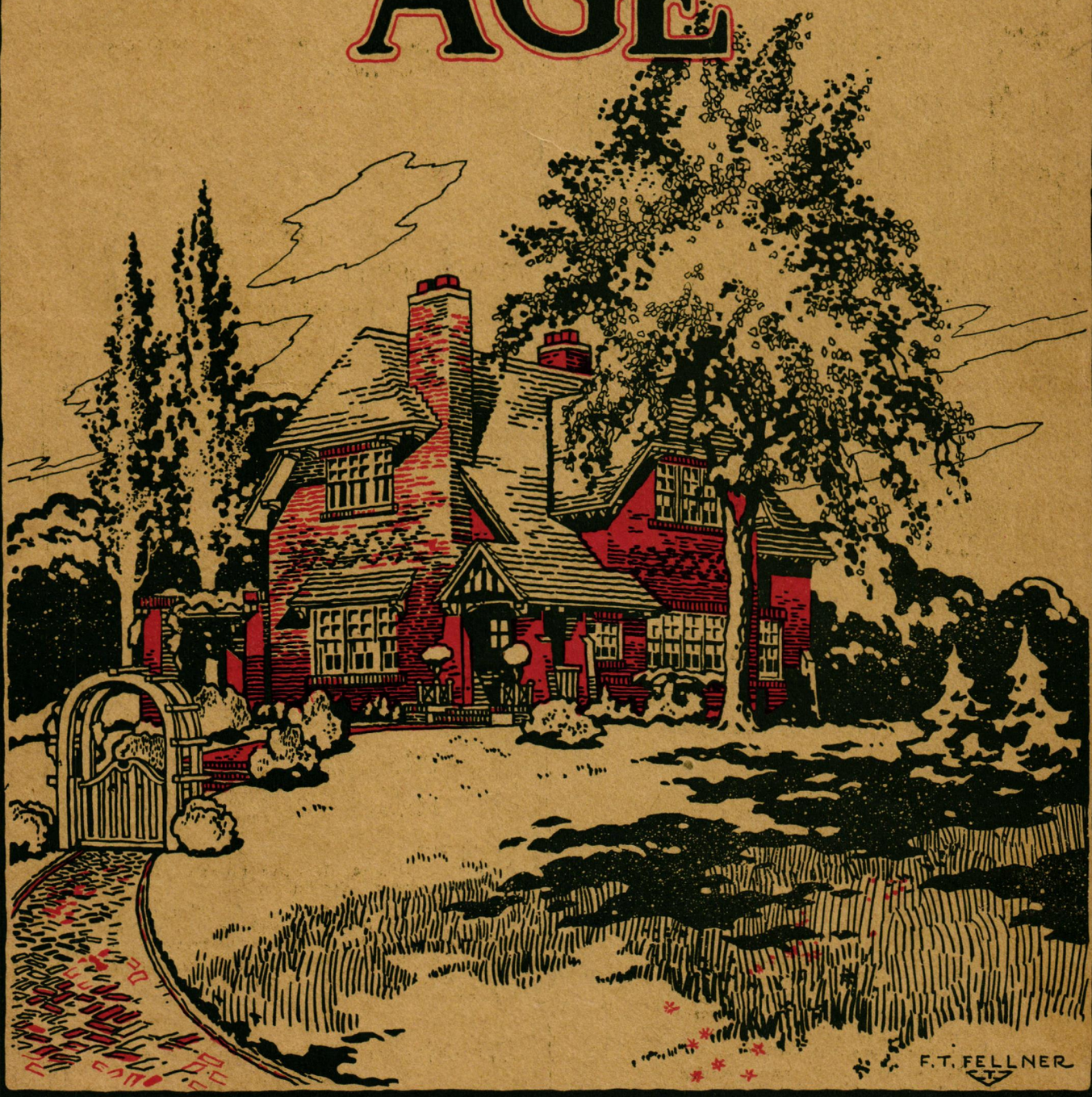
CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE



APRIL, 1915 PRICE 20 CENTS

HUDSON



ASPHALT SHINGLES

RED OR GREEN

Help Builders get new business and make satisfied customers.

They add beauty and durability to roofs which they cover.

No Paint or Stain required. Samples sent on request.

Address Department 452.

ASPHALT READY ROOFING CO

9 CHURCH ST. NEW YORK N.Y.

Yes, Mr. Contractor

You can lay Wood-Mosaic Floors of Hardwood. Our 5/16" Flooring can be laid in old houses as well as new. We make all kinds and thicknesses; Wood-carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring.

On receipt of accurate measurements of rooms, we will furnish colored sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

WOOD-MOSAIC FLOORING

Send for a free copy of our catalogue in natural wood colors.

Wood-Mosaic Company

32 Hebard Street Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.



Re-reinforcing Your Concrete

HERE'S the problem solved for architects, engineers and builders—how to prevent the disintegrating and corroding effect of water seeping through concrete.

Bay State Brick and Cement Coating

does it, because it's an absolutely waterproof coating. Keeps concrete, stucco or brick walls *dry*, makes them more enduring and preserves the metalwork.

Comes white and in beautiful shades. For interior walls, too.

Get the experience of other engineers and builders—it's all in our free Booklet 19.

WADSWORTH, HOWLAND & CO. Inc.
Paint and Varnish Makers
Boston, Mass.



PARADUX

Waterproof Canvas Roofing & Decking

Mr. Carpenter:—

Here is a chance to add a live money-making proposition to your regular line of work.

Lay Paradux *yourself* on sleeping porches, verandas, piazzas, dormers, etc. It fits right in with *your* work and means *extra dollars* for *you* on every job.

Nobody else has a chance to step in and finish up your porch and veranda work if Paradux is on the job.

Do you get the point?

Flintkote Manufacturing Company, Inc.

98 Pearl Street Boston, Mass.
68 Beaver Street New York
651 Peoples Gas Building, Chicago

The Creosoted Lath



Built with Bishopric Stucco Board

Jno. C. Cameron Contractor and Builder Arlington, Mass.

The wood lath in Bishopric Stucco or Plaster Board are thoroughly creosoted. Why?

Because creosoting preserves them, prevents swelling, shrinking, warping, and they withstand exposure to all kinds of weather.

The Union Pacific, the Northwestern, and other railways creosote their ties and telegraph poles for the same reason.

The creosoting of wood is nothing new. It has been done for *many* years—more than long enough to *prove* that it does what it's intended to do And so it is with every other part of this product—the dovetailed lath, the Asphaltic Mastic lining, the fibre board backing—all *ages-old* in principle and acknowledged to be *unsurpassed* for the various purposes intended.

It's the *combination* of these principles and materials into the Bishopric Stucco Board that accounts for the *dependability, efficiency* and *uniform satisfaction* under all conditions, of that product.

THE DOVETAILED KEY "LOCKS THE PLASTER" BISHOPRIC STUCCO OR PLASTER BOARD TRADE-MARK REGISTERED

"Built on the Wisdom of Ages"

The dovetailed lath hold the stucco so it *can't* let loose, crack or crumble—the Asphalt Mastic is moisture proof and fire resisting, *dampness can't penetrate it* — the sized fibre board protects against heat and cold and is an effective sound-deadener. And all these in combination meet the *most exacting* requirements of a *successful* background for stucco, cement or plaster.

There is *no metal* in Bishopric Board to *rust* and *break away from its fastenings*

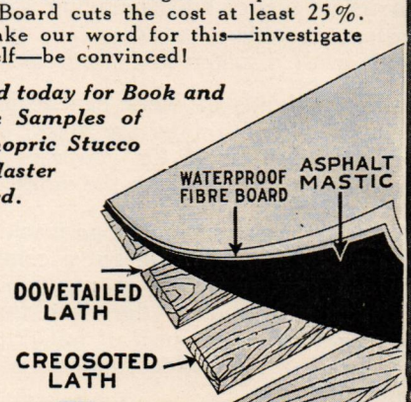
Bishopric Stucco or Plaster Board *costs less* than other backgrounds and saves in both material and labor. From *any* and *every* viewpoint it's an *economical* proposition.

Our *free book* "Durable Homes by the Bishopric System" illustrates homes, apartments, factory and public buildings on which Bishopric Board has been used. It contains letters from builders, architects and users, and furnishes facts and figures to prove that Bishopric Board cuts the cost at least 25%.

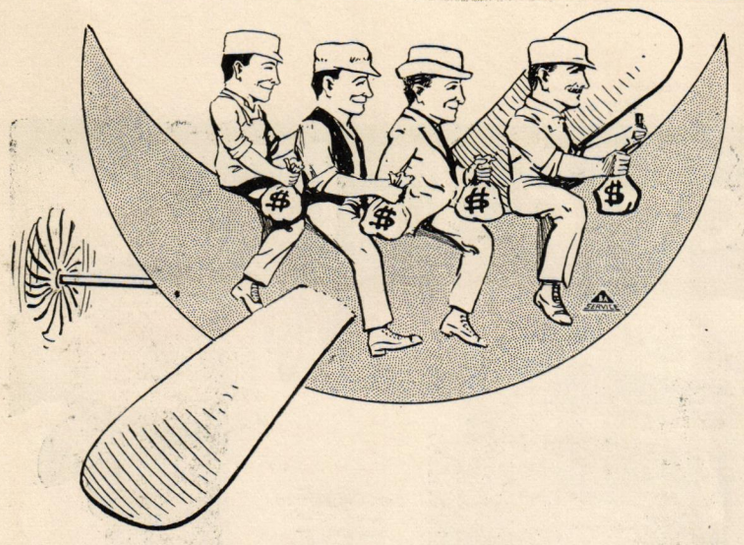
Don't take our word for this—investigate for yourself—be convinced!

Send today for Book and Free Samples of Bishopric Stucco or Plaster Board.

The Mastic Wall Board & Roofing Co.
651 Este Ave., Cincinnati, Ohio
Central Door & Lumber Co., Portland, Oreg.
Licensed Manufacturers and Distributors for Pacific Slope



CUTS THE COST ¼



Sails Right Along

The "Crescent" Universal Woodworker sails right into woodworking jobs of all kinds—puts the small shop on an equal basis with the big factory.

Instead of turning over your millwork to some one else, put it on the "Crescent" and keep the profits. The single feature of being able to have four men work on this machine, each at a different kind of work, **at the same time,** places it in a class by itself. Each man can control his own work, start and stop his own machine, without interfering with any of the others. The

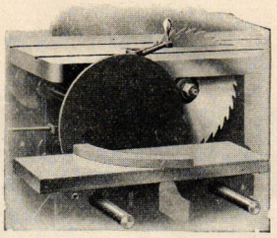
"CRESCENT" Universal Woodworker

is a shaper, band saw, jointer, saw table and boring machine all on one base. By adding attachments, panel raising, tenoning, mortising, tool or knife grinding, sanding, dadoing, resawing, moulding making and pole rounding may be done with dispatch and accuracy.

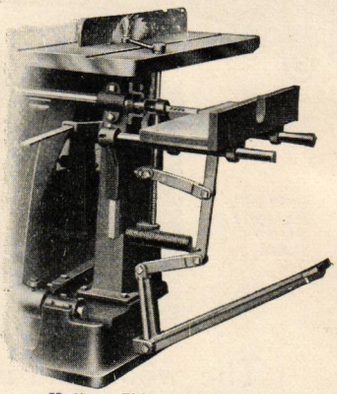
All told, fifteen different kinds of work can be performed on this machine. When things are slack, one man can do any one or all fifteen. Or you can put two or three men to work on it. Suit it to the work.

Remember, the "Crescent" is not merely *one* machine that can do four different kinds of work, but a combination of *five* machines, four of which, as mentioned, may be operated independently and at the same time. It saves you from buying a complete outfit of individual machines and offers you all the working facilities of a fully equipped planing mill.

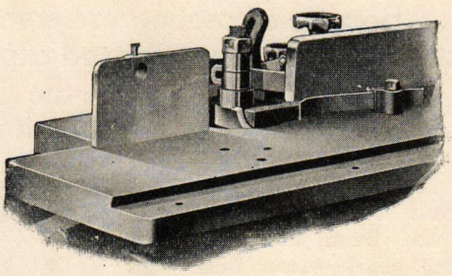
Besides, this Universal Woodworker, we build a complete line of improved Woodworking Machinery. Send for New 144-page Catalog.



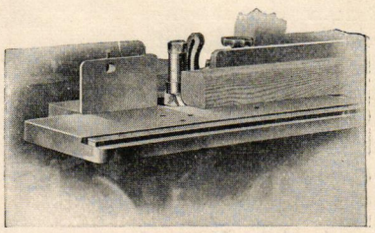
Disc Grinder



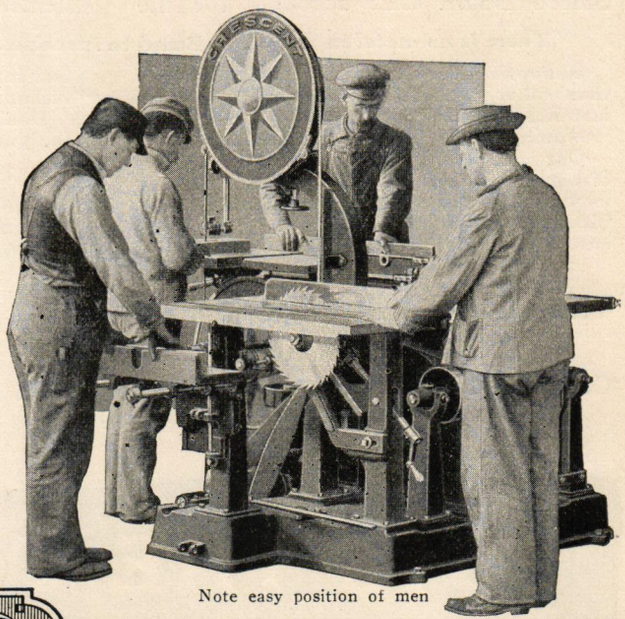
Hollow Chisel Mortiser



Shaper



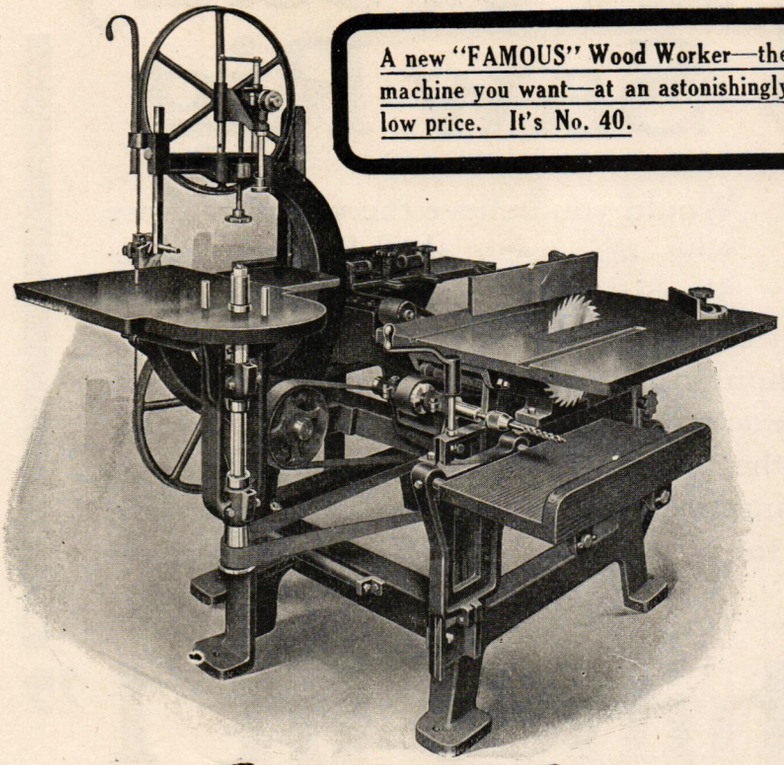
Rounding Poles



Note easy position of men

THE CRESCENT MACHINE CO.

206 Main Street **Leetonia, Ohio**



A new "FAMOUS" Wood Worker—the machine you want—at an astonishingly low price. It's No. 40.

ASK THE PRICE

THIS SPRING ***do your own millwork***—and make double profit. The New No. 40 **"Famous"** Universal Woodworker is a complete machine—with Famous features—backed by Sidney guarantee which has "made good" with over 4,000 contractors and builders.

Standard Equipment

includes 27 or 32 in. band saw, 8 or 12 in. jointer, one way or reversible single spindle shaper, saw table and boring machine, countershaft—self contained—all belts are within main frame. Self contained motor if desired.

It's O. K. FOR YOUR WORK!



Over 4,000 of your brother builders and contractors have ***put their O. K.*** on "Famous" woodworkers. They are O. K. for ***your*** work—and you'll save money this spring by using this New No. 40 which we offer at a most amazingly low price for such a type of machine. The price? Send the coupon and we'll tell you.

Attachments for No. 40

You can use the following attachments on this machine: mortiser, tenoner, sand drum, disc sander, emery grinder, knife grinder, copying head, band resaw, panel raiser, multiple boring bits, felloe rounder, pole rounder, dado heads—ANY attachment used on any of our heavy machines.

How to Increase Your Profits This Spring and Summer

Do your own millwork, for one thing! Do it with a "Famous"—the ***time tested*** woodworker. The Famous 410 Bulletin tells how. Tells how ***you*** may use this new machine to immense advantage.

The Sidney Tool Company

SIDNEY, OHIO

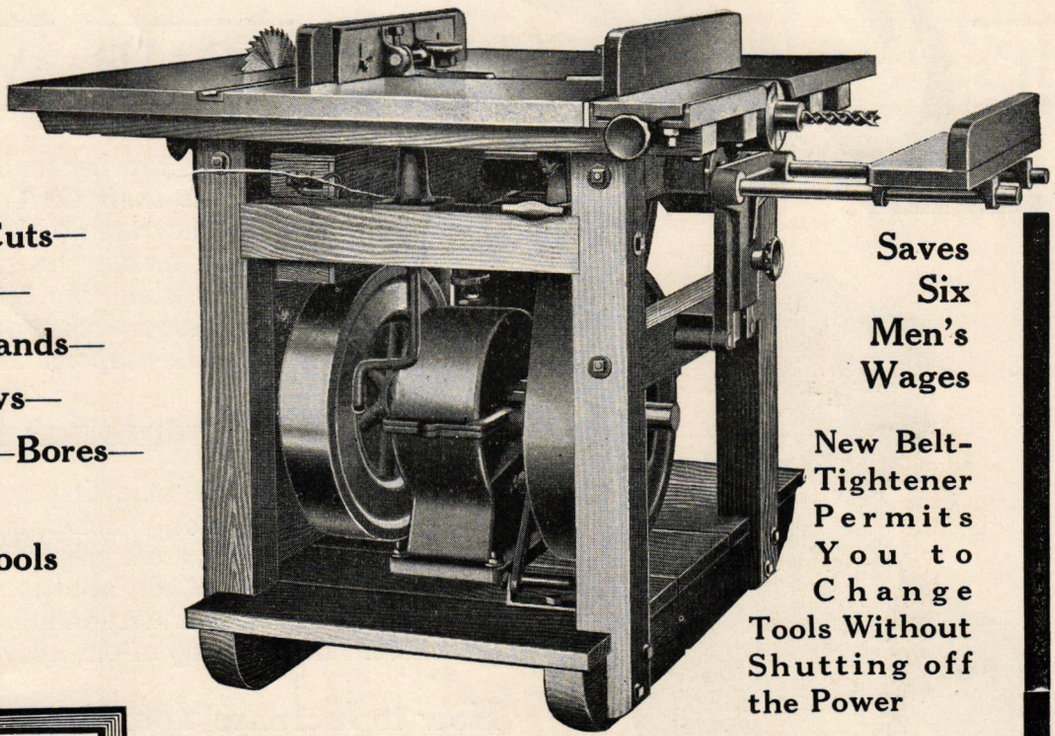
Name .....
Address .....
Send Famous 410 Bulletin to the above signed. Also, ***tell me the low price on No. 40.***

CHIEF TRADE MARK OSHKOSH

Eveready Saw Rig

Would you believe the words of those who are using this famous "Nine-Machines-in-One"? Such expressions ought to pretty nearly tell the exact, cold, unprejudiced truth—shouldn't they? Well, we will give you unsolicited expressions from actual users in any part of the country you can name—we'll give them to you from every quarter, if you wish them—just plain, ordinary, unbiased verdicts from men who have paid out their money for "Eveready" Saw Rigs, and who are using them every day.

"9 Machines in 1"



It Cross-Cuts—
Rip-Saws—
Joints—Sands—
Jigs—Saws—
Grooves—Bores—
Mitres—
Grinds Tools

Saves Six Men's Wages

New Belt-Tightener Permits You to Change Tools Without Shutting off the Power



Our Big Free Book contains a wealth of information concerning the manifold economies made possible by the use of the "Eveready" Saw Rig. Write for it today and find out more ways to make and save money than you ever thought possible. Leave nothing to doubt when investigation costs nothing but one cent for a postal card. Your name and address will bring that book.

OSHKOSH MFG. CO.
541 So. Main St. Oshkosh, Wis.

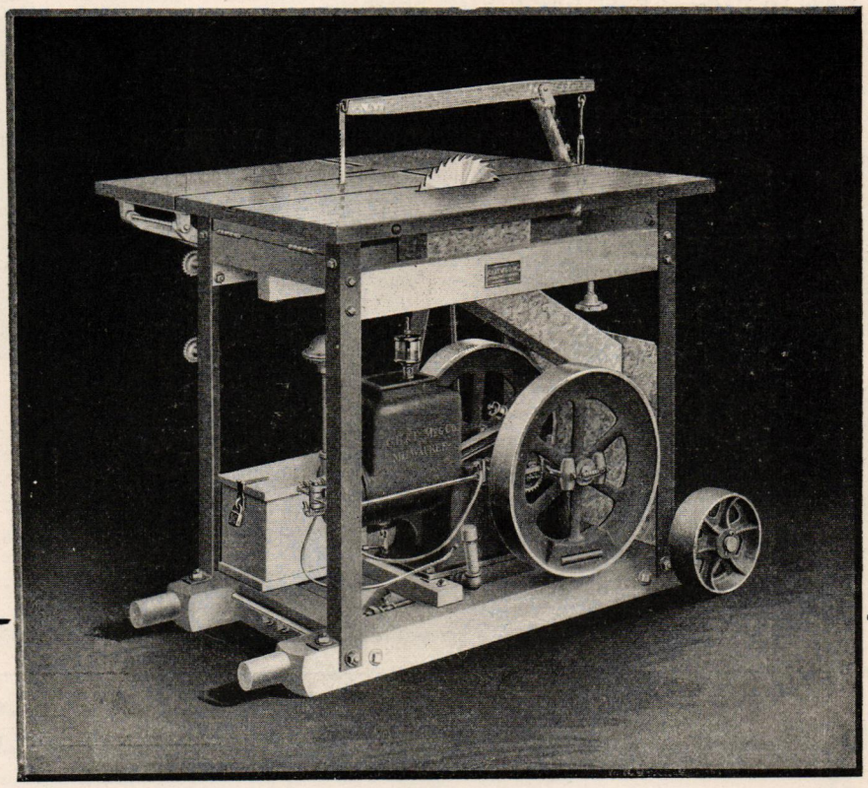
It's Mighty Convenient

to have—right there—ready to start at a moment's notice—the C. H. & E. No. 3 Portable Saw Rig, a complete woodworking mill—take it thru a door or window.

OTHER SIZES

of saw rigs and hoists, elevators, pumps, mixers, engines, etc.

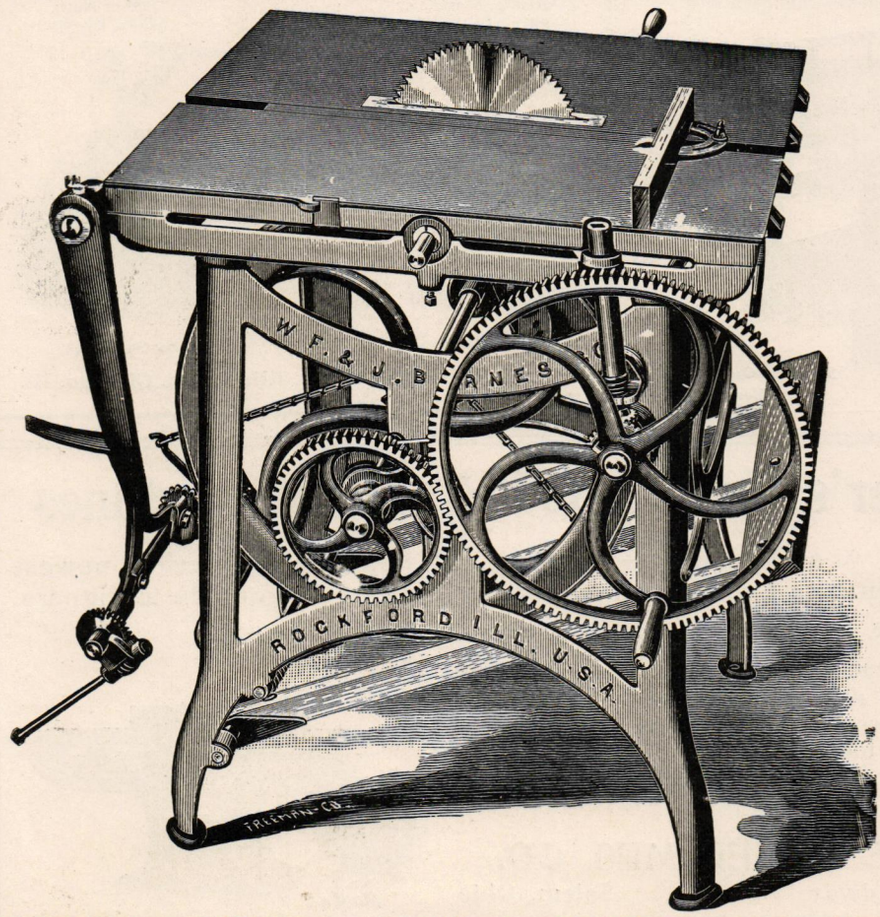
WRITE US



Send for Catalog

C. H. & E. Manufacturing Co., Inc., 330 Mineral Street Milwaukee, Wis.

BARNES Foot and Hand Power Machinery



For CARPENTERS and BUILDERS

Our New Hand and Foot Power Circular Saw No. 4, the strongest, most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, graining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines for wood workers.

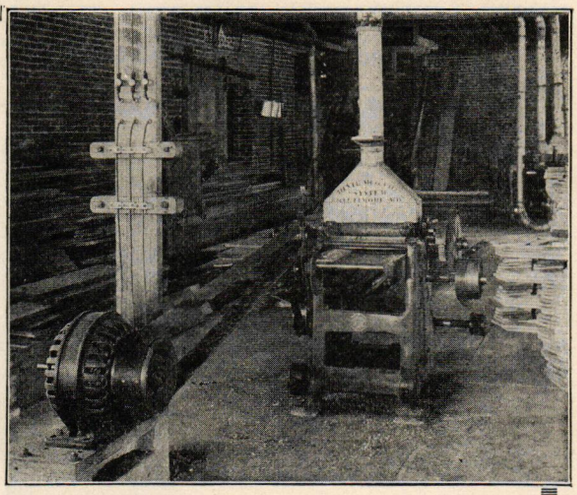
THE ONLY COMPLETE LINE OF SUCH MACHINES MADE

STRONG PRACTICAL DURABLE

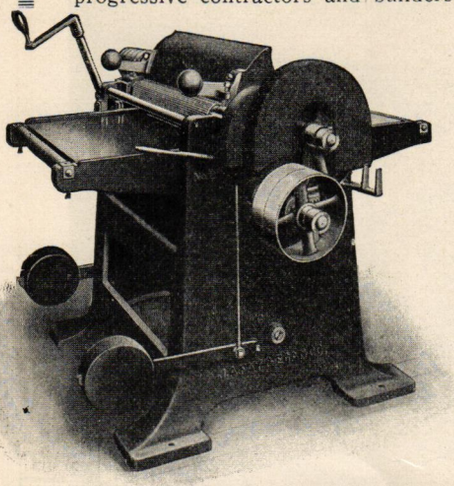
Catalogue Free on Application.

W. F. & JOHN BARNES CO.
71 Ruby St., Rockford, Ill.

Over 5000 FAY-EGAN "Lightning" No. 2 Pony Planers now in use—every one giving satisfaction—



—in every civilized country of the world—and in most uncivilized countries, too, you will find FAY-EGAN "Lightning" No. 2 Single Surfacers, or Pony Planers, in daily use in shops of progressive contractors and builders—and where you find a No. 2 you find also a highly pleased owner.



—the picture shows a typical installation—individual motor drive, with feed from cylinder to eliminate countershaft.

—a detailed view of this sturdy little surfacer shows its simple construction, enclosed gears, etc.

—and note especially, the gears on the No. 2 are cut from the solid—mesh perfectly and don't break—you can get a No. 2 with regular heads or full round heads and thin knives at the same price.

—every Contractor and Builder needs a pony planer—needs a No. 2.

Write for Bulletin A-5.

J. A. Fay & Egan Co., 221-241 W. Front St., Cincinnati, O.



Do you want the best

DRAWING TABLE

made? If so, send for illustrated catalogue and prices

R. E. KIDDER

22 Hermon Street Worcester, Mass.

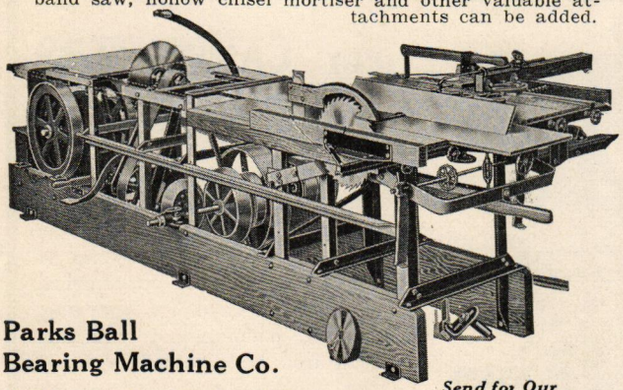
We Are the Headquarters for Books on

All Branches of the Building Trades.
New Catalogue of live, up-to-date books sent free on request.

Building Age Book Dept. New York
239 WEST 39TH STREET

PARKS' PLANING MILL ON THE JOB

Circular, rip and crosscut saw, swing cut-off saw, boring and tenoning machine, with 12-inch jointer, 22-inch band saw, hollow chisel mortiser and other valuable attachments can be added.



Parks Ball Bearing Machine Co.
Station A, Cincinnati, Ohio

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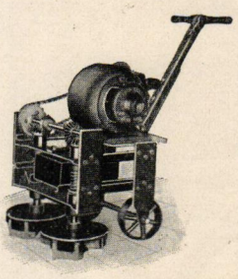
FREE TRIAL

Rapid, Flexible, Automatic, Electric Floor Surfacers.

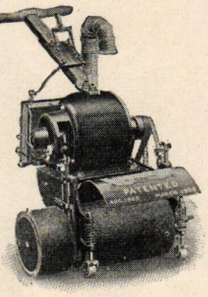
Mosaic, Marble or Composition Floors



Several Sizes

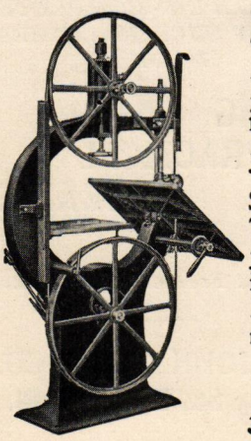
Send for Our Proposition

Old or New Wood Floors



Several Sizes

M. L. SCHLUETER, 225 W. Illinois St., Chicago, Ill.



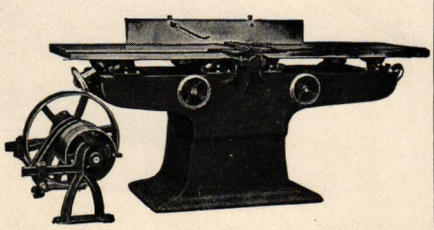
Silver's New Wood-Working Machines

Band Saws and Jointers—tools of good, honest construction, newest improvements and conveniences; patterns fresh from the designers.

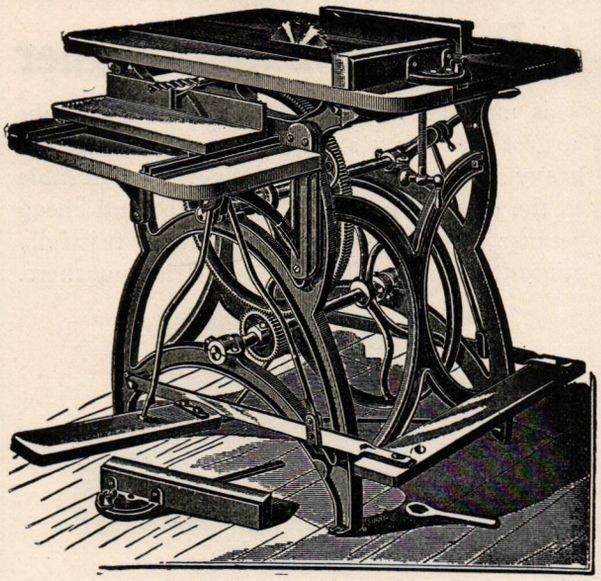
Jointers—8, 12, 16, 20 and 24-inch. Band Saws—20, 26, 32 and 36-inch.

Silver's machines are high-pressure machines. They will do your work and do it well, save you money and labor, suit you in sizes, and in prices, too.

Post up on these tools. Ask for our printed matter at once.



THE SILVER MFG. CO.
350 Broadway Salem, Ohio



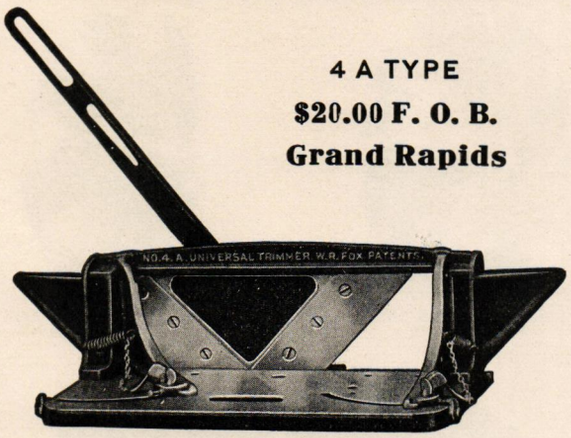
MARSTON'S HAND AND FOOT POWER CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron, accurately planed, with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine-cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight complete 350 pounds. Send for catalogue.

J. M. Marston & Company
201 Ruggles Street, Boston, Mass.

FOX

"UNIVERSAL TRIMMERS"



4 A TYPE
$20.00 F. O. B.
Grand Rapids

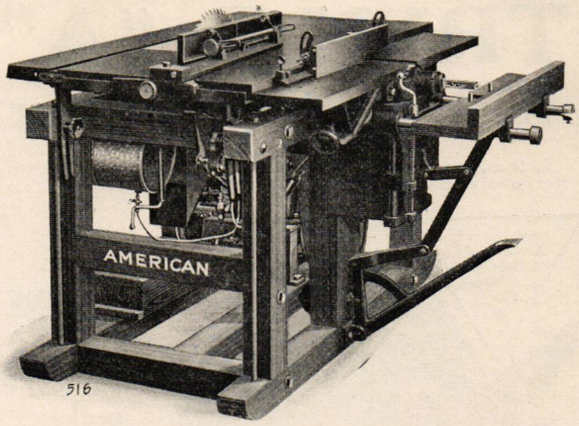
Height cut on gauge 4", Length cut on bed 7¼"

PERFECT JOINTS and TIME SAVED

are results obtained by using the Fox "Universal Trimmer" for Fitting Interior Finish.

Machine illustrated only one of our complete line of these tools.

FOX MACHINE CO.
655 Front Avenue, N. W.
Grand Rapids, Michigan



Another Big Improvement in the

"AMERICAN"

Contractor's Portable Variety

WOOD-WORKER

Year by year we have added something new to the "American" Woodworker, to make it a bigger money-maker for the contractor or builder who buys it. Last year it was the jig saw attachment. This year the improvement is

A HOLLOW CHISEL MORTISER

This device uses bits from ⅜ to ¾ inch, cutting a clean, smooth mortise with square corners and true to size. The table has a 3½-inch vertical adjustment by a handscrew and a travel of 4 inches in line with the bit. A foot lever feeds the work and a coil spring returns the table. For ordinary boring, simply remove the chisel bit and insert the regular boring bit.

Send for new Bulletin No. 57 describing this latest "American"

American Saw Mill Machinery Co.

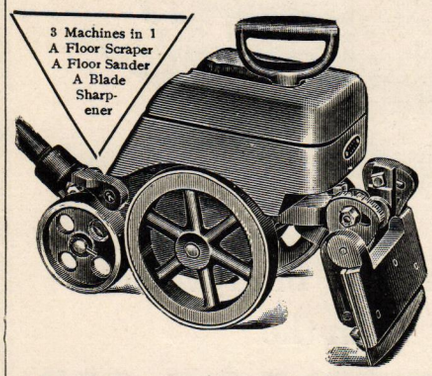
82 Main Street
HACKETTSTOWN, N. J.

1362 Hudson Terminal
NEW YORK CITY

TRIPLE "A"

The Adjustable Floorsmoother

It is adjustable in weight, depth of cut and shear of cut. Surfaces and finishes flush with the baseboard.



The MACHINE that makes the MONEY

With the TRIPLE "A" SPRING DRIVEN FLOOR-SMOOTHER, you can easily make from $12 to $20 a day refinishing new, old and varnished floors.

It is the only hand power machine that has a SPRING MOTOR. Fully as efficient as a power machine, much less expensive and guaranteed to take two-thirds of the work off the operator. Perfectly balanced, smooth running and adjustable to any floor in any condition.

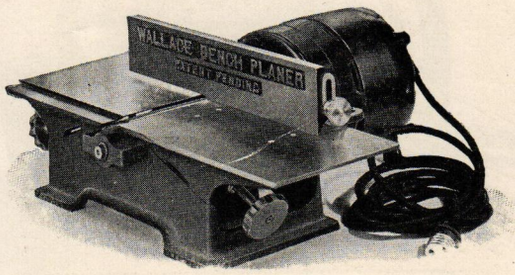
Write for Description

and complete illustrated circulars. We will also send you interesting data on the earning power of the Triple "A." Figures based on actual work done.

TRIPLE "A" MACHINE CO.
Room 330, 300 W. Grand Ave., CHICAGO, ILL.

A Portable Bench Planer

This machine will take as **heavy** a cut as the largest machines, and you can joint **long** and **heavy** stock on it. It is not flimsy, but as **durable** as the costliest machines. It is **light** and **cheap** because we got down to **fundamentals.** It is fully **guaranteed,** and will be sent on trial anywhere.



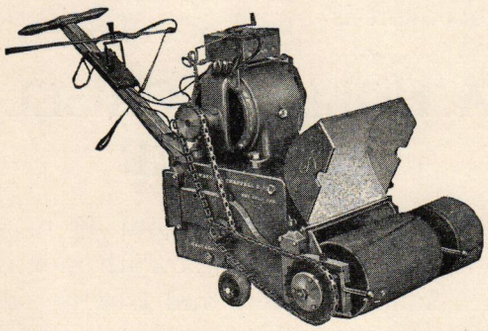
Wallace Bench Planer

Either Belt or Motor Driven

Easily portable, can be carried to the job.
Stands on bench without fastening.
Table adjustable to any depth of cut.
Fence adjustable to any angle.
Runs from an electric light socket.
Capacity, any length, and up to 4 inches wide.
Length of tables over all, 18 inches.
Weight of machine with motor, 50 pounds.

Our descriptive folders give full information

J. D. WALLACE
527 W. Van Buren Street **CHICAGO**



Automatic Ball Bearing Electric Floor Surfacing Machine

will quickly take off the wood from rough or warped new floors and sandpaper a finish superior to hand sandpaperwork, or will rapidly refinish old floors, taking off varnish, paint, etc., and make them white, clean and smooth.

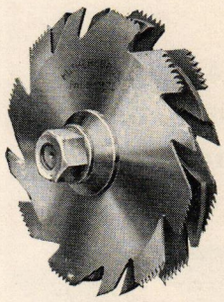
Made in 3 sizes—for small rooms and large areas. Is self-propelling—has automatic brake and gauge for easy, uniform and faster work—its powerful fan takes up all the dust—surfaces to base with Edge Roller quickly adjusted to either side, doing away altogether with the hard work of scraping—but write today for Booklet telling all about the machine, also for the names of well-known users.

Our price will interest you.

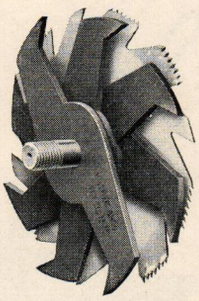
ACCEPT OUR FREE TRIAL OFFER.

Wayvell Chappell & Company
4845 Ravenswood Ave., Dept. E., Chicago, Ill.

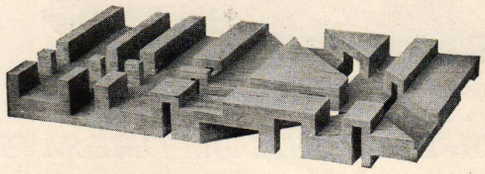
Fits Any Saw Rig



Patented Nov. 29, 1892.
Feb. 19, 1910.



Showing position of cutters on mandrel.



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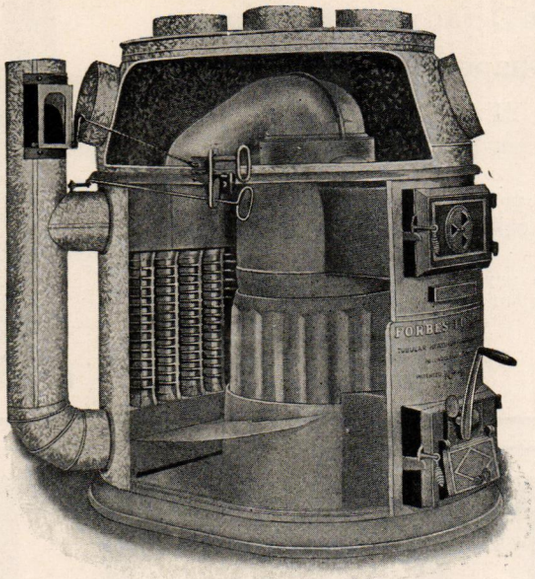

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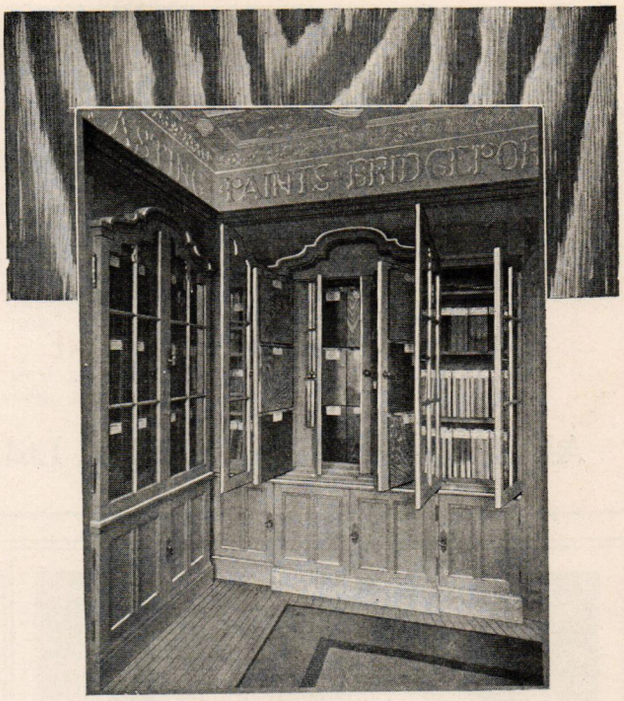

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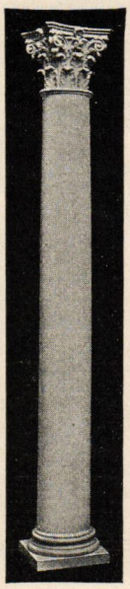

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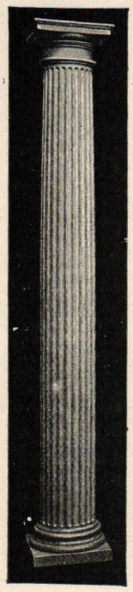

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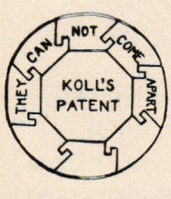

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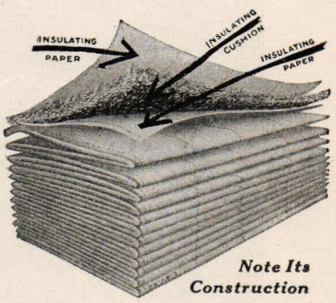
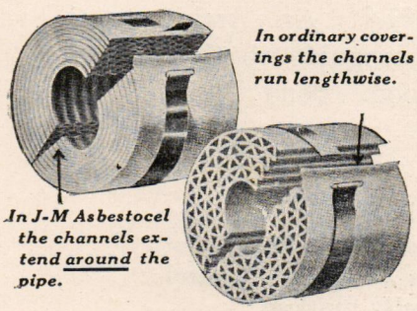


Note Its Construction



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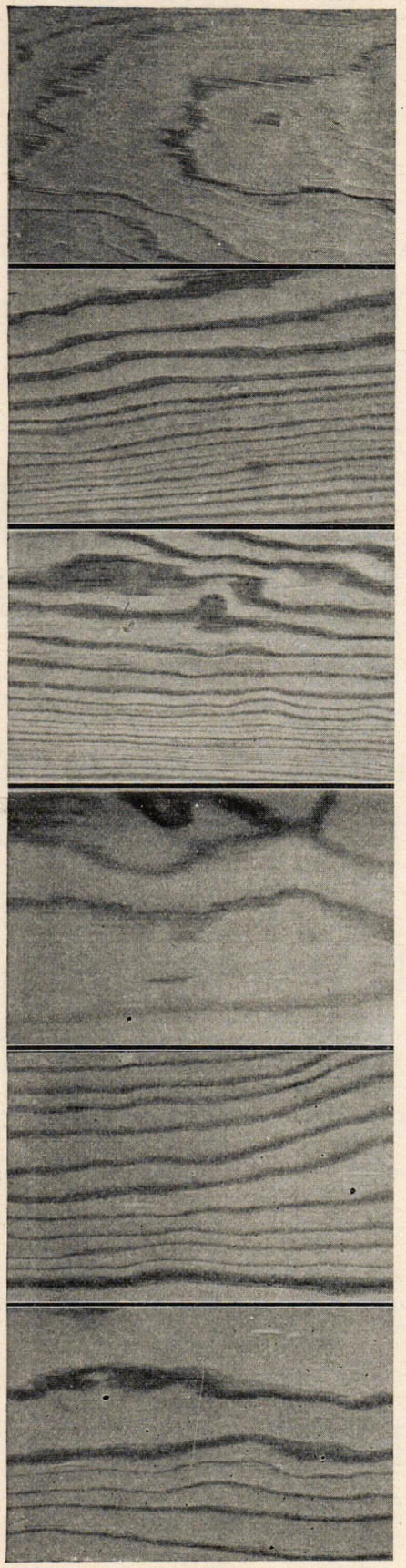

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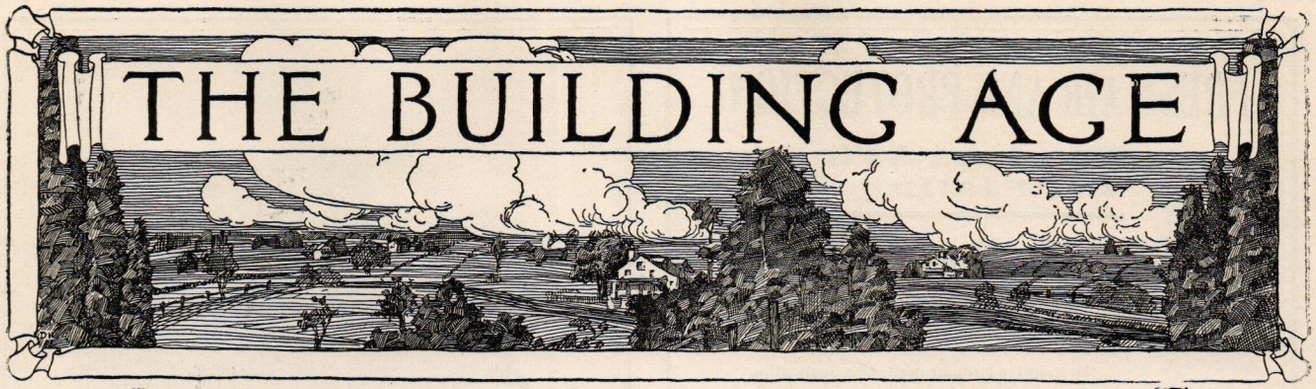

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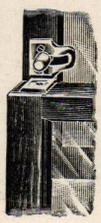

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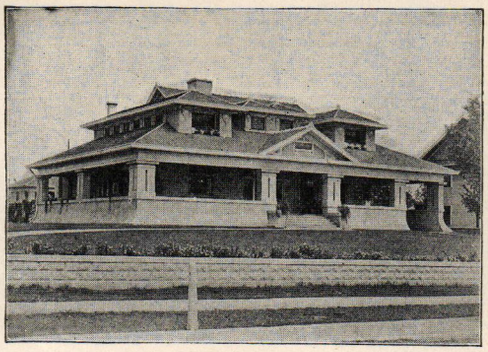

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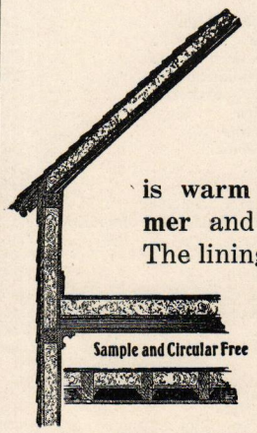

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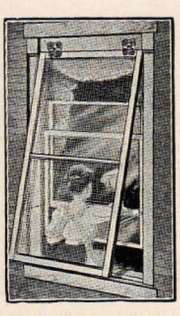

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NEW YORK, APRIL, 1915

The Popular Bungalow-Court Idea

The General Layout and Description of St. Francis Court at Pasadena, Cal.—Various Views

By Charles Alma Byers

THE bungalow or community-court idea, commonly so termed, virtually had its inception in California about five years ago, and it is rapidly meeting with favorable recognition throughout the country. This new idea in the building of apartments, for such it is, as a marked departure from the old-style apartment house, seems to be, for several reasons, particularly commendable, and builders are finding it as affording a means of very profitable investment. Of course, owing to the seeming necessary congestion of the "close-in" sections of our cities of today, and the consequent high price of property in such localities, the community court is more especially adaptable to suburban and other residental districts, for it is a scheme that requires a much larger plot of



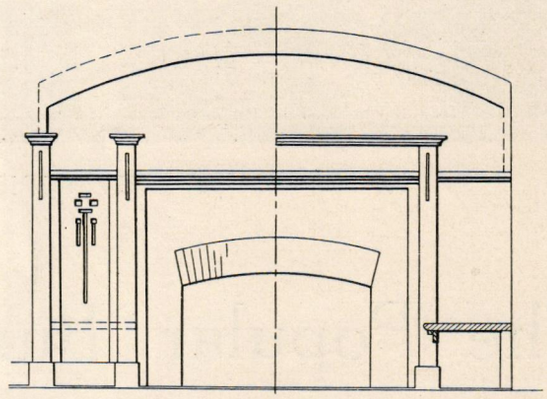
The Popular Bungalow-Court Idea—View Looking into the Court—S. B. Marston, Architect, Pasadena, Cal.

ground in proportion to its housing possibilities than does the old-fashioned apartment house. For this reason also, and because it affords more privacy and freedom and makes living in the open air more inviting, it is particularly popular in resort cities, and even more especially so in the warmer climates, such as Southern California.

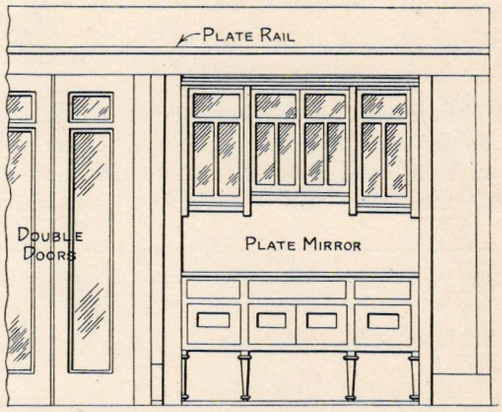
The community court consists of a group of small individual cottages or bungalows built around a sort of common court or parking scheme. It requires a plot of ground equivalent to several fair-sized city lots, probably comprising a combined area of at least something like 120 by 180 feet in size. A plot of these dimensions will allow ample space for the erection of about nine houses. This width is considered invariably sufficient, and even 100 feet will do, but the greater the depth the better. A row of houses is erected along each side with a court or park running through the center, toward which all of the houses are arranged to face.

Usually the entrance to the court from the street is more or less elaborate and attractive, and from it will probably lead an automobile driveway, with a walk on each side, down the center toward the rear of the plot. Ornamental electroliers are commonly set at intervals, to light up the place at night, and sometimes a fountain or other garden feature is worked into the plan. The lawns are kept in excellent condition, and there is always a very pretty arrangement of trees and shrubbery. Often there are garages built in the rear of the space for the use of the tenants, and in a few instances a club or summer house is included in the general scheme.

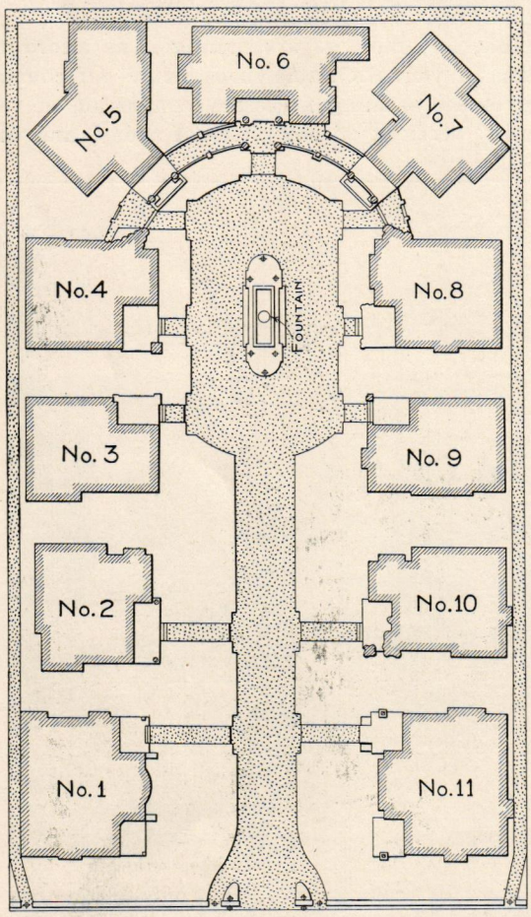
Each house, usually only one story in height, is a complete little home within itself, and is entirely independent of the others, except in its claim upon the court space and its accessories. In many of the courts the houses contain but three or four rooms, but in some cases a few of them may possess as many as six rooms, besides the bath room. In the three-room houses there will be a combined living and dining room, a bed room and a kitchen; in the four-room ones the living room and dining room will be separate, and in the houses possessing five or six rooms the additional rooms will usually be bed rooms. The little houses are invariably of



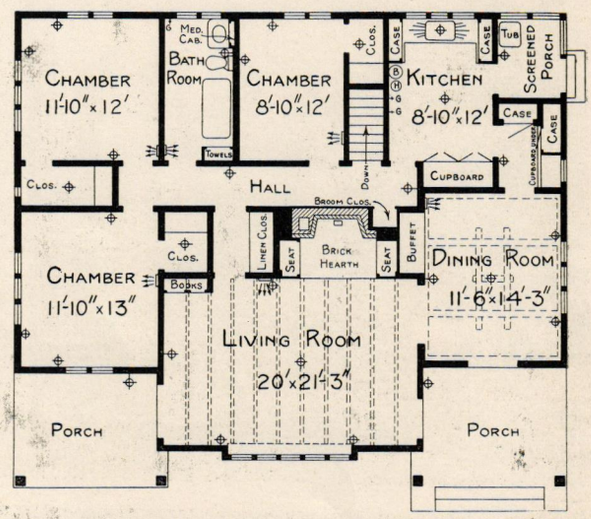
The Living Room Ingle Nook—Scale ¼ In. to the Foot



Elevation of Buffet in Dining Room—Scale ¼ In. to the Foot

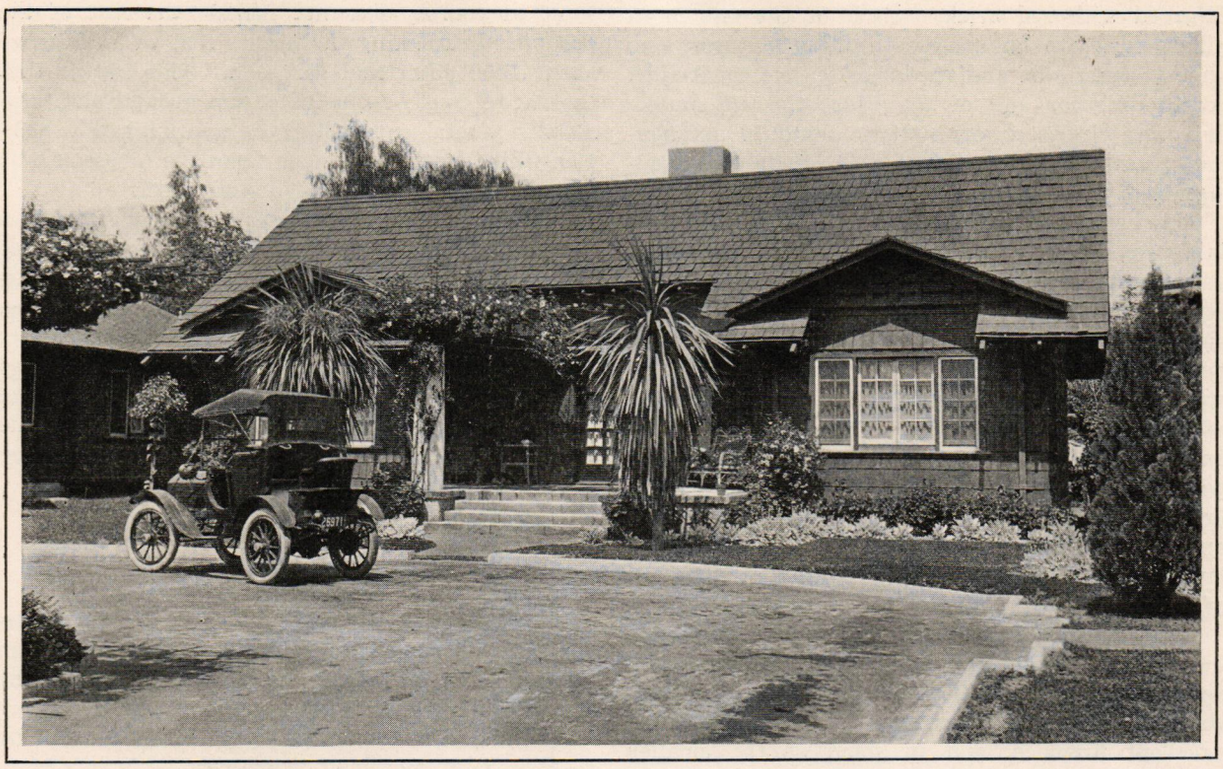


Block Plan Showing Lay Out of the Court and the Position of the Various Cottages



Floor Plan of House Indicated on Lot No. 11—Scale 1/16 In. to the Foot

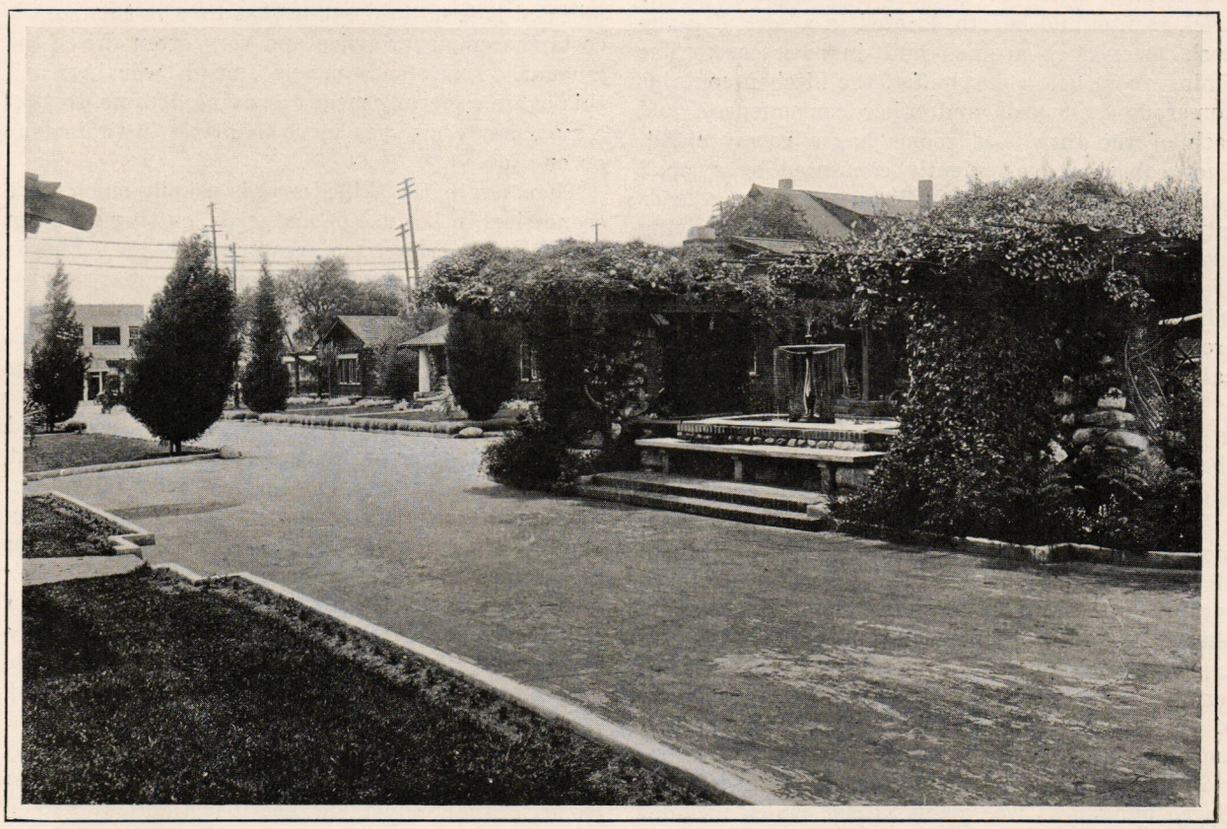
The Popular Bungalow-Court Idea—Plans and Various Constructive Details



General View of One of the Four-Room Bungalows Included in the Layout of the Court

pleasing and attractive architecture, and it is preferable that no two should be exactly alike in design. This not only makes the whole court more attractive in appearance, but enables the possible tenant to exercise a choice of style. The houses are artistically finished inside, and are frequently completely furnished by the owner.

The court illustrated by the accompanying pictures and plans, known as the St. Francis Court, is located in Pasadena, California, and was designed by Sylvanus B. Marston, an architect of that city, with offices in the Chamber of Commerce building. The Frank G. Hogan Company of Pasadena is the owner. It is an excellent representation of the idea, and the whole arrangement is most artistic. There is an imposing entrance, consisting of low street walls and massive gateway pillars, constructed of large boulders and cobblestones and



The Popular Bungalow-Court Idea—The Fountain and Seats at the Upper End of the Court

filigreed with red brick. Each of the two main pillars has two lantern-like lighting fixtures, one on the street side and the other on the court side. At the farther end of the court the automobile driveway circles a very artistic fountain arrangement, with stationary seats, the whole being designed to correspond with the entrance.

This court has a street frontage of 175 feet and is approximately 300 feet deep. It contains eleven very pretty one-story bungalows, of various sizes, styles and colors. Some of them have shingled outside walls, and some are weatherboarded; many possess masonry work of brick, and in a few instances either concrete or cobblestones is used. All of them have front porches—some of them two—and a brick or cement walk connects each house with the automobile driveway. Five of the bungalows have six rooms each, four of them five each, and the other two four rooms each. No two bungalows are exactly alike in design, and all of them are of particularly attractive architecture.

Each house constitutes a cozy and comfortable individual home. It is artistically finished and decorated inside and possesses many built-in conveniences. In the living room is always found an excellent fireplace, and in some of the smaller houses this room also contains a disappearing bed. In some cases this bed is so arranged that it can be used either on the inside or rolled out and used on the porch, and when not in use it occupies the space under two stationary seats—one on the inside and one on the porch.

Floor Plan of Six-Room Bungalow

In order to convey a clearer idea of the size and arrangement of these little court homes, the floor plan of one of the six-room bungalows is reproduced herewith. It will be observed that the rather large living room contains a fireplace with a brick mantel and hearth, located in a sort of inglenook, as well as a small built-in book case. The dining room has a fine buffet, the kitchen contains numerous cupboards and other conveniences, and each of the three bed rooms has a roomy closet. The rooms are conveniently connected by a small hallway, and from this hallway a stairway leads into the small basement. The ceilings of the living room and dining room are beamed and the floors are of oak. The two bedrooms at the left have pine trim and oak floors, while pine trim and pine floors are used in the remaining rooms. All the principal rooms have sand finish plaster.

This particular bungalow is one of the largest in the court, but all of the others are nevertheless charming homes. This one is also heated from a furnace, but some of the smaller ones are not.

The bungalows rent from $35 to $55 each per month. This includes free water and the use of all community features. The grounds are taken care of by the owner's attendant, and are therefore always kept in excellent condition, without labor or expense on the part of the tenant. In fact, the tenants enjoy all of the services and conveniences of the modern old-style apartment house, besides more privacy and purer outdoor air.

The average cost of constructing each of these eleven bungalows was about $1,800, which included its proportion of the court work, such as the fountain, the entrance features, the walks, and so forth. This, of course, does not include the cost of the ground. Furnishing the houses cost on an average about $300 additional for each. This means that the entire court, exclusive of the ground plot, represents a total expenditure of approximately $23,100, while the gross income from the investment is in the neighborhood of $475 per month.

Little houses arranged in this manner are always in demand, and vacancies for any considerable period of time are very rare. Because of the attractiveness of the whole arrangement, each house, by sharing equally with the others therein, has its own individual charm greatly enhanced. It also not only possesses all of the conveniences of the average apartment house, but is shut off from the street, and therefore affords much more privacy than the ordinary cottage or bungalow.

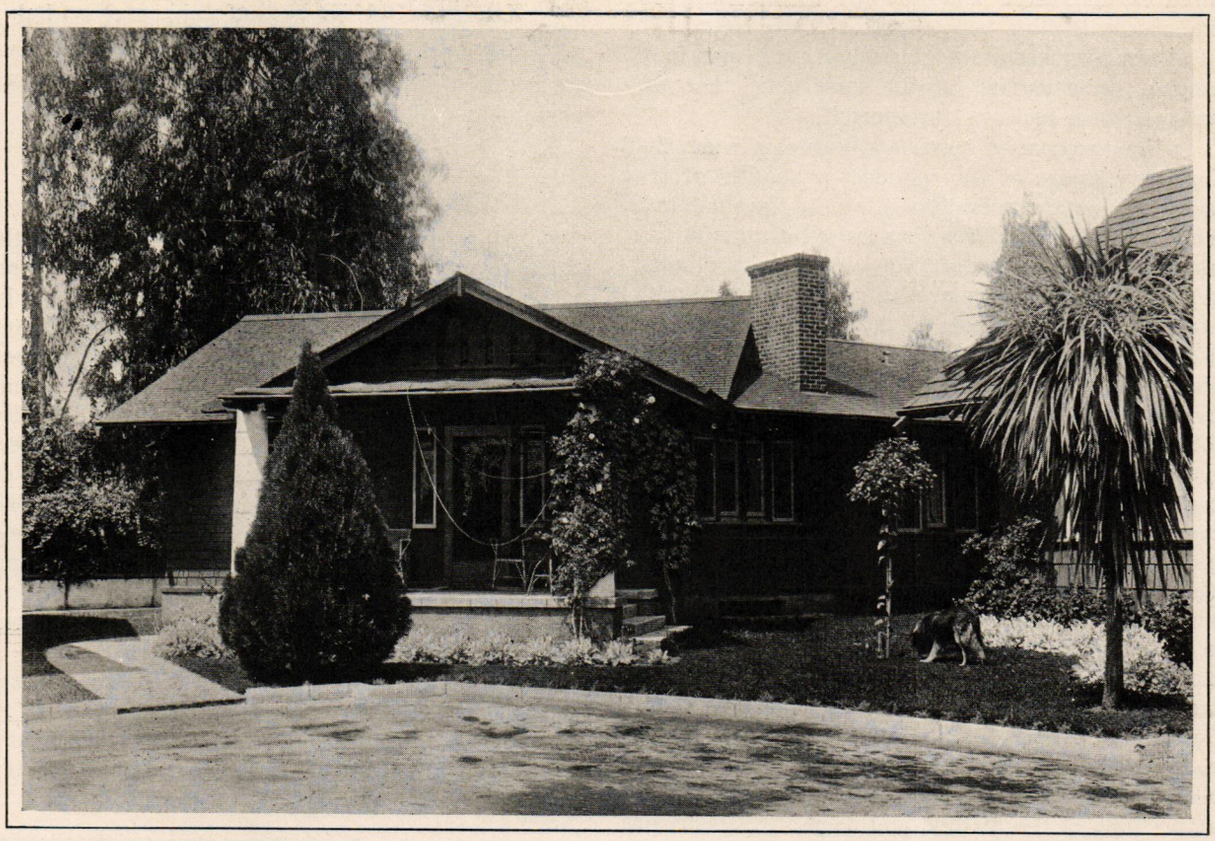
Making the Building Business Profitable

The success of a small builder's business is dependent to a large extent on his conducting it from the beginning on a sound economical basis, and the cause of many a downfall is undoubtedly the penny wise and pound foolish policy so often adopted by the man in a small way of business.

The first consideration of many builders is how much per hour they have to pay each workman, without any thought as to their skill at their particular craft. Such a narrow-minded view is at once fatal in the interest of true economy. While extravagance is not advised, often the penny and even more per hour paid to a skilled and experienced workman (instead of, as is so often the case, employing "improvers," who improve at the employer's expense) is money well spent. This sum on a week's work of, say, fifty-four hours, says Harrison Fielding in the London *Building World*, amounts to 4s. 6d., and it is quite possible that to save this sum it costs the employer twice and very often thrice the amount. Experience means smooth working, and this again generally means a saving of time, so that a man may easily pay more than this in time alone on one job.

Then, again, the skilled man is usually much more economical in the use of materials, cutting them up and using them to much greater advantage. This is a point that cannot be too strongly emphasized, especially in these days of advancing prices. Lastly, the better workman makes less mistakes, with the consequent loss of both time and materials, to say nothing of temper.

True economy is not always directly connected with £ s. d. For instance, there is another point which is not sufficiently taken into consideration. The small man, it is generally safe to assume, has at some time been an employee himself, and when he becomes an employer, is often prone to be either too harsh and strict or too lenient in the supervision of his workmen. In the first case, he will practically degenerate into a veritable nigger-driver, which is not conducive to good work or a continuance of steady working when he is absent. In the second case, advantage is invariably taken of slackness on the part of the master. It is better, however, to be too strict than too lenient, and it is even better to be either thoroughly than to earn a name for indecision. For the employer who knows not his own



The Popular Bungalow-Court Idea—One of the Three-Room Bungalows with Its Tropical Surroundings



The Rustic Masonry of Local Stone, the Curious Belt Courses and the Quaint Lanterns at the Tops of the Gate Piers Give an Entrance That Is at Once Unique and Impressive

mind is distrusted and disliked by all who have business with him, both clients and workmen. The ideal employer keeps a firm hand on every man in his employ, remembering, at the same time, that they are men with feelings like himself.

In the purchase of materials there is a wider field for the exercise of the soundest principles of true economy than is generally realized by the small man. The successful builder with a large business is fully alive to this, and makes the most of every opportunity. It is often the grossest extravagance to buy stuff because it is cheap. Take the man who is constantly buying up lots of stuff at low prices: knotty, shaky, and split timbers often out sizes not specified by the average architect, and consequently giving a lot of waste in cutting; odd lots of drain pipes, mostly untrue, cracked, and generally defective, with the consequent condemnation by a straightforward and conscientious architect; brick and tile "seconds"—generally containing about 25 per cent. of usable (one cannot say sound) stuff; and so on *ad infinitum*. Has he ever taken the trouble to calculate the actual intrinsic value of his purchase, the loss through waste of absolutely unusable stuff, the extra time entailed working in the remainder—to say nothing of the too often making good after the job has been so-called "finished"? If he would only work out these details he would certainly see the uttter folly of his method and drop all transactions of this kind.

On the other hand, there are often opportunities of buying good stuff at a really cheap rate, and these should never be allowed to slip. Particularly is this the case in picking up sound second-hand stuff. For instance, architects and owners are only too willing to pay extra for old weathered and toned-down roofing tiles in preference to the garish hues too often seen on the roofs of new buildings. These old tiles must be bought up whenever come across, and not wait until they are actually wanted, or the builder will usually find they cannot be obtained except at high prices. In picking up little lots of old tiles as he comes across them the builder can always rely upon their being a profitable investment. This applies with equal force to many other articles that will occur to the shrewd man who knows his business.

One often hears it said that the commercial prosperity of the country is based on credit; while not denying this in the broad sense of its meaning, it cannot be too strongly impressed upon the small man, the fact that he can always get better terms for cash; and if, as is too often the case, instead of going to the nearest builders' merchants with whom he runs an account, assuming that all wholesale prices are practically the same, he would only spend a little time with the small cost of postage in writing for competitive cash prices from two or three reputable wholesale firms, he would be much better off at the end of the year.

There is one other point that ensures the working of a business on methodical and economical lines, namely, that it is absolutely essential that proper and accurate accounts be kept of all transactions, enabling the principal whenever necessary to put his finger on, and effectually check, all wastage. If the business is not sufficient to carry the regular employment of a capable bookkeeper, it will be found wise to engage someone who will undertake it in his spare time, say a few hours per week. There are plenty of thoroughly competent men who are quite willing to do this at a reasonable figure, the result of which would prove that he saves his money many times over in the course of a year.

Compensation in Massachuetts

The Industrial Accident Board of Massachusetts has issued a bulletin in which is presented a plan for organizing safety in places of employment in the State. It offers to prepare, on request, accident studies covering the experience of each employer who undertakes the organization of a safety committee. These studies will show the cost of injuries prior to the establishment of a safety committee. Later comparisons will indicate the percentage of reduction effected by such an organization. The board has a growing index of the most approved safety devices. This is at the disposal of the employers of the state for the purpose of assisting them in solving the many problems which will confront their safety organizations.

The Massachusetts Employees' Insurance Association, 84 State Street, Boston, has issued the following table, which shows the increase in compensation benefits resulting from amendments passed by the last Legislature:

Compensation Benefits in Massachusetts Before and After October 1, 1914

	Per cent. of weekly wages		Duration of payments, weeks		Maximum payments	
	Before	After	Before	After	Before	After
1. Total incapacity.....	50	66⅔	500	500	$3000	$4000
2. Partial incapacity*...	50	66⅔	300	500	3000	4000
3. Death—						
Dependents totally dependent	50	66⅔	300	500	3000	4000
Partially dependent†	50	66⅔	300	500	3000	4000
No dependents.....	(Expenses of last illness and burial)				200	200
4. Specific injuries, calling for additional compensation—						
Loss of or loss of use of: (a) Both hands or Both feet, or One hand and one foot or the Sight of both eyes	50	66⅔	100	100	1000	1000
(b) Either hand.. Either foot... Or the sight of one eye...	50	66⅔	50	50	500	500
(c) Two or more fingers or toes at or above second joint	50	66⅔	25	25	250	250
(d) Loss of at least one phalange of finger, thumb or toe	50	66⅔	12	12	120	120
(e) Loss of use of one phalange of finger, thumb or toe	None	66⅔	None	12	....	120

*The percentages given are percentages of reduction in wages.

†The payments to partial dependents are that proportion of the payments to total dependents which the amount contributed to them by the deceased bears to his total earnings.

New York's Narrowest Office Building

One of the smallest office buildings in New York City will be the 12-story structure going up on Broadway, adjoining the Palace Theatre at Forty-seventh street. It will have a frontage of only 20 ft. and a depth of 80 ft. According to the plans of architect J. C. Green of Columbus Circle, the façade will be lime stone and terra cotta, and the style of architecture French renaissance.

Frame Barn of a Northwestern Farmer

A Building Designed to Meet Specific Requirements —Accommodations for Both Horses and Cattle

WE present in the illustrations which follow a general view and floor plan of a barn that was erected a short time ago upon the farm of N. J. Mitchell, Eden Prairie, Minn. The half-tone engraving clearly indicates the appearance of the finished structure, its gambrel roof surmounted by two ventilating aerators; the large doors in the end for filling the barn with hay; the position of the windows which light the several stalls and alleys, also the two windows in the upper part of the end gable for lighting the hay bays when the barn is nearly filled.

Referring to the floor plan on the following page it will be seen that there are at one end a series of horse stalls and on one side there are two box stalls, each of the latter being 10 x 12 ft. in size, together with feed bins for the horses and cattle. The box stalls are boarded up 5 ft. and fitted with wire netting above, the floors being of 2 x 10-in. elm plank. The four single horse stalls shown at the extreme left on the plan are 4 ft. 9 in. wide and the two double horse stalls are each 8 ft. wide, also floored with 2 x 10-in. elm planks. The mangers are 3 ft. 3 in. high and 2 ft. 4 in. wide.

There are two rows of Star Steel stanchions as clearly indicated on the plan with a feed alley 6 ft. wide extending between them. The gutters behind the cows are 14 in. wide and 8 in. deep. At one end of the barn is a 3-ft. alley and at the other end is a 4-ft. alley.

The dotted lines indicate the run of the litter carrier with which the barn is provided.

The posts and sills are of 8 x 8-in. elm and the studding and rafters are of 2 x 6-in. basswood. The outside frame is covered with 1-in. shiplap over which is placed 6-in. drop siding of Washington fir and the roof is covered with cedar shingles of assorted sizes.

The floors are of concrete mixed in the proportions of one of cement to 2½ of sand. The same proportions of concrete were used in building the 18-in. foundation walls and in addition the contractor put in several tons of small rocks.

The barn is fitted with F. E. Myers & Bros. Hay Carrier, combination fork and hay slings.



General View of the Farm Barn of N. J. Mitchell at Eden Prairie, Minn., Designed by Himself and Built by James C. Clark of That Place

Altogether, there are 16 windows, thus affording excellent light throughout. There is good ventilation and everything is as sanitary as the builder could make it.

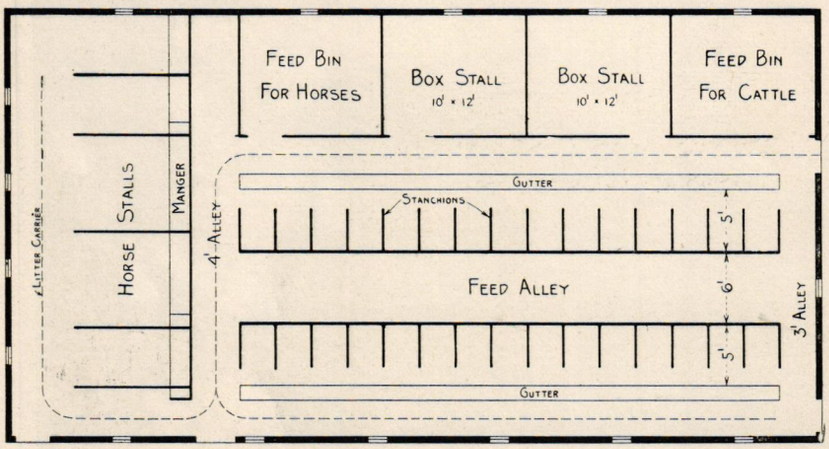
For purposes of ventilation the building is surmounted by two King aerators, made by the King Ventilating Company of Owatonna, Minn. There are two ducts on each side of the barn placed 13 ft. from the end and running from the floor to the aerators.

It may be interesting to state that the barn was planned by Mr. Mitchell to meet his individual needs, he being engaged in diversified farming and also keeping thoroughbred cattle of the beef type as well as some dairy stock.

The contract for the work was executed by James R. Clark, builder, of Eden Prairie, Minn.

Various Types of Roof Construction

A paper which was read a short time ago before the Incorporated British Institute of Certified Carpenters in London had for its subject "The Carpenter and Mason in Roof Construction," and dealt with the various types of roof used in classic and mediæval times. The author, George Arnall, pointed out that construction was largely influenced by two factors—climate and material. The temples at Luxor and Karnak, where a hot, dry climate necessitated the use of solid flat roofs and the material available, stone, which could only be used for small spans, led to the use of many columns.



Frame Barn of a Northwestern Farmer—Floor Plan—Scale 1/16 *in. to the Foot*

The Greek temples, although externally imitating wood construction, were probably roofed with wooden rafters supporting marble tiles. A temple at Pæstum has, above the entablature of the inner row of columns, a second series of smaller columns, forming a kind of triforium, and apparently used for supporting wooden rafters. Roman roofs were largely constructed of concrete, which gave no thrust at the walls. The Pantheon and the Baths of Constantine are good examples of this form of roof construction.

There are few early examples of timber roofs of domestic buildings in England. Most of the remaining examples are of purely ecclesiastical origin. There is no evidence from records or diagrams as to the method of construction used before the twelfth or thirteenth centuries.

The oldest roofs now in existence may be divided into, roughly, two main classes: one with simple beams thrown across the walls, and the roof built up from this, supported on upright posts, while the other is represented by what we know as the collar beam truss. This latter was probably the older. Some thirteenth-century examples at Stokesay, Peterborough, Coddesden, and Sutton Courtney show the various methods adopted to overcome the thrust produced at the foot of the rafters. Heavy stone buttresses, built outside the walls, or brackets fixed under the collar and to the principal rafter, were the more general means.

Examples of the fourteenth century of the beam type can be seen at Dunstable Priory, Polebrook, and Cirencester, and a fifteenth-century example at Magdalen College, Oxford. In some cases the beam is chamfered, but in most cases brackets are introduced under each end of the beam, bringing the weight of the roof on to the inner side of the wall. The roof in these cases was supported on upright posts, no attempt being made to truss the roof in the modern sense.

Roofs of the hammer-beam type may generally be regarded as fifteenth or sixteenth-century work, but a fourteenth-century roof at Woplode has an arched rib resting on two projecting beams, which, however, meet in the center. The thrust is taken to the wall by large brackets under. The earlier examples have high collar beams, with no trussing above; but the well-known examples at Hampton Court and Westminster Hall have this space trussed, and also a most elaborate system of windbracing.

Within the last few years attempts have been made to build timber roofs of fairly wide span by using modern market-size timbers. Mission halls at Cardiff, Croydon, and Burgess Hill have been erected in this way. The principal rafters are double, and are tied in at the foot by sloping collar beams, termed scissor beams. There are no wrought joints in the construction, butt joints and iron straps only being used.

These roofs, while proving very effective and handsome structures, have the additional recommendation of being much less expensive than the ordinary type.

Officers of Sand-Lime Brick Association

At the eleventh annual convention of the Sand-Lime Brick Association held at Dayton, Ohio, officers for the ensuing year were elected as follow:

President.....W. H. Crume, Dayton, Ohio
Vice-Pres....G. Sylvester, Calgary, Alta.
Sec'y.....H. W. Terry, Toronto, Ont.
Treas.....J. L. Jackson, Saginaw, Mich.

The attendance represented a majority of the concerns that are successfully engaged in making sand-lime brick in the United States and Canada.

A New Jersey Cottage of Neat Design

A Combination of Stucco and Shingles Forming an Artistic Exterior—Space Saved by Outstanding Chimney

THE English type of half-timbered house is constantly growing more popular in America as an architectural style for country houses. The present example combines a stucco treatment of exterior for the main story, with a shingle outer-wall covering for the second story. The English touch is apparent in the double gables, while a touch of the Dutch Colonial style appears in the right side of the house, with its gambrel roof and outstanding chimney. The lattice casement windows follow the Colonial style, while the ample screened porch at the right of the front entrance is a modern touch which greatly increases the comfort of those who dwell within.



A New Jersey Cottage of Neat Design—Architect and Builder, John Picken, Montclair, N. J.

The interior has three rooms on each floor, with a large butler's pantry adjoining the kitchen on the first floor, and a well-equipped bathroom on the second floor, which is easily accessible from the three bedrooms. The main entrance door is directly opposite the staircase which leads to the second floor. A wide passageway leads to the living room, which is provided with a fireplace flanked on each side with a built-in bookcase beneath a window.

The dining room is provided with a wide window seat beneath two mullion windows which face the street. From the dining room the kitchen is entered through the butler's pantry. A gas range, sink, and cupboard comprise the equipment of the kitchen, which is lighted on two sides by single windows. A door from the kitchen leads to the cellar below, where are located the wash trays, an ample vegetable room, coal bins, and a modern steam-heating plant with gas water heater.

The first and second floor joists are 2 x 10 in.; the third floor joists, 2 x 8 in., and the ceiling joists, 2 x 6 in., all placed 16 in. on centers. The rafters are 2 x 6 in., placed 24 in. on centers. The partitions, outside studding, and door and window studs, are 2 x 4 in., the partition and outside studs being placed 16 in. on centers. The plates and ties are 4 x 4 in. The spruce girders are 6 x 8 in.; the sills, 4 x 6 in.; valley rafters, 2 x 8 in.; posts, 4 x 6 in.; ridges, 2 x 8 in.; piazza sills and bearing timbers, 4 x 8 in., and piazza floor beams, 2 x 8 in., placed 18 in. on centers.

The interior trim of all rooms is of chestnut, white wood and North Carolina pine.

The building is sheathed on the outside with $\frac{7}{8}$-in. North Carolina stock, covered with black Neponset building paper made by Bird & Son, East Walpole, Mass. All exterior finish for window and door frames, cornices, verandas and all other finish is composed of No. 1 dressed white pine.

The exterior of second story walls is covered with 16-in. white cedar shingles, laid $5\frac{1}{2}$ in. to the weather. The ceilings of the porch of the

house are ½ x 2½-in. beaded North Carolina pine.

The roof is covered with 18-in. Perfection red cedar shingles, laid 5½ in. to the weather. The combs and hips are woven in and the hips and ridges have parallel courses laid on top.

The floors of the first story are red oak, and those of the second story are of ⅞ x 2½-in. No. 1 North Carolina pine.

The first and second-story floors are planed, filled and varnished two coats. The attic floor is of ⅞ x 2½-in. North Carolina pine. The porch floors are of white pine, tongued and grooved ⅞ in. in thickness. The bathroom is provided with a tiled floor.

The first-story hall, as well as the living and dining rooms, are trimmed in chestnut; the rooms on the second floor are finished in white wood; the kitchen, butler's pantry and attic are trimmed in North Carolina pine.

The entire exterior of the house, excepting the shingles, is painted with two coats of Atlantic white lead and linseed oil; the shingles have one brush coat of Cabot's stain; all tin work is coated with two layers of Prince's metallic paint.

The finish of the main rooms of the first story is filled with paste filler, over which are two coats of varnish, the last coat having a flat wax finish. The second story finish is painted with three coats.

A footing course of concrete is laid under all cellar walls, interior piers and chimneys which is 4 in. wider each way than the walls resting thereon, and 8 in. in depth.

All cellar walls are of concrete, as are also the porch piers. Concrete is composed of five parts of gravel and one part of Portland cement.

The chimney is built of clinker brick. The living room fireplace is built of red tapestry brick, with a 6 x 6-in. red tile hearth.

The walls and ceilings of the rooms are plastered two-coat work and have a white hard finish.

The second-story bathroom side walls are plastered to a height of 4 ft. with Keene's cement made by Best Bros., Medicine Lodge, Kan.

The kitchen sink is a 20 x 30 x 6-in. enameled iron fixture. The bathtub is made by the Standard Sanitary Manufacturing Co., of Pittsburgh, Pa. It has a 2¾-in. roll rim and is 5 ft. in length. The lavatory is 18 x 24 in. white enameled iron. The wash tray in the basement is a two-part fixture of Alberene stone, which is a product of the Alberene Stone Co., New York City.

A steam heating plant was provided and gas and electric lighting fixtures installed.

The house here shown was built for Alfred T. Gibbs, at Upper Montclair, N. J., in accordance with plans drawn and executed by John Picken, of Montclair, N. J.

Unusual Problem in Water Tight Construction

In connection with the construction of a very high tower it was required that the walls and two floors near the top, one being 160 ft., and the other 180 ft. from the ground, be cast as a monolith and be as water tight as a tank so that by no possibility could moisture penetrate from driving storms. Each of the two floors had an area 28 x 30 ft. and carried a load of 400 tons, the floor being supported on a central girder running the short way with beams running from it to the opposite walls. The unusual feature of construction mentioned required absolute prevention of all cracks from any causes, impermeable concrete and as near continuous work as possible. Under ordinary conditions there would be frequent joints between day's work of reasonable size which might allow penetration of water.

This problem was solved, says Leonard C. Wason in a paper read before the Boston Society of Civil Engineers, by using a little lower working stress in materials than is given by a rich mixture carefully proportioned for maximum of density; by designing forms for casting a large amount of concrete at one time, and by continuous work with different shifts of men, combined with very close supervision by more than the usual number of foremen, besides the inspector of the owner. The result, he stated, proved satisfactory in every way.

Labor Conditions in South Africa

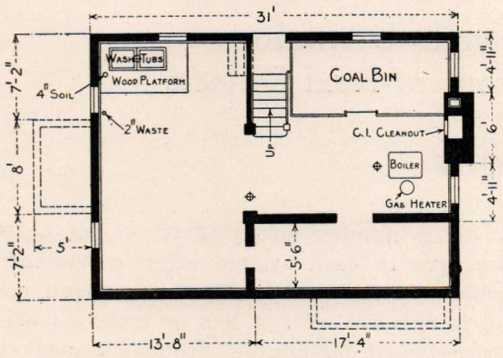
In response to inquiries as to existing labor conditions in South Africa, the United States Consul at Johannesburg furnishes the following:

It has not been possible to obtain the standard average wages paid by districts outside of the Transvaal owing to the statistical returns not being available, but those at hand are furnished with as much detail as circumstances permit. Carpenters, joiners and plumbers are paid $4.86 or £1 a day in Johannesburg, but carpenters and joiners in Bloemfontein, Orange Free State, receive 54 cents an hour and work nine hours a day, while plasterers and bricklayers in the Transvaal receive 60 cents an hour. All men coming under the classification of mechanics, plasterers, bricklayers, carpenters and joiners, plumbers, etc., work on an average of forty-eight to fifty hours a week or five and one-half days a week, approximately eight and one-half to nine hours constituting a day's work.

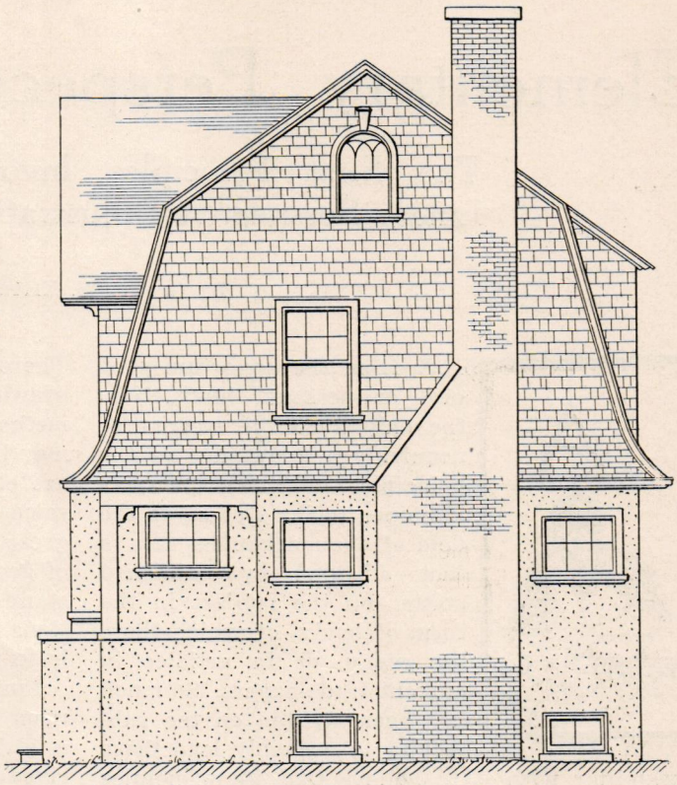
In this district as in South Africa generally there is no apprentice law. It is the general rule that all tradesmen serving their time sign articles for five years as an apprentice and eight to twelve months as an improver before receiving the standard wage of $4.86 a day. During the whole term of apprenticeship they receive wages on the following scale including overtime: For first year, 72 cents a day; for second year, $1 a day; for third year, $1.45 a day; for fourth year, $1.94 a day, and for fifth and final year, $2.43 a day.

In the Transvaal a workman who has been injured in the course of his employment may choose one of two remedies—sue his employer for damages for the injuries sustained under the common law, or he may claim compensation in the manner prescribed in the workmen's compensation act of 1907. Under the workmen's compensation act it is the duty of employers to insure their employees and it is from this source that employees receive their compensation.

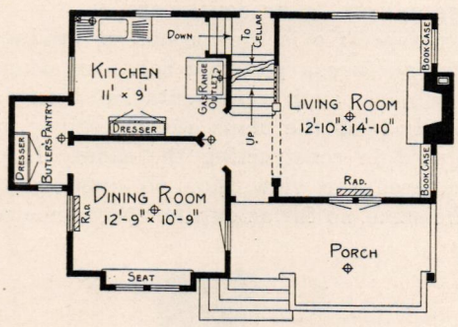
"Why are children so much worse than they used to be?"
"I attribute it to improved ideas in building."
"How so?"
"Shingles are scarce, and you can't spank a boy with a tin roof."—*Life*.



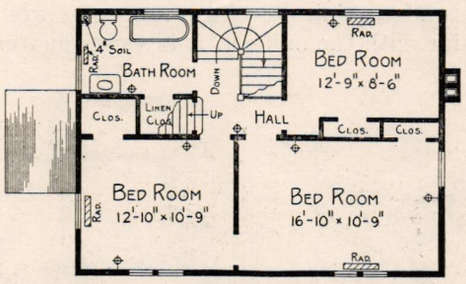
Basement Showing Position of Laundry Tubs, Boiler, Gas Heater, and Other Fittings—Scale 1/16 In. to the Foot



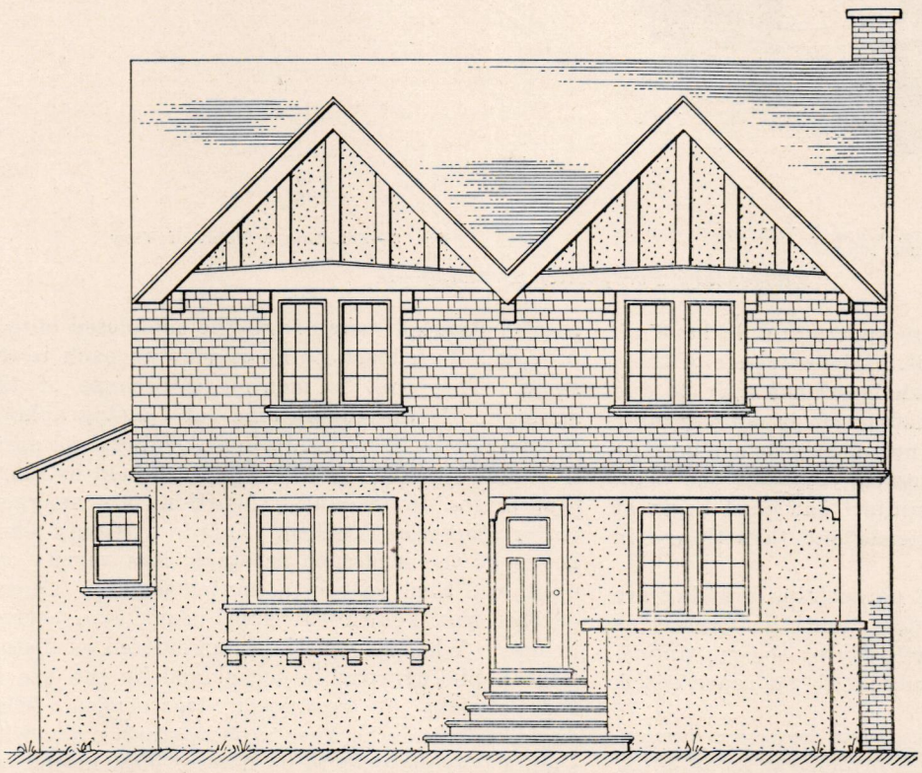
Right Side Elevation—Scale ⅛ In. to the Foot



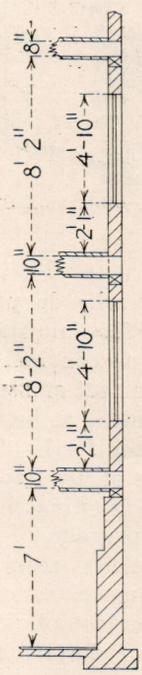
Main Floor Plan—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot



Front Elevation—Scale ⅛ In. to the Foot



Section — Scale ⅛ In. to the Foot

A New Jersey Cottage of Neat Design—Plans, Elevations and Section

Elementary Perspective Drawing—I

The First Principles Involved—Definition of Linear Perspective—Illustrations of Real Objects

By George W. Kittredge*



ASIDE from the opportunity of oral or personal instruction, the only available means for acquiring a knowledge of the principles of linear perspective open to the student in the field of the mechanical arts is that afforded by published matter on the subject in the form of books, of which there are many, or in articles in current trade papers. So much has been written on the subject as to probably lead those unfamiliar with it to believe that its principles are very difficult to master, and to deter many from undertaking it. To those who are really familiar with the subject, it is very apparent that many who do profess to understand it have an imperfect knowledge of it, if the evidence of their work is considered. Such ignorance may be due to the fact either that instruction is not available or that, if at hand, it is not clearly or systematically set forth. To successfully master the principles of any technical subject one must begin at the beginning, have patience and take things in logical order.

The first principles of perspective drawing are in themselves quite simple, and the operations become complicated principally by the multiplication of details in the subject to be represented. There are a number of systems of perspective drawing, and in each system often a number of methods by which the position of a given point may be found, but all systems or methods which are correct must, of course, produce exactly the same result. In beginning the work it will be of great assistance to the learner if he is possessed of good imaginative powers, and he should understand the methods employed in making the elevations and plans from which the subjects which he is to represent are to be constructed.

Linear perspective is the method of producing upon a flat surface a pictorial representation of a given subject, such representation being derived entirely from the plans and elevations used or to be used in constructing the same. If correctly rendered the view thus obtained will be exactly the same, so far as outlines are concerned, as a photograph taken from the completed object, provided the chosen point of view in each is the same. This fact is mentioned because of the analogy of the operations of photographers, geometrically speaking, to those of linear perspective, and because the idea is entertained by many that lenses distort and proportions are exaggerted or otherwise falsified. This is true only when lenses of the landscape or single lens variety are used, and then only in a limited degree. Lenses of the type known as "rectilinear" give correct images. What is sometimes considered as distortion in photographs is occasioned by the use of that variety of rectilinear lens called "wide angle." This is because a photograph made with such a lens includes in its field of view more than could normally be seen by the eye without turning the head, and even this distortion disappears

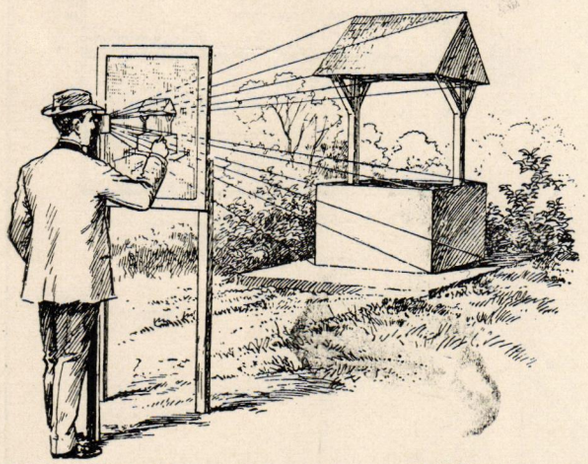


Fig. 1—Sketching from Nature, Using a Window Screen as the Picture Plane

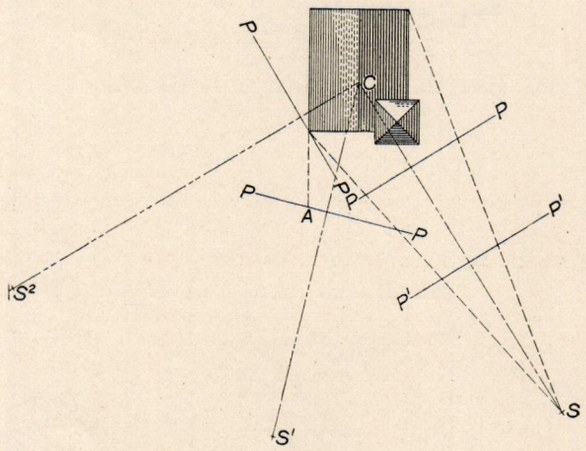


Fig. 3—Selecting a Point of View

Elementary Perspective Drawing—I

[*The present series of articles which appeared in these columns some years ago and attracted wide-spread attention by reason of the simple and comprehensive treatment of the subject of elementary perspective drawing, are being republished at the special request of a large number of our readers.—Editor The Building Age.]

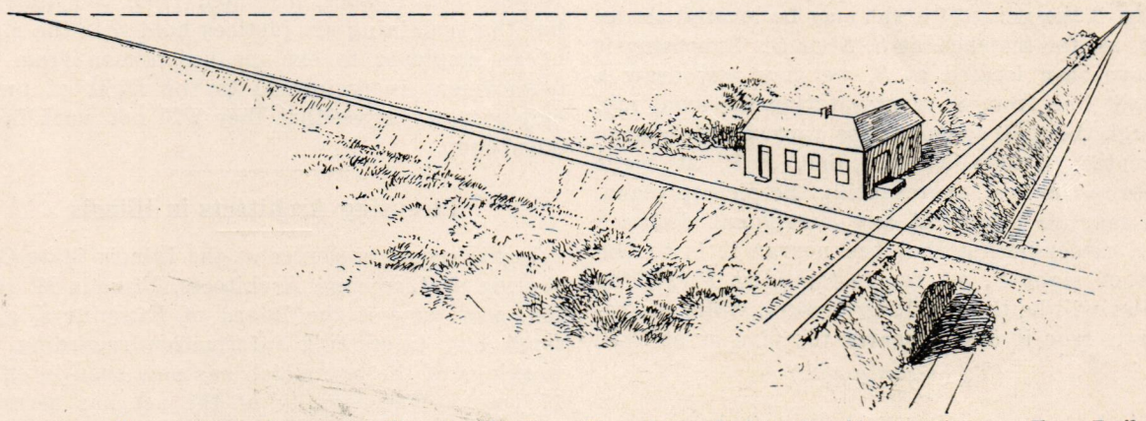
when the photograph is properly viewed. The same distortions will occur in the operations of perspective drawing under the same conditions. The angle of vision should not incude more than 30 or 35 degrees. Within this limit no distortion will appear.

The surface upon which the view is projected or drawn is called the "plane of the view" or the "picture plane," and the method by which the picture is constructed thereon is geometrically the same as that performed by nature in the taking of a photograph, in which operation the chief factor is the ray of light. Light moves in straight lines from all points of the object to form the image upon the sensitive plate, or otherwise, the picture plane. In the operations of perspective drawings, therefore, the rays of light must be replaced by straight lines drawn from the several points of the object to the point of sight, intersecting the picture plane in their course, thus locating each point of the object thereon.

In the operation of photographing the lens of the camera represents the point of sight, and the rays of light, instead of intersecting the picture plane in their course to the camera, cross in the lens and intersect it beyond, an operation which has no other effect geometrically than to invert the image or picture.

The idea to be kept in mind in the projection of an object upon the picture plane can perhaps be most simply and practically illustrated by supposing that a screen of wire cloth be firmly fixed in position in front of some object which it is desired to represent, as illustrated in Fig. 1, and that a point of view be selected from which the object can be seen through the screen. For accuracy's sake the point of sight could best be located by cutting a small hole through a piece of cardboard, which should also be fixed in position by any convenient means, so that the hole is at the chosen point of view, having it at the same time within arm's length of the screen. While looking with one eye through the hole in the cardboard, each point of the object beyond will be seen through a particular point of the screen at which its position can be marked by means of a piece of chalk. This sketching operation may be continued by drawing lines with the chalk, so that each line upon the screen shall cover or hide from view the corresponding line of the object beyond. Such an experiment will assist the beginner in forming an idea of how objects, as seen first in nature, will appear when afterward put into a drawing or sketch, and will greatly assist the imagination in conducting the operations of perspective drawing. It will also bring to his attention the apparent decrease in the size of objects as they recede from the observer, and the fact that these points of the subject being sketched which are below the level of the eye and near the foreground will appear lower down on the screen or paper than those which are more distant, while the reverse is true of those points above the eye.

To more fully illustrate this another observation may be made. Let the student take a position in the middle of a railroad track, standing behind a train which is about to move out of a station. At first he sees only the rear end of a car. As the train moves away the end of the car appears to diminish in size until bridges, hills and many objects, larger than the car itself, appear in view. If the track be straight for two or three miles the train becomes a speck on the horizon, and what remains in view is the long vista of track, the rails of which appear to rise before him and to meet at a point on the horizon exactly in front of him. Although the track is known to be perfectly level, the point of meeting (termed in perspective drawing the "vanishing point") will appear on a level with the eye. This will be equally true should the track be replaced by level street or road of any width or any inclosure whose receding lines are parallel and horizontal. If the point of view be raised or lowered, the vanishing point and horizon line will appear also to rise or fall an equal amount. Thus the rails of another track running parallel beside the first, but on a higher or lower level, will appear to meet at the same point on the horizon.



Elementary Perspective Drawing—Fig. 2—Finding Vanishing Points by Observation on Two Railroads Crossing Each Other

From this we reach the conclusion that all lines which are parallel and horizontal composing the parts of any view will meet at a common point of the horizon line. By the same course of reasoning we shall find that the rails of another track, crossing the first at any angle, will meet at another point also on the horizon. If it were now possible to apply the method of making a sketch of the railroad crossing by the use of a wire screen, as suggested above, taking a point of view far enough away to bring the crossing into the picture, as shown in Fig. 2, we should find that the vanishing point of one of the tracks would ap-

pear on the screen at a point exactly in front of us when standing so as to look in a direction parallel to the same; while the vanishing point of the other track—if the screen were large enough—would be exactly in front of us when turned so as to look parallel with the other track.

In the foregoing illustrations we have considered only real objects (not plans and elevations), and have spoken of rays of light as though they were threads stretched from points of the object to the eye. In conducting this work upon paper, of course only one view can be considered at a time. The view in which the projection of the points of an object upon the picture plane can be conducted to the best advantage is the plan or top view. In the upper part of Fig. 4 are shown the elevations and plan of a subject, very much simplified in outline, so as to best illustrate the principles and avoid the complications which would result from a more elaborate design. Before beginning the work the first essential is to select a point of view. Just as an individual would walk around a building at a suitable distance away to discover its most favorable aspect, so the point of sight may be located upon the plan at pleasure. Thus, in the plan of the building shown in Fig. 3 the point of sight may be located as desired, as, for instance, at S, S^1 or S^2. Supposing it to have been located at S, we may now draw a straight line from S, representating the axial ray, through the plan so as to pass approximately near its center C, then another line, $P\ P$, at right angles to the first, representing the picture plane. This may be drawn at any convenient distance away, remembering that the nearer it is to the point of sight S, as, for instance, at $P^1\ P^1$, the smaller will be the resulting picture, while the reverse is true if drawn nearer the plan as at $P\ P$.

(To be continued.)

Building Projects in Canton, China

The most important project for the ensuing year in Canton, China, is a new custom house, four stories in hight, which is estimated to involve an expenditure of $130,000. It will have a frontage of 152 ft. and a depth of 72 ft. The materials used will be granite from Kowloon, brick and reinforced concrete. There will be a dome clock tower the top of which will be 105 ft. upon the street level. In the main offices the floors will be of tile, while other floors will be of teak. The lavatory fittings will be of British and elevator of American make.

The Young Men's Christian Association is putting up a building in Spanish-American style of architecture, three stories in hight to cost $80,000, which was subscribed in the United States. On the ground floor there will be an auditorium 74 x 55 ft. in area with a seating capacity of 2000. The room will have a sloping floor and a suspended gallery. The gymnasium also on this floor will be 72 x 40 ft., and between the auditorium and the gymnasium will be an open swimming pool 60 x 20 ft., made of concrete and lined with tile. On the second floor will be class rooms, a dining room and a kitchen, while on the third floor will be dormitories for members.

Among the private structures at present under way may be mentioned the Karanjia building, which will be 130 x 80 ft. in plan, four stories in hight and built of brick and reinforced concrete, with a flat reinforced concrete roof. California red wood will be used for doors, windows and interior finish. It will cost about $75,000 and is expected to be finished by the end of the current year.

Binding Employees Against Unionism

The decision of the United Supreme Court lately handed down in the case of Coppage vs. Kansas, 35 Supreme Court Reporter 240, wipes from the statute books of several states a law which purported to make it a misdemeanor for an employer or his representative to induce an employee to agree to refrain from joining, or to withdraw, from a labor union, as a condition to employing him, or continuing his employment. Aside from Kansas, laws of this kind have been enacted in California, Colorado, Connecticut, Indiana, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oklahoma, Oregon, Pennsylvania, Porto Rico, and Wisconsin. Three of the judges of the Supreme Court, Justices Day, Hughes and Holmes, dissented from the decision, but the remaining six justices hold that the right of an employer to exclude union men from his employment is reciprocal to the right of union employees to agree that they will not work in an open shop.

Licensing Architects in Illinois

In his report presented at the Illinois State Convention of Licensing Architects, Francis M. Barton, secretary of the Board of Examiners, gave some very interesting information regarding the workings of the law which has now been in effect 17 years. The legality of the act has recently been established by the Supreme Court and the Board now proposes to enforce the provisions on its broad interpretation which heretofore has not always been the case. Secretary Barton said that to-day there are 863 licensed architects in the State, 410 having been admitted because they were practicing when the law went into effect, and 453 who passed the examination of the Board.

The present board holds that only a licensed architect can practice in the State or from the State, and that his license is not transferable or negotiable. Any licensed architect who assists others to practice who have no license is guilty of dishonesty as provided in the act and should have his license revoked.

Announcement has been made by the American Genetic Association of Washington, D. C.,, that two prizes of $100 each are offered for two photographs—one showing the greatest tree of a nut-bearing variety in the United States and one showing the largest broad-leaf tree which does not bear edible seeds. The contest will end on July 1, 1915.

There are somewhat more than 500 recognized tree species in the United States, of which about 100 are commercially important for timber.

Belgium and Some of Its Buildings

A Few Timely Comments on Some of the Interesting Examples of Architecture in the War Zone

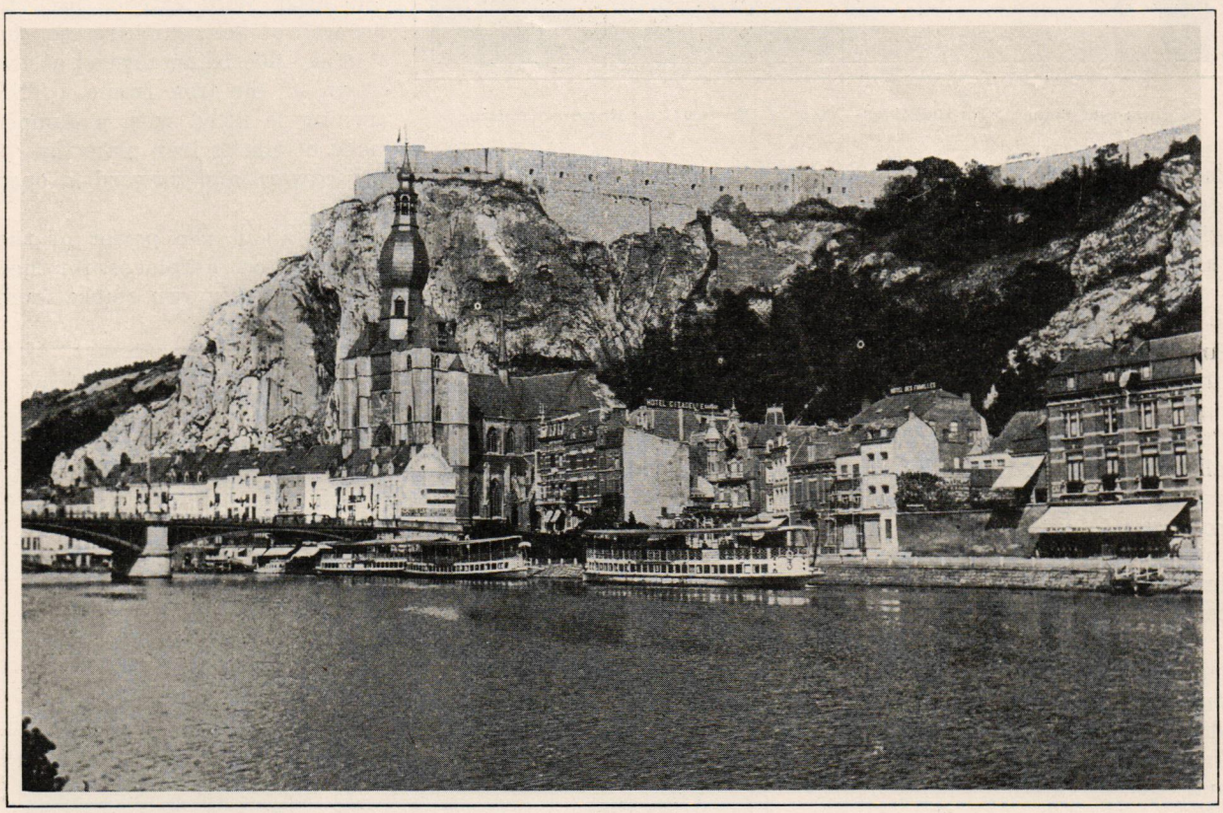
By John Y. Dunlop

BELGIUM may be considered the home of secular Gothic architecture. Many nations erected domestic buildings in this way, but in no country is the style utilized for such structures and to such an extent as the country named. There, fine churches are to be found in the principal cities and there is hardly a town of importance which has not its Gothic town hall belonging to the various Guilds, a belfry, a market place and an abundance of domestic street architecture.

The town halls of Brussels, Louvain, Bruges, Mechlin, Ghent and Ypres are all buildings claiming attention. Most of them were built in the 15th century and the general aspect of these famous structures were notable and bold in mass and rich in color. The main buildings usually consisted of a long unbroken block surmounted by a high pitch roof with many little dormer lights. This is one characteristic of the Belgian building, whether it be that of a public or a private aspect, which appeals strongly to the visitor.

In construction the sides of these buildings present many stories filled by rows of windows and when taken into consideration with the steep roofs crowded with dormers carried up to the lofty ridge, there is strong evidence of a conviction that beauty was obtained by regularity and order rather than by unsymmetrical treatment.

The square towers with their projecting turrets were very prominent in these buildings. In many cases they have angle buttresses on which the corbels of the turrets were formed. These were all built in coursed work of exceeding strength. It is well known, however, that the heaviest masonry is no protection against modern projectiles, but the grace of the stone arch and the beauty of the stone carving must be preferred to the iron ornament which can stand the ravages of war.



Belgium and Some of Its Buildings—The Citadel at Dinant Showing River Meuse and Old Church (Now Destroyed)

In many of the prominent belfries and towers we find the masonry of the various features carried up to a great hight and the summit crowned with lead covered domical roofs of varying shapes. The belfry tower at Bruges is finished with a battlemented parapet in cut stone, while the spire of the town hall more simple in construction is of a mass and hight which is truly imposing. Bruges is probably (or at least was before the present war) the most charming of all Belgian cities with

its wealth of artistic and historical interest and its fine examples of picturesque old houses, bridges and waterways.

To look out over Bruges from the belfry tower the visitor is struck with the variety and shape of the gable ends of the various town houses. In all classes of buildings the roofs are steep finished with crow stepped and tracery gables of picturesque outline.



Belgium and Some of Its Buildings—View of the "Quai du Rosaire" at Bruges

In the construction of these domestic buildings a free use has been made of plaster. Inside and outside this material is utilized not merely to cover surfaces but to form architectural features. Cornices, panels and enrichments of all kinds modeled in plaster are constantly employed in the interior of rooms and buildings and there are to be seen architectural features appropriate to stone executed in plaster and assimulating stone.

In many of the public and Guild houses proportion plays an important part in the design. The actual shape and size of the window openings make the buildings appear bold and vigorous, although many display grace and refinement which the Belgian builder has been able to grasp and turn to account.

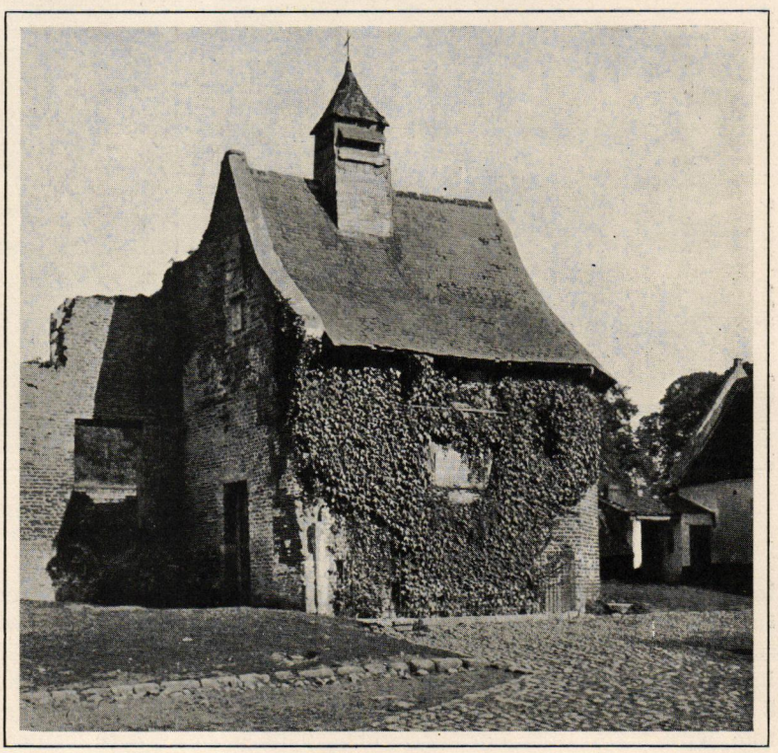
Flemish architecture, it is almost unnecessary to recall, has been a source of inspiration for other countries during a considerable period. For many years Belgium has been a favorite sketching ground and field of study for those who were interested in the art of building and its interest to-day may be seen in many of the modern façades, more particularly in the adoption of the gable which one continually meets in Flemish streets.

The greatest charm in Belgian structures of a modern type is to be found in the delightful examples of brick and stone street buildings in which the towns of Flanders are particularly rich. This charm is produced by the beautiful texture of the brick work and tiling, which is very pronounced by reason of the small bricks which are used in building—approximately 6 in. long by 3 in. deep.

The chimneys are, as a rule, well grouped together, for fireplaces are very much in use in Belgium homes.

The Flemish fireplace may be described as a sort of mongrel furnace praised for saving fuel and possessing the properties of a "*poe le de fonte*" without affecting the head by any emission of carbonic vapor. The width of the hearth is determined by the length of the billet burned, usually the opening above the fire bars being formed with a circular iron frame on which the brick front is built. The brick work extends back to the wall of the hearth recess, the chimney flue being formed at the crown of the iron frame. This opening is fitted with a damper made of tile or iron plate that is drawn by a handle backward and forward to open or shut the chimney flue.

There is little doubt about the power of the draft that was formed in these fireplaces, for they are not only able to expel their own smoke from the fire in all kinds of weather, but they heat the room much better than the ordinary open fire. This grated hearth for wood fuel may be reckoned to have been borrowed from the Dutch fireplace



Brick Chapel at Farm of Hougomont on the Battlefield of Waterloo

and the introduction of the damper does everything that could be done with this fireplace for comfort and economy.

The Belgians have a fashion of covering their roofs with slates and tiles, many of which are pan tiles with locking joints in which the piends and ridges are rendered water tight, all being covered with segmental tiles bedded in cement. Many of the old roofs are covered throughout with 15-in. long ridge tiles. These old tiles are tapered and measures 7 in. at one end and 9 in. at the bottom end. They are laid in courses on their back and the sides of two tiles are laid in the hollow, which make the raking joints water tight. The joints parallel to the eaves are lapped, that being arranged with the broad end of the tile over the narrow one.

The internal finish of the houses, including the staircases, windows and doors have a character entirely their own and the workmanship is the result of patient toil and careful craftsmanship.

Fine churches existed in all the principal cities, but they cannot be said to form a series differing from the churches of France. The principal cathedral of the low country is at Antwerp and is a building remarkable for its great width and for the wonderful picturesqueness of the interior and exquisite and daring spire. The gigantic system upon which the consummate flower of this architectural creation was to be at last unfolded was the plant of a whole century's growth. It rises to a hight of nearly 500 ft. over an edifice of as many feet in length.

Internally the church is a true impression of the Christian principal of devotion, everything pointing upwards, from the spire in the clouds to the arch which enshrined the smallest sculptured saint in the chapel below.

The main building is divided into five naves with internal rows of chapels, but separated by no screens or partitions, the temple forming an imposing whole in which the effect is most impressive. The vast and beautiful painted windows glow with sculptural scenes which are nothing less than gorgeous in their brilliancy, richness and harmony. In this building of large size it is difficult to find any stone heavier than two men could lift and the masonry is a perfect marvel of dexterity and skill as well as beauty. The art of the workers in the other material, such as carpenters, joiners, smiths and plumbers, has been carried to a high state of perfection.

Belgium also possesses a great number of other cathedrals of note, including those of Tournai, Brussels, Mechlin, Louvain, Liege and Ghent.

The Flemish fondness for bells caused the bel-



Belgium and Some of Its Buildings—Residential Section in Bruges with Tower of Belfry in the Distance

fry tower to be one of the architectural features of most of the towns. In order that the beautiful melodies played should be carried well out over the houses, these structures were high and characteristic of noble design. At Antwerp and Malines the belfry forms the cathedral tower, but in the case of Bruges it is built on the town hall, is 300 ft. high and forms a landmark for miles.

The town halls of Brussels, Louvain and Ghent were fine examples before the invaders devastated the country. Each was designed on the same lines and was several stories in hight.

The trade halls for the buying and selling of merchandise, especially cloth for which the country was famed, are also characteristic and one of the finest examples which is a monument to the importance of Ypres, is the Halles or Great Cloth Hall, which with its curious wooden ceiling is always looked upon with interest by the wood-worker.

In the basement below the covered market presents a fine and extensive example of brick vaulting and the quaint stalls with touches of color in the costumes of the Belgian peasantry form a scene which strongly appeals to the artist.

On the Cloth Hall is built the belfry tower with its bold flanking buttresses which give an impression of strength and dignity, though the effects are marred by the pitch roof which apes the never erected spire.

Many of the towns in Belgium are being brought into importance by their prominence in connection with the western theatre of the war with the result that the monuments of their importance are being particularly noted. What changes will be effected in their interesting buildings when next we visit them it is most difficult to say. It is to be hoped, however, that the reports of their destruction are exaggerated and that at most only a remediable degree of injury has befallen them.

Tall Buildings in Manila

According to a special correspondent of the United States government writing from Manila, there has gradually grown up a movement for taller buildings since the advent of concrete and steel construction. Heretofore, he states, three stories have been the limit on buildings in Manila and the islands, and not more than four or five reached more than two stories in hight. Within the last two years five or six new structures of concrete and steel have been built with three stories and one of four stories. One business block four stories in hight recently completed has proven so attractive for offices that two more stories are to be added.

There is also just completed a business block in the Chinese district and constructed by a Chinese firm that has six stories. The advent of the taller buildings is due to the belief that the reinforced-concrete structure will withstand earthquakes, which have rendered the buildings of ordinary masonry so dangerous. Thus far, however, there have been no severe shocks to test this form of construction.

A movement is on foot among the architects of Ohio looking to the enactment of a law compelling those who practice architecture to be licensed.

Adoption of New Form of Builders' Contracts

We are advised that at the meeting held at the Builders Exchange in Philadelphia on March 8, the Joint Committee of the American Institute of Architects and of the National Association of Builders Exchanges, ratified the contract documents that have been considered by these two organizations for the last two years. President Lewman officially approved the architects' new form of contract, and states that it is much fairer to building interests than the previous draft and is all that could possibly be expected at this time in the way of eliminating arbitrary powers that heretofore existed in the documents governing building construction.

A little over two years ago a resolution was passed by The Builders Exchange of Louisville, carrying with it a recommendation for improvement in contract documents. This resolution was endorsed by the various National Organizations connected with building and interested in financial ways, such as Credit Men's Association, bonding companies, etc.

Co-operation was heartily tendered by all of these organizations, and at the Washington, D. C., convention held in 1913, the National Association of Builders Exchanges started a campaign for the adoption of the recommendations.

A series of meetings have been held with the American Institute of Architects and at the National Association convention held in Columbus, O., January 26, 27 and 28, 1915, a tentative form was submitted by the architects to the builders. Several important recommendations were offered by the builders and were submitted to the joint committee at their meeting held in Philadelphia, as above stated. These recommendations are now incorporated in the new form.

Just as soon as the new documents are printed they will be promulgated for general use. This is the most important step taken by builders in a great many years and will be a great benefit to owners and investors, and will establish the building industry upon an ethical plane. It secures for all concerned a more reliable and better managed method of doing business.

The new documents provide for arbitration of all matters in dispute and make many other changes that have heretofore perceptibly increased the cost of erecting buildings.

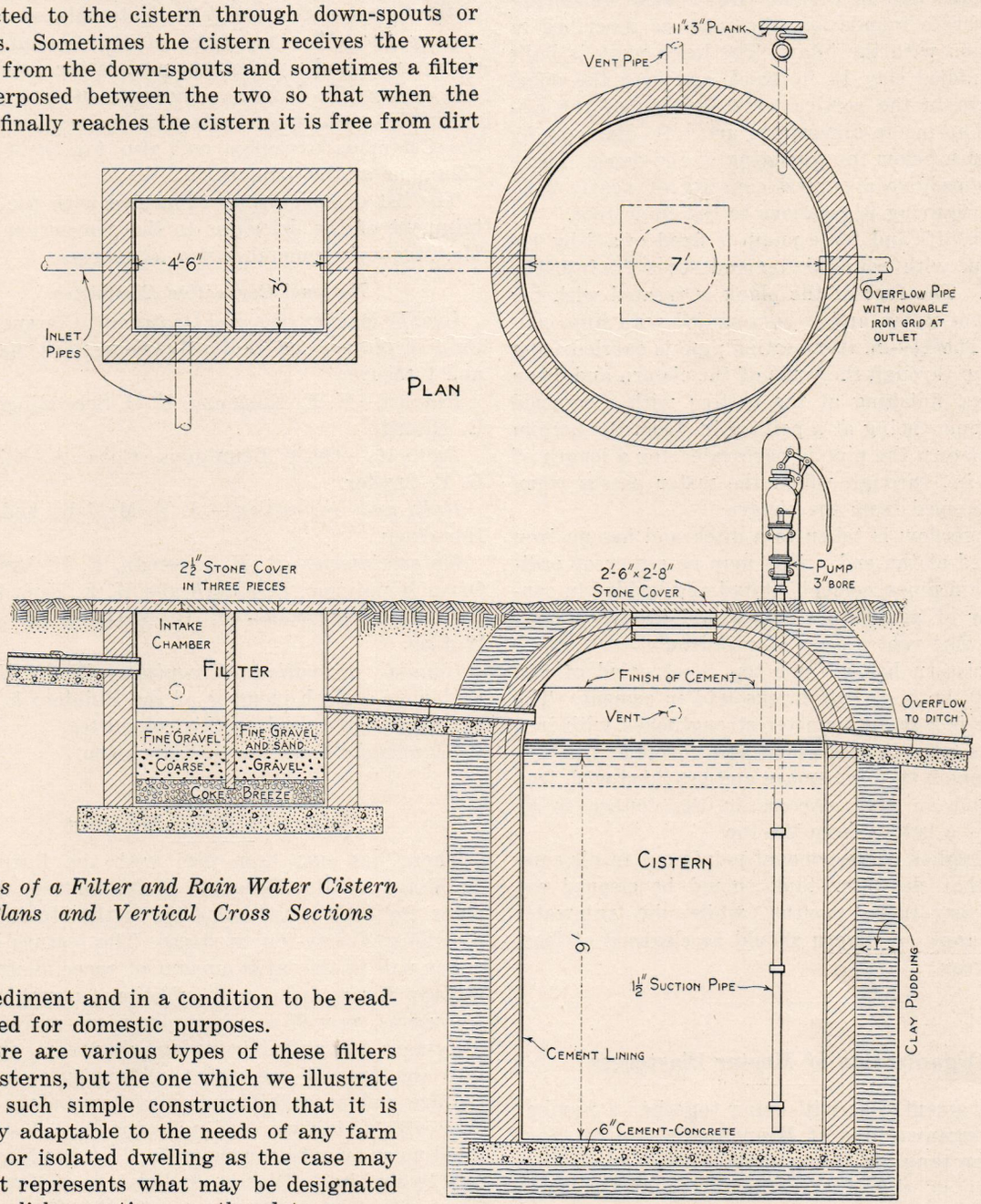
The firm of Schenck & Mead of New York City, composed of two women architects, won the first prize in a competition held under the auspices of the City Club of Chicago for plans for a "neighborhood center." The competitors were given permission to select any location in any city for their ideal "neighborhood center" and the prize-winning firm chose one square mile of the Bronx, between Washington Bridge and Macomb's Dam Park.

The University of Oregon at Eugene, Oregon, has recently established a School of Architecture, the term commencing with a class of 18 students under the direction of E. P. Lawrence, of Portland.

A Filter and Rain-Water Cistern

A Convenient Storage Tank for a Small Water Supply for Isolated Dwellings—Some Details of Construction

IT is the common practice in many sections of the country, more especially perhaps among those rural districts and suburban sections where a public water supply is not available, to make use of cisterns for the storage of rain-water which may be captured by the roof areas of a building and conducted to the cistern through down-spouts or leaders. Sometimes the cistern receives the water direct from the down-spouts and sometimes a filter is interposed between the two so that when the water finally reaches the cistern it is free from dirt and sediment and in a condition to be readily used for domestic purposes.



Details of a Filter and Rain Water Cistern —Plans and Vertical Cross Sections

There are various types of these filters and cisterns, but the one which we illustrate is of such simple construction that it is readily adaptable to the needs of any farm house or isolated dwelling as the case may be. It represents what may be designated as English practice, as the data accompanying the plans and sections of filter and rain-water cistern are gleaned from a recent issue of the *Building World*. The correspondent furnishing the information states that the filter tank is built of 9-in. brick work laid up in cement and resting on a 6-in. cement concrete foundation. It has a stone division which is carried down to within 4 in. of the floor, as may be readily seen from the cross section of the filter presented herewith.

The inside is rendered with ¾ of an inch of equal parts of cement and sand and finished with ¼-in. coating of neat cement finely troweled. The filter tank is 4 ft. 6 in. long; 3 ft. wide and 4 ft. 9 in. deep, allowing for a depth of 2 ft. 3 in. below the outlet, and 2 ft. 6 in. below the lost inlet. The inlet drain pipes are connected into the intake chamber as shown in the section.

The filtering material is 2 ft. deep and finishes

6 in. below the lost inlet. It therefore follows that the total depth of the filter is governed by the level on which the fall of the drains will permit the entrance of the lost inlet pipe into the intake chamber. The outgo is 3 in. below the lowest inlet, thus rendering it impossible for any floating matter to get back into the latter. The filtering material consists of layers of coke breeze, coarse gravel, fine gravel of layers of coke breeze, coarse gravel, fine gravel and fine gravel and sand, which combined, give a thickness of 8 in. The top of the filter is covered with three pieces of tooled stone 2½ in. thick and bedded in mortar.

The rain-water storage tank, or cistern, as it is called in America, is circular in cross section and bottle-shaped in vertical section and is built of 9-in. brick walls laid in cement with cement rendering and concrete foundation, the same as described in connection with the filter. The brick work is built with puddled clay 12 in. thick and over the dome as shown in the vertical cross section of the cistern. The inside dimensions are 7 ft. diameter by 9 ft. depth below the springing of the dome. These dimensions give a cubical capacity of nearly 2165 gallons, figuring 6¼ gallons to the cubic foot.

A 3-in. lift and force pump is fixed to a 3 by 11-in. plank with rounded top and set 3 ft. into the ground. The foot of the plank is treated with tar to prevent decay and is surrounded with lime concrete. The 1½-in. iron section pipe is carried from the pump through the walls of the cistern and down the sides, finishing at the bottom with a stopped end. Commencing at a point 9 in. from the bottom of the cistern the pipe is perforated for a length of 1 ft. 6 in., through which the water passes when being pumped from the cistern.

The overflow is taken to a ditch and has an iron grid fixed at the end. This may be either of ordinary drain pipes, cement jointed and bedded in concrete, or of agricultural pipes laid dry with open joints. The vent pipe is of cast iron.

The cistern has a dome top constructed of two segments built of half bricks laid in cement. The manhole is 2 ft. in diameter strengthened with iron rings as may be necessary and covered with 2½ York stone 2 ft. 6 in. square and provided with iron rings and an eye. Access to the cistern is by means of a ladder from the top.

The English correspondent points out in his comments that the filter tank should be cleaned out about every three months, while the rainwater storage tank or cistern should be cleansed at least once a year.

Organization of Master Plasterers

A movement that will bring together a number of old organizations of Minneapolis and St. Paul has taken tangible shape in the formation of what is known as the Master Plasterers of the Twin Cities. Incorporation papers have been filed with the Secretary of State and we understand that the new organization will hold much the same relationship to the plasterers as a Builders' Exchange holds to contractors. The incorporation papers were filed by Olaf Dahlstrom of 4000 Aldrich avenue, South, Minneapolis, Minn.

The Columbus Builders' Exchange and the National Convention

A movement to enlist the interest of Builders' Exchanges that have not yet affiliated with the National Association of Builders' Exchanges has been started as a result of the recent convention held in Columbus. All of the delegates who attended that meeting returned to their home cities with much enthusiasm. The splendid arrangements made by the local committees in Columbus have received a great deal of commendation. President Kunzman of the Columbus exchange took a lively interest in the proceedings, giving his entire time to the welfare of the visitors. He was recognized by the convention by election to the newly created position of finance commissioner and was made a member of the Board of Control of the National Association. Among the other members of the Columbus exchange who had a prominent part in the convention was George F. Mooney, chairman of the general committee on arrangements, who spoke on behalf of the Columbus exchange and also for the City of Columbus at the banquet.

The list of committees connected with the entertainment of the delegates to the convention under Mr. Mooney's leadership was as follows:

National Convention Committee

Geo. F. Mooney, General Chairman; Clarence Metters, secretary, and H. E. Kunzman, vice-chairman and treasurer.

Finance—H. E. Kunzman, F. O. Schrodinger and E. Elford.

Publicity—Orrin Bennignus, Chas. A. Klie and G. E. Snyder.

Halls and Decorations—J. E. McNally and L. C. Herschler.

Entertainment—B. M. Freeman, E. H. McGrath, Orrin Bennignus, E. Elford and H. E. Kunzman.

Hotel Reservations—E. H. McGrath and R. L. Watson.

General Reception Committee—Wm. Watson, Chairman. Each member of the Builders & Traders Exchange served on this committee.

Automobile Tour—L. G. Kallmerten.

Annex to Hotel McAlpin

There has just been filed with the Bureau of Buildings of the Borough of Manhattan, N. Y., plans for a 23-story extension to the Hotel McAlpin, West Thirty-fourth street. The feature of the annex will be the large amount of space allotted especially for women—four additional elevators and 200 rooms, as well as a large ballroom, private dining rooms and an extensive lounging room, opening into the present mezzanine restaurant. Another feature will be a children's playroom on the sixth floor with a stairway leading to the roof of a court, fitted up as an out-door playground. The plans were filed by architects Warren & Wetmore of New York City, who estimated the cost at $1,000,000.

A most encouraging feature of the situation in Seattle, Wash., is the gradual improvement in the lumber industry, as more plants are resuming operations every week. Orders for lumber, both domestic and foreign, are said to be increasing.

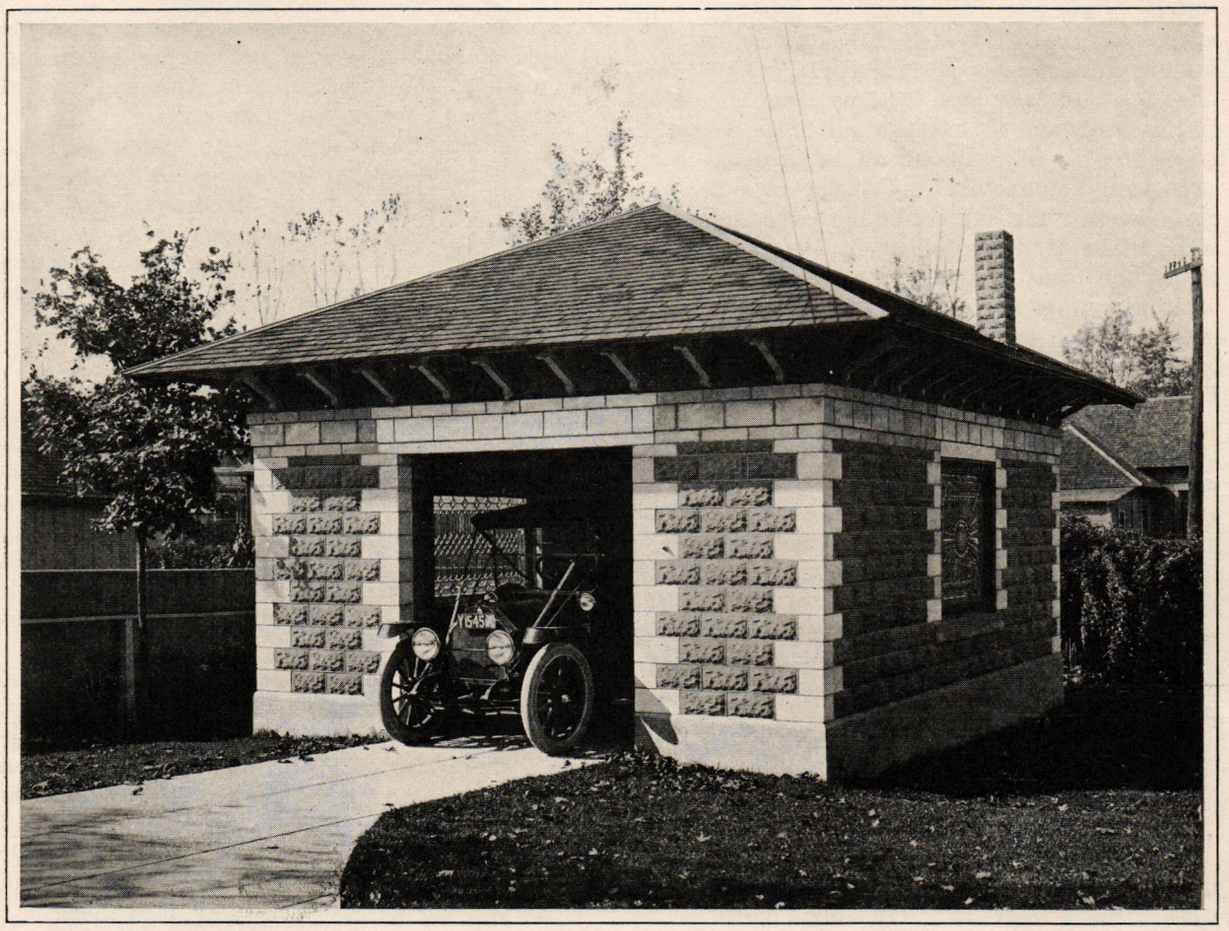
A Garage Built of Concrete Blocks

A Style of Building Which at the Present Day Is Becoming a Growing Necessity in All Sections of the Country

AN important adjunct of the country or suburban home at the present day is the garage for housing the favorite make of car, now counted as one of the greatest conveniences of the times, especially by those residing away from the business centers. The size of the garage depends of course upon the number of cars which the owner may possess, but even if there be only one, the garage should be sufficiently commodious not only to accommodate it, but also that of an occasional visiting guest. Then, too, it is a convenience to have plenty of room in which to wash the car and do any little repair work that may be necessary and not be cramped for space. In style of architecture it is well to have the garage in harmony with the dwelling house, thus producing an attractive effect.

At the present day all sorts of materials are used for the construction of garages, but those that are fire-resisting are much to be preferred by reason of the nature of the fuel that has to be kept about the place and the general accessories. A fireproof garage tends to invite a much lower rate of insurance, and painting and repairs are reduced to a minimum, while at the same time the life of the building is greatly prolonged. It is true that many garages are of frame construction, some having an exterior finish of stucco while others have monolithic concrete walls and still others are of brick or stone.

The example which we illustrate herewith is constructed throughout of "Ideal" concrete blocks and with their faces sufficiently varied in finish to give an exceedingly neat and attractive effect. The treatment of the front is especially clever and the use of leaded glass windows in the sides gives a tone and dignity which could not possibly be produced by the use of ordinary window glass. The cornice is of deep projection with a multiplicity of open brackets to support it, all as clearly indicated in the picture. The roof is of the hipped variety and is covered with shingles. The picture shows a one-car garage, but with ample floor space to readily move about without discomfort.



General View of a Garage Built of Concrete Blocks of Plain and Ornamental Face

Opening of the Panama Exposition

A Notable Event with Impressive Ceremonies—Architecture of Some of the Completed Structures

THE gates of the Panama-Pacific International Exposition were opened according to programme for a 288-day season on February 20 with an attendance that established a world's record. The total for the first three days, in spite of rain, was 442,957, as against an aggregate of 180,688 for the first three days of the World's Columbian Exposition at Chicago.

What the Architecture and Sculpture Symbolize

Held in commemoration of the building of the canal, the Exposition has been developed on a commensurate scale of magnitude. The multiform exhibits have been selected from all nations of the earth and as a whole epitomize concretely present-day world achievements in all lines. Similarly both architecture and sculpture express in poetic manner the purpose of the Exposition. The architecture of the buildings on the grounds embodies the ideas of many peoples, but in a combination new in effect and revealing marked originality. The sculpture, too, which adorns both buildings and grounds has a symbolic significance. The Fountain of Energy symbolizes the force that achieved the great Panama Canal. The column of Progress—the tallest sculptured column in the world—symbolizes the spiritual and material advancement which all races will enjoy because of the greater facility for communication made possible by the union of the oceans through the vehicle of the Panama Canal. The great Court of the Universe —the great radiating center of the main structural group of the Exposition grounds—represents the place where the world meets. The east and west boundaries of this Court are respectively the Arch of the Rising Sun and the Arch of the Setting Sun.

Pictures of Some of the Work

Upon the facing page are presented views of some of the more notable features of the completed work. No. 1 represents the entry portal to the Court of the Four Seasons from the Court of Palms. There are five principal courts in the architectural units embracing eight of the main exhibit palaces. The arrangement is such that it is possible for the visitor to view each of the eight exhibit palaces and the five courts without stepping onto a main boulevard.

No. 2 represents the great Arch of the Rising Sun, 160 ft. in hight and crowned by a huge sculptured group "The Nations of the East." The central figure is a huge elephant, richly caparisoned and bearing in the howdah a princely figure symbolizing India. The complementary figures represent Arabs, Mongolian warriors, camel riders, servitors, falconers and priests. Credit for the conception of this group is due to A. Sterling Calder, of New York, with whom collaborated two other famous sculptors—Leo Lentilli and Frederick G. R. Roth. The Arch of the Rising Sun is situated on the east approach of the central Exposition court shown in No. 9—the Court of the Universe. Upon the west approach to the court is a triumphal arch of similar proportions, crowned by a group symbolizing the advance of western civilization and known as "The Nations of the West."

No. 3 shows the colossal colonnades before the Palace of Fine Arts mirrored in the lagoon that lies between the Palace of Fine Arts and the Palaces of Food Products and Education.

No. 4 is the Court of the Four Seasons, showing the western portals to the left, while to the right are courts extending to the Marina and San Francisco Bay. There are many of these beautiful sunken pools in the various courts, reflecting, mirror-like, the splendor of the architectural and sculptural adornment.

The Column of Progress

No. 5 is the Column of Progress, crested by "The Adventurous Bowman." This commands the northern or San Francisco Bay shore approach to the Court of the Universe. The sculptured figures at the base, and the bas-relief that ascends the column are symbolical of the progress of mankind, the Bowman launching his arrow head being symbolical of the further spiritual and material advance of the peoples of the world.

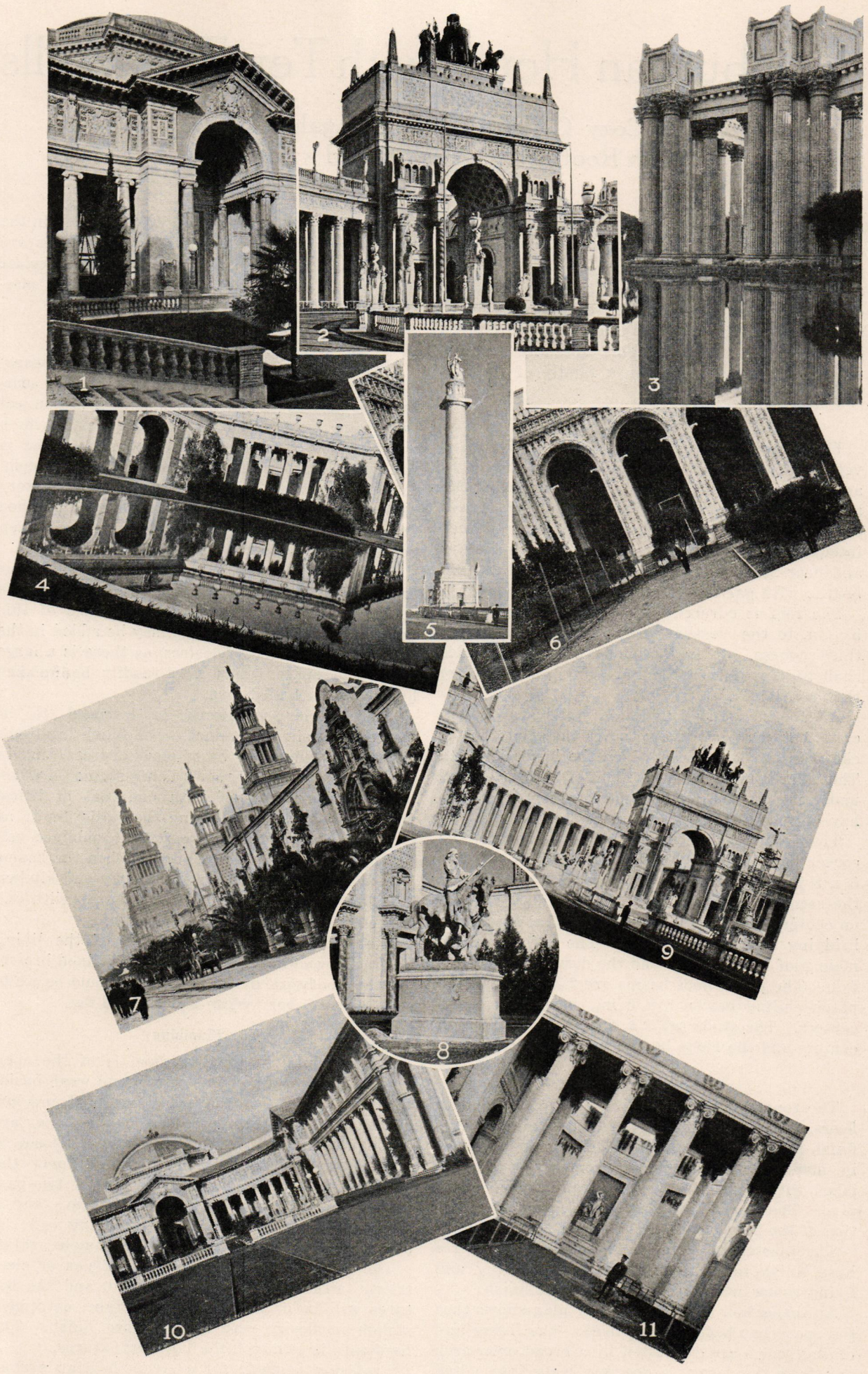
No. 6 shows the Court of Abundance of which Louis C. Mullgardt was the architect.

No. 7 is a view of the Avenue of Palms. On the left is the Tower of Jewels, 435 ft. high, and is in several successive terraces crowned by a globe, symbolizing the world. The tower is adorned with 125,000 cut glass prisms that tremble with the wind. At night they scintillate with all the colors of the rainbow as flashlights play upon them.

No. 8 is "The Pioneer" by Solon Borglum. This is one of the many notable equestrian figures that mark the avenues and courts of the Exposition.

No. 10 is a view of the Court of Palms, showing the portal to the Court of the Four Seasons and a vista, through the portal, of San Francisco Bay.

No. 11 represents "Winter," one of the four niches in the Court of the Four Seasons, the other three being Spring, Summer and Autumn. These niches have fountains and adornments typical of the seasons. To the right and left are the entrances to the colonnade which surround the Court, the space above the arches containing murals by world-famous artists.



Views of Some of the Notable Features at the Panama-Pacific International Exposition

A Suburban House with Tex-Tile Walls

A Cozy Cottage of the Bungalow Type with Roof of Shingles Stained a Tile Red

THE subject of our colored supplemental plate this month is a story and a half cottage intended for erection upon a lot with a 50 ft. frontage and designed to stand the wear of weather and time without constant painting and repairs. The exterior is of simple architectural treatment and suitable for any locality where a compact home for a family of four or five is desired.

The Exterior Covering

The exterior of the cottage is covered with a veneer of Tex-Tile laid up in a good mortar against the sheathing boards and eliminating the air space that is usually allowed for brick veneer owing to the fact that Tex-Tile have air spaces intended to check the transmission of moisture and heat. The tile are fastened to the sheathing boards with galvanized wire ties.

The roof is covered with cypress shingles laid 5½ in. to the weather with a heavy joint every third course. It is intended that the shingles shall be dipped in a tile red shingle stain before they are laid.

All footings and foundation walls are of concrete but may be of any other material that is cheap in the locality in which the house is built. The cellar is to have a clear hight of 7 ft.; is located under the kitchen, pantry and bed room, and is to have a concrete floor with cement finish.

The framing timbers are to be of spruce, the corner posts and sill plate being 4 x 6 in., girders 6 x 8 in., the first tier of beams 2 x 10 in., and the second tier of beams 2 x 8 in., placed 16 in. on centers and braced with rows of 2 x 4 in. cross bridging spaced 6 ft. apart. The rafters of the main roof are 2 x 8 in., and the dormer rafters 2 x 6 in. The porch floor beams are 2 x 8 in. and the porch ceiling beams 2 x 6 in., spaced 20 in. on centers. The studs are 2 x 4 in. spaced 16 in. on centers and the ridge boards are 1½ x 10 in.

The Floors

The rooms of the first story are to have double floors, the rough floor being of 1 x 6 in. pine and the finish floor in the living and dining rooms ⅞ x 4 in. maple. The rest of the rooms are to be finished with ⅞ x 4-in. North Carolina comb grain pine. The rooms in the attic or second floor portion of the house are to have single floors.

The plastering is to be two-coat work with a hard finish in all rooms except the dining and living rooms which shall have a sand finish.

An inspection of the main floor plan shows that the space has been well utilized. The living and dining rooms are connected by a broad open arch and from the former a doorway leads into a hall that connects with the sleeping rooms, the bath room and the stairway leading to the attic. In the opening between the living and dining rooms are shelves for books, and there is also a large fireplace faced with tile and tapestry brick. French casements open to the private porch.

The Rooms

The dining room is square in shape and especially suitable for a round table comfortably seating five people. French casements also connect the dining room with the private porch which latter can be screened in summer and glazed in winter at little extra cost, thus making it a comfortable summer dining room or a conservatory or sun parlor in winter. The kitchen is reached from the outside through an entry from which descend the stairs to the cellar.

The sleeping rooms in the attic or second floor have two windows in each and three large closets which are quite a necessity in a house of this type. An additional bedroom may be added in the future if the owner so desires, as there is a large unfinished space which may readily be finished by the use of wall board.

The interior woodwork is intended to be treated in a simple manner. The finish in all the first floor rooms is to be of clear cypress, that in the living and dining rooms being stained a warm brown and finished off with one coat of boiled wax. Above the wainscoting the walls are to be treated with a flat waterproof paint, subdued yellow in color, while the ceiling between the beams is to be a light cream. In the pantry and kitchen the woodwork is to be finished natural, with one coat of filler and two coats of varnish.

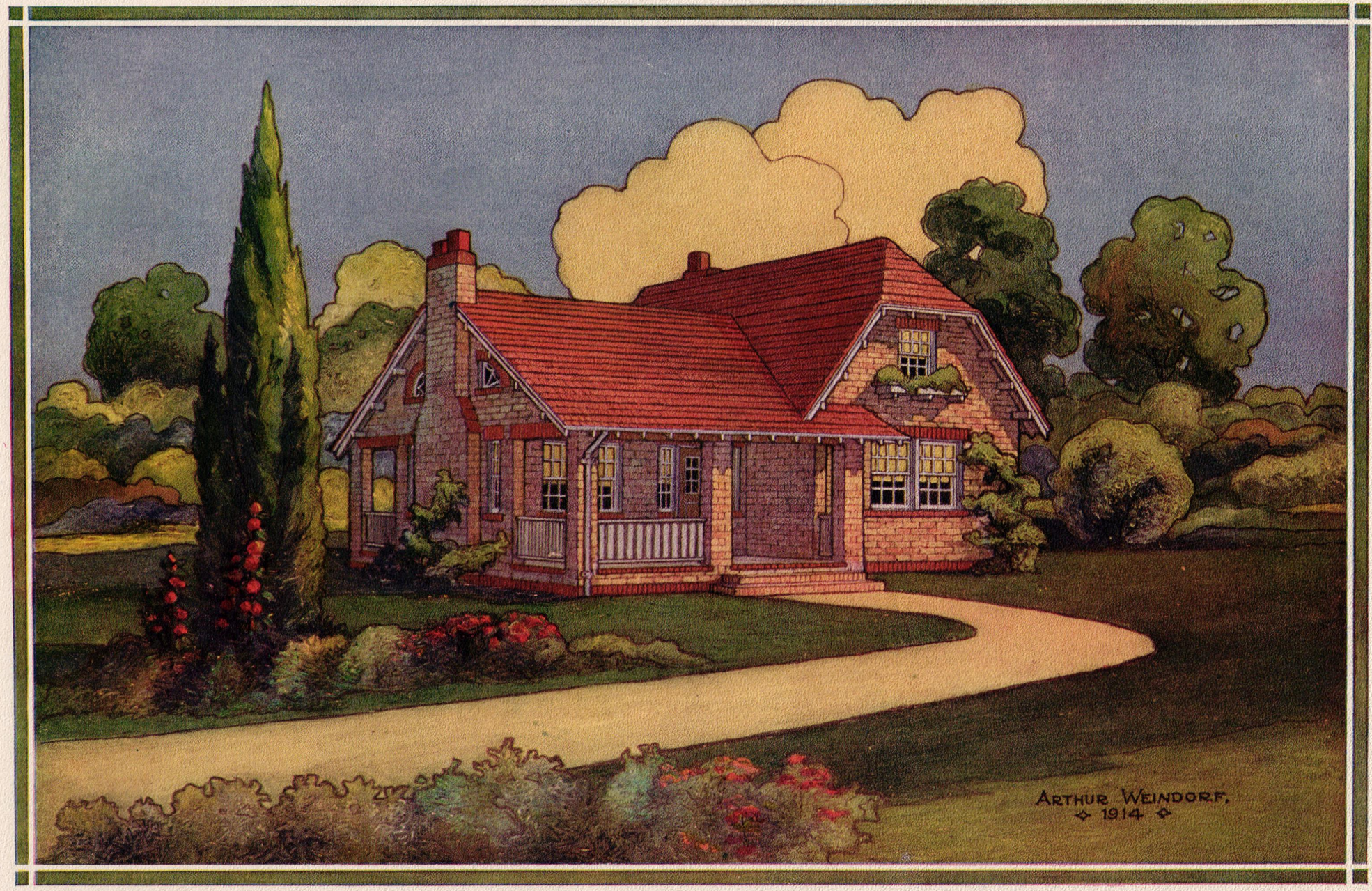
The hall continues the scheme of the living room, the woodwork being cypress, stained brown, but the woodwork in the bedrooms should be white wood painted ivory white and finished flat.

The Plumbing

All plumbing in the bathroom is of the open type with porcelain enameled tub and wash basin. The watercloset is to have a china bowl and low down tank. Wherever pipes are exposed they are to be nickelplated. A small medicine closet is intended to be built in the partition over the washstand. The kitchen is to have a two-part soap stone or enameled iron wash trays and a galvanized iron sink. All the plumbing is to be exposed and all pipes coated with enameled paint.

The lighting may be by means of gas or electricity, although both are provided, and the fixtures will be of the combination type, extremely simple in design and of a bronze finish. The hardware is to match the lighting fixtures.

Provision is made for a steam heating system and radiators are to be located in all rooms and


ARTHUR WEINDORF.
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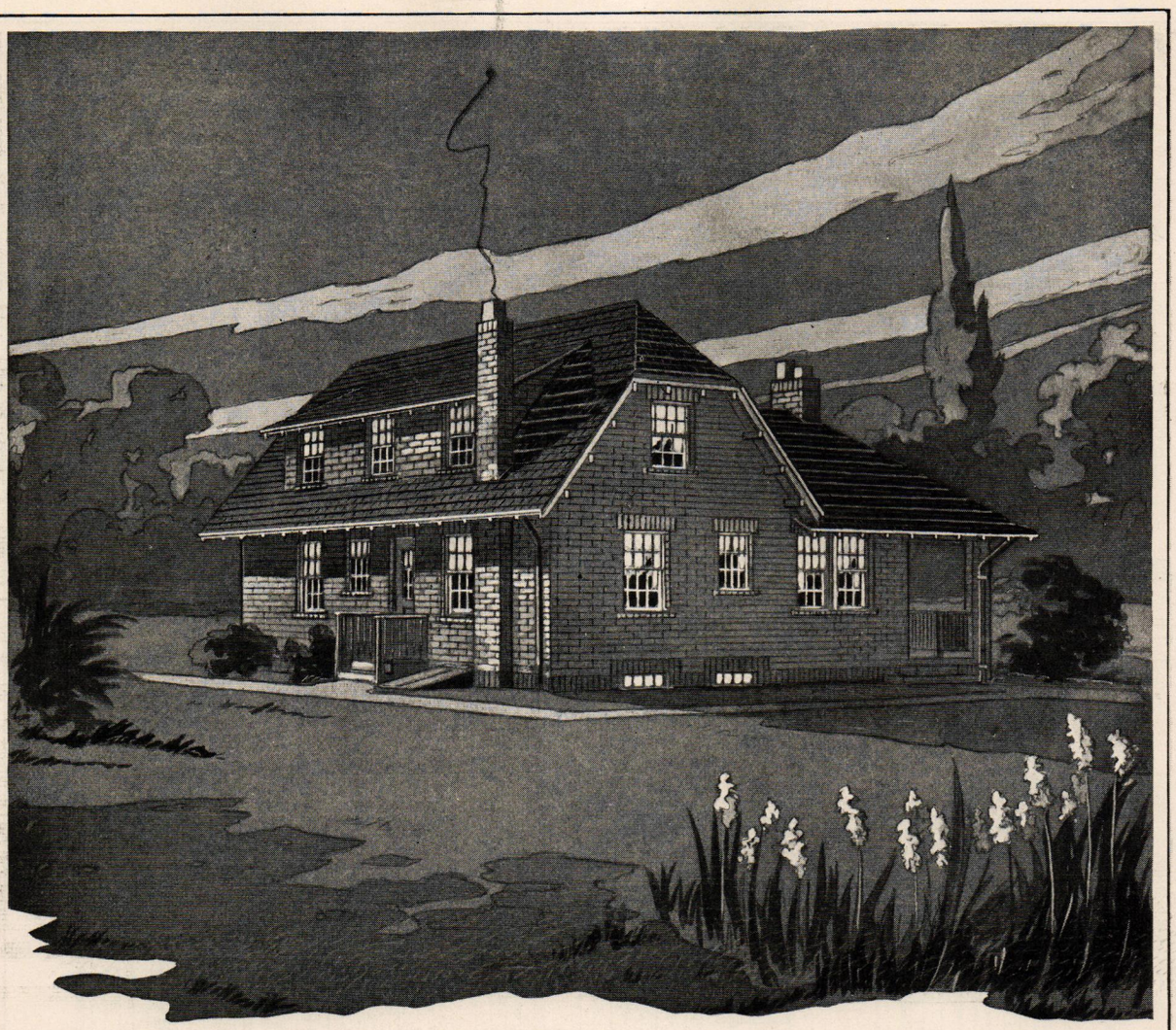
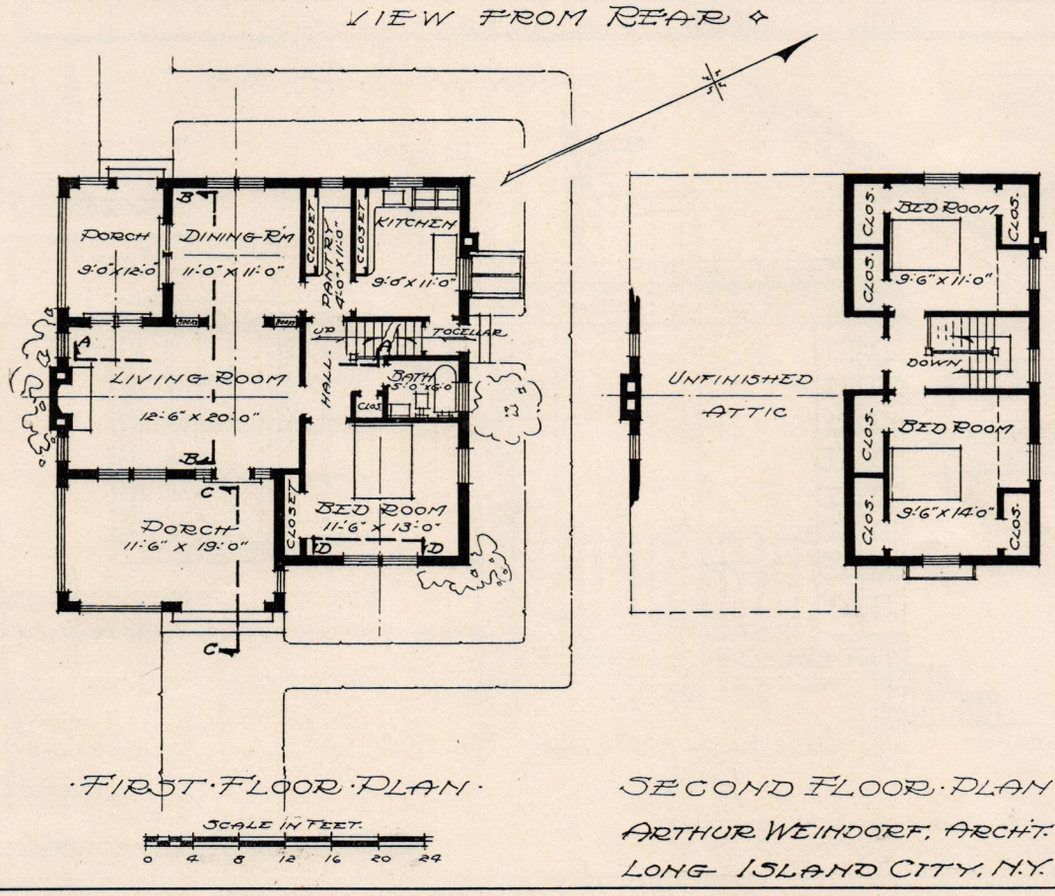


VIEW FROM REAR



FIRST FLOOR PLAN

SCALE IN FEET.

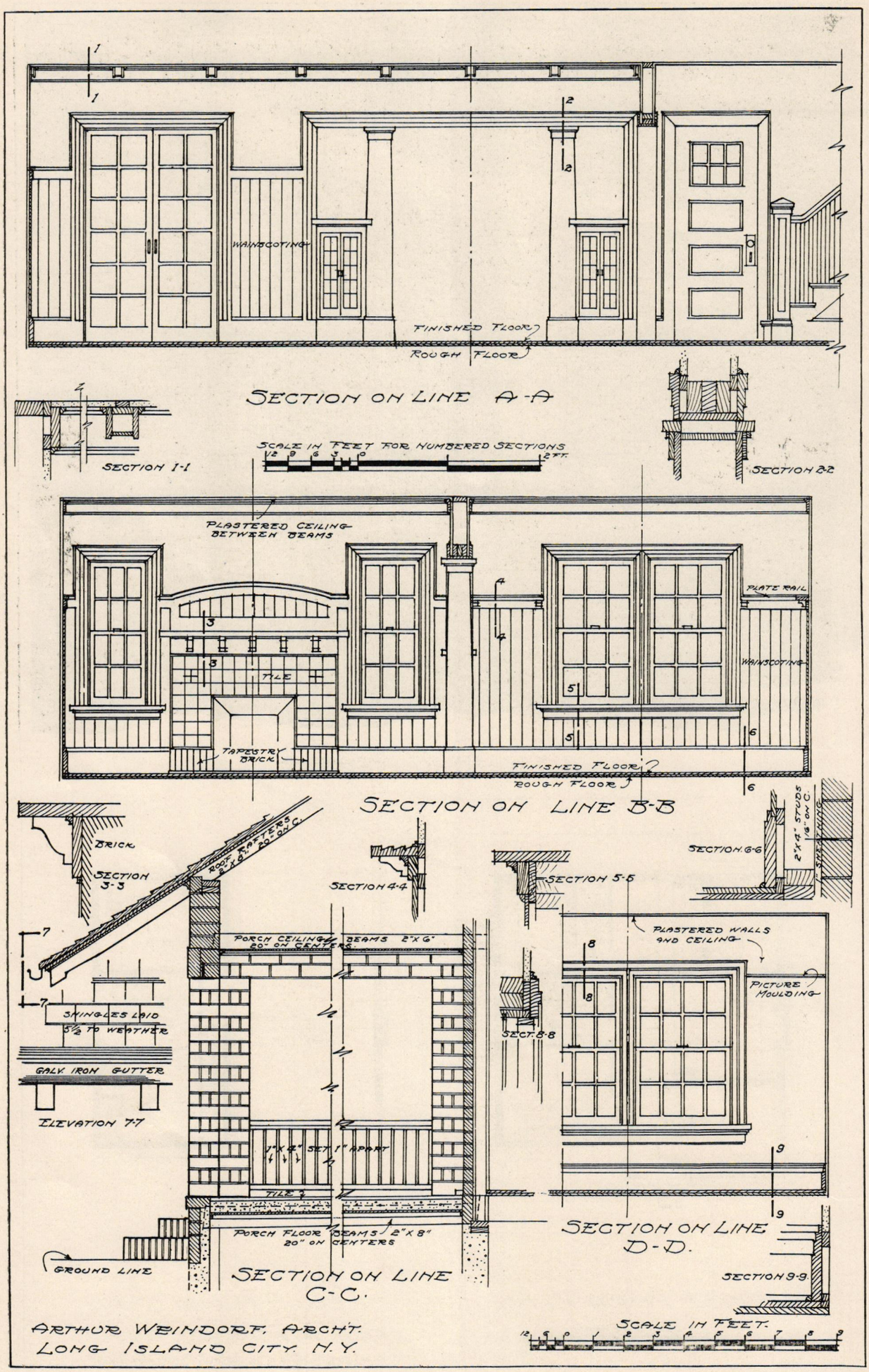
0 4 8 12 16 20 24

SECOND FLOOR PLAN

ARTHUR WEINDORF, ARCH'T.

LONG ISLAND CITY, N.Y.

Plans and Perspective of Suburban House Shown by Our Colored Supplemental Plate This Month



Miscellaneous Constructive Details of Suburban House Shown on Our Colored Supplemental Plate

of sufficient capacity to properly heat the house in zero weather.

Classified Estimate of Cost

According to the figures of the architect the house has a cubical contents of 23,100 cu. ft., which at 20c. per cu. ft. give an approximate cost of $4620, apportioned as follows:

Excavating and grading	$150.00
Masonry work, including concrete footings and foundation walls, exterior walls of building veneered with Tex-Tile, chimney and fireplace and tile work.	1,210.00
Plastering	330.00
Carpenter work, including lumber bill and mill work, glass, etc.	1,800.00
Hardware	90.00
Metal work	100.00
Plumbing and gas fitting	260.00
Heating	300.00
Painting, staining and tinting	250.00
Electric wiring and bell work	75.00
Combination lighting fixtures	50.00
Total	$4,615.00

The Tex-Tile cottage here illustrated and described was designed by Architect Arthur Weindorf, Long Island City, N. Y., who states that the figures above given include the contractor's 10 per cent. profit.

Effect of Fire on Concrete Construction

At the request of the Boston Manufacturers Mutual Fire Insurance Company, Leonard C. Wason, of the city named, made a critical inspection of the gutted buildings of the Thomas A. Edison plant, with the idea of determining how well the reinforced concrete structures had stood up under conflagration conditions. His conclusions bore out what has long been understood to be the fact in these matters. He says:

"Steel becomes ductile at a comparatively low temperature. The strength of a reinforced concrete structure depends upon the compressive strength of the concrete and the tensile strength of the steel. If the steel stretches, the floors will sag under load. If the stone crumbles under heat it will cause soft pockets to form between the films of mortar which hold the stones in place. These films will readily heat and break away.

"Accordingly, in order to secure a fire resisting concrete, it is necessary to select a stone which will not readily crumble under heat, and to bury the steel so deeply in the concrete that the heat generated by a fire in the contents of the building, cannot raise the temperature of the steel to its softening point, even after some of the concrete surface has been spawled off."

In his report he laid particular stress upon the desirability of making interior columns either circular or octagonal in cross-section. His argument was based upon observation of the buildings which were gutted during that fire. To quote:

"Considering the intensity of the fire the effect upon the concrete was surprisingly slight. The corners of the square columns suffered most, being spalled off to an average depth of about four inches. The shape of the final column after chipping off dead material was practically a circle owing to the loss of the corners. Neither of the two causes which combined in this spalling had to do with the dehydration of the cement in the concrete.

"The material is brittle, and under heat the temperature of the corners will rise more rapidly than the mass of the column, for the heat can penetrate from two sides. The result, in general, is the same as heating a piece of brittle glass on one side, where it will expand and crack away from the unheated balance of the sheet. In all the columns square twisted rods were placed vertically—some set well back into the concrete, some very close to the corners. When the heat reached these bars they expanded and buckled and helped to make a line of cleavage in the plane in which they occurred. The combination of buckling of the steel bars and strains in the concrete probably caused the serious spalling of the columns."

Convention of Builders' Supply Association

During the Cement Show one of the many interesting conventions held in the Windy City was that of the National Builders' Supply Association. The meeting was featured by the reading of many interesting papers. A record attendance was a feature of each business session and the character of the exhibits also created unusual interest.

The following officers were elected for service during the ensuing year:

President....James H. Allen, of the Nebraska Material Co., Lincoln, Neb.

Treasurer....John J. Voelkel, of the J. J. Clarke Co., New Orleans, La.

A large number of directors were also elected representative of the building trades in all parts of the country.

Skyscraper Model at Panama-Pacific Exposition

One of the exhibits of unusual interest at the Panama-Pacific Exposition, which opened in San Francisco on February 20, is a model of the 40-story pyramid-crowned steel and granite building of the Bankers' Trust Company of New York City. The model is about 40 ft. high and is an exact reproduction of the exterior of the building which towers 540 ft. above the street level. One of the architectural features of this building is its granite roof in the form of a stepped pyramid 94 ft. high.

The model was prepared under the direct supervision of Trowbridge & Livingston, the architects who designed the building. The model, divided into forty sections, was made into huge packages for shipment and forwarded across the continent by express freight. Upon reaching its destination it was assembled and erected in the Social Economy Building of the Exposition.

Competent opinion is that a considerable proportion of the building activity of the current year in New York City will be concentrated on Fifth avenue, Broadway and Park avenue. If building on the side streets were as active as it is on the important avenues contractors feel that there would be little ground for complaint.

Working Details of a Sewing Cabinet

Mill Bill and Instructions Which Will Be Found Convenient for the Mechanic Clever with His Tools

By Ralph F. Windoes*

WHAT to do with the sewing material that overflows from the machine drawers, is a question asked by every woman. In answer a number of sewing cabinets have been designed and offered by the trade. But all have their limitations, and the limit, generally, has fallen short of the overflow. As another solution, and one that has the capacity to take care of all of this material, the sewing cabinet illustrated on the facing page was designed.

The complete working drawing, mill bill, and instructions will make it easy for any man with ordinary tool-using ability to produce one during these long winter evenings, in his own home workshop. There is not a difficult mortise and tenon joint in the piece, in fact, the only joints are in the drawers, and these are very simple.

Order the lumber exactly as given in the bill, planed and sanded to these dimensions. Quarter-sawed oak will make a most attractive piece, but plain-sawed, or even chestnut, will work up well.

Instructions for Building

Pieces No. 1 are for the legs. They are planed to a taper at the bottom and given a slight round chamfer at the top. The three inner sections and the top, pieces Nos. 2 and 3, are next worked into shape. A piece 1¼ x 1½ in. is cut from each corner into which the legs fit. The latter are held in place by means of 3-in., 9's flat head screws, put in from the outside. The distance between the sections is shown in the side elevation. Pieces No. 13 are screwed on the top of each inner section, to make slides for the drawers. It may save confusion if these are screwed on before the legs are fastened. The 1½-in. piece, No. 8, is screwed into the bottom section. The back, No. 4, is held in place by screws fastened into these sections. This completes the framework of center.

The side pockets are built up, glued, blind-nailed, and clamped. They are fastened to the center by means of screws. The tops are hinged with one pair each of ¾ x 2½-in. brass butts.

The top drawer is detailed, and the other two drawers have the same construction with the inner partitions left out. Piece No. 5 is the top drawer front, and piece No. 14—pine, 9 ft. long—is to be cut up for the sides, end, and partitions. These drawers should have square oak knobs, which can be purchased at most hardware stores.

Be sure that you understand these instructions and the working drawing before touching the wood, as an exact idea of what you are going to do before you begin may save trouble afterwards.

*Instructor in Cabinet Making at the Davenport High School.

The finish for such a piece should match the machine by which it is to stand. If the latter is golden oak, and most of them are, the finish should be applied as follows:

Golden Oak Finish

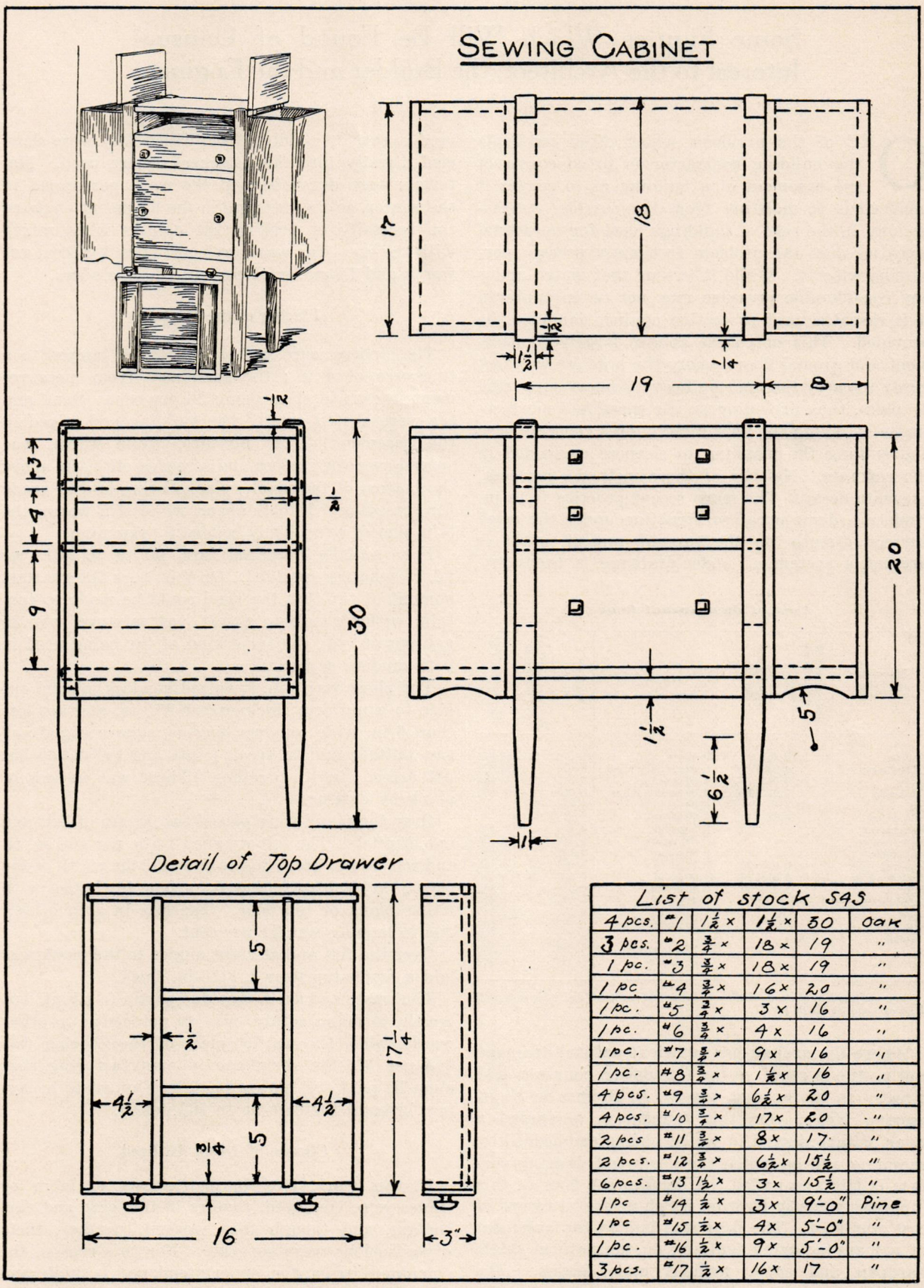
Secure a little asphaltum varnish and thin it out with turpentine or naptha until it is as thin as water and makes a yellowish stain. Apply it to the wood, and rub off with waste. The grain of the wood is open, so it will be necessary to "fill" it. Secure about one pound of "golden oak paste filler," or the "natural filler" darkened with burnt umber and drop black. Thin with turpentine, apply to the wood with the grain, and after 20 to 30 minutes rub off across the grain with waste or burlap. When this has had about 24 hours in which to set, varnish it with a good grade of "copal" furniture varnish. Apply the varnish with a bristle brush—plenty of it—so that it may even drip off the work. Then wipe off with the brush from which the extra varnish has been removed on the edge of the dish. Set it to dry in a dustless, warm, dry place for 24 hours. Repeat about four times. Between applications, wait about a week,, so that it will be absolutely dry and hard. When the last coat has thoroughly set, rub with a felt pad, powdered pumice-stone and water until the surface is smooth, unpitted and even, being very careful of the edges. Wipe it clean with a wet sponge and chamois skin, which will give a dull, "egg-shell' finish. For a polish, rub with a rotary motion, using a mixture of ½ sweet oil, and ½ alcohol.

If the craftsman experiences any trouble in the building of the piece or securing proper materials and supplies, the author of this article will be glad to answer, through the correspondence columns of this paper, any questions that may be asked.

First Lessons in Concrete Work

Under the above title there has just been issued from the press a little work which contains much practical information in regard to small concrete jobs. The author, Harold E. Smith, has written it especially for the use of the wide-awake and progressive builder, the carpenter-contractor and, in fact, for every man or concern who is just starting in the concrete business, or whose concrete work involves the use of small scattered amounts of concrete. It is in no sense intended for the big contractor. Within its covers are specific directions covering the construction of footings, small foundations, floors, walls, sidewalks, and other light concrete jobs. There are also valuable tables covering

methods of mixing concrete, the various ingredients to be used and the proportions of the mixtures. In addition will be found considerable data covering the cost of construction, a feature which cannot fail to be appreciated by the concrete worker at the present day, when this material is being so extensively used in all sorts of building work. The book is profusely illustrated in a way to render perfectly clear the features described in the text. Cold weather concreting and how concrete may be rendered water-tight are features of special interest, more especially the latter, when trouble from damp cellars is constantly arising. The little work is being sent out by the T. L. Smith Company, 3120AA Hadley street, Milwaukee, Wis., and we understand that anyone can secure a copy on application.



List of stock S43

4 pcs.	#1	1½ x	1½ x	30	oak
3 pcs.	#2	¾ x	18 x	19	"
1 pc.	#3	¾ x	18 x	19	"
1 pc.	#4	¾ x	16 x	20	"
1 pc.	#5	¾ x	3 x	16	"
1 pc.	#6	¾ x	4 x	16	"
1 pc.	#7	¾ x	9 x	16	"
1 pc.	#8	¾ x	1½ x	16	"
4 pcs.	#9	¾ x	6½ x	20	"
4 pcs.	#10	¾ x	17 x	20	"
2 pcs	#11	¾ x	8 x	17	"
2 pcs.	#12	¾ x	6½ x	15½	"
6 pcs.	#13	½ x	3 x	15½	"
1 pc	#14	½ x	3 x	9'-0"	Pine
1 pc	#15	½ x	4 x	5'-0"	"
1 pc.	#16	½ x	9 x	5'-0"	"
3 pcs.	#17	½ x	16 x	17	"

Working Details of a Sewing Cabinet

Cost of a Damp-Proof Timber Floor

Some Figures Which Will Be Found of Unusual Interest to the Architect, the Builder and the Engineer

ONE of the problems which often confronts the building contractor is to so construct the basement of a building as to render it impervious to moisture from the outside, and especially in the case of buildings used for industrial purposes does the problem frequently present perplexing aspects. While it is true that water under any considerable pressure may not be encountered it is essential that protection against dampness be provided. This of course applies largely to basement and ground floors where the practice was formerly to carry the floor on heavy timbers supported by piers, thus providing an air space and more recently by laying the floor directly on a concrete base and spiking the planking to sleepers embedded in the concrete. Neither of these methods, however, prevents decay. The more recent practice is to introduce a damp-proof construction under the wood surface directly on the ground, and if water is present a system of under-drainage is necessary.

Cost of damp-proof floor

Materials and Labor	Thickness of Material in Place	Quantity per Sq. Yd.	Unit Cost	Cost per Sq. Yd.	Per Cent of Waste and Shrinkage	Cost per Sq. Yd.*
Cinders	4 in.	0.151 cu.yd.	$0.50 per cu.yd.	$0.076	36	$0.076
Tar in cinders		0.0381 bbl.	2.00 per bbl. (57 gal.)	0.076		0.076
Sand	1 in.	0.045 cu.yd.	1.00 per cu.yd.	0.045	68	0.045
Tar in sand		0.0276 bbl.	2.00 per bbl. (57 gal.)	0.055		0.055
Felt	2 ply	3.10 lb.	35.00 per ton	0.054	21	
Pitch on felt		3.32 lb.	17.00 per ton	0.028		
Teaming, tar			0.50 per hr.	0.039		0.039
Labor, roofers			0.375 per hr.	0.433		0.358
Supt., roofers			0.50 per hr.	0.100		0.078
Kyanized plank	2½ in.	0.027 M.	33.50 per M.	0.905	00	0.756
Maple top floor	1 1/16 in.	0.0134 M.	45.00 per M.	0.603	40	0.603
Nails		1.2 lb.	2.10 per cwt.	0.027		0.027
Carpenters			0.41 per hr.	0.475		0.475
Labor			1.75 per day	0.230		0.230
Supt.			0.50 per hr.	0.080		0.080
Totals	9 in.			3.226		2.898
			Materials	1.869		1.638
			Labor	1.357		1.260

*Cost omitting felt, pitch on felt, labor placing felt and pitch and using untreated Hemlock plank at $28.00 per M.

Where the ground has sufficient natural drainage and no tile is required the foundation course is laid directly on the ground, says J. A. Holmes in *Engineering News*. On this foundation is spread a layer of tarred sand in which planks are bedded by ramming and on which the hardwood wearing surface is laid and nailed. A damp-proof floor of this kind was recently built on which a careful record of cost was kept. The floor was laid in the basement of a manufacturing building on the natural earth, hardpan and sand, without under-drains. The ground was prepared by the contractor for the building by rolling or puddling, therefore the costs given in the accompanying table are for materials and labor above the ground.

The soft-coal cinders used for the foundation course were purchased from the railroad and delivered in cars on a siding from which they were shoveled directly into the basement where used. Materials were delivered and the work performed in the winter, so that storage in the basement obviated the necessity of heating the cinders when mixed with the tar. Tar was purchased from the local gas works and 14 gal. used per cu. yd. of cinders.

Placing of the Mixture

The cinders were spread, rolled and tamped to a thickness of 4 in.; the shrinkage from measurement in cars to place being 36 per cent. Sand and tar were heated outside the building and mixed in the basement. This mixture, while warm, was spread over the cinders and screeded off ⅜-in. above the bottom of the plank; planks being laid to grade for screeding. Into the sand while still warm, the 3-in. planks were firmly bedded by ramming.

For specially prepared tars, 50 to 60 gal. per yd. of sand are specified. On this work the greatest amount of tar that the sand could be made to contain, without making a soft, wet mixture, was 35 gal. per cu. yd., the same kind of tar being used in both cinders and sand.

The plank was 3-in. kyanized hemlock, planed one side to a uniform thickness of 2¾ in. and not less than 6 in. wide, random lengths, square edged and saw butted; laid to break joints and toe nailed but not driven tightly together. There was no loss of plank by cutting.

Over the plank were placed two layers of felt and one of pitch. The felt weighed 14 lb. per 100 sq. ft. and was laid to break joints one-half the width of the sheet; no pitch was allowed to come in contact with either plank or top floor. The loss in area of felt due to lapping was 21 per cent.

Over the felt and at right angles to the plank was laid a maple-top floor 1 1/16-in. thick.

The waste and shrinkage due partly to laying, but mostly to manufacture, was 40 per cent.; in other words, while the market price of the flooring was $45 per M., the shrinkage in manufacturing that must be paid for, plus a small loss by waste in laying, brought the cost up to $63 per M.

Classes of Labor Utilized

In this work, two distinct classes of labor or trades were employed, roofers in this case and carpenters, and though they worked together, their organizations were separate. For this reason, the combined items for superintendence is high and that for superintendence of roofers unnecessarily so. Reducing the item for superintendence of roofers and using untreated plank and leaving out the felt and pitch between plank and top floor, the cost would be reduced as shown in the last column of the table presented herewith.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

IN Fig. 44 two beam sections are shown with the axes at right angles and the respective moments of inertia and section moduli are also given. The moment of resistance depends upon the square of the depth so that for two rectangular beams of homogeneous material, having the same breadth, the beam having a depth twice as great as that of the other beam, has a resisting moment four times as great. It will also be much stiffer so there will be less deflection with a deep beam. The most economical beam, considering stiffness and strength, with a rectangular cross-section has a breadth between two-thirds and three-fourths the depth.

A beam of I-section is possible in steel and iron because of the strength of these materials. The

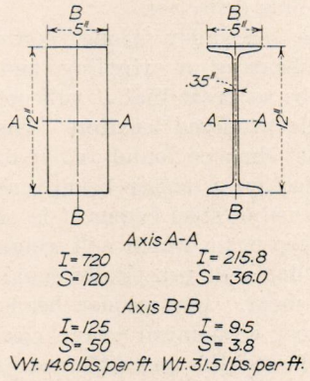


Fig. 44—Comparison of Moments of Inertia and Section Moduli in a Rectangular Beam and in an I-Beam

material is so disposed that practically all the metal highly stressed is concentrated in the flanges, the web transmitting the stresses and taking care of shear. When a beam of I-section is required having a depth greater than can be properly rolled, one is made of a plate having angles riveted along the edges, this being known as a plate girder. When a still deeper girder is required a latticed girder is used, this being known as a truss.

Wooden beams are made only in solid form, rectangular or round, for wood is composed of distinct fibers, many of which will be completely detached from the main fibers in shaping the section to provide broad flanges. Steel and iron will transmit stresses equally well in all directions, so while in the filleted section connecting the flange to the web there is some concentration of stresses, this has been taken care of in designing the beam. In all solid and rolled shapes the maximum fiber stress is the skin stress. In built-up sections, such as plate or latticed girders, the maximum fiber stress is assumed to cover the flange member and the whole action is on the line passing through the neutral axis. The stress is transmitted from the web, or the web members, to the flange through rivets, which must be properly proportioned in size and properly spaced to take care of the shear.

Shearing Resistance

A beam may be strong enough to carry the load without a bending failure which will crush the fibers at the top or pull them apart at the bottom, yet it may fail in shear. The direct shearing stress at any section on a beam is found by dividing the shear at the section by the area of the beam at the section. The direct shear, however, is seldom operative, this action being best represented by a punch making holes in a plate or by a large shear cutting a plate. The shearing stress which breaks a beam is diagonal tension resulting from the combined action of the horizontal and vertical shearing stresses.

The direct vertical end shear is equal to the maximum reaction. The horizontal shear is equal in amount and acts along the neutral plane where the fiber stress in bending changes from tension to compression, the stress being in reality a sliding of the fibers where they have no bending stress. The diagonal tension is the component of these two actions. Referring again to the statement that the area of the shear diagram between any section and the reaction multiplied by the length of this part of the beam equals the bending moment at the section, the diagonal shear at any section amounts to

$$s = \frac{V}{jd} = \frac{M_1 - M_2}{jd}$$

in which s = unit shear in pounds per square inch.
V = shear at the section in pounds.
M_1 = moment in inch-pounds at left of section.
M_2 = moment in inch-pounds at right of section.
jd = moment arm in inches.

The allowable shearing stress in steel is 10,000 lb. per square inch. After obtaining the size of beam to carry a certain load divide the maximum reaction by the web thickness multiplied by the depth of the beam. This will give the shearing stress in pounds per square inch. If it exceeds 10,000 lb. a

Note—In this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 28 of the March issue.

larger beam is required. In the steel handbooks the total amount of shear for which a beam is safe is given in the tables of "Properties of Sections." For example, in taking out from the tables a beam of sufficient size to carry the load the total amount of shear the beam is good for should be equal to or exceed the maximum reaction. Thin webs act like long slender columns and may fail by crippling. The crippling strength of the beams is also given in the tables and this should be equal to or exceed the maximum reaction.

Shear in Wooden Beams

In wooden beams the dangerous shear acts along the neutral plane and the beam may split, thus by shearing action being converted into two shallow beams, which will then break by bending, for the upper half must carry the whole load and the lower half carries the whole load when the upper half is destroyed. The strength in shear of wooden beams should be tested by the following formula. If the distributed load found by this formula is smaller than that found by the bending formula, increase the size of the beam.

$$W = \frac{4bhs}{3}$$

in which W = the load the beam will carry without failing in shear.
b = breadth in inches.
h = hight in inches.
s = shearing stress per square inch, usually one-tenth the maximum fiber stress in bending.

Modulus of Rupture

The modulus of rupture is a measure which represents a combination of all the forces that tend to break a beam; *i. e.*, the combined action of tension, compression, shear and crippling. The modulus of rupture was formerly used in textbooks almost exclusively. To-day it is used only for materials in which it is difficult to separate the different stresses, as, for example, clay, stone and concrete. The modulus of rupture is not used in computations for beams of wood, steel, iron and reinforced concrete. For such materials one sees to-day the moment factor, or, properly speaking, the unit moment of resistance, sometimes designated by K and sometimes by R.

The unit moment of resistance is a number which contains all the known quantities in an expression, leaving only the unknowns to be found. For example, the moment of resistance of a wooden beam in which we can use a maximum fiber stress of 1,200 lb. per square inch is

$$M_r = \frac{1200\ bh^2}{6}$$

and by dividing the fiber stress by 6 the unit moment of resistance equals 200, from which we get

$$M_r = 200\ bh^2 = Rbh^2$$

Some men use R for wooden beams, but where the divisor is so small the only advantage is some slight simplification of the work, provided a table of values of R has been previously computed for the woods used. In reinforced-concrete work a number of factors enter into the formula for the resisting moment and the use of a table, or of a diagram which is really a graphical table, for all possible values of R is almost indispensable for the designer. Where a number of factors enter into a computation it is easy to forget to use some.

Deflection

The amount of deflection when a beam is loaded is measured on the bottom or top of the beam for convenience. The difference in elevation between the end of the beam and the middle is the deflection. The deflection actually used in computations is the deflection at the neutral axis, but the deflection measured on the bottom or top, which for obvious reasons is more readily obtained than the deflection of the neutral plane, is close enough for all practical purposes.

Deflection in beams and girders used in buildings is important only when the lower side carries a plastered ceiling. The deflection is limited to a maximum of one-three-hundred-and-sixtieth of the span to prevent cracks in the plaster. For beams and trusses under moving loads the deflection must be limited to an amount which will not set up dangerous vibrations, but with this the ordinary structural designer seldom has to deal, it being part of the work involved in the design of bridges. Deflection also affects appearance so a camber is given to trusses to hide deflection.

A beam may be amply strong so it will not fail by bending, shearing or crippling, and yet the deflection may be so great that it will not be suitable for use in the proposed location. The amount of deflection must then be found and if it exceeds the allowable deflection a deeper beam must be substituted. When using steel beams it is often possible to secure a deep beam which will weigh less than a beam of less depth of practically equal strength in bending and shear. For wooden beams experience shows the most economical beam, considering the two factors of strength and stiffness, has a breadth equal to two-thirds or three-fourths the depth.

Deflection Formulas

Deflection formulas as usually presented are formidable in appearance so tables are given in the steel handbooks which enable the deflection in inches to be found by dividing a factor in the table by the depth of the rolled section in inches.

Similar information for wooden beams was not so readily obtainable until in 1913 the Yellow Pine Manufacturers' Association issued a book entitled "A Manual of Standard Wood Construction," following the lines laid down previously by the steel manufacturers in their handbooks. Copies of this book may be obtained from the secretary of the above association in St. Louis, Mo.

(*To be continued*)

Tool-Chest Dialogue

"It is 'plane' that I love you," he began.
"Is that on the 'level'?" she asked.
"Haven't I always been on the 'square' with you?"
"But you have many 'vices,'" she remonstrated.
"Not a 'bit' of it," he asserted.
"What made you 'brace' up?" she queried coquettishly.
"The fact that I 'saw' you," he replied, with a bow.
"I ought to 'hammer' you for that," she answered saucily.
"Come and sit by me on the 'bench,'" he urged.
"Suppose the other should 'file' in?" she murmured. "You shouldn't let your arms 'compass' me."
"I know a preacher who is a good 'joiner,'" he suggested, and they rushed off for the license.—*Exchange.*

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

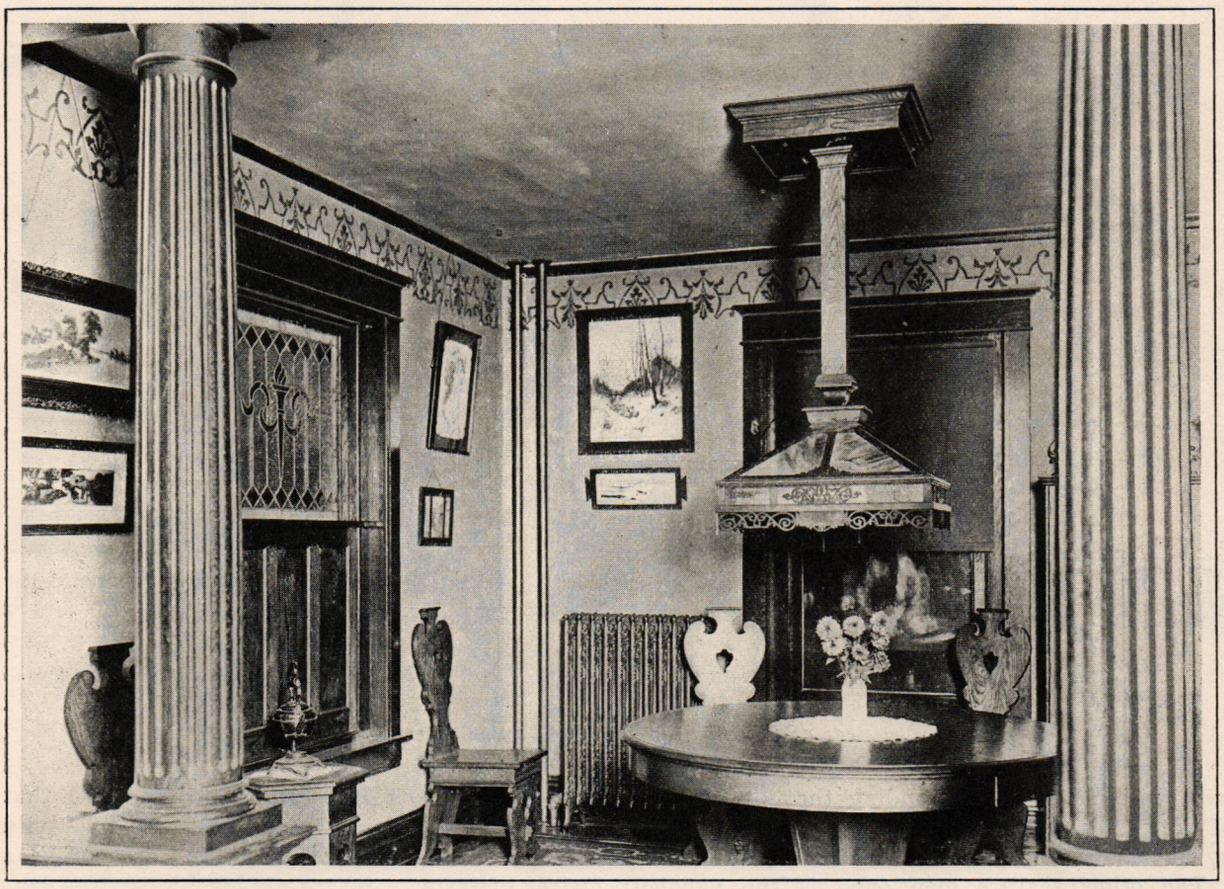
Interesting Features of Dining Room Finish

From John Wavrek, Jr., Fullerton, Pa.—The picture and sheet of details sent herewith relate to the dining room in my house, and although at first glance it may not appear worth while to make it the subject of special mention yet the room contains several features which are somewhat out of the ordinary and brief reference to them may therefore prove interesting to some of the readers of the paper. The dining room as it appears in the picture, Fig. 1, is not as yet in every detail what the owner has planned it should be like. In fact, when fully completed it will in several respects be quite different from what it appears in the picture. It may not be out of place to state that the writer designed and executed the different pieces of furniture which are shown, including the table, chairs, colonnade and nearly everything shown in the picture.

The special features to which I desire to call attention are the gas dome shown depending over the dining room table and the paneled window with art glass in its upper portion shown in the left wall. The trim is of chestnut and it is the scheme of the owner to have the finish of the room and the furniture to harmonize. Therefore, he designed the gas dome for this particular room so that it would be in harmony with the trim.

A gas dome, Fig. 2, constructed mostly of wood presents several difficulties which have to be overcome. Because of the heat thrown by the gas light it is necessary to protect the woodwork so that it will not catch fire and cause trouble. To guard against this danger the canopy marked "brass" in the half section through the center shown in Fig. 3 was obtained from a firm dealing in gas supplies and the wooden pillar was made to fit. The lamp, which is an inverted Welsbach mantel, and the other necessary hardware was obtained from the same concern.

For the purpose of making the work still more fireproof asbestos was placed between the canopy and the pillar so that in case the brass should become quite hot it could do no damage to the



Interesting Features of Dining Room Finish—Fig. 1—Interior View in Home of Mr. Wavrek, Jr.

wood because of the asbestos lining. The inner part of the neck is also covered by asbestos, as shown in detail, Fig. 3.

The ornamental part of the dome, that is, the scroll work, was sawed out by means of a small foot power jig saw by two sons of the writer, aged respectively 13 and 14 years, and the work is regarded as highly creditable to their individual skill. The woodwork is of dark finish and the art glass is green relieved with a yellowish hue, the whole presenting a pleasing effect.

The cornice at the ceiling is made up of the same style and size as the colonnade cornice, it being the scheme of the owner to have a beamed ceiling at some future time, and it is therefore obvious that the members of these two cornices should be alike so that the beams will member with both. The detailed drawings presented here-

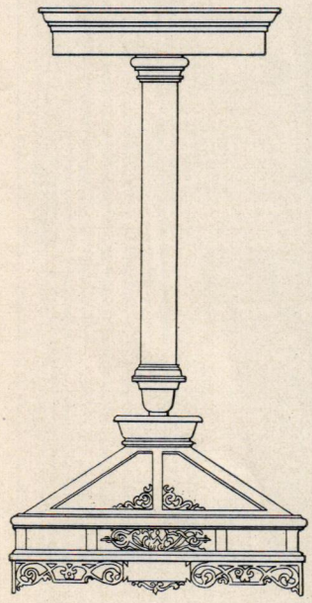


Fig. 2—Elevation of Gas Dome for Inverted Light

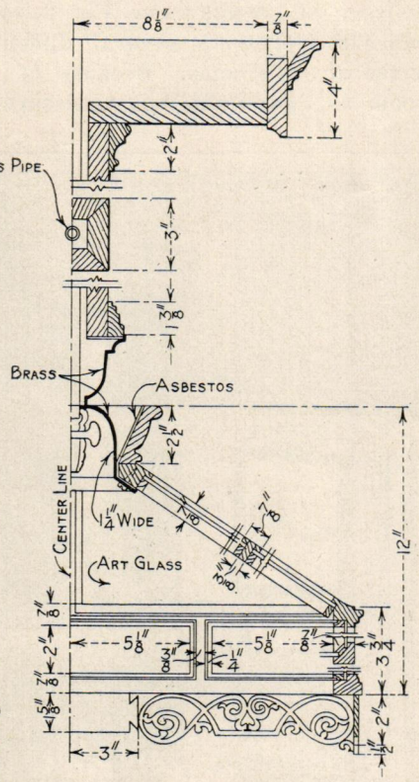


Fig. 3—Half Section Through Center

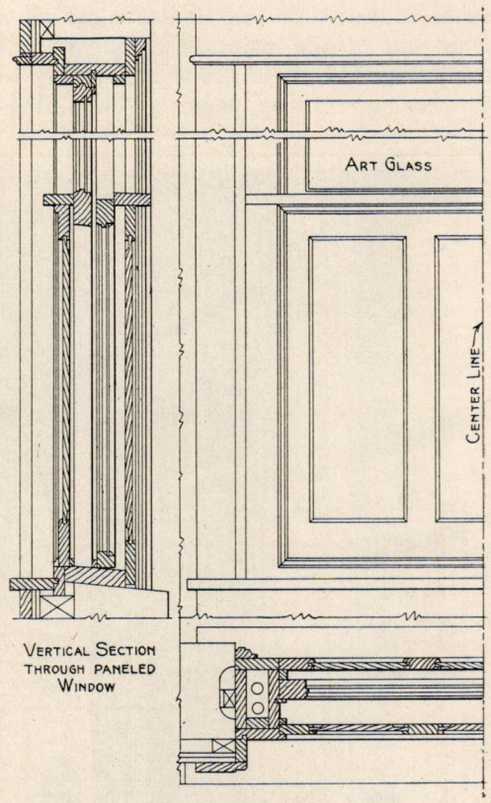


Fig. 4—Partial Plan and Elevation of Paneled Window

Interesting Features of Dining Room Finish—Some Details of Construction

with will aid in understanding the construction of the gas dome and the work can readily be done by any carpenter clever in the use of his tools.

The other feature mentioned is the paneled window shown in Fig. 4. Owing to certain circumstances this window was of very little service and rather than tear it out it was decided to panel up the lower sash inside and outside and place art glass in the upper sash—which really is the lower one but slid up into the raised position shown. The other sash can be lowered between the two panels or may be used as a storm sash in winter.

The owner proposed to place a buffet and china closet on either side of this window and a set of drawers directly under the panel, the top of the drawers to serve as a seat. In Fig. 4 is shown how the paneled scheme is worked out.

Proper Proportions of a Flag Pole

From O. K., Wapinitta, Ore.—I have been watching the Correspondence Department to see if anyone would reply to the query of "W. R." regarding the proper proportions of a flag pole which appeared in the issue of the paper for October last. So far as I can recall no one has replied, so I will start the ball rolling and then perhaps some others will comment on my mistakes and in that way "W. R." will obtain the information he desires.

My boss used to tell me to discard set rules and learn to apply principles, so I think that is what we will have to do in the present case, for the same ratio would not apply on a country schoolhouse as on a city skyscraper. If I were "W. R." I would take the length of the flag pole that I have, lay it off to scale and then with that same scale determine the size of the flag I would use, as I think the proportioning is merely a matter of taste.

The standard width of the United States flag is 10/19 of its length and the regulation flag for a schoolhouse is 8 ft. long.

The rule for determining the size of a flag pole from 30 to 60 ft. in hight is that its diameter at the roof shall be 1/50 its hight above the roof, and that the top shall be ½ the lower diameter.

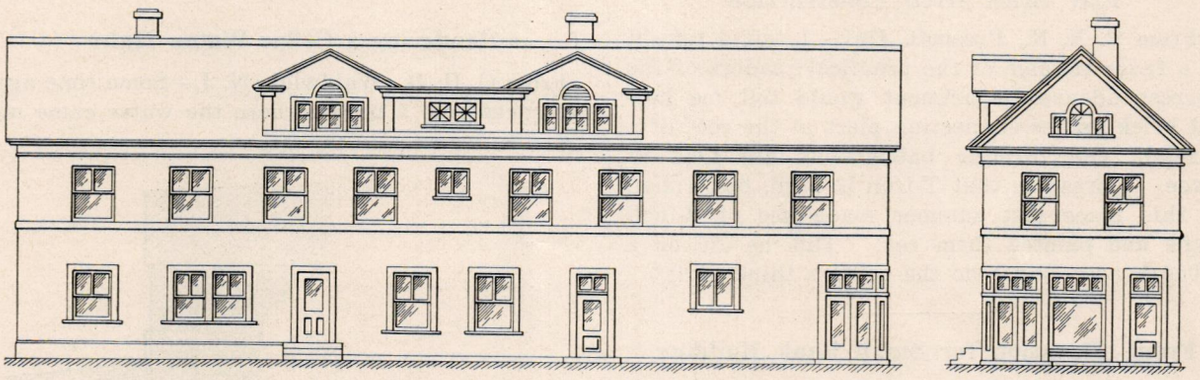
To profile the pole divide its length into quarters, making the lower or first quarter 15/16 the diameter of the base; the middle ⅞; the third quarter ¾ and the top ½.

Perhaps what I have said may help "W. R." to some extent provided he has not erected that flag pole long ago. In this connection it may be inter-

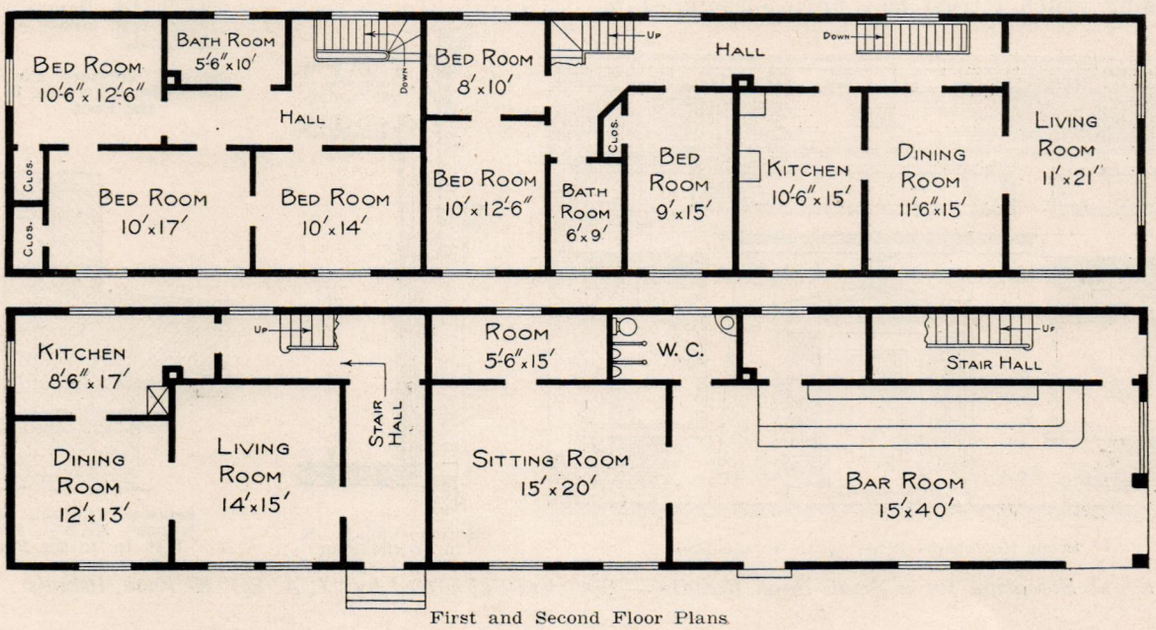
esting to state that the Oregon flag pole at the Panama-Pacific International Exposition at San Francisco is 232 ft. high and carries a 48 ft. flag. At the moment I cannot recall its diameter.

Design for a Two-Story Frame Building

From D. N., New York City.—I am sending herewith elevation of floor plans for a two-story frame building such as I understand "F. A.", Brooklyn, N. Y., requested in the February issue of the paper. He stated that the building was for a corner lot 25 x 100 ft. in size, and that he was obliged to keep 3 ft. away from both side lines. He wanted a bar-room to face the front on the first floor and living rooms on the second floor. The manner in which I have solved his problem is clearly illustrated in the sketches. I have, as requested, placed the bar-room on the front and the sitting room adjoining so that anyone entering the bar-room can easily look into the sitting room.



Front and End Elevations of a Two-Story Frame Building as Requested by "F. A.," of Brooklyn, N. Y., in a recent issue



First and Second Floor Plans

Design for a Two-Story Frame Building as Contributed by "D. N.," of New York City

Some Questions in Concrete Construction

From Builder, Redford, N. Y.—If "G. S. B.", Lewiston, Idaho, whose query appeared in the March issue of the paper, can obtain quarry or field stone he can make his basement wall faster and cheaper than of concrete alone. The stone should be well bedded in the concrete, thus forming a sort of rubble concrete or cyclopean masonry. The basement wall should be more than 10 in. thick; in fact, it should be thick enough to carry bond timber for the joists. This would leave 8 or 10 in. inside the blocks.

The difference in the color of the blocks and the stucco will prove to be an advantage rather than otherwise.

If lumber is reasonably cheap in his section the best plan will be to set up a balloon frame with 2 x 2 in. studs and board this outside with roof lumber; then build the concrete wall against it as a "form," anchoring to the concrete with wire knotted in it. This inside frame should be left there and plaster applied. Plastering on the bare concrete is not good building practice in cold or damp climates. The stucco should contain 5 per cent. to 10 per cent. of Maltha, which is a Standard oil product but which can probably be obtained from almost any paint store. Set up the studs outside, bracing them, and anchoring to the inside studs will serve for "form" supports. The best manner of providing the center air space is to use old tin cans 2½ to 3 in. in diameter. Set them on end an inch or less apart and simply bury them there. In fact, to leave a 2 in. air space

with "forms" will worry time and patience as will nothing else. Old stove pipe flattened out to 2 in. will also serve a good purpose. For such work as this or beam filling nothing is so satisfactory as the tin cans. No time is lost and the concrete can be worked around them with a stick and a boy can place them between batches.

Polishing Plate Glass

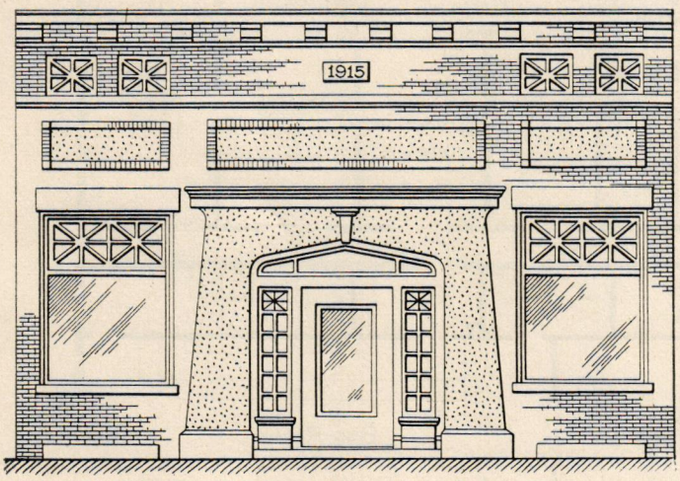
From G. W. N., Toledo, Iowa.—I would like very much indeed to have some of the practical readers of the paper tell me in detail the best way to polish plate glass.

Flat Brick Arch Construction

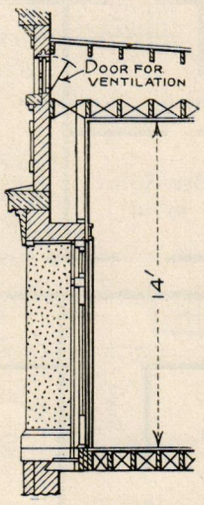
From P. N. R., Prescott, Ont.—I would take it as a favor if some of the practical readers of the Correspondence Department would tell me how flat brick arches connecting piers at the roof of a veranda and forming battlements are held in place. I presume that T-iron is used, but a man in this place last summer made use of 2-inch plank and painted them red. This he did on a $5000 house. What do the readers think of it?

Front Elevation for Small Bank Building

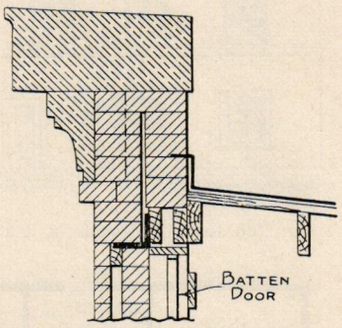
From J. A. R., El Paso, Ill.—I am enclosing drawings of a front elevation for a small bank building which I trust may prove of interest to "A, B.," Marthasville, Mo. There are also a few details which indicate the construction.



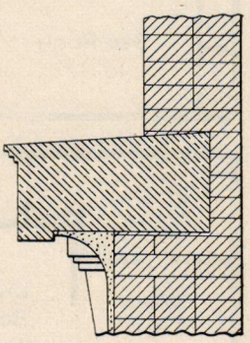
Front Elevation—Scale ⅛ In. to the Foot



Section — Scale ⅛ In. to the Foot



Section Through Cornice—Scale 1/16 In. to the Foot



Section Through Entrance Arch — Scale 1/16 In. to the Foot

Front Elevation for a Small Bank Building—Sketches Submitted by "J. A. R.," El Paso, Illinois

The Leaky Chimney Problem

From W. K., Highland Park, Ill.—In reply to the inquiry of "W. A. W.," Danvers, Mass., in the February issue of the paper it is my opinion that the apparent leakage is caused by condensation of moisture produced by the warm air coming in contact with a cold surface. The air during a rain storm is heavily charged with moisture and a well constructed chimney of hard materials is a good conductor of heat and cold. A tight damper to keep the warm air of the room out of the chimney will probaly remedy this trouble. It is true that a poorly built chimney, being a poor conductor of heat and cold, will not do this. In my opinion there should be an ash drop from all fireplaces to the ash pit in the basement and the hearth be slightly pitched toward this drop.

From C. R. H., Columbus, O.—In deply to the difficulty described by "W. A. W.," Danvers, Mass., in the February issue of *The Building Age* I am inclined to think that the trouble occurs at the reducer or off-set in the chimney, and at the point where it joins the brick wall of the house. This wall is exposed to a northeast storm and probably receives a good share of the blunt of the northeasterly wind.

Rendering a Cellar Water Tight

From C. H. H., Waldwick, N. J.—Some time ago we moved into a house where the water came up through the cement cellar floor and in order to remedy the difficulty I have thought of covering the floor with tar paper and then placing over it a coat of about 1 in. of neat cement. It is, however, inconvenient to find anyone who has a large tar pot so that I can tar the present floor before laying the tar paper. Can the readers suggest any other binder?

After I bind the tar paper to the walls would the cement stick to it when the cement is just thick enough to hide the tar paper?

How much material will be required to cover a cellar floor 24 x 26 ft. in area with a 5 x 15 ft. off-set, and extending up the side walls for a distance of about 5 ft. above the floor level.

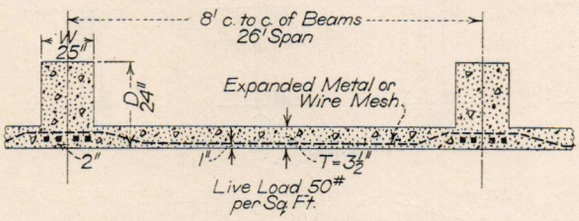
Figuring Strength of Concrete Roof Slab

From C. H. B., Schenectady, N. Y.—I am enclosing sketch of a reinforced concrete roof with the slab supported at the bottom of the beams and would like to know how the beam and slab as well as the steel reinforcement are figured. If it is possible to give a sketch showing this and how the steel reinforcement should be placed I shall appreciate it very much.

I have been a reader of *The Building Age* for the past five years and have obtained from its columns many good pointers.

Answer—The above inquiry was submitted to Ernest McCullough, who furnishes the following comments in reply and who has inserted in the correspondent's original sketch certain dimensions as well as the position of the reinforcing material.

From tables and diagrams in the office an approximate thickness of 3½ ins. is selected for the slab. The weight of this, if the concrete with steel weighs 150 lbs. per cu. ft., is 44 lbs per sq. ft. Adding 6 lbs. for roofing and 50 lbs. for live load, the total load per sq. ft. = 100 lbs. The end span must be computed first, as the slab is resting freely on the wall at one end and fastened securely to the beam at the other end. For this condition the bending moment = $w L^2 \div 10$, which gives the result in foot pounds. Multiplying by 12 the bending moment in inch pounds = $1.2 \times 100 \times 8 \times 8 = 7680$ inch pounds.



Figuring Strength of Concrete Roof Slab

Nothing was said about the fiber stresses to be used in the materials. Assuming a tensile stress of 16,000 lbs. per sq. in. in the steel and a compressive stress of 650 lbs. per sq. in. in the concrete with a ratio of deformation = 15, the moment factor = 108 and the steel ration = 0.0078. The ratio times 100 is the percentage of steel.

$$d = \sqrt{\frac{M}{Rb}} = \sqrt{\frac{7680}{108 \times 12}} = 2.44 \text{ ins.}$$

to the center of the steel. Adding one inch of covering and 0.06 in. from the center of the steel to the bottom gives a total thickness of 3.5 ins.

Steel area per 12 ins. width = $0.0078 \times 2.44 \times 12$ = 0.228 sq. ins. Use expanded metal or wire mesh having an equal or larger area per foot of width. The mesh should go up within an inch of the top of the slab about 18 ins. from the beam and keep in the top to the same distance the other side, then gradually drop to within an inch of the bottom for the middle of the span. The interior spans are tied at both ends to the beams so the bending moment equals $wL^2 \div 12$. Multiplying by 12 the bending moment = $100 \times 8 \times 8 = 6400$ inch pounds. The depth to the center of the steel = 2.44 ins. and the moment arm (the distance between centers of gravity of tensile and compressive areas) = $\frac{7}{8} \times 2.44 = 2.14$ ins. The steel area = $M \div (jd \times f_s)$ = $6400 \div (2.14 \times 16000) = 0.187$ sq. ins. of steel. This completes the slab design.

The beams are not continuous so the bending moment is found by the formula, $wL^2 \div 8$, which gives a heavy beam. The slab being attached to the bottom compels the use of a rectangular beam. If the slab were attached at the top the beam could be made in a T section and considerable material saved. Assume a beam 24 ins. square, the thickness of the slab being included in the depth. There must be 2 ins. of concrete under the slab and if we assume bars 1 in. square for reinforcement the depth from the top to the center of the steel will be 21.5 ins. At 150 lbs. per cu. ft. the beam will weigh 600 lbs. per lineal foot. The six feet of slab between the beams will weigh 600 lbs per lineal foot, so the total load on the beam is 1200 lbs. per lineal foot.

The bending moment = $1.5 \times 1200 \times 26 \times 26 =$ 1,220,000 in. lbs.

$$\text{The width} = \frac{1{,}220{,}000}{108 \times 21.5^2} = 24.4 \text{ ins.}$$

This is an increase of less than 2%, so we will let the original assumed width of 24 ins. stand.

$$\text{Steel area} = \frac{1{,}220{,}000}{\frac{7}{8} \times 21.5 \times 16000} = 4.06 \text{ sq. ins.}$$

This also is less than 2% more than 4 ins., so we will use 4 one-inch square bars.

The next thing to determine is the question of shear. Half the total load goes to one support as the reaction. This is also the maximum shear. Dividing this by ⅞ the depth to the center of the steel times the width of the beam the shear is found to be a trifle over 33 lbs. per sq. inch of cross section. This is safe for some cities permit a unit shearing stress of 60 lbs. per sq. in. expressed in terms of diagonal tension, but a general value is 40 lbs. per sq. in. The concrete assumed to be used in this problem is a 1:2:4 mixture with carefully selected materials well mixed.

It is not necessary to bend up any of the steel bars in the beams, but it is advisable to do so in order to help reinforce the web of the beam and take care of cracks near the supports. The quantity of steel computed is at the center of the span. Two outside bars should remain in the bottom the full span length. A third bar can be bent up at an agle of 45 deg. at the quarter span point and the fourth bar can be bent up similarly at the sixth span point. The steel should go to within two inches of the top and then go horizontally to the end of the beam. This then gives two pieces in the top and two in the bottom at the supports with four in the bottom for half the span length in the middle.

Designs of Two-Family Houses

From Congenial Reader, Paterson, N. J.—I have read *The Building Age* for a few years but have not as yet seen any suburban two-story homes for two and four families. Many people prefer to live double than be alone, and I should therefore like to see some designs of the character indicated.

Note:—If our correspondent has files of *The Building Age* as far back as January, 1910, he will discover a number of designs of two-family houses.

which have been published. We refer especially to the issues for January and October, 1910, November, 1911, and February, May and July, 1912. The designs in February and May, 1912, were arranged for four families each, and a design of this character will also be found in the issue of the paper for February, 1914.

A few years ago we published a long series of designs for two-family houses submitted in competitions covering this class of building.

Platform Stairway Construction

From Morris Williams, Bronx, N. Y.—Under the above title there appeared in the March issue of *The Building Age* a request from "M. C. G.," San Diego, Cal., in regard to the operation of drawing an easement upon the wall stringer shown in my Figs. 4 and 6 in the January issue. Because the stringer proper is too narrow to contain the easement a short piece is glued upon its upper edge, as shown at *C* in Fig. 1 presented herewith. This piece was not considered in my January sketches for the reason that my purpose there was to show the two different methods in practice for drawing the easements on top and bottom of wall stringers, taking it for granted that intuition was sufficient to safeguard the reader against attempting to draw the easements without having first prepared the necessary material to contain it. Fig. 2 indicates the method of connecting base and stringer when an easement is not required.

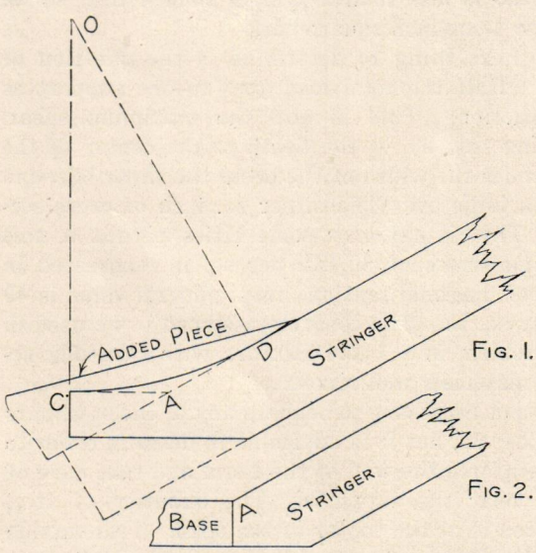


FIG. 1.

FIG. 2.

Regarding the method of bending the cove and carpet strip around the curving end of a step which "M. C. G." desires to have discussed, I present Fig. 3 representing four cross sections of steps and designed to show the varying methods in use for assembling the members that constitute a step. In order to make a good job in turning the cove around the circular end, it must be worked solid, for it is a well established fact that any attempt at bending a cove is doomed to result in miserable failure. A passable job by bending a steamed piece may be done in the case of the carpet strip because it is a quarter-round molding, or rather because it is not a cove. It is the cove of all the moldings that resists attempts at bending, and consequently should be worked out of a solid piece of board of the same thickness as the depth of the cove. It can be worked upon the shaper with very little trouble and if worked with a suitable round plane it takes but a very short time to accomplish it.

The method indicated at *D* in Fig. 3 is undoubtedly the one most to be preferred. The cove according to this method is worked solid all around and is of sufficient width to extend to the back of the riser, so that it may be nailed to it solid, as indicated in the sketch and also in Fig. 4, which gives a partial view of a step and indicates not only the method of fastening the cove at the upper edge of the riser but also all the other operations pertaining to the construction of a complete circular step.

If "M. C. G." is desirous of becoming a thoroughly competent stair builder he cannot do better than send to "*The Building Age* Book Department" for its new book on the subject, which explains every process of operation in the construction of stairways, hand rails, etc.

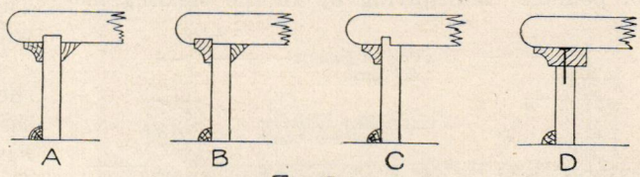


FIG. 3.

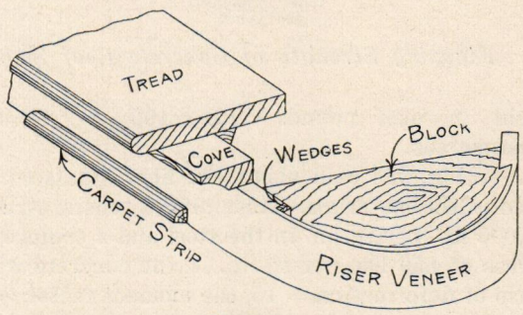


FIG. 4.

Platform Stairway Construction—Sketches Accompanying Comments of Morris Williams

Remodeling an Old Dwelling

From T. B., Va.—I have an old dwelling house that is now covered with weather boards which are too rough and worn to be restored by paint. I do not like the stucco process on wood or metal lath, but would like to cover the sides with something requiring no paint or repairs in the future.

I have thought of two ways of accomplishing the purpose. One is to cover the outside frame with tarred paper first, then use a small slate, say 8 x 7, and about ¼ in. thick, and so put on as to show 8 x 2½ in. to the weather, resembling bricks.

The other way is to use a 4-in. brick wall set about 1 in, away from the wooden frame of the house and tied with metal wall ties nailed to the studs through the old siding.

The slate will be much cheaper, but I would like to have the practical readers advise me as to which is the preferable method under the circumstances. Do they recommend either method, or can they suggest something better?

In case the stucco process is used, is it better to apply the stucco to metal lath or to wooden lath?

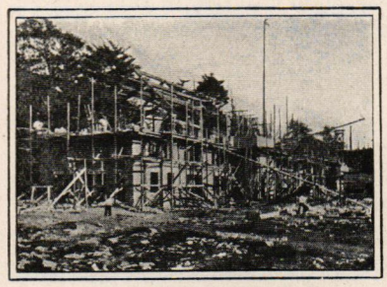
Should the Builder "Carry a Stock?"

Some Phases of the Builders' Business Which Are Especially Pertinent for Discussion Just at This Season

By G. D. Crain, Jr.

THERE are two kinds of discounts, one of which is for quantity and the other is for time. The first is earned by the buyer who orders in larger lots than the average, and the second by the man who pays his bills promptly.

The most successful concerns, in nearly all lines, are those which take both of these discounts. Though in some lines an attempt has been made to eliminate the quantity discount on the ground that it makes for price-cutting, and gives the big buyer an unfair advantage, the reduced quotation by virtue of the big order is as old as the hills, and is the real explanation for the dealer's discount. The latter may now be given irrespective of quantity, but it is based on the idea that quantity is necessarily involved.



In discussing the question of how the builder should purchase his materials, therefore, one bumps immediately into the proposition of buying in quantity. Is it good business for him to do so? Can he afford to carry a stock, as it were? Or is it better policy for him to concentrate his attention on the main issue of building, use all his capital for actually carrying forward building operations, and tie up as little of it in material, in advance of actual needs, as possible?

There are two sides to the question, of course, and yet a consideration of the subject suggests that some of the easiest money it is possible to make can be added to the profits account by liberal buying. The thing to remember is that the usual interest rate of 6 per cent. per annum is a good deal less than either of the discounts it is possible to secure in the manner indicated. The quantity buyer, getting a dealer's discount, frequently has an advantage of 25 per cent or more, represented chiefly by the retailer's cost of doing business, and while the builder who puts in a stock of material has to pay the carrying charges, involving interest and handling, as well as the cost of the land on which it is stored, the margin is always sufficiently large to make it worth while.

The discount for prompt payment is much greater than the cost of the money, that is, the interest on the amount at the usual rate, and hence it is worth while to take his reduction even if the money must be borrowed. Aside from the beneficial effect which such a plan has on net profits, the result is always a boost for the credit rating of the concern. Any builder or other business man on whom it is reported that he "discounts his bill" can usually buy up to the limit from anybody he cares to patronize. And a lot of large and important houses, which watch their discounts closely, find that they contribute enough to enable dividends to be paid even in very lean years.

The material which lends itself most readily to stocking is lumber. Cement, lime and some other materials are subject to deterioration in storage, and market quotations vary more than on lumber. While the latter is of course subject to fluctuations, these are not as great as in some other lines. At that, it is not a wise plan to attempt to carry enough lumber to run over a season, as this might involve losses due to the shrinkage of market value.

In most cases where the builder is doing a business of any importance, car-lot buying is the proper system. He can get his stock at so much less that it is well worth his while. As suggested, he will have to possess a place to store this material, and he must remember that he has to pay the cost of handling it and the interest on the money; but these carrying expenses are not prohibitive, and the difference between the quantity price which is secured by buying in large lots and the retail price, which is quoted by the dealer for delivery in wagon-loads, is sufficiently great to justify the outlay.

A successful builder, who is a strong advocate of the quantity method of purchasing, said recently that he would not consider buying in small lots.

"I get most of my stock in car-load lots direct from the manufacturer," he said. "Even if I bought from the retail lumberman, the purchases would be so large that I would be entitled to, and would get, a big reduction in the price. Some builders think that it is the best plan to wait until a job is secured, and then buy the stock for it, having it delivered to the job. This, of course means that no yard room is needed to take care of the lumber, and that no capital is tied up in it; but there the advantage ends, for the builder pays for all these things in the retail price, which has to be figured to take care of these expenses of the dealer, as well as the latter's profit. While this is not excessive, it is nevertheless worth saving, I think, and consequently I buy not for individual jobs, but with



reference to what I may require during the season.

In view of the fact that many if not most builders operate woodworking shops where lumber is cut to size, and where some millwork is manufactured, the purchase of material in quantity is of advantage in that it enables dull periods to be utilized in the manufacture of certain staple stock. Instead of having to lay off his men entirely, the builder can put them in the shop; and then, when business opens up again, he will have a start on the material for the job, and will be ready to push forward at rapid speed.

It goes without saying that it takes more money to do business this way, and that the builder who has a hard time paying for the lumber he buys in small lots would have a much harder time taking care of the carload invoices. On the other hand, however, the man who buys in big lots, and does business on a larger scale, can go to the bank and secure assistance in financing his purchases, especially when he explains to the banker just what will be the result of his policy.

Fear of Debt

Some builders have the idea that it would never do to get in debt for material, or to have a note at the bank hanging over them. The man who never borrows money is doing a very small business. Most of the trade of the world is done on credit, and it is only by making use of one's credit that larger operations can be handled. Of course, there is nothing to be said in favor of making debts just for the sake of making them; but to use the bank for legitimate purposes, for which it was established, is merely to adopt modern business methods. If you can make a profit out of the use of borrowed money, whether it be in the purchase of up-to-date mechanical equipment, material, or whatnot, don't be afraid to go to your banker and tell him so; he will be glad to take your note on such a proposition.

Hardware can be bought in the same way, if the work which the builder is doing is of the moderate-price variety. Of course, on extremely high-grade jobs, a very large range of selections, both as to design and quality, is needed, and this the builder would not be in a position to provide, as a rule. But for the man who is putting up a goodly number of houses, the requirements of which in this direction are rather uniform, it is frequently good policy to lay in a stock of hardware, on which a good discount for such purchases can be secured. The builder quoted above has been such a large buyer that the concern with which he deals gives him the regular wholesale price, so that he is able to reduce the cost of his work considerably.

Advantages of Buying in Quantity

Here is an interesting point to consider. The man who is buying in quantity, and is making a saving in the cost of his material, is in a position to handle a job at less cost, in respect to stock, than his competitors. He can either make the price as low as his reduced expenses will permit, or he can take the extra profit. The latter course is probably to be advised, both because the builder is entitled to the profit for carrying the stock, and performing the function of a dealer, and because he can afford to let his competitors establish the average price for materials used in building jobs, instead of putting the figures fairly below the average.

Another buying kink which is worth investigating is the opportunity to pick up desirable material in old houses which are being destroyed to make way for new buildings. There is a marked tendency at present to stress "Colonial" and other designs which revive ideas that were in use a good many years ago, and mantels, lighting fixtures, balustrades and other materials which would be hard to duplicate, except at great cost, can be gotten out of these old houses and put into use in new ones.

The writer recently saw a very handsome Colonial mantel being installed in a new house. It was explained that, though it looked as if it had just come from the factory, it had merely been scraped and refinished. It gave the interior of this home a touch of the antique that many people find attractive, and cost the builder a nominal amount. Yet it was more satisfactory to use in this particular case than anything else could have been.

Boston's Building Operations

The fiscal year of the Department of Buildings of the city of Boston, Mass., ended on February 1, and, according to figures compiled in the office of Building Commissioner, Patrick O'Hearn, there were 5971 permits issued for buildings of various classes and for alterations, involving an expenditure of $24,796,353. For the previous fiscal year 4480 permits were issued, of which 478 were for buildings of the first and second classes, 1194 for buildings of the third class and 2804 for alterations, involving an outlay of $24,996,900.

About a year ago, by and with the advice of Mayor Curley, amendments to the Building Laws were obtained, among them being one which authorized the Building Commissioner to placard buildings which he had reason to believe were not provided with sufficient means of egress in case of fire, etc.; also the Commissioner was empowered with the written approval of the Mayor to see that such buildings were vacated. The enactment of this law and its rigid enforcement is considered a long step in reducing fire hazard and risks.

Officers of Concrete Institute

At the recent annual meeting of the American Concrete Institute, held in Chicago, the following officers were elected for the ensuing year:

President.....L. C. Wason of Boston
Vice-Presidents,
Wm. K. Hatt of Lafayette, Ind.
Henry C. Turner, of New York.
Treasurer..Robt. W. Lesley of Philadelphia
Secretary..Charles L. Fish of Philadelphia

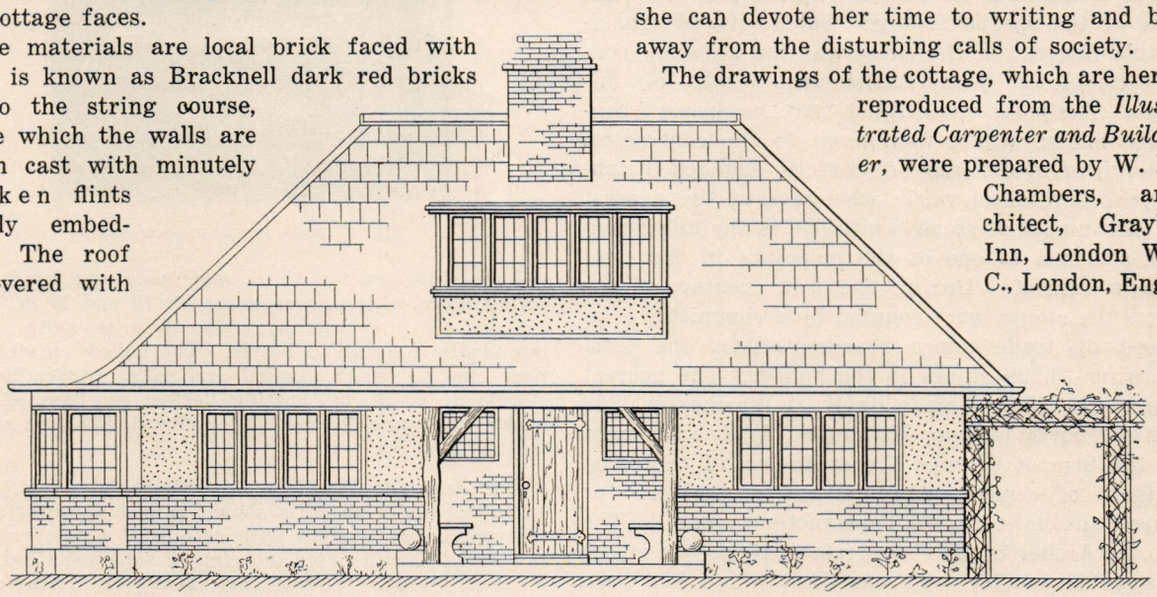
It is interesting to statee that the new president is a consulting concrete engineer and since 1895 has been president of the Aberthaw Construction Company, which has built some of the largest structures with this material in the country. Mr. Wason's organization has made a detailed study of cost-keeping and efficiency along all lines and states that these studies have produced some wonderful results in the execution of construction work.

An Attractive English Cottage

The Architectural Treatment and General Arrangement Such as May Interest Some American Readers

WE take pleasure in presenting to the attention of our readers the front elevation and floor plan of an attractive cottage which has recently been erected near Guildford, in the County of Surrey, England, for a well-known authoress. It stands on the site of a small disused chalk quarry which had been converted into a most delightful garden. The cliffs are at least 20 ft. high on all sides except the south, toward which the cottage faces.

The materials are local brick faced with what is known as Bracknell dark red bricks up to the string course, above which the walls are rough cast with minutely broken flints thickly embedded. The roof is covered with tiles, dark brindle in color, giving pleasing effects.



Front Elevation Showing Exterior Treatment with a Combination of Brick and Stucco Effects

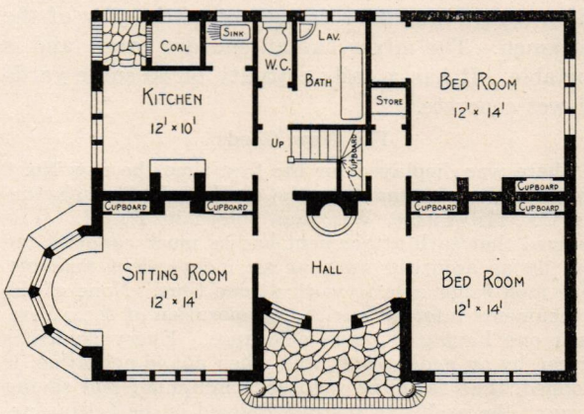
An inspection of the floor plan shows a central recessed entrance with a seat on either side of the front door. Opening from the spacious hall at the left is a sitting room with a large bay window provided with cushioned seat. There is also a large window at the front so that practically two sides of the room are made up of windows. Passing from the hall toward the rear the visitor reaches the main flight of stairs which rise from a point directly opposite the door leading to the kitchen. Beyond the stairs is the bath room and the water closet, the latter being separated from the bath room, an arrangement highly to be commended.

Coming back to the main hall, which by the way is fitted with a circular open fireplace, we find two bedrooms at the right each fitted with commodious cupboards. The bedroom at the rear has an alcove lighted by a window. Near the door of the bedroom is a store room or what in America we would probably designate as a linen closet.

The floor of the hall is of marquetry and that of the sitting room is of oak. The walls of the room instead of being plastered are lined with Beaver board divided into panels by oak moldings. The joists of the upper floor are left exposed and are stained a dark oak in order to match the rest of the trim.

On the second floor there is a large room which is fitted up as a library or lady's writing room and unusual precautions were taken to render this cool in summer by placing asbestos sheeting under the roofing tiles and by other methods. The idea has been to provide a quiet retreat for the authoress where she can devote her time to writing and be away from the disturbing calls of society.

The drawings of the cottage, which are here reproduced from the *Illustrated Carpenter and Builder*, were prepared by W. I. Chambers, architect, Gray's Inn, London W. C., London, Eng.



Main Floor Plan

An Attractive English Cottage

A Market for Mechanics' Tools

According to J. W. Evans, city engineer at Belleville, Ontario, "there is a very large market for fine tools in Canada—small files and tools for carpenters, joiners, cabinetmakers, etc., a large proportion of which have heretofore been imported from Switzerland, Germany and Belgium.

New Goods Seen at the Cement Show

Many Manufacturers Take Advantage of Annual Exposition to Launch New Models in Building Contractors' Equipment

THE thousands of readers of *The Building Age* who were interested in the Cement Show and were not able to attend are presented in the following pages with an exceptional opportunity of learning of the manufacturers' latest inventions and improvements in their respective products. Each apparatus briefly described is accompanied by an illustration in order that the reader my gather an idea of the general constructive and operative features in addition to what is explained in the text. One of the special features which created considerable interest in the show was the guessing contest conducted by the Archer Iron Works, of Chicago. The prize was a No. 1 "Archer Special" concrete mixer, which was given to the contractor, builder, or in fact any one directly engaged in concrete construction work, who guessed the nearest to the number of stones contained in the batch-hopper attached to one of the machines in the company's exhibit. During the last evening of the show the stones were counted by a committee composed of trade paper representatives, the total showing 13,299 stones in the hopper. The nearest guess was 13,313, made by N. G. Rasmussen, 293 Thirty-fourth avenue, Milwaukee, Wis., a member of the firm of Charles Fisher & Son, of that city, makers of cement products and contractors for miscellaneous concrete construction work. The No. 1 "Archer Special" concrete mixer is one of the successful smaller type machines which has been on the market for a number of years. It possesses the distinctive feature of having the engine mounted on top of the mixer frame out of the way of the workmen. The mixer has an end discharge, and is portable. It has a daily capacity of 50 cubic yards of wet concrete.

The New Goods

There was displayed for the first time the new No. 6 portable saw rig, made by the C. H. & E. Manufacturing Co., Milwaukee, Wis., and shown in Fig. 1. It is claimed that each attachment has as much capacity and will do as accurate work as an independent machine, four men being able to work at one time. None of the attachments interferes with the operation of the others, each one having its own clearance. Every device is driven by an endless belt, and when not in operation, is stopped, thus reducing wear to a minimum and saving power. An exclusive feature claimed is the belting arrangement in that the power drives to a pair of tight and loose pulleys on a countershaft, and from the countershaft to the arbor and thence to the other attachments. This provision gives the machine much better pulley proportions and longer belt centers, and a much larger belt surface than where the saw arbor pulley is driven direct from the engine flywheel. By this arrangement, all the attachments can be brought to a standstill by shifting the power belt to the loose pulley without stopping the engine. The equipment has a 4 h.p. water-cooled "C. H. & E." gasoline engine, though an electric motor can be installed if the purchaser desires, direct or alternating current. The frame construction is entirely of structural steel, so assembled that its constant rigidity and durability are assured. The table is built of ¼ in. steel, measuring 42 in. wide and 56 in. long. The band saw has a capacity for lumber 20 in. wide by 8 in. high. The table is 41 in. from the floor, and can be tilted to 45 deg. and locked in position. The jointer has the capacity for 6 in. stock. The tables adjust for depth of cut and for alignment,

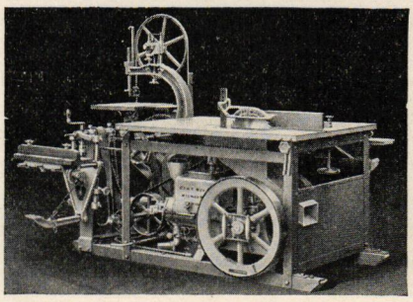


Fig. 1—New Portable Saw Rig

and are arranged for ½ in. rabbetting and fitted with tilting fence. Ripping capacity for 12 and 14 in. saws is 3 and 4 in., respectively, up to 16 in. in width. Boring can be done up to 1½ in. The hollow chisel mortiser can be easily applied and takes square hollow chisels up to ¾ in., cutting perfect mortises of any length and angle desired. The net weight of the equipment is 1450 lbs.

The Norwalk Vault Co., 44 Seminary street, Norwalk, O., whose booth is shown in Fig. 2, entertained the contractors present with details of a new proposition which is calculated to bring in substantial returns for a comparatively small cash investment. Started as a side line, many contractors have developed it to a point where they consider it almost as profitable as their regular business. The company proposes not only to sell the molds for making these concrete vaults, but to form a giant partnership of local manufacturers all

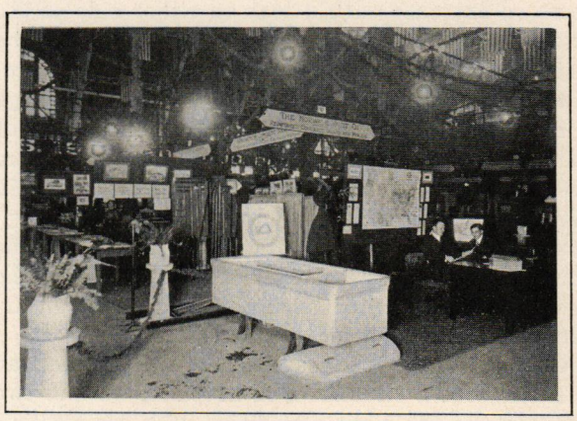


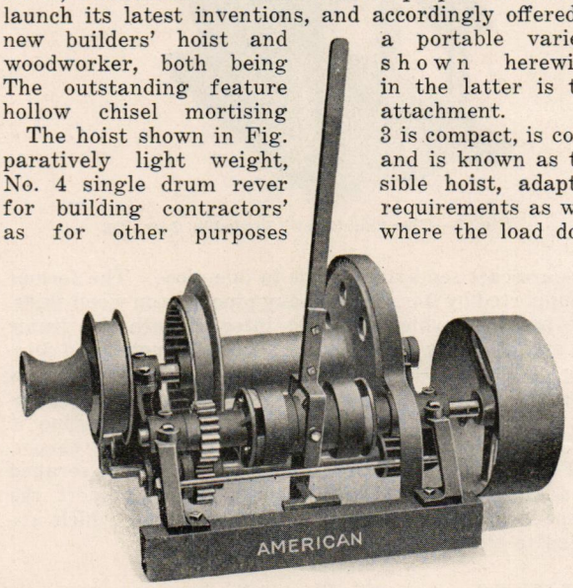
Fig. 2—Exhibit of Norwalk Vault Co.

over the country. In other words, the Norwalk Vault Co. makes arrangements with a building contractor in a certain section of the country to take over the local manufacturing rights. The contractor also forms a partnership with the local undertakers for them to sell the vaults while the contractor manufactures them. The vaults sell for not less than $20, and on each one there is a substantial profit for both the contractor and un-

dertaker. The amount of money to be invested depends on the size of the territory occupied. One man, for example, recently bought the rights for the entire state of Maine, while another started on a royalty basis in a half county in Ohio. The contractor, therefore, has the option of acquiring his territory outright or sharing it with the vault company on a royalty basis. It is said that more than 12,000 vaults are already in use. The vault is a trade-marked product fully protected by patents.

The American Saw Mill Machinery Co., Hackettstown, N. J., considered the show a most propitious time to launch its latest inventions, and accordingly offered a new builders' hoist and a portable variety woodworker, both being shown herewith. The outstanding feature in the latter is the hollow chisel mortising attachment.

The hoist shown in Fig. 3 is compact, is comparatively light weight, and is known as the No. 4 single drum reversible hoist, adapted for building contractors' requirements as well as for other purposes where the load does



New Goods at the Cement Show—Fig. 3—New Single Drum Reversible Builders' Hoist

not exceed 1000 to 1200 lbs. on the direct lift. The drum, sheave, and winch head are reversible, and may be used independently of each other. The winch head is for "snubbing" or quick, short and general utility work. The sheave is for double platform elevator work and the drum is utilized for heavy single line lifting. Forward and reverse motion is obtained through the operating lever which controls the clutches. A powerful band brake is controlled by a tread lever convenient to the operator. A safety ratchet and pawl are provided for holding the load at a desired height, and guards are equipped for all gears. The hoist may be driven by belt from any convenient power or directly connected by gearing or sprocket and chain to a gasoline engine or electric motor. It weighs 475 lbs. and occupies floor space 27 x 42 in. The hoist's capacity is 1000 lbs., 100 ft. per minute. Its drum is 5 in. diameter, capable of holding 500 ft. of ½-in. cable.

The woodworker illustrated in Fig. 4 is a portable compact and rigid machine, with self-contained power.

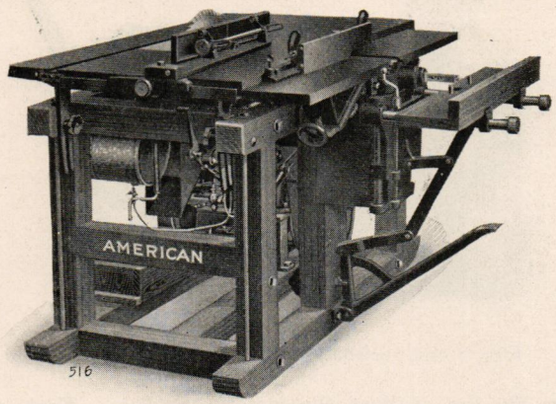


Fig. 4—The "American" Variety Wood Worker

The hollow chisel mortising feature to which special attention is called will work bits from ⅜ to ¾ in., cutting a clean, smooth mortise with square corners accurate to size. The table has a vertical adjustment of 3½ in., and a travel of 4 in. in line with the spindle. A foot treadle has been installed for feeding the work to the bit, and a coil spring operates for return motion. One ⅜-in. bit is furnished with the machine. The equipment also consists of a combined rip and cut-off saw bench, and has boring and jig saw attachments. A 6-in. jointer and dado heads are also provided, and the power equipment, either electric motor or gasoline engine, is mounted in the frame beneath the table and directly connected to the arbor. The top is 54 x 30 in., and is readily raised and lowered without interfering with the jointer table. An adjustable ripping gauge is furnished with a tilting fence for bevel sawing. It opens out 14 in. from the saw and has a rapid, fine adjustment and locking device. The floor space required is 54 in. square, and the total height is 3 ft.

The Ceresit Waterproofing Co., 110 S. Dearborn street, Chicago, displayed a new product in "Ceresitol" which is a transparent liquid to be applied to concrete surfaces with a brush, and is said to effectively waterproof them by entering the pores. It is absolutely colorless, and cannot be classified as a paint as it leaves no film on the surface. Cement mortar, porous natural stone, clay ware and art stone are said to be rendered waterproof by one application. The company also states that it makes an ideal foundation for the application of oil color paints. "Ceresitol" requires no mixing, as it is sent ready for use, one gallon having the capacity to cover from 150 to 200 sq. ft. of surface. The directions state that the surface to which "Ceresitol" is applied must be dry. This product is shipped in 1-, 5- and 10-gallon cans, and half and full barrels, the latter holding 25 and 50 gallons, respectively.

The Yaeger Machine Co., 216 Rich street, Columbus, Ohio, fitted up an exceptionally large booth in which a new 10 ft. mixer and the 4 cu. ft. "Little" mixer were featured. It was stated that the small machine was placed on the market in response to requests made by

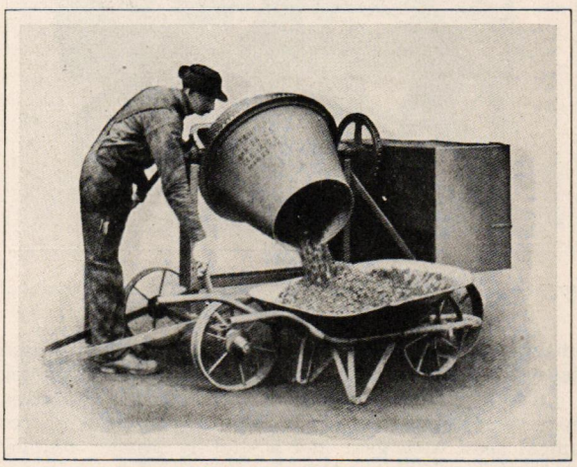


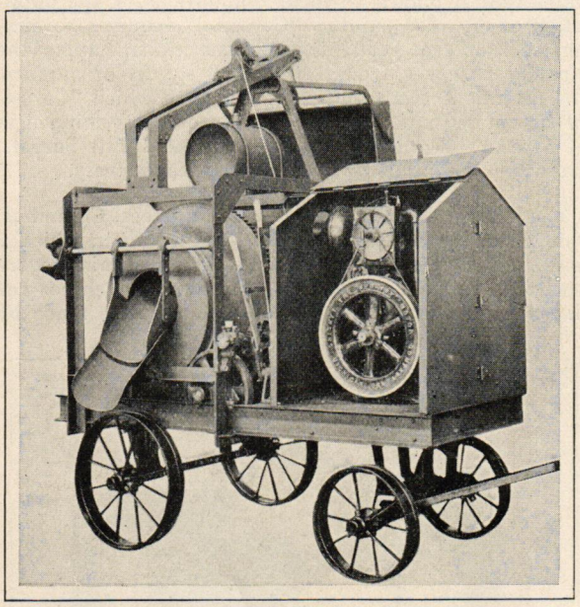
Fig. 5—General View of the Yeager" Concrete Mixer

hundreds of contractors for a mixer of high-grade workmanship, low cost and a capacity of not less than 3 cu. ft. The price of this mixer is very reasonable, and it contains the same design, materials and construction as the rest of the company's line. It is guaranteed to be dependable, and weighs but 1000 lbs. The drum is substantially constructed of semi-steel and steel plate, equipped with plows so arranged that proper mixing is accomplished. The levers at the right of the apparatus control the discharge, and power is supplied by a 1¾ h.p. gasoline engine. The frame and trucks are all-steel construction, the former being rigidly braced for long wear. The mixer is especially adapted for most all kinds of concrete, mortar, plaster work where the contractor does not have great quantities to handle at any one place. It is shown in Fig. 5.

O. G. Mandt, representing the American Machine Co., Keokuk, Ia., entertained booth visitors with a talk on the latest improvement in the "Boss" concrete mixers. Mr. Mandt said that cement, grit and sand,

combined with water, have been one of the worst enemies of a concrete mixer on account of cutting out bearings and rendering continual rebabbitting necessary. He stated that "Boss" mixers have been equipped with "Hyatt" roller bearings, guaranteed to withstand wear and tear. These bearings run in oil, encased in special dust and grit-proof boxes. From exhaustive tests it was found that their installation saved 17 per cent. of the power and 70 per cent. of the oil bill, and had the additional advantage of only one oiling per week. The bearing used is known as the flexible heavy duty type, which absorbs shock, consequently adding life to the mixer. The company has been unusually successful with its 6 ft. "Little Boss" mixer, as it has appealed to building contractors preferring a combination mixer and hoisting engine on their small jobs. It can also be equipped with a batch hopper or low charging barrow hopper with hinged loading platform.

The Eureka Machine Co., Lansing, Mich., displayed the first model of its new No. 5 batch mixer, shown in Fig. 6, a machine completed after three years of study by the company's engineers. It has capacity for 5 cu. ft. of unmixed material, and is operated by a 3½-h.p. "New-Way" motor. Especial attention is called to the



New Goods at the Cement Show—Fig. 6—The New "Eureka" No. 5 Batch Mixer

substantial drum which is built with a series of mixing blades and buckets which insure a uniform mixing and a quick discharge. It has double cones of unequal taper comprising only three parts, the large semi-steel conical head with gear and a slightly smaller rounded head being joined together by a shell of heavy boiler plate steel. It is of the non-tilting type, gear driven. The side loader is the pivoted type, provided with a clutch which is automatically released when the bucket reaches the discharge position. The trucks are all-steel, and the main frame is 83 in. long and 36½ in. wide. The water tank is the positive measuring type, 18 in. long, 14 in. diameter, having a 12-gal. capacity and 100 lbs. working pressure.

The Schaefer Manufacturing Co., Berlin, Wis., showed a light weight portable rig saw which is new to readers of *The Building Age*. It is a combination rip saw, cross cut saw, dado saw, grooving machine, jointer, jig saw, boring machine, sander and emery wheel, and a general view of it is given in Fig. 7. The equipment carries its own power plant, and the entire outfit is guaranteed for a period of two years against defective workmanship and material. The general construction of the equipment insures rigidity, minimum vibration and perfect alignment of gauges. The table top is made in two parts, the main section being built of semi-steel. A wooden extension is hinged to the rear end of the metal half, making the entire top 37 in. wide and 68 in. long. The rear of the extension is fitted with a hardwood roller which takes the weight of long lumber in ripping. The engine is accessible by raising the wooden table. The frame and main bear-

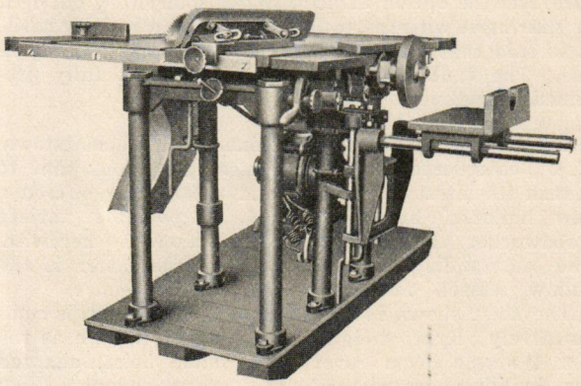
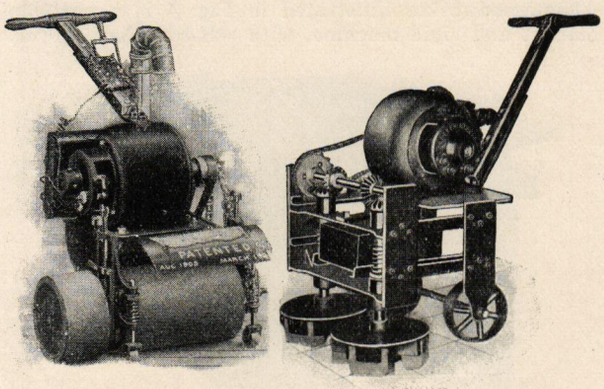


Fig. 7—The "Schaefer" Portable Saw Rig

ings are cast semi-steel, made in one piece. The former is supported by 2-in. extra heavy pipe legs on wood skids. The bearings which are cast integral with the frame are exceptionally large, being 1½ in. diameter and 5 in. long. They are of the self-oiling type, supplied by a reservoir cast into the frame, one oiling per week being sufficient, it is said, except when the machine is new. The left bearing is stepped to take the thrust. The metal is genuine babbit, cast in place, and scraped to a running fit. The pipe legs which support the frame have shoe castings on the lower end which are bolted to the skid.

M. L. Schlueter, 225 West Illinois street, Chicago, Ill., whose products are known to readers of *The Building Age*, interested visitors in his new "Marvel" stone floor surfacer. Mr. Schlueter also told of his recently invented "Baby" wood floor surfacer. Both machines are shown in Figs. 8 and 9 of the cuts. The "Marvel" grinder is constructed for smoothing marble, tile, terrazzo, cement and composition floors of all kinds. It will be seen from the picture that the apparatus is equipped with two discs, fitted with "Carborundum" blocks which revolve in opposite directions at 225 revolutions per minute. They are self-adjustable, and will grind to within one-quarter of an inch. The speed at which they operate insures a quick and efficient job. It is said to be the only flexible, automatic ball-bearing machine on the market. It is light in weight and most substantially constructed, and is guaranteed against defective workmanship and material for one year. The frame is 20 in. square, and is connected and braced with T and angle irons. The weight of the apparatus

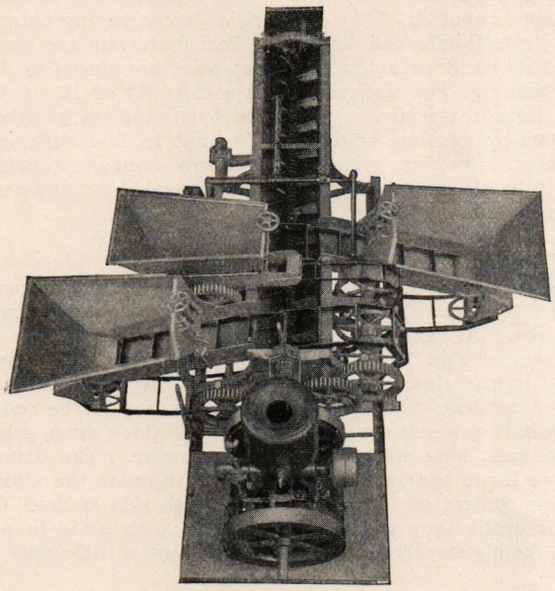


Figs. 8 and 9—Schlueter's Floor Surfacing Machines

is 130 lbs. without the motor or discs. Each disc weighs 20 lbs. The 1, 1½ and 2 h.p. motors weigh 80, 135 and 165 lbs., respectively. The "Baby" wood floor surfacer is a small model of the company's regular line of scrapers. It is built in four sizes, the rollers in each case being 8½ in. diameter, while the lengths vary from 9 to 18 in. Mr. Schlueter called attention to the

fact that he has an excellent exhibit at the Panama-Pacific International Exposition in the Palace of Machinery, Block 31, facing Third street.

The Elite Manufacturing Co., Ashland, Ohio, emphasized a distinctive feature which has been recently



New Goods at the Cement Show—Fig. 10—Top View of the "Elite" Mixer

adopted in connection with its low-down concrete mixers. In Fig. 10 is shown a top view of this machine. This mixer is the company's regular type heretofore manufactured with the exception of having a hopper on either side of the machine so that material can be shoveled in from both sides. The operation is unchanged, but the provision described allows more material to be mixed due to the fact that the workmen are not crowded. This machine is particularly adapted to road and street construction or where a large amount of concrete is being used continuously. The company also exhibited its well known scaffold bracket, the constructive features of which have already been presented in the columns of *The Building Age*.

The National Mixer Co., Fifth street, Oshkosh, Wis., featured its new mixer, shown in side view in Fig. 11, a model having a 5 cu. ft. capacity of unmixed material. The power is supplied by a 4-h.p. "National" engine, and the chain drive which connects with the drum is of the steel pin type. The sprockets are constructed from a special composition semi-steel. The drum is substantially constructed in two parts, and has a diameter of 32 in. and a width of 34 in. The interior arrangement has a series of four combination blades

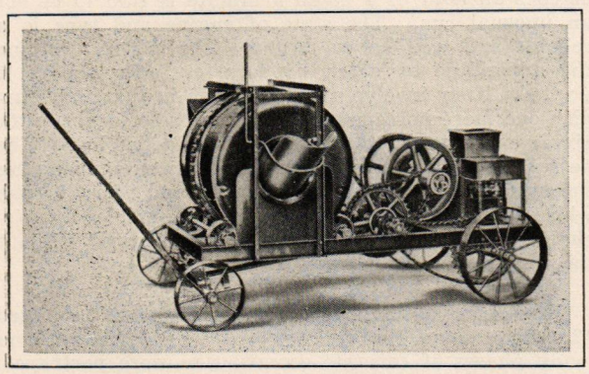


Fig. 11—The New "National" Concrete Mixer

and buckets which are designed to produce a thorough mix and quick discharge. The discharge chute is made from steel plate. When in its discharging position it extends to the center of the drum, but while the batch is mixing, it is held out of the drum by means of a catch. The latter can be released easily when the mixture is ready for precipitation. The lower frame of this equipment is constructed of 4 in. x 5.25 lb. channels, hot riveted together with heavy angle clips, to three cross channels. On the channels at the rear of the frame a large steel plate is riveted to serve as a squaring plate and a floor around the engine. The engine is bolted directly to the channels under the plate, thereby providing a rigid foundation. The upper frame is constructed of angles which not only run as high as the hopper and discharge chute, but entirely round the drum. The construction of this frame allows a quick change from a standard to a batch or side loader. Semi-steel trunnion rollers are provided, 8 in. diameter, with a 1¾ in. face. They are fastened solid to the shaft which runs in two wide babbitted bearing boxes, fitted with oil wells and dust-proof covers.

W. H. Tuohy, of Eagle, Wis., made his debut at the show by exhibiting a flexible concrete form which has just been placed on the market. It can be used in the construction of any wall or building which does not require a structural iron framework. The illustration, Fig. 12, shows the machine closed, ready for filling. The apparatus attracted considerable attention on account of its simplicity, rapidity of operation, and low cost. The form and core are built of sheet metal, mak-

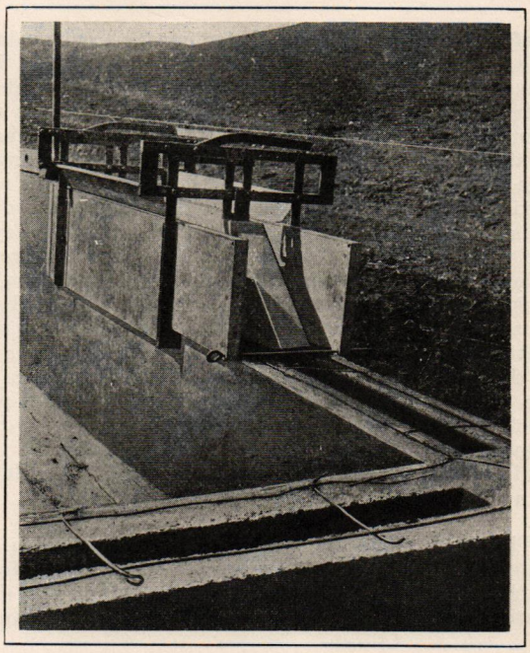
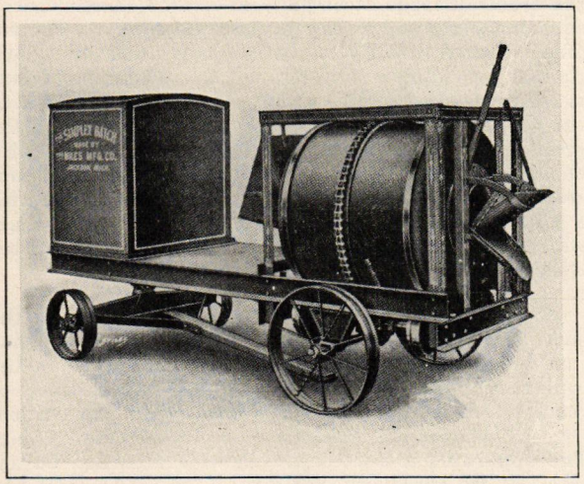


Fig. 12—The Tuohy Flexible Concrete Form Clamped onto a Wall Ready to Fill

ing them of exceptionally light weight. This product is readily adjustable, and is constructed to build either a solid or hollow concrete wall from 3 to 14 in. thick. It is said that one operator can keep three men busy carrying concrete to the machine. There is no waiting for the concrete to set. When the material has been spread and tamped, the raising of the lever on top of the "form" releases the machine from the wall. It can then be moved forward, clamped, and the operation repeated. The only lumber needed is a plumb or corner board with the necessary braces. The standard length of the form is 5 ft. 4 in., but forms can be furnished in lengths from 3 to 9 ft.

The Miles Manufacturing Co., Jackson, Mich., was one of the many companies showing new concrete mixers. Mr. Vining, who had charge of the booth, explained that the "Simplex" batch mixer No. 8, as shown in Fig. 13 is of the revolving drum type. The engine is housed and the drum located at the extreme end of platform, so that the former is free from all dust and dirt while the mixing is taking place. The large steel platform in the center is said to be convenient for dumping the wheelbarrow, and a bracket put up on either side allows the wheelbarrow to be

taken up one side and down the other. This mixer has a capacity of 8 cu. ft., or what is termed a one bag batch. The company states that an end discharge has met with universal favor, but those contractors who



New Goods at the Cement Show—Fig. 13—The "Simplex" Concrete Mixer

prefer the side feed and delivery can be accommodated. The "Simplex" drum does not tilt to discharge. It is driven from the centre by a heavy sprocket band and extra heavy riveted link chain belt, the latter, it is said, being superior to the gear drive, as there is no chance of stripping the teeth by small gravel stones falling in. The design of interior blades and buckets produces rapid mixing and discharging. Wear in the runways and drum rolls supporting the drum has been minimized by keying the drum rolls onto the shaft, so that they both rotate in long babbitted bearings lubricated with hard oil which is forced in by dust-proof grease cups. The discharge chute is made in two pieces, the outer end being fixed stationary to the frame, while the inner or upper end of the chute is pivotal, affording ample clearance for the wheelbarrow. The chute is built of boiler-plate steel for durability. The upper chute is reversed by a heavy spring to assist in mixing the material. The equipment includes a 4-hp. gasoline engine, an "Ideal" or a "Novo" being furnished as desired.

The Ideal Concrete Machinery Co., Cincinnati, O., shipped from its factory the new "Cincinnatus" No. 12 batch mixer which is shown in Fig. 14 of the illustration. The exclusive feature claimed by the company

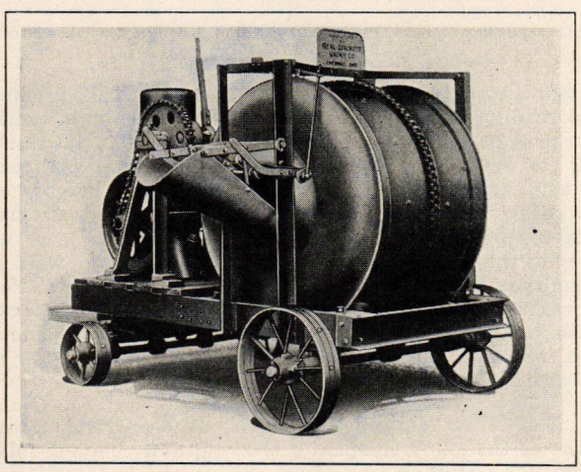


Fig. 14—General View of the New "Cincinnatus" No. 12 Concrete Batch Mixer

is the flexibly hung roller bearings. In mixers of this type, the drum is supported and revolves on four trunnions, having chilled surfaces running in roller bearings, so that the entire weight of the drum and contents finally rests upon the trunnion shaft bearings. By hanging these in flexible boxings and running the shafts in well oiled roller bearings, any binding which might result from twisting the frame, through its standing on uneven ground, is eliminated. Such provisions have the tendency to reduce wear, to make the mixer run easier, eliminate breakages and generally prolong the life of the equipment. The compactness of this mixer is another of the company's strong talking points. In its well-balanced design the best materials are used, and its construction is such that wear is reduced to the minimum. The equipment has a capacity of 12 cu. ft. of loose materials, and can be furnished with either steam or gasoline engine. It is built in four different types: Regular with wheelbarrow hopper; regular with batch hopper; regular with power loader, and as a rear discharge paver.

The Lansing Company, of Lansing, Mich., showed a line of 1915 model concrete mixing machines that combine the advantages of both the chain and the gear drives. A general view of the new No. 7 mixer is shown in Fig. 15. The machines are smooth running and it was almost impossible to hear any noise as they used a silent chain drive from the engine to the countershaft running over steel cut gears, which gives great strength, long life and eliminates noise. The drums have large bearings and the latest thing is the single cable control on the No. 10 mixer with side loader. On this outfit they use a regular hoist such as is in use on the big steel building hoist. They use a little heavier

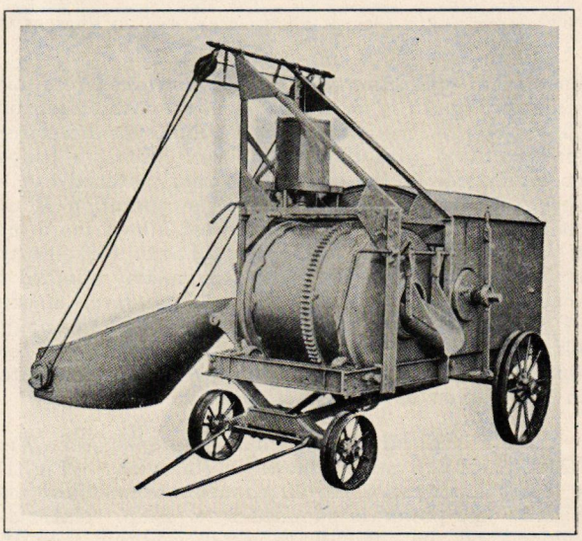


Fig. 15—New No. 7 "Lansing" Concrete Mixer

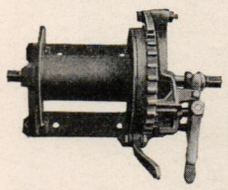
frame and wheels and other materials for the same size than most mixers and customers spoke very highly of the speedy mixing qualities and output per day. Sixty batches an hour or a batch a minute is said to be not an unusual run. The style of engine and type is a reliable and well known brand. The mixers combine the advantage of batch hoppers or side loaders if wanted. They involve a novel system in that they furnish one more horsepower engine for side loader outfit giving extra power to take care of the added load. The new 1915 models show these improvements, including the spout arrangement for sidewalk and "form" work which is a very handy attachment and enables the discharging of concrete directly into the "forms" without the necessity of handling.

The Universal Portland Cement Company occupied 12 spaces along the north wall of the Coliseum and many phases of concrete construction were portrayed. These included typical specimens of good and bad concrete made with superior and inferior aggregates, respectively; various types of cement products, such as building blocks and floor tile, sewer and drain tile, the economy of concrete roads and pavements, the fire resistiveness of concrete, suggestions for the farmer and rural concrete contractor, demonstrations of concrete products made in manual training schools by student

classes and the permanence of concrete as shown by specimens up to several thousand years old.

The essential feature of the fireproof booth consisted of transparencies showing the most striking scenes at the recent Edison fire, around which were grouped smaller transparencies, giving several pictures of this conflagration. The results of the Salem fire were also shown by a series of transparencies.

An attractive booth of interest to building contractors was that of the Sasgen Derrick Co., 2053 North Racine avenue, Chicago, Ill. Mr. Sasgen called visitors' attention to his latest invention — a single-shaft geared winch, details of which are illustrated in Fig. 16. This apparatus can be operated direct or in gear without changing the motion of the cranks, and by the movement of a small lever the winch can be changed from direct to compound immediately. It is claimed that a winch with such advantages is indispensable to building contractors having materials to hoist of varying loads. The winch has a capacity of 3,000 lbs. The drum is 4 x 8, and will carry 250 ft. of 5-16 in. cable.



New Goods at Cement Show—Fig. 16 — Single Shaft Geared Winch

The Whitman Agricultural Co., St. Louis, Mo., had a most diversified display of contractors' equipment, among which saw rigs, gasoline engines, hoists and

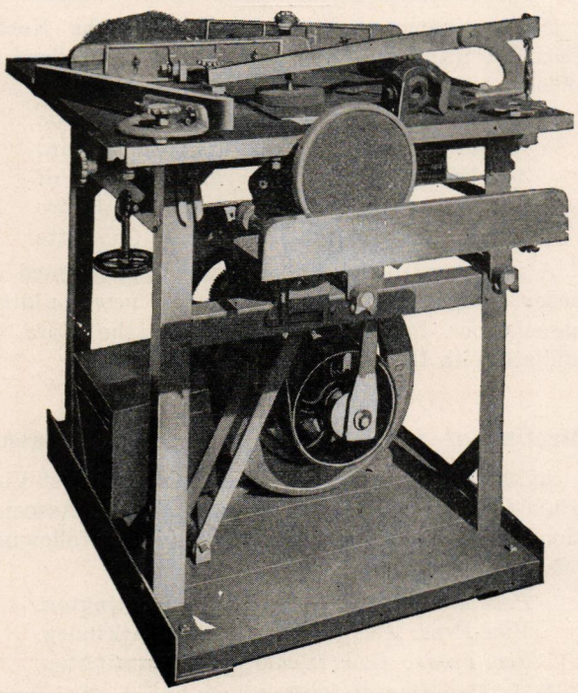


Fig. 17—The "Sultan" Portable Saw Rig

cross-cut saws were conspicuous. There are many features about the "Sultan" portable sawing rig which buyers of good machinery will appreciate, and from Fig. 17 of the illustrations some idea of its compactness and general construction can be obtained. The apparatus is equipped with 33 appliances, all high-grade tools of standard design and workmanship. It has a rigid all-steel frame and machine-surfaced table top; dust-proof engine of special design, and gravity blower to carry away all sawdust from the engine. In addition to this No. 1 model, two other types are built. The No. 1 has a ripping capacity from 3 to 4 in., is operated by a 5 h.p. engine, and the complete net weight is 882 lbs. The second size has about 20 appliances, with ripping capacity from 1½ to 2½ in., and a net weight of 650 lbs. The "Sultan Midget" will rip 1½ in. lumber, and is designed exclusively for ripping, cross-cutting, and tool grinding work. The company has issued a handsome 75-page catalog, which gives full details of its entire line, each product being clearly described and profusely illustrated.

The Chain Belt Co., Milwaukee, Wis., offered the contractor interested in small mixers, the "Rex," a new machine designed for work where the purchase of a high-priced machine is not justified. It has a capacity for 5 cu. ft. of mixed concrete per batch, and will

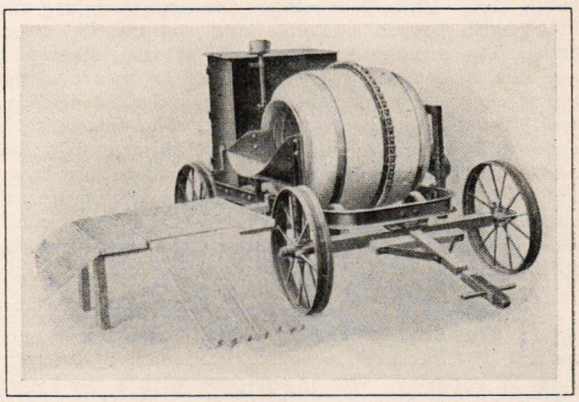


Fig. 18—The "Rex" Concrete Mixer

thoroughly mix and discharge a load in 45 seconds. This equipment is designed for the contractor building concrete sidewalks, curbs and gutters, silos, culverts, basements and floors. The mixer is built most substantially from steel and refined semi-steel materials. The drum is in two sections, securely bolted together in the middle, and is supported on large rollers which are lubricated by compression grease cups. The power used in a 3 h.p. "Novo" gas engine which makes connection to a riveted chain belt, as shown in Fig. 18. This method of drive is described as durable and efficient. The charging platform is low, being 18 in. from the ground. The opening for charging is 21 in. diameter, and the discharge is the pivoted type, 16 in. diameter, 20 in. from the ground. The countershaft which the engine drives is equipped with a friction clutch so that the engine can be started without turning the mixer drum. The wheels have been specially constructed for rough usage and are standard wagon gauge, 28 in. diameter with a 4 in. face. The dimensions of this mixer are 8 ft. long, 5½ ft. wide and 5 ft. high. Every machine is tested under its own power and is rigidly inspected before leaving the factory.

The Knickerbocker Co., Jackson, Mich., exhibited a concrete mixer calculated to invite the consideration of the contractor who is anxious to operate continuously at maximum capacity with maximum efficiency. The machine displayed was one of the features of the com-

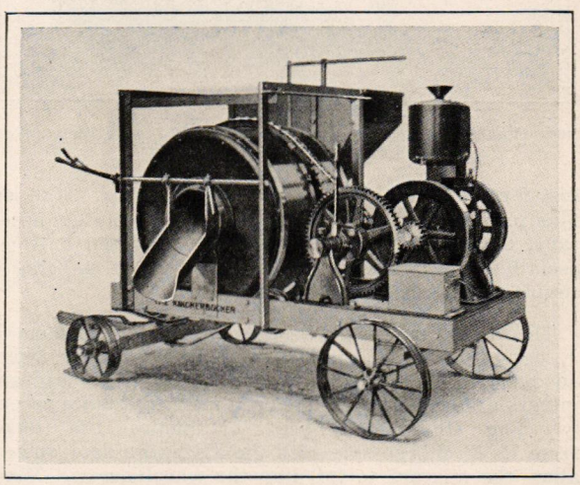
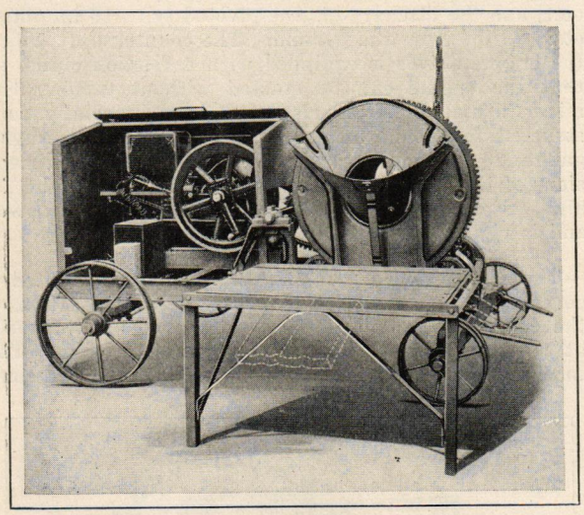


Fig. 19—The Knickerbocker Mixer with Engine Housing Removed to Show the Operating Mechanism

pany's booth. In Fig. 19 is shown a finished model, with the engine housing removed to reveal the drive. Two types are manufactured, with respective capacities of 6 and 10 cu. ft., both with a side discharge. To prevent excessive vibration this mixer is constructed with

an all-steel frame, and the castings are riveted to the channels to insure a rigid bearing for truck wheels. On the loading side of the frame over the front axle is a shaft controlled by a hand wheel so that it may be lowered to rest on the axle to prevent tipping or straining the frame when a power or stationary batch loader is being used. On both machines the same rolls are used, fitted with bronze bushings and compression grease cups. The mixing drum is made of tank steel plate, and the blades are so arranged as to insure a well-mixed concrete. Sufficient pitch is given the discharge spout for a rapid, continuous flow. The bottom of the spout is 25 in. above the ground, allowing ample clearance for a barrow. The buyer has his choice of having either a "Novo" or an "Ideal" engine, 3 hp. for the smaller mixer, and 6 hp. on the 10 ft. A heavy malleable link chain is used to transmit power from the shaft to the drum.

The Contractors Machinery Co., Keokuk, Ia., maintained a diversified display which included two new models of "Packard" concrete mixers, both having a 5 cu. ft. capacity. One is equipped with a low loading measuring batch hopper which allows the latter to be loaded while the batch in the drum is being mixed and discharged. The "Handy" size with a detachable hinged loading platform is shown in Fig. 20. This type of mixer is provided with an automobile pattern steel housing, complete with lock. The drum has ends manufactured from heavy iron, while the body and interior blades are constructed of No. 12 boiler plate steel. The size of the drum is 30 x 30 in., and is operated by a 3-h.p. "Packard" engine. The equipment is mounted on a rigid, substantial steel frame, having steel trucks which run in wagon tracks. Specifications call for gears made of pure semi-steel that are keyed to the shafts. All braces and straps are also steel. Dust-proof wick oil boxes have been provided for uniform



New Goods at the Cement Show—Fig. 20—Side View of the "Packard" Concrete Mixer

distribution, together with an oil reservoir. The engine provided is said to be larger than absolutely necessary, and gives reserve power. It has been built especially for these mixers and is referred to as being of simple construction and operation.

The Ransome Concrete Machinery Co., Dunellen, N. J., occupied a large booth in which the salesmen directed particular attention to the company's "Bantam" mixer, a machine which has been marketed quite recently. The illustration Fig. 21 shows the mixer from its discharge side with the discharge door open to allow the mixture to fall into the wheelbarrow. While the mixing operation takes place this door is closed tightly, and by simply moving the lever at the left of the drum backwards, the mixture discharges immediately. It has a capacity for one bag batch, and is driven by a 3-hp. engine. The drum is constructed of No. 10 gauge iron, and the mixing blades are built of the same material. The height to the feed platform is 27 in., and to the discharge 26 in. The wheels are 20 in. in diameter, with a 3-in. face. The specifications include platform and runways as part of the equipment shipped. The company stated that the good workmanship and

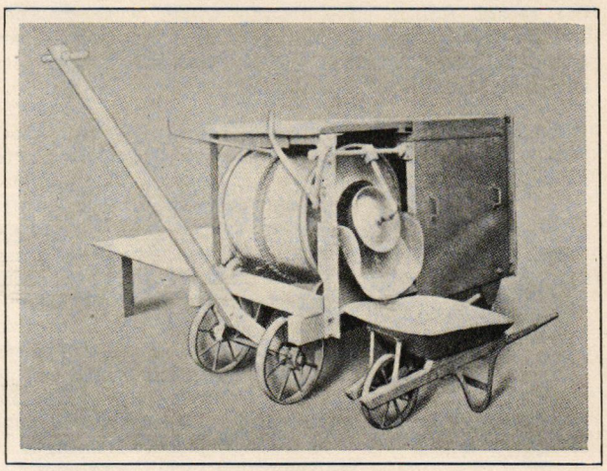


Fig. 21—The "Bantam" Mixer as Viewed from the Discharge Side of the Machine

material is the same as that which has made the larger "Ransome" mixers known the world over.

North Carolina Builders Elect Officers

At the recent meeting in Durham the North Carolina Builders' Exchange elected the following officers to serve the ensuing year:

President.....J. T. Salmon of Durham
1*st Vice-Pres*....J. W. Stout of Sanford
2*nd Vice-Pres*....J. R. McLlamroch of Greensboro
Treas.....L. D. Berry of Charlotte

A new constitution and by-laws were adopted in order to render it possible for the new building associations in various sections of the state to affiliate with the state organization.

Meeting of Southern Builders' Supply Dealers

At the second annual convention of the West Virginia Lumber & Builders' Supply Dealers' Association, held in Parkersburg, W. Va., the following officers were elected:

President....W. E. Minler of Huntington.
Vice-Pres..George M. West of Clarksburg.
Sec. Treas..G. J. Dickerson of Huntington.

E. L. Davidson of Parkersburg and A. M. Finney of Charleston were elected members of the board of directors.

A Mammoth Sugar Pine Tree

The United States Government has received $99.40 in settlement for a single sugar pine tree, which was cut in trespass in the Stanislaus National Forest in California, and which yielded more than enough actual lumber to build a good-sized suburban frame house. The tree scaled 18,933 board feet and was valued at $5.25 per thousand feet. Not many trees contain enough lumber to build a two-foot board walk nearly two miles long, and this is believed to be the first case on record in which a single tree felled in a National Forest was valued at almost $100 on the stump, although National Forest timber is frequently sold at considerably higher rates.

Stucco Board vs. Standard Built Walls

Results of a Series of Tests Demonstrating the Comparative Strength of the Two Forms of Construction

IT is a well known fact that when the wind acts on the side of a building there are stresses set up in those walls at right angles to the surface upon which the wind acts. Those stresses tend to "rack" or cause a movement in the plane of the walls which movement, although slight, is injurious to the interior or exterior plastering. For the purpose of determining the resistance to stresses approximating those caused by pressure, offered by sections of walls made of Bishopric stucco board nailed on studding and of sections of walls of standard construction, an interesting series of tests were recently made by H. W. T. Collins, a mechanical engineer of Norwood, Ohio, and the results of them are presented herewith.

The sections of walls to be tested were five in number, the first of which consisted of a frame

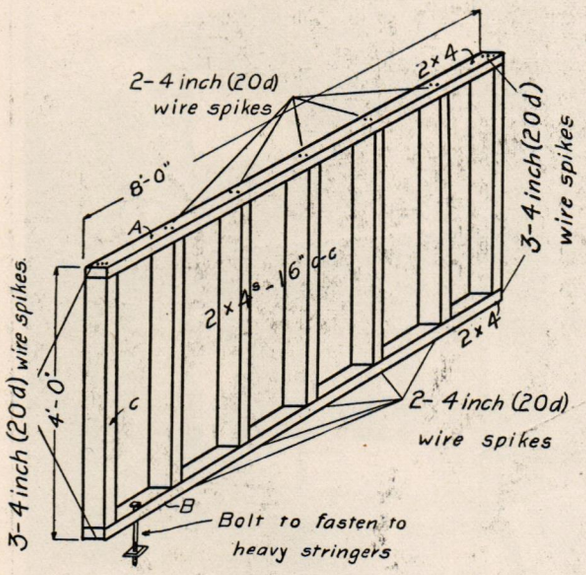


Fig. 1—Showing Construction of Frame for Testing

4 ft. high by 8 ft. long and made of 2 x 4-in. rough studding spiked together with 4-in. wire spikes as indicated in Fig. 1. Bishopric stucco board was nailed to both sides of this frame with one 1½-in. (4d.) nail in each lath in each stud, the lath being laid horizontally.

Test section No. 2 consisted of a frame of the same size and construction as No. 1, but with common lath on one side and sheathing on the other. The sheathing boards were 1 in. thick, 5½ in. wide and 8 ft. long. Each board had two nails 2½ in. long (8d.) in each stud. The sheathing was neither dressed nor matched, but closely laid and securely nailed. The other three test sections were modifications of those just described and their details are indicated in the table at the close of this article.

According to Mr. Collins the principal apparatus for testing the sections consisted of a screw jack for applying the load, a bell crank lever constructed of timbers and a Fairbanks platform scale, the arrangement being as indicated in Fig. 2 of the illustrations. It will be seen that the force was applied

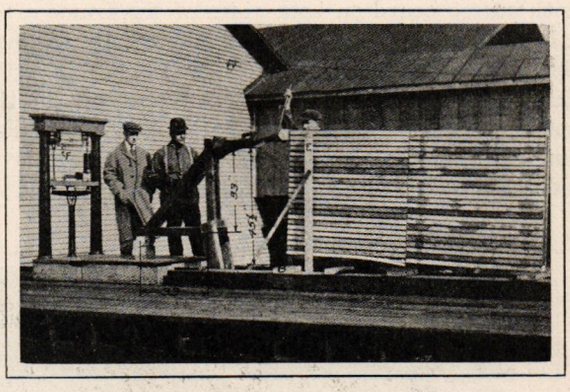


Fig. 2—Showing Test Section No. 1

in a horizontal direction by the jack, and transmitted through the bell crank to the platform of the scale. The fulcrum of the bell crank lever consisted of a round steel bar fitting loosely in a hole drilled in the timber.

In carrying out the work the bottom sill "B," Fig. 1, of the sections to be tested, was securely spiked and bolted to the timber "B" of Fig. 2, but in the shorter specimens a light brace was used to prevent their being sprung sidewise by the load. The block was adjusted on the scale platform and the jack so placed that the vertical distance from the center line of the jack to the center of the fulcrum was the same as the distance from the center of the block to the center of the fulcrum. The

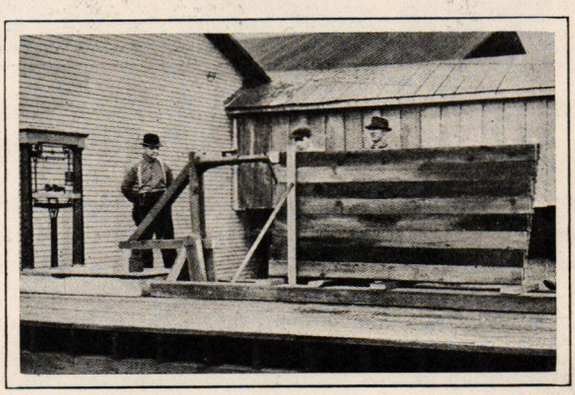


Fig. 3—Test of Section No. 2 Being Made

dimensions are shown in Fig. 2 and were the same for each test. The dead weight of the bell crank and blocks was measured on the scale and balanced by a tare-poise.

The force applied by the jack was transmitted by the bell crank to the scale platform. The load as measured by the scale was considered equal to the force at the jack.

The jack after being placed in position was tightened sufficiently to hold itself in place. This produced a force of about 200 lbs. on the scale. A steel rule was then fastened to the top of the frame and a steel plate in the upright, E, Fig. 2, which was independent of the section tested, was set up at a definite point on the rule. As the force was applied the rule moved under the steel plate, thus indicating the amount of the deformation in a line parallel to the direction of the application of the force. The load was applied in 100 or 200 lb. increments and the deformation measured at each load.

Fig. 2 is a photographic reproduction of No. 1 with stucco board on both sides of the frame after a load of 2,650 lbs. had been applied. At this load the rule showed deformation of 1 3/16 in. On examination it was found that the spikes in the bottom of the first stud, "C," Fig. 1, had been pulled out, allowing the stud to rise. This upward movement increased, to some extent, the deformation as measured. The paper backing of the stucco board was also ruptured near the point where the stud had been pulled out.

Fig. 3 is a photograph of test section No. 2, with common lath on one side and sheathing on the other, after a load of 1,650 lbs. had been applied. The deformation at this point was shown by the rule to be 5 11/16 in. The stud "C," Fig. 1, was pulled up in a similar manner to that in test section No. 1, but to a less extent.

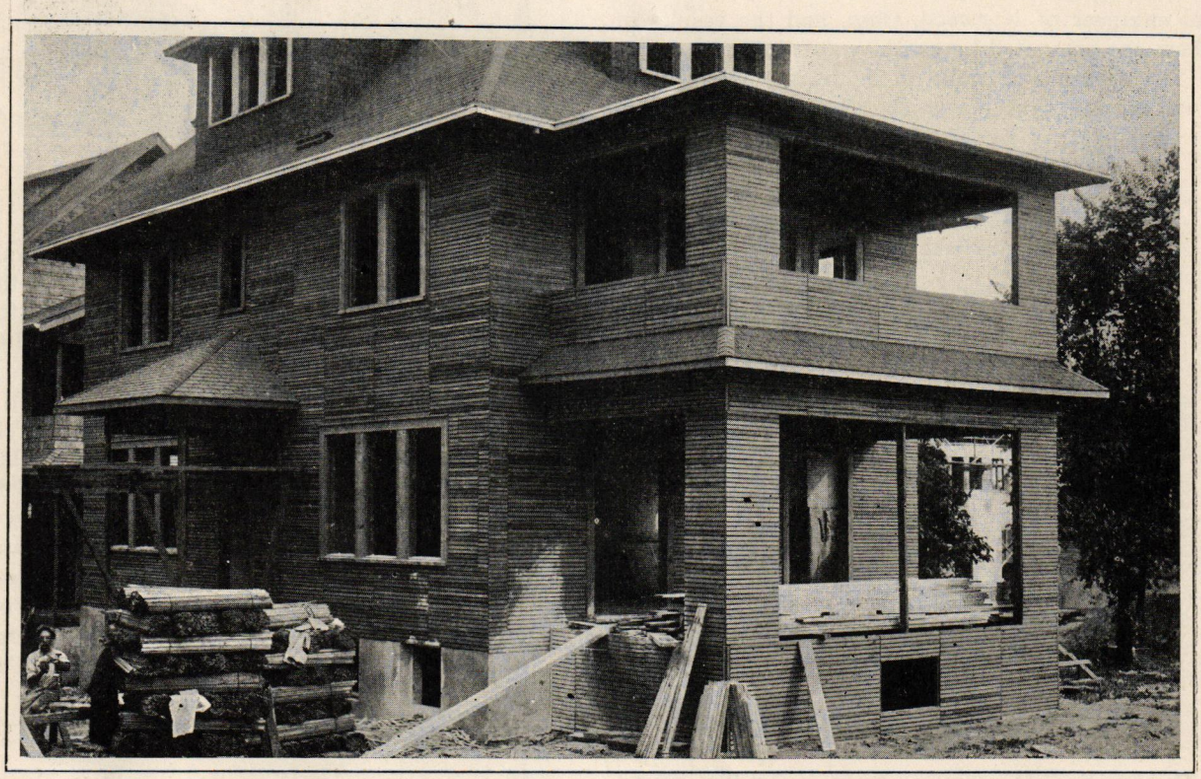
In Fig. 4 is shown the exterior of a dwelling house to the frame of which Bishopric stucco board has been applied and is ready to receive the plaster.

Section No.	Size Ht. Lg.	Construction	Deformation at Loads of		
			300	600	900
1	4 by 8	Stucco board on both sides.	0.05 in.	0.07 in.	0.10 in.
3	4 by 4	Stucco board on both sides.	0.05 in.	0.17 in.	0.38 in.
5	4 by 4	Stucco board on one side, lath on the other.	0.08 in.	0.30 in.	0.75 in.
2	4 by 8	Sheathing on one side, lath on the other.	0.10 in.	0.35 in.	0.90 in.
4	4 by 4	Sheathing on one side, lath on the other.	0.35 in.	1.30 in.	3.55 in.

The above table gives as a summary the deformation of each section at three loads—300, 600 and 900 lbs. respectively. The test sections are listed in the order of their rigidity and the results clearly demonstrate that under the same conditions stucco board is stronger than sheathing as represented by sections of walls of standard construction.

The plans have recently been filed for a structure to house a large mail order and parcel post business to be erected at Jackson avenue and Tenth street, Long Island City, N. Y. The structure will be 12 stories in hight and is to cost $500,000. It will be provided with elevators which will carry loaded automobile trucks to every story, thus greatly facilitating shipments.

One of the latest improvements in the Grand Central Terminal zone, New York City, is a 12-story apartment building to cost $750,000. The plans were drawn by Warren & Wetmore. The structure will be located at the northwest corner of Park avenue and Fifty-fourth street.



Stucco Board vs. Standard Built Walls—Exterior View of a Dwelling House to Which Bishopric Stucco Board Has Been Applied Ready for the Plaster

New Publications

Concrete Stone Manufacture. By Harvey Whipple. 256 pages. Size 4¼ x 7 in. Profusely illustrated. Published by Concrete-Cement Publishing Company. Price $1.00.

This is the first comprehensive work on the manufacture of concrete-stone in many years, during which period concrete block and stone manufacture has shown remarkable progress in many ways. The author, who is managing editor of *Concrete-Cement Age*, has treated the subject in a way to be of special value to those engaged in the branch of industry indicated, and in the preface he expresses the hope that "its influence may in some degree discourage efforts in concrete-stone manufacture by those incompetent to add something to the sum of progress in that industry and that it will be the means of putting many others in the possession of such information, developed in successful work, as will lend impetus and direction to important industrial growth."

The subject matter is comprised in ten chapters, the first of which deals with the development of concrete building units. Next the author takes up location, equipment, layout, materials, mixtures, manipulation and curing; describes special molds and illustrates various patterns, discusses treatment of block surfaces, shop records and cost keeping, and then gives various building regulations, tests and specifications. The closing chapters are devoted to selling the products and examples of layout and operation.

Power Heating and Ventilation. Parts I and II. By Charles L. Hubbard. Size of each 6 x 9 in. 300 and 308 pages respectively. Profusely illustrated. Bound in cloth covers. Published by McGraw-Hill Book Company. Price of each volume $2.50.

Part I is devoted to the design of small and medium-sized steam power plants and constitutes a treatise for designing and constructing engineers, architects and students. It is a second edition of the work indicated and has been fully revised and the type reset. The fundamental elements are first considered in some detail, after which various pieces of apparatus employed in power work are fully described. The later chapters are devoted to equipment for different conditions and the assembling of it in the completed plant. Care has been taken to treat the subject in a simple and concise manner, yet sufficient space has been devoted to the derivation of formulæ and to the principles involved in the various methods of procedure to make the book of value to both student and practicing engineer.

Part II deals with the physics of heating and ventilation and gives applications of the methods of determining the transmission of heat from air, water and steam, thus adapting the work alike to the needs of the furnace man and the steam and hot-water fitter. A comprehensive treatment is given of furnace heating, showing how to determine the size of furnace needed after the heating requirements have been ascertained on the thermal unit basis. It gives the means of determining the size of the hot-air pipes, and the area of round, oval and rectangular pipe. Different types of sectional boilers and horizontal return tube plate boilers are shown and the methods of arriving at their capacity for their work are described. One chapter is devoted to direct steam heating, another deals with indirect steam heating by gravity, while another has to do with methods of ventilation by means of aspirating coils or vent hoods at the termination of the flue. Still other chapters deal with hot-water circulation by gravity and by forced circulation; heating with exhaust steam and different types of vapor and vacuum systems of heating. In the closing chapter attention is given to the care and management of heating and ventilating plants.

Heating and Ventilating Buildings. By Prof. R. C. Carpenter. 605 pages. Size 6 x 9 in. Illustrated by 290 figures. Bound in cloth. Published by John Wiley & Sons. Price $3.50.

This is the sixth edition of a well known work on the subject indicated and has been largely rewritten, while considerable new matter has been added. In fact, the size of the book as compared with the first edition has been increased by nearly one-half. Several new chapters have been added relating to fans or blowers for moving air, also to the general subject of mechanical systems of heating and ventilation, to schoolhouse heating and ventilation and air conditioning. The volume is regarded as a standard work of reference for engineers and as a text book for any institution, as it covers the different methods of heating and much of the detail of their design and installation.

Heating Questions and Answers. By Alfred G. King. 214 pages. Size 6¼ x 9¼ in. 127 illustrations and 21 tables. Bound in cloth covers. Published by Norman W. Henley Publishing Company. Price $1.50.

The book contains 500 plain answers to direct questions on steam, hot water, vapor and vacuum heating. The contents are so arranged that it takes up step by step the theory of heating, with methods, the effect of chimneys and fuels, with boilers and boiler fittings, radiation, steam and hot-water heating, as well as the different methods of installing both types of heating. The illustrations tend to render more clear the answers to the questions, which naturally confront the man who must design the equipment for a building. In this way the various systems and fixtures used, valves and air valves, are shown, with a brief explanation of their purpose. The questions are arranged to require illustrations that will show the method of connecting two boilers to be used on the same heating system, the method of arranging expansion and swing joints, and making connections to radiator. There are also tables of the size of the main and return connections required for the various types of heating systems that are in common use. In addition, the list of contents is so arranged that any particular subject may be readily found, the list of illustrations showing where any particular type of installation may be located.

Brief Review of the Building Situation

Figures Showing Building Activities in Various Sections of the Country in February, 1915, and February, 1914

THE improvement in the building situation throughout the country, noted in our last issue, is emphasized in the reports which have come to hand from 116 cities covering the month of February. Whereas in January the decrease, as compared with a year ago, was 27.7 per cent., the figures for February show a falling off of only 11.6 per cent. as compared with February, 1914. Of the 116 cities reporting 47 show increases and 68 decreases.

A notable feature of the cities of the eastern states reporting is the continued gain in the boroughs of Manhattan and the Bronx in Greater New York. Philadelphia also shows an important gain in the new work projected as compared with the same month a year ago, the total being the greatest for any February since 1906. The building that is going on in the smaller cities is due more to the natural growth of the communities than to speculative operations, and is therefore of a more significant nature. Of the 44 eastern cities reporting 25 show increases and 19 decreases, but with a gain for the entire section of 10.1 per cent. This, indeed, is the only section of the four into which we have divided the country, showing an increase over a year ago.

CITIES IN EASTERN STATES

	1915.	1914.
Albany	277,115	200,650
Allentown	67,385	49,500
Altoona	16,843	98,907
Atlantic City	117,349	42,768
Binghamton	38,871	73,005
Boston	1,375,810	2,964,032
Bridgeport	237,495	154,628
Brockton	56,130	41,890
Buffalo	308,000	395,000
East Orange	182,607	42,678
Elizabeth	40,184	23,210
Erie	109,168	58,150
Harrisburg	38,425	41,875
Hartford	151,600	99,165
Hoboken	6,695	178,084
Holyoke	4,560	13,800
Jersey City	319,154	318,301
Lawrence	66,775	14,200
Montclair	65,926	48,987
Newark	955,391	1,247,933
New Bedford	92,925	111,825
New Britain	28,585	5,620
New Haven	674,855	291,754
New York:		
Manhattan	5,899,930	2,761,042
Bronx	2,657,934	1,286,311
Brooklyn	2,264,550	3,535,465
Queens	1,582,125	1,101,709
Richmond	151,379	100,404
Niagara Falls	15,450	73,875
Passaic	24,800	2,410
Paterson	57,217	65,378
Philadelphia	2,574,730	1,794,905
Pittsburgh	608,644	2,010,568
Rochester	382,607	372,957
Reading	102,275	95,750
Scranton	42,600	64,729
Springfield	692,795	292,765
Syracuse	160,383	75,915
Trenton	71,673	77,064
Troy	47,445	26,966
Utica	7,975	19,050
Waterbury	30,150	63,010
Wilkes-Barre	70,125	36,973
Worcester	104,220	104,820

In the cities of the middle states from which reports have been received the notable changes are in the nature of decreases as compared with February last year. Of the 34 cities reporting 12 show increases and 22 decreases, with a percetnage loss of 12.6. The important changes are to be found in the figures for Chicago, Cleveland, Detroit and Kansas City, Mo.

CITIES IN MIDDLE STATES

	1915.	1914.
Akron	110,260	198,530
Cedar Rapids	133,117	145,800
Canton	39,550	37,250
Chicago	4,701,400	5,097,900
Cincinnati	499,645	316,515
Cleveland	1,733,925	1,398,010
Columbus	153,350	225,915
Dayton	14,453	49,970

CITIES IN MIDDLE STATES (*Continued*)

	1915.	1914.
Des Moines	65,145	126,300
Detroit	1,307,215	3,020,850
Duluth	89,647	156,370
Evansville	85,435	159,256
Fort Wayne	80,120	103,300
Grand Rapids	104,301	82,095
Indianapolis	307,750	292,469
Kansas City, Mo.	896,330	1,053,950
Kansas City, Kans.	55,150	43,125
Lincoln	31,560	35,675
Minneapolis	811,495	498,005
Milwaukee	409,056	578,496
Omaha	84,120	221,175
Peoria	51,750	45,600
Saginaw	13,075	13,465
St. Louis	701,062	908,083
St. Paul	797,054	371,444
St. Joseph	18,751	29,715
Sioux City	36,150	28,875
Springfield	65,900	28,050
Superior	20,675	15,140
Toledo	454,607	606,400
Topeka	37,770	47,403
Youngstown	79,650	84,740

In the southern section of the country the changes are somewhat less striking, the 18 cities reporting showing a falling off, as compared with February last year, of 8.08 per cent. Baltimore is conspicuous by a heavy increase in activity as compared with a year ago, and in Atlanta and Louisville there is more new work projected than was the case last year.

CITIES IN SOUTHERN STATES

	1915.	1914
Atlanta	471,961	335,391
Baltimore	983,136	417,743
Beaumont	21,623	53,256
Birmingham	136,710	216,435
Chattanooga	33,110	108,925
Dallas	324,185	564,220
Huntington	48,625	30,747
Louisville	283,220	163,800
Memphis	101,735	275,455
Nashville	65,705	79,885
New Orleans	97,323	204,794
Norfolk	172,730	96,835
Richmond	259,184	270,567
San Antonio	113,595	577,950
Savannah	74,010	113,850
Tampa	58,055	109,820
Washington	890,838	884,036
Winston-Salem, N. C.	23,524	21,579

The opposite of the showing of the eastern section of the country is found in the reports from the extreme western states, where 19 cities reporting indicate a loss of 63.7 per cent. as contrasted with February, 1914. This is due almost wholly to the heavy shrinkage in operations in San Francisco, Los Angeles, Seattle and Portland. The falling off in San Francisco is not surprising in view of the tremendous activity which prevailed a year ago incident to the work in preparation for the Panama Pacific International Exposition.

CITIES IN EXTREME WESTERN STATES

	1915.	1914.
Berkeley	93,600	100,200
Butte	6,125	61,700
Colorado Springs	11,525	111,520
Denver	165,070	206,205
Fresno	77,128	56,624
Los Angeles	560,697	1,455,730
Oakland	328,934	429,192
Pasadena	36,531	83,035
Portland	311,740	605,530
Pueblo	5,700	45,200
Sacramento	123,307	200,691
San Diego	95,990	162,098
Salt Lake City	147,705	112,600
San Francisco	807,936	4,574,281
San Jose	27,418	42,278
Seattle	353,880	553,295
Spokane	21,725	24,125
Stockton	33,900	21,936
Tacoma	56,751	167,722

All things considered, the outlook is more encouraging than for some time past, and if even a goodly portion of the work now contemplated is put through, the year will show a very fair total.

Current News of Builders' Exchanges

Meetings of Various Organizations—Elections of Officers—New President of Cincinnati Exhange

Portland Exchange Occupies New Quarters

The members of The Builders' Exchange of Portland, Ore., took possession on Friday evening, February 19, of their new quarters in the Worcester Building. A most entertaining programme had been prepared, which included numerous talks on pertinent subjects by officials of the organization as well as by others invited for the occasion. The "house warming" if such it may be called, was a most enjoyable affair and the action of the Exchange in taking a long lease of its new quarters is regarded as showing its confidence in the return of better conditions in the building business.

Builders' Exchange at New Kensington, Pa.

Contractors and builders of the lower Allegheny Valley have just formed what is known as the New Kensington Builders Exchange with the following officers for the ensuing year:

President.....J. K. Watson
Vice-President.....George W. Douglas
Treasurer.....John D. Dixon
Secretary.....George V. Gardiner

There were also elected 15 members to constitute a board of directors of which George Keeler is chairman.

Testimonials to Officials of Pittsburg Exchange

At the regular weekly noonday luncheon of the Pittsburgh Builders' Exchange held on Thursday, March 4th, Wm. J. H. Boetcker, of the National Inside Association, made a very interesting and instructive address to 150 members present, after which R. K. Cochrane, former president of the Association, on behalf of the Exchange, presented to Capt. Thos J. Hamilton, former Treasurer, who retired Jan. 1st, 1915, a framed and engrossed copy of a resolution passed by the Board of Directors, which was as follows:

WHEREAS, There has come before this board the resignation of Thomas J. Hamilton as its treasurer, with an urgent request that the same be accepted, and

WHEREAS, In complying with this request we do so with extreme regret, yet feel that consideration of the reasons given demand assent; but in accepting this resignation we desire, on behalf of the Pittsburgh Builders' Exchange, and for ourselves, to place on record our appreciation of the long period of service and its exceptional value to this body; therefore be it

Resolved. That this board and the Pittsburgh Builders' Exchange inscrive on their minutes the following resolution:

IN accepting the resignation of Thomas J. Hamilton as our treasurer, we do so with a sense of lasting obligation to him for his invaluable services as our financial officer, our unpayable debt of gratitude for his advice and counsel on many trying occasions, his fidelity and loyalty to our organization during all the many years he has been our fiduciary officer and the accuracy with which he has always performed his manifold, trying and often difficult duties.

Resolved, That a copy of this preamble and resolution be inscribed and framed and presented to our retiring treasurer as a testimonial of our affection and regard for him as a man and as a memento for transmission to his descendants of his high and honorable character that will be pleasing and until the last generation testify his worth, his loyalty to every duty as citizen, as defender of his country—in which he has won admiration from his fellow soldiers during a time of peril to our common country—as a man of highest probity, faithfulness in the performance of manhood obligations, and as a fellow member of this organization.

Resolved, That it be ordered that the name of Thomas J. Hamilton be recorded on the membership roll of this organization as an honorary member for life.

Captain Hamilton served continuously as treasurer of the Association from 1886 to 1915 covering a period of twenty-nine years and this day was his 76th birthday.

He has lived a retired life for the past seven years and continued to serve in the capacity of Treasurer until a change of residence made it inconvenient for him to longer continue in office.

The greatest surprise was when J. Chas. Wilson in a few well chosen remarks, presented to R. K. Cochrane a beautiful mahogany chime clock, on behalf of the Exchange, in appreciation of his valuable services as president for the years 1912-1913-1914.

Both the recipients responded in a neat manner, expressing their thanks for the tokens of appreciation.

At the annual meeting, S. P. Trimble was elected president to succeed Mr. Cochrane and S. N. Murphy was elected to succeed Capt. T. J. Hamilton.

Annual Meeting of Cincinnati Exchange

The annual meeting and election of officers of the Builders' and Traders' Exchange, Cincinnati, Ohio, was held at headquarters in the Merchants Building, March 4. The election was a very spirited one, and interest in it was enhanced by the presence of a number of lady relatives and friends of the different candidates, who were electioneering for the different tickets in the field, of which there were three, all being headed by Wm. Miller, Jr., for president, and by George W. Baker for treasurer. Of course, both of these gentlemen were elected without a dissenting vote.



Pres. Wm. Miller, Jr., of the Cincinnati Exchange

There was a big fight for directors, the red ticket winning out with but one exception, this being the election of Albert Weist, who ran on the blue ticket. Joseph McDermott was chosen vice-president and Henry Niemes, secretary. The directors are as follows: C. Taylor Handman, J. O. Bagley, Walter McGarvey and A. G. Weist.

The arrangement for the election and social features were in charge of the retiring President, C. Taylor Handman, and Secretary Weingartner.

The new officers elected were duly installed at a meeting held at the Exchange headquarters on the afternoon of March 8.

Annual Meeting of Edmonton Builders' Exchange

At the recent annual meeting of The Builders' Exchange at Edmonton, Canada, a large percentage of the membership was present and the reports of the secretary and treasurer showed the organization to be in a flourishing condition. The officers elected for the ensuing year were:

President.....A. J. Brown
1st Vice-President.....H. Nash
2nd Vice-President.....C. W. Hillas
Secretary.....F. H. Drayton

Financial and executive committees were appointed and it was voted to hold monthly meetings hereafter on the first Tuesday evening of each month.

New Officers of Philadelphia Exchange

At a meeting of the Board of Directors of the Master Builders' Exchange at Philadelphia, Pa. held on February 9, the following officers for the ensuing year were chosen:

President.....George J. Watson
1st Vice-President.....Jacob L. Tyson
2nd Vice-President.....O. W. Ketcham
3rd Vice-President.....E. E. Hollenback
Treasurer.....Frank Reeves
Secretary.....Charles Elmer Smith

The Washington Builders' and Manufacturers' Exchange

What promises to become one of the most popular social features of the Builders' and Manufacturers' Exchange at Washington, D. C., is the one o'clock luncheon every Saturday at one of the downtown hotels which has recently been inaugurated. The attendance has shown an increase on each occasion and the luncheons are proving an excellent means of bringing the members together socially. The committee having in charge the selection of new quarters have several propositions under consideration and something definite is expected to develop shortly. The Spanish class inaugurated several months ago has now an enrollment of 30 and is making good progress under the leadership of S. J. Macfarren and A. B. Tugman.

Annual Meeting of Montreal Builders' Exchange

At the 17th annual meeting of the Builders' Exchange of Montreal, Canada, President T. Gilday stated in his report that notwithstanding the business depression and financial stringency consequent upon the war, the Exchange came through the year in a very creditable manner. He referred to the removal to the present commodious quarters in Victoria Square and of the results of the decision to do away with the Exhibit Hall and the disposal of the *Bulletin*. During the year several important amendments to the By-laws were passed defining different classifications of members and he pointed out that the action of the government in passing a statute increasing the duty on imported dressed stone which was petitioned for by the Montreal and other Exchanges is proving very beneficial to cut stone contractors. He also referred to the study which was being made of Quantity surveying. The election of officers resulted as follows:

President.....John Quinlan
1st Vice-President.....E. W. Sayer
2nd Vice-President.....J. B. Barbeau
Secretary-Treasurer.....D. K. Trotter

The new Board of Directors which included five who held office last year were as follows: John Allan, general contractor; R. F. Dykes, stone contractor; J. H. Hand, building contractor; W. M. Irving, brick and masonry; J. J. Roberts, carpentry and millwork; W. Bonnell, brick contractor; J. E. Walsh, contractor; R. S. Muir, mantel and tile; W. E. Potter, master painters and decorators; R. J. McCauley, master plumbers; Alex. Bremner, Jr., builders' supplies.

Annual Meeting of Saskatoon Builders' Exchange

At the annual meeting of The Builders' Exchange of Saskatoon, Sask., Canada, there was a large attendance, and deep interest was manifested in the proceedings. Secretary Maurice Prout rendered a report covering the work of the association during the past year pointing out, among other things, that "owing to the war and consequent financial stringency the building trade has been considerably curtailed in its operations, thereby causing the temporary withdrawal of some of the members. We still retain the majority, however, and are confidently looking forward to a day in the near future when our Exchange will be not only 'Bigger and Better' but the 'Biggest and Best' in Western Canada."

The election of officers for 1915 resulted in the following choice:

President.....James Preil
1st Vice-President.....A. W. Cassidy
2nd Vice-President.....Thomas E. Farley
Honorary Treasurer.....Andrew Rutherford
Secretary.....Maurice E. Prout

This is the fourth year in succession that Mr. Preil has been elected president of the Exchange. In the Board of Directors elected were represented general contractors, sanitary and heating engineers, electricians, sheet metal workers, dealers in builders' supplies, hardware, mill work, lumber and sand and gravel.

New Officers of Vancouver Exchange

At the recent annual meeting of Builders' Exchange at Vancouver, B. C., the following officers were elected for 1915:

President.....J. L. Skene
1st Vice-Pres.....J. G. Anderson
2nd Vice-Pres.....A. C. Brown
Secretary.....W. Hamilton-Lindsay

The president congratulated the members on the fact that although the times have been anything but favorable, the membership has increased and he expressed the hope that conditions in the building industry would show an improvement during the ensuing year.

The Builders' Exchange at Jackson, Miss.

Progress has been made in the organization of the Builders' Exchange at Jackson, Miss., brief reference to which appeared in these columns in January. The movement, which has been in contemplation by a few of the leading building contractors of the city for some time back, has taken tangible shape in the selection of W. J. McGee as provisional president, S. N. Cox as vice-president, and A. D. Paine as secretary, the latter being an architect. At the meeting when the temporary organization was perfected there were present representative building-contractors, mill men, lumber dealers, plumbers, architects, subcontractors, material men, roofers, painters, etc.

New Officers of Jacksonville Exchange

At the annual meeting of The Builders' Exchange of Jacksonville, Fla., held in the rooms of the organization on Saturday, February 6, the following officers were chosen to serve for the ensuing year:

President.....W. P. Richardson
First Vice-President.....O. P. Woodcock
Second Vice-President.....J. S. Bond
Secretary and Treasurer.....J. H. Kooker

The old Board of Directors was re-elected and the report submitted by the secretary showed the Exchange to be in a flourishing condition.

Officers of Toronto Builders' Exchange

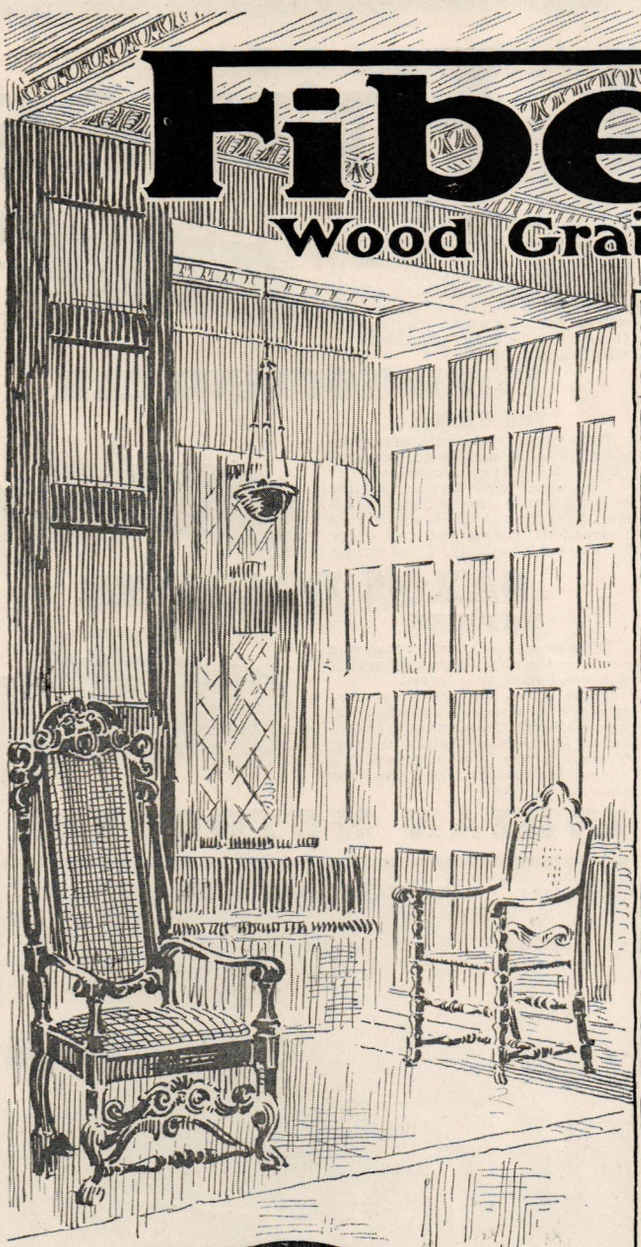
At the recent meeting of members of The Builders' Exchange of Toronto, Canada, officers for the year were elected as follows:

President.....George Oakley, Jr.
First Vice-President.....S. R. Hughes
Second Vice-President.....G. W. Britnell
Secretary.....A. E. Flower
Treasurer.....John Aldridge

There were also directors elected representing various branches of the building trades.

The Exchange has recently inaugurated a series of luncheons at each of which some prominent speaker is to address the members on a timely topic. At the first luncheon nearly 150 were present and City Architect W. W. Pearse spoke on the changes which he considered desirable in the building by-law at present under revision.

Fiberlic
Wood Grain Panels



FOR the first time in history, we now have an interior surfacing material that is a vast improvement over lath and plaster, and also

A Perfect Substitute for Interior Decorative Grained Woodwork

And Fiberlic is *not* a "wall board." Fiberlic is made from the fiber of a well-known imported root. These fibers are extremely tough and strong and, after undergoing a recognized chemical process to remove the resinous matter, are built up to any desired thickness.

The most attractive feature of Fiberlic is the Wood-Grain Panels, with the grain *in* the surface. Not a printed grain or printed paper mounted on wood, but "the grain is right *in* the wood," faithfully reproduced from the actual wood by a patented process. In oak, walnut and mahogany grains.

Fiberlic is *Not* a "Wall Board"

Fiberlic Wood-Grain Panels open up a wonderfully large field for interior decorative effects, answering every purpose of genuine grained wood, yet the comparative cost is very small.

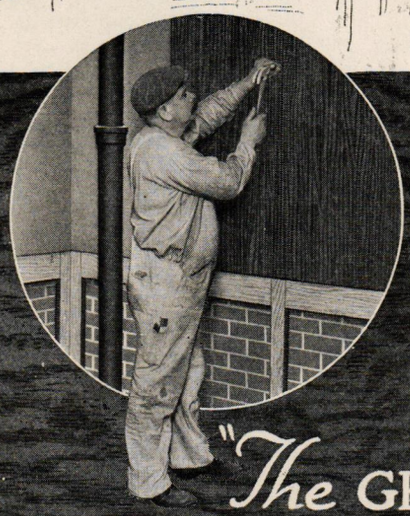
For strength, rigidity, toughness and fire-resistance, Fiberlic will meet astonishing tests. The panels afford many handsome interior decorative schemes. Fiberlic also comes plain

For Walls and Ceilings

Costs no more than the better class of wall boards. Just as easy to apply.

Samples, prices and specifications on request.

THE FIBERLIC CO. Camden, N. J.



"The GRAIN is RIGHT in the WOOD"

3 Great Prizes for Contractors!

OUR Second Great Annual Prize Contest for Contractors, Carpenters and Builders starts March 1st. The prizes in this contest will be awarded according to the amount of orders in dollars and cents, sent in to us between March 1 and December 1, 1915.

This time, instead of one **big** prize as we gave last year, we are giving three. Last year, we gave away one automobile and fifty additional valuable prizes. This year, instead of a single automobile, we are giving three—a Ford Touring Car for first, a Saxon Roadster for second and an Indian Motorcycle for third place in this great contest. Three extraordinary prizes! And in addition, just the same as last year, we are giving

50 Other Big PRIZES

All the prizes are practical, valuable and worth hustling for. In addition to the Automobiles and Motorcycle, there are hundreds of dollars worth of the finest tools—everything you want. After our last contest closed, several contractors in small places wrote us that they had not participated because they did not think they could do enough business to win a prize. Yet most of our prizes went to small towns!

The Small Town Man's Chance

to win is good. It is better this year than last—for, this year, there are three big prizes instead of one. Don't forget that it was a contractor in a small town—Polo, Ill.—who won the automobile last year! You probably don't realize how comparatively little effort would have won you a prize last year. Don't fall into that error this year. Remember, also that this contest is

Exclusively for Contractors Carpenters and Builders

and that no one else can enter. This contest is for the purpose of keeping old and new customers awake to the big inducements on Building Material offered in our Grand Free Building Material Catalog. Catalog free! Send the coupon. It is for men in the business **only!**

Send the Coupon for the Rules

The big free Contest Circular gives complete specifications of the Ford Automobile, The Saxton Roadster and the Indian Motorcycle and describes and illustrates the immense assortment of tools to be distributed. Gives Rules of the Contest and full information. Ask for latest edition of our Grand 156 Page Catalog of Building Material. Send the coupon for Big Circular today and **go after these great big beautiful prizes.** Go in and win!

GORDON-VAN TINE CO., 759 Federal St., Davenport, Iowa
Gentlemen—Please send the books checked below

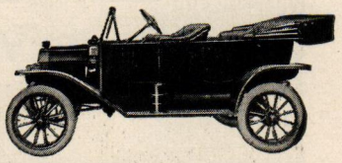
- ☐ **1915 Contractors' Contest Circular**
- ☐ **Building Material** { Lumber, Millwork / Hardware, Paint, etc.
- ☐ **Plan Book** (Send 10c for handling and postage on this book of 150 proven plans.)

Name .....
Address .....
Occupation .....

1st PRIZE

To be given to the contractor who sends us the greatest amount of business during the contest.

The lucky winner of this Five Passenger 1916 Model, Ford Touring Car will have a prize worth winning. Is there any reason why **you** should not win this splendid

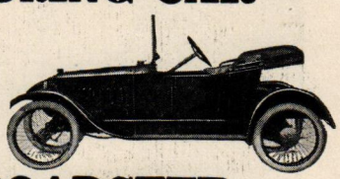


FORD TOURING CAR

2nd PRIZE

To be given to the contractor who sends us the second largest amount of business during the contest.

For Second Prize this year, we have selected a trim, speedy Saxon Roadster. This is a car which would be a tremendous convenience to every builder in his business. Go after this

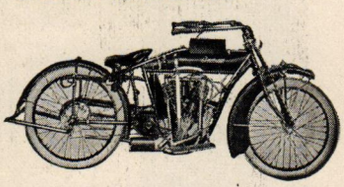


SAXON ROADSTER

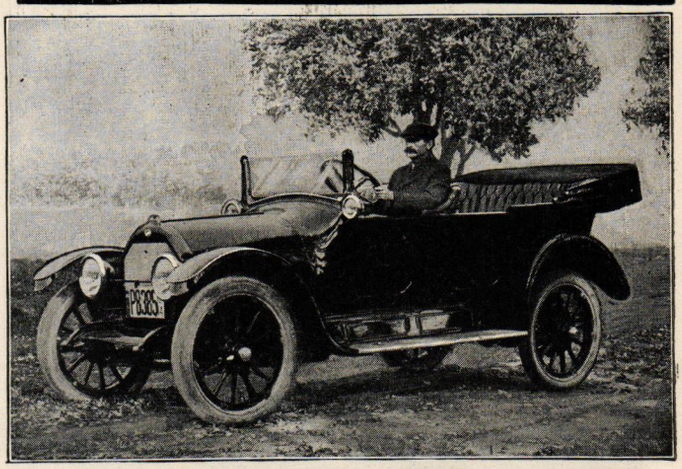
3rd PRIZE

To be given to the contractor who sends us the third largest amount of business during the contest.

There is not a carpenter or contractor in the country but who could use this Indian Motorcycle to advantage. It makes an ideal Third Prize. You could cover a lot of ground in a day on this machine. Are **you** to be the rider of this



INDIAN MOTORCYCLE



Last Year's Winner!

Above, we show a photograph of Geo. Drenner of Polo, Ill. in the car which he won for First Prize in our last year's contest. A pretty fair sort of first prize to win, eh? But the contest brought him more than just the prize.

By dealing with Gordon-Van Tine on our "direct-to-you" Sales Method **he made a saving of almost 33 1-3 per cent on every dollar's worth he bought from us. You** can do the same! You can make similar savings. And in addition—

YOU Can Win This Contest!

Get busy. Go in with that determination. Send today for our big Prize Contest Circular. Learn how easily one of these great prizes can be yours.

And, just in conclusion, let our Contest Circular explain to you how **we have arranged to give a Prize to every Contestant! Send for the circular!** Use the Coupon! Now!

GORDON-VAN TINE COMPANY

The Largest Building Material Supply House in America. Lumber, Millwork, Hardware, Paints, Roofing, etc., all at "Mill-Direct-to-You" Prices. We ship anywhere. Prompt, Safe Delivery and Satisfaction Guaranteed or Money Back. 10,000 Contractors Deal Regularly with us under this Guarantee.

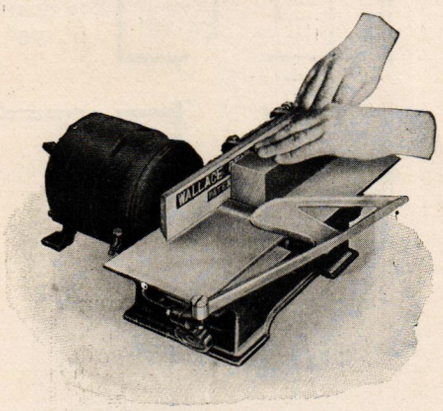
Contractors' Dept. 759 Federal St., Davenport, Iowa

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Wallace's Flap and Shutter Guard

A safety guard for planers and constituting an important part of the equipment of the Wallace bench planer has just been put upon the market by J. D. Wallace, 527 West Van Buren street, Chicago, Ill. It is shown in its practical application in the engravings. Its name—flap and shutter guard—is descriptive of the



Wallace's Flap and Shutter Guard—Fig. 1—Showing the Device in Use

device, which consists of two independent parts, as may readily be seen from an inspection of Fig. 1. The flap has an aluminum casting swinging on top of the tables. It is solid cast, the stock having a concealed spring and covers the unused portion of the cutting knives. When special work, such as rabbeting is done, it can be swung off the table to the rear, as shown in Fig. 2. The shutter is a part of a steel tube which envelopes the cutter head. The lip of the shutter rests on top of the front table and it is pushed around under the rear table, snapping back over the knives when the cut is finished and the stock releases it. Fig. 1 shows the throat opening completely covered and Fig. 2 shows it about half open. The important feature of the opera-

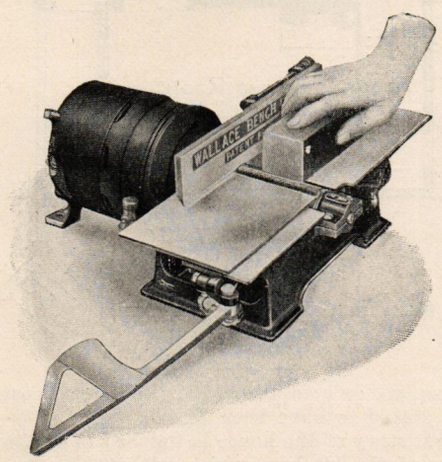


Fig. 2—The Flap Thrown Back for Doing Special Work

tion of the shutter is that any "kickback" of the stock being planed, causes the shutter to snap back over the opening as fast as the stock goes back. Nearly all planer accidents are caused by "kickbacks," and the shutter guards automatically renders such an accident impossible. The flap is included in the combination for the purpose of preventing careless and inexperienced operators getting their fingers into the unused part of the knives so that this addition makes the device absolutely "fool-proof."

Carborundum at the Panama Exposition

The Carborundum Company, Niagara Falls, N. Y., in designing its exhibit at the Panama-Pacific Exposition, which was opened at San Francisco with impressive ceremonies on February 20, adapted its product to the creation of a striking display. A central fountain, built of irregular masses of iridescent crude-carborundum crystals, rises to a hight of 10 ft. and over this a cascade of water plays. The flooring of the company's exhibit space is paved with carborundum and aloxite, and samples of the work for which these abrasives have been used, secured from all parts of the world, are displayed and appropriately described.

The Huther Dado Head

Some very interesting information for the carpenter and the builder regarding the Huther dado head is found in an attractively illustrated folder which is being distributed by Huther Brothers Saw Mfg. Company, 2500 University avenue, Rochester, N. Y. This dado head, which is claimed to cut perfect grooves of any width, with or across the grain, consists of two

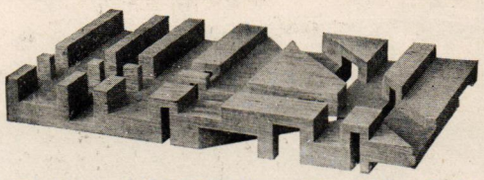


Fig. 3—Specimen of Grooving Done with Huther Dado Head

outside cutters and enough inside cutters to make the desired cut. The outside cutters are ⅛ in. thick and both being groovers may be used singly or as a pair to cut a ¼ in. groove. The inside cutters are made in thicknesses of 1/16 in., ⅛ in. and ¼ in. With each dado head the company sends out instructions for filing and fitting, and the point is made that it fits any saw mandrel or saw rig. The circular carries some illustrations in colors—one showing a stair stringer routed with a Huther dado head, while others show various kinds of grooves cut with the device, a sample of the work being indicated in Fig. 3 of the illustration.

Cabot's Old Virginia White

"Cabot's Old Virginia White in the Mississippi Valley" is the title of a daintily illustrated pamphlet that is being distributed by Samuel Cabot, Inc., Boston, Mass. The material referred to is a soft clean, white for shingles, siding and all other wood work, the claim being made that it has all the brilliancy of white wash, but none of its coarseness, rubbing off or other objectionable features. Reference is made to the fact that it is becoming fully as popular in the West as in the East, and the class of architecture upon which it is being used is well illustrated by the fine examples shown in the booklet. These are illustrated by means of direct reproductions from photographs of the finished buildings, and represent the work of architects in Illinois,

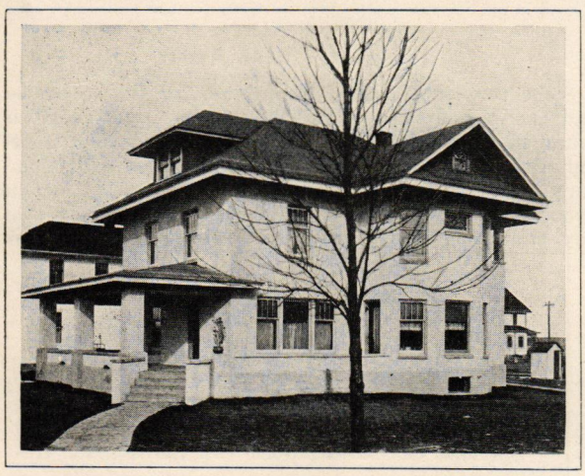
Indiana, Missouri and Wisconsin. A feature of the make-up of the booklet is found in the proofs of the half-tone engravings, together with their captions printed upon calendered paper which are pasted upon the brown colored paper leaves of which the booklet is composed. Accompanying the booklet is a smaller one of a size convenient to carry in the vest pocket and illustrating work of architects in New York State and also in the State of Massachusetts.

A Course of Instruction for Carpenters

A short course of instruction, which covers carpentry, geometry, projection, and architectural drawing, the steel square, joinery, stair building, and roofing, besides giving full instruction in the mechanics of carpentry, arithmetic, geometry, formulas, and mensuration, has just been issued by the International Correspondence Schools of Scranton, Pa. This course is of particular interest to carpenters and apprentices in the trade, who wish to increase their knowledge of the theory of their craft, and to have a firm foundation to advancement in position and wages. A prospectus of this short and excellent course, "The Carpenters Special Course," will be sent to any reader who may apply for it.

Van Guilder System of Hollow Wall Construction

A form of construction in which the walls are of such a nature as to provide satisfactory insulation from dampness, cold and heat, thereby rendering a dwelling



Van Guilden System of Hollow Wall Construction—Fig. 4—General View of Residence Built by this System

much cooler in summer and warmer in winter with a consequent saving in the cost of fuel, always appeals to the wide-awake builder as well as to the house owner. Combining these requisites with corresponding economy of construction has drawn to the Van Guilder Hollow Wall System a degree of attention that is constantly growing throughout the country. An excellent example of a dwelling erected in accordance with this system is shown herewith. The half tone, Fig. 1, gives an idea of the appearance of the completed structure, while Figs. 2 and 3 show the floor plan arrangement. The dimensions of this house are 28 x 40 ft. with a bay window extension 8 x 16 ft. The house is built of concrete, the double walls below the water table being 6 in. for the outer and 4 in. for the inner, with a 2½ in. air space between. In the superstructure the walls are each 4 in. thick. In securely tieing the two walls together across the air space $5.00 worth of No. 6 galvanized wire was used. The ties were placed 2 ft. apart horizontally and 9 in. apart vertically. Each wall was reinforced horizontally around the building every 9 in. in hight with No. 9 steel wire, while ⅝ in. iron rods were imbedded in the concrete over all the door and window openings. The cost of the reinforcing material used was $16.00. The outside walls were finished with stucco made of light colored sand, hydrated lime and white cement. The roof is covered with garnet vulcanite asphalt shingles, thus giving to the exterior of the building fire-resisting qualities. The residence is that of Peter Holt, of Ellsworth, Iowa, the house occupying a corner lot and facing south and west. We are told that for all the concrete work, including the foundation, superstructure, porches, cellar partitions, porch and cellar floors and cistern, there were used 181 cu. yds. of pit run gravel at $1.25 per cu. yd., and 167 barrels of cement at $1.40 per barrel. The entire cost of the concrete work of every kind except stucco is said to have been $900. The cost of the hollow walls was 16c per sq. ft., and the cost of the stucco for the outside walls was

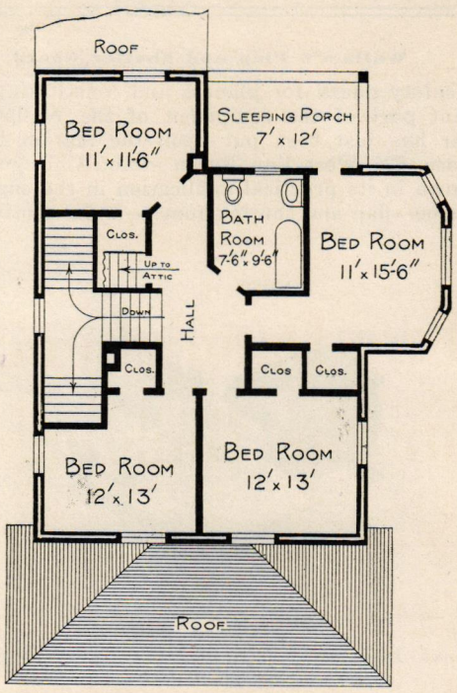


Fig. 5—Second Floor Plan

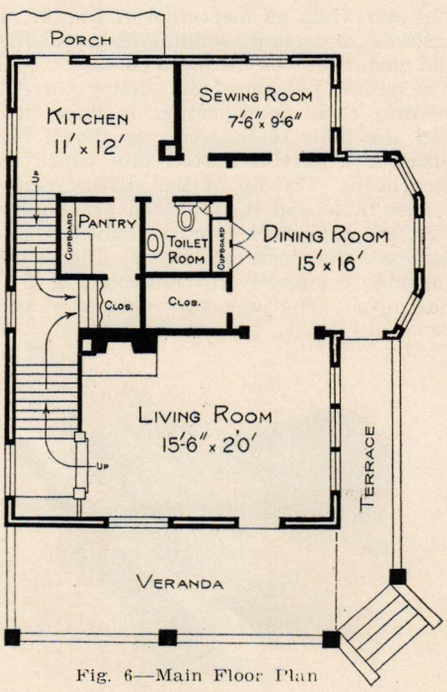
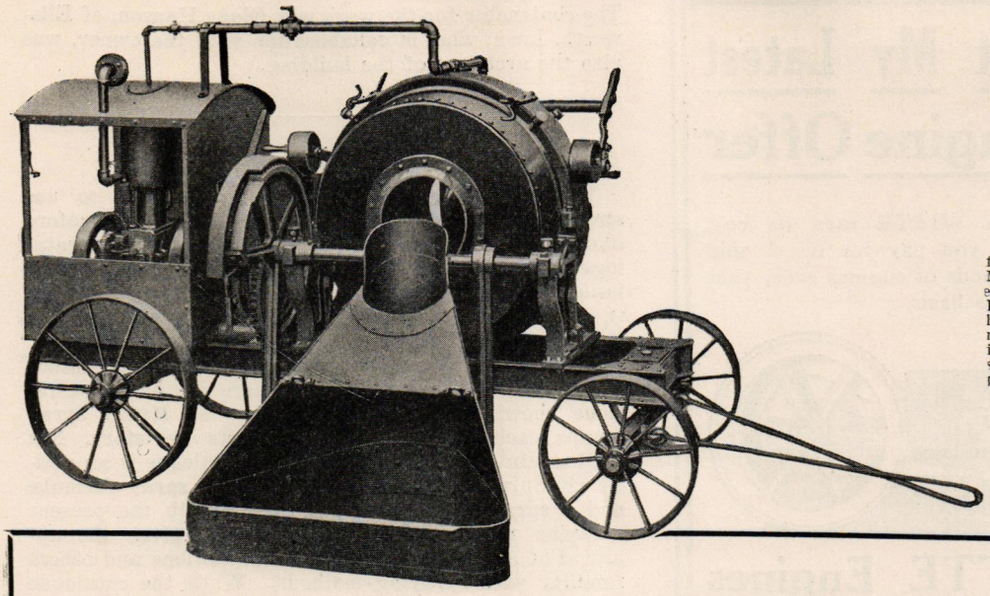


Fig. 6—Main Floor Plan

36c per sq. yd. or a total of $134. The total cost of the house is stated to have been $4,400.

The first story of the house is finished in oak, with the exception of the kitchen, which with the rooms on the second floor is in yellow pine. The double concrete walls were built with Van Guilder hollow wall machines made by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y. The mixing was done by a Cottren machine made by the Knickerbocker Brothers Mfg. Company, Jackson, Mich.

(*Continued on page 78*)



$315.00

F. O. B. MILWAUKEE

Check over the equipment you get for your small investment. A Smith Mixerette mounted on steel truck and equipped with a 2 HP "FROST PROOF" gasoline engine with steel house. This price includes our famous geared power charger as shown in the cut. If batch hopper is desired instead of power charger, the price will be $246.00.

Two Dandy Concrete Outfits for the Building Contractor

A small sum of money invested in a reliable concrete mixer will enable every building contractor to handle concrete jobs economically. And the Smith Mixerette is just the machine that will turn the trick for you.

The Smith Mixerette is a light, portable and easily operated mixer with a big capacity for turning out well mixed concrete. It holds 5 cu. ft. of loose, dry material or 3 cu. ft. of mixed concrete—40-60 cu. yds. daily.

It is an all-steel mixer—just chuck full of money making features. The gear ring and driving pinion are enclosed in a dirt and dust proof casing inside of which the drum revolves. Look at the geared loader. No ropes, sheaves or overhead frame. It lifts quickly and evenly and without the twisting, jerking motion common to the pivot type loader. If desired a batch hopper can be substituted for the power loader. Such an equipment will cost only $246.00.

Now look at the hoist outfit. This rig is the only one made having the hoist mounted on the sills between the engine and mixer drum—the one place where there is no chance for the rope to cut or fray by rubbing against the drum flanges, engine house or gears. And it is sure some hoist. It holds enough ⅜-in. cable for a lift of 175 ft. It is operated by a powerful cone clutch and band brake. All levers are banked for one-man control. The substantial steel truck is equipped with standard wagon-tread axles and strong, heavy wheels—we can't tell it all here, we haven't the space, so write for a copy of our "Mixerette with Hoist" Folder No. 161-F and standard Smith Mixerette Folder No. 115-F. And don't forget to ask for the book "First Lessons in Concrete Work." Fill in the coupon.

THE T. L. SMITH CO.

3120-F Hadley Street Milwaukee, Wis.

1341-F Old Colony Building, Chicago

Send for your Free copy of the New 40-Page Book, "First Lessons in Concrete Work"

This contains valuable data and tables which will be of help to you in your work. Send for the book and either or both of our folders. Indicate which ones you want by marking a X in the little square. We'll send them on without any obligation on your part.

First Lessons ☐

Mixerette Folder No. 115-F ☐

Hoist Folder No. 161-F ☐

NAME .....

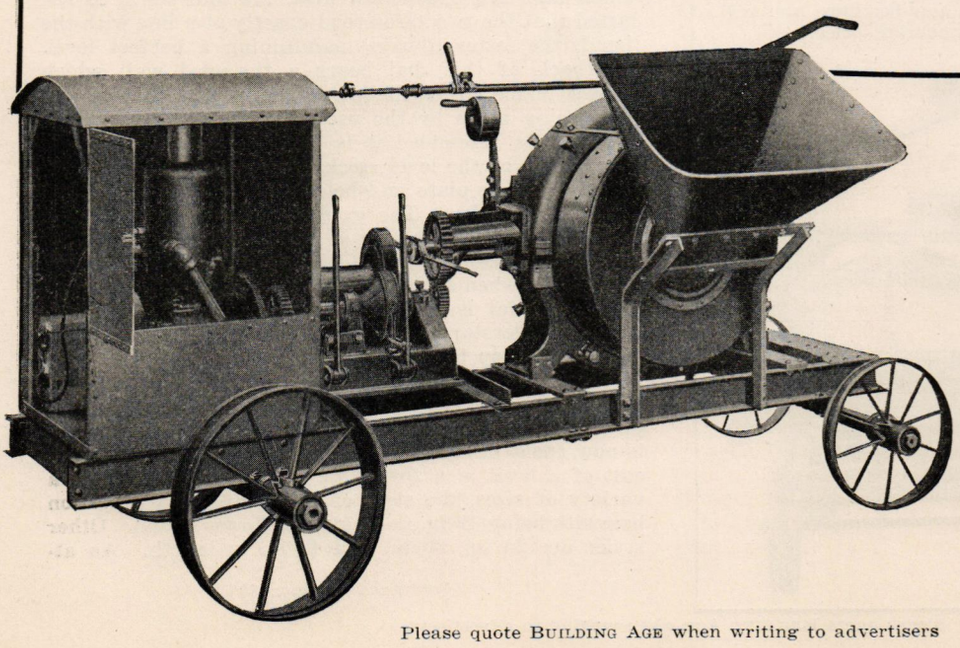
.....

Street No. .....

.....

City .....

State .....



$379.00

F. O. B. MILWAUKEE

This is the **big money maker** for the building contractor. It has the standard Mixerette drum. It has an extra long truck with **standard wagon tread axles** and strong, heavy wheels. A 3 HP FROST PROOF gasoline engine furnishes ample power to operate hoist and mixer simultaneously. This rig includes the hoist mounted on truck between engine and mixer drum. This equipment is furnished with batch hopper as shown for $379.00 or with the geared power charger for $448.00.

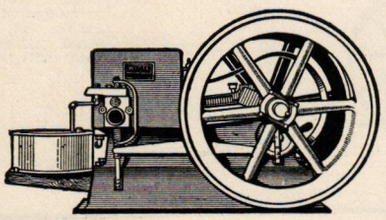


Get My Latest Engine Offer

Let a WITTE earn its cost while you pay for it. I ship thousands of engines every year on this basis.

Five - Year Guaranty

I unqualifiedly guarantee every WITTE engine for five years against defects, and consequent faulty operation. I carry the risk, as I have done for my thousands of customers during 27 years.
Ed. H. Witte.



WITTE Engines

Kerosene, Gasoline, Gas, Distillate

Sizes 2, 3, 4, 6, 8, 12, 16 and 22 H.P. Used and recommended by shop, mill, and factory men all over the earth. All my life I have been a shop man, making my own engines. I sell only what I make. That is why, for 27 years, WITTE engines have always made good and stay good.

Look at These Prices!

2 H. P.,	$34.95
3 H. P.,	52.50
4 H. P.,	69.75
6 H. P.,	97.75
8 H. P.,	139.65
12 H. P.,	197.00

16 H. P., $308.80; 22 H. P. $389.65. WRITE FOR MY FREE BOOK, and all about my New Liberal Offer BEFORE you arrange to try any engine. I save you money, besides giving you the easiest chance to get the best engine service.

Write me to show you.

Ed. H. Witte, Witte Engine Works
3196 Oakland Avenue Kansas City, Mo.

The New

Eureka Batch Mixer

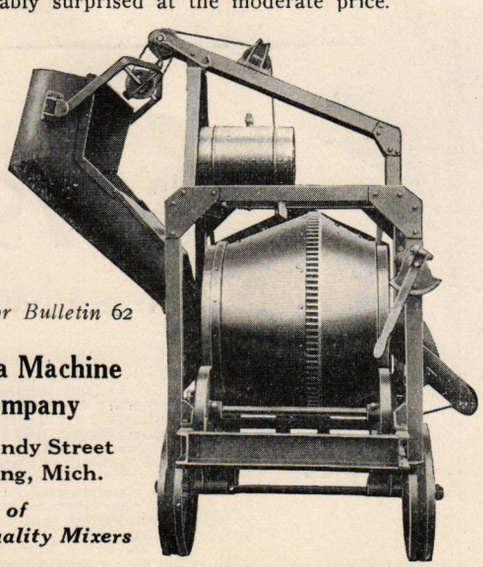
for Building Contractors

One is immediately impressed with its compact, substantial design. Your interest is almost sure to increase as you scan the specifications item by item.

In every detail you will find the exceptional—not the ordinary.

Quality and approved engineering standards have been incorporated to a wonderful degree.

Although a mixer of unusual qualifications, you will be agreeably surprised at the moderate price.



Write for Bulletin 62

Eureka Machine Company
113 Handy Street
Lansing, Mich.

Builders of Quality Mixers

The contractor for the work was Olaus Hanson, of Ellsworth, Iowa, who, in collaboration with the owner, was also the architect of the building.

Myers Spray Pumps

There are many readers having occasion to use spray pumps for various purposes and are therefore likely to be interested in an attractive 64 page catalogue relating to goods of this kind which has just been issued from the press by F. E. Myer & Bro., Ashland, O. It is known as catalogue "No. S P 15" and within its covers are illustrated and briefly described bucket, barrel, hydraulic and power spray pumps, hose, nozzles, fittings, fixtures, repairs, etc. There are also illustrations showing in operation a few of Myers spray pumps, each picture clearly telling its own story. Not the least interesting feature of the catalogue is an article on Spraying, which with a list of spray formulæ and a spraying calendar are in line with the present spraying requirements and have been given the approval of agricultural experimental stations and others familiar with spraying methods. While the catalogue under review has been prepared for general distribution, primarily through dealers, the company will be very glad to send a copy of it to any reader of *The Building Age* who may make application for it.

The Toledo Indicating Level

One of the more recent candidates for popular favor in the way of a level for carpenters, builders, masons, plumbers, contractors, etc., is the tool which has been placed on the market by the Toledo Indicating Level Company, 1348 Nicholas Building, Toledo, Ohio. It is referred to as "The level that talks," and in Fig. 7

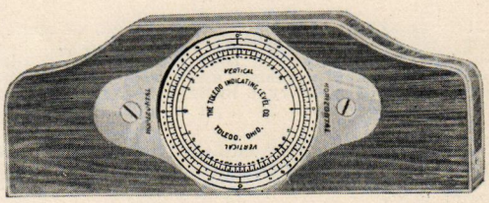
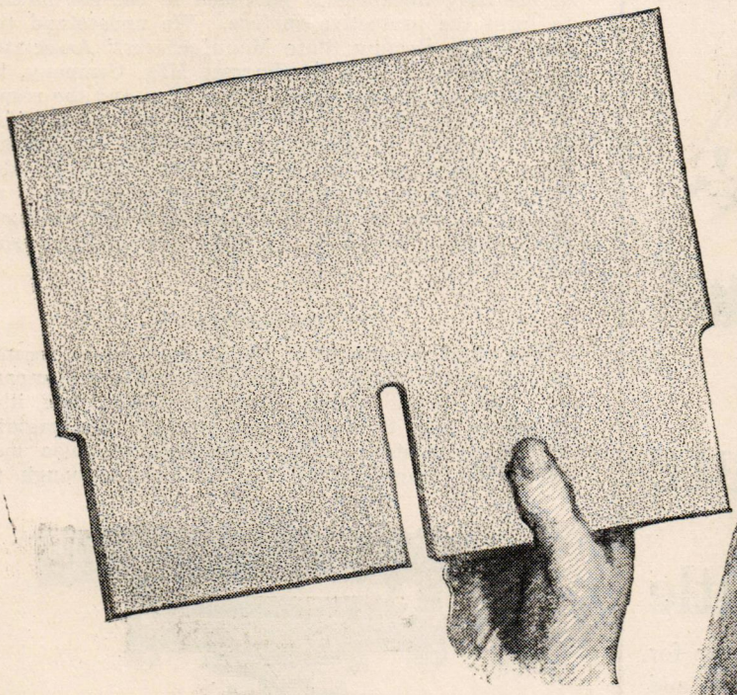


Fig. 7—The Toledo Indicating Level

of the illustrations we show the middle portion carrying the glass dial. The theory of this level is based upon the well-known physical fact that light liquid, whenever allowed to come to rest, always presents a surface parallel to the horizon. The level is constructed by the use of a very clear leaded-glass dial 3/16 in. thick, upon the front of which graduations and figures are etched and then traced with blue enamel so as to make them conspicuous against the bright red liquid, which half fills the hollow disk, the dial being so adjusted that the two zeros read exactly at a line with the liquid, the latter always maintaining a perfect level. The back of this dial bears a threaded wall which screws inside of a shallow nickel-plated fitting, the joint being made by the use of a thin gasket. When this unit is assembled it is inserted in a close-fitting bore inside of the level stock, where it is secured by a brass clamping plate and held by two screws as shown in the illustration. The graduations on this dial indicate the inches or fraction of an inch per foot that any kind of surface may be out of level or plumb, or on the other hand when such surface is exactly level or plumb. The 4-in. dial is graduated to quarter-inch readings, and we understand it is the intention of the company to later develop the principle as fine as 1/32 of an inch for the use of mechanics where *exact* readings are required. By the use of this level it is claimed that all guess-work is eliminated and that the time saved which is now spent in correcting work will more than pay the cost of a level in a few days. The level is made in a variety of sizes, the style of which we show a portion herewith being 12 in. in length and brass bound. Other styles are 24 in., 30 in. and 42 in. in length. An at-

(*Continued on page* 80)

"My Sale of *Wooden* Shingles *Increased*"





"When I first took on the NEPONSET Shingle I expected it would cut into my wooden shingle business. Instead, NEPONSET Shingles advertised *me* and *my business*, and *increased* my wooden shingle sales.

NEPONSET Shingles

PATENTED

are not ordinary composition shingles. They are built up *individually*. Made in pairs to reduce laying-costs.

"The greatest roofing development of the 20th century. Any carpenter would be foolish to overlook this new *yet time-tested* product."

The same materials are used in **Neponset** Shingles as in the well-known **PAROID** Roofing, also used in **Neponset** Proslate, the highest grade colored ready roofing ever made. **Neponset** Wall Board, **Neponset** Waterproof Building Paper and **Neponset** Floor Covering are other well-known **Neponset** products.

COUPON

BIRD & SON, Dept. B, East Walpole, Mass.

Please send me a sample of the NEPONSET Shingle. This does not obligate me *in any way* whatever. Also send copy of your booklet "Repairing and Building."

Name.....

Address.....

COUPON

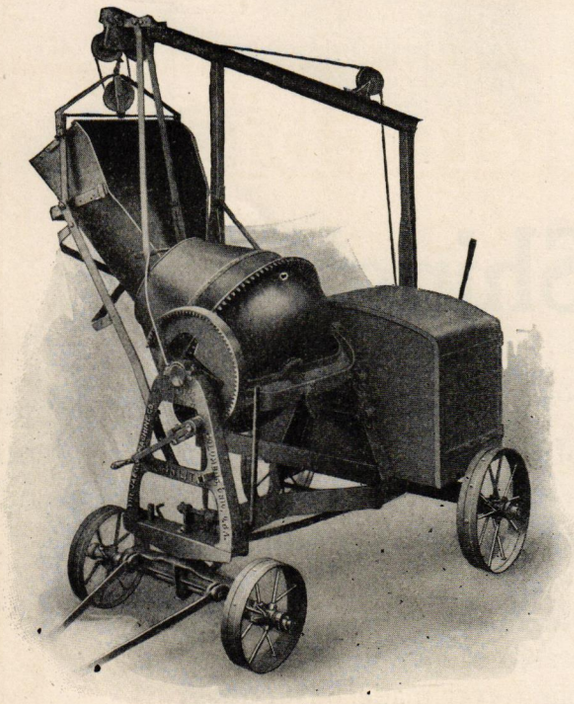


A Mix a Minute

With the

Jaeger Big-an-Litle

Saves time and money. Not only a Mixer for concrete BUT just the ONE for Mortar and Patent Plaster as well.



In use by hundreds of contractors, both Big and Litle, on all kinds of work. Built in 4 sizes —14 styles. Equipped with hoist, etc. A mixer for YOU.

Send for full information.

The Yaeger Machine Co.

216 W. Rich St., Columbus, Ohio

tractive circular sent out by the company carries a full size picture of one of the 24 in. levels and clearly shows the various graduations upon the dial plate.

Use of Slate on Flat Surfaced Roofs

One of the developments of the slate industry is the rapidly growing use of this material on flat surfaced roofs. The waterproofing is applied just the same as on a built-up roof intended for covering with slag or gravel, but instead of these materials roofing slate of ordinary thickness is imbedded in the hot mixture to form the protective surface. We understand that the Bangor Roofing Slate Manufacturers' Association in collaboration with the Barrett Mfg. Company, has given the subject very careful attention and the results of their investigations with instructions and specifications will soon be ready for distribution in pamphlet form. The claim is made that "slate makes the ideal flat roof" for the reason that the slate surface is not subject to wear by the elements and makes a smooth, clean surface, which is in effect practically a slate pavement.

The "Dumpy" Level

The chief advantage of the Dumpy Level, recently placed on the market by the David White Company, 421 East Water street, Milwaukee, Wis., and illustrated in Fig. 8 is its great strength and rigidity. The adjustments of this instrument are also more permanent than that of the "Y"-level, although the

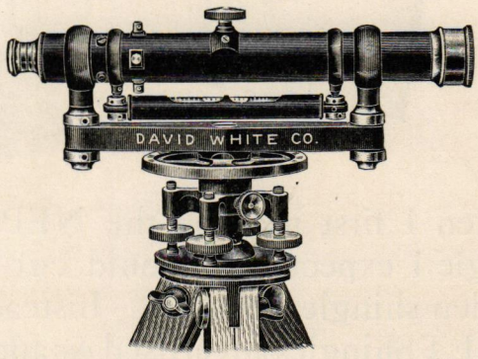


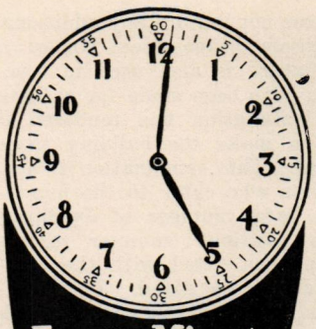
Fig. 8—General View of the "Dumpy" Level

"Y"-level, on account of its having more intricate adjustments, is capable of doing more accurate work. Yet the Dumpy Level, which is sufficiently accurate to meet the needs of the average building contractor, is becoming more of a favorite because of its ability to stand rough usage without injury to the instrument or its adjustments. The company further points out that the level here illustrated is but one of its many styles of instruments designed especially for the contractor and builder, all of which are shown in the new illustrated catalogue which will be sent free postpaid to all interested contractors.

Space Saving Fixtures for the Household

The Space Saving Appliance Company, 109 Lafayette street, New York City, is distributing among the trade an illustrated pamphlet relating to the space-saving fixtures which it manufactures. Prominent among these is the combination sink, drainboard and two-part wash tray which is said to require a floor space of only 24 x 48 in., and the space is used at all hours of the day whereas if separate fixtures were installed the floor space utilized by the ordinary wash trays would probably be used only once a week. When the sink and drainboard of the combination is in a raised position allowing the use of the tubs, it is possible to clean thoroughly the under side of the sink strainer and the standing waste pipe of the sink to the trap without using any other tools than a bottle wash. This waste pipe is separate and independent from the wash tray pipe and is permanently attached to the wash tubs in such a manner that it is not in the way when washing is being done. The combination which gives sink,

(*Continued on page* 82)



Every Minute This Hand Moves-You Save 15 Seconds

Clip 15 Seconds Off Every Mix



The actual mixing process in a mixer has been perfected to the point where no other improvements can be made—that is, no radical improvements of any kind. The process of mixing cannot be reduced in the matter of time expended—you've got to have a thorough "mix." The only places where time can be gained are in the charging and discharging.

The Northwestern Mixer has a large opening into which the materials can be easily dumped—there are no paddles at the feed end of the drum. This is done away with by reason of the tilted form of the Northwestern drum. Gravity does it.

By reason of the elongated and tapered cone-shaped cylinder the materials are turned fully 50% more times per minute than with either of these features used singly. This insures thoroughness of mix.

The Northwestern Discharge, with the big scoop in the inside of the drum, and revolving with the drum, picks up and dumps the contents of the mixer in three revolutions, or in from 8 to 10 seconds. This dumping, fast as it is, is controlled by a door and lever which is positive in action and within easy reach of the operator. The wettest grouting mixture will not slop.

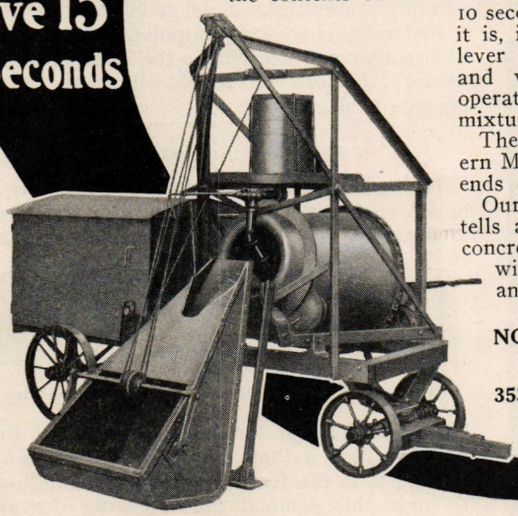
There is where the Northwestern Mixer saves you time—at both ends of the mix.

Our big FREE BOOK, which tells all about our entire line of concrete machinery of all kinds, will be sent you for your name and address on a postal.

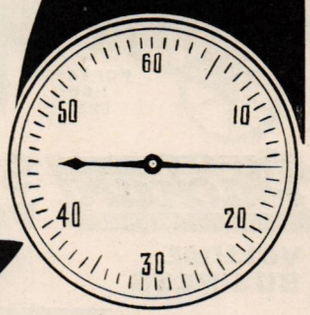
NORTHWESTERN STEEL & IRON CO.

353 Ball St., Eau Claire, Wis.

This Big Free Book Tells You All About It A Postal Brings It



Added Earning Power $4.00 to $8.00



Underbid—Your Competitors Make Bigger Profits



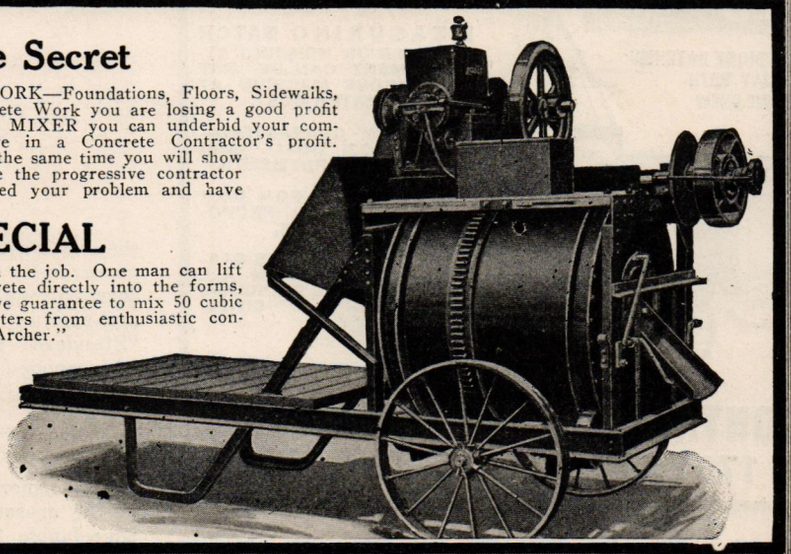
Here's the Secret

DO ALL YOUR OWN CONCRETE WORK—Foundations, Floors, Sidewaiks, Concrete Roads, Etc. By sub-letting Concrete Work you are losing a good profit that should be yours. With a CONCRETE MIXER you can underbid your competitors because you won't have to figure in a Concrete Contractor's profit. You yourself will have all the profit and at the same time you will show the people in your community that you are the progressive contractor who can build anything. We have studied your problem and have designed and perfected the

ARCHER SPECIAL

We have made it easy to move around on the job. One man can lift it at the platform end. It will spout concrete directly into the forms, no wheeling. It's a husky little mixer that we guarantee to mix 50 cubic yards of wet concrete per day. Many letters from enthusiastic contractors say, "I beat your claim with my Archer."

Do bigger things this year. We will help you. Write to-day for our handsome catalogue. It will show how to make your hard work earn you dollars.

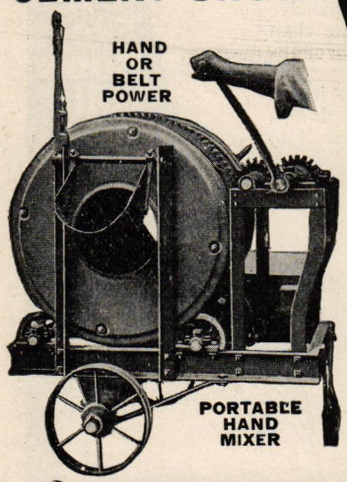


ARCHER IRON WORKS
2440 W. 34th Place
CHICAGO, ILL.

Ford's System Adopted In Packard Mixer Factory
Mixer Prices Smashed

THE BIG HIT
AT
CEMENT SHOW

OWNERS SAY:
S. W. Hill & Son, Minn., say: Mixes fast and thoroughly. Everybody likes the mixer. Batch hopper measures fine, etc.
W. H. Borough, Ohio, says: We investigated all mixers; glad we bought the Packard. 3 H. P. engine a success. Cut mixing cost 30%, etc.
HUNDREDS OF OTHER LETTERS, NAMES, ADDRESSES, ETC. ON APPLICATION.



FIVE-FOOT CAPACITY—UP TO 65 YARDS DAILY

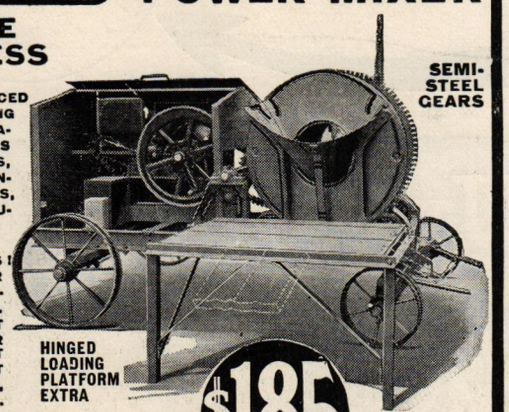
SAME MIXING ACTION AS $2000 PAVER

SPEED QUALITY Packard HAND AND POWER MIXER
STURDY LOW CHARGING POWER MIXER

VOLUME BUSINESS

OUR EXPERIENCED WORKMEN USING SPECIAL MACHINERY, JIGS AND TEMPLETS, TURN OUT HUNDREDS of PARTS, FAST BUT ACCURATELY,

MIXER BUYERS! PROFIT BY OUR REDUCED FACTORY COSTS. AT LOWEST PRICES EVER MADE YOU GET A COMPACT STEEL MIXER, WITH A 3 H. P. ENGINE.



COMPARE SIZE ENGINES WITH OTHERS.

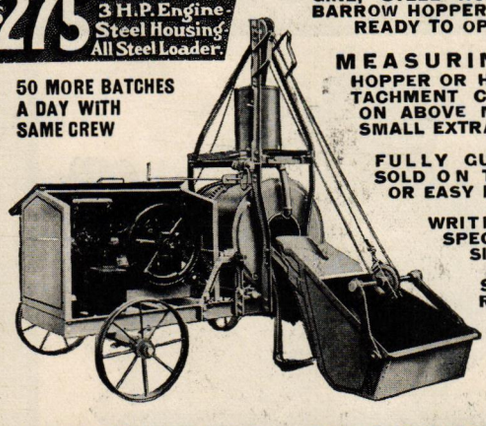
$185 BUYS MIXER

ON STEEL TRUCKS, 3 H. P. ENGINE, STEEL HOUSING, LOW BARROW HOPPER. READY TO OPERATE.

$275 Steel Trucks - 3 H.P. Engine - Steel Housing - All Steel Loader.

50 MORE BATCHES A DAY WITH SAME CREW

MEASURING BATCH HOPPER OR HOISTING ATTACHMENT CAN BE PUT ON ABOVE MACHINE AT SMALL EXTRA COST.



FULLY GUARANTEED—SOLD ON TRIAL—CASH OR EASY PAYMENTS.

WRITE FOR OUR SPECIAL PROPOSITION.

STOCKS CARRIED IN ALL PRINCIPAL CITIES.

CONTRACTORS MACHINERY CO.
170 ELEVENTH ST., KEOKUK, IOWA

drainboard and bath tub does not require any additional floor space and is used largely in apartment houses as a servant's bath. This fixture is also used in tenements where no provisions have been made for bathing purposes, and upon its installation has rendered it possible for the owners to make the building more profitable as an investment. This combination is also very popular with architects who cater to the bungalow style of building. A large number of dwellings of this character in the various summer resorts throughout the East have been fitted with the company's combination bath and wash stand. This combination has a movable partition in the center which has a rubber tire around it that fits into a brass frame recessed to the inside of the tub. This frame has a groove 1/16 in. deep and ⅜ in. wide, into which fits the rubber tire. The movable steel bar with two compression screws in it fits into the upper part of the brass frame on either side of the tub. By turning down these compression screws the rubber tire is forced against the brass frame, thus making an absolutely water-tight division in the tub.

Accompanying the pamphlet referred to is a folder illustrating and describing the Madsen automatic water heater, the use of which eliminates the hot water storage tank.

Wheeling Galvanized Wall Ties

The growing tendency in many sections to construct buildings having exterior walls in which an air space is provided for purposes of insulation has created an

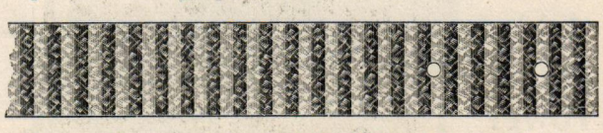


Fig. 9—Wheeling Galvanized Wall Ties—The "Standard"

increased demand for wall ties to bind the outer and inner walls together, or in the case of a brick veneer, to bind it to the frame work of the building. In order to meet this demand the Wheeling Corrugating Company, Wheeling, W. Va., is offering two kinds of galvanized wall ties, illustrations of which are presented herewith. One of these, known as the "Standard," made both straight and corrugated, is ⅞ in. in length. It is perforated at one end with two holes in the longitudinal plane of the tie, as indicated in Fig. 9. The "Veneer" wall tie shown in Fig. 10 is ⅞ x 5½ in. The upright part is flat while the base of the tie is corrugated. The point is made that by the use of wall ties

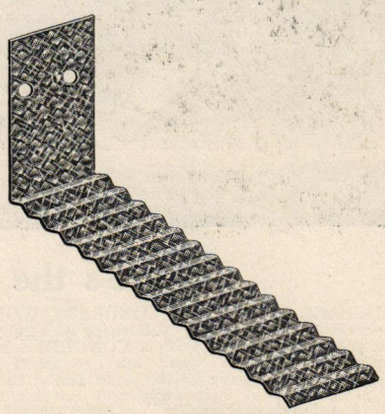


Fig. 10—The Veneer Wall Tie

the bricklayer is enabled to work faster as there is no necessity for clipping brick for bonds. The uniform corrugations in the ties give a large bonding surface and also an equal pull on the mortar at all points. The "Standard" ties are packed 100 to a carton, or 5000 to a wooden crate. The "Veneer" ties are packed 500 to a carton, or 5000 to a wooden crate.

Lansing Molds for Concrete Pipe

The cement industry has taken on such proportions at the present day that it is used in practically every conceivable form. One of the important applications

(*Continued on page* 84)

-Contractors who want- "Constant Service" use IDEAL Power

We recommend as the logical solution of all engine trouble—

—"investigation first." A moment spent in looking into the claims of engine builders may save you many dollars. For years **Ideal Power** has had the **confidence** of the power using public. Why, you may ask; **simply because they are sold on their merits and an investigation first policy.**

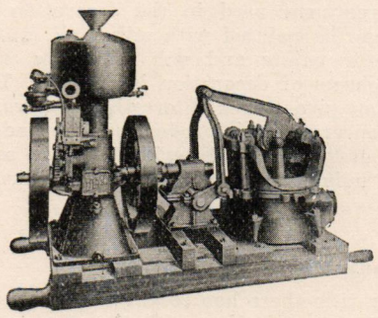
Further we might state that **Ideal Power** is especially contractors' power. Adapted to heavy, continuous service, such as concrete mixers, saw rigs, hoists and pumps.

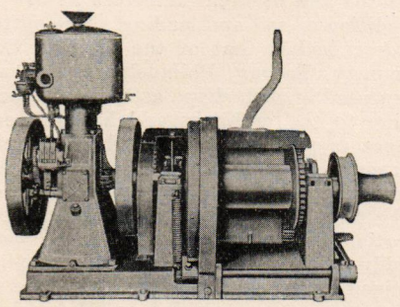
Ideal Power are **"Constant Service"** power producers of the highest type, with a large percentage of economy. Clean cut design, supreme workmanship, quality material and powerful operation.

If you are looking for better and low cost service, annex you equipment to

Ideal Type M Engines

Frost—Fool—Dirt Proof—Enclosed Crank Case—No Vibration—Large Valves—Large Cooling Tank





How are you fixed for early work?

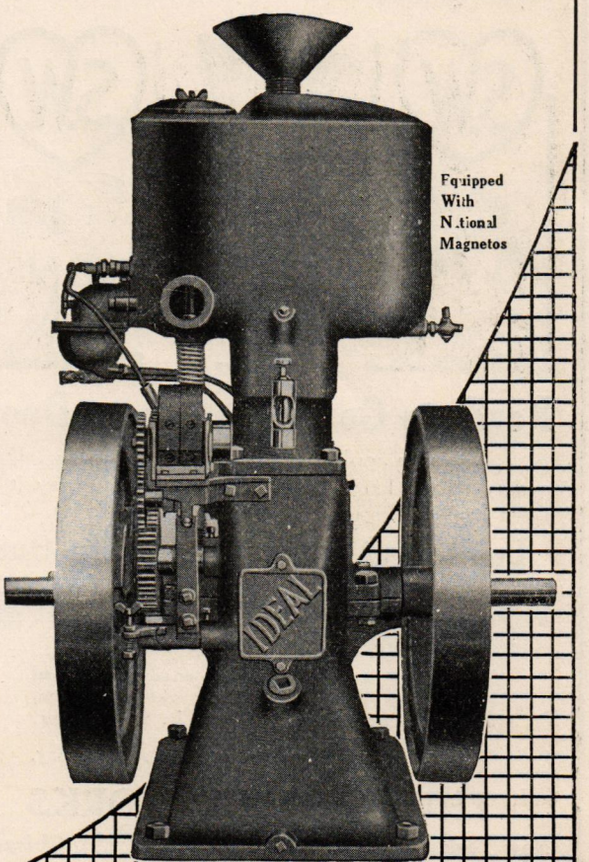
For quick action why not get some information on **Ideal Power Equipment.**

Single, Reversing or **Double Drum Hoists.** Sturdy build, quick and easy operation.

Trench Mud Pumps, large capacities, low first and operating cost. On skid or truck. Worm gear pump jack.

Centrifugal and **Force Tank Pumps,** skid or truck mounted. Powerful pumps for large volumes.

We believe you will find something of value in our catalog 415 — why not send for copy now?



Equipped With National Magnetos

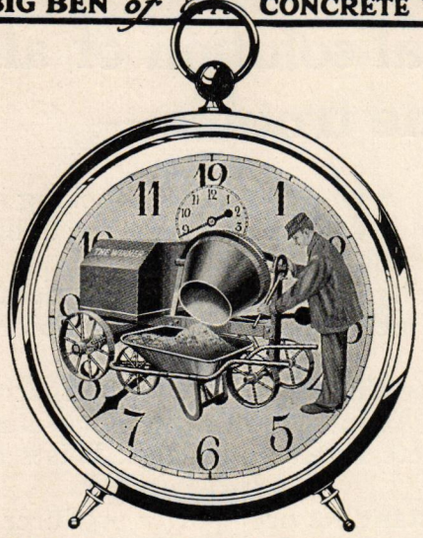
Original Gas Engine Co.

R. E. OLDS, Chairman

E. Kalamazoo St. Lansing, Mich.

Winner Mixer

The "BIG BEN" *of* CONCRETE WORLD



The WINNER looks all kinds of jobs square in the face. Time it per hour or per day and you will find it always *on time.*

Contractors everywhere call it the *main-spring* of their business and wherever you find the Winner—it's the whole works.

Tick Tock—the batch is loaded, *Tick Tock*—the batch is mixed, *Tick Tock*—the batch is dumped, *Tick Tock*—all day long it saves men's backs and makes men profit.

Wind it up in the morning—feed it a gallon of gas and a few drops of oil and with *two hands* it will do the work of SIX.

The Winner is the best business *Alarm Clock* you can buy—lets folks know you are on the job—turns hours into minutes—and fills your men with hustle.

Write the **CEMENT TILE MACHINERY COMPANY,** 392 Rath St., Waterloo, Iowa, and they will tell you the whole story.

STANLEY'S

Wrought Steel Screen Door Hardware



Set No. 1750
Each Set
Complete with Screws

Ready to Go on the Screen Door

Owners and Builders alike are pleased with the high quality of the hardware and the convenient way it is packed ready for use.

Don't Swat the Fly—Keep Him Out

A screen door hung on a pair of Stanley Butts and held shut by a Stanley Spring will do better work than a dozen fly swatters.

The door is quickly and easily removed in fall by merely slipping out the pins, and it is as readily rehung in the spring.

Write for circular "E." It tells the story.

THE STANLEY WORKS

New York **New Britain, Conn.** **Chicago**

of the material is in the manufacture of cement pipe both for drainage and water supply. One of the great advantages of this business is the small capacity required to establish it upon a profitable basis. A few molds and a place to make the pipe are all the essentials that are required. The expenditure for molds is small and the business therefore offers great possibilities as an exclusive line or as an addition to a cement block or concrete plant. Molds for making concrete pipe are one of the products of the Lansing Company, Lansing, Mich., and we understand that its molds have been used for putting in hundreds of miles of pipe in Brooklyn, Milwaukee, Denver and in the cities of Mexico. They are also largely used by the United States Government in connection with irrigation projects in the West. In addition to the hand molds, the Lansing Company turns out power drain tile mediums for which many claims are made.

Beautiful Interiors

Under the above title there is being distributed among architects and builders a dainty *brochure* carrying numerous half-tone engravings of interiors showing the application of Ceil-Board for the finish of walls and ceilings. The material is made on scientific principles and is designed to eliminate the many faults of plaster while providing many advantages heretofore unknown in a building material of this nature. It is a combination of highly compressed pure fiber panels treated with moisture-proof sizing and held together with guaranteed water-proof cement of great tenacity. A complete panel is 3/16 in. thick and has a tensile strength so great that a 16 in. square will, it is claimed, sustain the weight of 725 lbs. The panels are furnished in standard widths of 32 and 48 in. in the gray and tan finishes, but in the 32 in. width only in the wood grain finishes. The point is made that Ceil-Board is an effective sound deadener, also an excellent insulating material, excluding the heat in summer and the cold blasts of winter, and at the same time its fire retarding qualities reduce the fire risk in buildings in connection with which it is used. Another point emphasized by the makers of the material, the Philip Carey Company, 1003 Wayne avenue, Lockland, Cincinnati, Ohio, is that Ceil-Board cannot crack or fall like plaster and is unaffected by shocks, jars or vibration. The board is also well adapted to any treatment used in the decoration of plaster or wood, can be painted with either oil, water colors or cold water paints and will also take wall paper if such a scheme of decoration is desired. The *brochure* in question gives much interesting and valuable information concerning this product and we understand that a copy of "Beautiful Interiors" will be sent to any architect, builder contractor or house owner who may desire it.

Simplex Concrete Piling

Under the above title there has recently been issued a very attractive treatise dealing with the placing of concrete piling in the ground in straight cylindrical shape to such depths and of such diameters as are required by the condition of soil and loading. The system illustrated and described is that of the Simplex Concrete Piling Company, Tacony, Philadelphia, Pa., and the matter is presented in such shape as to be of special interest and value to the architect and building contractor. Reference is made to the Standard Simplex pile, the Simplex molded pile, the Simplex shell pile, and the Simplex composite pile, the latter type being designed to cheaply meet soil conditions requiring great depth of penetration and where the permanent water line is considerably below the surface. Fully one-half of the book is given up to well executed half tone engravings of typical structures carried on Simplex piling, together with a selection of tests by loading, exposure and experience.

New Home of A. S. Aloe Company

The A. S. Aloe Company has just taken possession of its new "made-in-St. Louis" building at 513 Olive

(*Continued on page* 86)



For Porches, Steps and Walks

You want materials that will not wear out, rot or require repairs or painting. Concrete porch floors, steps and walks are even, clean and attractive. They are easy to free of snow, last like stone, and please owner or buyer. Many builders are making nice profits by replacing wooden porches and steps with concrete.

But your materials must be right. Inferior cement or sand may ruin the job. Use

ALPHA THE GUARANTEED PORTLAND CEMENT

and be sure of *everlasting* results. ALPHA is made in only one grade—the product of 24 years of high-quality policy. It is absolutely guaranteed to more than meet the U. S. Government standard for strength. Expert chemists inspect it during every hour of its making. Every ounce is sure to be pure, live and active—full of binding power, great in sand-carrying capacity.

By insisting on ALPHA Cement—by refusing "just as good" substitutes and laying your walks, floors, etc., carefully—you are sure of permanent work. Using a Guaranteed Portland Cement saves worry. Don't experiment. Specify ALPHA and be SURE.

Capacity 25,000 barrels a day; storage for 2,000,000 barrels. Six great plants on six great trunk-line railroads. Eight branch offices at your service.

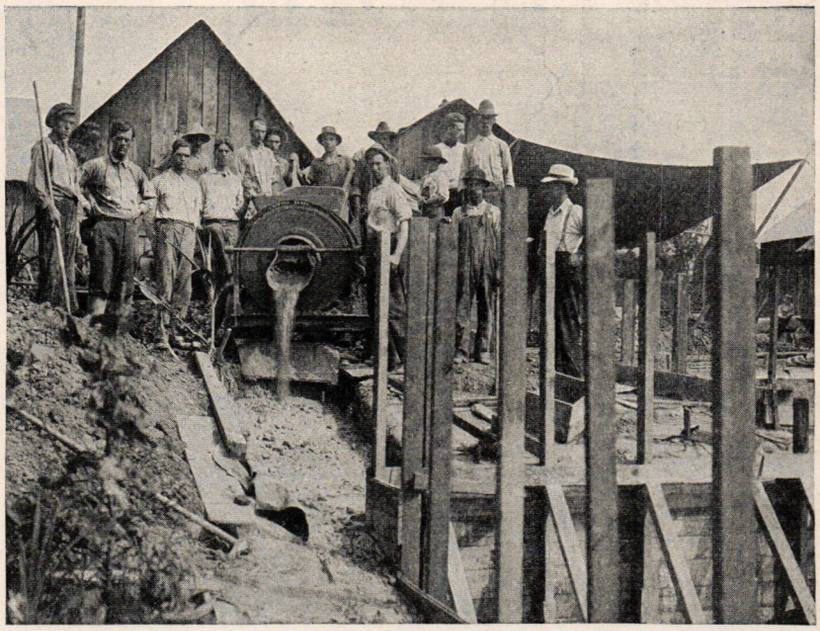
Send for the ALPHA Book No. 17, giving valuable information about cement and concrete work generally. This illustrated book tells how to do stucco work, how to build concrete barns, silos, ice-houses, and other small concrete buildings, walks, steps, porch floors, tanks, storage cellars, etc.

ALPHA PORTLAND CEMENT CO., General Offices: EASTON, PA.

SALES OFFICES: New York, Chicago, Philadelphia, Pittsburgh, Buffalo, Baltimore, Boston, Savannah



Just Watch *the* "Little Devil" Work



"Little Devil" Mixer on Two Wheels, with Charging Spout.

And you will realize how possible it is to save the cost of the machine in a short time.

If you are mixing concrete by hand you are losing money.

In the illustration you see the "Little Devil" dumping concrete directly into the forms. The end discharge makes this possible and is another of the money-saving features of the "Little Devil."

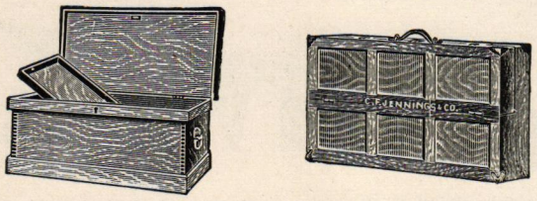
If you have any concrete to mix, let the "Little Devil" do it. Send at once for specifications, price, etc.



Chicago Builders' Specialties Co., 470 Old Colony Bldg. Chicago, Ill.

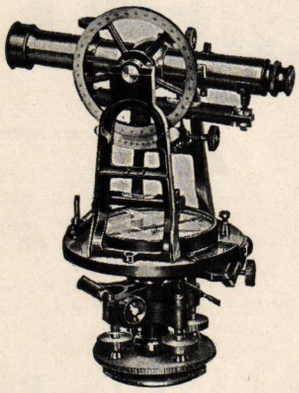
Tool Chests, Tool Cases, Tool Cabinets, Tool Kits, Tool Outfits

for the Carpenter, Electrician, Machinist, Householder and for the Great American Boy. We furnish them Empty and complete with Tools. The largest line of Tool Chests, etc. *"Made in America."*



C. E. JENNINGS & CO., 71-73 Murray Street, New York, U. S. A.

Builders' Transit



Building requirements of today demand the use of an accurate instrument for plumbing walls; laying out and leveling foundations; locating stakes, etc. The Transit illustrated herewith is designed especially for the use of the Contractor and Builder. It is of light construction without sacrificing strength and rigidity. All of the necessary surveying connected with building operations can be done with this instrument at a great saving of time over the convertible Level because levels can be taken, horizontal and vertical angles can be read without the necessity of changing the instrument. We make this Transit in 4 styles and the price is well within the reach of all. Ask for illustrated catalog describing a large variety of Levels and Transits.

David White Co., (Inc.) 421 E. Water Street, Milwaukee, Wis.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary STEEL Medicine Cabinet



The Recessed Steel Medicine Cabinet

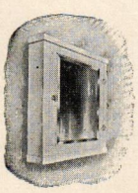
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.



The Outside Steel Cabinet

Send for Illustrated Circular

HESS, 1201-L Tacoma Building, CHICAGO

Makers of Steel Furnaces. Free Booklet

street, St. Louis, Mo., which is said to be one of the finest and largest devoted exclusively to that particular line of trade. The new structure is of fireproof construction eight stories in hight and has a floor space of 33,600 sq. ft., all of which is utilized by the company for the purposes of its business.

The first floor is devoted to the optical department and the display of photographic goods. It has white tile floor, rich mahogany furnishings and soft, indirect lighting. On the second floor is an extensive display of surgical instruments, hospital and school room supplies, while the third floor is devoted exclusively to the mathematical supplies for the students, the draftsman and the engineer. Everything from the pencil and drawing paper to the finest calculating instrument is here shown. Another floor is devoted exclusively to the manufacture of surgical belts, supporters and orthopedic apparatus.

The general offices occupy one entire floor, while another is given up to an elaborate plant for the developing of photographic prints. The top floor, which was designed especially for the purpose, constitutes a daylight factory for the grinding of lenses in co-operation with the optical department on the first floor. The architects were Mauran, Russell & Crowell, the building contractors were James T. Stewart & Co., and the engineer was H. H. Humphrey, all of St. Louis. The lighting fixtures were designed by the St. Louis Brass Mfg. Company, and the store fixtures and interior decorations were installed under the personal direction of Hugo Heimann.

Money Making Concrete Mixers

Under the above title the Cement Tile Machinery Company, Waterloo, Iowa, is distributing an attractive 24-page catalogue bound in paper covers and illustrating and describing its varied line of "Winner" concrete mixers. The line embraces both large and small capacity machines with the latter in the lead, the company stating that nine out of every ten mixers sold today are machines ranging in capacity from 2 to 6 cu. ft. The company's model "A" and "B" are built only in 2 cu. ft. size, the model "B" having been designed especially to meet the demand of the small contractor who desires to maintain a reputation for quality work and at the same time do the work with the least possible expense. The machine can be operated with a very small crew and will turn out 2 cu. ft. per batch or from 15 to 30 cu. yds. per day. The claim is made that it will be found a profitable little machine for the small contractor who is doing a varied line of work. The other models shown in the catalogue are of 4 and 6 cu. ft. capacity. The model "E" is referred to as being of special interest to carpenter-contractors who have need for a hoist of some kind, and the machine in question has been filling this requirement in a very satisfactory manner. It allows the carpenter to go ahead and do his small concrete jobs without waiting for a concrete contractor. At the same time the hoist saves much time and labor in getting the material to

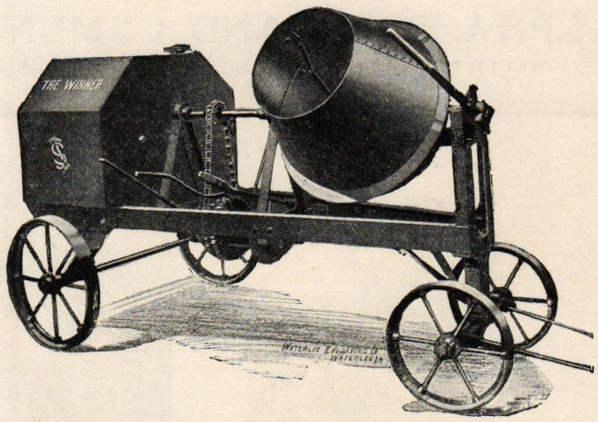


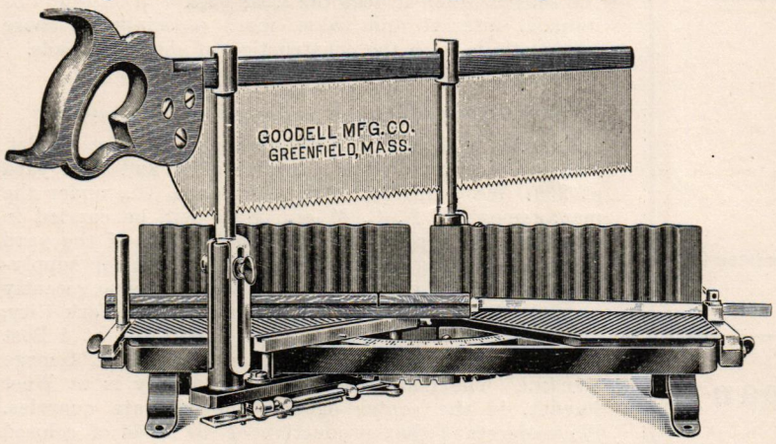
Fig. 11—Side View of Model "E" Winner Concrete Mixer

(*Continued on page* 88)

You'll Never Need Repairs for the Goodell Steel Mitre Box

By eliminating brittle cast iron for unbreakable steel, the Goodell Mitre Box has advanced a step over other mitre boxes. There is not a single part that can possibly break or cause after-trouble of any kind.

When you look at a Goodell from the under side you will notice its bridge-like build. The steel bed or main frame is rigidly trussed and riveted in place. Other features in brief are: a cold rolled steel corrugated back, a wrought steel lever or saw support, automatic detents for holding up saw, steel bottom plates with angular serratures, and long saw guides.



Many of these are patented. They all show up the Goodell Steel Mitre Box as a thing of exceptional durability and convenience.

We would like to explain these points in detail. Write for Circular K.

Goodell Mfg. Co.
Greenfield Mass.

78 Years' Experience



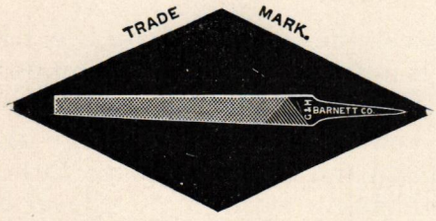
Look Here

We want to tell you about these Adze, but we put so many pictures in that we didn't even have room to tell you their names. Send for our Adze Folder.

The L. & I. J. WHITE CO.
100 Perry Street Buffalo, N. Y.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

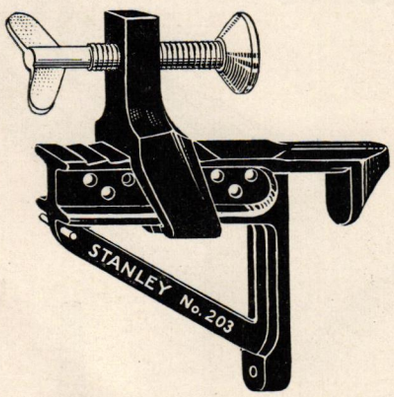
Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company

Philadelphia, Pa.

Owned and Operated by Nicholson File Company

Stanley Tools



Stanley Bench Bracket

No. 203

A tool that will immediately commend itself to the Carpenter, the Cabinet Maker or in fact to any one occupied or interested in carpentry or woodworking of any kind where a bench is necessary.

It simply requires that one or more holes (not smaller than one inch) be bored in the front of the bench. The shape of the tool is such that when the jaw or nose is put through the hole, it is automatically held in place, and by means of the screw clamp, the board being worked upon, is quickly and firmly secured.

The body of the Bracket is made of iron—japanned—and the clamp screw is strong, well threaded and nickel plated.

PRICE EACH 0.35

Send for special circular showing several ways in which this handy little tool can be used.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

the building. In Fig. 11 of the illustrations we present a general view of the model "E" machine.

The Concrete Road

One of the most important topics of the present day is undoubtedly that of good roads, for the advantages to be derived from good roads in lowering the cost of living by making longer and quicker hauls possible are a gain both to the farmer and to the city resident. This timely topic is interestingly discussed in an attractively printed *brochure* of 38 pages prepared by Arthur C. Newberry and distributed with the compliments of the Sandusky Portland Cement Company, Sandusky, Ohio. Interesting particulars relative to the initial cost of concrete roads, their durability and resistance to wear, cost of maintenance, together with details of construction are to be found within the covers of the little work. Not the least important information is found in the specifications of the American Association of Cement Manufacturers for concrete roadways. Emanating from the source which it does the little book will be found of unusual interest and value, more especially to those having to do with the construction of concrete roads.

New Offices of Rising & Nelson Slate Company

The Rising & Nelson Slate Company at West Pawlet, Vt., has recently opened a branch office and slate yard at 2554 West Harrison street, Chicago, Ill., under the management of F. C. Myer. Here will be carried in stock a good supply of slate, the location of the yard being such as to render it very convenient for supplying the Chicago trade. The company has also recently opened offices in the Singer Building, New York City, under the management of Leigh Lundy and at 4 Post Office Square, Boston, Mass., in charge of George Kendall. The main office of the company is at West Pawlet, in the center of the colored slate quarries. We understand that production of all kinds of colored slate has been largely increased by the company during the past year, and that it is now operating the largest and deepest slate quarries in the state. It has lately issued a wholesale price list of roofing slate dating from the first of the present year.

TRADE NOTES

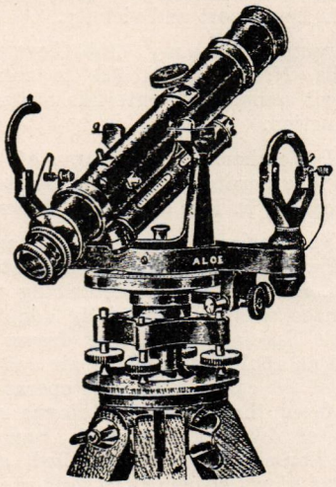
Mason & McNeil have opened offices for the practice of architecture in the Barrett Building, Jamestown, N. Y., and would like to receive manufacturers' samples and catalogues.

The Murphy Varnish Company, Newark, N. J., issues as a house organ an attractively printed 12-page *brochure* called "The Finishing Touch," and within its covers is found some very interesting matter relating to the products of this enterprising concern. Under the head line are the following words: "The setting up of knowledge where ignorance has prevailed is the best of all advertisements for a business founded on knowledge and conducted with knowledge." The feature of the copy of "The Finishing Touch" before us is a double-page living-room interior printed in colors and carrying the caption "Univarnish is the varnish that can be used for everything in and around your home for pianos, furniture, floors, boats, autos and railroad cars."

The latest issue of the "James Barn Magazine," which is published several times a year in the interest of successful dairying through modern barn equipment by the James Mfg. Company, Fort Atkinson, Wis., contains some very attractive illustrations of barns, which are accompanied by brief descriptive particulars. These barns are designed by the company in question and are equipped with its product. The pictures show not only exterior views but also a number of attractive interiors.

The manager of the Davenport Roofing Company, 321 Rock Island street, Davenport, Ia., regards the building outlook for 1915 as very bright and, in fact, much better than it has been for some years past. He states that his company has contracts for roofing four school

(*Continued on page* 90)



Rent this Level 10 Months Then It's Yours

Builders and Contractors

This is not the old style Architect's Level. It is the newest 1915 model *convertible* level. There is not a single Builder or Contractor who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder or contractor can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level, 1915 model. Don't confuse the Convertible Level with the ordinary old style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified **transit** and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level, 1915 Model, and complete details of your rental plan. This request in no way obligates me.

Name.....

Occupation.....

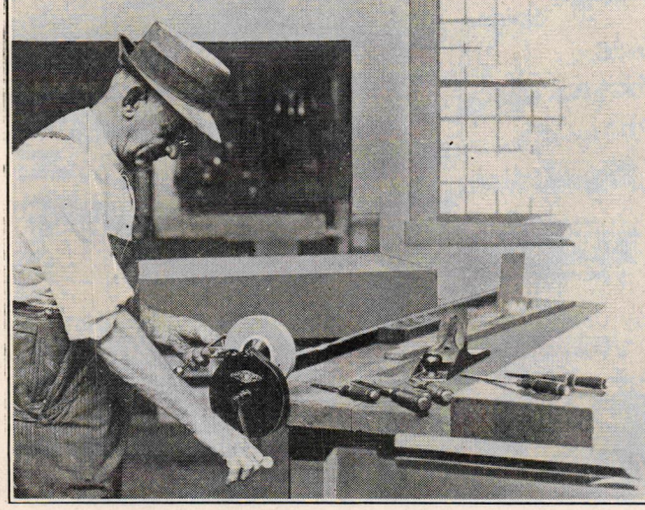
Street.....

City..... State.....

B. A., April, '15.

THE RIGHT GRINDER WITH THE RIGHT WHEEL

CARBORUNDUM NIAGARA GRINDER



ACCURATELY cut gears make it smooth and easy running — ground-to-a-fit castings make it oil and dust-proof— the malleable handle and clamp give it strength — superior workmanship assures careful assembling— *and every machine is equipped with a*

CARBORUNDUM GRINDING WHEEL

The fastest, cleanest, coolest cutting wheel for general work—every machine has a practical tool rest.

Made in several sizes for the work bench, tool kit or household. Ask your hardware dealer about Carborundum sharpening stones and grinders.

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

BY INVITATION MEMBER OF

NEW YORK, U.S.A.

One Pound JOHNSON'S Paste Wood Filler *Free and Postpaid*



FILL out and mail the coupon and receive in return a 1 lb. can of **Johnson's Paste Wood Filler.** There are no strings tied to this offer—all we ask is that you use the material we send you on a piece of work—a pound is sufficient for filling 40 sq. ft.

Johnson's Paste Wood Filler is made from pure linseed oil, the best Japan Dryer and finely ground Metronite-Quartz from our own mine. It is put up in cans ready for use in the following shades:

Natural No. 10	*Antwerp Oak No. 40*
Golden Oak No. 20	*Green Antwerp No. 50*
Dark Oak No. 30	*Mahogany No. 70*

When jobs are to be finished in colored effects you can save the cost of the stain coat by using one of the colored shades of Johnson's Paste Wood Filler. It stains and fills in one operation.

Johnson's Paste Wood Filler does not become hard in cans—will remain usable indefinitely after thinning, and may be wiped with ease in from fifteen minutes to six hours after application. These three advantages over other brands, together with its absolute filling quality, forming a perfect oval pore, make Johnson's Paste Wood Filler popular with the artisan.

Hundreds of barrels of **Johnson's Paste Wood Filler** are sold every year to fine furniture manufacturers who demand the best materials for finishing the beautiful furniture and pianos they put on the market.

INSTRUCTION BOOK

We will also send you free a copy of our 25c color Instruction Book. This is the work of famous experts. It gives full information on the proper method of finishing all wood. It will prove good profitable reading for every progressive painter and decorator.

BA-4

Please send me free and postpaid a 1-lb. can of Johnson's Paste Wood Filler No....., also booklet "The Proper Treatment for Floors, Woodwork and Furniture."

Name .....

Address .....

City & State .....

Fill out and mail to

S. C. JOHNSON & SON

"The Wood Finishing Authorities"

RACINE, WIS.

buildings in Cedar Rapids in addition to a great many other new structures in Davenport and vicinity.

D. J. Newson Contracting Company, 1155 Cleveland avenue, Niagara Falls, N. Y., would like to obtain copies of catalogues and samples of materials pertaining to building construction.

The National Metal Weatherstrip Company, of Ft. Worth, Tex., has been incorporated with a capital stock of $1000 by R. J. Pence, W. F. Fry and E. A. Jackson

Tubular Heating & Ventilating Company, 232 Quarry street, Philadelphia, Pa., is distributing an attractive catalogue of 48 pages, illustrating and describing the Forbes warm air furnace which is especially adapted for use in low cellars. Special attention is drawn to the radiating manifold as applied to heating air and to the general simplicity of the construction and operation of the furnace. Scattered through the catalogue are half tone engravings of dwelling houses in connection with which the Forbes has been installed, and there are also basement views showing the heater and its runs of piping.

International Slate Company, Slatington, Pa., is sending out a pamphlet of a size convenient to carry in the pocket relating to slate roofing and blackboards. Directions are given telling how roofing slate is put on, also how to use several sizes of slate on one roof. Not the least interesting feature of the pamphlet is found in the rules for measuring slate roofs. A table gives the slate in any number of squares from 5 up to 60, while others show the exposure to the weather on the roof when slate is used of standard 3-in. lap; the distance for lath or between the nails in each row, and the quantity of nails necessary to lay a square. Following pictures of the company's punching machine are patterns showing how the slate can be cut.

The Majestic Company, 504 Erie street, Huntington, Ind., has just issued an attractive catalogue for 1915 relating to Majestic modern building specialties, such as furnaces, coal chutes, garbage receivers, etc. These are illustrated and described in attractive form, and their merits are set forth in a way to command the attention of the architect, the builder and the house-owner.

The Roberds Mfg. Company, 101 Railroad street, Marion, Ind., is distributing samples of Roberds ideal wallboard, a tough, fibrous material constructed of four layers of strong, special fibre stock and three layers of the company's own special asphalt compound, waterproofed and pressed into panels of uniform thickness. It is intended to be used instead of lath and plaster, and may be nailed directly to the studding. It is furnished in 32 and 48 in. widths and in any length from 5 ft. to 16 ft.

The Marbleoid Company of New York City, makers of fireproof flooring, has recently established a branch office at 122 South Michigan boulevard, Chicago, Ill., under the management of the Mid-West Supply Company.

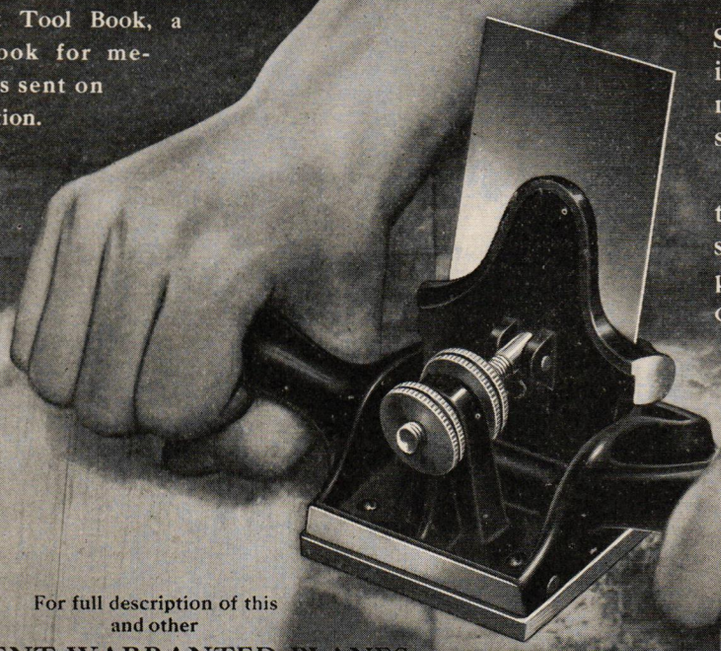
Detroit Show Case Company, 483 West Fort street, Detroit, Mich., is distributing a very attractively illustrated catalogue relating to the "Petz" system of metal store-front construction. The matter presented is addressed to architects, builders and contractors, the point being made that the Petz corner post and transom bar does away with large, unsightly pillars and posts, is strong, takes up but small space, does not obstruct the light and gives use of every inch of window display. The inner core is reinforced with a heavy steel bar which extends the full length and is turned over at each end so that it can be easily and securely fastened to the frame work. The outer core is made of cypress with a heavy metal covering tightly drawn over and clinched at both sides by a special process. Accompanying the pamphlet is a large sheet of blue-print details.

Provident Slate Company, Slatington, Pa., is favoring its friends in the trade with a daintily printed pamphlet containing much interesting information regarding slate, its quarrying and its application. The pamphlet has been prepared in response to numerous requests for information along the lines indicated, as it is a well known fact that many architects, contractors and slate roofers have but little conception as to

(*Continued on page* 92)

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.



No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of $1.75.

For full description of this and other

SARGENT WARRANTED PLANES

SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY

Makers of Squares, Planes and Mechanics' Tools

53 Water St. New Haven, Conn.

Weigh this Evidence



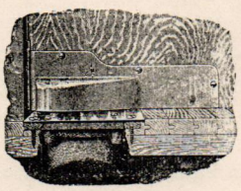
Here's the greatest improvement of recent years in the way of a double-action door spring—the

"Standard" Checking Spring Hinge

Combines all the advantages of the old style double-action hinge with the all-important Door Check feature—an ingenious device, so constructed that the door swings slowly, stopping at "dead center." No "swing bang" motion; can't fly back unexpectedly, causing a score of different accidents.



The Standard Checking Spring Hinge fills a long-felt want. Children are safe where it is used. Works like a charm; absolutely noiseless; push it open as hard as you like. It comes back only so fast. The only practical hinge of the kind for double-acting doors between dining room and pantry or kitchen in residences, apartments, hospitals, vestibules, churches, or public buildings. Guaranteed absolutely dependable. Made in two sizes. Positively Guaranteed.



Specify this modern hinge in your buildings. Your name and address on a postal card will bring complete information. Write while you think of it.

Or This—
Safety

This—
Danger

THE STANDARD MFG. CO.

SHELBY, OHIO

The finest product of the greatest plant—

DISSTON "D-115"



The hand-saw which in material, temper, toughness, adjustment and finish is as near perfection as the greatest saw-works in the world can produce after three-quarters of a century's specialized experience.

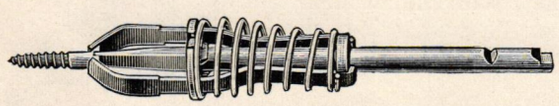
If you as a mechanic take pride in your tools, add the "D-115" to your kit.

Write for Descriptive Circular "D-115"

Henry Disston & Sons, Inc.
Philadelphia, U. S. A.

DISSTON 1840 1915 JUBILEE

Get This Bit for Your
"YANKEE"



Screw Holder Bit for "Yankee" Spirals.

Great for driving or drawing screws in places out of reach, overhead or in tight corners. Holds the screw firmly with bit in slot and releases as the screw is driven home. Slip the spring back and use it as a plain bit for all ordinary work — a great attachment. Made for the Nos. 30, 31, 131 and 130. Price, 35c. Your dealer can supply you.

Send for the Yankee Tool Book anyway
Tells you about the Yankee line complete

North Bros. Mfg. Co.
Lehigh Ave. Philadelphia, Pa.

the preparation of roofing slate for shipment to market, and also as to what veins or stratas produce the choicest unfading qualities. A feature of the company's business is the "guarantee" which is given with every shipment that the slate is absolutely uniform and unfading in color.

Universal Portland Cement Company, 208 South La-Salle street, Chicago, Ill., makes the announcement that Charles S. Fletcher has been appointed manager of the Sack Bureau, Oscar N. Lindahl has been appointed chief accountant and Gordon Wilson has resigned as assistant secretary to accept service with another concern.

The cover design of the March issue of "DooR-Ways," the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., is decidedly suggestive of the month, and is printed in colors with pleasing effects. Within the covers considerable attention is given to San Francisco and the Panama-Pacific Exposition, with intermingling pages devoted to R. & W. door fixtures and hangers. The calendar for March, which accompanies it, is in keeping with those with which the company has periodically been favoring its friends.

Bertram A. Duncan, 113 Munroe street, Lynn, Mass., has opened an office for the practice of architecture, and is desirous of obtaining catalogues and samples from manufacturers of building materials, plumbing supplies and electrical appliances.

William H. Hart, president for 60 years of the Stanley Works, New Britain, Conn., has recently resigned to accept the chairmanship of the Board of Directors, a new office created by a change in the by-laws adopted at the stockholders' meeting.

"Some Shingles" is the title of an 8-page folder sent out by Bird & Son, East Walpole, Mass., and relating to "Neponset" shingles. The company points out that there is every indication that 1915 will see a revival of building, and accordingly it has prepared a big campaign on its most distinctive product—Neponset shingles. The latter, it may be stated, are built-up shingles, tapered like wooden ones, with the butt end of treble thickness. Accompanying the folder is a large colored poster intended for display purposes by dealers handling Neponset shingles. A portion of the panel represents a dwelling roofed with the material in question.

The Stark Rolling Mill Company, Canton, O., makes announcement of the appointment of the Dearborn Steel & Iron Company with offices in the Peoples Gas Building as its selling agents in Chicago, northern Illinois and Wisconsin. The Dearborn company is a new concern, and we understand that much time will be devoted by it to the sale of the well-known Toncan metal products of the Stark mill, and at the same time they will solicit orders for regular black, galvanized and blue annealed steel sheets and formed products.

Kolesch & Co., 138 Fulton street, New York City, has just sent out an illustrated folder consisting of extracts from its catalogue and price-list of drawing instruments, papers, etc. Special reference is made to the "sets" in which the drawing instruments can be obtained, and in connection with the illustrations are given numbers, sizes and costs. We understand that a copy of the illustrated folder will be sent to any reader who may be interested.

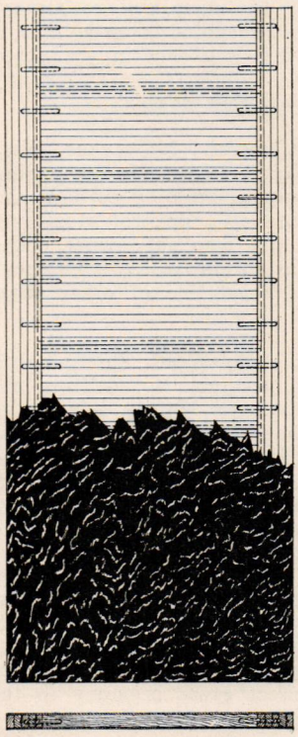
Jesse F. Kennedy has opened offices for the practice of architecture in Suite 512, Fayette National Bank Building, Lexington, Ky., and would like to receive samples and catalogues from manufacturers of building materials in various parts of the country.

The Detroit Flexotile Floor Company, Detroit, has been incorporated with $10,000 capital stock by George A. Erskine, John H. Collins and John J. Trevaskus, and others, to manufacture flexotile products.

Bangor Slate Mining Company, Bangor, Pa., presents some interesting facts about slate in a 12-page pamphlet which it has issued. The statement is made that its Bangor-Washington quarry was one of the first to be opened in the celebrated Bangor region and that it has been operated for the past 50 years. In addition to rules for measuring slate roofs and tables showing

(*Continued on page 94*)

"Sanitary Flush No Warp Doors"



Unequalled for entrances to bungalows, hospitals, schools, hotels, offices, etc. They are very attractive, never warp and are fire and sound retarding.

Furnished in many designs in any veneer and glazed with any design or kind of glass.

Read specifications and send for Catalogue.

SPECIFICATIONS:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated.

Dress Cores to required thickness, with uniform and true surface, and cover both faces with ⅛-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

Specify and insist upon a construction as outlined and you will secure best results.

Hyde-Murphy Co., Ridgway, Pa.

New York Office: 507 5th Ave.

Pittsburgh Office: 6101 Penn Ave.



Profitable to Carpenters and Builders

The tremendous balance of favor on the side of Parquetry Floors more than overbalances the slight difference in cost!

If you buy Federal Parquetry the difference is slight indeed!

Among Contractors, Builders and Architects Parquetry is recognized as the one highly desirable floor stock.

Federal Parquetry is the finest quality Kentucky White Oak, perfectly milled, accurately matched and uniform in color, character and design.

You can make money laying Federal Parquetry.

Ideal for dancing floors.

Write for Special Carpenters' and Builders' Circular 101.

Federal Parquetry Mfg. Co.

Flatiron Bldg., New York

Carpenters

You Can Save Money On Every Spring Job

Here's something right in your line—a Chemical Closet that you can sell to a home builder cheaper than a wooden privy and make a bigger profit for yourself.

Here's something you can sell at odd times or turn over to your son or your foreman to sell.

RO-SAN CHEMICAL CLOSET



An absolutely sanitary, *odorless* indoor closet that may be placed anywhere in the house. Abolishes the germ-breeding, outdoor vault. A comfort and a convenience where there is no sewer connection. Germs killed by chemical. Easily emptied as the ash pit of a stove.

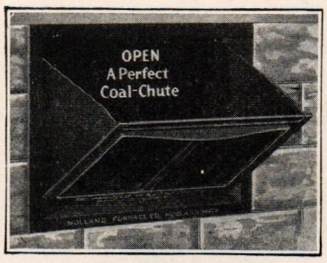
AGENTS WANTED

we want one live carpenter-contractor in each town to act as our agent. Good profits for little work. *We help you sell them.* Write today for complete details.

Rowe Sanitary Mfg. Company

204-D Sixth Street, DETROIT, MICH.

Ask about the Ro-San Washstand. Running Water (Hot or Cold) Without Plumbing.



If You Build Buy Own

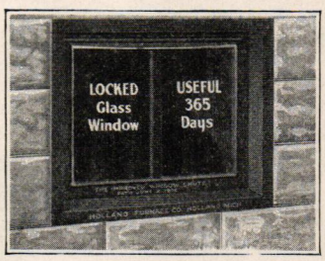
Be up to date and have the world's best

The Window Chute

for your coal bin.

Thousands in Use

The Very Best



Write for Booklet C.

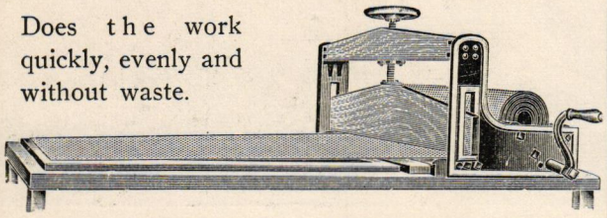
Holland Furnace Company

Holland, Mich.

World's Largest Direct Installers of Furnaces.

The ONLY MACHINE for Stretching Wire Cloth on Frames

Does the work quickly, evenly and without waste.



Can be used by anyone. Will hold any width to thirty-six inches, larger sizes to order.

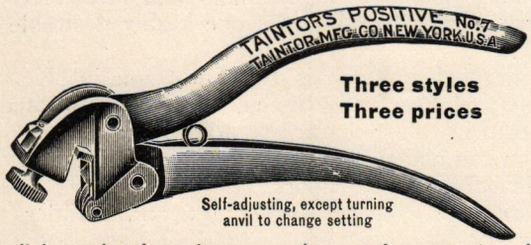
Price Ten Dollars. If not satisfactory may be returned in Thirty days.

J. F. Schafer, Mount Pulaski, Ill.

TAKE GOOD CARE OF YOUR TEETH

We mean of course your saw teeth—use only

TAINTOR POSITIVE SAW SETS



Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.

Ask your hardware merchant for it, also to show you our No. 7½ Double Plunger Set, and No. 8 Adjustable Handle Double Plunger.

Send for our free booklet, "Suggestions on the Care of Saws"

Taintor Mfg. Co., 113 Chambers St., New York

TRADE **SIMPLEX** MARK

Reg. U. S. Pat. Office

ROOFING NAILS HOLD!



Free Samples and Circular on Request

H. B. SHERMAN MFG. CO., Battle Creek, Mich.

Save big on Lumber

Send material bills for H-L-F prices on lumber. If bills aren't quite ready hurry them. Lumber prices are going to advance. Wait and the lumber will cost you hundreds of dollars more than now.

Get Quick Price

Write for H-L-F House Pricer

Get price without material bill

For the jobs on which you are working but haven't made bills of materials, get H-L-F price without bill of materials. Send for the H-L-F House Pricer. It's free. Simply answer a few questions. Get the H-L-F freight-paid price. No charge or obligation. Write today for H-L-F House Pricer; also for H-L-F big Plan Book. New edition just issued. 100 real homes based on ideas submitted by farmers. Gives floor plans and guaranteed cost. **HEWITT-LEA-FUNCK CO., 859 Crary Building, Seattle, Wash.**

the sizes of slate, etc., price lists are given together with brief reference to tools used in slate roofing.

Standard Mfg. Company, Shelby, Ohio, refers to the Standard checking spring hinge as combining all the advantages of the old style double action hinge with the all-important door check feature. It is an ingenious device so constructed that the door swings slowly, stopping at "dead center." The point is made that it is absolutely noiseless and that it is especially adapted for double acting doors between dining room and pantry or kitchen in residences, apartment houses, etc.

Milwaukee Corrugating Company, Milwaukee, Wis., and with branch office at Kansas City, Mo., is urging the merits of its "Milcor" metal building corners and batten barn strips which are of a nature to interest the architect, the builder and also the owner. The company is also calling attention to its "Titelock" metal shingles and to its varied line of other sheet metal specialties.

Weiser Mfg. Company, 325 West Thirty-eighth street, Los Angeles, Cal., has just issued from the press what is known as catalogue No. 11, relating to various lines of attractive builders' hardware in bronze and brass. The little book is profusely illustrated and the pictures are accompanied by brief descriptive text. The goods shown include locks, escutcheons, hinge straps, cabinet trim, door and window guards, push and kick plates, brass railings, etc.

Biesanz Stone Company, Winona, Minn., is distributing a circular descriptive of a new sand and gravel washing device which it has developed for use at its own gravel pits. The machine is simple in construction and is said to effect great economy in the washing of sand and gravel.

FOR SALE, as a whole or as separate machines a complete equipment of block-making machinery. Material can be seen on our farm, near Rochester, Mich., Stone Shop station on Detroit United Ry. D. M. Ferry & Co., Geo. S. Fleming, Construction Supt.

WANTED—agent to solicit work in our line of Ornamental Plaster Work, Lighting Fixtures and Cement Garden Furniture. Liberal commission allowed.

TOGNARELLI & VOIGT COMPANY

No. 1745 North 12th St., Philadelphia



SILICA-GRAPHITE is Nature's own paint pigment and, as mixed with pure boiled linseed oil in

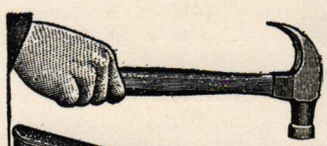
DIXON'S SILICA GRAPHITE PAINT

forms the best protection against Nature's own most powerful agents of corrosion and decay. Booklet 32-B.

Made in Jersey City, N. J.

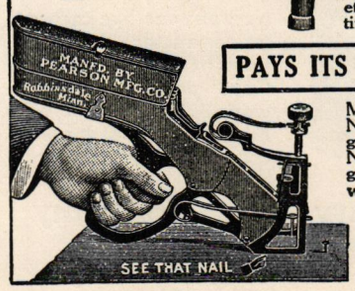
Joseph Dixon Crucible Co.
ESTABLISHED 1827

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB



Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only **$5.00** It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

147,100 Sq. Ft.
Used on
This One Job



Smashing Big Popularity!

CORNELL BOARD

Leads the Field!

The only wall-board that is all pure wood-fibre and *inner-sized* in addition. Inner-sizing hermetically seals it through and through, fortifying it against warping or swelling. Others are only surface-sized.

Cornell Board is best, yet costs less, because it is the only board made from log to finished product under one roof. Our great $3,500,000 exclusive modern wall-board mill in the heart of the Wisconsin spruce forests produces the highest quality at lowest costs.

300,000 Square Feet Daily

Write today for Particulars

CORNELL WOOD PRODUCTS CO.

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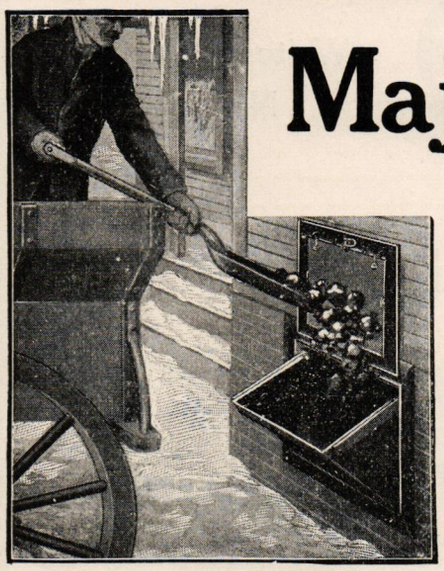


The Majestic Coal Chute

Majestic Coal Chute and Garbage Receiver

These new modern home necessities protect your health, house and lawn. The combination coal chute and cellar window is easily installed in any old or new house, hotel, apartment or office and is burglar proof.

The Underground Garbage Receiver is clean and sanitary, and protects you from the dangers of exposed garbage and keeps the garbage free from flies, dogs, cats, mice and vermin.

Should be in every new building

The Majestic when closed sets flush with the foundation. It has a glass door which gives splendid light to the basement. The glass is protected when chute is in use by special iron plate. The Majestic is more than just a coal chute. It's a cellar window as well.

The Majestic locks from the inside securely and is absolutely burglar proof. It is extra durable, and will outlast the building. It has a heavy steel body—cast-iron door frame and boiler plate hopper. When open the hopper comes out automatically, catching all the coal.

Thousands of owners of homes, hotels, stores, apartments, etc., have installed Majestic Coal Chutes in their buildings. Architects and Contractors indorse them and specify their use in all the new modern structures.

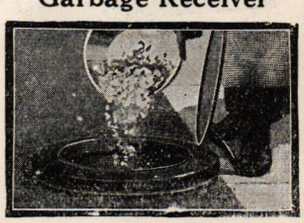
Send today for complete Catalog—It's FREE!

Write for the facts about the Majestic Coal Chute before you build and learn how it saves your house, lawn, walk, flowers and coal. This free book also describes every detail of and tells all about the Majestic Underground Garbage Receiver, and explains its many advantages. Send today.

The Majestic Co., 504 Erie St., Huntington, Ind.

The Galt Stove and Furnace Co., Galt, Ontario, Canada

The Underground Garbage Receiver



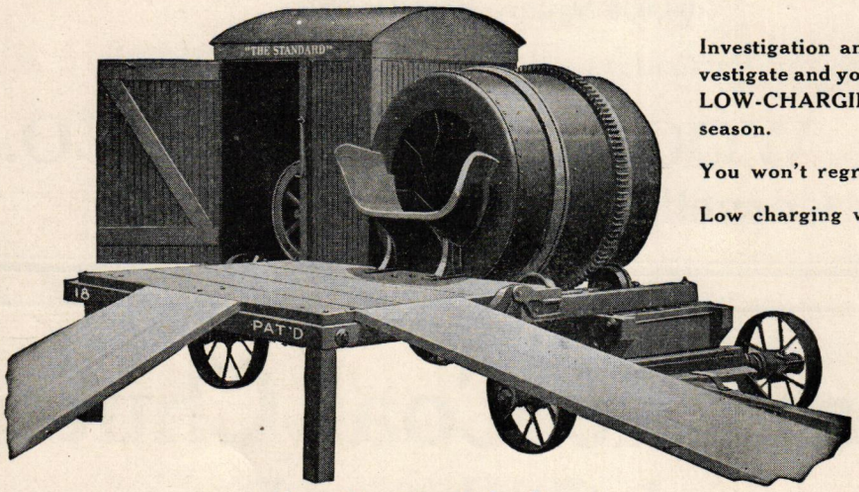
Can be buried in your back yard handy to the kitchen door where it is convenient to use but never unsightly. It is water tight—emits no foul odors and keeps contents free from mice, dogs, cats and flies, etc.

The only part exposed is the top and door. This opens and shuts with the foot. (See the picture.) When you want to dump garbage just press your foot on the little step. It closes by itself. Nothing could be more simple to operate or practical to use. The can easily lifts out for emptying.

"The Standard" Mixer Low Charging

Will save you one-third over any other mixer on the market, not only in first cost but in mixing cost, because of its Low-Charging. The drum is charged direct from wheelbarrows via the Low-Charging platform which is only 24 inches from the ground and is folded up when not in use. This does away with the excess weight of the complicated overhead side loader, and all the troubles and delays therewith, which makes it easy to move along the work as it progresses or from one job to another.

The large open drum of **"THE STANDARD" LOW-CHARGING MIXER** permits you to see the entire batch while it is being mixed and enables you to get a perfect mix at all times. This is necessary on reinforced concrete work and is demanded by engineers and inspectors.



Capacities 4 to 40 Cu. Ft.

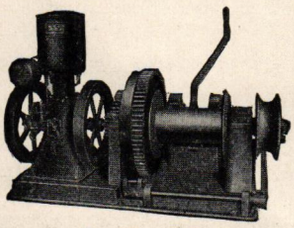
Investigation and use means satisfaction. Investigate and you will use "THE STANDARD" LOW-CHARGING MIXER on your work this season.

You won't regret it.

Low charging will save you one-third.

Write for Catalog No. 48-4

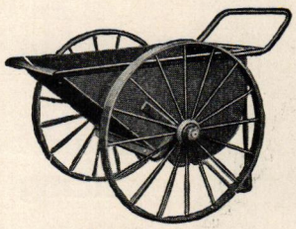
"The Standard" Equipment



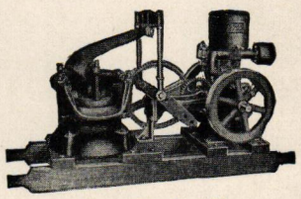
Gasoline Hoist



Wheelbarrow



Concrete Cart



Pumping Outfit

If you need Hoists, Pumps, Wheelbarrows, Concrete Carts, Distributing Towers, Material Elevators, etc., you should get our Catalog and Prices. We can save you money. Tell us your needs.

The Standard Scale & Supply Co.

New York
136 W. Broadway

Pittsburgh
243-245 Water St.

Philadelphia
35 South Fourth St.

Cleveland
1547 Columbus Road

Chicago
1345-47 So. Wabash Ave.

"Little Giant" (Model A) For Small Jobs

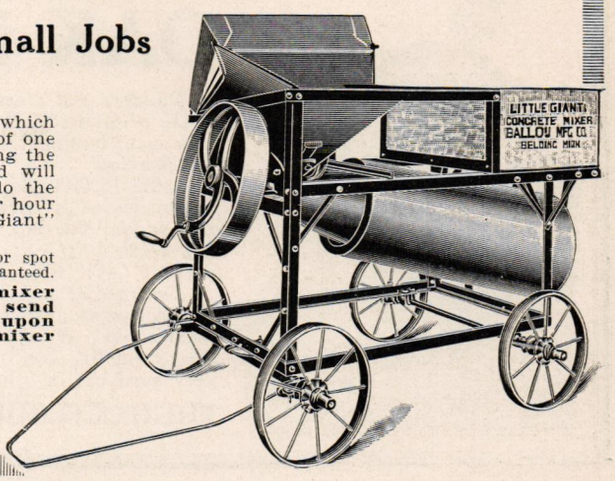
Price, $75.00 f.o.b. Belding

This Hand-Power Concrete Mixer has a proportioning device which can be regulated so closely that it will vary less than one-half of one per cent. Special means are also provided for thoroughly blending the ingredients, and for properly wetting the aggregate. Its blend will bear the very closest inspection. We don't claim a man can do the work of an engine, but reports from users show that 5 yards per hour is quite ordinary with a "Man at the Crank" of our "Little Giant" Model A.

We also build Power Mixers with steady running Air-Cooled Engines. For spot cash we will pay the freight on machine shown. Complete satisfaction guaranteed.

Do not take our statement for it, but let us send the mixer and leave it to your judgment while on the job. We will send a mixer on five days' trial to any responsible party, or upon guarantee of payment or deposit of price while the mixer is being tried out. Send for Catalog.

BALLOU MFG. CO., 95 HIGH STREET BELDING, MICH.



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The latest and greatest discovery for the contractor and builder. A material that prevents freezing of Concrete, Mortar, Plaster, Whitewash, etc. Tested by experts and prominent contractors and pronounced O. K.

A small amount mixed with the cement or lime keeps from freezing, prevents rusting of forms and reinforcing, and makes stronger concrete. Can be used in the coldest weather with absolute success.

Get the cold weather prices while the warm weather fellow does the loafing. Complete your concrete jobs now instead of allowing them to hang over.

15 lb. sample bags $1.00 each f.o.b. factory.
100 lb. sacks carried at all warehouses.

Get posted on this newest and greatest discovery which enables concreting the year around.

Lansing, Mich. **LANSING COMPANY** Le Roy, N. Y.
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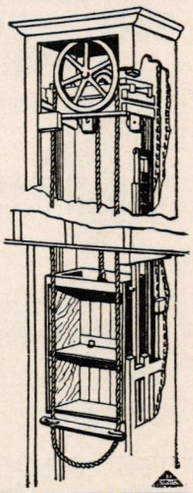
Warehouses: Kansas City, Minneapolis, Chicago, San Francisco



A B C Dumbwaiter

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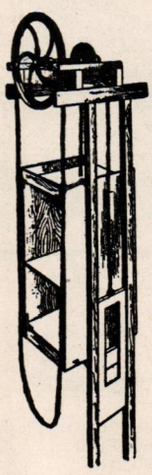

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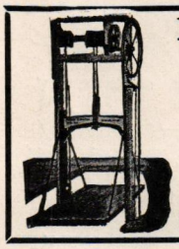

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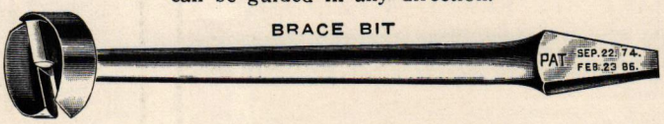

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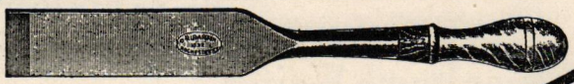

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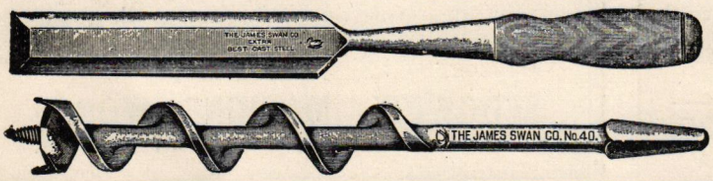

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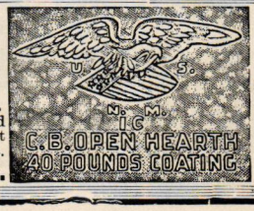

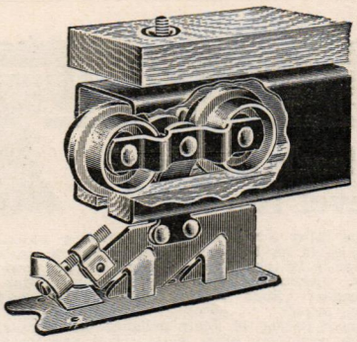

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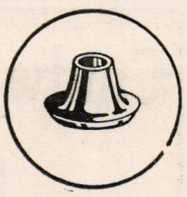

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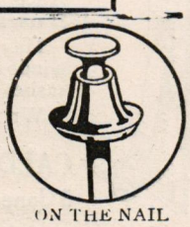

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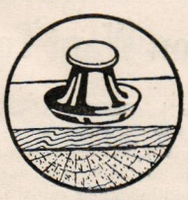

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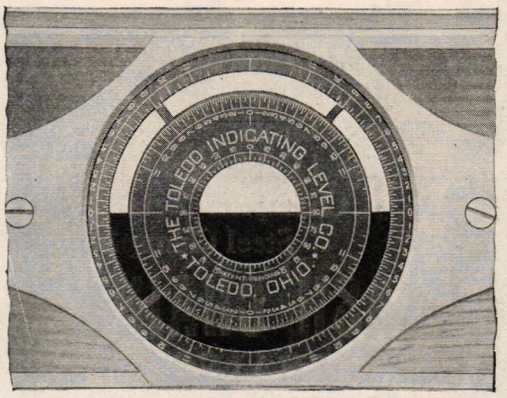

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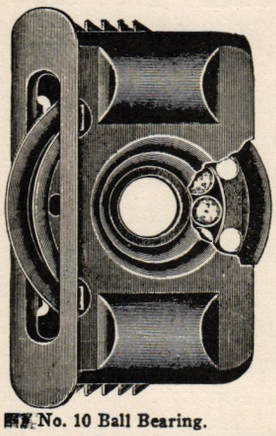

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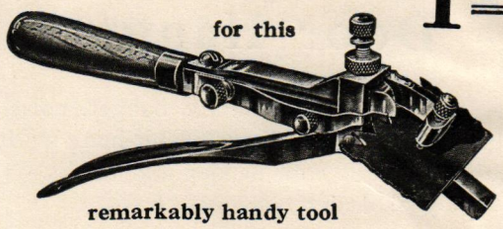

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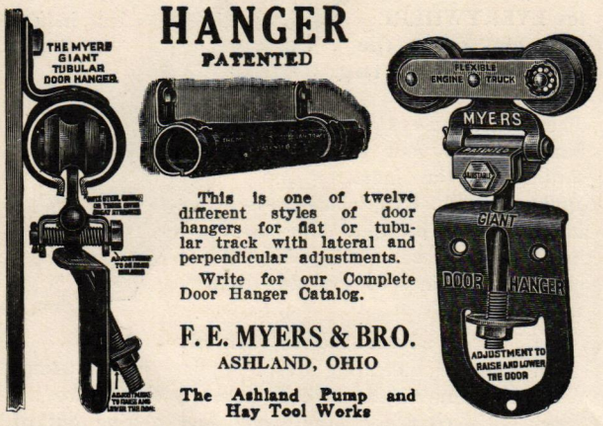

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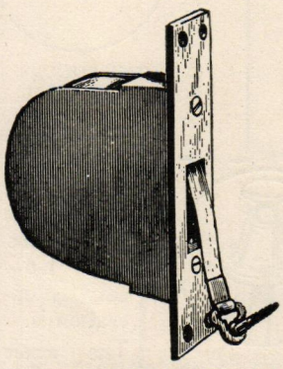

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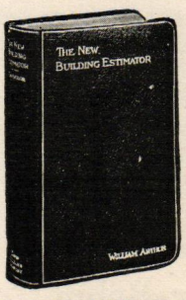

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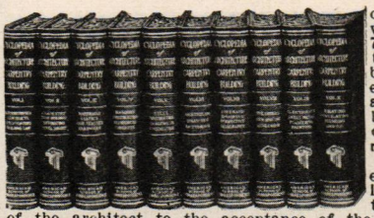

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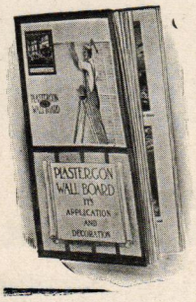

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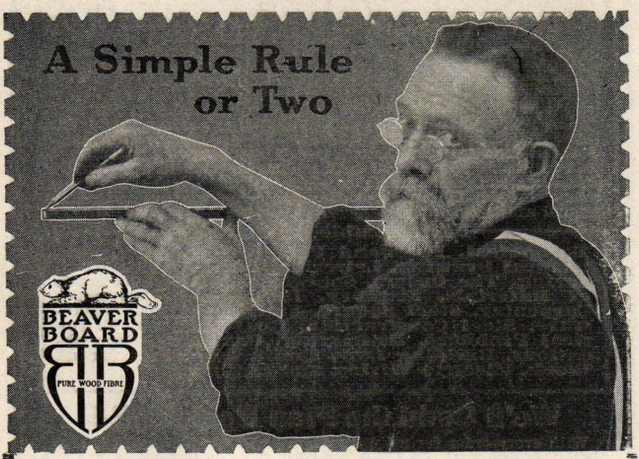

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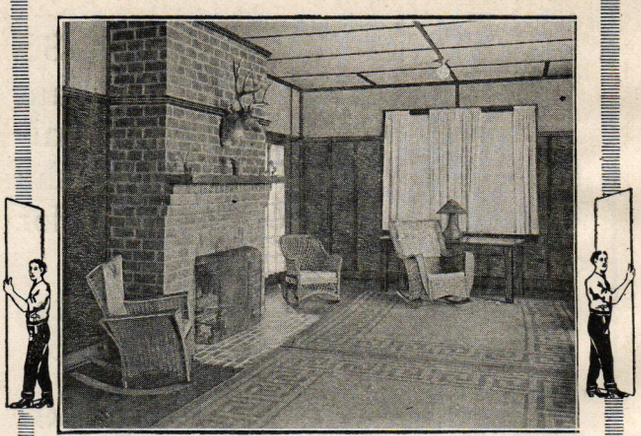
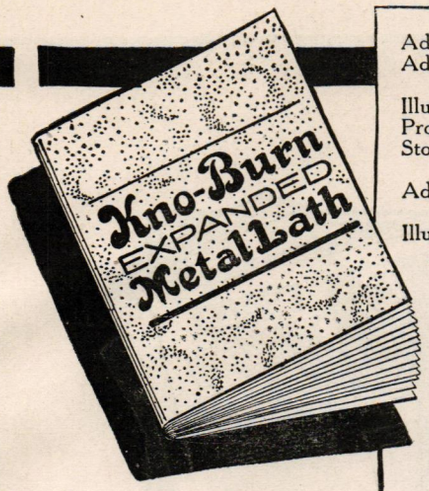


is the only moisture proof wallboard made to-day. Some others are sized on the surface—Ceil-Board is moisture proof throughout. Cut into it and test it. We will gladly send samples.

Ceil-Board may be had already finished in Golden Oak, Mission Oak and Circassian Walnut—also plain finishes for painting and wall-papering.

THE PHILIP CAREY COMPANY
General Offices 1020 Wayne Ave, Lockland Cin, Ohio
OFFICES & WAREHOUSES IN PRINCIPAL CITIES.

CAREY CEIL-BOARD



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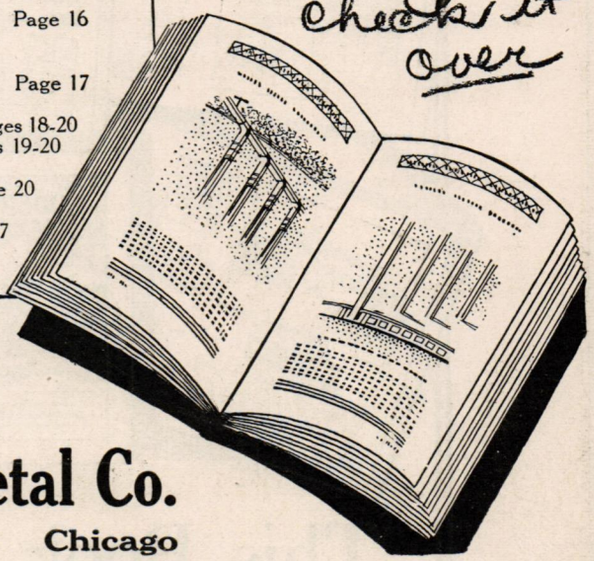
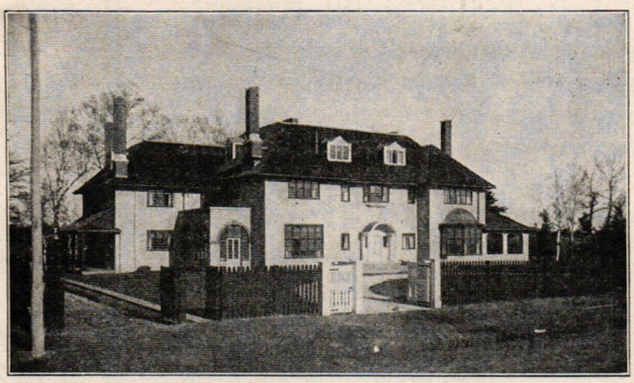


Send for this Manual of Metal Lath Construction Today.

Ask for Booklet 43

North-Western Expanded Metal Co.

904 Old Colony Bldg. - - - Chicago



All buildings in both views have all stucco work waterproofed with CERESIT Waterproofing Compound. George & Moorehouse, Architects, Toronto, Ont.



CERESIT
TRADE MARK REGISTERED

Other CERESIT Products of equal merit are Weatherwear Roof Coat, Floor Hardener, Damp-proof Plaster-Bond, Damp-proof Coating, Stone Backing and Cerisitol.

A Menace to Health!

Many eminent authorities on sanitation and health say unanimously that dampness in buildings is as serious a **menace** to health as defective plumbing.

Leading architects and contractors now realize the many advantages and benefits of damp-proofing, and are specifying that concrete, cement and stucco side walls and basements be waterproofed.

CERESIT—**the everlasting waterproof**—is recognized as standard by foremost engineers. For the sake of permanency, economy and sure results specify CERESIT.

Ceresit Engineering Service

Let our able staff of engineers co-operate with you in solving your waterproofing problems. Ask for complete and specific data.

Ceresit Waterproofing Co.

981 Westminster Building
Chicago



This Book of Bungalows,

city and suburban homes, cottages, farm buildings, etc., will be sent to you free on request.

Jud Yoho, the Bungalow Craftsman, says of our Book of Modern Homes: "The wide range of the designs shown and their adaptability to varied climates should enable anyone in any section of the country to choose just the home that would best suit his individual requirements."

We will mail this book free and postpaid on request to all readers of Building Age. Simply write us a postal card and say, "Send me your Book of Modern Homes No. 77B199." Almost every design in this book has already been built many times, proving the plans to be accurate. The builders say that we saved them money on material and gave them better quality than they could secure elsewhere. COMPLETE PLANS, SPECIFICATIONS AND BILL OF MATERIAL FOR ANY OF THE 117 HOUSES IN OUR BOOK OF MODERN HOMES CAN BE SECURED FOR A SMALL DEPOSIT OF $1.00. Should you purchase material from us this $1.00 will be allowed on your order, thereby making the plans free.

No matter what kind of a house you are going to build we can save you money on the material. Let us make you an estimate free and without the least obligation on your part. Send us any bill you may have received from any other concern and let us prove to you, as we have already proven in thousands of cases, that we can cut your building expenses down at least 25 per cent. Big stocks of lumber, mill work and other building material, always on hand ready for immediate shipment, enable us to give you QUICK SERVICE. We are the only concern manufacturing and selling direct to the consumer everything required in the building line, with the exception of cement, brick and plaster. Let us send you free and postpaid our big Book of 117 Modern Homes. Write for it today. *Ask for Book of Modern Homes No. 77B199.*

Sears, Roebuck and Co., Chicago



Before you lay any roofing jobs, put on any porch floors, or do any repairing work this Spring,

Investigate CON-SER-TEX

It costs very little. Is easy to lay. It never rots or stretches. It hugs the porch or roof surface tightly. Is neat and artistic in appearance. Is waterproof and weatherproof—deadens sound. Defies treading, coal gas, or any other wearing influence.

CON-SER-TEX costs less than most any other Roofing Material. It is a canvas roofing chemically treated to protect the fibre from mildew, and the detrimental action of the oil in paint.

Investigate the merits of Con-Ser-Tex. You can save and make money by using this material. We will send you generous samples and complete information, prices, etc., upon request.

WM. L. BARRELL COMPANY

8 Thomas Street New York City

CHICAGO DISTRIBUTOR: GEO. B. CARPENTER & CO., 430-40 Wells St.
CALIFORNIA DISTRIBUTORS:
WATERHOUSE & PRICE CO., Los Angeles.
THE PACIFIC BUILDING MATERIAL CO., San Francisco.

Nail This Fact Down Tight

There is and there can be only one genuine

Compo-Board

Trade-mark Reg. No. 94745

—because it is made with a center core of kiln-dried wood slats—our patented feature.

It makes Compo-Board desirable from these standpoints:—stiffness, durability, non-warping and non-shrinking strength, resistance to air, moisture, cold, heat and fire, ease of handling, sawing clean and adaptability to different methods of decoration. (It's the only wall board that can be successfully papered.)

You can see how necessary it is that you get genuine Compo-Board. You'll make no mistake, if you look for the wood core. The border illustration of this ad gives you a fair idea of what it looks like.

We issue this warning, because the name "Compo-Board" has become so well known that some folks have the impression that it is a generic name for "wall board." It isn't. It's the trade-marked name of our own patented product.

Sold by dealers everywhere in strips four feet wide and in lengths of one to 18 feet, as desired.

Write for book and sample.

NORTHWESTERN COMPO-BOARD CO.

5778 Lyndale Ave., No. Minneapolis, Minn.

The question before the house is paint.

Zinc

has long been used on interior work. Do you know that it has been found even more satisfactory for exterior work.

"One of Your Problems" is the name of a booklet which should appeal to every architect who takes the writing of specifications for painting as seriously as any other part of his work.

The New Jersey Zinc Company
Room 503, 55 Wall Street, New York

EXPANDED CUP
SYKES SELF FURRING METAL LATH
SAVES 3 TO 5¢ A SQ. YD.

Metal Lath is the Building Material of Today

It gives protection, better service, longer service and it saves the owner money.

SYKES **Expanded Cup Lath** *Self Furring*

saves 3 to 5 cents a sq. yd. because it is so crimped that it provides a perfect key for mortar. No furring strips are required. Sykes Expanded Cup Metal Lath becomes firmly imbedded in stucco or plaster.

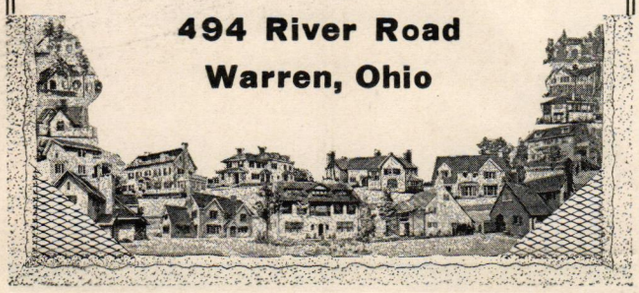
Best for Interior Work
Best for Exterior Work

Sykes Expanded Cup Lath is HEAVIER, STRONGER and BETTER than others when cut from the same gauge of metal, for the reason that it is cut with a wider strand. Don't judge metal lath by gauge alone, but by GAUGE and WEIGHT.

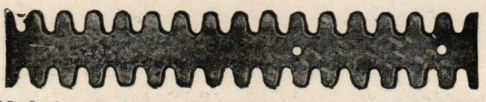
Indorsed by architects. Approved by U. S. Government for Post Office work.

Write us today for Free Book, which gives complete specifications for Stucco Work on Metal Lath, and for Free Sample. This book will save you money.

Sykes Metal Lath & Roofing Co.
494 River Road
Warren, Ohio



When a Wall Tie is a Wall Tie it is the Whalebone

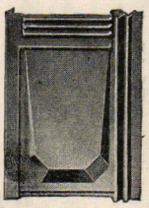


Made in any length from five inches to fifteen inches. Standard size for Solid or Veneer walls 7 inches by ⅞ inches, weighing 50 pounds to the M. Packed 1000 to the box.

Price on standard size, based on 21 gauge material, $2.50 Pittsburgh per M. Shipments made same day order is received.

Can quote on lighter or heavier material if desired, as we can supply the Standard Whalebone in boxes weighing from 35 pound to M to 85 pound to M. according to thickness of material.

Allegheny Steel Band Co.
BELL PHONE: 718 Cedar North Side: PITTSBURGH, PA.



Make Money Faster and Easier Than You Ever Did

before, by handling W. & C. Metal Shingles. We have a special selling proposition to make to one live man in every town in the country, and its acceptance puts the acceptor in a position to make a great deal of money very easily.

Walter's and Cooper's Metal Shingles

are proof against fire, wind, storm, snow, rain, lightning, rust and decay, and are long lasting. Cost no more than wood shingles. Ask for catalog and selling plan.

NATIONAL SHEET METAL ROOFING CO.
339-345 Grand St., Jersey City, N. J.

Vacuum Cleaning Systems

By Maxwell S. Cooley

THE contents of this book were compiled by the author during the seven years in which he was engaged in the preparation of specifications and the testing of complete plants installed in the buildings under the control of the Treasury Department.

It is an invaluable reference work to Engineers, Architects, Heating and Plumbing Contractors. Why not be ready to install Vacuum Cleaning Systems before your patrons demand them. This book will help you to get abreast of modern cleaning methods.

Size 6x9 in., 244 pages, 105 illustrations
Price $3.00 postpaid

Building Age Book Department
239 West 39th Street, New York City



THE STAMP OF A GOOD ROOF

WHEN the Heppes Company Arrowhead is seen on a box of asphalt shingles or on a roll of roofing or on a sheet of wall board or on the outside of a paint can—that sign stands for top-quality in building material.

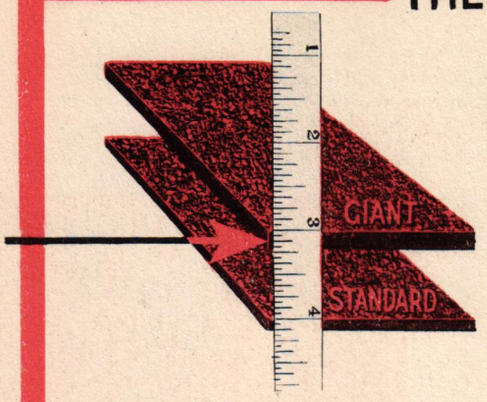
We point you to the following pages for concrete illustrations of the superquality that is in-built in all Heppes Company building products.

It would be difficult indeed to build a roof of greater endurance than the Flex-A-Tile brand. It is perfect in workmanship, beautiful in appearance, permanent in color and noted for its durability.

Utility Board can now be obtained in mahogany, circassian walnut, quartered oak and flat grained oak, permitting a wider range for the use of this preferred Wall Board.

THE HEPPES COMPANY
CHICAGO
U.S.A.

THE HEPPES COMPANY



GIANT ASPHALT SHINGLES

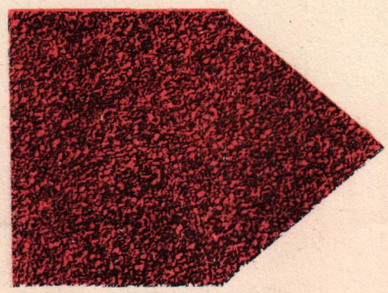
Giant Asphalt Shingles

By Actual Measurement

50% Heavier, 50% Thicker and 100% Stronger

We originated Giant Asphalt Shingles — heavy-weight **Flex-A-Tiles. Flex-A-Tile** "Giant" Asphalt Shingles are the thickest, heaviest, stiffest asphalt shingles ever made. **Flex-A-Tile** Giants don't get their weight from big stones on the outside—but from additional asphalt and heavy wool felt.

Their great thickness means economy — fewer shingles are required to cover a roof. "Giant" **Flex-A-Tile** Asphalt Shingles can be laid 5 inches to the weather—save 25 per cent in labor cost. In two fadeless natural mineral surfacings—garnet and emerald.

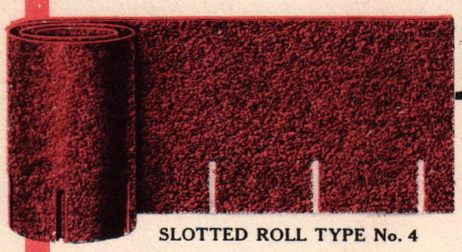


FLEX-A-TILE DIAMOND INDIVIDUAL SHINGLES

FLEX-A-TILE "DIAMONDS"

Realizing the demand for a shingle of **Flex-A-Tile** quality with which various patterns can be worked out on a roof, we have produced our **Flex-A-Tile** "Diamond-Point" Asphalt Shingle. Illustration shows the shape of "Diamond-Point" **Flex-A-Tiles.** They can be laid with either end to the weather. Made in garnet and emerald.

FLEX-A-TILES



SLOTTED ROLL TYPE No. 4

Flex-A-Tile Strip Shingles

Slotted Roll Type No. 4

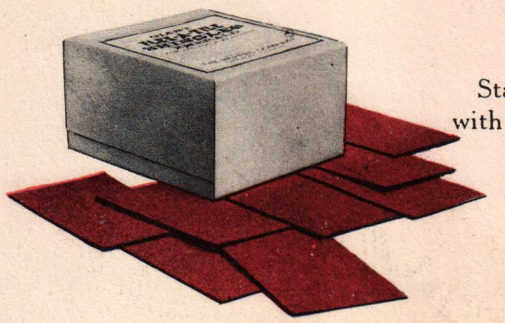
Here is a roofing of **Flex-A-Tile** quality that gives the appearance of individual **Flex-A-Tile** Shingles when laid—but that costs less to lay because it comes in rolls. The slots carry out the shingle appearance.



DIAMOND ROLL STYLE No. 2

Flex-A-Tile Diamond Point Roll No. 2

This is similar to the strip shingle above-mentioned in every way—except that it has a "diamond point" instead of a slot, thus permitting you to get the diamond-point shingle effect in a roll roofing—at the consequent saving in money and labor.



Flex-A-Tile Asphalt Shingles

STANDARD WEIGHT

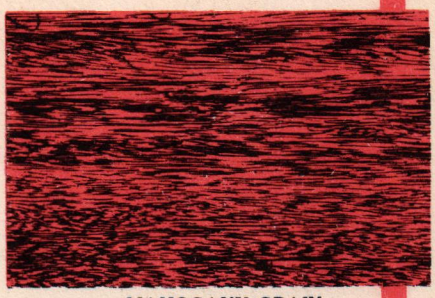
Standard weight **Flex-A-Tiles** represent our first success with high-quality asphalt shingles. Not quite so heavy and thick as the giant — but superior in every way to any other standard weight shingles. **Flex-A-Tile** standard weight Asphalt Shingles come in five (5) fadeless surfacings — red, greenish gray, garnet, emerald and brown.



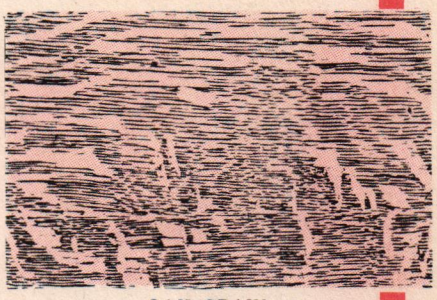
THE HEPPES COMPANY

Not Stained—But Grained

Something new—another Heppes Company triumph. Utility Board now obtainable in beautiful wood finishes: mahogany, plain oak, quartered oak and circassian walnut. Duplicates the natural wood grains of these beautiful, precious woods. See illustrations. Then get samples.



MAHOGANY GRAIN

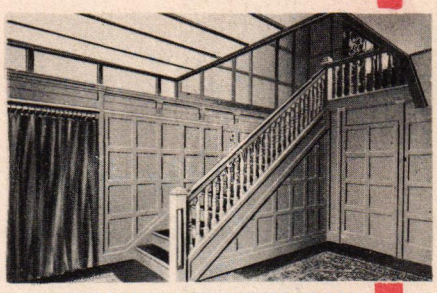


OAK GRAIN

UTILITY

the preferred wall BOARD

We have been making Utility Board for years—much longer and with much greater success than any of the other so-called wall boards. Utility Board is a special composition fibre board built up of layers lastingly welded together with asphalt under enormous pressure.



INTERIOR PANEL SUGGESTION

We have seen Utility Board make good under so many unusual conditions, in so many abnormal situations, in places and in service where no wall board was ever meant to be used—that we know how splendidly it will make good for you and your customers.

You can use Utility Board to advantage on many jobs where lath and plaster are not practical. Utility Board nails direct to studding and joists, or may be laid right over old plaster or ceiling without removing plaster from the walls. The work can be done in stormy weather—when business is slow and ordinarily profits are low—for with Utility Board the profits are quick, sure and liberal. Let us send you samples, photographs and actual instances, showing you how good and how big your Utility Board business can be.

We have two books to send you on Utility Board, our catalogue and "Evidence", a book showing actual jobs in a large variety.



THE HEPPES COMPANY

Roofing in Rolls

These Rolls Are Heavier and Tougher Than Any Others Made



DREADNAUGHT

110 lbs. per square

Flex-A-Tile Dreadnaught roll roofing is the "giant" **Flex-A-Tile** Shingle weight put into roll roofing form. It is the thickest and heaviest roll roofing that has been produced. There is no better factory roofing made—it is tough, strong, heavy.



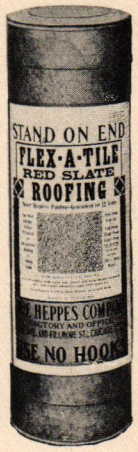
5-Ply Rubbertex Whale

A 5-ply, 75 lb. to the square, roll roofing that is so tough and so durable it practically can't wear out. Made to meet the demands of the country's leading roofing engineers and architects. Also made in 3-ply, 2-ply and 1-ply rolls of correspondingly lighter weights. We know from every test that this roofing is better in quality than any similar goods that we have been able to find on the market.

Flex-A-Tile Roll Roofing

80 lbs. per square

Here is a roll roofing that compares favorably in every way with **Flex-A-Tile** standard weight Asphalt Shingles. The 5 natural colors won't fade—because they are the natural mineral surfacings of the slate or granite which is literally rolled in.



5-Ply Monarch Roofing

75 lbs. per square
Silver Gray Type

A tough, strong, white surfaced roofing—made of the same high-grade felts and asphalts that are used in Heppes **Flex-A-Tile** roofings. Much lower in price than many less attractive roofings. In three other weights: 1-ply, 2-ply and 3-ply, respectively 35, 45 and 55 lbs. per square.

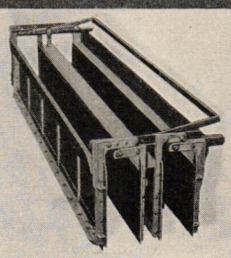


Remember This—Then Send the Coupon

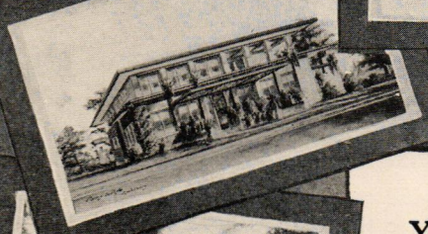
A Heppes Company products job is a monument to any contractor. Heppes Company quality in building material is put there to stay. Heppes Company products once used get repeat business and get it quick for the contractor who has the good judgment to use them and the dealer who has the good judgment to recommend them. Capitalize this advantage in your locality. Send the coupon now.

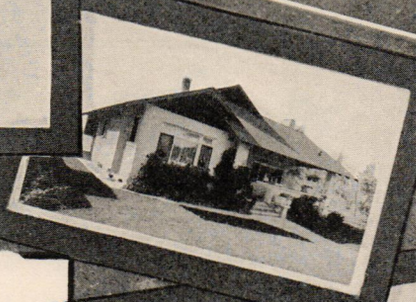
THE HEPPES COMPANY
Chicago

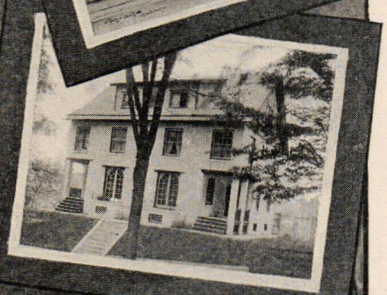
HOLLOW CONCRETE WALL BUILDINGS

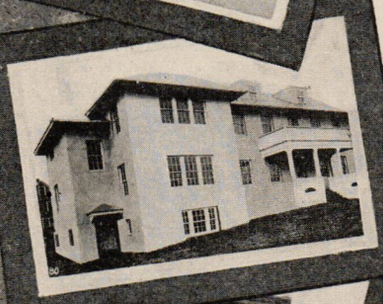


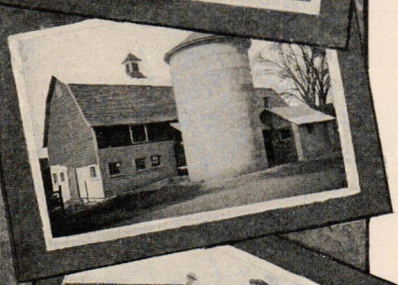
DOUBLE WALL MACHINE



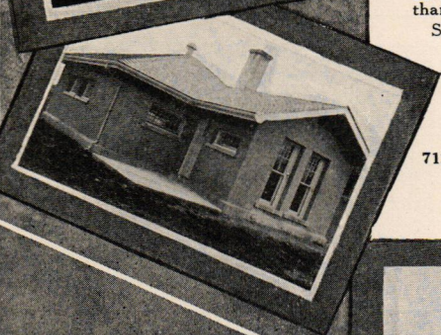


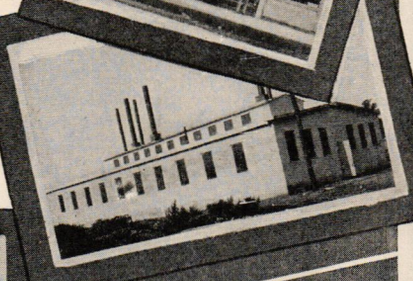












Save Money Yet Have the Best

DOUBLE CONCRETE WALLS, perfect dead air insulation. No cores to carry dampness and frost. Rooms more evenly heated with 25 per cent. less fuel. Refreshingly cool in summer without dampness or chill.

FIREPROOF AND SANITARY, thoroughly reinforced, no repairs ever, will not harbor vermin.

WONDERFUL INSULATION for ice houses and cold storage plants, yet cheaper than the cheapest.

EVERLASTING SILOS, no repairs ever, built with curved machines at lowest cost.

Artistic and Beautiful Residences

Architectural plans followed without difficulty.

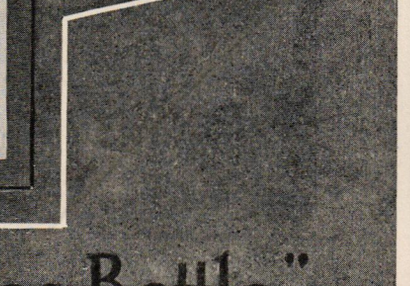
The maximum of strength, permanence, sanitation, comfort, and beauty at the minimum of cost—much lower than brick, no more than wood.

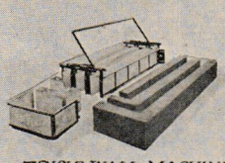
Send for free literature.

Van Guilder Hollow Wall Co.

712 Chamber of Commerce Bldg.

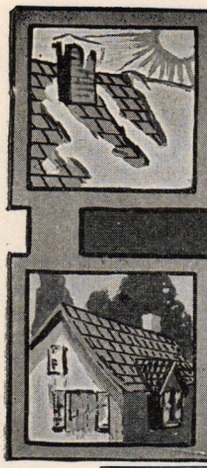
Rochester, N. Y.





TRIPLE WALL MACHINE
FOR COLD STORAGE PLANTS
AND ICE HOUSES

"Built Like a Thermos Bottle"



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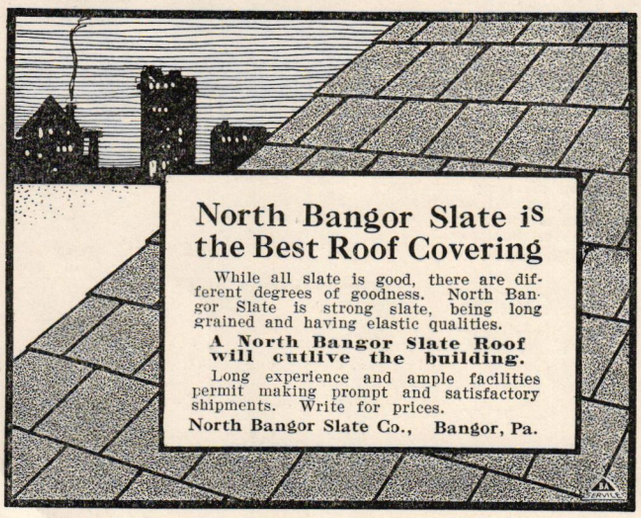

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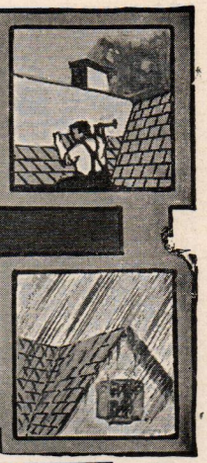

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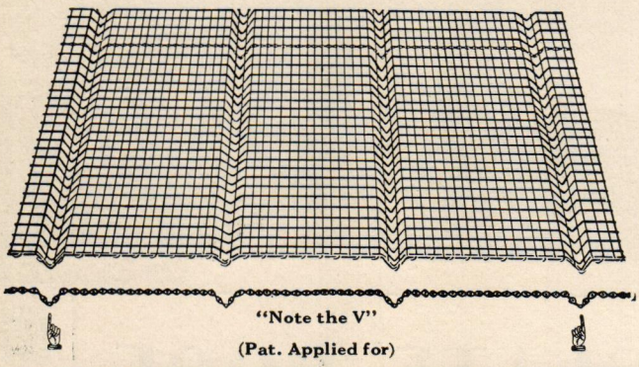

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(Pat. Applied for)

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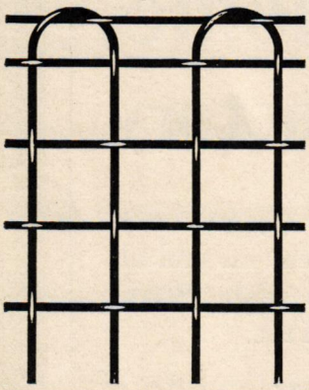

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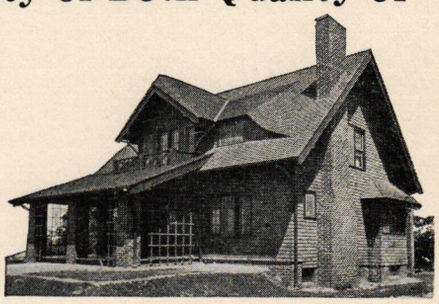

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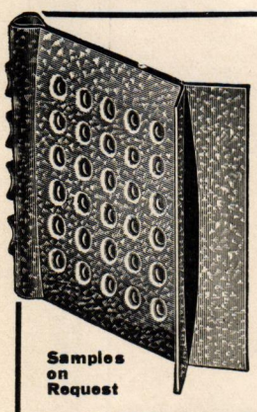

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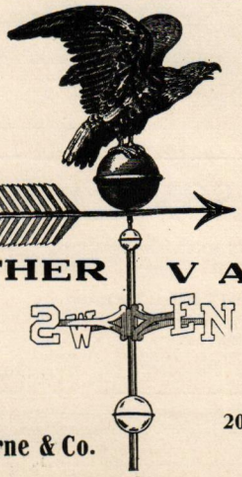

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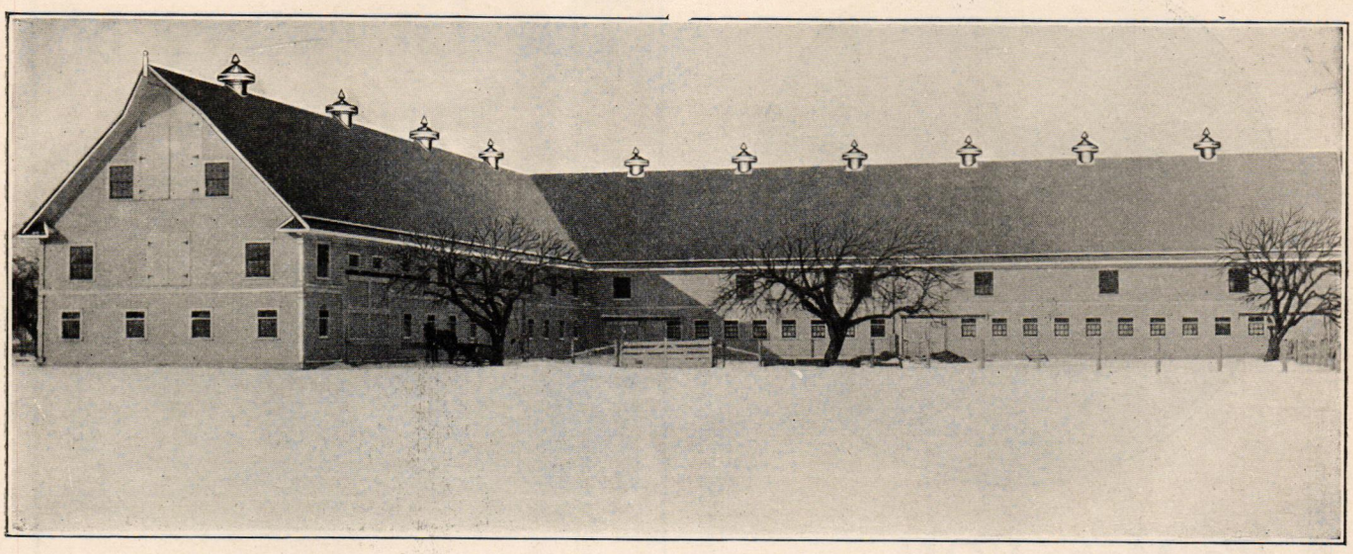

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Yours truly,

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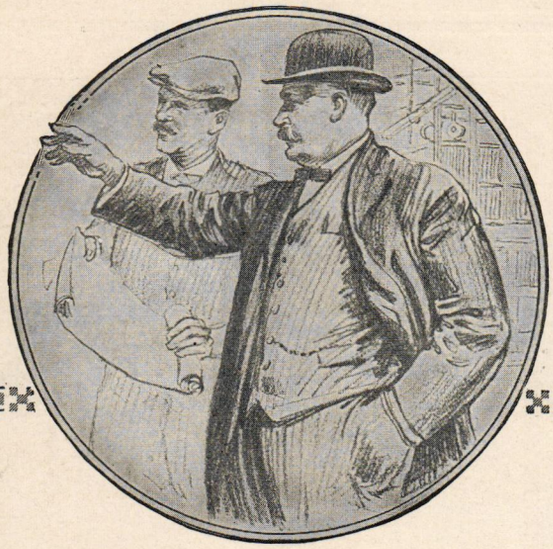

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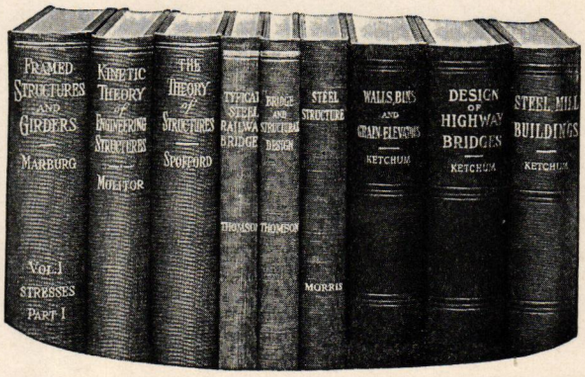

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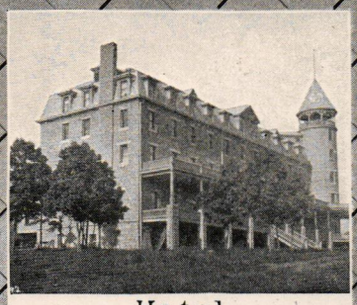

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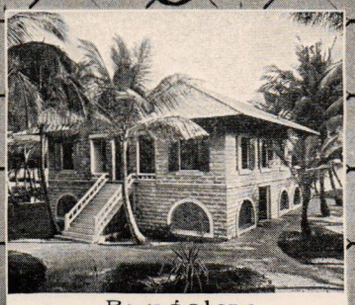

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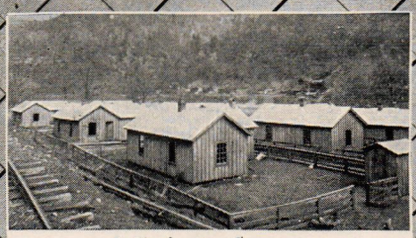

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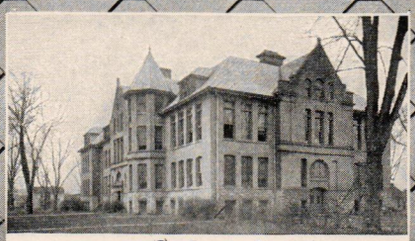

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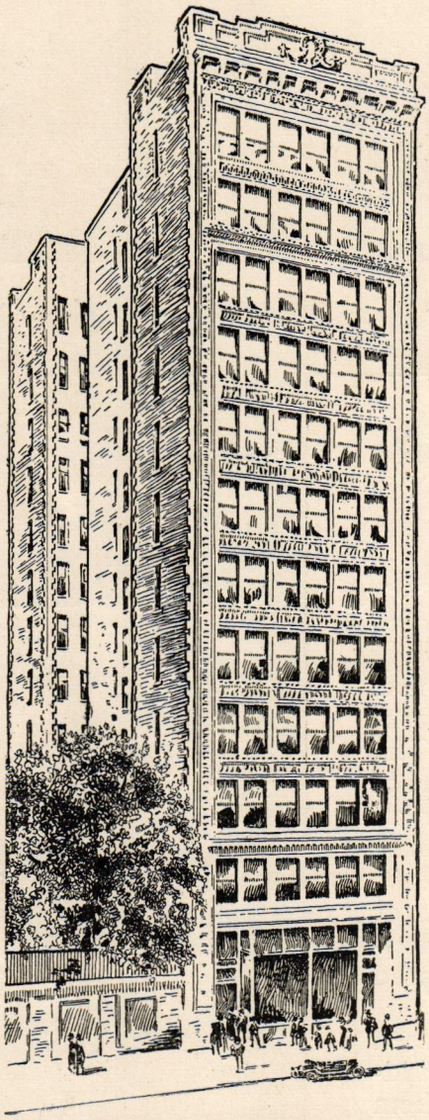

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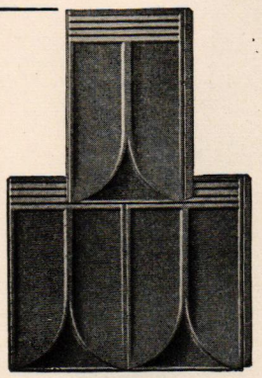

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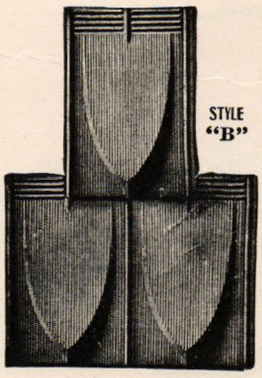

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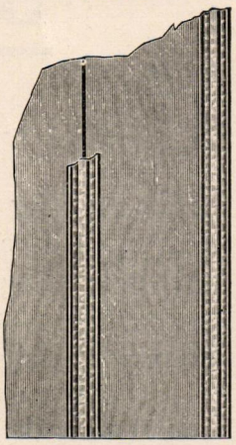

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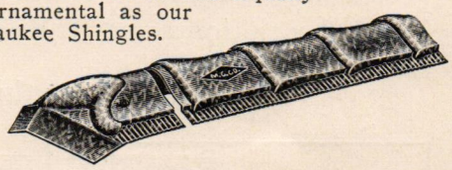

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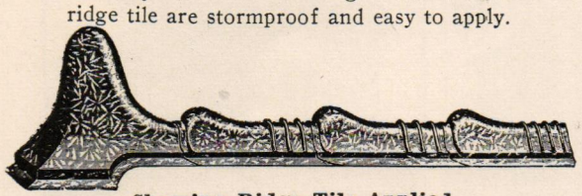

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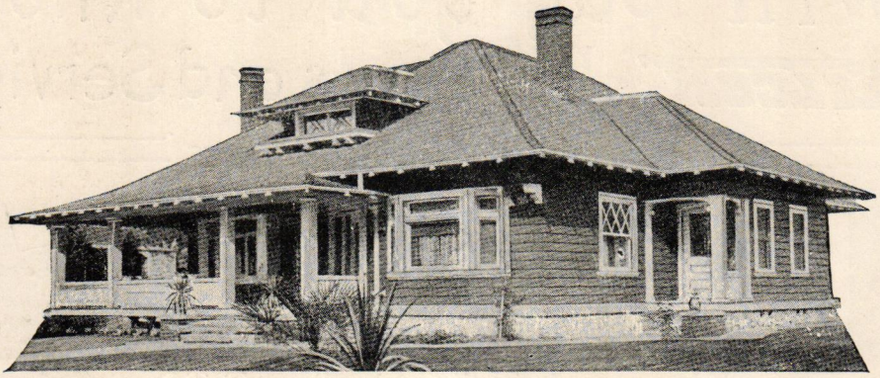

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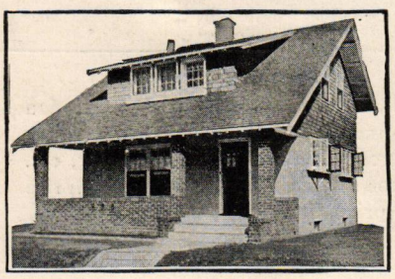

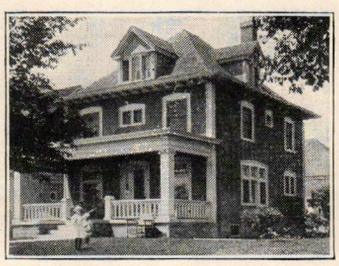

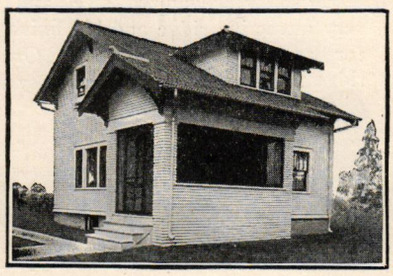

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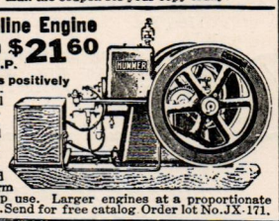

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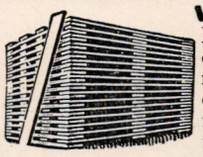

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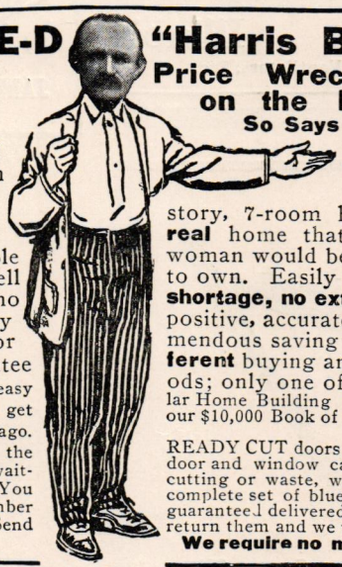

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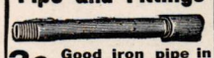

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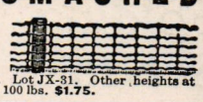

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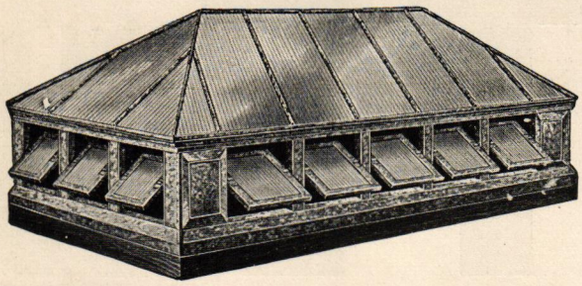

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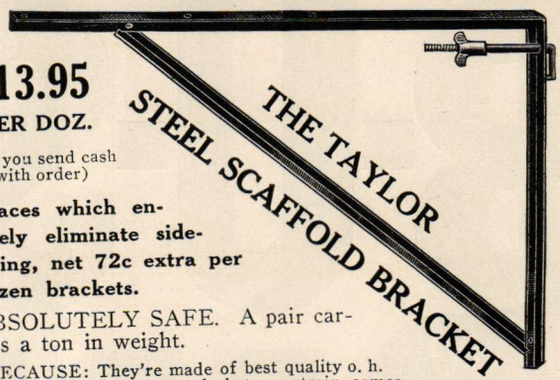

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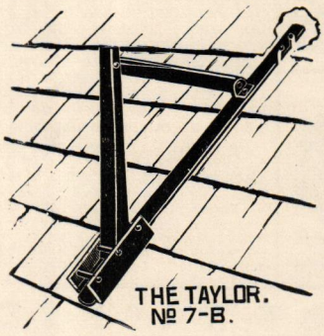

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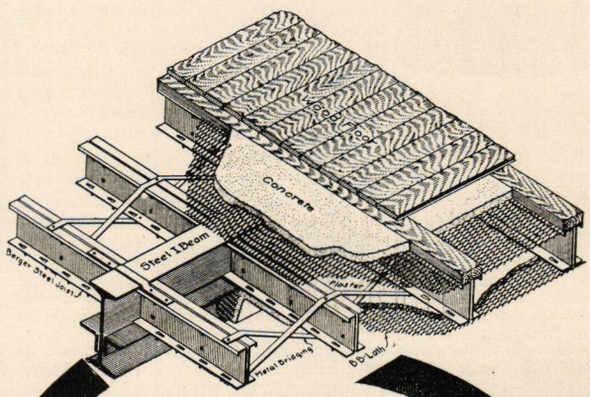

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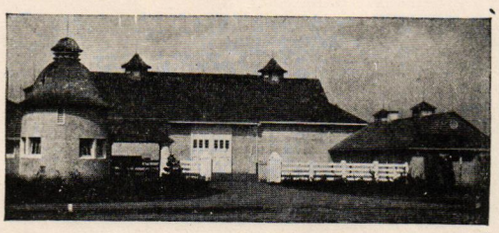

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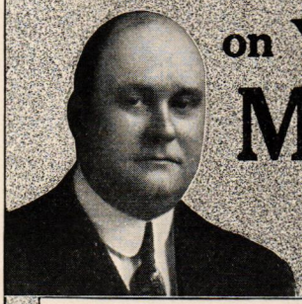

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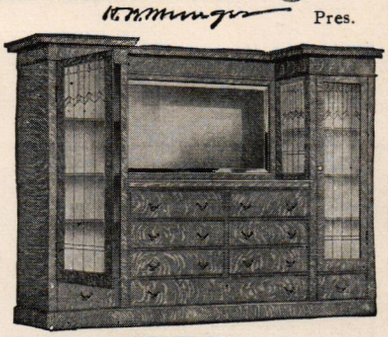


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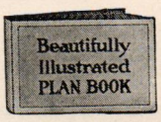

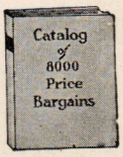

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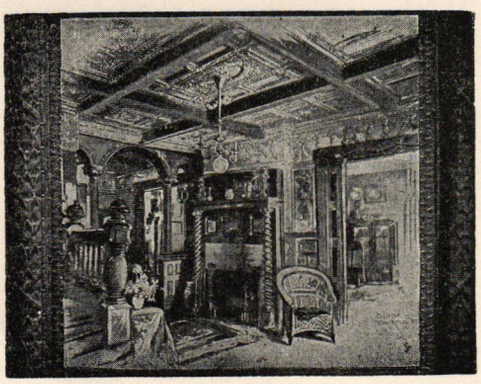
Wood Mosaic Co..... 2
Wright Wire Co.....114

Yaeger Machine Co..... 80



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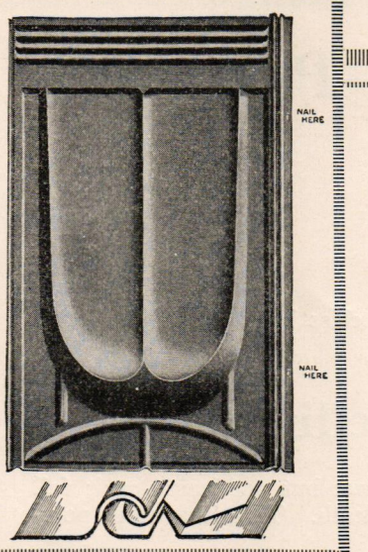

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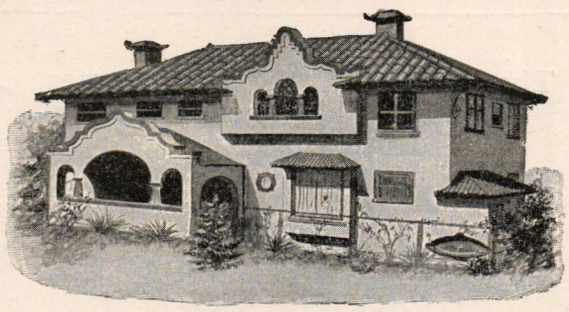

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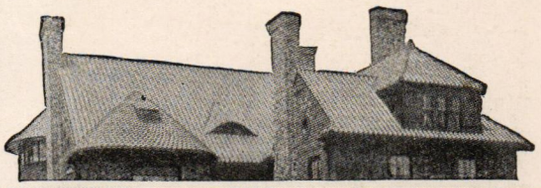

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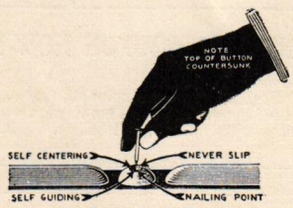

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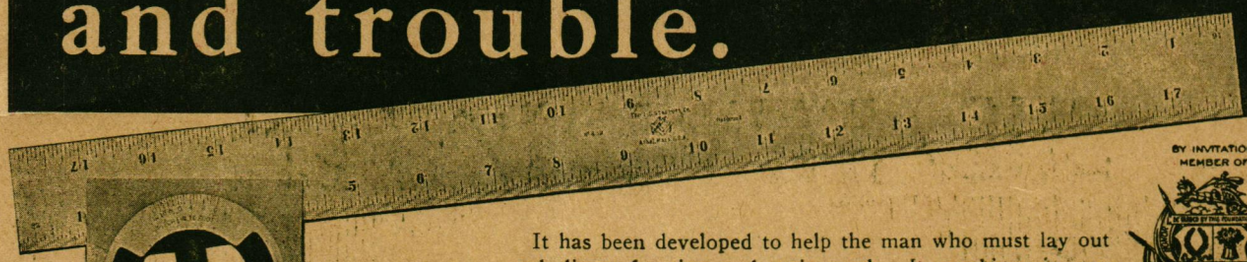

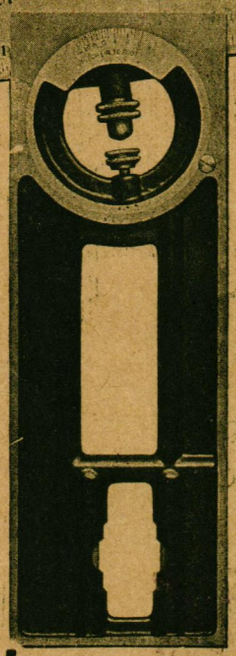

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