

THE CONCRETE AGE

REPRESENTING THE INTERESTS OF MODERN PERMANENT CONSTRUCTION

Entered as second-class matter October 10, 1919, at the Post-office at Dalton, Ga., under the Act of Congress of March 3, 1879.

VOL. XXXIII. MONTHLY DALTON and Atlanta, DECEMBER, 1920. \$1.00 Per Year. No. 3

Adjustable Poured Block and Concrete Log Molds

Pour your block in adjustable, non-sweat, true-to-size metal molds and you'll have a dense, waterproof, flint-hard product that will sell itself. Molds make standard 8x8x16 units and 8x8 blocks of any length up to 8-ft., with air courses up and down, along the sides and around the corners, making a complete insulated air course.

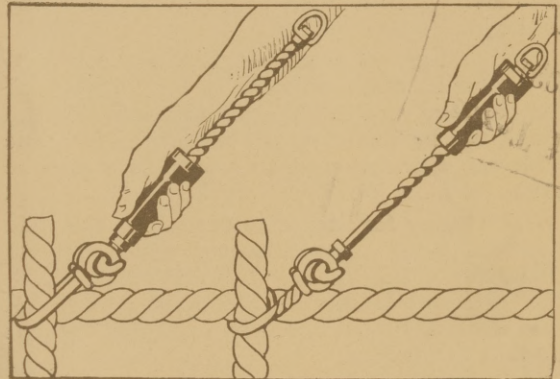
The same molds that form the standard block can be used for pouring the logs. Out in this country, houses built of concrete logs, poured in adjustable metal molds, are mighty popular.

Ask for Catalog and Exclusive Territory.

Ray County Concrete Mfg. Co.
Richmond, Mo.

FRANK CREASON, Manager.

W. A. MULLIN, Engineer.



**You Are Out of Wire.
We Have Full Stock.
Wire Ties for Reinforcing Steel.
Send In Your Orders Now.
Thousands Using Them.**

Bates Valve Bag Co.

7310 So. Chicago Ave.

CHICAGO, ILL.

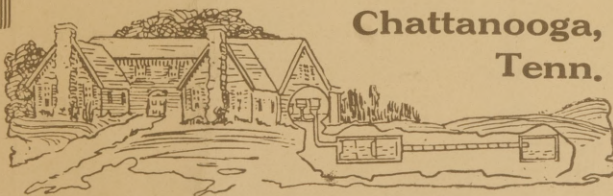
SEPTIC TANKS

Scientifically Designed for Suburban Sanitation.

Write for Circular.

E. J. NOBLETT MFG. CO.

Chattanooga,
Tenn.



Alabama Hewn Oak Timber

Trade



Mark

Reg. U. S. A

THE S. K. TAYLOR LUMBER COMPANY

MOBILE, ALA.

IRON PIPE RAILINGS

When in the market for Pipe Railing for Stairs, Bridges or Retaining Walls, send us your drawings. We can quote you prices that will be worth considering.

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SAUERMAN DRAGLINE CABLEWAY EXCAVATORS

are widely used in developing
local deposits of road gravel

The cost of road construction begins — not with the actual work on the road — but with the first move which is made to get materials ready for the job.

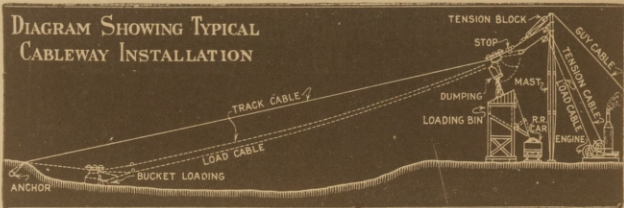
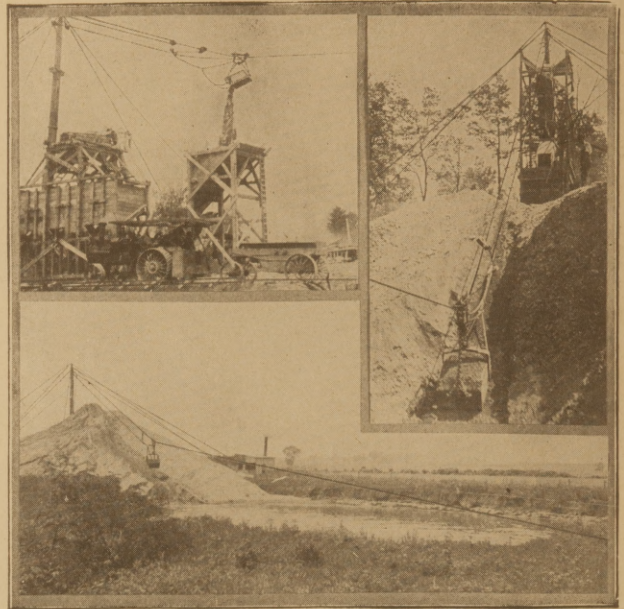
Sand and gravel producers, highway contractors and road commissioners in all parts of the country have proved the great saving which can be affected by installing the Sauerman Dragline Cableway Excavator when materials are to be rushed for a big job of road work.

Write today for literature describing the wide adaptability of this excavator which accomplishes the DIGGING, CONVEYING, ELEVATING and DUMPING of sand and gravel all in one continuous operation, and requires but one man to operate.

SAUERMAN BROS.

1136 Monarock Block, Chicago, Ill.

Cableway Excavators Cableway Accessories
Power Scrapers



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We are in a position at all times to furnish silo accessories of all descriptions for any make silo—we carry a full and complete stock on hand and can make immediate delivery from our warehouse on carload or small shipments.

Our goods are made from the best material obtainable—and are guaranteed.

Secure our inducements before placing your orders. We aim to give satisfaction. Prompt service and a square deal assured on all orders large or small.

A trial order will convince you.

If you are just beginning to manufacture or build silos—let us help you get started right—we will be more than pleased to aid you in any way possible.

We can furnish any quantity

- SILO Rods
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- Door Spreaders
- Reinforcements
- Reinforcing Steel,
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- Metal Roofs
- Cement Stave Machines,
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SMITH SILO HARDWARE CO., 11th and Market Sts. Des Moines, Iowa

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Start a Business of Your Own.

New lines, Methods and products. Concrete Marble, Granite and Sanitary Flooring, Etc.

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WAYNESBORO, PA. Lock Box 400

Here is a Glazing Composition that will



Adhere tightly to iron, steel, wood, glass, stone or concrete, make an elastic joint—tight yet definitely flexible, preventing glass from cracking.

Guaranteed to withstand heat, cold, rain or extreme climate conditions, without chipping or peeling.

KUHLS'

ELASTIC GLAZING COMPOSITIONS

is used for bedding and glazing all classes of glass construction and is unequalled for securely setting floor or wall tile. Also supplied in shades to match for pointing up stone work, terra cotta, granite, etc. Literature on application giving your nearest dealer, or make application to your own.

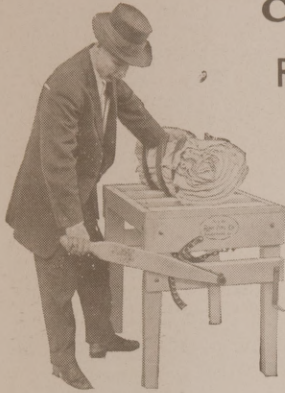


H. B. FRED KUHL'S

Sole Manufacturer

415 Third Ave. BROOKLYN, N. Y.

**Bale Your Empty
Cement Sacks
WITH A
ROWE SACK BALER**



Makes neatest, lightest bales; works fastest; takes up least space; nothing to get out or order.

Price Only
F. O. B. Galesburg. Order direct from this advertisement.

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Galesburg, Ill., U. S. A.



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The Concrete road will be giving good service when the bond issue matures—and for years thereafter. Every mile of Concrete road is a permanent link in a completed county highway system. In no other way can any county hope to complete its road-building scheme. Maintenance of existing roads of other types will soon absorb all possible revenue. Concrete roads mean no mud, no dust, low cost of maintenance and permanence.

WRITE FOR COPY OF "CONCRETE HIGHWAYS"
WE WILL SEND IT WITHOUT CHARGE

Dixie Portland Cement Company

James Building, Chattanooga, Tenn.
CONCRETE FOR PERMANENCE.



**Clean Your
Sacks
Handy Sack
Baler Co.**

and bale them up right. We do it quick and easy.

Write us.
Handy Sack Baler Co.
600 S. Second St., E.
Cedar Rapids, Iowa

**Machinery Covers
are cheap insurance**

Even though your equipment isn't laid up for long spells, it should be covered over the weekend to prevent tampering and theft of parts.

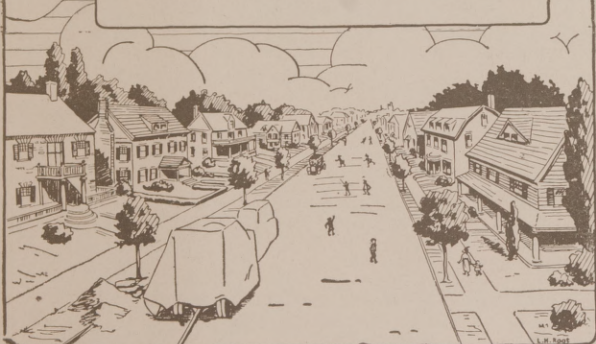
Sound construction and careful treatment give U. S. T. & A. tarpaulins long wear. They stand rough handling. Absolutely waterproof.

Estimates on plain and waterproof coverings will be cheerfully sent you.

*An ounce of covering is worth
dollars in repairs.*

**UNITED STATES TENT
& AWNING CO.**

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Buy Kramer Equipment

—and profit most from
the big 1920 Block
and Brick demand

Never have the opportunities for the Concrete Block and Brick manufacturers been so great. The man who uses Kramer Equipment can turn out a high grade product with speed. He is the fellow whose manufacturing cost will be least and his profits most.

Investigate. Prices on request.

Kramer Automatic Tamper Co.

Kelley Street, Peoria Heights
PEORIA, ILL.

Quality Higher Than the Price

The X-L All Face Down Block Machine is the only Foot Lever Machine on the market.

The X-L-All has stood the test for 16 years. Over 4,000 now in use.

The X-L-All Block Machine is made with either foot or hand lever.

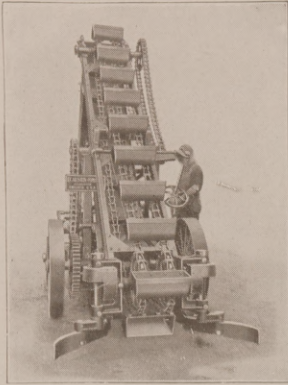
We furnish a complete outfit with each machine for making Rock or Plain face blocks.

Our Prices will surprise you. Send for Catalogue today.

BURRELL MFG. & SUPPLY HOUSE

Box Y-86 Kankakee, Ill.





AUSTIN Self-Feeding Wagon Loader

Not a so-called self-feeding loader, but a real labor saver for rapid and efficient

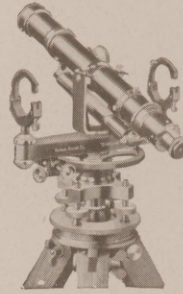
handling of material in concrete road and building construction, excavation work, quarry, storage and reclaiming plants and coal and material yards.

Note the steel feeding arms. In the view they are extended to outside radius of 6 ft. They dig into the material, gather it up and pull it into the elevator buckets. They cut a swath wide enough for the machine to pass through.

F. C. AUSTIN MACHINERY CO.

NEW YORK OFFICE
30 Church St. Railway Exchange, Chicago
Southern Sales Agents,
GRAVES MACHINERY CO., Atlanta, Ga.

No Up-to-Date Builder



can afford to be without a reliable Transit or Level. Our 1920 Model

"STERLING" CONVERTIBLE LEVEL

may cost a little more at the start, but its special features will save enough valuable time to more than repay the additional outlay. Free examination privilege. Easy payment plan.

Our Illustrated Pamphlet C contains valuable information on the selection of up-to-the-minute Leveling Equipment. Write today for your copy.

WARREN-KNIGHT CO., 136 N. Twelfth St, Philadelphia

Vest Pocket Manual of Adjustments Free.

Wet Mix Concrete Men, Attention!

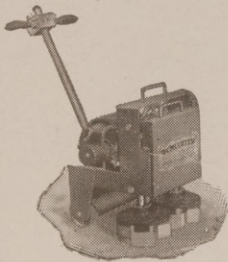
"McAdamite" is something new. Nothing like it on the market. Absolutely prevents cement from sticking to the forms and product comes out with a smooth, glossy surface, resembling the work of a trowel. Saves more than the price of other oils in labor. Gallon lots \$1.25 per gallon. Five gallons or more, \$1.00 per gallon. Money back if not satisfied.

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The IMPROVED Rapid Floor Surfer



will surface *right up to the wall or baseboard* without the use of Edge Roller. Just the machine you would want for surfacing all kinds of floors, whether old or new. Will smooth down rapidly and easily all joints or warped edges. *Perfect results guaranteed.* More than 20,000 in use.

Send for our free trial offer.

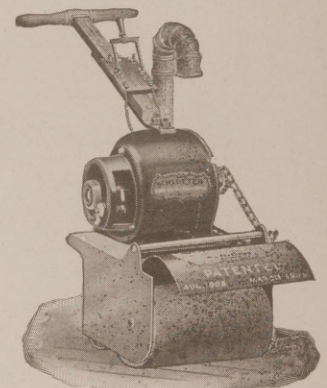
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CHICAGO, ILL.

Phone Main 2349

Several sizes. Extra 2-disc attachment can be removed making a 2-disc machine.



Made in several sizes.



Dustless—Non-Slippery—Always Serviceable—Lowest Maintenance

The use of concrete for road and street construction is increasing rapidly throughout the country.

The experience of those communities which have built concrete highways has proven beyond question that concrete not only gives the most substantial construction, but also solves the perplexing question of maintenance because

Concrete Practically Eliminates Maintenance.

With sand and gravel or crushed rock available locally throughout the South, and Portland Cement—manufactured here at home, the cost of Concrete roads is very low. Concrete roads are an INVESTMENT—not an EXPENDITURE.

Send for our Booklet, "CONCRETE HIGHWAYS." Free on request.

Standard Portland Cement Company

J. I. McCANTS, Sales Mgr.
Birmingham, Ala.
CONCRETE FOR PERMANENCE



THE building's call for protection against natural decay, damage by water, destruction by insects and wood fungi is answered best—for the building and for YOU—by

The Starks Line

OUTSIDE STAINS
SHINGLE STAINS
WOOD PRESERVATIVE

WATERPROOFING PAINT
CREOSOTE DISINFECTANT
CEMENT PUTTY

WATERPROOFING—
CONCRETE
CEMENT
BRICK
STUCCO

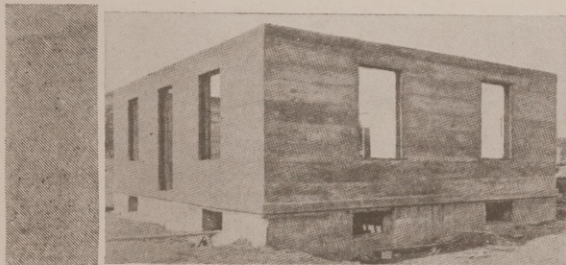
Write or Wire for Prices.

The Starks Manufacturing Co.

First & Main Sts.

Kansas City, Mo.

We Want Wide-Awake Jobbers



ACME

Hollow Wall System

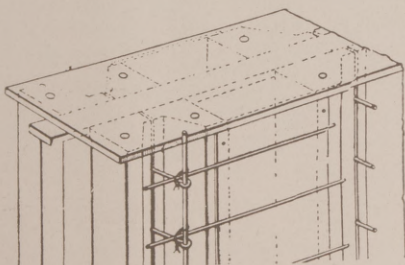


Speed and low-cost in building hollow walls—your bid low enough to get the business—high enough to make good money—and the speed gets you away to the next job in a hurry. That's how the Acme System works.

In building the one-story house (shown above) at Phillipsburg, N. J., on the Ingersoll-Rand property, 3 men erected all the form work in one day, and 5 men poured the entire walls above grade in 9 hours, carrying the concrete in buckets up a ladder.

With this system, simple wood forms are built 12 ft. high or higher. Ribs inside the airspace in the wall give strength—they act as pilasters.

Write for full details and explanation of other Acme advantages.



Acme Hollow Wall Co.,

Madera, Calif

BELMONT IRON WORKS

PHILADELPHIA NEW YORK EDDYSTONE

ENGINEERS—CONTRACTORS—EXPORTERS

STRUCTURAL STEEL

COMPLETE INDUSTRIAL BUILDINGS

MAIN OFFICE & WORKS, PHILA.,
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CABLE ADDRESS
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Code Western Union
fire letter addition.

Illustrated atalog in English, French and Spanish
mailed on request.

Complete Warehouse Stock of Structural Shapes and
Plates for Immediate Shipment.

Pipe Couplings

We will buy your couplings in any quantity,
large or small. Write us what you have.

A. & J. Manufacturing Co.

557 West Lake Street,
Chicago, Ill.

REFINEMENT IN DETAIL



NATIONAL PLASTIC RELIEF CO.
330 Main Street, CINCINNATI, OHIO

As here shown, will be found in all of our moldings and ornaments. Let us estimate on all your plastic relief and composition work. Let us lay before you more clearly the character of our work.

Multiple Oval Cores allow use of Wet Mixed Concrete

We are the originators of the core method whereby the small oval openings in block guarantee against collapse. Thus wet material can be employed. Simplest and best method for production in various lengths of block.

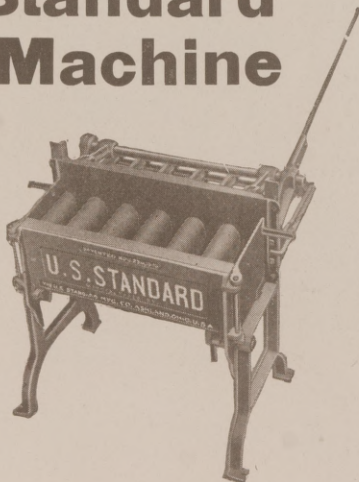
Our coring system allows for plenty of wall ventilation giving air space from top to bottom of wall.

Machine makes hollow or outside blocks and thin blocks for veneer and inside partitions.

U. S. Standard block are made face-down and are dense, strong and waterproof.

U. S. Standard Block Machine

Ask for details about this—one of the oldest and most widely used block machines on the market.



U. S. Standard
Manufacturing
Co.

Formerly of Ashland, O.
Columbiana,
Ohio

STOCK FIRE PROOF DOORS

Metal Covered

Standard Sizes in Stock of all Designs, with Frames and Trim

Write for Booklets and Price List



A. C. Chesley Co.
Inc.

279 Rider Ave., New York, N. Y.

THE CONCRETE AGE

DALTON and Atlanta GEORGIA

VOL. XXXIII. December, 1920

No. 3

PUBLISHED MONTHLY

Devoted to Modern Permanent Construction.

CONCRETE AGE PUBLISHING CO.

SUBSCRIPTION RATES.

In the United States and Possessions (Hawaii, Phillippine Islands and Canal Zone), Mexico and Cuba, \$1.00 per year. Canada, \$1.50. All other foreign countries, \$2.00 per year.

Advertising rates given upon application.

Entered as second-class matter October 18, 1905, at the Post-office at Atlanta, Ga., under the Act of Congress of March 3, 1879.

The Editor solicits correspondence from readers on matters pertaining to the concrete industry. Descriptions of concrete work done anywhere that is of general interest accompanied by clear, sharp photographs and going into details as to methods employed will be published and paid for if found acceptable.

TO OUR ADVERTISERS.

Our advertisers are requested to have copy and cuts for changes for advertisements in this office not later than the 10th preceding the month for publication.

We cannot be responsible for changes not made, when copy and cuts are received later, or submit proof.

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THE CONCRETE AGE

Wishes all its readers and patrons
A Merry Christmas
and a
Happy New Year

The Holiday Spirit.

During the holiday season we are especially reminded that the working force of the various cement and concrete plants of the country must feel very much at home, and most of them are laying up for the holidays.

In wishing them a Merry Christmas and a Happy and Prosperous New Year, we want to call your attention to the fact that probably the cheeriest factors calling at the offices of the concrete-cement plants of America today are those very same "Knights of the Grip" who blow in with an improved machinery proposition to lighten up the whole shop for three hundred days in the year. We are sure that our readers join in this expression of good will to the boys on the road during this holiday season.

The Concrete Age wishes all its readers happiness and prosperity throughout the coming years.

Promises and Their Fulfillment.

Those who are too free in making promises are too lax in their fulfillment, while those who are slow to promise are more likely to live up fully to their promises. It may please a customer or concrete contractor to promise quick delivery, superiority of quality, or all the other things he wants, but the satisfaction in this pleasure will be shortlived if the promises are beyond the ability of the institution. So it were better to be thoughtful in making promises, also thoughtful in filling them. A promise is really a species of contract, though generally verbally made. It would contribute materially to more thoughtfulness in making promises if those who are free with them would develop the habit of putting their verbal promises into writing, for then they would soon get more careful, and finally they would be better able to keep those that are made.

Improved Use of Fuel in Cement Manufacture.

It is well known that the use of bituminous coal in raw condition for fuel purposes is extremely wasteful, as the coal will yield, when distilled at low temperature, by-products such as oil, ammonia, of much greater value than the raw coal, and will also yield at least two-thirds of its weight of coke, suitable for use as smokeless domestic fuel or for making steam. It has been said that the burning of coal in the raw state will some day be made illegal and the production of the by-products which are greatly needed will be required by law.

Mr. Robert W. Lesley, one of the most conspicuous figures in the history of the cement industry, has lately secured patents on the distillation of coal by the waste heat of cement kilns, using the coke as fuel for burning the cement. The great advantage of this process is that it will permit the use in cement manufacture of low grade fuels such as bituminous shale or waste coal too high in ash to be marketable, as the ash of the coal or shale is just what is needed to furnish the clay constituent of the cement mixture. The cement industry is therefore the only one of consequence which can utilize the low grade fuels of this kind. The cost of cement making will certainly be greatly reduced by the adoption of this new process, and the world supply of crude oil and ammonia substantially increased.

Here is a Workable Plan.

The Concrete Age proposes to organize with the co-operation of the southern cement manufacturers, The Bureau of Permanent Construction.

This bureau is to be a concrete press agency, furnishing to weekly, daily and agricultural papers in the state of North Carolina, South Carolina, Tennessee, Georgia, Alabama and Mississippi live matter for every issue on Concrete highway bridges and culverts; concrete highways; concrete street paving; sidewalks, curb and gutter; sewer pipe; concrete structures for the farm.

The fundamental idea underlying the Bureau of Permanent Construction is to have an organization which can conduct a taxpayers' campaign through the press without having the appearance of advertising any particular product.

It appears to be an impossible task for the average southern concrete contractor to create any business. He waits for it to grow of its own accord. He needs co-operation of the kind that will start something for him in the way of sidewalk, domestic and other small work. Many of the smaller southern cities are ready for concrete street paving data and their papers will eat anything of the sort up that is well prepared and that does not cost them anything. The weekly press will always use small town civic improvement matter and farm concrete matter when offered to them free and in-

telligently prepared.

There are approximately 750 weekly, daily and agricultural papers in the territory in question.

The territory is shorter on concrete sidewalks in the smaller towns than any other section of the country. Agitation of the right sort can change this situation very soon and bring about a constant volume of this class of work that will call for large quantities of cement.

The steel bridge and metal culvert people are more active in the Southeast than elsewhere because they figure the people are less educated here than elsewhere. A concrete press agency can build up a public sentiment in a short time that will resent the use of impermanent waterway structures by officials expending public funds.

It is our plan to enlist concrete contractors throughout the whole territory in the work of the Bureau, and to use them to back up our efforts through the press, to furnish them with literature on specific subjects for use in starting campaigns to create more work.

We propose to furnish every publication in the territory with matter of specific interest to its particular class of readers. Long study of the course of concrete work in the South gives a clear idea of what to do and how to do it.

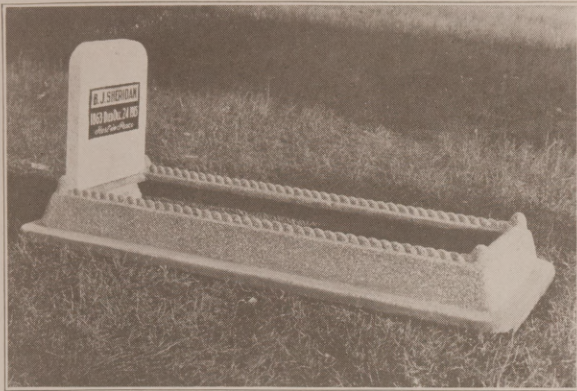
Cars, Wheat and Cement.

During the last thirty days there has been a marked improvement in the transportation situation, due partly to the effort of the railroads themselves, and partly to the fact that a short time ago a movement was set on foot urging the farmers to hold their wheat for a higher price, which, by the way, is having its usual effect; the price being abnormal, the farmers are continuing to hold, in spite of the fact that instead of increasing a rising market, the market is continuing to fall in spite of their efforts. As a result of this, there are now cars available for materials. Later, when the farmer gets ready to sell, there will be no cars.

The cement situation in Oklahoma City is unusual. Recently the writer called at the local office of one of the cement manufacturers and was informed that, due to the fact that the factory was so far oversold, the manager had closed the office and gone to California, and the date set for his return seemed to be decidedly indefinite.

The thing which will bring them all back on the job more quickly than anything else will be a repeal of the excess profits tax and such other relief as local contractors may be able to secure for themselves. There has never been an organization that could not eventually become so close and so tight that its own tension would sooner or later break it, and eventually this will happen to the cement association.

Grave Marker and Coping Molds



Patent Pending.

Our molds make money fast for concrete products manufacturers. The products sell readily and give excellent satisfaction.

Central Cemetery Co., Cook Co., Ill.: "Your base protection is a splendid idea."

Mrs. L. Truska, Blue Island, Ill.: "The concrete monument and 5 copings are more than satisfactory."

Write for catalog of molds for making tombstones, grave-coping and other ornamental products.

KEMPER GRANITE MOLD CO.

865 Transportation Bldg.

Chicago, Ill.

Carpenters Wanted as Special Representatives

CARPENTERS and others are making big money. It's right in your line. Fenton, of Indiana, made 400 sales in one week; Woodard sold 47 the first day. You, too, can sell the

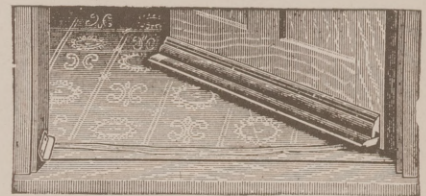
The Henry Airtight Weatherstrip
(Automatic)

for the bottom of doors and hinged windows. It's automatic. Fits down tight against worn sills as well as new ones. Keeps out every bit of cold, snow and rain and dust. Saves fuel. Sells fast; everybody wants it for economy's sake. Simple; easy to put on. Approved by architects, carpenters, and builders wherever known.

Send now for money-making plans.

The Henry Airtight Weatherstrip Co.

510 Elm St., Crawfordsville, Indiana



This attachment automatically shuts the strip tight against the sill.

"Perfect" Concrete Brick Power Machine

C. S. WERT - Inventor and Patentee

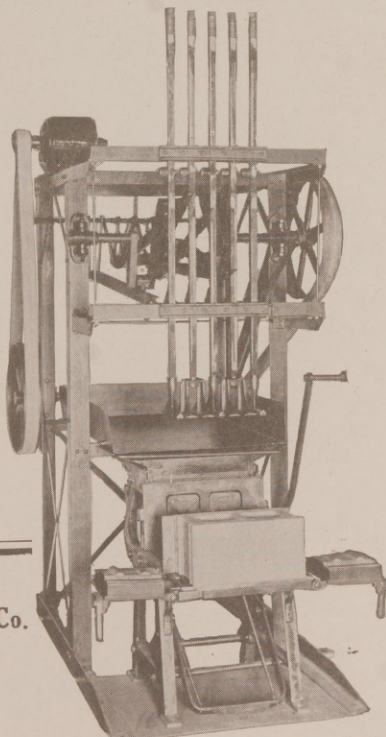
Turns out, with four men, 16,000 to 20,000 concrete bricks in ten hours.

In severe tests, Perfect Concrete Brick have proven stronger than common clay and pressed clay brick.

The power tamper may be operated by a one horse power motor, a 2 1/2 horse power gas engine or direct from a line shaft.

"There is no better brick machine manufactured," says W. T. Sharp, of Montana, owner of a Perfect brick plant.

Get facts and figures now. Write while the matter is on your mind.



Manufactured by
The Sealer Distributing Co.

2553 Railway Exchange Bldg.
CHICAGO

Late Model—Gearless and Noiseless.

Also
Hand and
Power Block
Machines
Hand Brick
Machines
Well, Cistern
and Silo
Molds

When a Reinforcing Bar Needs to be Bent



It needs to be bent then, on the spot, any angle, no slipping or creeping,—bent the way wanted.

Contractors cannot afford to be without

The Waterloo Bar Mending Machine

It's made in 2 sizes, and is guaranteed to bend bars as follows: No. 2 bends cold reinforcing bars including 1 1/4-inch round or square; Price, \$30,000. No. 3 bends cold reinforcing bars including 1 1/4-inch round or square; Price, \$35,000. Bends bars at various angles desired. Has a detachable handle 7 feet long for convenience in handling.

Waterloo Construction Co. : Waterloo, Iowa

Perforated Radial and Common Brick

CHIMNEYS

American Chimney Construction Co.

Suite 407-408 Oxford Bldg., Chicago, Illinois

All Repairs Made While Chimney Is in Use

Cleveland, Ohio, Branch: 505 Superior Building

News of Street and Road Building Activity in the South Briefly Told

NEVER before in the history of the country has the South seen such active preparations being made and now underway in some parts for permanent road building of all sorts. For years the South has lagged in this respect, but the people are now speaking in no unmistakable terms, through the ballot, that they must have bond issues to carry on the good work.

This magazine is giving as briefly as it can the news of this activity, strictly confining itself to the South, though all states in all parts of the country are waking up.

Road and Street Construction.

Bentonville, Ark.—Benton County Commrs.' Road Improvement Dist. No. 5, L. P. Kemper, Secy., Siloam Springs, Ark.; construct 34.75 mi. road; Maney Bros. & Co., Contrs., Oklahoma City.

Clinton, Ark.—Van Buren County Road Improvement Dist. No. 3; construct roads; sold \$95,000 bonds.

Rison, Ark.—Cleveland County Road Improvement Dist. No. 4; construct roads; sold \$124,000 bonds.

Mount Ida, Ark.—Montgomery County Road Improvement Dist. No. 5; construct roads; sold \$99,000 bonds.

Bradentown, Fla.—Manatee County, Bradentown Special Road and Bridge Dist.; construct roads and bridge to Annamaria Island and Gulf Beach; voted \$160,000 bonds.

Bunnell, Fla.—Flagler County Commrs.; improve 6 or 8 mi. Dixie Highway; contemplated.

Fort Myers, Fla.—City, John W. Owens, Clk.; improve 1st St.; 11,873 sq. yds. paving; brick, asphaltic block, asphaltic concrete, sheet asphalt or cement concrete; bids until Dec. 2; J. A. Davidson & Son, City Engrs.

Miami, Fla.—Dade County Commrs.; complete Tamiami trail and surface and improve Miami canal road; vote Dec. 20, on \$75,000 bonds.

Tallahassee, Fla.—State Road Dept., Forrest Lake, Chrmn.; improve and complete 9.9 mi. State Road No. 1 beginning at Lake City and extending east to Baker County line; 104,415 sq. yds. rock base course, 18 ft. wide; 92,814 sq. yds. bituminous macadam or asphalt wearing surface, 16 ft. wide; drainage structures; bids until Dec. 10; Chas. A. Browne, State Highway Engr.

Albany, Ga.—Dougherty County Commrs.; construct 2½ mi. pavement on Dixie highway; R. J. Edgerly, Engr.; construction work by county; Early

Construction Co., Augusta, Ga. has contract for top-dressing of oil asphalt.

Atlanta, Ga.—City, R. M. Clayton, Supt. construction; voted amendment to Constitution providing for bond issue of \$5,000,000.

Brainbridge, Ga.—City; pave streets; vote Dec. 8 on \$75,000 bonds. Address The Mayor.

Reidsville, Ga.—Tattnell County Commrs.; construct road to Upper Sisters Ferry.

Ashland, Ky.—City, W. A. Manning, Clk.; construct concrete sidewalks on Washington, Jefferson, Fortieth and Forty-second Sts.; bids until Nov. 15.

Bardstown, Ky.—State Highway Comsn., Frankfort, Ky.; construct 4 mi. Louisville-Bardstown road; Kentucky rock asphalt; \$99,752; Geo. M. Eady Co., Contr., Louisville, Ky.

Covington, Ky.—City, Thos. F. Donnelly, Mayor; improve Scott and Main Sts. and Decoursey Ave.; voted \$150,000 bonds.

Owensboro, Ky.—Service Station.—Lee Tires Sales Co.; occupy 45 x 60 ft. service station to be erected by R. E. Rogers.

Whitesburg, Ky.—Letcher County Commrs.; construct roads; voted \$300,000 bonds.

De Roيدر, La.—City; Chamber of Commerce, J. C. Fowler, Secy.-Mgr.; pave streets; brick, monolithic or concrete.

Monroe, La.—Ouchita Parish Police Jury; complete Monroe-Bastrop Highway; McGurie Cattle Co., Contr.; R. P. Boyd, Engr. Supersedes recent item.

Baltimore, Md.—Automobiles.—Richardson Automobile Electric Corp. organized, 7 West Chase St.; Oonald R. Richardson, Prest.-Mgr.; Mrs. Winfield F. Courts, Secy.-Treas.; install lathe, drill, testing apparatus and battery-charging plant.

Cassville, Mo.—Barry County, Monett Special Road Dist., S. A. Chappell, Commr.; construct 4.88 mi. road; Federal-aid Project 121A; 46,000 sq. yds. clay-bound macadam surfacing; \$60,341.33 available; M. E. Golliz, Contr.; Bert Robins, Project Engr.; both Monett, Mo.

Westminster, Mo.—State Roads Comsn., 601 Garrett Bldg., Baltimore; grade and drain 2.25 mi. State Highway from end Contract 520 toward New Windsor; Carroll County, Contract C1-27; low bidder, Thomas Bennett & Hunter, Westminster, Md., at \$43,407.70; W. F. Childs, Jr., Engr., Fredrick, Md.

Jackson, Miss.—Hinds County Supvrs.; construct roads; issue \$300,000 bonds.

Macon, Miss.—Noxubee County Highway Commrs.' Dist. No. 1, Nelson Stevenson, Commr.; sub-

grade and gravel 5½ mi. Poindexter and 2 mi. Bugg's Ferry and Pickensville Rd.; bids until Nov. 13; R. A. Wells, Engr.

Milan, Mo.—State Highway Dept., Jefferson City, Mo.; construct 1.4 mi. road; Federal Aid Project S. 20.15. Sullivan County; bids until Nov. 27.

Springfield, Mo.—Greene County Commrs.; improve 6 mi. road in Galloway Bridge Public Road Dist.; \$15,000; voted \$12,000 bonds.

St. Louis, Mo.—City; construct 2400 sq. yds. Warrenite-bitulithic pavement on 6-in. concrete foundation; Granite Bituminous Paving Co., Contr.

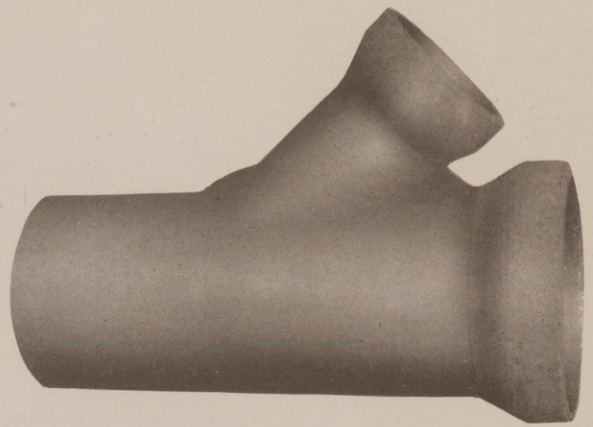
Charlotte, N. C.—Automobiles.—O. J. Thies; erect \$65,000 automobile building; 2 stories and basement; 46 x 146 ft.; 20,000 sq. ft. floor space; brick; tile; plate-glass front; show-room department embracing first and second floor with mezzanine floor; Thies-Smith Co., Contr.

Duram, N. C.—Duram County Commrs.; grade, drain and topsoil 4.52 mi. Fish Dam road; C. D. Rigsbee, Contr.

Duram, N. C.—City, J. H. Allen, Treas.; improve streets; issued \$250,000 bonds.

Washington, N. C.—Beaufort County Commissioners; construct 50,000 sq. yds. warrenite-bitulithic pavement; R. C. Lassiter, Contr., Norfolk, Va.

Whiteville, N. C.—Columbus County Commrs.; sand-clay surface 18 mi. Charlotte-Wilmington high-



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way; bridges; R. C. Council, Engr., Wananish, N. C.

Wilson, N. C.—North Carolina State Highway Comsn., Div. Office, Raleigh, N. C.; construct 6.25 mi. road; 16,500 cu. yds. topsoil surfacing; Federal-aid Project 177; bids until Nov. 22; W. S. Fallis, State Highway Engr., Raleigh.

Afton, Okla.—City, Oliver Hanshan, Mayor; pave Federal Highway through town; voted \$14,000 bonds.

Claremore, Okla.—City; pave 2 mi. streets; curb and gutter; Stanton & Amerman, Contrs., Coffeyville, Kan.

Walhalla, S. C.—Oconee County Highway Comsn., M. McDonald, Secy.; construct 7.165 mi. Highland road between Seneca and Walhalla; 20,554.3 cu. yds. top-soil surfacing; bids until Nov. 18; L. M. Weisiger, Div. Engr., Laurens, S. C. Supersedes recent item.

York, S. C.—York County Commrs.; construct 3.824 mi. Saluda and Chester road between Fishing Creek and York-Chester county line; 11,973 cu. yds. topsoil surfacing; Federal-aid Project 103; bids until Nov. 16; W. W. Miller, County Engr., Rock Hill, S. C. Supersedes recent item.

Bristol, Tenn.—City; complete street paving on Hill St., Kentucky and Pennsylvania Aves.; issued \$60,000 bonds. Address The Mayor.

Knoxville, Tenn.—City Comsn.; grade and pave Eleventh and Woodbury Sts. and Deadrick Ave.; \$35,000; will let contracts.

Knoxville, Tenn.—City Commrs., J. Boyd McCalla, Commr. Streets and Public Improvements; pave, curb, gutter and sewer District 190 on Payne St., 191 on 8th St., 193 on Thompson Pl., 194 on White Ave., 195 on Patterson St., etc.; bids until Nov. 23; Fred M. Maloney, City Engr.

Pulaski, Tenn.—Giles County Commrs.; construct 80 mi. gravel road; \$350,000 available; construction by local labor; T. C. McEwen, Engr. (Lately noted voting bonds.)

Fort Worth, Tex.—City; pave Concho St.; 3200 sq. yds. pavement; 7000 lin. ft. curb; 5200 sq. ft. gutter; \$17,240.50; Texas Bitulithic Co., Contr., Burton Bldg.; D. L. Lewis, City Engr.

Ballinger, Tex.—Runnels County, O. L. Parish, Judge; construct Ballinger-Abilene Rd., 12,291.7 cu. yds. gravel surfacing; bids until Nov. 18.

Beaumont, Tex.—City; pave streets; vote before Jan. 1 on \$350,000 bonds. Address The Mayor.

Fort Worth, Tex.—Tarrant County Commrs., W. E. Yaney, Auditor; improve 6.824 mi. Kuteman's Cut-off road; State Highway No. 1; construct drainage structures and bridges; bids opened.

Burkburnett, Tex.—City; improve streets; issue \$150,000 bonds. Address The Mayor.

Brenham, Tex.—City; pave streets; vote Dec. 16 on \$40,000 bonds. Address The Mayor.

Boston, Tex.—Bowie County Commrs., J. B. Ly-

tal, Judge; grade, surface and drain 4.05 mi. Highway 8 from Maud south to Sulphur River; grade and surface 12.3 mi. Maud-Red Water road; bridge and culverts.

Dallas, Tex.—City, F. W. Wozencraft, Mayor; construct undergrade railroad crossing at Maple Ave. and Fairmount St.; 86,500 lbs. reinforcing steel; 14,295 sq. ft. sidewalk; 9175 sq. ft. driveway; 2560 lin. ft. combined curb and gutter; 1500 sq. yds. gravel macadam pavement; contract to Vilbig Bros., 1709 Jackson St., and Klein Bros. Co., Junius and Walton Sts.

El Paso, Tex.—El Paso County Commrs.; grade and drain 12.6 mi. Fabens road, Highway 1; lowest bidder, Lee Moore Contracting Co., Contr., Two Republics Bldg.

Fort Worth, Tex.—Filling Station.—Mid-Texas Petroleum; erect \$100,000 filling station; O. J. McQuerry, Contr.

Jourdanton, Tex.—Atascosa County Commissioners; construct 13.5 mi. Puget Sound-Gulf highway; rock asphalt; 118,788 sq. yds. bituminous macadam; Haden & Austin, Contr., 272 Kress Bldg., Houston, Tex.

Fort Worth, Tex.—Tarrant County Commrs.; H. L. Small, Judge; grade and drain 6.824 mi. Kutemans Cut-Off road; bids opened Nov. 11; R. V. Glenn, Engr.

Hillsboro, Tex.—Hill County Commrs., J. Y. Boyd, Auditor; grade, surface with gravel and construct drainage structures on Irene-Hilleboro, Irene-Mertens and Irene-Corsicana roads in Irene Special Road Dist. No. 8; 65,000 cu. yds. grading; 12,000 cu. yds. gravel surfacing; bids until Nov. 19. Bryant & Huffman, Engrs.

Orange, Tex.—Orange County, D. C. Bland, County Judge; Construct Orange-Beaumont Rd.; reinforced concrete, with drainage structures in two sections, Section 1 beginning at West End at Park Ave. and extending west for 15 mi.; Section 2 beginning west of Cow Boyou and extending west for 3.5 mi.; bids until Nov. 18.

Palestine, Tex.—City, A. L. Bowers, Mayor; construct 80,896 sq. yds. pavement; 49,990 lin. ft. curb and gutter; sheet asphalt, asphaltic concrete, willite composition, wood blocks, brick, rock asphalt and warrenite-bitulithic; bids until Nov. 22.

Tahoka, Tex.—Lynn County Commrs.; construct roads; voted \$60,000 bonds.

Abingon, Va.—Washington County Commissioners; voted roads amendment to constitution providing for bonds.

Graham, Va.—City; construct Flat Top road; furnace slag; Geo. Rosenbaum, Contr.

Grafton W. Va.—Taylor County Supvrs., T. S. Scanlon, Supvr.; construct 2 mi. Blueville-Thornton road; graded roadway 26 ft. wide; \$54,000; bids

about Dec. 15; Wm. Steenburg, Engr. (See Machinery Wanted—Road Construction.)

Welch, W. Va.—Automobiles.—Tug River Automobile Co. inceptd.; capital \$50,000; H. W. Saunders, I. J. Rhodes, M. S. Taylor.

Florence, S. C.—Florence County Supervisors will receive bids until November 23 for constructing 11-2 miles of sand-clay road from Florence toward Lake City. A. L. Erwin, County Supervisor.

Lake City, Fla.—Florida State Road Department, Chas. A. Browne, State Highway Engineer, Tallahassee, will receive bids until 4 P. M. December 10 for building section of State road, 9.9 miles long, beginning at Lake City and extending east to Baker County line; 104,814 square yards rock base course, 18 feet wide; 92,814 square yards bituminous macadam or asphalt wearing surface; drainage structures, etc.

St. George, S. C.—Carolina Highway Department, Columbia will construct 15 miles of roadway between

Reevesville and Dorchester.

Thomason, Ga.—Upson county voted \$150,000 of road bonds. Chairman County Commissioners.

Titusville, Fla.—Brevard County Commissioners, J. F. Mitchell, Clerk, will receive bids until December 9 for constructing 28 miles of road. C. M. Rogers, Engineer, Daytona, Fla.

Vienna, Ga.—Dooly County Commissioners, Chas. S. Gurr, Clerk, will receive bids until December 7 for constructing 8.81 miles of sand-clay road; 12,682 cubic yards surfacing. Federal-aid project 18.

Decatur, Ala.—Morgan County Voted \$440,000 of road bonds. Chairman County Commissioners.

Orangeburg, S. C.—South Carolina State Highway department, Columbia, S. C., will receive bids until November 20 for constructing 12 miles of road; cost, \$90,000.

Walhala, S. C.—Bids will be received until November 18 by State Highway department, Columbia, S. C., for constructing 10 miles of road; top-soil.

Many Georgia Highway Projects

With highway projects aggregating \$1,690,000 completed during the past twelve months and others now in progress amounting to \$10,500,000, the state highway department announced Georgia's system of highways is being rapidly completed and within another fifteen months every county seat in the state will be linked together.

By combining federal, state and county funds, the highway department, it was stated, has been in a position to promote its construction on a much larger scale than it was at first thought possible. With experienced experts at their disposal county authorities have found it preferable to turn over all road projects to the state highway authorities, and with the whole of Georgia's highway fund required to be spent through this department, the engineers have been practically unhindered in their work.

More than two-thirds of the counties are embraced in the program of projects of the departments, it was stated, while every section of the state is represented. In the 122 projects now underway and those that have been completed an army of 3,500 men has been employed, thirty-three road rollers, 108 scrapes, seventy-five concrete mixers, twelve rock crushers, fifteen steam shovels, 1,200 teams and five asphalt distributing machines have been used.

The following projects have been completed by the highway department:

From Gainesville, north to the Lumpkin county

line, a sand clay road twelve miles in length, scientifically graded. This is a link in the Gainesville-Bairville route via Dahlonga.

From Jefferson towards Commerce, two-thirds of the distance, a sand clay road.

In three directions out of Washington, towards Athens, Elberton and Lincoln, a total of nine miles of concrete road.

From Moreland to Greenville, in Meriwether county, sixteen miles of sand clay road.

From LaGrange, twelve miles north towards the Coweta county line, a sand clay road and three concrete bridges, constituting an important link in the Atlanta-West Point route.

In Henry county, six miles of sand clay road, constituting the Henry county link of the Atlanta-Macon route, which is also the middle route of the Dixie highway.

From the Spalding county line going south to Griffin, eight and one-half miles of concrete road, and from Griffin south for a distance of two miles, a concrete road. Two more miles going south will shortly be completed. This road will then bisect Spalding county with a magnificent concrete link in the Atlanta-Macon route.

Another important link in the same route is nine miles of concrete road from the Bibb county line, at Lorraine, into the city of Macon.

In Bibb county from Macon south for a distance of two and one-half miles, a concrete road. This

is in the direction of Fort Valley and is a partly completed link in the Macon-Americus route.

Steel and concrete bridge, one-half of a mile in length, across the Flint river in Macon county, connecting Montezuma with Oglethorpe, and forming a most important link in the Atlanta-Macon-Americus-Thomasville route.

From Thomasville north to the Ochlochnee river, three miles of bituminous macadam road, and also a concrete bridge across this river which is 90 per cent completed.

From Quitman, running north towards Moultrie, eight miles of concrete road and five concrete bridges.

In Emanuel county, north and south of Swainsboro, the county seat, ten concrete bridges over streams that were troublesome and often impassable in wet weather, thus forming an important link in the main Atlanta-Macon-Savannah route.

North of Valdosta on the Valdosta-Adel link of the middle Dixie highway, an important concrete bridge.

In Chatham county, for eight miles out of Savannah, running north, eight miles of concrete road, another link in the Atlanta-Savannah route.

In Whitfield county, an important concrete bridge across Swamp creek, which has been in the habit of going on a rampage every once in a while and washing away the wooden bridge. This forms a link between Dalton and various northwest Georgia points.

In Gilmer county, one mile of object lesson road out of Ellijay built of bituminous macadam, and forming a link in the Atlanta Blue Ridge route.

Among the projects now under way are many of much interest and importance. In this respect is the Folkston-Waycross link of the middle Dixie highway. It consists of twelve miles of tar, gravel and asphalt road along the eastern edge of the Okefenokee swamp, and affords a route into Jacksonville for the whole of southeast Georgia.

Another is the Darien bridge across the Altamaha river and several eseuaries of the Atlantic ocean. This bridge was formerly the railroad bridge of the Georgia Coast and Piedmont railway. Recently the road was abandoned and sold for junk. The most valuable piece of its roadbed was the five-mile bridge. Glynn and McIntosh counties purchased the bridge and the state highway department is now remodeling it for vehicular traffic. It is stated this will open up the most important bridge link on the entire Atlantic seaboard between New York and Miami.

From Dahlonga running south to the Hall county line the department is building a bituminous macadam road that will connect with the complete link in Hall county and from an additional and

highly important link in the Gainesville-Blairsville route.

In Floyd county, running south towards Cedartown, the department is building seven miles of bituminous macadam road which will form another important link in the Chattanooga-Tallahassee route along the western side of the state.

Over the Flint river between Thomaston and Butler the department is constructing a concrete bridge where an old ferry has been operated since colonial days. This will form a link in the new Griffin-Americus short route via Zebulon. There has never been a passable route through that stretch of the country before.

Road Building in South Carolina.

The South Carolina State Highway Department is advertising for bids for the construction of 12 miles of road from Orangeburg south toward the Bamberg county line. The estimated cost of the road will be \$90,000, including bridges. The bids for the work will be received on the 20th of November.

The commission will also receive bids on the 16th for the construction of four miles of the road between Fishing Creek, in York county, the Chester county line. The road will cost about \$20,000.

Slattery & Henry, Greenville, S. C., have been awarded contract, under supervision of the State Highway Department, for the construction of two miles of road from Greenville to Jones' Store, in the direction of Laurens. The contract price is approximately \$113,000.

The Newell Contracting Co. has been awarded contract for the construction of four miles of the Piedmont highway in Newberry county. There were seven bidders.

Bids for the construction of the Seneca-Walhalla road, in Oconee county, will be received on November 18. This road is 10 miles in length, and will be of topsoil construction.

Plans have been completed at the highway office for the construction of 15 miles of road between Reevesville and Dorchester, in Dorchester county.

Highway Contractors Election.

The Associated Highway Contractors, composed of firms interested in highway construction in Pennsylvania, elected the following officers at a recent meeting in Harrisburg, Pa.:

Persident, H. H. Wilson, Hughesville; vice president, Benjamin Harrison, Derry; D. Rathbun, South Bethlehem; H. S. Souder, Lanchester; W. J. Wiseman, Pittsburg and W. Horn, Erie; secretary, H. S. Narding, Harrisburg; Treasurer, S. M. Irwin, Philadelphia, Pa.

Concrete Freight Cars.

If concrete ships why not concrete freight cars? The former have proved their practicability and in the near future many of them will be in service. E. J. Putnam, of Atlanta, Ga., has recently been granted a patent on a concrete box car covering a special small mesh form of reinforcing that will readily take care of the strain, vibration and shock to which freight cars are constantly subjected.

He has also added another feature to these cars, viz, two doors to each side which offers many advantages not found in the present box cars. There are several other distinct advantages the concrete car has over wood or steel such as:

More resilient and cheaper than steel.

Stronger and more waterproof than wood.

No painting required therefore maintenance cost at minimum.

No interior bolts, braces or other projections to damage contents.

Two doors on a side will greatly facilitate loading and unloading, afford better light and ventilation and give more strength to body of car between trucks.

This arrangement will permit loading of bars, poles, etc. up to 36 feet in length.

In case of a wreck they will not go to pieces like wooden cars but will protect contents thereby saving damage from rain, theft, etc.

Will not catch fire and if damaged may be easily repaired without sending to special car shop.

Can be erected quickly and materials required for construction are readily obtained.

High priced or expert mechanics not required to build them.

These cars will cost no more than the present standard wood box car with steel frames and ends and much less than all steel cars. This method of construction is especially adaptable to box and tank cars and from the view point of several leading railroad engineers will prove to be the freight car of the future.

Late in 1918 a concrete gondola car was built under a 7909 patent and while of an entirely different type of construction has fully demonstrated its practicability for rough service in switching and handling both empty and loaded 10% beyond capacity of 100,000 pounds. This car was built with the sanction and co-operation of the United States Railroad Administration.

Southern Building Comparative Figures.

Savannah is one of the only three Southern cities, out of nine listed, that show a gain in building for the month of September. Savannah's gain is 24 per cent. over last year.

While Atlanta led the South in building in September, according to figures compiled by the Ameri-

can Contractor, it shows a small loss over building in the same month in 1919. Atlanta's total for September this year was \$1,076,656, while the next highest in the nine cities reporting was that of Knoxville, \$799,916.

Building in Atlanta was 3 per cent. less than in the same month last year.

Knoxville showed the largest percentage of increase, its building in September, 1919, being \$155,700 and this year \$799,910, a gain of 415 per cent.

Savannah's building last year in September amounted to \$228,490, and this year to \$283,450, a gain of 24 per cent.

The figures for the nine cities are:

Atlanta, Sept. 1920, \$1,076,656; Sept. 1919, \$1,113,533; loss 3 per cent.

Savannah, Sept. 1920, \$283,450; Sept. 1919, \$228,490; gain 24 per cent.

Louisville, Sept. 1920, \$16,250; Sept. 1919, \$341,465; loss 7 per cent.

New Orleans, Sept. 1920, \$290,839; Sept. 1919, \$540,300; loss 46 per cent.

Shreveport, Sept. 20, 1920, \$501,324; Sept. 1919, \$306,636; gain 63 per cent.

Chattanooga, Sept. 1920, \$74,128; Sept. 1919, \$165,925; loss 56 per cent.

Knoxville, Sept. 1920, \$799,916; Sept. 1919, \$155,700; gain 415 per cent.

Memphis, Sept. 1920, \$343,195; Sept. 1919, \$1,006,400; loss 65 per cent.

Nashville, Sept. 1920, \$124,097; Sept. 1919, \$361,266; loss 65 per cent.

Texas Gravel and Sand Men Organize.

At a meeting held in Dallas, Texas, on October 13, sand and gravel dealers of Dallas and other points in the State organized the Texas Sand and Gravel Association, with B. O. Johnson, president, and E. Guy Sutton, business manager. The Dallas branch, together with similar branches in Houston and San Antonio, was used for a nucleus for the State organization.

Mr. Sutton, business manager, told the association that preference had been accorded the coal interests by a ruling of the Interstate Commerce Commission in the matter of open cars.

"As long as this condition exists, building of any kind will be practically stopped, for the producers will be unable to supply the contractors with sand and gravel, and these commodities are absolutely necessary for construction," he said.

"The sand and gravel men practically control the situation, and unless the railroads release some of the cars now being held idle in large numbers on storage tracks, the producers can refuse to supply the one material needed for all buildings. There will be a shortage of cars for the next 10 years," he predicted, "but with the proper distribution no one business will suffer."

Advantages of Concrete Vessels Outlined—Now Possible to Make Water-tight Repairs on Bottoms

An important objection to concrete ships has been overcome by the repairing and refloating here of the steamship Latham, which is of 7500 tons deadweight and is one of two of the largest concrete ships in the world. It had been held heretofore by many construction authorities that it would be impossible to make water-tight repairs to concrete bottoms. This theory has been now disproved, it is asserted. The Latham ran on the rocks of the North jetty at Tampico, Mexico, last July, and had two big holes torn in her bottom, running the entire length of the ship. The ship is owned by the American Fuel Oil & Transportation Co. The repairs were made under the supervision of Walter R. Harper, United States Shipping Board concrete engineer. The Latham was towed here from Tampico and was placed in the dry dock of the Galveston Dry Dock & Construction Co., where the repairs were made.

"Many have doubted the possibility of making successful water-tight connections between old and new concrete surfaces," said Mr. Harper, in commenting on the work on the Latham. "Not only have doubts been expressed by shipping men in regard to making such successful repairs to the bottom of a concrete ship, but contractors and other men accustomed to using concrete composed of the ordinary mixtures used in foundations and buildings have also doubted the possibility of obtaining a waterproof concrete on the bottom of these ships which is only five inches in thickness. Concrete, as ordinarily mixed and used for ordinary construction, is not, as a rule, waterproof. However, the concrete used in the construction and repair of ships is of an entirely different composition. The materials are carefully selected in regard to size, quality and strength.

"After various experiments by the Shipping Board in the Government laboratory, an aggregate which produces a concrete that is one-third lighter than concrete made of sand and gravel and is equally as strong, if not stronger, has been produced by baking an earthen substance which replaces a volcanic rock from Mexico previously used as a light but strong aggregate, but which is not of practicable value on account of high transportation costs from that country. In the Latham 1000 tons deadweight was saved by the use of this substance, adding that much to cargo capacity. This aggregate was also used in the repairs.

"The concrete used is not only waterproof, but is also oil-proof. The Shipping Board has samples

of pieces of concrete which have been cut from the Latham's oil tanks during the process of these repairs. These pieces, when broken across, show that there was absolutely no penetration of the oil into the concrete, notwithstanding the fact that it had contained oil for three months, having formed a portion of the oil tanks on the ship and having been under the pressure of from 15 to 20 feet head of oil.

"There have been built up to the present time and in commission only seven ocean-going concrete ships in the world, all of which have been built in the United States. This experiment in this new form of ship construction was resorted to during the war, when the Shipping Board was endeavoring to build as many hulls as possible to replace those destroyed by submarines. At that time enough steel plates to construct the required number of ships could not be turned out; neither could enough large timbers be obtained for wood ships. The Shipping Board, therefore, resorted to this experiment of ocean-going concrete ships.

"Probably few people know that the first example of reinforced concrete in any form was concrete rowboat, built in France by M. Lambot in 1849, who took out the first patent for this form of construction, combining both concrete and steel. The boat is said to be still in existence. This piece of work was the beginning of all the present reinforced concrete construction now seen in buildings, bridges and other structures.

"Until the present time concrete boats of small capacity, such as barges and river boats, have been built in many foreign countries, such as France, Holland, Germany, Norway, Sweden, Denmark and Canada, but these were all for use on rivers and in harbors. It was left for the engineers of the United States to make the first venture in an ocean-going reinforced concrete ship.

"The first one built was the Faith, constructed at Redwood, Cal., by private interests. The Faith has been in successful operation since her launching, in May, 1918, and has made trips on the Pacific from San Francisco to South America, passing through a 60-mile gale on her maiden trip from San Francisco to Seattle. She has been from the Pacific to the Atlantic through the Panama Canal, and has crossed the Atlantic with several cargoes without an accident.

"The Shipping Board has had under contract 12 ocean-going concrete ships, six of which, including the Selma and Latham, are now completed. The re-

maining six ships to be built by the Shipping Board are still under construction.

"The advantage claimed for a concrete ship over a steel or a wooden ship is that the original cost of building is below the steel ship; the repairs and upkeep is far below that of a steel vessel, as a concrete ship has no tendency to deteriorate by rusting or being injured from corrosive action of sea water or destroyed by torpedo or other forms of sea worm which tend to destroy wooden ships; also the fact that concrete ships are fireproof.

"It is a well-established fact that concrete gains in strength from year to year, instead of deteriorating. Repairs can be made at a much lower price and much more rapidly than on a steel ship, as has been demonstrated in the Latham. The concrete ships are much heavier than the steel ships. This is claimed by some to be a disadvantage. However, owing to its weight, it has a greater cargo capacity than a steel ship, and if bulky cargoes are selected for a concrete ship, such as cotton, sisal and similar commodities, a concrete ship will earn more money with the same deadweight carrying capacity than a steel ship, owing to the increase of size of its cargo holds. Of course, with a cargo of pig-iron, oil, etc., a steel ship has an advantage. Still we must have light loads.

"I know of no reason," said he, "why concrete ship construction cannot be commercialized and used successfully for bulky cargo carrying. The ships are 431 feet in length over all, 45 feet beam, 36 feet molded depth and 7500 deadweight tonnage. They are oil-burners, and have triple-expansion engines of 2800 horsepower."

Florida Engineers Met.

W. W. Fineren was appointed president; A. F. Ensey, secretary-treasurer and committee to draft bylaws and constitution was named last night at the organization meeting of the Jacksonville Chapter, American Association of Engineers. The meeting was held in the commissioners' room of the city hall Jacksonville, Fla., and was well attended both by local engineers and chapter members from St. Augustine who motored over for the occasion. The meeting was held under the auspices of the St. Augustine chapter and was featured by the presence of R. C. Baily, district secretary of the association, with headquarters in Washington.

During the meeting the question of ethics was fully taken up as were other questions of importance to the profession. The speech of Mr. Bailey left no doubt in the minds of those present as to the need for a local chapter of the association. On the bylaws and constitution committee were appointed George C. Hills, C. S. Hammatt and P. R. Bird, Jr. Another meeting will be held Saturday, October 30,

in the office of the city engineer, city engineer building.

The meeting was called to order by the president of the St. Augustine chapter, who introduced Robert Ranson, of St. Augustine. Mr. Ranson spoke on Why We Are Brought Together. Mr. Bailey's address followed. Other speakers included Dean J. R. Benton, of the engineering department of the University of Florida, Gainesville; C. S. Mammatt and W. W. Fineren. Dean Benton's talk was along the line of the practical results which would follow a co-ordination of engineering efforts in Florida. Mr. Hammatt spoke on registration laws of Florida and what co-ordination of efforts could accomplish. Mr. Fineren showed why Jacksonville engineers should affiliate with the association and called for signatures for the application for charter.

Foreign Trade Opportunities.

Where addresses are omitted they may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., and at the branch office of the Bureau, 315 Custom House, New York, N. Y.; 629 Federal Building, Chicago, Ill., and Association of Commerce Building, New Orleans, La., and 310 Custom House, San Francisco, Cal. For convenience in filing please use separate letter sheet for each trade opportunity request.

33985—A Government office in Poland is in need of lime, sand and cement. Offers, accompanied by samples and illustrated catalogue, should be forwarded. Payment will be made upon delivery with letter of credit.

34051.—The president of a manufacturers' association in Argentina desires to purchase and secure an agency for the sale of white and ordinary Portland cement in quantity of approximately 30,000 barrels a month. Quotations should be given c. i. f. Argentine port. Correspondence should be in Spanish. Reference.

Concrete for Various Uses.

The Portland Cement Association has published three valuable bulletins dealing with the following subjects: "Concrete Railway Track Support," this being a review of existing examples and of suggested designs for permanent support of track; "Curing Concrete Pavements," which is a very useful description of how to make concrete pavements most durable; and "Concrete Highway Grade Crossings," which deals with the use of concrete instead of other paving material at railroad crossings. It is used in the form of concrete "planks," instead of wooden planks.

Action of Alkali Soils and Waters on Concrete

FOR the past 6 or 7 years investigations have been under way in Western Canada on the action of alkali soils and alkali waters on concrete. In a paper presented Aug. 16 at the Western Professional meeting of the Engineering Institute of Canada, Mr. A. S. Dawson, Chief Engineer, Department of Natural Resources, Canadian Pacific Ry., summarizes these studies and gives the conclusion to date. An abstract of the paper follows:

Preventive Measures.—Any measures that hinder the penetration of the alkali solutions into the interior of the cement will delay the destructive action. For this purpose both soap and aluminum sulphate have been tried, and have been found to afford some protection. The soap, however, in itself had a slightly injurious effect on the tensile strength of the cement.

The efficiency of these and of other water-proofings is being further studied, and results may be expected later.

The mixing of cement in weak solutions of sulphuric acid, di-sodium phosphate, magnesium fluoride, and oxalic acid has been shown by laboratory tests to increase the alkali-resisting qualities of concrete. The effects of most of the alkalis have also been shown to be less pronounced on neat cement briquettes than on sand cement briquettes, and in fact, somewhat proportional to the amount of sand used.

Conditions Found in Practice.—In practice, the worst conditions are generally found on types of structures whose design has necessitated their being backfilled on one side, and subjected to ground water from the same direction—and at or below the original ground surface. These conditions seem to be aggravated where the structures are subjected to dry and wet surroundings—exposed to sun and shade during the winter months—and where alkali salts are most in evidence, and the ground wet. The facts that the deterioration starts on the surface extending inwards, and that the water being carried by the structures has analytically been shown not to be responsible for the trouble, would indicate that the deterioration was primarily caused by the ground water and its effects on the concrete. These vary in a degree from the surface spalling off in what results in a pile of loose gravel below—to a condition where the mass becomes of a slimy consistency, like so much lime mortar, and mud. As a rule samples in what might be termed an intermediate stage get harder if permitted to dry out in the air—when they become coated with white powdery salts.

Either the disintegration is due to soluble compounds which are leached out of the concrete, leaving it inert, or it is due to the disruption caused by the crystallization of the salts in the pores, or by chemical action of the substances in solution with the constituents of the concrete.

Any conditions which will tend to carry the salts from the soil, to the concrete, will hasten the disintegration action and lessen the per cent of alkali necessary to cause destruction.

Experimental Work by Committee of Calgary Branch of Institute.—In October, 1918, 270 concrete blocks and 180 cylinders were made at Calgary, under close supervision.

These blocks were moulded in wooden gang moulds, 8 in. in diameter and 16 in. long. Two hundred and sixteen blocks were made, using Western cement, and 54 from Owen Sound cement. All were carefully marked for identification purposes.

All materials used were analyzed physically and chemically.

The gravel was from what is known locally as the Carseland Pit, a well graded, bank-run material. The water was from a city of Calgary main. Samples of soil and ground water were procured from each hole in which a specimen was placed.

The blocks were made in three series.

(A) Screened, sized and washed. The sand was supposed to grade uniformly from fine to coarse—not to exceed 40 per cent by weight, passing a No. 30 screen, and not more than 30 per cent by weight, passing a No. 100 screen; and the voids were not to exceed 35 per cent.

The gravel was supposed to be uniformly graded in sizes from $\frac{1}{4}$ in. to 2 in. in diameter, and the voids not to exceed 40 per cent.

(B) Bank run material, washed.

Bank run material unwashed.

Each series of blocks were made in two mixes.

First, 1:2:4.

Second, 1:1½:3.

Of each mix, three blocks were plain.

Three were treated with two coats of soap and alum.

Three-quarters of a pound of castile soap, per gallon of water, heated to 180° F.

Two ounces of alum to one gallon of water, heated to 100° F.

One coat of hot alum solution.

One coat of hot soap solution.

One coat of hot alum solution, after 24 hours, all well brushed in.

Three were treated with water gas tar and coal

gas tar as follows:

First coat, refined water gas tar of thin consistency.

Second coat, same, and immediately after the first.

Third coat, refined coal gas tar, applied hot, after coats one and two, were well soaked-in.

Fourth coat, same as third, after third coat set.

The blocks were taken from the moulds in 48 hours and cured for 28 days, after which they were placed in the ground 22 in., with 8 in. exposed, at the following points:

1. On top of a high hill in Calgary, where no alkali conditions were likely to exist, and where there would be no ground water in contact with them.

2. Near a sewer, in a low lying plot of ground, in Burnside, Calgary, generally wet, and where alkali conditions had given evidence of being bad.

3. At Strathmore, in a low lying plot, once a slough, where alkali conditions seemed bad, and where they would probably be wet most of the time.

4. Near Brooks, in a low lying place, where the alkali conditions were apparently very bad, and where they would be wet most of the time from seepage water from an irrigation ditch.

The cylinders which were all made of Westerm cement, were buried at the foregoing points, and 62 were placed in the Calgary city hall laboratory.

Conclusions to Date.—1st. Laboratory test cylinders are all relatively lower in strength than field tests because of the difficulty of maintaining a uniform degree of moisture.

2nd. The blocks and cylinders located in the Calgary district show no disintegration as yet because of the fact that the ground conditions were relatively much dryer than normal.

3rd. The blocks at Cassils show a much greater disintegration than those at other locations because of the greater concentration of soil solutions. Those at Strathmore show the next greatest degree of disintegration, because of less concentration of soil solutions and possibly dying out at certain seasons.

4th. In a concrete of high density, where absorption of the alkali ground water appears to be mainly at the surface of the concrete, the action appears to be relatively slow and is largely in the nature of surface action, gradually extending to the interior.

In a concrete of low density and relatively high porosity the action is more rapid as it appears to take place simultaneously throughout the structure.

The more porous concrete is subject to the action of other disintegrating forces of a physical nature, such as frost action and the crystallization of salts in the pore space.

A dense concrete mixture, through some property not determined, such as low percentage of pore

space or the character of this pore space, results in a greater resistance to the action of the alkali ground waters. Apparently this is true in either mixture 1:1½:3 or 1:2:4. Chemical action takes place over relatively small distances, direct contact of the reacting elements being necessary. The more porous concrete allows this more intimate contact throughout the structure; and consequently more rapid action takes place.

5th. The presence of alkali soil solutions does not retard the setting of the cement.

6th. The action is undoubtedly more rapid in weaker mixtures and mixtures of low density.

7th. No apparent difference in results was found in blocks and cylinders made of Eastern and Western cements.

Continuation of Experiments.—The investigations are being continued in several lines that may give further information.

Blocks after approximately 20 months' curing in the Calgary district on which no alkali action has as yet become apparent, have been transferred to the Cassils location, and action of alkalis will be noted.

New blocks and cylinders are being prepared from gunite, and these after curing will be placed in the Cassils location and action of alkalis will be noted.

Some tests are being made on waterproofing compounds at the present time.

The important practical phase of this matter is to have further investigation work carried on by competent chemists and engineers, working in close co-operation with one another; and in the meantime for all those concerned, to make use of the existing data, and take all possible precautions and measures to prevent further deterioration to the existing works. In this connection the following points should be noted.

Desirable Features for Concrete in Alkali Soils.—Efforts should be made to get the densest possible mixture, and in this connection the smallest quantity of water consistent to good work should be used; in other words: a quaking mixture should be made of a workable mix, i. e., to a consistency that will permit of the concrete flowing around the reinforcement with thorough puddling, and not so as to cause the finer particles to be carried to the top in suspension and the heavier ones to settle. About 1 gal. of water to each cubic foot of concrete in place is a fair average for a good mix.

The best possible materials procurable should be used—and the best graded mixtures. All bank run material or river gravel should be screened out and remixed in proper proportions—based on proper tests made as to voids.

It is desirable that all material should be wash-

ed, and it is almost essential that the sand should be washed; and in this connection it would be folly to assume that sands can be properly selected and passed on, without proper tests having been made on them.

More care should be exercised in making field joints, using $\frac{1}{2}$ of 1 to 2 grout on the junctions between the old and new work.

Where chutes are used, they should be on easy slopes and kept down to the shortest possible length.

The time of mixing is an important factor, and it is now generally conceded that the best results are obtained from machine mixing for a period of about $1\frac{1}{2}$ to 2 minutes continuous revolving of the mixing drum.

Backfilling with sand and gravel with the coarser material next to walls and plenty of weep holes are all extremely desirable, and particularly on such

types of structures as have been previously mentioned, and the more easily subjected to alkali conditions.

Closer supervision of all work done, by men who really know the concrete business is essential.

Proper seasoning and protection from the elements, and not too early removal of the forms. It is important to remember that the methods and operations adopted in mixing concrete, are just as important factors affecting its density, strength and permanence, as are the qualities of the materials used.

The use of gunite and gun driven asphalt at normal temperatures or heated are being tried out, and are both likely to prove effective methods—not only of damp-proofing and water-proofing, but preventing the ill effects of alkali salts on concrete structures.

Refractory Cement Life Insurance

THIS interesting paper was read at the Sixth National Exposition of the Chemical Industries in New York City by F. W. Reisman:

It is esteemed a privilege to address you this afternoon, but the brief time allotted to me permits only touching the high spots of the many uses for varied types of metallurgical and other furnaces where plastic high temperature cement now replaces the use of fire-clay.

Plastic high temperature cement costs more than fire-clay. There must be, therefore, good reasons, you will all agree, to warrant expending a greater amount when the difference is considered between the costs of fire-clay and high temperature cement; and the question naturally presents itself, "What insurance is there for paying the difference?"

"The chain is no stronger than its weakest link." The wall, in the combustion chamber, is no stronger than its joint. The joint made up of fire-clay cannot be called strong for the reason that fire-clay possesses no bond. It will disintegrate, crumble, and fall out of the joint, leaving crevices, into which gases will enter, which, together with the abrasive action, will soon tell on the fire-brick, resulting in the weakened wall beginning to bulge out, and finally after a comparatively short life finds itself ready to drop in the bottom of the furnace. It is obvious, therefore, that the greatest efficiency of the fire-brick has not obtained.

This shortened life can be extended and the greatest efficiency obtained from the brick by the

use of plastic high temperature cement, when properly applied.

The wall laid in fire-clay lasting three months can be made to stand up for one and a half years by the use of high temperature cement. Does that not make the use of fire-clay and expensive proposition, not only from the standpoint of cost of material, but also in the item of labor cost, important in normal times and much more so today?

We advocate laying fire-brick practically in brick to brick joints, buttering them with a thin batter made of one part water and six parts of the cement. After the setting is laid, it is well to wash over the entire face of the lining with two coats of diluted cement; the first coat being of a consistency like whitewash, and the second coat immediately applied after the first, with a consistency the same as used in laying the brick. This insures an airtight wall, and, gentlemen, you will all appreciate what this means. I intend to show you in a few moments by slides the comparison between thick and thin joints. I also have with me several plates showing the merits of plastic high temperature cement, as well as its uses in various ways and as these plates are shown description will be made as we go along for various types of furnaces.

The old saying that "A man is known by the company he keeps" is equally applicable to the manufacturer; for his prestige is obtained through the character and reputation of those who use his product.

I could start in New England, taking you to the

cotton and woolen industries, where plants having fifty and more furnaces each, use plastic high temperature cement in preference to fire-clay; go along the lakes, where we find steel mills and oil refineries, packing houses and automobile manufacturers, wend our way to downtown New York, showing you central plants where, as you know, in all these instances accurate data is kept of costs in up-keep and where in these instances they have forgotten about fire-clay; go to the steel mills of Pittsburgh and Birmingham, the sugar refineries in Louisiana, the oil refineries of Texas and Oklahoma, the foundries of Missouri, the smelters of Utah and Montana, the varied industrial plants in California, the lumber mills of Oregon, and Washington, and British Columbia, where sawdust is so plentiful and is used as a fuel, causing heavy duty on the firewall, and continue on through the steel mills, gas plants and central stations of Canada, and all between these points stretched over this vast area are sandwiched glass works, electric power plants, gas works, having either coke-oven, water gas, or retort types, and everywhere we find "the kind of company we keep," having made satisfied friends by giving them longer life in the furnaces through the use of high temperature cement.

We are reaching out beyond these limitations and life insurance of furnace walls is now being realized by the agency of high temperature cement in far off Japan and Italy, France and Belgium are today becoming acquainted with its merits.

Indian "Topia" Concrete Everlasting

History makes very clear the fact that our forefathers believed in preparedness; that in times of peace they prepared for war. They trusted God, but at the same time they took care to mold bullets and to keep their powder dry.

One of the quaint builders of our country, and no doubt the most unusual of its kind anywhere to be found, is the old powder magazine, in Charleston S. C. It was built in 1703, and its walls of old-time cement, known as *tapia* (the Spanish call it *coquina*), are still in excellent preservation.

When the early settlers came to Carolina they found that the Indians possessed the secret of a formula for the making of concrete that was well-nigh indestructible. The concrete was formed chiefly of powdered shells, gravel, a certain kind of fine sand, with a small addition of native tar. But there was as much in the mixing, in the quantity of water used, as in the ingredients. When properly mixed the *tapia*, hardening, became as firm as stone.

The old powder magazine in Charleston, built of the Indian mortar, has stood with compact walls for more than two centuries. It is a building of considerable historic interest, owing to the fact that here was stored the cargo of powder that was seized aboard a British frigate in Charleston harbor, in 1775, by a determined little band of Carolina patriots. The powder was stored for safe keeping in the magazine till it could be sent—in response to Washington's appeal—to the struggling little Continental army around Boston.

The English Concrete Road

A Comparison With the Macadam Highway

WE have been slow in this country to construct concrete roads, and even yet their use is no more than in the experimental stage. Comments the Manchester, England, *Guardian*. Moreover, these experimental lengths have been so recently built—for all practical purposes we must wipe out of the computation the years of war and the years of prohibitive prices that have succeeded—that we are not yet sure of our data. The question in doubt relate to their economy of first cost and of maintenance, the resiliency of the surface under the action of the destructive traffic of to-day, and the great inconvenience arising if, as urged, their construction means that the whole width of a road must be laid at once. Yet there is evidence that speaks favorably on all

these points, that testifies to the wearing qualities of the concrete road and to its economy of upkeep, and that meets with a flat denial the argument that such a road must be laid in whole-width stretches. That evidence is worth close examination, for we are a long way behind the times with our roads.

Cardinal Points.

America, unhampered by any road tradition, and, indeed, up to recent years lacking a good road system, has gone in extensively for concrete roads, and therefore has data, some of it very detailed, bearing on all these points. Generally the experience gained there is favourable. Something has yet to be learned concerning methods of construction and laying, but where the circumstances have been favourable

the concrete road has been an undoubted success. In regard to construction, on which depends the success of the road, there are four cardinal considerations. Experience lays it down that the sub-grade should be compact and well drained. The concrete, to quote from a journal devoted to the concrete industry, should have a mortar that binds firmly and an aggregate that is highly resistive to abrasion so placed that these two qualities are most available where most needed. Methods of curing should be adopted which insure the fullest possible development of the strength of the material. Joints in the work should be filled with an elastic material and protected at the end so as not to brake down under the impact of traffic. Generally speaking, the experience of the American road engineers seems to focus in the opinion that the concrete highway, properly constructed under intelligent and expert supervision, is superior to the macadam road, and when covered with a pitch coating is superior to a bituminous macadam road.

Safe for Horses.

The question of resiliency brings in the fitness of the road surface for use by horses. This is one of the weaknesses of the bituminous road as laid in this country, which takes on a polish dangerous to horses under the action of motor-vehicle wheels. Interestingly enough, the one opinion quoted on this point in several reports examined by the writer was that of a veterinary surgeon, a concrete road enthusiast. He is convinced that the ordinary macadam road, with its projecting stones, is far greater nuisance to the feet of a horse than is concrete, even though macadam may have a little more resiliency. The difference is, however, so slight that it more than counterbalanced by the even surface of the concrete road.

With regard to upkeep, the following figures, taken from the detailed records kept by the surveyor of Huron County, Ohio, give the average yearly cost of the entire system of concrete roads in that area:—

Year.	Miles maintained.	Cost per mile
1917	68.56	\$41.20
1918	82.97	\$29.44
1919	96.27	\$20.10

The maintenance costs refer only to surface maintenance and do not include the maintenance of shoulders, ditches, &c. The cost for the first year after construction are almost always more than the second, as it is the policy to try all the joints the first year. Huron County has 17.58 miles of concrete roads wider than ten feet and 78.60 miles of ten feet or less in width. In 1919 the wide roads cost \$27.08 per mile to maintain, while the narrow roads cost 18.53 per mile. Of the wide roads 9.53 miles are not reinforced, while 8.05 miles are reinforced. The

cost in 1919 of maintaining those not reinforced was \$47.70 per mile, while the cost of those reinforced was \$2.57 per mile. These figures have an interest all out of proportion to the mileage they cover.

Opens Canadian Office.

The Portland Cement Association announces the opening of a Canadian office in the Birks Building, 718 Granville Street, Vancouver, B. C., in charge of A. E. Foreman as district engineer.

Mr. Foreman, who is a native of Canada, has since 1890 made his home in British Columbia where he has become well known through numerous engineering connections, last of which was Chief Engineer of the Department of Public Works, Victoria, B. C., which position he resigned to join the forces of the Portland Cement Association.

Mr. Foreman was graduated from McGill University in 1903. After a year's travel and several years spent in accumulating general business experience, he formed a connection with the Concrete Engineering & Construction Co. of Vancouver, of which firm he was Secretary and General Manager from 1907 to 1909. For a year following, he was member of the firm of Dutcher & Foreman, Consulting Engineers of Vancouver. Since 1910 he has had various engineering connections, among which are the following:

Resident Engineer in charge of construction of Hydro Electric Power Development at Revelstoke, B. C.

Supervising Engineer on special harbor work for Victoria, B. C.

Assistant City Engineer, Victoria, B. C.

In addition to his many other activities, Mr. Foreman finds time to maintain official relations with a number of engineering and other societies, and at the present time is president of the Canadian Good Roads Association.

Concrete Sea Wall Barrier.

One of the greatest pieces of concrete work in the United States is the sea wall which is being built along the Gulf front of Galveston island for the purpose of protecting the city of Galveston, Tex., against possible destruction or damage in time of tropical hurricanes. The wall is 17 feet high, 17 feet wide at its base and 5 feet wide at its top. Its original length was 17,593 feet, but an extension of 10,300 feet is now being built by the government, which, when completed, will give the city a solid protection wall more than five miles long.

The total cost of the five-mile sea wall will be approximately \$3,000,000, and a further extension of two miles is under consideration. Of the 10,300 feet of sea wall extension, approximately 7,800 feet has been completed.

With difficulties of obtaining material and cars for its shipment, as well as labor, largely overcome,

the last year has been a satisfying rate of progress on the project, which was begun in June, 1918. It was not until Feb. 13, 1919, however, that the actual work of pouring concrete on the government's portion began, the work up to that time having been hampered by war conditions.

Changes in the American Engineering Standards Committee.

The United States Department of Agriculture recently became a member of the American Engineering Standards Committee. This committee is an organization originally made up of three members from each of the five founder engineering societies—American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Mining Engineers, American Institute of Electrical Engineers, and the American Society for Testing Materials. The committee was later enlarged to take in three representatives each from the Army, the Navy, and the Department of Commerce. More recently organizations dealing with safety codes and with fire protection have been admitted to membership on the committee. The purpose of the American Engineering Standards Committee is to bring about the adoption of uniform and satisfactory standards in engineering work.

The department is entitled to three representatives on the committee, and the Secretary of Agriculture has appointed one from the Bureau of Chemistry, one from the Bureau of Public Roads, and one from the Forest Service.

The Bureau of Chemistry is interested in specifications and standards for a variety of materials including leather, paper, naval stores, dye, fiber products, vegetable and animal oils, etc. The bureau, from time to time, has prepared various specifications and methods of grading such materials based on results of extensive investigations.

The Bureau of Public Roads has done work on the standardization of specifications for road materials. It has had large experience in road work and has excellent facilities for observing the wearing qualities of various kinds of roads built under the direction of the bureau and otherwise.

The Forest Service has taken part in the establishment of standards for forest products of various kinds for over 20 years, including the establishment of names for trees and woods, strength values, forms of construction, specifications, grading rules, etc. The Forest Products Laboratory of the Forest Service, at Madison, Wis., has for a number of years conducted extensive tests and investigations of forest products and assisted in the preparation of standards and specifications covering the use of wood in engineering construction.

The opportunity for bringing about increased

efficiency in the use of engineering materials through the general adoption of carefully considered specifications is very large. The representatives of the Department of Agriculture who are members of the committee will be able to materially assist in furthering the work of the committee when dealing with the large variety of materials on which the department has conducted extensive tests and investigations.

The first meeting of the committee which the department representatives attended was held in New York, October 9. The representatives of the department appointed by the Secretary are: A. T. Goldbeck, Bureau of Public Roads; D. J. Price, Bureau of Chemistry, and E. H. Clapp, Forest Service.

Largest Concrete Swimming Lake.

ROANOKE, Va., a city with a population of more than 50,000, boasts the largest concrete swimming lake in the world. About four miles from the center of the business district is Lakeside, covering an area 300 feet long and 125 feet wide, its greatest depth being eight feet with a gradual incline to a depth of one foot. A rope is stretched across one end, where the depth is about three feet, for young boys and girls. In the center are four spring boards, 12 feet above the waters. Steps on the inside of the lake wall's lead into the pool.

Lakeside gets its water supply from Mason's creek, fed from clear springs miles up in the hills. A large pumping system has been installed to fill the lake, which holds more than 1,000,000 gallons. It can be filled in 25 to 30 hours. A purifying system will render the water pure enough to drink, as it enters the lake.

A two-story bath house is provided, the upper story for men, the lower for women. The clubhouse has a pavilion, newsstand, soda fountain and cafe service.

Cost of Pipe Joints with Cement.

In a recent discussion of pipe jointing compounds before the New England Watertanks Association (June Journal of the Society) Mr. E. E. Wall, Water Commissioner of St. Louis, Mo., gives the following data on the construction of pipe joints made of portland cement.

Joints made of portland cement were used on about 800 ft. of 6-in. pipe line laid in 1917 to supply Camp Galliard, a temporary recruiting station for a regiment of engineers, afterwards the 312 Engineers. From the 12-in. main for a distance of about 150 ft., the 6-in. pipe joints were made of lead, because the pipe was crossing a highway and also passed under the track of the water works railway, and it was assumed that any and all vibra-

tion or shock would be less liable to produce leaks with lead joints than with more rigid ones made of cement.

The cement joints were made by employees, who had formerly had experience in such work for the gas company, who have laid all of their smaller mains in St. Louis for years with cement joints.

No leaks developed, and the joints showed no deterioration or checking when the line was taken up a year later. The water pressure ranged from 90 to 210 lb. per square inch.

It was found that one bag of cement made 18 joints, and each joint required twice as much jute as a lead joint. Three men fixed and made 8 joints per hour.

Two men can attend to lead pot, make rolls, run and calk ten 6-in. joints per hour.

The actual cost of making 66 joints of cement in 1917 was:

4 sacks cement at 43 $\frac{3}{4}$ c.	\$ 1.75
16 $\frac{1}{2}$ days' labor at \$2.42	39.93
8 $\frac{1}{4}$ days' labor at \$2.10	17.32
82 $\frac{1}{2}$ lb. jute at 8c.	6.00
	\$65.60

Concrete is Good Material for Piping.

A general increase in the use of concrete for irrigation pipe lines has made it necessary to study concrete pipes from an engineering standpoint. This has been done by the irrigation engineers of the Bureau of Public Roads, United States Department of Agriculture, and the results are presented in Department Bulletin 852, "The flow of Water in Concrete Pipe." The engineers say that poor construction has often brought concrete pipe, when used for carrying irrigation water, into disfavor, but where properly made the pipe is undoubtedly a success.

For a long time concrete was thought to be adaptable to low head pressure only, but, with the better methods of construction now in use in this country, concrete pipe is often used for 100-foot heads. In Europe concrete piping is successfully subjected to much heavier uses and lines have been built to withstand pressure heads of several hundred feet. Steel reinforcement is usually given the pipe when the heads exceed 15 or 20 feet.

Concrete has the advantage of being capable of construction on the spot where the pipe is to be laid. This feature makes it extremely valuable for irrigation projects and pipe lines that are far removed from railways and where transportation is difficult. Its cost compared with the cost of cast iron and steel, its permanence and comparatively fire proof qualities, are in its favor. Reinforced concrete pipe is usually more expensive than wood-stave pipe and has not the required elasticity of wood or

metal when subjected to the wide range of temperature. Proper expansion joints, however, will care for these temperature changes, it has been found. Tests made by irrigation engineers of the department show that, while average concrete pipe has not the carrying capacity of average-stave pipe, a concrete pipe of the highest grade will convey slightly more than the same size of wood-stave pipe.

It is difficult to obtain any figures on the period of usefulness of the concrete pipe. It is apparent, however, from studies made of pipe laid down 38 years ago that there is no material decrease in the carrying capacity. A concrete pipe in France, after fifteen years of service, showed a deposit only one-sixteenth inch thick on the interior surface. The bulletin contains abstracts of experiments made by agencies other than the Irrigation Division, and is illustrated by photographs showing various forms of cement pipe construction. It treats primarily of the subject of flowing water in concrete pipes and is based on field tests made on pipes in commercial operation. The bulletin is intended for the use of engineers designing and measuring concrete pipes for irrigation, power, mining, municipal or other purposes, and for courts and lawyers interested in cases involving questions as to the carrying capacity of concrete pipe.

Concrete Paving on Adobe Sub Grade.

Perhaps the most troublesome subgrade over which permanent pavements are built is the adobe found in many parts of the southwest. In the summer this soil bakes hard and cracks, leaving openings large enough to insert a man's arm. Moisture causes adobe to swell and heave. Shrinking follows when it dries out. In paving an 8-mile stretch of road over an adobe subgrade in Butte County, California, special precautions are being taken to resist the action of the adobe. The method is described in the August-September Concrete Highway Magazine.

The road passes through level country and the subgrade is thrown up 1 foot above the natural elevation of the ground. On both sides ditches are dug to assure adequate drainage. The subgrade is then rolled and the grade thoroughly compacted.

A 4-in. mat of gravel is placed over the subgrade and this is thoroughly compacted with a 12-ton roller. Side forms are placed and the subgrade is then ready for the concrete.

A 6-in. slab, 18 ft. wide, of a 1:2:4 mix is used. Reinforcing rods are placed every 18 in. across the pavement about 2 in. from the bottom of the slab. Longitudinal reinforcing is placed 3 in. from the edges of the pavement, each rod lapping 18 inch. at the ends.

It is stated that this type of construction has

never before been tried in California, but it is believed that with these precautions a pavement will be obtained which will successfully withstand the tendencies of the adobe subgrade to destroy the pavement.

The pavement is being built by the Claifornia Highway Commission under force account arrangement with the contractors. T. A. Dennis is Resident Engineer in charge and E. C. Straucher, Superintendent of Construction.

Concrete and Cement Plants.

Sand Springs, Okla.—Frye & Son, C. O. Frye, Prest., Tulsa, Okla.; secured acreage of limestone and shale; plans to mfre. Portland cement.

Jopln, Mo.—John Zeidler, St. Joseph, Mo.; establish plant; leased building; install mech.; mfre. concrete pipe.

KIRKPATRICK SAND AND CEMENT CO.
 BIRMINGHAM, ALABAMA
 All Grades of Sand and Gravel for construction and foundry purposes.
 CAPACITY ONE HUNDRED CARS DAILY.

COOK & LAURIE GRAVEL COMPANY
 Capacity 15 Cars Per Day
 Washed and Screened gravel and Sand for all purposes. Concrete Gravel, Roofing Gravel, Reinforced Concrete Gravel (thoroughly tested and proved superior to granite in fire resisting qualities), Pea Gravel, Screened Sand, Concrete Sand, Marble Sand (finest for sawing marble). Used throughout Georgia and Alabama.
 9 1/2 Madison Ave. : MONTGOMERY, ALA.
 GRAVEL PIT, COOK'S, ALA.

Finds Cement Deposit on Farm.

Dr. J. J. Bennett, a Baptist minister, whose home is near Stone Mountain, Dekalb county, Ga., has recently discovered that his property in Bleckley county is very rich in raw material for making Portland cement. An exploration of his 300 acres is said to have indicated the presence of this material to yield about 150,000,000 barrels of the finished product. A company known as the Magnolia Development Company, with F. N. Merry as general manager, assisted by Dr. Bennett and others, will manufacture cement from this deposit.

FOR SALE OR LEASE.
 A complete concrete products plant, consisting of two "Ideal" block machines, 800 staple post molds, mixer and conveyor, motor driven. Switch track to building. Ten acres of abandoned cement tunnels with an even temperature of 55 degrees Fah. the year around, for curing and storing. The plant is located on a one acre plat in the wealthiest farming community in the state. For particulars, address,
Portland Cement Products Company,
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Underground Garbage Receivers
 The sanitary way to store garbage. That filthy garbage pail shows up again this Spring. We have had fifteen years experience eliminating them. Thousands of satisfied customers appreciate the change.
 Our Truck will wheel your ash barrel up or down steps.
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Let us send you complete description of this mold and the vault it makes.
AUTOMATIC SEALING VAULT CO.
 26 East River St., PERU, IND.

Needed Six Sacks of Cement.

“A half dozen sacks of cement isn't much to a job that has eight or nine thousand yards of concrete in it, but when you haven't got that half dozen and need it to finish pouring a slab and can't get it, then they look mighty big.”

Thus ran the comment of a contractor who was in just that predicament. Not a sack of cement in town that was not tied up. A yard of concrete to pour to finish the slab and no cement. In this instance, after an hour's hunt, he found enough to finish his pour.

The illustration is given to emphasize the shortage of cement in St. Joseph, and the shortage is not now the result of transportation. Correspondence with mills which were not making deliveries brought the information that the trouble was cars, but a personal visit to the mill indicated clearly that there is

a shortage of production.

Are the mills running to capacity? Is the production being purposely limited to keep the demand in excess of the supply? In two recent instances, upon receiving contracts for jobs, the contractors entered into contracts with dealers to furnish the necessary cement for the jobs at 75 cents net. But no deliveries resulted at that figure while it could be had for 95 cents. It is not easily believed that the mills are running to capacity, in view of the little building construction now going on. True, road work is making heavier demands on the mill, probably, than ever before, but still it seems that a normal growth of plant would take care of that increase and still be able to furnish enough for building construction.

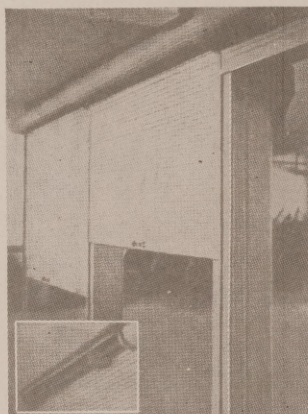
Another point in connection with cement supply. It is impossible for a contractor to buy his cement except through a local dealer, regardless of the quan-

We have molds for Vases, Flower Boxes, Spindles, Caps, Bases, Sills, Lintels, Coping, Lawn Seats, Pedestals, Columns, Bird baths, Jardinieres, Ball molds, Lighting Standards, Sun dials, Pier blocks, in fact a mold for every purpose.



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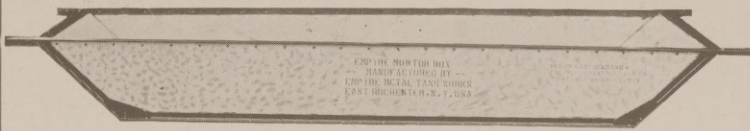
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Works at Egypt and Lesley, Pa., and Norfolk, Va.

tity. It is without doubt necessary for the producer to protect his distributor, but are not contractors, using enormous quantities of cement yearly, enough of a factor in the distribution of cement to warrant their being able to secure their supply without its first having to go through a dealer's hands? Particularly, as in most cases, where the shipment is large, the material not only does not pass through the yard of the dealer, but in most cases is not even seen by him.

This brings up the point, too, of whether a contractor should be entitled to a discount from the supply dealers. Under the method in vogue here, the contractor cannot buy his large quantities of material at any advantage over the occasional purchaser of small quantities.

The car supply is getting much better in this section and rock is available, but we must have cement.

Improved Concrete Mixer.

Application has been made at Washington to patent an improvement on the Austin cube mixer drum made by the Austin Machinery Corporation, Railway Exchange Bldg., Chicago, Ill. Strong claims are made on speed of mixing, loading and discharge. The new design is called the Cube-Hex and the mixing action is increased by the addition of six extra planes, which throw the concrete across the material thrown by the six-side planes. The claims are that dry mix, specified by many State bodies in many States, is much more quickly prepared than wet mix.

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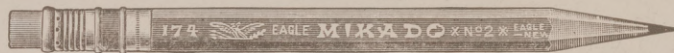
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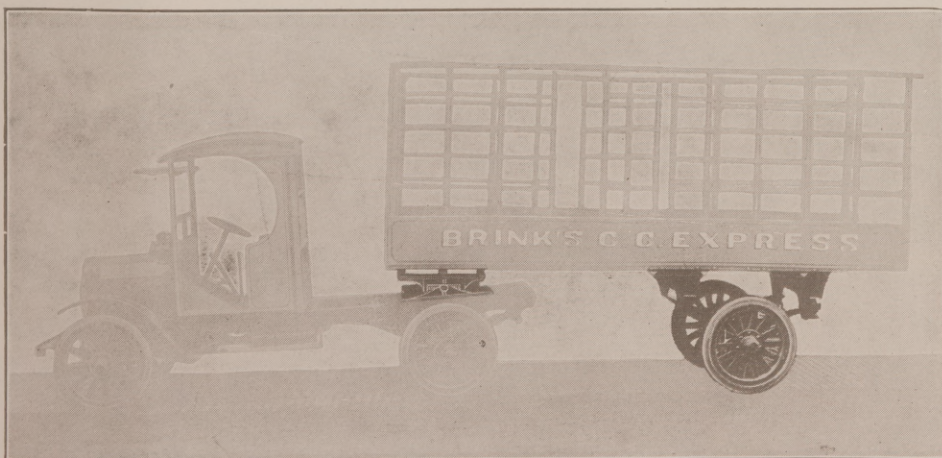
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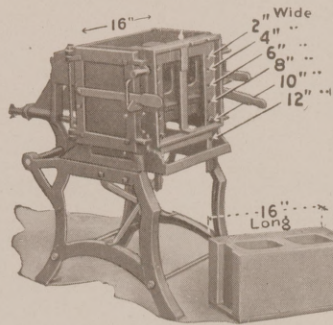
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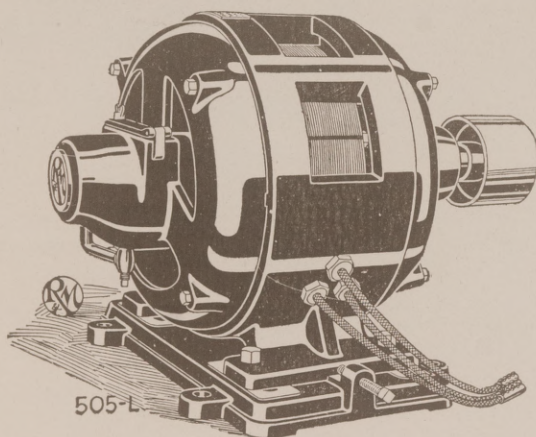
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This is particularly true where sanitation is neglected—epidemic among your employes brings business congestion and consequent financial loss to your mill, and death among your employes.

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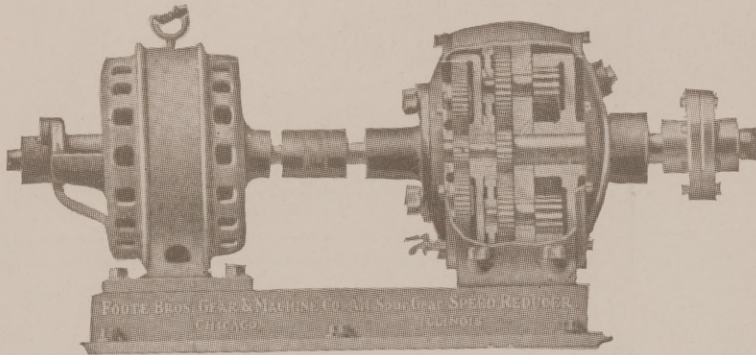
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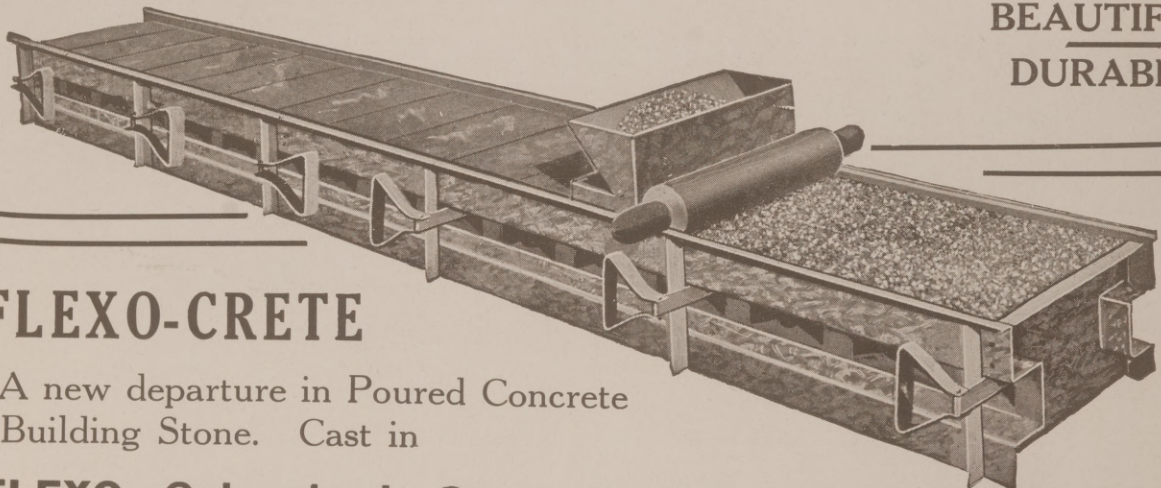
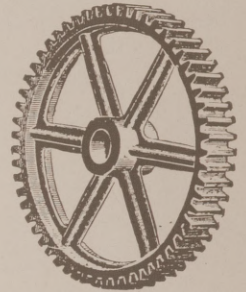
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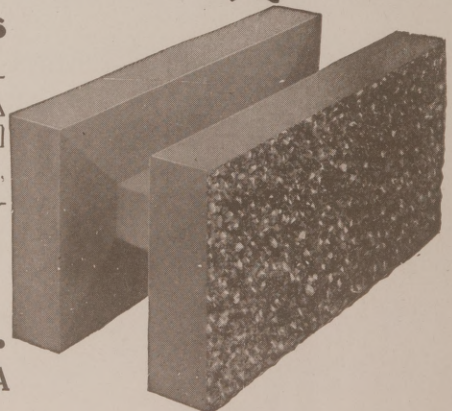
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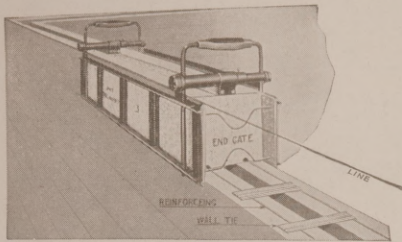
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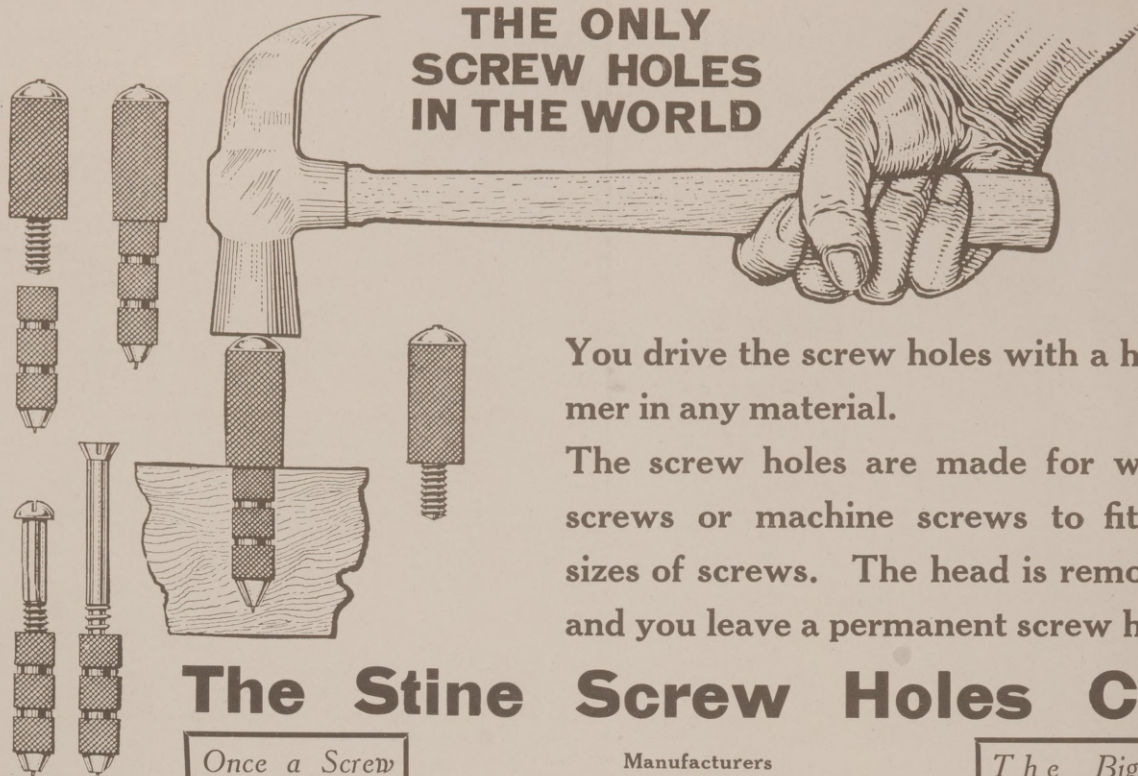
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- 11—No special screws are needed. These screw holes fit any wood screw or machine screw now in stock.
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- 15—They are endorsed by all dealers in screws and by all users of screws.
- 16—Screw holes are entirely new and the world supply is yet to be furnished.
- 17—This is a progressive Old World of ours, and every active person in it must adopt all improved methods, and all new articles that will help him keep in the front line of progress.
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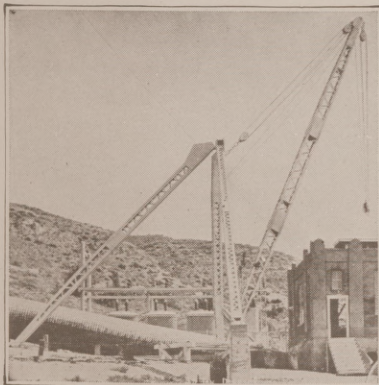
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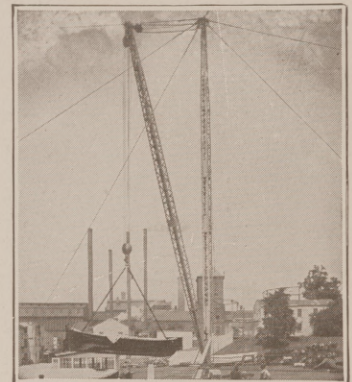
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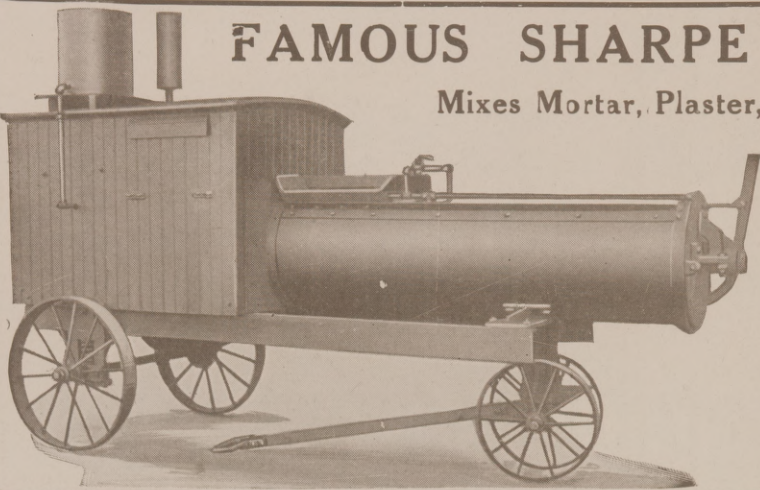
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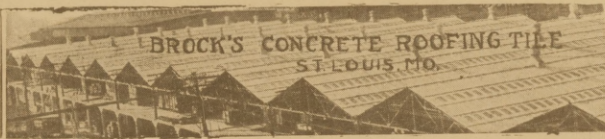
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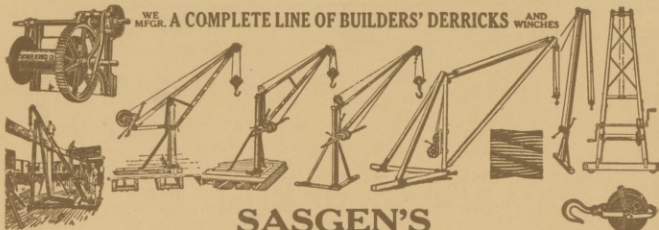
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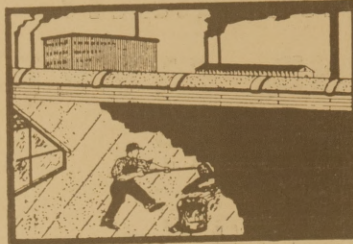
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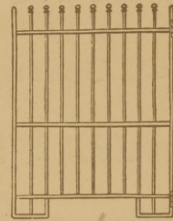
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