WESTERN CONSTRUCTION NEWS

ENGINEERING CONSTRUCTION IN THE FAR WEST

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SAN FRANCISCO, NOVEMBER 25, 1930

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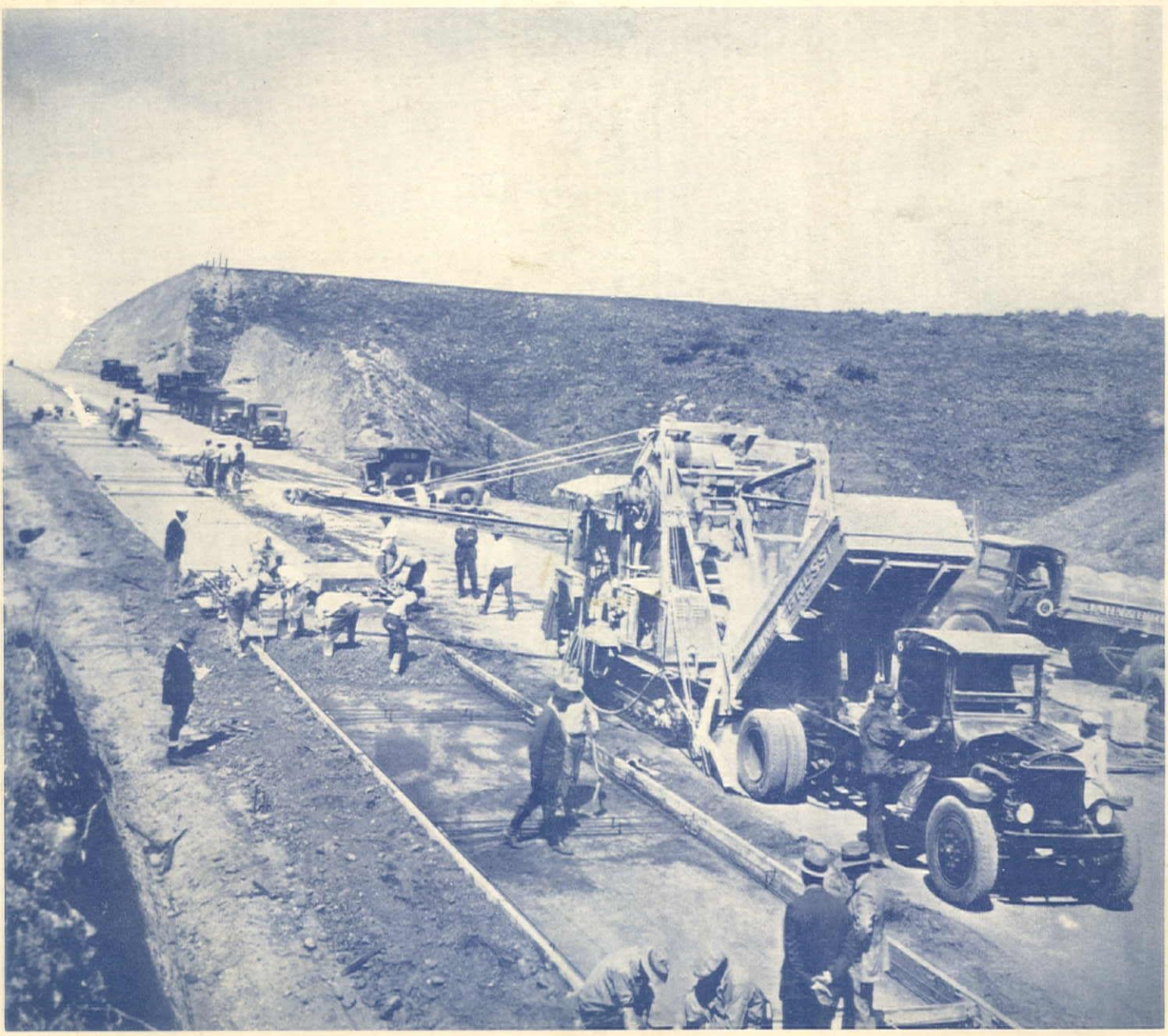


TUNNEL STATION—SANTA CLARA RIVER HIGHWAY, LOS ANGELES COUNTY, CALIFORNIA. THIS IMPROVEMENT BY CALIFORNIA DIVISION OF HIGHWAYS ELIMINATES NEWHALL TUNNEL BOTTLENECK

A 5/8-YARD Crane *that's* BUILT BIG

WHEN equipped as shovel, the Model 300-B has the P & H patented positive chain crowd. It will cut accurately to grade, force the dipper above and beyond the boom point, reverse rapidly so that sticky materials can be shaken off and cut any slope of bank.

The New York State Highway Department has just purchased seven of these models for highway maintenance and construction.

MODEL 300-B, 5/8-yard, is built heavy and strong. It has many features the same as the larger P & H models. As a crane or dragline, it weighs 42,000 lbs.—as a shovel, 48,000 lbs.

Years of hard service are built into the P & H Model 300-B. Unit-cast steel frames, with engine mounted directly upon the revolving base instead of on structural sills, make for rigidity and permanence of alignment. Large diameter alloy steel shafts and wide-faced cut steel gears give added strength.

Fast line and swing speeds make the Model 300-B a big producer. It hoists at 155 feet per minute and swings at 5½ r.p.m. Power clutch control insures easy operation. Steering brakes mean quick and accurate maneuvering.

And the ready convertibility of the Model 300-B doubles its usefulness. It can be quickly changed to shovel, dragline, clamshell, trench hoe, skimmer scoop, pile driver or crane. No change of drums is necessary to any of these adaptations.

The 300-B is a comprehensive excavating and material-handling unit all by itself. It will pay handsome dividends on a comparatively small investment.

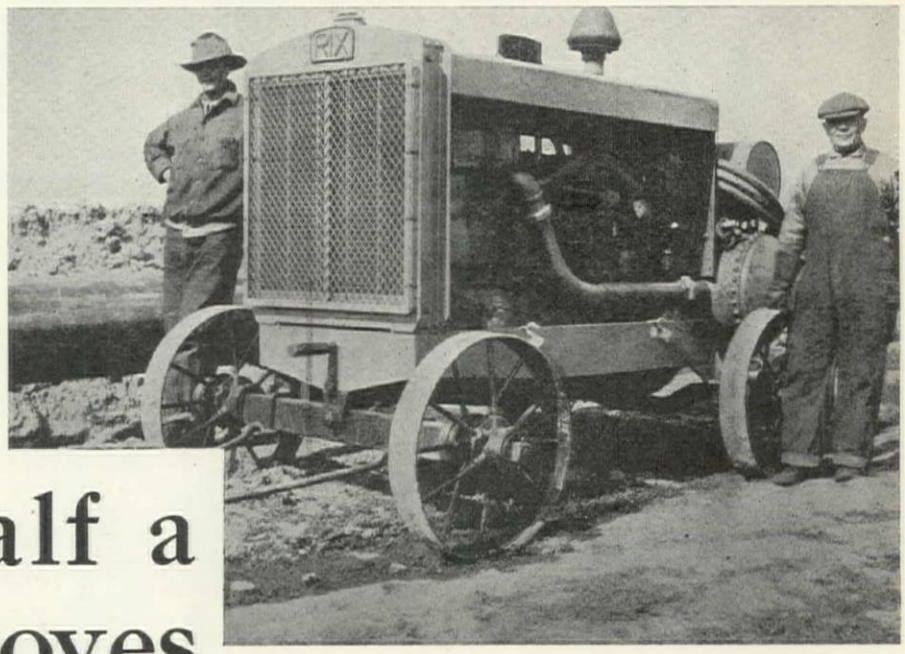
HARNISCHFEGER SALES CORP.
Established 1884
4490 W. National Ave., Milwaukee, Wis.
32 Beale St., San Francisco
2025 Santa Fe Ave., Los Angeles

ROBERT M. TAYLOR, Pacific Coast Manager
Service Stations, Complete Repair Part Stocks and Excavators at San Francisco, Los Angeles and Seattle

P&H MODEL 300-B- EXCAVATORS

A COMPLETE LINE
GAS DIESEL ELECTRIC
1/2 TO 3½ CU. YDS.

A-52



COMPRESSOR at right is a 220 ft. RIX "6" No. 2 with *"Super-Charger"* (patd.), on a pipe line job.

Over half a century proves you can depend on RIX *always*

THERE is just one answer. When the margin is close and you need *dependable* equipment, look to PERFORMANCE RECORDS—not *one* year but *fifty*—not in Egypt, Africa, or New Jersey, but right in your own territory amid the very conditions you face. Remember this when you buy a Compressor. Dig deep into a half century of Western History and learn for yourself the dependability of RIX. Now more than ever you need RIX *ruggedness,* RIX 26% *extra* efficiency, RIX *"express"* service. Success is mostly a matter of thought and *action.* Act NOW while you think about it—write for Bulletin 3-P.

COMPRESSED AIR MACHINERY ★ SAN FRANCISCO LOS ANGELES ★ RIX RIX SINCE 1877

The *Pioneer* RIX line includes compressors of *all* sizes for *all* purposes. RIX Co. are also agents for COCHISE Drills, and exclusive distributors for THOR Pneumatic tools in Seattle territory.

THE RIX COMPANY, Inc.

San Francisco - - - - 400 Fourth Street
Los Angeles - - - 684 Santa Fe Avenue
Portland - - - - 312 E. Madison Street
Seattle - - - - 1729 First Avenue South

the Compressor with the SUPER-CHARGER

RIX "6"

PORTABLE AIR COMPRESSORS

PHILIP SCHUYLER
M. Am. Soc. C. E.
M. Am. W. W. Assn.
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Jun. Am. Soc. C. E.
ASSISTANT EDITOR

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ASSOCIATE EDITOR

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M. Am. Soc. C. E.
ASSOCIATE EDITOR

DEVOTED TO ENGINEERING CONSTRUCTION IN THE FAR WEST

VOLUME V NOVEMBER 25, 1930 NUMBER 22

CONTENTS

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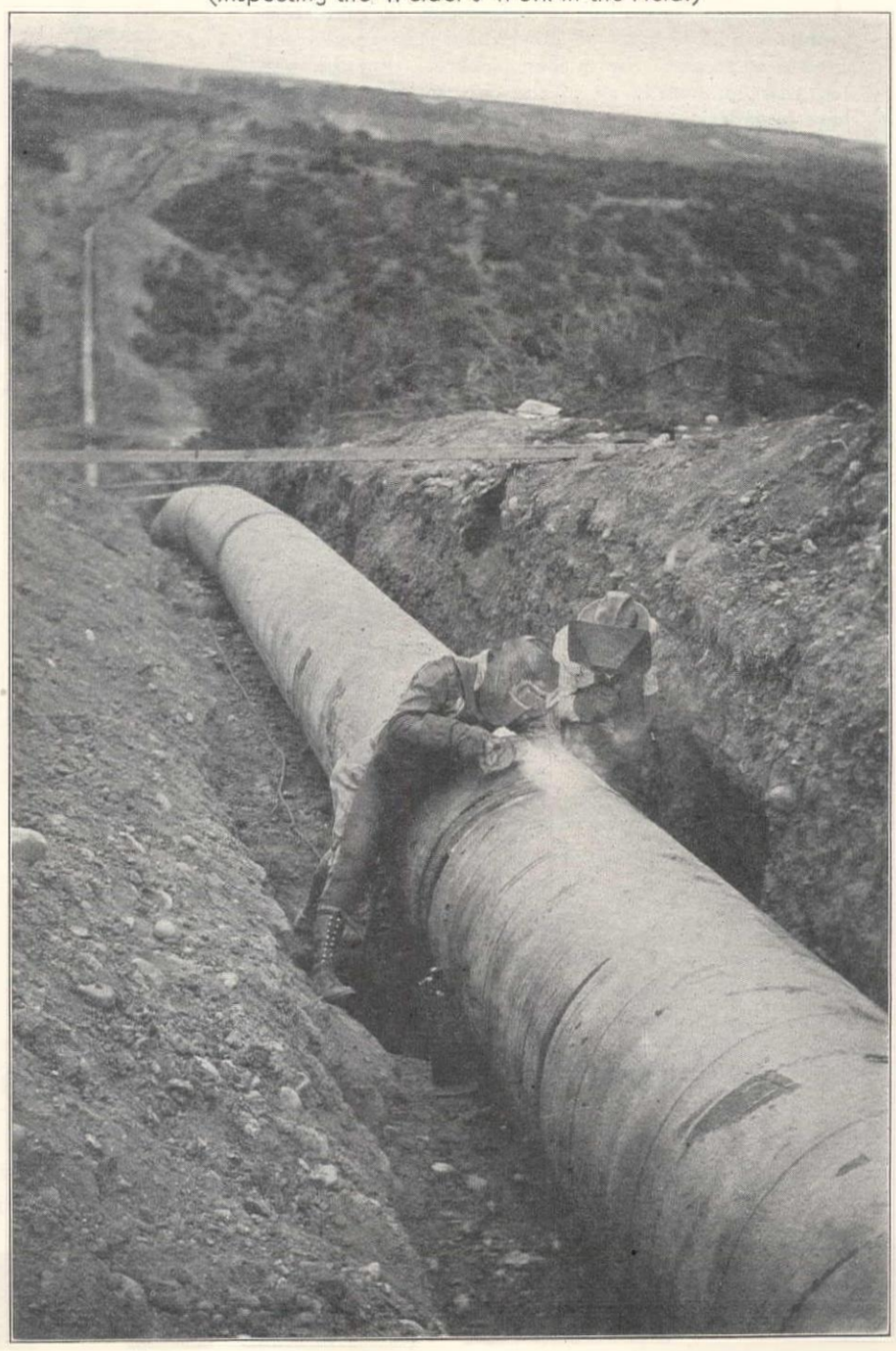
San Diego's New 16-mile Pipe Line

Recently completed, this Otay Reservoir - San Diego Second Main Pipe Line, consists of 43,300′ of 36″ and 43,160′ of 40″ Automatic Electric Welded Steel Water Pipe, double dipped and soil-proof wrapped. Of significance is the fact that it is the third large steel pipe water line furnished San Diego by this company in recent years—a fine example of "customer satisfaction." During field tests, not a single serious leak developed in the entire sixteen miles of pipe. Satisfaction again!

(Inspecting the Welder's Work in the Field.)



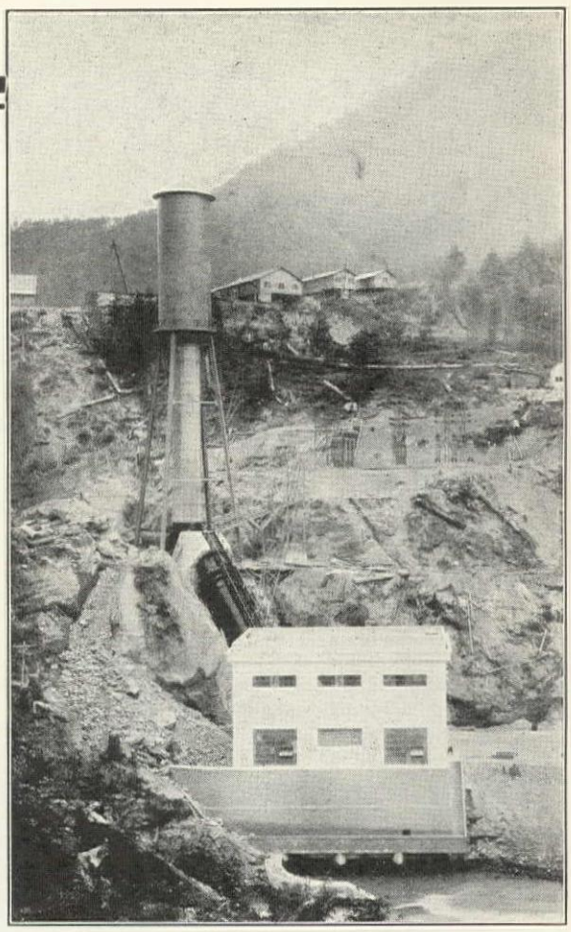
WESTERN PIPE & STEEL COMPANY OF CALIFORNIA

SAN FRANCISCO
LOS ANGELES
FRESNO
TAFT
PHOENIX

Larner Engineering Co. Surge Tank Designs for Power Plants

THE Larner Engineering Co. of Philadelphia has for many years specialized as consultants on regulation problems and designs of differential surge tanks for control of pressure rise in long pipelines. For the past ten years practically all of the differential tanks built have been designed under their supervision.

This accumulated experience, unique in the field of hydro-electric development, is now offered to public utilities as a consulting service only, permitting the use of these specially prepared designs and specifications for competitive bidding by local tank manufacturers. Such an experience, available at low cost, provides an obvious means for still further reducing the installed cost of differential tanks.

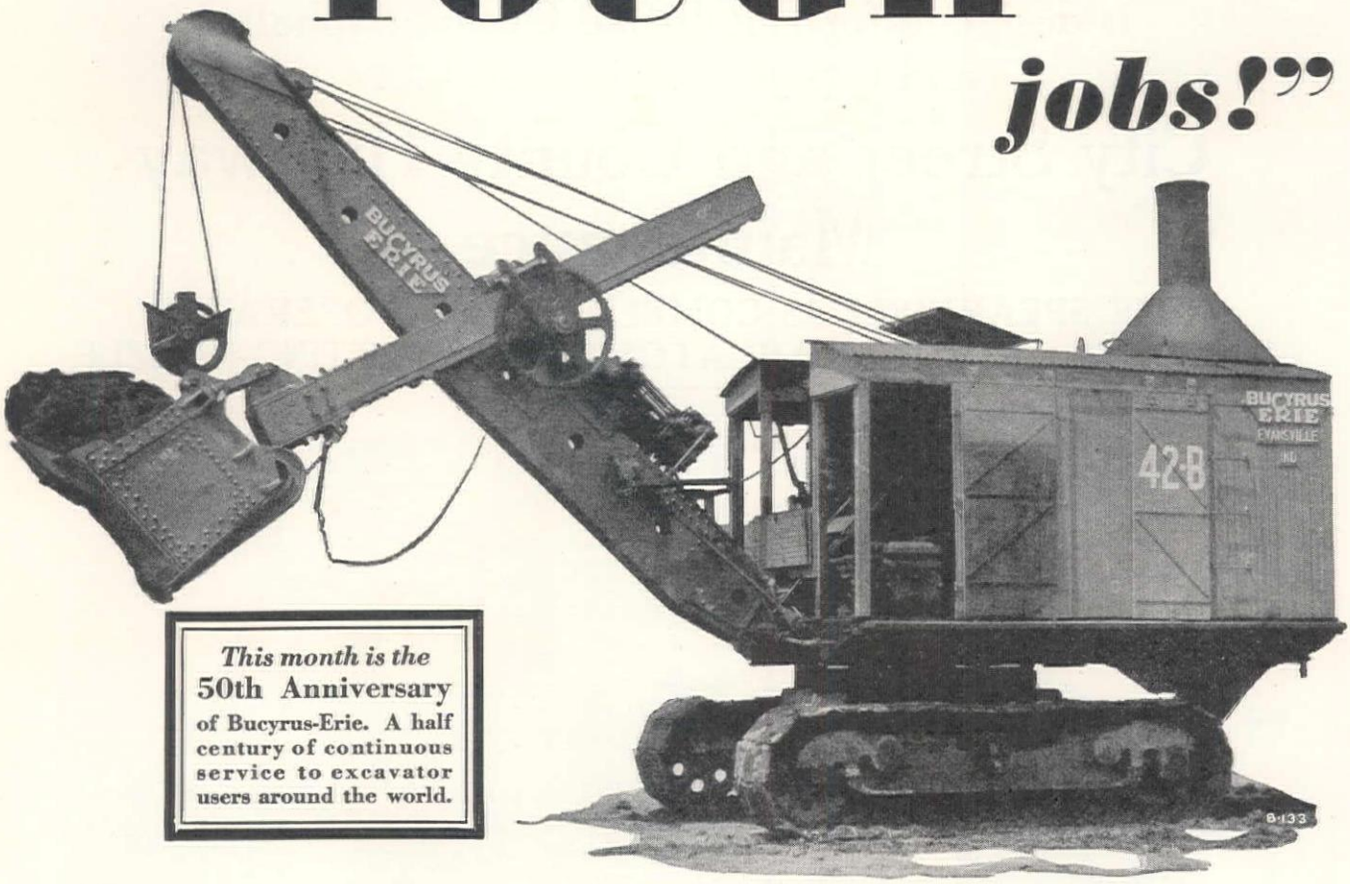


View of Glines Canyon development of the Northwestern Power & Light Co., showing a Larner Differential Surge Tank installed.

A PARTIAL LIST OF LARNER ENGINEERING CO. INSTALLATIONS

DEVELOPMENT	Conduit Length ft.	Conduit Diam. ft.	Disc. c.f.s.	Surge Tank Diam. ft.	Surge Tank Height ft.	Head ft.
Adirondack Power & Light Corp., Sprite Creek Plant	16,500	5, 5½, 6	180	12½	214	375
California-Oregon Power Co., Klamath River Plant	3,100	12	1,000	42	35	50
Granby Consolidated Mining, Smelting & Power Co., Anyox, B. C.	4,900	5	225	12	188	360
Great Northern Power Co., Thomson Plant	4,313	12	1,030	35	238	360
Montana Power Co., Mystic Lake Plant	9,000	4.6	153	12	118	1,050
Northern New York Utilities, Inc., Browns Falls Plant	6,078	11 & 12½	1,000	40	245	245
Pacific Power & Light Co., Powerdale Plant	14,440	8.3 & 10	505	28	207	180
Portland Railway, Light & Power Co.	2 Cond.	No. 1-9				
Oak Grove Plant	34,700	No. 2-11½	1,200	31	80	849
New England Power Co.:						
Davis Bridge Plant	12,700	14	1,650	34	194	345
Searsburg Plant	18,235	8	300	50	35	205
Washington Water Power Co., Similkameen Plant	772	7	347	17	33	70
Pennsylvania Power & Light Co., Wallenpaupack Development	18,000	14	1,900	55	135	370
City of Spartanburg, S. C.	1,250	6.5	292	25	34	60
Vaughan Engineers, Jackman Development	5,332	7.5	344	25	93	174
Utah Power & Light Co., Cutler Development	1,206	18	3,730	45	81	125
Rockland Light & Power, Rio Development	7,075	11	850	40	65.5	175
U. G. I. Contracting Co., Rocky River Development	1,355	15	1,700	28	76.7	230
Washington Water Power Co., Chelan Development	11,040	14	2,010	45	126	393
Northwestern Power & Light, Glines Canyon Development	680	11.7	1,140	20	141	194.5
Kanto Hydro-Electric Co., Japan	4,358	15	2,800	41	258	378
Shawinigan Engineering Co., St. Alban Development	2,112	10	665	38	32.5	48.7
International Paper Co., Kents Falls Development	2,430	13	900	28	129	156
W. S. Barstow & Co., Saluda Plant	1,038	16	3,125	38	205	180
City of Tacoma, Cushman No. 2 Plant	12,910	17	2,840	65	94	462
Sanderson & Porter, Mantaro River Power Plant	7,170	18.5	3,325	55	176	240
City of Seattle, Diablo Plant	1,920	19.5	5,680	45	95	310

"Show me your TOUGH jobs!"



This month is the **50th Anniversary** of Bucyrus-Erie. A half century of continuous service to excavator users around the world.

—says this NEW shovel

I'm that fast, rugged, new shovel, the 42-B. My 1 1/2-yard dipper is backed by every modern, money-making feature. Just give me a chance—I'll prove a thing or two. Watch my fast pace! See how I knock out the tight clay! Notice how sturdily I'm built throughout—yet how simply. I'm a Bucyrus-Erie, with stuff born of half a century of shovel leadership.

Note in particular my new underpinnings, Bucyrus-Erie's new improved caterpillar truck. Extra long and wide mounting for dragline work on soft ground, if you wish. Your operator can steer me anywhere, easily, from his seat. My easy operation saves you time all day long.

I'm built to do hard, big, fast jobs for somebody. Why not you? Send for my complete story today.

Steamer
2 or 3-motor AC electric
Full Ward-Leonard electric

Shovel
Dragline
Clamshell
Lifting Crane

Representatives throughout the U. S. A. Offices or distributors in all principal countries. *Branch Offices:* Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit, Chicago, St. Louis, Dallas, San Francisco.

BUCYRUS-ERIE COMPANY, *General Offices:* South Milwaukee, Wis. *Plants:* South Milwaukee, Wis.; Erie, Pa.; Evansville, Ind.

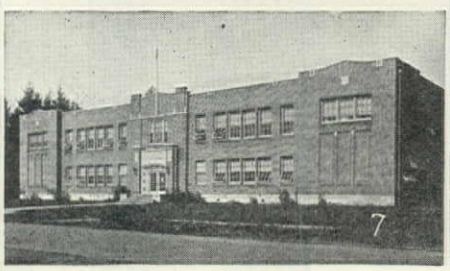
A-197—11-25-30—WCN

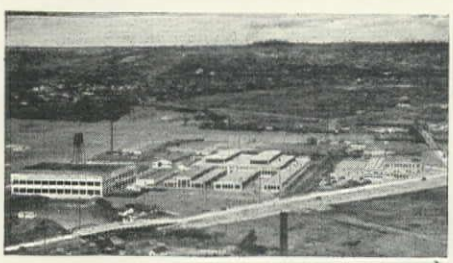
BUCYRUS ERIE

West Coast Branch Office: 989 Folsom St., San Francisco. Clyde Equipment Company, Portland, Ore.; Seattle, Wash. Concrete Machinery & Supply Company, Los Angeles, Calif.

When writing to BUCYRUS-ERIE COMPANY, *please mention Western Construction News*

PABCO MULTIPLE PROTECTION





(1) Montgomery Ward & Co. Warehouse, Portland, Ore. . . . 20 years protection guaranteed by Pabco 20-Year Roof.

(2) Pabco 10-Year Roof protects Sears, Roebuck & Co. Building, Portland, Ore. . . L. H. Hoffman, Contractor.

(3) Meier & Frank Warehouse, Portland, Ore. . . Pabco 10-Year Roof. Sutton & Whitney, Architects. Walle Shattuck Co., Contractors.

(4) *Left*... Northern Life Building, Seattle. Waterproofed with Pabco products.
Right... Pacific Telephone Co. Building, Seattle. Pabco 10-Year Roof.

(5) Multnomah Stadium, Portland, Ore. . . Pabco 10-Year Roof. A. E. Doyle, Architect. Hansen Hammond Co., Contractors.

(6) Men's Athletic Pavilion, University of Washington. University Engineering Department, Architects. Protected by 10-Year Pabco Roof.

(7) Washougal High School, Washougal, Wash., covered with Pabco 10-Year Roof. Freeman & Struble, Architects.

(8) The buildings of Boeing Airplane Co., Seattle are protected with a 10-Year Pabco Roof.

TROUBLE-FREE, ECONOMICAL, MAINTAINED . . .

Built-up on the job of sturdy materials already waterproofed with two coats of blended bitumen, at the factory, by controlled machine processes . . . Pabco 10, 15 and 20-year Maintained Roofs are always uniform, always waterproof.

They are warranted to give worry-free protection during the life of the maintenance agreement in spite of all attacks of sun, rain and cold.

Thousands of buildings throughout the West are enjoying this form of Pabco Multiple Protection. Our corps of engineering and roofing experts will gladly give you, without obligation, advice and suggestions that will enable you to protect your structures and their contents by the same sure, economical methods. Consult our nearest office or write us.

THE PARAFFINE COMPANIES, INC.

LOS ANGELES · OAKLAND · SAN FRANCISCO · PORTLAND · SEATTLE · KANSAS CITY
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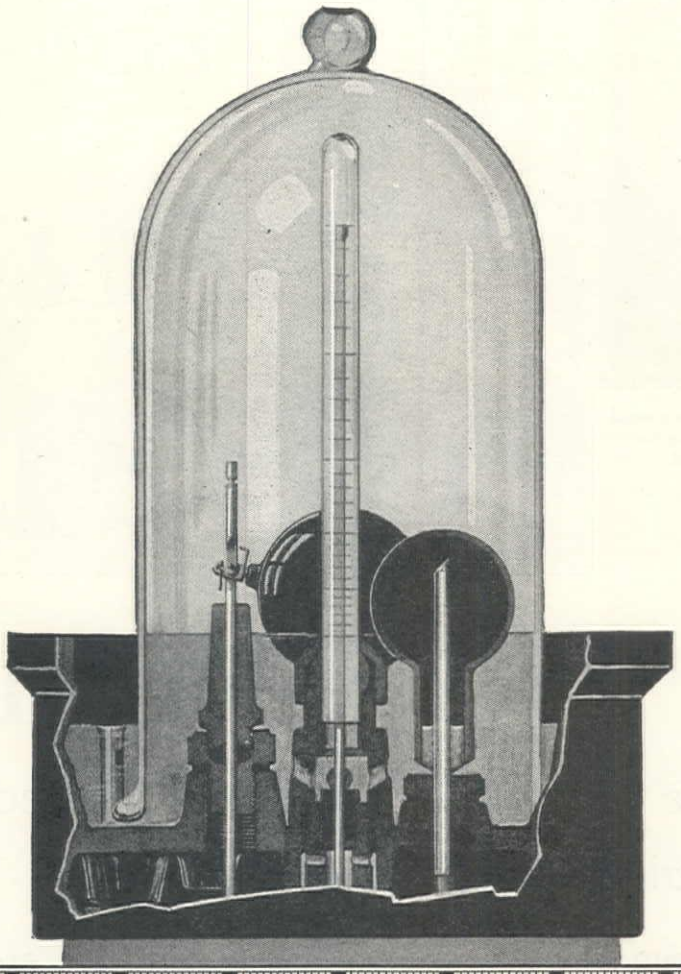
Manufacturers of

Pabco Multi-Service Paints, Varnishes, Lacquers and Enamels, Pabco Waterproofing Paints and Compounds, Mastipave, Pabco 10, 15 and 20-Year Roofs, Malthoid Membrane Dampcourse, Pabcobond and Other Products

 073

PABCO 10, 15 and 20-YEAR ROOFS

NO VACUUM CHLORINATOR HAS EVER WORN OUT



WHETHER used for drinking water sterilization, swimming pool disinfection or the general practice of Chlorination in sanitary and industrial fields the

VACUUM CONTROL CHLORINATOR

has established a record for trouble-free service and low maintenance costs unequalled in the history of chlorination.

Housed under the glass bell jar—free from diaphragms . . . springs . . . and delicate control parts—the complete control unit is always in sight.

A control unit so readily accessible for cleaning and adjusting—so simplified in construction and operation that—of the more than THREE THOUSAND W&T VACUUM CHLORINATORS installed since the first of the type was put into service over eight years ago—*not a single machine has ever worn out.*

VACUUM CONTROL is an exclusive W&T feature.

Ask for technical publication No. 38.

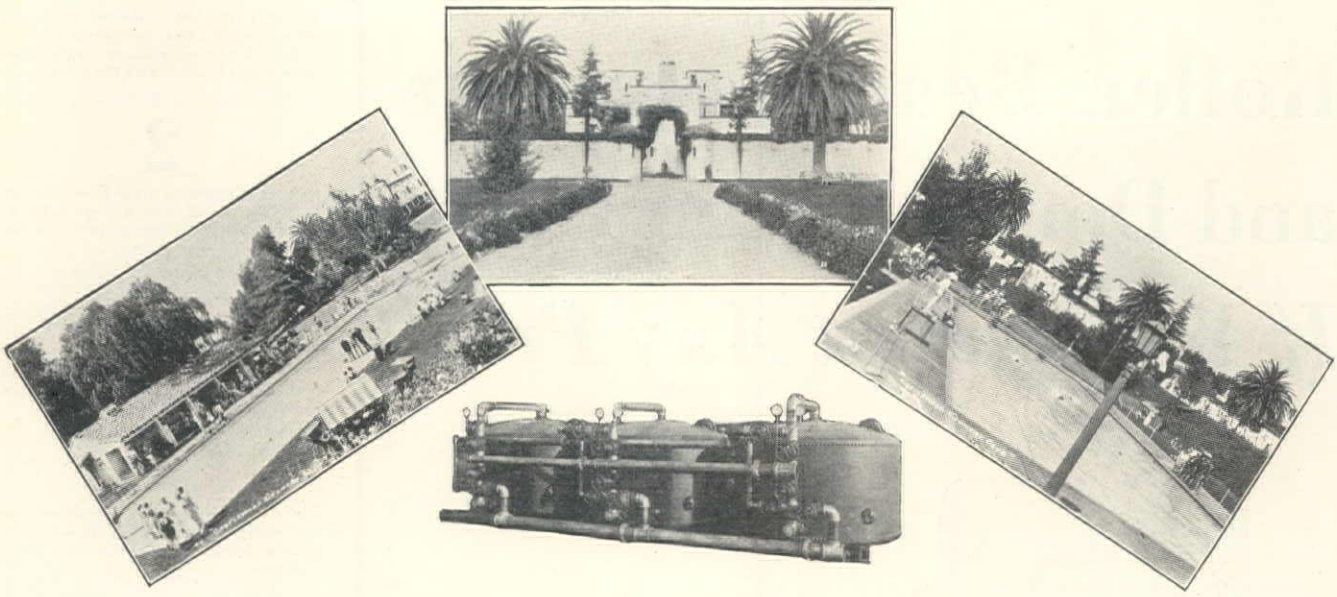
WALLACE & TIERNAN CO. INC.
"A Chlorinator for every purpose"
NEWARK, N. J.
BRANCHES IN ALL PRINCIPAL CITIES

A PRODUCT OF

WALLACE & TIERNAN

SA 25

THE ONLY SAFE WATER IS A STERILIZED WATER



CASTLEWOOD
Uses California Filters In 200,000-Gallon Pool

THE swimming pool at Castlewood Country Club, formerly the estate of Mrs. Phoebe Hearst at Pleasanton, California, is an outstanding example of modern out-door swimming pool planning. It measures 40 by 120 feet, is marked with five swimming lanes, and has a graduated depth of 2½ feet to 9 feet, with a capacity of 200,000 gallons.

Complete mechanical equipment for the pool was installed under the supervision of California Filter engineers, and consists of three 96-inch vertical California Filters, in addition to heating and chlorinating equipment. The entire contents of the pool can be filtered in 7½ hours.

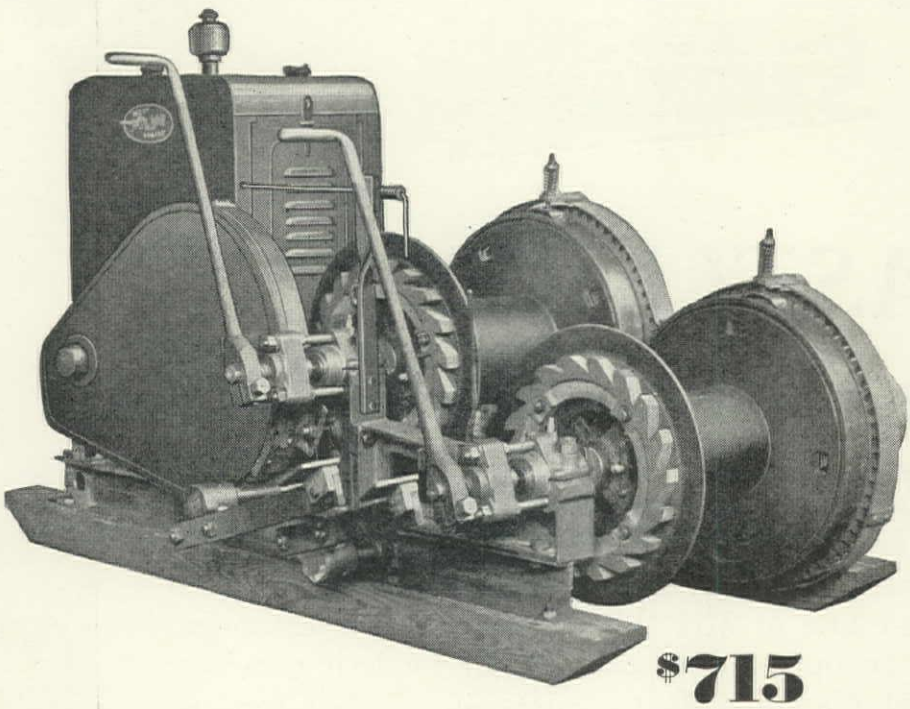
Our Booklets Nos. 30 and 40 contain detailed information on pressure filters for swimming pools. We shall be glad to supply copies on request.

California Filter Company, Inc.

981 Folsom Street

LOS ANGELES SAN FRANCISCO SEATTLE

Match This 4-Cylinder Roller Bearing Engine and Double Drum Hoist, *If You Can, at Any Price*



$715

F. O. B. LANSING

THIS Novo NH 165 double drum hoist is built to give contractors a fast, over-strength machine for handling platform elevators and concrete buckets on the average building job.

Feature for feature, it is a 100 h. p. hoist on a 14 h. p. scale.

That is why it stands out so far ahead of competition.

Try to find the hoist that matches it in design, construction, performance and price.

A postcard will bring you complete information for which we have not room here. Write your nearest Distributor today.

NOVO

PUMPS—ENGINES—HOISTS

1

The NH 165 has a double cone, six section, wood block, renewable friction —instead of the ordinary single cone friction cast integral with the drum gear.

2

Instead of releasing drum from friction by pulling it off with a friction lever, the NH 165 has a release spring on the drum shaft.

3

A one-piece brake on this Novo gives ⅓ more braking and a far more effective braking action than the two-piece brakes usually used.

4

The ratchet is bolted to the drum and can easily be replaced if broken. On others, the ratchet is cast integral with the drum.

5

Drum shaft bearings are of pillow block construction with stud bolts—instead of flat cap bearings with through machine bolts.

6

The pawl and brake shafts are separate on the NH 165. On others, where the pawl or dog is mounted on the brake shaft, the brake is absolutely useless when the pawl is engaged. This means that when a load is suspended in mid-air, and held there by the pawl, accidentally jarring the foot brake can throw the pawl out.

7

The NH 165 has a real screw thrust—not a cam thrust.

8

The side frames are separate from the base. And the base is of welded steel construction with tubular spreaders to maintain alignment and give additional strength. This is far superior to having the side frames and base all in one piece—and depending on wood skids for alignment.

9

A Novo four-cylinder, anti-friction engine, with Timken Roller Bearings on crankshaft and driveshaft, supplies the power. Vibration is virtually eliminated. Horsepower is increased. Gas consumption is less. And operation is extremely smooth and dependable. Extended hand throttle convenient for operator.

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1731-1741 First Avenue, South
SEATTLE, WASHINGTON

CROOK COMPANY
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LOS ANGELES, CALIFORNIA

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256 Porter Street
LANSING, MICHIGAN
CLARENCE E. BEMENT
Vice-President and General Manager

McCRAKEN-RIPLEY COMPANY
65 Albina Avenue
PORTLAND, OREGON

KRATZ & McCLELLAND, INC.
522 Bryant Street
SAN FRANCISCO, CALIFORNIA

When writing to NOVO ENGINE CO., *please mention Western Construction News*

A Complete Construction Equipment Line

This is a partial list of the nationally known firms we represent exclusively. In addition to stocking the equipment of these and other companies, we maintain a service department that is ready to serve your most urgent needs. Complete information on any type of construction equipment on request, without obligation.

J. D. ADAMS COMPANY
Leaning Wheel Graders
BURCH CORPORATION
Stone Spreaders
BYERS MACHINE COMPANY
Gas Shovels, Cranes, Draglines
TED CARR & COMPANY
Subgraders
EASTERN CAR AND CONST. CO.
Industrial Cars
FOOTE CO., INC.
Multifoote Pavers
FOUR WHEEL DRIVE AUTO CO.
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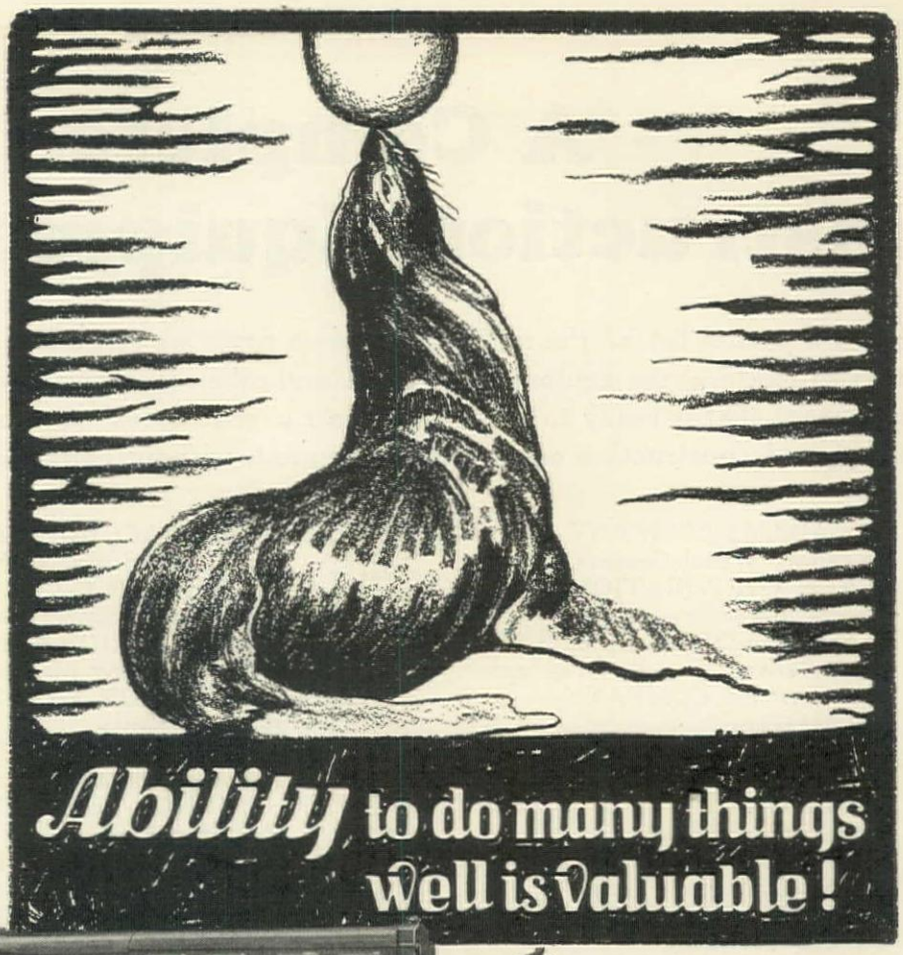
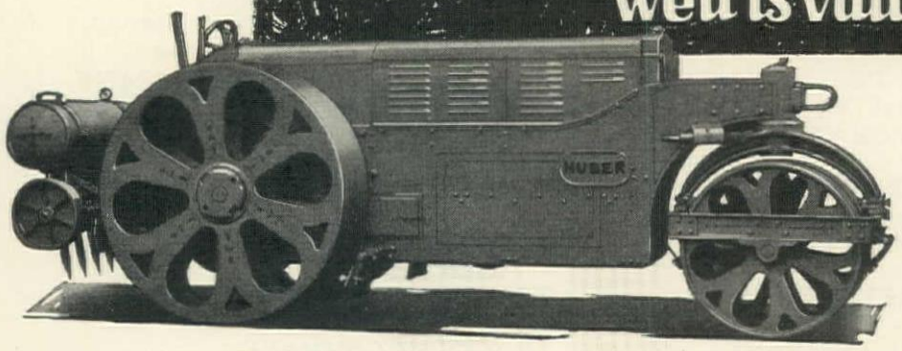
WESTERN MACHINERY COMPANY
Belt, Gas and Electric Hoists
WILLAMETTE-ERSTED CO.
"Hyster" Hoists

EDWARD R. BACON COMPANY

CONSTRUCTION ERBCo EQUIPMENT.
SINCE 1910

SACRAMENTO - OAKLAND - FRESNO - RENO - HONOLULU
17TH AND FOLSOM STREETS - SAN FRANCISCO





You'll like a *Huber* because of its all-round ability to do all types of road work. It takes the place of a number of different pieces of equipment — and does the work efficiently and economically! A *Huber* with sprinkling attachment is ideal for rolling hot asphalt—with scarifier it tears up old roads and streets to any accurate depth —with grader blade it levels off old roads in a hurry—many operations *with one machine.* Made in sizes from 5 to 15 tons.

Write for the *New* HUBER Roller Catalog

EDWARD R. BACON COMPANY

17th and Folsom Sts., San Francisco **Phone HEmlock 3700**

HUBER MOTOR ROLLERS

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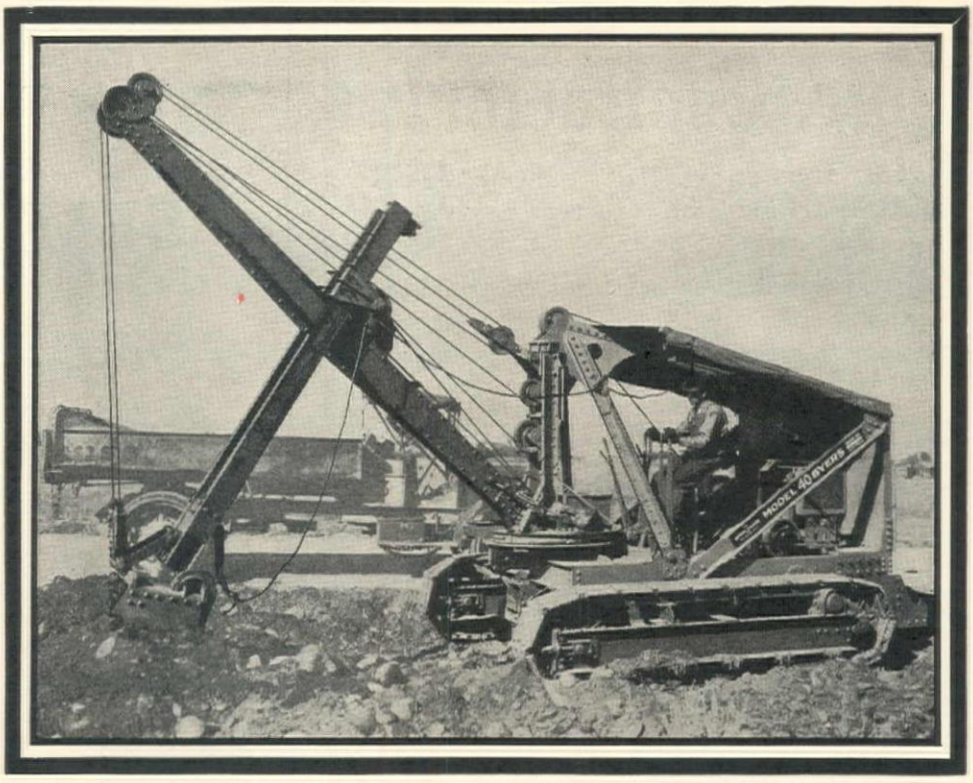


When ½ yard shovels and cranes are too big for your job—

call in Byers Model 40

Here's a full grown ⅜ yd. ¾ circle shovel and crane that tips the scales complete at only 10 tons.

It does small jobs in a big way, a profitable way.

It is built like Byers big full circle rigs with powerful motor, unit steel castings, direct drive, independent operations and two-speed crawler.

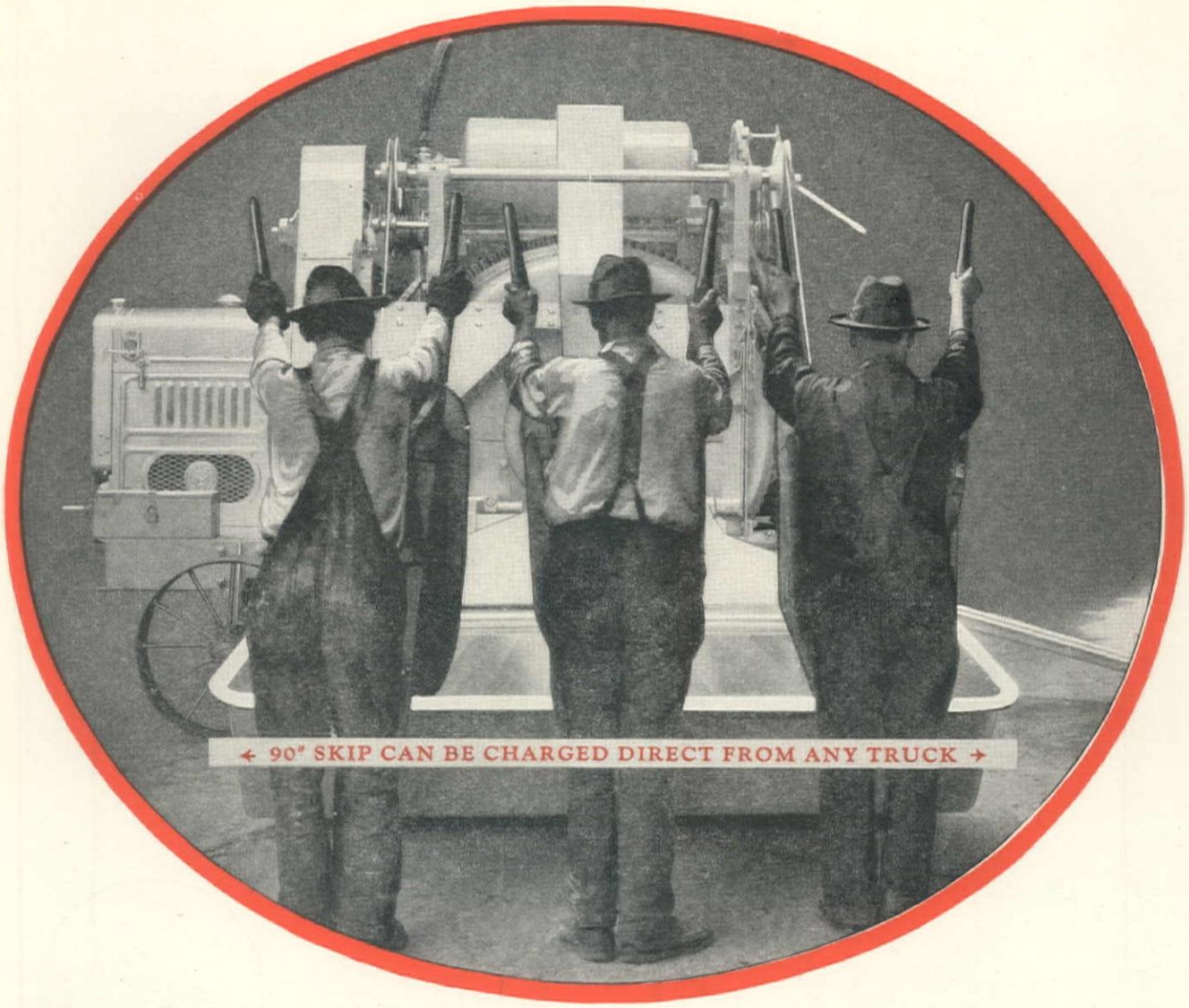
Model 40 is capable, dependable, able to *produce* a full day's work on any job you give it. As a clean-up tool it licks all those otherwise expensive little jobs around a big job. . . Write now for illustrated Catalog and prices.

BYERS

RAVENNA · OHIO

"40" · ½
¾ · · ¼

IN SAN FRANCISCO IT'S BACON



90" Skip Shaker Loader Makes Jaeger World's Fastest 14S Mixer!

This truck charging skip is optional equipment—at NO EXTRA COST!

BATCH by truck direct from proportioning plant to this loader and you get rigid control concrete cheaper than you can buy it anywhere, without stock piles, wheelers or bins, without a minute lost on material handling or charging, and with Jaeger's patented automatic Skip Shaker to slice more seconds off the loading operation for every batch. If you do use wheelers, three can load at one time, make real speed.

Faster concrete construction starts with a faster mixer. You need this 14S Jaeger and it doesn't cost a nickel more. Discharging time is cut to minimum, gives you a maximum thoro mix and all the easy handling of a short coupled, pivot axle, roller bearing truck, steel and ball bearing construction and original Jaeger one-man end control.

—With Patented SKIP SHAKER!

Also available with standard loader, extension track or batch hopper, on wheels or skids, gas or electric drive.

MAIL SLIP FOR CATALOG, SPECIFICATIONS, PRICES

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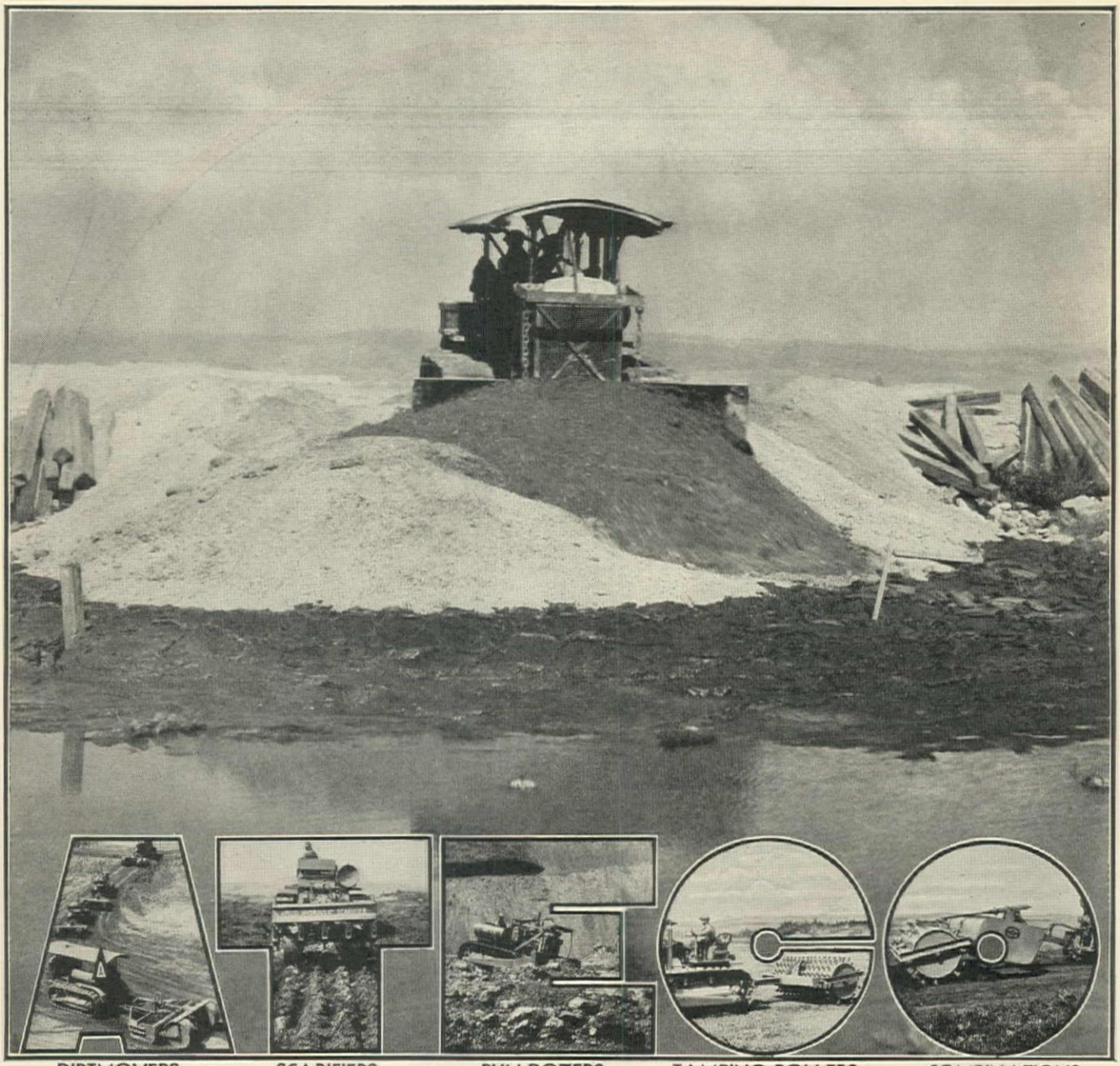
When writing to THE JAEGER MACHINE COMPANY, *please mention Western Construction News*



DIRTMOVERS » » » SCARIFIERS » » » BULLDOZERS » » » TAMPING ROLLERS » » » COMBINATIONS

FOR HAPPY LANDINGS

There can be no soft spots on the field when a giant transport comes swooping down from the sky. Smooth, well compacted earth is necessary to "happy landings." ATECO Bulldozers have a major part in this all important work of putting and keeping airports in condition. Their accuracy and capacity have earned it.

The ATECO Hydraulic One-Man Control instantly sets the bowl at any height to push a capacity load or spread and compact the earth in layers of any required thickness. The cast steel, electrically welded construction easily withstands the maximum power of the tractor, and the huge bowl means big yardages.

The framework does not interfere with the accessibility of the engine and no part of the Bulldozer extends at the rear. The drawbar is always in the clear and the tractor instantly available for other work. If necessary, the side arms and bowl are quickly detached by withdrawing four pins.

By means of the special valve, other ATECO Equipment can be operated with the Bulldozer by the One Pump and One-Man Control.

AMERICAN TRACTOR EQUIPMENT CO.

OAKLAND, CALIFORNIA
PEORIA, ILLINOIS

ATECO

Sold Throughout The World
By "CATERPILLAR" Dealers.

When writing to AMERICAN TRACTOR EQUIPMENT COMPANY, *please mention Western Construction News*

...You are the Judge ...and the Jury!

THE CONSTRUCTION FIELD OF THE FAR WEST is dominated by *Western Construction News*, the outstanding publication covering this important market for construction equipment and materials.

This statement is not based on assumptions but actual facts as told by the following figures:

Total Number of Advertising Pages Published During the First 6 Months of 1930 Compared with the First 6 Months of 1929

	1930	1929	Total Gain
Western Construction News	**704 pages**	**603 pages**	**101 pages**
Second magazine in this field	288 pages	274 pages	14 pages
Third magazine in this field	190 pages	234 pages	44 pages (Loss)

Total Number of Editorial Pages Published in 1929

Western Construction News	**975**
Second magazine in this field	282
Third magazine in this field	326

Total Number of Editorial Pages on Street and Road Work Published in 1929

Western Construction News	**316**
Second magazine in this field	205
Third magazine in this field	212

Total Pages of Advertising Published in 1929

Western Construction News	**1265**
Second magazine in this field	533
Third magazine in this field	456

Wise buying of advertising for 1931 should be based on the best possible mediums for the best possible markets for your products. The NEWS with the largest paid circulation is the most effective medium to reach the engineers and contractors who are actually doing the work in this important market.

Write nearest office for complete data.

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PUBLISHED SEMI-MONTHLY

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H. B. Knox, Jr., 101 Park Avenue
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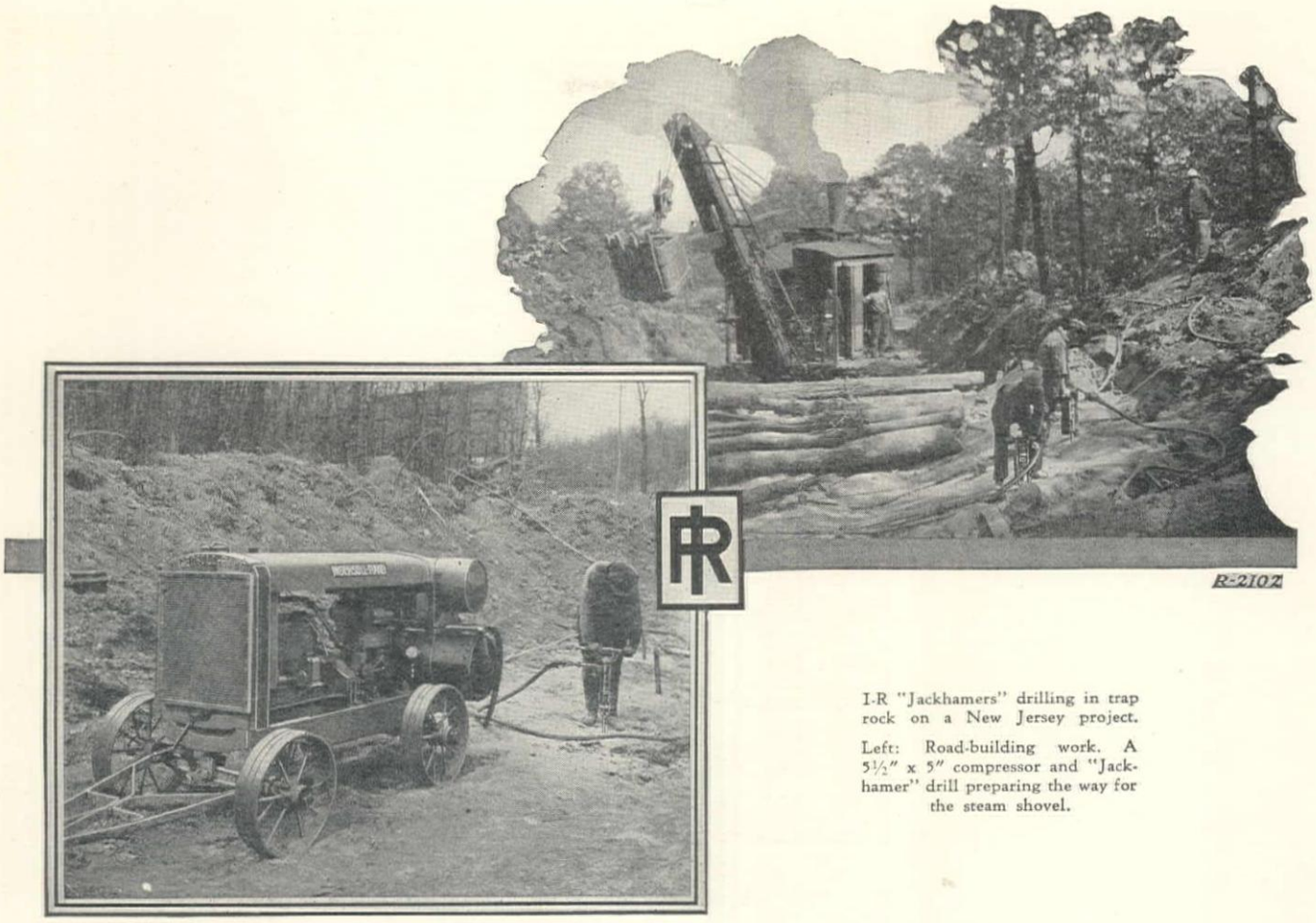

I-R "Jackhamers" drilling in trap rock on a New Jersey project.

Left: Road-building work. A 5½" x 5" compressor and "Jackhamer" drill preparing the way for the steam shovel.

Lower Drilling Costs Mean Greater Profits

Ingersoll-Rand "Jackhamers" and Portable Compressors are standard equipment with many thousands of contractors and builders all over the world.

As a drilling combination, they insure maximum footage at a unit cost far below the average. Since this is the real measure of drilling efficiency, they are being used in constantly growing numbers.

Whether the job is large or small, there is an Ingersoll-Rand outfit that will save money on your rock work. The I-R line includes many sizes and types of compressors, rock drills, and other labor-aiding tools. This means that you can secure your entire compressed air outfit from one reliable manufacturer.

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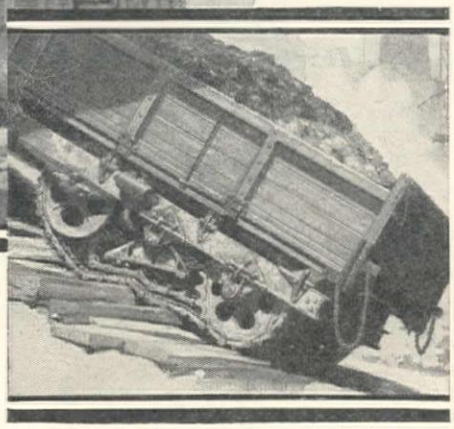
Ingersoll-Rand

When writing to INGERSOLL-RAND CO., *please mention Western Construction News*

THE LINN ON GREAT ENGINEERING PROJECTS....

One of a fleet of four Linns purchased by the Phoenix Utility Company for construction work on the Ariel hydro-electric project. The Ariel Dam on Lewis River, Washington, will be 200 feet high and 1,295 feet long. The Linns on this job are equipped with high speed reverse.



WHEN THE GOING IS TOUGH . . . THEY BANK ON THE LINN

Construction work on a mountain dam puts hauling equipment to every test. That's why the contractors chose Linns to move the dirt for the Ariel Dam in the State of Washington.

They have the traction, the power and the stamina to keep going under difficult and severe conditions. The flexible traction grips and keeps going in soft holes or gumbo that would paralyze the operation of a truck. With power to spare, and with a sure-footed traction that grips every inequality of rock surfaces, the Linn surmounts with ease the steepest grades.

On work like the Ariel Dam, time and money is saved by the high speed reverse which enables the Linn to go in and out of one way passes without a turn.

Statistical evidence—certified surveys of Linn cost per ton performance on difficult hauling jobs are yours for the asking. They show the reason for the growing dependence upon Linn in many industries.

Only The Linn Offers You All These Advantages

1. Patented Flexible Traction that grips any surface under all weather conditions.
2. Tremendous hauling power —100 horsepower to take full advantage of Linn Traction.
3. Ten ton capacity on its own chassis.
4. Extra traction and power for additional tow loads.
5. Easy on men—steers like a truck.
6. Four speeds forward with four speeds reverse optional.

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Manufacturers of American La-France Trucks, Linn Tractors, Republic Trucks

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105 direct distributors located throughout the United States and 49 distributors located in 30 foreign countries

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Patent No. 1,521,454
Patent No. 1,685,641
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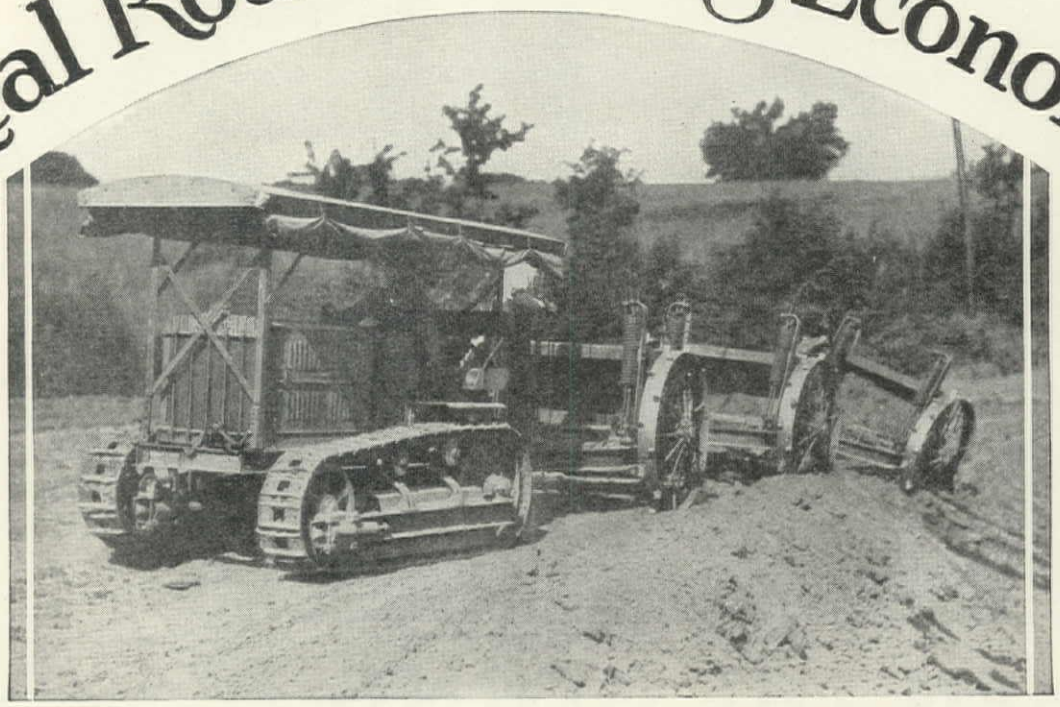
Patent No. 1,701,979
Other Patents Pending

When writing to LINN MANUFACTURING CORPORATION, *please mention Western Construction News*

Real Road Building Economy



With a BATES Steel Mule

BATES' Tractors are particularly well adapted to working with a train of automatic wheel scrapers. The unusual long tracks give a pull without slipping when loading. The ability to turn short saves time in getting at the bite. The easy riding and easy handling keeps the operator working without fatigue. Oversize working parts and superior quality of construction keeps it on the job without delays. That's why the Bates Steel Mule makes money. *Write for complete description*

Bates Manufacturing Company

A Subsidiary of

FOOTE BROS. GEAR & MACHINE CO.

111 North Canal Street Chicago, Illinois

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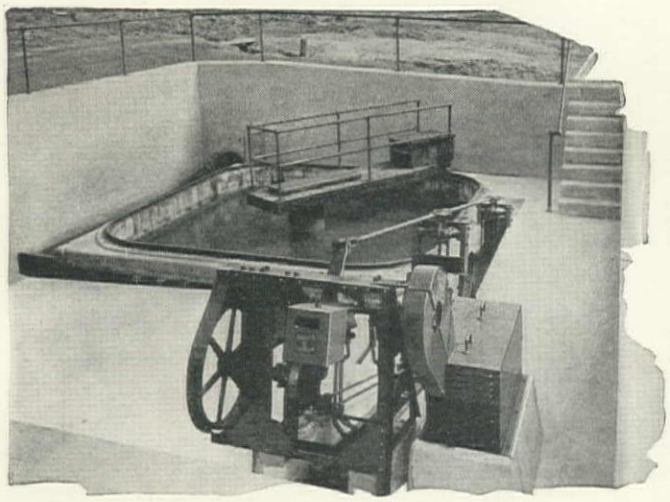
355 Fremont Street, San Francisco, Calif.

When writing to W. H. WORDEN COMPANY, *please mention Western Construction News*

Grit Removal

in the sewage treatment plant

of High Point, N. C.



Dorr Detritor in the East Side sewage treatment plant, High Point. Mr. W. C. Olsen, Raleigh, N. C., designed this plant, and also the West Side plant where another Dorr Detritor is installed

IN the East Side sewage treatment plant at High Point, a Dorr Detritor is installed to remove continuously the grit from the sewage. Regarding the operation of the Detritor, Mr. E. H. Moss, Superintendent of Plants, writes:

> "In reply to your inquiry concerning the Dorr Detritor at our East Side Sewage Treatment Plant, we are pleased to inform you that the machine is giving excellent service in every respect.
>
> "Current consumption is around five dollars per month and maintenance cost, so far, has been nothing. The attention, other than regular greasing, required by this mechanism is very little.
>
> "The grit as delivered by the Detritor has a very **low organic and moisture content** and has **no odor whatever.** The grit is being used for surfacing walks and filling around the plant.
>
> "The machine is so built that it is very easy to keep clean."

The Dorr Detritor is the answer to the troublesome question of how to handle grit without providing duplicate grit chambers and without a great deal of manual labor. We will gladly furnish consulting engineers and municipal officials with literature describing the Detritor. Ask our nearest office for bulletins 6001 and 6481.

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LOS ANGELES, CAL. 108 West 6th Street
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ATLANTA, GA. 1503 Candler Building
TORONTO, ONT. 330 Bay St.

THE DORR COMPANY

ENGINEERS

247 PARK AVENUE NEW YORK CITY

INVESTIGATION TESTS DESIGN EQUIPMENT

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Andrews & George Co., Inc., Central P. O. Box F-23

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The Dorr Company, Ltd.
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Societe Dorr et Cie
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JOHANNESBURG, S. A.
E. L. Bateman
Locarno House

When writing to THE DORR COMPANY, *please mention Western Construction News*

NUMBERED *for your convenience!*

Use

Pipe Economy Catalog When Ordering Pipe

THERE are figure numbers for practically every item listed in our famous "Pipe Economy" catalog of pipe system equipment.

These catalog numbers are for your convenience in ordering pipe, fittings, or anything you require for a pipe system. If you have never used them, you will be amazed at how they simplify writing an order.

Write these "Pipe Economy" numbers, or equal, into your specifications. All contractors and engineers have this catalog. A "Pipe Economy" number is a complete specification, and takes the place of your detail drawing or blueprint.

Bidders know where to reach the nearest Clow-National Sales Office, for prices and delivery information. "Pipe Economy" is the most complete catalog of pipe system equipment. Approximately 25,000 of them are in use, but if you have no copy, send your name and address.

James B. Clough & Sons
Chicago, Illinois

National Cast Iron Pipe Co.
Birmingham, Alabama

CLOW-NATIONAL
CAST IRON PIPE
"Everything for a Pipe System"

When writing to NATIONAL CAST IRON PIPE CO., OR JAMES B. CLOW & SONS, *please mention Western Construction News*

ARMCO INGOT IRON

for every tank and pipe requirement

THERE are certain pipe line and storage tank installations that require the dependable rust-resistance, ductility and weldability that go with Armco INGOT IRON. Many engineers and waterworks officials know that these essentials are not found in any other metal of moderate cost. And they specify accordingly.

More than two decades of dependable performance in the transportation and storage of many kinds of liquids has brought Armco INGOT IRON to the forefront as a metal of reasonable first cost and long, economical service. It is tested by time and the experiences of numerous users.

Any of the offices listed below will gladly study your plate requirements, and recommend the size, thickness and quantities needed for a given project. Call on them freely for this service.

STRETCHING off into the distant plain is this Armco INGOT IRON syphon installed by the Bigwood Canal Company at Gooding, Idaho. The Western Engineering Company of Seattle, Washington, fabricated the 78″ line which is 3600 feet in length made of 300 tons of $\frac{3}{16}$″ Armco INGOT IRON plates. The Syphon serves approximately 7700 acres of land under the Bigwood project.

The AMERICAN ROLLING MILL CO.
OF CALIFORNIA
540 Tenth Street, San Francisco
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ARMCO

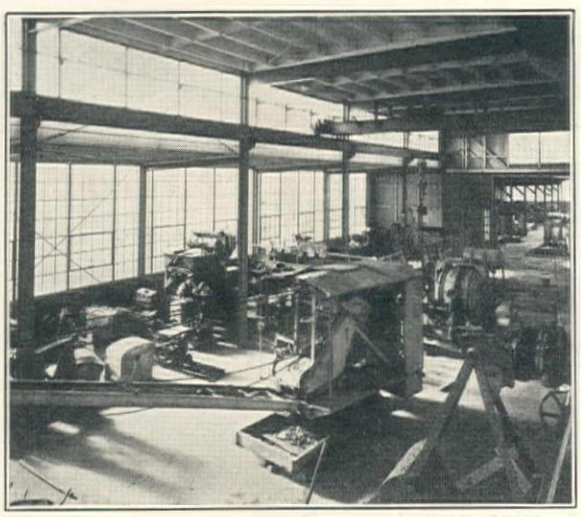
Back of this familiar symbol is nearly thirty years' experience in the manufacture of special analysis iron and steel sheets and plates. When you seek a rust-resisting, low-cost metal be sure to see this triangle and the words "Armco INGOT IRON." It is your assurance of dependable, economical service.

"BE SURE IT'S MADE OF ARMCO INGOT IRON"

When writing to THE AMERICAN ROLLING MILL CO., *please mention Western Construction News*

A Business Growing Steadily thru SERVICE

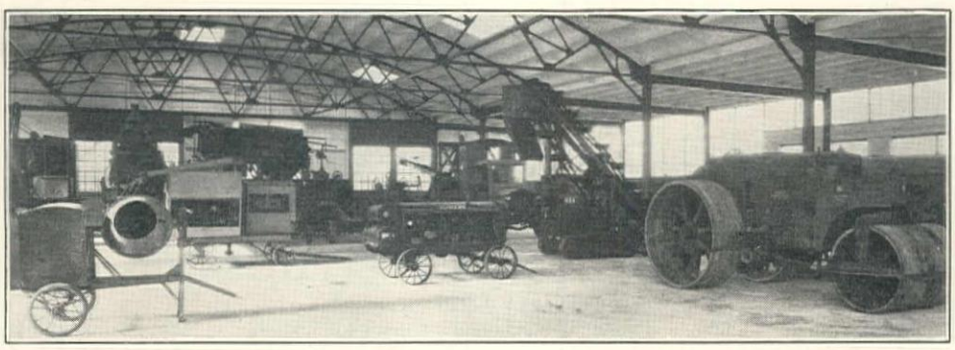
Our New Offices, Shop and Display Room



A Section of Our Machine Shop

Announcement...

IT is a pleasure to inform our many customers and prospective customers of our expansion program, which, from a steady growth of business, has necessitated an additional building to adjoin our present plant. Our ambition to give a better service . . and to offer a more extensive line of contractor's machinery has been realized upon the recent completion of our new building. There is more than 75,000 square feet of operating space of which approximately 30,000 feet is under roof. A convenient quarter for out-of-town visitors to do their estimating . . ample storage facilities . . spacious machine repair shop and private railroad siding. We cordially invite you to visit our new quarters at your convenience.



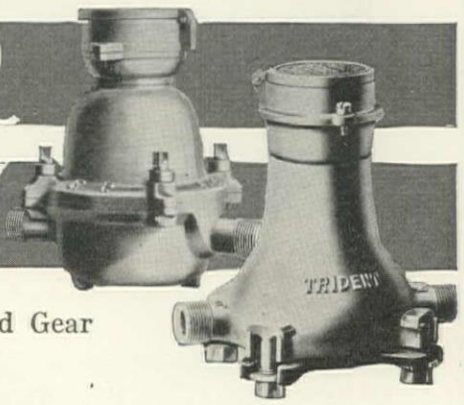
New Section of 12,000 Sq. Ft. Showing Partial Exhibit of our Rebuilt Machines

CONTRACTORS MACHINERY EXCHANGE

1135 FIFTY-SEVENTH AVENUE : OAKLAND, CALIF.

Telephone FRuitvale 0715

THAT YOUR WATER WORKS SHOULD PRODUCE MAXIMUM WATER REVENUE --- NEPTUNE FIRST SUCCESSFULLY PIONEERED IN THE EIGHT OUTSTANDING IMPROVEMENTS IN WATER METER LIFE AND ACCURACY



First Frost-Proof Meter

First Snap Joint Disk Chamber Construction

First Anti-Friction Thrust Roller Bearing Disk

First Heat-Proof Removable Rubber Bushings in the Register and Gear Train

First Successful Oil-Enclosed Gear Train

First Portable Test Meter

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First Fire Service Meter officially approved by the Underwriters' Laboratories, Inc.,—

TRIDENT PROTECTUS

And Neptune will continue to pioneer in every worthwhile development in water meter design and construction.

NEPTUNE METER CO. ~ THOMSON METER CORP

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THE SYMBOL OF SUSTAINED ACCURACY

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"THE CASH REGISTERS OF THE WATER WORKS FIELD"

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VOLUME V | NOVEMBER 25, 1930 | NUMBER 22

It makes no difference what—a hat or a suit of clothes—a new power shovel, a concrete mixer, or grader, some pipe, or a hydrant—a new automobile, or furniture for your home or office—let's buy something. What you buy, people will have to make, it will put them to work and they will have money to spend for what you have to sell.

Let's Buy Something

Start now—buy today, tomorrow, and the next day—and, it won't be long before the wheels of all industry will be humming and your money will come back to you.

American business today needs buyers — lots of them.

After contractors and equipment manufacturers finish reading the 17-page construction review of Highway and Railroad Grading in this issue, they will probably remark like Amos, "Well! Ain't dat sumpin".

Ain't Dat Sumpin

It certainly is considerably more than 'sumpin'. Although it is but a brief recital of merely a few of the hundreds of grading contracts underway in the Far West, it is amazing in magnitude—67 contracts, each more than $40,000, totalling over $24,000,000, covering an area 800 miles in length through 10 states.

We have made no attempt to estimate the total value of equipment in use or number of men employed on these projects; nevertheless, there are 133 power shovels on the 67 contracts, to say nothing of hundreds of tractors, trucks, scrapers, graders, rollers, crushing and screening plants, compressors, and no end of miscellaneous equipment. Certainly, Andy for once could not be "Regusted".

Furthermore, the grading program for 1931 will exceed those of previous years by a big margin.

It is the opinion of many, including the officials of the California State Department of Public Health, that the time has come when every municipality of consequence, or group of smaller communities, should have in its employ a trained sanitary engineer. Water purification and sewage reclamation are in most cases municipal functions of the foremost importance, closely related and requiring technical supervision. This matter is of such importance that it might be well for the state legislatures to consider making such employment mandatory. With a trained sanitary engineer in every district, as aforementioned, working in conjunction with the state departments of public health, the latter would be relieved of much of the present excess load which they are unable to properly care for because of lack of sufficient funds and personnel, just as the city and county medical health officers have become a strong auxiliary to the state department of public health.

District Sanitary Engineers

Seldom, if ever before, has a governor been elected in California as state-widely popular and satisfactory to both ends of the state as James Rolph, Jr.—familiarly known to San Franciscans as 'Our Jim'. For nineteen years he has guided the progressive destiny of San Francisco as mayor; and some even predict that he will carry on 'ad infinitum' as governor. He is a native son, of pioneer stock, and independently wealthy. He loves California and can be relied upon to carry on with acceleration the many construction programs undertaken or planned by the retiring governor, C. C. Young.

'Jim' Rolph and Prosperity

Although business conditions in the Far West are much better than in the East or Middle West, they could be better and can be made so.

When we are tempted to economize let us not forget that we are abetting unemployment, and that the unemployed cannot buy the things we have for sale.

Put the Unemployed to Work

This applies not only to individuals and the various industries, small as well as large, of a community, but collectively, especially to municipal and county governments, which are controlled by groups of these economists who, well-meaningly but short-sightedly, curtail construction and maintenance programs of road building, paving, sewers, water works, street lights, etc.

Federal and State-aid programs, especially in the Far West, are practically assured of continuation, with even a considerable increase in some localities.

Municipal and county officials can help alleviate the unemployment problem by expediting and increasing, instead of curtailing, all necessary public works.

Put the unemployed to work and they will flock to your industries to purchase.

As Henry Ford has repeatedly stated, "Keep the dollar turning over".

Middle Rio Grande Conservancy District, New Mexico

By J. D. HOLMES

Personnel Director, Middle Rio Grande Conservancy District, Albuquerque

Historical—One of the largest construction programs ever undertaken in New Mexico is now being carried out by the Middle Rio Grande Conservancy District,* consisting of flood control, drainage, and irrigation over an area 150 miles long and one to five miles wide. It embraces the most thickly inhabited and wealthiest part of New Mexico, including the counties of Sandoval, Bernalillo, Valencia, and Socorro, and extending from 50 miles north to 100 miles south of Albuquerque, the state's metropolis.

The district was organized in 1925 after preliminary legal phases had been completed. Early in 1926, Joseph L. Burkholder, who for many years had been in charge of drainage and irrigation for the U. S. Bureau of Reclamation, was employed as chief engineer, the organization at the time consisting of one part-time stenographer, and the only equipment a typewriter and a borrowed table. Today there are 725 employes and the most modern machinery; and, flood control, drainage, and irrigation for the middle valley is an assured fact—'not a consummation devoutly to be wished'.

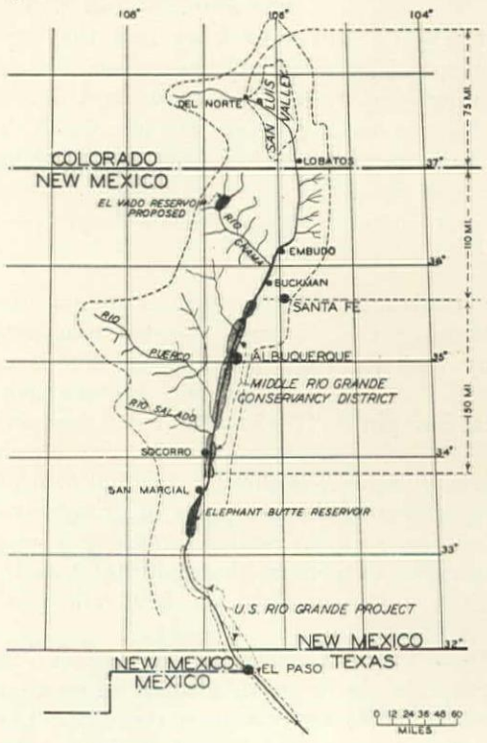
The board of consulting engineers consists of D. C. Henny, of Portland, Oregon; A. J. Wiley, of Boise, Idaho; W. M. Reed, of Washington, D. C.; and Arthur E. Morgan, of Dayton, Ohio.

The district is divided into the following five divisions so that the work may be carried out in a more satisfactory and economical manner: El Vado, Cochiti, Albuquerque, Belen, and Socorro. Warehouses for storing supplies and division offices have been established at Albuquerque, Belen, and Socorro, and will be at the El Vado dam when it is started. The Cochiti division is near enough to Albuquerque so that the preliminary work in this area can be handled from the Albuquerque office; later on divisional headquarters will be established. A machine shop with the necessary equipment for any mechanical job is located at Albuquerque. The Belen and Socorro divisions also maintain a small repair shop and carpenter shop.

Flood Protection Essential—When the Spaniards visited the middle Rio Grande valley in 1539, they found Indians growing agricultural crops by irrigation. Later, when a Spanish colonization party settled in the valley, irrigation works closely copied after the Indian system were constructed. The Rio Grande in those days was a real river, with a stream flow of sufficient velocity to keep its channel scoured of silt. Today, the channel of this river is so filled that in many places it is higher than the surrounding territory. This results in much of the once cultivated land being waterlogged and unfit for cultivation, and the river breaking over in many places and flooding adjacent territory.

If the city of Albuquerque had been located in 1874 where it is today, it probably would have been destroyed in the flood of that year, which broke over the river bank north of the city and swept through what is now the business district. For ten days, residents were forced to go about in boats rescuing their household property and obtaining supplies. In 1929, flood waters again broke over at this same place, north of the city, and had it not been for a hastily constructed sand-bag levee a great property loss would have occurred.

To prevent a recurrence of a menace that at any time may result in a disaster, the Middle Rio Grande



Conservancy District is now constructing riverside levees, 10 ft. high, 10 ft. wide on top, and 50 ft. thick at the base. Earth for the levee work leaves a drainage ditch 8 ft. deep, 16 ft. wide at the bottom, and 40 ft. wide at the top. The depth and size of the drainage ditches depend upon the area to be drained and the water table.

At dangerous points along the river levee, protection in the form of felled trees tied together with wire cable is provided, the trees being cut from the right-of-way for the drainage ditches and placed between the river and levee. This not only affords a good protection to the levee, but eliminates the cost of hauling slashings any great distance.

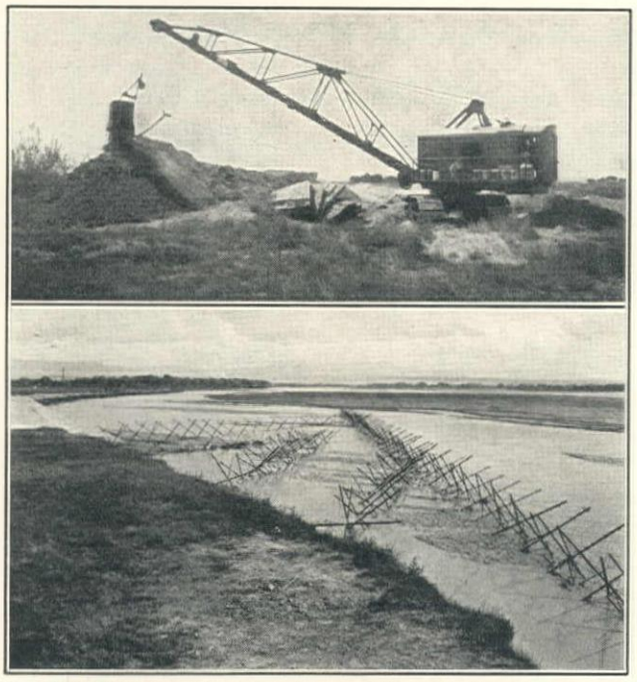
The flood channel ranges in width from 1000 ft. at the northern end of the district to 2000 ft. at the southern end.

Spur dykes at right angles are built on the stream side of the levee at intervals to prevent scouring.

*See preliminary description in July 10th, 1929, issue.

Kellner tetrahedron jetties are placed at strategical points in the river to decrease the velocity of the water so that the silt deposit will in time build up the banks. This method of building up the banks will also have a tendency to confining the water to a small defined channel, the velocity will be increased, and the stream kept free of silt. More than 18,000 lin.ft. of Kellner jetties has been placed.

The riverside levee and drainage ditch closely follow the river, 75 miles having been constructed out of 400 miles required. Sixteen draglines are used for this work; 10 P&H 1¼-yd. and 6 Bucyrus Erie 1½-yd. Construction was started March 22, 1930, the draglines being added as quickly as possible until 12 were in service during September and October; the 4 remaining machines were added during November.



(Upper) Building a Riverside Levee with P&H Dragline. (Lower) Kellner Tetrahedron Jetties Used to Direct Stream Flow and Build Up River Bank

During October, 822,000 cu.yd. of earth was excavated, with 12 draglines. The machines are worked three 8-hr. shifts, and the best monthly record made to date for one machine was 95,600 cu.yd.

Three of the draglines averaged 85,000 cu.yd. each and two of the draglines each made 65,000 cu.yd. during the month of October. This is considered a good record in view of the fact that the levees have to be kept smooth and at a regular height.

Pontoons are required when the machines are working in bosque or waterlogged land, but little time is lost except when a railroad or highway crossing is required.

A. B. 'Steve' Gale is the mechanical superintendent for the district and is in charge of the dragline operations. He had several successful jobs to his credit before coming to the Conservancy District. He says, "With sixteen diesel-powered machines working I'll lick the Rio Grande and keep it in its place."

As flood protection was the most important part of the program, it was started first. At points along the river where the flood menace is the greatest, partial flood protection, and in some cases complete protection, has already been accomplished.

Irrigation—The irrigation system will consist of six main canals and a series of laterals, and is so planned that water will be carried within one-half mile of every piece of land included in the district. There will be 510 miles of canals and laterals. Work on this part of the program will start in 1931. The system in use at present consists of 67 old ditches, and there is much duplication of work and loss of water. When the country was settled by the Spaniards, each community constructed its own ditch without any central head, which naturally resulted in many controversies over water.

There is much evidence today of the old prehistoric Indian irrigation system. Historians say the Rio Grande valley is the oldest irrigated valley in the United States.

Indian Lands—Included in the district are six Indian pueblos with a population of 3000 and a land area of 23,000 acres, 8000 of which are irrigated.

It was necessary to include this land in the district if one comprehensive system of flood control, drainage, and irrigation was to be carried out.

As the Indians are wards of the government and their land not subject to taxation, it was necessary to ask the Federal government to provide funds necessary to do the work on these lands. Congress appropriated $1,593,000 for this purpose, and a contract was entered into between the Conservancy District and the Secretary of the Interior.

The Red Man will be given flood protection, drainage, and irrigation water the same as his 'pale face' brother.

Diversion Dams—Four diversion dams will be built across the river at about equal intervals to divert water to the irrigation canals. Three of these dams, or weirs, will be built only slightly higher than the riverbed itself. A double row of sheet piling, filled with rock, will probably be used. At the end of the weir, a reinforced concrete headgate will be constructed to allow the passage of water to the canals.

On the downstream side in the river, a gate will be installed so that when silt fills up the area in front of the headgate, this downstream gate can be opened, allowing silt to be sluiced down the river. The fourth of these weirs will be similar to the others, only it will be built about 9 ft. high, and will be placed in the Cochiti division in the northern part of the district.

El Vado Dam—The river south of Albuquerque, during the summer months when water is most needed, is dry for about 40 days. To insure a plentiful supply of water during this dry season and detain flood waters during the spring months when snow is melting in the mountains, a storage dam will be built on the Rio Chama 175 miles north of Albuquerque and near the abandoned town of El Vado, from whence it gets its name. (See illustration of damsite in July 10th, 1929, issue.)

Preliminary investigations of many sites were made together with cost estimates before the present site

was selected. The reservoir is a natural widening of the streambed in a locality where the channel is deep cut and narrow. With the present-planned normal water surface 165 ft. above streambed, the storage capacity will be 200,000 ac-ft.

In general, the vicinity of the damsite is of sandstone formation. The west abutment consists of alternate layers of sandstone and shale in a fairly solid

JOSEPH L. BURKHOLDER
Chief Engineer

condition. In marked contrast to this, the sandstones of the east abutment are broken and disturbed. The strata are so fractured and displaced that it is unusual to find a rock mass more than 6 or 8 ft. long. The whole area of this abutment is covered with a jumbled mass of large and small angular blocks.

The present section and layout for the dam is the result of many trials and cost estimates for this particular site. However, due to the geologic peculiarities of the east abutment, a gravel and rock-fill dam was deemed the safest type. The main body of the dam will consist of an embankment of gravel and rock-fill. To prevent leakage through the gravel, the upstream face will be covered with reinforced concrete 8 in. thick at the top and 13 in. at the bottom. The downstream face will be covered with a heavy layer of rock-fill. The dam will have a top length of 1400 ft. and the crest will be 175 ft. above the present streambed. It will be 600 ft. thick and 50 ft. long at the base.

A heavily-reinforced concrete twin conduit will be constructed along the riverbed in which the outlet works will be installed. The outlet works will consist of a trashrack and emergency gate structure, with hydraulically-operated slide gates at the upstream end of the conduit, twin steel pipes from the emergency gates to the conduit outlet, and two balanced needle-valves at the outlet end of the tunnel.

In order to protect the dam from overtopping during high floods, it is planned to construct two spillways. The operating spillway will be placed at the west end of the dam and will consist of a two-gate opening under the crest of the dam leading to a long chute over a cliff to the riverbed below. It is planned to construct an emergency spillway across a saddle about a mile from the damsite, consisting of a reinforced paving in the form of an ogee section, with heavy riprap protection below. Water openings forming the operating spillway headgates were designed for a 6000-c.f.s. discharge before flow would occur over the emergency spillway. As the highest recorded data on stream flow on the Chama at this point is estimated at 4000 c.f.s., it is the best economy to allot all ordinary discharges to the operating spillway and rely on the emergency spillway for unusual floods. With the reservoir surface level with the top of the dam, it is estimated that the operating spillway will discharge 10,000 c.f.s., the outlet works 3000 c.f.s., and the emergency spillway 40,000 c.f.s.; making a total discharge of 53,000 c.f.s. before the dam is endangered.

On account of the broken condition of the rock, it will be necessary to construct a deep cutoff trench along the upstream toe of the east side of the dam. Immediately along the lower edge of the face, it is planned to excavate an open trench with a 12-ft. bottom to a depth sufficient to supply rock for the back slope. Along the bottom of this open cut and extending downward to sound rock, is planned a 4-ft. cutoff wall. From data obtained from test shafts and borings, approximate depth requirements will vary from 5 to 90 ft. Seams in the rock beneath the cutoff trench will be pressure-grouted to depths from 20 to 40 ft.

Approximately 2,000,000 lb. of reinforcing steel, 170,000 sacks of cement, and 1,000,000 lb. of metal work will be used in the construction. Gravel fill for the body of the dam totals 350,000 cu.yd., and excavation 100,000 cu.yd. Reservoir area is 3200 acres.

Work on this dam will start in the spring of 1931, and it will take probably two years to build. The cost will be $1,600,000. While it has not been definitely

Building Highway Bridge Across Riverside Drain

decided, this dam will probably be built by contract.

Personnel—Joseph L. Burkholder is chief engineer; R. G. Hosea, hydraulic engineer; Wilbur B. Ream, designing engineer; H. C. Neuffer, supervising engineer, U. S. Indian Irrigation Service; Carl A. Anderson, appraisal engineer; consulting engineers, see p. 566. Field engineers are W. W. Baker, Albuquerque division; E. R. Staver, Belen division; T. H. McCarthy, Socorro division.

Financing—The financial plan of the district is such that no hardship is worked on the taxpayer, and the bondholder has the utmost security, as taxable property within the district amounts to $67,000,000, and the appraised value is $40,000,000.

The total bond issue will be $8,744,000, and each piece of property within the district is assessed with a conservancy tax in proportion to the benefit derived. Agricultural lands pay 46%, and corporations, public utilities, and urban property 54%.

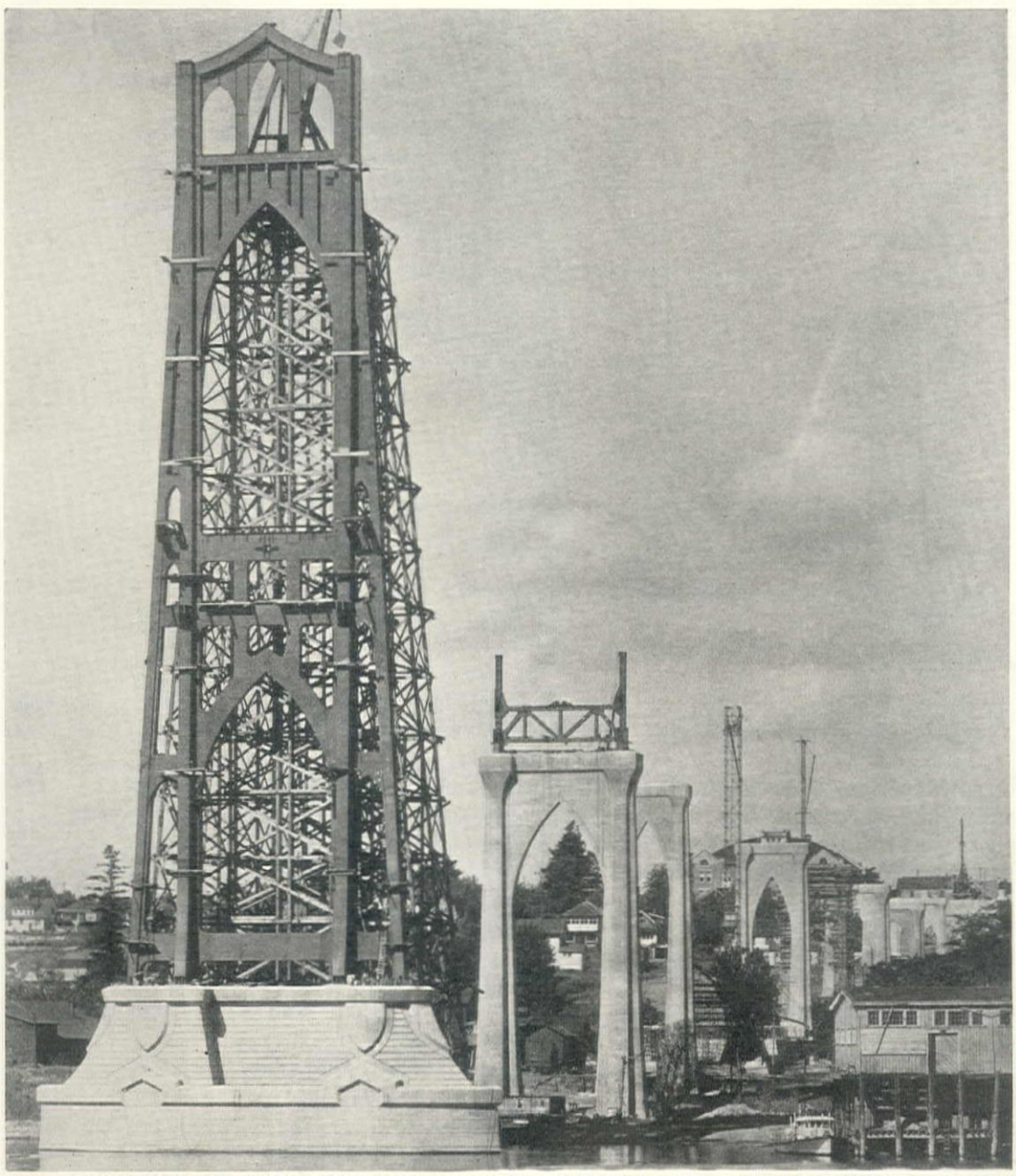
St. Johns Suspension Bridge Across Willamette River at Portland, Oregon

By MELVILLE E. REED*
Bridge Engineer, Multnomah County, Portland, Oregon

The St. Johns bridge at Portland, Oregon, spans the Willamette river between harbor lines and links the Upper Columbia River Highway through the Cascade mountains with the Lower Columbia River Highway to the sea. It is a distinctive bridge in many ways. The main span of 1207 ft. is the longest west of Detroit. With an underclearance of 205 ft. to low water at the center, it is the highest span over a navigable stream. The St. Johns is the longest suspension bridge to be built with stranded cables in place of the usual parallel wire construction. The outstanding distinction of this bridge, however, is its marvelous beauty of outline and detail.

*Member, American Society of Civil Engineers.

Architectural Treatment—For years it has been the dream of bridge engineers to build a structure which



ERECTING MAIN TOWER PIER, ST. JOHNS SUSPENSION BRIDGE, WILLAMETTE RIVER, PORTLAND. TIMBER ERECTION TOWER 100 FT. SQUARE ON BASE, NEARLY 300 FT. HIGH, CONTAINS FOUR HUNDRED THOUSAND F.B.M. AND MOUNTS 60-TON STIFF-LEG DERRICK. J. H. POMEROY & CO. ERECTORS; ROBINSON & STEINMAN CONSULTING ENGINEERS FOR MULTNOMAH COUNTY

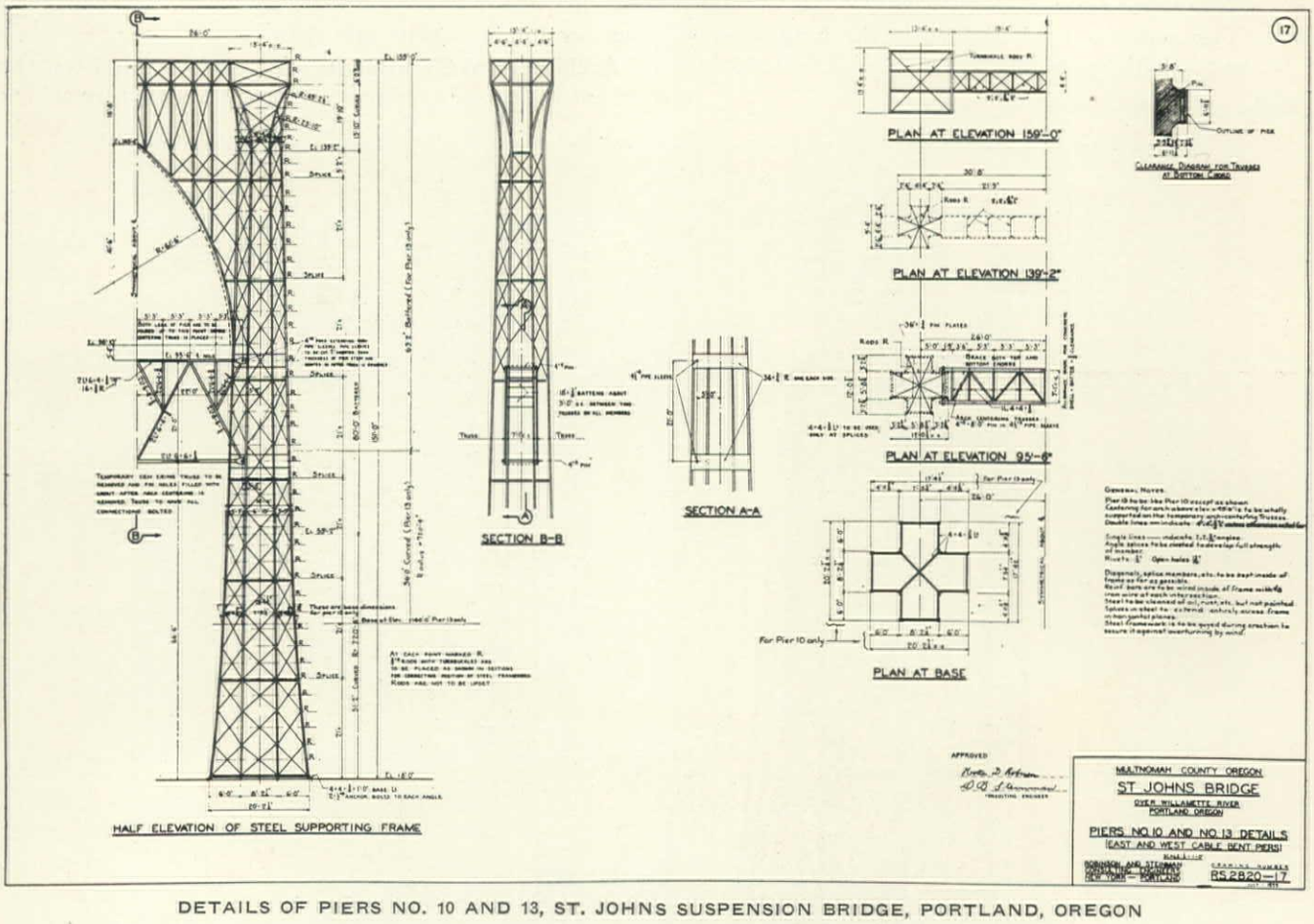
would combine both utility and beauty. Robinson & Steinman have accomplished this result in the St. Johns bridge in a most satisfying manner. No type of bridge lends itself to this result comparable with the suspension type—the very sweep of the cables is a line of beauty and combines the feeling of strength and utility.*

The main towers for the St. Johns bridge, 408 ft. high, rise majestically to receive the cables. The approach piers are of exceptional design, as they are each composed of two columns, tapering from the base to the coping, with no connecting members to detract from the beauty of outline. Through the entire structure, the Gothic form has been followed, both in steel and concrete construction, even to the detail of the abutments and piers. The result is especially pleasing in the design of the main towers. Although accompanying illustrations give the general idea of these towers, they are so carefully proportioned that their magnitude is not appreciated except as seen on the ground. Take, for example, the opening through the cable towers for the roadway—a magnificent Gothic arch 44 ft. wide and 98 ft. high.

Work Involved—With anchor spans each 430 ft. long, the 1207-ft. main span, an east approach consisting of a 1284-ft. steel viaduct and a 227-ft. concrete abutment, a west approach including 257 ft. of steel viaduct with concrete abutment and sidehill approaches to the north and south, the bridge and approaches have a total length of 8935 ft. The width of the bridge is 52 ft. between trusses, providing for a 40-ft. roadway and two 5-ft. sidewalks; the deck is of reinforced concrete 7 in. thick.

The main bridge contains 11,050,000 lb. of structural and 216,000 lb. of cast steel, the approaches 4,500,000 lb. of structural steel, and the cables weigh 2,077,000 lb. The project also requires 150,000 cu.yd. of excavation and 70,000 cu.yd. of concrete.

The estimated cost of the St. Johns bridge and approaches is $4,250,000, and the probable completion date is May, 1931. Construction contracts were let in seven divisions, as follows:



DETAILS OF PIERS NO. 10 AND 13, ST. JOHNS SUSPENSION BRIDGE, PORTLAND, OREGON

Division	Work	Contractor	Bid Price
A	Substructure	Gilpin Construction Co.	$1,029,897
B	Bridge Steel	Wallace Bridge & Structural Steel Co.	986,446
C	Cables	John A. Roebling's Sons Co.	472,200
D	West Approach	La Pointe Construction Co.	267,603
E	Viaduct Steel	U. S. Steel Products Co.	290,000
F	Concrete Deck	Lindstrom & Feigenson	146,000
G	Electrical Work	National Electric Co.	33,000

Main Piers—The west cable pier rests on solid basalt at elev. –25 ft. and the east cable pier rests on 1058 douglas fir piles, with the base of the pier at elev. –50 ft. Piles for the east cable pier were driven with a McKiernan-Terry subaqueous hammer. After the piles were cut off, a timber crib was floated into position and sunk. The crib was then sealed with concrete placed by means of tremies and, after unwater-

*See July 25th, 1929, issue for pre-construction description of the St. Johns bridge; the January 10th, 1930, issue for construction article; and July 25th, 1930, issue for additional construction progress.

ing, the pier was built in the dry. The pier is 61 by 161 ft. at the base and tapers, by means of offsets, to 14¼ by 106 ft. at the coping, elev. +60 ft.

The upper portion of the pier is made cellular to decrease the weight and amount of concrete.

The main steel towers are of tubular construction, 8 by 21½ ft. at the base, tapering to 7 ft. in either direction just below the copings. The plates at the base of the pier are 1¼ in. thick. The main columns are supported on either side by batter legs, which are also of tubular construction. Combination of the main perpendicular towers for the direct load with batter legs for the bracing, results in a most satisfactory design from the æsthetic standpoint. Gothic arches both below and above the roadway tie main columns together without the disfiguring effect of horizontal struts.

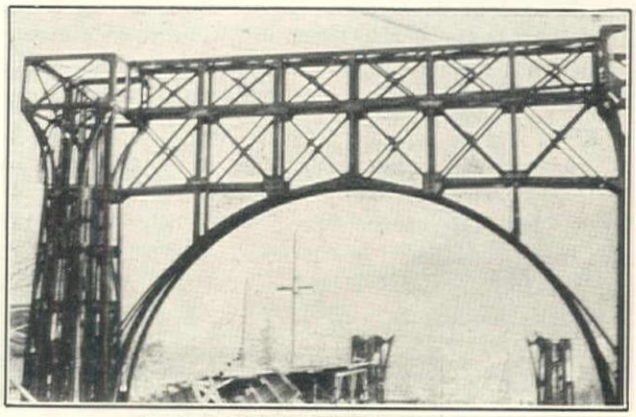
An exceptionally interesting detail of construction was the manner in which the main cable towers were erected. The extreme height of these towers, 408 ft. above datum, and the weight of the steel members to be handled—one piece weighing 34 tons—called for equipment of unusual size and power.

The erection contractor, J. H. Pomeroy & Co., had just completed erection of the Longview bridge across the Columbia river 50 miles below the site of the St. Johns bridge. This contractor decided to erect timber construction towers at each of the cable towers, using falsework timbers salvaged from the Longview bridge construction. These timber construction towers are 100 by 100 ft. at the water line and 40 by 50 ft. at the top, and rest on 65 foundation piles, some of them 100 ft. long. The towers top 315 ft. above datum and carry 60-ton stiff-leg derricks. The main posts of the towers are 12 by 14 in. and all upright connections are dowelled and strapped together. The sway braces are 4 by 12-in. and the purlins 8 by 10-in. The derricks were tied down with four cables, two leading over the outside corners of the tower to sand boxes near the base and two on the inside corners to U-bolts set in the pier. Each tower contains 400 M f.b.m. of douglas fir timber. The towers were erected for their full height and the derricks placed in position before any steel was erected on the piers. The result was most exceptional progress in steel erection, as much as 155 tons being erected and bolted in two 8-hour shifts.

Cable Anchorages—On the west side, the cables are anchored in tunnels driven 60 ft. into the solid rock. The eyebar anchor chain is composed of sixteen bars 14 by 1-13/16-in. and six bars 10 by 1¼-in. After the eyebar chain was in place, the tunnel was filled with concrete, only the outer ends of the eyebars extending for the cable connections.

On the east side it was necessary to construct a concrete gravity anchorage, resting on MacArthur concrete piles.

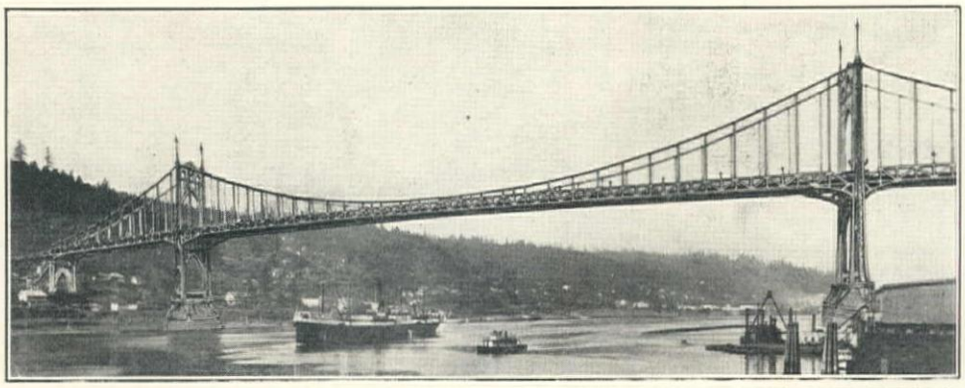
East Approach Piers—The east abutment is U-shaped, with heavy pilasters to give the idea of mass.



Structural Reinforcing for Pier No. 2

Piers 1 to 7, inclusive, rest on spread footings on a compact, sandy clay.

Pier 8 is designed monolithic with the east anchorage and rests on 516 MacArthur concrete piles. The east anchorage is a massive structure containing 13,000 cu.yd. of concrete and 390,000 lb. of reinforcing steel. The base is 45 by 115 ft. and extends from elev. +12 ft. to elev. +82 ft. This pier is designed with sand-filled compartments in order to decrease the amount of concrete and still have the required weight.



ST. JOHNS SUSPENSION BRIDGE ACROSS WILLAMETTE RIVER, PORTLAND, OREGON, AS IT WILL APPEAR WHEN COMPLETED

Pier 9 rests on timber piles, with the cutoff at elev. +3.0 ft.

Pier 10, the east cable bent pier, also rests on timber piles. The base of this pier is a concrete block 40 by 90 by 10 ft. The pier is 165 ft. from base to top, and the point of the Gothic arch is 140 ft. above the ground.

West Side Approach—Pier 13, the west cable bent, rests on a spread footing.

Piers 14 and 15 are built monolithic with the west anchorage pier, span 15 being only 37 ft. long.

The west abutment extends 240 ft. north and south, and is of massive design. The counterforts on the

west side of the retaining wall are tied to the solid rock by means of heavily reinforced concrete ties anchored in chambers drilled in the rock.

Approaches—The approach on the east side is by steel spans on concrete piers. The west approach is by means of roadways to the north and south to connect with the Pacific Highway. These roadways are on a 5% grade and are excavated in the solid rock hillside, except at Mill st. where there is a concrete-encased steel viaduct 300 ft. long. The west abutment is flared out to provide for part of the approach curves, the Gothic idea being followed in the abutment design.

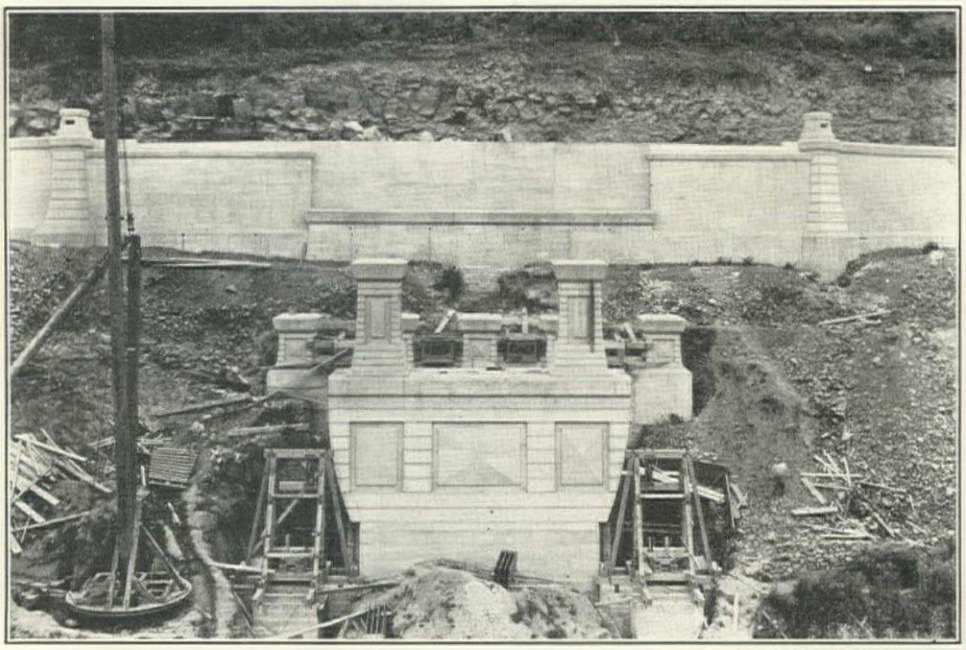
Concrete—All concrete, except for the main cable piers, was delivered ready-mixed by Swigert, Hart & Yett. This concrete was proportioned by weight and inspected at the mixing plant. A 1:2.6:3.4 mix was used for footings of the land piers; this mix required 5.64 sacks of cement and 6.8 gal. of water per cubic yard. The mix for the columns of the land piers was 1:2.2:2.8, or 6.77 sacks of cement and 5.6 gal. of water per cubic yard.

Concrete for the two main piers, which were subcontracted to the Pacific Bridge Co. of Portland, was mixed on barges. The cement was delivered in bulk on barges by the Oregon Portland Cement Co., of Oswego, Oregon. These barges were equipped with belt conveyors and elevators to carry the cement to bins on the mixing barge. Two 4-yd. Smith mixers were mounted on the mixing barge. All materials were proportioned by weight. To get a uniform mass, the concrete was placed through four tremies, the pour being continuous for each pier. The cement was increased to 7 sacks per cubic yard for the subaqueous concrete. For the east main pier, 17,000 cu.yd. of concrete was required, and for the west main pier, 10,000 cu.yd.

Special mention should be made of the detail of the concrete design. Curved lines have been used universally and architectural embellishments introduced to a marked degree, but in no case has this been overdone so as to mar the dignity of the structure. The contractors for the concrete work are to be commended for the manner in which the concrete surfaces are finished, giving the appearance of cut stones by means of thorough rubbing and bush-hammering.

Reinforcement of Concrete Piers—In addition to the customary deformed reinforcing bars, the concrete pier design calls for structural steel frames, held in position by turnbuckles spaced 2½ ft. vertically. These frames are made up of 4 by 4 by ⅜-in. angles, bolted together. The plans specify that the frames shall not carry the weight of forms or concrete during erection.

Progress—The substructure for the entire bridge is completed except for a small porton of the anchor piers, which cannot be done until the cables are in place. All steel spans on the east approach are erected ready for the deck, and also on the west side, except the 181-ft. span over the Pacific Highway. The stiffener truss is being assembled in two panel lengths ready to be raised into position when the cables and hangars are completed. Grading on the west approach has been completed and the concrete roadway will probably be laid in the spring of 1931. The John A. Roebling's Sons Co. has about one-half of the strands of the main cables in place and adjusted.



WEST ANCHORAGE AND RETAINING WALL (AUGUST 20, 1930) FOR ST. JOHNS SUSPENSION BRIDGE, PORTLAND, OREGON

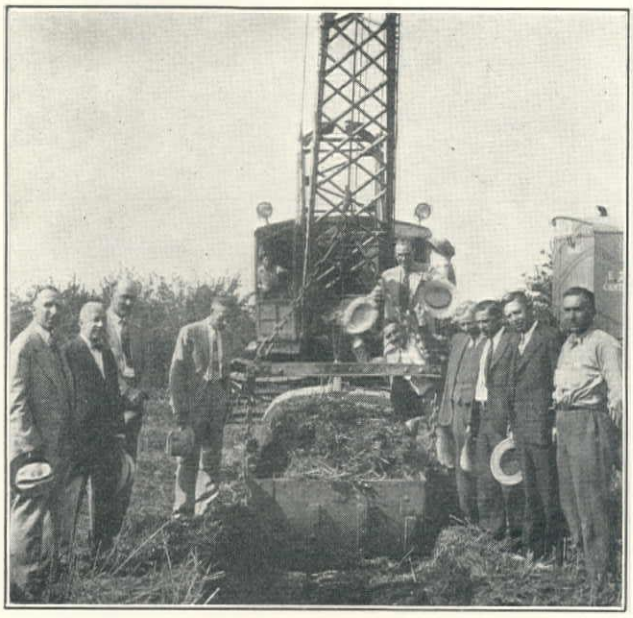
Personnel—The St. Johns bridge is being built by Multnomah county under direction of the board of county commissioners—Clay S. Morse, Grant Phegley, and Fred W. German. George W. Buck is roadmaster and I am bridge engineer for Multnomah county.

Robinson & Steinman are consulting engineers in charge of design and construction, with R. Boblow as resident engineer.

The Robert W. Hunt Co. is inspecting all structural materials except cement and concrete, which are being inspected by the Northwest Testing Laboratories.

Stockton Deep-Water Ship Channel

Dredging of the $6,000,000 deep-water ship channel for Stockton, California (see descriptive and historical articles in March 25th, 1926, and June 10th, 1930, issues) will be 20% completed at the end of November. This channel work involves more than 21,000,000 cu.yd. of excavation, to be moved in a two-year period, and is one of the largest earthwork projects now under way in the Far West.



Ground Breaking Ceremonies on September 17, 1929, with One of E. T. Fisher's Northwest Draglines. (Left to Right) Darcy Grant; Ralph C. Carter, President, Stockton Chamber of Commerce; W. A. McCutcheon; H. C. Britton; A. M. Robertson; Lyle Payton, City Engineer; Walter B. Hogan, City Manager; J. Carle Tremaine, Mayor; LeRoy Johnson, City Attorney; and Roy Spiva, Superintendent for E. T. Fisher

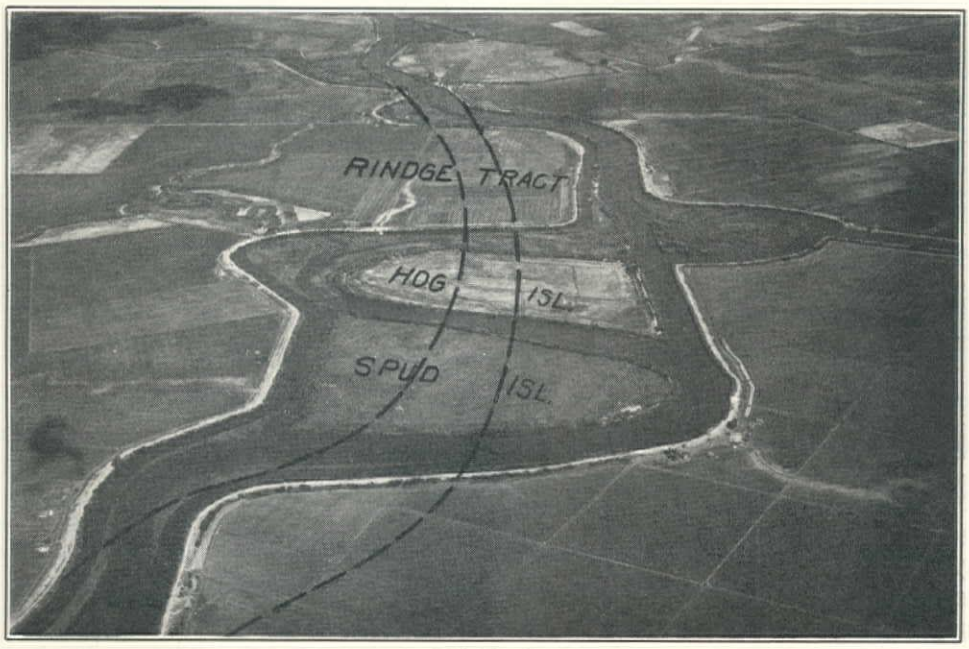
E. T. Fisher, Stockton, will complete his contract about December 10 for building preliminary levees with dragline excavators along the San Joaquin river as part of the 26-ft. deep-water ship channel leading to Stockton, California. Fisher's contract involves 1,100,000 cu.yd. and extends from the city of Stockton to Black slough, 18 miles below. The contract price is $0.073 per cu.yd., borrow pit measure.

Preliminary levee work on Fisher's contract is divided into three parts and four sections, as follows:

Part	Section	Between
1	A	Mormon Channel-Burns Cutoff
2	B	Burns Cutoff-Turners Cut
3	C	Hog Island-Headreach Island
4	D	Venice Island-Mandeville Island

On the work near Stockton, 300,000 cu.yd., the excavation is in solid dirt, while the remaining 800,000 cu.yd. is peat excavation along the delta islands.

The following types of preliminary levees are being constructed: tidal, spoil, seepage, and main channel levees. Tidal levees are built along the channelward edge of the levee right-of-way to exclude tidewater from reclaimed land during construction of the main channel levees by clamshell dredging. The tops of the tidal levees, at elev. 10.5 ft., U. S. Engineer Department datum, are 12 to 15 ft. high, have average crowns of 8 ft., and are sloped 1½:1; they will be backed up by the main channel levees. Spoil levees, of the same cross-section, are being constructed to surround areas which will be used for depositing spoil from the channel dredging. These levees are spaced 2 to 4 miles down the river and contain several hundred acres each; the area which they reclaim will be used for waterfront development. About 70% of Fisher's contract covers tidal and spoil levees containing 13 cu.yd. per lineal foot of levee. Seepage levees



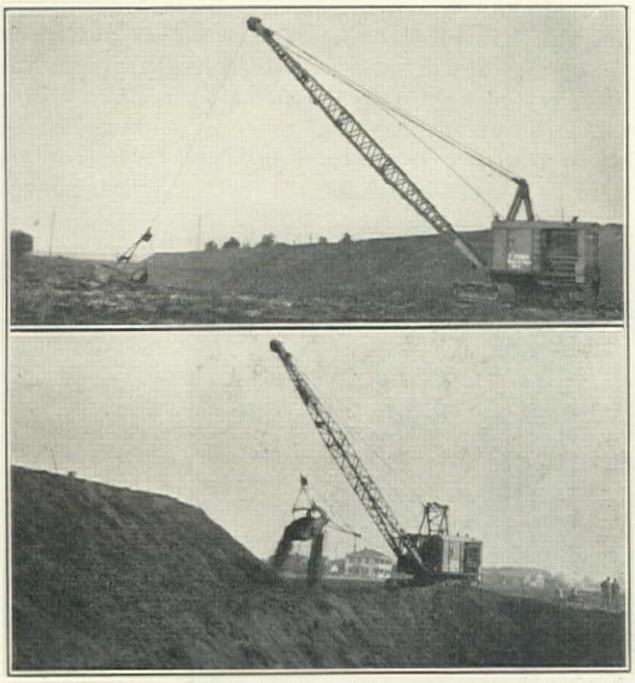
SAN JOAQUIN RIVER DELTA LOOKING EAST TOWARD STOCKTON FROM TURNER'S LANDING, SHOWING APPROXIMATE LINE OF DEEP-WATER SHIP CHANNEL. (PHOTO FAIRCHILD AERIAL SURVEYS, INC.)

are required along the landward edge of the channel levee right-of-way for protection of the reclaimed land from seepage during construction of the main embankment. The seepage levees are 4 ft. high, have a 4-ft. crown, are sloped 1½:1, and represent about 5% of Fisher's work. Channel levees are being built to final section (12 to 15 ft. high, 20-ft. crown, side slopes 4:1) and grade for flood protection. About 25% of Fisher's contract is on this type of levee, where the draglines must work over a 25 to 30-ft. berm and cut the borrow pit slope to final section.

The contract with the U. S. Engineer Department

Hart L. Weaver's Stinson-Detroiter Junior Plane Ready for Flight Over Project. Bert H. Lane, Pilot, Standing

required that the average monthly production on preliminary levees should be 220,000 cu.yd. and the minimum production in any one month 170,000 cu.yd. Fisher began work September 15, using four Northwest model 7 gasoline draglines with 50-ft. booms. These machines normally carry 1¾-yd. buckets, but on the Stockton levee contract were equipped with 2-yd. Yuba buckets; they are giving a job average of 380,000 cu.yd. per month.



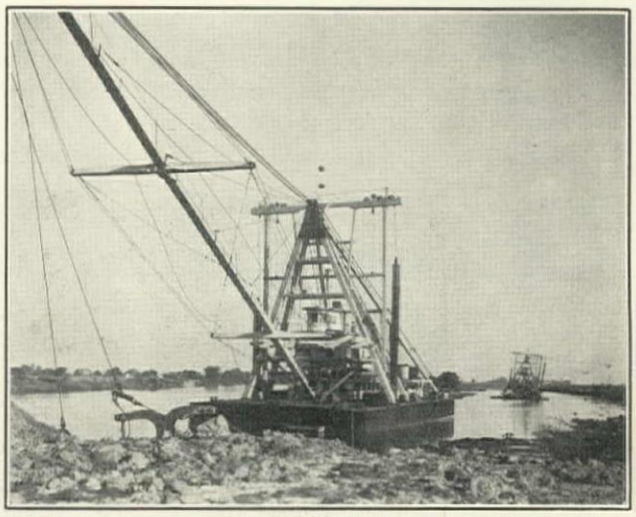
Two of E. T. Fisher's Northwest 1¾-yd. Draglines with Yuba 2-yd. Buckets on Channel Levee Construction

Three 8-hour shifts are being used for dragline excavation, Sundays and holidays included. During October, the production for the four draglines exceeded 400,000 cu.yd. and in this month one machine moved 110,000 cu.yd., being shut down 24 hours for minor repairs. The three other draglines each lost 30 hours during October for minor repairs. For night use, the machines are equipped with two 250-w. floodlights on the cab and one 300-w. floodlight on the boom. The work is scattered along both banks of the river and a total of eleven bargings is required to get the draglines into position. The barging is done only at high tides, using flat boats 30 by 70 ft., one machine to a barge, and a tug for towing. On several cross-

Barging One of E. T. Fisher's Northwest Draglines from One Island to Another

ings it was necessary to build approaches between the river bank and barge. Despite the time required for barging, high production has been maintained and the job is now (November 15) 100% ahead of schedule.

J. R. D. Matheson, major, Corps of Engineers, is district engineer for the War Department at Sacramento, and Walter Coffey is associate engineer at Stockton in charge of the deep-water channel project. Joe Davies is office manager and Roy Spiva is superintendent for



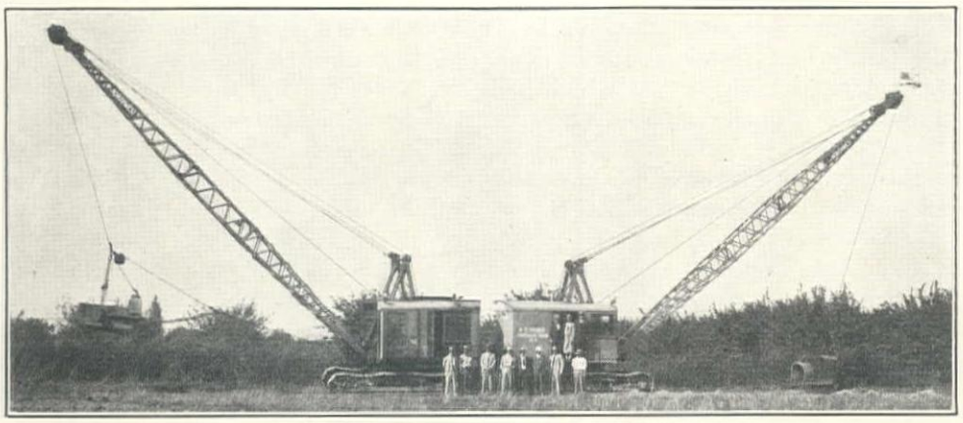
The 'Monterey' 5-yd. and 'Gabilin' 4-yd. Clamshell Dredges of the Franks Contracting Co. on Rough and Ready Island

E. T. Fisher on the levee contract. A crew of six men is required to operate each of the four draglines through three shifts. High wages are paid the operators, with resulting high output.

Other Contracts—The Franks Contracting Co., San Francisco, is operating floating clamshell dredges on a contract between Mormon channel and Turner cut for constructing channel levees by dredging. One of these dredges, the 'Gabilin', has a 4-yd. bucket and 170-ft. boom. Another, the dredge 'Monterey', has a

5-yd. bucket and 220-ft. boom. The dredges require a 12-man crew and move about 2500 cu.yd. in 24 hours. This company has moved about 10% of a 2,292,000-cu.yd. contract.

The Hydraulic Dredging Co., Oakland, has about 572,000 cu.yd. of material to move by suction dredg-



E. T. FISHER'S NORTHWEST DRAGLINES No. 6 AND 7 READY TO BEGIN LEVEE CONTRACT

ing near Antioch before that community will become a deep-water port. The California Delta Farms Co., Stockton, which is erecting channel levees on Spud and Hog island, has about 250,000 cu.yd. still to be moved.

The Project from the Air—Ye Editor was fortunate in being invited together with W. A. Fitzgerald, publisher of the 'Stockton Independent', to view this entire project from the air, by Walter Hogan, city manager of Stockton. Through the courtesy of Hart L. Weaver of Stockton, owner of a Stinson-Detroiter Junior cabin monoplane, Bert H. Lane, the pilot, flew the party from the Stockton municipal airport over the vast delta island region of the San Joaquin-Sacramento rivers, paralleling the course of the deep-water ship channel at 1000 to 2000 ft. elevation—a 45-mile trip in 30 minutes.

Not even engineers, familiar with the intricate network of river channels, forming innumerable letter 8's and S's and intersecting and branching in every direction, can appreciate the necessity for and great value to be derived from this cross-country channel unless they view it from the air. The work and progress of each dragline and clamshell dredge was clearly seen.

There is no question but that this channel, to be completed in about two years, will bring great prosperity to Stockton. Much of the raw products of the San Joaquin valley will then not only be shipped direct by ocean-going vessels but converted to various products in new industries which will be built at tidewater in the city.

Inspecting engineering projects by airplane, supplemented by aerial photographs, gives a comprehensive understanding which cannot be obtained from surveys and maps alone.

Tunnel Station-Santa Clara River Highway

California Division of Highways Eliminates Newhall Tunnel Bottleneck on Ridge Route North of Los Angeles by Construction of 8½ Miles of 30-ft. Cement Concrete Pavement

By DONALD L. HOLMES, *Los Angeles, California*

With the recent completion of 8½ miles of 30-ft. concrete highway from Tunnel Station to Santa Clara river on a new alignment through Weldon and Gavin canyons west of Newhall, California, the tunnel bottleneck of the Ridge route in Los Angeles county has been eliminated. While a saving of only one mile was effected by the new route, a wider pavement, a reduction in grade and curvature, and elimination of congestion caused by the narrow tunnel bore has greatly improved traffic conditions on the main inland highway north of Los Angeles.

Grading Contract—Both the grading, which was completed in 1929, and the paving, just finished, were pushed through in record time. The grading involved: roadway excavation—716,000 cu.yd. at $0.40; structure excavation—10,000 cu.yd. at $0.50; overhaul—4,500,000 sta.yd. at $0.01. The total cost of the grading and structures on the first contract was $391,391. In one cut alone, at the summit, nearly 250,000 cu.yd. was removed in a cut 159 ft. deep. This contract, which was separate from the paving, was completed two months ahead of schedule by R. G. LeTourneau and O. A. Lindberg, Stockton contractors.

Paving Contract—Jahn & Bressi, of Los Angeles, had the paving contract and completed the entire stretch nearly four months ahead of the time limit, which does not expire until November of this year.

The following work was included in the Jahn & Bressi contract: slide removal—20,000 cu.yd. at $0.20; overhaul—200,000 sta.yd. at $0.0075; subgrade for pav-

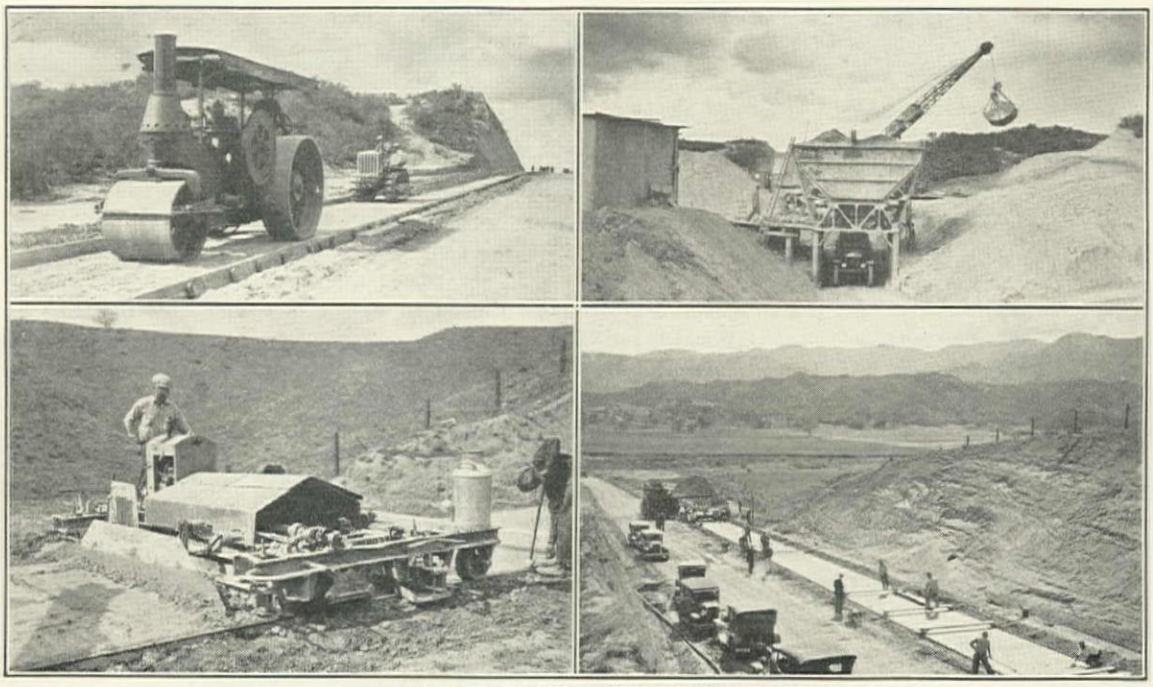
ing—150,000 sq.yd. at $0.08; class 'A' concrete pavement—30,800 cu.yd. at $6.65; reinforcing steel—712,000 lb. at $0.038; timber guide posts—1000 at $1.50; finish roadway—450 sta. at $5.00. The contract price was $253,126 and work was commenced early in January.

Permanent Paving on Fills—The item of time was important considering the value of the new highway cut-off. The saving in time was made possible by a new practice of the California Highway Commission to allow new pavement to be built on fills which had been placed for immediate compaction under the supervision of the state highway engineer. In earlier work, it has been the practice to allow fills to stand and settle for a season or two before paving. However, the fills on the Newhall cut-off, many of which were more than 50 ft. deep and one 150 ft., were placed in 8-in. layers with each level thoroughly watered and rolled before the next one was placed. Specially designed wagons were used by the contractors to accomplish this work and constitute some of the most massive pieces of road equipment yet to be developed. The wagons had a capacity of 16 cu.yd. each, and were equipped with tractor treads. There were ten Caterpillar '60' tractors employed on this grading work.

Borings made by the state highway department prior to the paving showed the fills suitable for immediate construction, and the contract for standard 9-7-9-in. concrete pavement was awarded in January, 1930. The road had been graded to a width of 50 ft. and upon this was placed the 30-ft. width of concrete, in three 10-ft. strips to define the traffic lanes for three lines of vehicles. On such a width, the center strip is used for passing.

Aggregates—Two proportioning plant set-ups were required for the efficient handling of batches. A 200-ton Blaw-Knox batcher plant was placed for the first set-up about midway on the new road at Pico canyon where a county road crossed to Newhall. Rock in two sizes of gradings—¾ to 1½-in. and 1½ to 2½-in—and sand were hauled by truck for part of the work and by rail later on. The second set-up was made at the south end of the work near a point where the cut-off leaves the older road. Stock piles were made at the bunkers and aggregates were lifted to the bins by a Koehring clamshell crane. In the plant, all materials were proportioned by weight for the individual batches which were designed on the basis of 6 sacks per cubic yard of finished concrete. Mack 2½-ton trucks carrying three batches each were used to supply the mixer.

Laying Pavement—The concrete was laid with a 27-E Koehring paver, and progressed rapidly, with average runs of 370 to 385 cu.yd. per day. A maximum run of 423 cu.yd. was made on one day. As a result of the blending of aggregates, high strengths were recorded for the concrete, the average being 5800 lb. per sq.in. at 28 days.



(UPPER LEFT) ROLLING SUBGRADE. (UPPER RIGHT) BLAW- KNOX 200-TON BATCHER PLANT FOR AGGREGATES. (LOWER LEFT) ORD FINISHER IN OPERATION. (LOWER RIGHT) COMPREHENSIVE VIEW OF PAVING OPERATIONS

Subgrading was accomplished with two Adams 8-ft. blade graders, a Carr subgrader, tractors, and fresnos. Surfaced headers (3 by 10-in.) were placed for each strip of pavement except when one strip abutted another. Reinforcing steel for each panel of pavement was placed well in advance. The mixer operated at the side and consequently did not disturb the prepared subgrade. Expansion joints were spaced 60 ft. with weakened plane joints at 20-ft. intervals between. Each 20-ft. panel carried two rows of ½-in. circumferential bars. Dowels were carried through the expansion joints.

Surface Finish—One of the distinct features of this construction was the care and attention given to finishing the pavement. This important item, upon which depends the smooth riding quality of the pavement, has been developed to a high degree of technique by the construction department of the California Division of Highways.

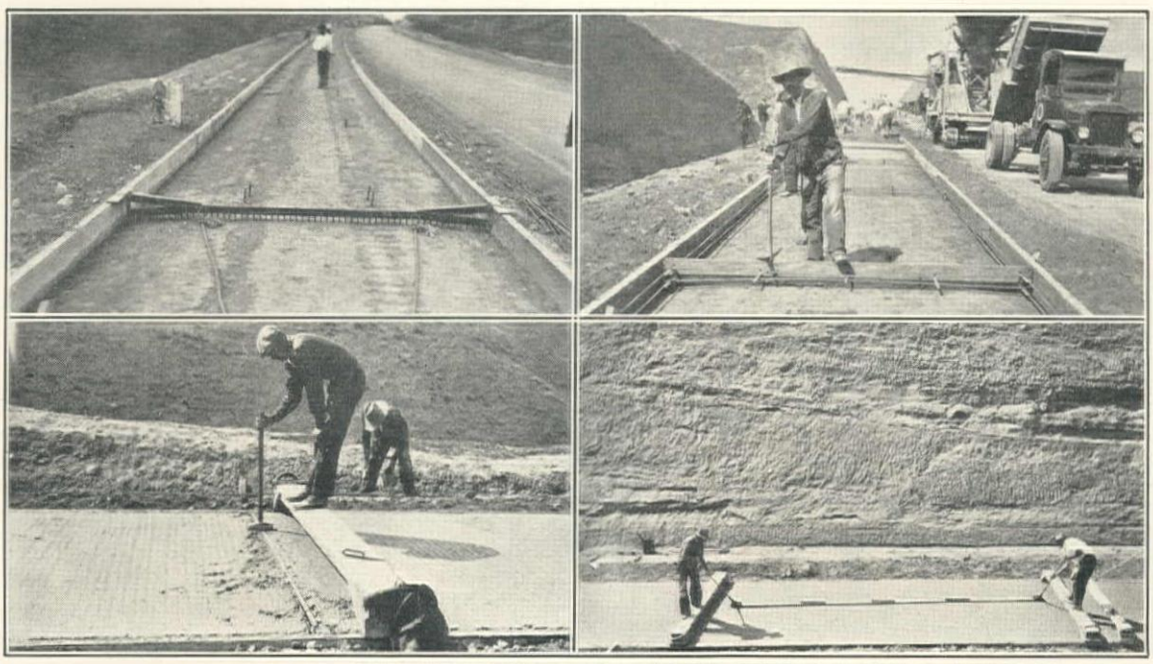
Methods have been devised to keep the concrete from checking by drying out under wind and high temperature. Experiments were made during the con-

struction of many miles of portland cement concrete pavement in the Imperial valley where climatic conditions were thought to be decidedly adverse to this type of paving, but the pavements produced fully attested that with careful workmanship quality concrete could be placed in that locality as in any other.

Any surface variations caused by the natural shrinkage or volume change of the concrete in hardening have been eliminated by the expedient of retarded finishing. Another item has been to eliminate the use of small push floats after the concrete has been struck off by machine and floated longitudinally with planer floats; as the push floats, while they seem to produce a smooth surface, may actually disturb the whole surface structure to such an extent that the advantage gained by the longitudinal planing is lost. On the Jahn & Bressi work, the Ord finishing machine was followed by two heavy longitudinal floats, operated from bridges spanning the pavement, and then a light 16-ft. finish float operated in the same manner. This final finishing was done as late as possible and often several hundred feet behind the mixing and placing operations. It is believed that an unusually smooth riding surface was made.

Personnel—The Newhall cut-off paving was done under the supervision of the California Division of Highways, of which C. H. Purcell is chief engineer. S. V. Cortelyou is district engineer at Los Angeles, L. M. Ranson, construction engineer, C. N. Ainley and R. D. Kinsey resident engineers. Joe Muscolo was superintendent for Jahn & Bressi.

Editor's Note—The grading contract on the Newhall alternate was reported in the following issues: unit bid summary—December 10th, 1928, p. 38; progress article—June 25th, 1929, p. 326; and detailed article—September 10th, 1929, p. 467. The unit bid summary for the paving contract was published in the January 10th, 1930, issue, p. 28, with progress articles in the March 25th, issue, p. 168, and the August 25th, issue, p. 410.



(UPPER LEFT) TOOTHED GRADER FOR FINISHING SUBGRADE. (UPPER RIGHT) PLACING REINFORCING STEEL AND EXPANSION JOINT HEADER BOARDS; KOEHRING 27-E PAVER AT WORK IN BACKGROUND. (LOWER LEFT) FINISHING EXPANSION JOINT AFTER CONCRETE HAS ATTAINED INITIAL SET. (LOWER RIGHT) OPERATING LONGITUDINAL FINISH FLOAT

The following 'Summary of Time Losses and Their Effect on Production' as made by the U. S. Bureau of Public Roads on the Jahn & Bressi contract was furnished us by C. F. Rogers, assistant highway engineer, Division of Management of the Bureau:

SUMMARY OF TIME LOSSES AND THEIR EFFECT ON PRODUCTION

Total available working time, 456 hours. Total estimated production, 14,498 cu.yd.

Total **major** delays occurring during available working time

Character	Class A Hours	Class A %	Class B Hours	Class B %
Rain	41.54	9.13		
Wet subgrade	24.00	5.26		
Late start			0.41	0.09
Finishers slow			1.50	0.33
Materials	75.41	6.50		
Mixer—mechanical	5.18	1.13		
State inspection	0.33	0.07		
Water at mixer			0.25	0.06
Totals	146.46	32.09	2.16	0.48

	Hours	%
Total all major delays	148.62	32.57
Time major equipment actually operated	307.38	67.43

Total **minor** delays occurring during time of actual operation

Character	Class A Hours	Class A %	Class B Hours	Class B %
Hauling equipment—shortage			3.50	1.14
Hauling equipment—operation			2.52	0.82
Mixer trouble—mechanical	2.52	0.82		
Mixer trouble—operative			4.67	1.52
Water supply			1.35	0.44
Miscellaneous	0.80	0.26		
Totals	3.32	1.08	12.04	3.92

	Hours	%
Total all minor delays	15.36	5.0
Time major equipment operated at 100% efficiency	292.02	63.9

With all Class B losses eliminated production

Grand total all Class B time losses	14.20 hours
Possible operating time, all B losses eliminated	306.22 hours
would have been	15,200 cu.yd.
Overall efficiency of major equipment operation	95.1 per cent

Notes—'Major Delays' include all stops of 15 min. or more in duration, while 'Minor Delays' include all stops less than 15 min. each in duration as found by stop-watch studies and extended to time of actual operation.

Construction Review

HIGHWAY AND RAILROAD GRADING

By S. J. SANDERS
Editor, Daily Construction News Service

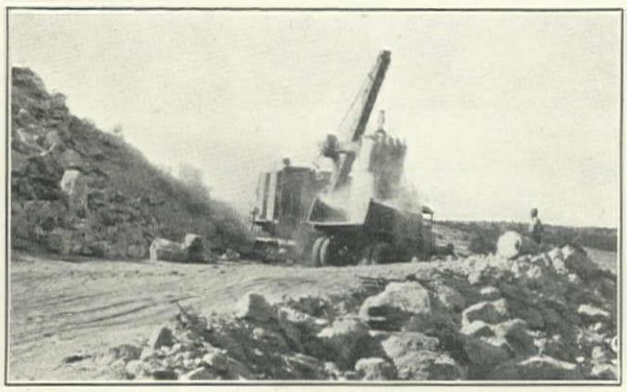
HIGHWAY GRADING

Progress is being made on important highway grading projects in ten Far Western states as follows:

ARIZONA PROJECTS FOR BUREAU OF PUBLIC ROADS

Grand Canyon National Park—Hodgman & McVicar, Pasadena, California, completed their contract October 3, about 20 days ahead of schedule, for grading and finishing 10 miles on the Bright Angel Springs-North Entrance project on the north rim of Grand Canyon National Park. This project is at 9000 ft. elevation and the working season is only about 5 months; the contract was 180 miles from railhead at Cedar City.

The contract price was $73,942 and included the following major items: clearing and grubbing—26.3 acres at $300; roadway excavation and borrow—90,000 cu.yd. at $0.60; overhaul—17,960 sta.yd. at $0.08; finishing—10 miles at $200. The grading was largely light earth excavation, about 85% of the material be-



Jasper-Stacy Co. Grading Houserock Canyon Section of Kaibab National Forest Highway, Arizona, for Bureau of Public Roads. Bucyrus-Erie 1½-yd. Diesel Shovel Loading 7-yd. Fageol Truck

ing handled with tumble scrapers drawn by teams and tractors. In heavy excavation, including rock, a gas shovel and trucks were used. The clearing area was generally medium-sized fir, yellow pine, and aspen. Trees were felled with a 60-hp. tractor and then cut, piled, and burned.

Major equipment included one 1-yd. Northwest gas shovel, two 30-hp. tractors with tumble scrapers, two 60-hp. tractors, two 5-ton Mack trucks, one 10-ft. blade, one 110-c.f.m. compressor. The average crew was 35 men; 24 head of stock was used.

Grand Canyon National Park—Lord & Bishop, Oroville, California, began work June 3 and will complete their contract about October, 1931, for 25.9 miles of oil-treated surfacing on route 3, Bright Angel Point-Cape Royal highway, Grand Canyon National Park. Because of the high altitude and 5-month working season, only the 3-in. base course was placed this year, the construction being suspended October 29. Work will be resumed in June and the 3-in. top course placed during the coming season. About 30,000 tons of surfacing has been delivered on the road and 12,000 tons stockpiled for the oil-treated surface course.

The rock formation at the quarry site is a brecciated limestone and chert which can be drilled and blasted, excavated with a power shovel, and hauled by truck to the crushing plant. The average haul is 5½ miles, five 5-ton trucks being employed on two 8-hour shifts. The crushing plant has an output of 500 tons per day (in two shifts) and is powered by a 200-hp. Atlas Diesel engine. The plant consists of one 18 by 36-in. primary and one 3 by 38-in. reducing crusher and one 4 by 8-ft. vibrating screen. Crushed material is spread in windrows to give a 3-in. course on an 18-ft. road, and is then worked with a 12-ft. blade for the entire width in four round trips. The top course will require installation of a 500-ton asphalt mixing plant. Other equipment on the project includes one 60-hp. tractor, one 30-hp. tractor with 1-yd. tumble scraper, one ¾-yd. P&H shovel, and four 3-ton trucks. The average crew is 40 men.

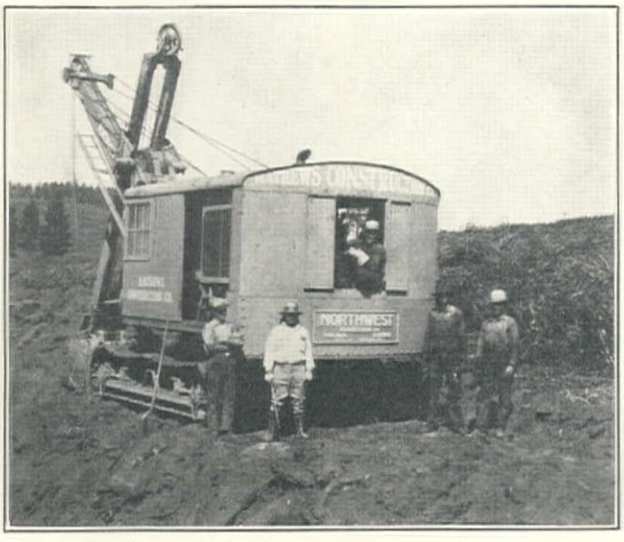
The contract price is $251,552 and includes the following: borrow—2000 cu.yd. at $1.00; overhaul—5000 sta.yd. at $0.05; fine grading—25.85 miles at $400; crushed rock base course—30,700 tons at $2.75; oil-treated crushed rock—35,550 tons at $4.25; stone guard rail—2300 lin.ft. at $1.50.

Kaibab National Forest—Jasper-Stacy Co., San Francisco, will complete a contract about April, 1931, for grading 4.9 miles on section A of route 28, Houserock canyon section, Kaibab National Forest highway. When completed, this section will eliminate a steep one-way road from the floor of Houserock canyon to the summit of Little mountain. The project is 155 miles from Cedar City, Utah, and required one month for shipping, moving in, and setting up equipment.

The contract price is $241,910, involving: clearing—16.5 acres at $64; unclassified excavation—198,077 cu.yd. at $0.96; structure excavation—1250 cu.yd. at $2.80; borrow—10,231 cu.yd. at $0.43; overhaul—142,378 sta.yd. at $0.025; finishing—4.9 mi. at $400; untreated timber—8.5 M f.b.m. at $97; cement rubble masonry—1550 cu.yd. at $16.70. The rubble masonry is being used mainly in constructing four 10 by 10-ft. and two 6 by 6-ft. arch culverts and the abutments and center pier of a double 16-ft.-span bridge with timber superstructure. The rock is a white limestone

obtainable locally, a red sandstone being used for copings on head and wing walls.

Major equipment includes one 1½-yd. Bucyrus-Erie diesel shovel, one Caterpillar '60' with Le Tourneau bulldozer and double power take-off unit, four 7-yd. Fageol dump trucks; one 10-ton Fageol transport truck; four Ford trucks; one 672-c.f.m. Ingersoll-Rand stationary compressor powered by a 125-hp. Atlas-Diesel engine; one Ingersoll-Rand drill sharpener; one Ingersoll-Rand 160-c.f.m. portable compressor;



Mathews Construction Co. 1¼-yd. Northwest Shovel on Section E of Loop Route, Lassen Volcanic National Park, California

two Ingersoll-Rand air hoists; one 12-ft. Galion blade; one Johnson scarifier; one electric light plant; 7000 lin.ft. of 4-in. and 3000 lin.ft. of 2-in. air line.

G. R. Moland is superintendent, O. C. O'Conners general foreman, and Grant Carlson timekeeper for Jasper-Stacy Co.

C. H. Sweetser is district engineer for district No. 2, U. S. Bureau of Public Roads, San Francisco. National forest and national park roads are under Levant Brown, with F. B. Lessman as assistant. G. L. McLane is in charge of a branch office for the district at Phoenix, Arizona.

CALIFORNIA PROJECTS FOR BUREAU OF PUBLIC ROADS

Lassen Volcanic National Park—Tieslau Bros., Berkeley, California, have completed their contract for surfacing 7.5 miles on the Summit lake project, Loop route, Lassen Volcanic National Park, contract price $53,279. The contractors moved in September 6 and began plant operations and hauling rock on September 28. Progress was somewhat impeded by early snow falls, but the average plant output was 425 cu.yd. per day, with a maximum of 825 cu.yd. The crushing plant included one 15 by 36-in. Universal jaw crusher and one 36-in. Symons cone crusher, one 60-hp. Russell dragline, one 120-hp. Atlas-Diesel engine, one Caterpillar '60' engine, and belt conveyors. Additional equipment included two Russell graders, two Caterpillar '30' tractors, one ½-yd. Universal crane, three Sterling, three Autocar, and five Mack trucks.

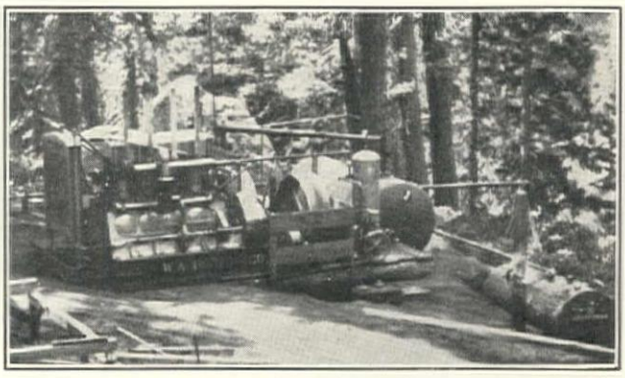
Main contract items included: borrow and slide removal—3000 cu.yd. at $0.65; grading subgrade and shoulders—7.5 mi. at $250; crushed rock surfacing and supplemental crushed rock—16,650 cu.yd. at $2.65; additional binder—2100 cu.yd. at $0.50.

Lassen Volcanic National Park—The Mathews Construction Co., Sacramento, California, has completed a contract for grading 7.7 miles of section E, route 1, Loop route, in Lassen Volcanic National Park. Originally planned as a two-season job, the contractor double-shifted two shovels from the beginning of operations and completed the project well within the contract time, using a crew of 60 men.

Principal equipment was as follows: two 1¼-yd. Northwest shovels, six 5-yd. White trucks, one Ingersoll-Rand compressor, two Caterpillar '30' tractors, one revolving scraper, one Ball wagon grader, one blade, one scarifier, and three service trucks. The contract price, $83,941, included: clearing—46 acres at $375; excavation—90,050 cu.yd. at $0.58; borrow—6250 cu.yd. at $0.50; finishing—7.7 mi. at $300; etc.

Sequoia National Park—W. A. Bechtel Co., San Francisco, will complete a contract about October, 1931, for grading 2.7 miles on section D-2, route 1, the Generals highway, in Sequoia National Park. A 1¼-yd. Northwest shovel has been excavating double-shift since August 26 and the right-of-way on the first mile has been partly cleared. Drilling and blasting is being done single-shift. Additional equipment includes one 700-c.f.m. Ingersoll-Rand stationary compressor powered by a 4-cylinder Atlas-Diesel engine, three 5 to 6-yd. Sterling trucks, one Caterpillar '60', one Ingersoll-Rand drill sharpener. About 30 men are employed on the work.

Main items in the $177,707 contract price include: clearing—19.9 acres at $300; excavation—95,133 cu.yd.



W. A. Bechtel Co. Power Plant Consisting of 4-cylinder Atlas-Diesel Engine Driving 700-c.f.m. Ingersoll-Rand Compressor on Section D-2, Generals Highway, Sequoia National Park

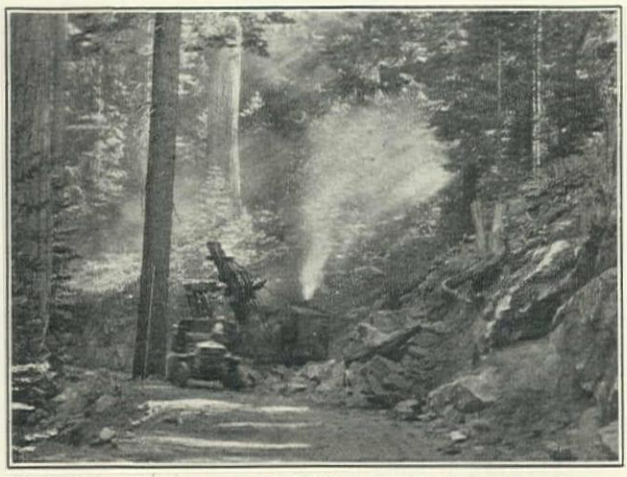
at $1.25; class 'B' excavation—19,475 cu.yd. at $1.60; finishing—2.7 mi. at $300; cement rubble masonry—414 cu.yd. at $20.

Sequoia National Park—A. J. & J. L. Fairbanks, South San Francisco, California, will complete their contract about May, 1931, for grading 4.5 miles on the Hospital Rock-Giant Forest section of the Generals highway, Sequoia National Park, contract price $87,452. The contract includes: clearing—8.76 acres at $300; roadway excavation—43,400 cu.yd. at $0.96; borrow—5500 cu.yd. at $0.96; haul borrow—6000 mi.yd. at $0.45; crush and place subgrade reinforcement material—5700 cu.yd. at $3.30; haul subgrade

reinforcement material—14,000 mi.yd. at $0.45; stone guard rail—1500 ft. at $0.60; etc.

Work was started September 23 on the upper two miles near Giant Forest, and to October 23 clearing had been completed on 1½ miles. A 1-yd. P&H shovel started widening and realignment on sections of the existing road on October 13. Drilling equipment includes one 260-c.f.m. Ingersoll-Rand portable and one 1-gun Rix portable compressors. Hauling, including placement of subgrade reinforcement, is handled by two 5-yd. Sterling and one 5-yd. Autocar trucks. One Caterpillar '60' with bulldozer is also used on the work.

Yosemite National Park—George Pollock Co., Sacramento, California, will complete a contract about October, 1931, for grading 7.1 miles of the Mariposa grove section, Wawona route, Yosemite National Park, contract price $205,875. The new highway will connect with an improved road at Camp Hoyle, and a wye connection with the Oakhurst road will be made at Four Mile. Major items in the contract include: clearing—55 acres at $100; roadway excavation—320,000 cu.yd. at $0.55; structure excavation—1345 cu.yd. at $1.90; finishing—7.1 mi. at $250.



A. J. & J. L. Fairbanks 1-yd. P&H Shovel Loading 5-yd. Sterling Truck on Hospital Rock-Giant Forest Section of the Generals Highway, Sequoia National Park, California, Bureau of Public Roads Contract

Grading operations began August 21, and to October 21 about 70,000 cu.yd. of earth and rock had been moved. Equipment includes one 1¾-yd. P&H shovel, five 9-yd. Sterling dump trucks, one 260-c.f.m. Ingersoll-Rand portable compressor, one Caterpillar '60' with Le Tourneau bulldozer, one Caterpillar '60' with 7½-yd. Le Tourneau scraper and 3-ton scarifier, one Caterpillar '30' and Adams blade, one Ingersoll-Rand drill sharpener, etc. Working in decomposed granite, the scraper averaged over 700 cu.yd. per shift on a 400-ft. haul. Heavy shooting is not permitted, as trees and shrubs must be protected. The rock is not solid and much steel is lost in drilling; the cuts shoot up in blocks which are too large for a shovel to handle.

Yosemite National Park—Welsh & Murdock, Oakland, California, will complete their contract about December 1 for grading 6.6 miles of the Wawona road, Elevenmile-Grouse creek section, Yosemite National Park. Rough grading has been completed and the entire force is concentrated on cleanup and finishing. The contract price is $189,882, and includes: unclassified excavation—230,000 cu.yd. at $0.63; type 'B' excavation—16,000 cu.yd. at $1.10; overhaul—32,200 sta.yd. at $0.02; finishing—6.6 mi. at $325; etc.

Major equipment includes one 1¼-yd. Lima, one 1-yd. P&H, one ¾-yd. Thew-Lorain shovels; one '60' and one '30' Caterpillar tractors, both with bulldozers; two 5-yd. Sterling, four 5-yd. Autocar, and one G.M.C. service trucks; one 12-ft. blade; one Sullivan drill sharpener and oil furnace; four 210-c.f.m. and one 110-c.f.m. Ingersoll-Rand compressors.

El Dorado National Forest—Tiffany, McReynolds & Tiffany, Oroville, California, and McDonald & Failing, Tres Pinos, California, have completed their contract for surfacing 4.2 miles on the Strawberry-Phillips section of the Placerville-Lake Tahoe road, Eldorado National Forest. Surfacing was secured from a granite ledge near the middle of the project, a 240-c.f.m. compressor being used for drilling in the quarry. Rock was loaded with a ½-yd. General shovel and hauled to the crushing plant in 4-yd. trucks. The crushing plant consisted of one 14 by 36-in. jaw primary and one No. 2 and one No. 8 Telsmith gyratory crushers, power being furnished by 55, 60, and 75-hp. gasoline engines. The contract price was $39,745.

Lassen National Forest—Nate Lovelace, Sacramento, California, will complete his contract about April, 1931, for grading 3.4 miles of section A, route 21, Deer creek highway, Lassen National Forest, contract price $99,653. Main items in the work include: clearing—25 acres at $350; roadway excavation—127,500 cu.yd. at $0.65; finishing—3.4 mi. at $250; hand-laid rock embankment—344 cu.yd. at $4.00. Lovelace has recently moved in from railhead at Chico, California, and intends to work into the winter.

Plumas National Forest—Isbell Construction Co., Carson City, Nevada, and Fresno, California, completed a contract October 25 for grading and surfacing on sections C and D, route 23, Quincy-Beckwith highway, in Plumas National Forest, contract price $74,469. The project included 9.9 miles of surfacing 16 ft. wide by 8 in. deep, loose measure, and 2.35 miles of new grading, the remaining mileage having been graded last year. Main items in the contract were: excavation—41,203 cu.yd. at $0.52; structure excavation—605 cu.yd. at $1.25; overhaul—61,883 sta.yd. at $0.02; fine grading—6.55 mi. at $260; crushed rock—22,255 cu.yd. at $1.49; watering—1064 M gal. at $1.75; concrete—258 cu.yd. at $27.

The equipment on this contract included one 1½-yd. and one 1¼-yd. Northwest gas shovels, one 15 by 38-in. Wheeling jaw crusher, one No. 3 Symons cone crusher, one 13-ft. revolving screen with 1-in. round openings and 2-in. scalping screen, two Caterpillar '60' tractors, one Caterpillar '30' with bulldozer, eleven 5-yd. dump trucks, one 1500-gal. tank truck with sprinkler, one 2-sack Jaeger concrete mixer.

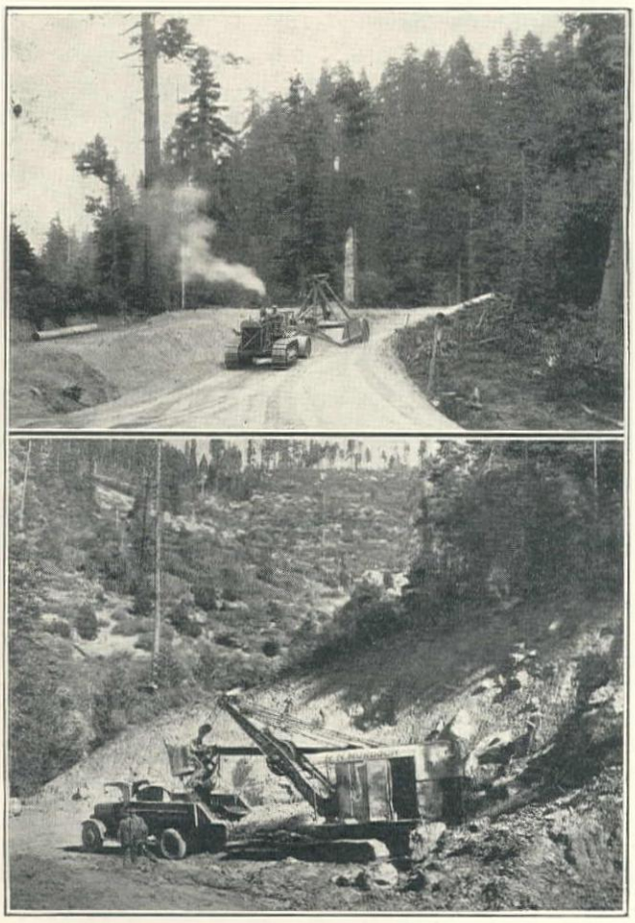
Plumas National Forest—Chas. Harlowe, Jr., Oakland, California, will complete his contract about October, 1931, for grading 8.3 miles on section E, Blairsden-Delleker section, route 23, Quincy-Beckwith highway, Plumas National Forest, contract price $118,295. Main items in the contract include: clearing—26.55 acres at $275; roadway excavation—212,-

083 cu.yd. at $0.39; finishing—8.3 mi. at $150; untreated timber—17.7M f.b.m. at $125.

To October 25, rough grading had been completed between sta. 666-698 and 728-780, and grading was in progress between sta. 710-728 and 800-820. Most of the corrugated metal pipe culverts have been laid and the two concrete box culverts have been constructed; headwalls are being placed. Piles and lumber for a trestle bridge consisting of three 19-ft. spans have been delivered and a piledriver built. Clearing has been completed.

Equipment includes one 1¼-yd. Bucyrus-Erie gas+air, three 4-yd. dump trucks, one 8 by 6-in. Rix compressor, three Caterpillar '60' tractors, two Le Tourneau scrapers, one Le Tourneau scarifier, one Le Tourneau bulldozers, one 12-ft. blade, one 1-sack concrete mixer, one 1000-gal. water tank, one 1½-ton service truck.

Sierra National Forest—George Pollock Co., Sacramento, California, will complete a contract about June, 1931, for grading 2.6 miles on section B, Fish Camp-Four Mile project, Oakhurst highway, Sierra National Forest, contract price $65,937. Main items in the work include: clearing—17 acres at $110; roadway excavation—85,420 cu.yd. at $0.64; finishing—2.6 mi. at $300. Grading operations began September 1, using one 1¼-yd. P&H shovel, one 310-c.f.m. Rix compressor, three 9-yd. Sterling dump trucks. As this project is being worked in conjunction with the Mariposa grove contract, the equipment is shifted between jobs as needed. Rock in a 17,000-yd. cut at sta. 129 was soft granite and shot up in good shape for the shovel. Over one-half mile of the project has been rough-graded, this work to be completed during the present season. All cuts are being daylighted on a flat slope on the low side to facilitate snow removal.



(Upper) George Pollock Co. Grading Mariposa Grove Section, Wawona Road, Yosemite National Park, with Caterpillar '60' and 7½-yd. Le Tourneau Gondola Scraper. (Lower) Welsh & Murdock ¾-yd. Thew-Lorain Shovel Removing Slide on Elevenmile-Grouse Creek Section, Wawona Road, Yosemite National Park

Tahoe National Forest—J. P. Holland, Inc., San Francisco, California, completed a contract October 15 for grading 3.1 miles, section D, of route 26 (Ladies canyon-Shady flat section) in Tahoe National Forest. This highway is a section between Downieville and Sierra City. The contract price was $63,448 and included: excavation—80,645 cu.yd. at $0.665; finishing—3.1 mi. at $300; hand-laid rip-rap—500 cu.yd. at $4.00; hand-laid rock embankment—400 cu.yd. at $3.50; etc.

Two 1¼-yd. gas+air shovels (Bucyrus-Erie and Link-Belt) were used to move 91,000 cu.yd. of unclassified excavation. Hauling was done with four 4-yd. White trucks. Two 220-c.f.m. compressors, mounted on truck chassis, were used for drilling, considerable hard rock being encountered. Subgrading was accomplished with a bulldozer and bowl, powered by a Caterpillar '30', and an Adams grader, powered by a Caterpillar '60', supplemented by hand work.

Welsh & Murdock Building Pioneer Road Around Rock Cut on Elevenmile-Grouse Creek Section of Wawona Road, Yosemite National Park, for Bureau of Public Roads

Yosemite National Park—Contoules Construction Co., San Francisco, California, began work May 12 and will complete a contract about December 1 for grading 2.2 miles of route 2, Wawona road, from Grouse creek to Turtleback dome, Yosemite National Park. Rough grading has been completed and one shovel is excavating type 'B' material while the other is moving fine material and shaping up the grade. The contract price is $89,900. Main items in the work include: unclassified excavation—57,640 cu.yd. at $0.84; type 'B' excavation—27,360 cu.yd. at $1.05; overhaul—38,000 sta.yd. at $0.05; finishing—2.2 mi.; corrugated pipe—1284 lin.ft. of 24-in. at $3.10; hand-laid rock embankment—1200 cu.yd.

The equipment includes one 1¼-yd. and one 1-yd.

Northwest shovels, four 5-yd. Sterling trucks, one Caterpillar '60' with bulldozer, one Ford service truck, two 300-c.f.m. Rix compressors, one Ingersoll-Rand drill sharpener with oil furnace, etc.

Cleveland National Forest—Dimmitt & Taylor, Los Angeles, California, have completed their contract for grading 6.8 miles of section A, route 73, Laguna highway, in Cleveland National Forest, contract price $41,751. Main items in the contract included 75,500 cu.yd. of excavation at $0.38 and 6.8 mi. of roadway finishing at $350. The principal equipment was as follows: one 1-yd. Link-Belt gas shovel, one 1¼-yd. Koehring shovel, four 5-yd. Brockway-Indiana dump trucks, two 4-yd. Autocar dump trucks, two 220-c.f.m. Ingersoll-Rand compressors, one Caterpillar '60' and one Caterpillar '30' with Ateco scrapers, and one 12-ft. Adams grader.

Dimmitt & Taylor Grading Rock Cut on Laguna Highway in Cleveland National Forest, California, Bureau of Public Roads Contract. Ingersoll-Rand Compressor in Foreground

Eldorado National Forest—The Finnell Co., Inc., Sacramento, California, will complete a contract about December 1, weather permitting, for grading and surfacing 5.1 miles of the Riverton-Kyburg project, route 32, Placerville-Lake Tahoe road, Eldorado National Forest. The contract price is $112,573 and involves the following main items: clearing—21 acres at $300; roadway excavation—61,194 cu.yd. at $0.75; fine grading—2.3 mi. at $250; crushed rock surfacing—14,000 cu.yd. at $2.45; screenings—3600 cu.yd. at $3.00. Two miles of this section was previously graded under separate contract.

The equipment includes two 1¼-yd. Osgood shovels, two 310-c.f.m. and two 220-c.f.m. Ingersoll-Rand compressors, four 7-yd. Athey wagons, four Caterpillar '60' tractors, five 5-yd. trucks, one bulldozer, one 12-ft. Russell blade.

C. H. Sweetser is district enginer for district No. 2, U. S. Bureau of Public Roads, San Francisco. National forest and national park roads in this district are under Levant Brown, with F. B. Lessman as assistant.

CALIFORNIA STATE HIGHWAY PROJECTS

El Dorado County—Nate Lovelace, Sacramento, California, has completed his contract for 1.8 miles of grading from Bay View Rest to 1 mile north of Eagle Falls, contract price $179,936. Equipment included one ¾-yd. Northwest shovel, one ¾-yd. P&H shovel, three portable compressors, six 4-yd. dump trucks, and one Caterpillar '30' tractor.

C. H. Whitmore is district engineer of district III, California Division of Highways, at Sacramento.

Humboldt County—E. C. Coats, Loleta, California, completed his contract August 13 for grading and surfacing 2.9 miles from Fish Creek to Stephens Grove, contract price $130,767. The project included 218,000 cu.yd. of unclassified excavation, 8350 cu.yd. of rock surfacing, etc. Major equipment included two ¾-yd. P&H and one ¼-yd. power shovels; three Caterpillar tractors, of which one was a '60' equipped with a bulldozer; ten 4-yd. White and one 7-yd. Mack trucks; graders; scarifiers; air compressors; two Universal crushers, 15 by 36-in. and 8 by 36-in.

Humboldt County—H. H. Boomer, San Francisco, California, has completed his contract for grading and surfacing 1.2 miles from Garberville to Bluff Creek, contract price $74,997. The project involved 120,000 cu.yd. of unclassified excavation, 3200 cu.yd. of rock surfacing, etc. Principal equipment included one ¾-yd. Northwest gas shovel, one ½-yd. Brownhoist gas shovel, one Caterpillar '30' with Ateco bulldozer, four 4-yd. White trucks, one 10-ton Buffalo-Pit steam roller, one portable crushing and screening plant.

Humboldt County—Chigris & Sutsos, San Francisco, California, have completed their contract for grading and surfacing 1.4 miles from the southerly line of Humboldt county to Richardson Grove, contract price $52,550. The project involves 82,000 cu.yd. of unclassified excavation and 4000 cu.yd. of untreated rock surfacing. Principal equipment includes one 1¼-yd. Osgood shovel, five 5-ton White trucks, one Caterpillar tractor with bulldozer, one Ingersoll-Rand compressor.

Humboldt County—J. P. Holland, Inc., San Francisco, California, has completed a contract for grading 1.5 miles and surfacing 5.2 miles from Loleta to Beatrice, contract price $51,480. The project required 97,000 cu.yd. of unclassified roadway excavation, 20,500 cu.yd. of river-run gravel surfacing, etc. Principal equipment included one 1-yd. Marion gas-electric shovel, one 1¼-yd. Northwest gas shovel, six 8-yd. Fageol dump trucks, one 5-ton Sterling truck, two 12-ton gasoline rollers, two Ateco dirtmovers, two Caterpillar tractors with bulldozers.

Finnell Co. Working In Rock Cut on Bureau of Public Roads Contract, Riverton-Kyburg Project, Placerville-Lake Tahoe Road, Eldorado National Forest, California. Osgood 1¼-yd. Shovel and Caterpillar '60' in Foreground

F. W. Haselwood is district engineer of District I, California Division of Highways, at Eureka.

Inyo County—Allied Contractors, Inc., Ludlow, Cal-

ifornia, have completed a contract for 21.3 miles of grading and oil-treated surfacing from Coso Junction to Olancha, contract price $239,792. Major equipment included one 1¼-yd. and one 1-yd. Northwest shovels; ten 4-yd. dump trucks; two 12-ft. graders; Ateco scrapers; Ball wagon graders; and a crushing and mixing plant of 1000 tons daily capacity.

F. G. Somner is district engineer of district IX, California Division of Highways, at Bishop.

Kern County—George Herz Co., San Bernardino, California, will complete a contract about February for 15 miles of grading and oil-treated surfacing from Cinco to 7 miles north of Ricardo, contract price $247,-

Crushing Plant on Isbell Construction Co. Contract for Sections C and D of Quincy-Beckwith Highway, Plumas National Forest, California

768. Grading has been completed and the oil-treated surfacing is in progress. This contract includes a section through Red Rock canyon, a wash carrying considerable cloudburst runoff. The new highway through the canyon has been raised 15 ft. above streambed and the slopes protected with hand-placed rock. The contract includes 228,000 cu.yd. of excavation, 33,400 tons of crusher-run base, 24,600 tons of oil-treated rock surfacing, etc. Major equipment is as follows: one 1½-yd. P&H and one 1-yd. Northwest power shovels, one 'Monarch' '75' tractor, one '30' tractor, eight 4-yd. dump trucks, four 4-horse fresnoes.

F. G. Somner is district engineer.

Los Angeles County—The T. M. Morgan Paving Co., Los Angeles, California, will complete a contract about April, 1931, for grading 1.5 miles of the La Canada-Mt. Wilson highway northerly from La Canada, contract price $272,790. The project is now about one-half completed.

The contract includes the following major items: clearing and grubbing—78 sta. at $25; roadway excavation—460,000 cu.yd. at $0.35; overhaul—3,000,000 sta.yd. at $0.007; structure excavation—5220 cu.yd. at $1.25; class 'A' concrete in structures—950 cu.yd.; etc. Equipment is as follows: one 1½-yd. Koehring shovel, one 1-yd. Northwest shovel, one Caterpillar '60' with bulldozer, one 300-c.f.m. Ingersoll-Rand compressor, one 110-c.f.m. Sullivan compressor, five 5-yd. dump trucks.

S. V. Cortelyou is district engineer of district VII, California Division of Highways, at Los Angeles, and L. M. Ranson is district construction engineer.

Marin County—Granfield, Farrar & Carlin, San Francisco, California, have completed grading and culverts and 60% of the surfacing on their contract for 1.3 miles of grading and bituminous macadam from Belvedere crossing to Tiburon, contract price $54,415. Main items in the contract include: roadway excavation—82,000 cu.yd. at $0.30; overhaul—1,016,000 sta.yd. at $0.005; crusher-run base—5600 tons at $1.80; broken stone surfacing—1800 tons at $2.10; asphalt road oil—100 tons at $20.50; finishing—69 sta. at $4. The project is 75% complete and 67% of the time has elapsed. Equipment includes one Caterpillar '60' and blade, five 2½-ton trucks, two 12-ton rollers.

J. H. Skeggs is district engineer of district IV, California Division of Highways, San Francisco.

Mono County—Kennedy-Bayles Construction Co., Oakland, California, began work August 25 on 12.9 miles of grading from Sonora Junction to 4 miles south of Coleville, contract price $161,510. The project will be completed about June, 1931, and is now 30% complete. Main items in the contract include: clearing and grubbing—265 sta. at $20; roadway excavation—259,000 cu.yd. at $0.47; overhaul—630,000 sta.yd. at $0.01; imported borrow—8000 cu.yd. at $0.60; structure excavation—1200 cu.yd. at $2.00; class 'A' concrete in structures—265 cu.yd. at $25; rock slope—6410 sq.yd. at $1.00.

F. G. Somner is district engineer.

Nevada and Placer Counties—T. E. Connelly, San Francisco, California, has completed his contract for

(Upper) Isbell Construction Co. Plant for Surfacing Topaz Highway in Mono National Forest, Nevada. (Lower) Finished Gravel Surfacing on Topaz Highway, Looking Toward Topaz Lake

9.3 miles of grading from Airport to Indian Springs, contract price $396,385. Equipment included one 1¼-yd. Lima model 101, one 1¼-yd. Northwest, one 1¼-yd. Thew-Lorain, and one 1-yd. Bucyrus-Erie shovels; four portable compressors; one '60' and one '30' tractors; and six 4-yd. dump trucks.

C. H. Whitmore is district engineer of district III, California Division of Highways, at Sacramento.

Nevada and Placer Counties—Hemstreet & Bell, Marysville, California, have completed their contract for surfacing with crusher-run base and untreated rock on 10.8 miles of highway between the south fork of Yuba river and Soda Springs, contract price $157,089. The contract involved: crusher-run base—52,200 tons at $1.85; untreated rock surfacing—29,020 tons at $1.85; and sprinkling water—3416 M gal. at $2.00. A crushing plant was erected at the quarry site, power being furnished by a 100-hp. Atlas-Diesel engine. This crushing plant had an average daily

production of 1000 tons of rock. The hauling fleet consisted of International, White, and G.M.C. 4-yd. trucks.

C. H. Whitmore is district engineer.

Placer County—The T. M. Morgan Paving Co., Los Angeles, California, will complete a contract about May, 1931, for grading 1 mile of 36 and 48-ft. roadbed and driving 531 lin.ft. of 36-ft. diam. tunnel through the town of Newcastle, contract price $209,755. Construction started September 2 and the contractor has completed the clearing and adjustment of public utilities that occupied positions within the limits of construction. Grading of the west portal approach has been started, using a 1¼-yd. Thew-Lorain model 75-B power shovel.

The bid price for tunnel drving is $120 per lin.ft., and for tunnel lining is $110 per lin.ft. for 240 ft. of class 'A' concrete in section A, $95 per lin.ft. for 75 ft. of redwood timber lining in section B, and $60 per lin.ft. for 216 ft. of redwood timber lining in section C.

(Left) Trimming Slope with Backsloper Attached to 12-ft. Blade, Chas. Harlowe, Jr., Contract for Blairsden-Delleker Section, Quincy-Beckwith Highway, Plumas National Forest. Caterpillar '60' and Le Tourneau Scraper Passing Blade. (Right) Bucyrus-Erie 1¼-yd. Gas-Air Shovel on Harlowe Contract

Other major items include: clearing and grubbing—51 sta. at $50; roadway excavation—71,000 cu.yd. at $0.70; overhaul—648,000 sta.yd. at $0.01; structure excavation—3900 cu.yd. at $1.50; class 'A' concrete in portals and structures—430 cu.yd. at $25; crusher-run base and untreated rock surfacing—3050 tons at $2.00; oil-treated rock surfacing—2200 tons at $2.50. The tunnel has a 36-ft. roadway, including two 3-ft. sidewalks.

C. H. Whitmore is district engineer.

San Joaquin County—Larsen Bros., Galt, California, have completed their contract for 1.7 miles of grading and rock surfacing from French Camp to Stockton, contract price $42,828. In preference to using a State borrow pit 1¼ miles from the project, Larsen Bros. purchased borrow from land adjoining the right-of-way at about the center of the job.

Equipment on the contract included one 1¼-yd. Brownhoist clamshell, four 5-ton Kleiber dump trucks, one 5-ton White truck, two Caterpillar '30' tractors, one Ateco bulldozer, one Killefer scarifier, one 8-ft. Adams blade, one 9 by 16 Adams maintenance drag, one scraper, one 12-ton Austin 3-wheel roller, one Fordson sheepsfoot tamping roller, one 5-ton Kleiber truck with water tank, one 10-ft. Russell grader.

R. E. Pierce is district engineer of district X, California Division of Highways, at Sacramento.

San Mateo County—Fredrickson & Watson, Oakland, and Fredrickson Bros., Stockton, California, have completed all work except an overhead structure at sta. 764 for 7.3 miles of grading from San Mateo to Redwood City, contract price $406,501. The project is 92% completed, with 76% of the time elapsed. Main items in the work include: imported borrow—315,500 cu.yd. at $0.43; hydraulic fill—321,000 cu.yd. at $0.28 and $0.50; roadside borrow—108,000 cu.yd. at $0.24; class 'A' concrete in structures—3200 cu.yd. at $17.50; untreated douglas fir piles—22,050 lin.ft. at $0.27, plus $7.00 each for driving 735 piles.

Equipment includes one 1½-yd. Northwest shovel, two ¾-yd. draglines, five 6-yd. and six 5-yd. dump trucks, one 1½-ton flat-rack truck, one Caterpillar '60' with bulldozer, one 1000-gal. sprinkler, one 2-sack concrete mixer, one 6-in. centrifugal pump, two 2-in. pumps.

J. H. Skeggs is district engineer.

San Mateo County—Basich Bros. Construction Co., Los Angeles, California, has completed 38% of a contract for grading 4.1 miles from Redwood City to Willow Road, contract price $83,436. Grading is 70% complete, culverts 4%, imported borrow 3%, and structure excavation 22% completed; 58% of the contract time has been consumed, but the project will probably be completed on time. Adobe soil has been stripped to grade between sta. 165 and 220 and the subgrade is being prepared for imported borrow. Main items in the work include: roadway excavation—86,520 cu.yd. at $0.30; imported borrow—77,060 cu.yd. at $0.50; overhaul—2,050,000 cu.yd. at $0.004; structure excavation—2890 cu.yd. at $0.70; concrete in structures—223 cu.yd. at $20.

J. H. Skeggs is district engineer.

Santa Cruz County—O. A. Lindberg, Stockton, California, began work July 16 and will complete his contract early in January for 2.6 miles of grading and bituminous-treated waterbound macadam from Waterman Switchback to Saratoga Gap, contract price $127,-229. The contract involves: clearing and grubbing—120 sta. at $5.00; overhaul—320,000 sta.yd. at $0.015; structure excavation—2570 cu.yd. at $1.50; subgrading—33,300 sq.yd. at $0.09; waterbound macadam base—10,480 tons at $1.75; screenings—1750 tons at $2.00; emulsified asphalt—140 tons at $28, roadway excavation—243,000 cu.yd. at $0.35.

Equipment includes two 1¼-yd. shovels, ten 4-yd. dump trucks, three '60' and two '30' tractors, one 8-ft. blade, two scarifiers, two bulldozers, one 6-yd. Le Tourneau scraper, two portable compressors, one crushing plant, two rollers, two service trucks, one electric light plant, one welding outfit.

J. H. Skeggs is district engineer.

Shasta and Lassen Counties—Mathews Construction Co., Sacramento, California, will complete a contract about August, 1931, for 17.9 miles of grading and rock surfacing from Fall River Mills to Big Valley, contract price $278,250. To November 10, grading in Shasta county had been completed between sta. 1341 and 1150 and partly completed between

sta. 1150 and 979. Work started July 2 and the grading (44,000 cu.yd.) was done with Ateco scrapers and Caterpillar tractors. The base-course surfacing on the Shasta county section has been placed between sta. 1341 and 1281. Grading in Lassen county between sta. 0 and 40 (8000 cu.yd.) has been completed, using Ateco scrapers and Caterpillars; partly completed between sta. 40 and 77 (7800 cu.yd.) using one ¾-yd. Northwest gas shovel and trucks; partly completed between sta. 114 and 277 (24,000 cu.yd.) using one 1¼-yd. Northwest gas shovel and trucks; and partly completed between sta. 358 and 429 (3000 cu.yd.) using Ateco scrapers and Caterpillars. The base-

George Pollock Co. 1¼-yd. P&H and Fleet of 9-yd. Sterling Trucks Grading Oakhurst Highway in Sierra National Forest, California, Bureau of Public Roads Contract

course surfacing on the section in Lassen county has been placed between sta. 0 and 27.

Main items in the contract include: clearing and grubbing—480 sta. at $25; roadway excavation—224,600 cu.yd. at $0.48 and $0.43; overhaul—649,200 sta.yd. at $0.0175, and 13,250 mi.yd. at $0.12; structure excavation—2500 cu.yd. at $1.00; untreated rock surfacing — 50,400 cu.yd. at $2.35; watering — 1400 M gal. at $2.00; structure concrete—375 cu.yd. at $27.

Grading equipment includes three Caterpillar '60' tractors operated with two Ateco and one Le Tourneau scrapers; one Caterpillar '30' and bulldozer; two Ingersoll-Rand compressors; two Northwest shovels; ten 5-ton trucks. Surfacing equipment includes one Allis-Chalmers Gage primary (No. 5) and one Allis-Chalmers Gage secondary (No. 4) crushers and one 24-in. Symons disc reduction crusher; one 14 by 12 Ingersoll-Rand compressor; one 10-ton roller; two 5-ton trucks; one Russell grader; three Caterpillar engines.

H. S. Comly is district enginer of district II, California Division of Highways, at Redding. C. H. Purcell is state highway engineer at Sacramento, and C. S. Pope is construction engineer.

COLORADO PROJECTS FOR BUREAU OF PUBLIC ROADS

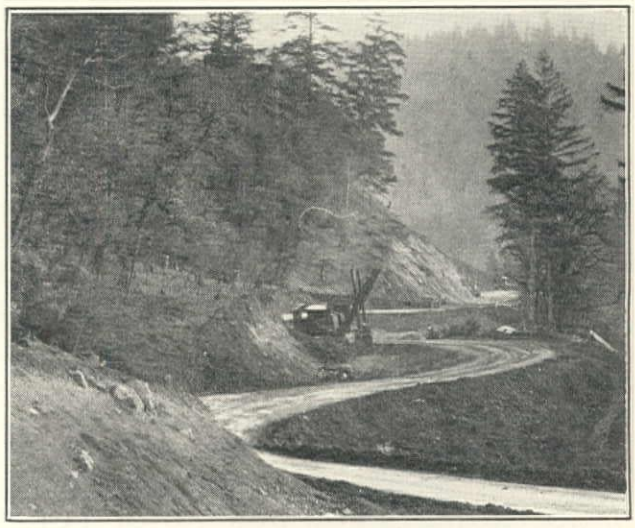
Mesa Verde National Park—The Pioneer Construction & Engineering Co., Denver, Colorado, will complete a contract in the fall of 1931 for grading 11.4 miles from the north entrance to park headquarters, North and South highway, Mesa Verde National Park. The contract is now about one-half complete. The project has a total of 110,000 cu.yd. of excavation, or about 10,000 cu.yd. per mile. Other contract items are: 5 acres of clearing and 12 acres of grubbing, 2400 cu.yd. of structure excavation, 17,000 cu.yd. of borrow, 235,000 sta.yd. of overhaul, 11.4 mi. of roadway finishing, 1525 cu.yd. of rubble masonry, etc.

The equipment includes one 1¼-yd. gas shovel, one air compressor, one Caterpillar '60', etc. During the past summer, it was necessary for the contractor to maintain traffic over the constructed road. A crew of 24 is employed on this project; the contract price is $114,965.

Rocky Mountain National Park—L. T. Lawler, Butte, Montana, will complete his contract late in the 1932 season for grading section C, 10.9 miles, of the Fall river project in Rocky Mountain National Park, contract price $437,178. This project involves mountainside construction averaging 30,000 cu.yd. of excavation per mile, largely through rock; much of the work is on the west side of the Continental Divide, and extends from Fall river pass at elev. 11,800 ft., to the Colorado river grade, elev. 9000 ft.

The contract was awarded late in September. A camp has been established on the lower end of the project, some clearing has been done, and excavation with a 1¼-yd. shovel has been started. The contractor will probably work late into the winter, especially on clearing; his clearing and grading crew totals 40 men.

Main items in the work are as follows: clearing—67 acres at $275; grubbing—36 acres at $200; unclassified excavation—315,589 cu.yd. in two types at $0.85 and



E. C. Coats Working two ¾-yd. P&H Shovels on Fish Creek-Stephens Grove Contract for California Division of Highways, Humboldt County

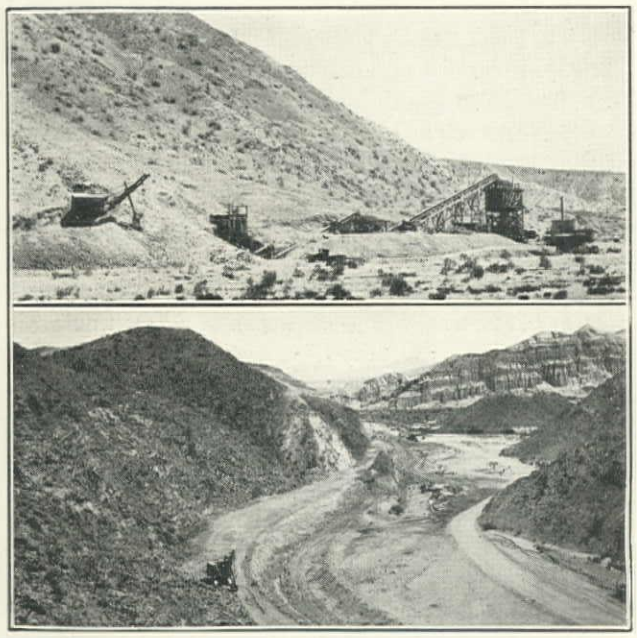
$1.30; structure excavation—5600 cu.yd. at $2.00; overhaul—63,000 sta.yd. at $0.03; finishing—10.9 mi. at $300; cement rubble masonry—2695 cu.yd. at $20; hand-laid rock embankment—15,000 cu.yd. at $1.35; etc.

Rocky Mountain National Park—W. A. Colt & Sons, Las Animas, Colorado, will complete a contract during the fall of 1931 for grading 17.2 miles of heavy mountainside construction on the east side of the Con-

tinental Divide between Fall river pass, elev. 11,800 ft., and Deer ridge, elev. 9000 ft. This contract is section B of the Fall river project, Rocky Mountain National Park. The contract is now 70% complete; it requires a total of 340,000 cu.yd. of excavation, or about 20,000 cu.yd. per mile.

The contract price is $393,674 and includes: clearing—70 acres at $250; grubbing—50 acres at $100; unclassified excavation in two types—331,500 cu.yd. at $0.83 and $1.40; structure excavation—4000 cu.yd. at $1.50; overhaul—77,000 sta.yd. at $0.03; finishing—17.2 mi. at $200; class 'B' concrete—144 cu.yd. at $30; cement rubble masonry—700 cu.yd. at $25; hand-laid rock embankment—4500 cu.yd. at $1.50; etc.

Five gas shovels are being used on this contract—three 1¼-yd., one 1-yd., and one ⅝-yd. There are five compressors and three Caterpillars on the work. By the middle of October, the weather became so unfavorable at high altitude that the contractor was forced to move his two upper shovels to the lower end of the project, where they are employed on cleanup



George Herz Co. Grading and Oil-Treated Surfacing Contract, Cinco to near Ricardo, Kern County, for California Division of Highways. (Upper) Surfacing Plant Opposite Sta. 355, P&H 1½-yd. Shovel in Left Foreground. (Lower) Red Rock Canyon from Top of 92-ft. Cut

work. A crew of 120 is required on clearing, grading, and structures.

A. E. Palen is acting district engineer of district 3, U. S. Bureau of Public Roads, at Denver.

IDAHO PROJECTS FOR BUREAU OF PUBLIC ROADS

Payette National Forest—J. A. Terteling & Sons, Moscow, Idaho, will complete a contract about June, 1931, for grading 5.9 miles of the North Fork Payette road in Payette National Forest, contract price $152,979. Work started August 16 and the project was 35% complete on October 21. Main items in the project include: clearing—45 acres at $100; grubbing—21 acres at $75; roadway excavation—217,230 cu.yd. at $0.60; slide removal—3500 cu.yd. at $0.60; structure excavation—1110 cu.yd. at $2.50; overhaul—31,000 sta.yd. at $0.05; finishing—5.9 mi. at $200; class 'C' concrete—104 cu.yd. at $27. Equipment includes two 1-yd. Northwest shovels, three compressors, nine trucks, etc.; the working force totals 43 men.

B. J. Finch is district engineer of district 12, U. S. Bureau of Public Roads, at Ogden, Utah.

NEVADA PROJECTS FOR BUREAU OF PUBLIC ROADS

Tahoe National Forest—Isbell Construction Co., Carson City, Nevada, has completed a contract for grading 2.6 miles of section C, route 3, Lake Tahoe highway, in Tahoe National Forest. A 1½-yd. Northwest shovel started work on this project August 25 and was double-shifted, 40% of the material encountered being hard granite. Additional equipment included four 5-ton Autocar dump trucks, one 310-c.f.m. Ingersoll-Rand compressor on a 5-ton Autocar truck, one 250-c.f.m. Ingersoll-Rand portable compressor, one Caterpillar '30' with bulldozer, one Caterpillar '60' with Ateco scraper, one 10-ft. Adams blade, one pneumatic drill sharpener, one Ford pickup, one 1-sack Jaeger mixer, etc. Main items in the contract price, $58,271, included 62,361 cu.yd. of roadway excavation at $0.79 and 2.6 mi. of finishing at $250.

Mono National Forest—Isbell Construction Co., Carson City, Nevada, will complete a contract about January for 2.6 miles of grading and 14.8 miles of surfacing on the Topaz highway in Douglas county, Nevada, and Mono county, California, all in the Mono National Forest, contract price $95,512. Main items in this project include: roadway excavation—24,400 cu.yd. at $0.49; structure excavation—600 cu.yd. at $1.50; fine grading—12.2 mi. at $260; rock surfacing—27,700 cu.yd. at $1.97; gravel surfacing—8700 cu.yd. at $1.03; watering—1800 M gal. at $1.50.

Surfacing, shoulders, and fine grading on the 3.5-mile section from the Nevada state line to the Minden-Yerrington road was completed October 25. Crushing and screening on this section was completed October 17, and the plant transferred to a quarry site in California near Lake Topaz preparatory to beginning operations on the section in that state. Structures on the ungraded section south of Coleville, California, are being built. Weather conditions in December may cause the work to be carried over until spring, 1931.

The Nevada plant contained a 3-ft. Symons cone crusher. A 100-hp. Twin City gas engine operated the rotary screens, crusher, bucket elevator, and three conveyors. Pit material was excavated with a ¾-yd. Northwest gas shovel and hauled in two 5-ton Autocar trucks. Finished rock was hauled from the plant in three 6-yd. Mack trucks. Subgrading, processing, and finishing was done with a Caterpillar '20' motor grader and a 12-ft. Russell Mogul grader powered by a Caterpillar '60'. The Nevada plant operated with two 8-hour shifts, using a Kohler plant for night illumination at the crusher and two acetylene floodlights for roadway operations.

The California crushing plant contains the following additional equipment: one 18 by 36-in. Wheeling jaw crusher, one conveyor, and two power units—Caterpillar '60' and Ford. The extra conveyor allows 100 cu.yd. storage of finished product. There are also in use on this contract one 3-ton White dump truck,

one Moreland and one Ford utility trucks, one 1500-gal. water tank on an Autocar truck, one compressor, one 2-sack mixer, one Ateco scraper, two pumps, etc.

C. H. Sweetser is district engineer at San Francisco.

NEVADA STATE HIGHWAY PROJECTS

Elko County—Utah Construction Co., Ogden, will complete a contract about May, 1931, for grading and rock surfacing on 23.2 miles from Thousand Springs creek to 3 miles north of Wells, contract price $117,-683. The project includes: unclassified excavation—154,500 cu.yd. at $0.27; overhaul—163,441 cu.yd. at

W. A. Colt & Sons 1¼-yd. Thew-Lorain Shovel in Rock Cut on Section B of Fall River Project, Rocky Mountain National Park, Colorado, Bureau of Public Roads Contract

$0.04; prepare subgrade and shoulders—23.2 mi. at $200; rock or gravel surfacing—50,600 cu.yd. at $0.86; concrete—429 cu.yd. class 'A' and 'B' at $38 and $34; etc. Major equipment is as follows: one 1¼-yd. shovel, nine dump wagons, three small trucks, two concrete mixers, one compressor, 75 head of stock.

Elko County—Nevada Rock & Sand Co., Reno, will complete a contract about December 1 for grading and surfacing 31.4 miles from Elko to Deeth, contract price $134,533. Major items in the contract are: roadway excavation—166,500 cu.yd. at $0.21; selected borrow—33,600 cu.yd. at $0.40; overhaul—194,964 sta.yd. at $0.02; prepare subgrade and shoulders—25 mi. at $75; widen surface—6.35 mi. at $75; crushed rock or gravel surfacing—74,050 cu.yd. at $0.72; concrete—457 cu.yd. at $30. Equipment includes one 1-yd. Northwest shovel, one '60' and two '30' Caterpillars, two 2-yd. Ateco scrapers, one assembled gravel plant, eight 6-yd. Mack trucks.

Lander County—Utah Construction Co., Ogden, will complete a contract about May, 1931, for 11.7 miles of grading and rock surfacing between the town of Austin and 12 miles east, contract price $147,975. Main items in the contract include: roadway excavation—235,100 cu.yd. at $0.46; overhaul—174,713 sta.yd. at $0.04; prepare subgrade and shoulders—11.7 mi. at $150; selected borrow—6800 cu.yd. at $0.50; selected surfacing material—22,900 cu.yd. at $0.76; timber guard rail—2512 ft. at $0.85. Equipment includes one 1¼-yd. shovel, two Caterpillar '60' tractors with Ateco scrapers, two compressors, fresnoes and teams.

Lyon County—Nevada Rock & Sand Co., Reno, completed a contract August 25 for grading and rock surfacing on 11.7 miles from Yerington to Wilson's, contract price $85,675. Main items in the work included: excavation—17,000 cu.yd. at $0.20; borrow—86,000 cu.yd. at $0.48; prepare subgrade and shoulders—11.7 mi. at $75; crushed rock or gravel surfacing—29,400 cu.yd. at $0.90; concrete—218 cu.yd. at $35.

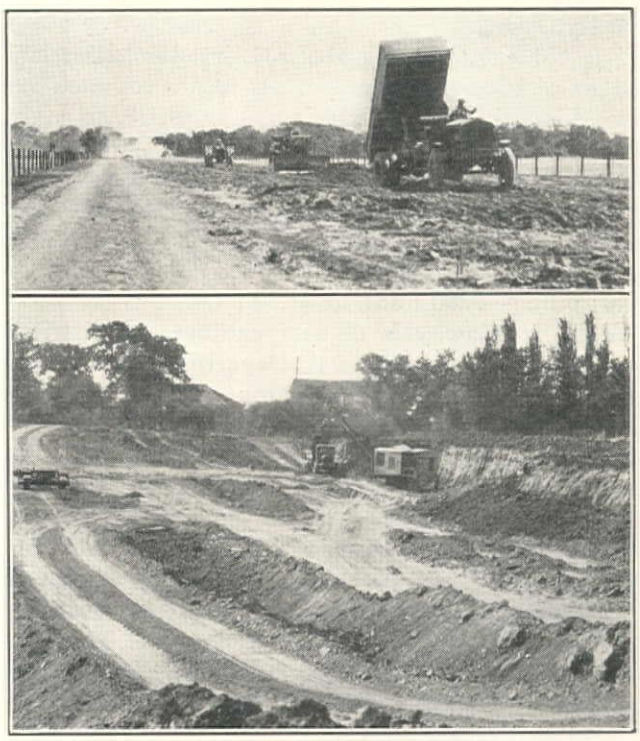
Ormsby and Lyon Counties—Dodge Bros., Inc., Fallon, Nevada, will complete a contract about January, 1931, for 7.7 miles of grading and rock surfacing from Carson City to 2 miles east of Mound House, contract price $43,842. Equipment includes one ¾-yd. gas shovel, two 'Monarch' '75' tractors, two Ateco scrapers, one compressor, one gravel plant, fresnoes, blades, and 50 head of stock.

S. C. Durkee is state highway engineer of Nevada at Carson City, and H. D. Mills is office engineer.

NEW MEXICO STATE HIGHWAY PROJECTS

Colfax County—Veater & Davis, El Paso, Texas, will complete their contract about January 1 for 13 miles of grading and surfacing and construction of steel and timber bridges between Raton and Springer. All grading has been completed; all structures with the exception of two timber and one steel bridge are complete; surfacing is being placed at an average rate of 900 cu.yd. per 20-hour day; and the railroad underpass is being constructed.

The contract price is $137,277, involving: unclassified excavation—61,467 cu.yd. at $0.19; common borrow—115,019 cu.yd. at $0.19; scarify and reshape sur-



(Upper) Larsen Bros. Grading Between French Camp and Stockton, San Joaquin County, for California Division of Highways. Kleiber 5-ton Truck Dumping in Front of Ateco Bull-dozer; Fordson Roller in Background. (Lower) 1¼-yd. Brownhoist Shovel in Borrow Pit on Larsen Bros. Contract

face course—13.7 mi. at $75; treated timber for bridges 142.5 M f.b.m. at $140 and $135; treated timber piling—2865 lin.ft. at $1.40; oil-processed crushed base course—24,688 cu.yd. at $1.20. Equipment includes one 12-ft. Adams blade, one Caterpillar '60', three 1-ton trucks, nine fresnoes, and one 1-yd. dragline, etc.

P. M. Bowen is district engineer of district 4, New Mexico State Highway Department, at Springer, and F. M. Limbaugh is project engineer at Raton.

Dona Ana County—A. O. Peabody, Deming, New Mexico, will complete his contract about February for grading and surfacing 10.1 miles and a timber bridge between Garfield and Hatch. Construction began April 5; the grading has been completed, and surfacing has begun. The major item in the contract is a treated timber bridge across the Rio Grande, consisting of twenty-three 25-ft. spans, on which construction began April 25. Equipment includes one ½-yd. gas shovel, 36 head of mules and horses with grading

Nevada Rock & Sand Co. Using 1-yd. Northwest Shovel and 2-yd. Ateco Scraper with Caterpillar '60' on White Horse Pass, Elko-Deeth Contract, Nevada Department of Highways, Elko County

tools, one Cedar Rapids screening and crushing plant, piledriver with Vulcan steam hammer, and several 2 to 4-yd. trucks.

The contract price is $147,334, involving: unclassified excavation—7227 cu.yd. at $0.20; common borrow—134,530 cu.yd. at $0.17; overhaul—28,965 sta.yd. at $0.03; and 6904 mi.yd. at $0.40; scarifying and reshaping surface course—10.1 mi. at $50; surface plating course—9072 cu.yd.; crushed gravel base course and oil-processed surface—18,324 cu.yd. at $1.25; treated timber in bridges—215.3 M f.b.m. at $135 and $140; piling—7390 lin.ft. at $1.50.

G. D. Hardaway is district engineer of district 1, New Mexico State Highway Department, at Deming, and O. D. Cowart is project engineer at Hatch.

Sandoval County—Veater & Davis, El Paso, Texas, will complete their contract about April 1 for grading and surfacing 7.5 miles from Algodones to Domingo and three steel bridges. To November 1, the following progress had been made: excavation, 45% complete; borrow, 67% complete; structure excavation, 100% complete; structure concrete, 100% complete; bridge steel, 100% complete; piling, 100% complete; and bank protection, 100% complete.

The contract price, $193,002, includes; unclassified excavation—158,067 cu.yd. at $0.20; common borrow—65,277 cu.yd. at $0.20; overhaul—288,824 sta.yd. at $0.03; scarifying and reshaping surface course—7.3 mi. at $100; base course for oil-processed surface—10,562 cu.yd. at $1.30; class 'A' concrete in box culverts and siphons—1000 cu.yd. at $20; reinforcing steel—400,650 lb. at $0.05; structure excavation—4732 cu.yd. at $0.75; class 'A' concrete in bridge sub and superstructure—2191 cu.yd. at $18 and $20; structural steel—512,911 lb. at $0.045; piling for bank protection—3450 lin.ft. at $1.35; etc.

Equipment on this project includes 30 head of stock, ten 4-ft. fresnoes, two large and one small railroad plows, six 4 and 5-yd. White trucks, one 1-yd. Northwest dragline with 1¼-yd. shovel dipper and piledriver leads, one 1-sack Smith mixer, one 3500-lb. steam hammer.

Frank Kimball is district engineer of district 3, New Mexico State Highway Department, and F. E. Barlow is resident engineer at San Felipe.

San Juan County—E. J. Maloney, Gallup, began work July 2 and will complete his contract about February 1 for 15 miles of grading and surfacing and bridges from Shiprock to the Colorado state line, contract price $235,847. The project requires 145,000 cu.yd. of unclassified excavation, 80% complete. Minor structures—38 box culverts and 72 pipe culverts—have been practically completed. Major structures—one creosoted timber bridge of seven 21-ft. spans, one of two 21-ft. spans, one timber bridge on 45-deg. skew and containing six 21-ft. spans, and one steel I-beam bridge (three 50-ft. spans) with concrete substructure—have been completed.

Most of the excavation was moved with a No. 42 Russell elevating grader, little shooting being necessary. Surfacing operations have been started with one 4-ft. Symons crusher at one setup and a 9 by 36-in. Pioneer and a 9 by 40-in. Universal breaker in the other setup. A fleet of eighteen 3-yd. Mack trucks is being used to haul the surfacing material.

T. G. Brown is project engineer at Shiprock.

Santa Fe County—Veater & Davis, El Paso, Texas, will complete the grading about December 1 on their

Isbell Construction Co. 1½-yd. Northwest Shovel in Rock Cut on Lake Tahoe Highway, Tahoe National Forest, Nevada, Bureau of Public Roads Contract

contract for 5.7 miles of grading and surfacing and two concrete and steel bridges between Santa Fe and Canoncito. Grading is being done under subcontract by Skousen Bros., and drainage structures have been completed under subcontract by Murphy & Murphy. Surfacing has not been commenced. Grading equipment included one 1¼-yd. gas shovel, five 5-yd. trucks, teams and fresnoes.

The contract price is $148,926. Principal items in-

clude: clearing and grubbing—53 acres at $30; unclassified excavation—82,252 cu.yd. at $0.55; common excavation and common borrow—76,016 cu.yd. at $0.21; overhaul—46,185 sta.yd. at $0.03; scarify and reshape surface course—5.74 mi. at $100; binder—2060 cu.yd. at $0.85; crushed base course—10,425 cu.yd. at $1.60; class 'A' concrete in culverts and siphons—1192 cu.yd. at $21; structure excavation—1625 cu.yd. at $1.00; class 'A' concrete in structures—718 cu.yd. at $19 and $20.

Frank Kimball is district engineer of district 3, New Mexico State Highway Department, at Albuquerque, and V. H. Henderson is project engineer at Santa Fe.

Union County—Everly & Allison, Las Vegas, will complete their contract about January 1 for 18 miles of grading and surfacing from Des Moines to Greenville. Construction started March 1. All grading, drainage structures, fencing, and other items except surfacing have been completed and the surfacing is over one-half completed.

Grading was handled by teams and fresnoes. A 1-sack Jaeger mixer was used on the drainage structures, aggregates being supplied by a 14-36 Cedar Rapids crusher. A Cedar-Rapids 9-36, 3-36 crushing plant powered by a 120-hp. Waukesha motor is being used for crushing and processing the gravel surface. A 2½-yd. Killifer fresno and two 5-ft. fresnoes are being used in the pit to supply the crusher. One 1¼-ton International truck is also on the work.

The contract price, $193,029, includes: unclassified excavation—23,685 cu.yd. at $0.40; common borrow—221,996 at $0.24; overhaul—179,068 sta.yd. at $0.03; and 8166 mi.yd. at $0.20; scarify and reshape surface course—18.4 mi. at $40; crushed surface course—38,860 cu.yd. at $1.55; class 'A' and 'B' concrete—902 cu.yd. at $22; etc.

P. M. Bowen is district engineer of district 4, New Mexico State Highway Department, at Springer, and L. B. Tyson is project engineer at Des Moines.

W. C. Davidson is state highway engineer at Santa Fe and R. W. Bennett is office engineer.

OREGON PROJECTS FOR BUREAU OF PUBLIC ROADS

Siuslaw National Forest Highway—Morrison-Knudsen Co., Boise, Idaho, has completed about 80% of a contract for grading 7.7 miles on three sections of the Siuslaw National Forest highway. Two shovels and 25 men are employed on each of the three sections. The contract price is $517,472 and includes: clearing—68 acres at $150; grubbing—51 acres at $100; excavation—332,000 cu.yd. at $1.05; borrow—70,000 cu.yd. at $0.85; overhaul—287,000 mi.yd. at $0.16; finishing—7.7 mi. at $400; class 'B' concrete—355 cu.yd. at $40; timber piling—8200 lin.ft. at $0.95 and $1.60; cedar piling—970 lin.ft. at $1.10; etc.

The shovels are 1¼ and 1-yd., mostly gas+air, and include Bucyrus-Erie, Thew-Lorain. Link-Belt, etc.

W. H. Lynch is district engineer of district 1, U. S. Bureau of Public Roads, at Portland, Oregon, and J. A. Elliott is in charge of forest road projects.

OREGON STATE HIGHWAY PROJECTS

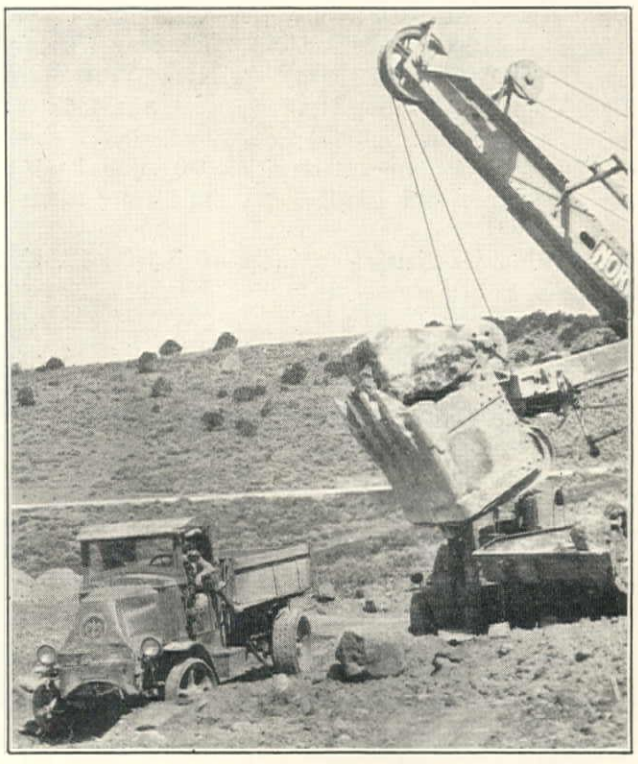
Jackson and Klamath Counties—Wren & Greenough, Portland, Oregon, will complete their contract about December 15 for grade widening and surfacing on 27.1 miles of the Green Springs highway, Jenny creek-Keno section. The grade widening and ditching have been completed and the roadway is now wide enough to allow an 18-ft. oil-macadam surface. Progress has been retarded because of excessively hard rock and it has been necessary to install special shafting in the rock crusher to stop breakage. One gas shovel and several trucks are in use on this project.

The contract price is $155,537 and includes: common excavation and imported borrow—22,000 cu.yd. at $0.30; solid rock excavation—5000 cu.yd. at $1.50; overhaul—50,000 sta.yd. at $0.02; haul selected borrow—25,000 mi.yd. at $0.18; surfacing—32,000 cu.yd. at $2.60; screenings—7000 cu.yd. at $2.50; stockpiled material—13,600 cu.yd. at $2.25.

Wm. E. Chandler is district engineer.

Wheeler and Grant Counties—J. W. Feak Construction Co., Tacoma, Washington, will complete a contract about December 1 for 10 miles of grading on the Barnhouse Ranch-Picture Gorge section of the Ochoco highway, contract price $187,656.

Equipment includes two 1¼-yd. Marion gas-electric



Nevada Rock & Sand Co. 1-yd. Northwest Shovel Loading 6-yd. Mack Truck on Section of Nevada State Highway Between Elko and Deeth

shovels, one 1½-yd. Bucyrus-Erie oil-steam shovel, four 120-c.f.m. Gardner-Denver compressors, six 2-yd. International trucks, two 3½-ton G.M.C. trucks, and three Ford trucks. Main items in the contract are as follows: common excavation—69,900 cu.yd. at $0.30; intermediate excavation—73,300 cu.yd. at $0.41; solid rock excavation—142,200 cu.yd. at $0.82; overhaul—284,000 sta. yd. at $0.15.

J. E. Peck is resident engineer on this contract.

Roy A. Klein is state highway engineer and S. H. Probert is office engineer for the Oregon State Highway Commission at Salem.

UTAH PROJECTS FOR BUREAU OF PUBLIC ROADS

Cache National Forest—Olof Nelson, Logan, Utah, began work August 4 and will complete his contract about December 15 for grading 4.7 miles on the Logan-Garden City road, Cache National Forest, contract price $96,824. Main items in the contract include: roadway excavation—91,000 cu.yd. at $0.52; structure excavation—1250 cu.yd. at $3.00; overhaul—80,000 sta.yd. at $0.03; finishing—4.66 mi. at $300; class 'A', 'B', and 'D' concrete—735 cu.yd. at $28 and $30; hand-laid rip-rap—1100 cu.yd. at $4.00; move and rebuild flume—$8000.

Equipment on this contract includes one ¾-yd. steam shovel, one ¾-yd. gas shovel, one Ingersoll-Rand compressor, three Jackhamers, one 2-sack and one 1-sack concrete mixers, one Caterpillar '30' and bulldozer; the crew totals 40 men.

Uinta National Forest—S. H. Newell & Co., Portland, Oregon, will complete a contract about June, 1931, for grading and rock surfacing on 10.8 miles of the Heber-Fruitland road in Uinta National Forest, contract price $102,943. The contract involves: roadway excavation—120,400 cu.yd. at $0.51; overhaul—41,000 sta.yd. at $0.02; finishing—10.84 mi. at $200; surfacing—28,500 cu.yd. at $1.60; concrete—170 cu.yd. class 'B' and 'C' at $20 and $18; etc. Work started July 28, and on October 21 the project was 45% complete. Equipment includes one ½-yd. diesel shovel, two 7-yd. trucks, one Caterpillar '30', one 1-yd. revolving scraper, one grader, etc. The crew totals 32 men.

B. J. Finch is district engineer of district 12, U. S. Bureau of Public Roads, at Ogden, Utah.

Link-Belt 1-yd. Shovel on Morrison-Knudsen Contract, Siuslaw National Forest Highway, Oregon, for Bureau of Public Roads

WASHINGTON PROJECTS FOR BUREAU OF PUBLIC ROADS

Mt. Rainier National Park—Elich & Co., Seattle, have completed about 45% of a contract for grading 1 mile of the Klaptche ridge-Sunset park highway in Mt. Rainier National Park, the completion date being September, 1931. One shovel and about 50 men are being used on the work. The contract price, $144,586, includes: roadway excavation—106,800 cu.yd. at $0.67; class 'B' excavation—34,200 cu.yd. at $1.16; structure excavation—2680 cu.yd. at $1.00; retaining walls—1060 cu.yd. at $12.50; masonry guard rail—238 cu.yd. at $20; cushion material—1400 cu.yd. at $0.70; etc.

W. H. Lynch is district engineer.

WYOMING PROJECTS FOR BUREAU OF PUBLIC ROADS

Yellowstone National Park—Morrison-Knudsen Co., Boise, Idaho, will complete top course surfacing early in 1931 on a contract for 15.9 miles of grading and surfacing of the east entrance project, extending from the east Yellowstone Park entrance to Lake Butte and crossing over Sylvan pass. Practically all of the grading (6 miles) and the base course surfacing (15.9 miles) have been completed. Equipment used on the grading work has been moved to other projects in the Park. Two crushing plants are in operation to supply

Earle McNutt Uses Three Caterpillar '60s' with Esco Scrapers for Grading Section of Roosevelt Highway Near Florence, Oregon; Day and Night Operation

45,000 cu.yd. of surfacing material. The grading involved 140,000 cu.yd., the contract price for the project being $340,991.

Yellowstone National Park—Morrison-Knudsen Co., Boise, Idaho, will complete a contract during the fall of 1931 for 15 miles of grading and draining on the Canyon Junction-Tower Junction section of the Grand Loop highway in Yellowstone National Park, contract price $448,118. The excavation on this contract totals 363,000 cu.yd. There is also required 44 acres of clearing and 31 acres of grubbing, 3750 cu.yd. of structure excavation, 9000 cu.yd. of selected surfacing materials, 136,200 sta.yd. of overhaul, 15 miles of finishing, 13,500 mi.yd. of overhaul, 935 cu.yd. of cement rubble masonry, 1970 cu.yd. of hand-laid rock embankment, 645 cu.yd. of class 'A' concrete, etc.

Work on this project started August 9. Three camps have been established and 100 men are employed. Four shovels are in operation, supplemented by drilling and hauling equipment. There is one scraper unit consisting of two 7-yd. Le Tourneau scrapers pulled by Caterpillar '60' tractors.

Yellowstone National Park—Morrison-Knudsen Co., Boise, Idaho, has practically completed a contract for grading and drainage on 9 miles of the Norris Junction-Madison Junction section of the Grand Loop highway in Yellowstone National Park. This contract is for two pieces of about equal length, separated by 6 miles of previously graded road. The contract price is $135,410, and involves: 26 acres of clearing

and 14 acres of grubbing, 68,400 cu.yd. of roadway excavation, 25,600 cu.yd. of borrow, 101,500 sta.yd. of overhaul, 10.3 mi. of finishing, etc.

Good progress has been made, although the work on portions of the project has been complicated by the necessity for using extreme care to protect natural phenomena such as geysers and hot springs. The average crew is 100 men, two power shovels and auxiliary equipment being used.

Yellowstone National Park—Taggart Construction Co., Cody, Wyoming, began work September 2 and will complete a contract about August, 1931, for grading and surfacing section F, 4.2 miles, of the Cody-Yellowstone forest highway project on the eastern approach to Yellowstone National Park. The contract price, $88,654, involves: clearing—5 acres at $175; grubbing—1 acre at $175; roadway excavation—47,600 cu.yd. at $0.72; borrow—5000 cu.yd. at $0.40; structure excavation—950 cu.yd. at $2.50; rock surfacing—7000 cu.yd. at $2.50; hand-laid rock embankment—2700 cu.yd. at $3.00; cement rubble masonry—645 cu.yd. at $17; class 'A' concrete—225 cu.yd. at $27; etc.

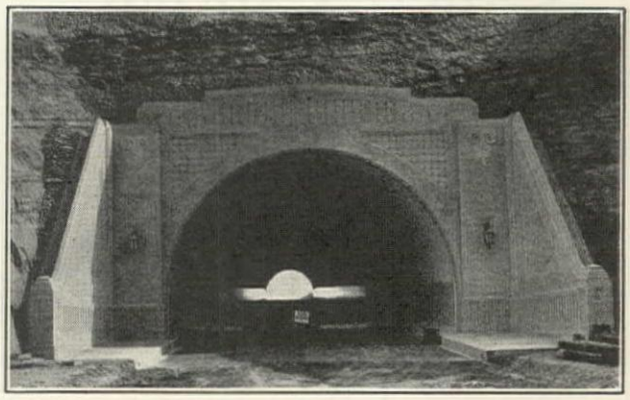
Good progress has been made, and better progress can be expected now that the heavy tourist traffic to Yellowstone has ceased and will not begin again until early in June. A crew of 30 men is employed and the equipment includes one 1¼-yd. Marion steam shovel, 10 teams with fresnoes and plows, dump trucks, etc.

A. E. Palen is acting district engineer.

CITY OF LOS ANGELES, CALIFORNIA

Sepulveda Boulevard Project—J. G. Donovan & Son, Los Angeles, completed this project and it was accepted on September 15. The boulevard project was 7.65 miles long and the roadway 54 ft. wide. The total roadway excavation was 514,978 cu.yd., excavation for ditches and channel changes 25,867 cu.yd., overhaul 1,451,781 sta.yd., and the cost $546,509, excluding engineering.

Major equipment on this contract included two 1-yd.



Completed Tunnel on Sepulveda Boulevard Project in City of Los Angeles, J. G. Donovan & Son, Contractors

type B Bucyrus-Erie steam shovels, two 1¼-yd. Bucyrus-Erie gas+air shovels, one 1¼-yd. Northwest shovel, four 8-yd. Linn truck tractors, four 3½-yd. La France-Republic trucks, one 1500-c.f.m. and one 150-c.f.m. Chicago-Pneumatic compressors, one 325-c.f.m. Ingersoll-Rand compressor, one 8 by 10 compressor.

J. J. Jessup is city engineer, H. P. Cortelyou engineer of general construction, and D. M. True office engineer for the city of Los Angeles. T. M. McDaniel is general superintendent for J. G. Donovan & Son.

RAILROAD GRADING

WESTERN PACIFIC NORTHERN CALIFORNIA EXTENSION

Good progress is being made on the 112-mile Northern California Extension of the Western Pacific Railroad from Keddie to Bieber, Utah Construction Co.-W. A. Bechtel Co., contractors. The roadbed on this 112-mile extension involves an expenditure of more than $9,800,000. For the week ending November 15, about 1000 men were employed on the work, 22 power shovels and draglines, 5 dinkies, 68 cars and dump trucks and 23 service trucks, and 17 tractors were being used, together with 47 head of stock. At that time, 50 miles of clearing and 18 miles of rough grading had been completed. (For a description of the line and work involved, see July 10th issue, p. 337.)

In the following details, crew and equipment are as of November 15 and progress on the several divisions of the general contract as of November 1.

M. P. 0 to M. P. 4—Morrison-Knudsen Co., Boise, subcontractor on sections 1 to 4 inclusive, has installed two camps and is using a crew of 184 men. Clearing started October 3 in section 3, and about 2300 lin.ft of roadbed has been rough-graded. Considerable work has been done on county road changes and on a detour between Keddie and Clear creek. Culverts have been installed in advance of grading, and construction of rubble end walls is scheduled to start. Tunnel No. 3 in section 3 has been opened up at the south portal, temporarily timbered for the concrete portal and 30 ft. of concrete lining, and the heading excavated for 80 ft. from the portal face.

Major equipment includes one 2-yd. Link-Belt, one 1½-yd. Marion, one 1¼-yd. Thew-Lorain, one 1¼-yd. Northwest, and one ½-yd. Insley shovels; one Sullivan stationary compressor; five portable compressors (Ingersoll-Rand and Sullivan); eight 5 or 4-yd. Mack dump trucks; two Chevrolet service trucks; one Caterpillar '30' tractor.

This subcontract is in residency No. 1, of which J. R. Graham is resident engineer. Dan Reardon is superintendent for Morrison-Knudsen Co.

M. P. 4 to M. P. 8—Paul J. Tyler, Oroville, subcontractor on sections 5 to 8 inclusive, has one camp in operation and is using a crew of 98 men. Clearing in section 7 was started September 15 and is about 50% completed. Grading was begun November 5 in section 7, and about 1500 lin.ft. has been rough-graded.

Major equipment includes one 2-yd. Bucyrus-Erie shovel; two Ingersoll-Rand portable compressors; two 18-ton steam dinkies; twenty-four 4-yd. Western dump cars. This subcontract is in residency No. 1. Pete Nicoletti is superintendent for Paul J. Tyler.

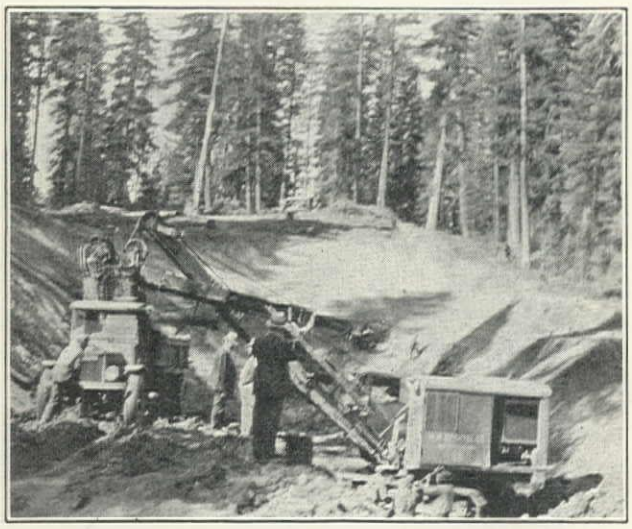
M. P. 8 to M. P. 15—Lewis Construction Co., Los

Angeles, subcontractor on sections 9 to 15 inclusive, has done no work in this territory.

Construction of a material yard north of Crescent Mills is under way by the Utah Construction Co.-W. A. Bechtel Co.

Work between mileposts 8 and 15 is in residency No. 2, of which H. V. Johnston is resident engineer.

M. P. 15 to M. P. 19—Paul J. Tyler, subcontractor on sections 16 to 19 inclusive, is operating one camp and working a crew of 86 men. Clearing and decking



W. A. Bechtel Co., Subcontractor on Northern California Extension of Western Pacific Railroad, Digging in with Northwest 1½-yd. Gas Shovel at Portal for Tunnel. Shovel Loading 5-yd. Sterling Truck

of logs is about complete, and one-half mile of the heaviest grading in this territory has been roughed out. Culverts have been placed in advance of grading, and rubble end walls are being constructed.

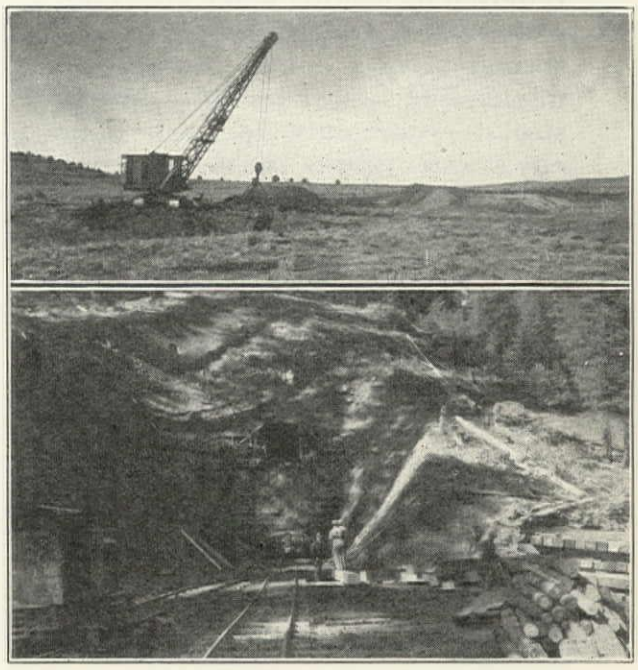
Major equipment includes one 1½-yd. Bucyrus-Erie and one 1¼-yd. Thew-Lorain shovels; one Ingersoll-Rand portable compressor; seven 5-yd. dump trucks (Sterlings, Morelands, and Whites); one Caterpillar '60' tractor. The subcontract is in residency No. 2. E. McCurdy is superintendent for Paul J. Tyler.

M. P. 19 to M. P. 23—Utah Construction Co., subcontractor on sections 20 to 23.5 inclusive, is operating one general camp in conjunction with the W. A. Bechtel Co., an adjoining subcontractor; the Utah crew numbering 127. The clearing has been practically completed and about 2½ miles rough-graded. Culverts have been installed in advance of grading and rubble end walls are being placed. The heading on the south end of Tunnel No. 7 has been driven 107 ft. and that on the north end 211 ft. Temporary timbering has been placed at each end of the tunnel for concrete portals and 30 ft. of concrete lining. Permanent timbering has been placed for 50 ft. beyond the concrete section at the south end. On tunnel No. 8, about 20 ft. of heading has been excavated at the south end.

The equipment includes one 2-yd. Link-Belt shovel, one 1¼-yd. Thew-Lorain shovel; three 5-yd. dump trucks (Sterlings, Morelands, and Macks); two Fords; one service truck; one Caterpillar '60'; two Ingersoll-Rand stationary compressors powered by 150-hp. Westinghouse motors; two 4-ton gas dinkies; five 4-yd. Western dump cars. This subcontract is in residency No. 2. Ben Earp is superintendent for the Utah Construction Co.

M. P. 23 to M. P. 25—W. A. Bechtel Co., San Francisco, subcontractor, is operating a joint camp with the Utah Construction Co. and is using a crew of 104 men on sections 23.5 to 25 inclusive. Clearing has been practically completed, and 3000 lin.ft. of the roadbed rough-graded. The Sheep creek viaduct has been eliminated and Tunnel No. 10 will be excavated as an open cut; a concrete culvert will be placed at Sheep creek. Culverts have been installed in advance of grading, and rubble end walls are being built. On Tunnel No. 9, the headings have been excavated 35 ft. at the south portal and 37 ft. at the north portal. Temporary timbering has been placed at both ends of this tunnel for concrete portals and for 30 ft. of lining; three permanent timber sets have been placed at the south portal.

Major equipment includes one 1¼-yd. Bucyrus-Erie gas+air shovel; one 1½-yd. Northwest gas shovel; four 12-yd. (struck measure) Le Tourneau chariot-type dump carts drawn by Caterpillar '60' tractors; six 5-yd. Sterling trucks; three service trucks; one Armstrong churn drill; one Sullivan angle compound stationary compressor, powered by a 125-hp. General Electric motor; nine Ingersoll-Rand S49 Jackhamers;



(Upper) W. H. Puckett Co. 1¼-yd. Osgood Dragline at M. P. 109.2, Subcontract for Northern California Extension, Western Pacific Railroad. (Lower) Utah Construction Co. Subcontract for Western Pacific Railroad. Davenport 4-ton Gas Dinkey and 4-yd. Western Dump Car at Portal of Tunnel No. 7, M. P. 21

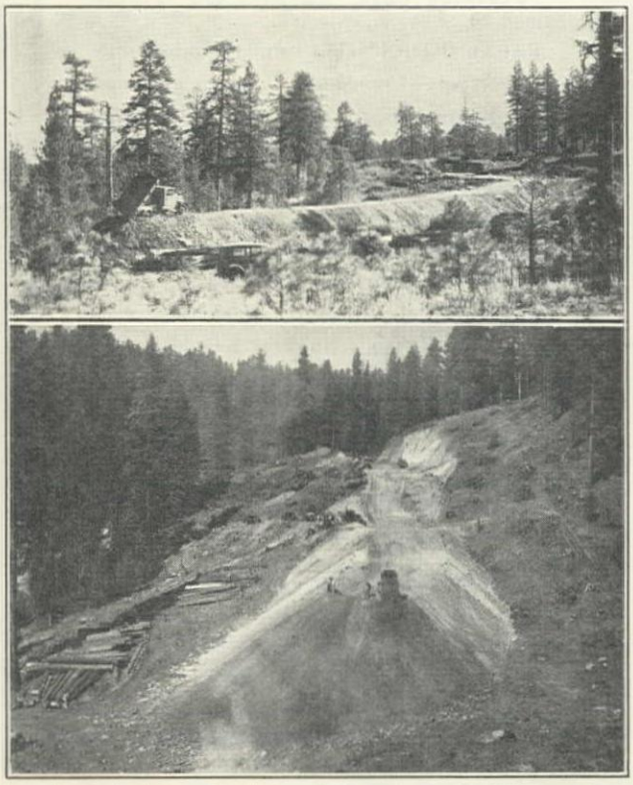
five Ingersoll-Rand No. 12 auger hammers; four Sullivan clay tools; one Sullivan slide mucking machine operating in conjunction with an Ingersoll-Rand 'Little Tugger' hoist; two 12-ton Whitcomb gas dinkies. The compressor house is operated jointly by Utah and Bechtel.

This subcontract is in residency No. 2. Justin F. Barber is superintendent for W. A. Bechtel Co.; the

work is under the personal supervision of W. A. Bechtel, Jr.

M. P. 25 to M. P. 40—Heiselt Construction Co., Salt Lake City, has one temporary camp and is using a crew of 57 men on a subcontract for sections 26 to 40 inclusive. Clearing is being done only in sections 26 and 27 and is practically complete. Grading is in progress only in sections 26 and 27; about one-half mile has been rough-graded. Culverts with rubble end walls are being placed in advance of grading.

The principal equipment includes three 1¼-yd. power shovels (P&H, Bucyrus-Erie, and Osgood);



(Upper) Fredrickson & Watson Subcontract for Western Pacific Railroad. Northwest 1¼-yd. Shovel in Distant Cut Loading 4-yd. Sterling and Fageol Trucks for Fill at M. P. 79.8. (Lower) W. A. Bechtel Co., Subcontractor, Making High Fill at M. P. 23.2

seven 4-yd. dump trucks (Mack and Coleman); two Caterpillar '60' tractors; one Ingersoll-Rand portable compressor; one blade; one bulldozer.

This subcontract is in residency No. 3, of which L. H. Jones is resident engineer. Collett is superintendent for the Heiselt Construction Co.

M. P. 40 to M. P. 78—Lewis Construction Co., subcontractor on sections 41 to 78 inclusive, is operating with 114 men from a general camp in section 60. Clearing over the entire area, excepting between mileposts 40 and 50, is about 80% complete, and grading is in progress in sections 57 to 63 inclusive. Culverts have been installed in advance of grading.

Major equipment includes one 3-yd. Bucyrus-Erie dragline; one 1¼-yd. Bucyrus-Erie steam shovel; two Ingersoll-Rand portable compressors; four 4-yd. dump trucks (Mack and Coleman); six Ford service trucks; five Caterpillar '60' and one Caterpillar '30' tractors. This subcontract is in residency No. 4 and No. 5, E. F. Stanley being resident engineer on No. 4 (No. 5 not assigned). Peary is superintendent for the Lewis Construction Co.

M. P. 78 to M. P. 96—Fredrickson & Watson, Oakland, subcontractors on sections 79 to 96 inclusive, have established a permanent camp in section 88 and are using a crew of 82 men. Clearing has been completed in sections 79 to 82 inclusive, and about one-half completed in sections 87 and 88. Grading in sections 79 and 80 is practically completed. Culverts and rubble end walls are being installed in advance of grading.

Equipment includes two 1½-yd. Northwest shovels; five 4-yd. dump trucks (Sterlings and Fageols); two Ford service trucks; three Caterpillar '60' and one Caterpillar '30' tractors; one Ateco hydraulic scraper; one Ingersoll-Rand portable compressor; etc.

This subcontract is in residency No. 6, of which S. W. Frew is resident engineer. Watson is superintendent for Fredrickson & Watson.

M. P. 96 to M. P. 112—W. H. Puckett Co., Boise, subcontractor on sections 97 to 12 inclusive, is operating three camps and using a crew of 124 men. About three-fourths of the total clearing in this territory has been completed and 4 miles rough-graded. Culverts with rubble end walls have been installed in advance of grading. The portals of tunnel No. 11 have been opened up, but no inside work done.

Merritt-Chapman & Scott Corp. Starting Work September 17 with 1¼-yd. Lima Power Shovel on 23-mile Boulder Canyon Branch Railroad. Celebration at Bracken Junction, Nevada

Major equipment includes one 2-yd. Link-Belt, one 1½-yd. P&H, and one 1¼-yd. Osgood shovels; eight 4-yd. F.W.D. dump trucks; four Chevrolet service trucks; six portable compressors (Sullivan and Ingersoll-Rand); one Caterpillar '30'; two blades; six 4-up fresnoes.

This subcontract is in residency No. 7, of which J. J. Kestley is resident engineer. Woodall is superintendent for W. H. Puckett Co.

J. W. Williams is chief engineer for the Western

Pacific Railroad Co. at San Francisco and T. L. Phillips is principal assistant engineer. R. A. Hollenbeck is construction engineer, with headquarters at Greenville.

CALIFORNIA EXTENSION FOR GREAT NORTHERN RAILROAD

A. Guthrie & Co., Inc., Portland, Oregon, began work September 1 and will complete a contract about August, 1931, for grading the 88-mile extension of the Great Northern from Klamath Falls, Oregon, to a joint yard at Bieber, California, where connection will be made with the Northern California extension of the Western Pacific Railroad Co. The expenditure for roadbed construction on the Great Northern portion of the 200-mile joint line is estimated at $3,300,000. (See July 10th issue, p. 337.)

To November 8, the following progress had been made between milepost 59.76 and milepost 87.79: clearing—100% completed; grading 26% completed; culverts—considerable work done. The status of various subcontracts is detailed below.

M. P. 59.76 to M. P. 70—Johnson Bros. are working two Ateco scrapers in a cut between sta. 3468 and 3483, one shovel in a cut between sta. 3489 and 3496, and one shovel in a borrow pit near sta. 3962 to complete a fill connecting with an adjoining subcontract. Over 5 miles of rough grade is ready for finishing on this subcontract.

M. P. 71 to M. P. 82—A. Frisk & Co. have completed a fill from side borrow between sta. 3970 and 4050 and a rock cut between sta. 4050 and 4057, using one shovel. A second shovel has completed a cut between sta. 4197 and 4201. One Ateco scraper and several trucks are being used on this subcontract.

M. P. 83 to M. P. 85.52—Hatfield & Stiles have completed a channel change for an irrigation ditch and are making grade from side borrow between sta. 4721 and 4732. These subcontractors have completed and finished a one-mile fill from sta. 4732 to the Redding-Alturas highway.

M. P. 85.52 to M. P. 87.79—Brown & Eatch have finished grading between sta. 4878 and 4900, using one shovel. Seven 4-yd. trucks, a tractor-drawn bulldozer, and team fresnoes are being used on this subcontract.

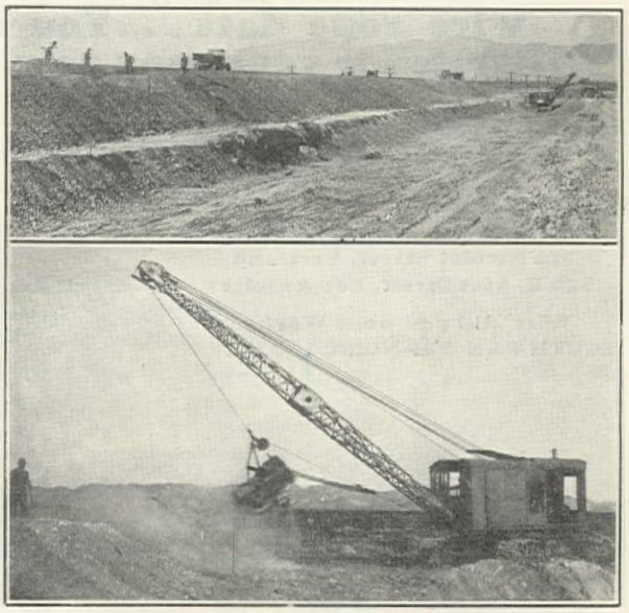
A. Pegan is the subcontractor on culverts.

J. R. W. Davis is chief engineer for the Great Northern Railway Co. at St. Paul, and Frederick Mears is assistant chief engineer at Seattle. R. H. Nicholson, locating engineer, is supervising the A. Guthrie contract from headquarters at Klamath Falls.

BRANCH RAILROAD TO BOULDER CANYON PROJECT, NEVADA

Merritt-Chapman & Scott Corp., San Pedro, California, will complete a contract about January 1 for 22.71 miles of main line on the Boulder Canyon Branch Railroad from the Los Angeles & Salt Lake (Union Pacific) at Bracken Junction, Nevada, to Summit. The contract includes 218,000 cu.yd. of common, 23,400 cu.yd. of loose rock, and 64,600 cu.yd. of solid rock excavation.

Major equipment on this project includes one 1¼-yd. Lima model 101, one 1¼-yd. Northwest, and one 1-yd. Northwest shovels; nine dump, five freight, and one service trucks; one '75' and two '35' Allis-Chalmers 'Monarch' tractors; two '60' and two '30' Caterpillar tractors; two 116-c.f.m. Rix, one 220-c.f.m. Sullivan, and one 300-c.f.m. Chicago-Pneumatic compressors; two 3½-yd. Atlas, one 4-yd., and four 2½-yd. fresnoes;



(Upper) 1¼-yd. Lima Shovel of Sullivan & Kerwin, Subcontractors, Loading Trucks in Borrow Pit at Bracken Junction, Nevada, Boulder Canyon Branch Railroad. (Lower) 1¼-yd. Northwest Dragline of Wm. Swinyer, Subcontractor, on Boulder Canyon Branch Railroad

one Adams leaning wheel grader; one piledriver outfit.

The Government will call for bids shortly for a 10½-mile extension of this branch from Summit to the Hoover damsite. Laying of the first rail on the branch railroad was celebrated at Bracken Junction on September 17 when Ray Lyman Wilbur, Secretary of the Interior, drove the first spike.

ASSOCIATION OF WESTERN STATE ENGINEERS

The Association of Western State Engineers (embracing Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming) held its third annual meeting in the House chamber of the State Capitol at Denver, Colorado, November 13 to 15.

The following committee reports were prepared for presentation at this meeting: (1) 'Delay in Publication of U.S.G.S. Data'; (2) 'Ownership of Return Flow and Its Relation to the Relative Rights of the Stream System'; (3) Stabilization of Commercial Phases of the Use of Water by Encouraging the Perfection of Laws Relating Thereto'; (4) 'Should the Federal Government Cede the Unreserved Public Lands to the States, and if So Under What Provisions'; (5) 'Flood Control and Stream Regulation'; (6) 'Proposed State Laws Governing Design and Construction of Dams'; (7) 'U. S. Reclamation Policy'; (8) 'Federal vs. State Control of Unappropriated Waters on Nonnavigable Streams, and Relations of Federal Government to States with Respect to the Control of Water Within the States'; (9) 'The Conservancy Act and Its Application to Western Reclamation Problems'.

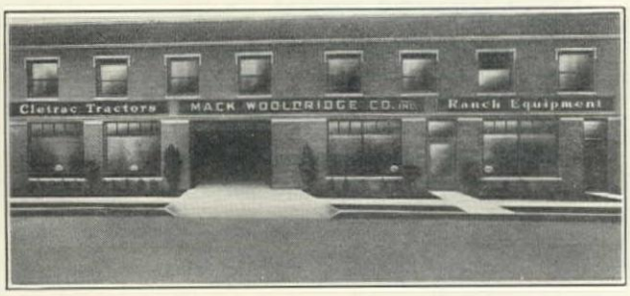
The association held its business meetings during the morning sessions on November 13 and 15, a dinner with the Colorado Section, American Society of Civil Engineers, on November 14, and a sightseeing trip on the afternoon of November 15.

New Equipment and Trade Notes

'MACK' WOOLDRIDGE EXPANDS LOS ANGELES PLANT

The Mack Wooldridge Co., Cletrac distributor in Los Angeles, with branches at Santa Maria, Goleta, Ventura, Fillmore, San Fernando, and Covina, has had such rapid and consistent growth since entering the territory in 1925 that expanded facilities at the home plant are required. Accordingly, the company has moved from 219 n. Los Angeles st. to 2114 e. 9th st. (former location of the Diamond Electric Manufacturing Co.) where all departments are housed in one of the largest and best equipped tractor plants in the west.

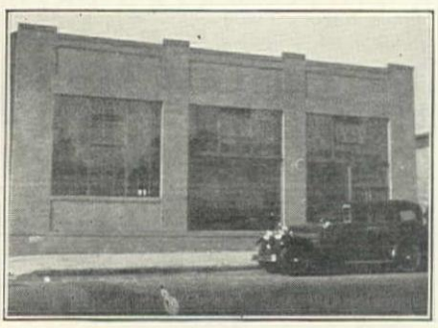
The Wooldridge organization numbers more than fifty employes. J. H. Hedge, who has had seven years' parts experience, heads the parts department at Los Angeles. Ed Mitvalsky, with eight years' experience, supervises the Los Angeles repair department. Chas. L. Cooper, who has been with 'Mack' since 1919, manages the Ventura branch, and Harry Farason, whose Cletrac experience dates to 1917, handles the Covina branch.



Wooldridge has one department producing specially built industrial and agricultural equipment, including the Wooldridge hydraulic backfiller and trailbuilder, a rose harvester, and a new pump hookup mounted on a tractor and used with a Cletrac 40 on oil-field work.

TWO GARDNER-DENVER WESTERN BRANCHES MOVE TO LARGER QUARTERS

The San Francisco branch of the Gardner-Denver Co., L. P. Young, manager, has been moved from 163 First st. to 250 Seventh st. The San Francisco branch was established in 1911. At the new headquarters, rock drills, drill sharpeners, hoists, stationary and portable air compressors, paving breakers, etc., are stocked and serviced. J. D. Lynch has been added to the sales force of the San Francisco branch to handle sales in the Bay area.



New Offices of Gardner-Denver San Francisco Branch

The Gardner-Denver Los Angeles branch recently moved to 845 e. 61st st. where, in addition to offices and warehouse space, a complete service department is available. A. H. Jones is manager of the Los Angeles branch.

STERLING ADDS 'ED' MARTIN TO SALES STAFF OF SAN FRANCISCO BRANCH

Wm. T. Sleddon, manager of the San Francisco branch of the Sterling Motor Truck Co. of California, 8th and Howard st., announces the appointment of 'Ed' Martin to his sales staff. Martin is well known in the northern California automobile industry and has held important sales positions with the Fageol, Mack, and Pierce-Arrow organizations.

Sterling sales as a whole are said to be 17% ahead of the average for the last three years, and the Pacific coast business is reported as especially good.

BACON WILL HANDLE FOUR WHEEL DRIVE

The Four Wheel Drive Auto Co., Clintonville, Wisconsin, with factory branch at 135 Tenth st., San Francisco, announces the appointment of the Edward R. Bacon Co. as distributor for their complete line of four wheel drive trucks for California.

ATLAS-IMPERIAL 110-HP. FULL-DIESEL ENGINE

The Atlas Imperial Diesel Engine Co., Oakland, California, recently delivered to the W. A. Bechtel Co. for use on a Sequoia National Park grading contract a 4-cylinder, 9 by 12-in., 110-hp. full-diesel engine. This engine is of the road builders' type and is mounted on a subbase complete with radiator and clutch for power take-off; it is being used by Bechtel mainly to operate an Ingersoll-Rand 700-c.f.m. stationary compressor at elev. 7500 ft. The engine is of dust-proof construction, is supplied with an air cleaner, and is said to have ample power to maintain the compressor at capacity operation, even at the high elevation.

McCORMICK BUYS POPE & TALBOT RETAIL LUMBER BUSINESS

The Chas. R. McCormick Lumber Co., San Francisco, has purchased the retail lumber business of Pope & Talbot, involving ten million board feet at the Third and Berry st. yard, San Francisco. The stock will later be moved to the McCormick lumber terminal at 1401 Army st., San Francisco. A stock of spars and piling will be carried at the Hunters Point boom.

NATIONAL ASSOCIATION OF PARIS TRANSIT-MIXED CONCRETE MANUFACTURERS

The members of this association, comprising more than 50 operators of Paris 'Transit Mixers' in the United States and Canada, will hold their annual convention in St. Louis, Missouri, January 9 to 12. Porter W. Yett is president and E. A. Landis is executive secretary of the association, both with headquarters at Portland, Oregon.

UNIT BID SUMMARY

Note: These unit bids are extracts from our Daily Construction News Service

STREET AND ROAD WORK

DENVER, COLORADO—GOVT.—NEW MEXICO—GRADING AND SURFACING

Award of contract recommended to Dudley & Amesbury, El Paso, Tex., who bid $166,654 to the U. S. Bureau of Public Roads, Denver, Colorado, for 13 miles grading Hondo-Mescalero Project in the Lincoln Forest, LINCOLN COUNTY, NEW MEXICO. Bids received on following main items:

(1) 136,800 cu.yd. road excav.
(2) 7,800 cu.yd. struct. excav.
(3) 74,000 sta.yd. overhaul
(4) 21,800 cu.yd. gravel or rock surfacing
(5) 1,300 cu.yd. suppl. rock or gravel
(6) 870 cu.yd. 'A' concrete
(7) 184 cu.yd. 'D' concrete
(8) 111,700 lb. reinf. steel
(9) 1,260 cu.yd. cement rubble masonry
(10) 3,520 ft. 24-in. corr. pipe
(11) 1,074 ft. 30-in. corr. pipe

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	TOTALS
Dudley & Amesbury, El Paso	.40	.40	.03	1.13	1.13	20.00	24.00	.05	13.00	2.26	2.87	$146,980
Cook & Ransom, Ottawa, Kan.	.44	1.50	.03	1.40	1.40	20.00	25.00	.05	12.00	2.25	3.00	166,654
Everly & Addison, Des Moines, New Mexico	.45	1.00	.03	1.65	1.40	22.00	23.00	.05	12.00	2.46	3.12	171,942
Skousen Bros., El Paso, Tex.	.55	1.00	.03	1.27	1.20	22.00	27.00	.05	12.50	2.55	3.25	178,433
H. C. Lallier, Denver, Colo.	.48	1.00	.03	1.50	1.50	24.00	24.00	.05	14.00	2.80	3.50	179,802
Cole Bros., Pueblo, Colo.	.50	1.00	.03	1.40	1.50	20.00	20.00	.07	15.00	2.50	3.00	181,533
Geo. W. Orr, El Paso, Tex.	.55	1.50	.03	1.25	1.00	24.00	25.00	.06	12.00	2.45	3.00	183,375
Lee Moor Contr. Co., El Paso	.63	1.00	.03	1.35	1.25	20.00	28.00	.055	10.00	2.60	3.30	187,115
J. F. Roberts & Sons, Denver	.60	1.00	.03	1.45	1.34	22.50	24.50	.06	15.00	2.46	3.98	193,924
Armstrong & Armstrong, Roswell, N. M.	.65	1.90	.03	1.40	1.30	30.00	30.00	.055	15.00	2.25	3.00	214,069
Engineer's estimate	.60	1.50	.03	1.65	1.65	25.00	30.00	.08	13.00	2.75	3.50	208,140

HELENA, MONTANA—STATE—GRADING—FLATHEAD AND LINCOLN COUNTIES

Contracts awarded as follows by the Montana State Highway Commission, Helena, Montana:

(A) FLATHEAD COUNTY—Contract awarded to Jas. Crick, Spokane, Washington, who bid $77,157 for grading 10 miles of Belton-Kalispell Road, Section B. Bids on:

(1) 189,993 cu.yd. road excav.
(2) 68,740 sta.yd. overhaul
(3) 848 ft. 24-in. corr. pipe
(4) 86 acres clearing
(5) 35 acres grubbing
(6) 110 cu.yd. 'A' concrete
(7) 34 cu.yd. 'D' concrete
(8) 10,540 lb. reinforcing steel
(9) 232 cu.yd. excavation for bridge

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	TOTALS
Jas. Crick, Spokane, Wash.	.25	.04	3.00	$125	$125	30.00	30.00	.10	4.00	$77,157
Tucker Bros. & Scott, Kalispell, Montana	.28	.025	1.90	$140	$70	26.00	26.00	.08	2.00	77,522
Clifton, Applegate & Toole	.30	.03	2.30	$80	$80	27.00	27.00	.08	2.00	77,707
Thos. Staunton, Great Falls, Montana	.30	.04	2.50	$150	$140	25.00	25.00	.08	2.00	87,777
Sam Orino, Spokane, Wash.	.34	.04	2.15	$85	$115	26.00	26.00	.10	4.00	88,038
A. R. Douglas, Kalispell, Mont.	.40	.02	2.25	$65	$65	25.00	25.00	.07	2.00	93,886
Morrison-Knudsen, Boise, Ida.	.38	.02	2.50	$75	$125	28.00	30.00	.10	2.00	94,085
L. T. Lawler, Butte, Montana	.43	.02	2.25	$100	$150	30.00	30.00	.08	4.00	107,315
Engineer's estimate	.36	.04	2.00	$90	$140	26.00	28.00	.07	3.50	92,852

(B) LINCOLN COUNTY—Contract awarded to Sutherland & Burns Const. Co., Missoula, Montana, $91,500 for 9 miles grading Styker-Roosville Highway, Section A. Bids on:

(1) 244,481 cu.yd. excav. and borrow
(2) 4,070 cu.yd. rock excav.
(3) 93,920 sta.yd. overhaul
(4) 450 cu.yd. random riprap
(5) 766 ft. 18-in. corr. pipe
(6) 396 ft. 24-in. corr. pipe
(7) 142 ft. 36-in. corr. pipe
(8) 93 acres clearing
(9) 17 acres grubbing
(10) 56 M ft. BM treated timber
(11) 36 treated timber piles, 25-ft.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	TOTALS
Sutherland & Burns	.25	.75	.025	1.50	1.50	2.50	5.50	$100	$150	$83	24.00	$ 91,500
Sam Orino, Spokane, Wash.	.27	1.00	.03	1.50	1.55	2.15	4.50	$125	$175	$95	28.00	101,353
Clifton, Applegate & Toole, Spokane, Wash.	.27	.70	.02	1.50	1.50	2.30	4.30	$130	$300	$100	20.00	101,646
Morrison-Knudsen, Boise, Ida.	.28	1.50	.02	1.50	1.75	2.50	5.00	$150	$200	$80	25.00	107,414
Jas. Crick, Spokane, Wash.	.25	1.20	.02	1.00	2.00	2.75	7.00	$200	$400	$80	23.75	107,664
E. L. Gates, Kamela, Oregon	.29	.80	.02	1.50	1.30	2.05	3.95	$214	$214	$70	25.00	111,222
L. T. Lawler, Butte, Mont.	.33	.90	.02	1.25	1.60	2.25	5.00	$100	$350	$95	35.00	116,055
Engineer's estimate	.25	1.10	.03	2.25	1.50	2.25	4.25	$125	$175	$95	28.00	97,237

GLENDALE, CALIF.—CITY—CONCRETE PAVING, SEWERS, WATER MAINS, ETC.—SAN FERNANDO ROAD

John Papac, 726 North Hill St., Los Angeles, who bid $183,683, submitted the low bid to the City of Glendale, Los Angeles County, for the improvement of San Fernando Road. Bids received on:

(1) 390,543 sq.ft. 8-in. concrete paving
(2) 212,881 sq.ft. sidewalk
(3) 25,683 sq.ft. driveway
(4) 26,264 lin.ft. Class 'B' curb
(5) 3,923 lin.ft. armored curb
(6) Water system complete
(7) Lighting system complete
(8) 9,131 lin.ft. 6-in. sewer house connection
(9) Culvert complete
(10) Storm drains, complete

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	TOTALS
John Papac, L. A.	.24	.125	.20	.455	.31	$3,350	$8,325	1.00	$3,850	$18,795	$183,683
E. L. Fleming	.2725	.134	.181	.43	1.07	3,830	7,500	.725	5,110	24,500	204,147
Griffith Co.	.25	.168	.20	.45	.80	4,000	8,000	.75	5,000	30,000	209,155
Geo. R. Curtis	.27	.15	.22	.50	1.00	4,175	8,650	1.00	5,200	24,000	213,001
Kovacevich & Price	.29	.1475	.213	.45	.90	4,625	10,200	.75	4,500	25,000	218,196
Campbell Reichert	.28	.17	.30	.55	2.00	5,000	11,400	1.10	5,000	19,700	231,216
Geo. H. Oswald	.32	.15	.22	.50	1.05	4,500	8,500	1.00	5,000	25,000	233,939
Tyron & Brain	.29	.1775	.20	.53	1.13	5,200	9,700	1.08	6,600	31,000	238,839
J. L. McClain	.31	.178	.23	.49	1.00	4,800	10,750	1.00	4,800	31,000	243,853

PHOENIX, ARIZ.—STATE—OILING AND BRIDGES—PHOENIX-YUMA ROAD

Skeels & Graham Company, 709 Consolidated Bank Bdg., Tucson, Arizona, who bid $61,769, low bid to the Arizona State Highway Commission, Phoenix, Arizona, for two bridges and 15 miles of oil processing of Phoenix-Yuma Road from Piedra east. Bids received from:

(1) Skeels & Graham, Tucson $61,769
(2) N. G. Hill & Company, Phoenix 65,549
(3) V. R. Dennis Construction Co. 65,697
(4) Packard & Tanner, Phoenix 70,094
(5) Martin Bros. Trucking Co. $71,012
(6) Schmidt & Hitchcock, Phoenix 71,453
(7) Hodgman & MacVicar, Pasadena 74,686
(8) Akmadzich & Leko, Los Angeles 76,602

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
UNIT 'A' APPROACHES								
136 cu.yd. roadway excav., unclassified	.40	.22	.30	.30	.50	.76	.40	.50
2,868 cu.yd. borrow, excavation	.20	.22	.25	.20	.40	.46	.25	.35
482 cu.yd. subgrade stabilizer	.45	.54	.80	.50	.56	.93	.75	.90
904 cu.yd.mi. subgr. stabilizer, haul	.09	.10	.07	.12	.14	.10	.16	.13
STRUCTURES OVER 20 FT. CLEAR SPAN								
913 cu.yd. structure, excavation	1.00	.90	1.00	1.50	1.00	1.60	1.00	1.00
12 cu.yd. 'AA' concrete	55.00	60.00	70.00	65.00	60.00	66.00	75.00	75.00
420 cu.yd. 'A' concrete	17.85	19.00	22.00	19.00	18.00	22.00	20.00	23.00
137 cu.yd. 'B' concrete	17.85	18.50	21.00	18.00	18.00	21.00	19.25	22.00
39,750 lb. reinforcing steel	.04	.045	.045	.05	.045	.05	.05	.045
UNIT 'B' (OIL PROCESSING)								
17,152 cu.yd. mineral aggre. surf.	.40	.60	.75	.50	.56	.53	.60	.75
76,164 cu.yd.mi. mineral aggre. haul	.09	.10	.07	.12	.14	.10	.14	.13
240,140 gallons oil	.065	.056	.0575	.063	.0575	.065	.06	.058
11.695 mi. mix, lay and finish	$500	$500	$350	$600	$550	$550	$600	$500
1,202 cu.yd. subgrade stabilizer	.45	.54	.80	.50	.56	.93	.75	.90
7,441 cu.yd.mi. subgr. stabil. haul	.09	.10	.07	.12	.14	.10	.14	.13
4,750 cu.yd. mineral aggre. surface	.40	.60	.75	.50	.56	.53	.60	.75
39,036 cu.yd.mi. mineral aggre. haul	.09	.10	.07	.12	.14	.10	.14	.13
66,500 gallons oil	.065	.056	.0575	.063	.0575	.065	.06	.058
3.239 mi. mix, lay, and finish	$500	$500	$350	$600	$550	$550	$600	$500

SACRAMENTO, CALIF.—MARIN COUNTY—STATE—GRADING AND SURFACING

Granfield, Farrar & Carlin, 65 Hoff Ave., S. F., $189,633 low to California Division of Highways for 3 miles, MARIN COUNTY, from Alto to Waldo. Bids received from the following:

(1) Granfield, Farrar & Carlin, S. F. $189,633
(2) Peninsula Paving Co., S. F. 189,725
(3) E. C. Coats, Sacramento 194,092
(4) M. J. Bevanda, Stockton 198,086
(5) H. W. Rohl, Los Angeles 197,904
(6) Fredrickson & Watson, Oakland 201,586
(7) Lewis Const. Co., L. A. 204,012
(8) Healy-Tibbitts Const. Co., S. F. 208,850
(9) R. G. LeTourneau, Stockton 217,986
(10) Geo. Pollock Co., Sacramento 223,782
(11) J. F. Knapp, Oakland $225,257
(12) O. A. Lindberg, Stockton 236,776
(13) Hemstreet & Bell, Marysville 239,635
(14) Guy F. Atkinson, Portland 253,202
(15) Skeels & Graham, Roseville 259,128
(16) W. H. Hauser, Oakland 262,724
(17) Utah Const. Co., S. F. 277,032
(18) Finnell Co., Inc. 293,557
(19) D. McDonald, Sacramento 329,875

Bids on following items:

(A) 15 sta. clearing
(B) 300,000 cu.yd. road. exc.
(C) 2,400,000 sta.yd. overh.
(D) 3,980 cu.yd. struct. exc.
(E) 18,900 tons cr. run base
(F) 7,500 tons broken stone
(G) 390 tons Emuls. asphalt
(H) 495 bbl. light fuel oil
(I) 440 yd. 'A' conc. (str.)
(J) 30,850 lb. reinf. steel
(K) 48 ft. 15-in. corr. pipe
(L) 626 ft. 18-in. corr. pipe
(M) 70 ft. 24-in. corr. pipe
(N) 48 ft. 30-in. corr. pipe
(O) 2,104 ft. 8-in. per. underdr.
(P) 11,800 ft. unt. fir piles
(Q) 198 drive piles
(R) 435 sq.ft. sheet piling
(S) 4,500 tons light riprap
(T) 3.1 miles property fence
(U) 1,222 ft. lamin. timb. gr. rail
(V) 241 guide posts, timber
(W) 161 sta. finish roadway
(X) 71 monuments

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(A)	60.00	$110	60.00	50.00	30.00	30.00	30.00	40.00	34.00	25.00	25.00	35.00	$100	50.00	70.00	$100	50.00	30.00	75.00
(B)	.28	.266	.30	.32	.30	.32	.35	.31	.32	.36	.375	.37	.35	.47	.45	.42	.475	.535	.54
(C)	.005	.005	.004	.005	.005	.005	.005	.005	.005	.005	.005	.0075	.01	.005	.005	.01	.008	.0075	.02
(D)	1.00	.90	1.00	1.00	1.00	1.00	1.00	1.50	1.00	1.00	1.00	1.50	.75	.90	1.00	2.00	1.25	2.00	1.50
(E)	1.75	1.70	1.66	1.50	1.70	1.55	1.55	2.00	2.10	1.90	1.75	1.90	1.95	1.80	2.00	1.85	2.30	1.85	1.85
(F)	2.30	2.30	2.10	2.10	2.00	2.40	2.00	2.30	2.40	2.80	2.25	2.85	2.45	2.10	2.55	2.60	3.00	2.40	2.60
(G)	22.00	22.00	22.00	21.00	23.00	24.00	20.00	20.00	22.00	20.00	22.50	20.50	23.00	23.00	23.50	21.00	23.00	23.60	25.00
(H)	2.00	1.60	2.00	2.00	2.20	1.90	1.25	1.50	2.00	2.00	2.20	2.00	1.85	2.00	1.95	1.70	1.75	2.20	2.10
(I)	20.00	20.00	24.00	19.00	25.00	18.00	20.00	23.00	22.00	20.00	22.00	25.00	22.50	28.00	23.00	20.00	20.00	25.00	25.00
(J)	.04	.05	.045	.05	.05	.04	.045	.05	.04	.07	.04	.05	.05	.05	.045	.05	.05	.0475	.05
(K)	.50	.50	.50	.50	.50	.50	.50	.45	.50	.50	.50	.50	.50	.50	.75	.45	.50	.50	.50
(L)	.50	.50	.60	.50	.50	.50	.50	.55	.60	.50	.60	.50	.50	.60	.85	.50	.60	.50	.75
(M)	.75	.50	.70	.75	1.00	.50	.50	.70	.75	.75	.70	.50	1.00	.75	1.00	.70	.80	.50	1.00
(N)	.75	.50	1.10	1.00	1.00	.50	.50	.90	1.00	1.00	.80	.75	1.00	1.00	1.25	1.00	1.00	1.00	1.50
(O)	1.50	1.50	1.40	1.50	1.20	1.30	1.25	1.15	1.25	1.50	1.25	.50	1.40	1.25	1.70	2.00	1.25	1.20	1.40
(P)	.27	.27	.30	.35	.30	.27	.10	.25	.29	.30	.25	.30	.25	.27	.29	.25	.28	.27	.29
(Q)	24.50	11.00	12.00	16.00	20.00	8.50	20.00	15.00	28.00	20.00	20.00	12.00	15.00	20.00	16.50	28.00	18.00	29.50	28.00
(R)	.30	.60	.20	.35	.50	.25	.40	.25	.18	.50	.40	.50	.25	.50	.25	.15	.30	.20	.20
(S)	.75	2.20	1.60	1.50	1.50	2.30	1.70	2.00	2.25	1.50	2.50	2.35	3.50	1.50	3.00	2.50	2.00	3.00	3.50
(T)	$400	$500	$500	$500	$500	$400	$450	$550	$475	$350	$400	$450	$500	$500	$425	$500	$475	$450	$600
(U)	.90	.95	1.00	1.00	1.00	1.00	.90	.75	1.00	1.00	1.00	.90	1.00	.75	.75	1.00	.90	1.00	2.50
(V)	2.00	3.20	2.10	3.00	2.00	2.00	1.00	2.20	2.00	2.00	3.00	2.50	2.50	3.00	2.85	1.50	2.00	3.75	1.00
(W)	4.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00	10.00	10.00	5.00	6.00	5.00	10.00	5.00	10.00	6.00	10.00	7.50
(X)	3.00	3.00	3.00	3.00	3.00	2.50	2.00	2.00	3.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00

CONSTRUCTION NEWS SUMMARY

NOTE: For additional information regarding projects in this summary refer to Daily Construction News Service, date appearing at end of each item.

LARGE WESTERN PROJECTS

(See Construction News, this issue, for details.)

WORK CONTEMPLATED

Piers, bulkhead, dredging, seawall, extension of railroad for Board of State Harbor Comm., San Francisco, $2,000,000.

Pumps, wells, reinf. conc. pipe and reservoirs, etc., for Camelback Water Conservation District, Phoenix, Ariz., $516,000.

Golden Gate Bridge over San Francisco Bay, Calif., bonds voted, $35,000,000.

Pumps, wells, concrete-lined canals, etc., for Randolph Irrigation District, Florence, Ariz., bonds voted, $624,000.

Hoover Dam, tunnels, and power house for Boulder Canyon Project, Nevada, for U. S. Bureau of Reclamation, bids to be called at once and opened about February 15.

Railroad, 10½ miles from L. A. & Salt Lake RR. to Hoover Damsite, Boulder Canyon Project, Nevada, for U. S. Bureau of Reclamation.

BIDS BEING RECEIVED

Pipe-lines, tunnels, reservoir, detritor for City of Phoenix, Ariz., $2,342,000, bids to Dec. 2.

High School (James Lick Junior) at San Francisco, bids to Dec. 3, $650,000.

Bridge over Isthmus Slough near Marshfield, Ore., for Coos County, $300,000, bids to Dec. 8.

BIDS RECEIVED

Bridge at Burrard St. for City of Vancouver, B. C., Hodgson, King, Marble, Dawson & Wade Co., Ltd., Vancouver, B. C., $1,677,047 low.

CONTRACTS AWARDED

Pipe-line to connect with East Bay Municipal Utility Dist. in Alameda County for City and County of San Francisco, to Western Pipe & Steel Co., San Francisco, $648,867.

Grading Islais Creek Industrial Yard at San Francisco, involving 450,000 cu.yd. rock excavation, for Western Pacific RR. Co., to Meyer Rosenberg, San Francisco.

Cracking plant for Associated Oil Co. at Avon, Calif., to E. B. Badger & Sons, Boston, Mass., $2,000,000.

Postoffice at Albuquerque, N. M., for U. S. Govt., to N. P. Severin Co., Chicago, $503,000.

Grading and tunnel in Yosemite Valley, California, for Bureau of Public Roads, to A. C. Goerig, Seattle, $627,224.

Grading Roosevelt Coast Highway, Siuslaw National Forest, LINCOLN COUNTY, Oregon, for Bureau of Public Roads, to Kern & Kibbe, Portland, Ore., $440,929.

STREET and ROAD WORK

WORK CONTEMPLATED

ALAMEDA, CALIF.—Plans by City Engr., protests Dec. 2, for improving Third St., involving 28,000 sq.ft. oil macadam paving, corr. culverts, etc. 11-8

HILLSBOROUGH, CALIF.—Plans by Geo. A. Kneese, City Engr., protests Dec. 2, for improving streets in Subdiv. No. 3, Brewer Drive, paving with asphalt. $30,000. 11-8

OAKLAND, CALIF.—Plans by W. N. Frickstad, City Engr., protests Dec. 4, for improving Foothill Blvd. from Park St. to Hollywood Blvd., involving 486,393 sq.ft. grading, 475,428 sq.ft. 7-9-in. concrete paving, vitr. pipe conduits, etc. 11-7

SALINAS, CALIF.—Plans by H. F. Cozzens, City Engr., protests Dec. 1, for improving Natividad St. from W. Lake St. to Menke St., involving 43,728 sq.ft. 5-in. concrete paving, etc. $10,699. 11-15

SAN DIEGO, CALIF.—Plans by E. R. Childs, Joint Dist. Engineer, Court House, San Diego, San Diego County, for the construction of the Julian-Kane Springs Road from Julian, San Diego County, to Kane Springs, Imperial County, a total distance of 51 miles, work for Joint Highway District of Imperial County and San Diego County. The first unit of this road will be 25.49 miles in length with 32-ft. roadbed, and will involve 74,000 cu.yd. roadway excavation, 128,077 sta.yd. overhaul, one pile trestle bridge 210 ft. long, two pile trestle bridges 20 ft. long, 566 cu.yd. reinf. concrete (check-walls), 630 cu.yd. rubble masonry (aprons), 72,360 lin.ft. earth dikes, 515 lin.ft. corr. pipe culverts. District is now being formed and plans and specifications have not yet been approved. 11-15

WILLOW GLEN, CALIF.—Plans by Engr., H. N. Bishop, Bank of Italy Bdg., San Jose, bids soon by City, for improving Willow St., Kotenberg and Blewett Aves., work involving 274,460 sq.ft. grading, 119,000 sq.ft. 5½-in. and 115,486 sq.ft. 4½-in. asphalt paving, concrete pipe, curbs, gutters, corr. pipe, etc. $93,000. 11-14

BOULDER CITY, NEV.—Plans by U. S. Bureau of Reclamation, bids soon, for 8 miles of highway (heavy excavation) from Boulder City to Hoover Damsite. 11-17

BIDS BEING RECEIVED

PHOENIX, ARIZ.—Bids to 2 p.m., Nov. 26, by U. S. Bureau of Public Roads, Ellis Bdg., Phoenix, Ariz., for surfacing 11.32 miles Clifton-Springerville Highway, APACHE COUNTY, involving 14,800 cu.yd. gravel or rock, etc. 11-6

PHOENIX, ARIZ.—Bids to 2 p.m., Dec. 2, by Bureau of Public Roads, Ellis Bdg., Phoenix, Ariz., involving 149,000 cu.yd. roadway excavation, 22 acres clearing, 1850 cu.yd. structure excavation, 147,000 lb. structural steel, 920 cu.yd. cement rubble masonry, reinf. conc. structures. 11-12

OAKLAND, CALIF.—Bids to 12 m., Dec. 4, by City for improving 92nd Ave. from G to Russet, involving 27,172 sq.ft. 6-in. macadam paving, reinf. conc. conduits, vitr. sewers, etc. 11-17

OAKLAND, CALIF.—Bids to 12 m., Dec. 4, by City Clerk for improving Hopkins St. from Coolidge Ave. to High St., involving 344,626 sq.ft. grading, 270,020 sq.ft. 7-in. concrete paving, vitr. pipe conduits, etc. $103,000. 11-14

MILL VALLEY, CALIF.—Bids to 8 p.m., Dec. 3, by City for improving Blithedale Ave., conc. paving, curbs, etc. $9000. 11-17

SAN FRANCISCO, CALIF.—Bids to 2:30 p.m., Dec. 3, by Board of Public Works for improving streets in Golden Gate Heights, involving 163,000 sq.ft. 6-in. waterbound macadam base and 2-in. asphalt surface, 150,000 sq.ft. 6-in. waterbound macadam base with 2-in. emulsified asphalt surf., curbs, vitr. culverts, etc. $56,000. 11-13

SEBASTOPOL, CALIF.—Bids to 7 30 p.m., Dec. 1, by City for improving Burnett St., involving 13,000 sq.ft. 5-in. concrete paving. 11-8

OGDEN, UTAH—Bids to 10 a.m., Dec. 1, by Bureau of Public Roads for 6.4 miles clearing in St. Joe National Forest, LATAH COUNTY, Idaho, involving 28 acres clearing.

SALT LAKE CITY, UTAH—Bids to 2 p.m., Nov. 24, by Utah State Road Comm. for 41.4 miles from Wendover to Knolls, TOOELE COUNTY, involving 95,000 cu.yd. gravel surfacing and 35,000 cu.yd. borrow. 11-12

OLYMPIA, WASH.—Bids to 10 a.m., December 9, by the Washington State Highway Commission, Olympia, Washington, for resurfacing about 20.5 miles of State Road No 9, end of pavement to Humptulips, in GRAYS HARBOR COUNTY, work involving 5590 cu.yd. crushed stone. 11-14

OLYMPIA, WASH.—Bids to 10 a.m., Dec. 9, by Washington State Highway Comm. for 2.8 miles KLICKITAT COUNTY from Grand Dalles to Spearfish, involving 108,850 cu.yd. excavation, etc. 11-14

BIDS RECEIVED

DENVER, COLO.—Low bids as follows by State: (1) J. H. Miller Co., Chamber of Commerce Bdg., Denver, Colo., $76,900 low for grading and gravel surfacing 6 miles from Fraser to Granby, GRAND COUNTY; (2) H. C. Lallier Const. & Engr. Co., Denver, Colo., $111,217 low for oil processing 18 miles from Stratton to Burlington, KIT CARSON COUNTY; and (3) Utah Const. Co., Ogden, Utah, $159,140 low for grading and gravel surfacing from Wolcott to Avon, EAGLE COUNTY.

SEATTLE, WASH.—N. Fiorito, Seattle, $72,755 low bid to City for Beacon Ave. extension.

CONTRACTS AWARDED

PHOENIX, ARIZ.—To Skeels & Graham Company, 709 Consolidated Bank Bdg., Tucson, Arizona, who bid $61,769 to the Arizona State Highway Commission for two bridges and 15 miles of oil processing of Phoenix-Yuma Road from Piedra east. (See Unit Bid Summary.) 11-17

ALAMEDA, CALIF.—To J. P. Holland, Inc., 1834 McKinnon Ave., San Francisco, who bid 17½¢ per yd. to City for grading Industrial Highway from west line of Webster to the last of Main St. Work involves: 13,200 cu.yd. excavation. 11-6

LOS ANGELES, CALIF.—To Chas. A. Ladeveze, 8459 Elizabeth Street, South Gate, who bid $5633 to the District Engineer, California Division of Highways, for fuel oiling 2.4 miles in LOS ANGELES COUNTY from La Canada north. 11-15

LOS ANGELES, CALIF.—To J. A. Thompson, Financial Center Bdg., L. A., $94,269 for improving streets in 68th St. and Denker Ave. Dist., grading, concrete paving, etc., for City. 11-14

LOS ANGELES, CALIF.—To A. D. Chalmers, 3051 Coolidge Avenue, Los Angeles, who bid $109,645 to the Board of Public Works, Los Angeles, for improvement of streets in Sunshine Terrace and Blue Canyon Drive Improvement District, grading, concrete paving, storm drain, sanitary sewer and water system. 11-10

MONTEREY, CALIF.—To J. L. Conner, Monterey, who bid .1489¢ per sq.ft. for concrete sidewalks on Pacific St., Polk St., and Lighthouse Ave. for City. 11-15

OAKLAND, CALIF.—To J. H. Fitzmaurice, 354 Hobart St., Oakland, $3500 for curbs, gutters and sidewalls on Harrison St. from 1st St. to 4th St. for City. 11-4

OAKLAND, CALIF.—To Granfield, Farrar & Carlin, 65 Hoff Ave., San Francisco, who bid $28,125 for grading 2 miles of Hayward-Redwood Canyon Road, near San Leandro Reservoir, for County. 11-5

PACIFIC GROVE, CALIF.—Awards as follows by City to Clark & Henery Const. Co., Chancery Bdg., S. F.: (1) For improving Lighthouse Ave. from Alder to Dennett Sts., involving 15,000 sq.ft. 4-in. asphalt paving at 19.4¢ ft., also curbs, corr. pipe, etc.; and (2) For improving Bayview, Jewel, Cedar, and Del Monte Aves., involving 90,000 sq.ft. 2-in. asphalt surface on 4-in. rock base at 16.25¢ sq.ft., also sewers, corr. pipe, etc. 11-10

REDWOOD CITY, CALIF.—To Hanrahan Co., Standard Oil Bdg., S. F., $15,075 for asphalt paving Hillside Blvd. for County. 11-10

SACRAMENTO, CALIF.—Bids received by California Division of Highways for 65 acres clearing from La Canada to Colby Canyon, LOS ANGELES COUNTY, have been rejected, work to be done by day labor. Low bid from Dan G. Munro, 1355 Quintero, Los Angeles, $18,525. 11-8

SACRAMENTO, CALIF.—To J. R. Reeves, 12th and American River, Sacramento, who bid .059¢ per sq.yd. to City for grading road at Municipal Airport, involving 146,300 sq.yd. grading. 11-7

SACRAMENTO, CALIF.—To Valley Paving & Construction Company, Visalia, who bid $22,819 to the California Division of Highways, Sacramento, for grading and concrete paving 0.2 mile near Wasco, KERN COUNTY. 11-15

SALINAS, CALIF.—To Granite Const. Co., Watsonville, $11,408 for surfacing Natividad Road for County. 11-5

SAN ANSELMO, CALIF.—To F. J. Main, Fairfax, $6112 for concrete paving Berlin Ave., Rose and Karl Ave. for City. 11-6

SAN FRANCISCO, CALIF.—Contract officially awarded to A. C. Goerig, 413 Fairview Avenue North, Seattle, Washington, who bid $627,224 for grading Section A5, Route 2, Wawona Route, and Section B2, Route 1, South Road, and tunnel construction in the Yosemite Park, work for the U. S. Bureau of Public Roads. (See Unit Bid Summary, Oct. 25th issue.) 11-12

SAN FRANCISCO, CALIF.—Awards as follows by City: (1) To Chas. L. Harney, 74 New Montgomery St., San Francisco, $7735 for improvement of portions of 26th Ave. between Ortega and Pacheco Sts.; 41st Ave. between Noriega and Ortega Sts.; Ortega St. between 43rd and 44th Aves., involving concrete curb; vit. side sewers; 6-in. concrete base with 1½-in. asph. conc. wearing surface. (2) To Municipal Construction Co., Call Bdg., San Francisco, $2250 for improvement of 44th Ave. between Moraga and Noriega Sts., involving armored concrete curb; 6-in. vit. side sewers; 2-in. asph. concrete wearing surface with 6-in. 'F' concrete base. (3) To E. J. Treacy, Call Bdg., San Francisco, $1360 for improvement of Delano Ave. and Mount Vernon Ave., involving curb; sidewalk; vitrified sewer; and 2-in. asphaltic concrete wearing surface on 6-in. 'F' concrete base. (4) To E. J. Treacy, Call Bdg., San Francisco, $1666 for improvement of the crossing of Kirkwood Ave. and Mendell St., work involving excavation; vitrified culvert; 2-in. asphaltic concrete wearing surface on 6-in. 'F' base. (5) To C. B. Eaton, who bid $4320 for improvement of Alameda St. from Potrero Ave. to York St., involving: 9600 cu.yd. excavation. (6) To G. A. Love & Sons, 395 Collingwood St., San Francisco, who bid $700 for artificial stone sidewalks on Saturn St. at Roosevelt Way, involving 5000 sq.ft. sidewalk. (7) To C. B. Eaton, 715 Ocean Ave., San Francisco, who bid $19,215 for the improvement of Cayuga Ave. from Oneida Ave. to Seneca Ave., and from Otsego Ave. to Alemany Blvd., involving grading, vitrified sewers, curbs, and paving with concrete base with asphalt surface. 11-7

SAN FRANCISCO, CALIF.—To Robt. A. Farish, 125 DeMontford, S. F., $8330 for 40,000 cu.yd. excavation for playground at Ocean Ave. and Aptos Ave. for Playground Comm. 11-14

SANTA ANA, CALIF.—To Griffith Co., Los Angeles Railway Bdg., L. A., $26,395 for asphalt paving Laguna Ave. for County. 11-14

DENVER, COLO.—Award recommended to Dudley & Amesbury, El Paso, Tex., $146,980 for grading and surfacing 13 miles of Hondo-Mascalero Project, Lincoln Forest, Lincoln County, NEW MEXICO, for Bureau of Public Roads. (See Unit Bid Summary).

JULESBURG, COLO.—To Ed Selander, Greeley, Colo., $12,035 for curbs, gutters, and sewers for City.

BOISE, IDAHO—Awards as follows by State: (1) To H. E. Reed, Twin Falls, Ida., $15,380 for furnishing gravel and rock in stockpiles north of Rogerson, TWIN FALLS COUNTY; and (2) To Dodge & Sayko, Mt. Home, Ida., $9027 for 7.4 miles rock surfacing from Mt. Home to Tollgate, ELMORE COUNTY.

HELENA, MONT.—Awards as follows by State: (1) To Charles & Sawtelle, Miles City, Mont., $59,930 for 15 miles grading Miles City-Broadus Road, CUSTER COUNTY; (2) To J. Crick, Spokane, Wash., $77,160 for 10 miles grading Kalispell-Belton Road, FLATHEAD COUNTY; (3) To Sutherland & Burns, $91,500 for 9 miles grading Stryker-Roosville Road, LINCOLN COUNTY; (4) To Goble Const. Co., $67,500 for surfacing and fencing 18 miles of Shelby-Cut Bank Road, TOOLE AND GLACIER COUNTIES; (5) To Goble Const. Co., Rapid City, South Dakota, $22,170 for surfacing and fencing 8 miles Lewiston-Grass Range Road, FERGUS COUNTY; and (6) To Basin Const. Co., Lewiston, Ida., $18,300 for 9 miles surfacing Grass Range-Jordan Road, FERGUS COUNTY.

CLOVIS, N. M.—To Zempter Const. Co., Amarillo, Tex., $67,155 for paving streets for City.

HOBBS, N. M.—To Louden, Shadden & Thrasher, Hobbs, N. M., $88,355 for paving Main St., etc., for City.

PORTLAND, ORE.—Contract officially awarded to Kern & Kibbe, 290 E. Salmon Street, Portland, Ore., $440,929 to the U. S. Bureau of Public Roads, Portland, for 4.935 miles grading Sections 5D, 5E, and 5F, Roosevelt Coast Highway, Siuslaw National Forest, LANE COUNTY, Oregon. (See Unit Bid Summary, Oct. 25th issue.) 11-12

OGDEN, UTAH—Award recommended to Ora Bundy, Ogden, Utah, $32,171 for 8 miles grading Widtsoe-Bryce Road, Powell National Forest, Garfield County, Utah, for Bureau of Public Roads.

OLYMPIA, WASH.—Awards as follows by State: (1) To John Slotte & Co., Astoria, Ore., $66,390 for 7.5 miles grading from Prosser to Grandview; (2) To Carl Nyberg, Spokane, Wash., $38,750 for 1.5 miles grading, PEND OREILLE COUNTY, McCloud Creek Revision; (3) To Sam Orino, Spokane, Wash., $34,100 for 2 miles grading at Alkali Lake, GRANT COUNTY; and (4) To Colonial Building Co., Spokane, Wash., $46,600 for 1 mile grading and surfacing from Stevenson to Nelson Creek, SKAMANIA COUNTY.

BRIDGES and CULVERTS

WORK CONTEMPLATED

SAN FRANCISCO, CALIF.—Bonds voted by the Golden Gate Bridge and Highway District, 690A Market Street, San Francisco (Phone GArfield 6047), in amount of $35,000,000 for the construction of the Golden Gate Bay Bridge from Fort Point in the Presidio of San Francisco to Lime Point in Fort Baker, Marin County. Estimated cost of the bridge and approaches is $32,815,000. The bridge proper is 6400 ft. end to end with a center span of 4200 ft., two side spans of 1100 ft. each, a 1582-ft. viaduct on the south, a 910-ft. viaduct on the north, and approaches. The total length of the main bridge between plazas is 8943 ft. The clearances are 4105 ft. horizontally between piers and 220 ft. vertically above m.h.w. at the center. The bridge will contain 75,000 tons of structural steel and the foundations and anchorages will require 110,000 cu.yd. of concrete. The towers are 740 ft. above m.h.w., with glass-enclosed observation platforms at the tops, reached by elevators. The two main steel cables will each be 7700 ft. long, weighing 43,750,000 lb. when wrapped. Each main cable will contain 27,600 individual strands, eye-bars being provided at the anchorages. The sag at the center of the span is 475 ft. Joseph B. Strauss is Chief Engineer of the Golden Gate Bridge and Highway District, and the Consulting Engineers are O. H. Ammann & Leon S. Moiseiff, of New York City, and Charles Derleth, Jr., of Berkeley. 11-5

BIDS BEING RECEIVED

SACRAMENTO, CALIF.—Bids to 2 p.m., December 3rd, by the California Division of Highways, for the construction of a steel bridge over the Western Pacific Railroad and over the North Fork of the Feather River at Pulga, in BUTTE COUNTY. Work involves: 590 cu.yd. Class 'A' concrete; 92,000 lb. reinforcing steel; 1,540,000 lb. structural steel; 35,000 lb. cast steel; 59,000 lb. structural steel (railings); 34,000 lb. cast iron (railings). 11-5

SAN DIEGO, CALIF.—Bids to Dec. 1 by City for First St. Bridge, involving 11,280 cu.yd. embankment, 520 tons structural steel, 1430 cu.yd. foundation excavation, 1480 cu.yd. concrete, etc. $155,000. T. J. Allen & R. R. Rowe, 309 G St., San Diego, are Engrs. 11-12

SANTA BARBARA, CALIF.—Bids to 10 a.m., Dec. 1, by County for reinf. conc. bridge on Patterson Ave. over San Jose Creek. 11-15

COQUILLE, ORE.—Bids to 10 a.m., December 8, by County Court of Coos County, Court House, Coquille, Oregon, for the construction of a double-leaf bascule bridge over Isthmus Slough on the Marshfield-Eastside County Road near Marshfield. Alternative bids are desired as follows: ALTERNATIVE 'A'—Consisting of 1435 lin.ft. of concrete viaduct, 113-ft. 4-in. steel deck truss, and 165-ft. double-leaf steel bascule. Work involves 5400 cu.yd. excavation, 63,500 lin.ft. piling, 6630 cu.yd. concrete, 800,000 lb. metal reinforcement, 120,000 lb. steel rail reinforcement, 452,000 lb. structural steel, 150 sq.yd. asphalt planks, 63,000 lb. machinery, 42 M f.b.m. Port Orford cedar lumber, electrical equipment, concrete hand rail, etc. ALTERNATIVE 'B'—Consisting of 1210 lin.ft. of concrete viaduct, 113-ft. 4-in. steel deck truss span, 165-ft. double-leaf bascule, and 225 lin.ft. wood trestle. Work involves 5700 cu.yd. excavation, 63,500 lin.ft. piling, 6270 cu.yd. concrete, 120,000 lb. steel railing reinforcement, 707,000 lb. metal reinforcement, 452,000 lb. structural steel, 150 sq.yd. asphalt plank, 63,000 lb. machinery, 73 M f.b.m. Port Orford cedar lumber, 225 lin.ft. trestle superstructure, electrical equipment, concrete handrail, etc. ALTERNATIVE 'C'—Consisting of 1425 lin.ft. wood trestle, 113-ft. 4-in. steel deck truss, 165-ft. double-leaf steel bascule, and 60-ft. concrete span. Work involves 6500 cu.yd. excavation, 60,500 lin.ft. piling, 4625 cu.yd. concrete, 120,000 lb. steel rail reinforcement, 182,000 lb. metal reinforcement, 452,000 lb. structural steel, 150 sq.yd. asphalt plank, 63,000 lb. machinery, 210 M f.b.m. Port Orford cedar lumber, 1425 lin.ft. trestle superstructure, electrical equipment, concrete handrail, etc. Estimated cost $300,000. 11-15

PORTLAND, ORE.—Bids to 10 a.m., Nov. 25, by Bureau of Public Roads, New Postoffice Bdg., Portland, Ore., for 5 bridges and 1 box culvert on Salmon River Highway, Siuslaw National Forest, LINCOLN COUNTY, ORE. Work involves 1265 cu.yd. structure excavation, 2300 cu.yd. approach fill, 430 cu.yd. Class 'A' concrete, 1080 cu.yd. Class 'D' concrete, 225,000 lb. reinforcing steel, 275 cu.yd. hand-laid riprap. 11-13

OLYMPIA, WASH.—Bids to 10 a.m., December 9, by the Washington State Highway Department, Olympia, Washington, for the construction of a reinforced concrete bridge 335 ft. long over Walla Walla River near Wallula, in WALLA WALLA COUNTY. Work involves one 129-ft. arch span and six girder approach spans. 11-13

BIDS RECEIVED

VANCOUVER, B. C.—Hodgson, King, Marble, Dawson & Wade Company, Ltd., Vancouver, B. C., $1,677,047 low bid to William McQueen, City Clerk, Vancouver, B. C., for the construction of the Burrard Street Bridge. Shea-Pacific Company, $1,727,282 next lowest bid. Work involves 3200 tons of structural steel, 50,000 cu.yd. concrete, 2000 tons of reinforcing steel, 18,000 sq.yd. paving. Bridge is to be 2817 ft. long and 80 ft. wide. 11-4

DENVER, COLO.—Mt. States Const. Co., Pueblo, Colo., $57,590 low for reinf. concrete overhead crossing between Florence and Portland, FREMONT COUNTY, for State.

LAMAR, COLO.—Pueblo Bridge & Const. Co., Pueblo, Colo., $36,025 low for reconstructing bridge over Arkansas River for County.

CONTRACTS AWARDED

CLOVERDALE, CALIF.—To J. E. Bentley, Cloverdale, $1657 for corr. iron and concrete culverts for City. 11-13

LOS ANGELES, CALIF.—To Byerts & Dunn, 7908 Santa Monica Blvd., Los Angeles, who bid $19,970 for constructing a reinf. conc. bridge on Pomona Blvd. across Alhambra Wash for County. 11-5

MERCED, CALIF.—To C. B. Cameron & Son, Merced, $2393 for reinf. conc. bridge over canal on 6 Mile Road for Merced Irrigation Dist. 11-5

MERCED, CALIF.—To E. K. Angle, Dos Palos, who bid $8200 to County for Bridge No. 224, a timber pile structure, on the Fremont Ford Road in Road District No. 4. Bridge is to be 400 ft. in length, consisting of creosoted douglas fir piles with untreated douglas fir pile deck. 11-12

MERCED, CALIF.—To Tom A. Wayne, Atwater, who bid $5567 for constructing bridges Nos. 218, 219, 220, 221, 222, and 223 over canals in Road District No. 3 for County. 11-12

OAKLAND, CALIF.—To V. DiZillo, 1022 53rd St., Oakland, $4200 for reinf. conc. retaining wall on Hopkins and High Sts. for City. 11-4

SACRAMENTO, CALIF.—To M. H. Slocum, 2055 Veteran Avenue, Los Angeles, who bid $25,118 to the California Division of Highways, Sacramento, for constructing four timber bridges located from 17 to 21 miles west of Wasco, KERN COUNTY. 11-15

SACRAMENTO, CALIF.—To Bodenhamer Construction Co., 4886 Mansfield Ave., San Diego, who bid $35,756 to the California Division of Highways for the construction of reinforced concrete girder bridge over Redwood Slough near Redwood City, SAN MATEO COUNTY. 11-15

SACRAMENTO, CALIF.—To Robt. E. McKee, Central Building, Los Angeles, $29,785 for reinforced concrete bridge over Atchison, Topeka & Santa Fe Railroad at Manhattan Beach, LOS ANGELES COUNTY, for California Division of Highways. 11-12

SAN LUIS OBISPO, CALIF.—To San Atas Construction Company, 992 Monterey Street, San Luis Obispo, who bid $9483 to the District Engineer, California Division of Highways, for repairing timber bridge over San Carpojo Creek, 11 miles north of San Simeon, SAN LUIS OBISPO COUNTY. 11-12

HELENA, MONT.—Awards as follows by State: (1) To L. F. Lockwood, Glasgow, Montana, $28,230 for steel and timber bridges on Miles City-Broadus Road, CUSTER COUNTY; and (2) To Macklin & Burns, Brockway, Montana, $30,075 for deck on Power River bridge.

WATER SUPPLY SYSTEMS

WORK CONTEMPLATED

SAN DIEGO, CALIF.—Plans by H. W. Jorgensen, City Engr., protests Dec. 8, for mains in City Heights, Blocks 72, 77, 99, and 105, involving 2670 ft. 6-in. 'B' cast-iron pipe and 4 hydrants. 11-14

BOULDER CITY, NEV.—Plans by U. S. Bureau of Reclamation, bids soon, for steel pipe system and steel tanks at Boulder City. 11-17

SEATTLE, WASH.—Plans by Engineers, Miller Engineering Company, Burke Building, Seattle, Washington, for 8 miles of 2-in. to 6-in. iron and steel pipe-line for Water District No. 38 located just west of Foster. $37,000. 11-4

BIDS BEING RECEIVED

PHOENIX, ARIZ.—Bids to 10 a.m., Dec. 2, by City Mgr. for water supply system improvements involving: UNIT NO. 1—Constructing supply line from intake on Verde River to new reservoir site. Bids are desired on two alternative routes as follows: Route A—20,000 lin.ft. water tunnel, largely granite and sandstone, 5½ by 7½ ft., lined where necessary, some guniting, portion unlined, also 60,750 ft. 48-in. or 45-in. pipe, 5420 ft. 54-in. or 48-in. pipe, 10,450 ft. 36-in. pipe; Route B—5500 lin.ft. tunnel, largely granite, 5½ by 7½ ft., lined where necessary, some guniting, portion unlined, also 39,930 ft. 48-in. or 45-in. pipe, 49,350 ft. 54-in. or 48-in. pipe, 16,650 ft. 36-in. pipe. Bids may be submitted on cast-iron pipe with lead caulked joints, with cement caulked joints, or Leadite or Hydrotite joints; or welded steel pipe dipped and wrapped with Pabco, McEverlast, or gunited; and centrifugally cast reinf. concrete pipe. Also junction chambers, concrete in crossings, manholes, air and vacuum valves, blowoff and gate valves. UNIT NO. 2—Constructing 20,000,000-gallon reservoir, earth embankment, concrete lined; also concrete central house and water distributing tower. Work includes 26,000 cu.yd. excavation and embankment, 85,000 cu.ft. concrete, 270 ft. 54-in. and 220 ft. 48-in. pipe, 1 54-in. Venturi meter, 1 54-in. valve, 2 48-in. valves. UNIT NO. 3—Construction of supply lines from reservoir to City limits, work involving 26,260 ft. 48-in. or 45-in. pipe, 7900 ft. 42-in. pipe, 4020 ft. 36-in. pipe, 16,023 ft. 24-in. pipe, 1 junction chamber, 2 48-in. elect. oper. valves, 2 48-in. hand oper. valves, 4 42-in. hand oper. valves, 1 36-in. elect. oper. valve, 8 24-in. hand oper. valves, 1 16-in. valve, 9 8-in. valves, 10 6-in. valves, also tees, reducers, etc. Bids may be submitted on cast-iron pipe with lead caulked joints, with cement caulked joints, or Leadite or Hydrotite joints; or welded steel pipe dipped and wrapped with Pabco, McEverlast, or gunited; or centr. cast reinf. conc. pipe; or Lock-Joint Steel Cylinder concrete pipe; or Hume steel-process centr. lined pipe. UNIT NO. 4—Construction of about 6 miles of cast-iron distribution mains in the City. Pipe to be 12-in., 8-in., and 6-in., U. S. make. Bids on: (1) Bell and spigot, Class B; (2) DeLavaud centr. cast; (3) Mono-Cast pipe; or (4) McWane pipe without pre-moulded joints. Also valves, hydrants, fittings, etc. UNIT NO. 5—Detritor (sand and silt remover on incoming line just below intake). Work involves one 60-ft. Dorr detritor (basin) with 77-ft. by 71-ft. concrete floor, steel frame roof, and galvanized iron cover. C. C. Kennedy, Call Bdg., S. F., is Engr. Bonds voted and sold, $2,342,000.

BEVERLY HILLS, CALIF.—Bids to 8 p.m., Dec. 2, by City for: (1) Deep well turbine pump; and (2) Water treatment plant. 11-17

SAN DIEGO, CALIF.—Bids to 11 a.m., Nov. 28, by Public Works Office, foot of Broadway, San Diego, for 6-in. cast-iron main, meters, hydrant, and valves at Naval Operating Base Hospital.

BIDS RECEIVED

SANTA CRUZ, CALIF.—California Corr. Culv. Co., Berkeley, $2.22 ft. low for 10,000 ft. 20-in. welded steel pipe for City. 11-17

CONTRACTS AWARDED

ANTIOCH, CALIF.—To P. L. Burr, 320 Market St., S. F., $3033 for furnishing and installing cast-iron mains, valves, and hydrants on B St. from 6th to 10th Sts. for City. 11-12

BEVERLY HILLS, CALIF.—To T. G. Lewis, $5400 for furnishing and installing booster pumps and hydro-pneumatic pressure tanks for the City. 11-8

COALINGA, CALIF.—To Wailes-Dove-Hermiston Corp., Los Angeles, $754 for cleaning and painting tank for City. 11-6

EUREKA, CALIF.—To U. S. Pipe & Foundry Company, Monadnock Building, San Francisco, who bid $2.13 per lin.ft. (f.o.b. wharf, Eureka) to the Supt. of Public Works for furnishing to City 1800 lin.ft. of 16-in. Class 'B' cast-iron water pipe. 11-7

OAKLAND, CALIF.—To Steel Tank & Pipe Co., Berkeley, who bid $3.79 per lin.ft., total bid of $37,142, to the East Bay Municipal Utility District, for 9800 lin.ft. of 24-in. diameter ¼-in. plate electric welded sheet steel pipe for the distribution system. 11-13

SAN FRANCISCO, CALIF.—To Western Pipe & Steel Co., 444 Market Street, San Francisco, who bid $648,867, using welded steel pipe, for the construction of 12 miles of 44-in. and 36-in. pipe-line to connect with the system of the East Bay Municipal Utility District and to run from San Lorenzo to near Newark, Alameda County, work for the City and County of San Francisco. (See Unit Bid Summary, Nov. 10th issue.) 11-5

TACOMA, WASH.—To Birchfield Boiler Co., Tacoma, Wash., who bid $46,628 to the City of Tacoma for furnishing 11,459 ft. 30-in. steel pipe with Valdura covering. 11-8

SEWER CONSTRUCTION

WORK CONTEMPLATED

CARPINTERIA, CALIF.—Plans by F. L. Johnston, 23 W. Figueroa St., Santa Barbara, for vitr. pipe system for Carpinteria Sanitary District. 11-14

HILLSBOROUGH, CALIF.—Plans by City Engr., Geo. A. Kneese, and will be presented to City Dec. 2 for concrete storm sewers on Hillsborough Blvd. and Bromfield Road. $8000. 11-8

MONTEREY, CALIF.—Plans by City Engr., protests Nov. 18, for vitr. sewers on Filmore St., Grace St., and other streets. 1911-15 Acts.

SAN BERNARDINO, CALIF.—Plans by A. H. Lowe, City Engr., for sewer system in Lincoln Drive, Arrowhead Ave., etc., for City. 11-14

WESTMORELAND, CALIF.—Plans by Currie Engineering Company, Anderson Building, San Bernardino, and protests November 20 by the Westmoreland Sanitary District, Westmoreland, Imperial County, for 20,000 lin.ft. of 8-in. to 12-in. vitrified pipe. 11-14

SALT LAKE CITY, UTAH—Plans by City Engr., H. C. Jessen, for sewers in Dist. 2. $146,000.

BIDS BEING RECEIVED

MADERA, CALIF.—Bids to 8 p.m., December 1, by City for furnishing and installing a pump at the sewage disposal plant. Pump is to be 600 g.p.m. to 900 g.p.m. direct connected to electric motor. A. M. Jensen, 68 Post St., S. F., is Engr. 11-10

BIDS RECEIVED

PORTLAND, ORE.—Albert Azorr, Portland, $16,850 low bid to City for cement sewers in Hoyt St.

CONTRACTS AWARDED

BERKELEY, CALIF.—To W. J. Tobin, 527 Balfour Ave., Oakland, $4979 for vitr. sewers on Indian Rock Ave. from Circle to San Diego Road for City. 11-12

CARPINTERIA, CALIF.—To H. E. Adams, 502 East Haley St., Santa Barbara, $24,300 for vitr. and cast-iron pipe intercepting sewer for Carpinteria Sanitary Dist. 11-14

SAN FRANCISCO, CALIF.—Awards as follows by City: (1) To J. Varano, 1648 Grant Avenue, San Francisco, $21,905 for vitrified sewers on Section C of Alemany Blvd. storm drain system. (2) To L. J. Cohn, 1 DeHaro Street, San Francisco, $11,961 for Army Street Main Street from Pennsylvania Ave. to Mississippi St. reinf. concrete construction. 11-5

ST. HELENS, ORE.—To C. R. Johnson, Portland, Ore., $43,512, using concrete pipe, for sewers in West End Dist. for City.

IRRIGATION and RECLAMATION

WORK CONTEMPLATED

FLORENCE, ARIZ.—Bonds voted in amount of $624,000 by the Randolph Irrigation District, Florence, Arizona, for irrigation works for 9600 acres, plans for which have been prepared by Consulting Engineers, Scott Engineering Company, 606 Ellis Building, Phoenix, Arizona. Work involves 34 complete pumping plants and wells, 136,000 lin.ft. of gunite-lined canals and laterals, 76 turnout structures, 35 culverts. 11-15

DENVER, COLO.—Plans completed by U. S. Reclamation Service, Wilda Bdg., Denver, Colorado, forwarded to Washington, D. C., for approval, and call for bids will be issued at once for the Hoover Dam, tunnels, and power house in connection with the Boulder Canyon Project in Nevada. Work will be let in one contract and involves 1,600,000 cu.yd.

SURETY BOND AND CASUALTY INSURANCE DIRECTORY

cut in dam, 1,900,000 cu.yd. tunnel and shaft excavation, 1,200,000 cu.yd. earth and rock fill for cofferdams, 4,400,000 cu.yd. concrete in dam, tunnel lining, power house, spillway, etc., 228,000 cu.ft. grout, 190,000 lin.ft. grout and drainage holes, 5,500,000 lb. reinforcing steel, 1,900,000 lb. metal pipe and fittings, 32,500,000 lb. metal conduit (penstocks), 10,600,000 lb. struct. steel (power house, etc.), 20,000,000 lb. gates and hoists. Govt. will furnish cement, steel, metal work, valves, and hoists. DAM will be arch-gravity type, 727 ft. high above bedrock; crest length 950 ft.; crest width 45 ft.; base width 650 ft.; with two 6 by 6-ft. slide gates. FOUR DIVERSION AND POWER TUNNELS, 50 ft. diameter, total length 16,300 ft. SPILLWAY SHAFTS—Two glory-hole type spillways, 50 ft. diameter, capacity 200,000 c.f.s. POWER OUTLETS—Four 28 ft. diameter intake tower shafts and two 28-ft. tunnels and 40 needle valves, 72-in. diameter. POWER PLANT—Capacity 1,000,000 hp., involving twelve 85,000-hp. hydraulic turbines; twelve 11 by 10-ft. balanced valves; twelve 75,000-kv-a. generators with exciters; thirty-six 25,000-kv-a. 220,000-volt transformers; four 250-ton cranes, switchboard, machine shop, etc. 11-17

BIDS BEING RECEIVED

PHOENIX, ARIZ.—Bids to 10 a.m., November 18, by the Camelback Water Conservation District, 417-420 Phoenix National Bank Bdg., Phoenix, Arizona, for the purchase of $516,000 bonds of the District (in denomination of $1000 each, bearing 6% interest). Bonds were voted by the District for the construction of: eight 20-in. diameter drilled wells, to be equipped with deep well turbine pumps and motor, 150-hp. capacity; seven booster pumps from 10-hp. to 200-hp. capacity; eight miles of 11,000-volt transmission line; 100,320 lin.ft. of plain and reinforced concrete pipe, 12-in. to 24-in. diameter; 12,540 lin.ft. 10-in. and 12-in. wrapped and dipped welded steel pipe; two reservoirs of approximately 50,000 gallons capacity each. Acreage of the District is 3314. Plans have been prepared by Consulting Engineer, Reed & Baker, Fleming Building, Phoenix, Arizona. E. E. Young is Secretary of the Camelback Water Conservation District. 11-10

BIDS RECEIVED

SACRAMENTO, CALIF.—Paris Bros., 2415 Oregon St., Berkeley, low bid to U. S. Engineer's Office, Calif. Fruit Bdg., Sacramento, for levees along San Joaquin River located between 10 and 20 miles below the City of Stockton. Bids from: (1) Paris Bros., Berkeley; (2) Delta Dredging Co.; and (3) E. T. Fisher, Stockton:

	(1)	(2)	(3)
It. 24—Per yd. borrow pit	.104	.11	.15
It. 24—Per yd. bucket meas.	.104	.15	.20
It. 31—Per yd. borrow pit	.094	.11	.15
It. 31—Per yd. bucket meas.	.094	.15	.20
It. 32—Per yd. borrow pit	.094	.11	.15
It. 32—Per yd. bucket meas.	.094	.15	.20

Work involves 76,200 cu.yd. dragline embankment. 11-7

DENVER, COLO.—Bids to 2 p.m., Dec. 23, by Bureau of Reclamation for 3 needle valves, 48-in., for Owyhee Dam, Oregon. 11-17

VALE, ORE.—Bids to 10 a.m., Dec. 19, by Bureau of Reclamation, Vale, Ore., for canals from Stat. 2060-58 to 2450, involving 582,350 cu.yd. excavation, 1890 cu.yd. concrete, etc. 11-17

CONTRACTS AWARDED

PARADISE, CALIF.—To Ely & Bean, 1211 Robinson St., Oroville, $2353 for furnishing pipe, cement, sand, gravel, lumber, etc., for Paradise Irrigation Dist. 11-8

SACRAMENTO, CALIF.—To J. R. Reeves, 12th and American River, Sacramento, who bid 10¢ per cu.yd. to City for the excavation of a continuous drainage canal on the Sacramento Municipal Airport, involving 20,000 cu.yd. excavation. 11-7

RIVER and HARBOR WORK

WORK CONTEMPLATED

SAN FRANCISCO, CALIF.—Bonds voted by State of California in amount of $10,000,000 for the construction of improvements as follows to San Francisco Harbor. Work includes: 8 new piers on north side of Ferry Building; 1 large pier in China Basin; 2 bulkhead wharves in Central Basin; development work at Islais Creek, including wharves, extension of grain terminal, lengthening the seawall, dredging, etc.; extension of the Belt Railroad. Frank G. White is Harbor Engineer, State Harbor Commission, Ferry Building, San Francisco. 11-5

BIDS BEING RECEIVED

LOS ANGELES, CALIF.—Bids to 3 p.m., Dec. 3, by U. S. Engineer's Office, 731 So. Figueroa St., L. A., for repairing breakwater at Long Beach Harbor, involving 16,000 tons of stone. 11-7

SAN DIEGO, CALIF.—Bids to 9 a.m., December 1, by the Medical Officer in charge of the U. S. Quarantine Station, San Diego, for replacing dolphins and extending jetties. 11-8

SAN FRANCISCO, CALIF.—Bids to 2 p.m., Dec. 4, by State Harbor Comm. for substructure for Pier 23, to have reinf. conc. jacketed piles and reinf. conc. deck. $450,000. 11-13

BIDS RECEIVED

RICHMOND, CALIF.—Low bids as follows by U. S. Engineer's Office (1) American Dredging Co., 255 California St., S. F., who bid 31¢ per yd., low for 195,000 cu.yd. sand fill in Richmond Harbor; and (2) Olympian Dredging Co., 249 1st St., S. F., who bid .097¢ per yd., low for 94,340 cu.yd. dredging in Richmond Harbor. 11-13

SAN FRANCISCO, CALIF.—Healy-Tibbitts Const. Co., 64 Pine St., S. F., $16,308 low for repairs to Piers 1, 2, and 3 at U. S. Naval Receiving Ship, Yerba Buena Island. 11-5

CONTRACTS AWARDED

SAN FRANCISCO, CALIF.—To Healy-Tibbitts Construction Co., 64 Pine Street, San Francisco, who bid $16,308 to the Public Works Officer, Twelfth Naval District, 100 Harrison Street, San Francisco, for repairs and replacements to Piers No. 1, 2, and 3 at the U. S. Naval Receiving Ship, San Francisco Bay, at Yerba Buena Island. 11-14

RAILROAD CONSTRUCTION

WORK CONTEMPLATED

BOULDER CITY, NEV.—Plans by U. S. Bureau of Reclamation, bids soon, for 10½ miles of railroad (heavy excavation) from L. A. & Salt Lake RR. to Hoover Damsite in connection with Boulder Canyon Project. 11-17

CONTRACTS AWARDED

SAN FRANCISCO, CALIF.—To Meyer Rosenberg, 1755 San Bruno Avenue, San Francisco, by the Western Pacific Railroad Co., Mills Bdg., San Francisco, for the first unit of Islais Creek Industrial Yard Project, involving 450,000 cu.yd. unclassified excavation, mostly rock, to be removed from 6 half blocks in Islais Creek between Connecticut and Kansas Sts. 400 ft. north of Army Street and moved into areas of property owned by Western Pacific within Islais Creek Reclamation District. J. W. Williams is Chief Engineer of the Western Pacific Railroad Company and E. P. Peterson, Assistant Engineer, Room 885, Mills Building, San Francisco, is in charge of this project. 11-5

BUILDING CONSTRUCTION

WORK CONTEMPLATED

SAN FRANCISCO, CALIF.—Bonds voted by City and County of S. F. for jail in San Mateo County, to cost $885,000. 11-6

BIDS BEING RECEIVED

IONE, CALIF.—Bids to 2 p.m., Dec. 2, by State Division of Architecture, Sacramento, for brick residence at Preston School of Industry. $30,000. 11-4

SAN FRANCISCO, CALIF.—Bids to 2:30 p.m., Dec. 3, by City and County of S. F., City Hall, for concrete, stucco, terra cotta, and steel frame James Lick Junior High School on Noe and 25th. $650,000. 11-6

SAN JOSE, CALIF.—Bids to 2 p.m., Dec. 2, by State Division of Architecture, Sacramento, for reinf. conc. and brick veneer gymnasium at State Teachers College. $130,000. 11-4

SAN JOSE, CALIF.—Bids to 11 a.m., Dec. 1, by County for reinf. conc. Service building. $100,000. 11-4

BIDS RECEIVED

BERKELEY, CALIF.—Barrett & Hilp, 918 Harrison, S. F., $26,792 low bid to Regents of Univ. of Calif. for construction of 1-story brick garage and super service station, cor. Oxford St. and Berkeley Way, Berkeley. 11-15

CONTRACTS AWARDED

AGNEW, CALIF.—Awards as follows by State Architect's Office, Sacramento, for concrete Ward, Kitchen, and Steam Plant building at the Agnew State Hospital, Agnew, Santa Clara County: GENERAL CONTRACT—Awarded to J. F. Shepherd, First National Bank Bdg., Stockton, who bid $207,961; PLUMBING, HEATING, AND VENTILATING—To Hately & Hately, 1710 10th St., Sacramento, who bid $41,880; and ELECTRIC WIRING—To Roy N. Butcher, 1020 Sherwood, San Jose, who bid $7629. 11-12

AVON, CALIF.—To E. B. Badger & Sons Co., 75 Pitts Street, Boston, Massachusetts, for the construction of a reinforced concrete, structural steel, and fire-brick cracking plant, to include power plant, furnaces, steam boiler plant, re-run stills, treating plant, and steel tanks, for the Associated Oil Company (Refinery), located at Avon, Contra Costa County. $2,000,000. 11-4

HILLSBOROUGH, CALIF.—To H. T. Holsher, 325 Elm St., San Mateo, $7897 for stucco and frame fire engine house addition for City. 11-6

SAN CARLOS, CALIF.—To Moody J. Henry, 132 Bancroft, Burlingame, $11,258 to City for enlarging and remodeling the City Hall. 11-10

OPPORTUNITY PAGE

RATES: *Situations wanted, 5c per word,* MINIMUM CHARGE, *$1.00;* HELP WANTED, *no charge to Subscribers;* OFFICIAL BIDS, *15c per line;* ALL OTHERS, *$2.00 per column inch or fraction thereof*

THE BUYERS' GUIDE

Refer to advertisements for addresses of companies listed. Advertisers index on page 70

Acetylene, Dissolved
Prest-O-Lite Co., Inc., The

Acetylene Generating Apparatus
Oxweld Acetylene Co.

Air Compressors
Bacon Co., Edward R.
Gardner-Denver Co.
Ingersoll-Rand Co.
Jenison Machinery Co.
Leitch & Co.
National Brake & Electric Co.
Rix Company, Inc., The
Schramm, Inc.
Sullivan Machinery Co.
West Coast Tractor Co.

Air Compressors—Engines
Atlas Imperial Diesel Engine Co.

Asphalt
Gilmore Oil Co.
Seaside Oil Co.
Shell Oil Co.
Standard Oil Co.
Union Oil Co.

Asphalt, Emulsified
American Bitumuls Co.
Shell Oil Co.

Asphalt Plants and Equipment
Bacon Co., Edward R.
Jenison Machinery Co.
Link-Belt Co.
Spears-Wells Mchy. Co., Inc.
Standard Boiler & Steel Works
Union Tank & Pipe Co.

Asphalt Paving
Warren Bros. Roads Co.

Back Fillers
Austin Machy. Corp.
Bucyrus-Erie Co.
Caterpillar Tractor Co.
Cleveland Tractor Co., The
Harnischfeger Sales Corp.
Jenison Machinery Co.
Link-Belt Co.
Northwest Engineering Co.
Orton Crane & Shovel Co.
Robinson Tractor Co.
Spears-Wells Machy. Co., Inc.
Speeder Machinery Corp.
Thew Shovel Co., The
Universal Crane Co., The
West Coast Tractor Co.
W-K-M Company, Inc.
Worden Co., W. H.

Beams, Channels, and Angles
Pacific Coast Steel Corp.

Bins, Storage and Hopper
Bacon Co., Edward R.
Blaw-Knox Co.
Diamond Iron Works, Inc.
Heltzel Steel Form & Iron Co., The
Jenison Machinery Co.
Link-Belt Co.

Blades—Fresno and Graders
Solano Iron Works

Blasting Supplies
Giant Powder Co., Cons., The
Hercules Powder Co.

Boilers
Montague Pipe & Steel Co.
Water Works Supply Co.

Bolts, Nuts and Rods
Claussen & Co., C. G.
Kortick Mfg. Co.

Bonds (Street) Bought
W. P. Bullock

Bonds, Surety
Aetna Casualty & Surety Co.
Associated Indemnity Corp.
Commerce Casualty Co.
Consolidated Indemnity & Insurance Co.
Detroit Fidelity & Surety Co.
Fidelity & Casualty Co. of N. Y., The
Fidelity & Deposit Co. of Maryland
Glens Falls Indemnity Co.
Great American Indemnity Co.
Indemnity Insurance Co. of North America
Maryland Casualty Co.

Bonds, Surety (Continued)
Massachusetts Bonding & Insurance Co.
New Amsterdam Casualty Co.
Rolph, James Jr., Landis & Ellis

Brick, Common
Gladding Bros. Mfg. Co.

Buckets, Elevator and Conveyor
Bacon Co., Edward R.
Industrial Brownhoist Corp.
Jenison Machinery Co.
Lakewood Engr. Co.
Link-Belt Co.

Buckets, Dredging
Haiss Mfg. Co., Geo.
Harnischfeger Sales Corp.
Owen Bucket Co.

Buckets, Excavating
Bacon Co., Edward R.
Bucyrus-Erie Co.
Haiss Mfg. Co., Geo.
Harnischfeger Sales Corp.
Industrial Brownhoist Corp.
Jenison Machinery Co.
Marion Steam Shovel Co.
Orton Crane & Shovel Co.
Owen Bucket Co.
Taylor & George
Williams Co., G. H.
Worden Co., W. H.

Buckets, Rehandling
Industrial Brownhoist Corp.
Jenison Machinery Co.
Lakewood Engr. Co.
Orton Crane & Shovel Co.
Owen Bucket Co.

Cableways
American Steel & Wire Co.
Bacon Co., Edward R.
Jenison Machinery Co.
Leschen & Sons Rope Co., A.
Worden Co., W. H.
Young Machy. Co., A. L.

Carbide
Union Carbide Sales Co., The

Cars, Industrial
Bacon Co., Edward R.
Jenison Machinery Co.
Lakewood Engr. Co.

Carts, Concrete
Bacon Co., Edward R.
Harron, Rickard & McCone Co.
Jenison Machinery Co.
Lakewood Engr. Co.
Ransome Concrete Machinery Co.

Castings, Iron and Steel
American Cast Iron Pipe Co.
Link-Belt Co.
U. S. Cast Iron Pipe & Fdy. Co.

Castings, Street and Sewer
U. S. Cast Iron Pipe & Fdy. Co.

Cement
Portland Cement Association

Chemicals
California Filter Co., Inc.
Great Western Electro-Chemical Co.

Chlorinators
California Filter Co., Inc.
Wallace & Tiernan
Water Works Supply Co.

Chlorine
Great Western Electro-Chemical Co.

Chutes, Concrete
Bacon Co., Edward R.
Haiss Mfg. Co., Geo.
Jenison Machinery Co.
Lakewood Engr. Co.
Ransome Concrete Machinery Co.

Clarifiers, Water
Dorr Co., The
Wallace & Tiernan Co.

Clay Products
Gladding, McBean & Co.
Pacific Clay Products Co.

Concrete Buckets
Jenison Machinery Co.
Young Machy. Co., A. L.

Concrete Curing
Concrete Curing Co.
Inertol Company, Inc.
McEverlast, Inc.

Concrete Forms
Bacon Co., Edw. R.
Blaw-Knox Co.

Concrete Roads
Portland Cement Association

Conveyors, Portable

Conveyors, Elevating and Conveying
Bacon Co., Edward R.
Bodinson Mfg. Co.
Jenison Machinery Co.
Link-Belt Co.

Cranes, Electric, Gasoline Locomotive
American Hoist & Derrick Co.
Austin Machy. Corp.
Bacon Co., Edward R.
Bucyrus-Erie Co.
Harnischfeger Sales Corp.
Harron, Rickard & McCone Co.
Industrial Brownhoist Corp.
Jenison Machinery Co.
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Ohio Power Shovel Co., The
Orton Crane & Shovel Co.
Speeder Machinery Corp.
Thew Shovel Co., The
Universal Crane Co., The
W-K-M Company, Inc.

Cranes, Tractor
Harnischfeger Sales Corp.
West Coast Tractor Co.

Cranes, Traveling
Harnischfeger Sales Corp.
Jenison Machinery Co.
Thew Shovel Co., The

Crushers
Austin Western Road Machy. Co., The
Bacon Co., Edward R.
Diamond Iron Works, Inc.
Guest Crushing Machines, Inc.
Jenison Machinery Co.
Smith Engineering Works
W-K-M Company, Inc.
Young Machy. Co., A. L.

Crushers—Engines
Atlas Imperial Diesel Engine Co.

Culverts, Concrete
Portland Cement Association

Culverts, Metal
California Corrugated Culvert Co.
U. S. Cast Iron Pipe & Fdy. Co
Western Pipe & Steel Co.

Culverts, Part Circle
California Corrugated Culvert Co.
Western Pipe & Steel Co.

Culverts, Vitrified
Gladding, McBean & Co.
Pacific Clay Products

Curing, Concrete
Concrete Curing Co.
Inertol Company, Inc.
McEverlast, Inc.

Cutting Apparatus
Jenison Machinery Co.
Diamond Iron Works, Inc.
Haiss Mfg. Co., Geo.
Oxweld Acetylene Co.
Victor Welding Equipment Co.

Cutting Edges
Solano Iron Works

Dams
Ambursen Dam Co., Inc.

Derricks
Bacon Co., Edward R.
Jenison Machinery Co.
Young Machy. Co., A. L.

Diesel Engines
Atlas Imperial Diesel Engine Co.

Ditch Machinery
Bacon Co., Edward R.
Bucyrus-Erie Co.
Cleveland Trencher Co.
Harnischfeger Sales Corp.
Industrial Brownhoist Corp.
Jenison Machinery Co.
Link-Belt Co.
Marion Steam Shovel Co.
National Equipment Corp.
Northwest Engineering Co.
Ohio Power Shovel Co., The
Orton Crane & Shovel Co.
Thew Shovel Co., The

Draglines
Austin Machy. Corp.
Bacon Co., Edward R.
Bucyrus-Erie Co.
Harnischfeger Sales Corp.
Harron, Rickard & McCone Co.
Jenison Machinery Co.
Link-Belt Co.
Marion Steam Shovel Co.
National Equipment Corp.
Northwest Engineering Co.
Ohio Power Shovel Co.
Sauerman Bros., Inc.
Spears-Wells Machy. Co.
Speeder Machinery Corp.
Thew Shovel Co., The
Universal Crane Co., The
Worden Co., W. H.
Young Machy. Co., A. L.

Dragline—Diesel Engines
Atlas Imperial Diesel Engine Co.

Drain Tile
Gladding, McBean & Co.
Gladding Bros. Mfg. Co.
Pacific Clay Products

Drills, Rock
Bacon Co., Edward R.
Gardner-Denver Co.
Ingersoll-Rand Co.
Leitch & Company
Rix Company, Inc., The
Schramm, Inc.
Sullivan Machinery Co.

Dump Cars
Bacon Co., Edward R.
Jenison Machinery Co.

Dump Wagons
Le Tourneau Mfg. Co.
West Coast Tractor Co.

Engineers
Ambursen Dam Co., Inc.
Burns-McDonnell-Smith Engr. Co.
Hunt Co., R. W.
Porter, Geo. J.

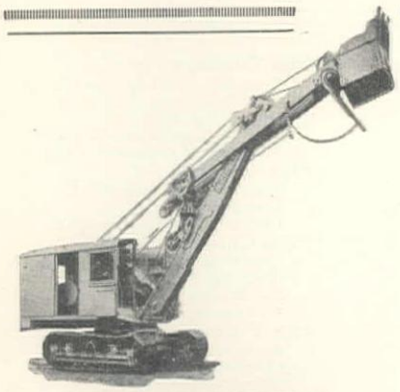
Engines, Diesel, Gasoline and Steam
Atlas Imperial Diesel Engine Co.
Bacon Co., Edward R.
Continental Motors Corp.
Hercules Motors Corp.
Ingersoll-Rand Co.
International Harvester Co.
Jenison Machinery Co.
Le Roi Co.
Novo Engine Co.

Excavating Machinery
American Tractor Equipment Co.
Austin Western Road Machy. Co., The
Bacon Co., Edward R.
Bodinson Mfg. Co.
Bucyrus-Erie Co.
Caterpillar Tractor Co.
Cleveland Tractor Co., The
Excavating Equipment Dealers, Inc.
Haiss Mfg. Co., Geo.
Harnischfeger Sales Corp.
Harron, Rickard & McCone Co.
Industrial Brownhoist Corp.
Jenison Machinery Co.
Link-Belt Co.
Marion Steam Shovel Co.

(Continued on page 66)

OPPORTUNITY PAGE

CONTINUED



SHOVELS CRANES DRAGLINES PULLSHOVELS

Factory Rebuilt with New Machine Guarantee

(1/2 to 2 cu. yd.)

We have a limited number of these machines which have been completely rebuilt in our factory and carry the same guarantee as our new equipment!

NORTHWEST ENGINEERING CO.

23 MAIN STREET, SAN FRANCISCO, CALIF.
4900 SANTA FE AVE., LOS ANGELES, CALIF.

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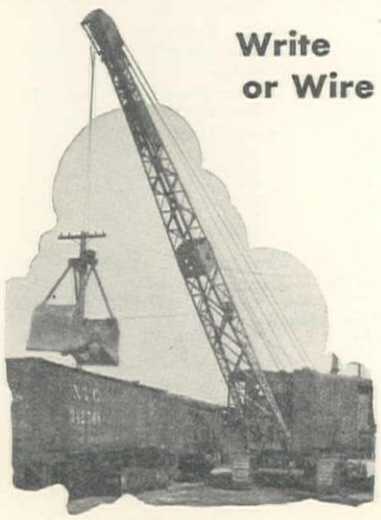
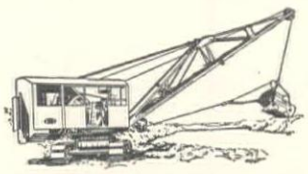


WONDERFUL BUYS IN USED



DRAGLINES :: SHOVELS :: CLAMSHELLS
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ALL SIZES DRAGLINE AND CLAMSHELL BUCKETS
EXCAVATING EQUIPMENT DEALERS, Inc.
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STORAGE SPACE FOR RENT

FORDSON TRACTOR

Equipped with
Two-Drum Hoist $450.00
West Coast Tractor Co.
San Francisco - - - California

TWO REAL BUYS

No. 4 Russell Motor Patrol with metal cab and scarifier attachment. Front wheels 32x5, rubber-tired, Timken bearings. Powered with 2-ton Caterpillar Tractor, equipped with road plates. Price, $2000.00.

One "Twenty" Caterpillar Tractor with steel sun top and road plates. Price $1000.00.

Both machines used only six months on surfacing work; are in perfect condition and will carry same guarantees as new machines. Write or wire Harry W. Boles, Hollywood, Calif., 118 N. Crescent Height Blvd.

FOR RENT OR SALE

Portable Air Compressors
Concrete-Breakers
W. H. COWEN
1114 Sutter Street Phone ORdway 0173

HELP WANTED

As listed by the Engineering Societies' Employment Service, 57 Post Street, San Francisco. Applicants will please apply direct to them.

CONSTRUCTION SUPERINTENDENT, preferably with experience in Latin-America and capable of taking charge of a hydro-electric construction project involving tunnels, dams, penstocks, power house, etc. Apply by letter with references and photo. Location, Colombia, South America. Headquarters, San Francisco. R-3388-S

ENGINEER, mechanical or electrical, not over 30 years, with 3 to 5 years' experience on hydro-electric plant operation for service and testing work. Must have mechanical skill, agreeable personality and be willing to travel. Salary about $175 mo. and expenses in the field. Apply by letter. Headquarters, San Francisco. R-3309-S.

ENGINEER for appraisal organization. Duties will include making cost studies of, and developing unit costs for detailed inventory quantities on overhead distribution and transmission. Must have had actual experience on identical work. Apply by letter stating minimum monthly salary requirements and giving information as to development unit costs for distribution and transmission on some former valuation. Location, Southeast. W-1887.

HYDRAULIC ENGINEER—Thoroughly experienced in the design of hydro-electric power plants and capable of taking responsibility for same in the field. Apply by letter with details of experience and references. Location, Colombia, South America. Headquarters, San Francisco. R-3387-S.

OFFICIAL BIDS

NOTICE TO CONTRACTORS

Sealed proposals will be received at the office of the East Bay Municipal Utility District, 512 Sixteenth street, Oakland, California, until 5:30 p.m., December 3, 1930, and will at that hour be opened for furnishing one Type N-1 "Cement Gun" or equivalent, complete with standard equipment listed on Proposal No. 261.

Specifications may be obtained at Room 21, 512 Sixteenth street, Oakland, California.

(Signed) JOHN H. KIMBALL, Secretary
Oakland, California November 20, 1930.

MADSEN ASPHALT PLANT—FOR SALE

PRACTICALY NEW, USED LESS THAN 3 MONTHS

100% Portable, on Its Own Wheels. Can be Set up in One-Half Day. Ideal for Alley, Street Repair, Oil Mix and Small Jobs. Mechanically Perfect. Can not Be Told from New. The Price Will Surprise.

W. W. ALLEN - - - - FORT BRAGG, CALIFORNIA

THE BUYERS' GUIDE—*Continued from Page 64*

Excavating Mchy.(Continued)
National Equipment Corp.
Northwest Engineering Co.
Ohio Power Shovel Co.
Orton Crane & Shovel Co.
Owen Bucket Co.
Sauerman Bros., Inc.
Shaw Excavator & Tools Co.
Speeder Machinery Corp., The
Thew Shovel Co., The
Universal Crane Co., The

Excavating Mchy.—Diesel Engines
Atlas Imperial Diesel Engine Co.

Expansion Joints
Industrial & Municipal Supply Co.
U. S. Cast Iron Pipe & Fdy. Co.
Water Works Supply Co.

Explosives
Giant Powder Co., Cons., The
Hercules Powder Co.

Equipment—Rental
Atkinson Construction Co.
Contractors Mchy. Exchange
Tieslau Bros.

Filters, Water
California Filter Co., Inc.

Fire Hydrants
Industrial & Municipal Supply Co.
Rensselaer Valve Co.
Water Works Supply Co.

Floating Roofs
Chicago Bridge & Iron Works

Flood Lights
Oxweld Acetylene Co.
Taylor & George

Flooring, Industrial
Paraffine Companies, Inc., The

Floors, Mastic
Wailes Dove-Hermiston Corp.

Flumes, Concrete
Portland Cement Association

Flumes, Metal
California Corrugated Culvert Co.
Montague Pipe & Steel Co.

Fluxes
Victor Welding Equipment Co.

Forms, Steel
Blaw-Knox Co.
Jenison Machinery Co.
Lakewood Engr. Co.

Form Ties
J. M. Willard Co.

Freight, Water
American-Hawaiian Steamship Co.

Gas Holders
Chicago Bridge & Iron Works
Western Pipe & Steel Co.

Gates, Cast-Iron
California Corrugated Culvert Co.

Gates, Radial
California Corrugated Culvert Co.

Gates, Sheet Metal
California Corrugated Culvert Co.

Governors, Steam Engine
Gardner-Denver Co.
Young Machy. Co., A. L.

Governors, Turbine
Pelton Water Wheel Co., The

Grader Blades
Solano Iron Works

Gravel Plant Equipment
Austin-Western Road Mchy. Co., The
Bacon Co., Edward R.
Bodinson Mfg. Co.
Bucyrus-Erie Co.
Diamond Iron Works, Inc.
Guest Crushing Machines, Inc.
Harnischfeger Sales Corp.
Jenison Machinery Co.
Link-Belt Co.
Smith Engineering Works
Young Mach. Co., A. L.

Hammers, Steam Pile
Bacon Co., Edward R.
Harron, Rickard & McCone Co.
Kratz & McClelland, Inc.
Union Iron Works, Inc.

Hoists, Hand and Power
Bacon Co., Edward R.
Gardner-Denver Co.
Harnischfeger Sales Corp.
Harron, Rickard & McCone Co.

Hoists, Hand, Power (Cont.)
Ingersoll-Rand Co.
Jaeger Machine Works, The
Jenison Machinery Co.
Link-Belt Co.
Novo Engine Co.
Sullivan Machinery Co.
West Coast Tractor Co.
Worden Co., W. H.
Young Machy. Co., A. L.

Hoppers, Steel
Bacon Co., Edward R.
Blaw-Knox Co.
Haiss Mfg. Co., Geo.
Jenison Machinery Co.
Lakewood Engr. Co.
Link-Belt Co.

Hose, Steam, Air and Water
Gardner-Denver Co.
Ingersoll-Rand Co.
Leitch & Co.
Rix Company, Inc., The

Hydro-Tite
Industrial & Municipal Supply Co.

Insurance, Casualty
Aetna Casualty & Surety Co.
Associated Indemnity Corp.
Commerce Casualty Co.
Consolidated Indemnity & Insurance Co.
Detroit Fidelity & Surety Co.
Fidelity & Casualty Co. of N. Y., The
Fidelity & Deposit Co. of Maryland
Glens Falls Indemnity Co.
Great American Indemnity Co.
Indemnity Insurance Co. of North America
Maryland Casualty Co.
Massachusetts Bonding & Insurance Co.
New Amsterdam Casualty Co.
Rolph, James Jr., Landis & Ellis

Iron, Plates and Sheets
American Rolling Mill Co., The

Jacks, Lifting
Jenison Machinery Co.

Kettles, Tar and Asphalt
Bacon Co., Edward R.
Montague Pipe & Steel Co.
Spears-Wells Machy. Co.
Young Machy. Co., A. L.

Leadite
Water Works Supply Co.

Loaders, Power, Truck and Wagon
Haiss Mfg. Co., Geo.
Industrial Brownhoist Corp.
Jaeger Machine Works, The
Jenison Machinery Co.
Link-Belt Co.
Spears-Wells Machy. Co.
Young Machy. Co., A. L.

Locomotives, Electric, Gas and Steam
Jenison Machinery Co.

Lumber
McCormick Lumber Co.

Metal Lath
Truscon Steel Company

Meters, Venturi
Water Works Supply Co.

Meters, Water
Industrial & Municipal Supply Co.
Neptune Meter Co.

Mixers, Chemical
Dorr Co., The

Mixers, Concrete
Bacon Co., Edward R.
Foote Company, Inc.
Garfield & Co.
Harron, Rickard & McCone Co.
Jaeger Machine Works, The
Jenison Machinery Co.
Lakewood Engr. Co.
National Equipment Corp.
Ransome Concrete Machinery Co.
Young Machy. Co., A. L.

Mixers, Plaster
Bacon Co., Edw. R.
Jaeger Machine Works, The
Jenison Machinery Co.
Young Machy. Co., A. L.

Motors, Gasoline
Continental Motors Corp.
Hercules Motors Corp.
Jenison Machinery Co.
Le Roi Co.

Oxy-Acetylene Apparatus
Oxweld Acetylene Co.

Oxygen in Cylinders
The Linde Air Products Co.

Paints, Acid Resisting
Columbia Wood and Metal Preservative Co.
Inertol Company, Inc.
Paraffine Companies, Inc., The
Wailes Dove-Hermiston Corp.

Paints, Metal Protective
Columbia Wood and Metal Preservative Co.
Inertol Company, Inc.
McEverlast, Inc.
Paraffine Companies, Inc., The
Wailes Dove-Hermiston Corp.

Paints, Technical
American Bitumuls Co.
Columbia Wood and Metal Preservative Co.
Inertol Company, Inc.
Paraffine Companies, Inc., The
Wailes Dove-Hermiston Corp.

Paints, Waterproofing
Columbia Wood and Metal Preservative Co.
Inertol Company, Inc.
McEverlast, Inc.
Paraffine Companies, Inc., The
Wailes Dove-Hermiston Corp.

Pavers, Concrete
Bacon Co., Edw. R.
Foote Company, Inc.
Harron, Rickard & McCone Co.
Kratz & McClelland, Inc.
National Equipment Corp.
Ransome Concrete Machinery Co.

Paving Breakers
Gardner-Denver Co.
Ingersoll-Rand Co.
Leitch & Co.
Rix Company, Inc., The
Schramm, Inc.
Sullivan Machinery Co.

Paving, Contractor
Warren Bros. Roads Co.

Paving Plants
Bacon Co., Edward R.
Jaeger Machine Works, The
Jenison Machinery Co.
Standard Boiler & Steel Works

Paving Tools
Bacon Co., Edward R.
Harron, Rickard & McCone Co.

Penstocks
Chicago Bridge & Iron Works
Lacy Manufacturing Co.
Pittsburgh-Des Moines Steel Co.
Water Works Supply Co.
Western Pipe & Steel Co.

Pile Drivers
Bacon Co., Edward R.
Bucyrus-Erie Co.
Harnischfeger Sales Corp.
Harron, Rickard & McCone Co.
Industrial Brownhoist Corp.
Ingersoll-Rand Co.
Jenison Machinery Co.
Kratz & McClelland, Inc.
Northwest Engineering Co.
Orton Crane & Shovel Co.
Thew Shovel Co., The
Union Iron Works, Inc.

Piles, Concrete
Raymond Concrete Pile Co.
MacArthur Concrete Pile Corp.

Piling
Pacific Coast Steel Corp.

Piling, Redwood
Union Lumber Co.

Pipe, Bell and Spigot
National Cast Iron Pipe Co.

Pipe, Cast-Iron
American Cast Iron Pipe Co.
Claussen & Co., C. G.
Industrial & Municipal Supply Co.
National Cast Iron Pipe Co.
Pacific States Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdy. Co.
Water Works Supply Co.

Pipe, Cement Lined
American Cast Iron Pipe Co.
National Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdy. Co.

Pipe, Centrifugal
National Cast Iron Pipe Co.

Pipe Clamps and Hangers
Kortick Mfg. Co.

Pipe Coatings
American Concrete Pipe Co.
Inertol Company, Inc.
McEverlast, Inc.
Paraffine Companies, Inc., The
Wailes Dove-Hermiston Corp.

Pipe, Concrete
American Concrete Pipe Co.
Lock Joint Pipe Co.
Portland Cement Association

Pipe, Culvert
California Corrugated Culvert Co.
Gladding, McBean & Co.
Pacific Clay Products
Western Pipe & Steel Company

Pipe Fittings
American Cast Iron Pipe Co.
Claussen & Co., C. G.
Industrial & Municipal Supply Co
National Cast Iron Pipe Co.
Pacific Pipe Co.
Pacific States Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdy. Co.
Weissbaum & Co., G.

Pipe, Flanged
National Cast Iron Pipe Co.

Pipe Line Machinery
Bacon Co., Edward R.
Harnischfeger Sales Corp.
Jenison Machinery Co.
W-K-M Company, Inc.

Pipe, Lock-Bar
Western Pipe & Steel Co.

Pipe, Preservative
Columbia Wood & Metal Preservative Co.

Pipe, Pressure Line
Lacy Manufacturing Co.
Lock Joint Pipe Co.
Western Pipe & Steel Co.

Pipe, Riveted Steel
Lacy Mfg. Co.
Montague Pipe & Steel Co.
Pittsburgh-Des Moines Steel Co.
Western Pipe & Steel Co.

Pipe, Sewer
Gladding, McBean & Co.
Pacific Clay Products

Pipe, Standard
Claussen & Co., C. G.
Pacific Pipe Co.

Pipe, Vitrified
Gladding Bros. Mfg. Co.
Gladding, McBean & Co.
Pacific Clay Products

Pipe, Welded Steel
California Corrugated Culvert Co.
Lacy Manufacturing Co.
Montague Pipe & Steel Co.
Steel Tank & Pipe Co.
Union Tank & Pipe Co.
Western Pipe & Steel Co.

Plows, Road
Austin-Western Road Mchy. Co., The
Bacon Co., Edward R.
Jenison Machinery Co.
Spears-Wells Machy. Co.

Pneumatic Tools
Gardner-Denver Co
Ingersoll-Rand Co.
Leitch & Co.
Schramm, Inc.

Po'es, Redwood
Union Lumber Co.

Powder
Giant Powder Co., Cons., The
Hercules Powder Co.

Power Units
Bacon Co., Edw. R.
Continental Motors Corp.
Hercules Motors Corp.
International Harvester Co.
Jenison Machinery Co.
Novo Engine Co.

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Byron Jackson Pump Mfg. Co.
Industrial & Municipal Supply Co.
Ingersoll-Rand Co.
Jaeger Machine Works, The
Pelton Water Wheel Co., The
Rix Company, Inc., The
Washington Iron Works
Woodin & Little

(Continued on page 68)

OPPORTUNITY PAGE

CONTINUED

OFFICIAL BIDS

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

Valves—Owyhee Dam—Oregon

Washington, D. C., November 4, 1930

Sealed bids (Specifications No. 516) will be received at the office of the Bureau of Reclamation, Denver, Colorado, until 2 o'clock p.m., December 23, 1930, and will at that hour be opened, for furnishing three 48-inch internal differential needle valves for Owyhee Dam, Owyhee project, Oregon. The valves will be installed by the Government. For particulars, address the Bureau of Reclamation, Owyhee, Oregon; Denver, Colorado; or Washington, D. C.

ELWOOD MEAD, Commissioner.

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

Earthwork and Structures

Washington, D. C., November 3, 1930

Sealed bids (Specifications No. 515) will be received at the office of the Bureau of Reclamation, Vale, Oregon, until 10 o'clock a.m., December 19, 1930, and then publicly opened, for furnishing labor and materials and performing all work for the construction of earthwork and structures between stations 2060+58 and 2450 of the Vale Main Canal and the Bully Creek East Bench Lateral System, Vale project, Oregon. The work is located near Vale, Oregon, on a branch of the Oregon Short Line Railroad. The principal items and the estimated quantities involved are as follows: 582,350 cubic yards of all classes of excavation; 25,000 station cubic yards of overhaul; 8400 cubic yards of backfill about structures; 1890 cubic yards of concrete; placing 118,000 pounds of reinforcement bars; laying 5590 linear feet of 12, 15, 18 and 24-inch concrete pipe; installing 20,900 pounds of gates, gate lifts, and structural steel; and erecting 22 M ft. b.m. in bridges. This invitation for bids does not cover the purchase of materials which are to be furnished by the Government. Materials to be furnished by the contractor, and those furnished by the Government are described in the specifications which will be a part of the contract. For particulars, address the Bureau of Reclamation at Vale, Oregon; Denver, Colorado; or Washington, D. C.

ELWOOD MEAD, Commissioner.

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF PUBLIC ROADS

Grading—Arizona

Standard Government Form of Invitation for Bids

Phoenix, Arizona, November 10, 1930

Sealed bids, in single copy only, subject to the conditions contained herein, will be received until 2:00 o'clock p.m. on the 2nd day of December, 1930, and then publicly opened, for furnishing all labor and materials and performing all work for the grading of Section C of Route 7, Oak Creek National Forest Highway, located in the Coconino National Forest, Coconino County, Arizona.

The length of the project to be graded is 2.818 miles and the principal items of work are approximately as follows:

Clearing, 22 acres.
Excavation unclassified, 149,000 cu.yd.
Excavation for structures, 1850 cu.yd.
Overhaul, 143,600 sta.yd.
Finishing earth graded roads, 2.818 miles.
Wood guard rail, 6000 lin.ft.
Class A concrete, 198 cu.yd.
Class D concrete, 156 cu.yd.
Reinforcing steel, 47,620 lbs.
Cement rubble masonry, 920 cu.yd.
Corrugated metal pipe, 1852 lin.ft.
Structural steel, 147,000 lbs.
Hand laid rock embankment, 940 cu.yd.

Proposals will be received from capable and responsible contractors who must submit with their request for Standard Government Form of Bid an attested statement, on forms to be supplied by the District Engineer, of their financial resources and construction experience. Standard Government Form of Bid will be supplied only to contractors showing sufficient experience and financial resources to propertly construct the work contemplated.

Where copies of plans and specifications are requested, a deposit of $10.00 will be required to insure their return. If these are not returned within 15 days after opening of bids the deposit will be forfeited to the Government. Checks should be certified and made payable to the Federal Reserve Bank of San Francisco.

Guarantee will be required with each bid as follows: In the amount of five (5) per cent of the bid.

Performance bond will be required as follows: In the amount of one hundred (100) per cent of the total contract price. Performance shall begin within ten (10) calendar days after date of receipt of notice to proceed and shall be completed within two hundred and fifty (250) calendar days from that date exclusive of any time that may intervene between the effective dates of orders of the Government to suspend operations on account of weather conditions and the effective dates of orders to resume work and subject to such extensions as may be provided for under the Special Provisions.

Liquidated damages for delay will be the amount stated in the Special Provisions for each calendar day of delay until the work is completed and accepted.

Partial payments will be made as the work progresses for work and material delivered if such work and material meet the approval of the contracting officer.

Article on patents will be made a part of the contract.

Bids must be submitted upon the Standard Government Form of Bid and the successful bidder will be required to execute the Standard Government Form of Contract for Construction.

The right is reserved, as the interest of the Government may require, to reject any and all bids, to waive any informality in bids received, and to accept or reject any items of any bid, unless such bid is qualified by specific limitation.

Envelopes containing bids must be sealed, marked, and addressed as follows:
Bid for Road Construction. To be opened 2:00 o'clock p.m., December 2, 1930.
Section C, Oak Creek Highway, Forest Highway Route No. 7, 508 Ellis Building, Phoenix, Arizona.

C. H. SWEETSER, District Engineer.

NOTICE TO CONTRACTORS

Bridge

Sealed proposals will be received at the office of the State Highway Engineer, Public Works Building, Sacramento, California, until 2 o'clock p.m. on December 3, 1930, at which time they will be publicly opened and read, for construction in accordance with the specifications therefor, to which special reference is made, of portions of State Highway, as follows:

Butte County, a steel bridge with concrete deck over the tracks of The Western Pacific Railroad Company and across North Fork of Feather River at Pulga (11-But-21-C), composed of one 349.95-foot steel arch span, one 82.14-foot plate girder span, one 79.06-foot plate girder span, two 62.51-foot plate girder spans, and one 44.02-foot plate girder span.

Proposal forms will be issued only to those contractors who have furnished a verified statement of experience and financial condition in accordance with the provisions of Chapter 644, Statutes of 1929, and whose statements so furnished are satisfactory to the Department of Public Works. Bids will not be accepted from a contractor to whom a proposal form has not been issued by the Department of Public Works.

Plans may be seen, and forms of proposal, bonds, contract and specifications may be obtained at the said office, and they may be seen at the offices of the District Engineers at Los Angeles and San Francisco, and at the office of the District Engineer of the district in which the work is situated. The District Engineers' offices are located at Eureka, Redding, Sacramento, San Francisco, San Luis Obispo, Fresno, Los Angeles, San Bernardino and Bishop.

A representative from the district office will be available to accompany prospective bidders for an inspection of the work herein contemplated, and contractors are urged to investigate the location, character and quantity of work to be done, with a representative of the Division of Highways. It is requested that arrangements for joint field inspection be made as far in advance as possible. Detailed information concerning the proposed work may be obtained from the district office.

No bid will be received unless it is made on a blank form furnished by the State Highway Engineer. The special attention of prospective bidders is called to the "Proposal Requirements and Conditions" annexed to the blank form of proposal, for full directions as to bidding, etc.

The Department of Public Works reserves the right to reject any or all bids or to accept the bid deemed for the best interests of the State.

DEPARTMENT OF PUBLIC WORKS,
DIVISION OF HIGHWAYS
C. H. PURCELL, State Highway Engineer.
Dated November 5, 1930.

SITUATIONS WANTED

POSITION WANTED by Draftsman on pipeline work and maps. Four years' experience. References can be furnished. Write H. L. Page, 32 Plaza Drive, Berkeley.

ENGINEER DESIGNER, 38, with a wide range of first-class experience, including 10 years' foreign service, covering Mine Development and Operation, Recovery and Treatment Plants, various production plants and the Steel Industry. Desire a permanent connection either as Engineer Plant Superintendent or in the Sales Field where ability, foresight and business acumen are recognized and rewarded with equitable remuneration. Employed at present. Box 505, Western Construction News.

POSITION WANTED by ditcher operator. Six years' experience on wheel and ladder-type machines. Can repair and maintain machines. Will go anywhere. Box 575, W.C.N.

SITUATION WANTED—A labor foreman, experienced, sewer construction, concrete, street, curb and gutter, walks, pipe lines, general work. Box 350AA, Route 2, Redwood City, Calif.

THE BUYERS' GUIDE—*Continued from Page 66*

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Byron Jackson Pump Mfg. Co.
Industrial & Municipal Supply Co.
Jenison Machinery Co.
Pelton Water Wheel Co., The
Pomona Pump Co.
Woodin & Little

Pumps, Dredging and Sand
Jenison Machinery Co.

Pumps, Hydraulic
Jenison Machinery Co.

Pumps, Power
Gardner-Denver Co.
Jaeger Machine Works, The

Pumps, Road
Bacon Co., Edward R.
Jaeger Machine Works, The
Jenison Machinery Co.
Novo Engine Co.
Woodin & Little

Pumps, Sewage
Dorr Co., The
Fairbanks, Morse & Co.
Industrial & Municipal Supply Co.

Pumps, Sewage Ejector
Industrial & Municipal Supply Co.

Pumps, Sludge
Dorr Co., The

Pumps, Water Works
Fairbanks, Morse & Co.
Industrial & Municipal Supply Co.
Jenison Machinery Co.
Pelton Water Wheel Co., The
Pomona Pump Co.
Washington Iron Works

Rails
Claussen & Co., C. G.

Reinforcing Bars
Pacific Coast Steel Corp.
Soulé Steel Co.

Reinforcing Wire Fabric
Soulé Steel Co.

Reservoirs, Steel
Chicago Bridge & Iron Works
Western Pipe & Steel Co.

Riveting Machines
Ingersoll-Rand Co.
Rix Company, Inc., The

Road Finishers
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Blaw-Knox Co.
Jenison Machinery Co.
Lakewood Engr. Co.

Road Forms
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Blaw-Knox Co.
Heltzel Steel Form & Iron Co.
Jenison Machinery Co.
Lakewood Engr. Co.

Road Graders and Scrapers
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Austin Western Road Machy. Co., The
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Caterpillar Tractor Co.
Jenison Machinery Co.
Jumbo Scraper Co.
Robinson Tractor Co.
Shaw Excavator & Tools Co.
Spears-Wells Machinery Co.
Taylor & George
West Coast Tractor Co.
Worden Co., W. H.
Young Machinery Co., A. L.

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Seaside Oil Co.
Shell Oil Co.
Standard Oil Co.
Union Oil Co.

Road Oil, Emulsified
American Bitumuls Co.
Shell Co.

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Roofing
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Lufkin Rule Co., The

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Water Wheels
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