevator.

For hauling of heavy equipment the M. K. T. Railroad under contract with the Government has built a rail line from its main line to the construction site.

According to Col. Robinson the Whitney Dam is presently approximately ten per cent complete and it is estimated that the entire project will be completed during 1951.

A. G. C. Charters Permanent Chapters In New Mexico and Alaska Territory

TWO NEW chapters have been chartered by The Associated General Contractors of America. They are:

The Alaska Chapter, with headquarters in Anchorage;

The Associated Building Contractors of New Mexico, with offices in Albuquerque.

The national association now has 105 chapters. Nearly 5,000 construction firms, engaged in all types of construction work—highway, building, heavy and railroad construction—are members of A.G.C.

Establishment of a permanent chapter of general contractors in Alaska, engaged in all types of constructive work, is evidence of the rapid pace at which the resources and industries of the Territory are being developed. Ten construction companies, resident or operating in Alaska, are charter members and there are assurances that this number will increase substantially.

R. H. Stock, of Stock and Grove, Inc., Anchorage, has been elected president. E. W. Dunn, who has had wide experience on Alaska construction projects as an official of Birch, Johnson, Lytle Co., has been appointed manager of the chapter. During the war Dunn served as a construction industry representative on the Wage Adjustment Board. Previously he was a highway engineer for the state of Iowa.

Presentation of the Alaska Chapter charter will be made shortly after the first of the year. The chapter will cooperate closely with A.G.C. chapters in the state of Washington.

Chartering of The Associated Building Chapter of New Mexico reflects the important and growing amount of industrial, commercial, and other building construction in that state. The building chapter takes a place, side by side, with the long-established Associated Contractors of New Mexico, composed of highway and heavy construction firms.

The new chapter's charter was formally presented to it on behalf of the national association on Dec. 18 by Gayle Armstrong, manager of Armstrong and Armstrong, Roswell, N. Mex., and a member of the Executive Committee of A.G.C. Alva J. Coats is manager of the chapter.

Gas Pipeline Would Tap Alberta Reserve Supply

IF ALBERTA natural gas was exported to British Columbia and Pacific Northwest United States, it would bring a revenue to three oil companies of $6,700,000 per year.

The estimate is based on provisional contracts signed between the Northwest Natural Gas Company and the three oil companies, Imperial Oil, Shell Oil and California-Standard Oil. The contracts will not be binding if the Alberta Government refuses permission to export. At present a royal commission is holding hearings throughout the province to determine gas reserve in Alberta.

The Northwest Natural Gas Company with head offices in New York, was incorporated recently to construct and operate a pipeline from Alberta oil fields to the Pacific Coast. The line would cost about $100,000,000.

The main pipeline to the Pacific Coast would have a 24-in. diameter. The line would leave Alberta at the Crow's Nest Pass and pass through the southeast corner of British Columbia to enter the United States at Kingsgate. From Kingsgate, it would go southwesterly to a point near Spokane, Wash., and then go due west to the Pacific Coast at a point between Seattle, Wash., and Vancouver, B. C. Branch lines would supply Spokane, Vancouver and Seattle as well as Nelson and Trail in interior B. C.

Present contracts call for the gas to be obtained in the following Alberta areas: The Viking-Kinsella district southeast of Edmonton; the Jumping Pound district west of Calgary; the Princess district about 100 miles east of Calgary; the Dunmore district a few miles south of Medicine Hat, Alta.; and the foremost district about 70 miles southeast of Lethbridge, Alta. Capacity of the line would be about 220,000,000 cubic feet of gas a day.

Construction Design Chart

CIV... Cantilever Retaining Walls

By JAMES R. GRIFFITH
Dean of Engineering
University of Portland
Portland, Oregon

SEVERAL CHANGES have been made in preparing the accompanying chart as compared to the original one on this same subject, as follows:

1. The allowable unit compressive stress in the concrete has been taken as $f_c = 0.45$, $f'_c = 900$ p.s.i., in contrast to the value of 800 p.s.i. used for the first chart.
2. The allowable unit tensile stress in the reinforcing steel has been taken as $f_s = 20{,}000$ p.s.i., whereas the original chart was based on 18,000 p.s.i.
3. A scale has been added showing the required area of reinforcing steel per foot of wall.

The accompanying chart is based on the pressure from the earth fill as computed by the equivalent fluid pressure theory. The values shown on the central scale for weights of equivalent fluids, were taken from Vol. I, Hool and Johnson.[1] I was interested to note that the current Seattle Building Code (Amended to 1946) Sec. 310, refers to the use of the equivalent fluid theory in computing the earth pressures against walls. It states "... which pressure shall not be assumed as less than that produced by the following assumed fluid weights computed in accordance with the equivalent fluid theory."

The effective wall thickness (d) from the compression side to the center of the reinforcement, and the amount of steel (A_s), are computed on the basis of balanced tensile reinforcing. Thus, for the assumed allowable stresses, the elements of a 1-ft. length of wall will be computed as follows:

$$d = \sqrt{\frac{M}{K \times 12}} = \sqrt{\frac{M}{157 \times 12}}$$

$$A_s = p \times 12 \times d = 0.0091 \times 12 \times d$$

The bending moment at any section of the wall, on the basis of the equivalent fluid theory, is found by the expression

$$M = \frac{w' h^3}{6}$$

On the accompanying chart I have drawn a solution line for the same conditions assumed to illustrate the use of the original chart on this subject:

Height of fill, $h = 12$ ft.

Average earth, equivalent fluid weight, $w' = 33$ lb. per cu. ft.

The following values will be noted on the chart:

Effective depth, $d = 7.8$ in.

Reinforcing, $A_s = 0.85$ sq. in. per ft. of wall.

Substituting the assumed values in the basic formulae given, as a check on the values obtained from the chart, we have:

$$M = \frac{w' h^3}{6} = \frac{33 \times 12^3}{6} = 9{,}510 \text{ ft. lb.}$$

$$d = \sqrt{\frac{M}{157 \times 12}} = \sqrt{\frac{9{,}510 \times 12}{157 \times 12}} = 7.78 \text{ in.}$$

$$A_s = 0.0091 \times 12 \times d$$
$$= 0.0091 \times 12 \times 7.78 = 0.851 \text{ sq. in. per ft.}$$

Horizontally opposite the intersection on the A_s scale of the chart, will be found the required spacing for various sizes of reinforcing bars. It will be seen on the chart that the above conditions will be satisfied by either of the following bar combinations:

¾-in. round bars 6 in. on center

1-in. round bars 11 in. on center.

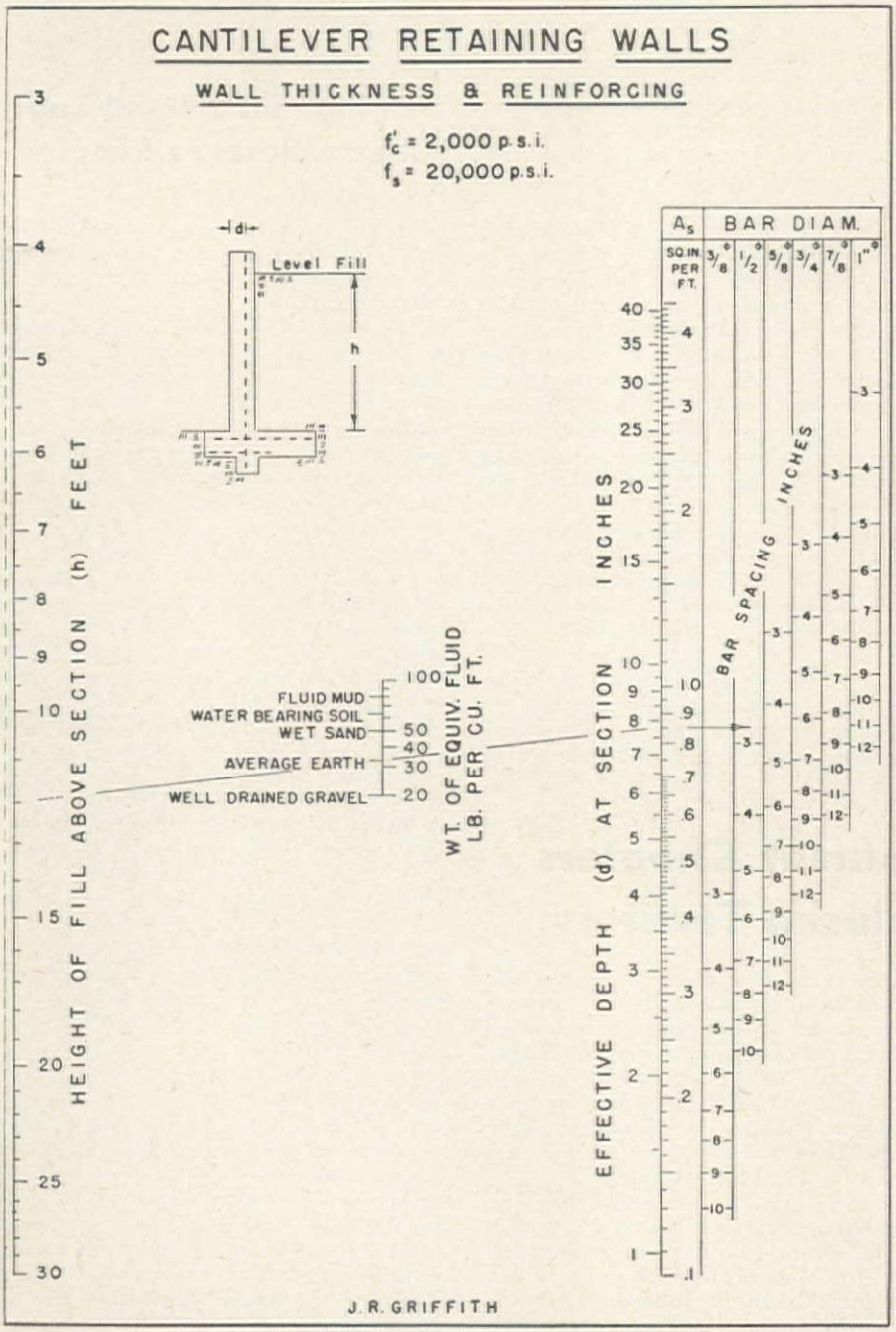
Referring to a standard table for bar spacing in slabs, we find the following:

¾-in. round bars at 6 in. on center, $A_s = 0.88$ sq. in. per. ft.

1-in. round bars at 11 in. on center, $A_s = 0.86$ sq. in. per ft.

It will be noted that either of the two combinations gives a value close to that required of $A_s = 0.851$ sq. in. per ft.

[1] *Handbook of Building Construction.*



Arizona Water Tables Drop

ARIZONA'S groundwater tables sank sharply during 1947-1948, according to the U. S. Geological Survey. Wells of the Salt River Valley have been forced to drop an average of 8 ft. for their supply, with the water being lifted more than 300 ft. in some locations. In the Queen Creek area, west of Chandler, the drop was slightly over 10 ft.

Blueprint for Safe Water Use

California engineers prepare set of standards outlining minimum design, construction, maintenance and operation requirements for domestic water utility systems—Text presented here as suggested blueprint for action by water works engineers of other Western states

AT THE RECENT convention of the California Section of the American Water Works Association, a set of standards of minimum requirements for safe practice in the production and delivery of water for domestic use was promulgated and adopted.

The standards are of particular interest because they were prepared to implement Division 5, Part 1, Chapter 7, Article 1 of the Health and Safety Code of the State of California, which refers to standards adopted by the California Section of AWWA, and will in effect, when the Code is adopted by the Legislature, make them a part of the State health law. The opportunity to have the standards prepared by engineers actually in the business, rather than by nontechnical legislators, is a rare condition and the Section and its special committee labored at great length and devoted its very best thought to the matter.

The standards were prepared by a special committee consisting of Louis J. Alexander, chairman; S. M. Dunn, Carl A. Lauenstein, Edward A. Reinke, Max K. Socha, J. W. Trahern, and George F. Yackey. They were adopted at the Section convention in Riverside.

The entire set of standards follows:

1.0 General Statement

1.1. These standards set forth minimum requirements for safe practice in the production and delivery of water for domestic use. They are to be interpreted as meeting **only the minimum** requirements of design, construction, maintenance, and operation of water utility systems.

1.2. For the purpose of these Minimum Requirements the use of the word **SHALL** indicates a mandatory requirement and the use of the word **SHOULD** indicates a recommendation for good Water Works practice.

2.0. Intent and Purpose

2.1. **Intent:** It is the intent of these standards to safeguard domestic water consumers from injury resulting from sanitary hazards or structural hazards, or both, which may arise from inadequacies in the design, construction, maintenance, and operation of water utility systems.

2.11. **Sanitary hazards** are inadequacies actual, or potential, which might permit the entrance of pollution, contamination, or infection into the water, thereby impairing water quality or rendering it injurious to public health.

2.12. **Structural hazards** are inadequacies which actually or potentially impair the physical structure of the water system and which are of a nature that might create sanitary hazards. Structural hazards may be due to structural weaknesses, improper design, poor workmanship, improper operation, or inadequate maintenance or an insufficient quantity of water.

2.2. **It is the purpose of these minimum requirements to outline standards of design, construction, maintenance and operation of domestic water systems which will provide protection of the public health.**

3.0. Water System

3.1. **The water system** shall be considered as made up of two parts; namely, the utility system and the customer system.

3.2. **The utility system,** consisting of the source facilities and the distribution system, shall include all those facilities of the water system under the complete control of the utility, up to the point where the customer's system begins.

3.21. **The source** shall include all components of the facilities, utilized in the production, treatment, storage, and delivery of water to the distribution system.

3.22. **The distribution system** shall include the network of conduits, used for the delivery of water, from the source to the customer's system.

L. J. ALEXANDER, chairman of the special committee, is design engineer for the Southern California Water Co.

3.3. **The customer system** shall include those parts of the facilities beyond the termination of the utility distribution system which are utilized in conveying utility delivered domestic water to points of use. Ordinarily, the utility has no direct control over the design, construction, maintenance, or operation of these facilities. The customer system should be open for inspection at all reasonable times to authorized representatives of the utility to determine whether cross connections or other structural or sanitary hazards exist. No secondary source of water supply intended for human consumption shall be permitted on the customer's premises or connected to the customer's system except with written permission of the utility or of the State Department of Public Health. In no case shall **any** secondary source be connected to the customer's system unless protective devices conforming to the cross connection regulations adopted by the State Board of Public Health are installed at points of connection to the utility system and properly maintained.

4.0. Quality of Water

The quality of water supplied for human consumption shall conform to Sections 3 and 4 of the United States Public Health Service Drinking Water Standards, 1946.

5.0. Design and Construction

5.1. **Design Principles:** All facilities of the utility system shall be designed and constructed to withstand, with ample safety factors, the physical stresses to which they will be subjected and shall be free from structural or sanitary hazards. All equipment shall be of adequate size and capacity and be correlated with available supply from storage to meet the requirements of Section 5.2. Wherever feasible, the units of source facilities shall be of such capacity that an outage of any individual unit during a period of peak demand will not result in reduction of supply to the distribution system below the requirements of Section 5.2.

5.2. **The quantity of water delivered** to the distribution system from all source facilities should be sufficient to supply adequately, dependably, and safely the total water requirements of all consumers under maximum consumption.

5.21. **The combined capacities** of all source facilities at periods of maximum demand shall support a rate of flow to the distribution system for two hours of not less than $Q = 100 + F(\sqrt{N})$ for 625 customer units or less and $Q = 100 + N$ for more than 625 customer units where "Q" equals the rate of flow in gallons per minute delivered from the combined source facilities to the distribution system, and "F" is a factor equalling

25, unless a lesser factor is approved by the State Department of Public Health for the individual water supply system, and "N" equals the total number of customer units where each unit is equivalent to one for a single family dwelling on a normal city lot. Other types of development shall be assigned appropriate customer unit values as experience within the distribution system or locality indicates.

5.3. Source: For the purpose of these minimum requirements, the source shall be considered as made up of the source facilities, the transportation facilities and all appurtenances thereto.

5.31. Source facilities are those developed to provide means of obtaining water from natural sources.

5.311. Stream diversion works shall have suitable appurtenances to guard against entry into the water system of foreign material and shall have cleaning or sluicing facilities. The diversion works shall be protected against trespassers. The stream system should be protected against uncontrolled recreational use, and against pollution from domestic, industrial or other harmful types of waste. Provision shall be made, where necessary, for the installation of facilities for disinfection or other treatment of water. The quantity of water available for use shall be considered as the minimum flow of the stream available for diversion during the driest year of record.

5.312. Reservoirs for impounding surface runoff, long term carry-over storage, and those formed by stream or river control dams should have provision for protection against uncontrolled recreational use, marginal vegetation and algae growths and animal pollution. Disinfection facilities and means for withdrawal of water from various levels in the reservoir should be provided. The quantity of water available for use shall be considered as the safe yield of the reservoir.

5.313. Infiltration galleries and springs shall have strongly constructed appurtenances to guard against collapse or failure and shall have protective features to prevent entry of foreign matter into the system. Facilities for the installation of equipment to disinfect the water shall be provided. The quantity of water available for use shall be considered as the minimum quantity developed during the driest year of record.

5.314. Wells shall be constructed to prevent, insofar as possible, contamination from any source. If a well casing, as set, is perforated at such levels that contaminated water may enter, adequate repairs shall be made before water from the well is used. Where impervious formations or scaling clay strata are not encountered that will prevent contaminated water from entering the well, provision shall be made for the installation of disinfection equipment. The productive capacity of the well shall be determined from tests taken at the lowest recorded static water level.

5.315. Water Treatment: Water, which is not obtained from a natural source free from pollution, shall not be delivered for domestic use unless it is adequately purified by natural agencies or adequately disinfected by artificial treatment to insure compliance with Sections 3 and 4 of the United States Public Health Service Drinking Water Standards, 1946.

5.32. Transportation facilities consist of the equipment and appurtenances, which provide means of delivering water to the distribution system from the source facilities.

5.321. Storage: Reservoirs and tanks from which the water is delivered directly into the mains of the distribution system where not adequately protected against pollution or completely covered shall have facilities for the installation of equipment to disinfect water.

5.322. Pumping equipment delivering water to the distribution system shall, in conjunction with the storage facilities, be so designed as to meet the requirements of Paragraph 5.2. Each pumping unit should be driven by a separate power unit of adequate size. Construction shall be such as to prevent sanitary hazard of structural defects whether the pumping unit is handling raw or treated water.

5.33. Piping: All piping in the source facilities shall be of adequate size to carry the required quantities of water with reasonable velocities. No pipe conveying contaminated water prior to treatment shall be connected to pipe carrying potable water.

5.34. Meters: A master meter or other suitable measuring device shall be provided for each source facility to register accurately the quantity of water delivered to the distribution system.

5.35. Materials: All materials, pipe, valves, fittings and other appurtenances used in source facilities shall be of such strength and durability as to be free of structural hazards.

5.36. Construction Methods: All work shall be performed by competent workmen experienced in the trade involved. Such work shall be done in a manner to avoid imperfections which might impair the stability of the physical structure. All work and equipment shall comply with applicable codes. Installation shall be made by or under the direction of qualified personnel.

5.37. Housing: Housing for all equipment, appurtenances, and other facilities shall provide adequate ventilation and protection against unauthorized entry. Ample space for the performance of all operating, maintenance and repair functions shall be provided.

5.4. Distribution System

5.41. The distribution system should be of adequate size and so designed in conjunction with related facilities to maintain a minimum pressure of 20 p.s.i. at every point during period of maximum normal demand.

5.411. The maximum length of run of each size of pipe should conform to existing requirements of proper local authority, but in the absence of such locally promulgated requirements and in no case should the maximum run of pipe be greater than the following:

5.4111. In unreinforced runs, (dead ends), none smaller than 2-in. diameter. For 2 and 3-in. diameter, 300 ft.; 4-in. diameter, 1300 ft., and 6-in. diameter, 2600 ft.

5.4112. In reinforced runs (connections at both ends of runs), none smaller than 2-in. diameter. For 2 and 3-in. diameter, 600 ft.

5.42. Water Quality Deterioration: Dead end runs shall be provided with means of flushing to prevent deterioration of water quality. Completion of the normal grid system is assumed to be in the program of development.

5.43. Materials used in distribution system shall be able to withstand with ample safety factors, all internal and external forces to which they may be subjected.

5.4311. Minimum Class or Gauge of Pipe—Cast iron pipe, 2-in., Class 250, shall conform to the applicable requirements of Federal Specifications WW-P-421. Cast iron pipe, 3-in. up to and including 12-in., Class 150, shall conform to the applicable requirements of Federal Specifications WW-P-421, or American Standards Association A-21. **Copper pipe,** 2- and 3-in., shall conform to Standard Specifications for Copper Water Tubing of the American Society for Testing Materials, Designation: B 88-46. **Steel pipe,** 2- and 3-in., shall conform to the applicable American Society for Testing Materials Standard Specifications for Steel Pipe. **Asbestos cement water pipe,** Class 150, commercial designation, to and including 12-in. **Steel pipe,** 4-in., 6-in., 8-in., 12-gauge, 10-in., and 12-in., 10-gauge and shall conform to the applicable requirements of American Water Works Association Tentative Revision of Standard Specifications for Steel Water Pipe of Sizes Up To but Not Including 30-in., No. 7A.4-1941-TR. All steel pipe at the time of installation shall be adequately protected inside and out against corrosion.

5.4312. Pipe lines larger than 12-in. nominal diameter should be designed and installed under the direction of an engineer properly qualified to practice in the field of engineering involved.

5.4313. Pipe that has been used for any purpose other than for transporting potable water shall not be used without previous effective decontamination.

5.432. Gate valves shall conform to the American Water Works Association Standard Specifications for Gate Valves for Ordinary Water Works Service.

5.433. Service pipe and fittings shall be designed for cold water working pressures of not less than 150 p.s.i. Pipe from the distribution line to the customer connection shall be of cast iron, copper, galvanized steel, or other corrosion resistant materials.

5.434. Fire hydrants shall conform to existing requirements of proper local authority, and there shall be no unauthorized use thereof.

5.435. Pipe joints of all types shall safely withstand the same working pressures for which the pipe is designed.

(Continued on page 116)

Portrait of an Engineer's Engineer

Col. Weaver, North Pacific Division Engineer for the Corps of Engineers, is adept at handling tough administrative problems, and he's been faced with plenty during an illustrious career

By ARTHUR J. LARSON
Portland, Ore.

SOMEONE has called the recently re-established North Pacific Engineer Division territory a land of magnificent distances, where magnificent military and civil works projects are underway.

There are more than 846,000 sq. mi. in this territory, including the Alaska, Seattle, Portland and Walla Walla districts. The man who has the gigantic task of correlating, interpreting, and carrying out all the projects is Col. Theron D. Weaver, North Pacific Division Engineer.

It takes a man of action and ability, and who possesses know-how plus years of experience and achievement to do the job, and Col. Weaver is that man. A brilliant engineer in his own right, he is making things click like clockwork in this "empire" of the engineering world.

Perambulation

The colonel gets around. One week in Alaska—next week in Washington, D. C.—next time at McNary Dam, he tirelessly watches the great projects in the sprawling domain under his jurisdiction. No detail is too small to escape him, because details done perfectly make a perfect engineering job, he believes.

On Thursday, Dec. 23, 1948, Col. Weaver tipped the first bucket of concrete into the forms of what will be the $227,000,000 McNary Dam that will harness 980,000 kw. of power from the Columbia river.

From the bluff beside the huge project, some 100 dignitaries watched a little train carry three buckets of concrete across a trestle to electronically-operated cranes. The cranes lowered the buckets to the forms, where Col. Weaver tipped them off into the walls of the navigation lock, the world's largest single lift navigation lock. This action marked the start of a major construction job that will take nearly six years to finish. The huge dam, a key link in the $1,500,000 development of the Columbia basin, is slated to begin delivering electrical power early in 1954.

Col. Weaver, tall, trim-figured, affable, friendly, every inch a soldier (and an engineer's engineer), took particular delight in this simple ceremony, because ten years ago when he was district engineer in charge of construction at Bonneville Dam, it was he who was in charge of making the preliminary drilling at the McNary Dam site, and laid out the town site and all the things necessary to the building of the great dam. It is a tribute to his engineering ability that the plans made ten years ago are being used now at McNary.

The business of supervising all the projects in the North Pacific Engineer Division requires all his time. This portrait should be a news reel to keep up with his field activities. He likes to play golf and used to be pretty good at the game. But he says, "I'm sure I don't know where my sticks are now. I haven't had time to use them for many years."

He has what almost amounts to a passion to see and know what is going on at all times in the field. He believes by going where the action is one can get first hand information that can be obtained no other way. The phone rang while the writer was interviewing Col. Weaver. He listened a minute and then gave short, to-the-point instructions. "That was the district engineer at Anchorage, Alaska," he said.

Things are really happening in Alaska. The first competitive bid for lump sum operation contracts was accepted by the Corps of Enginers in Alaska, December 15 and 16, 1948 for $18,000,000 worth of barracks and family housing construction in its military program, first of the Engineers' $65,000,000 program there.

Born engineer

Ever since he can remember, Col. Weaver had wanted to be an engineer. Born in Detroit, Mich., in 1892, he was educated at the University of Michigan, receiving his B.S. degree in Electrical Engineering.

He entered the army and was commissioned a second lieutenant in the Engineer Reserve in February, 1917. By November, 1917, he was on his way to France where he was first stationed at General Headquarters of the American Expeditionary Forces. Later, he served in battle areas with the British, French and U. S. 29th Engineers. He participated in the engagements at St. Mihiel and the Meuse-Argonne. After the Armistice he served in the Construction Division of the A.E.F. at LeMans and later in Paris and London as Assistant to the Chief Engineer of the A.E.F.

COL. THERON D. WEAVER

After the first World War Col. Weaver returned to the United States and served in the New York Engineer District. Later he entered and was graduated from the Infantry School at Fort Benning, Ga., and served as an instructor at the Engineer school at Fort Humphreys, Va. In 1928, he went to Fort Worth as instructor with the Texas National Guard. In 1934, he was graduated from the Command and Staff School, Kansas, and in 1935, from the Army War College. Next he was chosen as military assistant to the district engineer in New Orleans, and in 1935, was named Assistant Director of the Works Progress Administration at Los Angeles, Calif.

Rugged days

Back in 1937, Col. Weaver was appointed to the important job of taking charge of construction at Bonneville Dam. Although he was under constant pressure with the tremendous task of the work there he carried out other jobs in conjunction with the dam. When he arrived at Bonneville the project was not quite two-thirds completed. The turbines, generators, all powerhouse wiring were completed under his supervision as district engineer. The fishways were just started and there were no gates in the locks. He set up the plans for the hydraulic laboratory and supervised flood control work as well.

Those were rugged days and from his experiences he brings now to the North Pacific Division a familiarity with the problems peculiar to the area plus an engineering experience greatly enriched by important wartime assignments in World War II, both in this country and in the European Theater of Operations.

Thirty seconds of sweat

When asked what incident stood out most in his mind through his long and colorful experience as an army engineer he smiled and recalled the "thirty seconds on that day of September 2, 1937." That was the day President Roosevelt was to speak over the air and press the button that would release the power for this great area. For weeks everything was double-checked so there would be no slip-up. As the president talked Col. Weaver slipped to the phone to call up the man whose job it was to see that when President Roosevelt pressed the button everything would work. Col. Weaver could get no response over the

COL. WEAVER, on Dec. 23, 1948, tipped the first bucket of concrete into forms for the navigation lock at McNary Dam. Here, he addresses witnesses of the ceremony.

wire. He broke out into a cold sweat. He looked at his watch. A minute to go. Still no answer. Then for thirty seconds he jiggled the phone. Just 18 seconds before Roosevelt was to push the button, he heard the man's voice at the other end saying everything was O.K. The man later explained, "I just wanted to come down and take a look at the President."

Responsibility in the thick of things

In October, 1939, when World War II seemed imminent, Col. Weaver was selected to leave Bonneville and go to Washington as Chief of the Power and Fuel Division in the office of the Undersecretary of War, and his adept handling of difficult jobs while there prepared him for his next one: Chief of the Construction Division in that office when industrial and military construction was reaching its peak.

In this job, Col. Weaver was continually traveling by plane, train and car all over the country. One of his principal responsibilities, and one which his record shows was dispatched with outstanding speed and efficiency, was seeing that military and industrial plants maintained an uninterrupted flow of production.

Upon the formation of the Services of Supply in March, 1942, he was selected as the man to be assigned to duty in the Resources Division, and became chief of that division in July, 1942. A month later, he was promoted to the rank of Brigadier General, a rank he held throughout the war. In quick succession came more highly important assignments; he was appointed army member of the Executive Committee of the Army and Navy Munitions Board, and Deputy Director of the Production Division of the Army Service Forces.

In September, 1944, when the supply of oil, petroleum and lubricants for the U. S. Armed Forces in Europe became the key to victory, Col. Weaver was the man sent hurriedly overseas to join the G-4 section of Supreme Headquarters, Allied Expeditionary Forces, in charge of petroleum, oil and lubricants, directing the immense U. S. part of that operation until the war ended. Then, too, he was always up in the very thick of the action of everything. He'd be in North Africa, Italy, England and France, and always on the go.

The lighter side

One time he was a guest of an officer of the famed French Foreign Legion, and was made an honorary Legionnaire and wrote his name in the equally famous Golden Book. A short time later he was in Rome. He talked to the Pope and while not a Catholic, he had a little red-haired secretary who was. He'd bought her a rosary for a gift and he asked the Pope to bless it, and when he gave it to his secretary she was the proudest person in the whole world.

One of Col. Weaver's associates remarked to the writer, "The Colonel always has time for little things, so it's no wonder he's good at the big things."

When the First Armored Division was sweeping up north in Italy, Brigadier General Weaver was in a jeep sweeping along with them. He'd heard that near Larderello, Italy, north of Rome, there were two unusual power plants the enemy had constructed. These were two electric power plants, with 60,000-kw. and 90,000-kw. capacities. They were used for the general power supply for northern Italy.

Anxious to see these plants, he proceeded on in his jeep after the First Armored Division stopped to rest. In a small village, cheering Italians crowded around the jeep, the first American car they'd seen. In the distance he could see steam rising out of the ground. The roar could be heard for miles. He pressed on and took a look. The enemy had destroyed everything. What amazed him was that he found these two electric power plants were run directly from natural steam from underground. To his knowledge, this was the first time such plants had been run solely from underground steam.

Post-war jobs

When his brilliant job of performance was completed and the war over and the Chief Engineer for the European Theater of Operations was made responsible for getting battered German industry back into production, Brigadier General Weaver was given the job of building the organization and implementing the program. This included the production of lumber, building materials, mining operations, and petroleum.

With this organization finally set up and its smoothly functioning operation transferred to Military Government, Brigadier General Weaver in October, 1945, was ordered back to Washington as Director of Military Supply in the Office of Chief of Engineers. Col. Weaver left that post to assume his new duties as present North Pacific Division Engineer.

California Areas Denied Use of Colorado's Water

A LONG CONTROVERSY on basic policy within the Board of Directors of the Metropolitan Water District of Southern California culminated Dec. 17, when the board refused admittance to the District of the Pomona and Ontario areas, 25 mi. east of Los Angeles. The City of Los Angeles delegation, casting 50 per cent of the district's vote, blocked the acceptance. They expressed the view that admittance of any new territory should await settlement of all legal matters on the Colorado River, particularly the fight with Arizona.

The Los Angeles delegation contended that it was theoretically possible for the District's water supply (from the Colorado River via the Los Angeles Aqueduct) to be cut in half following legal determination of California's rights in the fight with Arizona. This was vehemently challenged by other members of the board, who cited reports from Julian Hinds, general manager and chief engineer of the District, showing that under full use by member units in 1980, nearly one-half of available water would still be unused; and by the District's Chief Counsel, James Howard, expressing the conviction that the District will have its full 1,000,000 ac. ft. despite the controversy with Arizona.

Monolithic Pour Encases Power Ducts

Biggest problem during installation of concrete duct bank in power switchyard at Keswick Dam in California was necessity for speed in monolithic pour around fragile conduit—Here's how the contractor solved this and other problems

By THEODORE C. MURPHY
Civil Engineer
Bureau of Reclamation
Redding, Calif.

FEATURING construction on the 230-kv. and 115-kv. power switchyards at Keswick Dam, Bureau of Reclamation's power structure 8 mi. downstream from Shasta Dam on the Sacramento River in California, was the installation of a concrete duct bank. The duct contains in its 1,235-ft. length approximately 18 mi. of 2-, 3-, and 4-in. non-metallic conduit, and 900 cu. yd. of concrete.

This structure, 4 ft., 5 in. x 5 ft., 3 in. at its greatest cross-section and carrying one hundred 2-in. and three 4-in. courses, runs through 10 previously constructed manholes. Numerous branches diminish it finally to a dimension of 4 ft., 5 in. x 2 ft., 9 in., encasing thirty-six 2-in. and three 4-in. courses. Construction of the switchyard substructures required about one year, of which 50 working days were consumed in construction of the duct bank.

Construction complications

Specifications required that the encasing concrete be truly monolithic, and for this reason placing of the conduit was organized so least possible delay resulted between succeeding lifts of concrete. With clearance between conduit courses being only slightly more than 2 in., the use of vibrators was impossible, so compaction had to be accomplished by thorough hand spading. Concrete with ¾-in. maximum aggregate having a slump of 3 to 4 in. was used, and an air entraining agent was admixed.

Further complication aside from the necessity for speed was the fact that the non-metallic conduit was subject to breakage during embedding. Immediately upon completion of a concrete lift, the embedded conduit was tested to insure 100 per cent utility of the duct bank. Testing was most easily and quickly performed by subjecting each run of conduit to water flow for two minutes. Broken couplings were quickly located and repaired. However, failure of the conduit was uncommon.

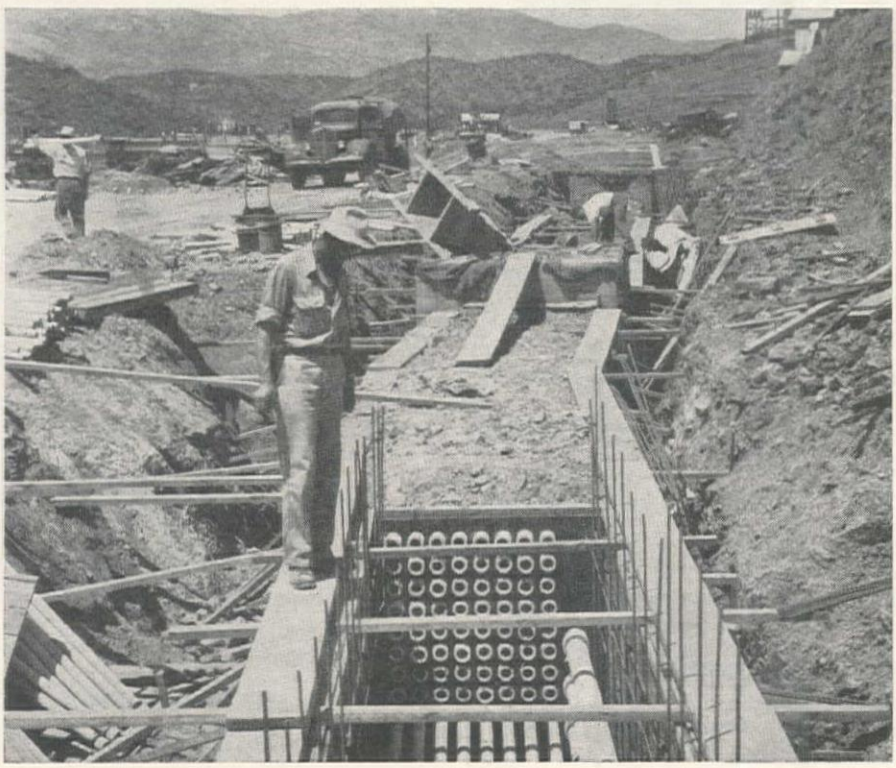
Continuous pour of concrete

Preparations for construction of a unit of the duct bank approximately 50 ft. in length involved forming and placing reinforcing steel, and stock-piling the one thousand 5-ft. lengths of conduit and fittings so they would be readily accessible. At the terminal end of each unit, the conduit had to be cut and machined to receive a coupling that would bring it flush with the inside wall of a manhole or beyond an expansion joint sufficiently to properly fit an expansion coupling. Pre-fabrication was impossible because the conduit was manufactured in random lengths.

T. C. MURPHY, left, was principal inspector for the U.S.B.R. on the job. With him is D. R. ALEXANDER, the Bureau's Inspection Chief, Shasta Dam Unit.

The conduit was supported by reinforcing steel, aligned with a light wooden template and tied in place to prevent movement during encasement. Immediately following the start of encasement of the initial course of conduit, make-up of the next higher course was begun so the rate of concrete disposition could be as nearly continuous as possible. Concrete was brought from the plant in one-cu. yd. bottom-dumping buckets, handled with a Northwest Model 25 crawler crane having a 30-ft. boom, and deposited into a collecting hopper, reducing the free drop to about 18 in.

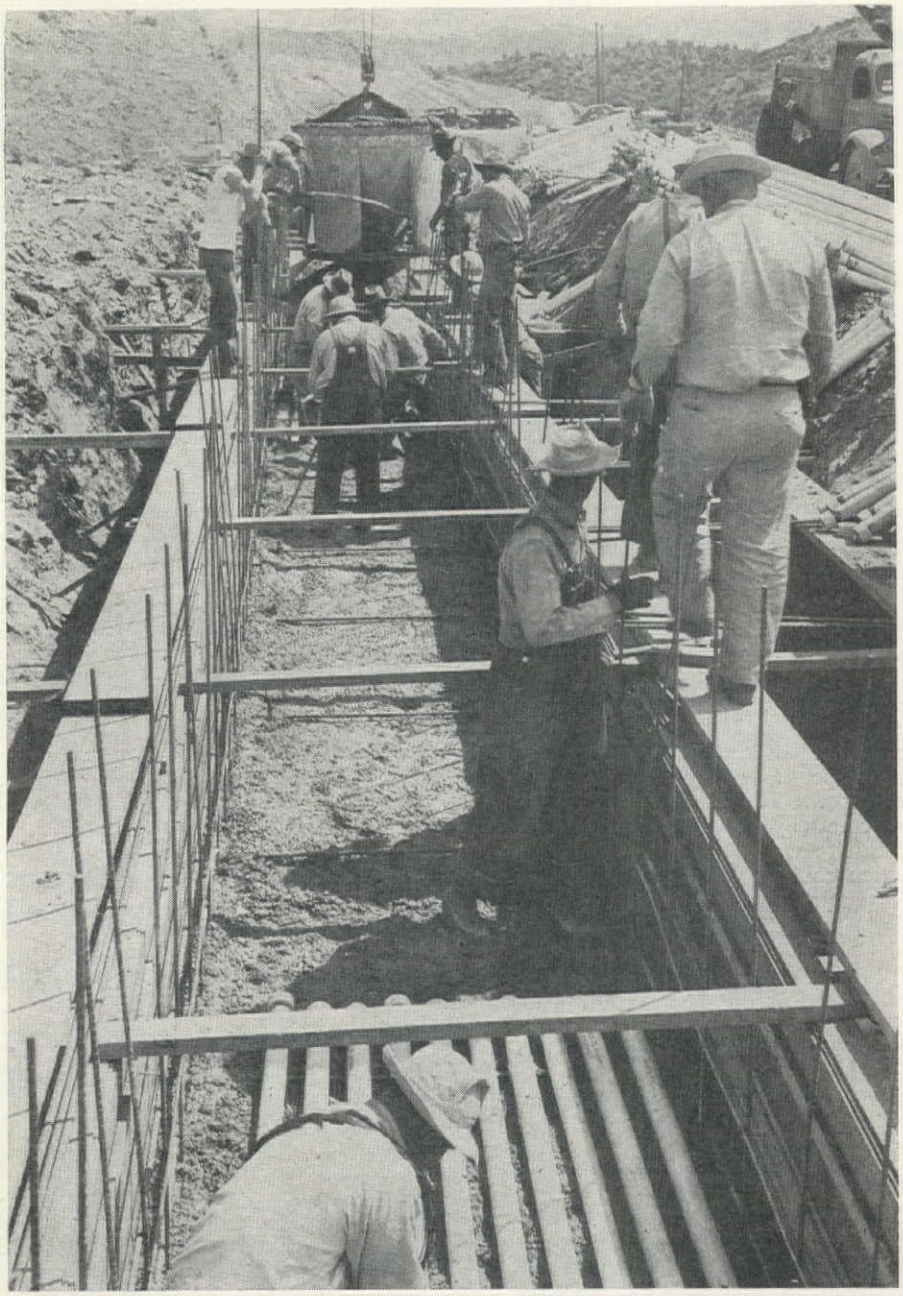
THE TERMINAL end of each course of conduit was fitted with an expansion coupling for connection to following course. Initial course, below, has couplings in place.



"Jitterbug" reduced cracking

Normal finishing for the structure would have been a wood float, but after completion of the first unit it was noted that cracks had developed during the final setting of the concrete. These cracks, which had no general direction or association with the reinforcing steel, were roughly one foot long, 1/16-in. wide, and penetrated the structure at least 2 in. Earlier and more generous application of curing water had no effect in their elimination. It was recognized that heat was a prime factor in their development, and a cover of 4 to 6 in. of earth served to protect the concrete from the sharp temperature differential occurring immediately at the surface.

This decreased the dimensions of the cracks somewhat, but not their frequency. Further investigation showed the non-metallic conduit was able to absorb up to 12.5 per cent of its own weight of clear water. Since there are approximately 3½ tons of conduit in each construction unit, the effect of this



EACH COURSE of conduit was made up ready for encasement immediately after the concrete pour began for the preceding course. Reinforcing steel supported conduit.

absorption, even though qualified by such factors as sealing action and setting of the concrete, was very considerable.

Use of a floor tamper, or "jitterbug," at a time subsequent to the development of the cracks and while the concrete was still semi-plastic, eliminated the cracks to an effective depth. The earth covering entirely prevented their development later.

This type of structure would lend itself ideally to internal cooling by maintaining a flow of water through the conduit, but water in the quantity required for such a measure was not available. Neither was it feasible to wet down the conduit prior to its incorporation because the compound used for sealing the joints required a dry surface for satisfactory application.

Contract for the project was made with Harms Bros. of Sacramento, Calif. Robert Box supervised work for the contractor. D. R. Alexander, Chief, Field Inspection and Design Unit; E. L. Chapman, Chief, General Engineering Section; and W. J. McCrystle, Construction Engineer, directed the work for the Bureau of Reclamation.

Thin Slab Concrete Airport Runway Developed by French

A NEW TYPE concrete airport runway of great strength was outlined in a report by Walter R. Macatee, manager of the airport division of the American Road Builders Association. The experimental development is a prestressed concrete runway pavement of relatively thin cross-section, claimed to possess extraordinarily high structural qualities. The development was made by Eugene Freyssinet, a French engineer.

The developer claims that pavements slightly less than 6½-in. thickness have the equivalent strength of ordinary concrete 24 in. thick. Temperature stresses in such slabs would be reduced substantially due to its thinner section and the resultant lowering of temperature differentials in the under and upper portions.

The high strength characteristics are accomplished in part by incorporating in the pavement structure a system of stressed high-strength cables. Some of the cables are anchored to a series of deeply embedded concrete abutments placed 26 ft. below the ends of paved areas. Through the use of the cables and the resistance due to the confining effect of the end-abutments, prestressing of the concrete takes place. Prestressing of the concrete is said to take place both longitudinally and transversely even though the cables within the principal portion of the paved area are placed only transversely.

In addition to the inclusion of the high-strength cables, the runway now under study was installed over a thoroughly consolidated foundation 14 in. thick, plus a 2-in. sand cushion. Also, concrete beams underlie the joints. The experimental pavement, installed at a major airfield near Paris, was precast in blocks approximately 1.2 sq. yd. each.

Atoms Change Design of The Potholes East Canal

THE DECISION of the Atomic Energy Commission to purchase 63,000 ac. of land on the Wahluke Slope of the Columbia Basin Project in Eastern Washington, as revealed by the Hanford works, will cause no change in the project's construction plans.

This 63,000 ac., together with 25,000 ac. heretofore acquired by the Bureau of Reclamation, constitutes an area of 88,000 ac. in the central portion of the Wahluke Slope known as the "control zone," of which approximately 55,000 ac. are considered irrigable.

The portions of the Wahluke Slope to the west of this zone, containing about 54,000 irrigable acres, and to the east, containing about 48,000 irrigable acres, together are referred to as the "secondary zone" where, according to the A. E. C., the irrigation development and attendant increase in population should not be encouraged at this time.

It is possible that the lands in the "control zone" will be permanently excluded from the Columbia Basin Project, but it is hoped that, at some future time, the 102,000 ac. in the "secondary zone" may be irrigated.

With this in mind, the Potholes East Canal of the Columbia Basin Project will be designed as follows:

The lined portions of the canal and other concrete structures will be built to carry enough water to serve all land originally contemplated to be served by this canal in the South District lying outside the Hanford Works "control zone," including the 102,000 ac. in the "secondary zone."

The unlined portions of the Potholes East Canal will be designed to serve only the acreage lying completely off the Wahluke Slope, or about 100,000 ac.

River Compacts End Long Quarreling

Signed compacts governing distribution of waters in Pecos and Arkansas Rivers signal end of 40 years of disagreement—Determination of plans for most effective use of water potential of both streams possible after final approval

TERMINATING more than 40 years of disagreement and quarreling over the division of the waters of two important Western streams, compacts were signed in December by the representatives of Colorado and Kansas, governing the distribution of water in the Arkansas River, and by the representatives of New Mexico and Texas covering the use of the flow in the Pecos River.

Await solons' approval

These agreements, which are subject, of course, to ratification by the Legislatures of the affected states, are mileposts in Western development. They represent the solution of knotty problems which have harassed citizens and governments and retarded growth of the respective states. By reaching agreement, it is possible for the areas involved to proceed with plans for the most effective use of the water and to determine both the direction and ultimate goal of development.

The Arkansas River Compact was signed Dec. 14, 1948, at Denver, Colo., by Henry C. Vidal, Gail L. Ireland and Harry B. Mendenhall, representing Colorado, and by George S. Knapp, Edward F. Arn, William E. Leavitt and Roland H. Tate, for Kansas. Chairman of the Compact Commission and representative of the Federal government in all the deliberations was Gen. Hans Kramer, USA (Ret.) of San Francisco.

The Pecos River Compact was signed Dec. 3, 1948, at Santa Fe, New Mexico, by John Bliss, the delegated representative of New Mexico, and by Charles Miller, representing Texas. Berkeley Johnson was the Federal representative on the Pecos negotiations.

Arkansas considerations

The principal considerations in the Arkansas Compact are:

Winter storage in John Martin Reservoir, formerly known as Caddoa Reservoir, located east of Las Animas, Colo., about 50 mi. from the Kansas border, shall commence on Nov. 1 of each year and continue to the following Mar. 31. All water entering the reservoir during this period, including the flows from the Purgatoire and Arkansas Rivers, shall be stored to the capacity of the reservoir, provided that Colorado may demand releases of water, to be used without avoidable waste, equivalent to the total river flow but not to exceed 1000 c.f.s. During summer storage in the reservoir, between April 1 and Oct. 1, all entering water shall be stored, provided that Colorado may demand all river flow up to 500 c.f.s. and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c.f.s. and 750 c.f.s., irrespective of releases demanded by Colorado.

Total release limited

Releases of water stored under the above provisions shall be made upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Arkansas River Compact Administration, separate releases of stored water shall not exceed 750 c.f.s. to Colorado or 500 c.f.s. to Kansas, or 1250 c.f.s. together, provided, that when water stored in the conservation pool—all reservoir space below that used for flood control—is less than 20,000 ac. ft., releases shall not exceed 1000 c.f.s. total, in the ratio of 600 to Colorado and 400 to Kansas.

These authorized releases shall not impose any call on Colorado water uses that divert waters of the Arkansas River upstream from John Martin Dam—this includes the Purgatoire River Basin—except in the event that the Administration finds that the water in the conservation pool, John Martin Reservoir, will be or is liable to be exhausted. During dry periods of storage when Colorado reverts to its administration of decreed priorities among its water districts, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir; however, waters of the Arkansas River, which are below John Martin Dam, originating in Colorado and flowing across the state line during such periods are apportioned by the Compact to Kansas.

Pact administration created

The Arkansas River Compact Administration is created to execute the powers of the Compact, and is an attempt to eliminate disputes such as the Colorado vs. Kansas case which ended in the U. S. Supreme Court in December, 1943. The administration is composed of three representatives each from Colorado and Kansas, appointed by the respective Governors for a term not to exceed 4 years, and a representative of the United States to act as chairman of the Administration without vote. The Compact does not concern the rights, if any, of New Mexico to waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River, and does not impair

STORAGE behind John Martin Dam, completed less than a year ago, was a principal consideration under the Arkansas Compact.

the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas, or over other waters that cross the state line into Kansas.

Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the state line for irrigation uses in Kansas only, Colorado concedes to Kansas the exclusive control over this canal and its headworks to the same extent as though the system were located entirely within the State of Kansas. However, water carried across the state line in the Frontier Canal or any other similar canal shall be considered as part of the state line flow.

Colorado Springs objects

As the Arkansas River Compact goes to the Colorado Legislature for ratification, complications arise from quarters affected by the Compact. Spokesmen for Colorado Springs, Colo., which is suffering a serious water shortage, expressed dissatisfaction to the Colorado Senate over distribution of water to areas in Colorado above and below John Martin Dam, claiming that too much water would be allowed users below the dam, and that that area should rightfully be considered with Kansas in water allocations. E. B. Debler, former Regional Director of the Bureau of Reclamation, was spokesman for the Colorado Springs delegation.

End of 40-year clash

The Pecos River Compact merits consideration as one of the most mature advances in sensible cooperation, by settling the problem of sharing waters of the Pecos River Basin by the states of New Mexico and Texas. The principal considerations in the Pecos River Compact are:

New Mexico shall not deplete the Pecos River or Delaware River flow at the New Mexico-Texas state line below an amount which will give Texas a quantity of water equivalent to that available to Texas under the 1947 condition. The 1947 condition is defined in the "Report of the Engineering Advisory Committee" dated January, 1948. Water salvaged in New Mexico over the 1947 condition from either Federal or joint New Mexico-Texas projects, is apportioned 43% to Texas and 57% to New Mexico. Water salvaged in Texas is apportioned to Texas, and beneficial consumptive use of unappropriated flood waters is apportioned 50% to Texas and 50% to New Mexico.

The Pecos River Compact establishes an interstate agency known as the "Pecos River Commission," composed of one commissioner from New Mexico and one from Texas, and one commissioner representing the United States who shall be the presiding officer of the Commission without vote. The President of the United States has been requested to designate such a commissioner. Under the Compact, the Commission shall have power to: adopt rules and regulations; establish and control water gaging stations necessary to study water supplies of the Pecos River and its tributaries; analyze and report on stream flow data and its depletion by man's activities in New Mexico and on the Delaware River in Texas; measure delivered and salvaged water at the New Mexico-Texas state line; measure nonbeneficially consumed water in New Mexico and all unappropriated flood waters, and measure losses from reservoirs constructed in New Mexico which may be used for the benefit of both states. The Commission has been given the power to acquire and hold such personal and real property as may be necessary for the performance of its duties as stated, and to dispose of these properties when no longer required.

Cooperation paramount

Neither New Mexico nor Texas will oppose the construction of any facilities permitted by the Compact, and both shall cooperate with agencies of the United States to devise means of alleviating the salinity conditions of the Pecos River. No reservoir shall be operated in New Mexico above Avalon Dam for the sole benefit of Texas unless the Commission shall so determine, however both states shall have the right to construct and operate any works for the prevention of flood damage. Either may construct additional reservoir capacity to make more efficient use of apportioned water or for utilization of salvaged or unappropriated waters.

Future water rights of the states are stated clearly. In the event of water brought from any other basin to the Pecos River Basin, the state making the importation shall have the exclusive use of the imported water. The failure of either state to use water apportioned to it under terms of the Compact shall not constitute a relinquishment of the right to such use.

Criticism of both the Pecos and Arkansas River Compacts is inevitable from the Western regions involved, but if the futile controversies of many years are to be solved, the West must establish a basis for sharing water rights, first recognizing the fact that until an amicable settlement is reached, it will be difficult if not impossible for the West to develop further its water potential.

Summer, 1950, Set as Operation Date For British Columbia Power Project

WHATSHAN LAKE power development of the British Columbia Power Commission to service the North Okanagan area, is expected to be in operation by the summer of 1950. S. R. Weston, chairman of the commission, states that the project, which will cost $4,500,000, will have four times the capacity of the Shuswap Falls plant, the actual development being 25,000 h.p.

A 60,000-volt transmission line is being built between Kamloops and Vernon, and the steam plant of the commission at Kamloops is being increased by a new 625-kva. turbine. The commission is planning to parallel the hydroelectric plants at Shuswap and Barriere with the Kamloops steam plant to carry the combined loads in the North Okanagan area until the Whatshan development is available in 1950.

Steady progress is being made on this Whatshan development near Needles on Lower Arrow Lake. The tunnel and subsidiary rock work contract has been placed with Miners Western Limited. This work includes an 1100-ft. lower outlet tunnel to the power-house site and a 560-ft. drop shaft. Work is also in progress on the 10,300-ft. main tunnel from Arrow Lake. Work will be commenced next summer on the Whatshan Lake end of the main tunnel.

The tunnel and shaft boring operations are being conducted with a five-machine jumbo built in the shops of the Inspiration Mining and Development Co. Ltd., at North Bay, Ontario. This company is the parent organization of Miners Western Limited. The unit was built from plans provided by the Canadian Ingersoll-Rand Co. Limited.

While the contract calls for the completion of the tunnel work by April 30, 1950, the contractors anticipate that the tunnel will actually be bored through by fall of this year. It will then take from four to five months for clean-up work.

All machinery and equipment used on this construction project was shipped in from railhead at West Robson by C.P.R. barge to Needles on the Lower Arrow Lake, from which point it was trucked to the job.

A road was built by the Power Commission into the intake site at Whatshan Lake where a cofferdam will have to be built before the tunnel work can be commenced from that end. Work on the construction of a townsite is now in progress.

Switching station steel is being supplied by the Western Bridge and Steel Fabricators Ltd., Vancouver. A 40-ton overhead crane for the power-house will be supplied by B. C. Equipment Company Ltd., Vancouver, at a cost of $25,000. General Electric Co. Ltd., has received contract for low tension switching and relaying equipment and for two 69-kv. oil circuit breakers. Canadian Westinghouse Co., Ltd., will supply two 138-kv. circuit breakers.

The Whatshan Lake dam will be comparatively low. The water will be diverted through the 12-ft. diameter tunnel approximately two miles to the power-house on the shore of Lower Arrow Lake. A head of approximately 720 ft. will be secured through the drop in level between Lower Arrow Lake and Whatshan Lake.

It is expected that the tunnel will pass through solid granite rock and that a steel lining will be required only near the lower end.

The initial development provides for the installation of two turbines, each having a rating of 15,000 h.p., connected to 12,500-kva., 6600-volt generators. Turbines will be of the vertical reaction type. The design provides for later addition of two more similar units should conditions warrant.

Equipment Maintenance at Davis Dam—

New Lubrication Ideas Cut Down-time

Maintenance of every piece of equipment at Davis Dam is silently checked by a "Status Board" that guarantees work is accomplished when required—Other new maintenance ideas are helping to keep equipment down-time at a minimum

By JAMES BLY
and
JACK HANAFIN
General Petroleum Corporation
Los Angeles, Calif.

OPERATIONS of the Utah Construction Co. at Davis Dam, $83,000,000 structure now under construction on the Colorado River 67 mi. downstream from Hoover Dam, require a large amount of expensive and diversified equipment. Proper lubrication of the 950 pieces of equipment on the job, varying in size from fractional horsepower electric motors to the giant 225-ton Clyde whirley cranes, was a problem met and solved by the setting up of a simplified and workable program. (For a story of the Davis Dam construction and equipment, see *Western Construction News* for June, 1948.)

Conditions under which equipment works at Davis Dam are typical of many Western construction projects. Temperatures in the summer reach 155 deg. on the desert floor, and dust and dirt are everywhere. Equipment is operated around the clock. The diversity of the equipment requires a wide range of lubrication facilities. The great size of some of the equipment requires special lubrication techniques.

The planning of an efficient and effective lubrication program was a necessity both to save time on the huge project and to cut material and maintenance expense. This program was worked out in detail by Utah Construction Company's maintenance experts: H. K. Thiessen, master mechanic; F. A. Garrison, lubrication superintendent, and Garrison's assistant, Earl Summers. On hand to help in setting up the program were General Petroleum Corporation engineers James Bly, resident lubrication engineer, and Jack Hanafin, contractor representative.

F. A. GARRISON, extreme left, lube superintendent for Utah, discusses the job during a lunch hour with EARL SUMMERS, his assistant. WAYNE LEE, up on the tractor, and JOE GILCREASE, extreme right, make up Utah's efficient field truck crew.

No cards, clients, notes or telephone calls

First, a complete survey of the lubrication requirements of each piece of equipment was made under Hanafin's supervision, and charts were provided indicating the recommended lubricants and the frequency of lubrication. Preventive Maintenance Charts were set up indicating oil change periods, oil and air filter changes and frequency of lubrication of each piece of equipment.

Lubrication "Status Boards" were employed, one for each class of equipment, with colored wooden pegs being used to indicate lubrication work accomplished on certain dates, and the dates when other work is to be performed. Benefit of this system to the lubrication forces is that it guarantees work is accom-

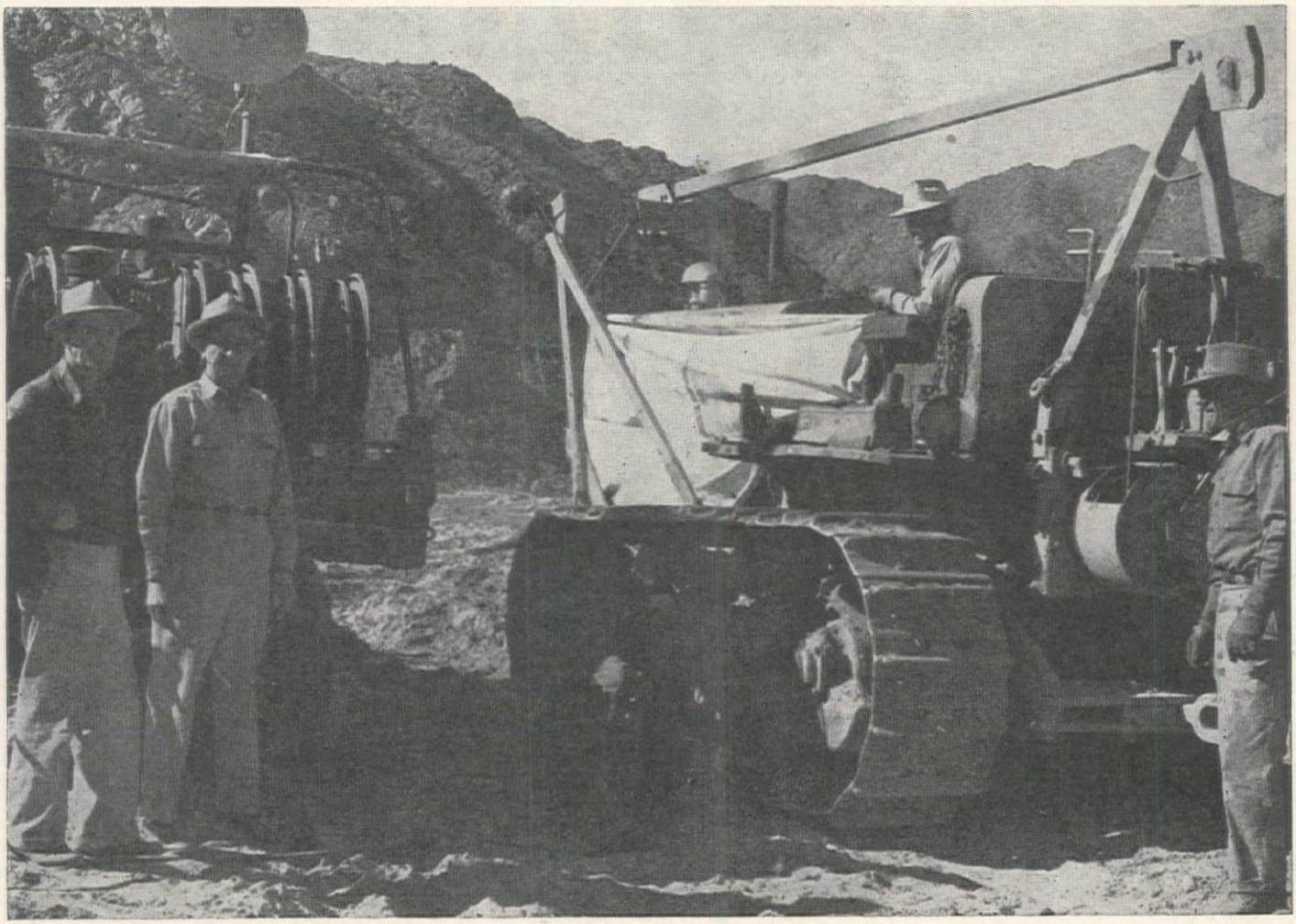


TABLE I

LUBRICATION SERVICE PERIODS

Equipment	Lubrication	Engine Oil Change	Filter Change	Transmission & Differential Change	Wheel Bearing Repack
Automotive	Weekly	Weekly	Weekly	4 Months	6 Months
Trucks (Heavy Duty)	Bi-Weekly	Bi-Weekly	Bi-Weekly	2 Months	3 Months
Euclids (Single Filter)	Daily	3 Days	6 Days	2 Months	3 Months
Euclids (Double Filter)	Daily	5 Days	10 Days	2 Months	3 Months
Caterpillar Tractors and Tournapulls	Every Shift	3 Days	3 Days	2 Months	
Shovels (Large Filter)	Every Shift	Weekly	2 Weeks		
Compressors	Every Shift	3 Days	3 Days	Compressor Oil-Monthly	
Light Plants, Pumps, Welders and Miscl.		Weekly	Weekly		

plished and also indicates what work is due for the following shift at a glance. No card system, clerks, notes or telephone calls are necessary to guide the lubrication foreman in the selection of equipment to be lubricated on his shift. Permanent lubrication records are recorded by the shop men for purposes of cost accounting and for analyzing engine conditions. Two control systems were necessary, one for equipment at the dam site and the other for equipment operated from the rail head.

Strategic shop location

Excellent shop facilities were set up by the Utah Construction Company forces. Well-equipped machine, pipe, electrical, carpenter, sheet metal, tire and lubrication shops have been located at strategic areas. Two fuel bulk plants were installed, one at Kingman, Ariz., and the other at dam site. The two plants have a combined storage of 55,000 gal. of Diesel fuel, 30,000 gal. of gasoline, and 4,000 gal. of stove oil. Two fuel trucks are utilized to service the equipment, with an average of 80,000 gal. of Diesel fuel and 60,000 gal. of gasoline being used each month.

Three oil storage docks and a well-equipped lubrication shop were provided with the latest equipment, such as compressed air to pump motor oils, gear oils and greases. The efficiency of this shop simplifies the rapid application of the proper lubricant without contamination. A pick-up truck, jeep, and a completely equipped field lubrication truck are also provided for servicing in the field, day and night, resulting in the saving of time and assurance that lubricants delivered in the field are clean.

Control system is key to success

The preventive maintenance program was headed by the lube superintendent and his assistant. For each of the three shifts, there is a lead man and two greasers in the lube shop, a lead man and greaser on the field truck, a greaser on the pick-up truck and fuel truck driver. Oilers are also assigned to each shovel, the grizzly, batch plant, etc., under the supervision of the foreman for that particular equipment.

The key to the successful maintenance program at Davis Dam is the control system, using the "Status Boards." Most of the equipment at the dam site is operated approximately the same number of hours or miles per day, so lubrication periods were based on calendar days instead of by gallons, miles or operating hours. Equipment operating from the rail head works intermittently, so lubrication periods there were based on miles.

The accompanying table shows lubrication service periods established following tests of the various lubricants. Because of the extremely hot and dusty conditions, periods are conservative.

How the boards work

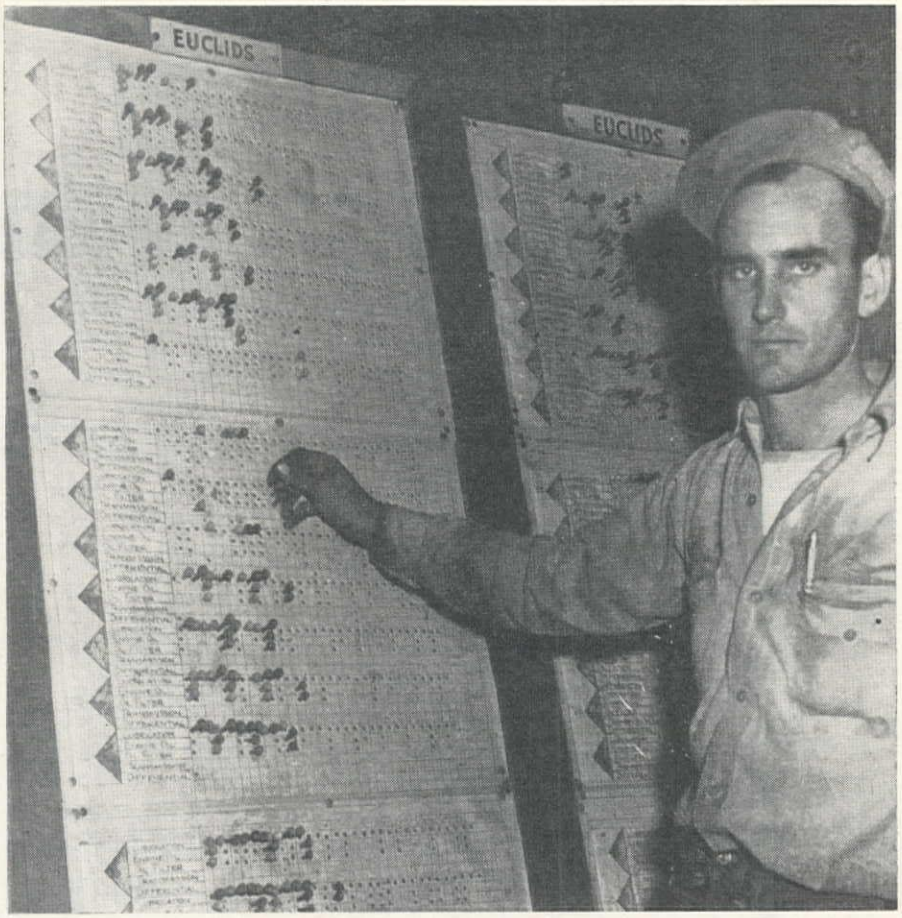
To illustrate the use of the "Status Boards," the accompanying photograph shows the board for one of the Euclid earthmovers. On the original board, colored pegs show the work that has been done and is to be done. In this illustration, for example, green pegs show on what days the Euclid was lubricated and a red peg shows that it is due for lubrication.

Also, green pegs show on what days engine oil was changed, and a red peg indicates a change due on a certain day. Blue pegs show when oil was added. An excessive number of blue pegs would indicate bad engine conditions. Yellow pegs show that oil is okeh. Other colored pegs show changes of the oil filter, and transmission and differential lubes.

It is apparent that any combination of items can be entered in the left hand column on the board. Time periods can also be changed to suit the equipment. The status boards are reused monthly by removing the pegs from the first half of the month when posting is started for the current month. At the tenth of the month, the remainder of pegs from the preceding month are removed.

For accounting purposes, all products are issued on "fuel and lube issue slips."

HOW would you like to grease the sheaves and "A"-frame on this giant Clyde Whirley? This is just one of the tough lubrication jobs facing Utah's maintenance crews.



TED PEDIGO, day-shift lube foreman, posts Euclid "Status Boards" at the end of a shift. Looking at the boards, the next shift foreman can determine needed work.

These are handled by the lead man at the end of each shift, and are then turned in to the shop clerk, who charged material against each piece of equipment. Crews use a "lube work sheet" to record all field work and to post the status boards at the end of each shift.

For keeping track of wheel bearings repacked in the maintenance shop, a simple status board is provided. On this board is a series of tags, one for each piece of equipment. As wheels are repacked, the date is recorded on the white side of the tag. At the end of the specified service period, the tag is turned red side up until the repack has been made. Records are kept on lube inventories, anticipated deliveries, orders on file, analysis of products, etc., to make sure that all necessary materials are available in required quantities.

Equipment operating from the rail head to the dam site was serviced on the basis of the number of trips. It was decided to set up the following schedule on the lubrication record:

No. of Trips	Lubrication Req'd.
3	Lubrication
6	Complete service
60	Differential and Transmission Lube Change
120	Wheel Bearing Repack

Services included in each lubrication were complete lubrication, check engine oil and add as necessary, check differential and transmission, service air filter, and report any mechanical defects to the shop foreman. When complete service was directed, engine oil and oil filter are changed in addition.

New lubrication ideas

The field lubrication truck used at Davis Dam is equipped with power greasing equipment for certain grease fittings. New type Caterpillar track rollers have a bellows seal, and the power grease gun on the service truck is capable of developing 4,000 psi. This high pressure and relative high volume would, of course, damage the Neoprene bellows seal. The General Petroleum Engineering Service suggested placing a pressure relief valve between the grease control valve and the giant button head fitting. This valve was set to open at 400 psi., a pressure which was previously determined as safe for the bellows seals. With this arrangement, the new type rollers can be rapidly greased by inexperienced personnel without damage to the seal.

Several other interesting lubrication methods have been developed by lubrication personnel assigned to this project. The swing gears on one particular shovel always failed after a very short operating period. Cause for this failure was generally conceded to be misalignment, but Garrison, Utah's lubrication superintendent, believed that an improved method of applying the open gear lubricant would reduce this gear tooth spalling. The inadequate, but normal method of applying open gear lubricant by hand was overcome by installing a drip oiler which allows a diluted open gear lubricant—Gargoyle Viscolite 90 Fluid—to drip slowly but constantly upon the gear teeth. To date, the present set of gears has lasted three times as long as normally and is still running. This same product can be effectively applied to open gears by spraying whenever compressed air is available.

Stiff grease overcome

One more new lubrication idea is worth attention. No doubt most lubrication men have had trouble with conventional wheel bearing packers when the wheel bearing grease becomes too stiff for pumping during cold weather. Utah is now experimenting with a means of overcoming this difficulty by inserting an immersion oil heater into the quarter drum of wheel bearing grease in order to maintain a temperature of approximately 120 deg. The grease should be soft enough at this temperature for easy pumping. The temperature should be maintained low enough to prevent damage to the grease by additional cooking.

Four-way savings

With the use of this lubrication system it is apparent that the following savings have been made by The Utah Construction Company.

(1) Equipment is being serviced properly at scheduled intervals.
(2) No lubricants are wasted.
(3) Available lube man hours are expended efficiently.
(4) Equipment down time is held to a minimum.

F. P. C. Endorses Federal Power Development Plan

THE FEDERAL Power Commission, after consideration of several proposals for development of hydroelectric power resources in California's Central Valley, has indicated its belief that the public interest would best be served if such developments were made by the Federal Government. A recommendation to that effect has been prepared by J. A. Krug, Secretary of the Interior Department, and will be submitted to Congress. The report favors the Bureau of Reclamation's comprehensive plan for the entire Central Valley Project.

Maximilian Baron, Presiding Examiner for the Federal Power Commission, considered proposals from Pacific Gas & Electric Co. and the Fresno Irrigation District before making his decision. P. G. & E.'s plan was found to be economically feasible, but was discarded as not being comprehensive. That company had indicated that it was willing and financially able to proceed immediately with the necessary construction work.

The proposals of the Fresno Irrigation District did not outline a project in sufficient detail nor was it comprehensive enough, in the examiner's opinion.

NEWS OF WESTERN CONSTRUCTION

FEBRUARY 15, 1949

New Portland Firm Planning Deschutes River Power Dam

APPLICATION before the Oregon State Hydroelectric Commission has been made by a newly-formed Portland corporation to build a $12,000,000 power dam on the Deschutes River near Madras. The dam would be of concrete-arch construction, about 200 ft. from foundation to crest, and with an average width of 200 ft. It would form a reservoir about 7.2 mi. long. A powerhouse below the dam would mount two 37,500-kw. generators.

Incorporators of the new organization, which proposes to manufacture power and deliver it to the Pacific Power & Light Co., the Washington Water Power Co., and the Portland General Electric Co., are Maj. Gen. Thomas Robins of Portland, retired division engineer of the Corps of Engineers, president; Hillman Lueddemann, Portland, secretary-treasurer, and Howard W. Turner, Madras, vice-president. The new group calls itself the Northwest Power Supply Co.

Present plans call for integrating lines from the project with the transmission grid of the Bonneville Power Administration, through the central Oregon transmission lines of Pacific Power & Light Co. The Pacific, P. G. E. and Washington companies would take delivery of power into their distribution systems through existing interconnection with B. P. A. and replace these deliveries with an equal amount of power from the Pelton Project.

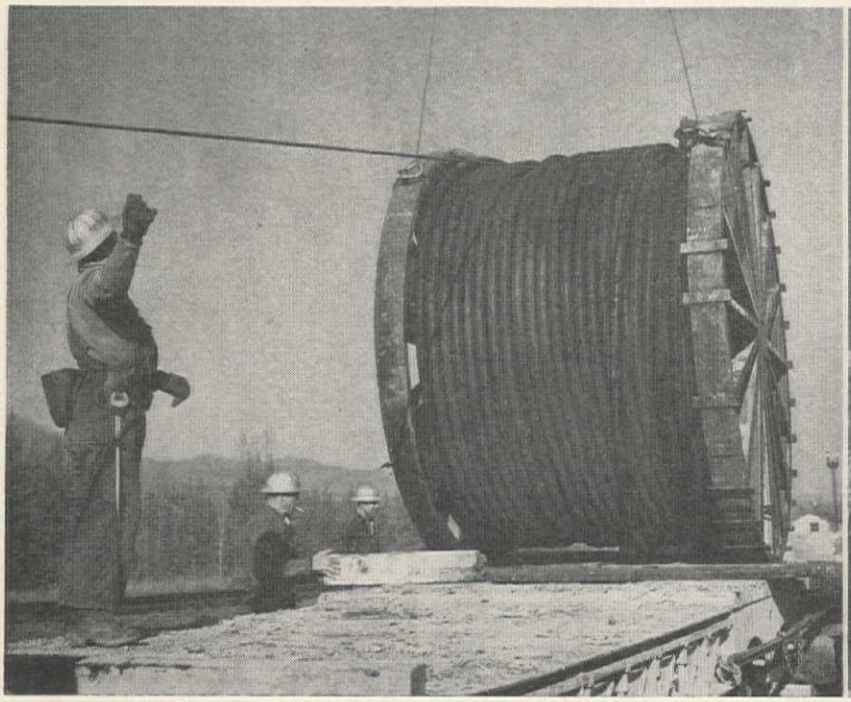
The proposed construction must pass two hurdles before approval. A bill is being introduced before the Oregon legislature to prohibit building of further dams on the Deschutes as a fish conservation measure. The second hurdle will be to find a way past a 1941 application by the now inactive Oregon People's Utility District to build a power dam on a site which would be flooded out by the proposed project near Madras. The application gives the P. U. D. a prior right, unless overruled by courts, to 1951.

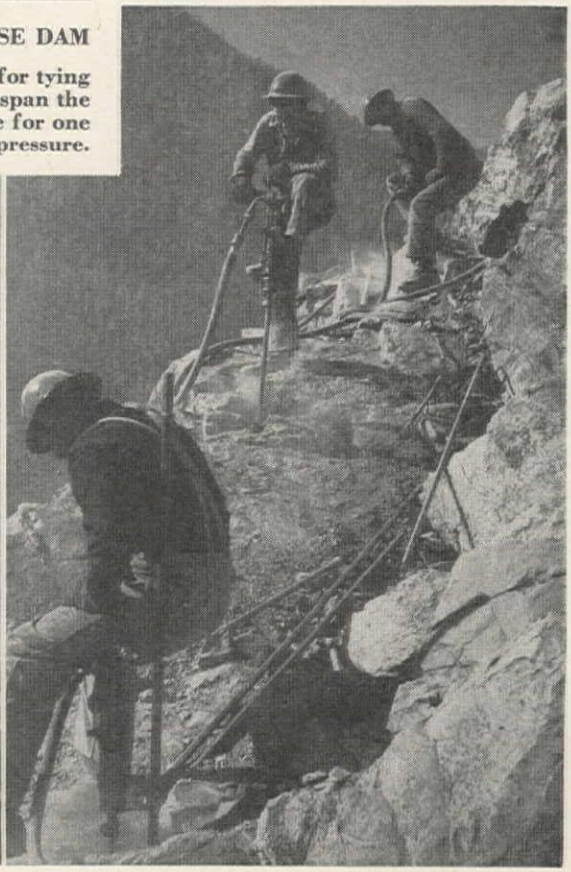
Colorado Earthfill Dam Done Way Ahead of Time

JACKSON GULCH Dam, rock-faced earthfill structure on the West Mancos River in Southwestern Colorado, has been completed more than 18 months ahead of schedule. Vinnell Co. of Alhambra, Calif., working under a $1,925,904 contract for the dam and inlet and out-

PRELIMINARY WORK UNDER WAY FOR CABLEWAY AT HUNGRY HORSE DAM

HEAVY CABLE used at Shasta Dam will be re-used by General-Shea-Morrison for tying cableway towers to anchors at Hungry Horse Dam in Montana. New cable will span the ½-mi. distance between the cable towers. Right, jackhammermen drill the base for one of the tail-towers of cableway. Note three different methods of applying down-pressure.





let canals totaling 4.58 mi. in length, completed the job in 567 days of the 1,150 allowed under the contract.

The dam, 181 ft. high, will create a reservoir having a capacity of 10,000 ac. ft., supplying farmers on the Mancos Project with irrigation water for spring crops as well as domestic water supply for the Mesa Verde National Park. The feeder canal, 2.65 mi. in length, will convey the waters of the West Mancos River to the reservoir. This storage will be returned as required for the same stream by an outlet canal 1.93 mi. long. This point of return to the river will supply water for all of the existing distribution system, which with a few minor changes, will serve the project lands.

P. G. & E. Will Continue To Buy Shasta's Power

THE DISPUTE between the Bureau of Reclamation and Pacific Gas & Electric Co. over distribution of power generated at Shasta Dam on the Sacramento River in California has been temporarily settled. Under the agreement, P. G. & E. will continue to receive Shasta power at its substation near Cottonwood for distribution through its own transmission lines, but the agreement is revocable on 24 hours' notice.

P. G. & E. will pay five mills per kilowatt for the Shasta power, compared to the approximately four mills paid under a wartime contract. The agreement also gives the company rent-free usage of the government's Oroville-Shasta transmission line. Under the agreement, P. G. & E. will deliver four kilowatt-hours of power to pumping plants on the Central Valley Project for every seven received at Shasta.

The continuing dispute has been over the government's insistence that similar exchange rates be arranged for other government agencies who are large consumers of electrical energy.

Los Angeles Needs Freeways

RAPID GROWTH of the Los Angeles area will require another set of parkways before parkways and freeways now building or projected are finished, according to a judgment expressed by Ernest E. East, chief engineer of the Automobile Club of Southern California, in a recommendation to the California State Highway Commission. He called for immediate location of routes for a "second priority" freeway system in the metropolitan area to protect rights of way and minimize the cost of acquiring and protecting property.

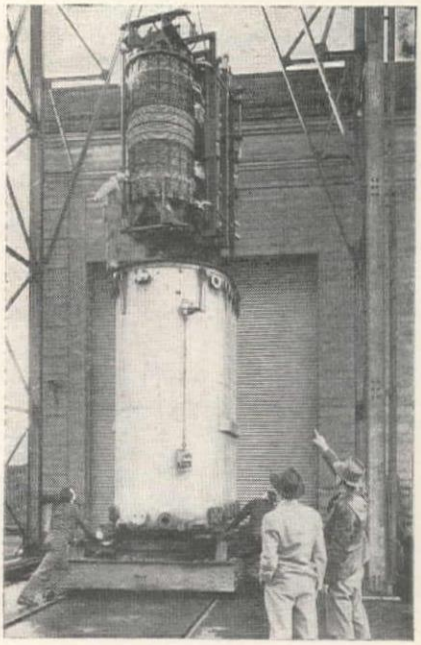
According to East's plan, perimeter freeways would be built to skirt the denser industrial and population centers and connect the original system of freeways and other main traffic routes. The recommended secondary system would be as follows: From Devil's Gate Dam north of Pasadena to Long Beach; from the northernmost point of Sepulveda Blvd. near San Fernando to the Coast Highway, and from North Hollywood to Pasadena via Glendale.

Silver Transformers Go Back to the U. S. Mint

TWELVE world famous power transformers, which due to wartime scarcity of copper were built with sterling silver coils valued at nearly a million dollars, are being rebuilt in Oakland for Pacific Gas & Electric Company's San Joaquin Valley substations.

The twelve 15,000-kva, 115,000-volt transformers originally were built by General Electric at its Pittsfield, Mass., plant and the coils wound with 75 tons of solid silver borrowed from the U. S. Treasury silver cache at West Point. During construction and their wartime service at an eastern aluminum reduction plant, the transformers were under military guard day and night.

After the war, the silver was removed and returned to Uncle Sam. The transformers were purchased by P. G. & E. and shipped to Oakland for the installation of new copper coils. Four of the twelve transformers are now in service at Stockton, and the rest will soon be ready for the P. G. & E. substations at Chico and San Rafael.



THE TRANSFORMERS go off the silver standard to copper as the costly coils are replaced at one of the 14 P. G. & E. substations where they were used.

Bureau of Reclamation to Invite Bids On Dams, Canals, Power Installations

MAJOR PROJECTS upon which invitations to bid will be issued by the Bureau of Reclamation at an early date include the Platoro Dam, an earthfill structure 180 ft. in height and 1,500 ft. long on the Conejos River about 40 mi. west of Alamosa, Colo. The work includes a dike 90 ft. long and 20 ft. in height and a 1,000-ft. long concrete-lined outlet tunnel. Invitations will be issued about Feb. 25. Specifications and bid forms may be obtained from the office of the Chief Engineer in Denver or from local Regional offices.

On Feb. 15, bid calls will be issued for the construction of earthwork, concrete lining and structures for the 10-mi. long Horsetooth Feeder Canal near Loveland, Colo. The work includes the placement of 12 concrete siphons and one steel siphon. On Feb. 18, about 1,000 ft. of the Willwood Canal near Ralston, Wyo., will go up for bid. This job includes one concrete siphon.

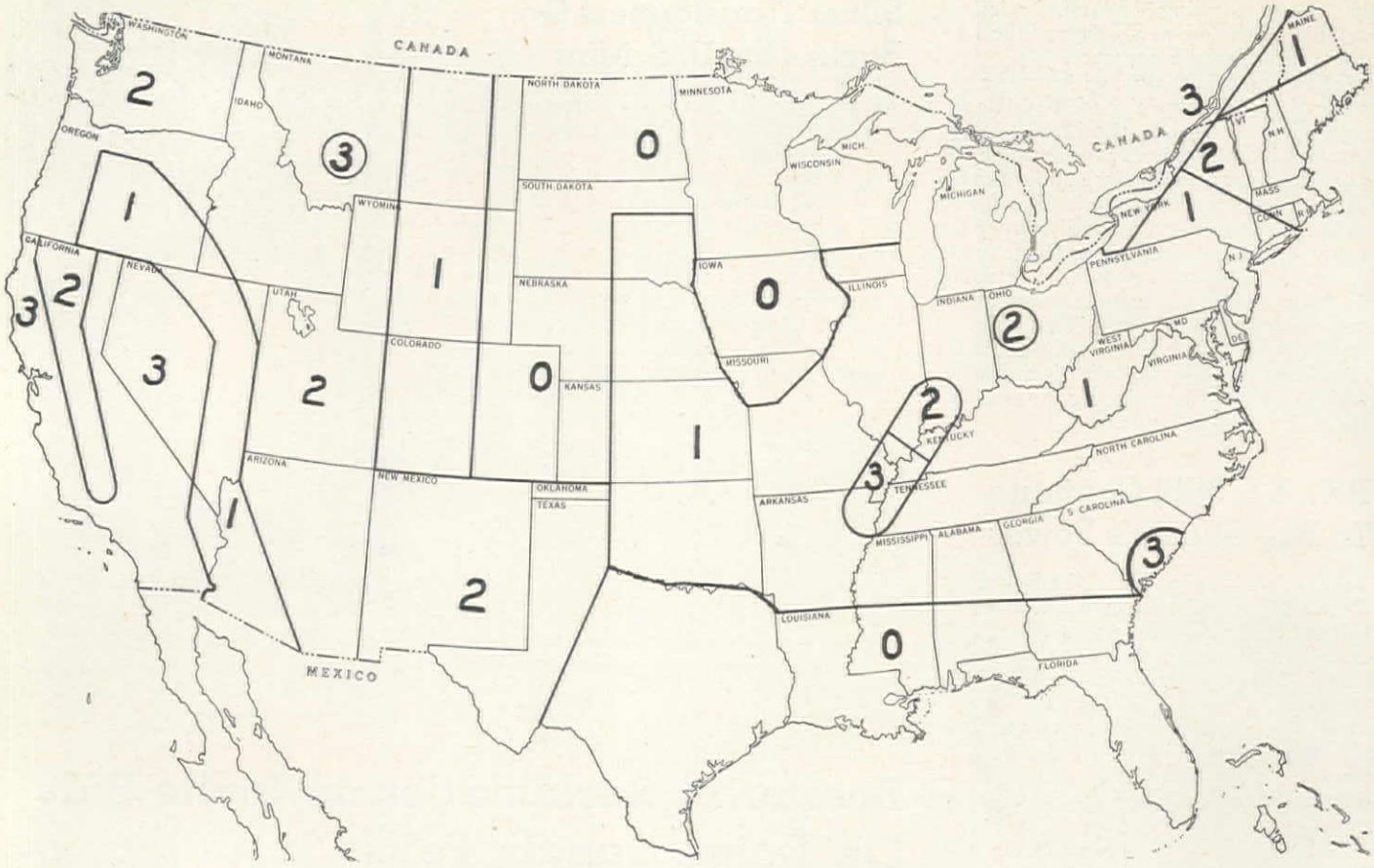
About Feb. 25, invitations will be issued for bids on construction of earthwork and structures for about 12.5 mi. of the Superior Canal near Superior, Neb.; for construction of a filter plant and small reservoir near Lewiston, Ida., on the Lewiston Orchards Project; for the construction of about 45 mi. of 115-kv. wood-pole, H-frame transmission line from the Fort Randall Dam substation near Fort Randall, S. D.; and for the construction of two 15,000-kva. capacity substations on the Davis Dam Project in Arizona and Nevada.

During the next two months, the Bureau expects to invite bids on the following projects. Dams: Rehabilitation of Ochoco Dam, spillway and outlet works near Prineville, Ore. Construction bids for Tiber Dam, an earthfill structure on the Marias River near Chester, Mont., have been postponed.

Canals: Construction of the 18-mi. long Wellton-Mohawk Canal on the Gila Project in Arizona; earthwork and structures for about 17 mi. of the Friant-Kern Canal near Delano, Calif.; about 17 mi. of Delta-Mendota Canal near Los Banos, Calif., earthwork and structures for about 16 mi. of Courtland Canal near Superior, Neb.; earthwork and structures for the 15-mi. long Winchester wasteway near Winchester, Wash., on the Columbia Basin Project; improvement of 10 mi. of the Lost River channel in Langell Valley near Klamath Falls, Ore.; and construction of earthwork and structures for 6.5 mi. of the Cambridge Canal near Arapahoe, Neb.

Electric installations: Construction of the Estes Park-Marys Lake and Estes Park-Granby Pumping Plant transmission lines on the Colorado-Big Thompson Project; 52-mi. Goshen to Palisades 115-kv. transmission line southeast of Idaho Falls, Ida.; 41-mi. long Cartwright 13.2-kv. transmission line from Bismarck, N. D.; substation of 5,000-kva. capacity about 56 mi. southeast of Idaho Falls, Ida., on the Palisades Project; and stringing 56.8 mi. of single circuit conductor for the Oroville to Elverta, Calif., transmission line on the Central Valley Project.

Miscellaneous: Construction of a government camp for Anchor Dam about 45 mi. west of Thermopolis, Wyo.; construction of 15 permanent dwellings on the Boulder Canyon Project in Nevada; and processing of sand and gravel for concrete aggregate on the Boulder Canyon Project.



Probable Damage From Earth Tremors Shown by Coast and Geodetic Survey

BECAUSE of widespread interest in recent earthquakes felt at Reno, Nev., and in southern California, *Western Construction News* publishes herewith an "Earthquake Probability Map" prepared some months ago by the Seismological Field Survey of the Coast and Geodetic Survey.

To prepare a seismic probability map, it is necessary, according to Franklin P. Ulrich, Chief of the Survey, to adopt certain general criteria. From records, it is evident that between 70 and 80 per cent of all earthquakes occur in the same general regions, and the map is drawn on the theory that what has taken place in the past in a given region is a fairly good forecast of what may happen in the future.

In general, zones marked O on the map are in the areas in which it is improbable that earthquake damage will occur. Zone 1 generally marks the area in which earthquakes have been felt, but damage has been minor, with no damage to structures. The areas included in zone 2 are those in which moderate structural damage has occurred frequently, and where greater damage may be expected occasionally. In Zone 3, major destructive earthquakes have occurred in the past and may reasonably be expected to occur at any future time.

Insufficient information is now available to connect the areas of probability with surface geology, though some general observations may be drawn. The boundary lines on the accompanying map are of course not accurately definable, but those shown indicate the combined opinions of a number of prominent scientists engaged in the study of seismology.

It is to be observed that both Reno and the Thousand Palms-Palm Springs areas are included in the zone 3 classification.

Shot in the Arm Needed By California Aviation

CALIFORNIA'S Aeronautics Commission has recommended consideration of three proposals for new aviation legislation at the current session of the state's legislature. The recommendations are: State financial participation in sponsorship of public airport projects under the Federal Airport Program, to assist political subdivisions in providing necessary matching funds; creation of a statewide system of airport areas or districts comprising metropolitan centers to handle construction and operation of public airports and thereby eliminate present inequities in financing and duplication of facilities; and the earmarking for airport construction purposes the tax on aviation fuel not claimed for refund, amounting to about $300,000 per year, which accrues to the highway program.

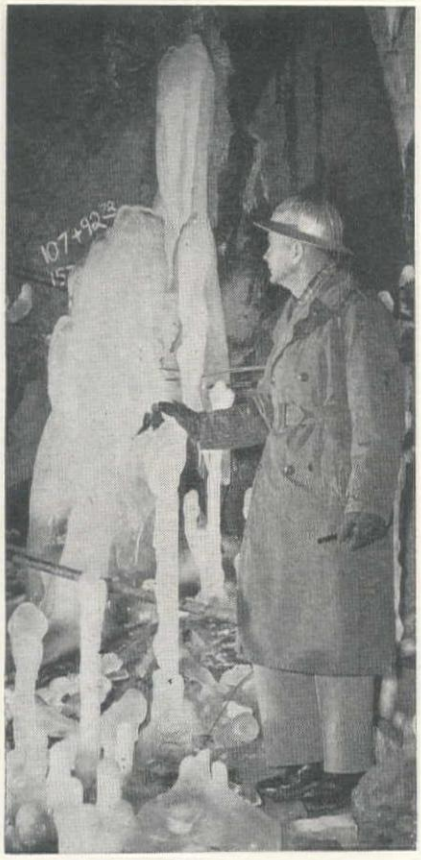
The Commission's 37-page report cites the State of Illinois as an example of how badly California has lagged in airport development since the war. By virtue of state appropriations totaling $6,240,000 for matching funds since 1946, Illinois, with about 1,500,000 fewer population and one-third California's area, has an active airport program amounting to $21,000,000, compared to California's active program totaling only $7,059,387 in Federal and local funds.

Due to lack of local sponsors with funds available for matching, California has been unable to take advantage of all the Federal funds which could be obtained for airport purposes, the Commission pointed out. For this reason, Illinois' total allocation of Federal aid alone is 25 per cent greater than California.

Fishermen Would Sink Cowlitz River Dams

QUALIFIED permission has been given to the City of Tacoma, Wash., to build two hydroelectric dams on the Cowlitz River. Director Frank A. Stewart of the state's Conservation and Development Department ruled that Tacoma was entitled to a state permit to build a 185-ft. high dam at Mossyrock, subject to final approval by the state legislature. Tacoma already has a permit to build a 325-ft. high dam at Mayfield, 12 mi. downstream.

Bitter opposition to the dams is being expressed by sports groups, fisheries interests and civic organizations who desire the river to remain as a sanctuary for salmon and game fish. At a two-day hearing in Olympia during December,



BACON TUNNEL ICICLES

MOISTURE dripping from the roof of Bacon Tunnel on the Columbia Basin Project in eastern Washington created these upside-down icicles. Examining them is E. J. NIEMEN, Bureau of Reclamation engineer, who said the water comes from underground seepage and moisture condensation in the frigid atmosphere of the 10,000-ft. long tunnel.

representatives of the Army Corps of Engineers testified that $1,000,000 has already been provided for making the Columbia River and its tributaries below McNary Dam a sanctuary for migratory fish. Also at that meeting, state departments of fish and game protested that the Mossyrock dam would ruin migratory fish runs. Stewart stated, however, that evidence indicated a potential fish loss of about $1,000,000, while the value of power produced at the dams would total $9,000,000.

The state departments of fisheries and game are asking the legislature to set aside the entire Cowlitz watershed as a fish sanctuary. If the legislature fails to act on this proposal, permit for the dam will be duly issued.

Utah Legislation Asks 7-Man Engineer Board

REORGANIZATION of Utah's state engineering department is asked in four bills presented before the state's Senate. The measures would terminate the terms of the present 3-member engineering commission and set up a 7-man member non-salaried commission. The new 7-man commission would employ an engineer to act as a general executive officer. The chief engineer would hold office indefinitely, but could be dismissed by the commission at any time.

Other bills of the series could bring the state building board and aeronautics department under the proposed commission. Other measures introduced to the Utah Senate would set up a registration committee for contractors and a statewide electrical inspection system.

Record Output at West Plant of Grand Coulee

FOUR NEW records for the production of electrical energy were established by the world's largest hydroelectric generators in the west powerhouse at Grand Coulee Dam during 1948, the Bureau of Reclamation announced in a year-end report.

The plant completed 1948 with a new yearly record of 8,415,000,000 kw. hr. of electricity and set new marks in hourly, daily and monthly outputs. The total of more than 8 billion kilowatt-hours for 1948 surpasses by far the yearly wartime peak of the power plant, said Supervising Engineer A. F. Darland of the Columbia Basin Project's Coulee Dam Division.

Darland said electrical output during 1948, in terms of manpower, was equivalent to the labor of 48,000,000 men working 8 hours a day, 5 days a week, 52 weeks a year. The daily value of Grand Coulee power, which is repaying more than three-fourths the cost of building the Columbia Basin Project irrigation system, is approximately $50,000.

All records established during 1948 are believed without equal, since the West powerhouse contains the greatest concentration of hydroelectric energy under a single roof in the entire world. Its nine big generators, each with a "nameplate" rating of 108,000 kw., consistently carry loads of 125,000 kw. or 167,500 hp. The Bureau plans to have three equally large generators operating in the East powerhouse in 1949, three more in 1950, and the final three operating in 1951.

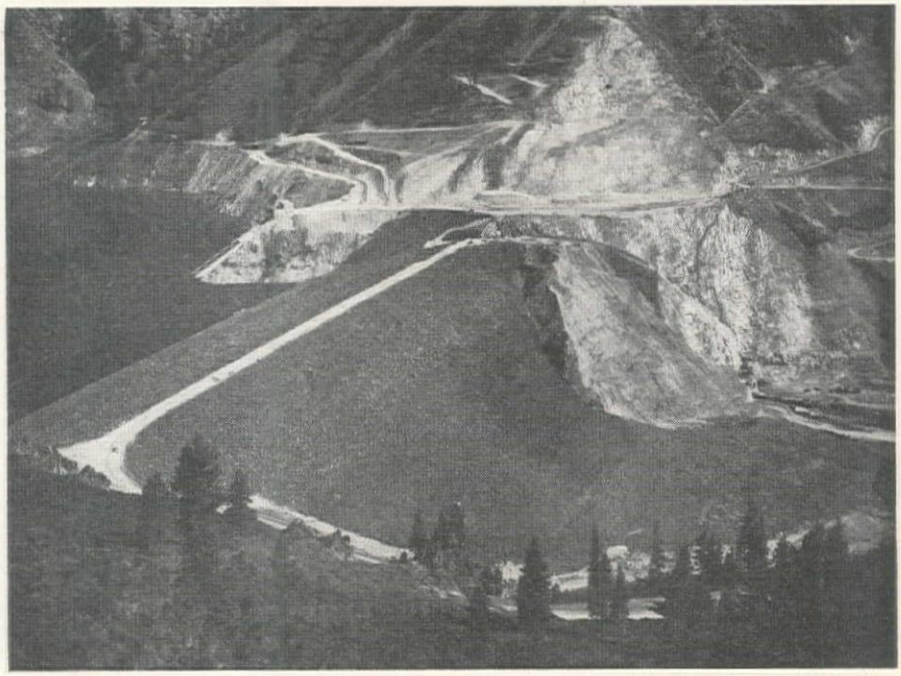
Generating Unit No. 7 in the West powerhouse proved to be the "workhorse" during 1948, producing nearly one billion kilowatt-hours. If figured at a nominal 2 mills per kilowatt-hour, the electricity produced by this unit alone was valued at $2,000,000. The complete unit cost about $3,500,000 to build and install.

Federal Funds Granted for Six California Hospitals

U. S. PUBLIC Health Service has recently approved Federal construction fund applications for six California hospitals. They are: Tulare District Hospital, 73 beds, estimated cost $1,299,500, Federal participation $416,500; Modoc General Hospital at Alturas, 54 beds, estimated cost $1,041,955, Federal participation, $346,901; John C. Fremont Hospital at Mariposa, 25 beds, estimated cost $385,800, Federal participation, $126,433; Mark Twain Hospital at San Andreas, 25 beds, estimated cost, $455,-565, Federal participation, $145,188; Corning Memorial Hospital, 25 beds, estimated cost, $352,325, Federal participation, $115,775; and Glenn County Hospital, Willows, 36 beds, estimated cost, $603,850, Federal participation, $201,283.

RESERVOIR FILLING UP AT WORLD'S HIGHEST ROLLED EARTH FILL DAM

COMPLETED Anderson Ranch Dam with its partially-filled reservoir presents a striking picture on Boise River's South Fork in southwestern Idaho. Since completion of the embankment last fall, the Bureau of Reclamation has been constructing a spillway, outlet works and power plant. Full storage is expected during 1949.



Army Engineers Okeh Santa Fe Dam For Protection of Rio Hondo Area

FINAL TESTS of the 16 hydraulically-operated gate valves at Santa Fe Dam near Los Angeles, Calif., have been completed and the huge earthfill structure has been pronounced ready to protect lowlands of Rio Hondo by controlling flood flows out of San Gabriel Canyon. The $11,845,000 barrier, designed exclusively for flood control, is placed near the foothills to receive flow downstream from Morris Dam farther up the San Gabriel Canyon, and will serve a drainage area of 231 sq. mi.

The dam itself, containing 12,000,000 cu. yd. of earth embankment to rank it as the third largest rolled earthfill dam in the world, was completed before the war by joint contractors, Morrison-Knudsen Co., Inc., Winston Brothers, J. F. Shea Co., and Ford J. Twaits Co. Guy F. Atkinson Co. installed the 30-ft. high gate valves.

Final tests were made by Glenn Morgan, resident engineer for the Army Engineers, sponsors of the construction.

The dam is 92 ft. high and 23,800 ft. long, and its reservoir has a maximum storage capacity of 47,200 ac. ft. Its spillway has a crest length of 1,200 ft. and a discharge capacity of 200,000 cu. ft. per sec. As a rolled earthfill structure, is is surpassed in size only by Denison Dam in Texas and Garrison Dam (under construction) in North Dakota.

CORRECTION

ON PAGE 109 of the December 15 issue of *Western Construction News*, a picture was shown to illustrate the moving of St. Paul's Episcopal Church in San Diego, Calif. In the caption beneath the picture, credit for the work was given to R. E. Hazard Contracting Co. This was in error, the contract for the moving having been awarded to Hollywood House Movers of San Diego, and the work was carried out under the supervision of Vincent A. Arloski of that firm. The connection of the Hazard firm was the renting of cranes used in the work.

PERSONALLY SPEAKING

O. R. Dinsmore has been appointed highway director for the state of Washington, succeeding **Clarence B. Shain. Raymond W. Clifford,** Olympia, has been appointed Washington's public utilities director, replacing **A. J. Zimmerman.**

* * *

William C. Wagner, Head of the Civil Engineering Department at the University of New Mexico, Albuquerque, was named Western Vice-President of the National Society of Professional Engineers at their recent annual meeting in Chicago. Two Western states' organizations became affiliated with NSPE during the Chicago Meeting. California Society of Professional Engineers applied for admission and was accepted. Favorable action also was taken on the petition for affiliation filed by Professional Engineers of Colorado.

* * *

De Leuw, Cather & Co., consulting engineers of Chicago, Ill., have established their Western office at 79 McAllister St. in San Francisco on a permanent basis. The firm offers specialized service in the Western states on plans, specifications, surveys, appraisal and studies of urban transportation, traffic and parking problems, railroad facilities, industrial works, power plants, tunnels, highways and municipal works. **Henry K. Evans** and **Gustave E. J. Jamart,** staff engineers of the De Leuw organization, have been appointed as the Western representatives.

* * *

Franklin Thomas, Professor of Civil Engineering and Dean of Students at California Institute of Technology, Pasadena, was named President of the American Society of Civil Engineers for 1949 in a mail ballot conducted among the organization's 24,000 members. Professor **Sidney T. Harding,** University of California at Berkeley, was elected as a director. ASCE awards announced for the past year include: **Hyde Forbes,** consulting engineer at Palo Alto, Calif., who received the James Laurie prize for his paper, "Landslide Investigation and Correction"; **Professor John K. Vennard,** Stanford University, Calif., the Collingwood prize for junior members for his paper, "The Nature of Cavitation," and **Professor Charles E. Jacob,** University of Utah, the Rudolf Hering medal for his paper, "Drawdown Test to Determine Effective Radius of Artesian Well."

* * *

Loren W. East, Glendale, Calif., has been appointed Public Utility Engineer of Oakland, Calif. East, who holds degrees in both civil and mechanical engineering, was employed by the Public Utilities Commission for 14 years before he entered private practice in 1944.

* * *

Lieutenant Colonel John P. Buehler has arrived in Portland, Ore., from Washington, D. C., to assume the duties of executive officer to **Colonel Theron D. Weaver,** North Pacific Division Engineer of the Corps of Engineers. Since his return from Japan in March, 1947, where he served a year and a half with the occupation services as executive officer to **Major General Hugh Casey,** Chief Engineer under General MacArthur, Buehler has been assigned to the Civil Affairs Division in Washington. As assistant chief of the division's economics and supply branch, his job was that of helping to form U. S. Government policies for occupied areas in the Far East and supervising economic rehabilitation programs in those areas.

LT. COL. JOHN BUEHLER

* * *

N. W. Haner, consulting engineer of Portland, Ore., has opened a civil engineering office for consulting and design service at 900 Guardian Building in Portland. The office will specialize in municipal engineering, water and sewage works, structural engineering, bridges, buildings and special structures.

* * *

The Board of Directors of Marin Municipal Water District at San Rafael in Marin County, Calif., has appointed **William R. Seegar,** who had been serving the District as assistant chief engineer, to the position of assistant general manager.

* * *

R. H. Willcomb will be succeeded by **W. O. Whipps** as secretary of the Montana State Highway Commission. Willcomb became a member of the commission in 1919 and had served as secretary since 1946.

* * *

Hayward C. McDonald will succeed the late **H. A. Harrold** as City Engineer of Napa, Calif. McDonald had been with the Napa water department since 1946.

* * *

W. B. Munson is office engineer with the Vancouver office of the Washington State Highway Department, succeeding the late **Matthew P. Brislawn.** Munson has done construction work in Alaska for the past 8 years, and prior to the war was assigned to work on the Alcan highway.

* * *

Bureau of Reclamation district manager **Frank A. Banks** announces the appointment of **Devere S. Davis** as resident engineer for the government on a 1.8-million dollar contract by Pacific Bridge Co., San Francisco, Calif., for work on Grand Coulee Dam and the Columbia River channel.

LOUIS B. ACKERMAN, left, former resident engineer at O'Sullivan Dam on the Columbia Basin Project, discusses a problem with his successor, ALTHE J. THOMAS. Ackerman is now Chief of Construction, U. S. B. R.'s Region VI.

Davis, a native of Ashton, Idaho, has been with the Bureau since 1933.

* * *

L. H. Bradley, formerly 17 years with the California Division of Highways and recently resident engineer on work at Donner Summit, has been appointed superintendent for the Leo F. Piazza Paving Co., San Jose, Calif.

* * *

Guy H. Taylor, a partner in Moffatt, Nichol & Taylor, consulting engineers of Los Angeles, Calif., and Portland, Ore., will be in the firm's newly opened office in Spokane, Wash. Assisting him will be **William W. Wilson** from the Portland office.

* * *

Elton J. Benton and **Richard C. Mielenz** of the chief engineer's office, Bureau of Reclamation, Denver, Colo., were awarded $150 each for their development of tests to determine the potential reactivity of concrete aggregates. **L. P. Witte** and **J. E. Backstrom** were awarded $200 for their contribution on apparatus to test the durability of concrete.

* * *

William J. Wenzel, Great Falls, Mont. director of public works since May, 1947, resigned that post recently to enter private practice as a consulting engineer. He was an engineer for Corwin & Co. prior to his job as director of public works.

* * *

The city council of Ellensburg, Wash., has appointed **James E. Morrison** as their city manager. Morrison, a native of Seattle and registered engineer, was city engineer of Renton for the past 5 years, and prior to that had been 17 years as an engineer for the city of Seattle.

* * *

Albert C. Horton, Jr., Chief of the Division of Engineering of the U. S. Department of Interior, retired Jan. 1 after nearly 40 years of service within the department.

* * *

Harold S. Carter, professor of engineering, Univ. of Utah, has been appointed to serve on the Highway and Bridge Survey Committee of the American Society of Civil Engineers, according to committee chairman **J. C. Carpenter,** Public Works Administration, Washington, D. C. The national committee is composed of six state and two university representatives. Carter is also chairman of the committee on student chapters, American Road Builders Association.

* * *

Althe J. Thomas has replaced **Louis B. Ackerman** as resident engineer for the Bureau of Reclamation on the $9,000,000 O'Sullivan Dam of the Columbia Basin Project. Thomas has been field engineer at the dam under Ackerman since 1946. When O'Sullivan Dam is completed, Thomas' office near the dam will assume direction of canal work in that vicinity. Ackerman, former resident engineer, has been promoted to Chief of the Construction Division in Region VI in the Missouri Basin. His headquarters will be at Billings, Mont.

* * *

Earl Barnwell, assistant county engineer of Snohomish County in Washington, has been named county engineer to replace **Roy Crane,** resigned. Replacing Barnwell as assistant engineer is **Arthur Dolph,** chief draftsman for the county office.

* * *

H. L. Crocker, Jr., building contractor of El Cerrito, Calif., is the new president of the General Contractors Association of Contra Costa County in California. He replaces **Robert B. Johnson,** El Cerrito contractor.

* * *

Frank S. Junk has been appointed Assistant Professor of Civil Engineering at the University of Idaho, Moscow. He has six years' experience with the Missouri Highway Department in highway design and construction.

* * *

Arthur Duffy, transitman with the Oregon State Highway Department at Portland, has been promoted to resident engineer in Tillamook County, Oregon. As his first assignment, he will be in charge of the Tillamook-Pleasant Valley project on the Oregon Coast Highway.

* * *

William E. McMorran has been named president of the Phoenix Chapter of the American Association of Engineers. **A. Glen Smoot** is the retiring president.

* * *

Roy Edwards, formerly with the Lummus Engineering Co. of New York, has been named the first full time city engineer for the City of Thermopolis in Wyoming.

* * *

T. P. Scholz, County Engineer of Whatcom County in Washington, has been hired as City Engineer of Bellingham in Whatcom County.

* * *

Howard Shelp has resigned as highway engineer for Maricopa County in Arizona.

* * *

Fred H. Rhodes, Associate Professor of Civil Engineering at the University of Washington, will act as general chairman when the American Society for Engineering Education holds its annual convention in June, 1950, at the University.

* * *

Duncanson-Harrelson Co., contracting firm of San Francisco since its incorporation in 1909, has moved its main office from the deYoung Building in San Francisco to its own building on company property in Richmond, Calif. Necessity for more office space, ample and convenient parking facilities and the expectation of greater operating efficiency are given as the main reasons for the move by the president, **Carroll T. Morton.** Major interest of the company is work which embodies pile driving and general waterfront construction, maintenance of wharf facilities and bridge work.

* * *

Award of the Army's Commendation for Meritorious Civilian Service to **Harry L. Highland,** safety engineer for the Denver, Colo., district of the Army Corps of Engineers, has been announced. The award, made by **Col. Craig Smyser,** District Army Engineer, was in recognition of Highland's work in the field of safety. The Denver district has recorded the highest safety record during the last three years.

* * *

Chester I. Brown, assistant engineer in the headquarters office of the Federal Secondary Roads Department at Sacramento, Calif., has been promoted to district construction engineer for the California Division of Highways, District V. There, he will be under District Engineer **L. H. Gibson.** Headquarters for District V are in San Luis Obispo.

* * *

Andrew G. Brenneis of Santa Barbara, Calif., Supervisor of Los Padres National Forest, has been promoted to Assistant Regional Forester in charge of personnel management at the San Francisco regional headquarters. **Lloyd A. Rickel** of Mt. Shasta, Assistant Supervisor of Shasta National Forest, will succeed Brenneis.

* * *

Commander Arthur H. Castelazo, with the Civil Engineer Corps of the Navy, has been transferred from Bremerton, Wash., to Adak, Alaska, where he will be the Officer-in-Charge of the 124th Naval Construction Battalion.

* * *

Robert McGrath, formerly with the Branch of Design and Construction of the Sacramento, Calif., Regional Office of the Bureau of Reclamation, has transferred to the U. S. Bureau of Public Health at Portland, Ore. There, he will work on stream pollution problems.

* * *

Arthur R. Watson, formerly with C. S. Replogle, consulting engineer of Oakland, Calif., is now with the California Division of Architecture at Sacramento.

* * *

Wallace F. Bennett of Salt Lake City, Utah, is the 1949 president of the National Association of Manufacturers. He is head of Bennett's, Salt Lake City glass and paint company, and also president of the Bennett Motor Co., president of the Cardon Jewelry Co. of Logan, Utah, vice-president of the Clayton Investment Co., and active in trade association work. He succeeds **Morris Sayre,** who becomes chairman of the board of directors of NAM.

Safety Record Improved By Raised Center Strip

FAR SURPASSING the record of multilane rural highways, the upper deck fatality rate on the San Francisco-Oakland Bay Bridge during the last two years was only five for one hundred million vehicle miles, Howard C. Wood, Bridge Engineer, has reported. In this connection it was pointed out that in the more than seven years since the installation in 1941 of the present raised center strip on the bridge there has not been a single accident attributable to or even remotely connected with the raised marker, which is one inch high and nine inches wide.

"The Bay Bridge engineers as well as the California Highway Patrol are convinced that the marker is not only safe but a definite safeguard to traffic," Wood said.

The original center line on the bridge was a double row of white tile squares embedded in the pavement and from the opening of the span on Oct. 12, 1936, there was a great deal of criticism of their poor visibility, particularly on rainy nights.

A positive divider has been considered for the Bay Bridge but the idea had to be abandoned for several reasons, principally because the lanes are only nine feet four inches wide, and the tendency of motorists to shy away from such barrier obstacles would preclude the proper function of all six lanes.

OBITUARIES . . .

Reginald H. Thomson, 92, former City Engineer of Seattle, Wash., died Jan. 7 in that city. Holding the city engineer post from 1882 until 1911, he took the lead in securing watershed lands and building the city's water supply system. From 1937 until his death, he was a consulting engineer for the Washington State Toll Bridge Authority. He was president of the Pacific Northwest Society of Civil Engineers in 1903-04, a director of the American Society of Civil Engineers in 1917-18, and was a life member of the Canadian Institute of Civil Engineers. In addition to his Seattle work, he was from time to time consulting engineer on major projects throughout the Northwest.

* * *

Col. Russell S. Lieurance, 55, project engineer for the Boysen and Owl Creek units of the Missouri Basin Project, died Jan. 10 at Boysendam, Wyo. Since the end of World War I, he had spent most of his time with the Bureau of Reclamation at Denver, Colo.

* * *

Arthur P. Banta, 44, Professor of Civil Engineering at the California Institute of Technology, died at his Pasadena home of a heart attack on Jan. 23. He held degrees from both Stanford and Caltech, and had served as sanitary engineer with Los Angeles County, Calif. During the war he received the Bronze Star decoration while serving as a lieutenant colonel in the Corps of Engineers. A member of the American Society of Civil Engineers, Banta received the James Laurie prize of that organization.

BIG MACHINES HOISTED INTACT

THIRTY-FOUR 3-ton linotype machines belonging to "The Oregonian," a Portland, Ore., newspaper, had to be moved intact from the 9th floor of a downtown office building fast enough to meet newspaper deadlines and keep molten type metal hot. Timber Structures, Inc., of Portland, did the job by pre-fabricating a timber elevator tower. Legs of the tower where erected from 8 x 8-in. selected structural Douglas fir timbers. Inside legs of the un-guyed tower were anchored through windows.

* * *

Harold H. Johnson, 61, Superintendent of Operations and Maintenance for Region VI of the Bureau of Reclamation, died of lung cancer recently at Billings, Mont. He had been in reclamation work in Montana and Wyoming since 1910.

* * *

Everett H. Smith, co-owner of the Triangle Construction Co., Boise, Ida., died recently at the age of 44. He had been president of the Idaho Branch of the Associated General Contractors of America in 1942.

* * *

William E. Jenkins, 64, president and general manager of Columbia Bitulithic Limited, Vancouver, B. C., died recently. He was well known in airport and road construction work, being a member of Engineering Institute of Canada, a director of Builders' Exchange and one of the founders of Road Builders' and Heavy Construction Association. He also was a vice-president of Canadian Construction Association.

* * *

Dwight B. Baldwin, partner in the Fred J. Early, Jr., Co., San Francisco contracting firm, died Jan. 7.

* * *

William F. Donnelly, 59, construction engineer and former deputy city engineer of San Francisco, Calif., died of a heart attack on Jan. 19 in Vallejo.

* * *

Robert L. Cooper, 71, former employee of the Bureau of Reclamation, died recently in Carlsbad, N. M.

* * *

Lee Howard Dana, 63, died Jan. 20 in Needles, Calif., of a heart attack. He was an engineer at Boulder City, Nev., for the Bureau of Reclamation.

* * *

Howard A. Harrold, 62, City Engineer of Napa, Calif., died Jan. 22. He came to Napa in 1917.

* * *

Joseph A. Maddox, 84, retired general contractor, died at his home in Los Angeles, Calif., Jan. 19.

* * *

Harold Klotz, engineer at Coulee Dam in Washington for the Bureau of Reclamation, was killed in a bus-car collision near Spokane on Jan. 15.

* * *

James W. Bainbridge, 57, civil engineer of Seattle, Wash., died Dec. 29. During World War II, he served as Chief Civil Engineer at McChord Field, Tacoma.

* * *

George Petersen, general contractor of San Leandro, Calif., died Dec. 25. He built a number of large structures throughout the San Francisco Bay region.

* * *

Robert L. Mitchell, 69, former building contractor of Salt Lake City, Utah, died Jan. 3.

* * *

Frank N. T. Cummings, 70, retired building and bridge construction engineer of Los Angeles, Calif., died Jan. 4.

* * *

Frederick R. Rowan, 53, civil engineer of Los Angeles, Calif., died Jan. 13.

* * *

Alfred R. Ebberts, 52, engineer for the California Division of Highways, died Jan. 2 in Sacramento after a month's illness. He was widely known for his research and writings in highway engineering.

* * *

James A. Reed, 64, retired building contractor of Los Angeles, Calif., died Jan. 11.

Revision of Truck and Trailer Laws Urged by Western Highway Institute

MEMBERS of the Western Highway Institute, regional organization of the motor carrier industry in the 11 Western states, met in Las Vegas, Nevada, recently for the purpose of reviewing the position of the interstate carriers with respect to legislative matters expected to be considered in the 1949 Western legislatures.

Among other matters, the Institute members agreed upon a long-range position with respect to truck sizes and weights. Designed to inform the state trucking groups in this area on the trend of thinking in the interstate field with respect to truck and trailer dimensions, the recommendations of the WHI include provision for 102-in. body width, tractor-semi trailer combinations of 60 ft., with a 45-ft. permissible lengths for semis, and overall lengths for other combinations up to 65 ft.

The present Western states standard 18,000-lb. axle loading was retained, but with the proviso that the subject should be further explored when highway improvements in the West are more advanced than at present. The WHI voted against any weight formula, other than the axle limitation, except for concentration of axles under 18 ft.

In taxation, the Institute favors a vigorous program of improving state reciprocity laws and simplifying truck tax structures by eliminating third-structure taxes, such as gross earnings and ton-mile taxes.

Officers of the WHI include R. H. Cutler, Salt Lake City, chairman; John Springer, San Francisco, president; Leland James, Portland, Howard M. Lang, Los Angeles, and Ray Lilenquist, Salt Lake City, vice presidents, and J. A. Gritsch, San Francisco, treasurer.

Construction Due This Spring On California-Mexico Freeway

CONSTRUCTION will begin soon on a $7,000,000, four-lane divided freeway from National City in Southern California south to San Ysidro at the Mexican border. Bids for the first section of the 11½-mi. long freeway will be advertised early in spring. The California State Highway Commission has budgeted $1,500,000 for the first link; extending from 16th St. in National City to H St. near Chula Vista.

The freeway ultimately will replace the present two and three-lane Highway 101, and will be built as an extension of the present Harbor Drive. Way was cleared for start of the construction when the San Diego County board of supervisors approved a freeway agreement with the state covering unincorporated areas through which the proposed route will run.

D. G. HALL, left, is superintendent for Morrison-Knudsen, Inc., and M. H. Hasler on their joint-venture construction of the Delta-Mendota Canal near Tracy, Calif. With him is L. G. "PETE" LYNCH, project manager on the job.

SUPERVISING THE JOBS

Bob Boyd is the general superintendent for Guy F. Atkinson Co. of South San Francisco on construction of the new Belhart Bridge in Long Beach, Calif. **Howard Thompson** is the job engineer and **Ben Clemens** is office manager. **Dominick Billi,** master mechanic at Atkinson's Long Beach shops, is acting as master mechanic on the job. **Ray McLellan** is the carpenter superintendent.

* * *

Dan Cleve is the project manager for the Hermann Co. of Los Angeles, Calif., on construction of the sewage disposal plant at Pomona, Calif. **Ed Waters** of Van Nuys, Calif., is the subcontractor for excavating and grading of roads on the project.

* * *

Samuel P. Weiss is the project manager for construction of approximately 200 residential buildings at Phoenix, Ariz., for contractors, Graver and Kennedy of Phoenix. The home-building program is sponsored by the Universal Realty Co.

* * *

O. E. McWhirtier, superintendent for the Arizona House Moving Co. of Phoenix, is directing the moving of 100 houses from Fort Huachuca to Phoenix, Tucson and Douglas. The houses will be placed at various schools in those cities. Tucson Warehouse and Transport Co. is also in on the job.

* * *

Fred McDowell is supervising construction of a $2,500,000 medical center building in Phoenix, Ariz., for the Del E. Webb Construction Co. of Phoenix. **Roy W. Murray** is handling the concrete slab work.

* * *

Ed Hallmark was superintendent for contractor Mark Cockrell of Phoenix, Ariz., on construction of a main-line sewer and sewage disposal plant at Tolleson, Ariz. The $160,000 job was completed last month.

* * *

S. R. Demaree, formerly with the Allison Honer Co. of Santa Ana, Calif., is now returning from Venezuela where he has been supervising construction for the J. G. White Engineering Corp.

* * *

H. A. Pittman is the superintendent for contractors Pittman Bros. of Hollydale, Calif., on construction of an American Legion Hall in Hollydale. **Don Winslow** is project manager on the job, and **Jack Temple** is foreman.

* * *

A. Papac is superintendent and **Leo Lopez** is foreman on construction of sewers in Arcadia, Calif., by contractors Papac & Artukovich of Montebello, Calif.

* * *

Farmer & Godfrey Construction Co., Arizona home-builders, are currently constructing nearly $1,000,000 worth of houses in Chandler and Phoenix. **F. H. Godfrey** and **E. L. Farmer** are acting as project managers for the various jobs, and **John Whitlatch** is the firm's general superintendent. **Clarence Martin** and **V. T. Miller** are key foremen for the company.

* * *

H. B. McPherson is the superintendent for Sterling Builders, Inc., Los Angeles, Calif., on the Sterling Village Development near Los Angeles. The project includes 130 single units, 22 four-family units and a shopping center.

* * *

Ralph Hamilton is now superintendent of construction for International Bechtel, Inc., on the Middle East Oil Development project at Dhahran, Saudi Arabia.

* * *

Emmet Roberts is general foreman for H. H. Potter, Escondido, Calif., on a new Veterans Administration housing project at Oceanside.

* * *

J. Chavarin is superintendent for Papac and Artukovich, contractors of Montebello, Calif., on sewer construction at Southgate, Calif. **Nick G. Luich** is the project manager, and **Nick J. Papac** is acting as foreman.

* * *

George Erno is the general superintendent and **E. R. Enstrom** is carpenter superintendent for Stanton-Reed Co., Los Angeles, Calif., on construction of the new Cafeteria and Physical Education buildings at the Gage Avenue Junior High School, Huntington Park, Calif.

NEWS BRIEFS

FIRST STATES RATIFY COLORADO COMPACT—Arizona, on Jan. 21, became the first state to ratify the Colorado Upper Basin Compact. A ratification bill was speeded through Utah's legislature on Jan. 19, but Arizona's Governor Garvey affixed his signature to that state's legislative approval before Utah's Governor got around to it. Wyoming became the third state to ratify the Compact on Jan. 25. Entire text of the agreement appeared in *Western Construction News* for December, 1948.

SHASTA DAM POWER—The Bureau of Reclamation announces installation of the final 450-ton rotor at the Shasta powerhouse, Calif. Operation of the generator and resulting maximum output at the Shasta plant is expected in March.

RIO GRANDE BRIDGE—New Mexico state highway engineer Burton Dwyre states that replacement of the bridge crossing the Rio Grande at Albuquerque on U. S. highway 66 can be considered only after an adequate traffic survey. The survey will be made by the Automotive Safety Foundation, Washington, D. C.

HAWAII ROAD PROGRAM—The U. S. Public Roads Administration announced a revision in the plans for the $12,000,000 Territory of Hawaii road project. The changes increase the mileage from 34 to 41 and divide the construction into 27 contracts instead of the original 10.

SIX BILLION BRICKS—Production of brick and tile during 1949 promises to keep pace with the record-breaking output of last year, asserts W. J. Goodwin, Jr., President of the Structural Clay Products Institute, Washington, D. C. He states that more than six billion brick equivalents were produced in 1948, pending final Commerce Department statistics, and that construction of residential, commercial and government buildings is likely to remain at or near 1948 levels, with structural clay tile, common and face brick available in sufficient quantities to supply the demand.

WYOMING CONSTRUCTION BUDGET—A $5,258,000 budget for construction and improvement of state institutions was recommended to the Wyoming Legislature in January. The sum would cover the next two years.

SECOND TUNNEL OF ST. MARY DAM—Announcement was made that construction will begin on a second 2,500-ft. tunnel connecting St. Mary Dam with the canal system in Alberta, Canada. The $5,000,000 St. Mary Dam is located at Spring Coulee in southern Alberta.

GREAT SALT LAKE STATE PARK—Magna, Utah, may introduce a bill in the state legislature to develop an area around the Great Salt Lake as a state park. Total cost of the proposed park has tentatively been set at some $3,000,000.

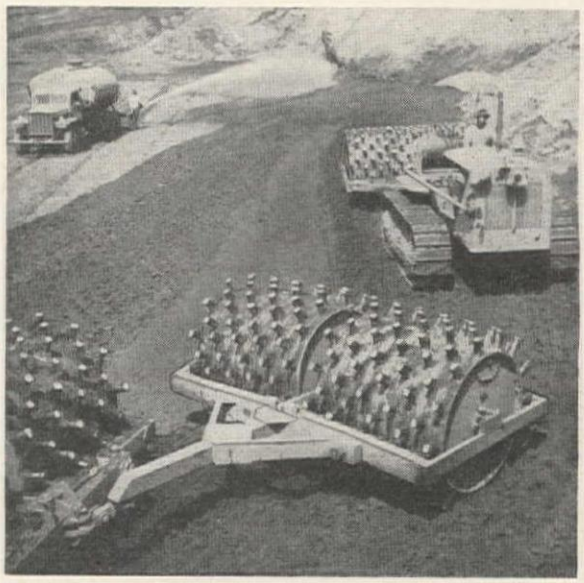
RECOMMEND $13,700,000 PIPELINE—Mayor Elmer E. Robinson, San Francisco, Calif., was urged by the city's public utilities commission to recommend appropriation of $13,700,000 for 3 new water pipelines to help meet growing demands.

NEVADA HIGHWAY BUDGET—W. T. Holcomb, Nevada state highway engineer, announces that proposals will be placed before the state highway board for a $7,250,000 budget during the next 18 months. New 4-lane pavements on U. S. Highways 95, 50 and 40 are included in the proposed state-wide improvements.

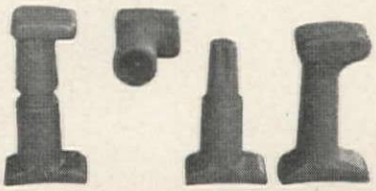
WHITTIER NARROWS FLOOD CONTROL—Necessary condemnation proceedings for land for the 27-million dollar Whittier Narrows Flood Control Project in Southern Calif. were filed recently. The proceedings involve about 3,000 ac. of land 4 mi. south of El Monte, Calif., for the site

Kay-Brunner Tamping Roller

Simplicity of design, combined with rugged construction, is the outstanding characteristic of the Kay-Brunner Tamping Roller. Openings are provided in the drum diaphragm to permit the loading of sand or water, or both, to meet any job specifications or the required pressures per square inch of each tamping foot. The base of each foot has a large bearing surface curved to fit the drum, allowing a strongly welded unit. The feet are made of long wear-resisting cast steel, with special designed toe that eliminates the tearing up of the top surface when feet leave the soil or tamped area.



Kay-Brunner tamping rollers on the job for the Cal-O-Well Construction Co. in Glendale, California.



Available with solid feet, or with removable heat-treated caps for easy replacement when worn.

KAY-BRUNNER STEEL PRODUCTS, INC.

2721 ELM STREET, LOS ANGELES 41, CALIFORNIA

BULLDOZERS • TRAILBUILDERS • RIPPERS • POWER CONTROL UNITS • TAMPING ROLLERS • CARRYING SCRAPERS

of an earth-fill dam to control flood waters of the Rio Hondo and San Gabriel Rivers.

REVAMP RIVER COMPACT—State Senator R. L. Greene, Wyo., states he intends to hasten agreement on the Yellowstone River Compact by introducing a bill to eliminate negotiations concerning the Tongue River and its tributaries from the Compact. Already ratified by Montana and North Dakota, the present compact has failed twice in Wyoming due to opposition from the Tongue River water users.

VOTERS REJECT BRIDGE—Citizens of Canon City, Colo., on Jan. 18 voted strongly against a proposal for the city to buy the famous Royal Gorge Bridge for $726,260. Opponents stated that the purchase price was too high, the revenue too low, and that the city would automatically own the bridge in another 20 years.

MULTI-MILLION DOLLAR HOSPITAL—Plans and specifications for a $8,500,000 hospital at Salt Lake City, Utah, have been completed for the Veterans Administration. Working drawings have been sent to the Corps of Engineers, Sacramento, Calif., for approval. Advertising for bids is expected March or April, 1949.

WYOMING ASKS BETTER SECONDARY ROADS—State Senator Lee Keith has introduced a bill in the legislature asking for gravel surfacing on many of Wyoming's county roads. The bill would appropriate $2,000,000 for badly needed improvements and graveling of the roads, many unimproved for years.

RENO TO ENLARGE SEWAGE DISPOSAL PLANT—Plans and specifications for improving and enlarging the sewage disposal plant at Reno, Nev., are nearing completion according to City Manager Emory Branch. Bid calls are expected in March.

YELLOWTAIL DAM—The Montana Legislature has recommended a speed-up on work at Yellowtail damsite on Big Horn River southwest of Hardin in Big Horn County. The dam will be a major development in irrigation, flood control and hydroelectric power.

COLORADO SILT REMOVAL—The Bureau of Reclamation announces that assembly has been completed on a floating suction dredge at Needles, Calif., costing nearly $900,000. The dredge will remove river silt that has accumulated below Needles, creating flood hazards. The dredge was built by the Pacific Coast Engineering Co. of Alameda, Calif.

HOTEL VANCOUVER FINIS—Demolition of the old Hotel Vancouver has now started in Vancouver, B. C. The work is estimated to take 8 months and cost about $2,000,000, and has been let to the Marwell Construction Co. of Vancouver and the Cleveland Wrecking Co. of Cincinatti, Ohio, by the T. Eaton Co., owners. About 250 Vancouver men will be employed to wreck the hotel and stockpile the debris for convenience of bidders.

McNARY DAM CONCRETE—The SS Permanente Silverbow arrived in Portland harbor Jan. 17 carrying a cargo of more than 54,000 bbl. of bulk cement for McNary Dam, now under construction near Umatilla. The shipment is the first installment of 670,000 bbl. to arrive from the Permanente Cement Company's Santa Clara, Calif., plant. Pouring on the first of three construction phases on the dam, a $21,648,736 contract awarded jointly to Guy F. Atkinson Co., Ostrander Construction Co., and J. A. Jones Construction Co., commenced last December using cement shipped by barge from Permanente's Seattle plant.

NATIONAL HOUSING—At least 1,265,000 city and farm homes were added to the national housing supply in 1948, setting an all-time record, Melvin H. Baker, Chairman of the Construction Industry Information Committee, Washington, D. C., stated recently. In addition to the 925,000 non-farm homes estimated to have been started during the year, fully 140,000 new farm homes were put under construction and another 200,000 units were provided through conversions of existing units.

Do 4 Days Work in 3 with a "new standard" JAEGER . . .

On an excavation contract for 1,600,000 yards of approximately 60% limestone and sandstone rock, on U.S. Route 22 east of Pittsburgh, Ralph Myers Construction Co. replaced a good 500 ft. compressor with a "new standard" Jaeger 600 and immediately increased daily footage 35% to 40% with the same two wagon drills.

"I'm doing as much drilling in 3 days as I used to do in 4," says Ralph Myers, who now owns two Jaeger 600's.

You can get a comparable increase in production with any "new standard" Jaeger Air Plus. Your air tools need more air than they did back in 1932, when the old 60 to 500 ft. compressor ratings were established. Jaeger gives you that 15% to 20% more air in every model from 75 to 600 ft., insures steady 90 lbs. pressure at the tools instead of 70 lbs., increases your daily production 30% to 40% *with the same men and tools.*

"New standard" ratings are 75, 125, 185, 250, 365 and 600 ft. See your Jaeger distributor.

Sold, Rented, Serviced by:

EDWARD R. BACON CO.....San Francisco 10, Calif.
SMITH BOOTH USHER CO.....Los Angeles 54, Calif.
WESTERN MACHINERY CO.....Salt Lake City 13, Utah and Denver 2, Colo.
A. H. COX & CO.....Seattle 4, Wash.
NELSON EQUIPMENT CO.....Portland 14, Ore., Twin Falls and Nampa, Idaho
ANDREWS EQUIPMENT SERVICE.....Spokane 9, Wash.
CENTRAL MACHINERY CO.....Great Falls, Mont.
TRACTOR & EQUIPMENT CO.....Sidney and Miles City, Mont.
WORTHAM MACHINERY CO.....Cheyenne, Wyo., Billings, Mont.
J. B. COGGINS & CO.....Albuquerque, N. M.
MILES CITY EQUIPMENT CO.....Miles City, Mont.
SHRIVER MACHINERY CO.....Phoenix, Ariz.

Contracts . . .

Summary of Major Construction Contracts Awarded Last Month

Pacific Bridge Co., 333 Kearny St., San Francisco, Calif., were awarded a $1,804,840 contract for repairing the spillway face and spillway bucket at Grand Coulee Dam in Washington and improving the Columbia River channel below the dam. Most of the work must be performed during the low-water season, since the principal item of equipment involved is a barge-equipped caisson which will be used in repairing the spillway bucket. The caisson rests in a circular drydock below the dam and will be moved out into the Columbia and lowered over the bucket to permit men to work in a normal atmosphere below the surface of the river. Other work in the contract, which covers 530 calendar days, will involve a separate caisson for repairing the spillway face, removal of two abandoned bridge piers about a mile downstream from the dam, dredging the river channel, and preparing the floating caisson for the high-water season.

All bids received Dec. 1, 1948, for construction of Canyon Ferry Dam and Power Plant on the Missouri Basin Project about 16 mi. northeast of Helena, Mont., were rejected by the Bureau of Reclamation as being too high. **Canyon Constructors**, consisting of 4 joint-venture firms, had submitted the low bid of $12,940,845. Certain modifications intended to reduce the cost will be made before re-advertisement is made.

A $5,116,796 contract for construction of Shadehill Dam in South Dakota, a part of the Grand River Unit of the Missouri Basin Project, has been awarded by the Bureau of Reclamation to **S. J. Groves and Sons Co.**, 509 Wesley Temple Building, Minneapolis, Minn., and **J. L. McLaughlin**, 327 Ford Building, Great Falls, Mont. The work is situated on the Grand River about 15 mi. south of Lemmon, S. D., and 1,000 days are allowed for completion. The dam is to be an earthfill structure about 145 ft. in height above the lowest foundation and about 12,900 ft. long at the crest.

A $3,336,510 contract for grading and appurtenant work for the westerly addition to Los Angeles Municipal Airport has been awarded to three California firms as joint venturers by the Los Angeles City Board of Airport Commissioners. The firms are **N. M. Ball Sons**, P. O. Box 430, Berkeley; **Harms Bros.**, 5261 Stockton Blvd., Sacramento, and **H. Earl Parker**, 12th and F Streets, Marysville. The work consists of almost 12,000,000 cu. yd. of excavation and appurtenant work and includes the construction of a reinforced concrete bridge across Lincoln Blvd.

Peter Kiewit Sons' Co., 1024 Omaha National Bank Building, Omaha, Neb., have been awarded a $7,494,380 contract by the Bureau of Reclamation for the construction of earthwork, concrete lining and structures, Sta. 4826 to Sta. 6076 of the Friant-Kern Canal on the Central Valley Project in California. The work is situated about one mile east of Lindsay to 10 mi. southwest of Porterville. Completion time is 700 days.

The Corps of Engineers, Omaha District, Omaha, Neb., have awarded two large contracts for the outlet works at Fort Randall Reservoir near Lake Andes, S. Dak. **Silas Mason Co.**, Shreveport, La., was awarded the $8,585,808 contract on Schedule B for tunnel work, and **McCarthy Improvement Co.**, Davenport, Iowa, was awarded the $10,977,836 contract on Schedule C for the regulating gate structure, tunnel terminal structure, powerhouse substructure, etc. All bids on Schedule A were rejected as too high and will be submitted for re-advertisement.

Hubert H. Everist, Sr., P. O. Box 100, Westley, Calif., on a bid of $3,679,107, was awarded the contract by the Bureau of Reclamation for construction of earthwork, concrete lining and structures from Sta. 1366 to Sta. 2149 on the Delta-Mendota Canal of the Central Valley Project in California. The work is situated about 2 mi. west of Patterson to 4 mi. west of Newman, and will require 750 days for completion.

Guy F. Atkinson Co., P. O. Box 593, South San Francisco, have been awarded a $914,158 contract by the California Division of Highways for construction of two reinforced concrete overpasses and a portion of the North Hollywood Freeway between Temple St. and Sunset Blvd. in Los Angeles.

Smith Hi-Line Co., Nashville, Tenn., with a $1,025,096 bid, were awarded a contract by the Bureau of Reclamation for construction of the Casper-Gering 115-kv. transmission line on the Missouri Basin Project. Casper is in Wyoming and Gering is in Nebraska. 500 calendar days are allowed for completion.

C. F. Lytle Co. and **Green Construction Co.** of Des Moines, Iowa, with a bid of $8,679,142, were awarded the contract by the Civil Aeronautics Administration for construction of the International Express Airport, located southwest of Anchorage, Alaska. The work involves the construction of two paved runways, one 7,200 ft. by 500 ft. and a northwest-southeast strip of 8,600 ft. length; 1,200,000 sq. ft. of paved parking areas, and 15,000 sq. ft. of taxiways.

Allis-Chalmers Manufacturing Co. of Milwaukee, Wis., has been awarded a $685,200 contract for the design, manufacture and delivery of one 38,889 kva. alternating-current generator for use in the Fort Peck Power Plant near Glasgow, Mont.

Pacific Alaska Development Co. of Seattle, Wash., will begin work March 1 on a $15,000,000 program of construction of housing and warehouse facilities in two Alaskan cities, Anchorage and Juneau. **Lewis Construction Co.** will build all of the structures, consisting of a number of 20-unit apartment buildings of reinforced concrete construction.

Harold S. Wright & Co., 407 Yale North, Seattle, Wash., were awarded a general contract for construction on a $868,860 department store at Northgate, a suburban center north of Seattle. The building will be 2 stories of concrete, steel and stone construction. Wright & Co. also received the contract for land improvement and concrete structural work on all the buildings in the shopping center. The Suburban Co. of Seattle are sponsors of the project.

W. C. Smith, Inc., Portland, Ore., has been let a general contract for construction of 180 houses at Roseburg, Ore., for Roseburg Homes, Inc. Total cost of the project is estimated at $1,500,000.

Cahill Bros., 206 Sansome St., San Francisco, at $2,507,570, were awarded a contract by the Roman Catholic Archbishop of San Francisco for construction of a boys' parochial high school at Phelan and Judson Avenues in San Francisco. The group of buildings will be of reinforced concrete with some brick veneer.

A $1,587,871 contract has been awarded to **Mesa Constructors** of Grand Junction, Colo., for construction of a reinforced concrete, brick and stone hospital at 7th and Patterson Streets in Grand Junction. The 6-story St. Mary's Hospital will have 132-bed capacity. The project is sponsored by the Sisters of Charity of Leavenworth of Xavier, Kan.

Robert E. McKee, P. O. Box 652, Albuquerque, N. M., has been awarded a $1,572,000 contract by the Albuquerque District Corps of Engineers for construction of troop housing at Sandia Base. The work includes construction of 2 reinforced concrete frame buildings, connection of utilities, and provision of sanitary sewers, water distribution facilities, access roads, underground electric and telephone systems, etc.

A $942,800 contract has been awarded to **Cahill Bros.**, 206 Sansome St., San Francisco, for construction of a planetarium adjacent to Steinhart Aquarium in Golden Gate Park, San Francisco. It will be a one-story structure with steel frame and reinforced concrete walls. The work is sponsored by the California Academy of Sciences.

Marwell Construction Co., Ltd., of Vancouver, B. C., was awarded the general contract for erecting the first unit of a new nurses' residence for Vancouver General Hospital on a bid of $1,086,326. The building will be a 9-story and basement reinforced concrete structure measuring 36 by 200 ft.

All bids for construction of the 200-bed Veterans Administration Hospital at San Diego, Calif., have been rejected because funds were not available. **Griffith Co.**, 1060 S. Broadway, Los Angeles, Calif., submitted the low bid for the project at $4,030,000.

Thomas Bate & Sons Co., 2311 10th St., Denver, Colo., at $1,447,000, submitted the low bid to the City and County of Denver for additions and alterations to the municipality's existing sewage treatment plant. Award of the contract to the firm is expected since their bid was below the engineers estimate of $1,461,000.

W. K. McIlyar, Dallas, Tex., submitted the low bid of $3,599,623 to the Tulsa District, Corps of Engineers, Tulsa, Okla., for construction of spillway and outlet works at Tenkiller Ferry Dam on the Illinois River about 7 mi. northeast of Gore, Okla. Construction of a portion of the earth embankment at the site is now proceeding under a separate contract.

Russ Mitchell, Inc., and **Wyche & Bruce**, contractors of Houston, Texas, have been awarded a $1,899,952 contract by the Galveston District Corps of Engineers, Galveston, Tex., for construction of the spillway and outlet works for Grapevine Dam and Reservoir on Denton Creek near Grapevine, Tex. 1,000 calendar days are allowed for completion.

Tilt-Deck Trailers with Hoist Control

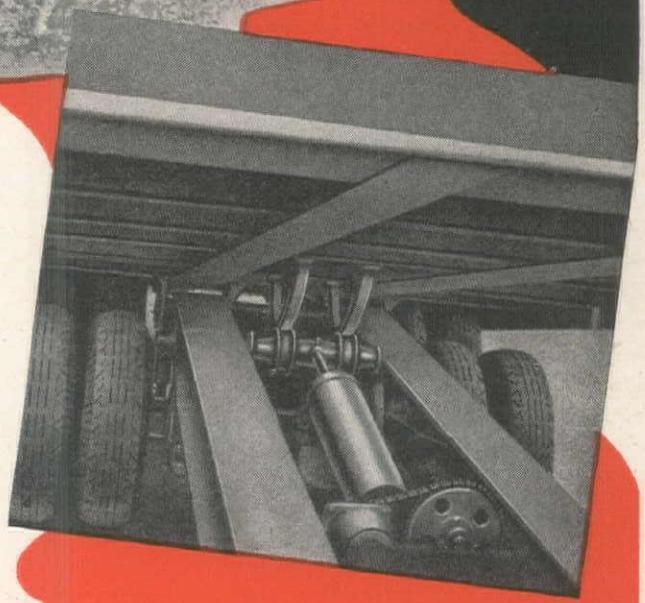
NEW ADDITION TO FRUEHAUF LINE

In response to popular demand, the Fruehauf line of Machinery Trailers now includes a tilt-deck model equipped with *hydraulic hoist.* This model is designed especially for self-loading vehicles such as tractors, dozers and track-laying "cats."

The Fruehauf hoist-controlled tilt-deck Trailer can be operated either with or independent of the towing unit. The speed of deck elevation and depression is under positive control at all times. Loading and unloading are absolutely safe.

Fruehauf Tilt-Deck Trailers are available in payload capacities up to 25 tons. They are equipped with drawbar to hook to a truck or as the Semi-Trailer type with coupler. They have a rubber-insulated walking-beam under-construction that insures even load distribution on tires. Bearings are taper roller and well over-size.

The new Fruehauf Tilt-Deck Trailers are an advanced means for convenient, quick, safe mobile machinery transport. Call your nearest Factory Branch for complete details.



Hydraulic Lifting and Lowering Device

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant — Los Angeles

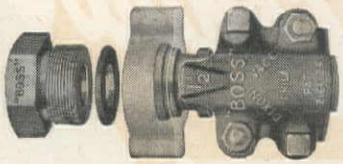
SALES AND SERVICE — LOS ANGELES • SAN FRANCISCO • SACRAMENTO • PORTLAND • SEATTLE
FRESNO • SAN DIEGO • PHOENIX • SALT LAKE CITY • EL PASO • SPOKANE • BILLINGS
ALBUQUERQUE • DENVER

PLAIN HORSE SENSE — YOU CAN PULL FAR MORE THAN YOU CAN CARRY!

"ENGINEERED TRANSPORTATION" Fruehauf Trailers

Hear Harrison Wood, Interpreter of World Events, Every Sunday Afternoon over ABC. Consult Your Local Paper!

Always Reliable
...FOR EFFICIENT, LOW-COST SERVICE



"BOSS"
WASHER TYPE
HOSE COUPLING
STYLE W-16

For Water, Steam, Air, Oil, Gas and Hydraulic Lines.

The coupling that has led the way in making the name DIXON synonymous with quality and reliability. Designed and built to combine great strength and durability with ease in connecting and disconnecting. Tightening of free-swiveling wing nut insures a completely leakproof seal. Powerful, full-circumference grip of the "BOSS" Offset and Interlocking Clamp precludes all possibility of blow-offs. Furnished in ¼" to 6" sizes, with male or female spuds. Cadmium plated for protection against rust and corrosion.

✦ ✦ ✦

For *washerless* couplings of otherwise identical design and construction, specify "G J-Boss" Ground Joint Hose Couplings, Style X-34.

✦ ✦ ✦

For companion male couplings in connection with both the above, specify "Boss" Male Couplings, Style MX-16.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods

IF IT'S A DIXON PRODUCT
IT'S DEPENDABLE

DIXON
VALVE & COUPLING CO.
Main Office and Factory: PHILADELPHIA, PA.
BRANCHES: CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

UNIT BID SUMMARY

Dam . . .

Montana—Lewis & Clark Co.—Bur. of Recl.—Concrete Gravity

Canyon Constructors, consisting of Brown & Root, Inc., of Houston, Texas; Wunderlich Contracting Co., Jefferson City, Mo.; the Griffith Co. of Los Angeles, Calif., and J. C. Maguire & Co. of Los Angeles as joint venturers, submitted the low bid of $12,940,845 to the Bureau of Reclamation at Helena, Mont., for construction of Canyon Ferry Dam and Power Plant on the Missouri River about 16 mi. northeast of Helena. Completion time for the project will be 1400 days. The dam will be of the concrete gravity type, about 1,000 ft. long at the crest and with a maximum height of 220 ft. above foundation. Foundation rock will be drilled and solidified by shallow grouting. Concrete of the dam will be divided into blocks by means of vertical-transverse contraction joints. The spillway will consist of an overflow section in the central portion of the dam and four radial gates, 34.5 high by 51 ft., will be provided. Four 84-in. diameter outlet conduits will be provided in the central portion of the dam. The Power Plant will be located at the top of the dam. It will be of reinforced concrete construction and will accommodate three main generating units, each consisting of a 18,750-kva. vertical shaft generator with a direct-connected main exciter driven by a 23,500-h.p. turbine. Bid price for concrete in the dam alone, was $4,800,000, more than one-third of the total low bid. A picture of the dam and power plant appeared in the January, 1949, issue of *Western Construction News*. Unit bids for the four firms follow. All bids were rejected as too high.

(1) Canyon Constructors (Brown & Root, Inc., Wunderlich Contracting Co., Griffith Co. and J. C. Maguire & Co.) $12,940,845
(2) Morrison-Knudsen Co., Inc. $13,681,877
(3) Al Johnson Construction Co., Winston Bros. Co. and United Construction Co. $14,185,161
(4) Guy F. Atkinson Co., Bressi & Bevanda Constructors, Inc., A. Teichert & Son, Inc., and David G. Gordon $15,332,217

	(1)	(2)	(3)	(4)
Lump sum, diversion and care of river during const. and unwatering foundations	$400,000	$700,000	$385,900	$570,000
267,000 cu. yd. excav., common, for dam and power plant	6.00	4.50	5.70	6.90
97,000 cu. yd. excav., rock, for dam and power plant	6.00	4.50	5.70	6.90
500 cu. yd. excav., all classes, in foundation tunnels	50.00	50.00	35.00	52.50
700 cu. yd. excav., all classes, in shafts in foundtn., faults and seams	100.00	80.00	80.00	70.00
Lump sum, constructing river crossing.				
90,000 cu. yd. excav., all classes, for roadway	5.00	2.50	2.60	2.10
190 cu. yd. excav., common, for roadway structs.	5.00	3.80	3.80	6.00
180 cu. yd. excav., rock, for roadway structs.	10.00	7.60	10.00	12.50
700 cu. yd. excav., all classes, for water pipe trench	10.00	11.00	11.00	10.00
17,000 lin. ft. drilling line holes for rock excav.	1.50	1.00	1.25	.75
9,300 cu. yd. rock fill	1.00	1.50	1.50	2.25
6,500 cu. yd. backfill for parking areas	1.00	1.90	.75	2.25
6,500 cu. yd. compacting backfill for parking areas	2.00	1.80	1.55	6.00
570 cu. yd. backfill for roadway structures	1.00	1.90	1.40	3.00
570 cu. yd. compacting backfill for roadway structures	5.00	3.70	7.00	7.00
25,000 sta. cu. yd. overhaul of roadway materials	.10	.02	.04	.04
2,400 cu. yd. dumped riprap	3.00	2.50	2.20	3.00
500 cu. yd. riprap for roadway	5.00	5.00	10.00	6.00
875 sq. yd. grouted paving behind spillway retaining wall	15.00	10.00	7.00	10.50
1,075 sq. yd. grouted paving for tailrace	30.00	16.50	9.00	13.50
50 cu. yd. coarse gravel for fire-quenching pits	10.00	10.00	5.00	12.00
2,500 tons gravel or crushed-stone roadway surfacing	3.00	5.00	2.00	4.00
50 sta. finishing roadway	100.00	50.80	28.00	60.00
15,000 lin. ft. drilling grout holes in stage betw. depths of 0 foot and 35 feet	2.00	3.50	3.00	2.90
6,300 lin. ft. drilling grout holes in stage betw. depths of 35 feet and 60 feet	2.00	3.50	3.00	2.90
10,600 lin. ft. drilling grout holes in stage betw. depths of 60 feet and 110 feet	2.00	4.00	3.00	3.05
3,100 lin. ft. drilling grout holes in stage betw. depths of 110 feet and 160 feet	2.00	4.00	3.00	3.05
600 lin. ft. drilling grout holes in stage betw. depths of 160 feet and 210 feet	2.00	4.00	3.00	3.30
500 lin. ft. core drilling NX holes in stage betw. depths of 0 foot and 50 feet	7.00	8.80	9.00	6.60
500 lin. ft. core drilling NX holes in stage betw. depths of 50 feet and 100 feet	7.00	8.80	9.00	6.60
500 lin. ft. core drilling 5½-in. diam. holes not more than 30 feet deep	20.00	15.00	21.00	20.00
43,000 lb. furn. and placing metal pipe and fittings for foundation grouting and drainage	.80	.70	.85	.52
18,000 cu. ft. pressure-grouting foundations	2.00	4.30	2.50	1.70
36,000 cu. ft. pressure-grouting foundations with packers	2.00	4.90	2.50	1.85
37,000 lb. installing metal tubing and fittings for grouting contraction joints	.60	.45	.80	.60
5,100 cu. ft. pressure-grouting contraction joints and cooling systems	3.00	7.60	2.50	3.00
Lump sum, reprocessing 100 cu. ft. of cem. for contract'n jt. grouting	$7,500	$4,000	$12,500	$4,500
2,100 cu. ft. reprocessing cem. for contraction-jt. grouting	1.50	2.80	2.20	1.10
3,100 lin. ft. drilling drainage holes in stage betw. depths of 0 ft. and 25 ft.	6.00	8.00	9.00	6.30
3,000 lin. ft. drilling drainage holes in stage betw. depths of 25 ft. and 50 ft.	6.00	8.00	8.00	6.30
2,400 lin. ft. drilling drainage holes in stage betw. depth of 50 ft. and 75 ft.	6.00	8.50	7.50	6.60
200 lin. ft. drilling drainage holes in stage betw. depth of 75 ft. and 100 ft.	6.00	8.50	7.50	6.60
700 lin. ft. furn. 6-in. diam. sewer pipe and const. drains with uncemented joints	3.00	2.50	4.80	2.50
1,200 lin. ft. 12-in. diam. sewer pipe and const. drains with uncemented joints	4.00	5.70	10.00	4.50
530 lin. ft. furn. 18-in. diam. sewer pipe and const. drains with uncemented joints	7.00	10.00	13.00	6.00
530 lin. ft. furn. and laying 6-in. diam. sewer pipe with cemented joints	2.00	2.30	4.80	2.40
100 lin. ft. furn. and laying 12-in. diam. sewer pipe with cemented joints	4.00	5.00	10.00	5.40
250 lin. ft. furn. and laying 12-in. diam. split sewer pipe with cemented joints	4.00	5.70	10.00	4.00
2,900 lin. ft. furn. and laying 24-in. diam. split sewer pipe with cemented joints	5.00	11.50	14.00	4.50
220 lin. ft. furn. and laying 36-in. diam. split sewer pipe with cemented joints	15.00	22.00	20.00	9.00

(Continued on next page)

Cherry Creek Dam is a "Caterpillar" Show

Here are a few of the 39 "Caterpillar" Diesel units on the Phelps-Wunderlich-James contract at Cherry Creek Dam.

This "Caterpillar" Diesel No. 12 Motor Grader is doing a grading job on the fill. Cherry Creek Dam project.

"Caterpillar" Diesel equipment—39 pieces of it—is at work on the Phelps-Wunderlich-James contract at Cherry Creek Dam, near Denver, Colorado. Not just the earthmoving but everything else, from lighting the job to wetting down the fill, is handled right by the big yellow machines.

Track-type "Caterpillar" Diesel Tractors, with scrapers, 'dozers and sheep's-foot tampers, do the bulk of the earthmoving and compacting. But rubber-tired DW10 Tractors are also there to handle the long hauls and pull the giant sprinklers. No. 12 Motor Graders do the finishing and maintain the haul roads, and a "Caterpillar" Diesel Electric Set supplies power for the lighting that permits 3-shift, 24-hour operation.

Here's an example of the efficient use of standardized, zoned equipment—all of it built by one reliable manufacturer—all serviced by one dependable dealer.

CATERPILLAR TRACTOR CO. • San Leandro, Calif.; Peoria, Ill.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

WRITE, WIRE or PHONE
FOSTER
. . . 1 TON OR 1,000
SOLD UNDER FOSTER'S WRITTEN GUARANTEE SINCE 1902

STEEL SHEET PILING
Rental
NEW AND USED
(First class re-drivable condition)

RAILS and TRACK ACCESSORIES

RAILS—New and Relaying
TRACK ACCESSORIES—
Frogs, Switches, Spikes, etc.

NEW PIPE
Various Sizes
Structural and Fabricated

RAIL TYPE FENCE POSTS

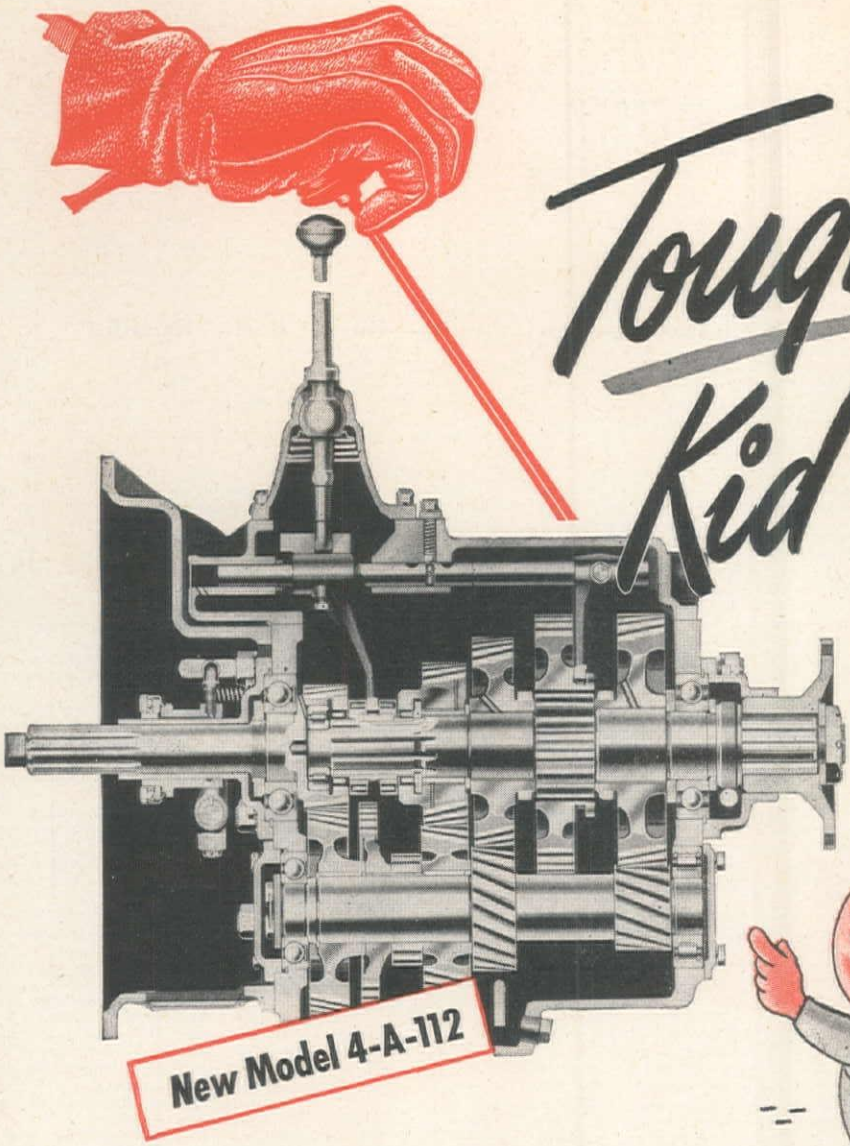
WIRE ROPE

Foster's New Interlocking Light Weight Corrugated Steel Sheet Piling

L. B. FOSTER CO.
P. O. Box 1647
PITTSBURGH 30, PA.
11 Park Place
NEW YORK 7, N. Y.
CHICAGO 4 - HOUSTON 2
SAN FRANCISCO 4
ADDRESS THE FOSTER OFFICE NEAREST YOU!

15,000	lb. furn. and placing metal pipe and fittings for formed drains	1.00	.75	.80	.5
100	lin. ft. drilling weep holes	5.00	3.80	2.00	7.5
125	cu. yd. porous concrete	40.00	50.00	50.00	75.0
65	lin. ft. furn. and laying 15-in. diam. concrete pipe	10.00	6.00	13.00	6.0
265	lin. ft. furn. and laying 18-in. diam. concrete pipe	10.00	7.60	14.00	6.0
320	lin. ft. furn. and laying 24-in. diam. concrete pipe	15.00	10.00	16.00	10.5
180	lin. ft. furn. and laying 42-in. diam. concrete pipe	30.00	25.00	28.00	27.0
2,900	lin. ft. drilling holes for anchor bars and grouting bars in place	3.00	2.90	1.80	2.0
400,000	cu. yd. concrete in dam	12.00	13.15	14.00	16.0
220	cu. yd. concrete foundation tunnel lining	60.00	90.00	85.00	102.0
700	cu. yd. concrete in shafts in foundation faults and seams	30.00	31.00	15.00	30.0
2,490	cu. yd. concrete in spillway bridge piers	30.00	40.00	45.00	44.2
270	cu. yd. concrete in spillway bridge	60.00	100.00	150.00	100.0
4,900	cu. yd. concrete in spillway training walls	30.00	38.00	45.00	49.5
5,000	cu. yd. concrete in spillway retaining walls	25.00	26.70	40.00	26.6
26,700	cu. yd. concrete in spillway apron	16.00	17.80	18.00	18.5
3,470	cu. yd. concrete in trashrack structures	95.00	100.00	110.00	94.0
140	cu. yd. concrete in elevator tower	100.00	130.00	150.00	192.0
390	cu. yd. concrete in sidewalks, curbs, and parapets	75.00	80.00	85.00	125.0
310	cu. yd. concrete backfill in shafts and adits in dam	30.00	28.00	22.00	90.0
5,200	cu. yd. first-stage concrete in powerplant substructure	20.00	27.00	27.00	43.5
5,100	cu. yd. first-stage conc. in powerplant intermediate struct.	40.00	55.00	80.00	74.0
2,850	cu. yd. first-stage concrete in powerplant superstruct.	80.00	100.00	110.00	117.5
4,700	cu. yd. second-stage conc. in powerplant struct.	20.00	37.00	30.00	35.0
350	cu. yd. concrete in blockouts	100.00	100.00	150.00	135.0
3,900	cu. yd. conc. in gravity retaining walls for parking areas	25.00	30.00	35.00	30.5
315	cu. yd. conc. in cantilever retaining walls for parking areas	60.00	90.00	90.00	75.0
20	cu. yd. concrete in roadway structures	100.00	120.00	130.00	110.0
4,600,000	lb. furn. and placing reinforcement bars	.14	.14	.15	.15
180	intersections insulating reinf. bars and elect. metal conduit	5.00	2.15	.65	2.2
360,000	cu. yd. cooling concrete	.30	.76	.55	.6
400,000	lb. placing met. tubing and fittgs. for conc. cooling system	.30	.57	.23	.4
140	recesses finishing lighting recesses	20.00	17.80	6.50	9.0
400	lin. ft. constructing control joints	5.00	5.20	2.50	6.0
800	sq. ft. furn. and placing resilient-type joint filler	2.00	2.35	.50	1.5
250	sq. ft. furn. and placing preformed bitum. joint filler	2.00	1.50	.90	1.5
10,000	sq. ft. furn. and placing corkboard joint filler	2.00	1.10	.95	1.3
400	lin. ft. const. asphalt seals in power plant	10.00	15.25	5.50	17.0
3,000	lin. ft. placing rubber water stops	3.00	3.80	2.50	2.2
600	lin. ft. installing rubber facing strips	2.00	1.80	2.00	1.5
200	lin. ft. installing metal facing strips	2.00	1.85	1.50	2.2
5,100	lin. ft. constructing asphalt seals in dam	10.00	8.90	3.50	12.0
2,800	lin. ft. furn. and placing metal grout groove covers	2.00	1.30	2.30	1.9
16,000	lin. ft. furn. and placing metal sealing strips in dam	2.00	3.20	2.50	3.7
2,000	lin. ft. furn. and placing metal seals in horizontal const. joints in power plant	3.00	3.80	2.50	3.7
3,800	sq. ft. placing room insulation	.20	.25	1.00	.3
4,000	sq. ft. placing coal-tar-saturated-felt roofing	.30	.32	1.10	.3
18,500	sq. ft. placing membrane waterproofing	.30	.63	.80	.6
1,100	lin. ft. installing flashing and cants for membrane waterproofing	2.00	2.55	1.30	2.2
8,000	sq. yd. furn. and applying each coat of damp-proofing	.80	.45	1.90	.9
4,600	sq. yd. bonded concrete floor finish	5.00	7.60	7.50	7.0
550	lin. ft. concrete wall base	1.00	2.60	4.50	2.2
520	sq. ft. terrazzo floors	5.00	6.00	6.00	4.0
100	lin. ft. terrazzo cove bases	5.00	5.10	6.00	7.5
80	lin. ft. terrazzo wall bases	5.00	5.10	6.00	7.5
1,900	sq. ft. installing glass-block panels	3.00	4.75	6.00	4.5
570	sq. ft. furn. and installing 7/16-in. thick structural glass wainscots	10.00	5.70	2.00	6.0
80	sq. ft. furn. and installing 7/8-in. thick struct. glass toilet-stall partitions	12.00	6.60	4.00	7.5
30	sq. ft. furn. and installing 1¼-in. thick struct. glass urinal partition and toilet-stall stiles	20.00	31.00	8.00	30.0
30	sq. ft. furn. and installing wood toilet-stall doors	10.00	11.50	8.00	9.0
1,100	sq. ft. furn. and installing metal room partitions	10.00	4.80	1.00	15.0
30	lin. ft. furn. and installing metal toilet-stall partitions	20.00	43.80	5.50	30.0
3,100	sq. ft. furn. and install. suspended acoustical-unit ceilings	3.00	3.45	1.50	3.0
18,000	lbs. installing sump pumps and sump eductors	.10	.25	.18	.1
127,000	lbs. installing metal pipe, fittings, and valves less than 6 in. in diam.	.25	.33	.50	.3
312,000	lbs. installing metal pipe, fittings, and valves 6-in. and larger in diam.	.20	.30	.30	.2
542,000	lbs. installing frames and guides for bulkhead and fixed-wheel gates and guides for stop logs	.15	.11	.17	.1
472,000	lbs. installing fixed-wheel and bulkhead gates	.10	.09	.11	.07
63,000	lbs. installing fixed-wheel gate hoists	.10	.10	.11	.0
6,000	lbs. installing control apparatus and piping for fixed-wheel gates	.50	.47	.45	.7
260,000	lbs. installing 77-in. outlet gates and cast-iron conduit and bellmouth sections	.10	.07	.11	.0
1,060,000	lbs. installing radial gates	.07	.10	.11	.1
300,000	lbs. installing radial-gate hoists	.07	.10	.09	.07
514,000	lbs. installing cranes	.05	.06	.06	.04
23,000	lbs. installing embedded metal frames for stop-log slots, embedded metalwork for gate-slot closures, and bearing plates for trashracks	.15	.15	.14	.1
1,075,000	lbs. installing trashrack logs and lighting beam, and gate-slot closures	.04	.06	.08	.0
123,000	lbs. installing track rails	.06	.07	.08	.0
250,000	lbs. erecting structural-steel roof framing	.08	.07	.09	.0
380,000	lbs. erecting structural steel in spillway bridge	.05	.06	.08	.0
1,500	lbs. installing fire-hose and service cabinets	.50	.04	1.10	1.1
675,000	lbs. installing penstocks, pumping intake, and outlet conduit liners	.10	.12	.15	.1
1,700	lbs. installing ice-prevention air system	1.00	.45	.80	1.2
3,600	lbs. installing metal inserts	.50	.75	.70	.4
6,000	lbs. installing embedded metal frames for openings in floors, decks, and walls	.50	.33	.36	.3
1,100	sq. ft. installing metal accordion doors	2.00	3.30	5.00	6.0
750	sq. ft. installing metal swinging doors	3.00	3.80	5.00	3.0
60	sq. ft. installing metal fire doors	5.00	3.80	5.00	4.5
60	sq. ft. furn. and installing metalsash windows	8.00	2.90	8.00	9.0
23,000	lbs. installing oil storage tanks	.15	.15	.16	.0
52,000	lbs. installing metal stairways and handrails	.30	.25	.45	.2
2,500	lin. ft. installing aluminum railings	3.00	2.70	3.00	3.7
3,200	lin. ft. furn. and constructing wire-cable guard fence	4.00	3.80	2.60	3.0
44,000	lbs. installing miscellaneous metalwork	.50	.24	.70	.4
4	lavatories furn. and installing lavatories	150.00	175.00	200.00	135.0
4	closets, furnishing and installing water closets	150.00	145.00	200.00	135.0
3	urinals, furnishing and installing urinals	150.00	170.00	200.00	190.0
1	sink, furnishing and installing service sink	150.00	215.00	200.00	190.0

(Continued on next page)



Tough Kid Brother

New Four-Speed Version of Fuller's Proved Model 5-A-1120

"Truck-killer" hauls that call for sustained low-gear operation are made to order for the new Model 4-A-112 Fuller Transmission—a four-speed version of Fuller's extra-large, heavy-duty "1120" series. Model 4-A-112 is the outgrowth of Fuller's success with its five-speed Model 5-A-1120.

Helical gears in all forward ratios give Model 4-A-112 capacity to operate in low for long periods of time. The high capacity of helical gears results from the large tooth areas which are always in contact.

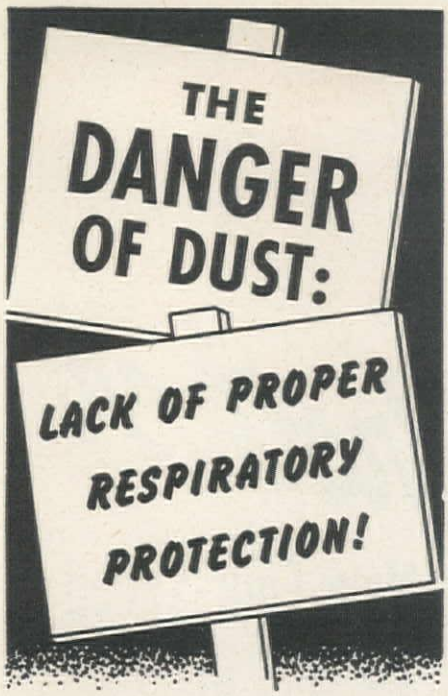
Gears in Model 4-A-112 are engaged easily by sliding clutches . . . large bearings insure long, trouble-free operation.

Used with a three-speed Fuller Auxiliary, it gives you high capacity, long wear-life, easy shifts and quiet operation through as many as 12 forward and three reverse speeds.

FULLER MANUFACTURING COMPANY, TRANSMISSION DIVISION
KALAMAZOO 13F, MICHIGAN
Unit Drop Forge Division, Milwaukee 1, Wisconsin

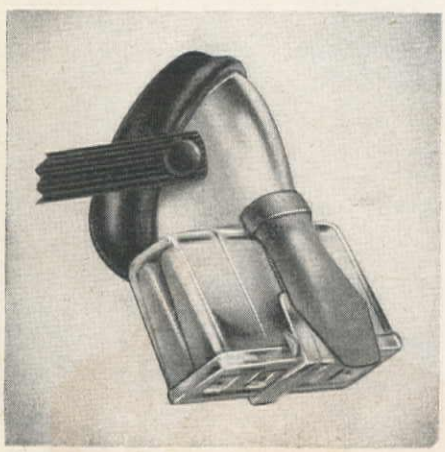
WESTERN DISTRICT OFFICE (SALES & SERVICE)
1060 East 11th Street, Oakland 6, California

Fuller TRANSMISSIONS



Dust is an industrial hazard only as long as workers are without approved respiratory protection. U.S. Bureau of Mines approved McDonald Dustfoe Respirator completely eliminates the dangers of pneumoconiosis-producing dusts and mists. Light, comfortable, serviceable — does not interfere with working freedom.

McDonald
DUSTFOE
RESPIRATOR



Write for circular.

B. F. McDONALD CO.

Manufacturers & Distributors of Industrial Safety Equipment

Safety FROM HEAD TO FOOT

5102 South Hoover Street
Los Angeles 37, California
Other Offices in San Francisco & Houston

2 cabinets, furnishing and installing shower cabinets	200.00	340.00	250.00	150.00
1 heater, istalling storage water heater	100.00	75.00	400.00	75.00
2 coolers, installing electric drinking-water coolers	100.00	75.00	550.00	75.00
12,400 lin. ft. installing embedded electrical metal conduit 1¼ in. or less in diam.	1.50	1.80	1 60	1.65
12,200 lin. ft. installing embedded electrical metal conduit larger than 1¼ in. and not larger than 3 in. in diam.	2.00	1.95	2.30	1.95
200 lin. ft. installing embedded electrical metal conduit larger than 3 in. and not larger than 6 in. in diam.	3.00	4.75	5.50	4.50
1,500 lin. ft. installing embedded non-metallic conduit 2 in. and larger in diam.	2.00	1.80	2.40	3.00
4,500 lbs. installing ground wires and ground rods	1.50	.75	.80	1.50
3,000 lbs. installing crane runway conductors	.80	1.00	.80	1.15
3,000 lin. ft. installing electrical cable for resistance thermometers, strain meters and joint meters embedded in conc.	1.00	2.90	.80	1.15
1,700 ton transporting matls. of all kinds for the Govt. or its agents, other than the contractor, betw. the railhead and the dam site	10.00	15.00	10.00	18.00

North Dakota—Stark County—Bur. of Recl.—Earthfill

Adler Construction Co., Madras, Oregon, submitted a low bid of $1,034,071 to the Bureau of Reclamation, Glen Ullin, North Dakota, for the construction of Dickinson Dam, Heart River Unit, North Dakota, Missouri Basin Project. Principal features involved are an earth-fill dam across the Heart River and a combined spillway and outlet works structure at the right abutment. The dam will be about 2,275 ft. long at the crest and will have a maximum height of about 49 ft. above the river channel. The spillway and outlet works structure will consist of an approach channel; an uncontrolled open-channel spillway 200 ft. wide; a stilling basin, and outlet works adjacent to the left wall of the spillway consisting of a trashrack, a gate structure, a 24-in. outlet pipe, and a valve box. The work is situated on the Heart River about 2 mi. west of Dickinson, North Dakota. A total of 800 days will be allowed for completion of the project. Unit bids were submitted by the following:

(A) Adler Construction Company.....$1,034,071
(B) Vinnell Company 1,280,007
(C) S. J. Groves & Sons and J. L. McLaughlin..... 1,312,952
(D) Northwestern Engineering Co.....$1,452,913
(E) C. F. Lytle Construction Co. and Green Construction Co..... 1,475,264

(1) lump sum diversion and care of river during construction and unwatering foundations;
(2) 17,000 cu. yd. excavation, stripping borrow areas;
(3) 108,000 cu. yd. excavation, all classes, for spillway and outlet works;
(4) 110,000 cu. yd. excavation, all classes, for foundation of dam;
(5) 325,000 cu. yd. excavation, earthfill material, in borrow areas and transportation to dam embankment;
(6) 22,000 cu. yd. excavation, sand and gravel, in gravel borrow areas and transportation to dam embankment;
(7) 35,000 cu. yd. excavation, transportation, and placement of materials in railroad embankments;
(8) 1,200 cu. yd. gravel bedding for rip-rap in railroad embankments;
(9) 264,000 lbs. furnishing and driving steel sheet piling;
(10) 2,700 cu. yd. procuring riprap from source A, transporting, and placing on railroad embankments;
(11) 282,000 cu. yd. earthfill in dam embankment;
(12) 700 cu. yd. tamping earthfill;
(13) 22,000 cu. yd. sand and gravel on upstream slope of dam embankment;
(14) 1,300 cu. yd. procuring, transporting, and placing riprap from source A, for rock riprap on upstream slope of embankment and for dumped riprap in spillway outlet channel;
(15) 2,000 cu. yd. procuring, transporting, and placing riprap from source B, for rock riprap on upstream slope of dam embankment and for dumped riprap in spillway outlet channel;
(16) 10,200 cu. yd. procuring, transporting, and placing riprap from source C, for rock riprap on upstream slope of dam embankment and for dumped riprap in spillway outlet channel;
(17) 7,200 cu. yd. backfill;
(18) 5,000 cu. yd. topsoil for seeding;
(19) 14,000 sq. yd. seeding;
(20) 325 mil. gal. water for seeded areas;
(21) 1,300 cu. yd. furnishing and placing gravel filter under spillway floor;
(22) 25 cu. yd. continuous gravel drain back of spillway walls;
(23) 325 lin. ft. furnishing 4-in. diameter sewer pipe and constructing drains with uncemented joints embedded in gravel;
(24) 210 lin. ft. furnishing 6-in. diameter sewer pipe and constructing drains with uncemented joints embedded in gravel;
(25) 1,700 lin. ft. furnishing 8-in. diameter sewer pipe and constructing drains with uncemented joints embedded in gravel;
(26) 220 lin. ft. furnishing 12-in. diameter sewer pipe and constructing drains with uncemented joints embedded in gravel;
(27) 650 lin. ft. furnishing 8-in. diameter sewer pipe and constructing drains with uncemented joints embedded in gravel;
(28) 750 lin. ft. furnishing 12-in. diameter sewer pipe and constructing drains with uncemented joints embedded in gravel;
(29) 50 lin. ft. furnishing and laying 4-in. diameter sewer pipe with cemented joints;
(30) 70 lin. ft. furnishing and laying 8-in. diameter sewer pipe with cemented joints;
(31) 350 lin. ft. furnishing and laying 12-in. diameter sewer pipe with cemented joints;
(32) 30 lin. ft. furnishing and laying 48-in. diameter reinforced concrete pipe;
(33) 82 lin. ft. furnishing and laying 72-in. diameter reinforced concrete pipe;
(34) 10,450 bbls. furnishing and handling cement;
(35) 4,800 cu. yd. concrete in spillway floors;
(36) 2,460 cu. yd. concrete in spillway, except floors;
(37) 50 cu. yd. concrete in paved gutters;
(38) 672,000 lbs. furnishing and placing reinforcement bars;
(39) 1,100 lin. ft. furnishing and placing metal sealing strips;
(40) 80 lin. ft. placing rubber water stops;
(41) 50 sq. ft. furnishing and placing joint fillers;
(42) 1,300 lbs. installing cast iron slide gate and hoist;
(43) 1,100 lbs. installing metal pipe, fittings, and valves less than 6 in. in diameter;
(44) 19,000 lbs. installing metal pipe, fittings, and valves 6 in. and larger in diameter;
(45) 5,300 lbs. installing pipe handrailing;
(46) 1,300 lbs. installing miscellaneous metalwork.

	(A)	(B)	(C)	(D)	(E)
(1)	$ 50,000	$120,000	$ 75,000	$ 45,000	$ 67,538
(2)	.40	.35	.35	.40	.422
(3)	.50	.70	.75	.90	1.42
(4)	.60	.50	.45	1.05	.547
(5)	.50	.42	.60	.38	.584
(6)	1.30	1.30	2.00	1.80	3.44
(7)	.40	.55	.40	.48	.60
(8)	1.40	1.50	1.00	3.90	2.20
(9)	.15	.14	.13	.18	.11
(10)	2.75	8.50	8.75	9.50	9.62
(11)	.31	.32	.20	.20	.255
(12)	3.20	5.00	4.50	6.80	6.80
(13)	.22	.30	.40	.70	.463
(14)	2.60	7.30	7.00	9.50	9.62
(15)	3.20	8.00	8.00	10.00	9.62
(16)	4.20	9.20	11.00	12.20	13.88
(17)	.40	.85	.35	1.00	2.20
(18)	.35	1.00	1.00	2.00	885
(19)	.11	.30	.03	.07	.05
(20)	4.00	5.00	6.00	5.40	4.00
(21)	5.00	5.60	3.00	8.00	14.00
(22)	12 00	7.50	9.00	9.50	13.00
(23)	2.50	1.20	1.50	2.50	2.00
(24)	2.80	1.70	2.00	2.70	2.20
(25)	3.25	2.10	2.50	3.00	3.00
(26)	4.00	3.00	3.00	4.00	4.00

(Continued on next page)

TIGER BRAND Field Specialist is shown here checking a cross-wind on a drum as part of equipment check to insure proper wire rope application. Even such a small cross-wind as this can cause unnecessary abrasion and reduce life of the rope.

How to stop wire rope trouble—before it starts

Here's a man who can help you plan for maximum wire rope performance. He's one of Columbia Steel Company's **Tiger Brand** Wire Rope Specialists. These skilled service engineers will give your equipment a complete check to make sure all parts are working in long-wear harmony, point out any necessary changes and recommend the proper rope to use. Sheave diameters, sheave grooves, fleet angles, loads handled, service records . . . these are just some of the items on the Specialist's check-list.

Tough **Tiger Brand** is one rope that's under constant control from raw ore right on through to the finish. It's engineered for long wear... and to make sure you get all the stamina that's put in it, you are welcome to the services of a **Tiger Brand** Specialist . . . without charge or obligation. Contact your **Tiger Brand** Distributor or any Columbia Steel Company Office.

Columbia Steel Company · San Francisco
Los Angeles · Portland · Seattle · Salt Lake City

Tiger Brand Tip

It's not good practice to have more than one layer of rope on a drum. But if this can't be helped, the added layers should not cross-wind but should wind uniformly across the drum in each succeeding layer of rope.

USS **U·S·S TIGER BRAND Wire Rope**

UNITED STATES STEEL

THESE DAYS
you need
PACIFIC 4S* WIRE SCREENS
*4S-SUPER STRENGTH SPRING STEEL

4S QUALITY PLUS...

. . . plus service that's prompt, interested, never satisfied until you are. Familiar as you may be with the rugged dependability that characterizes Pacific 4-S Wire Screen Products, we wish you'd put our service to the test, too . . . From our Engineering Service Department to your job in the field, Pacific makes research work for YOU.

Complete for Vibrators, Cones, Shakers, Cylinders . . . Be Specific —Say PACIFIC to your dealer or write us. Insist on 4-S.

PACIFIC WIRE WORKS CO.
KARL H. KAYE, President
Factory and Warehouse
4515 Sixth Ave. South, Seattle 8
SEneca 4457
"Artisans in Wire Products Since 1891"

GATKE Custom-Bilt BRAKE MATERIALS

Smooth, non-grabbing action with dependability and long wear life for every brake and clutch requirement of Construction, Excavating and Road Building Equipment. Large stock for quick shipment. Send dimensions of part with make and model of equipment for recommendation.

GATKE CORPORATION
234 N. La Salle St., Chicago 1, Ill.

(27)	3.75	3.00	3.50	3.70	4.20
(28)	4.50	4.80	5.00	4.30	5.80
(29)	2.50	1.50	1.50	3.20	1.90
(30)	3.20	2.50	2.00	3.70	3.20
(31)	4.00	3.00	4.00	4.50	5.00
(32)	22.00	38.00	22.00	27.00	28.00
(33)	45.00	70.00	40.00	53.00	60.00
(34)	7.20	9.00	7.50	7.50	6.00
(35)	27.00	35.50	40.00	48.00	41.00
(36)	44.00	53.50	65.00	81.00	58.25
(37)	44.00	30.00	65.00	68.00	80.00
(38)	.147	.16	.16	.18	.15
(39)	2.00	4.00	3.50	2.70	4.25
(40)	2.00	4.50	1.00	2.70	5.00
(41)	1.00	3.00	1.00	1.40	1.50
(42)	.20	.22	.30	.40	.25
(43)	.40	.22	.40	.50	.29
(44)	.20	.15	.20	.20	.25
(45)	.20	.18	.40	1.00	.25
(46)	.25	.22	.40	.60	.35

South Dakota—Charles Mix County—Corps of Engineers—Earthwork

Western Contracting Corporation, Sioux City, Iowa, submitted a low bid of $4,198,060 to the District Corps of Engineers, Omaha, Neb., for the excavation in the outlet works and spillway areas and construction of the embankment for Fort Randall Dam, Stage II. The site of the work is adjacent to Pickstown, on the left bank of the Missouri River. The Fort Randall Dam site is about 80 mi. northwest of Yankton, 15 mi. west of Wagner and 7 mi. south of Lake Andes. Principal features of work involve clearing in the excavation and blanket areas; excavation of overburden and shale in the area between the Outlet Works and Spillway, and the enlargement of the stilling basin and tailrace area of the Outlet Works. Work will commence on or before March 1, 1949, and should be completed about March 1, 1950. The following submitted unit bids:

(1) Western Contracting Corporation....$4,198,060
(2) Peter Kiewit Sons' Company..... 4,858,950
(3) Mittry Brothers Construction Co.....$5,867,000
(4) Government Estimate 3,968,885

		(1)	(2)	(3)	(4)
85	acres clearing	$140.00	$400.00	$200.00	$194.63
4,779,000	cu. yd. unclassified excavation above elev. 1245	0.31	0.36	0.505	0.307
148,000	cu. yd. unclassified excavation below elev. 1245	0.45	0.50	0.605	0.54
725,000	cu. yd. shale excavation	0.53	0.59	0.61	0.476
2,850,000	cu. yd. chalk excavation	0.54	0.59	0.61	0.509
2,700	square preparation of horizontal surface	30.00	20.00	50.00	12.01
360	square chalk channeling	30.00	20.00	120.00	12.01
25,000	cu. yd. stock piled boulders	1.75	3.00	2.00	2.06
3,380,000	cu. yd. rolled embankment	0.10	0.12	0.15	0.096
1,050,000	cu. yd. impervious blanket	0.06	0.10	0.10	0.085
41,000	cu. yd. pervious fill in channel	0.13	0.12	1.50	0.065
30,000	cu. yd. chalk and boulder dike	0.11	3.00	1.50	0.07
60,000	mil. gal. water for compaction	2.40	2.00	2.50	1.41
500	roller hr. addit. rolling with tamper-type roller	13.00	15.00	15.00	7.79
676	lin. ft. settlement gage pipe	15.00	40.00	6.00	13.18
Lump sum,	moving buildings and structures	$9,000.00	$25,000.00	$58,059.00	$5,368.06

Sewerage . . .

Arizona—Maricopa County—City—Treatment Plant

Mark Cockrill Contracting Co., Phoenix, Ariz., at $155,281, was low bidder before the City Clerk of Mesa for the construction of a small sewage treatment plant for the City. Unit bids were submitted by the following:

(1) Mark Cockrill Contracting Co.....$155,281
(2) J. H. Welsh & Son Contracting Co..... 174,566
(3) R. E. Bruce Construction Co..... 180,880
(4) Arizona Sand & Rock Co.....$182,844
(5) King-Hoover Construction Co..... 184,782
(6) Fitzgerald Construction Co..... 201,857

		(1)	(2)	(3)	(4)	(5)	(6)
7,300	cu. yd. trench and struct. excav.	.87	.92	1.24	1.35	1.48	2.50
830	cu. yd. class A concr.	58.18	79.50	69.00	62.67	76.12	52.00
107,000	lb. reinf. steel	.1175	.12	.12	.14	.13	.14
370	lin. ft. 8-in. cast iron B & S pipe	5.30	5.39	5.75	6.00	5.60	3.75
100	lin. ft. 6-in. cast iron B & S pipe	3.58	4.30	3.80	5.00	3.91	3.00
155	lin. ft. 4-in. cast iron B & S pipe	3.34	3.04	2.85	4.00	2.67	2.50
30	lin. ft. 8-in. cast iron flanged pipe	12.90	12.61	8.30	12.25	11.54	5.00
53	lin. ft. 6-in. cast iron flanged pipe	9.27	9.58	6.90	7.25	7.87	4.50
145	lin. ft. 4-in. cast iron flanged pipe	6.12	6.40	4.40	5.50	5.39	3.75
5,000	lb. cast iron B & S fittings	.34	.37	.44	.42	.30	3.00
4,500	lb. cast iron flanged fittings	.48	.47	.49	.56	.42	3.00
700	lin. ft. 24-in. vit. clay pipe	8.29	8.59	9.50	9.50	9.28	10.00
70	lin. ft. 21-in. vit. clay pipe	7.10	8.69	7.50	9.70	7.94	9.00
130	lin. ft. 4-in. vit. clay pipe	.90	1.35	1.50	1.35	1.45	5.00
46	lin. ft. 6-in. std. galv. steel pipe	5.19	3.61	5.40	6.00	4.73	3.25
76	lin. ft. 2½-in. extra heavy std. galv. steel pipe	3.24	2.48	3.25	1.90	2.86	3.00
55	lin. ft. 2½-in. std. galv. steel pipe	2.80	2.15	2.45	1.60	3.46	2.00
170	lin. ft. 2-in. std. galv. steel pipe	1.43	1.09	1.80	1.30	.99	1.50
150	lin. ft. 1½-in. std. galv. steel pipe	1.17	.75	1.60	1.00	.66	1.25
60	lin. ft. 1¼-in. std. galv. steel pipe	1.00	.77	1.50	.95	.52	1.25
500	lin. ft. 1-in. std. galv. steel pipe	.98	.41	1.30	.70	.46	1.00
30	lin. ft. ½-in. std. galv. steel pipe	.60	.37	1.15	.60	.32	1.00
3	8-in. pipe supports	41.00	23.42	16.00	19.00	21.18	20.00
3	6-in. pipe supports	28.00	22.52	15.50	18.00	21.18	20.00
2	2½-in. pipe supports	17.50	17.84	14.00	13.00	17.03	15.00
7	6-in. pipe hangers	9.00	6.86	3.60	10.00	7.36	3.50
1	4-in. pipe hanger	7.50	5.95	3.20	9.09	6.18	2.50
2	2½-in. pipe hangers	7.00	4.77	2.80	6.00	5.44	2.50
1	8-in. Drisser coupling	15.00	12.91	17.40	18.00	17.31	20.00
2	6-in. Drisser couplings	12.00	11.10	16.35	16.00	13.44	10.00
1	3-in. Drisser coupling	8.00	8.07	14.85	11.00	11.87	5.00
4	8-in. flanged lubricated plug valves	130.50	126.25	125.00	200.00	46.13	125.00
3	6-in. flanged lubricated plug valves	85.00	81.84	90.50	150.00	88.51	75.00
4	6-in. flanged lubricated plug valves, chain oper.	93.20	93.95	110.40	150.00	112.91	75.00
6	4-in. flanged lubricated plug valves	40.00	53.23	62.50	90.00	43.63	50.00
6	4-in. flanged lubricated plug valves, chain oper.	45.00	58.08	57.50	80.00	53.15	50.00
5	2½-in. flanged lubricated plug valves	22.00	35.27	44.80	40.00	26.29	50.00
2	4-in. screw lubricated plug valves	29.60	48.98	60.50	50.00	38.71	50.00
3	2-in. screw lubricated plug valves	12.92	19.71	28.20	25.00	18.07	35.00
1	1½-in. screw lubricated plug valves	12.50	16.69	27.00	17.00	18.58	25.00
5	1-in. screw lubricated plug valves	9.80	14.86	25.70	15.00	13.43	25.00
2	3-in. screw gate valves	29.75	32.02	46.40	40.00	36.26	25.00
2	2-in. screw gate valves	27.00	13.65	34.20	30.00	13.70	15.00

(Continued on next page)

3 times more life *when hard-faced with*

STOODY SELF-HARDENING 21

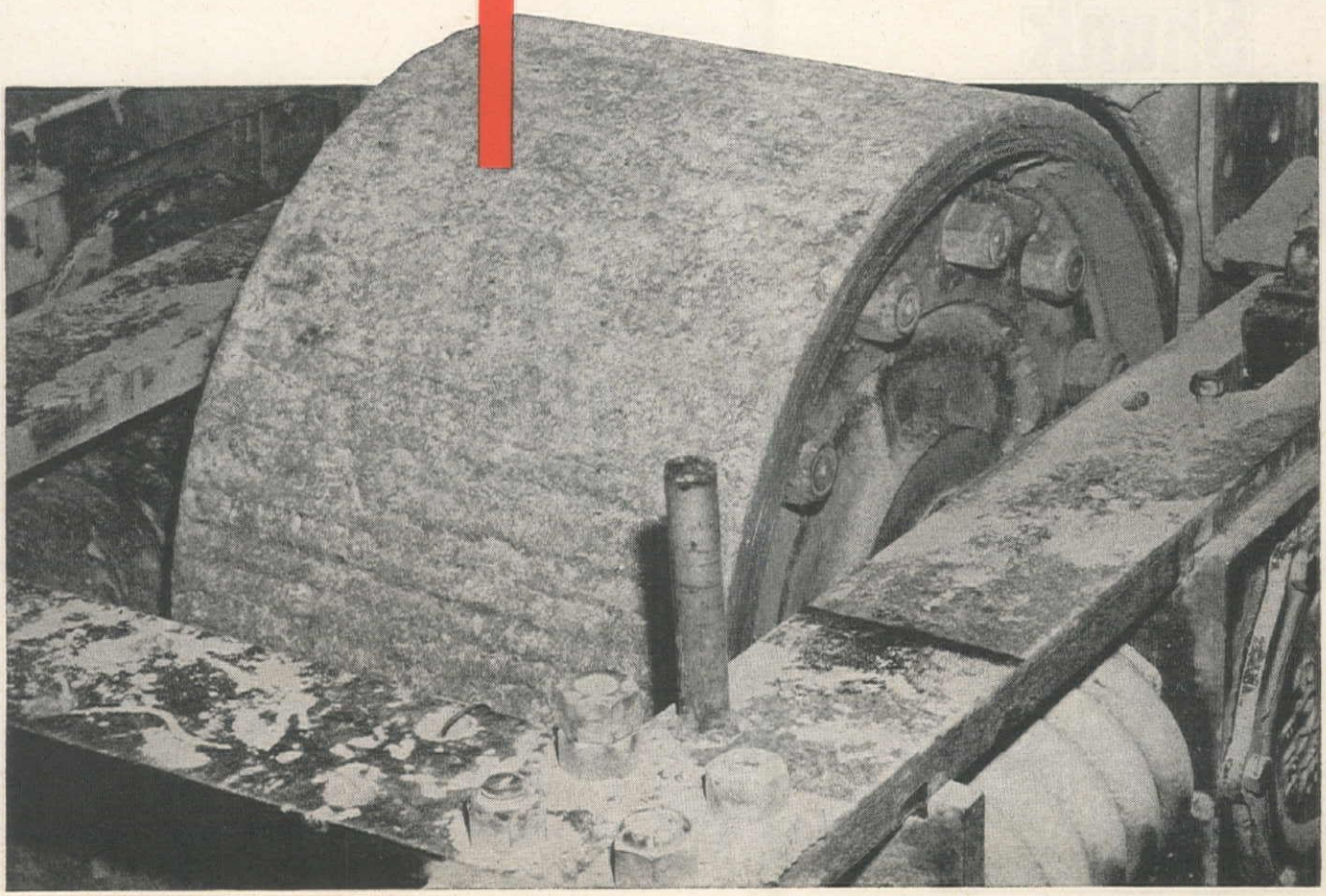
On a competitive test, crushing quartzite at high speed, this portable roll crusher operated 3 times longer when protected with Bare STOODY SELF-HARDENING **21** than with a more costly alloy. An additional bonus was obtained in freedom from spalling–even after repeated hard metal applications.

The new STOODY SELF-HARDENING **21** holds many advantages to users of heavy equipment:

Exceptional abrasion resistance • Good impact strength • Heavy deposits in a single pass • Bare rods run as easily as coated with D.C. electric welders • Can also be applied with A.C. • No slag • Multiple passes • Bonds readily to manganese steel, cast iron or common steels

For all-around weldability, STOODY SELF-HARDENING **21** can't be beat–its exceptional burn-off rate, wide amperage latitude and freedom from slag interference save you time, simplify hard-facing requirements. Try 50 lbs. on your next wear-proofing job. Call your Stoody dealer for complete information and literature . . . or write to

STOODY COMPANY 1156 W. SLAUSON AVE., WHITTIER, CALIF.



NEW BOOKS . . .

PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE ON SOIL MECHANICS AND FOUNDATION ENGINEERING—Available from T. K. Huizinga, Director, Laboratory of Soil Mechanics, Oostplantseon 25, Delft, Netherlands. 6 volumes. Price, 15 Guilders or approx. $30.

Notification has been received that 1,000 sets of the Proceedings of the recent conference in Rotterdam are still available. The 6 volumes contain a wealth of information supplied by outstanding engineers in the field of soil mechanics from all over the world.

* * *

FIELD ENGINEERING—By the late William H. Searles and the late Howard Chapin Ives. Revised by Philip Kissam, Professor of Civil Engineering at Princeton University. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 422 pages, 4 x 7. Price $6.50 (combined volume).

This is the 22nd edition of the best-known handbook on the theory and practices of railway surveying, location and construction. Professor Kissam has revised a considerable portion of the previous edition to bring the new work completely up to date. New material added includes a discussion of the meth-

(Continued on page 114)

1	1¼-in. screw gate valves	22.00	8.11	29.70	10.00	9.31	12.00
11	1-in. screw gate valves	6.00	6.90	28.30	7.00	6.59	8.00
1	6-in. flanged clearway check valve	96.50	93.95	105.50	150.00	105.16	125.00
1	4-in. flanged clearway check valve	61.00	58.60	80.40	80.00	66.70	75.00
1	3-in. screw check valve	18.00	21.60	55.70	46.70	25.72	50.00
15	1-in. screw hose valves	5.00	16.70	11.40	13.90	11.12	12.00
12	6-in. shear gates	62.67	69.50	92.80	66.40	81.95	75.00
1	24-in. Calco Model 104 head gate	95.92	91.20	82.05	108.50	113.68	100.00
4	30-in. x 30-in. Calco Model 173 head gates	228.00	194.60	215.83	236.50	178.87	200.00
5	valve operated flood stands	81.20	91.35	152.00	166.70	94.84	100.00
1	mechanically cleaned bar screen	$4,881	$3,030	$4,019	$5,500	$4,611	$4,620
1	grit collector	$4,497	$6,700	$4,689	$8,294	$4,963	$5,395
2	coagulators	$2,646	$2,945	$2,733	$3,646	$2,971	$4,000
2	sludge collecting mechanisms	$6,024	$5,758	$6,305	$7,007	$5,597	$4,800
1	digestion tank gas holder cover	$7,440	$7,850	$9,697	$10,159	$9,235	$7,500
1	primary sludge pump	$2,899	$2,970	$2,818	$3,132	$2,587	$3,040
1	sludge circulating pump	$1,144	$1,300	$1,253	$1,251	$1,092	$2,000
1	complete water seal pumping unit	829.15	820 00	825.83	788.00	735.85	$1,500
1	well pump	$1,589	$1,350	$1,942	$1,716	$1,638	$2,000
20	lin. ft. addn. pump column and shaft	7.40	9.80	5.08	10.00	9.40	8.00
1	portable dewatering pump	$2,383	$2,254	$1,962	$2,155	$2,293	$2,000
1	pressure tank	417.25	895.00	278.50	433.00	276.23	250.00
1	complete gas protective and safety devices	$1,075	$1,280	$2,302	$1,098	$3,057	$2,000
1	Parshall recording meter	861.32	631.50	884.00	$1,023	$1,344	$1,000
1	complete 12-in. cased well, 100 ft. deep	$1,381	$1,378	$1,485	$1,557	$1,415	$1,400
75	lin. ft. additional well and casing	16.00	13.25	14.27	15.00	14.20	15.00
100	lin. ft. perforated casing	.80	.66	.58	.61	.85	1.00
1	complete electrical work	$4,973	$4,725	$4,261	$4,465	$4,644	$5,000
1	complete miscl. bldg. construction	$3,560	$3,495	$10,500	$2,904	$3,503	$5,000
1	complete painting	$3,579	$3,150	$3,349	$4,477	$8,229	$8,000
1	complete miscl. struct steel	$2,034	$1,848	$1,852	$2,294	$2,311	$2,500
2	MFBM Redwood baffles and board covers	400.00	385.00	250.00	420.00	590.00	300.00
28	lin. ft. cast iron stop plank guides	7.00	6.60	5.92	7.15	6.05	6.00
1	complete rubber masonry	120.00	110.00	220.00	115.00	425 00	300.00
1	complete laboratory equip. and tools	263.75	275.00	500.00	383.00	270.60	500.00
4,520	sq. yd. roads and walkways	.54	.45	.83	.70	.49	1.00
1	complete demolition of existing septic tank	500.00	550.00	750.00	$2,505	750.00	500.00

Irrigation . . .

California—Stanislaus County—Bur. of Recl.—Earthwork & Struct.

Hubert H. Everist, Sr., contractor of Westley, Calif., submitted the low bid of $3,679,107 before the Bureau of Reclamation at Antioch, Calif., for construction of earthwork, structures and concrete lining from Sta 1366 to Sta. 2149 of the Delta-Mendota Canal, Central Valley Project. The work includes construction of a timber operating bridge at Sta. 1229. Time for completion is 750 days. Biggest items were excavation for the canal, trimming of foundations, concrete in the lining and furnishing and handling cement. The Everist firm was by far the lowest bidder on all of these important items. Unit bids of the five firms were as follows:

(1) Hubert H. Everist, Sr. $3,679,107
(2) Morrison-Knudsen Co., Inc., and M. H. Hasler 4,344,206
(3) Bressi & Bevanda Constructors, Inc. 4,438,779
(4) United Concrete Pipe Corp., Stolte, Inc., Ralph A. Bell, C. M. Elliott, Stroud and Seabrook, and John C. Gist $4,778,386
(5) Peter Kiewit Sons' Co. 4,942,403

		(1)	(2)	(3)	(4)	(5)
4,700,000	cu. yd. excavation for canal	.132	.14	.175	.18	.19
3,000,000	sta. cu. yd. overhaul	.02	.016	.02	.02	.02
400,000	cu. yd. compacting embankments	.30	.40	.33	.25	.25
200,000	cu. yd. excavation for drainage channels and dikes	.25	.25	.27	.30	.30
108,000	cu. yd. excavation for structures	1.32	1.00	.75	.75	1.10
48,000	cu. yd. backfill	.60	1.00	.60	.70	.90
22,500	cu. yd. compacting backfill	3.00	3.50	3.00	3.00	4.00
945,000	sq. yd. trimming foundations for concrete lining	.24	.35	.41	.40	.40
2,000	cu. yd. excavation for roadway	.35	.25	.40	.50	.35
600	cu. yd. untreated rock base	2.60	3.60	5.50	4.50	3.00
20	M. gal furn. and applying water for untreated rock base	4.60	5.00	2.50	4.00	3.00
6,000	gals. furn. and applying asphalt for road surfacing	.20	.20	.25	.15	.20
300	cu. yd. furn. and placing min. aggre. for road surfacing	2.90	8.00	6.00	6.00	4.00
5,300	sq. yd. mixing, finishing and rolling road surfacing	.20	.17	.16	.40	.20
1,000	cu. yd. riprap	6.90	8.00	15.50	10 00	8.00
12,600	cu. yd. concrete in structures	44.57	60.00	48.00	60.00	60.00
104,500	cu. yd. concrete in canal lining	2.50	10.00	9.00	11.75	11.00
175,650	barrels furn. and handling cement	3.20	3.40	4.25	4.00	4.40
1,950,000	lb. furn. and placing reinforcement bars	.11	.10	.12	.11	.13
60,000	lb. placing reinf. bars furn. by Government	.045	.05	.05	.05	.05
4,050	sq. ft. furn. and placing ½-in. elastic filler in joints	1.70	2.30	1.75	1.80	2.00
510	sq. ft. furn. and placing ¼-in. elastic filler in joints	2.40	3.00	2.00	2.30	3.00
365	sq. ft. furn. and placing 1-in. elastic filler in joints	2.90	4.00	2.25	2.80	4.00
1,310	lin. ft. placing rubber water stops in joints	1.70	2.50	2.50	2.00	2.00
8,100	lb. furn. and placing metal water stops in joints	.45	.70	.40	.40	.30
308	M.B.M. furn. and erecting timber in structures	220.00	280.00	290 00	250.00	300.00
26	cattle guards furn. materials and const. cattle guards	290.00	480.00	425.00	400.00	375.00
15	mi. furn. and erecting barbed wire right-of-way fence	$1,300	$1,250	$1,500	$1,300	$1,200
3	mi. furn. and erecting comb. barbed wire and woven wire right-of-way fence	$1,800	$1,800	$1,800	$1,600	$1,400
1,500	lin. ft. furn. matls. and const. underdrains with uncemented joints	2.80	1.90	2.25	3.00	3.00
300	lin. ft. furn. and laying sewer pipe with cemented joints	1.70	1.50	1.50	2.00	1.00
555	lin. ft. furn. and laying 15-in. diam. reinf. conc. pipe for turnouts	10.50	6.30	7.00	6.00	9.00
140	lin. ft. furn. and laying 18-in. diam. reinf. conc. pipe for turnouts	11.35	7.60	8.00	7.00	11.00
420	lin. ft. furn. and laying 24-in. diam. reinf. conc. pipe for turnouts	16.20	13.00	13.25	11.00	11.00
140	lin. ft. furn. and laying 30-in. diam. reinf. conc. pipe for turnouts	20.05	16.00	17.00	15.00	21.00
210	lin. ft. furn. and laying 36-in. diam. reinf. conc. pipe for turnouts	23.60	20.00	21.00	18.00	27.00
650	lin. ft. furn. and laying 18-in. diam. stand. str. reinf. conc. culvert pipe	6.20	5.00	5.30	4.00	5.00
885	lin. ft. furn. and laying 24-in. diam. stand. str. reinf. conc. culvert pipe	9.30	7.00	8.00	6.50	6.00
55	lin. ft. furn. and laying 30-in. diam. stand. str. reinf. conc. culvert pipe	11.00	9.70	10 00	10.00	10.00
780	lin. ft. furn. and laying 16-in. diam. conc. irrig. pipe	5.50	3.50	4.00	3.00	6.00
650	lin. ft. furn. and laying 18-in. diam. corr. metal pipe	4.80	3.50	4.00	3.50	5.00
250	lin. ft. furn. and laying 24-in. diam. corr. metal pipe	6.60	5.70	6.00	6.00	7.00
50	lin. ft. furn. and laying 30-in. diam. corr. metal pipe	8.20	8.00	9.00	8.00	8.00

(Continued on next page)

"How good were the good old days?"

In some respects, they were wonderful. In others, terrible. Take that matter of truck mixer sizes and capacities. There was a time when trying to determine true capacity was like looking in a dark room for a black cat that wasn't there.

That's why we formed the Truck Mixer Manufacturers Bureau—to set up standards that would guarantee sizes and capacities, for your convenience.

All you have to do now is look at the Bureau's rating plate on each truck mixer. That's your guarantee of size and capacity . . . your protection against "outlaw" sizes . . . your assurance that you can figure accurately your costs based on truck mixer operation.

So that rating plate does away with a lot of the troubles you used to have in the good old days. We think it does away with a lot of our old troubles, too. We think it helps us in our manufacturing and sales policies, and in our relations with you, our customers.

Yes, the rating plate of the Truck Mixer Manufacturers Bureau is one thing that would have made the good old days even better.

Truck Mixer Manufacturers Bureau

Affiliated with The National Ready Mixed Concrete Association

BLAW-KNOX DIVISION
Pittsburgh, Pa.

CHAIN BELT COMPANY
Milwaukee, Wis.

CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.

THE JAEGER MACHINE COMPANY
Columbus, Ohio

WORTHINGTON PUMP AND MACHINERY CORPORATION
Ransome Division, Dunellen, N. J.

THE T. L. SMITH COMPANY
Milwaukee, Wis.

New Books

. . . Continued from page 112

ods and advantages of air mapping, the complete theory and application of the vertical curve, basic economic aspects for highway and railway location, the latest surveying techniques, the two base methods for precise altimetry, and many other topics not contained in the former edition. Published in pocket size with flexible binding, the book is available either in two volumes, one text and one tables, or in a single combined volume.

* * *

THE SPECIFICATIONS AND LAW ON ENGINEERING WORKS—by Walter C. Sadler. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 500 pages, 6 x 9. Price $5.00.

The book is intended as a practical aid for the engineer not trained in law, and provides a thorough foundation in engineering law to enable the writing of foolproof specifications. In addition to the complete description of the engineer's commonly encountered legal problems, a summary of the historical significance of various legal systems is included to show how modern courts apply statutes to practical legal questions on engineering works. A complete set of detailed contracts and specifications is presented in the appendix. The author is currently Professor of Civil Engineering at the University of Michigan.

* * *

MATHEMATICS AT WORK—By Holbrook L. Horton. Published by the Industrial Press, 148 Lafayette St., New York 13, N. Y. 728 pp., 6 x 9. Price $6.00.

This book is a working manual intended for machine designers, tool engineers, mechanical draftsmen, technical or trade school students and teachers. The practical applications of arithmetic, algebra, geometry, trigonometry and logarithms are illustrated by a wide variety of mechanical problems taken from actual practice. These problems are analyzed and solved in an easy-to-follow, step-by-step procedure. To round out the book, 145 pages of standard mathematical tables are included. The book should be an indispensable tool for all who are engaged in the mathematical solution of mechanical problems.

* * *

PAINT AND VARNISH TECHNOLOGY—By William von Fischer, head of Department of Chemistry and Chemical Engineering at Case Institute of Technology, Cleveland, Ohio. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 510 pages, 6 x 9. Price $8.00.

Literature covering the organic protective coatings field is scanty, being confined mostly to journal articles. Here is a book presenting a survey of the chemistry, formulation, manufacture and applications of paints, varnishes, lacquers and enamels.

146 lin. ft. furn. and laying 42-in. diam. corr. metal pipe	13.60	12.50	13.50	14.00	13.00
1,600 lin. ft. laying 12-in., 14-in. and 16-in. diam. steel pipe	1.70	2.40	2.60	5.00	2.50
203,700 lb. installing gates and gate hoists	.15	.12	.12	.10	.15
81,000 lb. installing miscellaneous metalwork	.15	.35	.30	.30	.12
1,570 lin. ft. furn. and installing elect. metal conduits	1.20	1.25	2.50	2.50	3.00
350 lb. furn. and installing elect. gd. wires and gd. rods	1.40	1.50	2.50	2.00	2.50

Highway and Street . . .

Utah—Kane County—State—Bitum. Surface

W. W. Clyde & Co., Springville, Utah, submitted a low bid of $368,044 to the Utah State Road Commission, Salt Lake City, for 7.6 mi. of 3-in. plant mixed bituminous road surfacing on the Sevier Summit-Glendale Highway. Unit bids were submitted by the following:

(1) W. W. Clyde & Company.....$368,044
(2) L. T. Johnson Construction Co..... 359,773
(no bid on last three items)
(3) Reynolds Construction Co.....$451,331
(4) A. O. Thorn & Sons Construction Co. 463,950
(5) Engineer's estimate .....

	(1)	(2)	(3)	(4)	(5)
19,000 ton plant mixed bitum. surfacing	2.20	3.00	2.50	2.50	3.25
230,500 gal. bituminous matl., Type 200-300 penetration	.18	.18	.18	.19	.16
59,000 gal. bituminous matl., Type MC-1	.20	.195	.19	.20	.17
29,500 gal. bituminous matl., Type RC-4	.20	.195	.19	.22	.17
1,500 ton cover material	3.50	4.00	3.00	3.50	2.50
21,000 ton cr. rock or cr. gravel surf. course	.80	1.00	.80	.90	1.00
49,500 ton gravel or cr. rock base course	.75	.85	.80	.90	.95
210,000 cu. yd. unclassified excavation	.45	.30	.80	.75	.50
560,000 sta. yd. overhaul Class "A"	.015	.02	.015	.015	.015
5,000 yd. mi. overhaul, Class "B"	.15	.20	.15	.20	.20
3,900 1,000-gal. watering	1.50	1.75	2.00	3.00	2.00
3,200 hr. rolling	5.00	4.00	6.00	5.00	5.00
1,400 cu. yd. excav. for structs.	2.00	3.00	3.00	2.50	1.50
20 lin. ft. 15-in. C.G.M. pipe	2.50	2.50	2.70	2.50	2.40
1,569 lin. ft. 18-in. C.G.M. pipe	2.85	3.00	3.00	3.00	2.85
796 lin. ft. 24-in. C.G.M. pipe	4.60	4.25	4.50	4.50	4.40
350 lin. ft. 30-in. C.G.M. pipe	5.75	5.50	6.00	6.00	5.50
30 lin. ft. 36-in. C.G.M. pipe	9.00	8.50	9.00	9.00	8.60
128 lin. ft. 48-in. C.G.M. pipe	12.00	14.00	12.00	15.00	11.50
76 lin. ft. C.M. pipe arches 72-in. x 44-in.	19.30	22.00	20.00	22.00	18.00
328 lin. ft. relaying 18-in. C.G.M. pipe	1.50	2.00	2.00	2.00	.50
184 lin. ft. relaying 24-in. C.G.M. pipe	1.50	2.25	2.00	2.00	.75
1,850 cu. yd. channel excav.	.50	1.50	1.00	.75	.65
52 acre clearing and grubbing	150.00	200.00	100.00	300.00	100.00
16,300 lin. ft. surface ditches	.07	.06	.05	.20	.10
172 cu. yd. concrete, Class "A"	65.00	70.00	60.00	70.00	60.00
26,600 lb. reinforcing steel	.14	.17	.12	.15	.12
0.22 M.F.B.M. lumber (treated)	500.00	300.00	300.00	400.00	400.00
11,000 lb. structural steel	.20	.15	.25	.20	.20
194 each guide posts	5.00	4.50	5.00	10.00	4.00
3,370 lin. ft. guard rail	2.75	3.00	3.00	3.00	3.00
2.7 mile obliteration of old road	150.00	300.00	200.00	500.00	150.00
51,100 lin. ft. right of way fence, Type "B"	.30	.28	.30	.35	.30
42 each 14-ft. gates	40.00	40.00	35.00	35.00	35.00
164 each right of way markers	5.00	5.00	5.00	5.00	2.50
2 each F.A.P. markers	20.00	20.00	25.00	50.00	20.00
10,000 ton cr. rock or cr. gravel surf. course (place in stockpile)	.60		.50	.70	.75
1,500 ton cover matl. (place in stockpile)	2.50		2.00	2.50	2.00

Nevada—Clark County—State—Improve Highway

Olof Nelson Construction Co., Logan, Utah, have received a $730,035 contract (Proposals "A" and "B") from the Nevada Department of Highways, Carson City, for construction of a portion of the State Highway System from a point about 0.3 mi. east of the Clark County Hospital to about 3 mi. easterly. The following submitted unit bids:

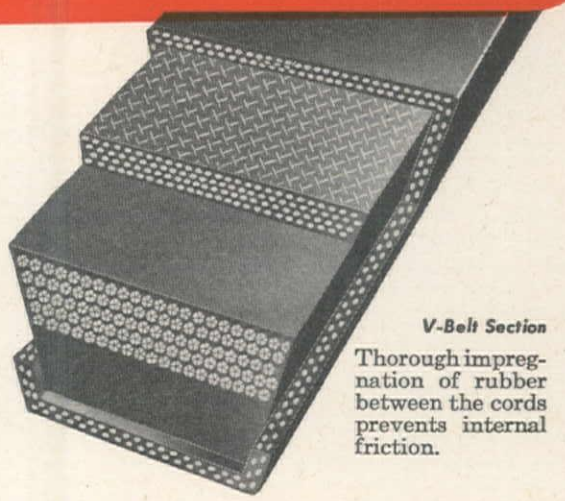
(1) Olof Nelson Construction Company....$730,035
(2) Gibbons & Reed Co..... 784,388
(3) Dodge Construction, Inc..... 824,986
(4) Silver State Construction Co.....$870,409
(5) Vinnell Company, Inc..... 874,102

PROPOSAL "A"

	(1)	(2)	(3)	(4)	(5)
Force account, special detours	$7,000.00	$7,000.00	$7,000.00	$7,000.00	$7,000.00
2,252 ton Type 2 gravel base 1 in. (detour)	1.50	0.78	1.25	1.50	1.60
28 ton liquid asph., Type SC-4 or SC-5 (roadmix detour)	40.00	34.75	32.50	35.00	40.00
0.45 mi. roadmix (detour)	1,000.00	700.00	1,200.00	1,000.00	1,500.00
Lump sum, signs	1,000.00	1,760.00	5,000.00	1,000.00	5,000.00
8 ea. remove trees (4 in. to 12 in.)	20.00	23.00	50.00	25.00	25.00
2,072 lin. ft. remove fence	0.30	0.31	0.15	0.10	0.15
Lump sum, remove building	1,000.00	700.00	1,500.00	2,000.00	1,500.00
30 cu. yd. remove concrete	20.00	11.50	25.00	20.00	25.00
405 lin. ft. remove culvert pipe	2.00	1.15	2.50	1.50	2.00
4 ea. remove headwalls	25.00	35.00	25.00	25.00	15.00
31,411 cu. yd. roadway excavation	1.27	1.22	1.00	1.25	2.45
1,160 cu. yd. drainage excavation	1.00	0.50	1.00	0.40	1.60
21 sta. slope rounding	40.00	55.00	20.00	5.00	13.00
127,870 yd. sta. overhaul, yd. sta.	0.02	0.02	0.02	0.02	0.02
878 yd. mi. overhaul, yd. mi.	0.30	0.20	0.50	0.25	0.50
36,308 cu. yd. backfill	1.50	1.20	2.49	2.75	2.00
1,357 mil. gal. water	2.00	1.75	1.00	2.00	2.50
Lump sum, furnish water equipment	300.00	600.00	1,750.00	1,000.00	1,500.00
68 hr. power roller	7.00	6.50	10.00	7.00	8.00
9,784 ton Type 1 gravel base	1.20	0.78	1.00	1.00	1.50
3,639 ton Type 2 gravel base, 1 in.	1.50	1.70	1.25	1.50	2.30
24 ton liquid asphalt, Type MC-1 (prime)	45.00	38.00	35.50	40.00	45.00
13 ton emulsified asphalt (seal)	45.00	34.00	42.50	50.00	60.00
109 ton screenings	4.00	6.00	5.00	5.00	7.00
126 ton liq. asph., Type SC-4 or SC-5 (plantmix)	35.00	32.50	32.50	35.00	40.00
1,791 ton Class F-2 plantmix surface	6.00	3.60	5.00	4.00	7.00
904 cu. yd. Class A concrete	60.00	58.00	58.00	65.00	55.00
30 cu. yd. Class B concrete	60.00	35.50	35.00	65.00	50.00
83,240 lb. reinforcing steel	0.15	0.13	0.13	0.12	0.15
4,260 sq. yd. mesh reinforcement	0.60	0.42	0.90	0.50	0.60
405,060 lb. structural steel	0.16	0.18	0.14	0.19	0.19
332 lin. ft. structural steel rail	10.00	11.00	10.00	10.00	10.00
28 lin. ft. 12 in. reinforced concrete pipe	2.70	4.50	3.00	2.75	6.00

(Continued on next page)

Specify Thermoid



V-Belt Section
Thorough impregnation of rubber between the cords prevents internal friction.

Thermoid Impregnation Process* Assures Longer V-Belt Life

Thermoid V-Belts are built for the job!

Thermoid V-Belts resist moisture-absorption, and both *internal* and *external* abrasion. Internal abrasion of the cotton cords weakens V-Belts, causing stretch and wear. The Thermoid Impregnation Process assures longer belt life by eliminating internal friction and reducing heat. *And Thermoid V-Belts are pre-stretched to insure perfect operation.*

There are Thermoid V-Belts available to meet *your* requirements.

Your nearest distributor has most sizes in stock for immediate delivery. Through close cooperation with Thermoid field representatives, he can offer quick service on your special V-Belt problems. It will pay you to ***Specify*** Thermoid!

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

Thermoid Company

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products
Friction Materials · Oil Field Products

*Thermoid Impregnation Process

The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasion action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

Water Works Standards

. . . Continued from page 82

Where backup gaskets are required, rubber or asbestos is recommended, but in no case shall backup materials be used without adequate disinfection.

5.44. Construction: The main line pipe shall be installed below the known frost line but in no case shall there be less than a 30-in. cover over the top of the pipe unless such pipe in private rights-of-ways is constructed on trestles or bridges or in tunnels or is of other special construction and is installed under the direction of an engineer properly qualified to practice in the field of engineering involved. All pipe and other conduit in the distribution system shall be designed and constructed so as to prevent leakage of water due to defective materials, improper jointing, corrosion, impact, freezing, or other causes. It is recommended that water pipes be laid as far as possible from and at a higher level than sanitary sewers, but in no case shall they be laid in the same trench. All pipe or conduits, before being placed in service shall be completely disinfected in accordance with American Water Works Association Procedures for Disinfecting Water Mains, approved September 30, 1947.

6.0. Operation and Maintenance

6.11. Training and Experience of Personnel: All personnel responsible for operation and maintenance shall have sufficient experience and training to qualify them to perform properly the duties required. They shall be fully aware of the function of the particular facilities for which they are responsible. Water treatment plant operators should hold an appropriate certificate issued by the California Section of the American Water Works Association. Superintendents, foremen, chief operators, or others having jurisdiction over one or more employees, shall have sufficient training and experience to enable them to instruct and properly train employees under their supervision.

6.12. Specially designated personnel shall be available for call during nights, Sundays, and holidays to meet emergencies.

6.21. Maps: Complete and up-to-date maps of the utility system drawn to adequate scale shall be maintained. They shall show locations of pipe lines, gate valves, fire hydrants and service connections and shall include notations as to size and kind of pipe and year of installation. Engineering drawings shall be kept of all facilities showing in detail piping, pumps, motors, appurtenances, electrical wiring, and structures.

6.22. Records: Complete and up-to-date records shall be kept showing results of bacteriological and chemical analyses of water, quantities of water produced and delivered and such other data as may be necessary.

6.31. Facilities and equipment of the utility shall be kept clean and orderly and in good working condition. Grounds should be maintained in an attractive condition.

110 lin. ft. relay culvert pipe	2.00	2.30	1.50	2.00	2.00
7,836 lin. ft. 6 in. tile underdrain	1.00	1.18	1.50	1.25	1.00
1,756 cu. yd. drain backfill	3.00	3.50	4.00	3.00	5.00
321 cu. yd. Class A concrete curb and gutter	40.00	46.00	35.00	55.00	35.00
109 cu. yd. Class A concrete sidewalk	40.00	35.00	35.00	55.00	30.00
10,696 lb. structural steel	0.40	0.40	0.40	0.25	0.35
390 lin. ft. beam type metal guard rail	3.00	3.15	3.00	5.00	6.00
1,802 lin. ft. construct fence	1.00	0.32	0.30	0.30	0.25
642 lin. ft. reconstruct fence	0.50	0.28	0.30	0.25	0.15
11 ea. right of way markers	10.00	9.00	10.00	5.00	15.00
50 lin. ft. 6 in. sewer pipe	1.00	1.27	2.00	1.00	5.00
1,627 lin. ft. 10 in. sewer pipe	1.50	1.87	2.75	2.00	4.00
2 ea. 6 in. x 24 in. ring (manhole)	15.00	15.00	25.00	50.00	20.00
4 ea. 8 in. x 24 in. ring (manhole)	20.00	17.00	25.00	50.00	20.00
5 ea. 36 in. to 24 in. reducer (manhole)	50.00	50.00	75.00	100.00	60.00
85 lin. ft. 36 in. R. C. P. manhole shaft	20.00	16.35	25.00	10.00	30.00
2,855 sq. ft. 3-ply membrane waterproofing	0.30	1.00	0.45	0.50	2.00
500 cu. yd. ballast	3.00	2.35	4.00	3.00	4.50
355 cu. yd. concrete slope pavement	0.40	51.00	35.00	55.00	35.00
2 ea. soil load test	50.00	250.00	367.15	1,000.00	350.00
Lump sum, lighting equipment	3,000.00	4,000.00	5,000.00	7,500.00	3,000.00
Force account, miscellaneous work	600.00	600.00	600.00	600.00	600.00

California—Solano County—State—Grade and Pave

Harms Brothers, Sacramento, Calif., have been awarded a $789,867 contract by the California Division of Highways, Sacramento, for 4.3 miles of grading, paving, and the construction of a reinforced concrete bridge between 3.5 miles east of Fairfield and 0.4 mile east of Alamo Creek in Solano County. Following are the unit bids received:

(A) Harms Brothers $789,867
(B) Morrison-Knudsen Company, Inc. 802,153
(C) N. M. Ball Sons 833,256
(D) Fredrickson Brothers 874,452
(E) Parish Brothers 893,646
(F) A. Teichert & Son, Inc. $930,404
(G) Fredrickson and Watson Construction Company 952,671
(H) H. Earl Parker and Clements & Co. 965,448
(I) Charles L. Harney, Inc. 1,074,553

(1) 65 cu. yd. removing concrete
(2) 227 sta. clearing and grubbing
(3) 286,000 cu. yd. roadway excavation
(4) 3,800 cu. yd. structure excavation
(5) 14,300 cu. yd. ditch and channel excavation
(6) 4,550,000 sta. yd. overhaul
(7) 32,000 sq. yd. comp. original ground
(8) 70,000 tons imported borrow
(9) dev. wat. sup. and furn. wat. equip.
(10) 17,000 M. gal. applying water
(11) 227 sta. finishing roadway
(12) 55,600 sq. yd. mix. and comp. (cem. tr. sub.)
(13) 1,500 bbls. Portland cem. (cem. tr. subgrade)
(14) 95 tons liq. asphalt, R.O.R.C.-5 (cur. sl., cem. tr. subgrade)
(15) 17,000 tons untreated rock base
(16) 75 tons liq. asphalt, SC-2 (pr. ct.)
(17) 106 tons asphalt. emul. (pt. bdr. & sl. ct.)
(18) 630 tons screenings (sl. ct.)
(19) 210 cu. yd. sand (pr. ct. & sl. ct.)
(20) 220 tons liq. asphalt SC-3 or 4 (bit. surf. tr.)
(21) 35,000 sq. yd. prep., mix. & shap. surface (bit. surf. tr.)
(22) 700 tons paving asphalt (pl.-mix.-surf.)
(23) 14,000 tons mineral aggregate (pl.-mix. surf.)
(24) 650 lin. ft. raised bars
(25) 12,500 cu. yd. P.C.C. (pavement)
(26) 8,500 ea. pavement tie bolt assemblies
(27) 612 cu. yd. Class "A" P.C.C. (structures)
(28) 147 lin. ft. concrete railing
(29) 630 lin. ft. furnishing steel piling
(30) 28 ea. driving steel piles
(31) 210 cu. yd. sacked concrete riprap
(32) 230 cu. yd. Class "A" P.C.C. (curbs & gut.)
(33) 70 ea. monuments
(34) 200 lin. ft. laminated guard railing
(35) 132 ea. culvert markers and guide posts
(36) 45 ea. access opening markers
(37) 4.5 mi. new property fences
(38) 16 ea. drive gates
(39) 544 lin. ft. 8-in. C.M.P. (16 ga.)
(40) 2,050 lin. ft. 18-in. C.M.P. (16 ga.)
(41) 136 lin. ft. 18-in. C.M.P. (16 ga. close riveted and soldered)
(42) 156 lin. ft. 24-in. C.M.P. (14 ga.)
(43) 238 lin. ft. 30-in. C.M.P. (14 ga.)
(44) 116 lin. ft. 36-in. C.M.P. (12 ga. close riveted and soldered)
(45) 78 lin. ft. 66-in. C.M.P. (10 ga.)
(46) 212 lin. ft. 90-in. C.M.P. (8 ga.)
(47) 7 ea. 18-in. field joints for C.M.P. siphon
(48) 7 ea. 36-in. field joints for C.M.P. siphon
(49) 850 lin. ft. salvaging exist. pipe culv.
(50) 400 lin. ft. relaying salvaged C.M.P.
(51) 75,500 lbs. furnishing bar reinforcing steel
(52) 75,500 lbs. placing bar reinforcing steel

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	25.00	13.00	8.00	12.00	10.00	20.00	10.00	10.00	12.00
(2)	50.00	55.00	100.00	47.50	45.00	35.00	110.00	25.00	95.00
(3)	.55	.48	.60	.58	.46	.65	.70	.69	1.00
(4)	3.50	2.75	3.00	3.00	3.00	3.50	3.50	3.00	3.00
(5)	1.00	.65	1.00	1.50	1.00	1.00	.75	.90	1.00
(6)	.004	.005	.003	.006	.0076	.003	.003	.01	.005
(7)	.05	.07	.04	.06	.06	.06	.06	.09	.066
(8)	1.50	1.35	1.50	1.40	1.95	2.00	2.00	2.60	1.95
(9)	5,000	3,000	1,000	10,000	6,650	10,700	5,550	10,000	3,400
(10)	1.50	1.65	1.40	1.80	1.60	1.50	1.70	1.50	1.85
(11)	15.00	20.00	25.00	18.00	20.00	20.00	20.00	20.00	20.00
(12)	.30	.30	.25	.24	.30	.26	.26	.25	.30
(13)	4.30	4.50	4.60	4.15	4.35	4.00	4.45	4.50	4.30
(14)	50.00	40.00	50.00	35.00	40.00	45.00	33.00	30.00	33.00
(15)	2.30	3.20	2.40	3.30	3.45	3.50	3.15	3.00	3.50
(16)	32.00	27.00	26.00	28.00	39.00	37.00	32.00	25.00	32.00
(17)	45.00	38.00	45.00	38.00	45.00	40.00	33.00	25.00	35.00
(18)	6.00	5.00	4.00	6.00	8.00	7.00	6.70	5.00	7.50
(19)	5.00	7.00	4.50	7.75	8.00	8.00	7.00	5.00	5.50
(20)	27.00	30.00	26.00	28.50	26.00	25.00	25.00	20.00	32.00
(21)	.08	.07	.09	.14	.21	.15	.20	.10	.09
(22)	24.00	25.00	23.00	24.00	27.50	22.00	25.00	20.00	26.00
(23)	4.20	5.00	5.10	5.50	5.65	5.80	5.90	5.00	6.50
(24)	1.10	2.00	1.00	1.25	1.75	1.50	1.40	1.00	1.30
(25)	13.60	14.50	15.20	15.40	15.80	16.00	16.00	15.00	17.25
(26)	.50	.70	.47	.50	.50	.60	.55	.40	.60
(27)	55.00	58.00	60.00	60.00	62.00	60.00	64.00	65.00	55.00
(28)	8.00	7.50	8.00	8.90	10.00	10.00	9.00	10.00	9.50
(29)	2.75	3.00	3.80	3.00	2.50	2.50	2.90	2.75	3.00
(30)	110.00	125.00	60.00	60.00	90.00	100.00	114.00	120.00	120.00
(31)	22.00	25.00	23.00	30.00	26.50	30.00	32.00	30.00	33.00
(32)	42.00	55.00	43.00	45.00	46.00	60.00	46.00	40.00	42.00
(33)	7.00	5.00	6.00	7.00	6.00	6.00	6.00	7.00	5.00
(34)	3.25	3.00	3.00	4.75	3.50	3.00	3.00	3.50	2.30
(35)	5.00	10.00	5.00	6.00	6.00	6.00	5.00	7.00	5.75
(36)	10.00	10.00	15.00	9.00	10.00	10.00	10.00	7.00	10.00
(37)	1,500	1,250	1,200	1,300	1,400	1,200	1,200	1,250	1,500
(38)	50.00	40.00	50.00	47.50	50.00	50.00	40.00	50.00	52.00
(39)	1.50	1.50	1.00	1.60	1.55	1.60	1.65	1.40	1.60
(40)	3.00	3.00	3.20	3.10	2.80	2.80	3.05	2.75	3.00
(41)	6.00	5.00	4.30	5.00	5.00	4.70	4.75	5.00	4.75
(42)	4.00	4.50	5.00	4.50	4.20	4.30	4.60	4.25	4.60
(43)	5.50	5.50	6.50	5.60	5.20	5.30	5.75	5.50	5.70
(44)	15.00	12.00	7.40	11.50	11.00	10.00	11.30	8.50	11.00
(45)	22.00	25.00	16.50	23.00	26.00	19.00	21.00	20.00	26.00
(46)	37.50	40.00	42.00	39.00	40.00	35.00	35.00	35.00	52.00
(47)	20.00	17.00	20.00	30.00	20.00	20.00	25.00	25.00	30.00
(48)	30.00	32.00	37.00	50.00	35.00	30.00	39.00	50.00	50.00
(49)	1.50	1.50	1.00	1.80	1.25	1.25	1.15	1.50	1.40
(50)	1.50	1.50	1.00	1.80	1.75	1.25	1.30	1.50	1.05
(51)	.07	.06	.07	.08	.07	.08	.07	.07	.07
(52)	.035	.03	.02	.02	.03	.03	.03	.04	.04

You get better service wherever you see this sign

There's a *Macwhyte* Rope that's the *right* rope for your equipment. All job-proved — a thousand and one wire ropes to choose from.

Our distributors and mill depots — located at convenient points all over the country — carry stocks for immediate delivery. Ask a Macwhyte representative to recommend the rope best suited for your equipment.

MACWHYTE COMPANY

2909 Fourteenth Avenue · Kenosha, Wisconsin

Manufacturers of Internally Lubricated Wire Ropes, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

Portland · Seattle · San Francisco · Los Angeles

Distributors and stocks throughout the west.

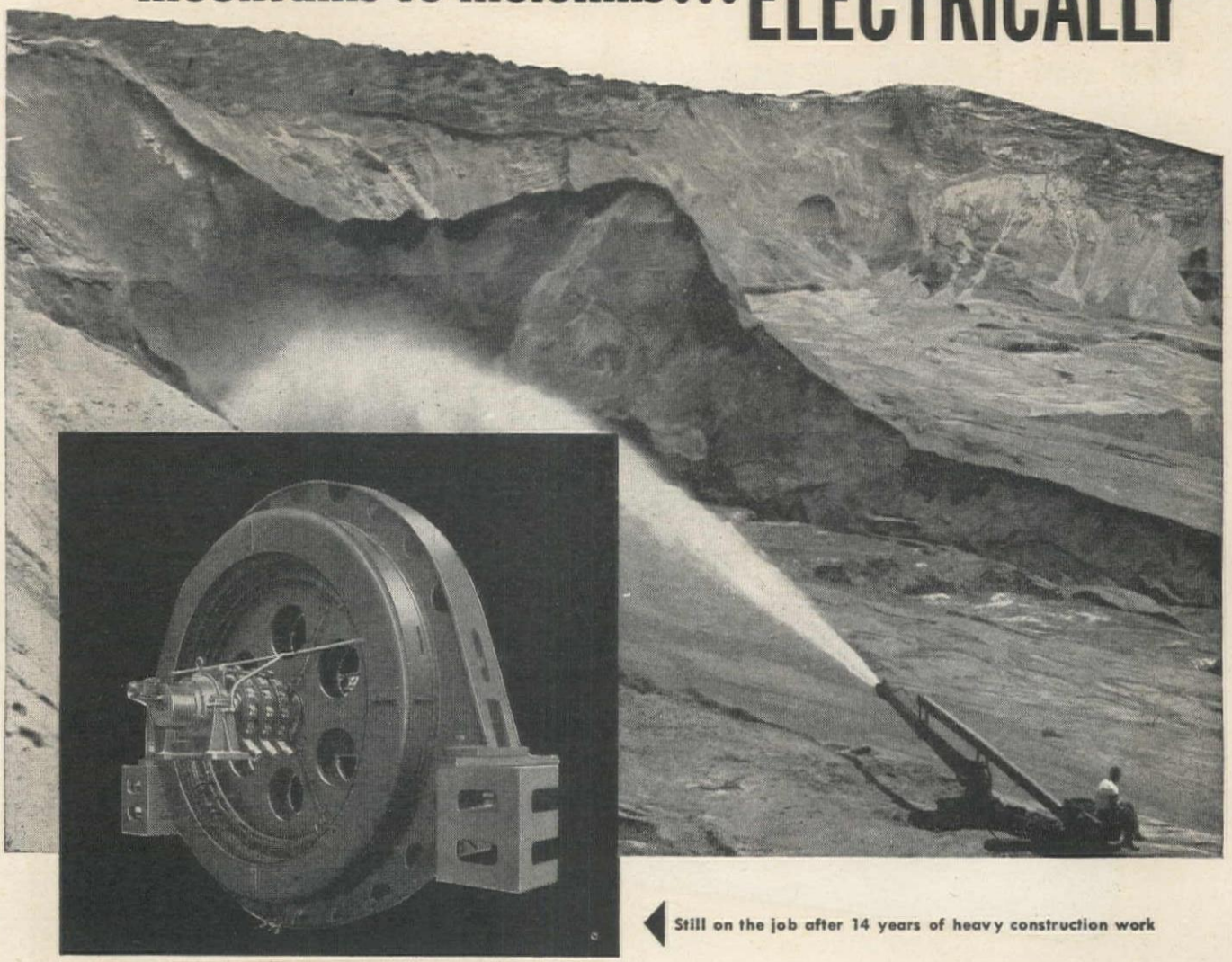
Catalog on Request

NO. 957-L

For easy handling and longer service

Use PREformed Whyte Strand Wire Rope—it's internally lubricated

mountains to molehills . . . ELECTRICALLY



Still on the job after 14 years of heavy construction work

Veteran G-E Motors Drive the Pumps on this Hydraulic Sluicing Operation

One 14,000,000-yard sand dune will be dissolved by water from this nozzle to make way for the construction of Los Angeles' new high-rate activated sludge plant. This unique hydraulic sluicing operation depends for its pumping power on six giant General Electric induction motors built back in 1934 for construction of Fort Peck Dam. Although they have passed through the hands of several contractors, and have been rewound to give different characteristics, they are still on the job 24 hours a day, six days a week.

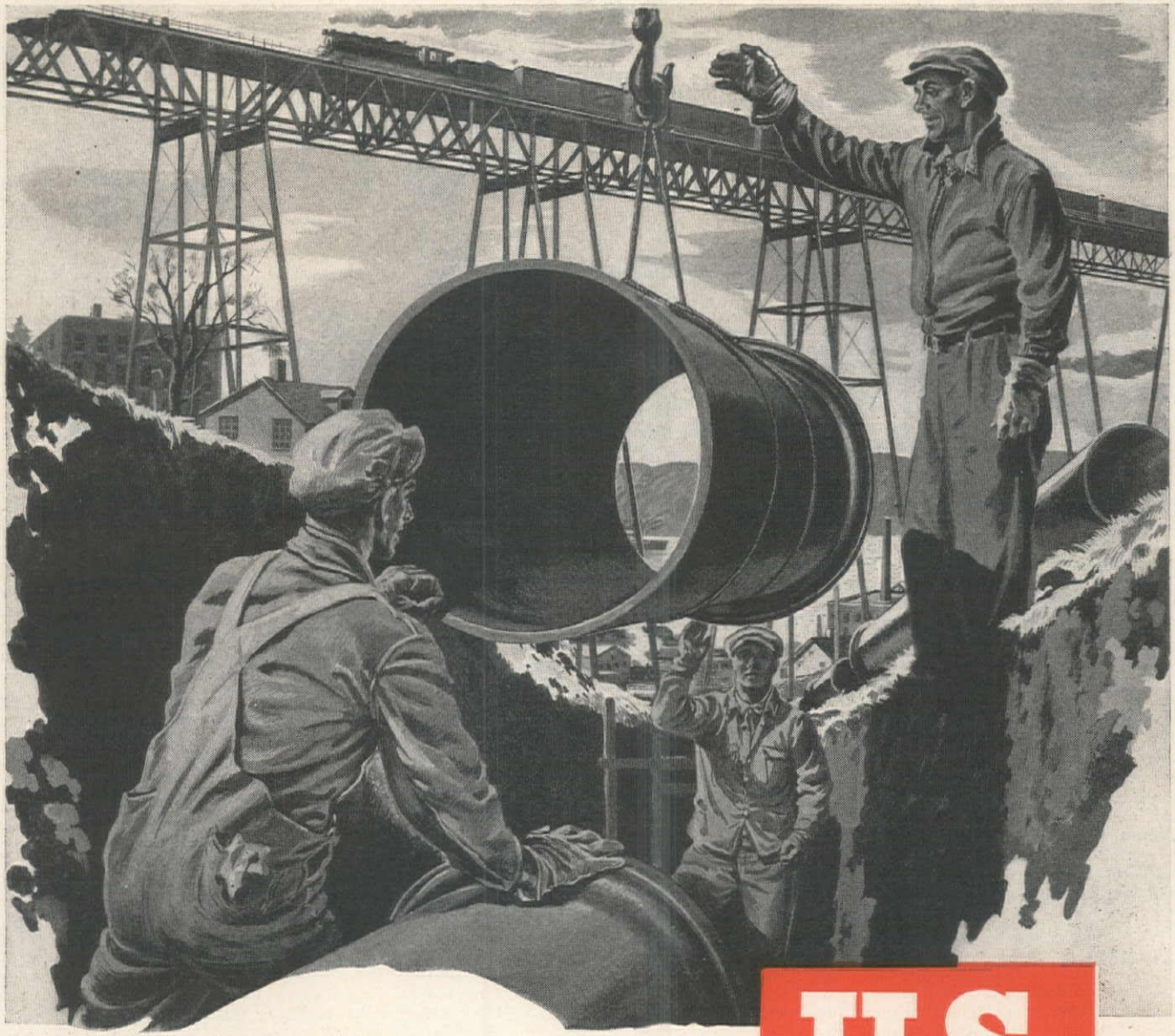
Electric drive, which offers the maximum in reliability with minimum maintenance, helps contractors build more for less . . . faster. Whether you buy or build construction tools, ask your General Electric representative to tell you about the inherent advantages of electric drive. *Apparatus Dept., General Electric Co., Schenectady, N. Y.*

ELECTRIFIED CONSTRUCTION

BETTER PRODUCT

LOWER COST

GENERAL ELECTRIC



Painted for U. S. Pipe & Foundry Co. by Paul Laune

U.S. cast iron PIPE

FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE

Improvements in the quality, and quality-controls, of U. S. Cast Iron Pipe are the fruits of research and development. They are also the rewards of patience. Months of pilot plant operation may elapse before a process-development is adopted as standard manufacturing procedure. Exhaustive tests in our headquarters research laboratory, one of the finest foundry laboratories, must precede a "go-ahead" to our plants. This is just another reason why you can lay U. S. Cast Iron Pipe with confidence. **United States Pipe and Foundry Co., General Offices: Burlington, New Jersey. Plants and Sales Offices Throughout U.S.A.**

TRADE WINDS

News of Men Who Sell to the Construction West

ASSOCIATED EQUIPMENT DISTRIBUTORS

Associated Equipment Distributors, trade association of manufacturers and distributors of construction equipment in the United States and Canada, elected their officers and directors for 1949 during their 30th annual meeting in the Stevens Hotel, Chicago, Ill., Jan. 19. **William W. Bucher,** president of R. E. BROOKS CO., New York, was elected President of A.E.D. **C. F. Halladay,** president of HALLADAY-DETTMAN CO., Sioux Falls, S. Dak., is Executive Vice-President. Halladay, a civil engineer, was engaged in highway and railroad work before entering the construction equipment field. Vice-presidents include **R. L. Arnold,** president of ARNOLD MACHINERY CO. and TRACTOR-IMPLEMENT, INC., of Salt Lake City, Utah, and **Jewel A. Benson,** president of BENSON TRACTOR CO., Houston, Texas. **Frank G. Knight** of Chicago was reappointed Executive Secretary of A.E.D. for the third time. Among the 15 newly elected regional directors are: **C. F. Halladay,** Sioux Falls, S. Dak.; **Jack How,** San Francisco, Calif.; **William H. Booth,** Seattle, Wash.; **R. L. Arnold,** Salt Lake City, Utah. More than 1700 representatives of manufacturers and distributors of construction equipment attended the 5-day convention which opened on Jan. 16. In his annual message, 1948 President **A. F. Garlinghouse,** Los Angeles, Calif., called for increased cooperation between manufacturers and distributors as the means to mutual prosperity.

☆ ☆ ☆

CALIFORNIA

WILSON & GEO. MEYER & CO., Pacific Coast distributors of agricultural and industrial chemicals, is constructing a $150,000 warehouse and office building to serve its customers in Southern California, Arizona, Utah, Colorado and New Mexico. The new building, designed by Barondon Corp. and being built by Wm. P. Neil, Ltd., both of Los Angeles, Calif., will contain 10,200 sq. ft. of floor space. In addition to a railroad spur track the new warehouse will have ample loading and unloading facilities for trucks and space for convenient customer parking. The firm's Southern California activities are supervised by **Tom. W. Harris,** vice president. **Tom H. Lathe,** 20 years with the firm, manages the Southwest agricultural chemical sales. **Wilson Meyer** is president of the firm with headquarters in San Francisco. One of the Coast's oldest firms, Wilson & Geo. Meyer & Co. traces its history back to San Francisco's Gold Rush days of 1850.

☆ ☆ ☆

THE MERRILL-BROSE CO., contractors' equipment agency, San Francisco, was recently incorporated as a subsidiary to MERRILL CO., long established San Francisco engineering firm. The new agency, under the direction of **George Brose,** general manager, has obtained a number of new accounts with prominent Eastern manufacturers of contractors' equipment,

power and processing machinery and boilers, and is now prepared to extend its service to Western contractors. Equipment handled by the new agency includes the shovel line manufactured by BYCYRUS-ERIE CO. of South Milwaukee, Wis.; the truck, wagon and Diesel locomotive cranes manufactured by BROWNING CRANE & SHOVEL CO., Cleveland, Ohio; the steam boiler line of CLEAVER-BROOKS CO., Milwaukee, Wis.; the compressors and pumps produced by PENNSYLVANIA PUMP & COMPRESSOR CO., Easton, Pa., and pumps, compressors, and sewage treatment equipment manufactured by YEOMANS BROTHERS CO., Chicago, Ill. The company has obtained many other accounts to provide a complete line of contractors' equipment. Agency headquarters and service facilities are located in a building at Eleventh and Howard Sts. in San Francisco.

At the annual meeting of the ASPHALT INSTITUTE, New York City, the board of directors, representing the major part of the petroleum asphalt industry, elected **Norman H. Angell** president and chairman of the executive committee for 1949. **W. L. Spencer** of the Union Oil Co. of Calif. was elected a regional vice president. Angell has been closely affiliated with asphalt sales work of the Standard Oil Co. of Calif. for over 25 years. He has been active in The Asphalt Institute work on the Pacific Coast since its inception 17 years ago, both in the technical development of asphalt uses and in the guidance of the organization in its work on the Coast.

☆ ☆ ☆

D. M. Ebberts, sales manager for MADSEN IRON WORKS, Huntington Park, Calif., announces the appointments of the following firms to handle executive sales and service for Madsen Asphalt Plants, Johnson Float Finishes, Travel-Mix-Plants and a variety of aggregate handling equipment: BARRIOS CO., New Orleans, La., HUNTER TRACTOR MACHINERY CO., Milwaukee, Wisc., and MOTT HAVEN EQUIPMENT, New York City.

☆ ☆ ☆

Appointment of THE J. C. RICHARDS CO. of Los Angeles, Calif., as sales agents has been announced by **Morton S. Miller,** president of GENERAL SWITCH CORP,. Brooklyn, New York. The Richards Co. will service electrical wholesalers in Southern California from their offices and warehouse in Los Angeles where inventory will be maintained.

☆ ☆ ☆

J. E. Nauman, president, KINGWELL BROS., LTD., San Francisco, Calif., announces the new "Kingwell" continuous cast bronze bar, produced for his company by American Smelting and Refining Co. at its Perth Amboy, N. J. plant under a patented process. Contrasted with sand casting methods of bar manufacturing, the continuous flow method withdraws molten metal from an overhead crucible and forms it through a chilled steel die. This patented method assures greater uniformity, an even dispersion of alloy constituents, freedom from porosity, hard spots and surface inclusion of sand. Kingwell engineers are

More Dirt Moves Faster When
OWEN BUCKETS
swing over dump trucks

This claim is strongly substantiated by the increasing numbers of excavating contractors who have standardized on Owen Buckets to "Insure a Bigger Day's Work".

Long popular, Owen design and construction characteristics make for consistent "ease of operation" with "A Mouthful at Every Bite" and a clean and rapid discharge.

OWEN BUCKET CO., LTD. Berkeley, California

Dealers: Los Angeles, Spokane, Seattle, Portland, Salt Lake City, Honolulu.

A MOUTHFUL AT EVERY BITE

available for recommendations for most advantageous use of the new bars. Stocks are now being placed throughout the eleven Western States.

☆ ☆ ☆

Announcement was made recently of the enlargement of the office and warehousing facilities in Fresno, Calif., of the DRAKE STEEL SUPPLY CO., Los Angeles, Calif. According to **A. H. Weinert,** president of the company, phenomenal growth

of Valley industries and unprecedented demand for steel greatly taxed the old facilities and made immediate enlargement mandatory. The new warehouse adds approximately 6600 sq. ft. of storage, and office space has been doubled.

☆ ☆ ☆

Appointment of **Paul C. Van Cleave** as district manager of the Los Angeles, Calif., warehouse of United States Steel Supply Co., a subsidiary of UNITED STATES STEEL, was announced today by the newly elected vice president in charge of Pacific Coast warehouses, **Clifford W. Lord.** At the same time it was announced that **Frank B. Stewart** has been appointed district manager of the San Francisco, Calif., warehouse.

☆ ☆ ☆

Appointment of **William G. Davis, Jr.,** as superintendent of production planning, and **Gordon White** as assistant superintendent of production planning for the Pittsburg, Calif., plant of COLUMBIA STEEL CO. was announced recently.

☆ ☆ ☆

Jay E. Miller, associated with the B. F. GOODRICH CO. in Akron, Ohio, for the past 13 years, has been named western manager of public relations with headquarters at the company's offices in East Los Angeles. Miller's new assignment will include work with all divisions of the Company in its operation over the 11 Western states. Prior to this move, he has been promotion manager for various company divisions, including industrial products and the Associated tire lines. Miller was on the editorial staff of the Detroit Free Press before joining B. F. Goodrich.

☆ ☆ ☆

WOOD MANUFACTURING CO. announces the appointment of WECO EQUIPMENT CO., North Hollywood, Calif., as exclusive California distributors for sales and service of all Wood products. This includes the Wood line of roadmixers, preperizers, windrow spreader boxes, proportioners, bottom dump spreader wagons and portable supply tanks.

☆ ☆ ☆

Appointment of **C. Lee Emerson** as manager of Rolled Steel sales for KAISER STEEL, INC., Oakland, Calif., was announced by **C. F. Borden,** general sales manager. Emerson joined Kaiser Company, Inc., at the Richmond shipyards in the early months of 1942 as steel procurement officer. Following three years of various responsibilities in connection with shipyard steel requirements, he was with Kaiser

The NEW
Martin
Model 48 Concrete
Pipe Machine

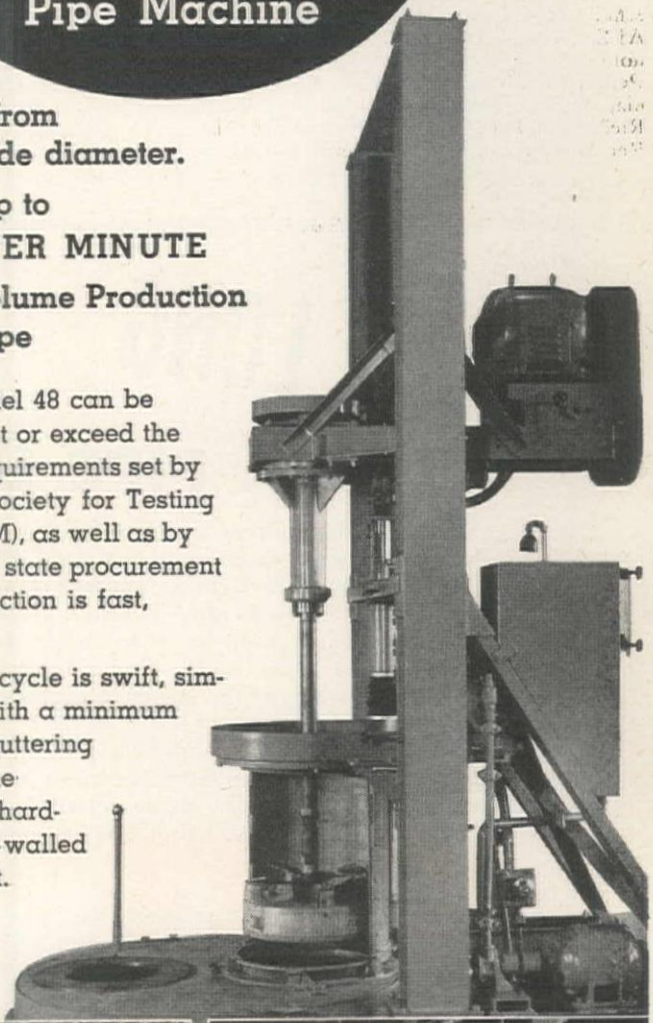
Makes pipe from 4" to 24" inside diameter.

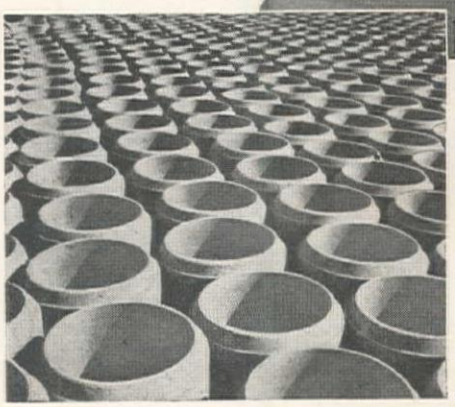
Production up to 2 JOINTS PER MINUTE

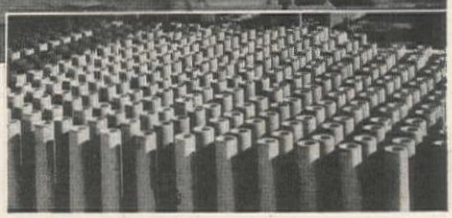
For Large Volume Production of Quality Pipe

The Martin Model 48 can be expected to meet or exceed the specification requirements set by the American Society for Testing Materials (ASTM), as well as by city, county and state procurement agencies. Production is fast, costs are low.

The Production cycle is swift, simple and neat, with a minimum of waste mud cluttering up the base of the machine. Good hard-packed, smooth-walled pipe is the result.







Above: A typical run of 4" Bell and Spigot Sewer Pipe.
Left: A typical two hour run of 12" Tongue and Groove Pipe on a Martin Machine.

Backed by more than 40 years' experience in the manufacture of concrete pipe equipment and irrigation gates and valves.

Write for Folder No. 48

DISTRIBUTORS WANTED

Martin
IRON WORKS
Box 2857, Terminal Annex
Los Angeles 54, California

Steel in the Los Angeles sales office for the last four years.

☆ ☆ ☆

COLUMBIA STEEL CO., Western subsidiary of United States Steel Corp., announced the appointment of PERRY KILSBY, INC., of Los Angeles, Calif., as distributor for Shelby Seamless Tubing, manufactured by National Tube Co. and marketed by Columbia on the Pacific Coast.

☆ ☆ ☆

Riehle Testing Machines Division of AMERICAN MACHINE AND METALS, INC., East Moline, Ill., has announced the appointment of **Howard E. Pellett** as sales engineer covering California, Nevada, and Arizona. Before joining Riehle, Pellett was research supervisor for Republic Steel Corp., and has wide experience in specifying, fabricating, heat treating and testing steel. He will maintain two offices in California, one in San Francisco and one in Los Angeles.

☆ ☆ ☆

ZIMMER-KELLER, INC., Detroit, Mich., advertising agency, has announced the appointment of **Roy H. Compton** as manager of their Los Angeles, Calif., office effective Feb. 1, 1949. Compton will be in charge of Zimmer-Keller's automotive activities on the West Coast with headquarters in Los Angeles.

☆ ☆ ☆

Val Lobanoff has been appointed assistant chief engineer for United Centrifugal Pumps, a division of UNITED IRON WORKS, Oakland, Calif. Because of his previous specialization in refinery and high pressure boiler feed pump design, Lobanoff has been assigned to aid in the development of new lines of centrifugal pumps.

☆ ☆ ☆

GAR WOOD INDUSTRIES, INC., announces the appointment of **W. F. Keeton** as manager of the Los Angeles, Calif. branch. Keeton has been with Gar Wood Industries for 12 years, during which time he has served in an administrative capacity in both the sales and advertising departments.

☆ ☆ ☆

ASSOCIATED WOOD PRODUCTS CO., Berkeley, Calif., and Portland, Ore., announces the affiliation of **Perry E. "Ed" West** as director of sales promotion. West is well known in the architectural, structural engineering and contracting fields. He was California division engineer for Timber Structures, Inc., and helped pioneer that concern when it first entered the roof truss field in California.

☆ ☆ ☆

Norman Zeesman and **Norman Nussbaum**, principals of ZEESMAN PLYWOOD CORP., Los Angeles, Calif., now have the largest known stock of Douglas Fir plywood in Southern California in their

recently enlarged warehouse. Enough fir plywood sheets are maintained in stock to surface over 850,000 sq. ft. Zeesman, left, and Nussbaum are shown checking their stock.

☆ ☆ ☆

PACIFIC NORTHWEST

Collis Johnson, president of INTERSTATE TRACTOR AND EQUIPMENT CO., Portland, Ore., announces the appointment of **George J. Altstadt,** vice president, as general sales manager, and the transfer of **Byrle H. Hunter** to the firm's Portland store managership. Simultaneously it was announced that **S. G. Rodway** and **J. V. Chamberlain** have been named managers of the company's stores at Eugene, Ore., and Roseburg, Ore., respectively.

☆ ☆ ☆

Election of **Clifford W. Lord** as vice president in charge of all Pacific Coast warehouses, including two newly added facilities at Portland, Ore., and Seattle, Wash., was announced by **L. B. Worthington,** president of UNITED STATES STEEL SUPPLY CO., Chicago, Ill., warehousing subsidiary of United States Steel Co. Prior to his election, Lord was district manager of the Los Angeles and

HOW LONG
IS A PIPE LINE?

Measure it in labor time, and you'll discover that any pipe line is shorter when you use ARMCO Welded Steel Pipe.

That's because this light-weight pipe is so easy to handle and install. The whole job goes faster, smoother and more profitably. Lengths up to 40 feet mean fewer joints—there are just 132 in a mile. And even these go together quickly with any of the standard couplings or by field welding.

ARMCO Steel Pipe is supplied in diameters from 4 to 24 inches and in gages from No. 16 to No. 3. Use it for water supply and force mains, oil and gas lines, plant piping and similar installations. Write us today for complete information.

ARMCO

ARMCO DRAINAGE & METAL PRODUCTS, INC.
CALCO - NORTH PACIFIC - HARDESTY DIVISIONS
Berkeley—Los Angeles—Seattle—Spokane
Portland—Salt Lake City—Denver

ARMCO WELDED STEEL PIPE

with OLIVER "Cletrac"!

One of the primary features designed into every Oliver "Cletrac" crawler tractor is safety . . . safe traveling on dangerous hills and slopes.

The exclusive Oliver "Cletrac" steering principle assures positive traction on both tracks *at all times*. For example, when turning, one track is speeded up, the other slowed down. Power is never completely disconnected from either track at any time as is the case with "clutch" type steering. Thus there is always a factor of safety with both tracks engaged, providing power and traction where operations must be carried out regardless of conditions . . . added safety on hills and slopes. It's easier to handle, too, because there is no need to "declutch" when turning.

This exclusive steering principle lets you take full advantage of all tractor power. Since there is always power on both tracks, you can handle bigger loads . . . can balance the side drag of off-center loads . . . get more work done in less time, features that mean greater profit for you.

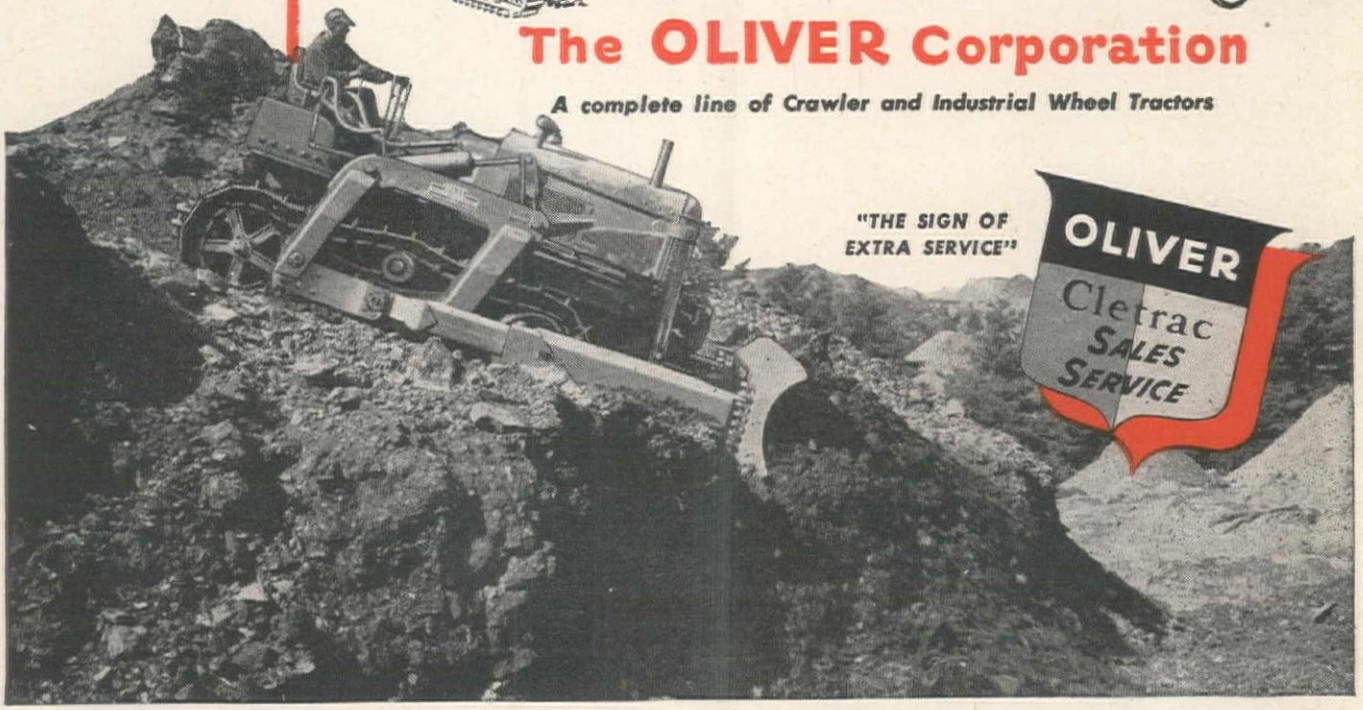
Investigate the *plus* advantages you get with an Oliver "Cletrac" crawler tractor. Your Oliver "Cletrac" dealer will be glad to give you the story. The OLIVER Corporation, Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio.

Cletrac

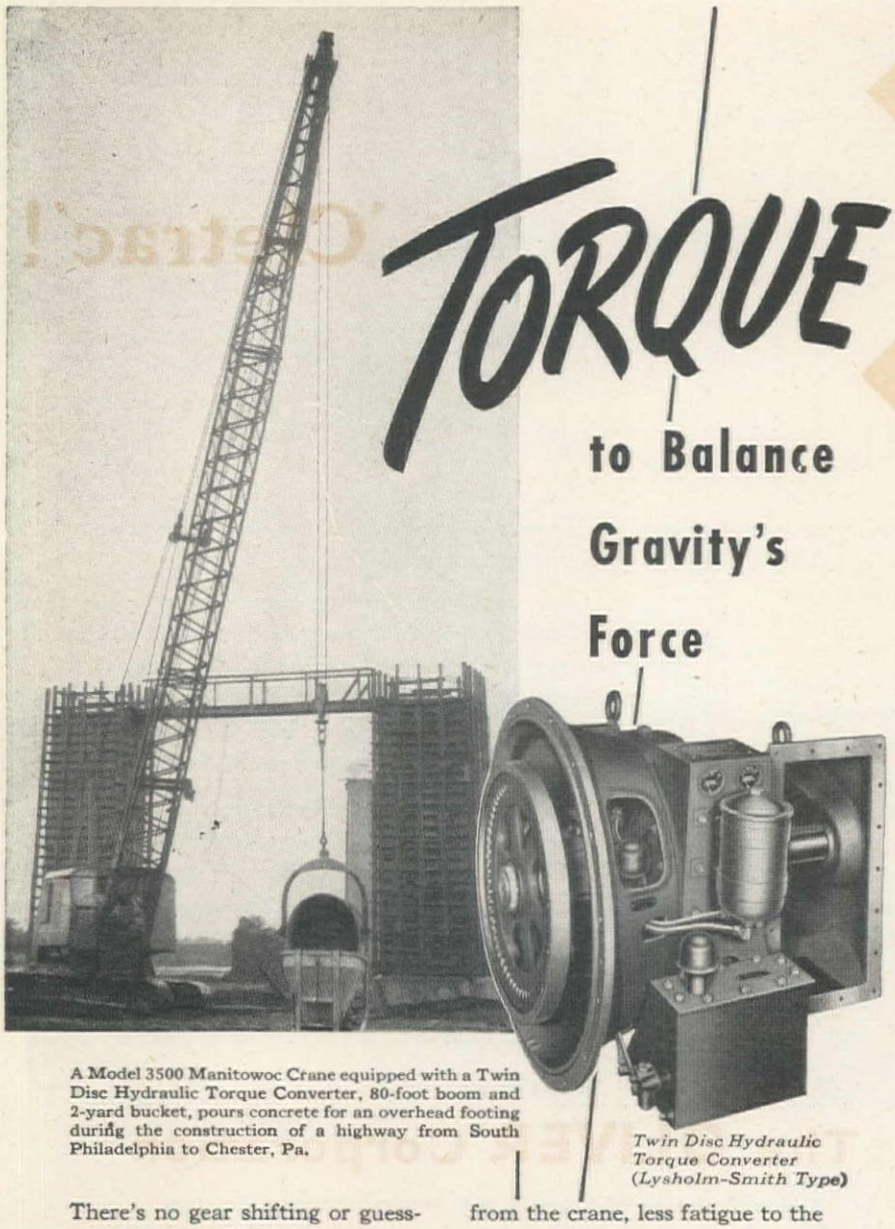
a product of

The OLIVER Corporation

A complete line of Crawler and Industrial Wheel Tractors



State of Arizona: Guerin Implement Co., Phoenix., 1401 S. Central St. ***State of California:*** Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Ashton Implement Co., Salinas; Comber & Mindach, Modesto; Tractor Service Company, Inc., 820 Broadway, Chico; Tractor & Equipment Co., San Leandro; Flood Equipment Co., Sacramento; W. J. Yandle Co., Santa Rosa; Hamsher Tractor Co., Stockton; Branch Equipment Co., Ventura; Jim Ingle Co., Fresno and Tulare; Oliver Implement Co., Bakersfield; Turner & Chapin, Whittier; Farmers Tractor & Implement Supply Company, Colton. ***State of Washington:*** Inland Diesel & Machinery Company, Spokane; Pacific Hoist & Derrick Co., Seattle; Melcher-Ray Machinery Co., 202 East Alder Street, Walla Walla; Central Tractor and Equipment Co., Wenatchee. ***State of Oregon:*** Loggers & Contractors Machinery Co., Portland, Eugene & Klamath Falls. ***State of Idaho:*** Idaho Cletrac Sales Co., Lewiston; Engineering Sales Service, Inc., Boise. ***State of Montana:*** Western Construction Equipment Company, Billings and Missoula. ***State of Nevada:*** B & M Tractor & Equipment Corp., 1420 S. Virginia St., Reno. ***British Columbia:*** Pacific Tractor & Equipment, Ltd., 505 Railway Street, Vancouver.



TORQUE to Balance Gravity's Force

A Model 3500 Manitowoc Crane equipped with a Twin Disc Hydraulic Torque Converter, 80-foot boom and 2-yard bucket, pours concrete for an overhead footing during the construction of a highway from South Philadelphia to Chester, Pa.

Twin Disc Hydraulic Torque Converter (Lysholm-Smith Type)

There's no gear shifting or guesswork involved in crane operation when a Twin Disc Hydraulic Torque Converter transmits the engine's power to hoist and swing.

Applying just enough torque to balance gravity's force, the operator can hold his load motionless in midair . . . then ease it gently up or down, without bobbing, by varying the throttle setting.

The ease of operation and complete absence of jolts and shock that result from Torque Converter operation increase daily output all the way around . . . more work from the crane, less fatigue to the crane operator.

The more a Twin Disc Hydraulic Torque Converter is slowed down by the work it has to do, the more power it exerts to do that work, as measured in foot-pounds of output torque. Gasoline and diesel engines perform more efficiently and maintenance costs are materially reduced. Write the Hydraulic Division for your copy of Converter Bulletin 135-C. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

San Francisco warehouses. Associated with the company since June, 1947, he formerly occupied various positions with Columbia Steel Co. in the Los Angeles office.

☆ ☆ ☆

INTERMOUNTAIN

Roland Vokac is now associated with the HUSKY REFINING CO., Cody, Wyo., in a consulting and advisory capacity. Vokac will assist in the development of Husky's industrial asphalts as well as advise in all their manufacturing operations.

☆ ☆ ☆

AMONG THE MANUFACTURERS

John C. Keplinger, vice president in charge of sales of HERCULES MOTORS CORP., Canton, Ohio, was promoted to executive vice president of the company at a recent meeting of the board of directors. Keplinger has been associated with the company since July, 1926, and has served progressively as a member of the sales staff, sales manager and vice president in charge of sales. He will continue to direct the sales activities of the company.

☆ ☆ ☆

Jim Sevick has been named district sales representative for R. G. LeTOURNEAU, INC., Peoria, Ill., for the states of Okla, Ark., Miss., La., and western Tennessee. Coming to LeTourneau early in 1948, Sevick has been at Oakland, Calif., for the past few months as assistant to the western sales manager. Before joining LeTourneau, Sevick was industrial engineer for Johns-Manville Corp. at Waukegan, Ill. He also served as mining engineer and asst. mine superintendent for Industrial Collieries Corp., Fairmont, W. Va.

☆ ☆ ☆

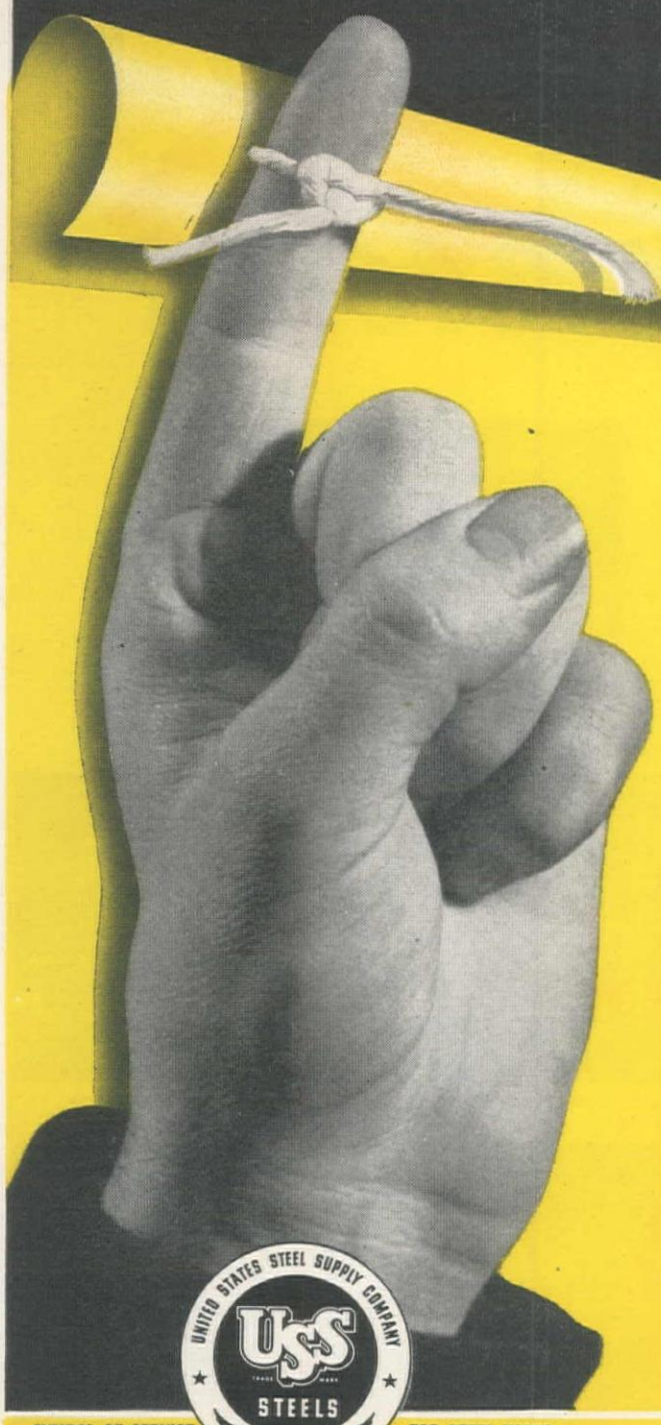
A. W. Wagner has been appointed general parts division manager it was announced by **A. W. Smythe,** vice president and general manager of THE THEW SHOVEL CO., Lorain, Ohio. Wagner will temporarily continue his duties as manager of parts division sales. He in turn appointed **Cyril Brecknock** as manager of parts division manufacturing in charge of Plant No. 5. **N. W. Anderson** was named manager of parts division operations. **Don Lewis** was appointed manager of parts division publications and catalog design. The complete parts division recently underwent an extensive expansion program. A new warehousing building as well as an addition to the office building at Plant 3 and a foundry addition at Plant 5 were completed recently.

☆ ☆ ☆

Robert H. Morse, Jr., vice president of FAIRBANKS, MORSE & CO., was elected president and treasurer of the DIESEL ENGINE MANUFACTURERS ASSOCIATION, Chicago, Ill., at their annual meeting in December. Elected as vice presidents were **A. W. McKinney,** executive vice president of NATIONAL SUPPLY CO., and **O. H. Fischer,** president of THE UNION DIESEL ENGINE CO. Directors elected in addition to the three men above were **George W. Codrington,** vice president of GENERAL MOTORS CORP. and gen. manager of Cleveland Diesel Engine Division; **Perry T. Egbert,** vice

TRY US FIRST

when you need Stainless Steel



Are you looking for Stainless? Then you'll be glad to learn that our stocks include: No. 2B Finish Sheets "par-excellence"; No. 4 Finish Sheets of uniform quality; bars meeting high standards of machinability; plates up to 120″ wide and 360″ long; welded and seamless tubing, pipe, angles, channels, welding electrodes in all standard grades and specifications.

Moreover, you can't beat U·S·S Stainless Steel for quality and proven excellence. And you'll get prompt, courteous service.

Fill in and mail the coupon — now — for free booklets on U·S·S Stainless Steel.

TURN IN YOUR SCRAP · The more scrap—the more steel

United States Steel Supply Company
Dept. AA-29, 208 S. La Salle St., Chicago 4, Ill.
Without obligation on our part, please send us free booklets on U·S·S Stainless Steel as checked below.

☐ Fabrication Book ☐ Food Handling and Processing ☐ Petroleum Industry

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

SYMBOL OF SERVICE — UNITED STATES STEEL SUPPLY COMPANY — USS STEELS — SERVICE — FOR STEEL USERS

UNITED STATES STEEL SUPPLY COMPANY

SAN FRANCISCO (1), P. O. Box 368, 1940 Harrison St., MArket 1-4988, ENterprise 1-0017 (Trans-Bay Only)
LOS ANGELES (54), P. O. Box 2826—Terminal Annex, 2087 E. Slauson Ave., LAfayette 0102
SEATTLE (1), Sales Office: 1331 Third Ave., Room 402, ELliott 3014, Whse: 3rd. South & Lander Sts.
PORTLAND (10) ORE., 2345 N.W. Nicolai St., CApitol 3283

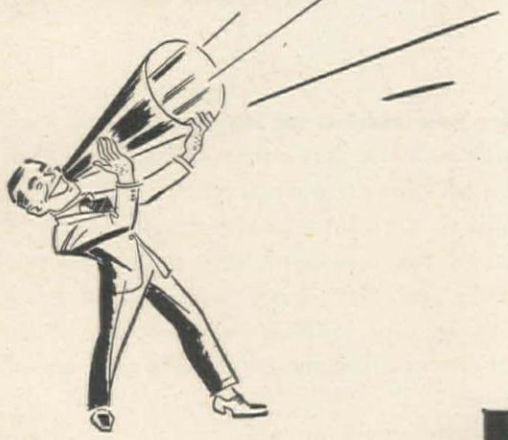
Warehouses: BALTIMORE · BOSTON · CHICAGO
CLEVELAND · LOS ANGELES · MILWAUKEE · MOLINE, ILL. · NEWARK · PITTSBURGH
PORTLAND, ORE. · SAN FRANCISCO · SEATTLE · ST. LOUIS · TWIN CITY (ST. PAUL)
Also Sales Offices at: KANSAS CITY · PHILADELPHIA · TOLEDO · TULSA · YOUNGSTOWN

USS

UNITED STATES STEEL

ATTENTION

DAM CONTRACTOR



DON'T stick your neck out.

Before you make a bid involving rubber Gate and Lock Seals, Water Stops, or other molded parts, get accurate costs *FIRST* from a manufacturer who has had plenty of experience in working with dam engineers.

Many a contractor has underestimated the cost of these items . . . not realizing that they are made to accurate specifications from special high-quality rubber compounds that must give trouble-free service for many years.

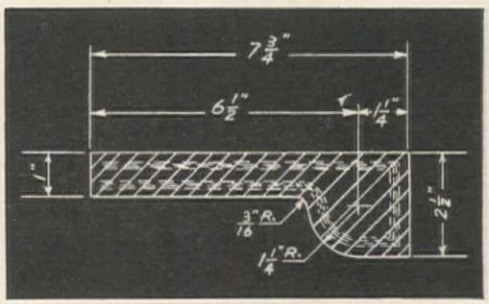
Play safe, consult with an engineer from U. S. Rubber. You'll probably save money, if you do.

Write Molded Goods Sales, United States Rubber Company, 1 Market St., Passaic, New Jersey.

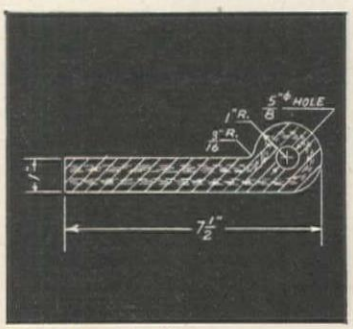
Made by

U.S.RUBBER
SERVING THROUGH SCIENCE

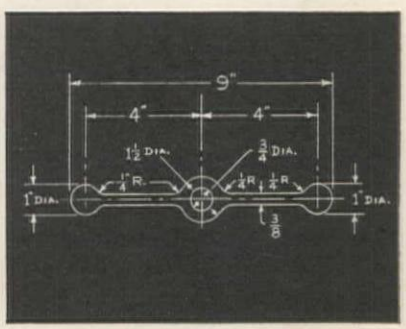
UNITED STATES
RUBBER COMPANY



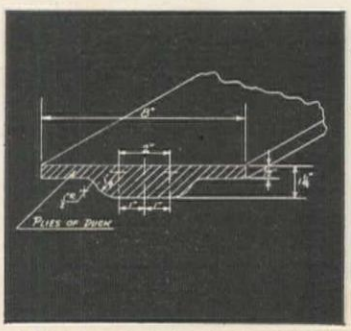
MOLD G-49121—"PORK CHOP" TYPE GATE SEAL



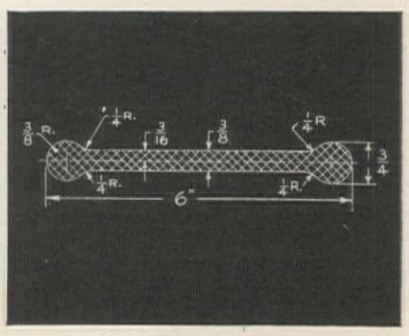
MOLD G-49123—"J" TYPE GATE SEAL



MOLD G-49125—WATER STOP



MOLD G-49143—CAISSON SEAL



MOLD G-49169—WATER STOP

"A few of the many designs for which U. S. Rubber has molds."

"U. S." ENGINEERED RUBBER PRODUCTS FOR THE CONTRACTOR

AIR, WATER, STEAM SUCTION HOSE · CONVEYOR BELTS · V-BELTS · PACKINGS · HYDRON

president in charge of Diesel and locomotive sales, AMERICAN LOCOMOTIVE CO.; **Robert E. Friend,** president of NORDBERG MFG. CO.; **Gorden LeFebvre,** president of THE COOPER-BESSEMER CORP.; **Walter A. Rentschler,** vice president of LIME-HAMILTON CORP.; **E. J. Schwanhausser,** vice president in charge of sales, WORTHINGTON PUMP & MACHINERY CORP.; and **Marvin W. Smith,** executive vice president of THE BALDWIN LOCOMOTIVE WORKS. **Harvey T. Hill** was reappointed executive director of DEMA, and enters upon his fifth year of service at that post.

☆ ☆ ☆

John S. Coleman, president of BURROUGHS ADDING MACHINE CO., was elected a director of FRUEHAUF TRAILER CO. at the annual meeting of the trailer firm's board of directors. In addition to his duties with Burroughs, Coleman is a director-at-large of the National Association of Manufacturers and a director of Standard Accident Insurance Co. of Detroit. He is a member of the Economic Club and Engineering Society of Detroit; American Management Association; Detroit Board of Commerce; Detroit Club and a director of the Employers Association of Detroit.

☆ ☆ ☆

W. G. Frome was elected member of the executive committee at a meeting of the board of directors of ATLAS POWDER CO., Wilmington, Del. Frome continues as vice president of the company and general manager of the explosives department.

☆ ☆ ☆

Dr. William L. Davidson, an international authority on atomic energy, has been named director of the B. F. GOODRICH COMPANY, Akron, Ohio, physical research department, it is announced by **Dr. Howard E. Fritz,** vice president in charge of research. Davidson, a graduate of William and Mary College and of Yale University, has been with B. F. Goodrich since 1940 and is co-author of a textbook on nuclear physics widely used in major colleges and universities. The rubber company scientist went to the government atomic energy project in Oak Ridge, Tenn. in 1947 and returned to Ohio before the new B. F. Goodrich Research Center at Brecksville, Ohio, began operation in June, 1948.

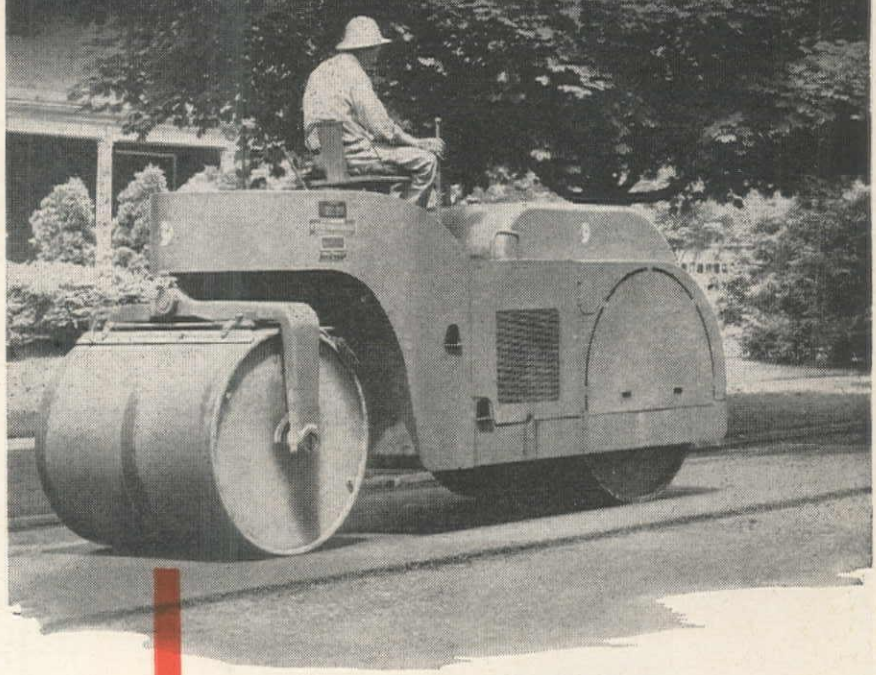
☆ ☆ ☆

Appointment of **C. S. Gotwals** as quality manager of all SKF INDUSTRIES, INC., plants is announced by the Philadelphia Pa., ball and roller bearing firm. Gotwals was instrumental in installing SKF's rigid quality-control system during the war and served as chief of inspection and quality-control prior to becoming superintendent of the main plant in Philadelphia in 1944. He has been associated with the company since 1915. **Charles R. Scott, Jr.,** in charge of the machining division since 1946, succeeds Gotwals as superintendent.

☆ ☆ ☆

TRUSCON STEEL CO. announces that **C. B. McGehee,** after a year's leave of absence, has returned to assume the responsibilities of his former position as general manager of sales.

BEST OPERATOR *Vision* EVER OFFERED IN A TANDEM ROLLER



A roller operator must be able to see where he is working at all times without difficulty. That's why the new Buffalo-Springfield tandem rollers, with the sides of their drive roll hoods relieved and their final drive placed on the side opposite the operator, present the most complete vision ever offered in tandem rollers.

THE STANDARD OF COMPARISON

BUFFALO SPRINGFIELD

SPRINGFIELD, OHIO

CLYDE EQUIPMENT CO. ..... Seattle, Washington
CONSTRUCTION EQUIPMENT CO. ..... Spokane, Washington
RAY CORSON MACHINERY CO. ..... Denver 2, Colorado
CRAMER MACHINERY CO. ..... Portland, Oregon
CROOK COMPANY ..... Los Angeles, California
INTERMOUNTAIN EQUIPMENT CO. ..... Boise, Idaho
INTERMOUNTAIN EQUIPMENT CO. ..... Pocatello, Idaho
THE SIERRA MACHINERY CO. ..... Reno, Nevada
STEFFECK EQUIPMENT CO. ..... Helena, Montana
WORTHAM MACHINERY CO. ..... Cheyenne, Wyoming
(Branches at Sheridan & Greybull)
SPEARS-WELLS MACHINERY CO., INC. ..... Oakland 7, California
R. L. HARRISON CO., INC. ..... Albuquerque, New Mexico
O. S. STAPLEY COMPANY ..... Phoenix, Arizona
J. K. WHEELER MACHINERY CO. ..... Salt Lake City, Utah

NEW EQUIPMENT

MORE COMPLETE INFORMATION on any of the new products or equipment briefly described on the following pages may be had by sending your request to Equipment Service, Western Construction News, 503 Market Street, San Francisco 5, Calif. For quicker service, please designate the item by number.

201

Pavement Breaker

Manufacturer: Rapid Pavement Breaker Corp., Los Angeles, Calif.

Equipment: Late model Mighty Midget.

Features claimed: More steering control is obtained with higher wheels and a worm gear drive with conventional steering wheel. All controls are within easy reach of the operator's seat, directly behind the machine, allowing the operator to see at all times where and how the hammer hits the pavement.

202

Concrete Drill

Manufacturer: Tilden Tool Mfg. Co., Pasadena, Calif.

Equipment: Drill bit with sintered carbide cutters.

Features claimed: Because of its core drill design and side exhaust slot, the Tilden drill bit can penetrate concrete at the rate of 2 in. or more per minute in diam-

eters of ¼ in. to 2 in. Specially treated sintered carbide cutters are located around the perimeter of the core, and can be resharpened on any ordinary grinder used for tungsten carbide. The drills are available in all sizes from ¼ in. to 2¼ in. and in sizes from 2 in. to 6 in.—up to 4-ft. lengths—for taking samples and drilling through walls.

203

Concrete Mastic

Manufacturer: Keystone Asphalt Products Co.

Equipment: Asphaltic base plate mastic.

Features claimed: Used under the expansion joints of rigid type pavements, the mastic board prevents water seepage and pumping action of pavement slab on subbase. Built to last the life of the road, the base plate mastic is furnished precut from the factory in ¼-in. thickness.

204

Front End Loader

Manufacturer: Galion Iron Works & Mfg. Co., Galion, Ohio.

Equipment: Scoop loader attachment.

Features claimed: The loader is designed for attachment to the Galion No. 402

Maintenance Motor Grader, and makes it possible to windrow dirt or snow, scoop it up and load it on trucks in a continuous operation. Lifting operation is by hydraulic power under finger-tip control from the grader seat and operation is independent of the scarifier. The loaded bucket is tripped by manual cable control. Capacity of the standard bucket is 9 cu. ft.

205

Air Compressor

Manufacturer: O. K. Clutch and Machinery Co., Columbia, Pa.

Equipment: Compressor SS60 made of standard automotive parts.

Features claimed: This portable, lightweight air compressor keeps manufacturing costs down by the use of Ford motor and standard automotive parts. Compressor delivers 60 cu. ft. of free air per minute with an air tank capacity of 4 cu. ft.

206

Giant Portable Crusher

Manufacturer: Pioneer Engineering Works, Inc., Minneapolis, Minn.

Equipment: Primary crushing plant, easily dismantled for moving.

Features claimed: This new plant, designated the No. 153 PR, has a 3042 overhead eccentric jaw crusher with 42-in. x 14-ft., 3-chain apron feeder, mounted on a 3-axle chassis equipped with 12-12.00 x 20 pneumatic tires. A 30-in. x 25-ft. built-in conveyor delivers the crushed material over the front end of the plant. Standard equipment includes a removable bolster for the front wheels. Overall length of the plant is 40 ft. 6 in. Weight without "on plant" power unit, 79,000 lb. Power required for operation is 125 h.p. continuous. An interesting feature of the plant is the simplicity of design which allows for a minimum of dismantling for moving. The feeder can be raised or lowered readily by means of two hydraulic rams actuated by a single Blackhawk pump.

207

Welding and Brazing Fluxes

Manufacturer: Victor Equipment Co., San Francisco, Calif.

Equipment: Four new fluxes.

Features claimed: Victor No. 9 flux is effective for fast welding of cast iron. It will not cake when container is subjected to moderately high heat. Number 7 flux is used for high heat brazing of cast and malleable iron where base metal gets exceptionally hot. Number 5 flux, for moderate heat brazing of cast and malleable iron, does an excellent job of "tinning" dirty castings. Number 3 flux is effective for brazing brass and bronze, steel, clean cast and malleable iron.

208

Well Pump

Manufacturer: Peerless Pump Division, Food Machinery and Chemical Corp., Los Angeles, Calif.

Equipment: Turbine pump for small diameter deep wells.

Features claimed: The new pump, designated as the "Peerless Champion," fills the gap in water production from deep wells of 4-in. diameter and larger. It is capable of developing water capacities up to 5,000 gal. per hr. from depths as great as 200 ft. The model is an open line shaft pump and bowl and shaft bearings are lubricated by the well's own water. No oil is used underground. All shafting is stainless steel, and utilization of long fluted rubber shaft bearings, spaced every 5 ft., provides resistance to normal sand and abrasive conditions. Impellers are die cast bronze, hand finished and balanced. The Champion is ideally adapted to a vertical tank pneumatic pressure system, being capable of developing pressures up to 90 lb. or more.

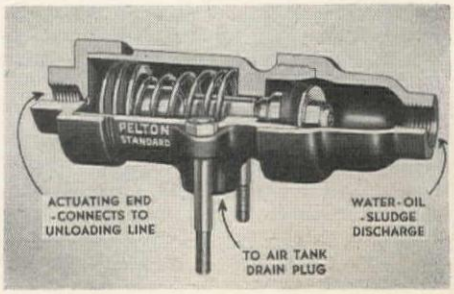
209

Moisture Ejector Valve

Manufacturer: Monroe Standard, Inc., Galion, Ohio.

Equipment: Port and piston type unit to eject water, oil and sludge from air compressor storage tanks.

Features claimed: The valve operates automatically each time the compressor "cuts in" and "cuts out" with the tank pres-



MM
MINNEAPOLIS MOLINE
MODERN MACHINERY

Power Units* Cut Operating Cost

MM POWER UNITS *in* 6 sizes - 25 h.p. *to* 230 h.p.

Economically Powering:
Hoists, Crushers, Pumps, Shovels, Generators, Conveyors, Cranes, etc.

*Select the MM Power Unit of the recommended size for your job and you have long-life, low-cost *dependable* power! And there's a reason . . .

MM Power Units are planned, designed and manufactured with all accessories as an integral part of the complete unit! Oil filters, governors, safety cut-outs on cooling system and lubrication system . . . these and many other MM features are built-in, planned parts of a power package!

The increased power of MM Units results from an improved combustion chamber design and controlled cooling that make valves longer lasting and give added economy of operation. MM crankcase ventilation minimizes maintenance, and at those infrequent times when even MM Power Units require attention, the removable cylinder heads and block simplify servicing and reduce costs. Drop forged steel crankshafts and special valve inserts are additional MM features that give that extra "staying power" for which MM Power Units are famous!

Get complete information and specifications from your nearest MM Dealer on economical, dependable MM Power Units.

Model 283 Operating Hoist On a Construction Job.

MM DEALERS:

LEE REDMAN EQUIP. CO., Phoenix, Ariz.; INDUSTRIAL EQUIP. CO. OF SO. CALIF., Los Angeles, Calif.; WESTERN MACHINERY CO., Sacramento and San Francisco, Calif.; CLYDE EQUIP. CO., Portland, Ore., and Seattle, Wash.; MODERN MACHINERY CO., Spokane, Wash.; THE SAWTOOTH CO., Twin Falls and Boise, Idaho; REED HDWE. & IMPLT. CO., Idaho Falls, Idaho; MISSOULA MERC. CO., Missoula, Mont.; HAMILTON EQUIP. CO., Salt Lake City, Utah; HARRY CORNELIUS CO., Albuquerque, N. Mex.; BASIN TRUCK & IMPLT. CO., Durango, Colo.; CONSTRUCTORS EQUIPMENT CO., Denver, Colo.; LADD LUMBER & MERC. CO., Pueblo, Colo; CENTRAL MACH. CO., Great Falls, Mont.; CROSKREY-CARLSON CO., Kalispell, Mont.; GALLATIN IMPLT. CO., Bozeman, Mont.; MILLS IMPLT. CO., Billings, Mont.; TRACTOR & EQUIP. CO., Miles City, Mont.; WYOMING ELEV. & SUPPLY CO., Worland, Wyo.

MINNEAPOLIS-MOLINE
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA

sure furnishing the motive force. Construction is of bronze with reinforced Neoprene caps. Self cleaning action prevents carbonization of working parts.

210

Tilt Type Trailers

Manufacturer: Foster Trailer Co., Los Angeles, Calif.

Equipment: Trailer and flat bed truck for loading equipment without use of special loading ramps.

Features claimed: Three exclusive Foster developments make the double loading possible. Automatic cribbing brakes prevent movement of the trailer while loading, an automatic hydraulic tilting control cylinder allows the trailer bed to tilt gently under loads, and loading-aid hooks are placed in recesses on the truck bed to help in moving the equipment across the trailer to the truck bed. The trailers are available in two primary types, tandem and single axle, and in fourteen production models. Special designs are also available.

211

Truck Tracks

Manufacturer: P & G Supply Co., Portland, Ore.

Equipment: Crawler type tracks to fit hauling equipment.

Features claimed: The tracks may be fitted to single or tandem axle trucks equipped with most standard dual tires. Mounting is a simple operation requiring about 10 min., with less time required for removal. Pads are made of drop-forged steel alloy. Fitting is done by adding or removing pads and linkage. Each pad has a master adjustment to assure proper track tension. Connecting the pad is a cadmium-plated chain of heat-treated, high tensile steel. The tracks have been tested and approved by the U. S. Army Engineers.

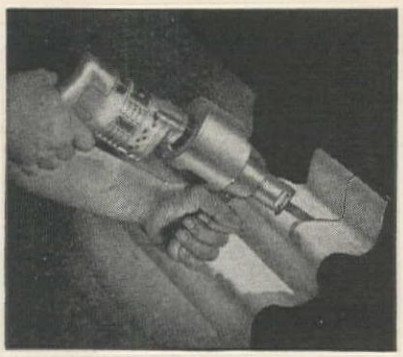
212

Portable Power Saw and File

Manufacturer: Anchor Mfg. Co., Chicago, Ill.

Equipment: Unit that attaches directly to electric or air drills or a flexible shaft for power.

Features claimed: The unique mechanism of the unit converts the rotary action



of the power unit to a reciprocating motion. By inserting an ordinary hack-saw blade in the holder, a fast power saw is provided that will quickly cut through all metals. It can be quickly converted to a power file by simply inserting a machine file in place of the cutting blade. For working in close quarters, it has an adjustable handle which can be turned and locked in any desired position.

213

Rock Crusher

Manufacturer: Latture Crusher Co., Los Angeles, Calif.

Equipment: Double-Conical Reduction Crusher.

Features claimed: Hardest rock is fractured with a minimum of both fines and power requirements by the transverse impact principle. The reduction crusher has positive feed and discharge and will not clog when handling wet or sticky material. Special linkage gives overload protection.

214

Light-Weight Welder

Manufacturer: General Electric Co., Schenectady, N. Y.

Equipment: Engine-driven DC welder, designed for a wide range of general applications.

Features claimed: Weighing only 660 lb. for a maximum of 250 amperes of welding current, the new welder can be easily transported on a pick-up truck, leaving ample truck capacity for other equipment. It is powered by a Wisconsin VF-4 air-cooled engine, speed-ratio-coupled by a steel-core V-belt drive to a G.E. Type WD-3200 generator with 50 per cent duty cycle. A fully calibrated dual control permits the accurate setting of a desired welding current before the arc is struck. The welder has a built-in auxiliary power outlet of 110 volts for the operation of lights and power tools, and stands on a full-length, rigid, welded steel base.

1. PLAY SAFE . . . . . .
. . . 2. CUT COSTS . . .
. . . . . 3. WORK FAST

Three things happen when you blast with PRIMACORD-BICKFORD Detonating Fuse

Improves powder efficiency	One cap shoots unlimited charges
Practically instantaneous	Simple to hook up—simple to check
Always safe to handle	No caps required in holes

Other Coast Products:
Coast Safety Fuse
Spittercord
Celakap
Hot Wire Fuse Lighters

COAST MANUFACTURING & SUPPLY COMPANY ESTABLISHED 1867 LIVERMORE CAL.

COAST MANUFACTURING & SUPPLY CO.
Livermore, Calif.

AN AMAZING LUBRICANT

LUBRIPLATE 130-AA

Protects Against Rust and Corrosion

A super grease-type lubricant! A marvelous anti-seize compound and a real protector against rust and corrosion. From the standpoint of general utility and diversity of important uses, LUBRIPLATE 130-AA is unequalled. While it is ideal for the heaviest loads, this remarkable lubricant does not cause drag and actually conserves power. Write for a free copy of the LUBRIPLATE Service Hand Book.

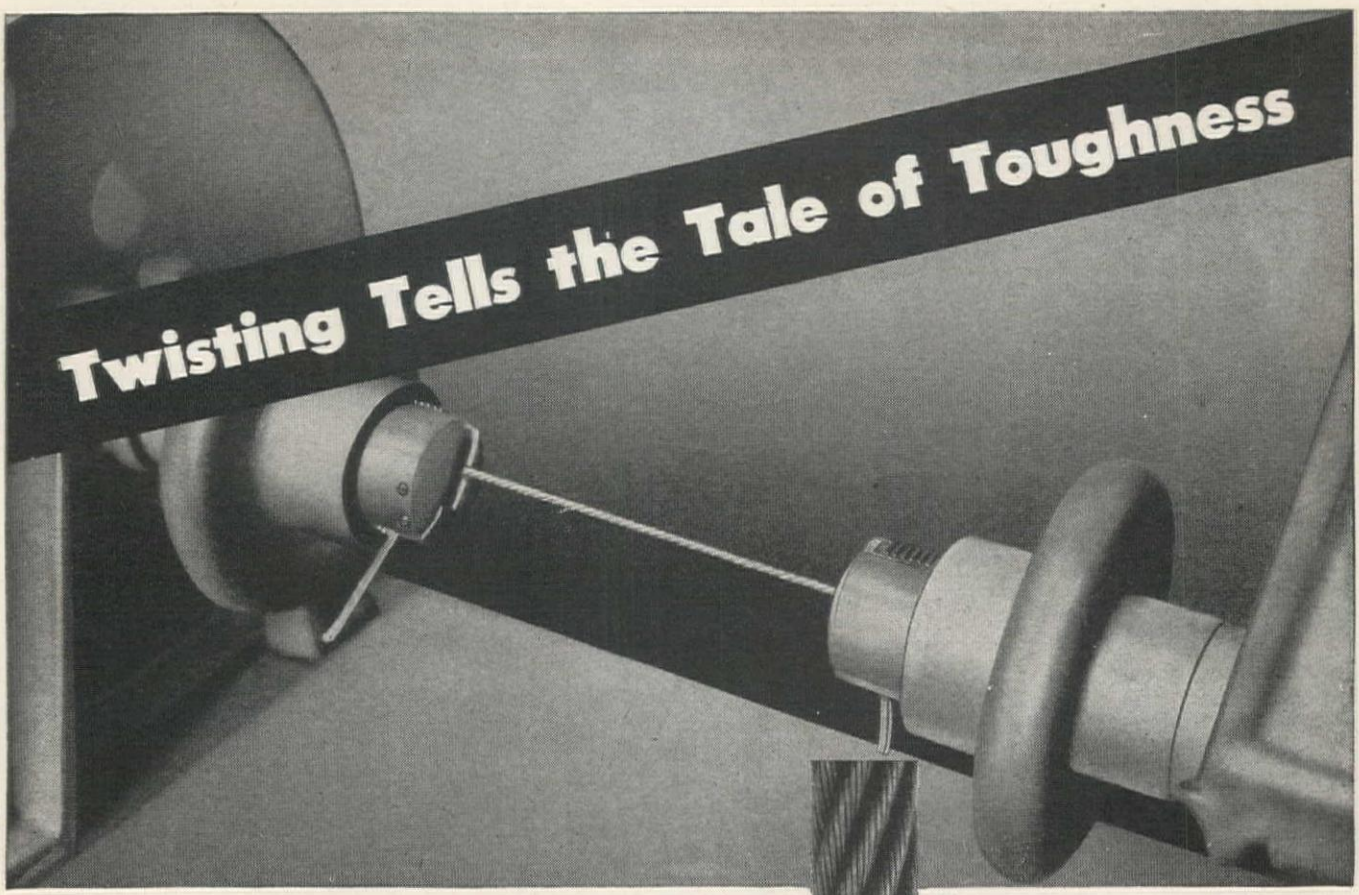
LUBRIPLATE DIVISION
FISKE BROS. REFINING COMPANY
Newark 5, N. J. • Toledo 5, Ohio

DEALERS FROM COAST TO COAST • *See Your Local Classified Telephone Book*

Here's a new catalog you should see. It fully describes the latest model of the finest mobile, self-propelled, one man operated *Power Shovel and Crane* mounted on its own specially engineered short coupled chassis . . .

BYERS *Traveler*

REQUEST FROM BYERS RAVENNA, OHIO OR YOUR NEARBY BYERS EQUIPMENT DISTRIBUTOR



Here we see an 8" piece of rope wire being twisted on its own axis. The revolutions necessary to break the wire are counted and only those coils are accepted which test at least 10% above American Petroleum Institute specifications for wire rope. In addition to being an indication for toughness, the torsion test reveals whether the wire is free from steel defects such as seams and cups.

A routine test? Yes, but with higher standards. And every coil of wire on both ends must pass this and countless other tough tests before acceptance for use in making Wickwire Rope. It's these tests, coupled with over 125 years of wire-working know-how, that are your assurance of the utmost in performance, safety and long rope life when you use Wickwire Rope.

Wickwire Distributors and Wire Rope engineers throughout the country are ready to help solve your wire rope problems, and to provide prompt delivery of the rope you need from strategically located warehouse stocks. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed.

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE. WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write —Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

WICKWIRE ROPE

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

CF&I & SUBSIDIARIES

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass. **EXECUTIVE OFFICE**—500 Fifth Avenue, New York 18, N. Y.

SALES OFFICES—Abilene (Tex.) • Boston • Buffalo • Chattanooga • Chicago • Denver • Detroit • Emlenton (Pa.) • Fort Worth • Houston • New York • Philadelphia • Tulsa

PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

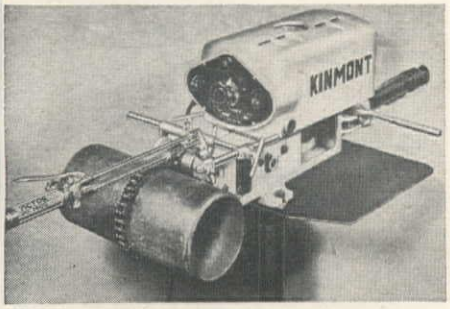
215

Cutting Torch Attachment

Manufacturer: Kinmont Manufacturing Co., Inc., Glendale, Calif.

Equipment: Accessory for Kinmont Universal Power Unit.

Features claimed: The new attachment provides speedier adjustment of the cutting torch in handling a wide range of pipe sizes



and increased ability to maintain smooth bevels and square cutoffs. A patented split link chain drive holds the pipe tightly locked in position as it turns against fixed rollers on the power unit. The range of the Cutting Torch Attachment permits use on any pipe size from 3 to 36-in. diameter, and on tanks up to 10 ft. in diameter when turned on a roller rack.

216

Pipe Conveyor Truck

Manufacturer: Pearne & Lacy Machine Co., Los Angeles, Calif.

Equipment: Ceramic pipe conveyor.

Features claimed: Developed by the Pacific Clay Products Co. at Whittier, Calif., the conveyor truck is built with 7 metal prongs instead of a single flat loading platform. The prongs are spaced so that they can be inserted in the centers of a horizontal row of pipes, thus permitting easy movement with a minimum of breakage.

217

Window Sash

Manufacturer: East Side Tool and Die Works, Portland, Oregon.

Equipment: "Ball Bearing Window Glide."

Features claimed: The device is a metal strip that lies in the side channels and a ball bearing mounted in the side of the sash. As the bearing rolls up or down it seats itself in holes punched in the strip, securing the sash at any level. The glides are furnished with or without weather seal.

218

Asphalt Plant

Manufacturer: Madsen Iron Works, Inc., Huntington Park, Calif.

Equipment: Portable asphalt paving plant.

Features claimed: The new "1000 Madsen Asphalt Paving Plant" rolls on its own wheels from job site to job site and has a capacity of 30 to 40 tons per hour of bituminous aggregate. The plant can be profitably used for jobs as small as 1,500 tons, yet can handle jobs as large as 7,000 to 10,000 tons. Easy to erect, the plant is equipped with patented jack legs on all four corners, making it possible to erect the plant to its full operating height in three hours without the assistance of a crane, jim poles or skids. A single source of power, either electric motor or Diesel engine, operates all parts of the plant, including the cold-stone elevator, dust-elevator and screw, vibrating screen, pug mill mixer and pressure-injection pump.

219

Giant Mobile Crane

Manufacturer: The Thew Shovel Co., Lorain, Ohio.

Equipment: Rubber-tired, two-engined Moto-Crane with 45-ton capacity.

Features claimed: The Lorain MC-820 Moto-Crane has a safe-rated lifting capacity, on outriggers, of 45 tons at a 12-ft. radius. Weighing 65 tons, the new machine has the following overall dimensions: length, with boom in travel position over front of carrier, 66 ft., 5 in.; width, outside to outside of tires, 11 ft., 7¾ in.; height with gantry erected, 19 ft., 5 in. The crane comprises two basic components. These consist of the carrier, or rubber-tired mounting, which transports the unit from place to place, and the turntable, or revolving superstructure, which is attached to the carrier frame. Its five forward speeds range up to 18 m.p.h. Maximum boom length is 100 ft. Many applications of the unit are anticipated where the handling of heavy materials is an essential operation.

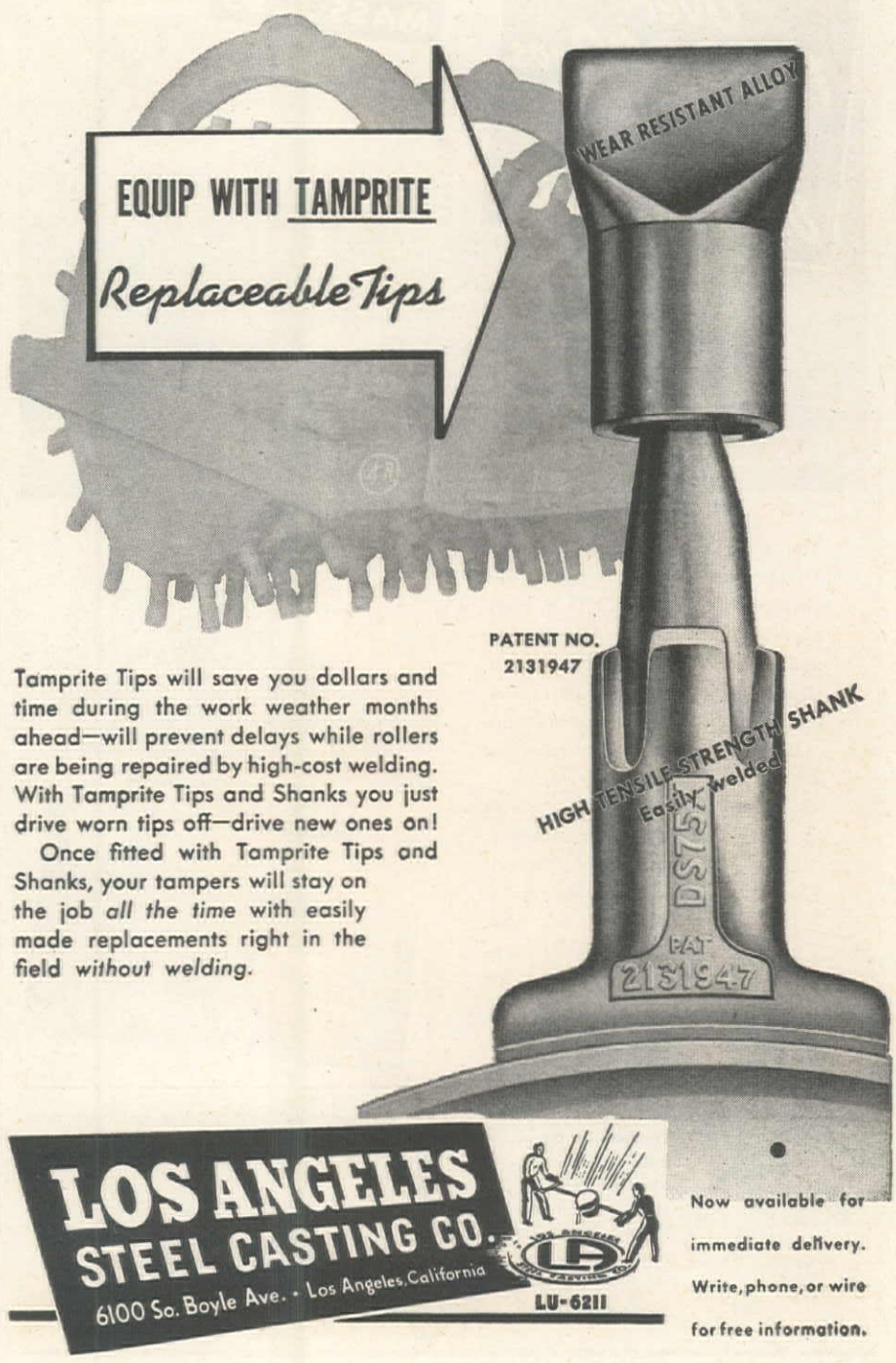
220

Backstop

Manufacturer: The Falk Corporation, Milwaukee, Wis.

Equipment: Attachment for preventing reverse rotation on conveyor drives, winches, etc.

Features claimed: This uncomplicated unit to stop "back-run" has pawls mounted on the rotor which are forced by springs or by gravity into engagement against the housing bore. The wedging action of the cylindrically machined pawls makes it impossible for any reverse motion to take place. Since the gripping action takes place



at the moment forward rotation ceases, the possibility of shock and strain is reduced to a minimum. Keyways with opposite tapers make it possible to quickly change direction of operation. The unit is built in three sizes to accommodate a wide range of shaft diameters and torque requirements.

221

Earth-Moving Equipment

Manufacturer: Wooldridge Mfg. Co., Sunnyvale, Calif.

Equipment: Wooldridge Models BB-85 and BB-120 4-wheel scrapers and the BHD-19 bulldozer.

Features claimed: The new scrapers offer a wide, unobstructed front apron opening of 60 in. and feature rear-draft fulcrum leverage and pivot-tilt bowl to assure faster, more efficient loading and dumping of greater volume. The BB-85 has a capacity of 8.5 cu. yd. struck, while the BB-120 carries 12 cu. yd. struck. Other engineering features include higher yoke clearance and greater ruggedness throughout. The BHD-19 bulldozer for Allis-Chalmers' HD-19 tractor is designed for rugged service in straight bulldozing operations. Heavy push arms, fabricated from formed channel, telescope for knock-down shipment. The cable to power the control unit follows the side of the tractor frame from a sturdy engine-mounted assembly.

222

Form Tie Tool

Manufacturer: Safety Specialties, Portland, Ore.

Equipment: New tool for tying forms in concrete.

Features claimed: The design and construction of the device offer several time-saving and cost-cutting features which contractors, builders, and other users will recognize as a valuable addition to include in their tool equipment for wire-tieing operations. Wire of any size up to and including No. 7 may be tightened and tied, and the tool removed from the form within 30 seconds. Weighing 3 lb., the tool is made of cast bronze, precision machined, and is guaranteed to withstand all wire form-tying requirements.

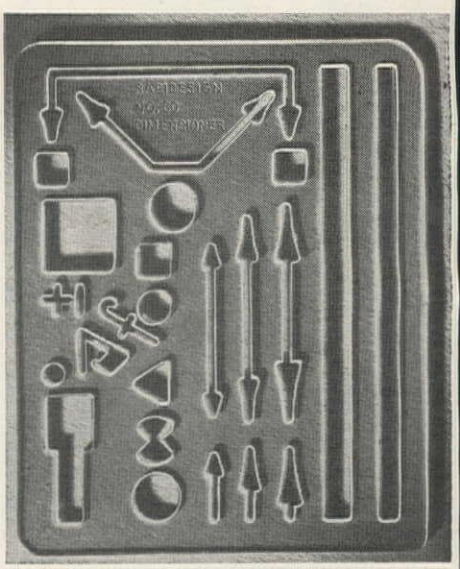
223

Drafting Template

Manufacturer: Rapidesign, Inc., Glendale, Calif.

Equipment: Number 60 Dimensioner.

Features claimed: Milled and beveled cutouts of symbols give accuracy and speed



for standard dimensioning and lettering of drawings. All symbols and sizes conform to standard drafting room practice.

224

Test and Repair Bench

Manufacturer: Inland Manufacturing Co., Omaha, Neb.

Equipment: Bench designed to fit into production line methods of radiator testing and repairing.

Features claimed: Basically, the bench is a tank with an electrically operated worktable to drop into water for testing. Air pressure applied to the radiator by means of quick-coupling hose allows an instant and visual check of any leaks. A flick of a lever raises the worktable upon which work rests and allows the repair man to solder and repair leaks without moving to another bench. A special radiator soldering torch is one of the accessories incorporated in the bench. The bench provides better working conditions for workers who combat problems of dampness and hoisting heavy radiators many times a day.

225

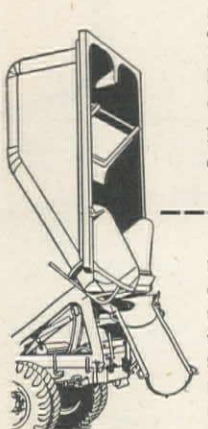
Power Plants

Manufacturer: Motor Generator Corp., Troy, Ohio.

Equipment: Gasoline and Diesel engine driven power plants.

Features claimed: Each generator set is self-contained and fully equipped with controls, radiator, fuel tank and weatherproof canopy. The A.C. generators are of the revolving-field type and with direct-connected exciter and built-in automatic

That's a lot of concrete. And the Dumpcrete placed it faster and cheaper. Mass pours for U. S. Engineers, Atomic Energy Commission and Bureau of Reclamation—small, slow pours into buggies and wheelbarrows—city and state paving work—footings and floors for industrial and housing projects. You name it. The Dumpcrete's done it . . . with identical loads of better concrete, accurately mixed at a central point. The low-cost, high production Dumpcrete can save for you too. Mail the coupon today.



The lower cost Dumpcrete is lightweight, watertight, with 13-foot chute, controlled higher discharge and lower center of gravity. Hauls sand, gravel, and coal too.

I want better concrete at lower cost. Mail me the facts today.

Name_____

Firm_____

Address_____

DUMPCRETE

DIVISION. MAXON CONSTRUCTION CO., INC.

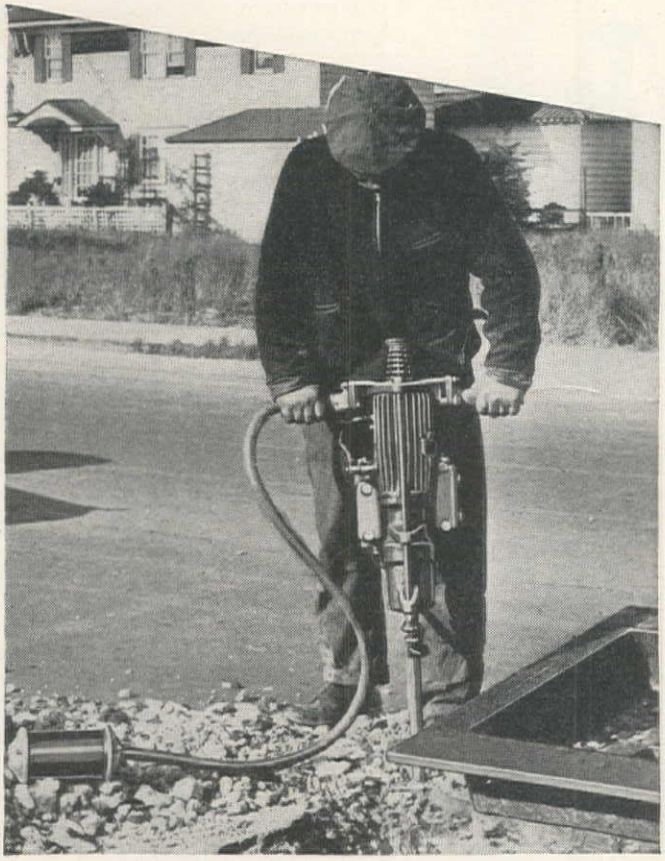
520 Talbott Bldg., Dayton 2, Ohio

IT COSTS LESS TO OPERATE A BARCO

LESS for investment

LESS for fuel

LESS for maintenance



For heavy pavement breaking, the Barco Model H-6B is recommended. It is the fastest, most powerful gasoline hammer ever developed.

FOR all-around pavement breaking and demolition work, no other hammer does a more economical job than Barco. This portable, versatile slugger delivers more work, with lower operating and maintenance charges, permits work on projects that otherwise would not support the cost of breaking equipment. Drilling attachments are available. Many widely separated jobs can be carried on at the same time without heavy capital investment or costly transportation charges. In power, speed and portability, Barco has no superior. Write Barco Manufacturing Company, 1819 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

The Barco Model J-2, is ideal for hard ground or for digging in rock which can be broken out without blasting.

BARCO

PORTABLE GASOLINE HAMMERS

BREAKING • DRILLING

DRIVING • TAMPING

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

voltage regulators to guarantee termin voltage within 3 per cent of any load power factor within the generator ratin D.C. generators are of the compoun wound interpole type and are available any size, 5 through 60 kw. These generato are of the single ball bearing, heavy du type and are directly connected to the e gine by a flanged coupling. A.C. or D.C generators up to 25 kw. are available wit gasoline engine, whereas units with 20 t 60-kw. ratings have Diesel engines.

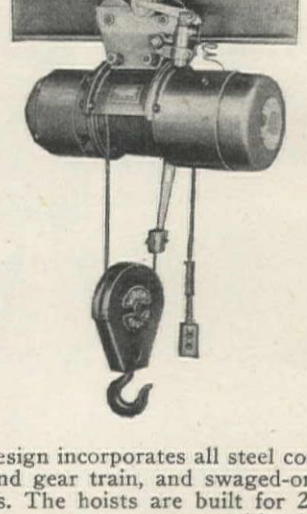
226

Electric Hoist

Manufacturer: American Chain & Cab Co., Inc., York, Penna.

Equipment: Wright Speedway Hoists.

Features claimed: Wright Hoist Divisio announces a new line of Speedway Electri Hoists in capacities from 1000 to 20,000 l



The design incorporates all steel construc tion and gear train, and swaged-on cabl fittings. The hoists are built for 220-vol 3-phase current, reconnectable for 44 volts, and can be furnished for other volt ages and frequencies. Furnished in lug hook, plain, or geared Timken trolley (mounted crosswise or parallel to runway beam).

227

Electric Impact Wrench

Manufacturer: Independent Pneumati Tool Co., Aurora, Ill.

Equipment: Thor ⅜-in. Universal Wrench.

Features claimed: Trademarked "Packy," this tool drives nuts, bolts, and cap screws

up to ⅜-in. thread size and studs up to ½-in. thread side. It also drives "Ezy-Out" extractors, wood and machine screws, reamers and other cutting tools. The "Packy" operates on A.C. or D.C. at 2150

).m., weighs 6 lb., 4 oz., and strikes 2000 ows per minute.

228

neumatic Paving Breaker

Manufacturer: Independent Pneumatic ool Co., Aurora, Ill.

Equipment: Thor "24" paving breaker.

Features claimed: The Model 24 Thor, eighing 70 lb., is a companion machine to e 84-lb. Model 25, and answers a demand r a demolition tool just under the heavy ity class. Overall length is 28 in., with ½ by 6-in. chuck sizes for collared steels, -in. hose size, and ¾-in. hose inlet pipe read.

229

ortable Conveyor

Manufacturer: Universal Engineering orp., Cedar Rapids, Iowa.

Equipment: Portable conveyor with hy-aulic hoist.

Features claimed: The hoist lifts the nveyor to 21 degrees in 10 min. and wers it to traveling position in 1 min., and ay be driven by gas, Diesel, or electric ower through simple drives. Balanced ounting makes it possible for one man lift the conveyor to truck hitch. Con-yor is available in lengths of any multiple 4 ft.

230

ilt-Deck Trailers

Manufacturer: Fruehauf Trailer Co., Los ngeles, Calif.

Equipment: Trailers designed for the ansportation of self-propelled machinery.

Features claimed: The trailers are equipped with a hydraulic hoist, mounted in a horizontal position beneath the deck. With this arrangement, the speed of deck elevation and depression are under positive control at all times, and in practical application, the deck is manipulated at all times similar to a hoist-actuated dump body. The hoist functions whether the trailer is attached to the towing unit or not. Underconstruction is of the walking-beam type, rubber insulated, thereby assuring even weight distribution on the tires and the ability to negotiate any terrain.

231

Front End Loader

Manufacturer: Mixermobile Manufacturers, Portland, Ore.

Equipment: Model "C" Wagnermobile SCOOP.

Features claimed: The new model is a further refinement of the previous models with one of the main improvements being the addition of planetary drive gears to each of the drive wheels. Instead of direct drive to the wheels, the axle now drives heat-treated sun gears that transmit the power to drive wheels at a gear reduction of 3 to 1. Other improvements include a larger chassis and cab, safety glass, shorter turning radius, simplified hoist control, and built-in 600-lb. counterweight.

232

Light Weight Sprayer

Manufacturer: Sellco Corp., Minneapolis, Minn.

Equipment: Sprayer with built-in compressor.

Features claimed: Introduced as the Payswell Sprayer, the new unit operates with a built-in compressor, eliminating the need for hose or separate motor. The enclosed motor operates from any 110-volt A.C. or D.C. outlet at a speed of 10,000 r.p.m. and producing 50 pounds pressure. Total weight is 4 lb., including a 1-qt. container. Interchangeable nozzles are available to handle any sprayable liquid in either cone or fan shape spray patterns.

233

Combination Power Unit

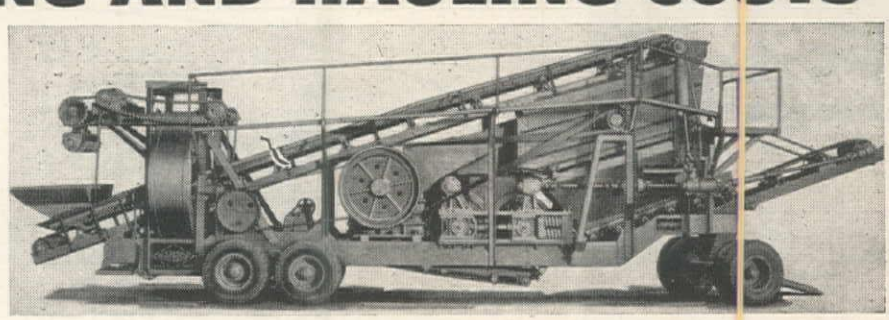
Manufacturer: Detroit Diesel Engine Division, General Motors Corp., Detroit, Mich.

Equipment: Torque converter and fluid coupling unit for General Motors Series 71 2-cycle Diesel engine.

Features claimed: Consisting of four major elements—a pump, turbine, and two stators—the unit produces torque multiplication of up to 4 to one. The complete integrated power plant actually occupies no

CUT CRUSHING AND HAULING COSTS

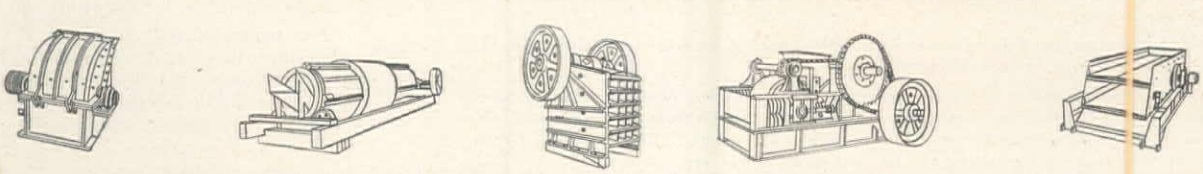
with a Portable DIAMOND ROTOR-LIFT PLANT!



Make extra profits and save valuable time by having a DIAMOND Portable Rotor-Lift Plant on or near construction site. Crushes . . . screens . . . washes. Handles stone or gravel. Straight through run and many exclusive Diamond features assure value output of uniform material.

WRITE TODAY FOR ILLUSTRATED BULLETINS

• THERE'S NOTHING TOUGHER THAN A DIAMOND!



DIAMOND IRON WORKS, INC.
AND THE MAHR MANUFACTURING COMPANY DIVISION
MINNEAPOLIS 11, MINNESOTA

1744 N. 2nd STREET, MINNEAPOLIS, MINN.

more space than the same engine equipped with the conventional clutch and power take off. Outstanding characteristic of the unit is its ability to pick up load with maximum lifting power and shift automatically from torque converter to fluid coupling principle in the higher speed range. It is anticipated that the unit will find considerable use in excavating and hoisting machines where extremely high torque is required for digging and lifting operations.

234

Package Conveyor

Manufacturer: George Haiss Mfg. Co., Inc., New York City.

Equipment: Conveyor designed to handle large cartons, crates, etc.

Features claimed: The new Model 485 conveyor will handle cases weighing up to 500 lb. at a rate of 30 per minute. It has a rubber pulley lagging of ¼-in. tire tread rubber, easily replaceable without removing the pulley from the conveyor. Another feature is the telescoping feed end with toggle bolt make-up, adjusted at one point only. The new conveyor is accurately balanced to suit the weight of the material to be handled and, therefore, can be moved easily by one man.

235

Hydrogen Coated Electrode

Manufacturer: Hobart Brothers Co., Troy, Ohio.

Equipment: Electrode designed for welding high carbon, high sulphur and other hard-to-weld steel without underbead cracking.

Features claimed: The absence of underbead cracking is achieved by a special low hydrogen coating. The electrode has a smooth and steady arc insuring good root penetration. Deposited weld metal is sound with high ductility. Physical properties of the Hobart No. 90-PL electrode are: Tensile strength, 94,000 p.s.i.; yield point, 85,000 p.s.i., and 26 per cent elongation in 2 in.

236

Cement Aerator

Manufacturer: Butler Bin Co., Waukesha, Wisconsin.

Equipment: Compact aerator for handling bulk cement.

Features claimed: Occupying little more space than a standing man, the compressor unit directs air automatically to the jet lines, controlling the flow of cement by a measured application of compressed air at critical points in the handling system. Featured is the dual pressure take-off that provides extra air for other uses around the plant. Two models of the aerator are available with 60-gal. tanks, one with a displacement of 8.6 cu. ft., the other with 12 cu. ft.

237

Water Hydrant

Manufacturer: Crane Co., Chicago, Ill.

Equipment: Non-freezing water hydrant.

Features claimed: The new design of this hydrant helps eliminate the need for underground pits, gravel boxes, drainage lines, and other preventatives against freezing. Water is allowed to remain and freeze in the portion of the hydrant above the frost line; however this freezing occurs within a rubber tube which runs the length of th riser-spout. With the water pressure turne on, the rubber tube expands against th inside of the riser-spout, allowing a fu column of water to flow around the thi column of ice. The ice breaks up and flushe out with the water, giving a free-flowin stream almost instantly.

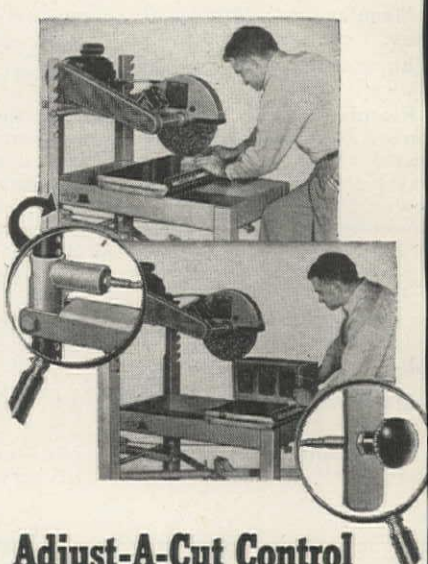
238

Masonry Saws

Manufacturer: Clipper Mfg. Co., Kansa City, Mo.

Equipment: High-speed cutting blade provided with one-man adjustment of cu ting head.

Features claimed: The 1949 Clippe models incorporate production speed-u features such as the "Adjust-a-Cut" con



Adjust-A-Cut Control

trol for fast adjustment of cutting head Using the control knob at the front of th saw frame, one man can lower or raise th cutting head to the desired position whe compensating for changes in materia sizes. The new saw models cut all type and sizes of materials more quickly an easily. It takes 4 sec. to cut fire clay brick 15 sec. for chrome magnesite brick, an 19 sec. for concrete blocks. Clipper an nounces over two dozen exact blade speci fications are now available and that fou of the nine Clipper models manufacture are equipped with the new "Adjust-a-Cut control.

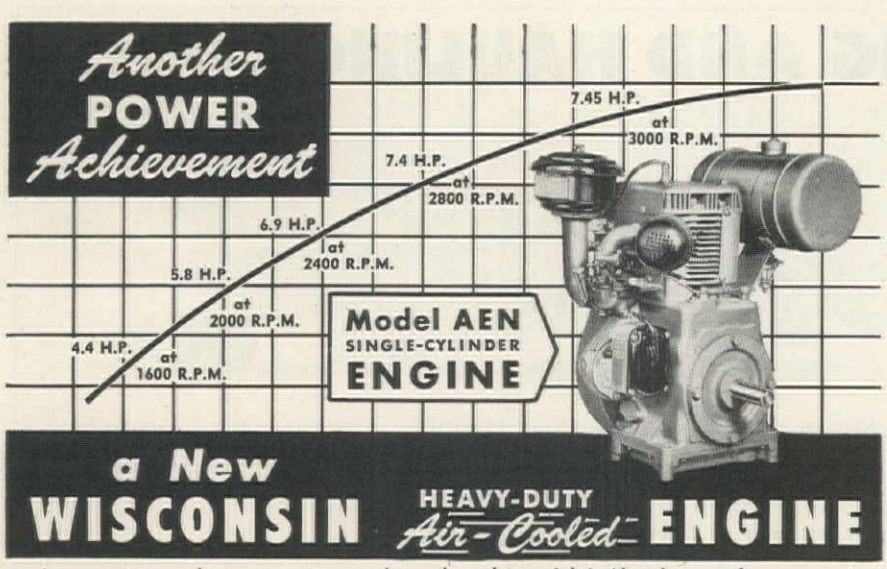
239

Trucks and Tractors

Manufacturer: White Motor Co., Cleve land, Ohio.

Equipment: Twelve basic models wit more horsepower for the same gross vehicl weight capacities of previous models.

Features claimed: The new WC models including the new WC16 and WC16T truck and tractor in the lighter field and new WC32 in the heavy duty field, offer highe horsepower engines as standard equipmen The use of the larger engines in the tracto line as well as the higher horsepowe engines all through the WC line enable operators to obtain greater fuel economy and lower maintenance costs in addition t the more rapid acceleration and higher sus tained speed without excessive top speed Also, it is possible to carburete with a leane gasoline mixture than was formerly pos sible, since the engine does not have t work so hard to maintain satisfactory



Lower cost, more horsepower at normal speeds . . . less weight! Already, manufacturers and users alike are praising these features of the new heavy-duty air-cooled Model AEN 7½ hp. single-cylinder engine.

As shown, it develops peak horsepower well within normal speeds, yet weighs only 126 pounds . . . less than any comparable engine.

Advanced engineering design alone is responsible for the added power, decreased weight and lower cost per delivered horsepower. Every part is machined to traditional close tolerances. Every service-proved, heavy-duty feature still remains . . . Timken tapered roller-bearings *at both* ends of the crankshaft; jet and spray oiling, etc.

Write today for additional data. Other Wisconsin Air-Cooled Engines available in Single Cylinder, 2-Cylinder and 4-Cylinder Models, 2 to 30 hp.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 14, WISCONSIN

speeds. The engines in both tractor and truck models are interchangeable in corresponding models.

240

Air Line Hood

Manufacturer: B. F. McDonald Co., Los Angeles, Calif.

Equipment: Hood with plastic window and rubberized cape to protect against fine sprays and dusts.

Features claimed: The window and cape are sealed to assure complete protection from dusts and sprays. Air supply enters at the top of the hood under pressure, is filtered at two points and trapped all along the line, keeping the air supply to the operator dry and clean. The air hose extends from the top of the hood to the operator's belt where it is fastened and connected to 8 ft. of air line. The plastic window is kept free of mist and dust by a curtain of air forced across the outside of the lens making it fog proof. The swing-front mounting of the window permits opening and closing at will.

241

Self-Feed Rip Saw and Moulder

Manufacturer: Smithway Machine Co., Seattle, Wash.

Equipment: XL Ripper and XL Moldmatcher.

Features claimed: The ripper has 4 feeds between 50 and 190 ft. per min. for materials up to 4 in. in thickness. May be used for resawing 4-in. stock either straight or up to 45 degree angle with special attachment and for ripping stock as short as 4 in. long. The moulder takes up to 2 by 4-in. stock and produces 2400 to 12,000 ft. of moulding per hour.

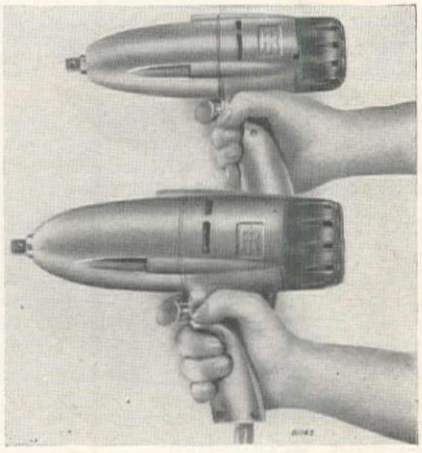
242

Electric Impact Tool

Manufacturer: Ingersoll-Rand Co., New York City.

Equipment: All-purpose tool for heavy construction and equipment repair.

Features claimed: With standard accessories, the new model is rated to run and remove nuts up to 5/8-in. thread size, drive and remove studs, extract broken cap



screws, apply and remove machine screws of all kinds, run wire brushes, drill steel, brick and masonry, and tap and ream. The reversible motor makes it easy to remove screws, studs and nuts. The impact principle operates whenever resistance is met and provides extra power to push through the job. Virtually no torque reaction is transmitted to the operator under any conditions. The tool is 12⅛ in. long and weighs 9 lb., 13 oz.

243

New Welding Process

Manufacturer: Air Reduction Sales Co., New York City.

Equipment: Process for welding heavy sections of aluminum at high wire feed speeds.

Features claimed: A gas-shielded, metal arc method of welding, the new process consists of feeding a consumable wire through a manually operated welding "gun." The metals being welded are shielded from the air by an inert gas. The filler metal carries the welding current and an arc is maintained between the end of the wire and the work. Power is supplied from a standard d.c. welding generator. The component parts of the Aircomatic unit are the welding "gun," gas hose (concentric with which is the metallic tube for conveying the welding wire), a 3-conductor control cable, feed motor box, control box and wire reel. Wire feed speeds range from 100 to 300 in. per min.

244

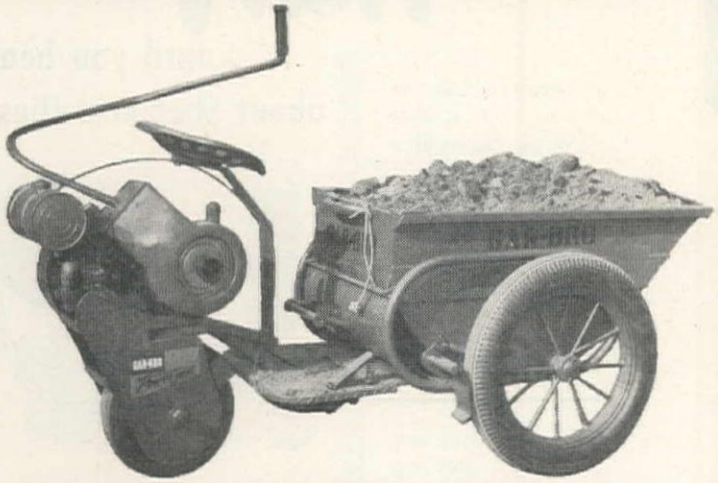
Triple Roll Crusher Plant

Manufacturer: Pioneer Engineering Works, Inc., Minneapolis, Minn.

Equipment: Secondary crusher with feed hopper and delivery conveyor mounted on a chassis.

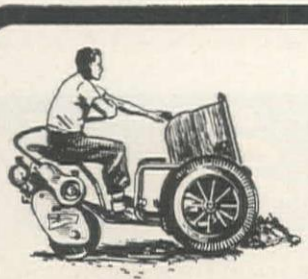
Features claimed: Pioneer's new 4309 Secondary crusher has three rolls to give a

HERE IS GAR-BRO'S MONEY-SAVING *Power-Cart*



The facts and figures prove that this new Gar-Bro product helps cut construction job costs and builds up real profits. Designed to carry as much concrete as three ordinary wheelbarrows or two carts, it relieves "concrete men" for less back-breaking jobs. It's simple to operate as the steering and transmission are controlled by one lever—a tiller. Forward and reverse speed is foot-throttle controlled. Power unit is detachable from cart. Tractor-type seat reduces operator fatigue.

Designed in accordance with proven engineering principles, the Power-Cart is designed to LAST. GAR-BRO Mfg. Co., 2416 E. 16th Street, Los Angeles 21, California.



Note the large front wheel where the bulk of the load is carried. Dumping is easy because load is balanced in the tray. Hauls all construction materials. Loads directly from mixer. Specifications: 81½" long; 39½" wide. Maximum load: 1500 lbs., 9 cubic feet of concrete . . . Bulletin #77 tells the full story . . . shows the Power-Cart in use. Write for it, or contact Gar-Bro distributors.

Power-cart (PAT. PEND.)

A NEW PRODUCT MANUFACTURED BY

GAR·BRO

double pass to the material, thereby greatly increasing the stage of reduction obtainable from a single unit. The delivery conveyor is 30 in. in width by 20 ft. long and delivers the crushed material into trucks over the front end of the plant. The plant has an equalizer between the two rear axle and is equipped with 10.00 x 20 tires as standard. Feature of the triple roll crusher is the positive gear drive using chrome-molybdenum star gears which provide proper tooth contact for any adjustment of the rolls. Provision had been made for plant mounting of a 110 to 125-h.p. continuous duty power unit.

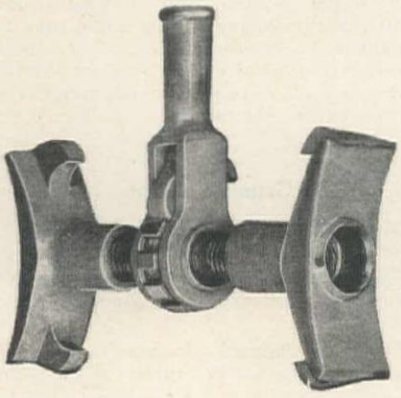
245

Push and Pull Jack

Manufacturer: Templeton, Kenly & Co., Chicago, Ill.

Equipment: New Simplex Cramer-type jack designed for all types of push and pull jobs.

Features claimed: Machine V-edged nut protrusions on the jacks assure a firm grip for pushing and save wear and tear on piles. In addition, lugs offer a firm hold for chain on pulling jobs. These factors mean that the jack cannot slip and make sure that it always "stays put." Ruggedly built throughout, the jack features screws of precision-cut acme threads, thus lending greater strength. Model. No. 5 is 11 in. in length, extends to 17 in., and weighs 34 lb. Model No. 6 is 18 in. in length, extends to 30 in., and weighs 42 lb.



246

Tractor Winch

Manufacturer: American Hoist & Derrick Co., St. Paul, Minn.

Equipment: Single drum unit with a capacity of 7,500 lb.

Features claimed: The winch is adaptable to many industrial wheel type tractors and can be easily installed or removed. Its outstanding features include fairlead rollers which allow a sharp offlead of the cable to either side and permit easy moving of materials in tight spots, a hand operated contracting band brake, and a drawbar built into the winch frame to allow the tractor to perform regular towing jobs without removing the winch. Capacity is 7,500 lb. single line pull on the first layer of cable.

247

Electrode for Cast Iron

Manufacturer: Lincoln Electric Co., Cleveland, Ohio.

Equipment: Electrode for depositing machinable welds in cast iron.

Features claimed: The new Softweld is a non-ferrous electrode designed to cause the weld to flow over and bond to the cast iron with a minimum of penetration and heating of the base metal. The deposit is smooth, dense and well feathered into the base metal. The entire weld area may be drilled, machined, sawed or tapped with ease. Available in 14-in. lengths in ⅛ and 5/32-in sizes, Softweld is recommended for use both in original manufacture and in repairing broken or defective castings and also for correcting machining errors.

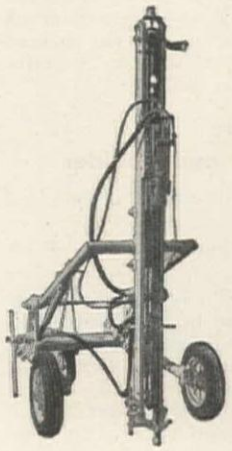
248

Wagon Drill

Manufacturer: Independent Pneumatic Tool Co., Aurora, Ill.

Equipment: Rock drill with mast swinging 360 deg. vertically or horizontally.

Features claimed: The new Thor Wagon Drill features a single reversible pneumatic motor that feeds and raises the drill, eliminating the need of a hoist. The motor-driven feed also permits throttle control that allows the feeding speed of the drill to be reduced when necessary. The tubular frame of the rig serves as an air receiver, maintaining a continuous supply of air under pressure and insuring a continuous pressure against the rock bit to prevent steel rebound between blows of the piston hammer.



COSTS PER HOLE TUMBLE WITH

Rotary

CONCRETE DRILL BITS

LESS TIME · LESS BREAKAGE · CLEANER, STRAIGHTER HOLES

Costs per hole tumble when *Rotary* Concrete Drill Bits are used in concrete, brick, marble, or rock. Their unique blunt-end design insures precision holes and cuts drilling time 85% or more. Backbreaking, time consuming pounding and chipping is eliminated. Their quiet pulverizing action enables them to drill thru masonry clean and fast. *Rotary* Concrete Drill Bits also last longer. When used according to Drilling Recommendations, they make hundreds of holes without dulling the sharp cutting edges. Used nationally by all industries, by utilities and government agencies.

For use in ordinary electric or air rotary drills. Standard sizes from ¼" to 6" in diameter. Larger sizes on request.

Available on Request: Small demonstrators to prove that Rotary Concrete Drill Bits do drill concrete cheaper, faster, cleaner, and quieter. Write today for illustrated folder giving complete details and prices.

ROTARY CONCRETE DRILL COMPANY

650 S. ARROYO PARKWAY • PASADENA 2, CALIFORNIA

YOU HAVEN'T HEARD

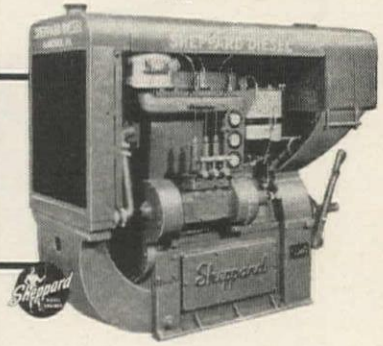
"THE **half** OF IT"

. . . until you hear about Sheppard Diesels

Sheppard Diesels consume HALF as much fuel per hour as gasoline engines

Sheppard Diesels run on any one of 15 fuels, most of which cost less than HALF the price of gasoline

Sheppard Diesels operate 3 to 5 times longer between overhauls —cut down-time by a lot more than HALF



45 H.P. 3 Cylinder Power Unit with power take-off and clutch. Also available as 2 to 36 K.W Generating Set.

Get the WHOLE story of Sheppard Diesel economy, dependability and long life. Write today for 16-PAGE BOOKLET

Diesel's the Power

Sheppard's

THE DIESEL

STATIONARY • AUTOMOTIVE

SHEPPARD DIESELS, HANOVER 17, PA.

LITERATURE FROM MANUFACTURERS...

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the Western Construction News, 503 Market Street, San Francisco 5, California.

249

STATIONARY BATCHING PLANTS—**Heltzel Steel Form & Iron Co.,** Warren, Ohio, has put out an 18-page color booklet designed to present the Heltzel stationary plant and its variety of arrangements, accessory equipment and engineering facilities available. Three types of batching plants are described and illustrated, including all recent improvements in the central mix, transit mix and concrete products plants and equipment. The plants described range in capacity from 100 to 400 tons and in most cases are combination plants with both aggregate and cement compartments.

250

CATERPILLAR MOTOR GRADERS—**Caterpillar Tractor Co.,** Peoria, Ill., has available an illustrated 8-page booklet describing their Diesel motor graders on state, county, and township road jobs. The units are shown handling road work from heavy construction to fine maintenance and from summer ditching to winter snow removal.

251

INDUSTRIAL DESIGN—Production from raw material to finished product and from office to shop, in the new **Link-Belt Speeder Corp.** plant at Cedar Rapids, Iowa, is shown vividly in the company's 16-page booklet. Pictures tell the story of layout and operations inside the recently completed plant.

252

TOURNAPULL AND TOURNADOZER—**R. G. LeTourneau, Inc.,** Peoria, Ill., has issued two 8-page folders on the new "B" Tournapull and "B" Tournadozer. An overhead cutaway diagram shows the features of the Tournapull. Basic specifications of size, power, and speed are given for the Tournadozer.

253

HEAVY GATES AND VALVES—**Westinghouse Electric Corp.,** Sunnyvale, Calif., has recently published an 8-page bulletin on their valves and gates for hydraulic equipment. With the emphasis on heavy and high-pressure installations, the bulletin contains many pictures and sectional drawings of the discharge structures.

254

HEAVY RAM PILE HAMMER—The 31,800-lb. single-acting pile hammer built by **McKiernan-Terry Corp.,** has been described and photographed in a 16-page bulletin by the manufacturer. Specifications, parts list, explanations and operating instructions are included with the information on the weighty hammer and anvil.

255

ROAD SWEEPING MAGNETS—**Dings Magnetic Separator Co.,** Milwaukee, Wis., describes its new high intensity road sweeping magnet in a recently issued 2-page bulletin. Basic specifications and performance on roads and airfields are included in the information.

256

SNOW LOADER—Designed for small cities and industrial plants with limited budgets, the mechanical snow loader developed by **Barber-Greene Co.,** Aurora, Ill., is revealed as in an illustrated 8-page booklet. The model 552 loader is pictured under typical operating conditions, and its efficiency shown in before-and-after photographs. A final section of the booklet describes and illustrates some special component parts of Model 552.

257

CLEARING FOR ACTION—This is the title of the latest 16-page illustrated booklet released by **Caterpillar Tractor Co.,** Peoria, Ill. It shows the "Cats" and clearing methods used for reclaiming agricultural land, construction sites, mine and quarry operations, and housing projects.

258

NICKEL ALLOY CASTINGS—**International Nickel Co.,** New York, N. Y., technical consultants in the nickel alloy field, have compiled a 32-page book illustrating the service of this alloy in tough foundry work. Some of the heaviest and hardest steel castings ever produced by the foundry industry in the United States are photographed in the shop and field, with a brief statement of their required specifications. Pictures are from many prominent foundries in North America, including 12 western firms. Typical subjects covered include railroad equipment, oil production, excavating and dredging, power plants, mining, and construction projects.

259

DOUGLAS FIR—Third in a series, this 52-page book published by the **Western Pine Association,** Portland, Oregon, is designed as a basic reference for builders, architects, and wholesalers of Douglas Fir of the Western Pine Region. The comprehensive manual on the properties and uses of Douglas Fir contains full page pictures

SKOOKUM BLOCKS

serve with distinction in construction

Light weight utility blocks with all the features of the highest priced blocks

•

Manganese steel sheaves

•

Annealed cast steel sides

•

Alloy steel draw pins and shackle

•

1 ½-in. hardened sheave pin • Bronze bushings

It pays to specify Skookum

SKOOKUM CO., INC.

8504 N. CRAWFORD ST. PORTLAND 3, OREGON

of typical pieces of each grade accompanied by explanations and general outline of grading rules. The index lists standard manufactured sizes and an alphabetic catalog of uses of Douglas Fir with recommended grades.

260

WICKWIRE ROPE — The beginning of Wickwire rope, and its present-day use, manufacture, design applications, and specifications are published in a 200-page work by **Colorado Fuel and Iron Corp.,** Palmer, Mass. The first chapter of the comprehensive book explains wire rope characteristics from cross-sections to safe loads and safety factors. The following chapters deal with wire rope applications in construction, drilling, logging, slings and fittings, and marine and elevator use. Each chapter introduces the special problems involved, then gives the application of Wickwire rope to each job, including catalogs, specifications, and recommended procedures. The book is well illustrated throughout with photographs and drawings.

261

STUD WELDING GUN — A 4-page price list and 32-page inventory are available from **Nelson Stud Welding Division, Morton-Gregory Corp.,** Lorain, Ohio, listing ordering specifications for M-G studs. Used for end welding with the Nelson automatic stud welding gun, the new M-G studs are described in the price list. The inventory lists some 1500 types, sizes, and styles of flux-loaded studs available for immediate delivery.

262

WESTERN LARCH LUMBER — **Western Pine Association,** Portland, Ore., announces publication of a new Larch species book covering the properties, uses, and grades of Western Larch lumber. The new 52-page book is a complete revision of the former reference manual and contains basic information for builders, architects, dealers and wholesalers. Properties and uses sections are illustrated with photographs of Larch in actual use in buildings and industry.

263

KEEPING ON SCHEDULE—This is the title of an illustrated 8-page booklet issued by **Caterpillar Tractor Co.,** Peoria, Ill., on the use of their off-track equipment on railroad jobs. Action photographs show job equipment and procedures in varied earthwork done by contractors with railroad work.

264

SUPER-COMPACTOR—**O. J. Porter & Co.,** Sacramento, Calif., released a 12-page reference folder showing their Porter Super-Compactor and optional testing unit in the field. The photographs of the compactor show clearly the heavy ballast boxes (376 cu. ft.) and massive tires, designed for a ground pressure of 10 tons per sq. ft.

265

ARMCO LINER PLATES — Entitled "Tunneling for Profit and Convenience," a new 4-page folder published by **Armco Drainage & Metal Products, Inc.,** Middletown, Ohio, stresses tunneling with lightweight corrugated liner plates. The illustrated folder describes the liner plates as a simple and economical means of avoiding inconvenience to traffic and obstructions to places of business.

266

HARD-FACING ELECTRODES — **Stoody Co.,** Whittier, Calif., has available a 4-page folder on 2 new Stoody alloys—the self-hardening "21" and high-strength "1027." In addition to statements on properties and welding characteristics, sizes and prices, the folder illustrates the use of the alloys for hard-facing heavy machinery and field equipment.

267

CONCRETE BUILDING BLOCK — Published by the **Empire Building Materials Co.,** Portland, Ore., a comprehensive 28-page building block catalog describes concrete, pumice, and lite-rock Empire blocks for residential and commercial building. The illustrated catalog features construction suggestions and information on mortar joints, reinforcing, interior and exterior finishes, and estimating the number of block required.

268

AUTOMATIC SHUT-OFF VALVES —**Security Valve Co.,** Los Angeles, Calif., recently issued a 4-page folder describing their low and high pressure Warden automatic shut-off valves. The folder has sectional drawings, photographs, and basic specifications.

269

TUNGSTEN ELECTRODES — **Fansteel Metallurgical Corp.,** North Chicago, Ill., has released a 4-page bulletin on tungsten electrodes for inert gas and atomic hydrogen welding. With a brief statement of the characteristics and production of tungsten, the illustrated bulletin explains

LOW IN COST...
HIGH IN PERFORMANCE

THE OSGOOD MODEL 50 3/8 YARD SHOVEL

A rugged, versatile, and dependable performer at low cost—that's the OSGOOD Model 50. Its simplicity of operation, easy maneuverability, and full convertibility to all attachments provide outstanding performance in the construction, road building, pit and quarry and industrial fields.

Available as shovel, crane, hoe, dragline, and clamshell. Equipped with OSGOOD patented wire rope crowd and automatic retract.

Write for complete details.

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. O-G THE GENERAL CO. EXCAVATOR

MARION OHIO

DIESEL, GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

DISTRIBUTORS:

Equipment Sales & Mfg. Co., Albuquerque
General Machinery Co., Spokane
Caird Engineering Works, Helena, Montana
Hyman-Michaels Co., San Francisco & Los Angeles
Power Equipment Co., Denver
Wood Tractor Co., Portland

the success of pure tungsten electrodes for special welds. List of standard dimensions and prices is included.

270

CATERPILLAR TRACTOR — **Caterpillar Tractor Co.**, Peoria, Ill., has a new 32-page booklet giving specifications and details of their Diesel D2 tractor. The booklet features many cut-away drawings, photographs, attachments, and field-condition pictures of the D2.

271

MACADAM CONSTRUCTION—**Seaman Motors, Inc.**, Milwaukee, Wis., have published a 16-page booklet, "Macadam Base Construction Methods," explaining the action of the Seaman Pulvi-Mixer and showing how it overcomes the difficulties of even distribution and leveling of crushed stone and other aggregates. The booklet should be a valuable guide for airport, highway, municipal, parkway engineers and others interested in better macadam pavements.

272

ADHESIVES—**The B. F. Goodrich Co.**, Akron, Ohio, has published a revised catalog section on adhesives describing the company's range of such products and their applications. The section gives classifications of various types of rubber cements and service requirements and lists the different products. Data on standard containers are included.

273

EARTHMOVERS—**R. G. LeTourneau, Inc.**, Peoria, Ill., have issued two new broadsides: one describing the new "B" Tournapull, the other the "B" Tournadozer. Complete specifications for both units are listed. An overhead cutaway diagram of the B Tournapull shows and explains its features. Features of size, power and speed available in the B Tournadozer are listed along with advantages to be gained by matching the two big production tools.

274

SIMPLIFIED PHYSICS OF THERMAL INSULATION—The revised edition of a 32-page manual by Alexander Schwartz, president of **Infra Insulation, Inc.**, New York City, contains a discussion of heat transfer, condensation, vermin, mold, radiant heating and other factors involved in the study of insulation and insulating values. The famous Chart of Thermal Insulation Values which has proved so helpful in the previous edition, has been completely revised, and is broader in scope than ever.

275

BLIND FASTENER—**The B. F. Goodrich Co.**, Akron, Ohio, have published a revised edition of the Rivnut data book describing the blind fastener which can be used either as a rivet or nut plate and giving step-by-step installation data, types, sizes and grip ranges. Among interesting parts of the new book are announcements of new power and manual tools for use with Rivnuts.

276

SOLDER—**Alpha Metals, Inc.**, Brooklyn, N. Y., have issued a condensed catalog of its products giving information on their tri-core resin-filled solder, tri-core "leakpruf" acid-filled solder, Alpha solid wire solder and Alpha preforms. An outstanding feature of the publication is a comprehensive solder selection guide which lists the sixteen metals that are most frequently soldered along with recommendations for the best soldering operations.

277

STEEL FORMS FOR CONCRETE—**Irvington Form & Tank Corp.**, Irvington, N. Y., have published a manual exhaustively discussing the use of steel forms in poured concrete construction. The 28-page, 2-color manual tells how to erect, maintain and strip steel forms, gives methods for difficult situations, and discusses the use of wafers, edges, wedge clips, inside and outside corners, inserts and outserts and provisions for doors, windows and irregularities. There are illustrations of the company's Atlas forms in the construction of tunnels, bridges, caissons, roads, pipes and sewers.

278

LOW HEAT WELDING TECHNIQUE—**Eutectic Welding Alloys Corp.**, New York City, are distributing an illustrated 8-page bulletin presenting the advantages and reasons for selecting the low heat welding alloys manufactured exclusively by them. The bulletin presents complete case histories of eight difficult welding problems with pictures illustrating each. A complete reference chart for the welding of all metals that shows the proper low heat alloys for every welding application, is included in the issue.

279

BUCKET LOADER PERFORMANCE — **Pettibone-Mulliken Corp.**, Chicago, Ill., has issued a 12-page circular on the Haiss Heavy-Duty Bucket Loaders equipped with integral swivel belt conveyor discharge. The circular, besides giving the principal specifications of the

This Portable Asphalt Plant is Suitable for All Paving Maintenance

Almost any type of pavement can be repaired economically and efficiently with a White Portable Asphalt Plant. Asphalt, brick, concrete, macadam, can be easily patched or resurfaced.

It will match any bituminous surface. Produces for immediate hot application or makes mix for deferred cold laying.

Contains internally-fired rotating dryer, pug-mill mixer, bituminous heating kettle, volumetric measurement, air controls. Mounted on pneumatic tires, or furnished for stationary operation. Capacities 4, 8, 12, 25 tons per hour.

Write for Catalog

Elkhart White Mfg. Co. **Indiana**

endures ROUGH TREATMENT

CF&I SILVER-TIP BLADES

FOR GRADERS, DOZERS, SCRAPERS & SNOWPLOWS

COLORADO FUEL and IRON CORPORATION

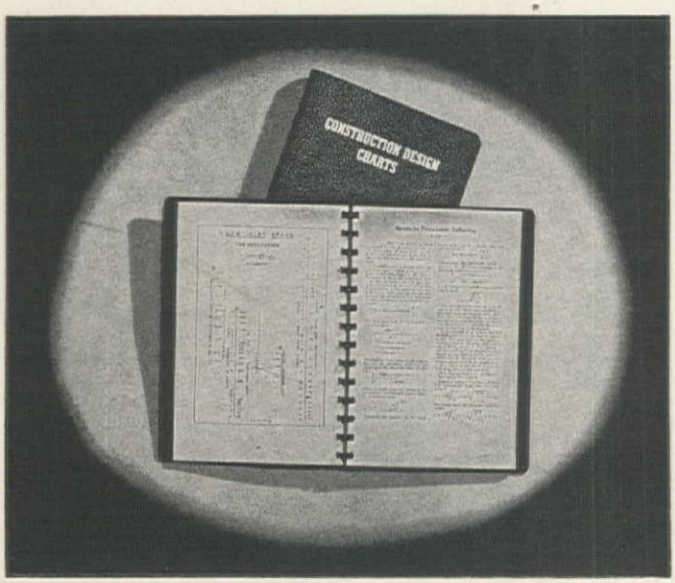
General Offices: Denver, Colorado

On the Pacific Coast: California Wire Cloth Corp., Oakland, Calif.

ENGINEERS — CARPENTERS — CONCRETE MEN — FOREMEN — SUPERINTENDENTS:

SOLVE ENGINEERING PROBLEMS . . . . . at a Glance!

There is no time to waste these days on tedious figuring of routine problems! This new, enlarged edition of CONSTRUCTION DESIGN CHARTS, by Consulting Engineer James R. Griffith gives countless engineering shortcuts—and answers preliminary design problems in a flash! There's a whale of value in this enlarged edition for every man engaged in construction today!



This is the fourth reprinting of CONSTRUCTION DESIGN CHARTS, and greatly enlarged over all previous editions. Contains 100 design charts and 215 pages filled to the brim with valuable information that is a sure-fire hit with construction men. Handsomely bound in sturdy black Fabrikoid with gold stamped letters. A special metal binding allows each page to lie flat for easy reference.

HERE'S WHAT A SATISFIED CUSTOMER SAYS:

Gentlemen:

Three days ago I received my copy of "Construction Design Charts," and I like it better every time I go through it. Mr. Griffith has certainly made a great contribution to the practicing field engineer. I have already had occasion to use it on the job, and I feel that it will pay for itself over and over again in time and effort saved.

Price

$5.00

Postpaid

Add 13c Sales Tax if ordering from a California address

YOU GET ALL THIS...

How Nomographs Are Constructed
Concrete Design
Concrete Form Design
Earthwork
Highway Design
Hydraulics
Structural Design
Timber Design
Compressed Air Transmission
Measurement of Triangular Areas

...PLUS MUCH MORE!

MAIL THIS COUPON TODAY!

KING PUBLICATIONS
503 Market Street
San Francisco 5, California

YES, I want a copy of CONSTRUCTION DESIGN CHARTS, for which I enclose $5.00. (Add 13c if ordering from a California address.) If not completely satisfied, I can return the book in 10 days and get full refund plus postage.

Name.....

Address.....

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

Position..... Company.....

various models of the loaders, describes and illustrates with large pictures the advantages of the various applications of this type of materials loading.

280

TAPERED ROLLER BEARINGS—**Tyson Bearing Co.,** Massillon, Ohio, have published a 12-page, 2-color booklet entitled, "The Story of the Better Tapered Roller Bearing" which describes in detail their All Rolls bearing. The company is also offering free copies of their Anti-Friction Bearing booklet.

281

PORTABLE ASPHALT PLANT — **Madsen Iron Works,** Huntington Park, Calif., have released a 12-page, illustrated bulletin, No. 200-88, describing the new portable batch-mix asphalt plant. The catalog gives complete erection and operating data and includes specifications and diagrams.

282

CENTRIFUGAL PUMPS—**Gorman-Rupp Co.,** Mansfield, Ohio, are distributing a 16-page booklet covering their full line of self-priming centrifugal contractors' pumps. The self-priming feature of the pumps is fully explained and illustrated by "X-Ray" pictures showing what goes on inside the pump. Photographs are shown of the complete line of pumps ranging from the 7M, 2-in., to the husky 125M, 8-in. With each illustration is a description of the pump, its specifications and rating for easy reference.

283

SNOW LOADERS—**N. P. Nelson Iron Works, Inc.,** Clifton, N. J., have released a bulletin describing the Nelson KR-5 and R-10 snow loaders, a utility and heavy-duty model respectively, featuring spiral feed with renewable steel teeth and with capacities from 8 to 20 cu. yd. per min. The bulletin tells in detail about both units and describes the advantages claimed to derive from the use of teeth on the feeder mechanism so that it picks before it shovels.

284

HARD FACING FOR CONCRETE—**Wall Colmonoy Corp.,** Detroit, Mich., have published a 3-page booklet describing the hardfacing of mixer arms on concrete and cinder block equipment. It contains new complete information on hard facing procedures plus sketches showing exactly where to hard face the parts. Increased life of 4 to 5 times has been reported from users of this equipment when hard faced as described in the booklet.

285

CONTRACT METHOD OF CONSTRUCTION—**Associated General Contractors of America, Inc.,** Washington, D. C., have published a 16-page booklet outlining briefly why the public interest is served best in the construction of public projects by the contract method. Advantages discussed are those of guaranteed cost, guaranteed quality, completion on schedule, free and open competition, proper planning, centralized responsibility, use of normal business channels, and the proven efficiency and economy.

286

THERMOCOUPLES — **Wheelco Instruments Co.,** Chicago, Ill., are releasing a 40-page illustrated manual providing information on selection of proper thermocouples and protection tubes, methods of checking thermocouples and pyrometers and installation data. It describes and lists current prices on thermocouples, thermocouple wire, lead wire, heads, connectors, plug and socket assemblies, insulators, protecting tubes and radiation heads.

287

FLEXIBLE CORRUGATED METAL PIPE—A 4-page bulletin illustrating the use of flexible paved corrugated metal pipe is available from **United Steel Fabricators, Inc.,** Wooster, Ohio. Engineering data for typical applications are included in this USF culvert bulletin.

288

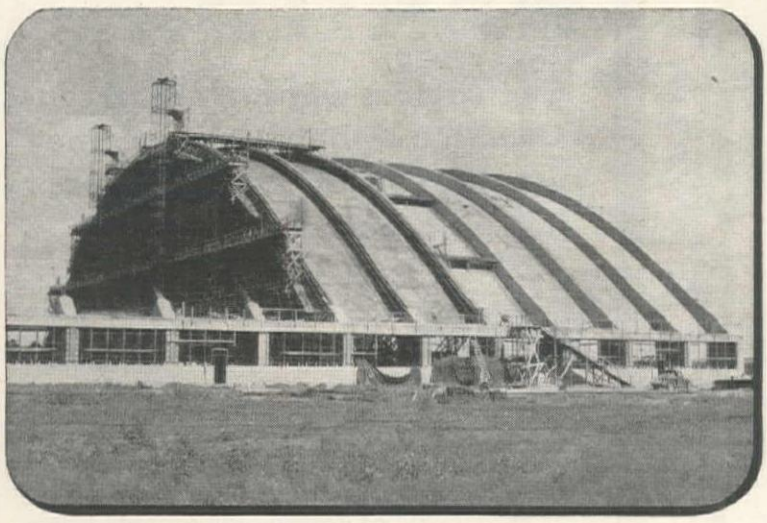
STEEL SHEET PILING—**L. B. Foster Co.,** Pittsburgh, Pa., has published a 6-page brochure completely describing their new lightweight interlocking corrugated steel sheet piling. The brochure contains five complete cross-sectional views, with dimensions, of the piling and a physical characteristics chart, discussion of the economies and advantages in using this type piling, and 23 suggested applications.

289

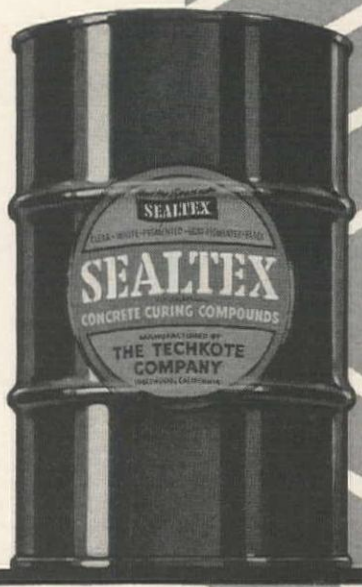
PORTABLE HEATERS — **The Herman Nelson Corp.,** Moline, Ill., have published two bulletins giving complete information about their new electric-powered, kerosene burning, portable heaters for temporary and semi-permanent heating applications. Both of the models feature complete separation of the products of combustion from the ventilating air stream, and forced hot air delivery to the areas where needed.

290

INDUSTRIAL EXPLOSIVES—**Olin Industries, Inc.,** East Alton, Ill., have issued a 64-page booklet entitled "Explosives Products" supplying a complete catalog of the company's explosives along with their specifications, qualities and recommended use. The booklet also contains such useful information as wire resistance and distance



SEALTEX Clear was used on this all-concrete hangar — the world's largest. Rapid City Air Base, Rapid City, S. D.



SEALTEX Concrete Curing Compounds
meet the exacting specifications of the Bureau of Reclamation, Army and Navy, other Federal agencies; State Highway Departments, Counties, Cities, Engineers and Architects.
Clear • White-Pigmented • Gray-Pigmented • Black

THE TECHKOTE COMPANY, Inglewood, California

tables, comparisons of weight, strength and density, burden on bore holes, suggestions for using electric blasting caps, sample calculations for field use and a list of 62 safety and handling "Don'ts."

291

GLASS BLOCK — **Pittsburgh Corning Corp.**, Pittsburgh, Pa., have released a 16-page booklet on the control of natural daylight through the use of functional glass block fenestration. The booklet describes in detail the proper selection of glass block and its usage for light direction and diffusion. Featured is the PC Nomograph for estimating illumination levels.

292

WELDING EQUIPMENT — **Victor Welding Co.**, San Francisco, are releasing a 40-page, 4-color catalog showing a comprehensive portion of the large line of Victor gas welding and flame cutting apparatus. Each type of equipment is illustrated, along with specifications and data to help in the selection of the correct type for every kind of job.

293

DIESEL ENGINES AND POWER UNITS—**The Industrial Power Division of International Harvester Co.**, Chicago, Ill., have published a 24-page illustrated booklet presenting in graphic feature style the design features, specifications and work capacities of International Diesel engines. Six engines, from the 39-h.p. UD-6 to the new 180-h.p. UD-24 are described and shown. Illustrations show the engines stripped as well as with various attachments.

CONSTRUCTION DESIGN CHARTS

Makes an Excellent Gift.

SEE AD PAGE 144

TWO GRADUATE

Construction Engineers

for highway construction work in Alaska. Must have had at least ten years experience in responsible capacity in bituminous and concrete highway construction, be familiar with and capable of directing all phases of highway construction and inspection. Salary $7,500.00 per year, plus travel expenses.

BOX 1055
WESTERN CONSTRUCTION NEWS
503 Market Street, San Francisco 5, Calif.

LOOK GREAT SAVINGS

To All Owners of Construction Heavy Duty Equipment . . .

I rebuild all types of rails, track pads, sprockets, idlers, and rollers, also their cast hubs for wear washers, and repair all types of scrapers, earth packers, rooters, shovels, etc.

Yes, I rebuild and repair all these items with good sound wearing service for much less the price of new ones. For low operating overhead in 1949 phone Bakersfield 3-0083 or write to:

Joe's Industrial Field & Shop Portable Welding Service
403 RIOS STREET, BAKERSFIELD, CALIF.

FOR SALE... EQUIPMENT FROM THREE MINES

CONVEYORS
3—New, link belt apron feeders, 36"x6' 8", 36"x16' 6"
3—Used, link belt apron feeders, 24"x24'
1—Apron feeder, 42"x16½', 5 H.P. motor drive

CRUSHERS
Farrel 13"x30" JAW, 50 H.P. Motors
A.C. Size #5 GYRATORY, 50 H.P. Motors
BLAKE 8"x20" JAW type
A.C. 55x24 Crushing Rolls

ELECTRIC MOTORS
150—Used good motors ¼ to 250 H.P., many speeds
Motor starting equipment, switches, breakers

BALL MILLS
3—#86 Marcys w/225 H.P. Motors
1—#75 Marcy w/200 H.P. Motor
5—5x8 & 5x13 Tube Mills

SAND PUMPS
1—New Byron Jackson Deep Well 150 H.P., 1000 GPM., 424' head
High Pressure Piston pumps
2", 3", 4", 5", 6" size sand pumps w/motors

TRANSFORMERS
4—833 KVA-GE, 16,500 to 460 Volts
4—500 KVA-GE, 14,850 - 16,500 to 230 - 460
3—100 KVA-GE 16,500 to 2300 - 460
2.5, 5, 10, 15, 20 KVA lighting transformers
1—25 KVA-GE 2200 to 110/220 Type H

This is but a portion of stock available
Write for full details and complete inventories

CATE EQUIPMENT COMPANY, INC.
49 E. Ninth South, Salt Lake City, Utah
Phone 9-2021

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS

SEE YOUR ETNYRE DEALER...

Allied Equipment Co., Reno, Nevada
R. L. Harrison Co., Albuquerque, N. Mexico
Howard-Cooper Corp., Seattle, Washington, Portland, Oregon
Intermountain Equip. Co., Boise, Pocatello & Spokane
Kimball Equipment Co., P. O. Box 1103, Salt Lake City, Utah
Neil B. McGinnis Co., Phoenix, Arizona
Studer Tractor & Equip. Co., Casper, Wyoming
The Creek Co., Los Angeles, California
Colorado Builders' Supply Co., Denver, Colo.; Scottsbluff, Neb.
Bay Equipment Co., San Francisco, California
Industrial Equipment Co., Billings, Montana
Normont Equipment Co., Great Falls, Montana

E. D. ETNYRE & CO., Oregon, Illinois

WANTED...

Contractors who have used construction equipment which they want to convert into ready cash immediately!

FOR SALE...

Advertising space in the "Opportunity Section" of WESTERN CONSTRUCTION NEWS—your surest, fastest and most economical way of selling equipment! Rates are only $10 per column inch. Send in your list of equipment today. Our Copy Department will prepare an ad which will be read by over 12,000 heavy buying construction men all over the West.

WESTERN CONSTRUCTION NEWS
503 MARKET STREET SAN FRANCISCO 5, CALIFORNIA

OPPORTUNITY SECTION

HELP

WELL QUALIFIED MEN AVAILABLE FOR YOU

IN THE ENGINEERING FIELD

ENGINEERS • TECHNICIANS • CONSTRUCTION MEN

For Selected Personnel Now Available

CALL OR WRITE

M. L. REDDEN, Director of Engineering

PARAMOUNT PLACEMENT AGENCY

Room 1010, 703 Market St., San Francisco 3

Phone YUkon 6-2743

FOR SALE

GUNITE PORTABLE RIG

LATEST MODEL—
LESS THAN 200 HRS.

500 cu. ft. Worthington Compressor

D-13000 Cat. Engine

N 2 Allentown Cement Gun

Comp. mounted on 10 all Wheel Drive Dia. T. Truck

Automatic Escalator System

MOST MODERN RIG EVER BUILT

COMPLETE — READY TO GO

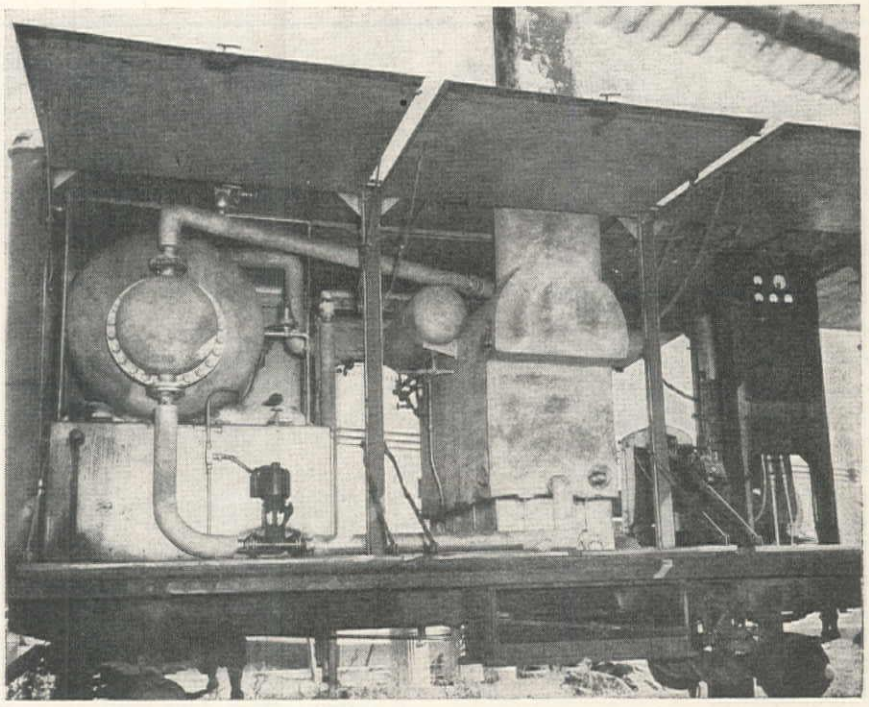
Have Moulds, Nozzle Liners & Hose

Corrigan's Picture Ranch

SIMI, CALIFORNIA

PHONE: Days — SUnset 1-4021

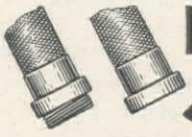
Evening — Simi 33



FOR SALE

Power Trailer, Van Enclosed, Mounted on Fruehauf Chassis, 155" Wheelbase. Complete Lighting and Hot Water Plant including Hercules Diesel Engine, 500 Watt Generator, Large Boiler and Equipped with Air Brakes. No Tire, Tubes, or Wheels included on the Unit. Address

ROEMER & RUBEL, Buick-GMC Dealers, Santa Maria, Calif., Phone 4



HOSE SALE

BRAND NEW 4-INCH

DISCHARGE HOSE

Brand new, Goodrich, Discharge or Fire Hose. 200-lbs. pressure, rubber-lined, complete with male and female bronze couplings.

USES: portable pipe lines, discharge on pumps; mine stripping; sewer and trench work; fire hose.

SALE PRICE—per ft. 60c

50-ft. length, complete with bronze fittings $30

BERNSTEIN BROTHERS

Phone 8404 • PUEBLO, COLORADO

***Waterproof With* FORMULA NO. 640**

A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.

HAYNES PRODUCTS CO., OMAHA 3, NEBR.

CONSTRUCTION SUPERVISOR—Age 47, married, 4 dependents—25 years broad experience all phases construction industry including administration, management, engineering, field superintendence, purchasing, estimating, etc. Large scale housing, prefabrication, industrial & commercial projects. Excellent references, resident New York interested in locating West. Will consider any reasonable proposition. JOHN J. KEARNEY, 206-17 43rd Ave., Bayside, New York.

BRIDGES FOR RENT

***Portable* Military Vehicular**

Bailey Truss Bridges

- Span & capacity to suit your requirements.
- Rent by the month—just like other equipment.
- Detour spans for bridge, highway and canal construction.
- Emergency bridges.
- Construction bridges for contractors.

WRITE TO

BAILEY BRIDGE EQUIPMENT COMPANY

P. O. Box 687

2262 North Oxnard Boulevard

Oxnard, California

ATLAS CONCRETE FORMS

Walls • Cylinders • Floors • Sewers

Irvington FORM & TANK CORP.

Irvington, N. Y.

SOLD
RENTED
REPAIRED

Transits
Levels
Steel Tapes
Compasses

PORTLAND INSTRUMENT CO.

334 S.W. 5th nr. Stark, Portland 4, Ore., AT 3598

WANTED

Will buy complete backhoe attachment for a Byers model 65 or 75 one-half yard machine. Must be in good condition and priced reasonably.

FRANK PAPILLO, Contractor

125 North Side HAVRE, MONTANA

BRIDGE ENGINEER

Experienced in design of steel highway bridges, must be qualified to design and detail plate girder and truss spans and floor systems. Two to three years work.

Location: Alaska. Salary: $9,000.00.

BOX 1054, WESTERN CONSTRUCTION NEWS
503 Market Street, San Francisco 5, California

INDEX TO ADVERTISERS
★ IN THIS ISSUE ★

Johnston Stainless Welding Rods

Anderson Equipment Co. Los Angeles | Arizona Welding Supply Co. Phoenix | J. E. Haseltine & Co. Portland, Seattle | MacDonald Co. Reno | Mahl Steel & Supply Co. Los Angeles