

APRIL 1917

PRICE 20 CENTS

AMERICAN BUILDER

THE WORLD'S GREATEST BUILDING PAPER

Spring Buying
Number



OUR 12th ANNIVERSARY

Continued, Page 20
Advertiser's Index, Page 247

TH1
A25

THE DEMAND OF PROGRESS

Has called for better tools. This is especially true where saws are used. For sixty years ATKINS has, by scientific practice and the best steel, produced saws that were far in advance of other makes.



Our exclusive processes of Taper Grinding and Tempering have eliminated the "bind" and frequent filing and refitting.

Therefore a SILVER STEEL SAW is your assurance of less filing and easier work. We guarantee ATKINS SILVER STEEL SAWS to cut faster, work easier and hold their edge longer than any saw made. Keep ahead of PROGRESS through the use of SILVER STEEL SAWS. Buy them at your dealer's. They are sold on a Money Back Guarantee.

ATKINS ALWAYS AHEAD!

*Send ten cents for Miniature Gold Plated Hand Saw
Charm, "Saw Sense" and Monthly Time Books*

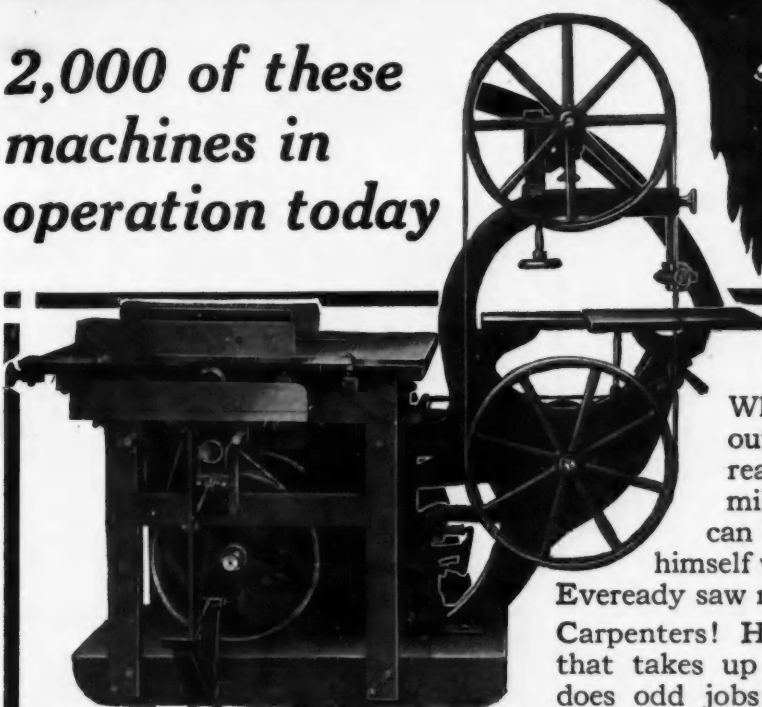
E. C. ATKINS & CO., Inc.

Established 1857

Indianapolis, Ind.

There's MY planing mill

2,000 of these
machines in
operation today



Wise old boy!

Why should he pay out good coin of the realm to the planing mill people when he can turn out the job himself with his own handy

Eveready saw rig!

Carpenters! Here is a machine that takes up but little space—does odd jobs about the shop—

almost as useful as your good right arm in doing up the day's work. It bores, joints, grinds, tenons, sands, crosscuts, rip saws, band saws, jig saws, rabbets, hollow chisels, mortises, mitres and bevels. It saws the hardest lumber—true as a diamond. It can't wear out.

Builders! Here is a thoroughly dependable saw rig that you can load into a light wagon and take **right to the job**. It will turn out your own window and door frames. It will mean a saving in lumber. With the Eveready you take the odds and ends and turn them into blocks or strips that can be used in building. It has its own self-contained power plant.

Let Us Present Our Evidence

The word of the users! That is the most important consideration with you, isn't it? You want to know what the man who has actually used the Eveready saw rig has to say about it. Very well! Send for our recent booklet entitled "Here is the Evidence" containing letters from many satisfied users and photographs of the saws in operation. There are over 2,000 satisfied Eveready users. Will you be one? Are you in the market? Would you be interested in further information on this money-saving equipment? If so, let us hear from you.

Oshkosh Manufacturing Company

47 Amber Street, Oshkosh, Wisconsin

The American Sash Trimmer

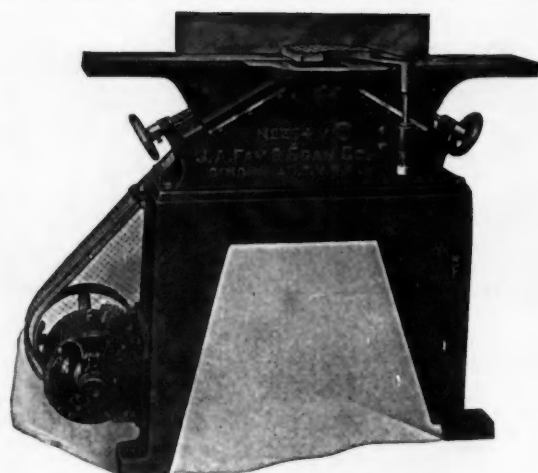


will reduce
labor cost and
increase the
profit of
your Sash
Department

Send
for booklet

Mann Corporation

Kankakee, Illinois

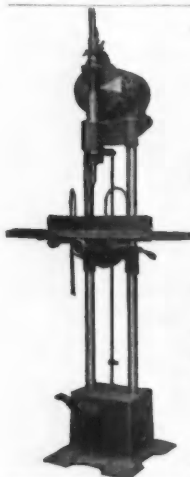


—a really practical Carpenter's Hand Planer

—bench or pedestal—with or without motor

DON'T buy a toy, get a real machine:
64-inch safety head, thin air hardened
steel knives, adjustable bevel fence, re-
movable steel lips, rabbeting arm, pedestal
that gives your feet clearance; easy to
keep clean under the machine; a practical
time-saver and money-maker. Write for
Bulletin H-7.

J. A. Fay & Egan Company
545-565 W. Front St., Cincinnati, O.



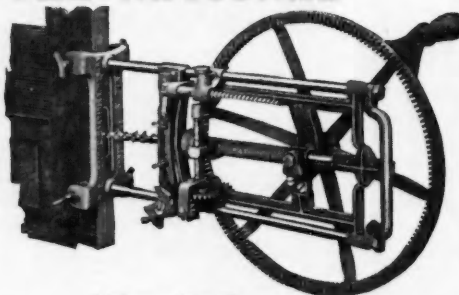
SUPERIOR HOLLOW CHISEL ELECTRIC MORTISER and Multiple Speed Boring Machine

Made in three styles, also belt drive. Just
the machine for the general jobbing shop,
as well as sash and door mills, cabinet and
furniture work. For fast work, quick and
accurate adjustments and cheapness of power,
these machines can't be beat. Address all
inquiries to

WARREN W. MORSE
Hopkins, Minn.

THE NATIONAL

Makes per-
fect mortise
in three
minutes,
ready for
lock or
tenon,
without
brace and
bit, or
chisel.
Fully guar-
anteed.



Address the Co.

362 Lexington Ave. - Columbus, Ohio

Write
for
catalogue
showing
full line of
Wood
Working
Machinery
for
Carpenters
and
Builders.
Also
Bargains
in second
hand
Machinery.



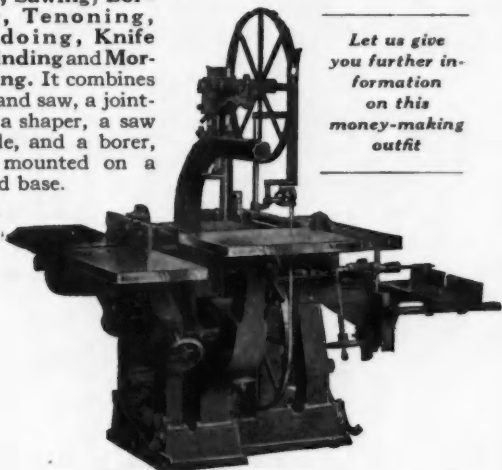
CHICAGO MACHINERY EXCHANGE

1215-1223 WASHINGTON BOULEVARD
CHICAGO, ILLINOIS

FIGURE CLOSER for a bigger profit on your next contract by installing the Crescent Universal Woodworker.

You can keep your men busy all the year around, turning out such work as interior trim, exterior trim, door and window work, cabinet work, porch work, etc.

The Crescent Universal Woodworker does Band Sawing, Cross Cutting, Ripping, Re-Sawing, Panel Raising, Grooving, Disk Grinding, Sanding, Jointing, Sawing, Boring, Tenoning, Dadoing, Knife Grinding and Mortising. It combines a band saw, a jointer, a shaper, a saw table, and a borer, all mounted on a solid base.



Let us give you further information on this money-making outfit

The Crescent Machine Co.
224 Main St., Leetonia, O.

HOISTS

Attention Contractors & Builders



Labor is getting scarcer and more expensive every day. It will be to your advantage to get

A RELIABLE ERIE HOIST to do your heavy lifting. Not an expense but a good investment.

Write for booklet.

Erie Clutch & Pulley Co.
26th & Holland St., Erie, Penna.

Miller's Lock Mortiser

TWO MINUTES
Will cut an opening in a door for a mortise lock
IMPROVED AND UP-TO-DATE

cuts true, in any kind of wood for any size lock from 1" to 1 1/2" thick. Easy to operate; durable in construction. Builders use it everywhere.



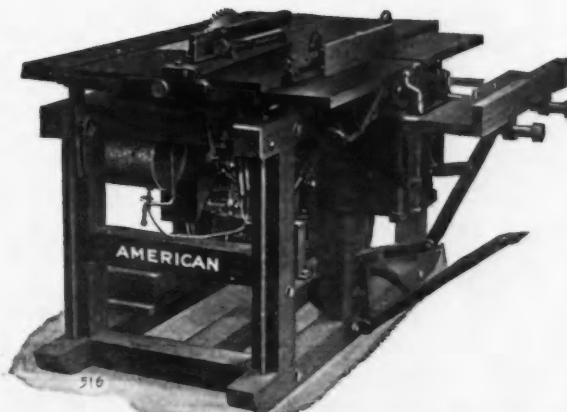
Sent subject to trial.

A. W. Miller Mfg. Co.
Riverside, Calif. 1-1 Cincinnati, Ohio
Our Butt Mortiser and Rule Gauge for 75c, Postpaid

Let Yours Be An "AMERICAN" Contractors' Portable Variety WOOD-WORKER

You can't afford to make a mistake in this matter of buying a wood-worker. A few dollars' difference in price may mean hundreds of dollars of difference in ultimate earnings. Remember—your wood-worker should be a profit-earning investment, not an expense. And the "big buy" in the wood-worker field this year is the "**American**"—the 18-in-1 wood-worker—the 4-man wood-worker—the wood-worker with built-in earning power—the year-after-year wood-worker that will be on the job for you season after season.

Write today for new Bulletin 67. It shows you why the "**American**" is the wood-worker you want.

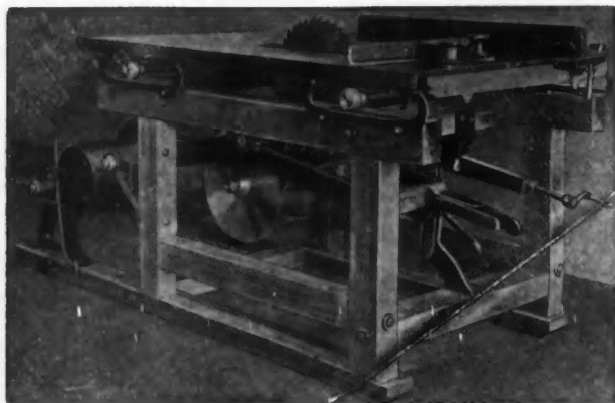


You may have the "American" with gasoline or electric motor built in—or arranged for belt drive.

American Saw Mill Machinery Co.

1360 Hudson Terminal

New York City

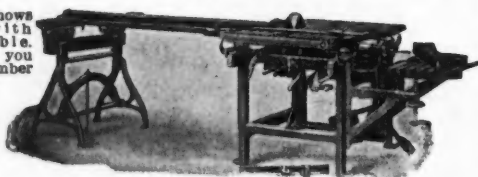


**NOW IS THE TIME TO GET A
BEACH
DOUBLE ARBOR RIP AND CUT-OFF MACHINE**

Get this money-maker on the job. This portable wood-worker will handle all your fine sawing, as well as your dimension stuff. Either gasoline engine or electric motor drive. Has our patented rolling table, making it the most efficient machine on the market. Don't delay—make this year the most profitable and successful of your career. Write for descriptive catalogue.

BEACH MFG. CO., Montrose, Pa.

This view shows extension with rolling table. This allows you to handle lumber up to 20 ft. and slides easily with 1000 lbs. weight in it. Locks instantly for ripping or beveling.

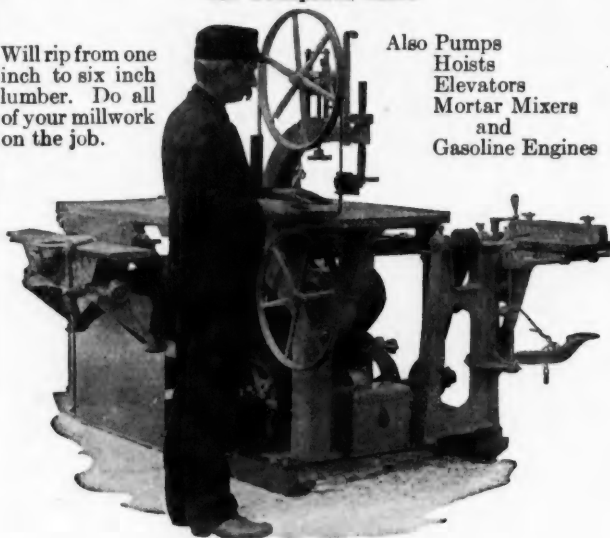


C. H. & E. PORTABLE SAW RIGS

Six Complete Sizes

Will rip from one inch to six inch lumber. Do all of your millwork on the job.

Also Pumps
Hoists
Elevators
Mortar Mixers
and
Gasoline Engines



This shows the No. 6 Rig
Write for our Catalog

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



SILVER'S NEW WOODWORKING MACHINES

SAW TABLES, JOINTERS, SWING SAWS, BAND SAWS—

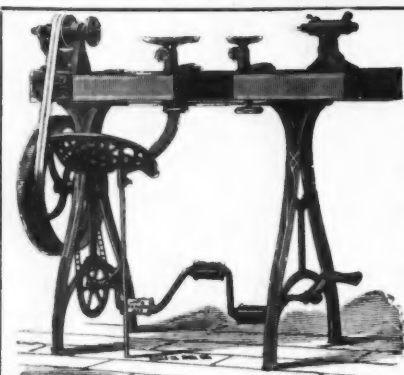
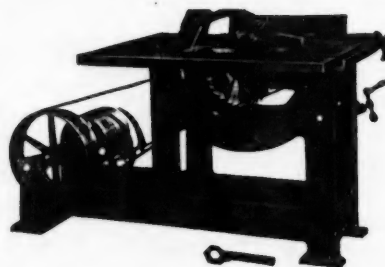
Tools of good honest construction, newest improvements and conveniences; patterns fresh from the designers.

Jointers, 8, 12, 16, 20, 24-in. Band Saws, 20, 26, 32, 36-in.
Swing Saws, 6½, 7, 7½, 8-ft.

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

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

The Silver Mfg. Co. 345 BROADWAY
SALEM, OHIO



COMPLETE OUTFIT Hand and Foot-Power MACHINERY

Our No. 3 Wood Turning Lathe can be speeded from 1,000 to 2,000 revolutions a minute with perfect ease. Stopped or reversed at will of operator.

Write for Particulars

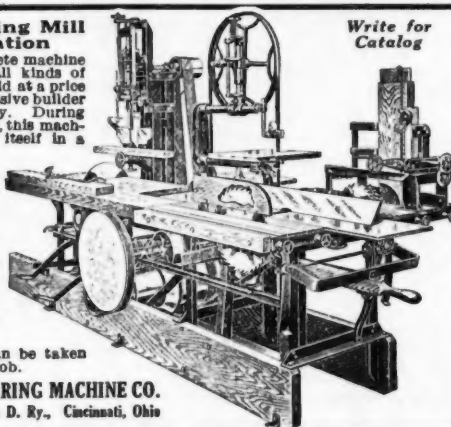
W. F. & Jno. Barnes Co. 74 RUBY ST.,
Rockford, Ill.

Parks Planing Mill Combination

The most complete machine for getting out all kinds of mill work, and sold at a price which any progressive builder can afford to pay. During the season, this machine will pay for itself in a couple weeks.

Rip saw, 12" Jointer, 22" Band saw, Swing cut off saw, Shaper, Upright mortiser, Tenoner, Sand disk. All ready for instant use without having to make any changes. Machine can be furnished with long bases with engine mounted in rear so it can be taken right out on the job.

PARKS BALL BEARING MACHINE CO.
Fergus St. & C. H. & D. Ry., Cincinnati, Ohio



Write for
Catalog

HAND WORK

-OR HEAD WORK?

Which
Pays
Biggest

Right
under
your
thumb
you
have
the
oppor-
tunity
to
make
money
this year

?

You have heard the statement, "I have only one pair of hands." It expresses the limitations of hand work.

The man who depends only on his two hands may some day depend on others.

The man who uses his head to save his hands has taken a big step forward.

But the man who uses his head to LET MACHINES and OTHER hands save manual labor, is the chap who is on the way to an easier life and wealth.

Watch one of your men (or do it yourself) take his hand saw and after squaring and marking the board, shift it into place for cutting and saw through it. Time him! With a simple power outfit on the job, the board is shoved into place and, without squaring by hand, pressed against the busy teeth of the power saw. "Zip!"—it's done. A clean, accurate cut is made by power much cheaper than by hand.

With one "FAMOUS" machine you can do all this hand work such as sawing, boring, planing, etc., five to ten times faster and proportionately cheaper. You can save mill work charges. You

can mount the machine in a portable manner and use it in a shop as well as out of doors.

It will make money for you summer and winter.

The Sidney Tool Company
Sidney, Ohio

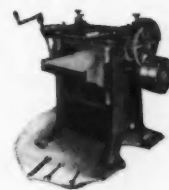
It's easy enough to put your money into a machine. The question with you is HOW TO GET IT OUT. We have prepared a Bulletin (ask for No. 12) that tells how. Mail the coupon for this valuable story. It shows what you can do with woodworking machines. Mail it now!



FAMOUS Saw Tables, built in eight sizes and styles, for ripping, cutting off and variety work.



FAMOUS The above illustrated "FAMOUS" automatic hollow chisel mortiser and borer is valuable in carriage work, furniture and door shops, and a wide range of operations in woodworking plants.



FAMOUS "FAMOUS" planers are steady, thorough workers—they save time and produce uniform work. Heavy, powerful machines. One of the several styles we build may prove what you want. Write for catalog No. 12.

Gentlemen:

Date.....

Mail me free Bulletin No. 12 on "Getting the Money OUT."

I am interested in (what machines?)

.....

.....

Name.....

Address.....

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



The Old-Fashioned Method—

That of using the Jack Plane, caused much labor and irritation; and netted no perfect results. It was a slow monotonous grind with the finish always uncertain.

Wallace Bench-Planer

has established the *modern method*. It eliminates all hard work; and gets mechanically perfect results, easily, swiftly and automatically.

It Is Portable—Safe

It is light in weight (only 50 pounds) and is run by electric power attached to **any light socket**—belt driven if

desired. It is eighteen inches long, and has 4-inch knives.

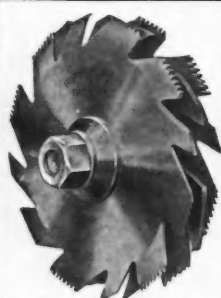
The very narrow throat opening, the patented flap and the shutter guards absolutely prevent accidents. Pieces as short as 3 inches can be safely and accurately planed on the Wallace.

We shall be glad to send our literature to anyone interested.

J. D. WALLACE & CO.

1405 W. Jackson Blvd.

CHICAGO, ILL.



Patented Nov. 29, 1892.
Feb. 10, 1910.



Showing position of cutters on mandril.

Our No. 24 Catalog sent on request. Describes full line of tools for saw rig.

For Your Saw Rig Huther Bros. Dado Head

will cut perfect grooves, any width, with or across grain. It consists of two outside cutters and enough inside cutters to make the desired cut.

The Head comes to you ready to use and guaranteed to do your work satisfactorily.

Ten days' free trial at our expense.

This cutter head can be used on the saw table. Knives are adjusted by headless set screws and are held by dovetailed slides and bolts. Runs like a solid cutter. Any shape knives made to order.



Patented Dec. 30, 1913.



Grooves cut with Huther Dado Head.

HUTHER BROS. SAW MFG. CO.

1101 University Ave.

Rochester, N. Y., U. S. A.

BERLIN

A Machine for All Purposes

Does the Work of Ten Men

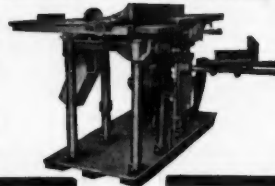
The Berlin Wookworking Mill does away with high priced hand labor and is the greatest labor saver you can buy.

This machine has a wide range of work. Its working parts consisting of Rip Saw, Cross Cut Saw, Dado Saw, Grooving Machine, Jointer, Jig Saw, Boring Machine, Sander and Emery wheel. Equipped with either gas engine or electric motor. Guaranteed for two years.

Write for Information

Schaefer Mfg. Company

American Street, BERLIN, WIS.



Bicknell's Combination Jointer, Saw, Sticker and Rabbeting Machine No. 105

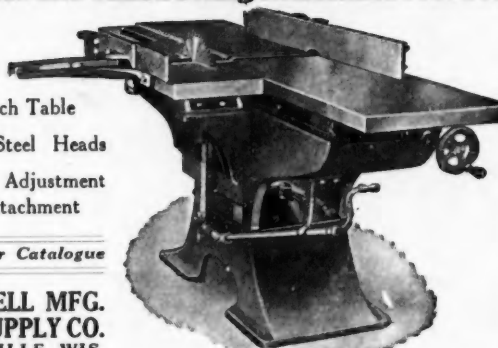
84 Inch Table

Slotted Steel Heads

Instant Adjustment of Attachment

Write for Catalogue

BICKNELL MFG.
AND SUPPLY CO.
JANESVILLE, WIS.





GREYHOUND SAWS

Speed—Toughness—Easy Running

If you want a saw with the above features and one that will hold its set and sharpness longer than any other good saw, buy the Geo. H. Bishop Co.'s Greyhound Saw.

30 Days' Free Trial

We are so positive that the Greyhound will satisfy you that we offer it on 30 Days' Free Trial. During that time use it on all kinds of wood. If it does not run easier, cut faster than any other saw you have ever used, we will gladly refund your money.

Prices: Made in Both Straight and Skew Back also Ship Carpenters' Pattern.

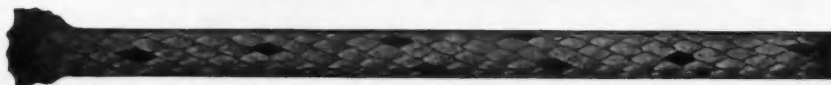
Length,	18	20	22	24	26	28	30	inches.
	\$2.35	\$2.50	\$2.65	\$2.80	\$3.00	\$3.30	\$3.65	net

Packed one in a Box.

**Geo. H. Bishop
& Company**
Lawrenceburg, Ind.



SAMSON SPOT SASH CORD



Samson Cordage Works

Boston, Mass.

Made of extra quality stock, carefully inspected, and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

Samples and full information gladly sent.



We can offer something **SPECIAL** in the way of **PRICE**. Write for catalog and particulars.

"A Bit of Utility"

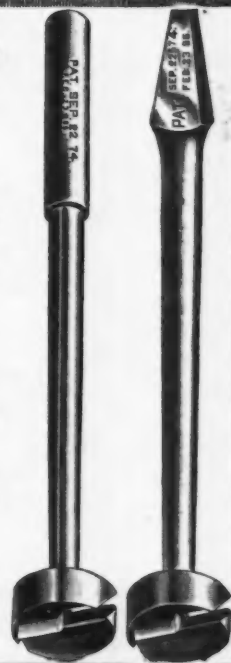
FORSTNER BITS are DIFFERENT from all other wood boring tools. Being guided by the outer rim they may be turned in any direction. The work is left smooth and polished.

Unequaled for Delicate Work

Practical for use as gouges or chisels, suitable for scalloping, fancy scrolls, twists, columns, newels, ribbon mouldings, mortising, etc.

Cabinet and pattern workers are enthusiastic over them. They do more work and cost no more than other bits.

The Progressive Mfg. Co.
Torrington, Conn.





When Buying Measuring Tools

Quality means more than simply the materials and care used in manufacturing—it includes convenient combinations of many tools in one, lessening the number to be purchased and carried about. The clean cut graduations and the ability of tools to produce accurate work characterize

Starrett Tools

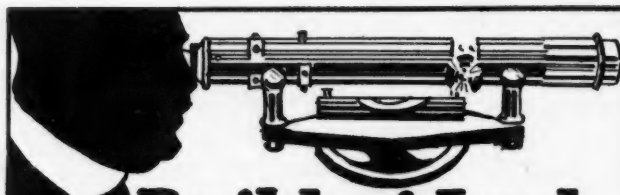
To aid the carpenter in laying-out and measuring accurately all kinds of framing and stair work, mortises, fine cabinet work, etc., there are no tools like Starrett.

Carpenters and woodworkers will find rules, squares, levels, bevels, marking gages, combination sets, scrapers, etc., described in our free catalog No. 216. Write for your copy today.

For sale at all good hardware stores

The L. S. Starrett Co.
The World's Greatest Toolmakers
Athol, Mass.

42-634

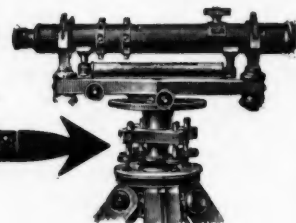


Builder's Level

A high grade instrument especially designed for contractors and architects. Excellent equipment for leveling walls, laying out angles, giving lines and levels for buildings, grading streets, drains, etc. Made of best phosphor-bronze and bell metal. Write for our booklet describing Beckmann Levels.

THE L. BECKMANN COMPANY, 500 Adams St., Toledo, Ohio

This is the one
best Level
for Builders, Architects,
and Contractors



Get a
"KOLESCH"

It is built throughout for long and hard usage, is light in weight, and accurate—and is sold at a reasonable price.

KOLESCH quality in a level means
an instrument that pays big



KOLESCH & COMPANY
138 Fulton Street, NEW YORK



DIETZGEN Measuring Tapes

embody superior accuracy, dependability and perfect workmanship.

Leather cases are hand sewed and steel lined. Steel cases are heavy steel, with knurled band that insures firm grip.

The handles are easily opened, the division lines *on upper edge of ribbon* convenient to read, the simplified reading—foot number in front of each inch number—saves delays and mistakes.

EUGENE DIETZGEN CO.
Manufacturers

Chicago New York San Francisco New Orleans
Pittsburgh
Philadelphia

Tape Catalog "A"
on request



The Reliance and Admiral Tapes
are two of our popular sellers

Showing
Sun-Shade
Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in

this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 621 Olive St., St. Louis, Mo.

Mail Coupon NOW

**A. S. ALOE COMPANY,
621 Olive St., St. Louis, Mo.**

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name.....

Occupation.....

City.....State.....



Builders-Transit

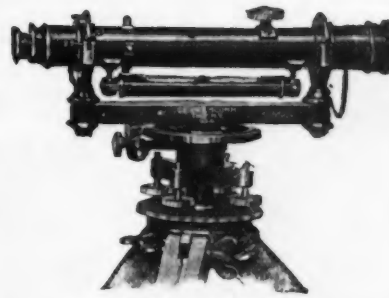
G & B Transit-Level

The only instrument on the market with all the features of a

Builders Transit and Architects Level

It is THE ONE INSTRUMENT FOR ALL JOBS. Durable, accurate and economical. The price is \$67.50 F. O. B. Troy, N. Y.—not a big price after you have seen the instrument. Consider well before buying your instrument. A few dollars more on the first outlay will save you much disappointment and worry later. Have us mail you our Circular "B." You want quality and service, an instrument which you can use under all kinds of conditions and which is easy to operate. Write today.

GEIER & BLUHM, Troy, N. Y.



Architects-Level

Avoid the Rush *Don't Wait Till Spring*

to order Screens for your new building.* Prices are much lower now and workmanship not hurried. Spring delivery if desired. **Carpenters and Contractors**—Our special equipment enables us to produce high grade order made **WINDOW AND DOOR SCREENS** of all kinds at astonishingly low prices. Write for illustrated catalog and prices. Good territory for live agents still open.

Standard Screen Company

1848-58 Hastings Street

Chicago, Ill.



No. 2020

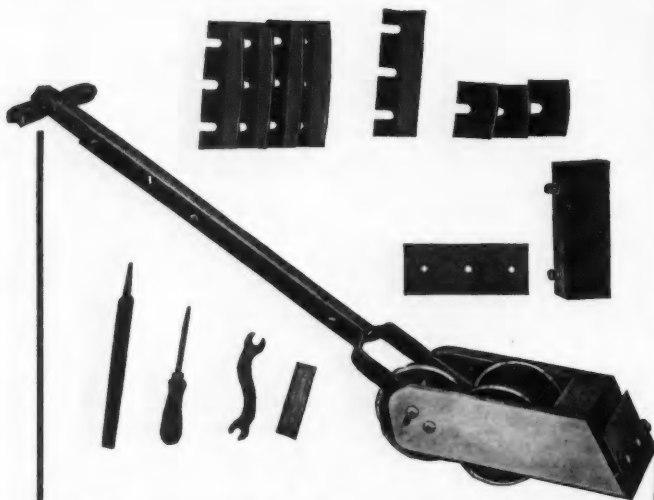
Combined Level and Transit Try It For 10 Days—FREE

Either a level or a modified transit with which to run straight lines, plumb girders, walls, etc. Instantly convertible from level to transit. An accurate, up-to-date, moderate priced instrument for use on construction work. "White" levels have been standard equipment for many years. There are thousands of them in daily use on as many jobs. Try one on your work for 10 days free—no obligation.

Circular sent on request.

DAVID WHITE CO., Inc.

419 E. Water St., MILWAUKEE, WIS.



A Satisfied Customer is far more important to us than a Floor Scraper sale. Floor Scraper users are our best salesmen. That is the reason for our unusual selling plan under it. You

Borrow a Floor Scraper for two weeks, you pay nothing, you deposit nothing. You agree to buy the Floor Scraper at the end of two weeks if you are satisfied, or return it at our expense if you are not. Made in five sizes. Write for prices.

FOX SUPPLY COMPANY
Dept. A, Brooklyn, Wisconsin

OVER 3000 Universal Floor Scrapers In Use Daily

When you think of "over 3000 Universal users" you are pretty sure to realize that this is the scraping machine that is giving results. Over 3000 satisfied users with frequent repeat orders! Here is a machine that is standing the test of hard usage on all kinds of work. Every carpenter and builder needs a Universal—can make good money with it. Used on all kinds of work—smooths joints and warped edges down nicely—doesn't leave irregularities or spots. Our patented sharpening device is an important feature.

Let us hear from you

UNIVERSAL Floor Scraper Co.
166 Union St., Worcester, Mass.

For Quality Work Use the



Triple "A" Spring Driven Floor-smoother

- Easy to operate.
- The Automatic Spring Motor does the work of a self starter on each and every cutting stroke.
- Scrapes from 200 to 400 square feet of floors per hour.
- Has reversible shear cutting blade adjustment.
- Scrapes every part of the floor including corners.
- Blades sharpened in the machine without removal.
- Has two adjustable weights.
- Depth or width of cut can be regulated to suit.
- Weights detachable for easy handling.
- Automatic Sandpapering Attachment included, together with six double edged blades of assorted shapes and thickness, and a full and complete set of high grade sharpening tools.

Send for descriptive booklet and Free Trial offer.

TRIPLE "A" MACHINE CO. Room 316, 4101 Ravenswood Ave. Chicago, Ill.

Stern Scrapers

The Stern has been shipped to all parts of the United States and Canada without complaint and we will gladly ship one to you on trial, without charge.

Easily adjustable to one thousandth of an inch without tools of any kind. Simple and accurate the Stern Floor Scraper never leaves a wavy or chattered floor.

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SOLVE YOUR LABOR PROBLEMS

By Surfacing Your Floors

"The American Universal Way"

The American Universal will cut at least **FIVE MEN** off of your pay roll. Let us tell you all about this wonderful machine and our

FIVE DAYS' TRIAL

American Floor Surfacing Machine Co.

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The Oldest Concern in the Business



Wire Window Guards

Counter Railings
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Tubular Hand Rails
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BUILDERS' IRON WORK

Window Guards, Elevator Enclosures, Elevator Cabs, Hangers, Ornamental Iron, etc., etc., etc.

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10% DISCOUNT!

For one month we offer the Improved Floor Surfer at a 10% discount. This is a complete machine equipped with 1 H.P. motor and vacuum cleaner. Will surface from 800 to 1200 sq. ft. per day close up to base board, on either old or new floors. Guaranteed for one year against defects of workmanship or material. Write for our free trial offer.

Standard Floor Surfacing Machine Co.

Sole Agents

Demonstrating
and
Salesroom



40 Kilby Street
BOSTON
MASS.

The WEBER DOUBLE ACTING Floor Scraper

What It Means

To have a Weber means a satisfied owner and a satisfactory job both of which boost the Weber Double Acting Floor Scraper. Mr. Weber wants every contractor in the U. S. to have a floor scraper that will do satisfactory work on all kinds of hardwood floors. Don't forget to order 15 to 20 days before you plan to use it. Reason—big demand for floor scrapers and difficulty in getting steel and other materials.

WEBER MFG. CO.

Office: 684-686 73rd Ave. Factory: 670 71st Ave.
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The IMPROVED Rapid Floor Surfer

will surface right up to the wall or baseboard without the use of Edge Roller. Just the machine you would want for surfacing all kinds of wood floors, whether old or new. Will smooth down rapidly and easily all joints or warped edges. Perfect results guaranteed. More than 20,000 of our machines now in use. Guaranteed against defect in material and workmanship for five years.

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It will interest you.

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Made in several sizes

Stop Making "Borderwork"

around your baseboards—which results when you use a narrow edge roll attachment, as its work is uneven and looks different from the rest of the room when finished. Get the same uniform work right up to baseboards that you do throughout the room by using

The Improved Type Automatic Ball-Bearing Electric Floor-Surfacing Machine

The sanding roller is mounted so one end extends just beyond the side of the machine—easily adjustable to either side so that the wall all around the room can be reached. And the Little Automatic Electric Surfacing Machine (shown below) is a wonder for removing old varnish from desk tops, tables, counters, etc., as well as for dressing up new work.

FREE TRIAL OFFER
on either of these machines.
Write today for full information.

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"YANKEE" Plain Screw Drivers

STANDARD No. 90
CABINET - No. 95

They cannot loosen in the handle, in use or abuse. You have our guarantee.

They are durable as the high grade steel that composes them, and will render faithful service for generations. The comfortable handle and various lengths of blades make them suitable for all classes of work.

Your Dealer Can Supply

Let us send you a "YANKEE" Tool Book.

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DID'S "Money-back-if-you-want-it" FLOOR FINISHER

I'm no liar, flim flammer nor hot air shooter, but—

You might think so if I tried to tell you how quick and easy—how much time, labor and money you can save in finishing wood floors with my Floor Finisher.

So, I'll ship it to you on free trial—no obligation to buy. The machine will do its own talking and you may be your own judge.

If after ten days you are not well pleased or entirely satisfied, and not certain it is just the machine you want and need, ship it back at my expense. Price for Scraper, six blades, bur-nisher, wrench and Sander Attachment, \$24.50. Or, if you remit with order, \$22.00.

Guaranty

If at any time or for any reason you are not well pleased, you may have your money back if you want it.

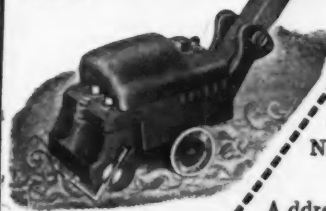


H. P.
Didrikson,
1825 Summit St.,
Columbus, Ohio

Send your complete Floor Finisher on ten days' FREE TRIAL. If I decide to keep it will remit \$24.50. Otherwise will return at your expense.

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Address.....



10-reasons for our -year Guarantee Unit Sash Balance

1. It is recognized and approved by the FIRE UNDERWRITERS LABORATORIES, and may therefore be used in fire-proof or ordinary constructions.

2. It is no experiment — has been on the market more than 30 years, and there are over 5,000,000 of them in use today.

3. It is more economical — replacing the box frame with a plain plank frame.

4. It is easier to install — a carpenter can fit at least twice as many windows with sash balances that he can with weights and cords.



5. It eliminates rattling weights, broken cords and squeaking pulleys.

6. It saves space and permits narrower mullions and thus gives more lighting area.

7. It is impossible to pinch it too tightly in mortise to interfere with smooth running of the balance.

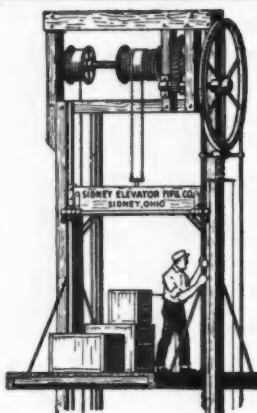
8. It balances the sash perfectly at all points.

9. It is absolutely dependable in any kind of building.

10. It is guaranteed for 10 years against faults or defects in construction or material.

Send for catalog with full description and prices, also blue print showing installation.

Pullman Mfg. Company
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SIDNEY ELEVATORS

Will reduce your handling expense, and speed up your work.

Our machines are easily installed from our complete plans and instructions which are sent with each elevator.

The Reasonable Cost Will Interest You

Write us today, stating requirements, giving style of machine wanted, size of platform and number of feet travel, and we will quote a money saving price on equipment to serve you well.

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DUMBWAITER COMPLETE \$19.50 READY TO INSTALL

Includes all necessary material, not knocked down—machine, machine timbers, bolts, boxes, car, counterweight, ropes, guide ways, etc., all ready to set in hatchway and erection instructions. Length up to 20 feet. All material guaranteed. Money back if not satisfactory. Write for further particulars.

Highwood Dumbwaiter Co., Grand Ave., Leonia, N. J.



CARPENTERS WANTED AS AGENTS
Now is the time to act. Big Money Ready Seller. **SANITARY AUTOMATIC DUMBWAITER** saves carrying food to and from cellar. Perfectly ventilated, screened openings; padded inside with durable white enamel. Keeps food perfectly. Top line flush with kitchen floor. You can walk over it. Operates with push button or lever. Also furnishes as a Refrigerated dumbwaiter. Assembled complete ready to install. Three hours' time places them in actual operation in old and new homes. \$19.50 apiece; \$15.75 apiece in one third dozen lots. Write for complete information.
York Automatic Dumbwaiter Works, 639-645 W. Market St., York, Pa.

*"It's great to
feel sure your
bit can't clog"*

Wherever you bore a hole—remember that instead of using a bit that clogs, heats or holds back, ruining your disposition and getting poor results, let a

LEBANON "Z" TWIST AUGER BIT

do the work. It bores easier than you ever thought a bit could bore and 40 to 60 per cent faster than all others.

It is the famous "Z" Twist that brings the chips out without clogging, and the special points on Lebanon "Z" Twist bits allow them to enter any wood without much pressure. They are certainly labor savers for carpenters.

Write for the new pocket catalog, and ask your dealer about these high speed bits.

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JUMPER DISAPPEARING DUMB WAITERS
CHAIN HOISTS, CRANES AND TROLLEYS
SEND FOR CATALOGUE

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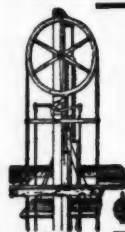
Do away with sash weights, cords, pulleys and pocket frames and save money by using
AUTOMATIC SASH HOLDERS

Proved by Use—Unexcelled for windows without pocket frames. Excellent for new windows.



Send for circular and prices, or \$1.00 for trial set prepaid; state approximate weight of sash.

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We manufacture an improved line of Electric, Hand or Belt Power Elevators, Dumbwaiters, Hatch Gates, etc. Send for full information.

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Are you with the big majority?

A recent canvass of hardware stores again verified the fact that by far the greatest number of saws sold to mechanics are

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This means that most of the men who are in a position to *know*—whose reputation and success demand that they use the best—are using the saw that has been acknowledged best for three-quarters of a century. Are you one of these men?

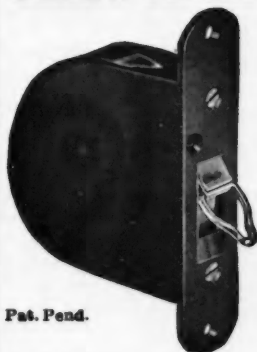
As a mechanic our Handbook "S" will interest you. Send for it; it's free.

Henry Disston & Sons, Inc.



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Caldwell Sash Balances Uniform Mortises



Pat. Pend.

For use in all classes of new work. Box frames unnecessary. Mortises cut at mill reduces cost of installing. Counterbalance sashes perfectly unaffected by atmospheric conditions. Cheapest method for modernising old window, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

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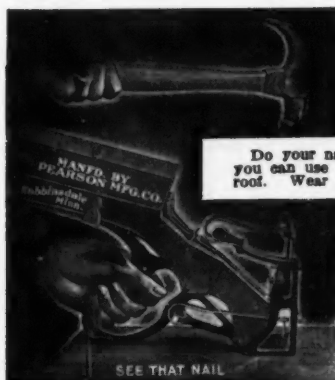
NICHOLLS FRAMING SQUARES

Gives all lengths and cuts of all rafters for sixteen pitches of roof

The ORIGINAL and MOST COMPLETE

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PAYS FOR ITSELF ON THE FIRST JOB

The Pearson Automatic Shingle Nailer

Do your nailing fast—faster than ever before. you can use this Pearson's Nailer on any pitch roof. Wear mittens, gloves, etc. This "Hand Nailer" is the only Nailer—throw nails in by the handful—then start nailing. Nails easily driven through tin or quite heavy sheet iron.

These nailers are 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.

The regular price is \$7.00, but if you order from this ad. we will send it prepaid parcel post for \$5.00. This offer is liable to be withdrawn, so act now.

PEARSON MFG. CO. - ROBBINSDALE, MINN.

1853



1917

Fine Beveled Edge
Shank and Socket

Chisels



Tang and Socket Butt Chisels

Plain and Beveled Edges

Send for illustrated Catalog

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INTERLOX—a quick, accurate rule

Contractors and builders who are having to use rules constantly will find the Interlox a highly satisfactory and durable device. Many concerns have purchased them in large quantities for their employees to insure accuracy. Made in lengths from 2 to 8 ft. If your dealer can't supply you send us 20c a lineal foot (in U. S. A.) and we will mail you one promptly.

THE Interlox Master-Slide Rule takes inside as well as outside measurements with absolute accuracy. No figuring necessary—just read off the measurement. It's made of selected boxwood finished with waterproof lacquer and is trimmed with brass. It is rustproof.

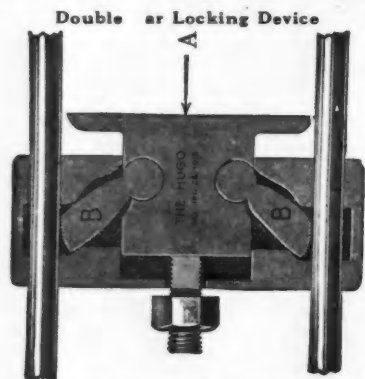
Dahl Manufacturing Company, 51 E. 42d St., New York City, N. Y.



Made of the very best steel, carefully tempered, accurately cupped and tested on steel. This nail set will last twice as long as any other. "Norol" the square nail set that cannot roll away sells for 12c.

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SYRACUSE TWIST DRILL CO. - Syracuse, N. Y.

10^c



No Springs to break—No Wedges to stick

A New Clamp—The HUGO

Single and Double Bar Steel Clamps

FOR PRICE LISTS AND DISCOUNTS WRITE

The Norfolk Manufacturing Co.

NORFOLK, CONN., U. S. A.

Northwest
BUILDING MATERIAL EXHIBIT

1917

What are you going to build this year?

A Garage?

A Bungalow?

A House?

Apartments?

A Church?

A Hotel?

A School?

A Hospital?

A Factory?

A Skyscraper?

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EVERYTHING

that enters into building construction, including heat, light, ventilation, decoration—as well as the materials that make the structure and the methods of application—for a little job or the biggest building—is on free view at the

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whether you are owner, architect, contractor or sub-contractor for all or any part of any building, you can't afford to build without inspection of the world's latest and best as shown in the

200 Exhibits on One Big Floor

It's FREE to See

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Look before you build

QUICK ACTING SELF LOCKING

Clamps

**An Investment
Not an Expense**

The quickest and strongest clamps made. That's why they're the standard in U. S. Government Works and in such concerns as General Electric Co., Singer Sewing Machine Co., Victor Talking Machine Co., etc.

We can PROVE it in your own shop. Write today.

James L. Taylor Mfg. Co.
Poughkeepsie, N. Y.

Big Money in Foundation Work

Build Yourself a Sheldon Home-Made Concrete MIXER and Clean Up!

Here's your chance to pick up some extra money! You don't get money-making opportunities every day. So, grab this and be ready to estimate and contract for concrete foundation work, as well as for the other portion of building.

You can handle any ordinary foundation job with the wonderful little Sheldon Mixer. And the beauty of it is that you don't have to tie up any money in one—that is—none to speak of.

We'll supply you, at astonishingly low prices, with all the necessary iron parts. Then, with our **Blue Print Plans**, which we furnish **absolutely free** along with the iron parts, you can build a Sheldon Mixer yourself at lowest possible cost.

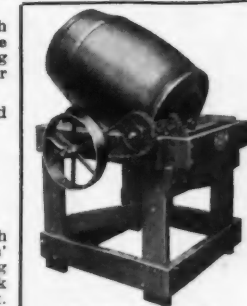
Or, if you like, we'll furnish you the machine (hand or power) all built up, ready to run.

Get Our New Catalogue and 1917 SPECIAL OFFER

The catalogue shows our full line of mixers which are sold direct to you on strong guarantee. 30 days' trial privilege. \$11.50 up. Chain drive, self-tilting dump, easily moved, all parts guaranteed. Steel or oak mixing barrels. Mounted on frame, skids or truck. Does work equal to \$200 mixers.

We want one to three men in each county to accept our **Special Co-operative Offer** right now which will help you to secure a machine at little or no cost.

Go to the bottom of this extra-money opportunity with us. You're missing a profit on every job when you allow someone else to do the concreting. Grab that profit yourself. Write now for our Catalogue and Special Offer.



Free Book

Write us today and get our Catalogue which tells all about the Sheldon Mixers. Including the Sheldon Power Mixer which will work one, two, three, four, five or six men, and will mix more material than any other mixer at double the price.

A Few Letters From Sheldon Money Makers

"I am more than busy with my Sheldon Concrete Mixer. Have more work than I can do. I get \$10 a day when I work out. It has anything stopped in this town."—**James L. Witter**, Wellsville, N. Y.

"The machine works fine. Have already got the job of mixing concrete for the bridges in this township."—**John Rose**, Spartansburg, Pa.

"I mounted your mixer on the back end of a low wagon just high enough for a wheelbarrow to go under the mixer when it is dumped. I put a small gasoline engine on the wagon, attached the mixer to run it, and I expect to put a small rip and cut-off saw on the other end of the wagon, then I think I will have a complete rig for farm jobs. I had more work than I could do last year, as I got lots of jobs because I was ready to start mixing as soon as I got my rig backed up to the job."—**A. D. Bresee**, Contractor, McClure, N. Y.

"I have mixed 1,200 sacks of cement this summer along with my carpenter work and I can say that I can mix concrete faster than my competitor can with a \$150 machine, and mix is better than he can."—**C. D. Cook**, Chandler, Minn.

"The mixer I got of you over a year ago has made a good many foundations and sidewalks since my last letter to you."—**James Loukota**, Friend, Nebr.

"The machine certainly does the business. I put in a wall 44x12x2 ft. high and 8 in. wide on three sides. It took me three and one-half hours, with three men."—**Max Hager**, Baraboo, Wis.

"I will say that the Sheldon Mixer, if operated with as many men as other machines require, will mix more concrete in the same length of time and you can get around with it where there is not room enough for big mixers."—**Ed. H. Mlady**, Verdigré, Nebr.

"Your mixer is the wonder of our town. I put down 1400 sq. ft. of walk, a 16 in. wall 80 ft. long, using 287 sacks of cement. On October 22nd, mixed 122 sacks and on the 23rd mixed 122 sacks up to 4 p. m. Morning of 24th put in 6 walls 30 ft. long for double crib. All of this in one week."—**W. H. Sampson**, Blencoe, Iowa.

THE SHELDON MANUFACTURING CO., Box 7003, Nehawka, Nebraska

MAKE MONEY MAKING TILE

A Business That Fits in with Yours

Every building contractor can be a tile maker for a very small investment. The cement tile business is permanently profitable *when the product is right*. A small hand machine **WON'T DO!** The "Dunn" is strong and heavy enough to exert **great pressure** in compacting the tile. Its efficiency is time-and-use-established.

Upon request we will send the book "Cement Drain Tile" which completely describes the tile business and Dunn machines. Ask for it.

W. E. DUNN MFG. CO., 415 24th Street, Holland, Mich.

DUNN Tile Machine

SOLD ON 15 DAYS' TRIAL.

BOSS

HIGH SPEED
GASOLINE-KEROSENE-ELECTRIC
HOISTS AND BACK FILLERS
PROVEN AS RELIABLE AS STEAM

Get Our Startling
LOW 1917 PRICES
Hoists—Grouters
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Pumps, Etc.
Complete Catalogue
Write or wire
for 1917 propo-
sition. Cash
or easy
payments

THE AMERICAN CEMENT MACHINE CO.
HOME OFFICE AND FACTORY
Keokuk, IOWA, U.S.A.

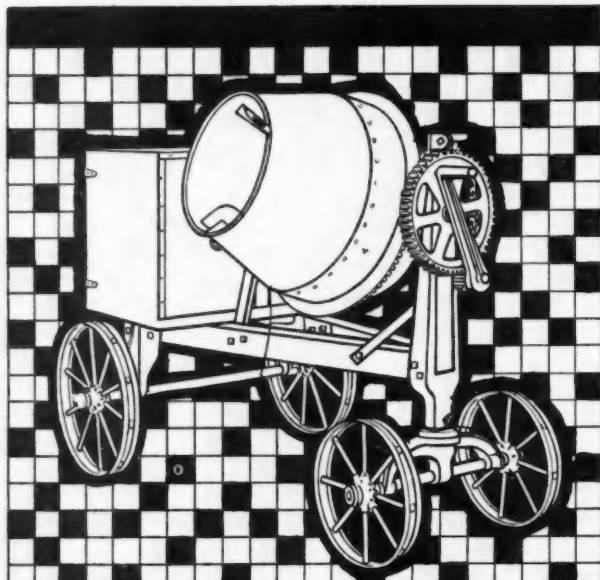
WE HAVE A COMPLETE LINE OF BUILDERS' DERRICKS AND CRANES

WE SEND DERRICKS ON TRIAL TO RELIABLE CONTRACTORS

Our Motto is SATISFACTION OR DERRICK RETURNED

Write for circular No. 2 with illustrations, descriptions and best prices on our complete line. The Sagen Builders' Derricks are built of best Crucible Steel and Malleable Iron Fittings, which makes them light, strong, safe and durable. The derricks will please you and probably more than pay for themselves on the first job. Get one on trial.

SASGEN DERRICK CO., 3101 GRAND AVE. CHICAGO, ILL.



IN the concrete machinery industry, the makers of Winner Mixers have been real trail-makers. They have blazed the way time after time with new ideas, new ways and new methods.

The big WINNER LINE, from the Two to the Nine, shows the effects of experience, efficiency, inventive genius and workmanship.

If you want a concrete mixer that's BUILT on the square from the ground up, a concrete mixer that's sold on a fair square kind of plan, and a mixer that will turn out the biggest, squarest day's work you ever heard of—buy the Winner.

Write for literature and prices, let us tell you WHY Winner Mixers make good.

The Cement Tile Machinery Co.
45 Rath St. Waterloo, Iowa

Write STEWART MFG. CO., 127 Rath Street, Waterloo, Iowa, for a copy of literature describing the STEWART UNI-TRUCK

To Make Sure Profits, Use Sure Mixers

"Most
Mixing
Least
Fixing"

Find out about the
Universal

This Low Charging
One-Bay Mixer
is the Biggest
Value Known



Marsh-Capron Concrete Mixers

You have heard about Marsh-Capron Mixers — **but do you know them?** Do you know that they have wear-proof features not found on other machines; that they are simpler to operate, easier to understand? Marsh-Capron Mixers are the surest profit makers on the market, because they stand up every day under heavy strain, never give trouble, and turn out the full yardage claimed for them. No matter what size machine you want, nor the work you want it for—we have the right mixer, and the right power to give you the biggest output.

*Standard Mixers — Pavers — Grouters
Find out about them now*

MARSH-CAPRON MFG. COMPANY
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Extraordinary Announcement

During the next thirty days readers of *The American Builder* can secure a copy of the new seventh edition of *The Lightning Estimator* for about half price or only sixty cents postpaid. Grab this opportunity to secure a copy of this standard, tried and proven work that teaches you the ins and outs of the most vital part of your business. Thousands of these books are being used by live wire contractors and builders all over the country. Learn to estimate an ordinary house job in an hour and be sure you are right. Simple, accurate, reliable. All labor given in hours so that prices can be adjusted to any part of the country. Get busy right now, as this is only a temporary price for a short time, and mail sixty cents (money order only) with Coupon below.

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Enclosed find sixty-cent money order for copy of the new seventh edition of *The Lightning Estimator*.

Address.....
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Mixes mortar and plaster as well as concrete—

A Batch a Minute

This is how fast the **Frank Mixer** works and it only takes $2\frac{1}{2}$ H. P. to do it. A **Frank Mixer** can be used on any job where concrete or mortar is used. It is **easy to charge** and **quickly discharged**. A friction clutch makes it possible to stop the mixing shovel, but not the engine. You can't make a better investment.



Send For
Particulars
Today



Simplicity

of the **Frank Mixer** makes it in great demand. It's why they don't **cost one-tenth** of what others do, yet do everything that other mixers do and more. There is **never a thing out of order** and they are as easy to clean as a pail.

Frank Mfg. Company

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HELPER MIXERS MAKE CEMENT WORK EASY



Just the machine for putting in sidewalk, curb, foundations, barn floors, etc. Built strong, mixes perfectly, and lasts years. Run by hand or power. Sold on trial. Write for free literature and prices.

Superior Manufacturing Company
1001 Concrete Avenue - Waterloo, Iowa

• adaptability •

THE designers of the Grand Mixer have given especial attention to "adaptability" and as a result The Combination Grand Concrete and Mortar Mixer is particularly adapted to the work of the all-round carpenter. From the smallest sidewalk job to the largest reinforced concrete construction the Grand will be found highly efficient.

The all metal construction of the Grand make it a strong, rigid and compact machine with the least possible weight. The engine is mounted on a large crating to prevent any possibility of getting out of alignment.

If you are an all-round contractor and need a machine that will do your concrete and mortar work equally well, our illustrated catalogs would interest you.

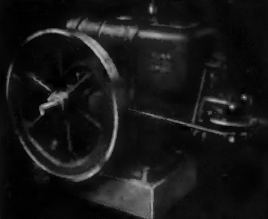
A postal brings you both catalog and prices

THE HALL HOLMES COMPANY

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DUNN HEAVY OIL ENGINES



Use Low-Grade Fuel

No electrical ignition, carburetor or preheating.

Doesn't Use Gasoline

Starts cold and runs on kerosene or cheaper fuels. Closed crank case, five-ring piston and heavy construction to withstand high compression. Write for Dunn Heavy-Oil Engine Bulletin.

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SAVE 75%
OF FUEL COST
SOLD ON 15 DAYS' TRIAL



EUREKA No. 5

CENTRAL ILLINOIS
LIGHT COMPANY
Peoria, Ill.

Feb. 5, 1917.
Eureka Machine Co.,
Lansing, Mich.
Gentlemen:

Note enclosed pictures taken on our job just completed. The machine is still going it and wouldn't trade it for a new one. Worked from Nov. 20 to this date steady every day.

(Signed)
J. E. COOK

Wouldn't trade it
for a new one

"Quality
Wins"

There are many more EUREKAS working throughout the country that are *still going it*—and have been for a long time—and their users aren't ready to trade for new ones either.

This is just another reminder of Eureka Service—that continuous service you receive when you buy a *Quality Equipment*.

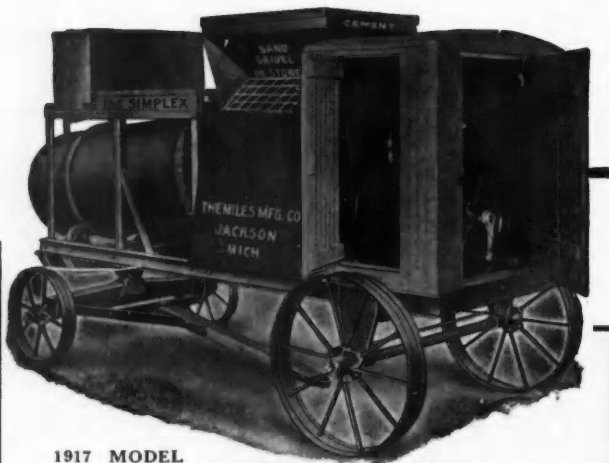
Made with either a Batch Hopper or Power Loader.

Let us tell you more about the Eureka—write for our descriptive circular—obey that impulse—do it now



EUREKA working at 16 degrees below zero

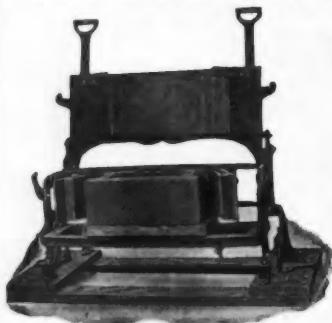
EUREKA MACHINE CO. 103 Handy Street Lansing, Mich.



1917 MODEL

The SIMPLEX Improved Mixer

Continuous Batch Mix, Low Down, Steel Frame, Heavy Construction, Positive Feed



"THE MILES" No. 5, Down Face Wet Concrete Block Machine

Makes Stone

In Lengths 4, 6, 8, 10, 12, 16,
18, 20, 22, 24 inches.

In Widths 4, 6, 8, 10, 12 inches.

In Height 4, 6, 8 inches.


Also Angle Stone, Circle Stone, Gable
Stone, Hollow or Solid Stone

THE CONTRACTORS' FRIEND

Simple, Strong and Rapid
LOWEST IN PRICE

Write for New 1917 Catalog

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It's Free!

—This big twenty-four page book with an answer to all your concrete problems—is free.
—The Concrete Dope Book tells you—oh! send for your copy today, then you can see for yourself.

*Just say, send me the Dope Book—
and we will do the rest.*

The Cement Tile Machinery Co.
44 Rath Street Waterloo, Iowa

THE NON-SLOP

TROUBLE-PROOF More power
FROST-PROOF than any other
NON-SLOP mixer of the
AND NO DELAY same capacity

Our prices
are lowest
Our service
is best



We Have
Distributors
in Every
Large City

5-Foot Mixer
10-Foot Mixer
 They never slop
with the
regular charge

Write for
Bulletin No. 4
giving sizes and
prices.

**NORTHWESTERN
STEEL & IRON WORKS**

Capital Stock, \$200,000 Eau Claire, Wis.

"The House of Good Service"

Also ask for Bulletin No. 4 on Tile Moulds and Culverts

"NORTHWESTERN"

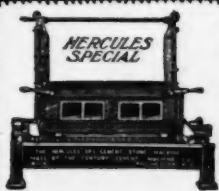
Hercules Stone---Sells on Sight

Stone made with the Hercules is true to size, attractive and bonds perfectly. The Hercules equipments contain the necessary plates for making corner blocks of the proper shape and size, also fractional plates, etc.

The Hercules is a face down machine, strongly built of iron and steel and is low set to make tamping more effective and easy. It is built in 3 sizes.

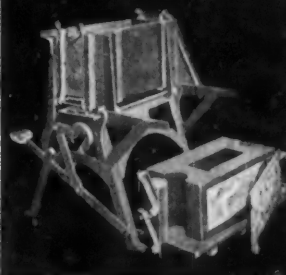
Write Today for Complete Catalog of Cement
Block Machinery

CENTURY CEMENT MACHINE CO.
55 Browns Race - Rochester, New York



CEMENT BLOCK MACHINE

**SOLD ON
15 DAYS' TRIAL**



EASY TO OPERATE

You can make perfect blocks on the Dunn machine because the design is simple and because the mold prevents the possibility of the block cracking or breaking. Has a capacity of 150 blocks per day of all sizes used in standard building construction. Highly efficient, moderately priced. Write for Block Machine Bulletin.

W. E. Dunn Mfg. Co.
415 24th Street, Holland, Mich.



Get the Price

It's not the cheapest mixer made, but it is the biggest value in the whole history of the industry.

It is a reliable, strong, long service mixer, first of all—and the price is low enough to make it the **remarkable value**.

To send back the coupon today is to make a start in money-saving.

DANDIE MIXER

5 cu. ft. and 10 cu. ft. capacities. May be equipped with low charging platform, power loading bucket, feed spout, batch hopper, automatic water-measuring tank, and light duty hoist.

The Dandie Mixer is built by the largest manufacturers of mixers in the world—in big volume—and absolutely standardized. This keeps **quality up** and **price down**.

All-steel constructions—universal joint bearings—fast, easily regulated discharge—liberal power—double drum drive—and the strong, railroad truck principle of drum roller construction.

**Send back the coupon today—
before you forget it.**

Koehring Machine Co.
Milwaukee, Wisconsin

KOEHRING MACHINE CO.,
Milwaukee, Wis.

Please send me Dandie Mixer Catalog E42, and price on Dandie Mixer of capacity, equipped as follows:

Name
 Address
 City State

STOP Splitting! Sacks! Prevent Waste



Buy
This "One
Sack" Mixer



"Highway
Special"

with measuring Batch Hopper—High Wheels—Built
for Long Hauls over Bad Roads

Built of Steel
1-2 ton lighter
20% stronger

Hyatt Roller Bearings
Self Oiling—Save 70%
Oil—17% Power

Patented

"High Speed" Mixing and Discharging Action—Mixes Mortar as Well as Concrete

Real News To Contractors
In This New Catalog
Write Today



Built In
5-8-11-15-22 Ft. Sizes
Gas—Steam—Electricity

Also Furnished with Auto-
matic Power Loader—
Measuring Water Tank.

Ask About "Lincoln
Highway" One-Man
Pavers.

Get Our Prices



One-Man
Paver



Builders' Mixer Complete \$185

Address Nearest Office

THE AMERICAN CEMENT MACHINE CO. INC.

HOME OFFICE AND FACTORY

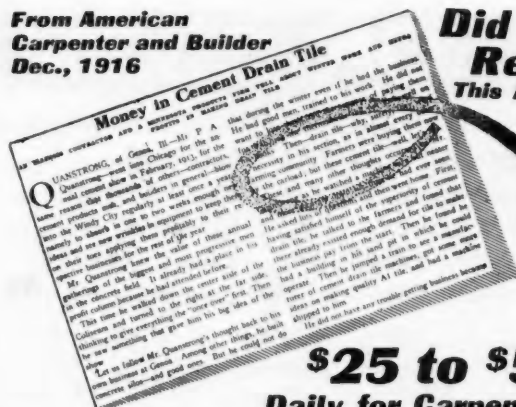
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THE 300,000 H.P. ELECTRIC CITY

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From American
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Dec., 1916



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Daily for Carpenters

Write us at once for full details of the Cement Drain Tile business. Let us show you how to cash in on the enormous demand for this product—how you can start with small capital—how we help you to succeed. We'll explain the business from A to Z—tell you how to make big money the year 'round. All you need is one machine, if it's a

Richmond CEMENT TILE MACHINE

Makes a quality product—easy to sell—demanded when known. Farmers everywhere know the value of under-drainage. It's a necessity—an insurance of crops. Cement tile is always preferred. Enormous market right around you. Grab the opportunity this gives you to enter an independent, profitable business.

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A post card with your name and address brings our catalog of the Richmond Tile Machine and full particulars. Tells how Cement Tile is made—how it's sold, and how we help you make a success of the business. We allow Free Trial without the risk of a penny. Write today.

Farmers' Cement Tile Machine Co.

Dept. 224 St. Johns, Mich.



CONCRETE PORCHES

ATTRACTIVE
EVERLASTING
INEXPENSIVE
EASY SELLING

**300%
PROFIT**

Concrete porches built with Dunn Molds cost no more than wooden porches. In big demand because they look good, are good and stay good. Porch-building outfit costs little—the profit on two jobs will buy it; same molds will make blocks for many other purposes. Ask for Concrete Porch Bulletin.

W. E. Dunn Mfg. Co.
415 24th Street, Holland, Mich.

MOLDS SOLD ON 15 DAYS' TRIAL.

C. G. HUSSEY & CO.

Pittsburgh, Penna.

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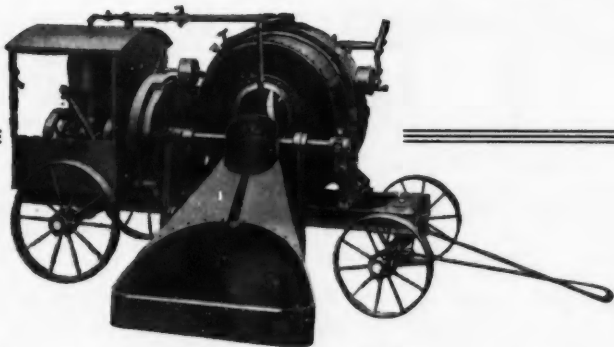
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In Sheets, Plates, Rolls

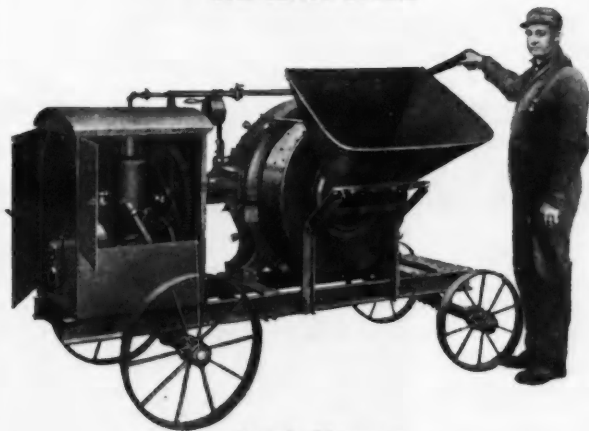
CORRUGATED COPPER CONDUCTOR PIPE



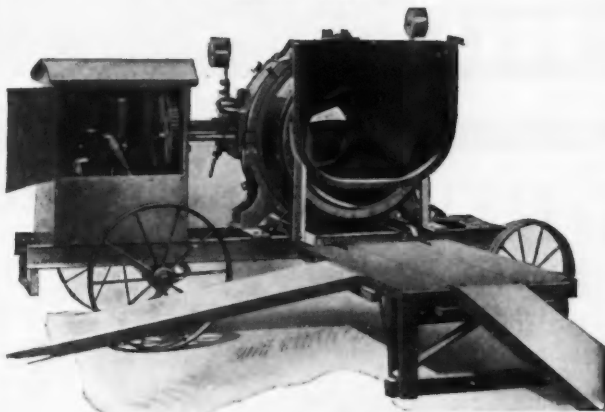
Copper Nails, Copper Rivets, Conductor Pipe, Eaves Troughs, Elbows, Shoes, Mitres, Soldering Coppers, Gaskets, Etc.



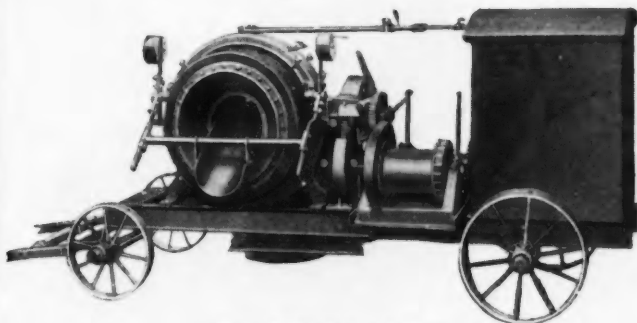
Gear-Lifted Loader



Batch Hopper



Low-Charging Platform



Smith Builders' Rig

THE T. L. SMITH CO.
 3123-D Hadley Street
 MILWAUKEE, WISCONSIN

QUICK DELIVERIES of SMITH MIXERETTES

from

OUR AGENTS' WAREHOUSES

SMITH AGENTS ARE PREPARED TO MEET THE DEMAND FOR "QUALITY" MIXERS DURING THE RUSH SEASON.

The T. L. Smith Co. has made it easy for you to get the

SMITH MIXERETTE

at the time you need it. Our agents at various distributing points throughout the United States carry machines in stock and are in position to ship the type of equipment you select at a moment's notice.

We do not leave you at the mercy of the railroad companies with their embargoes and slow shipments.

THE SMITH PLAN ENABLES YOU TO GET WHAT YOU WANT—WHEN YOU WANT IT.

Use the coupon—check the equipment that interests you and we will send you full information and prices without any obligation on your part. When you land that job you are figuring on, write or telegraph us and the machine you select can be on the way the same day.

Smith Service in this respect is unexcelled by any other mixer manufacturer. Smith Agents are prepared to answer calls for immediate shipment or future rush orders.

MAIL THE COUPON

MAILING COUPON

*Check the Equipment
 That Interests You*

Mixerette Catalog No. 116-D ☐

Smith Builders' Rig, Cat. No. 160-D ☐

with Power Loader ☐

with Batch Hopper ☐

with Low-Charger Platform ☐

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RANSOME

Registered U. S. Patent Office

Well Mixed Concrete for Permanence—Ransome for better mixing
(Member Nations Association Mixer Manufacturers)

The STANDARD machinery in concrete mixing, paving, handling or placing and in the manufacture of power equipment, engines and boilers. CIRCULARS and information on application. The most complete, the largest and the oldest concrete machinery manufacturing concern in the world—everything from sand piles to forms.

RANSOME CONCRETE MACHINERY CO., Dunellen, N. J.

Chicago Office: 208 North Clinton St. San Francisco Office: 931 Hearst Building Executive Offices: 115 Broadway, New York City

DUNN CONCRETE MIXERS

The Biggest Labor Saver on Wheels

HANDWHEEL DISCHARGE FROM EITHER SIDE is another exclusive Dunn Mixer feature to lighten labor and save time. It's further proof of **real mixer efficiency at moderate price.**

Dunn Mixers are so good that a more expensive machine is not necessary. They are *low enough in price* to make hand mixing or cheaper machines **EXPENSIVE** by comparison. Investigate the advantages of 4-blade mixing, extra long tilting drum, variable mixing angle and other Dunn features by asking for our Mixer Bulletin. *Agents Wanted.*

W. E. DUNN MFG. CO., 415 24th Street, Holland, Mich.

SOLD ON 15 DAYS' TRIAL

LOW PRICE DRUM MIXER

Riveted Wrought Steel

The small chain mixer is not a machine in which elaboration of fixtures is worth paying for.

The Austin Drum Mixer

has all the fixtures that count in saving labor, but its great merit is its super-durable construction. Every part wrought steel and chilled iron.

The picture shows all the working parts and attachments. Observe! None of real utility is lacking. But the picture cannot show the Austin quality of material and workmanship and finish that are characteristic of all Austin-built machinery.

Write Us About Austin-Built Small Drum Mixers---Catalogue 7-D

Municipal Engineering and Contracting Co.

Main Office: Railway Exchange Building, Chicago

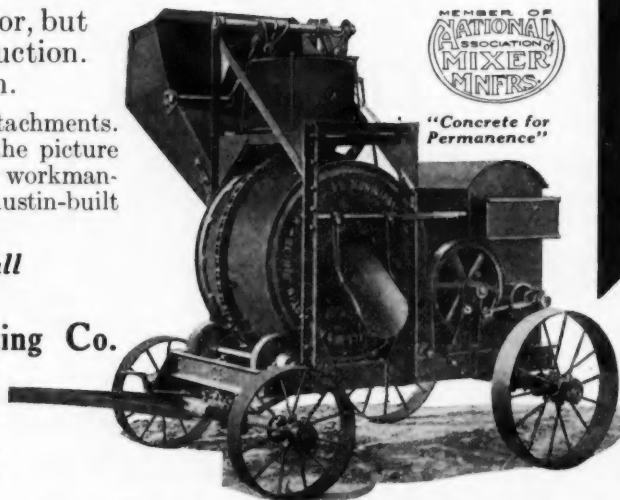
New York Office: 30 Church Street

NEW ENG. AGENT
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PACIFIC COAST
J. H. Hansen & Co., San Francisco
Howard Cooper Corp'n., Portland
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Agents Wanted in Open Territory



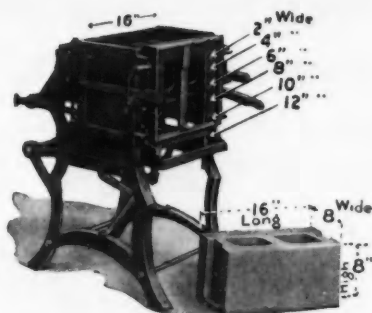
No. 1 DRUM MIXER. Capacity 6 cubic feet of mixed material. Output about 70 to 80 cubic yards per day. Operated by a 4 horse-power gasoline engine, friction clutch, equipped with charging elevator and water tank. Elevating and discharge levers operated from discharge side of machine.



Republic

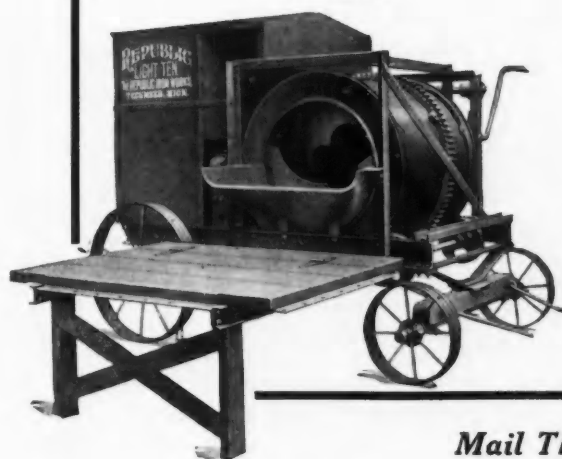


REPUBLIC "5" and "7"
Loaders, Hoists, Tanks, Pumps or
other attachments



MONARCH BLOCK MACHINE
Adjustable to all sizes

THE LIGHT "10"
Low Charger



Select Your Outfit According to Your Needs

New 1917 Models

No matter what your requirements may be, you will find an outfit in the Republic Line that will suit you, whether it be for a small, light, cheap machine—a medium size—or a full sack size outfit—mixers that have made good and will prove the most profitable, sensible mixers for you to buy.

Prices

Republic prices are extremely reasonable; for instance, a hand mixer for \$40.00—"The Little Builder" for a little over \$100. Other prices proportionately low. They represent the biggest value ever offered for good, reliable, well-made machines—and will fit your purse.

Terms

Republic Mixers are sold on cash or time basis to responsible parties. You cannot afford to be without one of these machines, purchasable on our liberal selling plan.

Guarantee—Write your own guarantee. You take no chances when you buy Republic machinery, as they must make good or we will. It avoids any dissatisfaction on your part.

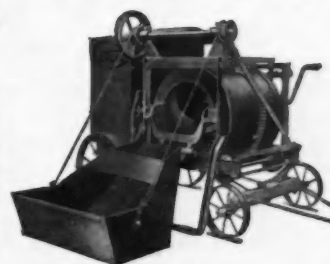
Free Catalogs—Write for catalogs today.

It does not obligate you to buy, but will show you the latest and most up-to-date machines built and sold at prices you can afford to pay.

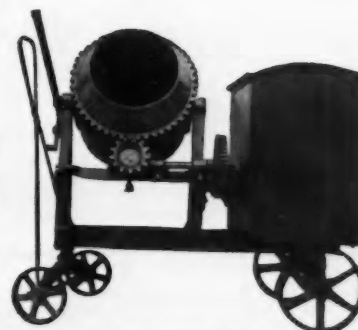
Republic Iron Works

Tecumseh, Mich.

112 Patterson St. or Box 445



LIGHT "10" Loader Outfit



REPUBLIC "3" Little Builder



THIS CUT SHOWS
THE 30 YD
STYLE "B.E."
SYSTEMATIC AUTOMATIC—4 Sizes

Mail This Coupon Now

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

Gentlemen: Please mail me catalogs today on
I expect to be in the market about



The Ideal Cincinnati No. 5 Batch Mixer

Just the mixer for pouring foundations or silos. It is especially designed to meet the requirements of building contractors.

This mixer represents a combination of features, any one of which is important, but when combined give a mixer that will pay on every job.

Some Important Features of the Cincinnati No. 5

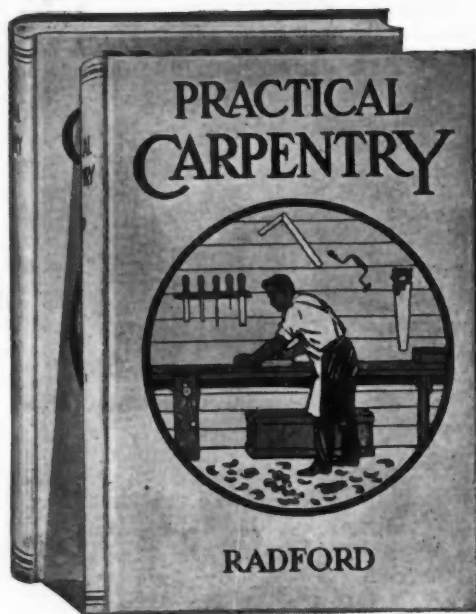
- Daily output, 45 to 50 cu. yds. of thoroughly mixed concrete.
- Light enough to be taken up on the forms for discharging directly into same.
- Capacity of batch, 5 cu. ft., requiring one-half sack of cement.
- Low charging type.
- Materials easily dumped into drum direct from wheelbarrow.
- Large, roomy loading platform built on, which is only 15" high.
- Standard gauge trucks.
- Durably constructed, mixer and engine are both guaranteed.
- Reasonable in price.

Send for Catalog
No. 27



Windsor,
Canada

Ideal Concrete Machinery Co.
1308 Monmouth Ave. Cincinnati, Ohio



Two volumes of reliable textbooks to which to refer in work that is new and unusual. **PRACTICAL CARPENTRY** is the most complete, most accurate, most practical and most up-to-date work of its kind. It describes the best and quickest methods for laying roofs, rafters, stairs, flooring, mitering, coping, splayed work, circular work, and, in fact, for forming all kinds of joinery and carpentry work.

Bound in cloth, over 600 pages of useful and necessary information. Complete information from foundation to roof.

Price \$2.00 Postpaid
American Builder
1827 Prairie Ave., Chicago

Delivers
Wet Mix
Direct
Into
Forms!



Archers Do More

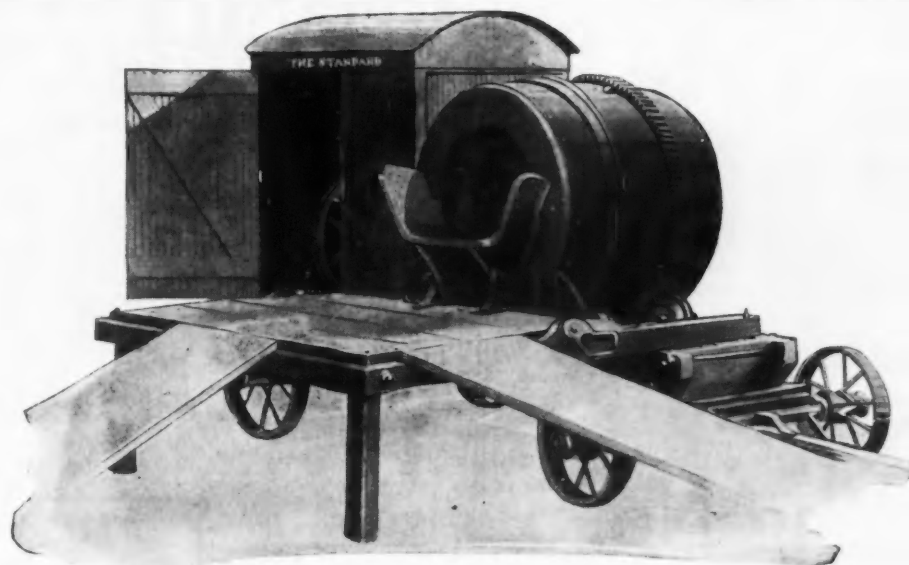
Archer Mixers do more for the contractor than any other mixer can. They do it because they are years ahead in design and construction. Just two of the many exclusive features that enable them to cut labor costs are—

END DISCHARGE—Mixer can be backed up to the work and so discharge wet mix direct into forms. Saves three wheelers.

PORTABILITY—Two-wheeled truck, so perfectly balanced that one or two men can move the entire mixer anywhere on the job.

Archer Mixers are made in one model only: two sizes, one bag and half bag. Write for prices and terms of our "show me" offer.

Archer Iron Works, 2434 W. 34th Place, Chicago



PERFORMANCE

"The Standard" Mixer delivers concrete at minimum cost and labor due to the low-charging principle on which it is built. The low compact design of "The Standard" makes the use of any kind of a mechanical charging device unnecessary and enables it to be made of the fewest possible parts. The simplicity of construction eliminates the necessity for employing skilled men for its operation.

Unique Charging Principle

"The Standard" Mixers come in units for every use. Machines of small capacity up to machines of very large capacity adapted to the heaviest construction work. They all embody the low-charging principle — which requires only one-half the amount of power needed for operating the mechanical charging type.

Portability

The simple construction of "The Standard" Mixer and the fact that no charging elevator is required, makes it more portable than any other batch mixer of equal capacity. The entire outfit is simple, consists of few working parts, with no excess weight.

Get Our New Mixer Catalogue

It contains 48 pages of useful information—interestingly presented and profusely illustrated with photographs showing "The Standard" Low-Charging Mixer on important jobs. The Catalogue is free. Write to our nearest office today and ask for Catalogue No. 44-4.

"THE STANDARD" CONCRETE MIXERS

THE STANDARD SCALE
PITTSBURGH NEW YORK PHILADELPHIA
1631 Liberty Avenue 145 Chambers St. 523 Arch Street



& SUPPLY COMPANY
BALTIMORE CHICAGO CLEVELAND
409 N. Gay St. 1345-47 Wabash Ave. 1547 Columbus Rd.



Lansing No. 5 "Half-Sack" Batch Mixer

This Lansing No. 5 has the distinction of being the youngest member of the Lansing family. It is also the smallest. Like all other Lansing mixers it is deservedly popular. Just plain "making good" has put it in the front ranks.

For walks, curbing, small foundations, and the average country job, it is the ideal outgt.

If you use more than thirty or forty cubic yards of concrete a day this isn't your size.

Costs little to run, little to buy, and effects a big saving.

Equipped as ordered with loader, tank, silo hoist, batch measuring hopper, etc.

A special circular describes this mixer in detail. Ask for it and catalog No. 202 of larger sizes.



22 Cedar St., Lansing, Mich.

CHICAGO.....167-169 West Lake Street
NEW YORK.....288-289 West Street
BOSTON...78 Cambridge (Charlestown District)
PHILADELPHIA...Cor. North American and Willow
MINNEAPOLIS.....517-519 North Third Street
KANSAS CITY.....1413-1415 West Tenth Street
SAN FRANCISCO.....338-348 Brannan Street

GRANITE FACE YOUR CEMENT BLOCKS

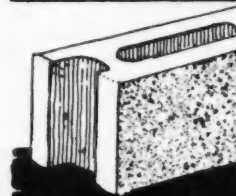
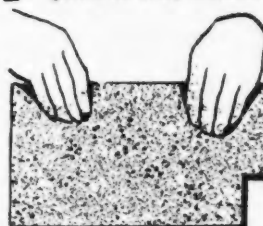
WITH the Gibler Sheet Facing Process you can put new life and greater profits into your cement block business. Cost of production but slightly more.

The Gibler Process of Granite Facing is simple but effective—a patented process. The Gibler Facing Machine makes it easy—insures success—pays back its cost first month in crushed granite saved. Machine is strong, well built—will last a lifetime.

Right to use this wonderful glue-paper-granite facing method goes with every machine. Full working directions furnished.

As a special introductory offer we will ship this \$18.00 machine to you for only \$15.00. Terms \$5.00 down—balance C. O. D. 10 days. This gives you a ten-day trial. Money returned if not fully satisfied.

Send your order today to
B. F. GIBLER
MAUSTON, WISCONSIN



**SPECIAL
30 DAY PRICE
\$15.00**



NO LOST MOTION with the Blystone mixer

They are charged or discharged while in full motion—no stoppage—no loss of time—no lost motion.

The best recommendation for an equipment comes from the user. Does it do the work well? Has it lasting qualities? Is it easy to run? Does it pay for the investment? These are questions that determine the practicability of any equipment. Use is the real test.

What of the Blystone?

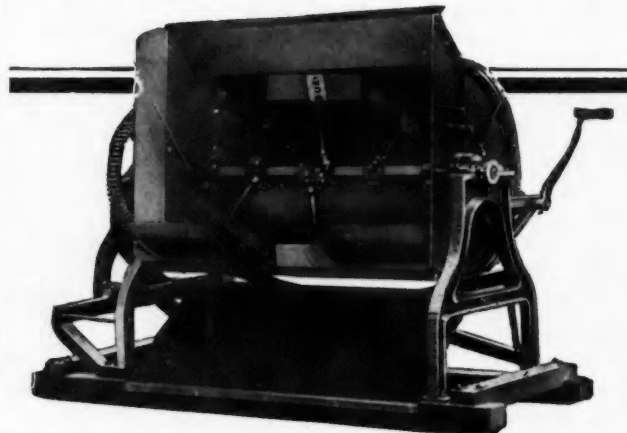
The Blystone is doing its work well—there are over 2500 in operation (in a field that is overcrowded with different makes of mixers, good and bad). We are getting repeat orders constantly from contractors who have tried out the Blystone.

The Blystone lasts—it is built of the best materials and its simplicity in construction eliminates useless wear of many complicated parts.

The rapid shovel action of the Blystone is the secret of its widespread success in the field. Back and forth goes the batch in the drum—forty-four times each minute and you have a thorough mix.

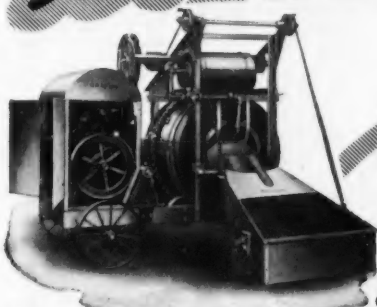
Write for our descriptive literature and price stating your requirements.

BLYSTONE MFG. CO., 417 Carpenter St., Cambridge Springs, Pa.



The Knickerbocker

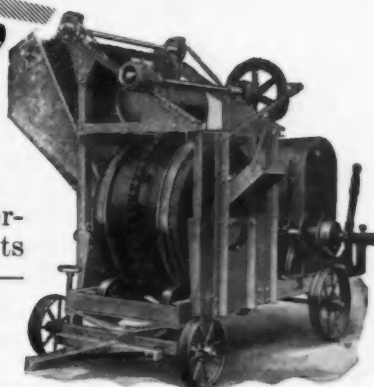
"ON THE JOB"



FAST CHARGING

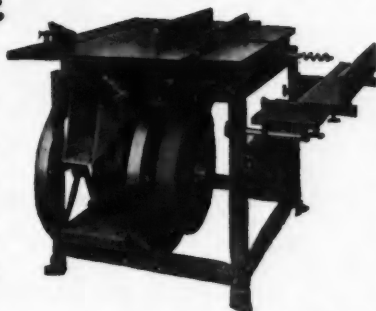
Talk to users of our first Coltrin Continuous Mixers, the hundreds of users of our batch mixers, mortar mixers and woodworkers, and you will hear the selling points that bring reorders.

Absolutely proves that they have been built for the need of the user—that improvements have been perfected to meet that need—improvements which show on daily operating reports—users reorder because on their jobs the Knickerbocker products have won their confidence by satisfactory service.



QUICK DISCHARGING

Learn about the fast loading, the quick discharging, the slop guards, the long wearing features of the drum, the new overhead construction and dozens of other features found on no other mixers.



A Sturdy, Light, Complete Portable Woodworker

*Built in 20
Styles and
Sizes*

*Quick
Deliveries
from Stocks
Carried
in All
Principal
Cities*

The Knickerbocker Company

525 Liberty St.
Jackson, Mich.



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Every minute means money if you use the Mix-a-Minute Big-an-Little Batch Mixer

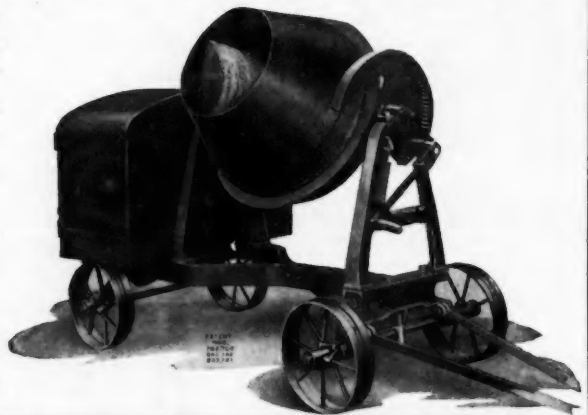
*10 seconds for hoisting, 40 seconds for
mixing, and 10 seconds for discharging*

A machine that is as efficient as if it had brains; as economical as a well managed factory; as dependable as a ship's chronometer and as speedy as a racing car.

It beats hand mixing, that's why we sell so many machines. It's cost is forty-five cents a day and operating cost is but three cents per hour. Every batch the Big-an-Little turns out is thoroughly mixed—and can be emptied on either side—an exceptional feature worth your consideration.

We are issuing a catalog that contains some valuable pointers on money making and are reserving a copy for you. Write for it.

Jaeger Machine Co.
318 W. Rich St. Columbus, Ohio



KELLY ORDER DIRECT
and save
50 to 100
\$\$\$

By dealing direct with the contractor and builder we can sell you the Kelly mixer at a saving of \$50 to \$100 without cheapening the machine in any way.

The Kelly is a first-class machine, complete in every detail. Engine is equipped with a magneto that does away with batteries, wiring, spark coils and plugs. Engine is guaranteed for five years.

*Write for Our Illustrated
Matter Giving Prices and
Trial Proposition.*

F. H. CLARKE MFG. CO.
10719 Superior Ave., Cleveland, O.



THE *Atlas* MIXER

A FEW REASONS WHY

YOU Should Own An Atlas Mixer

- BECAUSE:** It represents the best established practice in concrete mixer construction—
- BECAUSE:** It gives the best mix in the least possible time, and at less expense—
- BECAUSE:** It has fewer working parts than any other mixer of the same size, and therefore will give less trouble—
- BECAUSE:** It enables the small contractor, the sidewalk builder and the cement block manufacturer to own a mixer that will do as good work as the larger and more expensive machine—
- BECAUSE:** Its large capacity adapts it for large work as well—
- BECAUSE:** It is sold at a price you can afford to pay. Made in 5, 8, 12-foot capacity.

SEND FOR BULLETIN

*A Postal will bring the new circular
"Concrete Facts"*

ATLAS ENGINEERING COMPANY
MANUFACTURERS

3009 Lisbon Avenue - Milwaukee, Wisconsin

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

REX MIXER

For PERMANENCE
in CONCRETE



Rex Paver owned by George J. Markey, Milwaukee, Wis., at work on Milwaukee County Road.

Choose the Size You Need

Whether you mix ten yards or a million, you can find a Rex Mixer that will meet your needs exactly. No need to confine yourself to a small machine if a big fellow will save you time. No need to tie up to a big machine if your jobs are handled more easily with small-batch mixers.

Whatever Rex you buy, you can be sure you're getting a mixer that is right in design and construction. The makers of Rex Mixers have been manufacturing machinery for 25 years and concrete mixers for 9 years. Every part of the Rex, except the engine, is made in the company's own plant.

Rex Mixers are equipped with Rex Chain Drive, the most reliable of any drive used on concrete mixers. Positive as a gear, flexible as a belt, it is more efficient than either.

Send today and get the Rex Catalog No. 71-D showing Rex Models. It will show you the advantages that standardizing on Rex Mixers will give your work.

Chain Belt Company

Established 1891

730 Park Street

Milwaukee, Wis.



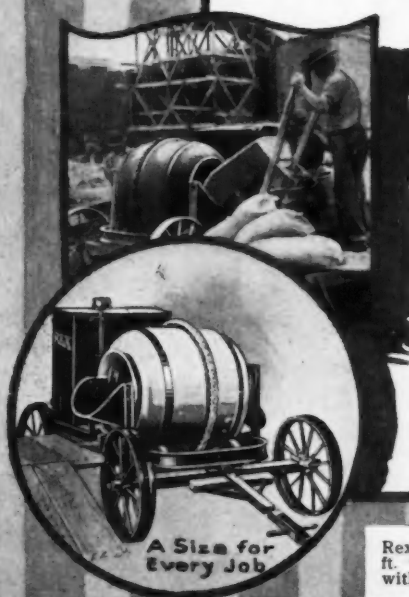
Chain Belt Company, 30 Church Street, New York City
W. B. Louer Company, Old Colony Building, Chicago

Makers of

Rex Chains for elevating, conveying and transmission
Sprocket Wheels—Gears
Shaft Couplings and Collars

Malleable Elevator Buckets
Rex Concrete Mixers
Rex Paving Mixers
Travelling Water Screens

Write for interesting booklet on any of these



Rex 4-S. Capacity 4 cu. ft. wet mix. Equipped with 3 h.p. Novo Engine.



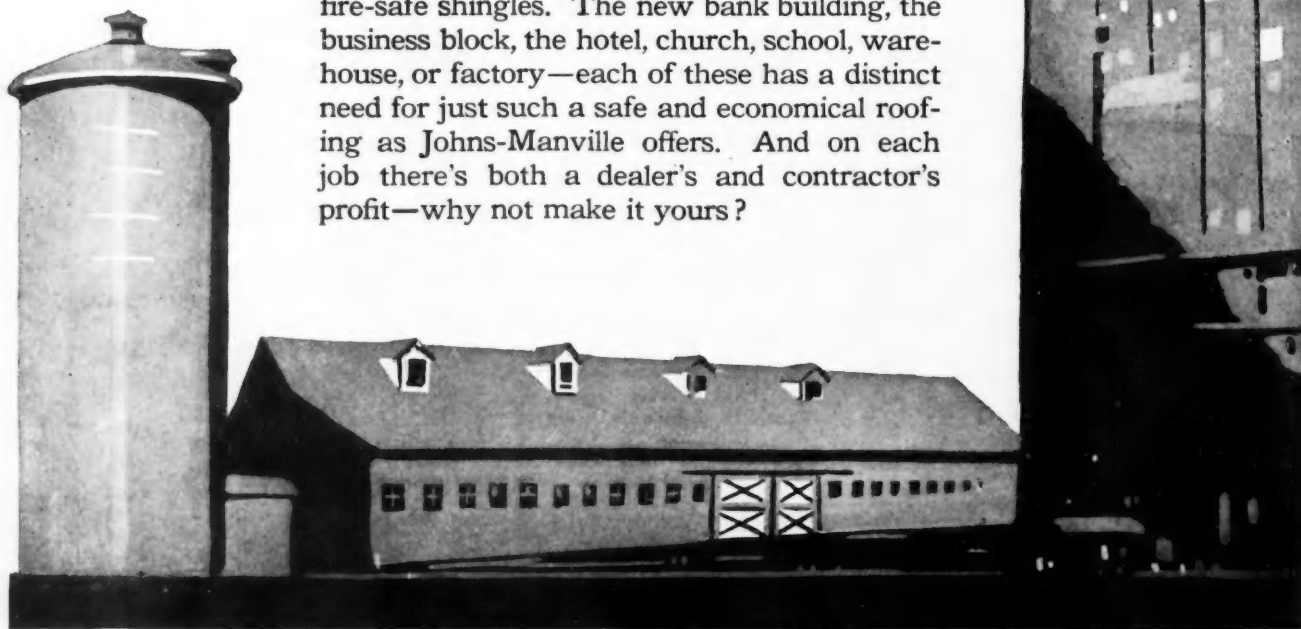
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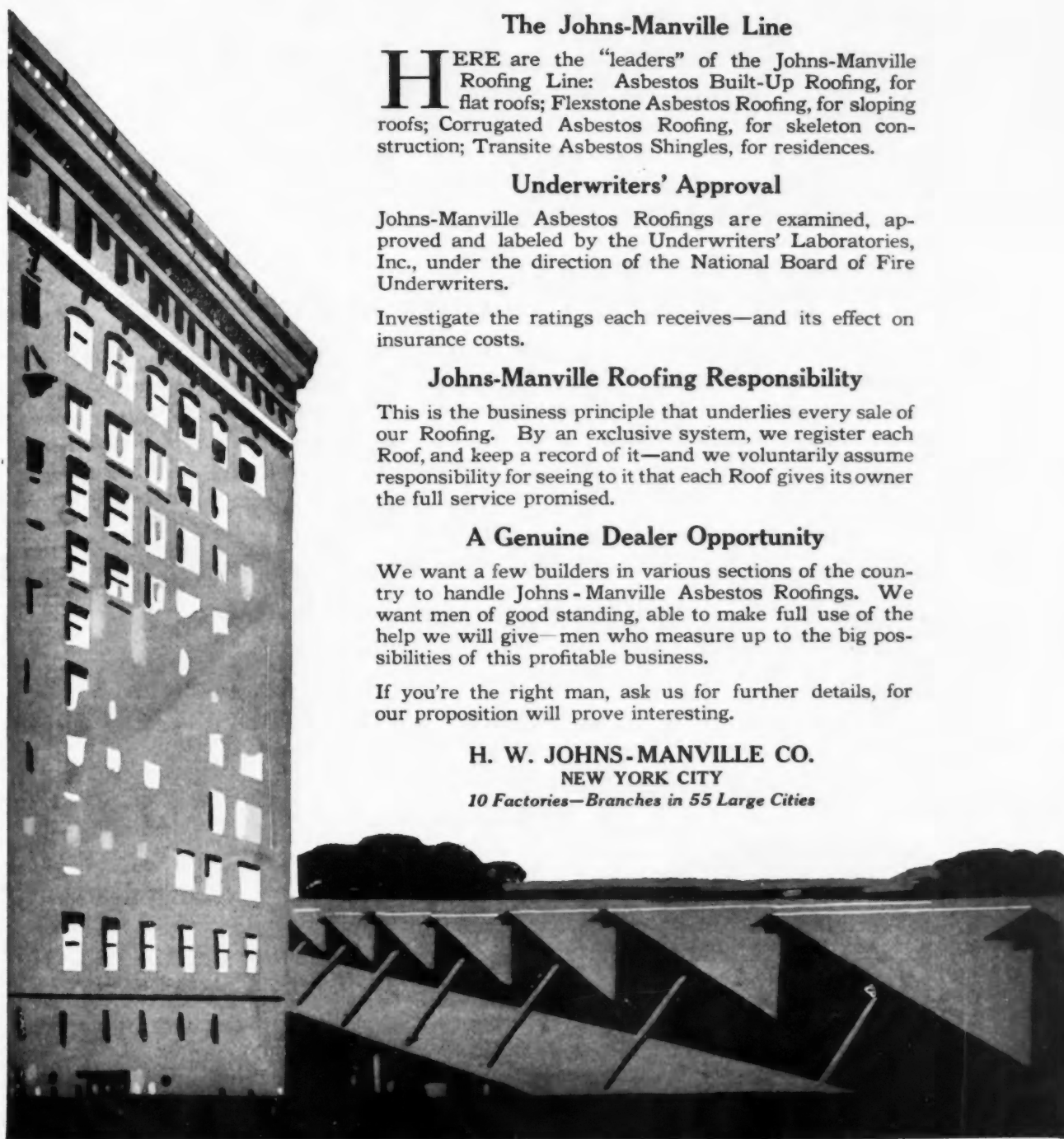
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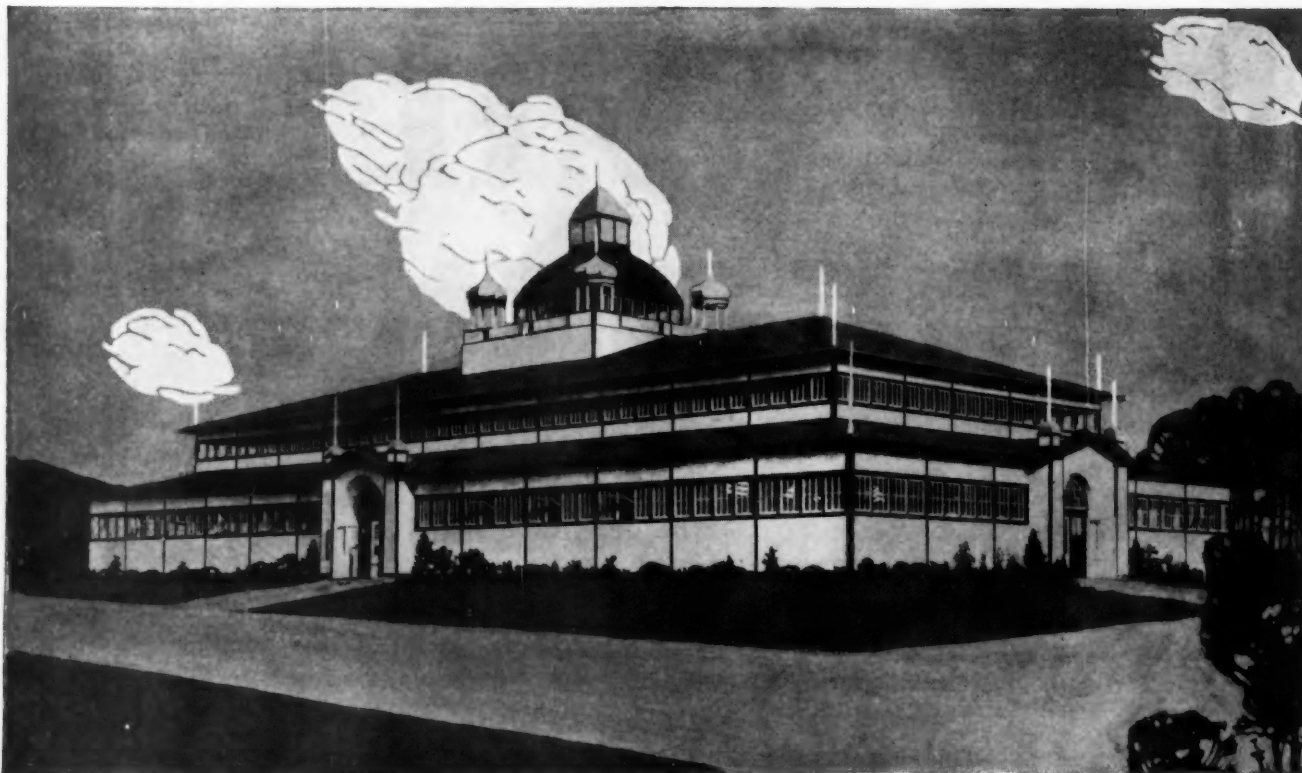
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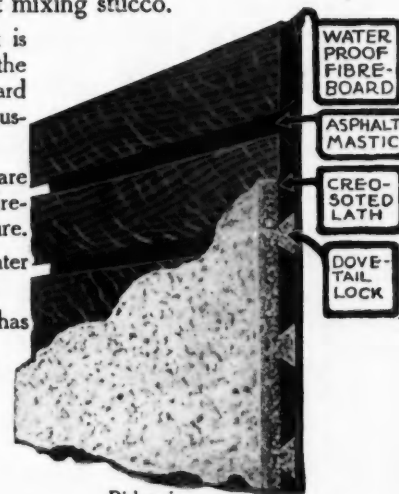
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Still Open to Suggestions

WE received a letter not long ago from one of our subscribers, and it wasn't exactly what you would call complimentary; in fact our friend was rather outspoken in his criticisms, and ended his letter with that regulation windup in such cases—"Please cancel my subscription."

The Editor was not particularly concerned over the loss of a subscriber, but he did take to heart certain of the criticisms voiced by this letter and immediately wrote a letter in reply, stating that some of the changes suggested would be made at once.

Many of the best features of the AMERICAN BUILDER have developed from a suggestion or request made by some reader, and we hope that we will never get to know so much that we won't be open to ideas from the outside.

Our critic in this instance wrote in response to our letter that he was surprised to hear from us in that way. He needn't have been surprised, for his criticism was sound and his suggestions good. The working out of some of these are in evidence in this month's magazine.

More Correspondence—More Instructive Departments—No "Writeups"

One very popular feature that is often commented on is our Correspondence Department. Notice the number of items

and the great variety of subjects presented this month. We will confess that for the past few months we have permitted other features of a more special nature to crowd in on the Correspondence Department space. The remedy is not to leave out these special features, but to provide *more pages*. This has been done this month, so that there is room for all. This policy will be continued. Big value is the motto.

Ask Questions—Send in Photos—Write Out Your Pet Ideas

The Correspondence Department belongs to our readers, and we want you to use it. Fill it up with pointers that will help the other fellow. Let him see the kind of work you are doing and the equipment you are doing it with; have photos taken and send them in. Put up your questions to the Correspondence Department. The editorial staff will answer part and leave part for you men out on the job to answer.

We want every one of our readers to feel privileged to criticize and suggest and help. With more than forty thousand contributing editors we would have SOME paper, wouldn't we?

Cordially yours,

Editor AMERICAN BUILDER.

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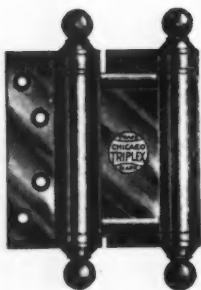
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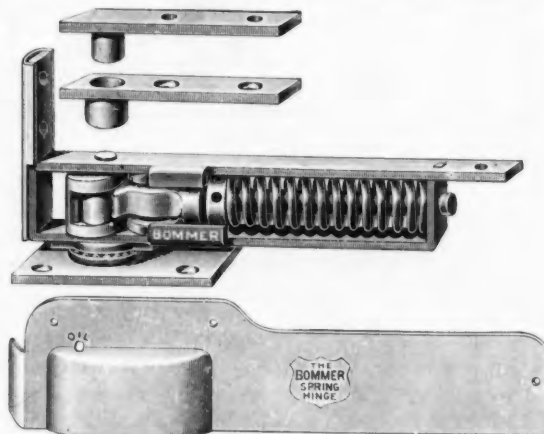


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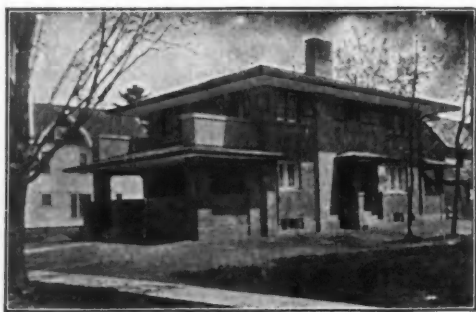
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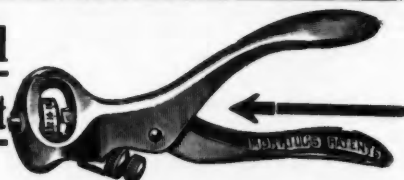
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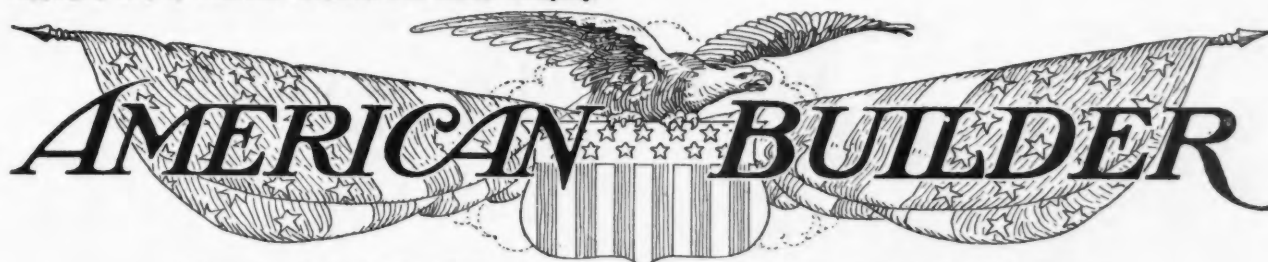
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VOL. XXIII

April, 1917

No. 1

Lost Motion Must Go

IDEAS FOR EFFICIENT KITCHENS PICKED UP WHILE INSPECTING A MODERN HOSPITAL

By A. S. M. Anderson, M. D.

I RECENTLY sat for a short time in the waiting room of a hospital belonging to a large manufacturing concern. My attention was attracted at once by variations from the ordinary in the construction of the room.

The usual right angles at the juncture of wall with wall or of walls with ceiling or floor were not sharp angles, but curved or concave—that is, the ceiling surface continued down the walls in a curve instead of a sharp, square turn or angle. There was no mop board, but the wall surface came right down and met the floor in a curve. Of course no quarter round was used. The facings of the doors and windows were rounded instead of square cornered, and free from all carving or beading or base or corner blocks. The doors, too, instead of being paneled were perfectly smooth and plain, painted and enameled white; and all, except the outside doors, were hung with simple two-way hinges. No stops were then used in the doorways for the doors to shut against. This abolished more square angles.

The floors were covered with rubber or linoleum of like color with the walls, and this, too, curved up

to meet the walls, but so fitted as to leave no edge or margin to hold dust.

The furniture was plain and smooth, no carving. The picture frames hanging on the walls, likewise were plain, not embossed. All this was so for the reason that dirt and dust are dangerous disease carriers.

Are they less so in a kitchen than in a hospital? Should not, then, our kitchen carpentry be remodeled on these same lines to the end that the housewife might be able to keep a clean, sanitary kitchen without making a slave of herself?

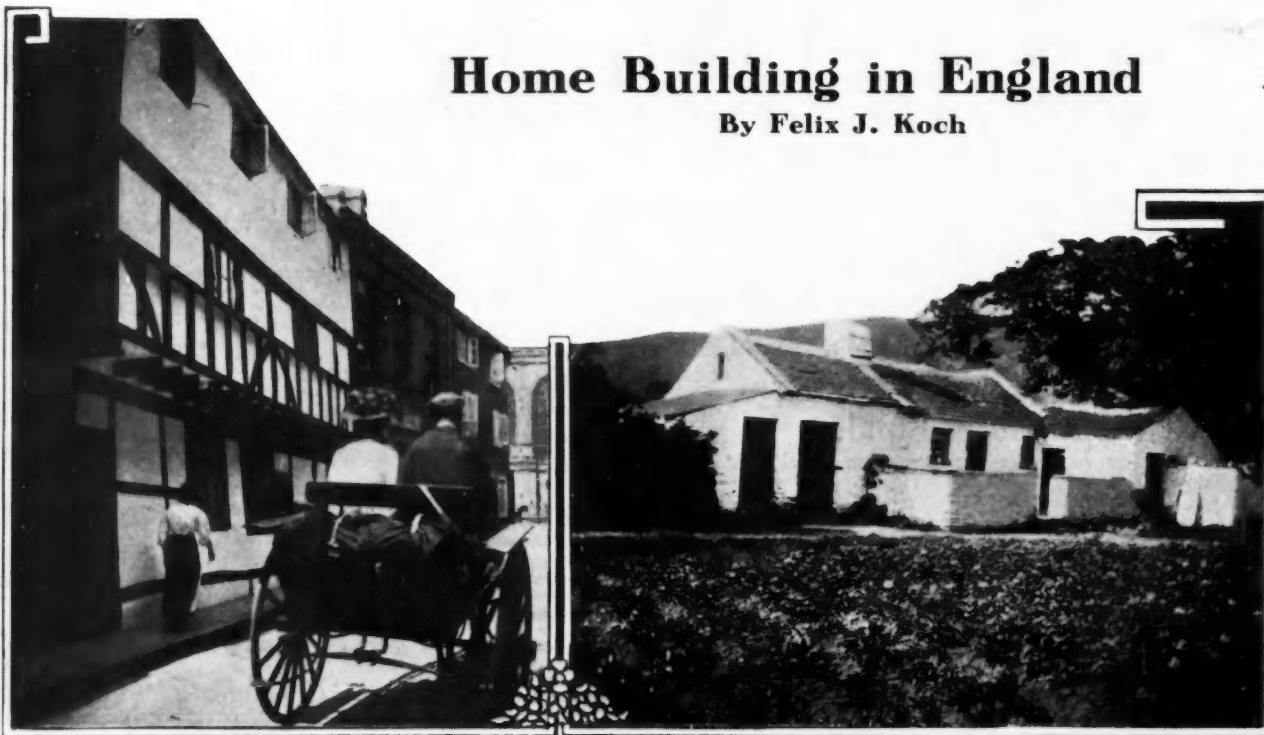
Let the square corners be rounded out by the plasterer, and let the mop board with its quarter round go forever. If a mop board must be used, its upper edge should not be a square angle, but a very obtuse one, and the quarter round should present a concave instead of a convex surface and be finished to an edge where it meets the wall and the floor.

A wainscoting, with its upper dust carrying rail, its beaded, narrow up and down boards, and quarter round below, has nothing to recommend it in kitchen

(Continued to page 152.)

Home Building in England

By Felix J. Koch



EVERY so often, lately, the architect, and close upon his heels, the carpenter and builder, is called upon to construct what its future occupants dub their "real English home." Architectural styles run in waves, naturally, and just now this harkening back to the English homes seems to have quite the vogue.

What, then, is the typical English home—as built by the typical English house constructor? Naturally, the answer varies with the purse of the tenant-to-be!

Probably the simplest style of English home is the cottage. Poets, time out of mind, have sung the charms of cottage life, and American newlyweds who do not favor apartment-house honeymoons are coming more and more to adopt it. But the real English cottage is hardly sufficiently pretentious to meet the demands of even the most modest of American house owners. Quite often it's just a room—a bit broader than deep—four square otherwise, and built of the

stone that's so handy, hewed roughly and laid tier upon tier. This stone is then surfaced over and the exterior, as well as inside, whitewashed, adding neatness and a certain inviting aspect to the whole. From the front and the rear the roof slopes up to a gable. At one or both ends of this gable a crude chimney is built. The roof itself is of thatch; and, to keep wind and storm from dismantling this, a heavy cording of fish-net is laid down on the whole. Against the tempest's carrying off the fish-net, *in toto*, in turn the builder sets a series of beams to project their edges just beneath this thatch slope, the owner then binding the loose strands of the fish-net soundly to these.

Otherwise, the construction is of the simplest. A door at front center, a window, deep set in its panes and of a design using many small lights; and there is your cottage. That is your typical English cottage, and is also the sort one finds predominating in Wales and parts of Ireland as well.

Rooseveltian doctrines, however, have resulted, in every generation, in making these little cottages too small, notably when the son marries and brings daughter home to live with him; and gradually the grandchildren cry for bedrooms and the like. So the good builder in the country district of England builds his cottages on a plan that permits of expansion along with the growth of the family. Of course, he could do this with an eye to beauty, but more often he strives to make utility and the size of his patron's purse reconcile. So our little cottage comes to have what amounts to an exact replica added to it; this, however, with perhaps only a door at front and windows at the rear. When that grows too small, a third cottage is added at the other side; and if some



A Typical English Peasant Cottage.

great tree, whose shade is more to be preserved than are artistic proportions, prevents running that other wing out as the first, then they simply run it at right angles to the original, perhaps adding a connecting door where the wing and main cottage join; sometimes not. And if all these don't suffice, then a lean-to is added, to serve for storing things not in actual use. You'll find a thousand such homes as this on almost any long journey in England.

Here and there the English folk of the smaller cities will imitate. For example, in the suburbs of many a town you'll find the cottage with its next-door cottage joined, as some "double house" would be in an American city; but the little houselets are identical and often have a connecting door on the inside. Sometimes these cottages run two rooms deep, with the rear arranged almost as the front is. Modern shingling, too, is com-



Row of Shops with Living Rooms Above.—Lincoln, England.

ing to supplant the thatch; and sometimes it is set side by side with an old shingling. The interior of such a house plan naturally explains itself.

In quite a number of towns, too, the evolution from this style to the more up-to-date home has been logical and clear. When houses could expand by adding a room each way, houses could also be joined—one to each; and so we come to find cottage rows. Absolutely the same construction and plan—only now houses



Picturesque English Half Timber House at Shottery.

are joined one to another. And now, when space is cramped and you can't expand at sides because your neighbor owns this; nor at front, which is the King's highway, and at back, because you don't want to sacrifice the bit of garden, you go up in the air—that is, you add a second story. This means making living-room and kitchen of the ground floor; bedrooms of the upper.

Given the two-story stage in English home-building and returning to the country, English farm houses present some quaint studies. Here, for one, is an English home at Shottery—two stories. Plan is simple—central hallway, room each side, on each story. The roof, however, takes on an odd form at the ends. Not content with this, the carpenters and builders have exposed a sort of square-work of beams in the stucco at the several facades, until the house looks from afar like nothing so much as a checker board stood erect, or else one of the drawings for a game of "squares" English children delight in. Aside from this, the house is simple in its style, and the rooms are large and delightfully airy.



Row of Workingmen's Two-Story Cottages at Lincoln, England.



English Half Timber Work at Stratford-on-Avon.

Buildings of Shakespeare Association at Stratford-on-Avon, too, make use of this geometrical patterning of heavy weathered beams, on their outer facades. In addition, the gable is employed to good use and there are square-set bays—with windows of a translucent cathedral-pane glass—that protrude at this place and that. Thus such houses seek to imitate the better-class home of the Bard-of-Avon's own time—and American architects and builders are seeking, accordingly, for similar conceits for orders of their own.

All English homes do not partake of the unusual or the fancy. Here's an attractive home—at Lincoln, England, that is almost severe. Walls square set and neatly coated. At the front, on right, and left, a bay, with the long French windows, that will serve as doors if need be. Look closely and you'll find that the front bay of each pair is built into a set of doors. Between the bays you have a window; on the upper floor you have three. Rest assured there's a central hall-way, with broad old stairs, and rooms at east

side. Out before the first floor center window there hang iron Gypsy kettles, filled with flowers; adding to the attractiveness of the whole. These, tho, are a motif for which the builder is hardly to be held accountable.

Time out of mind, however, the English who could



Type of English Town House.



Mud Cottages in the Country.

not afford both country and town-house, and who were not distinctly yeomen—country folk—have lived in the cities themselves, and so, right in the cities, often at their very heart, built closely side by side, sometimes with shops and stores, are the homes of well-to-do, if not rich, *burghers*.

Many of the simpler English city-homes are built in rows—the householder, however, purchasing his individual house in this. These homes, too, have their appeal. The pictures give an idea of prevailing types in Lincoln and London, and, as with most other English homes, these explain their interior plan of themselves.

"No Man Whose Motto is 'Caveat Emptor' Ever Has, Nor Ever Can Make a Permanent Success"

—THE MAN FROM THE LUMBER YARD

We commend the creed as given by this writer to the careful consideration of our readers—even to those who don't know what the words mean.—EDITOR.

DID you take the wife and babies out walking of a Sunday afternoon, and as you passed that bungalow, office building or residence, point with pride to the work of your hands? It is worth while taking pride in your work. It is worth noting your improvement as time goes by. I feel mighty sorry for the poor fish that don't do his work any better today than a year ago.

Yesterday was one of those nice March Sundays, cold enough to enjoy a bit of a fire, enough bite in the air to make the blood tingle.

For want of something better to do, I looked back over the files of the AMERICAN BUILDER. Yes, I was pleased to note that my letters were not quite as awkward as they were two years ago, but I was especially pleased to note the wonderful improvement in every phase of our publication, editorial and advertising.

I don't believe there is another magazine published where the advertisers talk as intelligently to their audience as do ours. Nor is any credit due us. It is simply because our readers are men trained in their work, with brains to appreciate a good business talk about material and machines which they use.

About Apples

This is the time of year when the ordinary apple shrivels. There is one wonderful line of difference twixt men and apples. There is no need of a man shriveling at any time of life—at any stage of the game. His face may be wrinkled, his muscles softer, but the MAN may keep his 100 per cent until the end.

There is one thing worse than a shriveled apple. I bought one yesterday, and paid a nickel for it. It was large—had rosy cheeks, but when I cut into it, I found it was rotten from the core out.

Education

I am a strong advocate of every man having a good education. It helps him in any kind of work. But I have seen several instances where knowledge without wisdom has made for degeneracy. It is very human for one to think that he is smart enough to put it over, even if others failed; but you can take it from a fellow who has been observing things for a good many years: You can't monkey with God's laws. Retribution is sure, whether you be a mechanic, minister or merchant.

"Caveat Emptor"

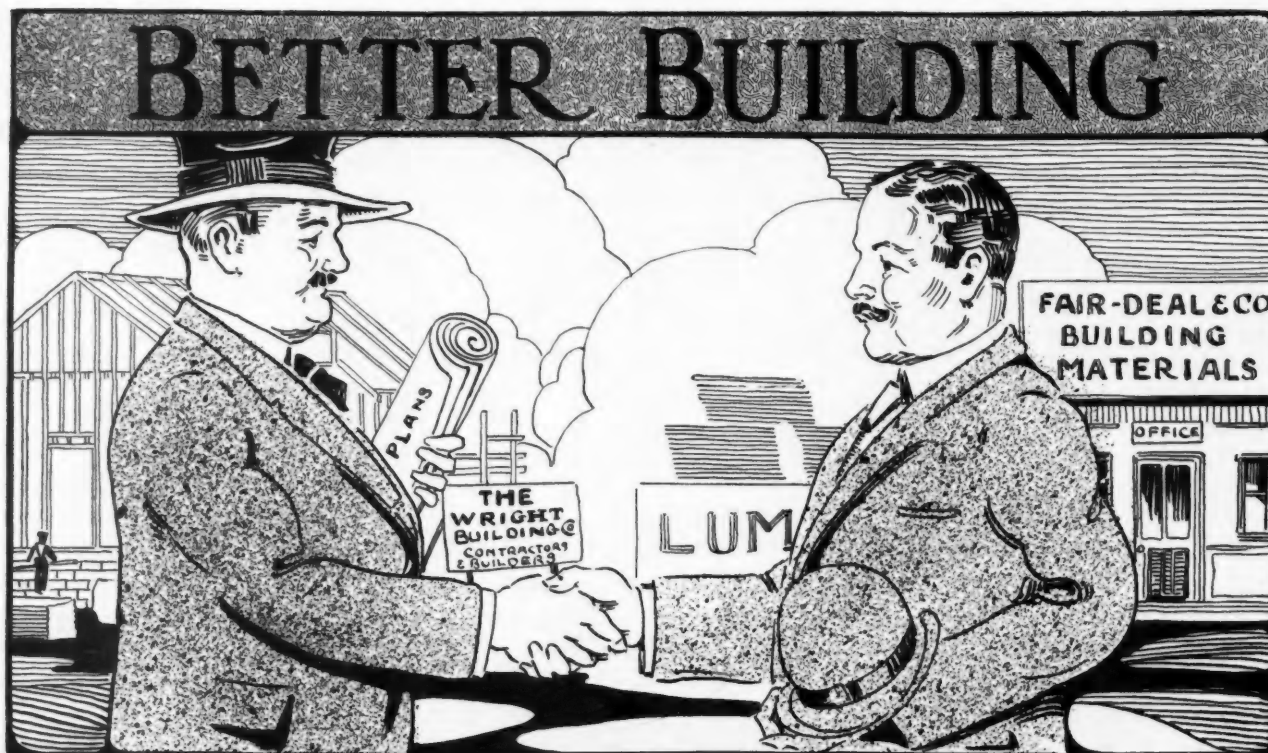
Some fifteen years I was acquainted with a contractor whom we will call Schmidt.

He was of that sturdy stock which has made so many successes in the building field, because of their industry and good constructive ideas. When I first met Schmidt, his son was off at school. The father determined that his son should not have the handicap he had had, and insisted he have knowledge of common law as well as those things generally acknowledged as being essential in the contracting business. This was where a little knowledge was a dangerous thing. His research was not as to how he could protect the interests of himself and his patrons, but as to how he could, with impunity, take advantage of the confiding.

(Continued to page 158.)



Square Dealing and Business Nerve Win the Prizes in the Small Building Field the Same as in the Large.



Dealer-Contractor Good-Will Best for Building

It Wasn't Their Stuff—

THE WHY OF LUMBER BRANDING AND HOW IT WORKS IN AN ILLINOIS RETAIL YARD

By J. D. Eddy

Special Staff Investigator

MR. L. H. DODD, vice-president and general manager of the Sterling Lumber Co., threw down the letter he had been reading, with an exclamation of anger.

"Jim!" he called to the yard foreman, who had just entered the office, "here's another kick from the Williams-Sherwin company about the lumber we have been sending them. I told you to take extra care that these shipments should be not only up to standard but a little above it when they made that first kick. Now they are complaining again that some of the pieces are filled with dry rot, others are imperfect. What's the answer?"

Jim hesitated before replying. He looked steadily at his employer, but in his eyes was an expression of bewilderment.

"I took particular pains with that order and personally inspected the shipments, Mr. Dodd," replied Jim. "I can't make it out. There must be a mistake, somewhere."

Dodd did not reply. He again picked up the letter. The first complaint from the Williams-Sherwin company had not made much impression on him. One of the men in his office had called his attention to it. He ordered that the claim be allowed and it had passed from his mind.

The letter before him, however, was different. In

it the writer, the chief purchasing agent, had intimated that the last shipment was such that the Sterling company need not expect much future business from his company. This latter statement was what had aroused Dodd.

The Williams-Sherwin company was one of his best and biggest customers. The loss of this business would make a big hole in his annual statement to the stockholders and directors of the Sterling company. How was he going to explain it to them; what was the explanation anyway? These questions flitted thru his mind.

Dodd was a man of action. Ability to reach quick decision had carried him up to his present position. He contemplated the letter for perhaps five minutes. Then he jumped up, reached for his coat and hat, and quickly left the office. An hour later he presented himself to the Williams-Sherwin purchasing agent, a man who was not only a business friend, but whom Dodd had made into a personal friend.

"Hello, Dodd!" the purchasing agent said as he extended a hand, "glad you came in. The carpenter foreman on our new warehouse was in here again this morning kicking about the lumber you shipped us. What's the matter with your firm lately? We've been getting material from you that isn't much better than culls."

"That's just what I came to talk to you about," replied Dodd. "I talked to my yard foreman this morning after I got your letter. He is a reliable man, and he told me that he had personally inspected your shipments since that first complaint, and he is sure that there is a mistake, that the lumber you are kicking about didn't come from us."

As he made this later statement, inadvertent as it was, Dodd stopped, thought a minute and then asked:

"Have you been buying any lumber from other firms?"

"Why, yes, we have," said the purchasing agent. "You know there were some pieces we needed that you couldn't supply at once, and as we are working

"What is there to prevent a recurrence of this same trouble," thought Dodd, as he was journeying back to his office. That was the thought uppermost in his mind. Sterling lumber was the best that could be supplied for the price paid; he had taken great pride in the quality of the material shipped from his yard. His business had grown to its present size because of his policy. Then this thought came tumbling upon him: "If Sterling lumber is always up to standard, why not let the company's customers and everyone else know where that lumber came from."

That was the solution. Every piece of timber, when practicable, of course, that left the Sterling company's yard hereafter must bear the Sterling mark. And it does. No one can be in doubt now about the origin of lumber, if he buys of the Sterling company.



If Branding or Trade-Marking is Good for the Lumber Manufacturer It Should Be Equally Good for the Lumber Retailer. This Concern Stencils Its Mark, "Sterling," on Every Board that Leaves the Yard.

night and day to get this warehouse up we went into the market and made some small purchases."

"That's the answer," said Dodd. "Let's go and take a look at this bad lumber."

An inspection confirmed Dodd's conjecture. The lumber had not come from the Sterling company's yard, but as the bulk of the material used had been supplied by Dodd's concern, blame for the poor lumber had fallen upon him.

Altho elated by the discovery and the happy outcome of a situation that a few hours before had been extremely serious, Dodd was too good a business man not to study what had happened and apply it to his business.

Neither will the Sterling company have to shoulder the blame for some other concern's poor lumber.

Perhaps the quoted parts of this story are not the exact words of Mr. Dodd, and perhaps the yard foreman's name is not "Jim." The name of the company, however, is the Sterling Lumber & Supply Co., of West Pullman, Ill., and the name of its vice-president and general manager is L. H. Dodd.

But the rest of the story is true. The Sterling company did come near losing one of its best customers, and it now marks every piece of lumber sent from its yards with the name "Sterling."

While the idea itself is not new, its application

(Continued to page 156.)



Concrete Construction

Details for Window and Door Openings in Reinforced Concrete Buildings

By Albert M. Wolf

Assoc. M. Am. Soc. C. E.

IN modern reinforced concrete buildings the ordinary type of wood sash are seldom used, owing to the fact that for the relatively small additional first cost of rolled steel sash it would be poor economy to use combustible material in such an important place in an otherwise fire-resisting building. Where wood sash are used in concrete buildings the danger of fire spreading into a building from an outside source or spreading from one floor to another in the same building is very great as demonstrated by the now memorable Edison Plant fire at Orange, N. J. In the course of rehabilitating and repairing the damaged concrete buildings at this plant steel sash were used in the openings previously occupied by the wood sash which had formed such an "excellent" means of communication for the fire.

It has been demonstrated that steel sash if properly set and glazed with wire glass will prevent the spread of flames to or from the building, except possibly in fires of the most extraordinary character, which are of rather rare occurrence. To prevent the spread of fire, it is highly essential that in addition to being glazed with wire glass which will hold together even when badly warped by heat, the sash be properly secured and attached to the concrete. The head of the sash should prefer-

ably be held together after the manner shown in Fig. 1., this detail allowing for vertical expansion of the sash under the influence of the heat from a fire which will be most intense at the ceiling level. In addition to this the mullions between sash sections (the sash are usually made in widths not exceeding 7 or 8 ft., so that two or more sections with vertical mullions between are required to fill an opening) should be well anchored at the sill and head level, so as to give adequate lateral support for the sections.

It is also highly important that the details for connection of sash are such as to give weather tight joints at all points. This will be done if the sash are installed in accordance with the details given in Fig. 1. At the head the sash is held rigidly against a $2\frac{1}{2}$ by 2 by $\frac{1}{4}$ inch angle by clips and stove bolts on 1 ft. 6 in. centers, the angle being about $1\frac{1}{2}$ in. longer than the width of window opening, so as to extend into the jamb grooves, and thereby give a tight joint at the ends. To give a tight weathering at the connection of the angle and the underside of floor slab (ceiling) the angle is placed in the forms, so that the underside of the horizontal leg is flush with the ceiling. The angle should be anchored to the slab with hook bolts, or preferably bent plate anchors about 18 inches centers.

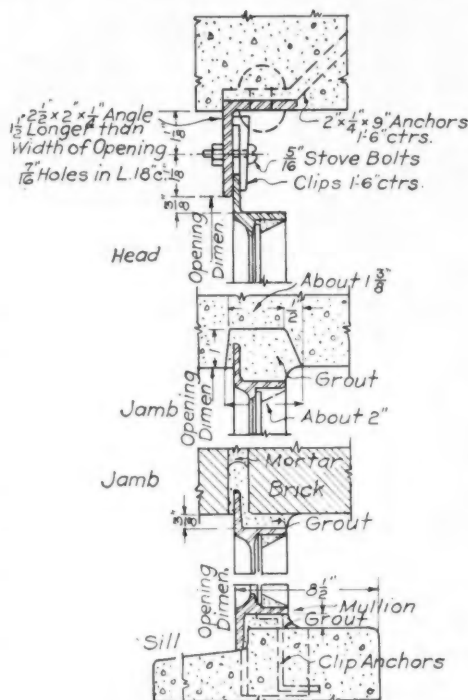


Fig. 1. Typical Detail for Steel Sash.

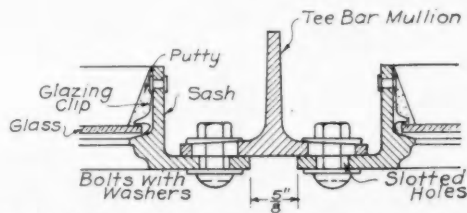


Fig. 2. Detail of Sash Connection to Tee Bar Mullion.

Where sash jams frame into concrete columns a vertical angle can be anchored to the column in a similar manner and the sash anchored thereto, but the more common and cheaper detail is that shown in Fig. 1, which consists of a tapered slot formed in the column by a beveled strip fastened to the forms, into which the sash is grouted with cement mortar. This detail has often been used at the head section of sash, but the angle section seems best adapted at this point, since it allows for expansion of the sash vertically, while if a T-bar mullion is used between sash sections (Fig. 2) with sash held in place by clip

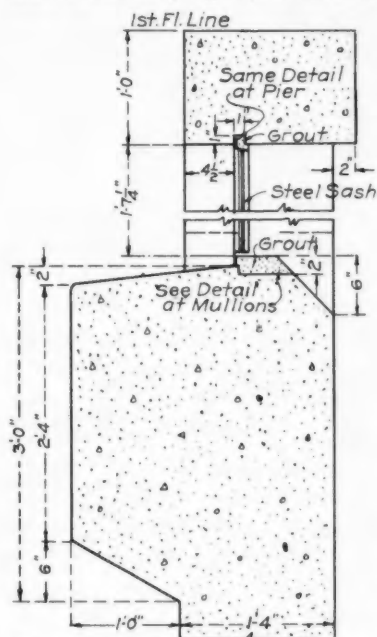


Fig. 3. Basement Curb and Sash Detail.

anchors bolted to the mullion, some lateral expansion is also allowed for, thus preventing buckling of sash during hot fires.

If the side jams of sash frame into brick piers a continuous vertical slot is generally formed (usually 4 1/2 or 8 1/2 inches in from face of pier) at vertical brick joints, by building in a strip of lath in the joint and then removing same as the work is carried up, the sash being grouted

into the slot. Sometimes the sash are set when brick is being laid and in such case after the sash is set, plumbed, and stayed they are bricked up into the piers. A sill detail, which has given the most satisfactory results for stone, terra cotta or concrete sill is shown in Fig. 1. It will be noted that the bottom section of the sash rests on the sloping portion of sill against a shoulder formed at the back of same, and that the joint is made weatherproof by filling the space between sash and sill with cement grout, none of which is directly exposed to the weather. Mullions are carried down and anchored into the sill, and if the sash units are over 6 ft. wide a clip anchor should also be provided at the middle of each section or unit. A sill detail similar to that shown for jams in concrete has been and is being used, but is not nearly

so satisfactory as the one just described, since the grouting on the outside of the angle shaped sill of sash tends to shrink away from the surrounding concrete or the sash, leaving a crack into which water finds its way and on freezing pushes out the grout forming an unsightly opening along the sill.

Small single units of steel sash are often used in the concrete basement walls of a building, and owing to the fact that the walls are usually completed before the steel sash can be delivered, it is necessary to provide slots in the walls when pouring which will allow the insertion of sash later. A slot 2 in. deep should be provided from back of wall to line of sash face at the sill, and at one jamb, while at the head and the other jamb a 1 in. by 1 in. slot will be sufficient. The bigger slots allow sash to be set from the inside, and after raising into the head slot and shift-

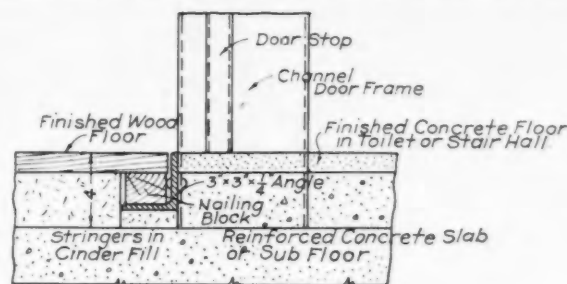


Fig. 4. Detail of Stair or Toilet Room Door.

ing into the smaller jamb slot, the sash can be grouted into place as shown in Fig. 3.

Door Opening—Floor Details

In reinforced concrete buildings where the main floors have a finished surface of wood (usually maple laid on sleepers in cinder concrete filling), and the toilets, stair halls, etc., have finished concrete floors, it is absolutely necessary that a sill of some sort be provided at the junction of the two different flooring surfaces to prevent undue wear. Such detail is shown in Fig. 4 from which it will be noted that an angle is riveted to the jambs of the door frame with the top of the vertical leg at the finished floor line and the horizontal leg extending out so as to form a firm seat for the wood floor. The advantage of this sill is that a minimum amount of metal surface is subjected to wear, and hence the sill can never become as slippery as if 2 or 3 inches of steel (the leg of the angle) formed the sill, and also the

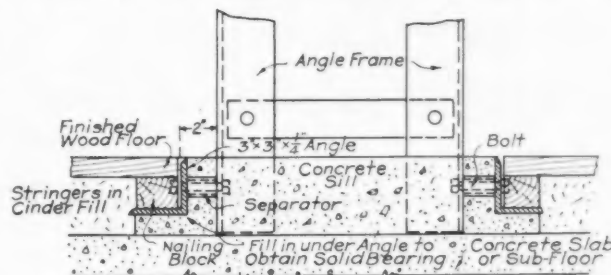


Fig. 5. Detail of Concrete Sill for Fire Door.

wood floor, has an unyielding support at the junction with the concrete, thus eliminating excessive wear on the wood surface as would be the case if the floor were allowed to spring or deflect at the joint.

At opening in fire walls the Underwriters' require, and it is good practice, to provide a fireproof sill extending thru the opening. If the finished floors on sides of the wall are of wood, the latter must not extend thru the opening, but a checkered steel plate resting on concrete or a concrete sill provided. The wide steel plate is objectionable, in that a large surface is presented which can wear down and be-

come slippery. To a concrete sill detailed as shown in Fig. 5 this objection does not apply. As shown in the detail, the sill angles are bolted to the door frame with the top of vertical leg at the finished floor line and the horizontal legs extending out to form an unyielding support for the wood floor, while the space in the opening between angles is filled with concrete to form the fireproof sill. Where sliding fire doors are used it is common practice to have the fireproof sill project 2 in. beyond the face of wall, while if swinging doors are used the concrete sill need not project beyond the opening.

Fundamentals of Reinforced Concrete Design

In Two Parts—Part I

A TREATISE PREPARED AS A SHORT COURSE FOR MANUAL TRAINING AND VOCATIONAL TEACHERS

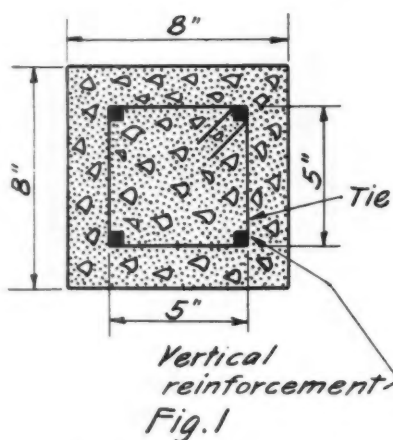
By Ernest McCullough

Chief Engineer, Fireproof Construction Bureau, Portland Cement Association

REINFORCED concrete is a combination of concrete and metal, preferably steel, with the two materials so disposed as regards position and amounts that each resists the stresses it is best fitted to resist. In piers, posts and columns the concrete takes compression assisted by the steel, and the vertical steel takes tension if any bending occurs. In beams three stresses act; namely, compression, tension and shear. The concrete takes all the compression and a limited amount of shear. The steel is computed as taking all the direct tension and assists the concrete to carry shear.

To fully understand the principles of reinforced concrete it is best to first consider materials uniform in composition, such as wood, iron or steel. Take for example a square wooden post having a length less than 15 times the thickness. This length is chosen because after the length exceeds 15 times the thickness bending can occur under heavy loading. The ratio of length to thickness (the slenderness ratio), then becomes a factor in the rules and formulas.

The column chosen is 8x8 in. The length is immaterial so long as we have it less than $8 \times 15 = 120$ feet. The cross-



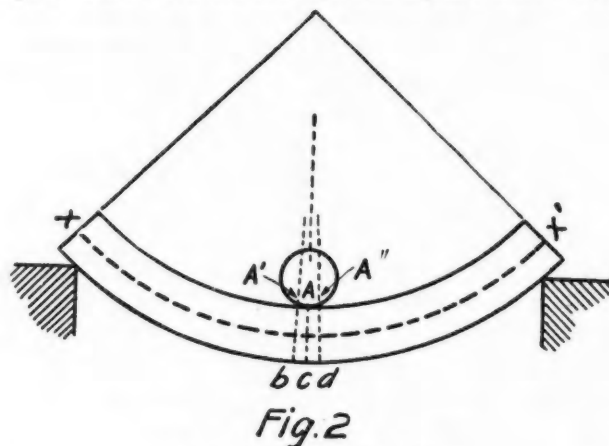
Concrete Column Having Four Vertical Rods Tied with Heavy Wire.

sectional area is $8 \times 8 = 64$ sq. in. The allowable unit load or compressive stress for the wood considered is 800 lb. per sq. in. The column can safely sustain a load of $8 \times 8 \times 800 = 51200$ lb.

Let us now consider a rein-

forced concrete column. For the benefit to be obtained by comparison we will make it also 8 by 8 inches outside dimensions. The steel will be in the form of four bars, each $\frac{1}{2}$ inch square.

The bars are set in corners, as shown in Fig. 1, and $1\frac{1}{2}$ inches in from the sides of the column. This is necessary for fire protection. The concrete outside of the steel (used for fire protection) assists in carrying the load until the fire comes, but after a severe fire it should not be depended on so we neglect it entirely in our computations. The actual area of the column is therefore $5 \times 5 = 25$ sq. in. Four $\frac{1}{2}$ in. square bars have an area of one square inch. The



ratio of steel to concrete is $1 \div 25 = 0.04$. The steel ratio multiplied by 100 is the per cent of steel reinforcement. Our column therefore contains 4 per cent of steel, the maximum for a column of this type.

Some building ordinances limit it to 3 per cent, following the lead of Chicago.

When a load is applied to the top of a column and the steel bars get their share they may bend because the slenderness ratio is large. It is necessary to put ties around the upright bars and these ties are spaced at intervals not exceeding 12 times the thickness of

the vertical bars. Therefore, in the column under consideration, the ties will be spaced 6 inches apart because the bars are only $\frac{1}{2}$ inch square. The ties are held in place by No. 18 black stove wire and the ends are turned in far enough to be gripped by the concrete so they cannot be pulled out when stressed. Ties are usually made of heavy wire or $\frac{1}{4}$ or $\frac{3}{8}$ -inch round steel rods.

Having arranged the bars and the ties, how much will our column carry?

Let us assume a 1:2:4 concrete with an allowable fibre stress in compression of 400 lb. per sq. in. The area of the concrete is 25 sq. in. less 1 sq. in. of steel = 24 sq. in., which at 400 lb. gives $24 \times 400 = 9,600$ lb. To determine the strength added by the steel we must be governed by the ratio of deformation be-

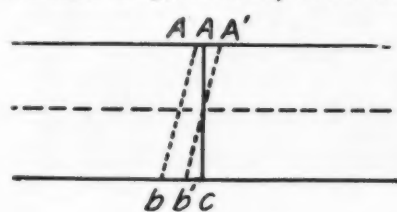


Fig. 3

Line A'A is moved across A'e so that AA' = b'e.

between the steel and concrete. This, for the concrete we are using, is 15, as determined by experiments. Assume a piece of steel fastened in a vertical position and a load placed on top. Assume a piece of concrete of the same size similarly placed and loaded with an equal load. Careful measurements will show that both materials shorten under the applied loads but the decrease in the length of the steel is $\frac{1}{15}$ that of the concrete. To produce equal shortening (deformation) under equal loads the cross-sectional area of the concrete must be 15 times the cross-sectional area of the steel. Thus each square inch of steel is equal to 15 square inches of concrete.

Now apply this to the column in question. The area of concrete is 24 square inches. The area of the steel is 1 square inch, the equivalent of 15 square inches of concrete. Consider the area of concrete to be increased, making it $24 + 15 = 39$ sq. in. The load-carrying capacity of the column is now $39 \times 400 = 15,600$ pounds. The average stress is

$\frac{15,600}{25} = 624$ lb. per sq. in., an increase of 56 per cent.

25

The unit stress on the steel is $15 \times 400 = 6,000$ lb. per sq. in.

A safe compressive stress for the steel alone would be 12,000 pounds per square inch, which shows that it is not

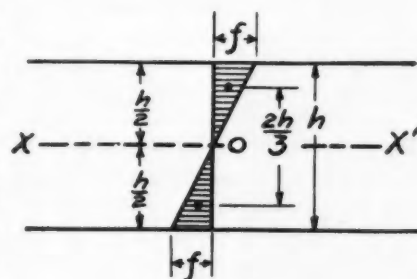


Fig. 4

Compression and Tension Force Triangles.

economical to use steel in compression in reinforced concrete, except in columns.

We cannot use a steel stress exceeding the concrete stress multiplied by the ratio of deformation or the concrete will be stripped from the steel and the column will fail. The two materials must act together and shorten equally, each carrying a proportion of the load. The ratio of deformation is therefore a stress ratio for columns or for members acting wholly in compression.

The following formulas are used for the design of columns in which the unsupported length does not exceed 15 times the effective diameter or thickness; that is, the thickness of the column after deducting the protective covering of the steel.

Let f = average unit stress per sq. in. of effective area.

f_c = allowable unit stress per sq. in. on plain concrete.

p = ratio of steel to concrete.

A_c = area of concrete in sq. in.

A_s = area of steel in sq. in.

A = total effective area = $A_c + A_s$.

n = ratio of deformation.

P = total load.

then $P = Af = f_c (A_c + nA_s)$.

or $f = f_c [(1 - p) + np]$.

The Hooped Column

Make a cylinder of thin paper and fill it with sand.

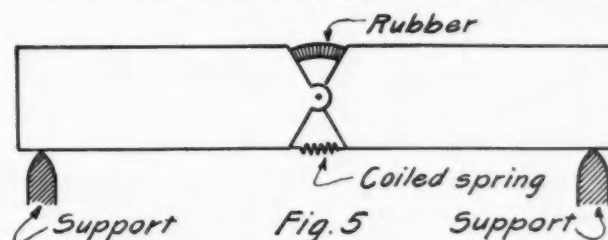


Diagram Illustrating Action of Upper and Lower Fibers in a Loaded Beam.

The paper is barely strong enough to hold the sand and if the load is put on top the paper will burst and the sand will flow. Use a tin cylinder and the pressure required to burst it will be very great. Instead of sand use cement mortar or concrete and the metal casing can be made very thin, so thin, in fact, that a wire wound spirally around the concrete cylinder will furnish the necessary strength provided the amount of metal in the wire is equal to the amount found to be necessary in the solid thin shell. Poorly made concrete needs more reinforcement than first-class concrete.

The hooped column consists of a concrete core reinforced with vertical steel and having a steel spiral around the core. There should be not less than eight vertical rods not exceeding 6 per cent of the area. The spiral hooping should be not less than one-half of one per cent and not to exceed one and one-half

(Continued to page 166.)

STRUCTURAL TILE WORK

for Houses, Farm Buildings,
Stores, Garages, etc.

conducted by
MATT L. KING
TILE CONSTRUCTION ENGINEER



A Permanent Home for \$1200.00

By M. L. King

AS they say in the "ready cut" advertisements, "THIS HOUSE FOR \$1200," finished ready to move into. Walls are 8 inches, made of a dark vitrified block. The absorption of these blocks is extremely low and will last until, as Bob Ingersoll says, "Gabriel wets his lips to give that horn a final toot."

Some of the most picturesque places in Iowa are located along the Des Moines River. The road winds along between bluffs and the river. Occasionally we

passed thru a string town with a store and a post office or a coal mine, or whatever else makes an occasion for a town.

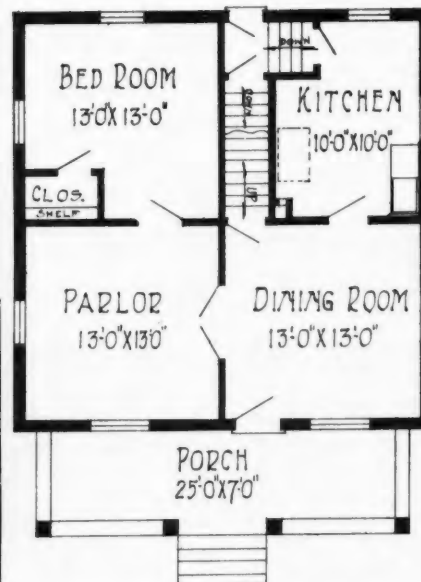
The town of Clay Works, Iowa, differs from a great many others only in that the buildings, tho built economically, are permanent. Everything from coal houses to large modern commodious residences are made of this same vitrified tile.

The illustration naturally shows only black and white. The material, however, is not all black. A great deal is a dark brown and gray, or a sort of salt color.

While the house was being occupied at the time the picture was taken, the front steps shown are only temporary. This building



The \$1200 House Made of Dark Vitrified Tile Blocks.



Floor Plan of the \$1200 Tile House.

serves as a good illustration of use of special corner and jamb blocks.

The four porch columns are built up entirely of rounded corner blocks, four of them making a twelve inch pier. The windows are the same. We even see a tile water table at the joist line.

From the plan it will be seen there are four good rooms downstairs, and there are also two rooms upstairs, well protected against winter and summer temperatures by closets between the rooms and the portion of the gambrel roof. The partitions are not made of blocks. The owner wanted them built of blocks and the principal reason they were not was that the contractor felt a little more at home standing two by fours on end and watching the boys nailing on the lath.

This is a good example of low cost, permanent home, six good rooms and a basement under the whole house, for \$1200. As Harry Lauder says, "Can You Beat It?"



Attaching Woodwork to Tile

ONE of the first questions that is asked by the average citizen concerning a block house is, "How do you hang the pictures, put on the plate rail, and base board, etc.?"

Incidentally I have seen some pretty fair mechanics puzzle over this matter, especially if they left it to receive attention after the building is up. Even door frames put in 8-inch walls are often put in without being

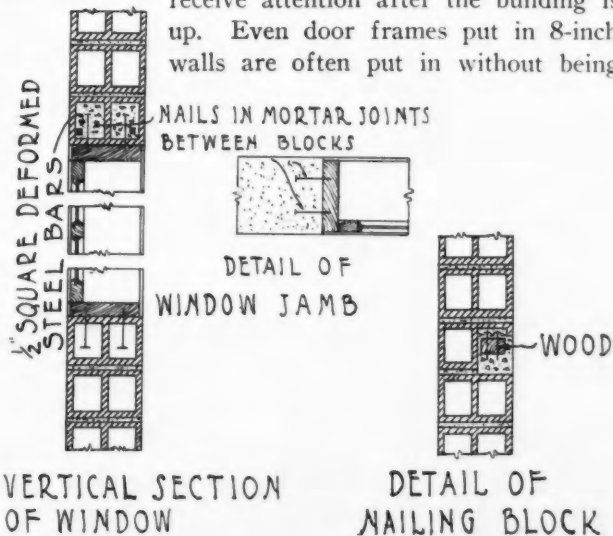


Fig. 1.

Details of Methods for Attaching Woodwork to Tile.

NAILS IN MORTAR JOINTS
BETWEEN BLOCKS

DETAIL OF
WINDOW JAMB

WOOD

DETAIL OF
NAILING BLOCK

Fig. 2.

properly secured to the masonry.

The easiest way to do this is to put a few casing nails or even heavier nails in the frame so that they will project into the mortar joints as shown in Fig. 1. No calculations or measurements are necessary on this. Simply after the first course or two has been laid against the frame, drive a couple of spikes or large casing nails so that they will lie flat directly on top of the tile.

The next tile are laid on top so nails are bedded in fresh cement mortar and are there to stay. There

should be three or more of these anchorings on each side of this frame, depending upon the size of the frame.

In case of nailing blocks we have all used a piece of a 2 by 4 instead of a brick in brick walls, and this can be done in the case of block walls. The better and more substantial way to provide nailing blocks is shown in Fig. 2. Break the corner out of the tile, then take a scrap of lumber about as large as will go into the cell of the tile. It does not need to fit tight.

Put it against the part of the tile where the corner has been broken out and throw cement mortar in on the back side to make it fit.

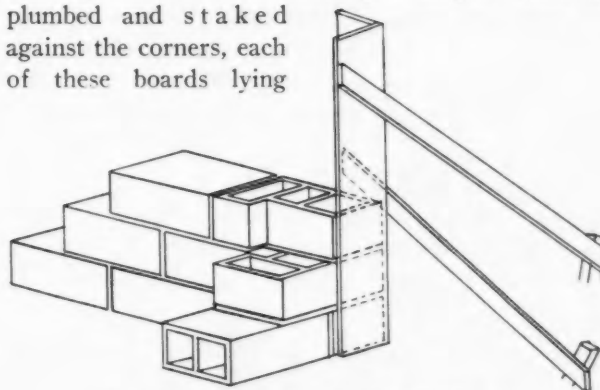
If the heads of a few nails are projecting into this mortar it will be just that much better. Two nailing blocks can be in the same 5 by 8 by 12 tile. This would be necessary in case of nailing to both sides of a one-inch wall at points opposite each other.



Laying up Tile Corners

WITH workmen not accustomed to laying up tile corners where it is necessary to use a vertical system the work is slow and not altogether satisfactory.

The writer met a condition of this kind a few years ago very satisfactorily and economically by taking a couple 1 by 6-inch boards, nailing the edge of one onto the edge of the other—making an angle. This was plumbed and staked against the corners, each of these boards lying



Showing Method of Laying Up Tile Corners.

against the sides of the building, which were of course at right angles to each other.

The difficulty arising from setting the corner tile without some such a device of this kind is due to the usual necessity of adjusting the block after it has been placed on the bed of mortar. The bed is so thin that a slight movement and the bed is gone. Then it is necessary to remove the block and re-bed.

Also after it is properly placed the placing of other material up to it, crowding the vertical joints to make them fit, will misplace the corners. However, with the assistance of a guide just described the mortar is spread on the ends of the block just placed or on the foundation in case this is used from the beginning.

The next block is then placed inside of the guide directly above the position it is to occupy in the wall. Naturally it can be held against the guide and slid

down in its proper place. It is then unnecessary to move the block to adjust it in any way except to crowd it down to its proper level and the guide holds the block so that the placing of other material adjacent to it does not disturb it in any way.



Tile House of True Bungalow Type

DURING the past summer, George H. Peters, Marcus, Iowa, built the stucco bungalow shown in the accompanying illustrations. This beautiful structure is 34 feet by 38 feet in plan, 9 feet from floor to ceiling. The outer walls are built of 8 by 5 by 12-in. vitrified clay blocks, both exterior stucco and interior plastered being applied directly to the blocks. Mr. Peters states that all of the work dried out thoroly during the summer and that the owner is very much pleased with the house.

The exterior of the house, especially the roof, is interesting. Features of decoration have been carefully worked out to emphasize the characteristics associated with the true bungalow type. The low-pitch gable roof with exposed rafter and purlin ends is one evidence of the effectiveness of the design. Attention is called to the outlining of separated surfaces in white and the effectiveness of the simple decorative scheme used in the porch design.

Three sizes of vitrified clay blocks are used in building up the walls of a structure of this kind. These are respectively 5 by 8 by 12 inches, 4 by 5 by 12 inches and 4 by 5 by 8 inches, the last being the jamb block which is the corner block or the one which is set on end for closing the corners. The 5 by 8 by 12 block is used together with the jamb block for closing the corners so that joints in each course will break half way between those in courses immediately above and below.

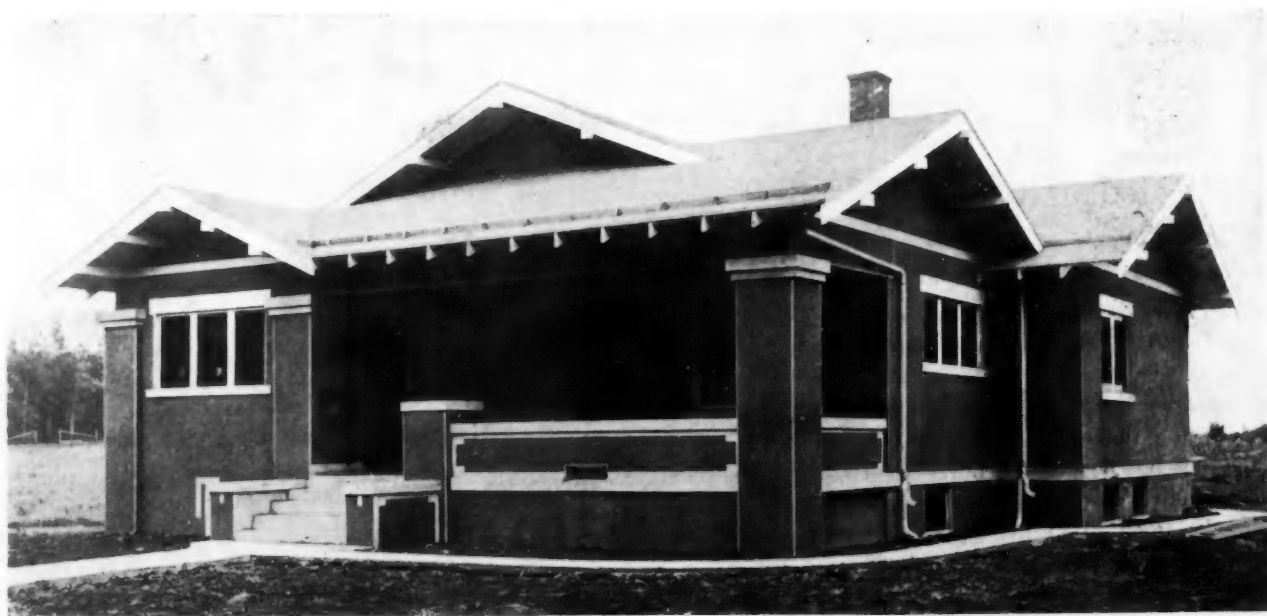
An interesting feature of the interior is the entrance

arrangement from the front porch. The front door is at the end of the porch, from which a vestibule is entered. There is a set of three casement windows in the front wall and a set of two in the side wall. French doors open into the living room. This entrance arrangement is out of the ordinary and may offer a useful



Floor Plan of Clay Tile Bungalow Shown Below.

suggestion to builders. Another feature of interest is the location of the bath between the two bedrooms. The interior is finished in western fir, stained and finished flat, the varnish being rubbed down with pumice and oil.



Stucco Finished Tile Bungalow Built by George H. Peters of Marcus, Iowa. This House Is 34 Feet by 38 Feet and Represents a Very Artistic Treatment of Details After the Bungalow Type of Architecture.

A decorative border surrounds the central text. The top-left corner features a rolled-up architectural plan with the letters 'PVA' and 'EM' visible. The top-right corner shows a compass and other drafting tools. The bottom-left corner contains a stack of framed photographs, one of which shows a person. The bottom-right corner depicts a stack of books. The bottom edge of the page is decorated with a row of six small, detailed illustrations of various house styles, including a cottage, a bungalow, and a large two-story house.

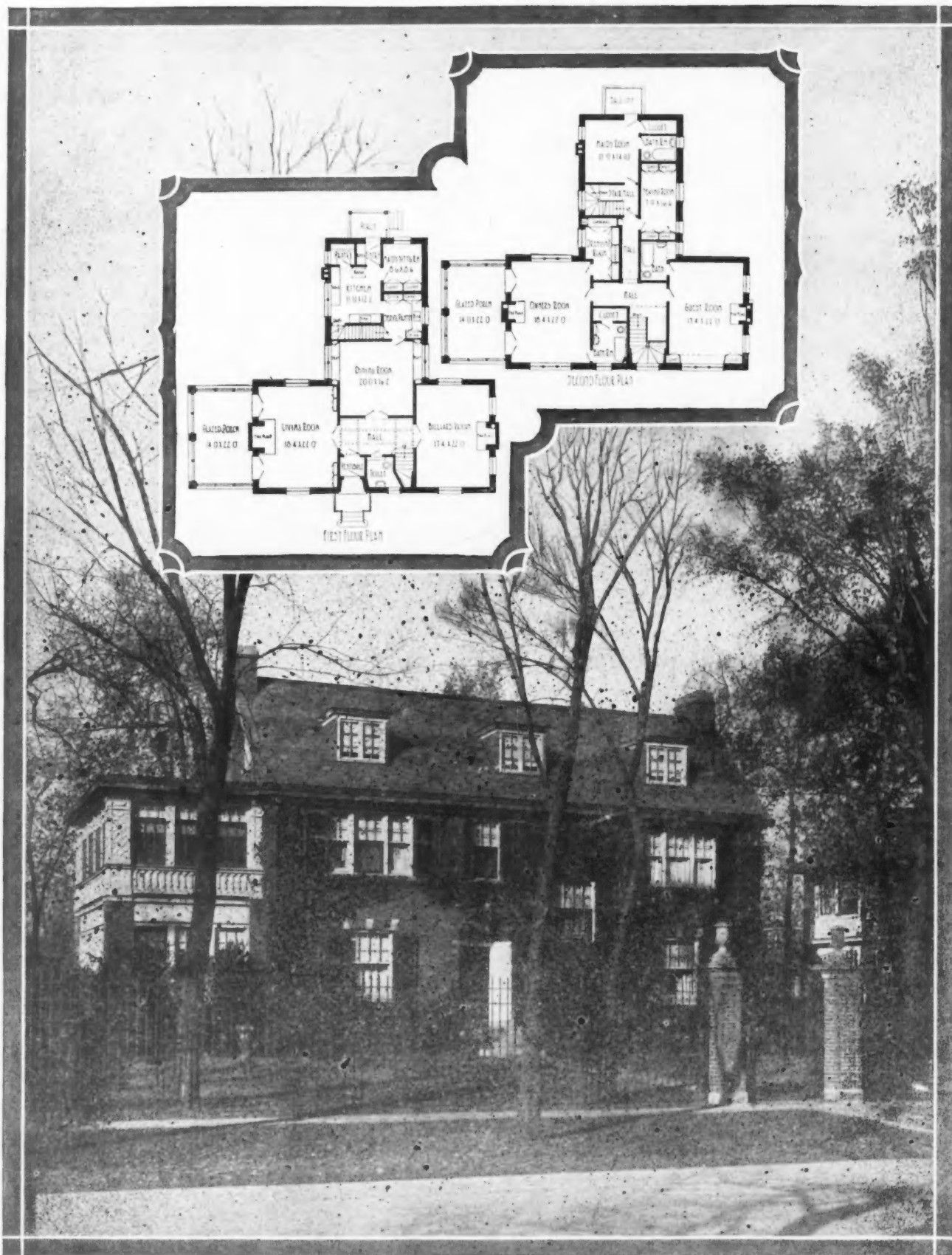
A Portfolio of Beautiful Homes

DWELLINGS of modest size, but of surpassing beauty, are available to builders in every community—dwellings complete in their every appointment and so skillfully designed that they please both the eye and the purse.

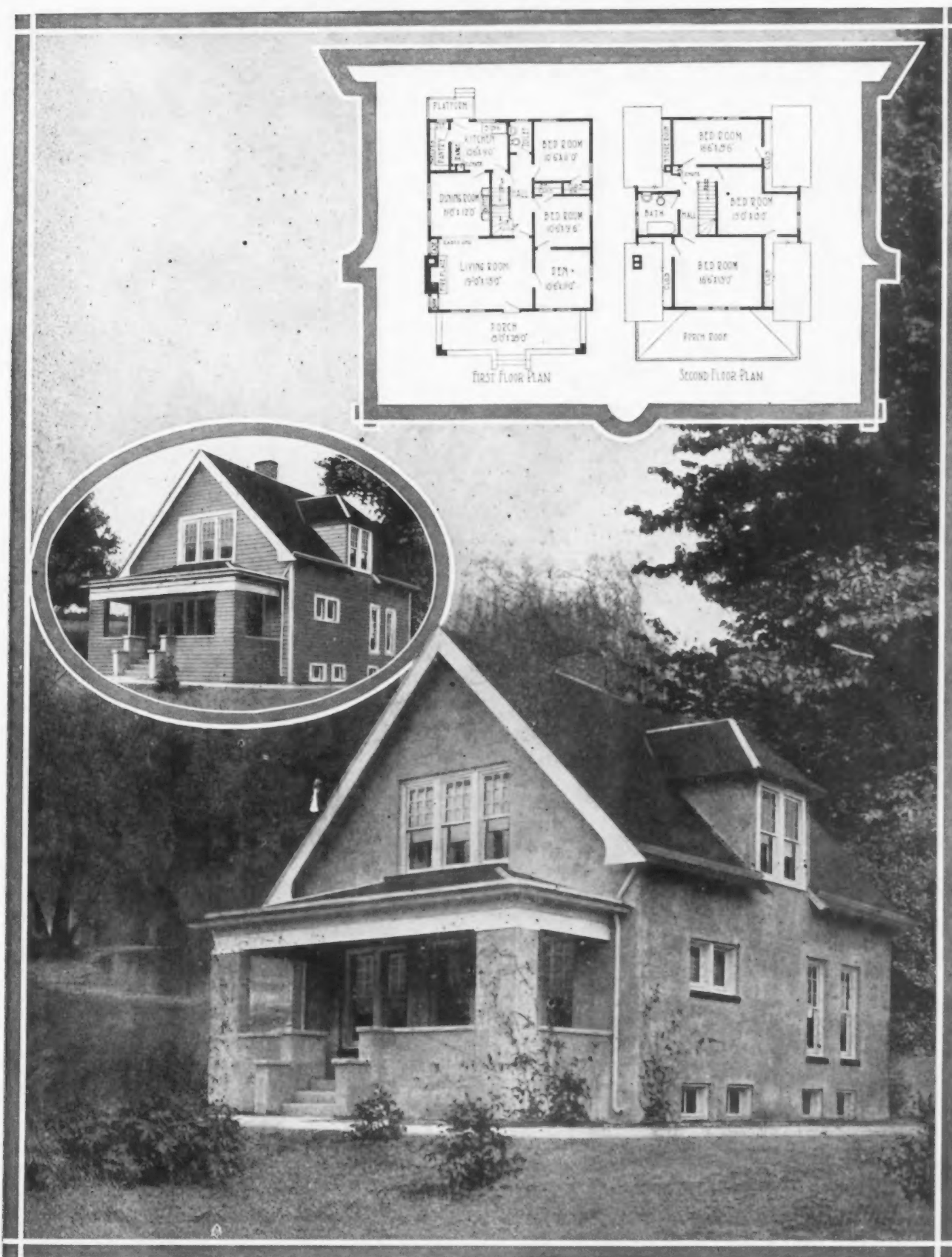
When building a HOME it is a pleasure to be even a little bit *extravagant*; for the many years of satisfaction will more than repay.

It is with considerable pleasure that the AMERICAN BUILDER presents this group of extraordinarily beautiful examples of modest home designing. If further details are desired regarding any one of them, a letter addressed to the publication office, Chicago, will bring all the information we have regarding it.

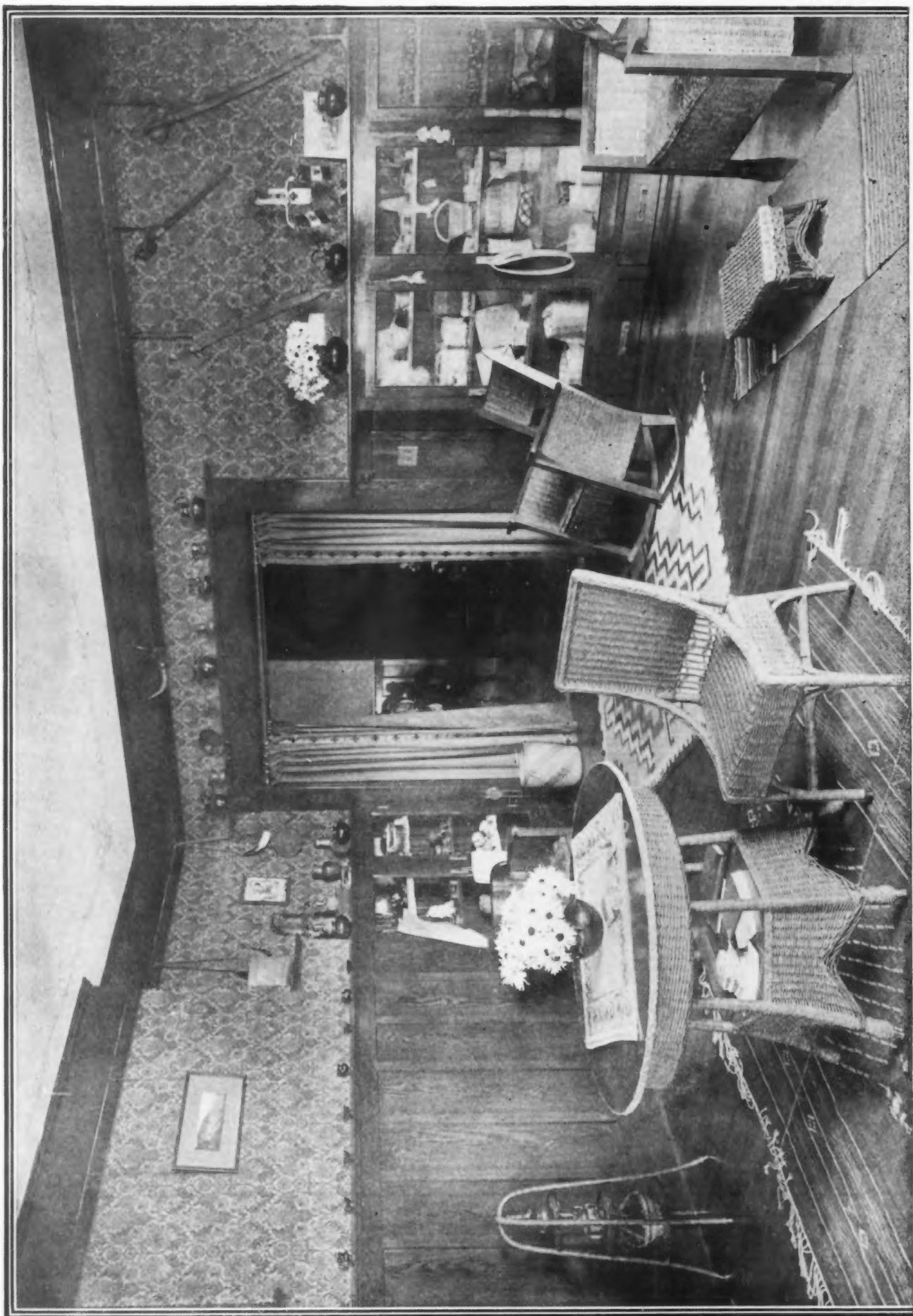
HOME PLANNING EDITOR, AMERICAN BUILDER.



ADIGNIFIED RESIDENCE OF COLONIAL PATTERN. This is the residence of F. V. Skiff, Oak Park, Illinois, designed by Howard Shaw, Architect, of Chicago, Illinois. The exterior is finished with brick, white trim, slate roof, every detail blending together in the ensemble to produce this characteristic dignity. Notice on the plans the central hall dividing living room and billiard room; dining room with built-in seats under the windows; glazed porches on both first and second floors, and the isolation of the service part of the residence.



SENSIBLE HOUSE OF NINE ROOMS. From the first glance this dwelling gives the impression of sound common sense, inside or outside. The exterior is simple, yet thoroly "easy to look at." The large view shows this house finished with stucco, while the small inset view presents the appearance of the alternate finish, wood siding, preferably with the siding boards exposed to the weather a trifle more than the ordinary. The size is 31 feet by 36 feet. Attention is directed to the convenience of the interior. Large living room with connected yet not wholly exposed dining room, handy kitchen and pantry. Notice cozy and well-lighted den adjoining living room. Two bedrooms on first floor in addition to three on second floor



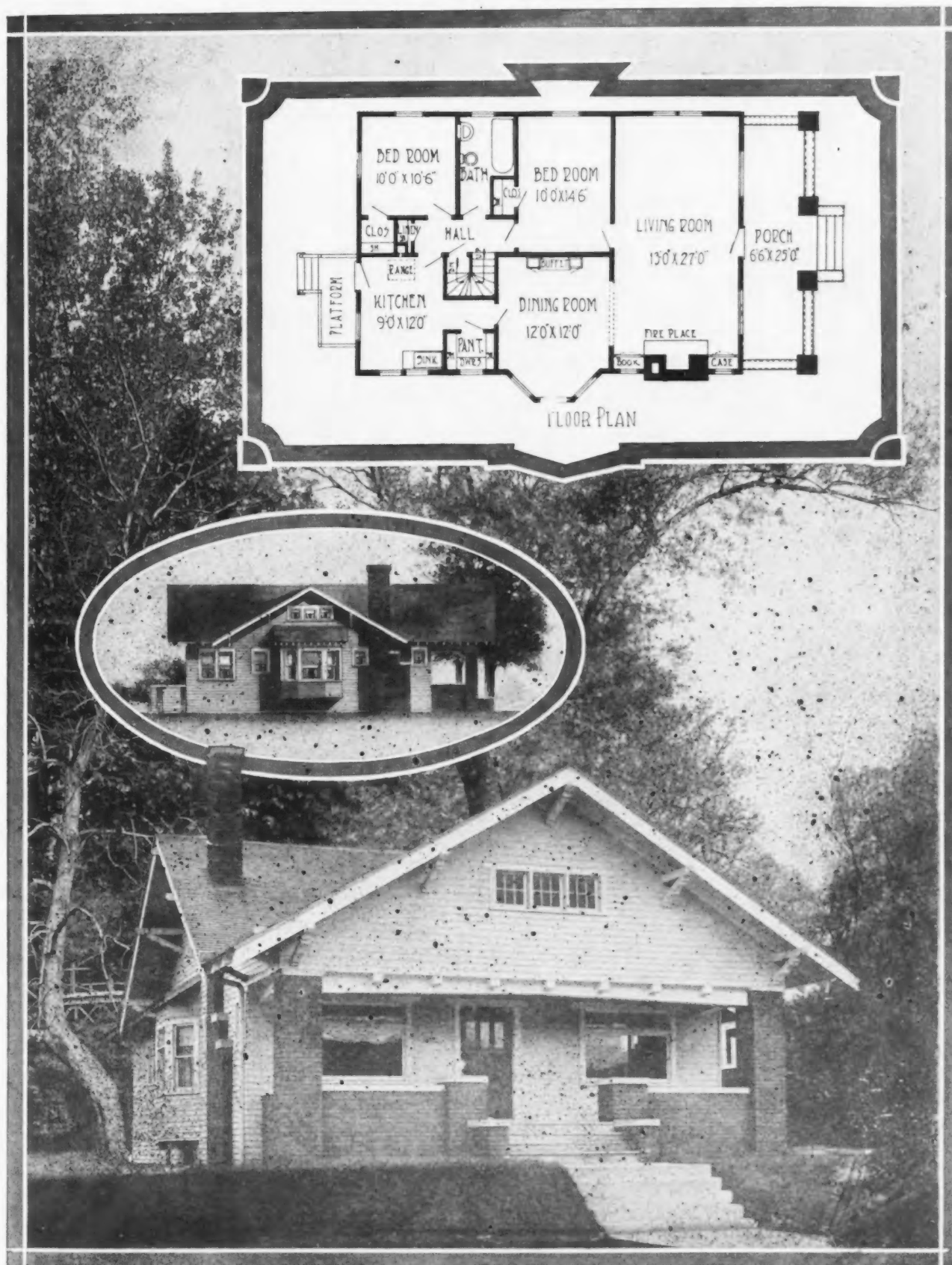
There is Nothing More Pleasing Than the Evidence of Skillful Fitting of Carefully Selected Wood in Interior Trim. Little Thought Need Be Paid the Finish if the Woodwork is Properly Handled—the Finish Serves Only to Protect and Should Not Obliterate the Natural Grain of the Wood. Here is an Example of a Room in Which the Wood Trim Forms the Most Attractive Feature.



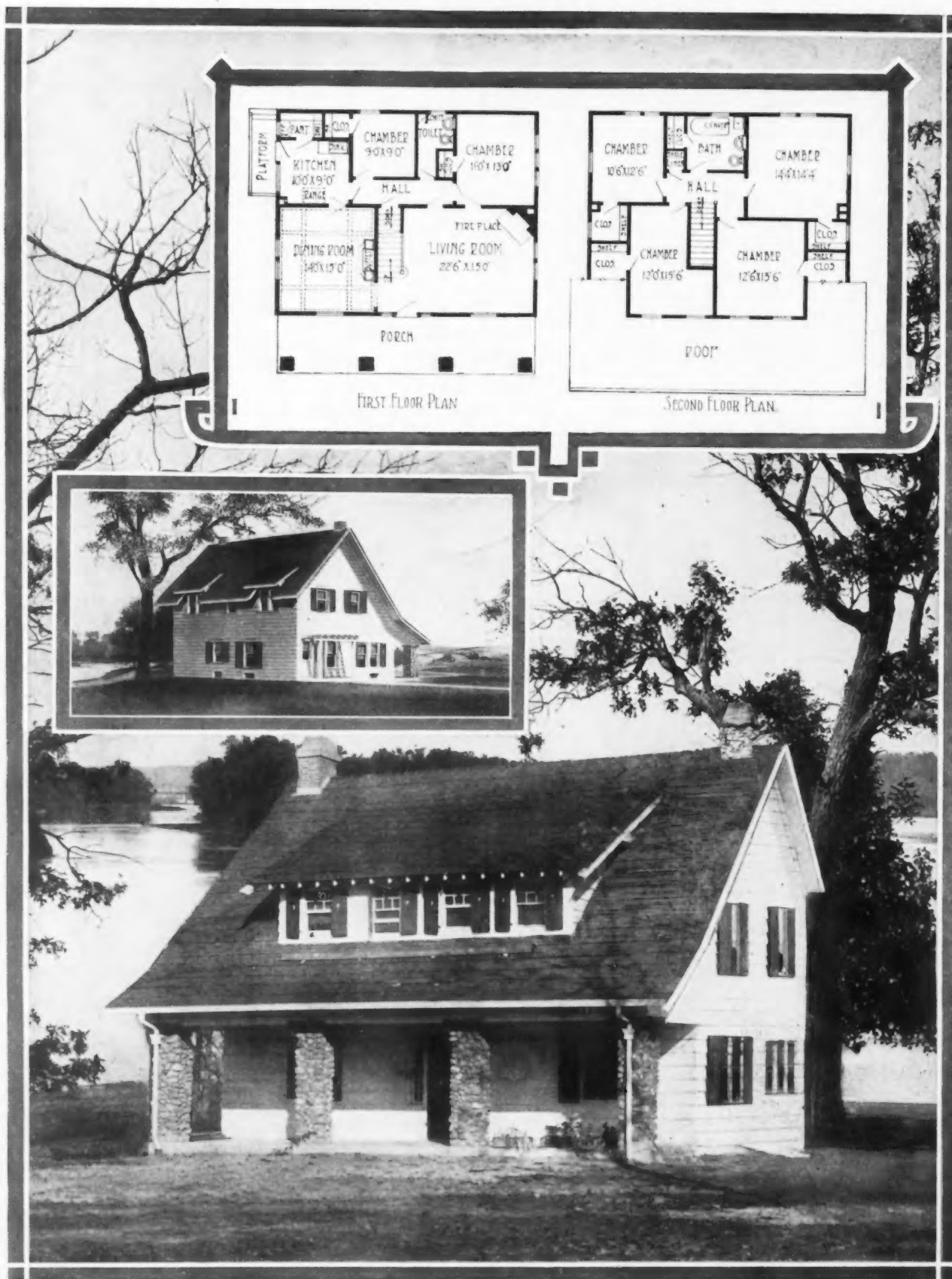
Room in Which the Wood Trim Forms the Most Attractive Feature.



An Interior Which Speaks Comfort in Every Detail. Every Man Has a Right to Expect a Light, Airy Living Room Like This in His Home, No Matter What Its Size May Be. The Five-Window Bay in This Room is Largely Responsible For the Cheer Which is Plainly Evident.

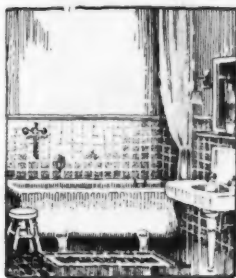


ONE STORY GABLE ROOF HOUSE. In the expansive surfaces of the low-pitch gable roof of this house is found the strongest feature of the exterior design. Because solidity is needed and also because the artistic effect is always very pleasing, face brick are used in the walls and piers of the porch and in the chimney. A side elevation is shown in the small inset view. The plan is 28 feet by 42 feet, exclusive of the porch. Notice the immense living room, the pleasant dining room and the general good arrangement of the interior.



UNIQUE STORY-AND-A-HALF HOUSE. This is a type of house which is finding favor everywhere that it has appeared. Several novel features characterize this example. Notice the method of placing the shingles so that the roof is divided by long parallel lines. The cobblestone porch pillars are out of the ordinary. The house is 38 feet by 29 feet 6 inches, not including the porch. A rear view is shown in the small inset. The living room is an attractive part of the interior. There are six bedrooms, two on the first and four on the second floor.

MODERN CONVENIENCES FOR THE HOME



Water in the Country Home

A PERSONAL EXPERIENCE IN STORY FORM



THIS burning subject has so frequently been discussed in so many impractical ways by theorists, that I concluded that by using horse sense, no magic wand would be required to install a small plant according to my own ideas, and thus secure the comforts and conveniences of my city neighbor and at far less cost than what water can be purchased for in the cities. In the first place, I acquainted myself with house water supply plants in my locality. I always aimed to be present when these plants were in operation, and I soon found out wherein the different kinds of plants fell short of what was required of them.

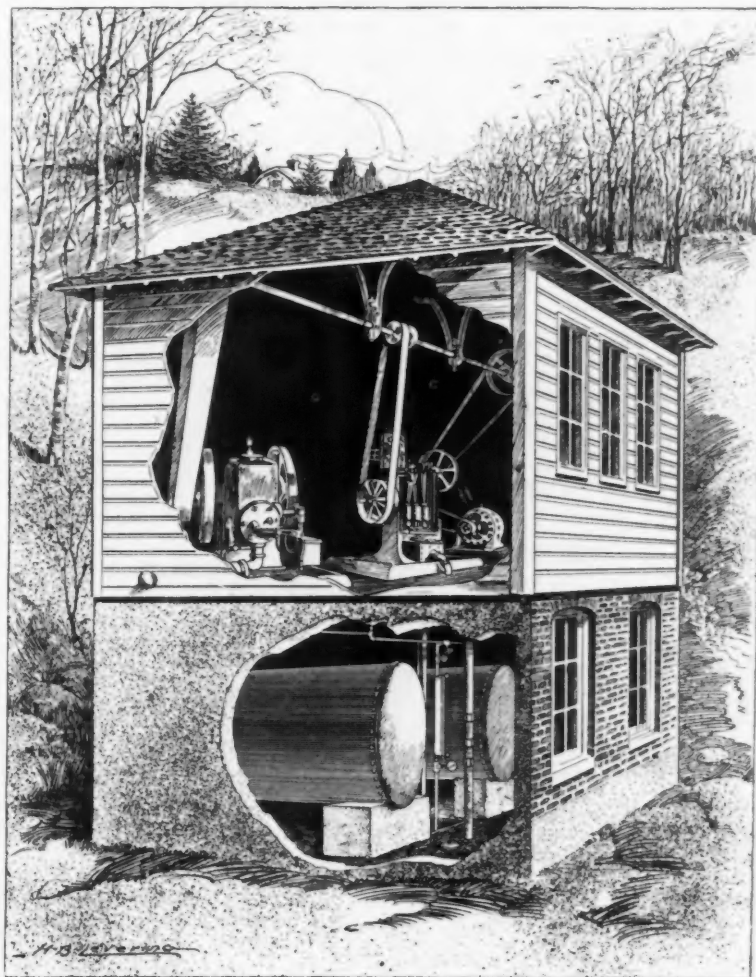
Chose Too Small a Tank

The first one I visited was a friend of mine who built himself a bungalow of eight rooms on one floor, and I tell you it is a beauty. He bought the lumber and hired a carpenter and a handy man to put it up, and I must say he has the best looking house for its size in the neighborhood. Now, when it came to supply it with water, everybody he met suggested some different method, so he wrote to a company making a specialty of water supply plants. They sent him a beautifully illustrated book which he showed me. On the first page they showed a bungalow with a water plant in it, and everything seemed to fit his requirements. His well was only twenty feet deep and near the house, so he wrote to the company and bought the outfit at a very low price. Everything was just as represented, the tank held one hundred gallons, and the pump, which was used to pump water into the tank and also supply fresh water to the kitchen, worked very easily, but he soon found, to his sorrow, that 100 gallons of water was just as good as nothing, because the children used a great deal of water every day, and figuring that used in the kitchen and on wash days, the tank was empty half the time.

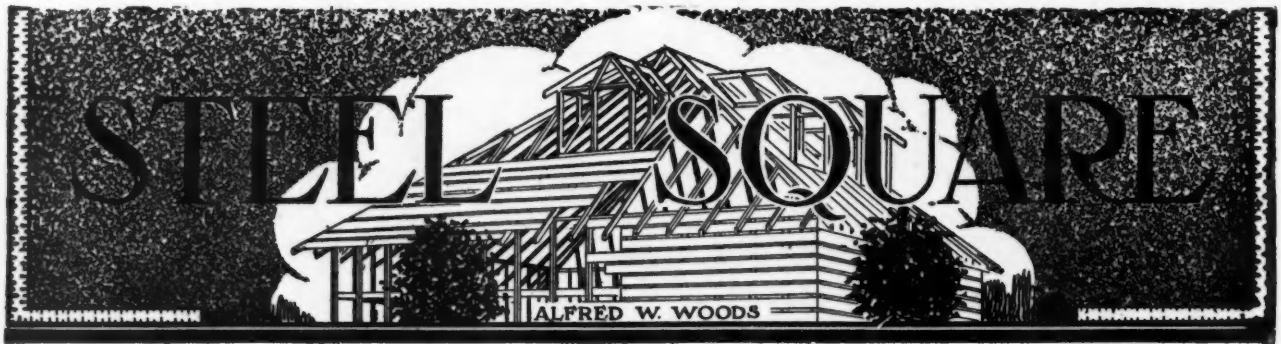
Now, let's see what he could have done. It required about a half hour or so to fill

his tank before he went to work in the mornings. If he had put in a 300-gallon tank he could have filled it by using a little larger pump in three-quarters of an hour and have more water than he needed, with a little reserve for fire protection. He learned that the slightly larger pump and tank would have cost him only \$9.00 over what he paid, but to throw away or sacrifice the small tank and pump and buy the sizes needed, it would cost him about \$30.00. He was penny wise and pound foolish.

(Continued to page 182.)



Pump House with Water Storage Tanks of Ample Size. Gas Engine Pumps the Water and Puts it Under Pressure.

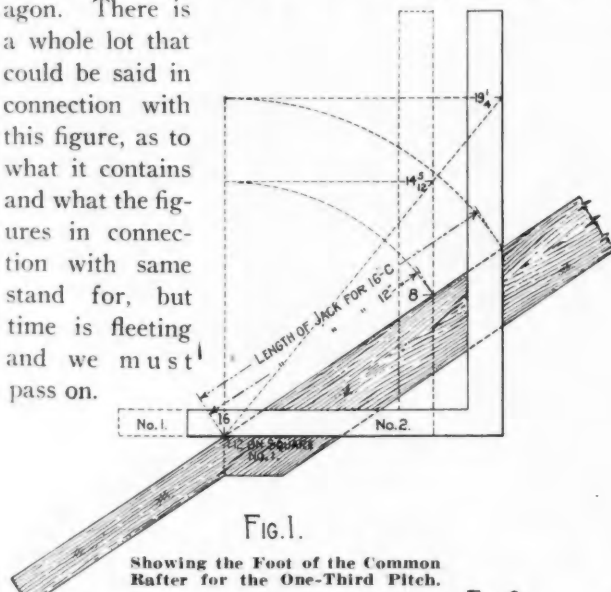


Possibilities of the Steel Square

A SQUARE DEAL REPRESENTING THE TWELFTH ANNIVERSARY NUMBER—SOME PERTINENT POINTS IN COMMON ROOF FRAMING

By A. W. Woods

WE are reminded again that another Anniversary is at hand, and in keeping with other years, we will illustrate on the square something in keeping with the number of years the AMERICAN BUILDER has passed thru. It seems but a short time since the first number of this magazine was published. Many of the readers of that number are still readers, and is the best recommendation of its real worth. And now, as 12 is on every tongue, we too will repeat it on a number of squares to produce a figure containing the number of sides pertaining to the number of years thru which the magazine has run—namely, the do-odiconagon. There is a whole lot that could be said in connection with this figure, as to what it contains and what the figures in connection with same stand for, but time is fleeting and we must pass on.



In our last article, we were talking on the length and cuts of the common rafter and promised to continue, taking up the same for the corresponding jack. A jack is simply a part of a common rafter; in other words, it is cut short of its full length on account of the hip crossing its path. Its seat and plumb cut remain the same as that

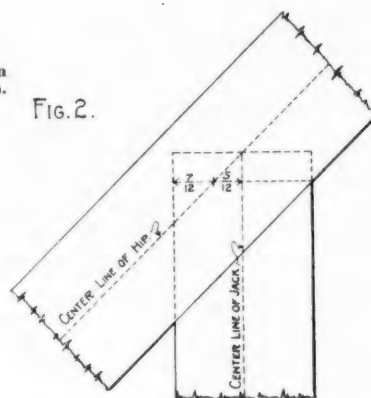
of the common rafter; but on account of the hip crossing its path, it must have a cut across its back to fit against the hip, which is generally called side cut of the jack, why it is so called, is not very clear. It might be more properly called the oblique cut, as it is a combination of the plumb on the side of the rafter and a diagonal cut across its back.

But before describing the cut further, we must first find the length of the jack, or rather its common difference, because this is one of the factors to be used in determining the cut.

Referring to Fig. 1 is shown the foot of the common rafter for the one-third pitch. 12 and 8 on the square give the seat and plumb cut of the rafter. These figures also furnish the basis for the oblique cut before mentioned. That is, if the jacks are spaced on 12 inch centers, then the length of the first jack from the corner would be the same as that for one foot run of the common rafter, namely, 14 5-12 inches, and therefore represents the common difference in the length of the jacks.

Now, suppose the jacks are spaced on 16 inch centers instead of 12. Then all that is necessary is

FIG. 2.



Showing Oblique Cut of Jack Rafter.

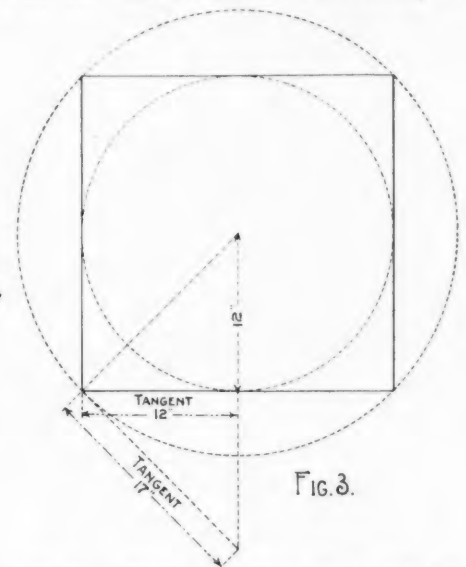
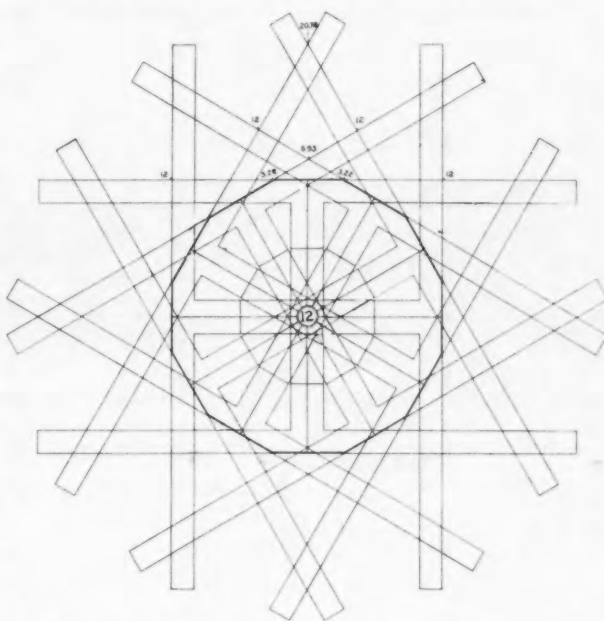


Diagram Showing Relation of Layouts for Common and Hip Rafters.

to first place the square at 12 and 8, as shown by the position of the square No. 1 and mark along the tongue, as for the seat cut. Then slide the square over till 16 rests at the point where 12 was on No. 1 and the length of the jack will be as shown by the position of square No. 2. This length ($19\frac{1}{4}$) taken on the blade and 16 on the tongue will give the same angle as 12 and 14 5-12, as proven by the broken lines in the illustration.

From this it will be seen that we have a perfect sliding scale for determining the length of the jack for any desired spacing by simply sliding the square back, or forth, as the case may be, for the spacing and the length will be delineated per full scale.

However, it should be remembered that the length thus found is for the net length of the jack to the center line of the hip, as shown in Fig. 2, tho if the measurement is made to represent the long side of the jack, it will be practically correct, as the first space would only be out of space five-twelfths of one-half of the hip's thickness; but the rest of the spacing will be regular, except the spacing may not come out just right to receive the first common rafter at



A Twelve-Part Design Fabricated Out of Steel Squares by Bro. Woods to Commemorate Our Twelfth Anniversary.

the juncture of the hip with the ridge piece; but with this and a little knowledge of the sliding scale as described above, a problem of this kind may be easily solved.

The same rule governing the oblique cut of the jack also applies to the same cut for the hip, but being at a different pitch, naturally requires different figures to obtain it.

This is fully explained by the tangent system, as shown in Fig. 3. From this it will be seen that 12 represents the tangent for the common rafter, while 17 represents that for the hip and explains why these figures are used on the tongue for the starting point.

In the case of the square corner, the tangent for the hip is the same length as its run, but this does not occur in any other angle.

The backing of the hip is another thing that should be taken into consideration, whether backed or unbacked, as it affects the depth of the seat cut, especially where there are hips and valleys in the same roof, but we will not say more at this time, but leave it for our next article along with some other points we wish to bring out.

A Few More Pickups on the Job

MITERING SCREEN MOULDING: A carpenter taught me a new one the other day in putting on half-round on screens. He nailed the two side strips up and down the sides, letting them project a couple of inches beyond required length. Then he nailed top and bottom strips on, allowing them to lap over the sides. After which he took his fine saw and "mitered" each of the four corners in succession, sawing the ends of two strips at one operation. It is the niftiest trick I have seen yet.

STRETCHING WIRE NETTINGS: This same man had a new (to me) method of stretching. He simply used a scratch awl. Raise the netting a little, jab the awl thru on a slant, and then straighten it up. The netting sure comes out of its kinks.

SHEETING: Instead of placing each board on centers of rafters and then marking, just shove it back against the side of the rafter on which it is to joint, then cut down alongside the one at the other end. When raised and shoved back to center it comes just right. Again, lay a lot of sheeting on the rafters (where you use 1x4 and space 4 in.), shove back

against side of rafter as above, then cut along the rafter, thus cutting seven or eight boards at one time. Now tack every other one, then take out and move up the ones between. Repeat until all are used. After which go ahead and nail solid. This makes quick work of sheeting. There is one man here who even goes so far as to nail only the joints of all boards until all the sheeting is on. Then he nails the whole. Anyone who has not tried it will be surprised at the rapidity of the method. One caution, however; don't try it on the hips. Because when you raise the piece to place it will be too long.

PAINT SCALING AROUND NAIL HEADS: Ever take off an old casing and when you tried to drive the nails back (or out), find that the heads peeled a regular hole as big as a nickel, ruining the piece for any further use? Turn the casing back up, and place the head of the nail on the end of a 2x4. Strike the point a sharp blow and you will find that the head is out far enough to take the hammer claw—and the surrounding paint not injured.—H. J. BLACKLIDGE, Patagonia, Ariz.



Winners of the "Three Butt" Contest

By A. H. Dessau,
Manager of Service Dept. the Stanley Works

THERE is no more important part of a house than its doors. Their proper hanging is a job worthy of the most skilled builder, and the butts on which they swing are the most important pieces of hardware in the building. This is almost the unanimous opinion of seven hundred builders and contractors who submitted articles in The Stanley Works "Three Butt" prize contest recently closed.

Cash prizes were offered for the best reasons for hanging all doors on three butts. The awards have just been made, as follows:

First prize, \$25.00, John Winter, Davenport, Ia.

Second prize, \$10.00, Ernest Goodspeed, Ypsilanti, Mich.

Third prize, \$5.00, F. E. Meigs, Peru, N. Y.

Three fourth prizes of \$3.00 each to E. F. Ryan, Laurel, Neb.; R. E. Templeton, New Egypt, N. J.; Edw. H. Crusell, Sacramento, Cal.

A wealth of information about hanging doors and the use of three butts to every door was received, and in the course of the competition some very interesting data was collected.

J. H. Krenmyre of Tiffin, Ia., wrote that he had investigated seventeen houses, with a total of one hundred fifty-two doors hung on two butts. With but few exceptions the doors had warped to such an extent that the finish was worn either at the top and bottom of the jamb, or at the center of the jamb. In eighty-nine cases the door had rubbed the stop at the center, while in forty-three cases they had rubbed at either the top or the bottom. Seventy-six doors were sprung so badly that they would not shut easily, and twenty-three would not latch as they should.

O. W. Fitzgerald of Portland, Kansas, wrote that he was sure the pearly gates of heaven swung on three golden butts. We are sure that they do.

The judges had a long and difficult task to review each article carefully and to award the prizes. The following article won the first:

Reasons for Hanging All Doors on Three Butts

By John Winter, Davenport, Iowa
Winner of First Prize

1. The third or center butt will hold the butt edge of the door in alignment and to a great extent will prevent the door from warping.

(Continued to page 192.)

A Buffet—Bookcase

Designed by Ralph W. Ermeling, Architect

IT frequently happens that a living room and dining room are not connected in the orthodox fashion. This usually consists of a cased opening or a treatment of square columns with, perhaps, built-in bookcases to separate the rooms. In houses that are planned to be very economical of space these two rooms are often thrown into one, with a folding screen set up when meals are being prepared. Even in more pretentious houses these rooms are sometimes thrown together.

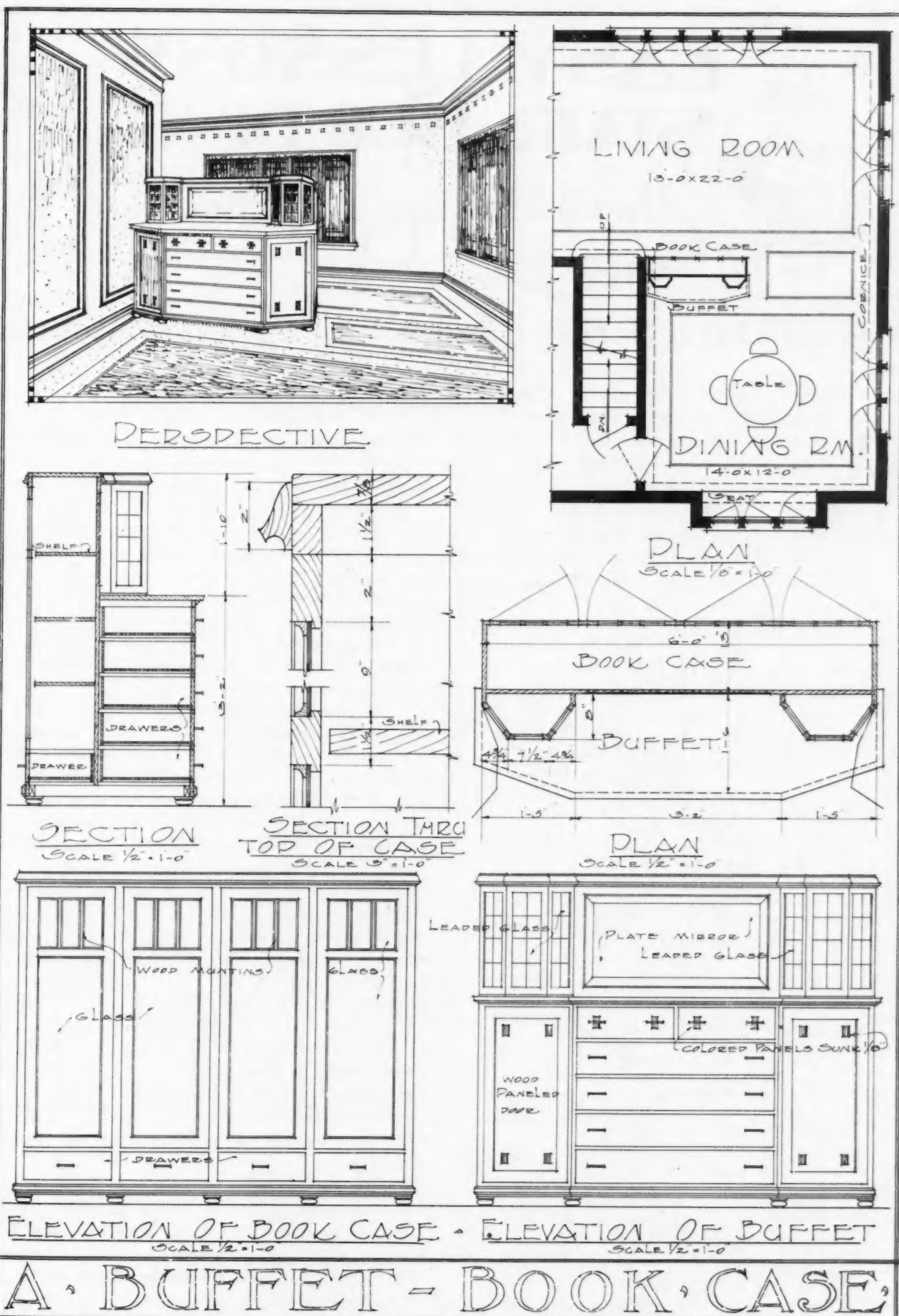
In the house whose two rooms are illustrated here the problem was to pull out the short side of the living room with an effective screen that should be useful. The living room required a bookcase, and the dining room a buffet, and the two were built together with a common back.

The bookcase is very simple, consisting of four doors and four drawers at the bottom. The glass is separated into two main divisions, the lower one plain and the upper one subdivided with wood muntins into oblong lights. The mouldings are somewhat different from what are used ordinarily, but they are graceful even tho simple. They are carried around the top and bottom of the buffet to help preserve the unity of design.

The buffet departs from the usual straight front by splaying off at the sides with paneled wood doors. Shelves for chinaware are set in behind the doors. The plainness of the panels is relieved by smaller panels set back $\frac{1}{8}$ inch from the front. These small spaces are colored. The same decorative device is used for the two small drawers at the top.

As a concession to the lady of the house who wishes to display her finer chinaware and silver, two small cabinets are built on the top of the buffet having glass fronts leaded in small lights. This may not be according to the latest dictates of fashion in dining room furnishings, which call for a plain top shelf with nothing built over it, but many housekeepers still prefer to have at least a small display space that can be enclosed and protected from dust.

This fixture might have been put in the center of the opening between the living room and the dining room, with passageways at each side. This would give a more open effect and also act as a screen.



Perspective Sketch, Floor Plan, Elevation and Details of a Combined Buffet and Book Case, Arranged to Form a Half Partition Between a Dining Room and a Living Room. Designed by Ralph W. Ermeling, Architect.



EASY LESSONS IN STAIR BUILDING

Hand Railing Explained



Laying Out a Scroll Handrail by Ordinate Method

Lesson 7.

By Morris Williams

Note: Lessons 1 to 6 appeared in the issue of AMERICAN BUILDER July to December, 1916.

WE present in this lesson a third method to lay out a scroll handrail, primarily for the purpose of further demonstrating the value of "Ordinates" or level lines in handrail construction.

The scroll curve as shown in Fig. 39 is drawn by a different method to that used in the last two lessons.

The line shown from 1 to 8 is made equal to the

size decided for the scroll to be. In this figure it represents 24 inches. Divide it as shown into 8 equal divisions and bisect the divisions between 4 and 5, as shown at Z. From Z draw a perpendicular line to C and upon it fix point 2 at a distance from Z equal to one of the eight divisions shown on the line from 1 to 8. Now draw the first quadrant from center Z, as shown from A to C, and the second from center 2, as shown from C to E. These two quadrants are the only parts of the scroll that will be twisted, the remainder around the eye will be left as cut square to the face of the plank.

To find the other centers, make 8-E equal 8-7 and draw a line as shown from E to A and a line square to it as shown from C. Thru the intersection, draw a line from Z to 3, fixing point 3 as the third center to draw the quadrant from E to D. Now draw a line from 2 to 4, fixing 4 as the fourth center. The remaining centers are found by drawing line from 4 to 5 and 5 to 6, to intersect the cross lines as shown.

In Fig. 40, is shown a part plan of few steps adjoining the scroll, the risers shown to be equally spaced upon the center line. Across the scroll is shown level lines, which will be made use of in the development of the face moulds. Those across the bottom quadrant C-E are drawn parallel with the bottom tangent D-E because of its being a level tangent aligning with the level block of the scroll, a condition necessary to guarantee a true butt joint at E, which is made square to both the block and tangent.

The level lines across the top quadrant A-C are made perpendicular to the chord line and equally spaced upon it.

Having thus prepared the plan level lines, we will now need corresponding level lines for the face moulds.

Proceed as shown in Fig. 41. Make the base line A-B-C-D-E in this figure equal in length to the plan tangents A-B-C-D-E, shown in Fig. 40, and upon each point draw perpendiculars. Measure from A to A', the height of three steps. At A' place the pitch board and

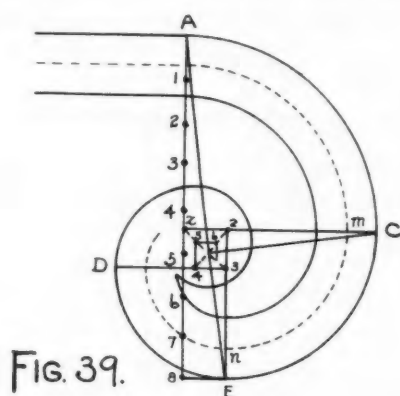


FIG. 39.

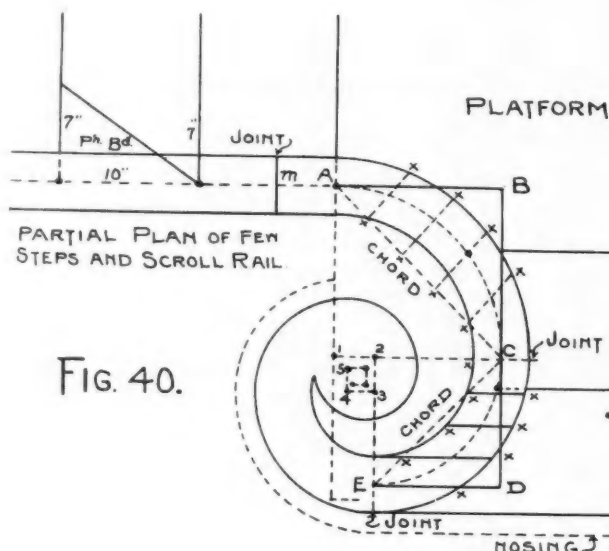


FIG. 40.

draw the pitch as shown down to Z, cutting the perpendicular from B in B'. From B' draw a line to D cutting the perpendicular from C in C', thus determining the length of all the tangents which are required upon the face mould.

To find the twisting bevels, place in the compass the length shown from B' to Z, fix one point in A' and turn around to cut the tangent as shown in S, and from this point draw a line across to O.

Now connect B' W and from center O open out the compass to it as shown by the arc. Open it out again to touch the tangent A'-B'. Make O-N equal I-C, the plan radius of the top quadrant, shown in Fig. 40, and connect the arcs to point N, as shown for the bevels.

The bevel for the bottom piece of wreath is shown at the joint C', and is to be applied to the bottom end E as shown in Fig. 42. To lay out this mould, make the base line O-E equal to the plan chord line E-C, shown in Fig. 40, and make the height O-C equal to the height C-C', shown in Fig. 41.

To find the angle between the tangents, take E for a center, and with the length of the level tangent D-E, Fig. 41, draw an arc; again, take C for center and with the length of the pitch tangent C'-D, Fig. 41, intersect the arc in D and connect D E and D C for the face mould tangents. Make the joints at each end square to the tangents. Now draw the chord C-E and divide it into 4 equal divisions, and thru each draw

level lines parallel with the level tangent E-D. Upon these locate the points x, x, etc., measuring from the chord distances equal to those shown from the plan chord E-C across the plan rail in Fig. 40. Complete the mould by tracing the curves thru the points x, x, etc., as shown.

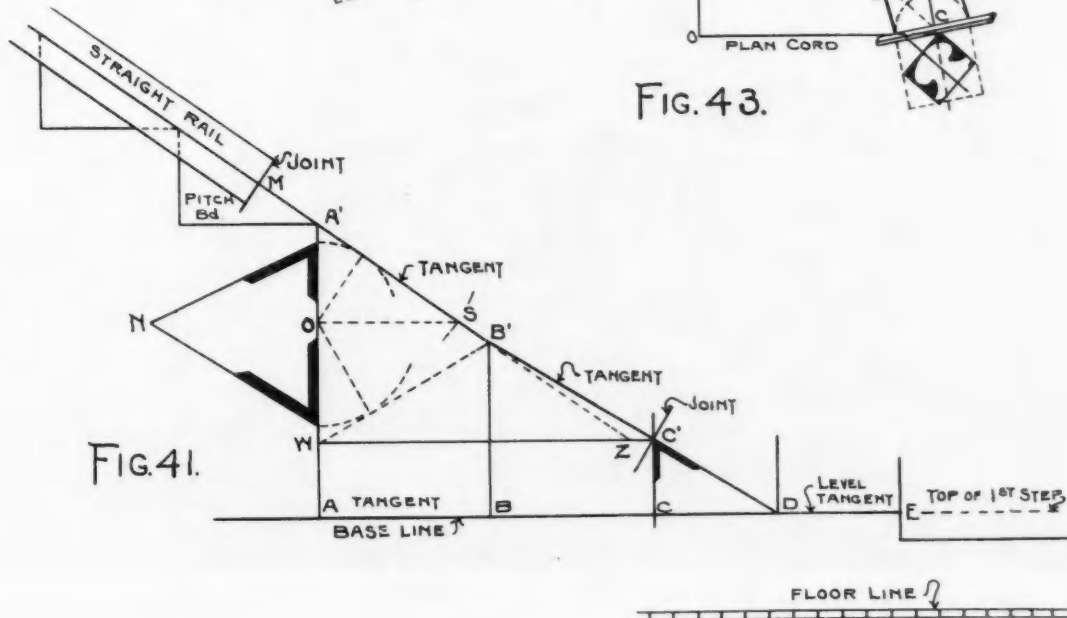
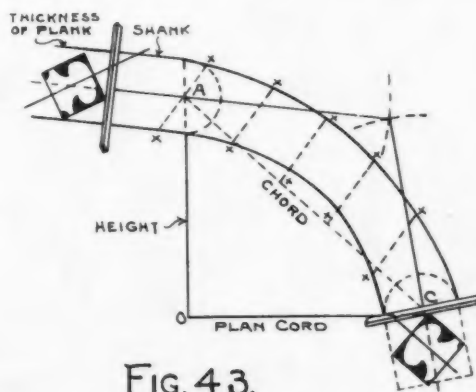
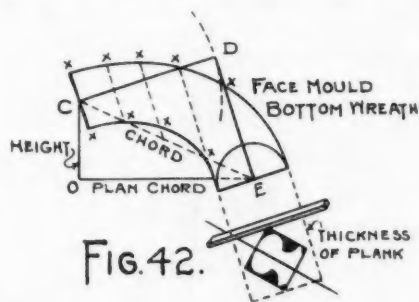
The face mould for the top wreath is shown in Fig. 43, having been laid out by the same operation. In this figure, make the base O-C equal the plan chord A-C, shown in Fig. 40; the height O-A equal the height shown in Fig. 41 from W to A', and draw the chord from A' to C. Divide the chord into five equal divisions, and upon each point, draw perpendicular lines, which will be the level lines. Upon these locate the points x, x, etc., at a distance from the chord equal to the distances from the plan chord across the plan rail to the points x, x, etc., there shown. Complete the mould by tracing the curves thru the points x, x, etc., either by free hand or by scribing along a bent lath touching the points.

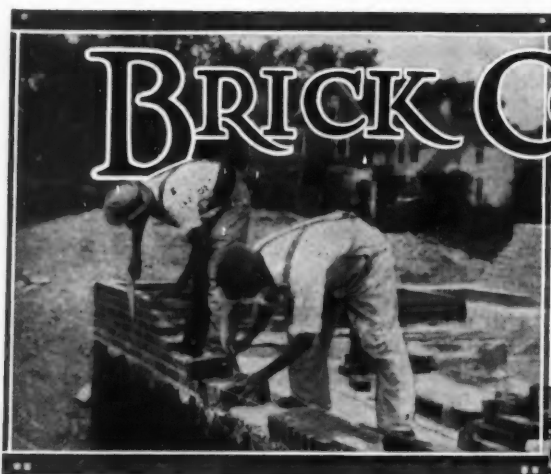
The shaded part from A' to the joint will be a straight piece. The thickness of plank required equals the width of the mould at the widest end, or, to be more exact, the diagonal of the square section of the rail.

It is shown in Fig. 44 how the mould is used to cut out the wreath material from the plank and the manner of applying the bevels at each end.

Observe that the material is cut out square to the

(Continued to page 180.)





BRICK CONSTRUCTION

for Modern Carpenters and Builders

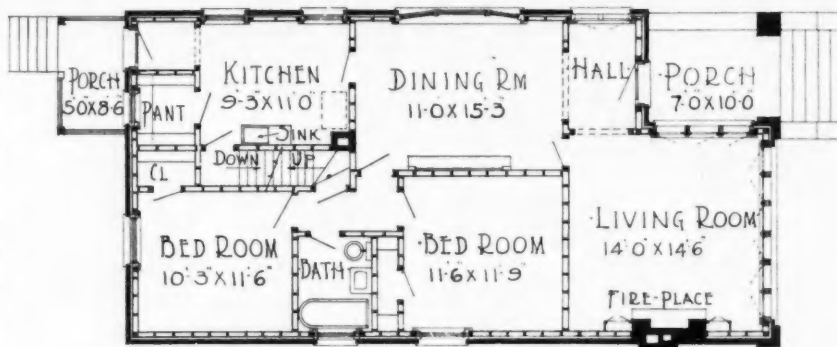


The Face Brick "Dickey"—a Crime!

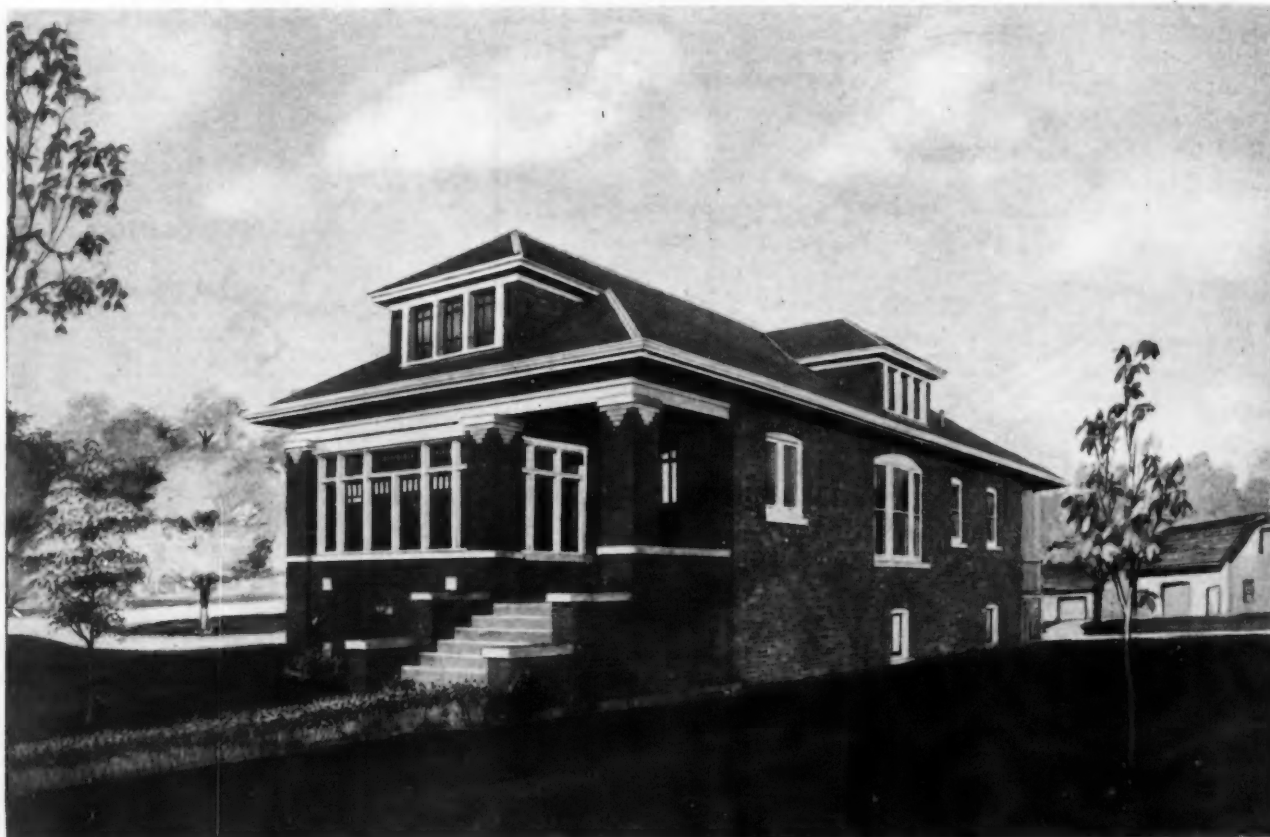
USE FACE BRICK ALL THE WAY AROUND, IT COSTS ONLY ABOUT THREE PER CENT MORE.

WE have no quarrel with common brick. It's a useful and valuable building material; but doesn't it seem a shame to use it in place of face brick for the sides and rear of brick dwellings?

The editor of this journal is going to make up a model building code one of these days and when he does the face brick "dickey," or false front, is going to be prohibited by law!



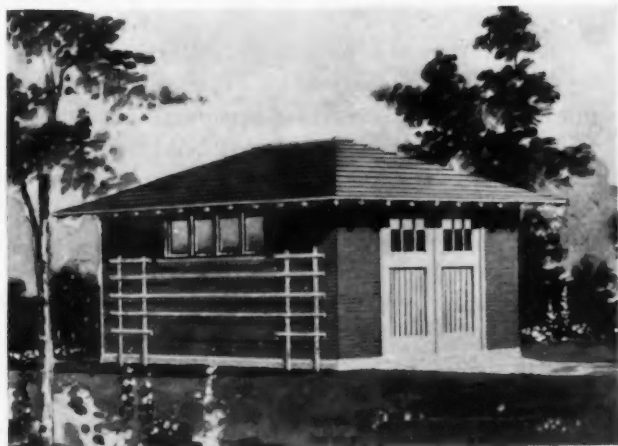
Arrangement of Cottage Below. Size 24 Feet 10 Inches by 48 Feet.



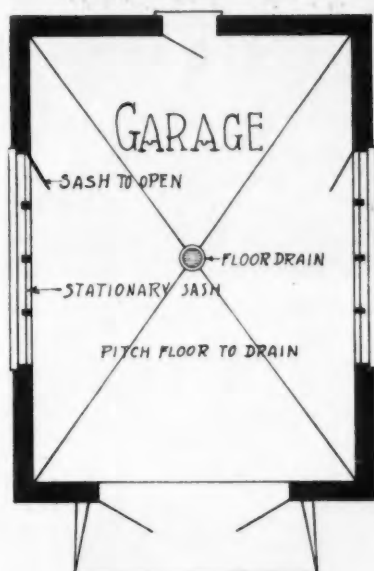
Modern Brick Cottage Put Up by a Chicago Builder and Offered for Sale. It is a Beauty from the Front, But Those Cheap Looking Common Brick Sides Kill It. For \$150 More Face Brick Could Have Been Used All Around.

Garage Designs for One and Two Cars

IN designing the two garages shown in the accompanying illustrations the same idea has been applied to both the single car and the two-car building. Construction methods are identical, and appearance



Attractive Brick Garage. Generous Space for One Car is Provided.



One-Car Brick Garage. Size 15 by 20 Feet.

is altered only insofar as the square shape of the two-car garage brings the hip roof to a point, while in the single-car garage it terminates in a line. Brick built up on a solid foundation of concrete is the material used in the walls. Double-hinged doors are used for each part of the double garage and for the single garage. In the side walls there are four win-

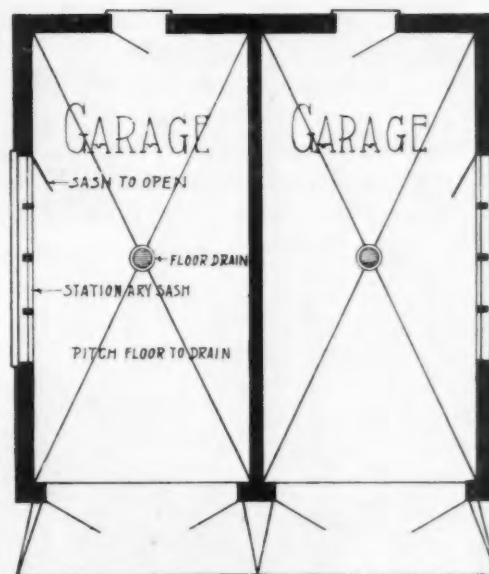
dows fitted into a single opening, one sash being hinged to open in and the other three being stationary sash. The private garage is something more than just a place to put the car in. It must be made attractive or its influence will reflect upon the good qualities of the house with which it is associated. At the same time, an extremely elaborate garage does not fit into the average scheme. The ideal garage is one which may be placed in position near an attractive house without causing the house to lose any of its beauty.

The two designs shown in the illustrations are especially well adapted for use on the same lot with a brick house of average type. They could not harm the effect produced by such a house, while if the house had been designed with very elaborate decorations and wide departure from usual types, it would be neces-

sary to design the garage with some consideration for the eccentricities of the house design. The brick used in the construction of the garage should be similar to that used in the house. The lattice work suggests a method of allowing nature to take a hand in the finishing of the little structure.

The purpose of the double garage might at first seem to be for use in connection with a house built for two families, since a dividing wall is included in the design. Altho this is surely one of its uses, there is often times a use for this dividing wall in a garage built to house one man's cars. In case of fire in one part, the dividing wall often makes it possible to get the second car out before it is damaged. If one car is an electric vehicle, it is a great deal more safe and more satisfactory from every standpoint to keep the machines separated.

The foundation walls and floor in each of these designs is built of concrete. A floor drain is placed in the center of the floor in each case, and the floor is sloped from the walls to the drain. Concrete should be used for approaches because of its neat appearance and durability.



Double Garage of Brick Construction. Size 20 by 20 Feet.



Brick Garage Design for Two Cars. The Dividing Wall Has Several Advantages.

How I Remodeled My Farm Home

By Chas. R. Ford

Contractor and Builder

I SAW in the December number of the *AMERICAN BUILDER* an old house being veneered with brick. The accompanying illustrations are of a house that I repaired about 15 years ago. I dug down on the outside of the old wall to solid clay and laid up a stone wall to where the window sills should be, then I set up a 2 by 4 for a form and ran a cement cap all the way around the house, letting it form the window sills. Then I got out some 2 by 2-inch strips and spiked them on the edge of the old casings to form a brick mold, using a 2 by 6 to cut the segment out of to go over the doors and windows.

I used a wire wall tie made out of No. 11 wire.

When I got up to within 12 inches of the upper windows, I put on a 2 by 4 for a plate, then I cut out some curved pieces and spiked them to the house and toenailed them to the 2 by 4. Then I nailed 4-inch strips to these to shingle to. I took off one piece of siding and let the last row of shingles run under, then nailed it back on again, thus forming a shingled belt. I left the siding on the upper part, as this does not get to the weather to

wear off the paint as the lower part does. This makes a very substantial job at little cost, and has a classy appearance.

You can veneer a house like this about as cheap as you can give it a second painting. This house was built in 1892 and has not been repainted since.

EDITOR'S NOTE: Your shingled belt course is ingenious, but for real good looks and a thoroughgoing job we would suggest overcoating the second story with metal lath and cement stucco.



The Residence of Chas. R. Ford Before Remodeling Had Been Attempted.



The Above House After Mr. Ford Had Overcoated the First Floor with Brick Above a Stone Foundation Wall.

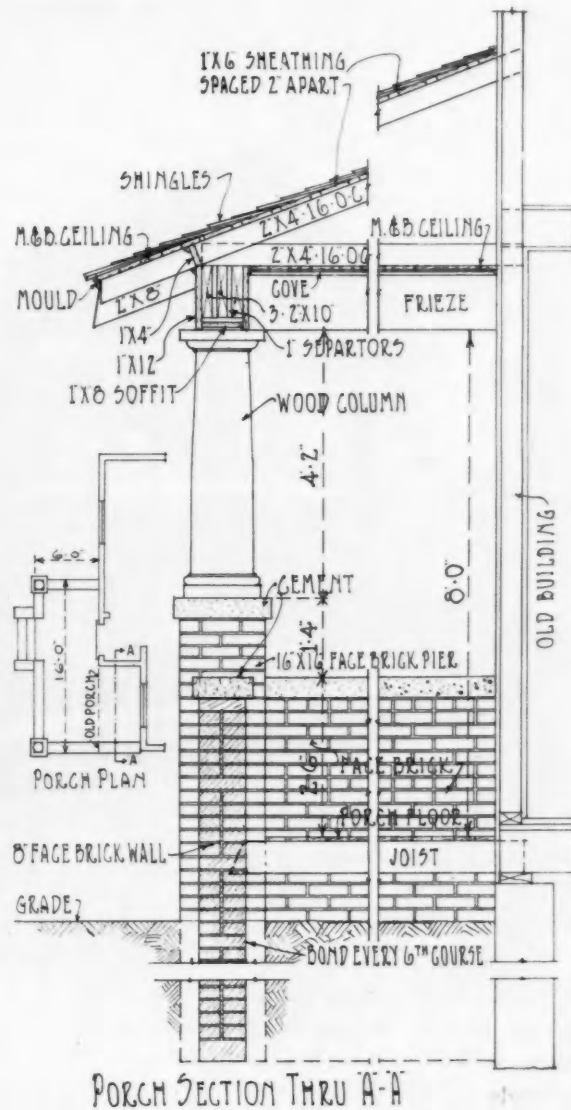
What a New Brick Porch Would Do

HERE is a little bungalow which may be greatly improved by the addition of a modern brick porch. The upper view on this page was taken from the photograph just as it was sent in by H. H. Mount of Pasadena, Calif. A brick porch was designed for the house by the service department of the AMERICAN BUILDER, plan and section of which design is shown on the right. The lower view is taken from the photograph on which the proposed brick porch has been painted in.



View of Bungalow on Which H. H. Mount, Pasadena (Cal.), Wishes to Build a Modern Brick Porch.

In addition to the brick porch, Mr. Mount requested that the door be placed where the small window shown in the upper view is now located. This change has also been indicated in the lower view. The proposed porch is 6 feet by 16 feet, out to out, in addition to the old porch. This added space will be useful and the large light in the door will admit considerably more sunshine into the house, making the remodeling plan thoroly worth while.



PORCH SECTION THRU "A-A"

Detail of Modern Brick Porch with Gable Roof Suggested for House Shown on This Page.

The structural details are clearly indicated in the drawing. The brick walls of the porch are 8 inches thick, of face brick, and the corner piers are 16 inches by 16 inches. Concrete copings are placed above the brick of the walls. These may be made with a facing of white cement and silica sand to good advantage, especially if the house is trimmed in white. Porch floor joists are recessed into the brick wall and are sloped to drain down the porch steps. The brick walls are carried down to a good firm foundation on soil so that there will be no danger of cracking due to shifting of the sub-soil or the effects of moisture.

Rafter ends on the porch may be cut to correspond with those of the main roof of the house. When finished with a similar cornice, the gable roof of the porch harmonizes perfectly with the main hip roof.



Showing How Above House Will Appear After a Modern Brick Porch Has Been Added.

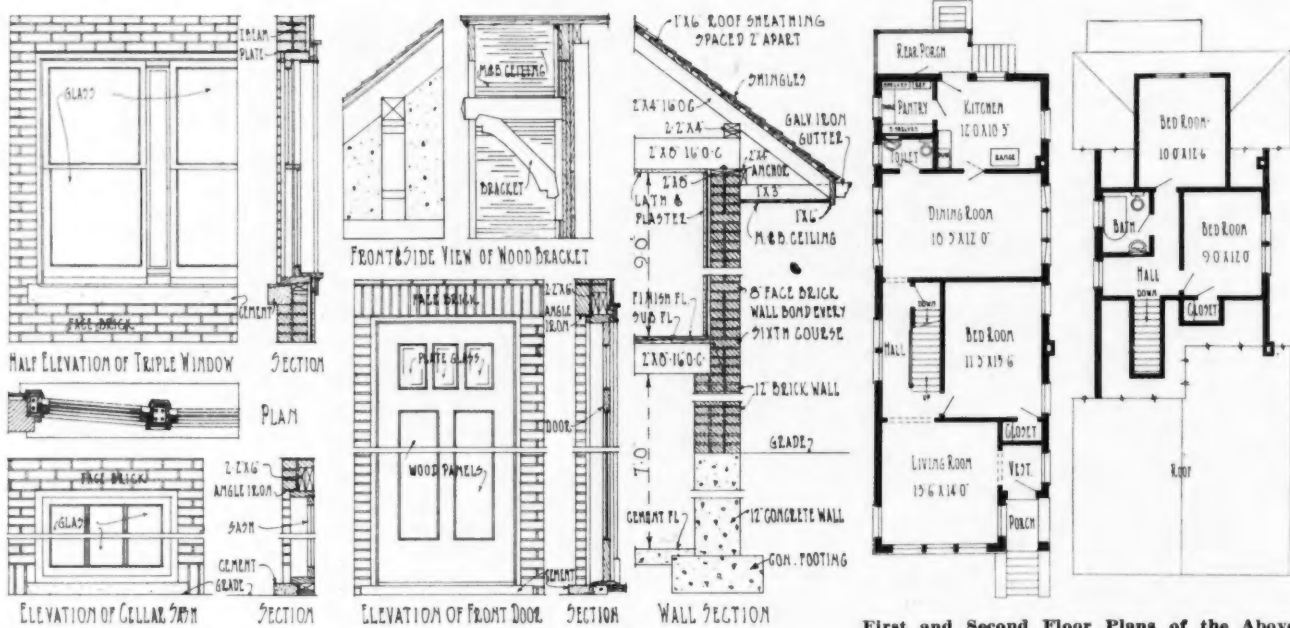


Attractive Brick House Designed for a Narrow Lot. All Walls Are of Solid Brick With the Exception of the Small Portion Under the Main Gable, Which Is of Stucco With Stained Wooden Battens.

THIS house is a very substantial and decidedly pleasing example of a narrow lot house. While the width of the house is only 20 feet, there is no evidence of crowding in the arrangement of rooms, and the exterior is well balanced and attractive from any angle.

The walls are of solid brick built upon a 12-inch concrete foundation wall. The brick is carried up 12 inches thick to the floor joists, from which point the

thickness is reduced to 8 inches. Some of the more important details are shown in the drawing on the left below. The triple windows require an I-beam with steel plate riveted to the lower flange to support the brick wall above. The sash of the dining room windows are set so that the middle window is parallel to the wall of the building and the other two windows make a slight angle with the middle window. This, of course, does not affect the method of supporting the brick.



Details of Windows, Front Door, Walls and Wood Roof Bracket.

First and Second Floor Plans of the Above House. Size 20 by 55 Feet.



What Every Architect and Builder Should Know About Strength of Materials and the Design of Safe Construction

Noon Hour Talks by the Boss Carpenter

THE BOSS TELLS HOW TO DESIGN THE FOUNDATIONS FOR A SMALL FACTORY BUILDING

Talk No. 57. Design of Foundation

New Series No. 14

"DURING the past few talks," said the Boss, "we have designed the roof, floors, beams, girders, posts and main carrying members for two different types of construction as applied to a small factory building. In Fig. 13B, which appeared in the last Talk, we showed the detail of construction where the basement posts rest on the foundation piers, but no sizes were given for the concrete pier. Today we will take up this matter of foundation design and see the points which control the dimensions of such piers and footings.

"You will all realize that the load carried by the roof and floors of a building, together with the weight of the building itself, is carried to the ground by the posts, piers and side walls of the structure. Also, you know that the earth or ground under the building must support all of these loads evenly or parts of the walls or piers will sink lower than others, and trouble will follow. The walls may crack, floors become uneven, shafting and other fixed pieces of machinery be put out of alignment or out of balance, and if conditions are very bad the walls may even

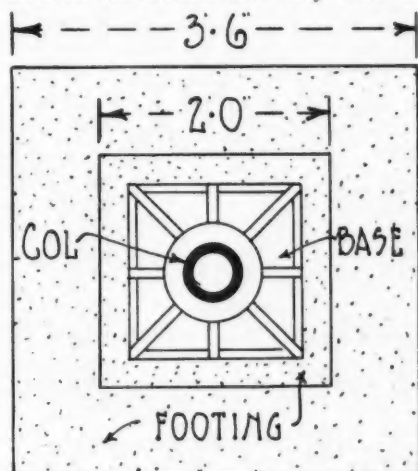


Fig. 14A. Concrete Pier for Column Support.

fall or the building collapse. The way to prevent such trouble is to provide ample foundations resting on firm soil.

"If you take a piece of 12-inch by 12-inch timber, and place it on end in the ground, the amount of load that you can put

on the top of the stick before it begins to sink into the earth will depend upon the kind of earth or soil in which it rests. Rock or hard, firm ground will support more than ordinary soil or loose sand. This is the principle used in finding the size of the foundation surface which rests on the soil.

The only way to find the true bearing or supporting power of a given soil is by loading a test piece as referred to above. For estimates and ordinary calculations in soils where you know the character of the ground, the following bearing values may be used.

Bearing Power of Soils

Rock	10 to 200 tons per sq. ft.
Gravel, compacted	8 to 10 tons per sq. ft.
Sand, clean and compact	4 to 6 tons per sq. ft.
Clay on thick beds, always dry. 4 to 6 tons per sq. ft.	
Clay, on thick beds, moderately dry	2 to 4 tons per sq. ft.
Sand, clean and dry	2 to 4 tons per sq. ft.
Dry earth	1 to 2 tons per sq. ft.
Quick sand and wet soil	1/2 to 1 ton per sq. ft.

(Continued to page 188.)

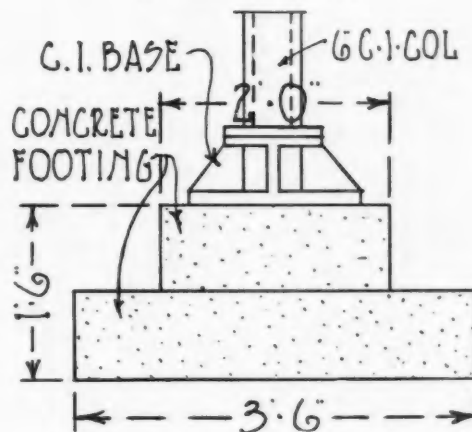


Fig. 14B. Plan of Pier Shown in Fig. 14A.



Model Home Designs

A Desirable Bungalow

Many home builders like the quaint artistic appearance of the low one-story bungalow but reject it because they must sleep on the first floor.

To satisfy these people the builder will find the accompanying design very desirable. The built-in porch is of note because it in no way obstructs the light coming in the two groups of casement windows in the front of the house.

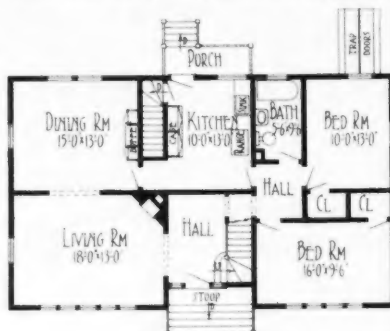
The hall is nicely arranged with an open doorway from the front hall to the hall from which the bath and bedrooms on the first floor radiate. This makes it handy to get to the bed and bath rooms directly from any part of the house and saves the many

steps of a round-about trip. If desired a closet can be made under the stairway.

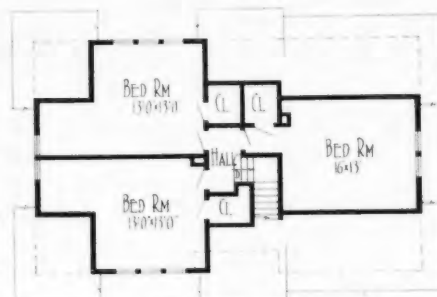
The living room is very large. The nice group of five windows in front, with the light unobstructed by a porch

roof, makes the room exceptionally cheerful.

The bedroom hall can be entered from the kitchen or front hall so that the back bedroom may be used for a maid's room.



First Floor Plan.



Second Floor Plan.

Arrangement of House. Size 46 feet by 27 feet 6 inches.



Picturesque Bungalow Type House. Size 27 feet 6 inches by 46 feet.



Residence Built by William A. Smithson at Wilmington, Ohio. This House Should Serve Mr. Smithson Well as an Example of the Kind of Work Which He Offers to the Community.

Substantially Built House of Eight Rooms

The house shown in the accompanying illustrations is the well designed and substantially built residence of William A. Smithson, Wilmington, Ohio. Mr. Smithson built this house in 1915. It is an example of the sensible square-type frame house with hip roof and wide box cornices. This type of house always presents a pleasing appearance and it offers every possible advantage in interior arrangement.

It will be noted that the exterior of the house is given a perfectly balanced appearance by the use of the wide gable-roof porch, the three-window bay and the small dormer. The bracketed gutter on the main roof is a feature which contributes very largely to the finished appearance of the house.

Several special features appear in the interior design. The large reception hall with its adjoining closet is worthy of note. The built-in seats in the reception hall and dining room are useful features. The combined kitchen, pantry and dining room arrangement shows the effect of careful study. The kitchen cabinet in the pantry was built in by Mr. Smithson. The second floor arrangement furnishes four large bedrooms, a porch and the bath. Without wasting any useful space, the hall makes each of the bedrooms independent of the others.



Floor Plans of Home Built by Wm. A. Smithson at Wilmington, Ohio.

Odd Windows and Their Treatment

By Mary H. Northend

UNTIL recent years there has been but little variety in windows. Whether the windows were grouped, or appeared singly at intervals of painful regularity, they were all alike of the old-style check-rail type, double-hung and box-framed. In groups, there appeared round bays and square bays, in which the use of the double-hung window necessitated a complicated system of double-weight boxes and overhead pulleys.

We have only to look around us at the houses which are being built to discover that this sameness is now broken, and that the windows in use present many variations. The old, square-topped, single window still predominates, but there is a good showing of arched tops, and of round and oval windows. The groups of mullioned windows show frequent returns to the old Palladian motive of the Georgian era, where the central window in a group of three is much wider than those at the sides, and has a rounded arch at the top, whereas the flanking pair of narrower windows have their heads cut off square at the rise of the central arch. In our present styles of architecture there is a notable tendency to tone down the single sheets of plate glass which, by the edict of yesterday, had to constitute the entire sash.

Whenever a fashion remains with us so long as to be almost universally accepted for two hundred years, there

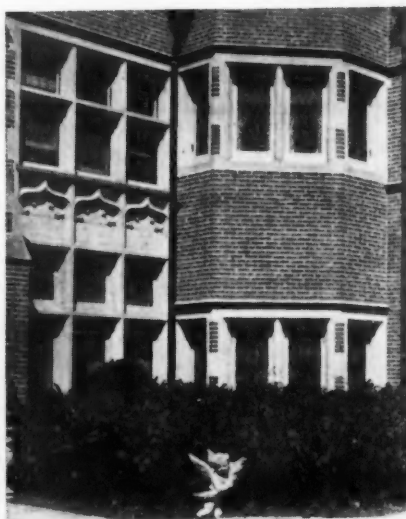
must be much to be said in favor of it. Whenever a new departure gains ground, and bids fair to overturn old and established usages, the new way must have many and excellent points of superiority. In the case of the odd windows, vantage points may be seen quite readily.

Let it be conceded in the first place that the old-style check-rail window was well adapted to its place in the large, single openings for which it was made. When accurately balanced and hung on pulleys that ran easily, a window of the usual width was not hard to open or to close. Moreover, it could be made perfectly tight, during the inclement season, by means of proper locks and weather strips applied by the initiated. Storm-windows, screens, and window blinds did not interfere with its domes-

but its proper placing with regard to the arrangement of furniture in the room; and perhaps the ease with which a type of window can be washed and mended should also come under the head of convenience. The relative expense, both of first cost and of the subsequent keeping in repair, is another important item, and so is beauty of architectural style.



Casement Windows in Stucco Wall.



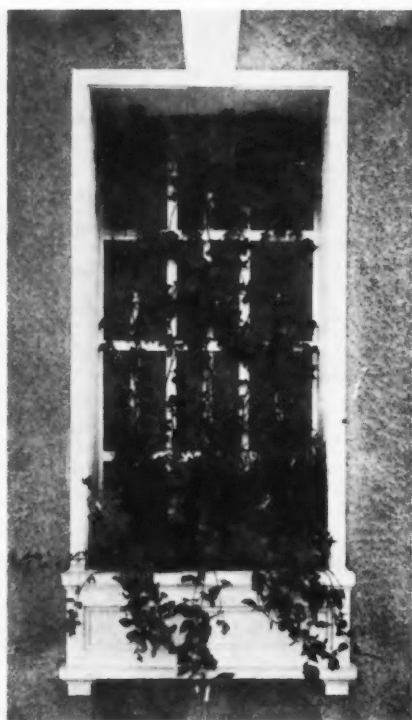
Windows in Groups with Cut Stone Trim.

tic economy. When located on the ground floor, it was easy to wash. This is all that can be said in its favor.

It will be necessary, for one moment, to consider the uses of windows in a modern dwelling. When we say that we have them to admit light and air, we seem to find nothing further to be said; yet the provision for ventilation by means of the double-hung window has always been notoriously inadequate, and most of you will agree with me that it is quite as important for us to be able to look out as it is for the light to come in to us; that is, the outlook deserves as much consideration as does the admission of light. Convenience is another leading consideration which concerns not only the adjustment of the window,

Since the doors and windows furnish the leading motives for enriching and adorning the outside of our house, we do wrong when we forget that the chief exterior use of a window is found in its decorative value. From this point of view there can be no two opinions concerning the relative charm of the old style and the new. Grouped windows, in odd and artistic combinations, give far more original and pleasing effects than did the box-frames, inserted at regular intervals, with all the precision, and more than the monotony, of a checker-board. Their appearance tallied with the style of the old Colonial houses, and in such structures they will always be in good taste; but modern groupings lend a charm to modern dwellings. By a similar comparison, the huge surfaces of staring plate glass, dear to the hearts of a former generation, will be found short of the standard set by a judicious intermingling of leaded diamond panes and small wooden muntins.

As to the admission of light, there can be no doubt that light is more concentrated when the windows at one side of the room are grouped and also carried well to the ceiling, with window-stools not more than 2 feet from the floor, except in bathrooms and kitchens,



Lattice Window With Built-in Flower Box.

which may be as much as 3 feet, altho much light and much consequent cheerfulness is lost by this difference. Much gain in wall space, with added improvement in the arrangement of furniture, results in this concentration of the lighting surface.

We have twice as good ventilation from the use of casement windows as we had from the old double-hung style, which never could give us an air space of more than half the window space, whereas casements permit the whole opening to be utilized.

formed by mullions in a group of casements, never produce this effect upon the sensitive eye. They simply form an agreeable method of carrying the structure of the building thru the group. Since they do not interfere with the sky line, they serve to emphasize the charm of the landscape.

The first cost of putting in windows works against the new style, since the expense of a group of narrow windows, casement style, leaded glass in some simple pattern, is somewhat more than

mer country home, or in a permanent home in a warm climate.

In order to keep their screens, blinds, and storm windows upon the outside, many persons have given their casement windows the inward swing. This has the added advantage of providing the easiest window in the world to keep clean. The objection is that its inward swing requires wall space which is not always easily spared. Moreover, when these windows are used upon an exposed house wall, without porch, balcony, or



Four Outward Opening Casements in a Group with Transoms Above. The Grouping of Windows Increases Lighting Efficiency.

The outlook is much improved by grouping the windows, a fact to which the old bay window owed its popularity. The meeting-rail in the middle of the old box frame window is the inevitable result of its structure. Without that check-rail, it could not be double-hung. That one defect spoils it for use in country houses, seaside cottages, mountain bungalows, or any other location where there is a beautiful outlook. That ugly horizontal line, cutting squarely across the view, is a source of constant annoyance. The vertical lines,

as if their places were taken by wide windows of the old double-hung type, each sash glazed with a single sheet of plate glass. The repairs on the small panes cost much less and are easily made, even in a rural community.

There are two forms of hinged window in common use—the long French casement, opening inward, and the shorter English casement, opening outward. The former is really more like a door, and as such is very effective when opening upon porch, loggia, or balcony, more particularly in the sum-

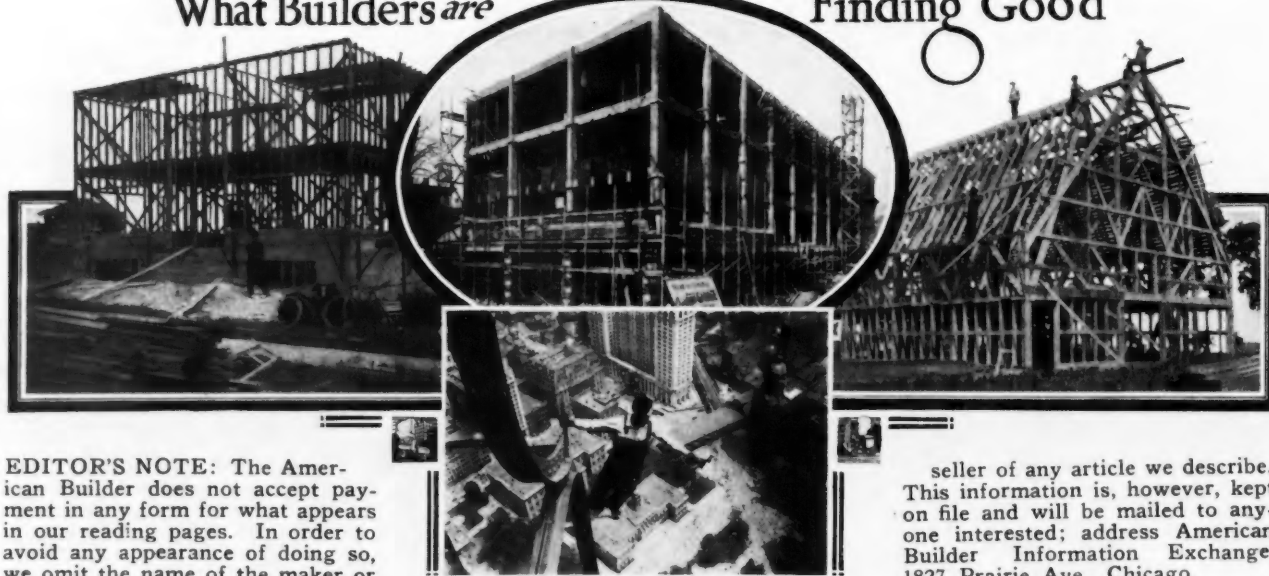
jutting angle of the building, to break the force of violent storms it is somewhat difficult matter to make them weather tight. The question of curtains is also troublesome since it seems necessary to fasten each shade to its particular sash, which makes the shade of no avail when the casement is open.

The outward swing of the casement necessitates inside screens in summer and inside storm windows in winter.

Grouped casements, with high stools, give a Dutch effect in bedrooms or dining-rooms.

OUT ON THE JOB

What Builders are Finding Good

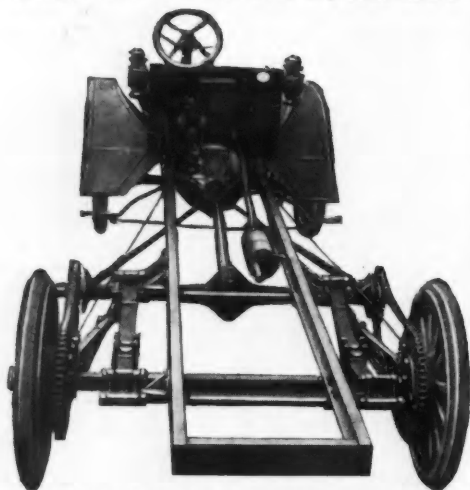


EDITOR'S NOTE: The American Builder does not accept payment in any form for what appears in our reading pages. In order to avoid any appearance of doing so, we omit the name of the maker or

seller of any article we describe. This information is, however, kept on file and will be mailed to anyone interested; address American Builder Information Exchange, 1827 Prairie Ave., Chicago.

Truck Easily Made From a Ford

The illustration shows the chassis of a truck which may be made from a Ford by any mechanic. The truck attachment is bolted to the frame of the Ford without changing the chassis in any way. The Ford rear axle is suspended above springs and it does not carry any load and is relieved of road



Showing the Chassis of a One-Ton Truck Built by Bolting Truck Attachment to a Ford Chassis.

shocks. All load is carried on the truck axle, springs, wheels and solid rubber tires. The truck has a capacity of one ton. Any style body is furnished with the attachment by the manufacturer, at factory cost. The builder, who has a Ford which he does not care to use for pleasure purposes any longer, may equip himself with a good one-ton truck in this way at much lower cost than the purchase price of new truck of this capacity. This is an easy and satisfactory solution of his haulage problems. It makes him independent and allows him to furnish quicker and better service to his clients without a great deal of additional cost to himself.



Bringing Out the Beauty of Concrete

This is the age of concrete. Out of the earth man takes a substance and mixing it with his genius, makes a stone stronger and more enduring than Nature's own marble and granite. This is concrete.

From the first the popularity of concrete has been phenom-

enal. Its strength and durability are not its only virtues. Perhaps even more valuable than these is the fact that it is easily fashioned into every conceivable form and design. By its use the builder in these modern days may reproduce the charming Grecian and Roman architecture of antiquity.

Concrete has proved itself as the only material for the construction of great engineering projects. It has made possible greater bridges, higher sky-scrapers and larger water reservoirs; it is finding a ready place in the construction of homes, mills and factories.

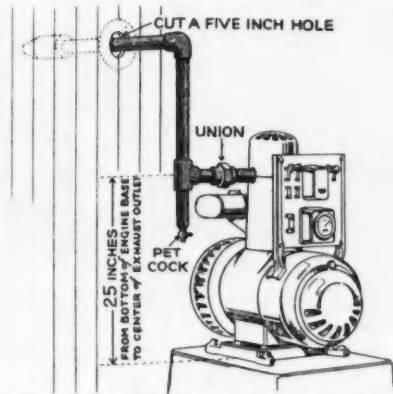
The demand for concrete in homes, especially, will be even greater as it becomes more generally understood that the principal drawbacks are easily corrected. These drawbacks are the fact that concrete ordinarily has an unattractive, monotonous blue-gray tone and that it has a tendency to absorb moisture. In order to correct these defects, various means have been tried. One of the successful treatments which has been developed is that of a special surface coating which has been compounded to produce a permanent color and exclude dampness. Treated properly this way, concrete has the elements which are required in the modern structure—it lends itself to beauty in design. It is economical, it is clean and fire-resisting, it prevents moisture from penetrating the interior and it will stand almost for ages.



Residence of Mr. Hulett Merritt, Pasadena, Calif., an Example of Beautified Stucco.

Compact Farm Lighting System

The modern farmer has at his command practically every home convenience that the city man enjoys. One of the important improvements which farmers are becoming interested in is the lighting of their buildings by electricity. When an electric lighting system is installed there are several problems solved. Of course, the primary purpose of the system is to provide handy and sufficient light everywhere that it is needed. At the same time, the system makes it possible to use a great deal of light power equipment to ease up the work and increase the comfort of the home.



Combined Gasoline Engine, Electric Generator and Switch Board Mounted on Cement Base.

The lighting system shown in the accompanying illustration is a very compact unit consisting of an air cooled gasoline engine direct connected to a direct current generator. The switch board carrying indicating instruments, automatic cut-out and starting switch, line switches and protective fuses, is mounted above the generator. The storage

battery set is usually mounted on a rack which is low enough to enable the jars to be easily filled to the proper height with pure rain or distilled water. One of the features of this system is that it cannot freeze up even in very cold weather.

Some of the changes which are possible when electrical energy is available are interesting. For instance, a water system may be installed in the house, small motors may be used to operate milking machine, cream separator, churn, washing machine, fans, vacuum cleaner and several other small machines and devices.

How One Contractor Prepares His Mortar

There are various methods in vogue of getting mortar ready, but the one here described is a new one in most places. The method has worked out well for the Byers Construction Company of Kalamazoo, and Mr. Adams, their general superintendent of the work, should be given credit for having originated this unique idea.

A pit is first prepared that will take care of a car-load of lime. In the one shown in the illustration the pit was 30 feet long, 18 feet wide and 4 feet deep. Into this pit was dumped 235 barrels of lime and sufficient water added to slack it. About 4 inches of sand was then put on top of the mortar and every night this was wet down thoroly to keep

the lime at the proper temperature. The mortar, kept cool in this way, goes further than when it is slacked just before using.

The mortar mixer is set as close to the pit as possible. On the other side of the mixer is the sand pile. One man with the mixer will mix enough mortar to supply any number of masons up to 30. He also screens the sand and adds the cement to it before it is shoveled into the machine. In a very few minutes the batch is mixed to the finest possible consistency, and it is then discharged into the large box under the end of the mixer trough.

He then proceeds with another batch. The cost of operating the mixer is very low, as about the only expense is the gasoline and oil that the engine consumes. The mixer shown in the picture has seen eight years of service, but it is still clicking along and nobody seems to believe that it has yet reached the end of its usefulness. The owners claim that it has paid for itself dozens of times during the period they have had it.



Heating the Farm Home

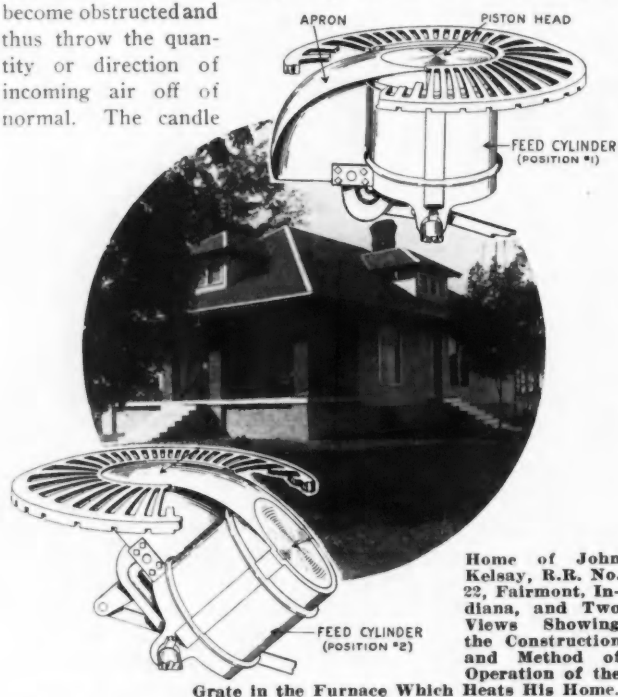
The American farmer of today is a man who employs progressive ideas in the selection of tools, implements and equipment. He is keenly interested in everything which contributes to the comfort of his family and the efficiency of his farm management. Naturally, one of the problems which confronts him at one time or another is the selection and installation of a heating system. The central heating plant has advantages which appeal to him and he eventually will replace his stoves with such a system.

It is well that the builder, as adviser to the farmer, be well posted on the principles of heating and ventilating. A simple experiment will illustrate very well what is required for combustion. Suppose a lighted candle is placed in a vessel where the supply of air is limited and the entrance of fresh air is seriously restricted. We know that the candle will soon burn less brightly and in time will give forth only an uncer-



View Showing the Method of Preparing Mortar as Used by the Byers Construction Company of Kalamazoo, Michigan.

tain flicker which will die out very soon if the supply of fresh air happens to become totally cut off. This shows us that the heating unit selected must be designed so that a supply of fresh air is available at the point of combustion in sufficient quantities to maintain combustion. From holding the candle in air currents of different strengths and directions we know that a steady supply of air coming from below the candle produces the best flame. We must inspect the heating unit to see that the direct passage of the air is not likely to become obstructed and thus throw the quantity or direction of incoming air off of normal. The candle



Home of John Kelsay, R.R. No. 22, Fairmont, Indiana, and Two Views Showing the Construction and Method of Operation of the

Grate in the Furnace Which Heats His Home.

will also serve to illustrate the matter of fuel supply.

Suppose we hold the lighted candle upside down. The fuel will run down the wick in large quantities and the result will be soot and smoke given off, a large quantity of fuel wasted and perhaps the flame will be extinguished. The trouble is due to improper feeding of fuel. When the candle is held right side up the fuel is fed in a steady slow stream, being heated gradually as the combustion region is approached. The resulting flame is clear and steady.

The principles are applied in different ways in the different types of heating units. As a rule the main air supply is directed upward from below the fire pot, thru the fuel to the combustion region. In some units this supply is supplemented by a supply of air, usually previously heated, which is injected thru tuyeres near the combustion plane. Of course the air supply must be capable of regulation so that adjustment to conditions may be possible.

The common method of feeding fuel is simply to fill the fire pot and allow the fire to eat its way up thru, under control of the air. One interesting departure from this method is found in a unit in which the fuel is fed from beneath. A cylinder with piston actuated by levers is mounted on a pivoted base and connected to an apron in such a manner that when the cylinder is swung out to be filled with fuel, the apron slides across under the grate. This apron closes the hole thru which the fuel is forced from the cylinder by the piston when tilted into the vertical position. Thus the fuel is fed to the fire from directly underneath, in much the same way as in the case of the upright candle.

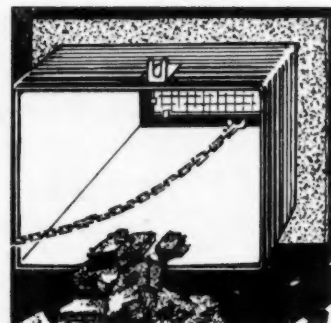
A study of the simple principles of combustion and a knowledge of how these principles are applied in the different types of heating units—warm air, steam or hot water—will be a valuable asset to any builder who is interested in helping the farmer solve his problems.

Fuel Chute With Glass Door

The ordinary cellar window is not satisfactory as an opening thru which fuel is to be delivered. In the first place, it will not successfully withstand the wear which it is subjected to; furthermore, it is not adapted to this use, since a chute is required. A combined chute and window, such as is shown in the accompanying illustration, overcomes these difficulties. The frame of this chute is made of cast iron, the tube is of steel and the door is glazed. It is intended for use in foundations for placing coal and other fuels into the basement, but it can also be used in buildings and sheds where fuel, sand, rock and other materials are stored.

The glass used in the door is heavily reinforced with wire and is held in position by a collar on the back of the door. A heavy screen is placed between the collar and a light cast iron frame bolted to it, to protect the glass from falling objects. The glass is easily removed and may be replaced in the summer-time by an insect screen.

The door opens vertically against the side of the house where it is held by a hook in the frame which engages with a hook in the door frame. When the door is closed, it locks automatically by a gravity catch. The door is unlocked by a small chain, which may be extended so that the door may be unlocked from any part of the room.

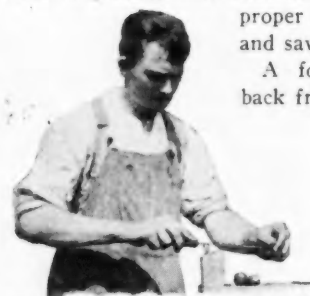


Fuel Chute With Protected Glass Door and Gravity Catch.

How Floor Scraper Blades Are Sharpened

The successful operation of a floor scraper is largely dependent upon the manner of re-sharpening the blades. It is as important that floor scraper blades should be kept in proper condition as it is that chisels and saws should be properly cared for.

A form having one side beveled back from the face on which the blade is placed holds the blade in position by means of screws. The form is clamped in a vise with the beveled side of the blade up. One of the leading manu-



First, File Blade to Proper Bevel.

facturers of floor scrapers recommends a 10-inch mill file for this work. One of the illustrations shows how the blade is filed until a light feather edge is obtained across the entire cutting edge. The blade is then removed from the form and a hone is applied at an angle of 45 degrees until the feather edge is removed and a keen edge is obtained.

The filing form is reversed in the vise and by means of a burnisher a hook edge is turned on the blade. To do this the burnisher is first held at an angle of 45 degrees with the face of the blade and five strokes are taken forward and backward. This process is repeated with the burnisher held at an angle of 30, 15 and 3 degrees. When the thumb is run across the edge of the blade, if the edge is smooth the blade will cut perfectly.



Burnisher for Turning Scraper Edge.

Builders Should Provide Lightning Protection

THE AMERICAN BUILDER has observed the great increase in the number of buildings that now are protected by lightning rods soon after completion. There are several reasons for this. One is the appalling loss of property and lives every year as a result of lightning strokes, and people are not taking

it is a part of the construction itself—and thus add this profitable side line to his own business?

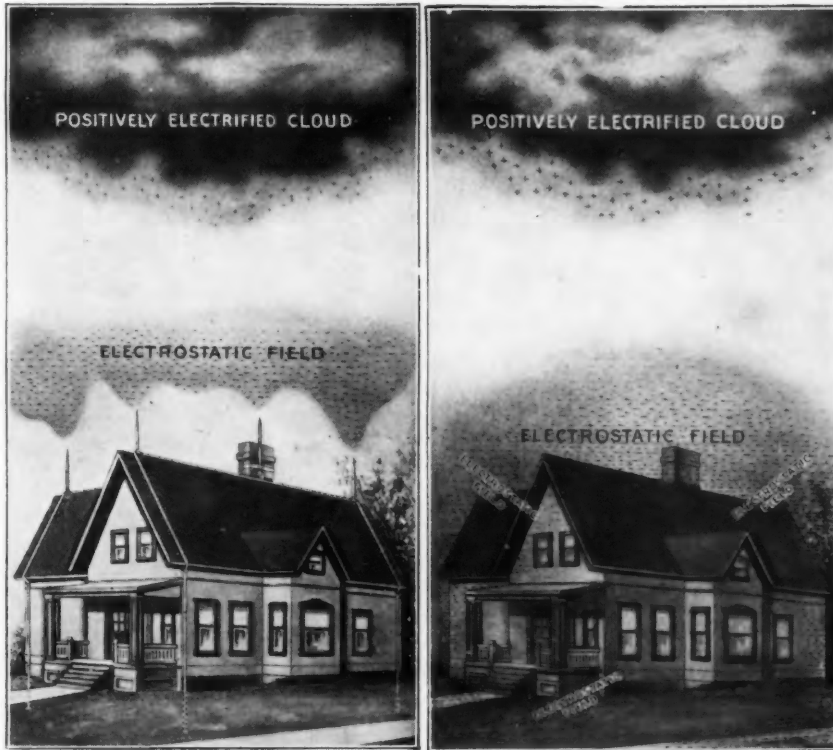
In reply to our inquiry, as to whether the contractor is not the logical man to have this business, the head of one of the largest lightning rod companies in the country writes:

"I can see no reason why contractors and builders should not be very successful in handling lightning conductors. In fact, we are now doing business with a number of such men, who have been very successful with the business.

"The proper installation of lightning conductors is an important piece of practical work, but the contractor is a practical man and he is accustomed to handling important work.

"Personally, I can see no reason why he should not turn over the building protected, instead of leaving the protection for some other man to apply. It is really easier to put on conductors when the building is being completed than afterward."

The two very interesting drawings illustrate the reason why lightning strikes a building.



Comparison of Electrical Conditions Surrounding Houses Both With and Without Lightning Rod Protection.

so many chances. Another reason is the fact that many insurance companies now make a reduction of premium on buildings properly protected by good conductors.

Still another reason is the wide publicity given to the experiments and observations of such men as Professor Day of the Ontario Agricultural College. After investigations covering ten years, Professor Day found that lightning struck 37 unrodded buildings to 2 rodded buildings. In Iowa he found that in eight years claims paid for lightning damage amounted to \$4,464 on rodded buildings, and \$341,065 on unprotected buildings. In Michigan he found that for each dollar damage on buildings protected by rods, there was paid \$1,168 for damages on unprotected buildings. All rods were not inspected and some losses on the rodded buildings were doubtless due to improper installation. However, the difference was so overwhelmingly in favor of lightning rods that Professor Day was convinced that no building should be left unprotected.

Since lightning conductors are so important, and since so many buildings are now being protected, why does not the contractor secure this business, instead of leaving it for some traveling agent?

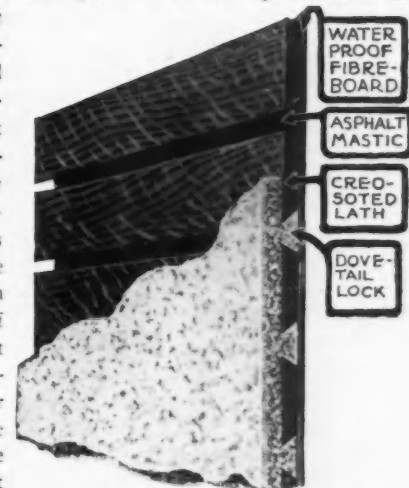
The following statement appears in a bulletin of the United States Department of Agriculture:

"The farmer continues to buy lightning rods, but he is careful nowadays to see that they are properly installed."

This very fact that the installation is an important and particular job is sufficient reason why it should be intrusted to the man who builds the structure. Besides, why shouldn't he insist that the owner let him protect the building—that

A novel method of stucco construction is shown in the illustration. This method consists in placing over the studs a background of special material upon which the

stucco is placed. This material is a combination of creosoted dovetailed lath imbedded in asphalt mastic on a background of heavy fibre-board. The material comes in rolls and is nailed to the studs thru every lath so that the weight of the stucco cannot cause the background to sag or break away. The dovetail locks the stucco so it can't let go. The wall is insulated from heat and is proof against moisture and vermin.



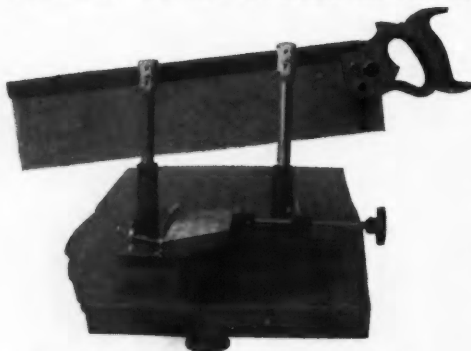
Detail of Stucco on Creosoted Lath Having Undercut Beveled Edges.

Thurston County, Washington, is the first County in the State to receive Federal aid in hard-surfacing its county roads. The County will receive \$28,000 and is now completing surveys for four miles of concrete pavement 20 feet wide.



An Accurate Mitre Box

The illustration shows a new mitre box which has many interesting features, among them exceptional accuracy of adjustment. The new box chucks the work and can be locked



A New Mitre Box Which Is Capable of Very Accurate Adjustment.

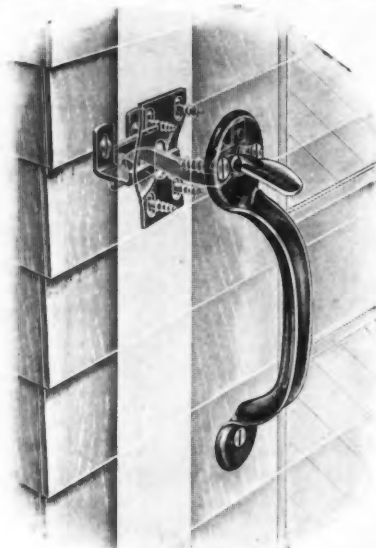
The saw shown in the illustration is unique in that the manufacturer of the mitre box can furnish new blades for less than the price of refiling, altho the saw may be refiled if preferred. Any ordinary back saw may also be used, or a hack saw blade may be substituted for cutting metal.

at any degree or fraction thereof. The mitre box stands on a swivel base and can be swung to any desired position. It takes up very little space and is easily carried.

The saw

Wrought Steel Back Catch

The danger of damaging fenders and lights by the swinging of garage doors is eliminated by the wrought steel back catch shown in the accompanying illustration. Almost any swinging door may be equipped with a back catch of this type to advantage. The usefulness of the door is greatly increased



This New Back Catch Keeps the Garage Door From Slamming Shut.

if its operation is certain and easy in the hands of a single person. It is not handy to place a prop against the door to hold it open. Effort is wasted if one person holds the door open while the other drives in or out of the building.

When the back catch is applied to the door, swinging it open forces the stout hook over the catch plate and the hook is held in this position by the double leaf steel spring. When the thumb-piece is pressed lightly, the hook is released and the door

is swung shut by means of the handle. The escutcheon plate is struck up to act as a bumper against the catch plate. The screw holes in the catch plate are slotted so that it may be adjusted to meet the bumper.

Heavy Knob for Planes

Because a light plane is hard to operate on hard wood owing to its tendency to jump, one manufacturer of carpenters' tools has placed on the market a japanned cast iron plane knob which was designed to eliminate this difficulty. It is placed on the plane by removing the regular plane knob and knob nut. When used with a plane it has the advantage of placing the weight at the forward end in front of the cutter where it will do the most good. The height is $2\frac{3}{4}$ inches so that plenty of room is provided for the full hand of the user.



Easily Installed Bungalow Furnace

The furnace shown in the illustration is one which has been designed especially for small houses and installations in old houses. It is easily installed and gives a much better distribution of heat with less fuel consumption than can be obtained with a stove. The furnace also furnishes an efficient method of ventilating the house. The dirt tracked into the living rooms of the house incident to supplying the stove with fuel is kept in the basement when a furnace is used.

This furnace is fitted with an adjustable top which reaches a single register on the first floor. The heated air passes thru this register and is rapidly forced up to the ceiling where it is spread out into the other rooms of the house. There is no space required in the living rooms for any part of the system, it merely being necessary to allow the air which comes up thru the register a free path to the parts of the house where it is needed. Builders are becoming interested in heaters of this type because of the ease with which they are installed and the satisfaction which they give especially when installed in houses which have been built for some years.



Bungalow Furnace With Only One Pipe and Register.



Steel Latch Stanchions of Hard Wood

In the accompanying illustration is shown the upper part of a cattle stanchion which, with the exception of the high carbon steel latch shown, is entirely of hard wood. The latch



All Wood Stanchion Has Steel Latch.

does not come into contact with the animal. The hard wood grows smoother with use.

The latch is opened or closed easily. The stanchion is rigidly held in place when open, but it swings freely as soon as it is closed. This feature is important in that it saves time in handling the cattle. Each animal must go to the right position and the stanchion

is closed without removing gloves or mittens, and without danger of pinching while operating the fastening.



Making Three Rooms Serve for Five

Here is a study in space economy! Examine the plan carefully. No, you're wrong—the architect didn't forget the bedrooms. The fact is, he has provided for four full-grown people. That's it—they sleep in two standard size double beds in either the living room or the dining room, or both, and the beds, being of the type shown in the two small views above, spend the day, frame, springs, mattress and all in the two small bed closets shown on the plan.

By the use of these beds, which may be easily rolled to any

Perspective View of Bungalow in Which Three Rooms Serve for Five.



When Bed is Rolled Straight Into Closet the Door Opening Need Be Only Two Feet Two Inches in Width Since Felt Bumpers Protect Woodwork From Scratching.



View Showing the Bed After Having Been Removed From Closet on Left and Lowered Ready for Use.

part of the house and which require only a very small closet space during the day, this three-room bungalow is the practical equivalent of a five-room house.

One point must not be overlooked. The lady of the house (nearly always) has a dressing table in her bedroom which would hardly be a fitting piece of furniture for the living room or the dining room. Recognizing this fact, however, the architect has provided a little dressing room in which the dressing table will fit very handily.

Attention should be called to the fact that, altho this type of bed is a full-size double bed, it will pass thru a very narrow opening. The bed closet off the living room allows the bed to be rolled straight in, and the door opening need be, therefore, only 2 feet 2 inches. The depth of this closet is 5 feet, which is sufficient for the bed. The other bed closet requires that the bed be pivoted in rolling it in. When this sort of closet is used the door opening is 2 feet 10 inches and the closet depth is 31 inches.

It is not necessary to exercise care in moving the bed in or out of the closet or in rolling it thru the house, because there has been provided a bumper of felt at every point where it is likely that the bed might strike objects in its path.

Studless Partition Withstands Fire and Water Test

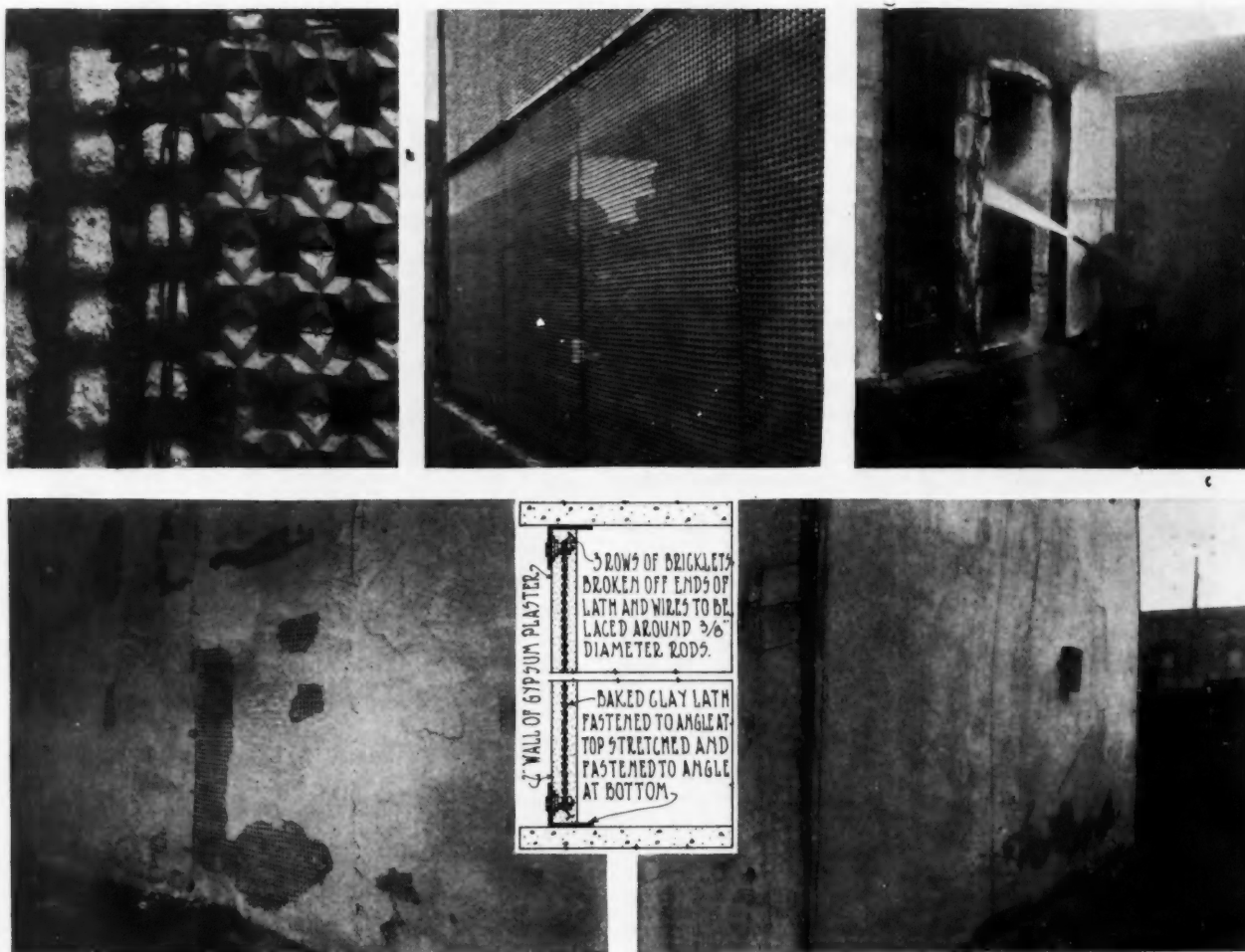
On January 26, 1917, an interesting test was conducted at the Columbia Fire Testing Station at New York City, on a partition built without studs. The partition was built up as one wall of a test house of the standard size—14 feet 6 inches by 9 feet 6 inches in plan and 9 feet 6 inches from grate to ceiling.

The lath shown in the central portion of the wall in the illustration consists of small clay briquettes baked on 19-gauge wire woven to form a $\frac{3}{4}$ -inch mesh. The lath sheets were 40 inches wide and were fastened to a $\frac{3}{8}$ -inch round rod at the top and bottom, the rod being held by the angle iron frame mentioned. The sheets were lapped 2 inches and laced with 18-gauge wire, as shown in one of the views.

brought the temperature gradually up to 1700 deg. F. in the first half hour, and maintained an average of 1700 deg. F. during the last half of the test. Then a $1\frac{1}{8}$ -inch stream of water at from 25 to 30 pounds per square inch pressure was thrown against the partition for two and one-half minutes.

At the expiration of eight minutes three cracks developed. Two were vertical and adjacent to the angle iron frame. The third was horizontal and extended irregularly from front to back of the wall at an average height of 18 inches above the foundation. A fourth crack had developed at the expiration of twenty minutes. This extended diagonally upward from the lower back corner of the wall. Several other minor cracks developed as the test progressed and those above described increased somewhat in dimension.

At the expiration of one hour the partition became warped inward toward the front of the chamber and outward toward



Views of Fire and Water Test on Studless Partition. Top—Two Views on Left Show Baked Clay Lath Used in Partition; Lath is Shown Reduced to About One-Half Actual Size in View on Left. Right Hand View Shows Application of Water After Fire Test. Bottom—View on Left Shows Inside and One on Right Shows Outside of Partition After Test. Line Drawing in Center is Cross Section of Partition.

The plaster used for the inside scratch coat was a 1:2 gypsum Cow Bay sand mix, and was applied December 13, 1916; this coat froze on the night of that date. The inside browning coat was a 1:2½ gypsum Cow Bay sand mix, and was applied on December 28, 1916. A hard finishing coat was applied December 30, 1916. The total thickness of the inside was 1 inch. The plaster used for the outside browning coat was a 1:2½ gypsum Cow Bay sand mix and was approximately 1 inch thick. This was applied December 28, 1916. The total thickness of the partition was 2 inches.

The partition was submitted to the following imposed conditions: A continuous fire against the partition for one hour

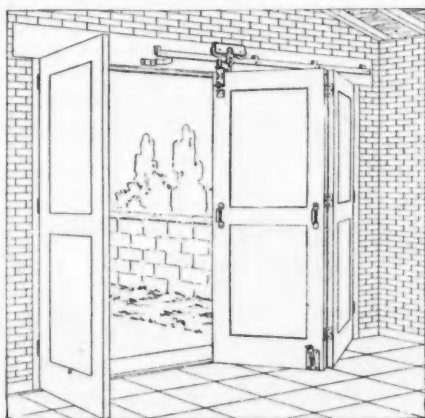
the back. The displacement was estimated as about 2 inches. During the last fifteen minutes the plaster sagged away from the lath in several places on the inside of the wall, but the lath was not exposed.

The application of water carried away the finishing coat as well as considerable of the browning and scratch coats. About 10 sq. ft. of the lath was exposed. The water forced the outside coat away from the lath over a considerable area.

After the wall had cooled down several of the outside cracks were found to carry completely thru the outside coat. No fire, smoke or water came thru the partition. The exposed briquettes were in good condition.

Easy-Working Garage Door Hanger

The garage door set shown in the illustration may be supplied to either new or old doors. Each set is applied to a pair of doors, one of which is hinged to the building and



Garage Door Which Cannot Sag and Which Operates Very Easily.

the extremity of the other is supported by the hanger and track, the two doors being hinged at the middle. Various combinations may be formed where the opening is wide enough to require more than a single pair of doors. The sets may be used on either the inside or the outside

of the building, but it is advisable, where possible, to use them on the inside.

An adjustment is provided so that the hanger may be applied to any door up to 2 1/4 inches thick; for doors of greater thickness, the drop strap must be mortised in. A vertical adjustment is also furnished to provide a means of obtaining perfect adjustment of the doors in the casement.



Novel Cabinet of Many Uses

Combining storage space for medicine, toilet articles, shoe shining outfit and ironing board with the many uses to which it is intended to be put, the cabinet shown in the accompanying illustrations is a novel idea.

The cabinet is 3 feet wide, 6 feet 4 inches high and 7 inches deep. Fig. 1 shows the cabinet closed, the contents being protected from dust when not in use. Fig. 2 shows the cabinet doors open and the shelf raised. The small cabinets above are used to store the ironing outfit, shaving set, medicine and other such articles. The left hand case below is used to store soap and other toilet articles. The lower right hand compartment contains the

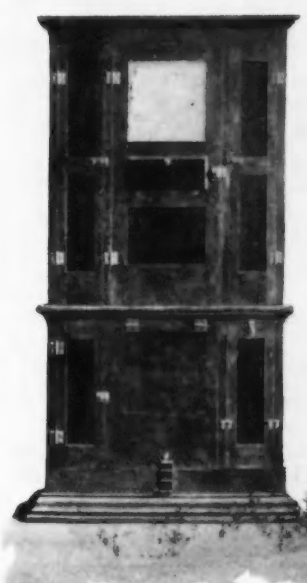


Fig. 1. Cabinet Closed.

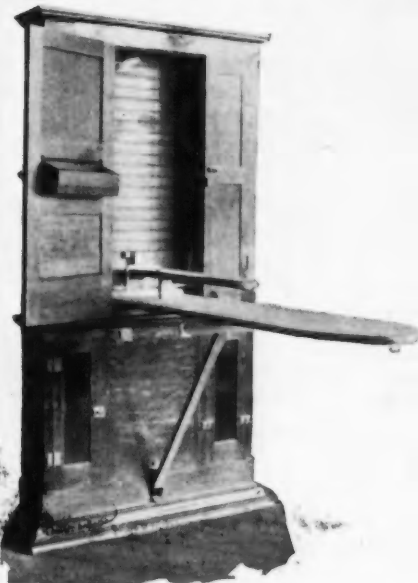


Fig. 3. Ironing Board Let Down.

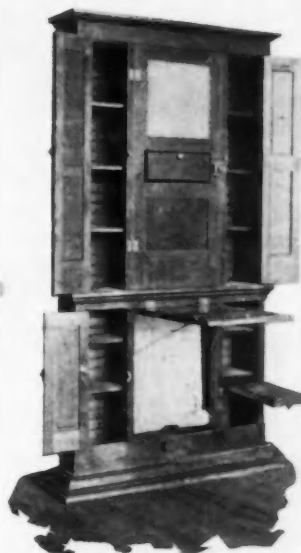


Fig. 2. Shoe Shining Stand Opened.

shoe shining outfit, the door swinging back to form a foot rest. The ironing board is shown extended in Fig. 3. A 12-inch by 12-inch mirror is placed near the top of the large upper door, and a comb case, which is hinged at the bottom, is built into the door just below.

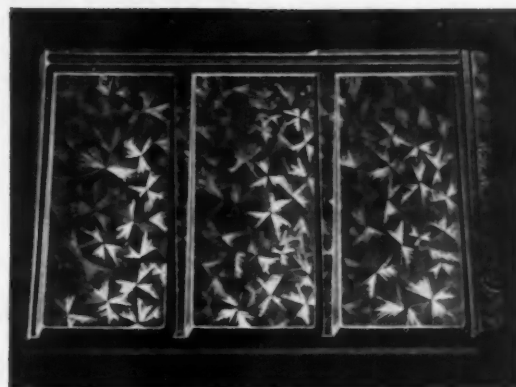
An ingenious device is used to mount the ironing boards in the cabinet. This, as shown in Fig. 3, consists in a combined guide for the ironing board and back support for the sleeve board. A spring sash lift is used at the back end of the ironing board to counter balance the weight of same.

When the cabinet is in place, an angle iron is screwed to the top of the cabinet and to the wall, holding it firmly in place. The cabinet may also be built into the wall with face casings to match the woodwork of the room.



A New Metal Shingle Design

In the illustration is shown a new metal shingle which differs from the ordinary in that it is not characterized by the sameness of design and high ornamentation which has heretofore been responsible for the lack of individuality and



Three Flat Shingles Are In a Sheet.

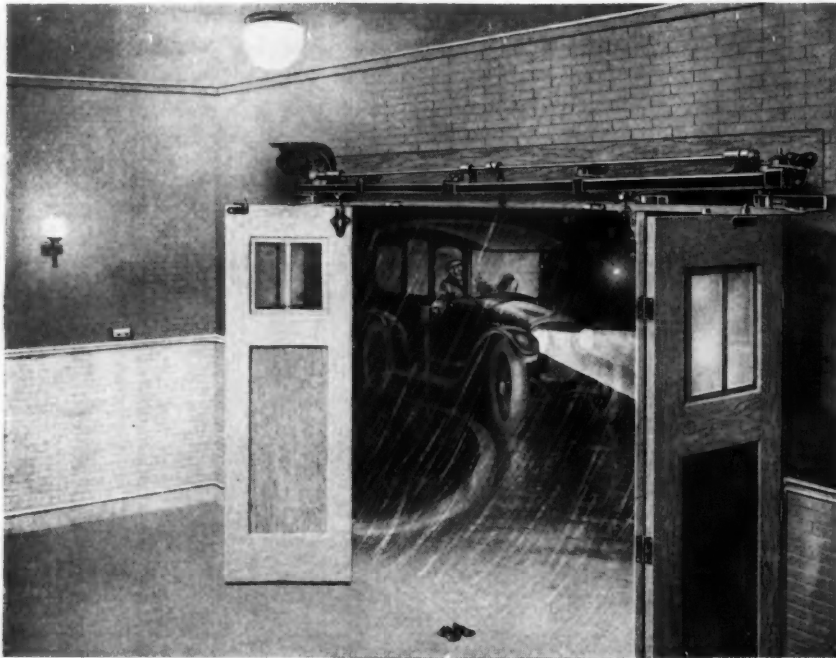
character of the metal shingle. In addition to the properties which tend to make this shingle fireproof, waterproof, dependable, easily applied and reasonable in cost, the designer has carefully considered their artistic value. Six different styles are made, to be used in various combinations and thus a very natural shingle appearance is obtained. A feature of

special importance, shown clearly in the illustration, is the high butt ends which produce a very pleasing appearance when placed on the roof.

The shingles are galvanized after formation and are painted red or green. In order that the roof may be given a complete, harmonious appearance, the manufacturers have also designed and are manufacturing a special set of trimmings to be used in connection with the shingles.

Electrically Operated Garage Doors

The convenience of being able to open the garage doors and in the same operation turn on the lights by simply pressing a button is easily recognized. This arrangement is especially convenient since the starting button may be placed on the



"Keep-Your-Seat"—Press the Button on the Post Outside and the Garage Doors Open.

outside of the garage and operated by a cylinder lock. Equipment required to operate garage doors in this way is shown in place in the accompanying illustration.

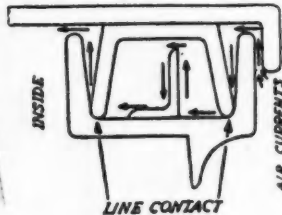
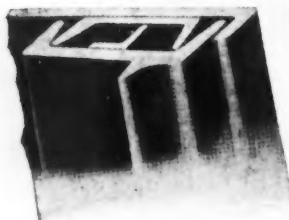
The fixtures require one foot of headroom above the top of opening. The device is motor driven thru worm gears. A spring checking device prevents accidents, due to machines or persons standing in the way of the doors after the starting button has been pressed. By pressing a second button the lights are extinguished and the doors closed.



Vertical Sliding Solid Steel Window

Recent developments in the design of sliding solid steel windows have been directed toward the perfecting of a type which would incorporate the qualities of easy operation and satisfactory weathering. The result of the investigations of one large manufacturer of these windows is shown in the accompanying illustrations.

The danger of sticking, binding and rusting is eliminated by the use of a channel section with flaring sides, see illustration, which forms a line contact instead of a flat surface contact with the sliding portion of the sash. This feature, together with the counterbalancing of the upper and lower sash,



An Angle Is Attached to the Sliding Section of this Steel Sash and Causes Any Air Currents to Change their Direction Ten Times Before Reaching the Other Side of the Sash.

an adjustable chain running over a roller bearing pulley of large size being used to tie the sections together, provide for ease of operation.

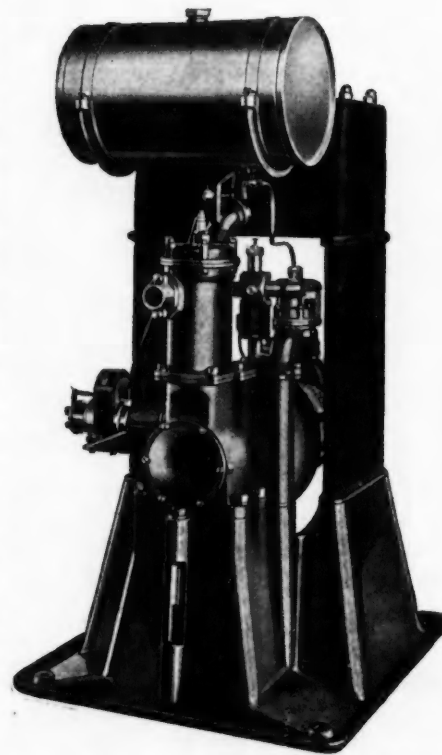
By the insertion of an angle attached to the sliding section of the sash and protruding into the center of the channel guides, air currents are forced to change direction ten times in entering the building. This feature secures proper weathering. The entire window is protected by paint which does not have a tendency to be rubbed off.



Lighting Plant Which Requires no Battery

With the ordinary isolated lighting system of small size it is necessary to use storage batteries in order that the power impulses of the gasoline engine do not show up in the lights, making them flicker perceptibly. The plant shown in the illustration has been designed with the elimination of the storage battery as one of the principal objects. In order to accomplish this object, the engine which drives the generator is of a special high speed design. Its operation is so rapid that the periodic pulses caused by the explosions are so small and so closely crowded together that the human eye cannot detect them.

The plant is self-contained, the engine and generator being direct connected, the cooling water tank being bolted to the base which contains the oil reservoir. The engine is equipped with a special design carburetor and ignition is by a high tension engine. A voltage regulator connected across the generator circuit is also mounted near the engine so that the speed of the machine may be varied to maintain a constant voltage on the line. In this regulator the downward thrust of a solenoid acting on a soft iron core carried on a vertical spindle made of brass above and steel below, is balanced against the upward thrust of a wooden float partially submerged in mercury. Variations of voltage



Electric Plant Gas Engine Showing Carburetor, Magneto, and Voltage Regulator.

across the solenoid coil cause a movement of the spindle which is transmitted to the throttle valve of the gasoline engine by means of a small rack and pinion mechanism. The rotating sleeve-valve engine is very sensitive and regulation is remarkably close.

An automatic starting device is not used because it would require a storage battery. The engine is started by means of a high geared crank with automatic engagement. The ratio is 3:1, and since the moving parts of the engine are very light and well balanced and the engine is small, starting is very easy. The machine is designed for 24-hour service and the low cost of operation when running idle makes it possible to run the plant continuously without expense greater than would be experienced in maintaining the storage battery on an automatic starting system.

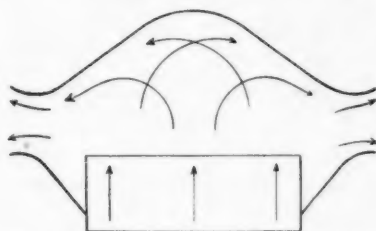
The voltage of the plant is standard, which makes it possible to obtain lights and equipment at any shop selling electrical supplies.



Changing the Direction of Air Currents

Since the ventilation of farm buildings, warehouses and factories has become recognized as a subject of great importance, ventilating equipment has passed thru a period of rapid development. One of the simple facts which had been overlooked in the earlier natural draft ventilators was that air currents tend to change direction in curves.

The old style wooden cupola made no attempt to direct the air, which it was intended to exhaust from the building in a definite path such that whenever it became necessary to change the direction of the current it would be changed in a curve. Largely because of this fact, the old wooden cupola failed to ventilate the



No Back Draft Here. This diagram shows the curved lines of the Ventilator and natural way in which it works.

building satisfactorily, and led to metal ventilators.

One manufacturer of modern cupola ventilators has given the matter of changing air current direction special attention by placing a curved dome in the ventilator head, tending to prevent back pressure in the ventilating tube. The effect which this construction has upon the passage of air thru the ventilator is clearly shown in the illustration, which represents the curved dome ventilator.



Wood Screw Punches

The punch shown in the illustration is used to increase the speed with which screws may be driven into soft or medium woods. By the tap of a hammer, the hole is formed in which the screw is inserted, and this hole is countersunk for the head of the screw if the punch is driven completely in.

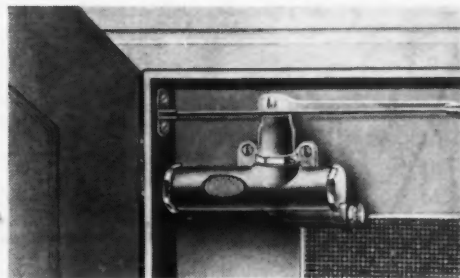


Punch Which Saves Time in Driving Screws.

For round head screws, the punch is not driven in far enough to countersink the hole. The 3/16-inch groove near the countersink is used to withdraw the punch from the wood by means of a claw hammer. The punch is made in three sizes, one of each making up a set. The common over-all length is 2 1/8 inches and the punch proper diameter varies from about 1/6 of an inch to 1/8 of an inch.

Well Made Screen Door Check

The screen door check shown in the accompanying illustration is made in the same way that checks for heavy doors are made. The difference between this check and the heavy door check is principally one of size. The check consists of a rack and pinion movement, valve construction, provision for the prevention of leaking, simple adjustment and liquid same as in larger checks. They are adaptable to right and left hand doors without change. The check lies close to the screen door, a space three inches in depth being sufficient for its accommodation. It can be attached to a screen door with a top rail as narrow as 3 1/2 inches. The strength of the spring is varied to suit the weight of the door.

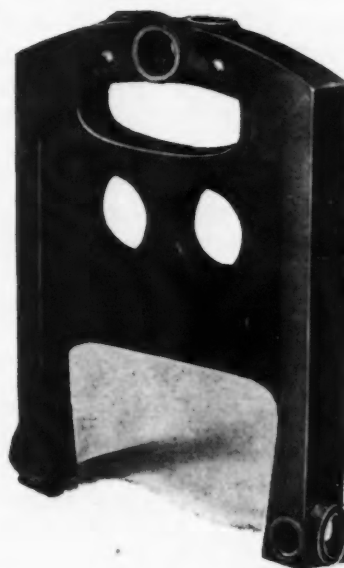


This Screen Door Check is Small Enough to Be Mounted in the Door Jamb Space.



Sectional Hot Water Heater

In order that the maximum number of heat units may be utilized for every unit of grate surface, one manufacturer of heaters for hot water heating systems has designed a sectional heater. One water section is shown ready to be assembled, in the accompanying illustration. Each section has a thin V-shaped water way extending down toward the fire. Both sides are directly exposed to the action of the fire, and this thin column of water heats up more quickly than a large body, hence a rapid circulation is set up.

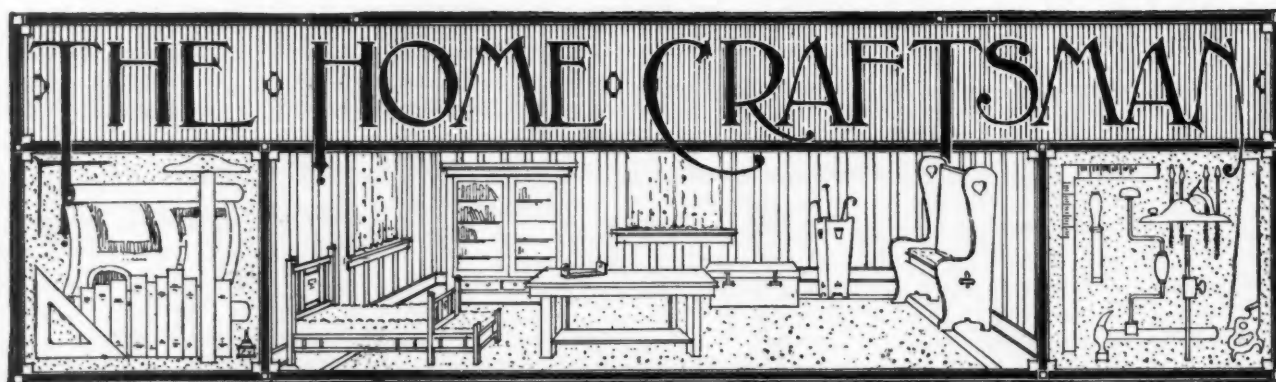


Section of Water Heater.

The sections are so constructed that when assembled the latter will be either round or oval. Square corners are eliminated to prevent strain and the accumulation of ashes in corners. The sections are put together with taper pressed nipples made of heavy brass, there being no exposed parts of the nipple to be eaten away.

The grate used on heaters of this kind is designed so that the air is drawn thru all parts of the fire evenly, insuring complete burning of the coal. An increase in boiler rating carries with it a corresponding increase in the size of grate used.

The American Builder Information Exchange will be pleased to furnish on request the name and address of the parties responsible for any of the interesting novelties or improvements described in these columns.



Fuming for Manual Training Schools

HOW TO MAKE AN AMMONIA BOX

By J. T. Parker

Instructor in Woodworking Kansas State Agricultural College

ONE of the favorite finishes for oak at the present time is obtained by the fuming process. The color is a rich, almost chocolate brown. Fuming with ammonia is simple and cheap and is highly recommended for manual training schools. It is necessary to have a well constructed case or box large enough to hold the articles to be fumed; quite large pieces may be fumed in sections.

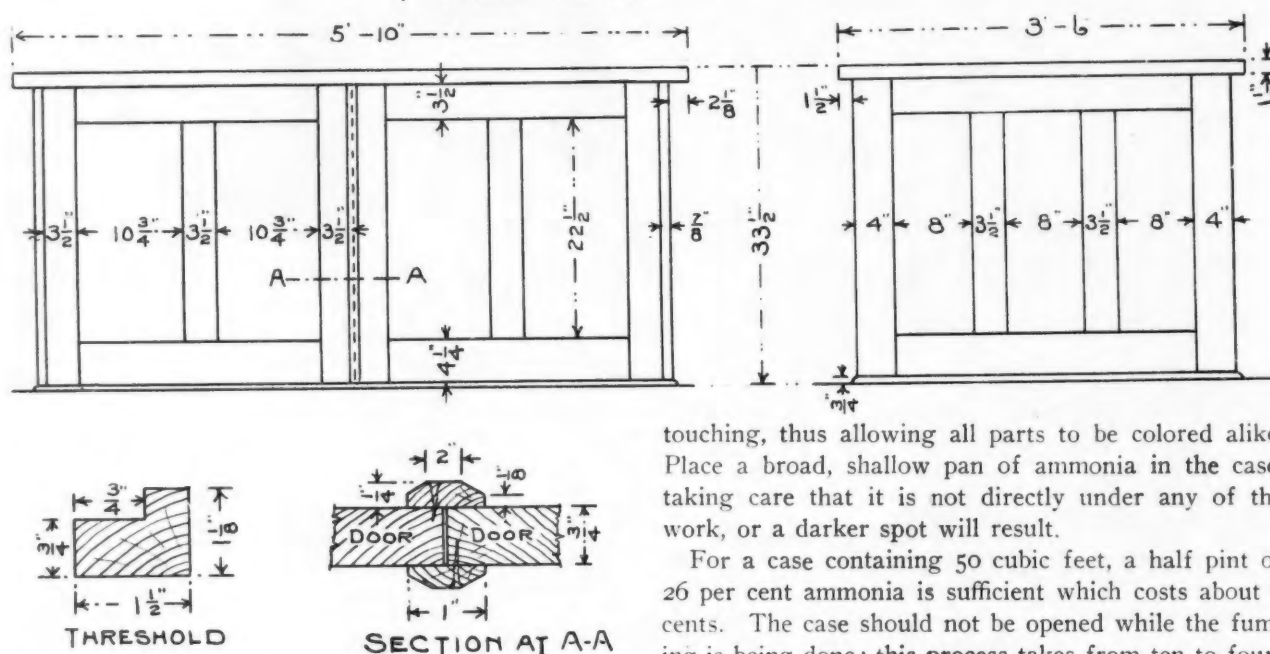
The sketch shown is of the case in use at the Kansas State Agricultural College. The fuming case should be made as nearly air tight as possible, so there may be no leakage. There need not be a floor in the case if it is to be set up on the shop floor. A quarter-round should be nailed to the floor on the outside of the case and on the front a rebated threshold should be placed under the doors, which also forms a stop for them. Window stops are used to close any opening where the doors are hinged, and at the top. The

opening between the doors is covered by a strip screwed to the inside of one door and another strip screwed to the outside of the other door.

This case may be made of tongue and grooved ceiling and lined with prepared roofing or heavy building paper. To see how the fuming is progressing where it is done on a large scale, a small door, 8 or 10 inches square, is made in the side of the case or room where samples are placed on a shelf inside, which admits of the work being observed without opening the large doors. The case can be so constructed as to be used as a work bench, all the filling, waxing or varnishing being done on the one bench.

Place the work in the case, arranging the articles so that two flat surfaces do not come in contact, for if they do, those parts will not be colored as dark as the others. Nails or screws should be used to hold the articles off the floor and to keep the parts from

FUMING CASE



Showing Dimensions and Details of Fuming Case Used by Kansas State Agricultural College.

touching, thus allowing all parts to be colored alike. Place a broad, shallow pan of ammonia in the case, taking care that it is not directly under any of the work, or a darker spot will result.

For a case containing 50 cubic feet, a half pint of 26 per cent ammonia is sufficient which costs about 6 cents. The case should not be opened while the fuming is being done; this process takes from ten to four-

(Continued to page 87.)

teen hours, sometimes twenty-four hours, depending on how well the wood responds, which is determined by the amount of tannic acid contained in the wood. White oak and chestnut are the best woods to fume. Red oak and mahogany are darkened a little, other woods only slightly or not at all.

Some of the advantages of this method of staining are: The beautiful rich color produced, the depth of penetration, the ease by which the color is obtained, the cheapness of it, the elimination of the students handling stains which are liable to be spilled on the bench or floor, or upon other students' work; and as the color is produced by a chemical change, the grain of the wood is not obscured, as is sometimes done by other methods of staining. Attempts have been made to obtain the same results by the manufacturers of stains with only partial success.

The lumber cut from large old trees colors more readily than the new growth, while sapwood is colored only slightly. The same shade of color can be produced in from two to three hours if the wood is

sponged with water before placing in the case. The objection to this method is that the grain of the wood is raised. However, this can be sanded down without affecting the color. The color thus obtained is permanent and is an eighth of an inch or more deep, which permits of scratches being removed by means of a cabinet scraper without damage to the work. Care should be taken not to spill any of the ammonia on the work as it will show a darker spot.

It is possible to fume by applying the ammonia by means of a brush directly to the work, which gives the same results as dry fuming; but this raises the grain of the wood; it is also rather disagreeable for the one doing the work.

After the fuming has been done, all sap wood should be stained, using a good penetrating stain of a rich brown color. Then apply a paste filler, spreading it on crosswise of the grain, and in fifteen or twenty minutes rub off; first crosswise, then lengthwise of the grain, and after allowing twenty-four hours to dry, the article may be waxed or varnished.

How to Make an Indoor Flower Box

By Herbert C. Crocker

HERE is a combination indoor flower box and window bench, easily made by artisan or novice, which will afford a lover of plants and flowers much pleasure without inconvenience. Mounted on casters it is easily moved to any part of the house. Flowers for early spring planting may be started in it. Later the lid is put on and a few cushions add to the effect.

The cost is \$2.25. The material required is:

1 2 x 4 x 12 for legs.....	\$0.30	Linseed oil.....	.10
3 1 x 8 x 12 top, sides and bottom	1.20	Burnt umber.....	.05
1 1 x 8 x 4 for ends....	.15	Nails05
6 casters15	4 angle bars.....	.10
24 1½-inch caster screws ..	.10	4 straight bars.....	.10

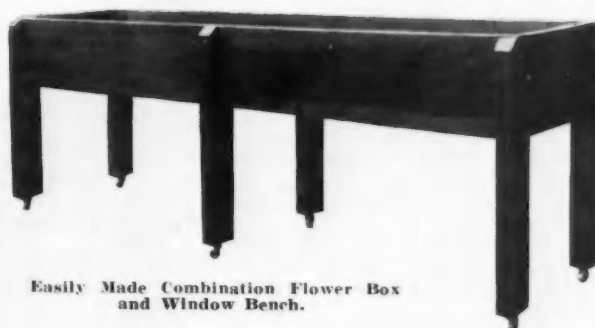
\$2.25

Make a box 14 inches wide and 5 feet 6 inches long, outside dimensions. Sandpaper for a smoother finish. Place angle bars on inside, near the top, to assist in holding box together. The straight bars are put on outside of bottom to hold boards together. The box

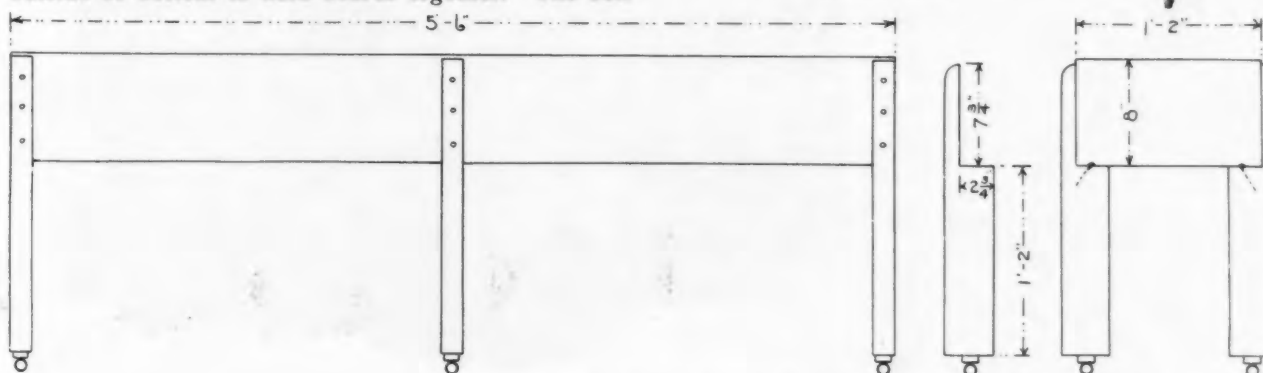
may be made watertight with putty or lined with zinc.

Then cut the six legs as shown in diagram. If the box is accurately squared and the legs perfectly cut the parts will fit accurately. By fastening legs onto box with screws from outside the inside of box is more rigid. An extra large nail thru bottom of box into the leg will help.

The box is then ready for staining. Add burnt umber to a small amount of linseed oil, trying the stain on a board until the desired shade is obtained.



Easily Made Combination Flower Box and Window Bench.



Detail Showing Construction of Indoor Flower Box.

CORRESPONDENCE



Questions Answered and Ideas Exchanged.

Our Readers are Requested and Urged to Make Free Use of These Columns for the Discussion of all Questions of Interest to Carpenters and Builders

An Unusual Table

To the Editor:

South Lebanon, Ohio.

We are herewith displaying the picture of a library table which is of rare design and workmanship and of great value,



Table Made of Over 135 Different Varieties of Wood, by Wm. H. Snook.

having in it over one hundred and thirty-five different varieties of woods and over six thousand separate pieces. It was built by myself and took six months of steady labor to complete.

This table is composed of many different varieties of rare woods, among them being Hungarian ash, Russian ash, camphor, tulip, California red wood, white holly, cocoblo, teak wood, ebony, box wood, woods from the Philippine Islands and many others from all parts of the globe.

The size of this table is thirty-five by forty-eight inches, the entire top being covered by a plate glass which acts as a protection of the beautiful woods.

WM. H. SNOOK.



How About Auto Trailers?

To the Editor:

Davenport, Ia.

I have heard about auto trailers and light motor trucks as being the thing for country builders. I would like to hear from any of the brothers who are using them.

ED. SMITH.

Enclosed Porch and Entry

To the Editor:

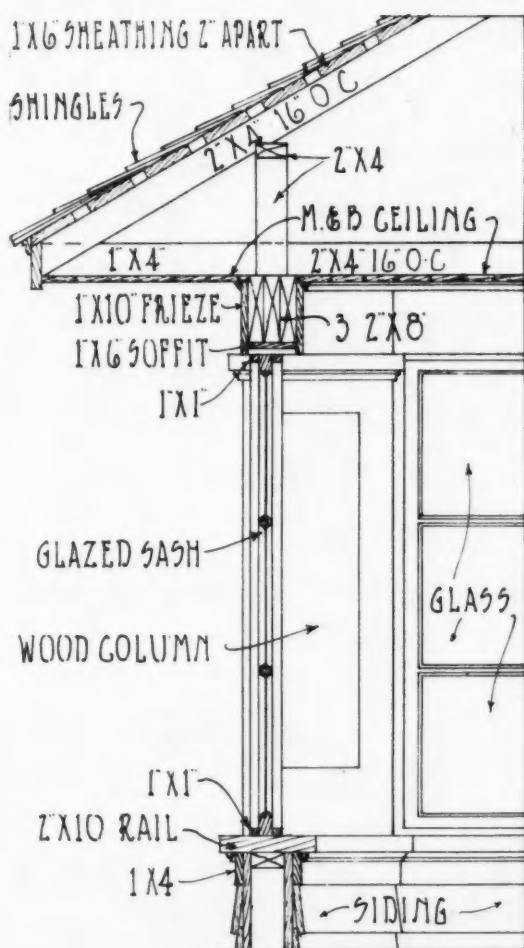
Donnellson, Iowa.

And here comes a prospective builder who has recently visited in Detroit, Mich., or South Bend, Ind., or some other town where it happened to be cold and where this "Old Homer" saw the front porch (on quite a number of new houses) closed with windows all around, forming sort of a sun porch and entry, too.

He wants to know how large and where to place the windows, how to finish the interior,



William H. Snook and the Top of Table Which Required Six Months of Steady Labor to Complete.

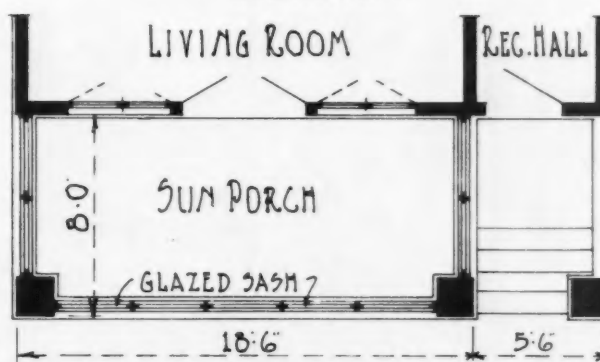


PORCH SECTION THRU LINTEL, SASH & RAIL

Details of Enclosed Porch and Separate Entry with French Doors and Cement Windows Between Porch and Living Room.



ELEVATION



PLAN

what kind of doors between this porch and the living room and also the front reception hall. As we have not built any front porches enclosed, will you be so kind as to give us some data on this part of the residence. Feel assured that it will rest our weary mind.

P. G. HIRSCHLER.

Answer—The sun parlor-porch, with separate entry is finding advocates in quite a number of towns and cities thruout the central and northern states. Its popularity is well deserved, for it has several advantages. In the first place, a sun parlor is always a pleasant part of a house if it is properly built and located. Unfortunately, the smaller houses do not provide space for a sun parlor, as a general rule, unless advantage is taken of what space would be used as a porch. The enclosed porch may be converted into a screened porch during the warm months without a very greatly increased investment. In case the sun porch is not used during the coldest months, a considerable saving in fuel is noticed because of the protection which it offers.

The illustration suggests the details of an enclosed porch with separate entry into a reception hall. The elevation shows how easily this feature may be worked into the design of a house having a hip roof. Reference to the plan will show a popular treatment of window and door details. French doors and casement windows are nearly always used between the porch and living room. The front door of the house is in keeping with the window design used for the house and the porch windows also follow this scheme.

The interior finish of the porch, on a frame house, will

depend somewhat upon the exterior finish of the house. Interior siding on the rails is usually painted the same color as the siding on the house; the rail coping is painted in correspondence with the exterior trim. The ceiling is often stained and varnished. The porch floor construction will depend upon how the porch is to be used. If the porch is to be simply screen in during the summer, it is necessary to build the floor so that rain will not cause damage. The flooring is then painted some pleasing color, or deck cloth is laid on the flooring and painted. Some prefer to have the porch windows built in permanently, in which case they are usually hinged to open in, and provision is made for placing screens on the outside. When this construction is used it is common to lay maple or oak flooring which is stained and waxed or varnished. This construction is widely used on the more expensive brick houses. The sash of porch windows are usually painted white altho this may not be possible if it conflicts with the color scheme of the house. EDITOR.



HomeMade Portable Woodworker

To the Editor:

Moultrieville, S. C.

I got one of your valuable books from a friend of mine and was very much interested in "Jimmie's" woodworker and would like to hear from him or any gentleman for more stunts and improvements.

Enclosed find a photograph of my woodworker in action, which I designed and built myself. I run same with a 6 H. P. stationary gas engine. I never have any trouble with it.

[illegible]

Sheet Used on Large Job and Filled Out by the Foreman.

It is mounted on an old auto chassis, and I haul it on the job with a mule. It consists of a rip, cutoff, and jig-saw and borer for light work. The jig-saw cuts 5-inch material



John E. Blanchard (to left) and Two of His Men Operating Power Woodworker.

and saws cut stuff up to 6 inches thick, also rip same size. The frame of piping is a belt sander and 20-inch band saw combined, which is removed partly, as I did not need it on this job.



Good Time Cards

To the Editor: Rutherford, N. J.

I enclose two forms of time cards, which, if you think will be of any assistance to your readers, you may publish. From my experience I find that there are many who would like to keep simple records, but lack the ability to get up the proper form. I think these are very simple and complete in themselves.

The card is used for jobbing, generally for man and helper; while the sheet is used on a large job by the foreman recording men's time, material received, and material sent away and credited to said job.

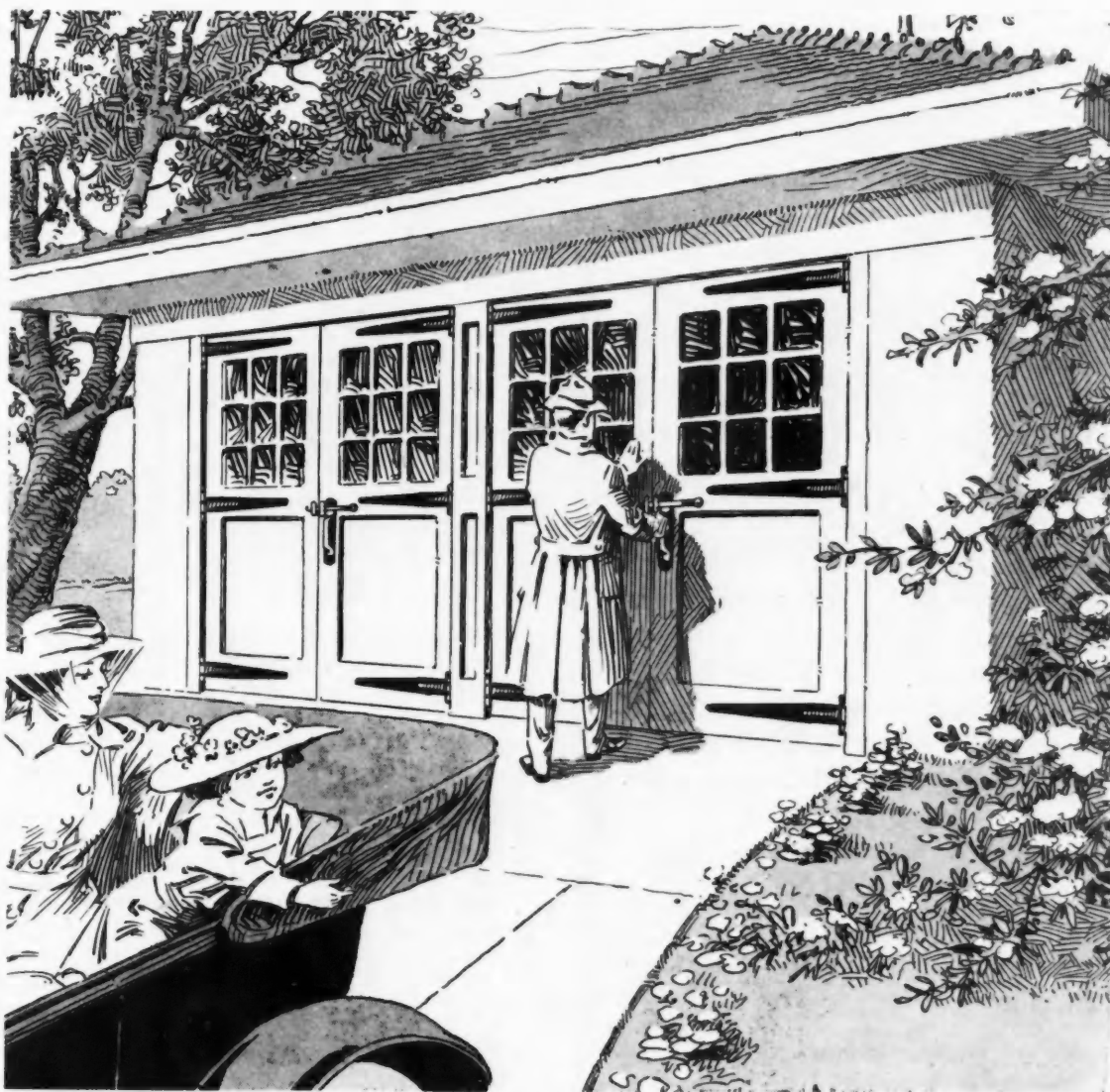
S. SMITHSON.

Plumber, Steam and Gas Fitting, Roofing
and Jobbing.

(Correspondence Department Continued to
Page 92)

[illegible]

Card Used for Jobbing with Man and Helper.



EVERY architect is interested not only in "beauty of line" but in the "substantial construction" which gives lasting satisfaction. The heavy garage doors here shown cannot sag or warp, and they close easily and weather-tight, as they are swung on

Stanley Garage Ball-bearing Hinges

No. 1458—36 inch

They will always look well, work well and wear well.

There are many things in the Stanley Garage Hardware Book A-4 which will interest you. If you have not received your copy, let us know and it will be sent you.

THE STANLEY WORKS, New Britain, Conn., U.S.A.

New York, 100 Lafayette Street

Chicago, 73 East Lake Street

The finishing touch

Floors that are easy to care for and which stay new looking, woodwork that remains unclouded, enamel that keeps its whiteness—these things give your customers a feeling of confidence and satisfaction. They judge your whole contract by the part they can see and test.

Murphy Varnish

"the varnish that lasts longest"

produces a finish that will do you credit in first appearance and in length of service. It goes farther and works easier than poor varnish. It saves labor.

You may think the public do not appreciate good varnish. They would if they knew all the facts. Through our advertising in the leading magazines, we hope to make them see that it is worth while to pay for a good varnish job. Have we your co-operation?

Our principal house-finishing products are:

Murphy Transparent Interior Varnish
Murphy Transparent Floor Varnish
Murphy Transparent Spar Varnish
Murphy Nongloss Interior Varnish
Murphy Semi-Gloss Interior Varnish
Murphy Univernish
Murphy White Enamel
Murphy Enamel Undercoating

Write for further information.

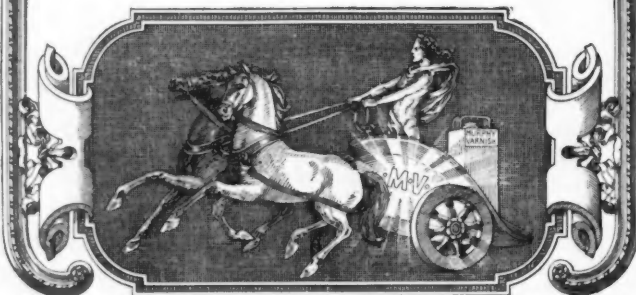
Murphy Varnish Company

Franklin Murphy, jr., President

Newark New Jersey

Chicago Illinois

Dougall Varnish Company, Ltd., Montreal, Canadian Associate



To Keep Liquid Glue Warm

To the Editor:

Detroit, Mich.

I would like to make a suggestion with reference to the plans you publish each month. Why not give us more plans suitable for 30-foot lots? Those given are mostly for houses, or bungalows, which if built on a 30-foot lot would have almost no light thru the side windows, if the adjoining house were built correspondingly close to the lot line.

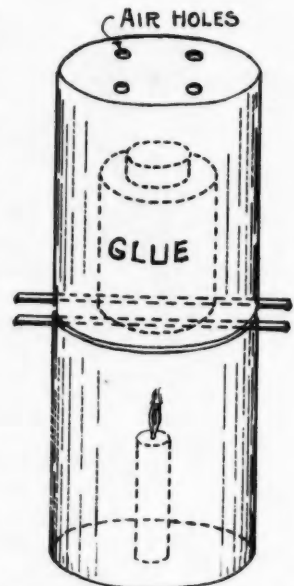
In Buffalo, N. Y., the majority of moderate priced lots are only 30 feet and here fully 50 per cent of them are no wider, while in Toronto there are thousands of semi-detached houses built on lots ranging from 36 to 40 feet, for the two houses, and I have frequently seen a terrace of three houses built on 30 feet. So my request is for some narrower house plans.

Now, if you will allow me a little more space, I would like to offer the following "kink" to our fellow builders:

With the winter upon us and house trim cold, I have found this an easy way of keeping the liquid glue warm. Get two old tomato or fruit cans, place a candle in the bottom of one and lay two heavy pieces of wire or band iron across the opening for the glue to rest on; place the other can over this, bottom side up, as shown in sketch. If the glue gets too hot, let a little more air in as horse sense dictates.

This is handy, safe and most economical in cost and upkeep.

WILFRID H. THOMPSON.



Simple Device by Which Glue May Be Kept Warm During Cold Weather.



Two Questions

To the Editor:

Tabb, Va.

I am a reader of your valuable building paper and like it very much. I have seen a great deal about making cement posts and reinforcing them. I would like to know if wood in the center would make good reinforcement. If not, what is the trouble?

I would like to know, also, which preparation is best to use on outbuildings such as barns built with boards up and down. The buildings I have in mind have been white-washed with lime once a year. I have seen cheap barn paint advertised but have never seen creosote used. Would like to know which is the best and cheapest. I do not care for looks or color, but something which would benefit the wood. White-washing each year is expensive, especially when help is hired.

Would be glad if you would answer these two questions thru your magazine.

H. L. R.

Answer:

(1) No, wood does not answer as reinforcement. Use mild steel.

(2) Creosote barn paint would serve well. EDITOR.

(Correspondence Department Continued to page 96.)



Residence of Mrs. F. W. Baker, Blanchardville, Wisconsin

Out of the Beaten Path

Progressive contractors who want their work to stand out as a monument of their ability are building houses of concrete blocks, faced with

MEDUSA WHITE-CEMENT WATERPROOFED

THE handsome residence of Mrs. F. W. Baker (Blanchardville, Wis.), is an example of the beautiful and practical effects that can be obtained with Medusa products.

This house was constructed of cement blocks faced with Medusa White Cement Waterproofed. As a result, its white finish is permanent and the walls are absolutely water-proof and damp-proof. The cellar of the house is concrete, made permanently water-proof and damp-proof with Medusa Waterproofing.

The T. H. Bonsack Co., contractors, who built the Baker home have been using Medusa Waterproofing for years, in various kinds of work with and uniformly good results. They have found it always economical.

Medusa Waterproofing is **not** a surface paint or a mixture, but a material that becomes an inseparable part of Portland Cement. By preventing efflorescence, the cause of discoloration in cement, it produces a finish permanently white and non-staining. It is economical to use—only 2 per cent being necessary to give positive, permanent waterproofing results.

Medusa Waterproofing comes in either paste or powder form or already mixed with the celebrated Medusa Cement (white or gray). It can be easily used by inexperienced workmen.

You should know all about Medusa Waterproofing now. Learn what it has done for successful contractors everywhere. Fill out and mail the coupon today so we can send you free booklets and specific information for your particular job.

THE SANDUSKY CEMENT CO., Dept. L, Cleveland, O., U. S. A.

The Sandusky Cement Co., Dept. L, Cleveland, O.

Gentlemen:

Please send me copies of free booklets "Medusa White Cement" and "Medusa Waterproofing."

I am particularly interested in waterproofing for (State Kind of Work)

Name Address

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MIDLAND



ANY BUILDING

is a better building

IF

it is built
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MIDLAND TERRA COTTA



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HOMES,
are made more attractive!
 APARTMENTS,
rent more readily!
 STORES,
draw a greater trade!
 THEATRES,
increase their patronage!
 GARAGES,
catch the motorist's eye!

Portfolio—free

MIDLAND TERRA COTTA CO.
 1515 Lumber Exchange, Chicago



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Completed Gothic Roof Garage Built by Chas. R. McPherson.

Gothic Roof Garage

To the Editor:

Rouleau, Sask.

Here are photos of a new garage I have just designed and built. They go well with the Gothic type of barn that is being put up around here.

In your July number for 1915 there was a design for a barrel garage, which indeed was very good, but the one I show here can be put up for much less money as there is less than one thousand feet of lumber in the complete building.

CHAS. R. MCPHERSON.



Some Barn Framing Questions Answered

To the Editor:

Pontiac, Ill.

I have been a subscriber to the AMERICAN BUILDER for some time, and would like to ask for a little information.



View Showing Framing of Small Gothic Roof Garage.

I have been studying the barn plans in the late numbers of your magazine, and want to ask a few questions about them.

Would not the form of construction detailed in Plan No. 353 in the February, 1916, number, with the one 2 by 12-inch chord truss have been strong enough for the barn details which are given in the September issue? Was it necessary to use those 2 by 8-inch stiffeners shown in the end trusses of this Bentley barn? Is not the gable brace shown in Plan No. 353 stronger?

Also, I do not quite understand how the end plates are handled in this form of construction. Are the end plates cut in between the members of the end trusses, or are they clear inside the truss?

(Continued to page 98.)

Modern Homes at Less Cost

You can build the finest types of *strong, permanent, fireproof* structures at a decided saving of material and labor—by using Hy-Rib and Rib Lath.

These materials *eliminate all forms* for pouring cement—saving expense, labor cost and time of erection. Because of their extraordinary stiffness and rigidity, they *permit the wider spacing of studs and supports*, saving in the cost of studding and labor of installation.

Begin now to build with Hy-Rib and Rib Lath. The line is complete, including Diamond Lath, Channels, Studs, Corner Beads, Base Screeds, etc. They provide a more valuable building in every respect—and assure the greatest satisfaction to your customers.



Rib Lath Residence for F. L. Spaulding, Los Angeles, Cal.—S. Munson, Architect

Hy-Rib A steel sheathing, stiffened by rigid deep ribs. Manufactured from a single sheet of steel. Its use is decidedly simple. The easily handled sheets are fastened to the supports and the plaster or concrete applied. No forms, stiffening channels nor wiring required.

Rib Lath A superior metal lath with beaded ribs that span between the studs, making it exceptionally stiff and rigid and permitting the wider spacing of studs. Provides a perfect clinch for plaster and will not crack or streak. Saves time, labor and material in erection.

Write for Hy-Rib Handbook, with specifications, tables, illustrations, etc. Every builder should have a copy. Address Hy-Rib and Lath Dept.

TRUSSED CONCRETE STEEL CO.
YOUNGSTOWN, OHIO

Representatives in Principal Cities



A helping hand



BACK of every hollow tile made by the National Fire Proofing Company is a corps of graduate ceramic and architectural engineers whose combined efforts not only made possible the supremacy of NATCO products but also afforded the opportunity of establishing a permanent and ever ready

NATCO SERVICE

This NATCO service is *your* service and is maintained for the sole purpose of co-operating with those desiring assistance in solving their fire proofing problems.

Whether designing or building a fire proof residence, church, hotel, hospital, municipal building or skyscraper, consult NATCO, the world's largest exclusive Hollow Tile manufacturers.

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Makers of

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DISTINCTIVE TEXTURE—CONVINCINGLY BEAUTIFUL

Plant: Mapleton, Ohio. Offices: Louisville, Ohio
Selling Agencies in All Principal Cities
Write for our new folder showing our line in full range of colors and textures.

Rockford Hollow Building Tile

Hollow Building Tile is a safe material for all classes of buildings, especially farm buildings, and one which all progressive contractors should know how to use. We will be glad to give you any assistance in the matter of the Rockford line.

Sold only to Dealers and Contractors

Rockford Hollow Tile is only sold to the building public when we have no dealers, and even then at a price at our dealers' price. We always protect the dealer.

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—On the basis that brick houses make for a higher standard of construction and therefore more good work and more profit to you.

—With the knowledge that once you are familiar with brick construction that you can make more money building brick houses than any other kind.

—With the absolute conviction that "Belden Brick" represent the biggest value you can buy and that we are prepared to give you the kind of service you want.

We appeal to you to investigate carefully brick house construction.

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We have dealers in hundreds of cities and towns in the United States and Canada at the present time. We ask you to write for samples and prices and the name of our nearest dealer. Belden Brick are made in five modern factories and come in all colors, shapes and sizes, and in most textures, rough and smooth. We have the very brick you are looking for, be it house, bungalow, garage, theater, store, bank, church, school, library or office building.

THE BELDEN BRICK CO. Est. 1885 **Canton, Ohio**
Five Plants at Canton, Somerset, Uhrichsville, Port Washington

-----USE THIS COUPON NOW-----

Belden Brick Company, Canton, Ohio
Gentlemen:—We are favorable to the use of brick for many purposes and would like to know more about your product. We are figuring on building (use this line if anything definite).

We buy thru (give name of dealer).....

Name Address

Barn Framing Questions Answered

(Continued from page 96.)

I don't understand either just how to go about it to get the cut on the top end of the purlin posts so that the purlin plate can be dropped into them. Is there any danger of the ends of this kind of a barn bulging out?

You will see that I am rather new at the game, and would like some information along this line if you can help me.

J. A. BENTLEY.

Answer—Referring to the trusses shown in February, 1916, the one 2 by 12-inch chord would not have been strong enough for a barn of this longer span. It is best where the span is wider than 38 feet to use two 2 by 12's for the purlin posts and two 2 by 10's for the chords.

In regard to the end bracing one is about as strong as the other and a great deal of this lies with the builder, as to the one he can build the cheapest. The end plates run between the trusses and not as shown on the cross-section of the Bentley barn. This was an oversight by the draftsman. After the foundation is in and the frame for the first story wall complete, the supporting columns are put in place, the proper footings for same having been provided.

When these columns are in place and the concrete set, the girders may be laid. The floor joists are next put in, and a temporary floor laid on them so that the workmen can move about freely while raising the trusses.

Cut and put together the first truss according to the plans. When the first truss is completed lay it on the floor and build the other trusses on top of it to insure absolute accuracy in all joints and measurements. When all trusses have been finished, the first truss is placed in position at the end of the barn. This is usually done by placing the feet of the truss at the place where they are to rest when in position, with the top of the truss towards the center of the barn. Blocks are then spiked to the joists at the proper points so as to keep the feet of the truss in place while being raised. The feet of the truss rest against these blocks and pivot on them. A gin pole is erected at the end of the barn in the center, leaning at an angle of about 50 degrees toward the center of the barn; a block and tackle is rigged, the rope passing over a gin pole and attached to the upper parts of the truss.

A couple of men pull the blocks and tackle, and the truss is quickly raised to position. A few men with guy rope are necessary to steady the truss while being raised. As soon as the first truss is up, it is braced in position. The second truss is raised in like manner, and as soon as it is up the girts are added. Then one after the other the trusses are put in place, the girts being spiked on as you go along. The last two trusses, when laid in position for raising, will project over the end of the barn. The projecting portion is supported by temporary props, which are removed when the truss is being raised. The end girts can be added at any time convenient.

To put on the plates, no scaffolding is needed since it is not difficult to climb on the truss itself. The next step is to put the purlins in place; these are put in place one piece at a time and the lower rafters are nailed thru the lower member of purlins and in this way the joints are broken.

Before putting on the lookout rafters and cornice, the siding is nailed on, because it can be done more conveniently then.

H. M. WARD.

Wants Double House Designs

To the Editor:

West Bethlehem, Pa.

I would appreciate an issue some month showing designs for double dwellings suitable for twenty-five foot city lots, that is, a double house to every fifty feet.

EDWIN C. WILLOSS.



A HY-TEX COTTAGE

Hy-tex
The Standard of Quality in Brick

¶ Mr. Carpenter Builder, improve the looks of your home town by putting up houses like the one shown above. By doing so, you will not only *please* your clients because you increase their safety and comfort, and enhance the value of their property, but you will also become a *public* benefactor because you make your town more attractive.

¶ Put variety into your work by adding the natural color and beauty of brick to the walls you build. People in town will appreciate it, and you will have your reward in gaining a higher reputation as a builder.

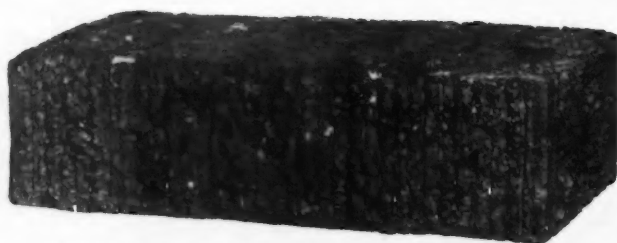
¶ The pages of THE AMERICAN BUILDER will show you how easily it may be done. Ask your lumber dealer to look up Hy-tex Brick, and write us for catalog and booklets.

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Largest Manufacturers of Face Brick in the World



ALLIANCE MULTI-COLOR RUFF BRICK

EXCEL ALL OTHER BRICK as to beauty of coloring. The chromatic scale of colors runs through the beautiful rough-texture faces, most of the individual brick showing on the face of each brick three or four or more of the seven primary colors or their shades—gun-metals, wines, chocolates, browns, ox-blood reds, bluff tones and multi-colors.

Mr. Dealer: If you want the best seller among the many brick made today, ask for the agency for Alliance Multi-Color Ruff Brick—beautiful rough-texture and all the colors of the rainbow. Samples and prices on request.

The ALLIANCE BRICK CO., 25 South Linden Ave., Alliance, Ohio

Shackelford Brick and Hollow Tile

Made of Iowa's Best Shale

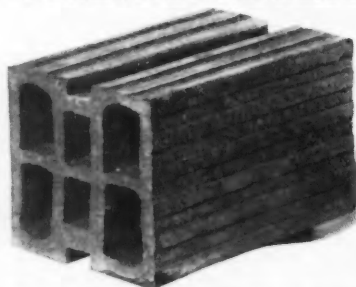
Shackelford common brick and hollow tile are made of Iowa's best shale, and always give entire satisfaction. They are in wide demand throughout the Central West. We would be glad to have your inquiry.

Our Lumberman's Special is a brick that hundreds of lumber dealers are carrying to decided advantage. If you carry chimney and foundation brick get in touch with us at once—we have something of interest for you.

SHACKELFORD BRICK CO., Des Moines, Ia.

"HEAVY DUTY" INTERLOCKING TILE

The STRENGTH of BRICK and the DRYNESS of TILE are combined in Vigo American Heavy Duty Interlocking Tile to make a BETTER wall than solid brick and at two-thirds the cost.



We also manufacture Fire-proofing, Building, Arch, Partition and Drain Tile, Hollow Brick and other shale products. Send for our literature.

VIGO-AMERICAN CLAY COMPANY

7th and Ohio Sts., TERRE HAUTE, IND.

Home Planning Helps "Brick Homes at Low Cost"

10 Practical Small Homes
Perspective and Floor Plans

Send 10c for Postage

\$100 The Average Man's Home
50 Prize House Plans, Postpaid,
Range in Price \$3,000 to \$5,000

S-A-F-E

354 Leader Bldg. Cleveland, Ohio

Pleased with Brick Department

To the Editor:

Saratoga Springs, N. Y.

Find enclosed \$2.00 for my yearly subscription to the AMERICA BUILDER from September last. I have had all numbers up to January, and the December number is a mighty fine one.

I am doing a lot of house building in Albany, N. Y., and some shops. I have been building of "Tapestry" brick, and being a practical bricklayer for thirty years, this brick question just strikes me right. I will try to develop a good business in Albany vicinity during the next season. Prospects look mighty good here. I shall also have a cement block factory here to make all kinds of cement products.

CHARLES L. SCOVILLE.



Wants to Build a Clapboard Boat

To the Editor:

Ira, Iowa.

Will you give me your way of making a boat 10 feet long, 30 inches wide and 1 foot deep, straight on the bottom and both ends tapered to a wedge point. I have a customer who wants it made from clapboarding.

S. V. CASTOR.



Wants Eye-Brow Window Pointers

East Northport, L. I., N. Y.

To the Editor:

I would like to have a little advice thru the columns of the AMERICAN BUILDER as to the proper way to lay out an eye-brow window frame, and also framing it in the roof with straight rafters and with the curved rafters. If some good brother could enlighten me on this, I would greatly appreciate it.

(Continued to page 102.)



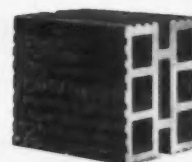
Interesting Circular Stair Built by George Ehrle.

Increasing Demand for Permanent Buildings

Every contractor and builder wants to increase his profits. Hollow Tile construction pays larger profits with less competition. Tile houses are in great demand and have effectually determined their superiority over other types.

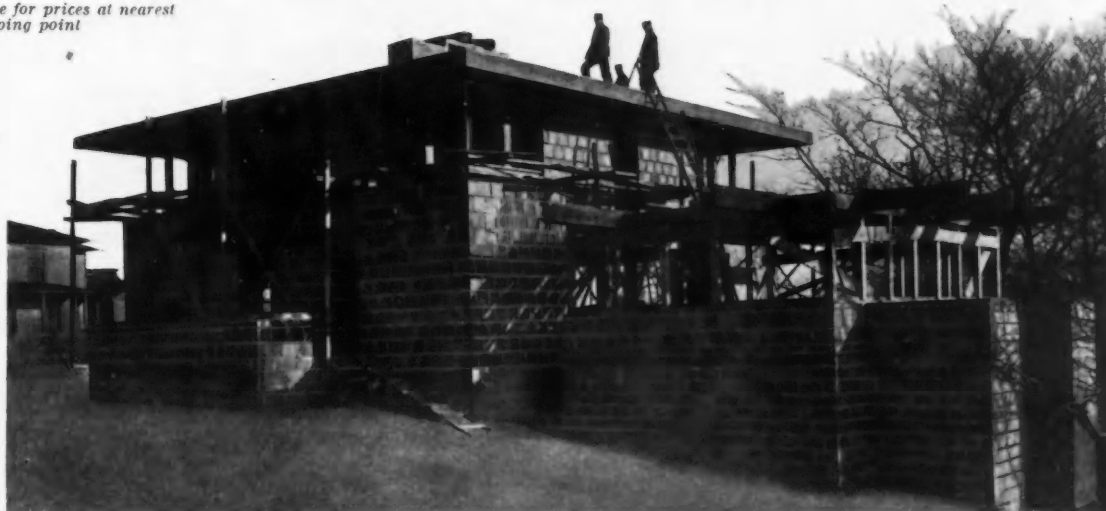
A Hollow Tile House is permanent. There is nothing to deteriorate. The first cost is the last cost. It never has to be repainted or repaired. Built of non-burnable material, it allows a lower rate of insurance. It costs no more than good frame construction, yet will last a century.

Denison Load Bearing Tile will carry a load of 140,000 pounds to the square foot. The bedding surfaces are easy of access and the tile lays up quickly and easily. The broken mortar joint prevents frost or moisture from penetrating to the inside walls. Plaster applies directly onto the tile without furring.



Made by the **Denison Fire Proofing Co., Mason City, Iowa**

Write for prices at nearest shipping point



WITHOUT OUR ESTIMATE YOU HAVE NO COMPETITION

The
Whitacre-Greer Fireproofing Co.

Manufacturers of
**HOLLOW TILE FIREPROOFING
and BUILDING BLOCK**

Waynesburg, Ohio

Chicago Office:
538 South Dearborn St.

Pittsburgh, Office:
7138 Jenkins Building

FIREPROOFING MADE OF PURE FIRE CLAY



*Drop us a line and tell us what you
are figuring on building this Spring*

HUNDREDS of progressive contractors are finding that brick construction is as easily handled as frame, and it has many advantages—the principal one is, that it gives your client a more permanent home and relieves him of the continual expense of painting and upkeep.

**Then we will tell you how "Artfashioned"
Brick can be used to advantage**

Artfashioned Brick are made in a wide range of colors and textures. There is a Nuvogus Brick for every style of architecture—from the modest bungalow to the best building in town.

**You can get "Artfashioned" Brick from
your Local Dealer**

We have hundreds of lumber dealers in the Middle West now handling "Artfashioned" Brick. If your local dealer does not carry our line ask him to write us. We prefer to furnish it through his yard.

BOONE BRICK TILE & PAVING CO., Manufacturers of Artfashioned Brick, Boone, Iowa
Sales Offices all through the Middle West

MADE IN IOWA!

TILE BAK

(Hollow Clay Tile)

Covered with STUCCO or

HOMESTEAD FACE BRICK

Makes ideal construction for Residences, Schools, Churches,
Banks, Garages, Theatres, etc. *It's Fire-Proof*
Send for Descriptive Pamphlets

The Barkwill-Farr Company ^{Nine Modern Plants} Cleveland, O.

I am also sending you a picture of a flight of circular stairs—one of two which I recently built and installed in the house. It may be of interest to some of the brothers, as it is a little out of the ordinary. The picture (page 100) shows it just as I was finishing.

GEORGE EHRL.

Bark From an Old Sea Dog

To the Editor:

Springfield, Ill.

In the August number you have "Useful Knots and How to Tie Them," by J. H. Blackledge, which is pretty good for the average carpenter, but to an old man-o-war's man it does not look good.

Now, for the "granny" and "square knot," he has the



Square Knot if A A is Standing Part of Rope.

granny all right, but did not go far enough with the square. The greatest objection to the granny is that you cannot untie it; but it holds. The "thief's" knot,

which looks like the square knot, and isn't—that is the bad one.

Now, to prove what I say. Take two pieces of rope and tie as illustrated. With AA as standing part of rope, you have a square knot; but with AB as standing part you have the thief's knot, which looks like the square, but is a thief, as you cannot make it hold and is worse than the granny.

He has his "dates" mixed on the "clove hitch," as it is two half hitches made in the same direction as his own picture shows. Two half hitches in opposite directions ties No. 10, which we also call the "cat's paw" in the navy.

In regard to Fig. 13, will ask if he ever heard of the

double bow line, or bowline on a bight?

With apologies from an old sea dog who hit the high places with old Fighting Bob Evans for a number of years.

H. C. REUTSCH.

A Legal Question for Floor Finishers

To the Editor:

Dayton, Ohio.

I follow as a business floor dressing with an electric sander. With the machine I finish the room, excepting 4 or 5 inches around the border, which must be dressed by hand scraper and then sanded lightly by hand. Some painters in filling the floor with stain in filler have trouble in getting the scraped and sanded parts of floor uniform in color. The scraped part in oak is apt to finish a lighter shade. In a case of this kind can the architect hold the dresser, or should he hold the painter responsible? Also, where an architect is supervising the construction and instructs the painter to fill the floors, does that relieve the dresser of any further labor, or can he be held until after the last coat of varnish has been applied?

E. KLEPINGER.

Recommends Concave Door Jamb

To the Editor:

Potsdam, N. Y.

I have been a subscriber to your magazine for some time, always looking for information and willing to help. I have not seen anything in print concerning doors with floor hinge, double action. I have hung a good many. If side jambs are concave when door is hung and door is shrunk, you cannot see into next room. I have hung doors this way and they give good satisfaction.

Hoping this will do some good to some of my brother carpenters, and wishing to help all I can, I will leave it to your consideration.

GEO. H. MOULTON.

It Looks Pretty Fine, Doesn't It?



This is Our Navajo Light No. 308, Red Center Cream Mortar 5/8 Inch Flush Joint.

"Navajo" and the New "Brocade" are our most popular styles of brick among home builders.

No one can deny the handsome appearance a really well designed brick house presents. There is an air of distinction about the Kansas Buff Brick Line that is certain to appeal to the most exacting taste.

BUILD WITH BRICK, Mr. Contractor

Brick stands for permanency, dignity and safety in building construction. We have a complete line of brick for churches, schools, stores, theaters, garages, etc.

Send for a Portfolio of Beautiful Brick in Natural Colors

The Kansas Buff Brick & Manufacturing Company
Buffville, Kansas

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

HYDRATED LIME PLASTER

These homes were made more satisfactory and pleasant by its use.



HERE are some of the reasons why Hydrated Lime Plaster for scratch and brown coats will make *your* houses more satisfactory and comfortable.

Walls made of lime plaster deaden and absorb sound. This reduces the sound transmitted from one room to another.

The Slower Setting Property of the Hydrated Lime enables the plasterer to straighten and tone the walls and angles in a proper manner. This property also eliminates the trouble caused by buckling lath.

Hydrated Lime Plaster is fire-resisting, non-corrosive and also a lath preservative.

ITS ECONOMIC ADVANTAGES

The droppings of Hydrated Lime Plaster can be gathered at night or on the following morning, retempered and used.

On jobs of any size this feature means a vast saving of material. The cost of the Hydrated Lime Plaster is no more than for others and its higher sand carrying capacity makes it the most economical and satisfactory plaster to be used.



Let us send you our interesting and worth while bulletins treating the subject of interior plaster fully. Simply mail us the attached coupon today.

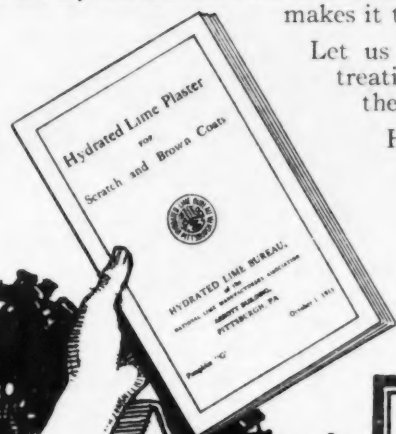
Home builders who insist on the best in building materials are using Hydrated Lime Plaster.

The homes illustrated here are finished entirely with our plaster.

HYDRATED LIME BUREAU

of the National Lime Manufacturers Ass'n

1610 ARROTT BLDG. - PITTSBURG, PA.



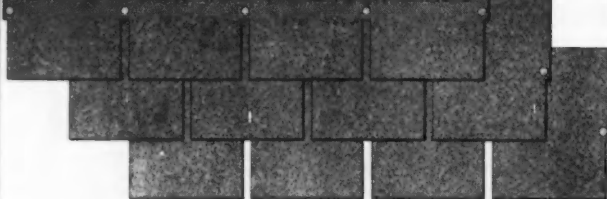
Get This Worth While Booklet FREE.

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REX STRIP SHINGLES

Made in Two Colors—Dark Red and Grayish Green

WITHIN forty-five days the leading lumber and building supply dealers in one city of less than 100,000 population ordered enough Rex Strip Shingles to cover 584 houses!—(16 squares per house).

There would be fifty-six carloads if we could ship all the orders at one time—a trainload of 840 tons!

We leave it to you if that is not Some Shingle Business from just one hustling little city!

The dealers mentioned believe in Rex Strip Shingles. They have found them profitable to handle. They order so heavily because the turnover is so rapid.

If you see Rex Strip Shingles you will appreciate their merits without being told about them. They cost less to buy, do the same work better, cost less to lay, and look as well as any Asphalt Shingle. They protect the building from fire, increase its value, and reduce insurance rates.

Rex Strip Shingles are being used on many moderately expensive residences. Yet they are so low in cost that the most modest home builder can afford them.

We have a beautifully illustrated Catalog that describes Rex Strip Shingles—and twenty-two other Rex products. It also contains much valuable information about all kinds of roofing materials. If you want a copy, just write your name and address on the margin on this page below, mail to us, and we will gladly send it.

Flintkote Manufacturing Co.

INCORPORATED

90 Pearl Street, Boston, Mass.

New York

Chicago

New Orleans

Brick House Dormer Design

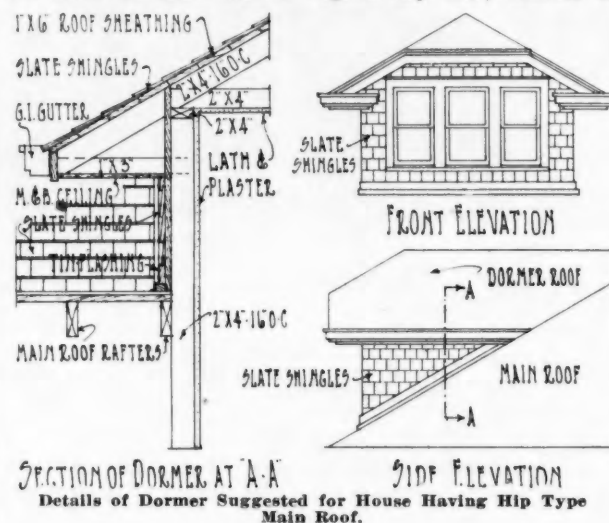
To the Editor:

Superior, Wis.

Enclosed you will please find the front elevation of a brick house I am going to build this summer. I am writing you to see if you can offer me any suggestions on how the dormers should be built. It does not seem to me that one I have on is the best that could be done. Knowing that you have had lots of experience in this line I am asking you for suggestions.

GEORGE E. JARVIS.

Answer—In view of the fact that the main roof of this house is of the hip type, it is well, in designing the dormers, to carry out the hip roof effect. It would, of course, be impossible to use a dormer of the size and shape indicated on the front elevation with a regular hip roof, because the



windows extend above where the bottom of the cornice would be in this case. The same effect may be obtained, however, by building the dormer with a gable roof with the exception of the small portion at the outer extremity. The peak of the roof is broken down into the hip type construction at a point about 3 feet 4 inches from the outer edge of the gable, the pitch of the triangular section being that of the main roof of the house. The cornice of this section of the roof has a vertical clearance over the window casing of about six inches. A wide box cornice is used in accordance with the main roof construction. By continuing the sheathing up past the plate to the roof sheathing, a good tight cornice is obtained. The dormer is shown finished with slate shingles, following the construction indicated on the front elevation of the house.



EDITOR.

Wants Rare Woods in Small Quantities

To the Editor:

Coldwater, Mich.

As I am building a library table top out of all the different kinds of wood I can get, I thought I would write and see if you could send me the address of places where I could get some. I want the pieces to be ten inches long and about six inches wide. I would like to get circassian walnut, rosewood, and such.

FRANK TAPPENDEN.

Answer—Perhaps some of our readers can give him this information.

EDITOR.



Wants Ideas for One Story Factory

To the Editor:

St. Catharines, Ont.

I would like to ask some of my brother AMERICAN BUILDER readers to give me a little sketch of a one-story factory building 50 by 100 feet deep, with concrete floors and cellar, built so as to allow for a future addition. The proposed building is to be used for storing furniture.

A. CROCKER.



Nature Colored This Roofing a Million Years Ago —

Asphalt Shingles

"The Roof that Stays Young"

ASPHALT SHINGLES owe their beautiful colorings to the crushed rock products which are tightly gripped on their surface. These rock products are imperishably tinted with the richest shades of red, gray, green, brown or black.

These are the *natural colorings* of the rock, just as it was quarried from Nature's workshop. The colorings were unchangeably fixed in them millions of years ago. That is why an *Asphalt Shingle* roof never fades or loses the rich beauty of its colorings.

Cost need never make you hesitate to use *Asphalt Shingles* so as to give your customer's home the beauty and attractiveness that such a roof would give it. For *Asphalt Shingles* cost no more than commonplace roofings. But their handsomeness, long life and everlasting waterproof qualities are putting them on hundreds of thousands of houses each year.

You should recommend and use them if you want your customers to have attractive homes that will be a credit to you, and if you want them to have efficient, moderate priced building materials that they will later thank you for having suggested.

*See that you specify reliable quality **Asphalt Shingles**, made with a strong felt, saturated or coated with Asphalt, with crushed rock products tightly embedded on the surface.*

ASPHALT SHINGLE PUBLICITY BUREAU, 955 Marquette Bldg., CHICAGO

ARKANSAS SOFT PINE

Satin-like Interior Trim

Being a Non-Resinous Wood

is physically adapted to stains or enamels.

Under stains it produces a rich soft-toned effect which is greatly enhanced by the natural figure of the wood itself.

This figure shows to marked advantage under various oak tones or mahogany, and lends character to the now popular Silver Gray finish.

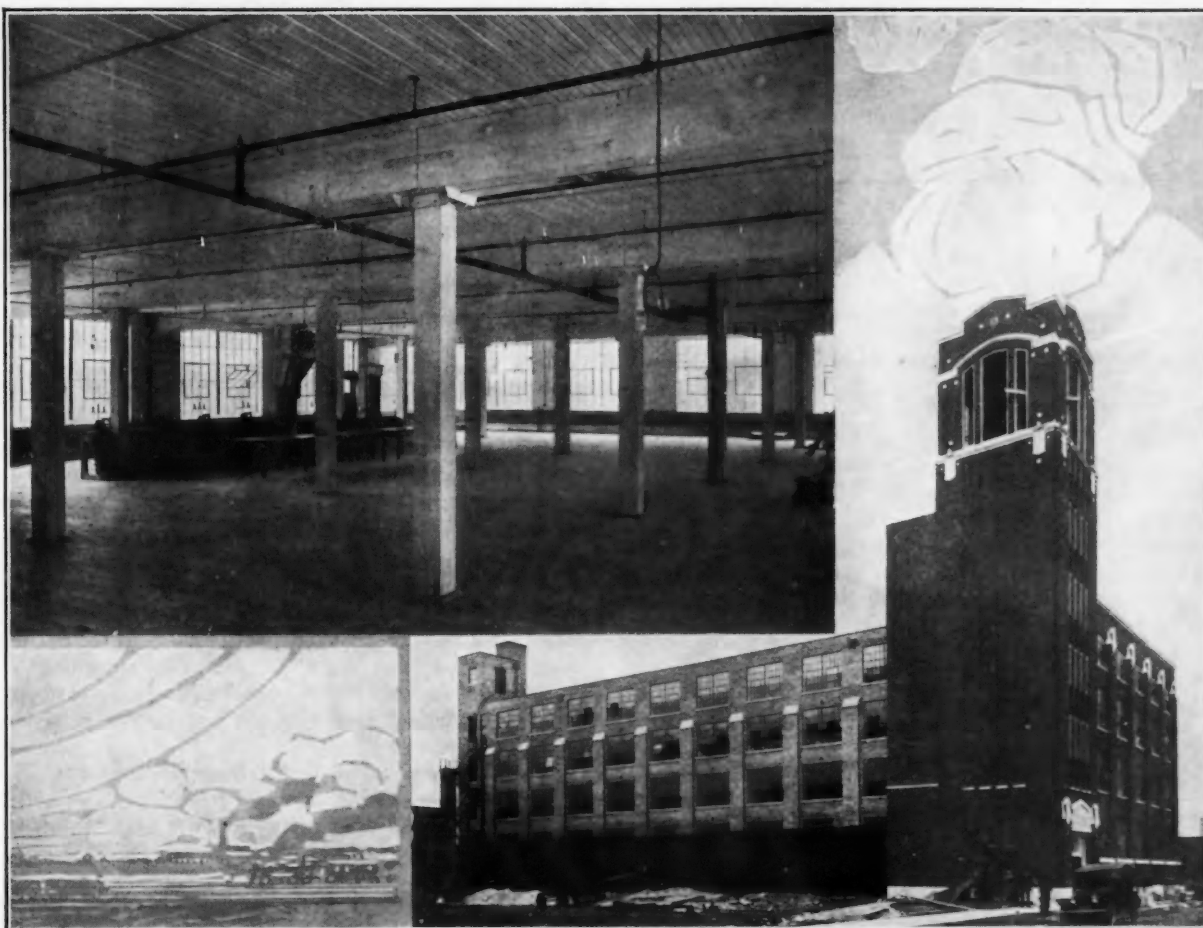
Our samples will demonstrate the foregoing. Sent on request, together with Painting and Finishing Book and Architects Manual.

Arkansas Soft Pine is Trade-Marked and sold by dealers. Yours can supply it.

Arkansas Soft Pine Bureau

120 Bank of Commerce Building
LITTLE ROCK, ARK.





Modern Mill-Construction Typified in a Recently Completed Chicago Plant

"Standard Mill-Construction"

offers the solution of every problem confronting the builder of industrial plants today. It embodies the features of Economy, Flexibility and Availability of Material to a degree equaled by no other type of construction.

Have **you** industrial building problems to solve? Do **you** understand fully what Standard Mill-Construction offers in Saving, Service and Satisfaction? Do **you** realize that there are available today unlimited quantities of perfectly manufactured

Southern Yellow Pine

the wood that standardized "Mill-Construction?" Do you know that the great strength, density and durability of Southern Yellow Pine timbers now is made absolutely certain by the application of the Density Rule, devised by the Government Forest Service, and adapted by the American Society for Testing Materials and the Southern Pine Association?

The Southern Pine Association will gladly supply you with printed copies of the Density Rule, which shows just how easily and accurately the strength of Southern Yellow Pine timbers may be determined. This test is an absolute safeguard against substitution of inferior material and a guarantee that the Southern Yellow Pine you employ will give maximum **service**.

Southern Pine Association
2061 Interstate Bank Bldg. **New Orleans, Louisiana**



Trisecting Angles

(Continued from page 108.)

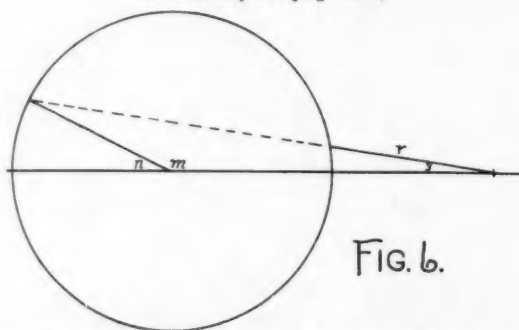


Diagram Showing Relation of Angles When m is Greater than 135° .

Consequently, if we lay off the 60° arc PQ and draw the radii BE and BQ , the angle QBE will be equal to $\frac{1}{3}m$.

6. The formula $\frac{1}{3}m = 60^\circ - \frac{1}{3}n$ does not apply only to m and n in the case illustrated by Fig. 4, for in all cases where m and n are supplementary angles, $\frac{1}{3}m = 60^\circ - \frac{1}{3}n$, and $\frac{1}{3}n = 60^\circ - \frac{1}{3}m$; because since $m = 180^\circ - n$, and $n = 180^\circ - m$, therefore $\frac{1}{3}m = 60^\circ - \frac{1}{3}n$, and $\frac{1}{3}n = 60^\circ - \frac{1}{3}m$.

Apply these formulas, a summary of the principles established in this discussion will be expressed by the following figures and formulas:

- | | |
|--------------------------------------|--|
| I. If m is less than 135° . | II. If m is greater than 135° . |
| 1. $\frac{1}{3}m = x = 60^\circ - y$ | 1. $\frac{1}{3}m = 60^\circ - y$ |
| 2. $\frac{1}{3}n = y = 60^\circ - x$ | 2. $\frac{1}{3}n = y$ |
| 3. $x + y = 60^\circ$ | |

7. It is obvious that $\frac{1}{3}$ of an angle which is greater than 180° (and less than 360°) equals $60^\circ + \frac{1}{3}$ of the angle's excess over 180° .

HERMAN LINCKE.

Fast Shingler Pierce Tells About Fast Lathing

To the Editor:

Boise, Idaho.

Well, here I am, back again from the hills after a summer with the fish and game and gold mines.

I have hardly had time yet to catch up with my reading of the AMERICAN BUILDER, but have found much interesting *dope*. As usual, of course, I have read the Correspondence Department and found some letters which I wish to comment on. One request is from Mr. Dietel for lathing pointers, which I will try to answer briefly. But first, some comments on Mr. Preston's and Mr. Schneider's letters in the July, 1916, number.

I wish to say that they both have the correct idea of the genuine Boston hip, but Mr. Schneider's drawing is not correct. Shingles marked E and F in Mr. Preston's drawing of third and fourth course show the correct shape of true Boston hip shingle. These can be cut to pattern from shingles slightly wider than the finished shingles, using the short side for pattern, of course. They are nailed in place and trimmed along hip line with hatchet.

This form of hip is very good and makes a tight job, but I haven't seen it used for nearly twenty years, as it takes too much time to put on. The western shinglers put on a capping course right over the main roof, using full length shingles lapped as shown in Mr. Schneider's drawing. Narrow shingles for this course are saved out from the common shingles and tacked down near the hip ready at hand for the capping course.

Just a hint—be careful to put these shingles on right side up, so the grain will run right for trimming. You will soon know what I mean after trying a few.

(Continued to page 114.)



Metal Roofings give instant and sure *protection* from fire and weather—and offer a strong bulwark against loss or damage. Unequaled for fine residences and for industrial properties.

KEYSTONE COPPER STEEL

Galvanized Sheets and Roofing Tin Plates

Have won a verdict of highest approval for resistance to rust and corrosion, and for adaptability to fireproof building construction. APOLLO-KEYSTONE Copper Steel Galvanized Sheets will put life and stability into Cornices, Spouting, Corrugated Roofing, and all exposed sheet metal work. KEYSTONE Copper Steel Roofing Tin meets the demands of the most particular architect and builder. Highest quality plates—grades up to 40 lbs. coating. Send for booklets.

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

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Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis
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Pacific Coast Representatives: UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

Select the Right Wood

THREE of the essentials for success in building a home are—a practical plan, artistic design, and good workmanship.

But without the fourth essential—proper selection of materials—the other three are of little avail.

Take the matter of lumber. All woods are not equally good for all uses. One is good for one purpose—another for another. Select woods for their proper uses, and your clients will have no disappointments.

WHITE PINE

Every carpenter knows that for the outer covering of a house—subjected to the rigorous onslaught of rain and snow, heat and cold, sun and wind—no other wood is so durable and holds its place so well, without warping, splitting, rotting or opening at the joints, as White Pine.

A Free Magazine for Contractors

We publish a bi-monthly architectural magazine, every issue of which is full of valuable and helpful information for contractors and builders. If you would like this magazine write us and we will be pleased to place your name on our mailing list.

WHITE PINE BUREAU,

1435 Merchants Bank Building, St. Paul, Minn.

Representing
The Northern Pine Manufacturers'
Association of Minnesota, Wisconsin
and Michigan, and The Associated
White Pine Manufacturers of Idaho

Here Are Some of Their Advantages

Neponset Twin Shingles are self-spacing. The twin shape halves the cost of laying and requires 25% fewer nails.

They will not crack, dry out, warp, buckle, pull off or blow away.

They are approved by National Board of Fire Underwriters.

They are the only widely advertised asphalt shingles on the market, which means that they are better-known and in bigger demand.



Look for this trade mark on all Shingles, Roll Roofings, Wall Boards and Building Papers. There is a Neponset Product meeting every requirement and purse — all guaranteed by us.



NEPONSET TWIN SHINGLES

(Patent applied for)

The handsome red and green slate surfaces of Neponset Twin Shingles harmonize perfectly with any surroundings or architectural plan. But the quality of Neponset Twin Shingles is more than "Surface deep." Layer upon layer of tough, fibrous felt, crushed stone and slate, and the famous Neponset Waterproofing compound build them up into one thick, solid mass impervious to rain and moisture, unaffected by sparks and flying embers.

It's the combination of beauty, wear, fire-resistance and comparatively low cost that gives Neponset Twin Shingles the preference over similar types of roofing.

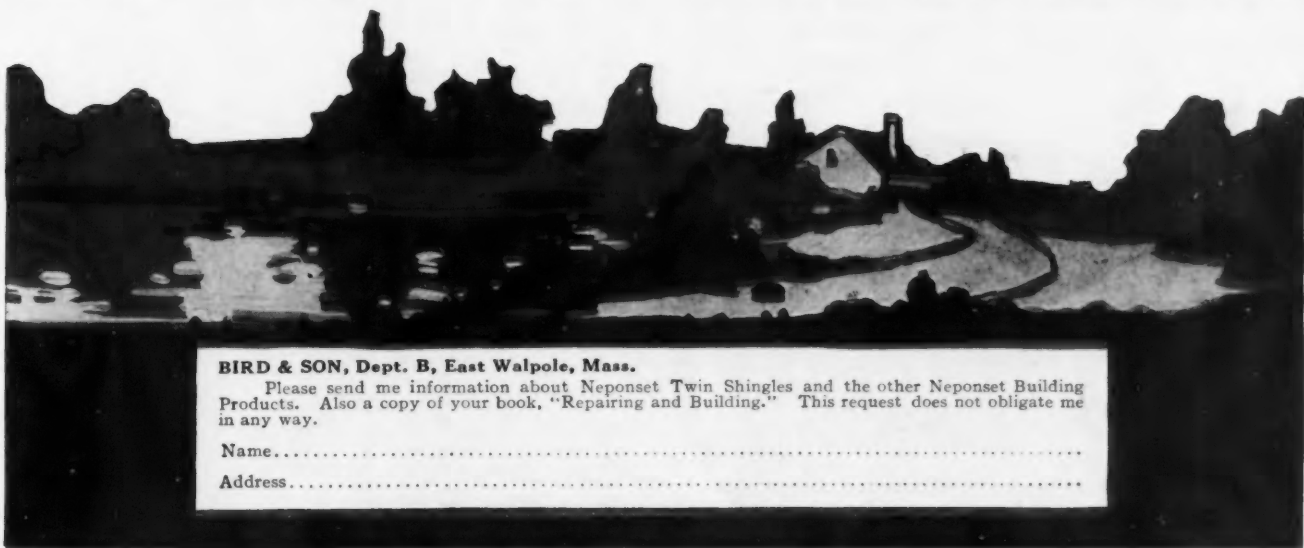
Other Neponset Products

There are three types of Neponset Shingles, all made from similar materials that have given our Neponset Paroid Roll Roofing its wonderful records for durability.

Neponset Wall-Board is another one of the big family of Neponset Building Products. Neponset Building Papers have been specified by architects and used by contractors for over twenty-five years.

Fill out and mail the coupon below for detailed information about Neponset Products. Let us present you with some facts and figures that will be of interest and value to you. Get the coupon into the mail today.

BIRD & SON (*Established 1795*) **Dept. C, Walpole, Mass.**
 New York Washington Chicago Canadian Office and Plant, Hamilton, Ont.



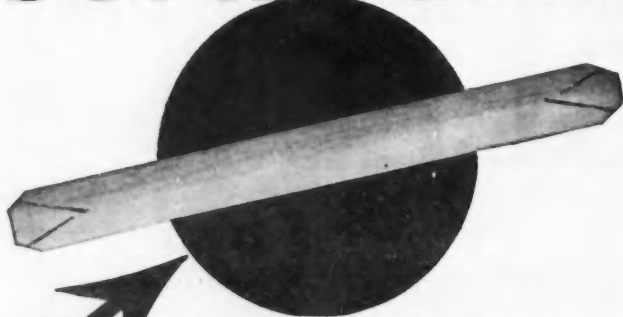
BIRD & SON, Dept. B, East Walpole, Mass.

Please send me information about Neponset Twin Shingles and the other Neponset Building Products. Also a copy of your book, "Repairing and Building." This request does not obligate me in any way.

Name.....

Address.....

WEDGE DOWEL SUPREMACY



—an Exclusive Morgan Feature that puts your Service beyond Competition

As a contractor, you cannot afford to flirt with uncertainties—

Your *reputation* in your community *must* attract new contracts or "you're through"—

So, when you turn to the MORGAN LINE—it is proof positive that you appreciate the value of an *established line*—a line replete with distinctive features which *attract* the *better* class of contracts, and *put your service* beyond competition.

MORGAN DOORS

are designed with this object before us. Every detail of construction is followed to completion with *you* and *your customer* in mind. That's why MORGAN DOORS are worthy of your recommendation and *our guarantee*.

Send for the Morgan Millwork Data Book today

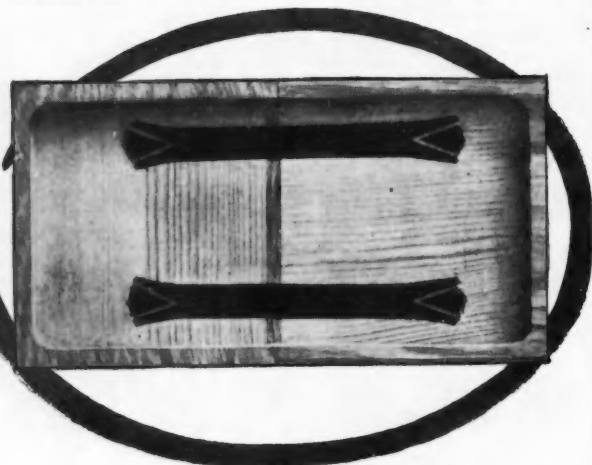
Your dealer can promptly supply you with all Morgan products because of our unmatched service.

MORGAN SASH & DOOR COMPANY

Dept. C-73 Chicago

Morgan Millwork Co., Baltimore
Morgan Co., Oshkosh, Wisconsin

Exhibits of finished Morgan Model Doors in all principal cities. Ask for list.



Fast Lathing

(Continued from page 110.)

Now about lathing—

I am afraid I cannot give much valuable information in a short letter, but may be able to give some good "hunches." If the carpenter wants to make a credible showing at lathing, he will have to do like the lather in one respect, at least, and that is, "go like the devil is after you." No matter how wise he is, it is nothing but steady knocking that gets the slats on the wall.

First, clean out all the rubbish and see that all corners, base blocks, etc., are in place.

A good scaffold comes next. Two long trestles and a cleat nailed on the partition makes three supports for your eight or ten 2-by-10 planks. Arrange them so that the planks run the long way of the house, then they can be shoved thru partitions across cleat and trestles moved into next room without taking planks down.

Do all your ceilings and tops of walls from scaffold before doing any of the lower walls. In lathing tops of walls begin low enough so that you can reach up from bottom to that point. Don't begin at the top and lath down. "There's a reason."

Most lathers start at the right-hand side of room. I have always found it easier to place lath against those already on at the right than the opposite way, and you come out with your short piece (if any) at the left which is an advantage in filling in later.

Always space off your wall or ceiling and note how you come out, with even lath, half lath, one-third, two-thirds.

If you come out with even lath on ceiling, start at right side and run clear along right-hand wall, or from floor as high as you can reach if on wall. You now have a run clear across room without a break. If your plaster specifications say not more than eight lath without breaking joints, then count off eight and cut out four. Why four? Because you have to put some extra work chopping out those lath and putting in the pieces at the other end. So being in a hurry and naturally lazy anyhow, you slight the break that has the most work in it.

If it spaces out with a half lath, that means there is a wide 16-inch space at one side of the room and an 8-inch or less space at the other. In this case, instead of cutting out for a break we "set out" four, thus leaving a space at each end to fill in later, after all whole lath are on. By "setting out" we use pieces that may be made some other place, but as the "set out" course takes one more piece to reach across the room than the "half lath" course or break, we usually slight it, using four lath.

If the room spaces out with one-third lath we start in the corner with a full break, then set a full break, leaving—after all whole lath are on—holes at each end to be filled with pieces.

If the space comes out with two-thirds lath, by which we mean a space bigger than 2 feet, the best practice is to chop out even breaks; i.e., run on clear across room, then leave eight and cut eight, leaving the pieces to be used somewhere else if it looks like the job would use them. Perhaps they can be used on the walls from the same scaffold where they are made. If you are afraid that you will have pieces left and do not object to some extra work, you can figure to use all the pieces on this ceiling by putting on sixteen, then setting out eight, then chopping the second break and putting on the pieces behind the ones you have set out.

So much for breaking joints. It may be hard to separate my idea from the foregoing stuff, but what I mean is this: Make as few pieces of lath reach across the room as possible; if one break has more pieces in it than the next, make it shorter, use less lath in that break.

(Continued to page 116.)



BUILT-IN furniture is becoming more and more the fashion. There is an opportunity for you in this circumstance—an opportunity to share in the profits that have hitherto been going elsewhere.

1866 CURTIS WOODWORK

"The Permanent Furniture For Your Home"

THE CURTIS COMPANIES, SERVICE BUREAU, 1636-1736 S. Second St., Clinton, Iowa

Manufacturing and Distributing Plants at Clinton, Iowa; Wausau, Wis.; Minneapolis; Lincoln, Neb.; Sioux City, Iowa; Oklahoma City; Chicago; Detroit; Topeka, Kan.

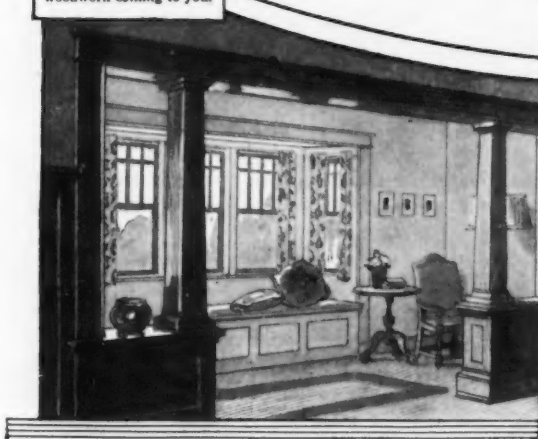
The Makers of **CURTIS** Woodwork Guarantee Complete Satisfaction to Its Users.

"We're Not Satisfied Unless You Are."

Why Not Build *Furnished* Houses?

You can put **CURTIS** Woodwork in place with a minimum of time and labor. Everything possible has been done to make the installation easy and inexpensive to you. Curtis Built-in Sideboards, Kitchen Cupboards, etc., are made from the same material as the other room finish, and shipped to you unfinished so that exact color matching is certain. The pride that Curtis cabinet-makers take in their work insures the same high quality that you find in all **CURTIS** Woodwork, a quality that means much to your contracting business. Let us put you in touch with a Curtis dealer. Address

If you haven't examined a Curtis Lock-mitred Colonnade you have a treat in woodwork coming to you.



Doors
Windows
Window and
Door Frames
Storm Doors
and Windows
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and Windows
Stairways
Newels
Bookcases
Mantels
Window Seats
Wall Panels
Ceiling Beams
Mouldings
Porch Columns
Porch Rail
Porch Balusters
Everything in
Woodwork

There's little in this room that didn't mean profit to a Curtis dealer and contractor.





The Guarantee Formula printed on every can of DEVOE Marble Floor Finish, DEVOE Pale Interior and DEVOE Vernisite is your assurance that these varnishes are free from all adulterants.

Fossil Gum

is a sap that oozed out of certain trees thousands of years ago and has since been buried in the soil, gradually maturing and fossilizing. Ages of seasoning under ground have given it a wearing quality not possessed by new gums. Therefore, it will not scratch white as will rosin, its common substitute.

Pure Linseed Oil

gives to DEVOE Varnishes a durability no other oil can equal. China wood oil used in many varnishes as a substitute for linseed oil, produces a varnish that will not wear as long as a linseed oil varnish.

Pure Manganese Dryer

is used in DEVOE Varnishes because it dries from the bottom out to the surface. Varnishes made with cheaper dryers, dry from the surface in. They appear to be dry when they are still moist beneath the surface.

Pure Turpentine

Years of experience have proven turpentine to be unequalled as a varnish thinner. In many varnishes benzine is used as a thinner. But benzine is highly combustible and its only advantage is to cheapen the cost to the manufacturer. There is no benzine in any DEVOE factory.

AND NOTHING ELSE

is the most important line in the DEVOE Varnish Formula Guarantee. This statement is our assurance to architects, decorators, dealers and property owners that no benzine, rosin, naphtha, lime, hardening powders or any other adulterants are used in these DEVOE Varnishes.

DEVOE

The oldest manufacturing concern in the United States. Founded in New York in 1754.

F. W. DEVOE & C. T. RAYNOLDS CO.
New York

DEVOE & RAYNOLDS CO.
Chicago

Fast Lathing

(Continued from page 114.)

In breaking joints you will have holes to fill in. Try to make these come at the left side or next to openings as much as possible. You will find it easier to handle the short pieces in that way.

Some good lathers use a saw for cutting, usually managing to cut a full bundle of lath at once. Then they bundle the short pieces and place them near where they will be needed. Most lathers will grin when this is suggested, but it is the best way for our hyphenated carpenter-lather.

Use all pieces as soon as possible, but do not cut whole lath for "piecing in" on the walls below scaffold or "bottom," until all whole lath are on, as you may find a wall that will "make" pieces.

Take nails from the mouth head first on ceilings and back-handed nailing on walls and point first where the regular stroke is used in driving. This may sound funny, but if followed will help to prevent bruised fingers.

All good lathers take two nails at once from the mouth while hanging lath, and most any number while nailing ends; five or six is not unusual—three or four the rule. My advice to the cub would be to take two nails while hanging lath and drive them just as quickly as possible, cultivating the fingers to space the lath automatically. Here is where most slow lathers spend a great deal of time fooling around too long, sliding the lath around here and there trying to get it spaced. Try to put it in the right place the first time and hold it with the hatchet while you get the nails, then hold it with the back of the left hand while you start and drive the nail. Don't get into the habit of hitting the nail too many times; one tap to start it and a good wallop to finish it—that's all. But in the nailing ends, I believe that one nail at a time is best for a beginner. This will give him more practice handling nails in his mouth and make him quicker with his fingers; later he can take more.

Your lath must always be where you can get them easily. You don't want to make a step after them as I have seen some do. Not long ago I saw a fellow trying to lath on a wall. He had his lath lying on the floor behind him and would nail one on and turn around after another.

The proper way to start on the wall is to lay down a bundle of lath about a foot from the wall, kneel down in front of it, chop the strings and start at the bottom. Drive nails with the back-hand stroke until about 2 feet from the floor, then shove your bundle closer to the wall, get closer yourself, hunch down until you are in a proper position for the regular ordinary lick with the hammer. Put as many as you can on from this position, then get on your feet and stand your bundle up against those already on and keep climbing. One bundle reaches about as high as you do. Of course you either chop out or set out for the break the same as explained above.

Get your key even; it is better to put in a "dutchman" at the break occasionally than to have wide cracks or two or more lath jammed together in an endeavor to bring them out even.

If you run across a bunch of crooked lath, put them all on the same way; they will space as evenly as straight ones.

Pick out straight grained lath for your "dutchman" and it will be no trouble to patch those aggravating little holes where the breaks come out unevenly.

Ends should be bent so they space the same as the middles. If they are crooked, this can be done at the time of driving the nail or after it is driven with a raking blow of the hatchet.

There are many ways of holding lath while working on the ceiling. The usual one is to lean lath against the body. This is O. K. for a short man, but I never could get to liking it.

(Continued to page 118.)



We'll Get the Contracts and Turn Them Over to YOU!!

THE Art-Craft Roof offers an opportunity to contractors that is absolutely without parallel. Through direct, newspaper and magazine advertising and personal selling, we will uncover and develop prospective users of the Art-Craft Roof and give you the job of applying the material. This is not a "catch"—it is a sound, honest business proposition backed by a company with a flawless reputation of 26 years. We want a responsible contractor in every town to become thoroughly acquainted with the qualities of Art-Craft Roof and to co-operate with us and the local dealer in marketing and applying Art-Craft.

Art-Craft Roof

Nails Right Over Old Roof or Direct to Boards

The Art-Craft is the only roof that nails right over the old roof or direct to the roof boards on new buildings. Just stop and think how many homes there are in your town needing new roofs. That will give you an idea of the prospects this proposition holds for you.

This Material is Guaranteed

Art-Craft is a guaranteed material. It *must* give satisfaction. It can't leak or rip off. It costs only half as much as a shingle roof and is many times better.

Don't delay in sending the coupon for big samples and complete information about Art-Craft Roof and our plan for putting contracts into your hands. This proposition is sound and honest and will bear the fullest investigation. Send the coupon today—now! Your profit is sure (and liberal).

The RECKITT CORPORATION
76th and Ashland Avenue CHICAGO

Three Handsome Patterns—Red, Green and Silver-Gray

Art-Craft comes in three beautiful, artistic patterns. Patterns are non-fading—weathering only mellows their beauty. Art-Craft will improve the looks of any home, whether it be a mansion or a humble cottage.

No Stock to Carry—You are Supplied by the Dealer

You don't have to make any investment in Art-Craft. You merely co-operate with our local distributor and get the material for each job from him,

THE RECKITT CORPORATION,
Dept. T-1, Chicago

Coupon

Send me samples and complete information about Art-Craft Roof and Art-Craft Plan for giving me contracts.

NAME

ADDRESS

BOGALUSA BOGALUSA

"BOGALUSA" is the name *BY WHICH TO BUY* the BEST LONG-LEAF PINE THAT GROWS. (There's a difference.)

BOGALUSA is the name of the city where the best long-leaf pine that grows is cut into every size from great bridge timbers to little laths.

BOGALUSA, in lumber, is more than a name—it is a symbol of superiority and responsibility.

FOR ALL STRUCTURAL USES SPECIFY "BOGALUSA"—that is your guaranty.

And if you don't find "BOGALUSA" stamped on EVERY PIECE or bundle you'll refuse it as "not per order."

WRITE US. (*Cutting 1,000,000 feet a day still leaves us time to take an interest in YOU.*)

There's a *value* for you in the *Bogalusa Book*. (Free.) It's full of valuable pine statistics.

GREAT SOUTHERN Lumber Co., Dept. A, Bogalusa, La.

BOGALUSA BOGALUSA

Fast Lathing

(Continued from page 116.)

One fellow who had lathed his way around the world, tho he wasn't very swift, had a peculiar way and much faster than one would think. He laid them down on the scaffold and picked them up with the corner of his hatchet blade (which, by the way, had to be ground square and thin).

Some use a barrel or nail keg to stand them in, but the best stunt I have found is a carrier made of wire. Copper trolley wire or spring steel wire about $\frac{1}{4}$ inch is the best to use.

Make this to fit the body just above the hip bones. The main loop around the body must fit nicely and sit nearly level. The ends are bent down and out and fit against the front of the pelvis, then the hooks drop straight down and curve to the front and up, making a bend large enough to carry fifty lath. If this is made right it will be perfectly comfortable and a great help on the ceiling.

O. P. PIERCE.



Wants Better Hand Tool Grinders

To the Editor:

Fleischmanns, N. Y.

As a carpenter and a great admirer of your paper, I want to ask why some of the makers of hand tool grinders do not make one of real merit, for instance, one with $1\frac{1}{4}$ by 8-inch grinding wheel with a speed of 30 turns of the grinding to one turn of the handle would give one the service of a tool grinder. I have owned four, but all have the same fault—lack of speed, and the grinding wheel is so small that it hollow grinds the tool more than it should.

Please ask some of the brother carpenters what their experience is with tool grinders. It is the greatest tool for a carpenter that ever was invented, if properly developed.

D. ROWLAND SANFORD.



Fiberlic Wall Board

The **material** from which it is made, the fact that the pulp is **chemically cleansed** and that the **fiber lengths** give the finished product that **natural reinforcement** that is lacking in ground wood boards, is in itself a guarantee of superiority of FIBERLIC for strong, permanent, economical and sanitary construction.

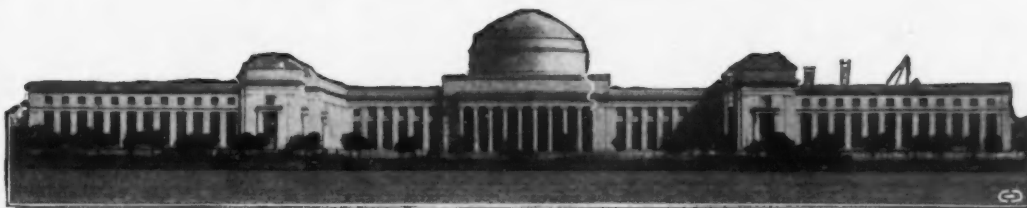
MacAndrews & Forbes Company

200 Fifth Avenue

Factory: Camden, N. J.

New York City

"BEAUTIFUL BIRCH FOR BEAUTIFUL WOODWORK"



The Correct Choice

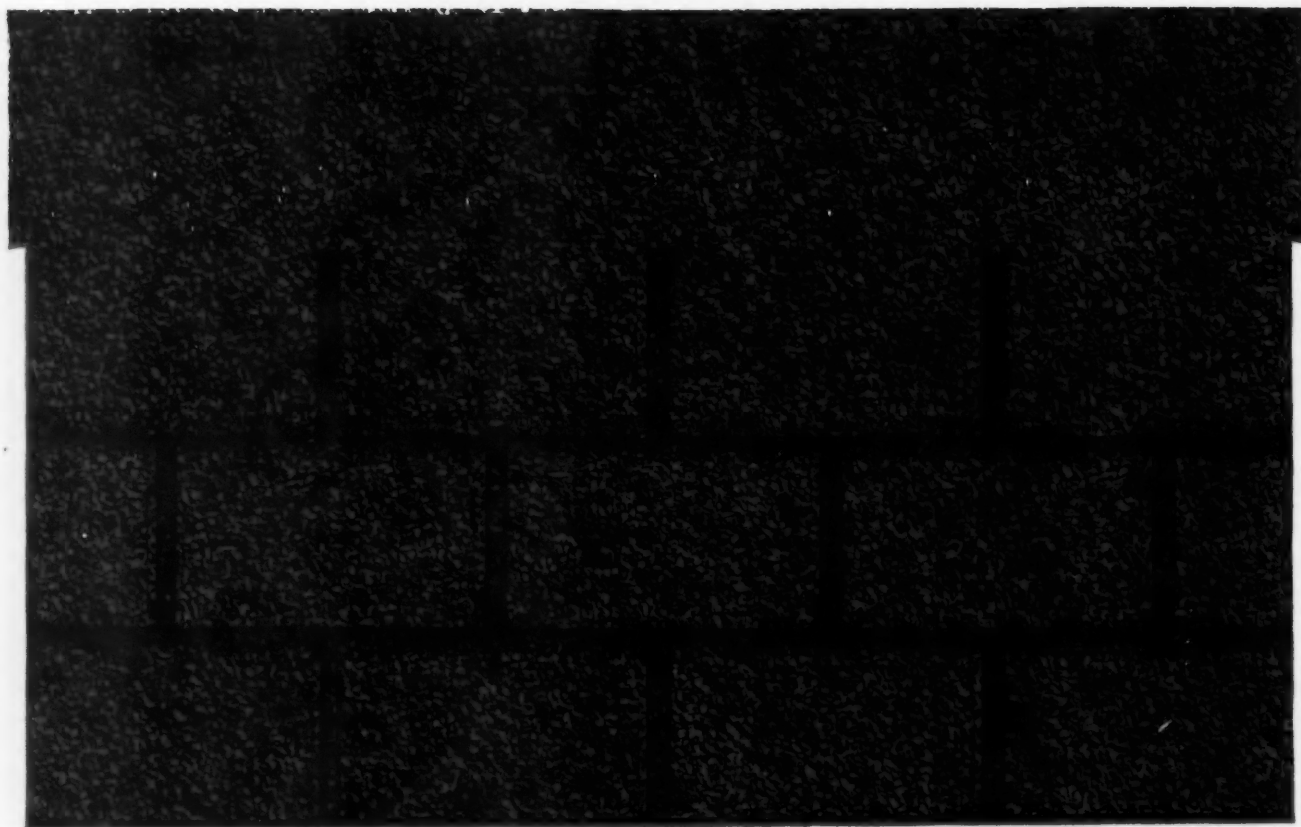
In the Massachusetts Institute of Technology Buildings (Wm. Welles Bosworth, Architect), "Beautiful **birch**" was very naturally chosen for practically all the trim and doors. This is but one, though a conspicuous example.

Due no doubt to the present happy tendency to decrease the use of imitation materials, this **birch** was stained a rich brown—not, as is too often the case—"mahoganized."

birch is one of the world's fine cabinet woods in its own right. It takes practically all stains beautifully.

*May we send you sample
panels variously finished?*

The NORTHERN HEMLOCK and HARDWOOD MFR'S ASSN.
201 F. R. A. BUILDING OSHKOSH, WISCONSIN



Why FLEX-A-TILES

Lower Building Costs

FLEX-A-TILE Slab Shingles save on the job itself. **Over 50 per cent in labor cost alone**—because you lay a FLEX-A-TILE Slab of four shingles in practically the same time as one individual shingle. No chalk lining. You save **38 per cent on nails**—5 nails do the work of 8. And save **35 per cent on freight**—because the Diamond Point Slabs (owing to their shape) weigh 165 lbs. per square as against 220 lbs. for the same protection with individual shingles. Can be laid over old shingles as well as on new work.

A Prettier Job That Lasts

FLEX-A-TILES come in rich red or deep green fadeless colors—due to the natural stone surfacing—and three styles—Diamond Point, Square End and Reversible. The variety of pleasing patterns inexpensively obtained satisfies every taste. And there are no complaints from customers afterwards—no costly “come-backs” from short-lived roofing. FLEX-A-TILES endure.

More Contracts Follow

Your first FLEX-A-TILE roof is only the beginning of an ever-increasing FLEX-A-TILE business, with a solid profit on every job. They build your reputation—advertise for you from your customers' house tops.

Other Heppes-Nelson Products Are

FLEX-A-TILE Roll Roofing

FLEX-A-TILE Roll Shingles

No-Tar Asphalt Paint

FLEX-A-TILE



Increase Builders' Profits

Immediate Service Immediate service is a fact and not a promise where FLEX-A-TILES are concerned. With the three great factories of the new HEPPE-SNELSON Roofing Co., strategically located in the great centers of demand, contractors or dealers can rely on speedy deliveries in any part of the country. The confidence in bidding and stocking given by this service—the actual saving in **dollars and working days**—mean much to the man who applies or sells roofing.

Show Sample Shingles This is the time to go after roofing jobs with energy—and the best roofing proposition you can submit. Show prospects sample FLEX-A-TILE Shingles and views of FLEX-A-TILE roofs. Write us today for these and other helps to FLEX-A-TILE sales.

DEALERS

If your section has no local FLEX-A-TILE dealer, this is your invitation to learn our attractive dealers' offer. Full page and double page advertisements constantly appearing in all the leading building trade papers are helping the dealer to sell **more FLEX-A-TILE products**. Write today for sample FLEX-A-TILE Shingles, prices and full proposition.

BUY NOW SO YOU CAN SUPPLY YOUR SPRING TRADE

The Heppes-Nelson Roofing Co.

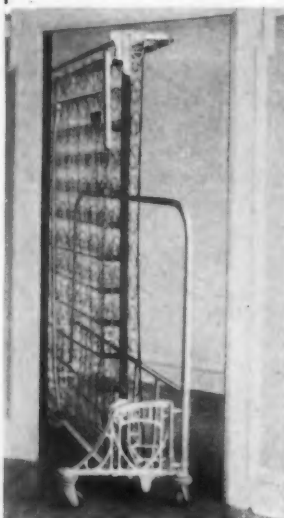
Dept. D-1010, Kilbourne Ave.
CHICAGO, ILL.

Factories: Chicago, Minneapolis
and in New Jersey.

414 Marshall St. N. E.
MINNEAPOLIS, MINN.

Asphalt Slab Shingles

**DISAPPEARING BEDS
INTO YOUR CLOSET
THRU AN
ORDINARY DOOR**

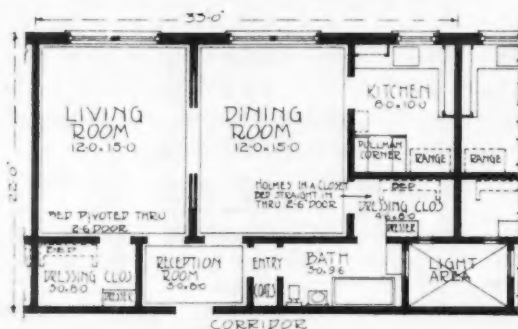


**HOLMES
IN-A-
CLOSET
BED**

Comfortable
Double-Room-Service
for the
**BUNGALOW
RESIDENCE
APARTMENT
FLAT**

Roll the bed where you like—over to the window—to air and sun—into the cool spot in summer—or out on the porch—without effort. Will fit your space—without re-arrangement of your plans—or—special building construction.

DOESN'T COST A LOT OF MONEY



SAVE A ROOM BY ASK-
ING FOR A BOOKLET

Holmes Disappearing Bed Co

Manufacturers of
Concealed, Disappearing, Recess and Wall Beds
175 West Jackson Boulevard
Chicago

-----MAIL THIS COUPON TODAY-----

HOLMES DISAPPEARING BED CO.
175 West Jackson Blvd., Chicago
Send me your booklet.

Name.....

Address.....

Good Bungalow Job

To the Editor:

Detroit, Mich.

I am sending you a small picture of a bungalow that I am building and part of my gang. Size of building 24x26 with



View During Construction of Bungalow Built by T. B. Hansen of Detroit, Michigan.

seven-foot porch, three bedrooms second floor, also bath room, three clothes closets. Linen cupboard and medicine cabinet. First floor reception hall, open stairway, dining room, living room, kitchen and pantry.

T. B. HANSEN,
Carpenter and Builder.



Put Up Eighteen Buildings Last Year

To the Editor:

Frederick, S. D.

I enclose one or two photos of new buildings I erected last year. I put up eighteen buildings of this kind, including four



Hog House Erected by E. H. Sheppard, Frederick, S. D.



Well-Built Barn Erected During Last Season by E. H. Sheppard.

houses, and had a good repair trade all thru the year.

I also sell wall paper, cupolas and did a good business in that line.

E. H. SHEPPARD,
General Contractor and Builder.

The Board of Education

People Educated to
Better Building Specify
Cornell Wood-Board for
Walls, Ceilings & Partitions
in

Homes
Stores
Offices
Schools
Churches
Theatres
Garages
Farm Buildings
Small Jobs
Repairs
Alterations

BY pointing out the advantages of this **better** wallboard, building contractors are landing new jobs, uncovering new business and increasing their profits.

The Cornell Panel Suggestion Service alone closes many contracts. More than 90 per cent of the Panel Suggestions result in contracts for the contractors who submit them. These Panel Suggestions, with Cost Estimates, are drawn up free on receipt of dimension sketches or blueprints.

Cornell-Wood-Board is a real modernizer of old homes. It is far superior to ordinary wallboard. A remarkable resistant of fire and moisture. Makes buildings warm in winter, cool in summer. Decorates perfectly. Nails right over old walls or direct to studding.

Comes in boards 3-16 inch thick, 32 inches and 48 inches wide, standard lengths.

Write for sample and complete information illustrating uses. In writing mention American Builder.

Cornell Wood Products Co.

C. O. FRISBIE, President

Dept. T-3, 173-175 W. Jackson Blvd., Chicago

Cornell Wood-Board

COUPON

Cornell Wood Products Co., Dept. T-3, Chicago

Please send me sample and complete information about Cornell-Wood-Board—or—send Panel Suggestions as per dimensions enclosed. I am not obligated by this service.

Name _____

Address _____

Case for Fruit Storage

To the Editor: Bucyrus, Ohio.

For years the writer has been a subscriber to your magazine, and in all these years I have never seen anything on fruit cupboards, that is, a cupboard for storing fruits in cellars and like places.

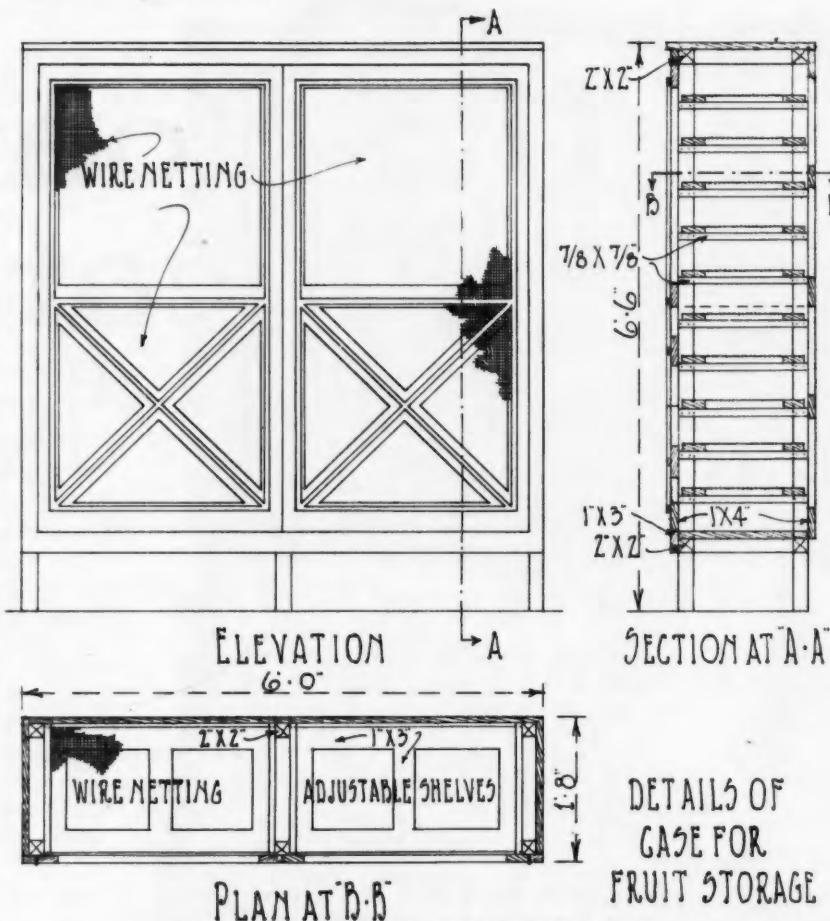
If you will publish a design of such a cupboard in your magazine I will appreciate it.

C. EICHMAN.

Answer—In the accompanying detail drawing is shown the principal features of a popular type of case for fruit storage. It is built up on a strong frame of 2-inch by 2-inch lumber with solid top, bottom and sides and ventilated front, back and shelves. The vertical 2-inch by 2-inch members are carried down below the bottom of the case to form supports which will hold the body of the case up from the floor.

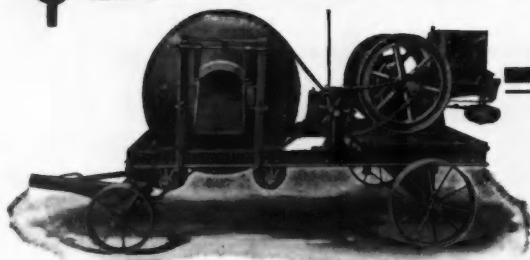
Shelves are made of 1-inch by 3-inch stock in the form of frames, over which wire netting is stretched tightly. These shelves are supported by $\frac{7}{8}$ -inch spare strips nailed to the framework. The height between shelves may be regulated to permit the storage of fruit in jars of different sizes. The case is divided in the center by the two vertical frame members, but no partition is built between the parts. The division serves to make the shelves more easy to handle and pro-

(Continued to page 126.)



Details of Large Capacity Case for Fruit Storage.

\$197.00 is our price until May 1st



We cannot guarantee to sell our big 5-foot mixer for this price after May 1st, 1917.

If you are anticipating heavy work this summer—if you are in the market for reliable mixing equipment, you cannot afford to overlook this exceptional bargain. This is a high grade mixer. Fine steel drum construction; thorough mix by three distinct, constant mixing operations which are independent and opposed to each other; discharges directly into barrows or forms; uses less fuel; has bigger capacity; requires minimum of attention. If you are familiar with the Interstate Mixer, your business sense will tell you "Here is a good buy." If you are not familiar with the Interstate machine let us send you complete specifications.

Let us tell you more. Write for our interesting book entitled "The Mixer Where the Dollar Does Its Duty"

Interstate Equipment Co., 1745 Ernsperger St., South Bend, Ind.

THE amount of Building Construction planned this season is enormous. Will you plan *now* to get your share of the Big Profits to be made? Will you let us show you how you can secure larger profits with **WONDER** Equipment than with any other?

WONDER MIXERS WONDER HOISTS

Because they embody advanced, proved, principles of construction — because of high quality at moderate price, low upkeep, dependability, long life—all the qualities that insure profit where you figure profit — these machines are your logical choice when you understand.

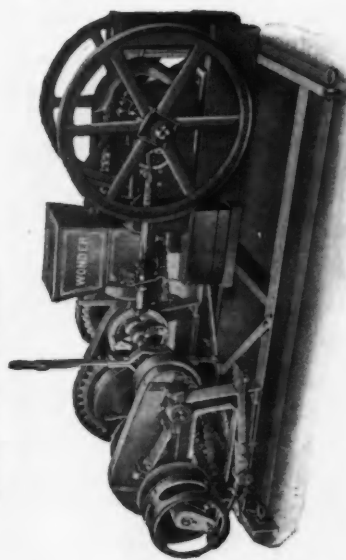
Wonder Reversible Builders' Hoist

Has reversible elevator sheave. Specially adapted for single or double material elevators. Rugged, simple, easily portable, and peculiarly suited for uneven loads, high speeds and rough usage. Drum and sheave operate together or independently in both directions. Winch head runs independent of drum or sheave. Interchangeable sprockets give two line speeds and load capacities. One lever control, 5, 7 or 9 H.P. Wonder Gas Engine. We build also, Single and Double Drum Non-Reversible Hoists with special features you should know about.

ASK THE PRICE



Waterloo Cement Mach'y Corp'n
103 Vinton Street
Waterloo, Iowa



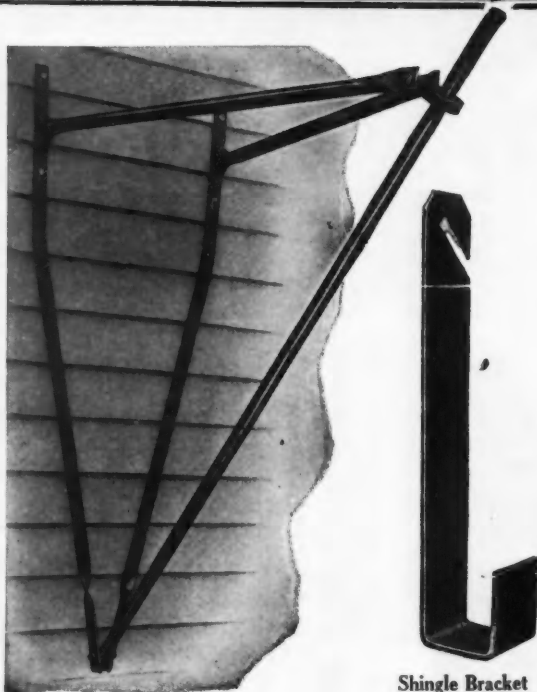
Here's "The Mixer that Makes the Money" For Builders

with or without Folding Track Loader. The mixer with the right capacity, high speed and perfect mix — with widest range of utility—the mixer of small upkeep and economical operation—the mixer of greatest earning capacity per dollar of investment — the mixer that is *standardized* upon by many of the largest contractors after years of test of all makes, and indorsed by thousands of individual contractors because of these superiorities—this is the mixer you should have if you want to make the most of the Big Business Opportunity that is presented this year.

Ask us to SHOW YOU—QUICK
There's no time to lose



RELIABLE- FOLDING SCAFFOLDS



Pat. Oct. 4, 1910

Shingle Bracket
Pat. Applied for

Just Drive in 4 Nails
and your bracket is up ready
for business. Think of the
time saved. No boring of
holes, placing of bolts or boards
to remove. No need to spend
your valuable time sawing lumber
for scaffolding. Four 16-d nails
do the job in a few seconds. When
the brackets are removed nails are
driven in flush with the siding
leaving no trace of your work.
Made in two sizes, 36" and 48" ex-
tension. When not in use brackets
fold up compactly, occupying very
little space.

Malleable iron and steel construction.
Absolutely rigid. No side swing.
Note the roofing bracket at right.
A single nail holds it in place. Indis-
pensable for asbestos shingling.
If your dealer does not handle "Reliable" Scaffold
and Roofing Brackets, send us your order direct
and mention your dealer's name.

ELITE MFG. CO.
ASHLAND Dept. "B" **OHIO**

vides for the use of two doors in front. These doors are strongly braced to prevent sagging. In order to brace the entire case and allow for the use of stock widths of wire netting, there are strips carried across the back from one side to the other.

The storage capacity of this case is sufficient for a large family. Since it is well ventilated and reasonably proof against insects, there are a number of other uses which such a case may be put to, and its size is therefore probably not too large.

EDITOR.



Gambrel Framing on the Square

To the Editor:

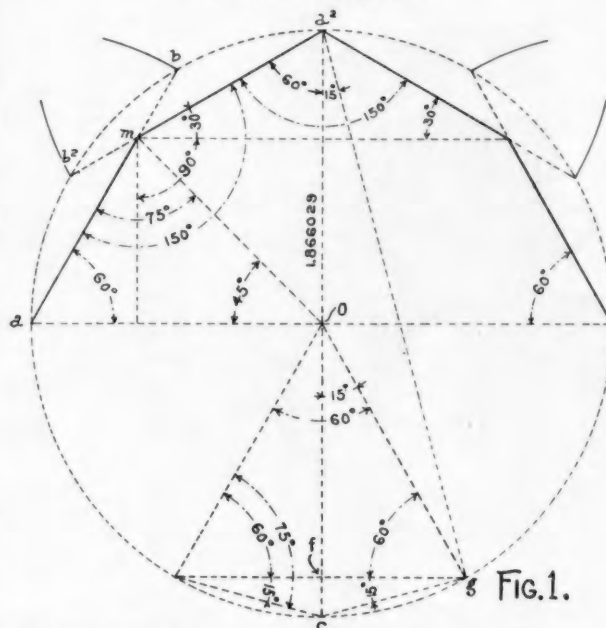
Ithaca, N. Y.

Mr. Woods, in the Steel Square Department of the current AMERICAN BUILDER, invites contributions relative to gambrel roof framing, which, by the way, he has already treated in a masterly way. Prompted by the incentive of his generous spirit so recognizing the talents of others, I take pleasure in submitting a few suggestions on the subject already stated.

In Fig. 1 is shown a few of the principles on which gambrel roof framing depend. The circle is divided by perpendicular axis into quadrants and by chords $a b$, $a^2 b^2$, etc., each equal to the radius (as O_a) of the circle, the outline of the roof is shown in position. The intersection of the chords $a b$ and $a^2 b^2$ positively determines the gambrel angle, which, when bisected, gives the gambrel joint.

Fig. 2 shows an accurate method laying out angles of 60 degrees and 30 degrees, with the steel square. First measure off on the edge of stock or straight edge, any given number of inches; in this case 24 inches (any convenient number will do) as shown at A B, Fig. 2. Then take one-half that number on the tongue, in this case 12 inches, place at A and pivot around until the blade coincides with the point B. In this position tongue gives 60 degrees and blade gives 30 degrees, absolutely correct; 60 degrees is the plumb cut of upper rafters and foot cut of lower ones, while 30 degrees gives the cuts to fit against the purlin. Return to 60 degree and 30 degree cuts; in 30 degree and 60 degree right-triangle, the shortest side is equal to one-half of the hypotenuse. The most accurate set of figures I know of is 7 and $12\frac{1}{2}$ for the base and perpendicular and 14 for the hypotenuse; as $7^2 + 12\frac{1}{2}^2 = 196.015 \sqrt{196.015} = 14.000535 +$

(Continued to page 128.)



Diagrams Illustrating Principles of Gambrel Roof Framing.

Kawneer

STORE FRONTS

The name Kawneer stands for copper store fronts, service and satisfaction

YOU want maximum value for your money when you select or recommend a store front construction for your client.

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The advantage of having a **RESILIENT GRIP** is evident if you stop and think how you would expect glass shipped to you. You would not be satisfied if this arrived with a couple of boards 'round it, would you? No, you would insist on having it protected by a *resilient* packing to absorb the shocks and vibrations.

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As for yourself, the embarrassment of having such a thing happen would discredit you in your client's eyes, especially when he had faith in your knowledge of store front construction.

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Before you decide on a store front construction, make sure that it is an all copper construction. Rust-proof processes and rigid grips have not proven satisfactory. Investigate the merits of our pure copper construction with resilient grip.

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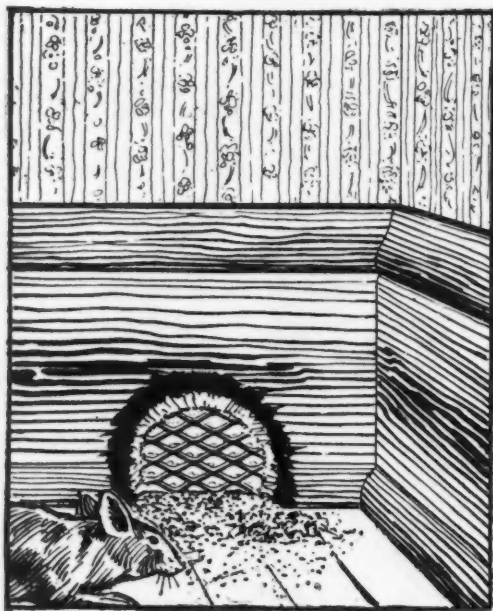
No matter where you are, we have a Branch or Representative near you, who at all times is willing to assist you in all matters pertaining to store front construction. Why not take advantage of this—our co-operative service.

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When you place interior plaster, or outside stucco or overcoating on a base of



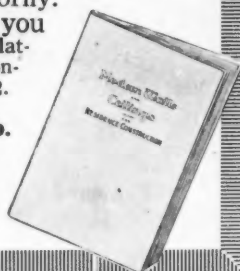
you are cutting out any risk that the work won't be of lasting satisfaction to the home owner.

Undoubtedly you have used "Kno-Burn"—you know that its mesh grips the plaster so tightly that the bond will never break—have found out that the line is so broad that it covers every demand you can make on it satisfactorily. If you haven't, let us send you "Modern Walls and Ceilings," our latest book on metal lath for house construction. Just ask for booklet 32.

NorthWestern Expanded Metal Co.

Manufacturers All Types
of Expanded Metal

903 Old Colony Bldg. Chicago, Ill.



Gambrel Framing

(Continued from page 126.)

which differs from 14 by a very small margin.

Now for the gambrel joint, Fig. 1, lower side, shows an equi-angular triangle whose sides each equal the radius of circle. It is bisected by diameter $a^2 c$, making a 30 degree-60 degree triangle $g f O$ measured by the chord $c g$, which is 30 degree; $a^2 g$ and we have a second triangle $g a^2 f$ measured by one-half of arc $c g = 15$ deg. Now, the complement of 15 deg. = 90 deg. - 15 deg = 75 deg. = one-half of gambrel joint. The hypotenuse of a 30 deg.-60 deg. triangle = twice the shortest side; the square of hypotenuse = 1 and the square of the shortest side is $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. Whence the

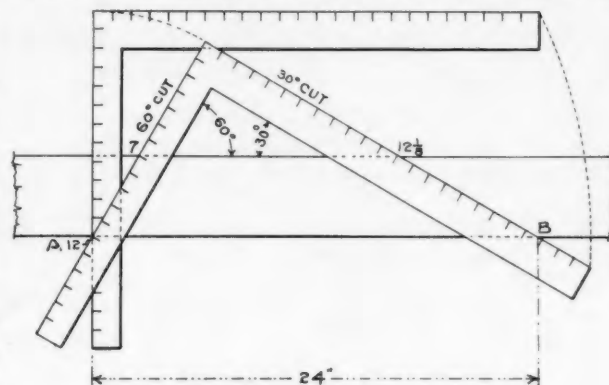


FIG. 2.

Showing an Accurate Method of Laying Out Angles of 60° and 30° With Steel Square.

square of the other side = $1 - \frac{1}{4} = \frac{3}{4}$, and the other side = $\sqrt{\frac{3}{4}} = .866029$. If we add this to the hypotenuse we have 1.866029, and this, divided by 5, gives the tangent of 75 degrees, $\frac{1.866029}{5} = \frac{18.66}{5} = \frac{18.8-12}{5}$ nearly. This gives the

gambrel cut. The run of the rafter is 5 feet $10\frac{8}{32}$ inches

and the length is twice this, or 11 feet $8\frac{17}{32}$ inches. Now, it does not require all this ceremony to lay out these rafters, or to determine their lengths. The same principles apply to bisecting angles of other degrees. Take the figures used by Mr. Woods, 7 and 12. He gets the figure 13.89 as a bridge measurement of 7 and 12 on the steel square and found by $\sqrt{(7 \times 7) + (12 \times 12)} = \sqrt{193} = 13.89$, which is length per 7-foot run on lower section of rafters and per 12 foot run on upper ones. I think there is a misprint in current AMERICAN BUILDER on this point. On the basis of 7 and 12, to find the gambrel joint, cut by applying the principle shown on the 60 degree and 30 degree, we have the hypotenuse regarded as $\frac{12}{12} + \frac{7}{12} = \frac{13}{12}$ 19

unity or $\times \frac{1 - 7/12 = 5/12}{5} =$ the cut. In this case,

the rafters 11 feet $7\frac{15}{32}$ inches long instead of 11 feet $8\frac{17}{32}$ inches. If the 5/12 cut be used, then the gambrel requires 17/7 cut.

With a little practice no diagram is needed and angles may be bisected with as much celerity as shooting clay pigeons, as the graphical method instead of the mathematical may be used.

This seems like stirring up a lot of dust, but I trust someone may find some helpful suggestions. Sometimes the pivoting of a steel square around a point may be found useful in determining some unknown quantity as illustrated in Fig. 2 and a tedious mathematical calculation obviated. When thus used as a compass it has the advantage of carrying the right angle with it and the consequent completion of the right triangle and the number that is impossible to represent is often avoided.

CHAS. GRAY.



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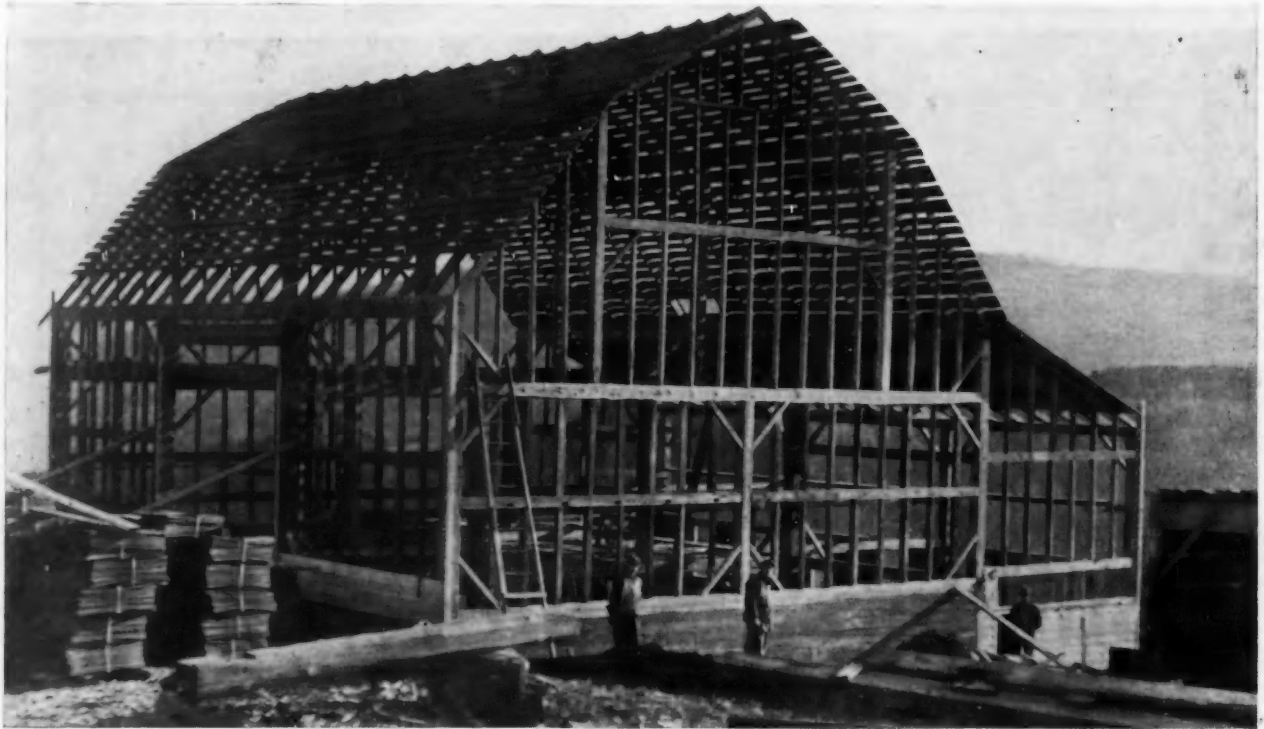
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Old Style Timber Frame Barn Erected by William Granby for Vernon Huse of Franklinton, N. Y.

Good Old Heavy Timber Job

To the Editor:

North Blenheim, N. Y.

I am sending you photo of a farm barn that I built for Vernon Huse, of Franklinton, N. Y., in the fall of 1916. This is an old-style timber frame. The timbers are hewn

with a broad axe, mortised and tenoned together, and fastened with wooden pins. It sits on an 8-foot concrete basement. The frame would have shown up better had the photo been taken from the other side, as the timbers go way to the ground there.

WM. GRANBY, Carpenter.



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WHENEVER linseed oil sells around \$1 per gallon or higher, the market is flooded with substitutes. Some of them are cleverly disguised. None of them have the binding and wearing qualities of pure linseed oil, and many are so flagrantly adulterated that they are positively dangerous to use.

The paint troubles common to adulterated oil are:

Non-drying, the surface remaining tacky and quickly gathering an unsightly coating of soot and dust;

Yellowing of white or light-tinted paints;

Early loss of gloss and chalking due to lack of the binding qualities of pure linseed oil.

The market price of a paint pigment or a paint oil has no effect on its durability. Whether pure linseed oil costs 50c per gallon or \$1.50, it is the only oil that will make a glossy, long-wearing, weather-proof surface.

At best you can save but a very small percentage of the total cost of a job of painting by using adulterated materials. Then why not use the best—the most reliable—and make your price cover the cost? You are acting in the interest of the owner or the buyer when you do this and few are unwilling to pay the difference when they understand what it means to them.

When you use Carter White Lead and pure linseed oil and **let the owner or buyer know that you use it**, you are giving him the best possible evidence of the quality of your work and furnishing a long time policy of insurance against decay and depreciation.

Other troubles than those due to adulterated oil are prescribed for in "The Carter Paint Calculator." This vest-pocket compendium of paint information will be sent free on request to any building or painting contractor. Especially useful to those specializing on remodeling and repainting.

Carter White Lead Co.
West Pullman Station "B"
Chicago, Ill.



Sketch of Porch as Arranged at Present.

To Enlarge a Glassed-in Porch

To the Editor:

Cresco, Iowa.

Enclosed find blueprint of a house that is in need of a front porch. The owner has no photograph of it, but I thought the print would be as good. I am only sending the front and side elevations and the floor plan, which I think is all that is necessary. The owner wants to enclose the terrace with a porch to be glassed in in winter and screened in summer.

The problem that gets me is to get a roof that will look right.

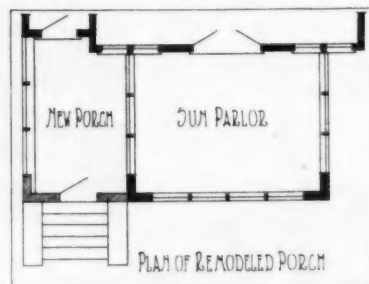
I like the porch in the January number and thought you could help me plan this as I am young at the business.

GUY A. DAWS.

Architect and Contractor.

Answer—The accompanying illustrations show perspective views of the porch before and after the terrace has been enclosed and the plan of the sun parlor and porch.

(Continued to page 134.)



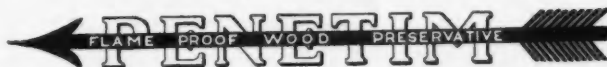
Floor Plan.



Sketch of Enlarged Porch as Suggested in Accompanying Remodeling Directions.

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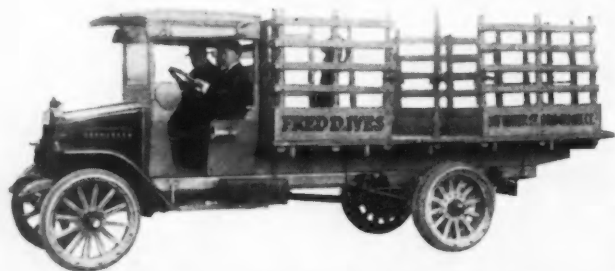
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The alteration of floor plan consists in carrying out the front wall of the sun parlor across to the extended side wall of house. A glazed door with fixed sash above is placed at the center of the new porch and three windows of the type used in the sun parlor are placed in the side wall of this porch. This consists simply in building up the walls of the terrace called for in original plans. Foundation, front steps and hand rails remain in the same position that they formerly occupied.

Perhaps the most important change will occur in the construction of the roof. The hip type roof is maintained, but because of the changed width of this portion of the house, it will be swung over past the center of the house. The new roof centers at a point about in line with the inner edge of the window divided by the wall between sun parlor and new porch. In order that correct appearance may be given this roof, a wider cornice is used than that which extends around in line with second floor joists. This necessitates placing a hip and valley out from the corner of the house above the front door.

EDITOR.



Advocates Cavity Brick Walls

To the Editor:

Fontanet, Ind.

In the recent issues there has been quite a bit about brick construction. I have often wondered why more was not said about brick houses.

We read about safety first, and read about danger and losses from fire, but still the inclination is to put up fire traps, for that is what I call frame houses. Of course, I understand the man who is wanting a home usually has to consider cost first, last and all the time, and often has no alternative but to build a frame house, because of the great difference in the cost of brick and frame houses. This difference is quite an item as a rule, for most building laws call for a 1 $\frac{3}{8}$ -inch wall, for even a one-story building; also, there is in some parts a prejudice against brick houses on account of dampness. Brick houses are damp sometimes, but it is not the fault of the bricks every time. A house can be built with bricks that will not be damp, and it does not need to be 1 $\frac{3}{8}$ -inch walls.

I have not seen hollow or cavity wall construction advocated very much, and this is, I suppose, because the building laws call for 13-inch walls. There is no reason or sense of fitness in this. A building can be put up with 2x4-inch studs, two or three stories high, and used for most any purpose. But if a brickmason wants to show his calling and build a cottage out of bricks, even if only one story, he must build 13-inch walls. The result is he usually has to be content to have a brick flue and enclose it with 2 by 4's and weather boards. I lay part of the blame for these conditions on the bricklayers for not advocating hollow wall construction more. Yet they could not boost it very much, for lots of them probably do not know what a cavity wall is.

Hollow wall construction, to be built properly, must have a space or cavity between the inner and outer walls, and these walls should not touch each other at any place from bottom to top. The walls should be tied together by galvanized metal ties every five courses. No. 9 galvanized wire cut into short lengths and hooked or bent on each end make good wall ties. Since they are round, the moisture from the outside wall will not travel very easily to the inside wall and thus cause a damp spot. This can be guarded against by keeping the inside a little higher than the outside, which will prevent the moisture from getting to the inside wall. Another important matter is to see that all mortar joints are cut clean, and so leaving no place for anything to lodge in the cavity that drops down.

(Continued to page 136.)



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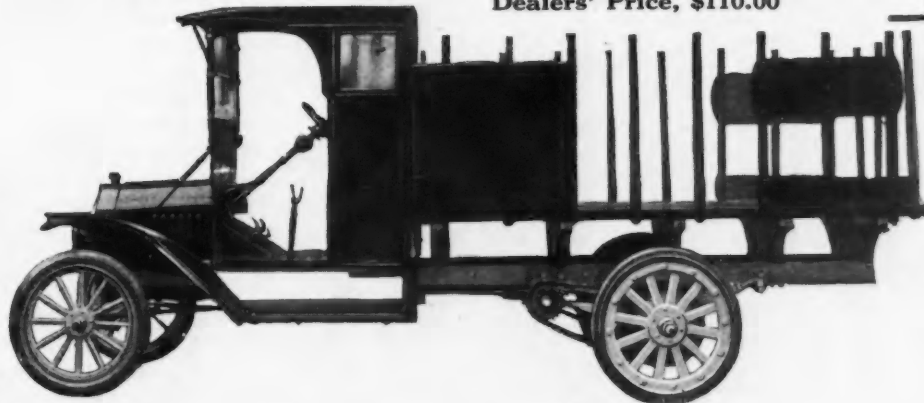
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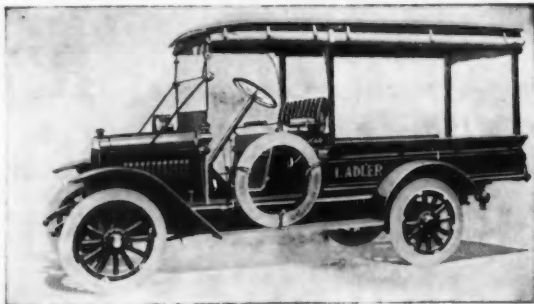
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For ordinary residence of one or even two stories, two four-inch walls with a two-inch cavity between will make a good substantial building, and can be plastered right on the bricks without any furring whatever; far superior to a brick veneer; outclasses ordinary frame buildings out of sight until there is no comparison; the cost is within reason, and there is no need to put headers in every fifth course, so that people would not think it was a veneer job (as C. S. Dow states), for you would know that it was a brick house and that would be sufficient.

My house is built with cavity walls. It is story-and-a-half and 32x36-foot floor plan. All the walls inside are 4-inch brick walls, and the only studdings used are to divide the rooms upstairs, as these do not come directly over the lower rooms.

I claim that if this method of construction was used we would have warmer houses, less danger from fire, and therefore less premiums to pay; and the cost is no more than a brick veneer, for face brick can be used outside and common bricks on the inside walls. A good frame house will generally last about an hour in a fire and all will be gone, while a brick house has always the bricks left at least. I would like to hear what others have to say on cavity walls. I say build one.

Yours truly,

W. H. H.



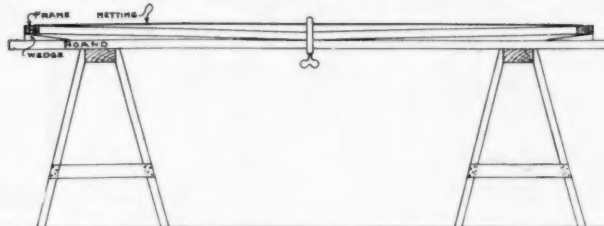
Another Screen Wire Stretcher

To the Editor:

Clinton, Conn.

In the issue of August, 1916, I noted in particular the method of J. E. Donaho, stretching wire netting on screen frames, which I should think would work very well. But most everybody has a method of their own, and the one I use, for simplicity, is about as good as anything, especially for those that do not make a specialty of screen work.

My method is to take a pair of common saw horses, set as far apart as needed for the work in hand. Then take two boards, about 1x6, or any width will answer, lay on the horses the width of frame to be screened, laying the screen frame on the boards. A clamp hand screw to fasten frame at the center on the 1x6 board is then needed. Take four wedges and drive them at the four corners of the frame until you get the proper tension for stretching the netting



Method Used by Alva H. Pierson to Stretch Wire Screen Cloth on Frames.

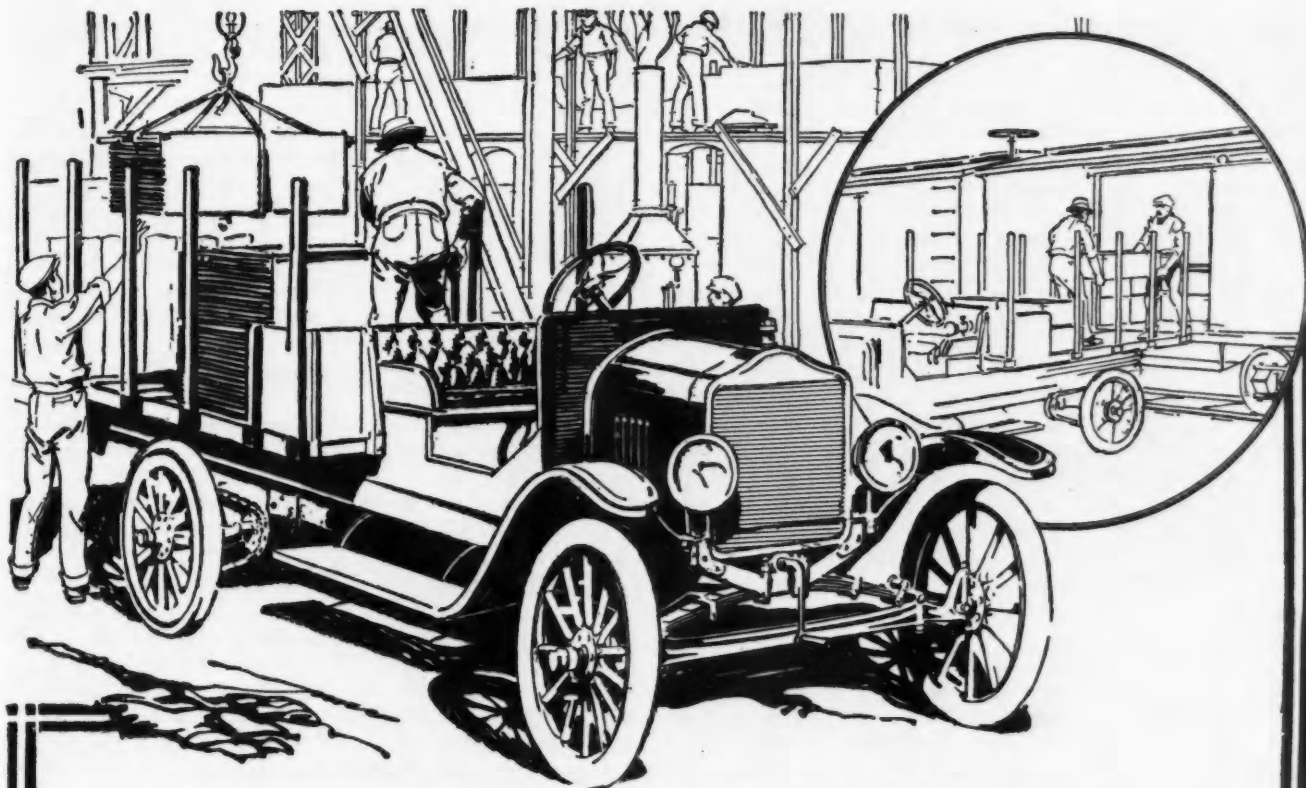
on the frames. Place the netting on the frame and nail each end to the frame and release the wedges and the frame will spring back on the board, and the netting is then stretched nicely.

If the frames are about square they can be turned at right angles and proceed nailing as before. When the wedges are driven, it hugs the frame to the board on the horses and that also presses the horses on the floor and makes them quite secure, besides getting the tension of frame to tighten the netting.

In this method, it will be readily seen, there is no special device whatever, and the writer has had very good results with same.

Hope this will be of some value to any Brother Chip and wish the AMERICAN BUILDER success that it justly merits.

ALVA H. PIERSON,
Builder and Joiner.



Does Work of 4 Teams

SMITH Form-a-Truck is displacing horses for hauling among Building Supply Houses all over the country. Daily hauling performance, under practically every condition, is giving these concerns 300% more efficiency than horses.

A Smith Form-a-Truck in your business right now would enable you to dispense with four of your costly teams—save extra drivers' wages or cover a far greater territory.

Sell your teams. Install Smith Form-a-Truck. Make an actual cash profit on the investment. **Save 74 Per Cent**

Lumber Companies and Supply Houses use Smith Form-a-Truck for hauling the same loads as heavier trucks costing several times the Smith Form-a-Truck price. It hauls those loads just as far—over the same roads—under the same conditions. And the saving is at least 2/3.

New Hauling Efficiency

Consider the amazing low ton-mile cost of Smith Form-a-Truck. Less than 8¢ per ton-mile. Consider the tremendous tire mileage—6,000 to 8,000 miles per set of tires. Now figure the vast saving in gasoline consumption—12 to 18 miles per gallon. And the unusual speed—12 to 15 miles per hour—enables quick getaways—quick deliveries—frequent returns for reloads—saving in extra drivers' wages.

This amazing maintenance economy cannot be even remotely approached with horses or more expensive trucks.

\$8 For Repairs

The lowest motor truck repair cost ever recorded. The first Smith Form-a-Truck made has already traveled 20,000 miles, carrying an average load of 2050 pounds. Yet its total repair cost was only \$8. Economy impossible with any other truck.

Amazing Power and Strength

"We put a platform on our trucks and load same up to 3500 pounds. We haul this load wherever we want to go. In unloading lumber from the car we attach a wagon to the rear axle and haul any length of lumber. In this way we have hauled 4 tons and over easily."

J. E. WIESS LUMBER COMPANY, Sioux City, Iowa.

Smith Form-a-Truck is a big, strong, fully guaranteed, one-ton truck, with tremendous power.

For These Cars

Nation wide demand has compelled us to make Smith Form-a-Truck attachment for Ford, Maxwell, Dodge Bros., Chevrolet, Buick and Overland power plants. You know the power, speed and efficiency of these wonderful cars.

We Solve Your Problems

Our transportation engineers will figure the solution of your hauling problems. Right now. Learn approximately what Smith-Form-a-Truck will save you.

SMITH MOTOR TRUCK CORPORATION

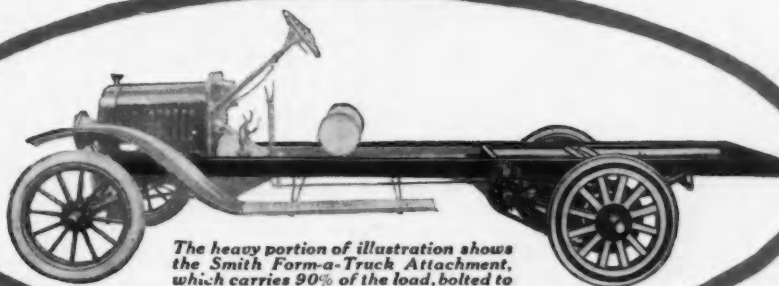
Manufacturers of Smith Form-a-Truck

Executive Offices and Salesroom: Suite 906 Smith Form-a-Truck Building
CHICAGO

**Smith
Form-a-Truck**

\$350

F. O. B. CHICAGO



The heavy portion of illustration shows the Smith Form-a-Truck Attachment, which carries 90% of the load, bolted to the power plant with a vise-like grip.

Good Pointers on Brick and Tile Work

To the Editor:

Kennedy, N. Y.

Am writing you a letter, altho I haven't been on your list very long; but will say that until recently there hasn't been the interest for me that has developed lately in your brick and tile articles.

I have been using brick and tile in construction for over ten years and am naturally interested in others' experiences, and like to compare my ways with theirs.

Am using brick and tile for heavy as well as light work and have had the best of success. In doing this I use what we call loaded tile. To make these tile, simply set on end on a board and pour full of good concrete.

Make your footings a little wider where these blocks start and build right in with the other wall up to receive bearing plate, making them first three, then two, then three, and so on up to plate.

For lighter irons start about four courses down and about four tile long, then three on the third course, finishing with one under the iron.

I like the brick and tile rather than the solid tile, as you get a continuous airspace from top to bottom, thus insuring a dry wall by using wall ties and making your caps in two sections.

In ordering tile I generally buy 8-12-12 and 8-5-12's with about 15 per cent halves; and if I am using them for outside work I first load enough for corners and jambs by setting on a board and filling up 2 or 3 inches with concrete. With these a mason can make almost any desired combination.

In laying tile I always lay them with the cells parallel to the wall, as I think the advantage gained in securing a good bed joint more than offsets all the rest and especially in backing up brick, as then your ties do some good.

In laying I only put on a cross joint where it will not be plastered, as I think it best to let the plaster go thru and

clinch where it is to be plastered.

In leveling up get as close as possible to the height with tile, then put a board along side of tile and just the right height and level with concrete. This will make the carpenter happy.

Inside for non-bearing partitions use 4-12-12 tile, making the caps for openings of concrete the same thickness and well reinforced. The openings should have rough wood jambs to plaster and case.

In making mortar use a power mixer if possible, for this is the place on the building where it is needed, especially if colored mortar is to be used. It will make a 50 per cent better mortar with the same material, and it will be evenly tempered and will stand twice as long on the boards without setting, which means a lot to the mason.

I have just completed a brick and tile school without having a joint freeze out, which is doing pretty well considering the winter we have had. I used a frost-proofing made by Mr. G. O. Sander, of Leroy, N. Y., which certainly gives good results.

PRESTON B. PARKS, Mason Contractor.

How Can He Finance His Jobs?

To the Editor:

West View, Ohio.

I would like to ask you to send me two or three good ways that a carpenter with limited means can get started into contracting, or how he can finance a job until he gets his money. I would like to build for myself and sell and build again and so on.

L. A. OSBORN.

Oh! For a No-Leak Casement

To the Editor:

Azusa, Cal.

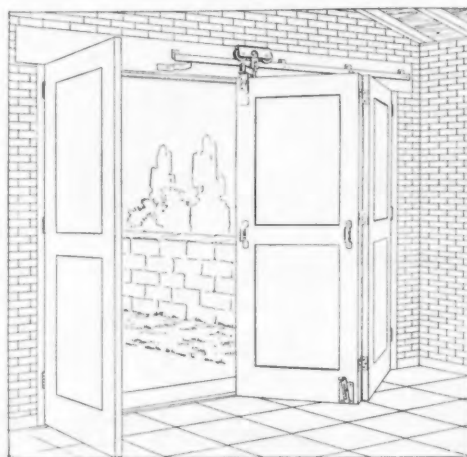
Will some kind brother give me his way of putting in casement windows, both single and double, so that they will not leak?

Yours for satisfactory work.

C. H. E.

The Sharon No. 23 Garage Set for New or Old Doors

Permanently prevents sagging; brings the sagged doors up into shape. Seals the doors into the casement and makes it weather-tight.

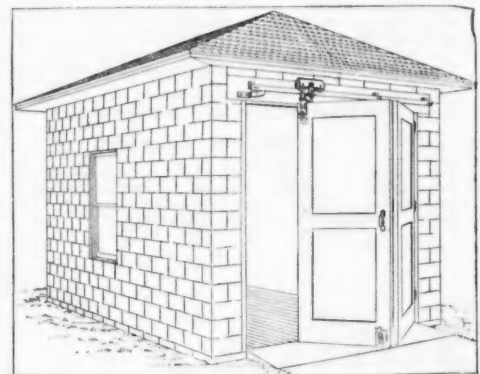


Patents Pending

Sliding doors leave cracks around the edges.

Hinged doors will sag and leave gaps.

The Sharon No. 23 holds up the far end of the door, takes the friction off the hinges and opens and closes the doors almost automatically. There isn't anything like it.



Patents Pending

Write us and we will tell you how to get a set to prove it

SHARON HARDWARE MFG CO., Sharon, Pa.



*from Office
to Lumberyard
---to the Job,*

Often times a long way around,
and you may have to travel the
same route many times a day.
You can make the trip quickly
and cheaply in the

New Case "40"--\$1190

Justly called the "100,000-Mile Car"

One generation after another has found in the name CASE a standard of good workmanship and efficient service. You who particularly need a *faithful* car will find in the CASE a wonder for your use---comfort, power, endurance, speed---in abundance.

When it comes to a long, *hard* pull, or to a *steep* climb, you will realize just how faithful this car is. And then after you have owned it a *long* time, and have driven it 100,000 miles, you will appreciate the CASE standards of construction.

Consider what you want a car for and what you want it to do. Then write in for our illustrated description, and see if the CASE does not fill the bill in every particular. We can tell you of other Contractors' experiences at the same time.



The Sign of
Mechanical
Excellence
the World Over

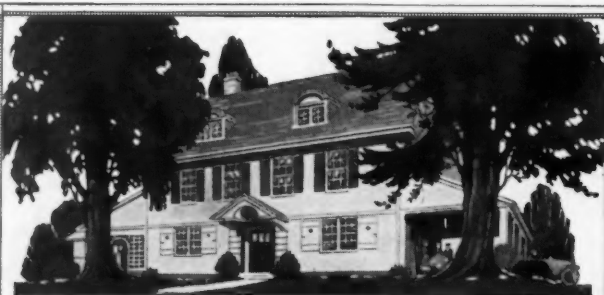
J. I. Case T. M. Company, Inc.

719 Liberty Street

Racine, Wisconsin



The Sign of
Mechanical
Excellence
the World Over



Why Every Modern Kitchen Should Have a KOHLER Sink

KOHLER Sinks have the same quality distinctions that make KOHLER Bath Tubs and Lavatories first choice for the well planned home.

The designs have the hygienic features that are characteristic of all

KOHLER WARE

always of one quality—the highest

KOHLER Sinks are made for right and left-hand corners, and for open wall spaces. They have right, left or double sloping drain-boards, and are made without aprons.

"It's in the Kohler Enamel"

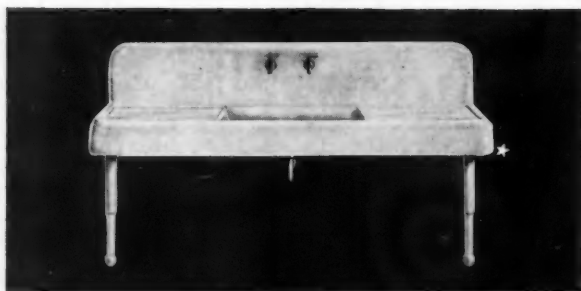
The whiteness of the enamel is notable in all KOHLER products, each of which has our permanent trade-mark—a guarantee of its high quality.

Owing to manufacturing economies the prices of KOHLER WARE are not excessive.

KOHLER CO., Founded 1873 **Kohler, Wis.**

Boston New York Philadelphia Atlanta Pittsburgh
Detroit Chicago Indianapolis St. Paul St. Louis
Houston San Francisco Los Angeles
Seattle London

★ The KOHLER permanent trade-mark in faint blue appears on end of sink shown by star.



K-1003-A



NEWS OF THE FIELD

Western Drawing and Manual Training Convention

The twenty-fourth annual convention and exhibit of the Western Drawing and Manual Training Association will be held at Lincoln, Nebr., in the high school building, May 2-5, 1917.



Hobbs Sold to Anchor

The Hobbs Concrete Machinery Company of Detroit, Mich., has been bought by the Anchor Concrete Stone Company of Rock Rapids, Iowa. The main office of the company will be located at Rock Rapids, Iowa, and the business will be continued under the old name. Chas. W. Bradley, of the Anchor Concrete Stone Company, will be in active charge, with office at Rock Rapids. Geo. M. Friel will be manager of the eastern territory, with office at 234 Hamilton Ave., Columbus, Ohio.



New Chain Belt Agency in East

The Hartford Contractors Supply Company of Hartford, Conn., has taken over the entire state of Connecticut and the western half of Massachusetts in the interests of The Chain Belt Company. This concern will carry a complete stock of mixers and repair parts at Hartford, and will maintain a large service department consisting of five expert mixer, gasoline engine and steam engine mechanics, who are equipped to go out on trouble calls on a moment's notice. A completely equipped machine shop and repair department devoted to complete overhauling of mixer equipment offers service of this kind to customers at a very reasonable rate.



Johns-Manville Moves Into New Quarters at Louisville

After March 15th the Louisville branch of the H. W. Johns-Manville Co. will be located at the corner of Fourth Avenue and Guthrie Street, Louisville, Ky., in the new building erected by the Speed Realty Co.

This building provides a frontage on Guthrie Street which is in the very center of the retail district of Louisville.

Mr. A. H. Voight will be in charge of this office and will have under him a corps of salesmen who in these new and large quarters will be able to give even bigger and better Johns-Manville service to the buying public of Louisville and surrounding country.



Changes in Atlas Engineering Company

The Atlas Engineering Company, one of the largest manufacturers of concrete mixers, has recently undergone a change in management. The company was purchased outright by H. W. Zimmermann and William I. Buhl. The new officers are: H. W. Zimmermann President; L. A. Clas, Vice-President, and William I. Buhl, Secretary and Treasurer.

The new owners will make some improvements and addi-

(Continued to page 142.)



To Light
Your House and
Barns

To Cook
Your Breakfasts
and Dinners

Union Carbide Gives Your Country Home This Two-in-One Service

CARBIDE LIGHTS are as brilliant as the cities' best—they shine from handsome bronze fixtures—they are commonly equipped to turn on without matches.

CARBIDE COOKING RANGES are just like city gas ranges—they furnish heat on tap—instantaneous—steady—uniform heat, without kindling, ashes or fuel to handle.

Fifty pounds of **UNION CARBIDE** will run a single **CARBIDE LIGHT AND FUEL PLANT** for weeks.

Without attention the plant will automatically "feed" the range in your kitchen, and as many lights as you care to install in your house and barns.

The beauty and convenience of the light will double the charm of your fireside hours—and the modern gas range will bring relief from kitchen drudgery to the woman who cooks your meals.

During the past fifteen years these **CARBIDE** Lighting and Cooking Plants have been tested, by country home folks, in competition with hundreds of different lighting plants invented during the same period.

While most of this army of lighting plants have lived a day and fallen by the wayside, the **CARBIDE** Plant alone has survived and gained steadily in popularity.

One and all, the hundreds of thousands of **CARBIDE** Plants now in use are practically indestructible—they last most a lifetime.

Instead of daily attention, the **CARBIDE** Plant needs monthly attention—instead of constant repair, it needs none at all—instead of a single service, it furnishes double service—two in one—twice the value for your money.

We would like to answer any question about the **CARBIDE** Plant you care to ask—we can send you too, if you wish, with our compliments, intensely interesting Booklets telling you why the light flame is the coolest of all—and the cooking flame the hottest—why the light is called artificial sunlight—how it grows plants the same as sunlight—why the **UNION CARBIDE** in one hundred-pound drums (always colored blue and gray) is as easy to store as coal—why it won't burn—why it can't explode—how we sell it direct at factory prices to most a million users and distribute it through two hundred warehouses scattered all over the United States.

Write us today for this wonder story, and ask us the hard question you have in your mind—just address

UNION CARBIDE SALES COMPANY

Dept. 28

42d Street Building, New York
Peoples Gas Building, Chicago
Kohl Building, San Francisco

(Continued from page 140.)

tions to the present line and have under consideration the erection of a new factory for the manufacture of contractors' equipment, which will be sold under the present trade name of "Atlas."

The Atlas mixer will be manufactured in 5-, 8-, 12- and 16-cubic foot capacity sizes, and the paver will be a 14-cubic foot machine.



Lining Up The Boys For Better Building

As part of the educational campaign for better buildings, which the National Lumber Manufacturers' Association is extending to manual training schools, Mr. R. S. Whiting, architectural engineer for the association, recently gave a lecture to 300 students of the Harrison Technical High School, Chicago, on "The Building Code and the Carpenter." Mr. Whiting, after emphasizing the importance of every carpenter and builder producing the best that is in him, and using only such material as is best suited to the service to which he is put—went at length into the value of a good building code to every citizen and builder, as being the basis upon which they should work out all problems of construction and at the same time establish and maintain a substantial standing in their community.

"The building code," he said, "is the evolution of constantly changing methods of construction in growing localities to secure the prevention of fire and the protection of life, health and morals by regulating the inspection, materials, construction, alteration, repair, height, area and location and use of buildings within the corporate limits of states, cities or towns. Codes may be classified in three groups:

"Large congested cities, smaller cities, rural districts outside corporate limits.

"The larger cities, such as Chicago, New York, Philadelphia.

Boston and St. Louis, cities of above 150,000 population have usually well compiled codes, but find it necessary to add to them from time to time to meet changing conditions. While many cities of this size and under are found to have but such building ordinances as have been enacted by force of circumstances or by some catastrophe or incident which aroused the people to see the necessity for them. These ordinances usually grow to a more complete code."

The students were then told of the extensive use of wood in all classes of buildings, and each classification was taken in order and in detail to give them a clear idea as to the value, importance and extent of wood in each. More time was given to a discussion of the frame building than any other, especially the frame dwelling, as in this type lies the greatest possibility for laxness of construction and the substitution of cheap material which make it unsafe if the material were not properly used as well as properly protected.

In conclusion Mr. Whiting stated the value of better buildings to every community, and also the still greater value to every community of better builders, and expressed the hope that all his listeners might be such.



Wheeling Corrugating Company Name Changed

The Whitaker-Glessner Company, Wheeling, W. Va., who for a number of years have owned all of the capital stock of the Wheeling Corrugating Company, have arranged to assume the liabilities and assets of that company.

Except as to the name, no change has been made, and the business of the Wheeling Corrugating Company will, on and after March 15, 1917, be conducted by the present organization under the name of Whitaker-Glessner Company, Wheeling Corrugating Department. The branch offices and warehouses will be continued as now located.



DELCO-LIGHT

ELECTRICITY FOR ANYONE - ANYWHERE

NO matter where the house is located, Delco-Light makes possible the comforts, conveniences and economies of electric light and power.

That is why home-builders everywhere are insisting that the house be wired for electricity when it is built.

Delco-Light is a complete plant for generating electric current. It has ample capacity to furnish light for house and barn and to provide power for pump, washing machine, churn, cream separator, electric fan, vacuum cleaner, etc. It is very economical and so simple that a child can operate it.

The price complete with batteries, except in Canada and far western points, is \$275

f. o. b. Dayton

Write for the Delco-Light book

The Domestic Engineering Company
Dayton, Ohio
Offices In All Principal Cities



DELCO-LIGHT

Every Country Home You Build Needs Electricity

HERE is a chance for carpenters and builders to cash in on the big, growing demand for electricity in rural districts. The up-to-date prosperous farmer is thoroughly sold on the idea of having city conveniences.

The Uni-Letric Lighting Outfit is fulfilling one of the greatest needs in the farm home today. It is furnishing the farmer, his wife and their family with thoroughly efficient electric current—current which can be used for lights as well as for operating electric irons, vacuum cleaners, electric fans and small motors for power purposes.

The Uni-Letric system is in reality a central service station in home size. It is a compact, complete unit and the first thing of its kind ever devised.

No Belts—No Batteries—No Complications

The Uni-Letric outfit generates standard 110 volt direct current, exactly the same as city central service stations. The outfit comprises a small high-speed, perfectly governed, four-cycle engine and a very efficient generator, direct connected.

The whole outfit is simple and very easy to understand and operate, requiring the very minimum of care and attention. The wiring is very easily done and, if our directions are carefully followed, it is not even necessary to get the assistance of an electrician.

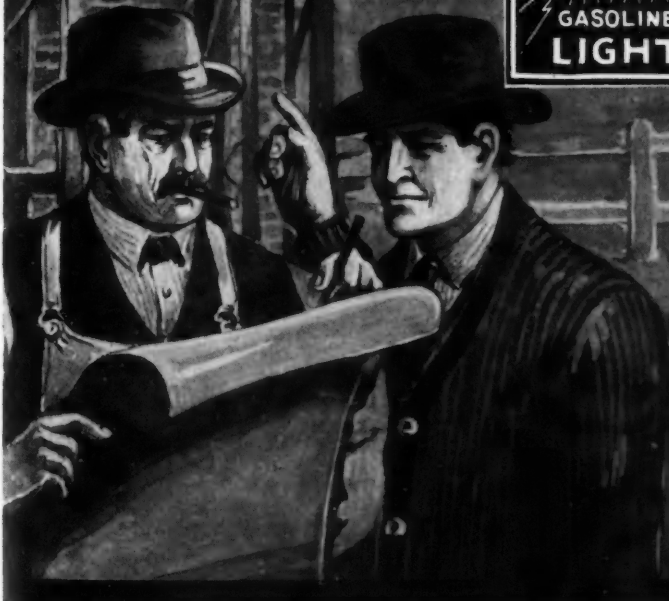
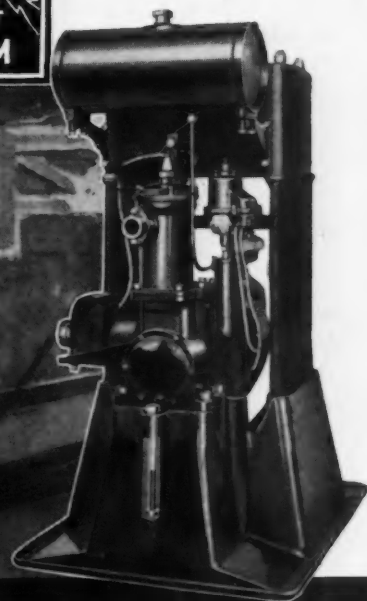
The Uni-Letric has unusual capacity for a home-size plant. It will operate all the way from one to fifty lights, and as previously stated can be used for other power and heating devices.

There is a splendid opportunity for contractors and builders to introduce Uni-Letric machines where they are building new country or farm homes. You will not only be pushing a device that is a boon to the farmer, but a device that has thoroughly demonstrated its efficiency and practicability in the hands of users.

For complete details of our special proposition to contractors and builders, write us at once, addressing

THE WATERMAN MOTOR COMPANY
152 Mt. Elliott Ave. Detroit, Michigan

Uni-Letric
GASOLINE-ELECTRIC UNIT
LIGHTING SYSTEM



Economical Power for Contractors

For running mixers—pumping water—hoisting material—or for ANY work requiring power, the "NEW-WAY" Engine will prove a big money maker.

It has every feature essential to this kind of work. The material and workmanship are such that we GUARANTEE the "NEW-WAY" for the ENTIRE LIFE of the engine.

It will pay you to look into this feature of GUARANTEED POWER which is your assurance of a maximum service at the lowest possible cost consistent with the quality offered.

THE "New-Way" ENGINE

"GOES AND GOES RIGHT"

Buy the engine that delivers steady power all the time.

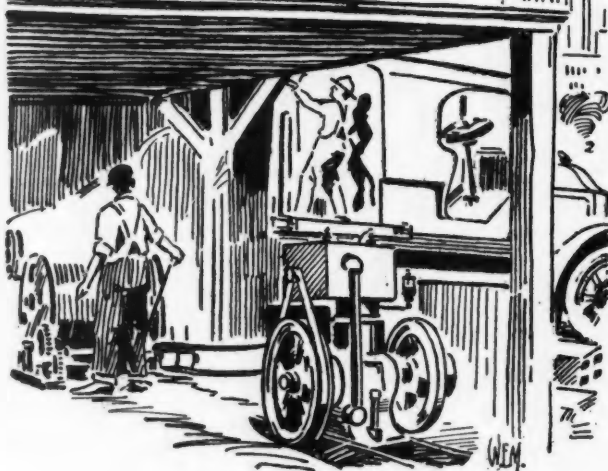
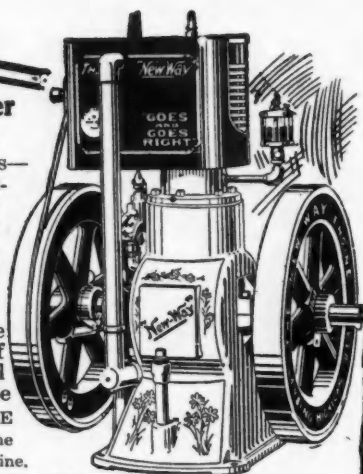
"NEW-WAY" Engines are direct cooled, eliminating heavy water or hopper tanks—no freeze up—no overheating—cylinder case in one piece—no leaky hose or packed joints.

The "NEW-WAY" Engines require practically no attention except to start and stop them. Compact in design and light in weight for power delivered. Easy to move about—take up little space. Enclosed crank case, dust-proof, oil tight. High tension magneto, high efficiency carburetor and other features not common to ordinary engines.

Built in all sizes and types from 1 to 12 H. P. For full details get our Catalogue No. 35

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

10 Gray Street
M-5



If the Owner Wants Competition, Let Him Pay for It

What is the unfair thing about the present methods of bidding for contracts which affects the contractor and more indirectly his clients? That is what H. W. Nelson, president of Moline Heat, Moline, Ill., has been thinking for some time. He has been interested in the building and contracting business for twenty years so that he is well qualified to study out an intelligent solution of his problems. This he has done and so that all contractors and builders may know of his methods and help in getting owners and contractors to adopt it he has published his ideas in book form, "Choosing Bidders and Awarding Contracts."

In helping to get this system generally used you will help yourself, your brother contractor, the business, the owner, and, in fact, all people interested in contracting and building.

In the first pages of the book Mr. Nelson tells of the things done by a building committee in advertising for bids. The doings of this committee are told of in story form and is called "A 1 to 160 Shot."

A large building to cost \$200,000 is to be put up. The committee is after all the bids it can get and, as usual, is going to award the contract to the contractor who makes the lowest bid regardless of his past record or qualifications. Jack Martin, a contractor and the principal character, does not put in a bid. In telling why he has not entered a bid for the contract, Martin goes on to tell one of the committee of his previous experience in this respect.

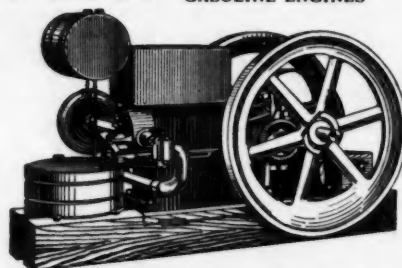
It was relative to entering a bid for a similar contract. Martin's bid in this case was \$4,800 higher than the lowest. He therefore lost the contract, but the building owners were out more than this \$4,800 when the building was

(Continued to page 146.)

HEAVY DUTY KEROSENE AND GASOLINE ENGINES SAVE MONEY BUY NOW

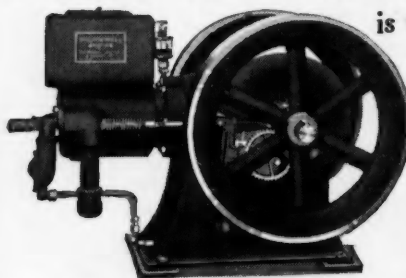
HEAVY DUTY KEROSENE ENGINES save You Money. They are safer to operate than gasoline engines and you can operate them at half the cost of gasoline. Kerosene costs about 10 to 12 cents, gasoline over twice that. HEAVY DUTY ENGINES work as well on Gasoline as on Kerosene, use whichever fuel you prefer, you are not bound to use Kerosene if you don't want to, as the HEAVY DUTY works better on Gasoline than any other Gasoline engine, but it also works on Kerosene which a Gasoline engine will not do. Save money, get more power and better results. Buy the HEAVY DUTY Kerosene engine. We have not as yet made an advance in price but there will be an advance about May 1st. Buy now, save the extra cost. SPECIAL PRICE IF YOU ARE THE FIRST BUYER IN YOUR LOCALITY. CATALOG FREE.

A. CONSOLIDATED GASOLINE ENGINE CO., 202 Fulton Street, New York City



CONTINUOUS ENGINE SERVICE

is what you want



You get it with a Brownwall. Investigate our engine and let us show you how to reduce delays and running expenses on your contractors outfit.

Light weight—compact—simple—economical.

Write for catalogue.

The Brownwall Engine and Pulley Co.
1200-1240 Fourth St., Holland, Mich.

Where Time Means Money

On building jobs of every nature, time is a factor of prime importance—more so today than ever before because labor is scarce and wages are high.

Therefore, mechanical power is becoming more and more important every day—every job that you can handle in quicker time and with less help than by old-fashioned methods means increased profits for you.



Ideal engines and Ideal equipment are saving time and making money on thousands of building jobs today. Wherever there is material to hoist, water to pump or other work requiring power, Ideal Engines are dividend paying investments.

The carpenter and builder find reliable power an absolute necessity—power that will give them dependable service every day in the year, regardless of weather conditions.

The Ideal Engine is especially adapted for the work encountered in this particular field. It is of simple, compact design, very easy to understand and operate, requiring the very minimum of care and attention.

Being of the vertical type, it requires very small floor space—its light weight also makes it an easy engine to move about from job to job. The enclosed crankcase keeps out all dirt, dust and grit. In short, Ideal Engines are dirt-proof, frost-proof and fool-proof.

Special Equipment for Carpenters and Builders

The line of Ideal equipment includes hoists and pumping outfits in various types and sizes for all the different kinds of work. Single drum reversible hoists, double and single drum one way hoists, force pumping outfits and diaphragm pumping outfits.

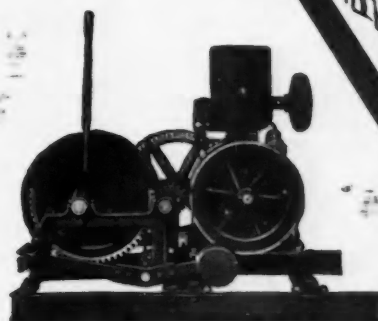
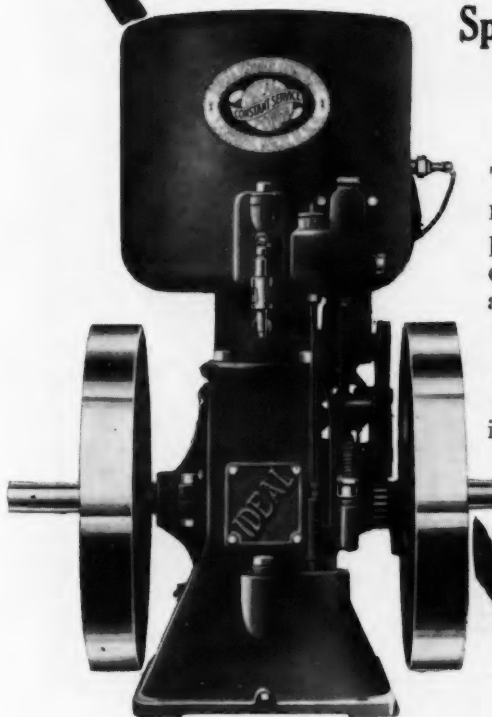
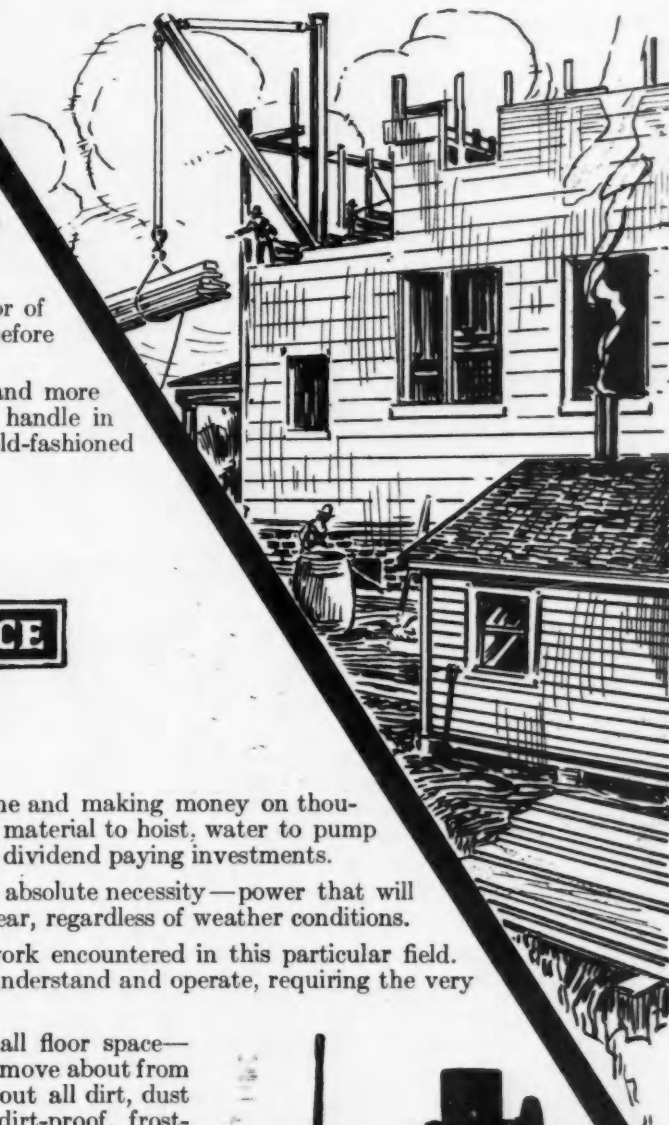
For complete details and specifications, address

IDEAL ENGINE CO.

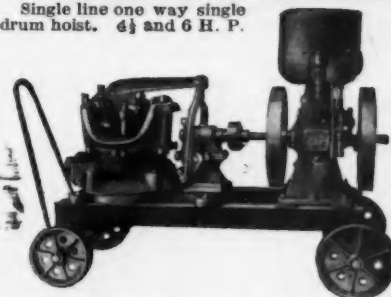
R. E. OLDS, Chairman

630 E. Kalamazoo St.

Lansing, Mich.



Single line one way single drum hoist. $4\frac{1}{2}$ and 6 H. P.



Diaphragm pumping outfit on skids or truck 2 $\frac{1}{2}$ H. P. only. 3" or 4" suction.

If the Owner Wants Competition Let Him Pay for It

(Continued from page 144.)

finished. The man who got the contract had bid so low that he went broke before the job was finished. A bonding company had to be resorted to for finishing up the contract; liens were filed by sub-contractors; lawsuits were necessary and many other things came up which more than exceeded the \$4,800 asked by the higher bidder. This shows the loss to the owner of the building.

To show the loss and injustice to the contractor, Martin says that it cost him \$296.20 to prepare an estimate for the bid. There were sixteen bidders, so Martin had one chance in sixteen of getting the contract—that is, if all the contractors figured as carefully as he did. But some don't and some cut the price to get the contract. This left him but one chance in thirty, so Martin concluded. Errors are only human things; so it was further concluded that the chance of getting the contract was only one in forty, on a possible profit of \$3,000. The profit in that case should have been forty times the \$296.20 or nearly \$12,000. Thus note that the profits possible were only one-quarter of what they should be. For this reason the one-to-forty chance is made—a one-to-one hundred and sixty chance of ever getting anything out of the \$296.20 spent for making the estimate. Martin said that he could not lose that money and so, as in the majority of the cases, he added it to the prices he asked for work which he did. In reality this \$296.20 should be paid by the people who wanted and received the benefit of his bid—that is, the building committee.

To see that the contractor gets, from the owner, what it cost him to make the bid, Mr. Nelson, in the pages following the story, gives the details of a very good system to remedy this fault. Specific rules are given here. Briefly they state

that the owner desiring bids shall select his own bidders. Each shall be paid for his services as a bidder and in this way the owner can have as much competitive bidding as he is willing to pay for. There are a number of rules governing the details of his paying and selecting of contractors whom he desires to have bid. These rules, with illustrations of the blank forms to be used in carrying out the system, are given in detail and will be found very instructive.

If you are interested in bettering the present bidding system, write Glen Smith, 1824 Third Avenue, Moline, Ill., and get one of these little books.



Here's to the Chicken!

We have always believed that Wm. J. Bryan's oft quoted "What is so mysterious as an egg?" was the last word in appreciation of the queen of breakfast foods. His tribute has been surpassed, however, by that of an old colored philosopher of our acquaintance.

"Chicken, suh," said this sage, "is the usefulest animal they is. You c'n eat 'em 'fo' they's bo'n an' aftah they's daid!"



Wished a Thoro Test

The negro janitor of the flat next door approached the grocer and handed him a paper containing some white powder.

"Say, boss," he asked, "what yo' t'ink dat is? Jes' taste it an' tell me yo' 'pinion."

The grocer smelled it, then touched it to his tongue.

"Well, Jake, I should say it was soda."

"Dat's jes' what I say," replied the janitor, triumphantly. "I say dat's soda, but my ol' woman, she 'low it's rat pizen; she says she know 'tis. Jes' taste it again, boss, fo' to mak sure."

Not Complete!!! Your Contracting Plant Without

The least
of your
worries
will be
to keep

The
CEMENT-GUN
continually
busy

The
CEMENT-GUN

TESTED BY YOUR
UNCLE SAMUEL

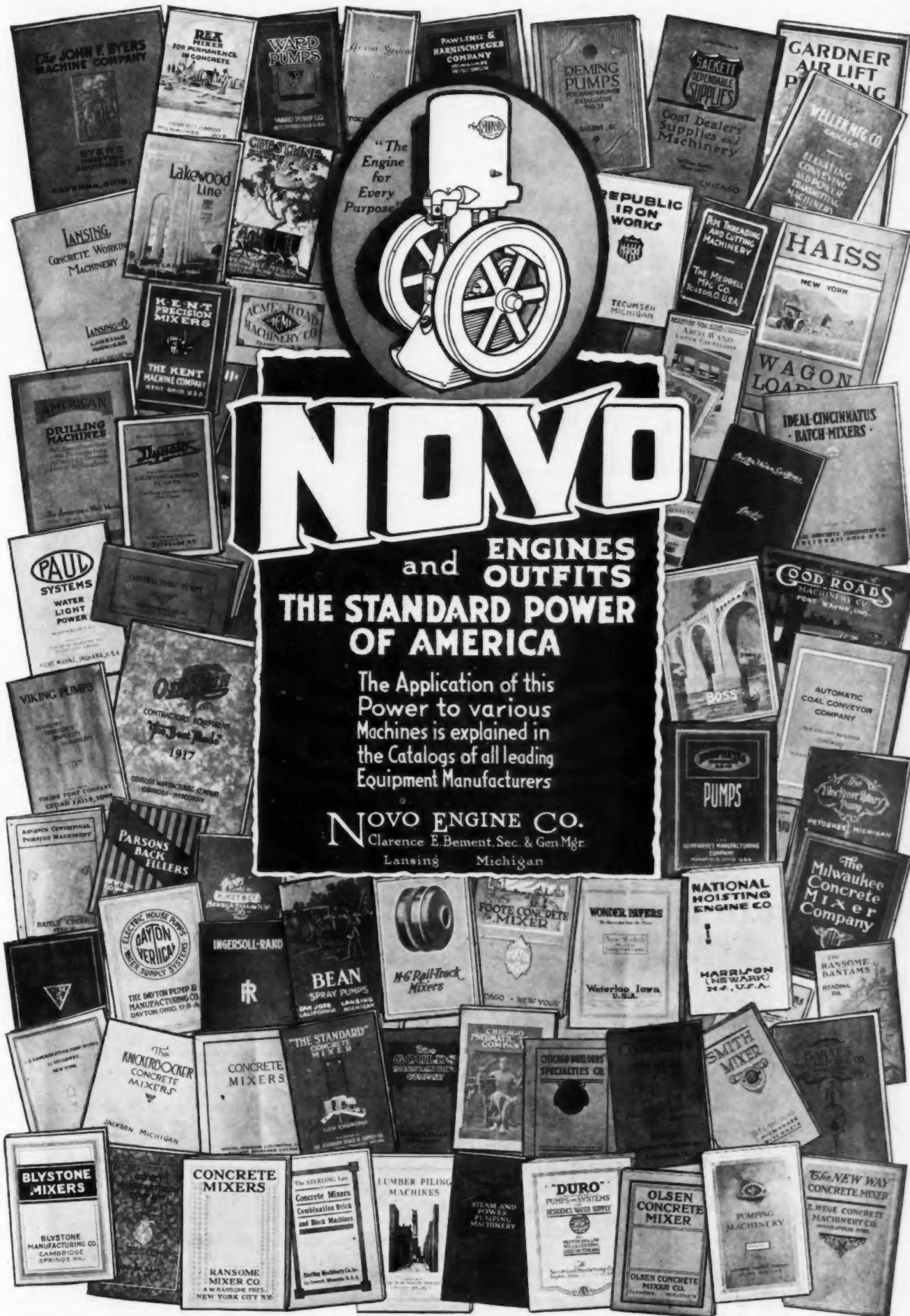
Tests made by the UNITED STATES BUREAU OF STANDARDS have proven "GUNITE" the Sand and Cement product of the Cement-Gun to excel all other types of "STUCCO" when shot onto Metal Lath, Hollow Tile, Monolithic Concrete Walls, etc.

Write Department BCC for complete report.

Cement-Gun Company
Inc.

S. 10th and Mill Sts. - Allentown, Pa.
Cement-Gun Co., Inc., 30 Church St., New York City.
Byers & Ayers, 1414 Fisher Building, Chicago, Ill.
John A. Traylor, Newhouse Bldg., Salt Lake City, Utah.
Taylor Engineering Co., 538 Central Bldg., Seattle, Wash.
Taylor Engineering Co., Vancouver, B. C.
A. R. Roberts, 727 Traders Bank Bldg., Toronto, Ont., Can.





"The Engine for Every Purpose"

NOVO

and **ENGINES**
OUTFITS

THE STANDARD POWER OF AMERICA

The Application of this Power to various Machines is explained in the Catalogs of all leading Equipment Manufacturers

NOVO ENGINE CO.
Clarence E. Bement, Sec. & Gen. Mgr.
Lansing Michigan

BLYSTONE MIXERS
BLYSTONE MANUFACTURING CO.
CAMBRIDGE SPRINGS, PA.

CONCRETE MIXERS
RANSOME MIXER CO.
NEW YORK CITY, N.Y.

CONCRETE MIXERS
THE STERLING LUMBER CO.
Concrete Mixers, Combination Brick and Block Machines
Sterling Machinery Co., Inc.
140 South Broadway, N.Y.C.

CONCRETE MIXERS
THE KNICKERBOCKER CONCRETE MIXERS
JACKSON, MICHIGAN

DAYTON VERICAL
ELECTRIC HOUSE PUMPS
WATER SUPPLY SYSTEMS
THE DAYTON PUMP & MANUFACTURING CO.
DAYTON, OHIO, U.S.A.

PARSONS BACK FILLERS

BEAN SPRAY PUMPS
SAN JOSE, CALIFORNIA
LANSING, MICHIGAN

H-6 Rail-Truck Mixers

FOOTE CONCRETE MIXER
PACO - NEW YORK

WONDER PUMPS
New Models
Waterloo, Iowa, U.S.A.

NATIONAL HOISTING ENGINE CO.

HARRISON (NEWARK) N.J., U.S.A.

SMITH MIXER

OLSEN CONCRETE MIXER
OLSEN CONCRETE MIXER CO.
LANSING, MICHIGAN

THE NEW WAY CONCRETE MIXER
E. WEGE CONCRETE MACHINERY CO.
MILWAUKEE, WIS.

THE MILWAUKEE Concrete Mixer Company

THE RANSOME BANTAMS
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WAGON LOADS
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HAISS
NEW YORK

REPUBLIC IRON WORKS
TECUMSEH, MICHIGAN

DEMING PUMPS
FOR HAND PUMPS
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NO. 13
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PAWLING & HARNISCHFEGER COMPANY

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REX PUMPS
FOR PERFORMANCE IN CONCRETE
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JOHN F. BYERS MACHINE COMPANY
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ALBERT H. AND YANKEE CONCRETE

BOSS

GOOD ROADS
MACHINERY CO.
PORT WASHINGTON, N.Y.

AUTOMATIC COAL CONVEYOR COMPANY

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VIKING PUMPS
VIKING PUMP COMPANY
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AMERICAN DRILLING MACHINES
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KENT PRECISION MIXERS
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LANSING CONCRETE WORKING MACHINERY

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FORT WAYNE, INDIANA, U.S.A.

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1917
CONTRACTOR MANUFACTURING COMPANY
CHICAGO - WISCONSIN

ADAMSON CENTRIFUGAL PUMPS MACHINERY

BATTLER PUMPS

CHICAGO BUILDERS' SPECIALTIES CO.

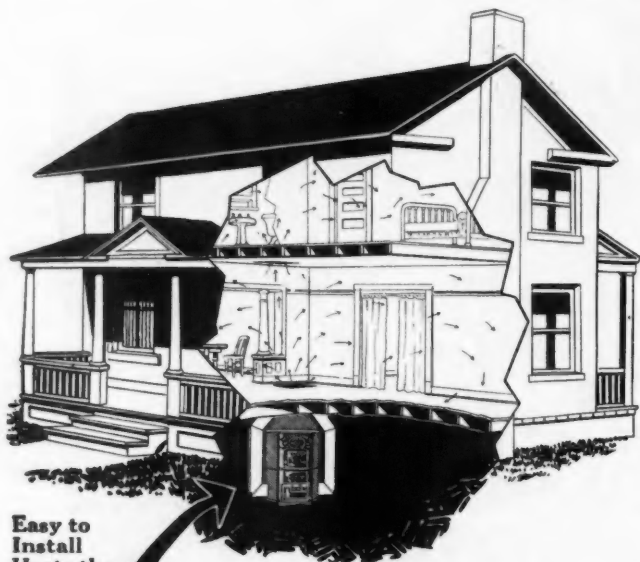
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STEAM AND POWER PUMPING MACHINERY

DURO PUMPS - SYSTEMS
RESIDUAL WATER SUPPLY
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THE NEW WAY CONCRETE MIXER



Easy to
Install
Heats the
Whole
House

Good Profits Are Easy Installing *Estate* Single Register Heaters

You can give your customer a better heating plant and make more money for yourself.

Here is the **quality** pipeless heating plant—built with a large grate on ball bearings—high ash pit—big white enameled water pan attached to water pan door—straight side, double-ribbed fire pot—guaranteed for five years—extra large radiating surface—a real, powerful heater.

The Estate Single Register Heater is the scientifically correct pipeless system—separate flues for cold air returns—the home gets a complete circulation of warm air. One or both intake registers may be placed at a distance from the warm air register.

Easy to install—no clumsy heating pipes to fit—no hard job of tinning.

WRITE US—Get our proposition for home builders, carpenters and contractors. Address

Estate Stove Co.

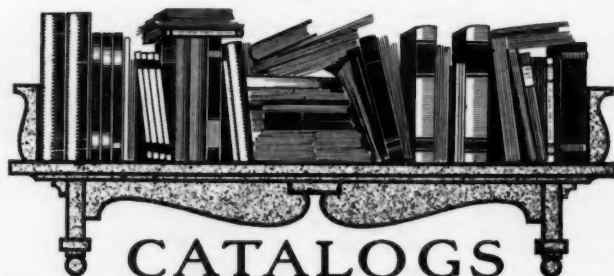
892 South Avenue, Hamilton, Ohio
and Minneapolis, Minn.



Stratford Wis.
Jan. 13, 1916

Gentlemen:

The No. 21 Estate Single Register Furnace, which we installed for Mr. Taft of our city, is giving great satisfaction. Mr. Taft's home contains 9000 cubic feet. This morning the temperature was 20 degrees below zero, and the room located the greatest distance away from the register was warm and comfortable, so was every other one. To say that Mr. Taft is pleased is putting it mildly.
Yours truly,
Maxson Lumber & Hardware Co.



CATALOGS BULLETINS & BOOKS RECEIVED

The following literature, dealing with subjects of interest to builders, has recently been sent in:

Medusa White Portland Cement is discussed in a 48-page book, 8½x11-inches, published by The Sandusky Cement Company of Cleveland, Ohio. The book is well illustrated with photographic views showing the many uses of this white stainless cement.

"Arkansas Soft Pine—How to Finish and Paint It" is the subject of an illustrated booklet of 24 pages, 7x9 inches, by the Arkansas Soft Pine Bureau, Little Rock, Arkansas.

"The Theory of Drying and Its Application to the New Humidity-Regulated and Recirculating Dry Kiln" is the subject of Bulletin No. 509 of the United States Department of Agriculture, Washington, D. C. This bulletin was prepared by Harry D. Tiemann, in charge, Section of Timber Physics, Forest Products Laboratory.

Prentiss Vises are illustrated and described in catalog No. 50, 72 pages, 6 by 9 inches, of the Prentiss Vise Company, 110 Lafayette St., New York City.

Why the Price of Beaver Board Had to Advance is explained in a little circular by The Beaver Board Companies, Buffalo, New York.

The line of concrete mixers manufactured by The Standard Scale and Supply Company, 1631 Liberty Avenue, Pittsburgh, Pennsylvania, is illustrated and described in their new catalog Y159.

"Standardized Power," an illustrated booklet 6x9 inches, 24 pages, presents the line of contractors' equipment manufactured by the Novo Engine Company, 701 Willow Street, Lansing, Michigan.

March number of **"Graphite,"** published by the Joseph Dixon Crucible Company of Jersey City, N. J., contains special articles pertaining to paints and the care of crucibles.

The 5- and 8-cubic foot batch mixers manufactured by the Interstate Equipment Company, 1745 Ernsperger Street, South Bend, Indiana, are illustrated and described in a 10-page booklet.

"Your Streets" is a booklet 6x9 inches, containing 34 pages of material illustrated with a great many photographic views showing concrete pavements in all parts of the country. The booklet is published by the Portland Cement Association, 111 W. Washington Street, Chicago, Ill.

"Made-to-Measure Window and Door Screens" is the title given a 24-page catalog, 6x9 inches, of the Standard Screen Company, 1848 Hastings Street, Chicago, Illinois, showing the construction of their screens and a line of screen door and window fixtures.

Sheet metal construction and products are fully covered in the general catalog No. 7 of the Willis Manufacturing Company of Galesburg, Illinois. This catalog is a handy reference book on all matters pertaining to sheet metal.

HOLLAND FURNACES

Make Warm Friends

Ask Any Owner



Yes—ask any owner of a Holland Furnace.

Hear what **he** has to say about how warm it it keeps his whole house—how warm it keeps the floors—what perfect ventilation it provides—how much it saves in fuel. You will then readily understand why Holland Furnaces make warm friends everywhere. The lucky owner of a Holland Furnace regards it literally as the heart of his home. It insures a warm, healthful, cosy home—the kind of home that keeps the family circle together. Investigate the merits of the Holland Furnace and you will understand why more than thirty thousand owners declare it to be the best and most economical heating plant that can be installed in a home.

Holland "Boosters" Also Make Warm Friends

Your recommendation, Mr. Contractor, goes a long way in the final selection of any special kind of material, appliance or fixture for the home. And your reputation and success depend very largely upon the degree of satisfaction the home owner derives from your recommendations.

You can conscientiously recommend the Holland Warm Air Furnace. You know, because you have given the subject of heating plants close study, and also because scientists have proved it, that warm, moist air, such as the Holland Furnace supplies, is the most healthful heat that can be had. You know that it costs less to install a warm air furnace than any other kind of a heating plant and that it is the most economical to operate.

Your recommendation of Holland Furnaces will make you friends. Not only does a Holland Furnace insure an abundant supply of heat in even the coldest weather at the smallest cost, but it invariably enhances the value of the house in which it is installed. Our Holland Service Home Comfort Bond is the strongest guarantee ever given with any heating plant. Free heating plans. Send your floor plan.

Special Proposition to Contractors and Builders

Holland Furnaces are not installed by dealers. We have our own special representatives who have made a study of the Holland Furnace and who make a regular business of installing it. We have a very special proposition which we would like to submit to you. It is a proposition which means increased prestige and more business for you. Let us submit this proposition in detail to you. Mail the coupon for full particulars. This places you under no obligation of any kind whatsoever. Just sign and mail coupon today.

The Holland Furnace Company
HOLLAND, MICH.

World's Largest Installers of Furnaces
2 Factories—128 Branches

**HOLLAND
FURNACE CO.**

Dept. 703, Holland, Mich.

Gentlemen:

I am interested in your Special Proposition to Contractors and Builders. Without obligation to me please send me full particulars.

Name.....

Address.....

City..... State.....

Catalogs, Bulletins and Books Received

(Continued from page 148.)

Portable saw mills manufactured by The Enterprise Company of Columbiana, Ohio, are presented in a book of 24 pages, 6 by 9 inches, in which photographs, drawings and tables are liberally used to make the subject matter clear.

"How Better Lighting Yields You More Profits" is the title of a booklet by the National X-Ray Reflector Company, 235 W. Jackson Boulevard, Chicago, Illinois. The booklet explains how efficient, glareless and eye-conserving light can be secured for all working spaces.

Three "Cannon Ball" garage door hangings, comprising the "curve," the "right angle" and the "parallel" installations, are illustrated and described in a catalog of 16 pages, 8 by 9 inches, of Hunt-Helm-Ferris & Company, Harvard, Illinois.

Gas and soot consuming furnaces of The Gibson Furnace Company, Waterloo, Iowa, are presented in a 16-page catalog, 6x9 inches, illustrated, together with a complete line of furnace accessories.

"Motor Trucks of America"—the fifth volume of this nature published by The B. F. Goodrich Company of Akron, Ohio, is an illustrated book, 7x10 inches, having 164 pages. It contains photographs of each make and detailed specifications of the various models, this material being furnished and checked by the truck manufacturers.

The King System of Ventilation is explained in a 60-page book published by the King Ventilating Company, Owatonna, Minnesota. Subject matter is well illustrated with photographs, drawings and colored views.

Smith-Chicago Mixers are illustrated and described in catalog No. 402 of The T. L. Smith Company, Milwaukee, Wisconsin. Booklet is 6 by 9 inches, 48 pages, contains a table of capacities based on new rating of N. A. M. M., presents new high drum pavers and improved Smith Mixerette.

"The Proper Ventilation of Farm Buildings" is the subject of a 38-page catalog, 7x10 inches, illustrated with photographs, drawings and colored views, of The Thomas and Armstrong Company, London, Ohio.



Detroit Steel Products Growing

At the annual meeting of the Board of Directors of the Detroit Steel Products Company, manufacturers of Detroit Self Lubricating Springs for motor cars and trucks and Fenestra Solid Steel Windows for factory buildings, it was reported that 1916 was by far the most successful year the company has ever had. Recent indications are that 1917 will show a proportionate gain over last year. January sales already show an increase of 100 per cent over January, 1916. The capacity of the company's factory departments has been increased to meet the requirements of the rush of business which is confidently expected.



Schlaflly Celebrates Thirtieth Year With Berger

On March 5, 1917, Julius H. Schlaflly, General Superintendent of The Berger Manufacturing Company, celebrated the thirtieth anniversary of his service with this company. Mr. Schlaflly has grown up with the organization which he has served since he was a lad of sixteen years.

make the next one a HERO

Don't Experiment Further with Your Heating and Ventilating Problems.

Hero Pipeless Furnaces are easily and quickly installed and our agency Proposition gives the Builder a good commission on each sale.

The **Hero Furnace** employs the simplest and most direct method known for the heating and ventilating of homes, stores, halls, etc. There are no pipes to waste heat and room in the basement and a constant flow of warm, fresh air is maintained throughout the house.

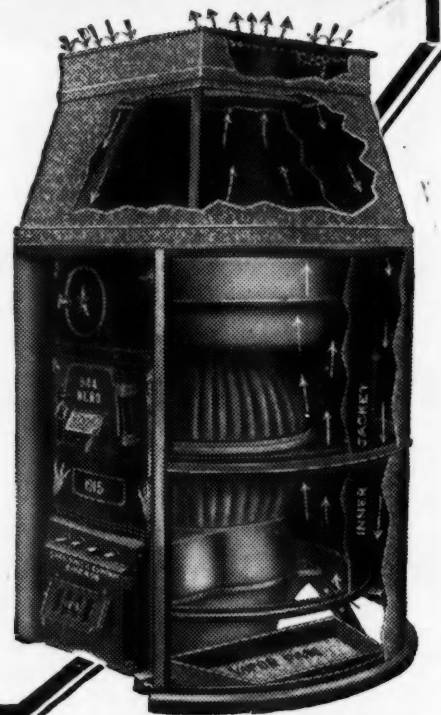
Hero Furnaces are Economical, both as to the original price and the cost of installation, and are giving the best of satisfaction to their many users.

Write us today for details of our agency Proposition and Dealers Prices

CHAS. SMITH COMPANY

180 No. Dearborn St.

Chicago





Bovee's Upright Furnace



Bovee's Cast Iron Pipeless Furnace

ing and there is nothing more economical of fuel. With this system of piping the basement is always cool.

The Central Heating System

With this system of piping but one large warm air register is used directly over the furnace. It also has two cold air returns that may be taken from other rooms which greatly aids in the circulation of heat in the different rooms and also prevents the cold air moving over the floor to reach the one central register as used with the pipeless furnace. This also allows using a rug in the room as the openings in the floor are not as large as when both hot and cold air registers are one. With the CENTRAL HEATING SYSTEM we use any style of our furnaces and of suitable size to heat the building. With this system a separate pipe can easily be run to a bath room or to any other rooms, which is often very desirable.

We ship everything prepared so that any handy man can install any of the Bovee Furnaces quickly and without the aid of a tinner.

Send us a rough plan of your building for estimate on best system of heating plant.

Bovee Furnace Works
50 8th Street Waterloo, Iowa

Old Reliable Bovee Furnaces

*At Special Prices to
Contractors*

**The Pipeless Furnace With One Register
The Central Heating System With One
Warm Air and Two Cold Air Registers**

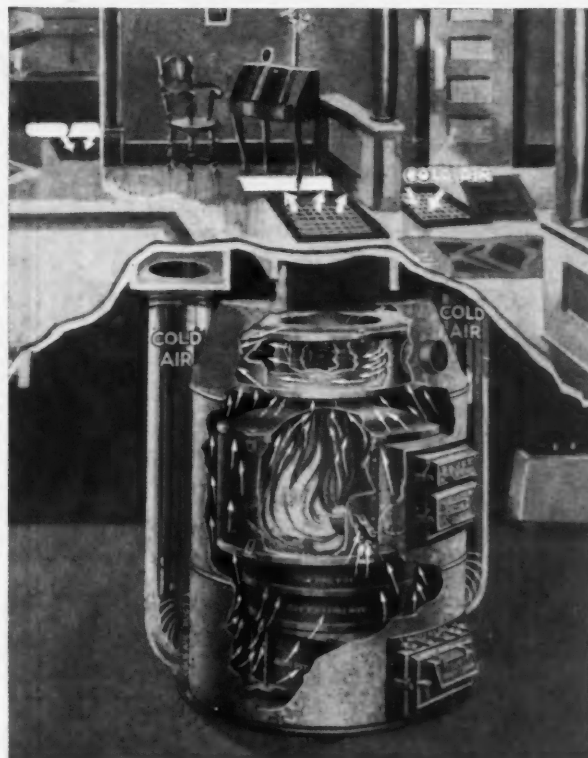
Regular Piping to Each Room

We MANUFACTURE a full line of furnaces, both UPRIGHT AND HORIZONTAL, which we furnish with regular piping to every room where the buildings are not arranged to be properly heated by one register. We have had a very wide experience and can tell at once on receipt of a pencil sketch of the building to be heated the best style of furnace and piping to use. The BOVEE FURNACES are well made of the best heavy material and actually use very much less fuel than other furnaces.

The Pipeless Furnace

This style of furnace is especially adapted to houses having large openings between rooms and open stairway to allow free circulation of the warm air. Also for old houses where it is difficult to cut piping into the walls. We use only furnaces having ample capacity to heat the building as we make different sizes suitable to heat

any building from a cottage to a large church. They are very easy to install as as there is but one register to cut in the floor directly over the furnace and no piping in the basement. The heat is delivered instantly in the build-



Bovee's Upright Furnace With Central Heating System



TOPPING GARAGE HARDWARE

Easily Attached!

Efficient and easy to operate
in all kinds of weather.
Prevents injury to cars from wind blown doors.
Makes more room and presents a neat appearance.

Car Owners want Topping Hardware

The sale and installation of Topping Hardware is only a natural consequence to your erection of a garage and garage owners can easily be shown the advantage of Topping Hardware over the ordinary hardware used on the sliding or swinging door.

Write today for details and illustrated literature if your dealer cannot supply you

Safety Door Hanger Company
Dept. G., Ashland, Ohio



NEAT and PROFITABLE jobs

Lost Motion Must Go

(Continued from page 37.)

structure and has very much to condemn it.

The panel door, with its multiplication of lines and corners to collect dust, has no compensating advantages. Its lightness and strength can be secured in a plain door which any carpenter can make of double thickness and perfectly braced within. The facings of doors and windows should be plain and free from angles, beading, offsets, and carved blocks.

The floor space of the kitchen should not be larger than necessary. It should be entirely free from pipes coming thru the floor for water or for gas. Plumbers have been great offenders in this respect, and will continue to be unless better work be required of them. Table and sink should not be supported on legs. The entire floor should be accessible for rapid cleaning.

Correct furniture arrangement will reduce the floor space to the minimum. There should be no lost motion in tramping back and forth ten or fifteen feet from work table to the range and sink.

To secure comfort in small working space close to the stove or range provision must be made for carrying off the heat from over the stove. This can be done by means of a window above the stove with sash so hung that it can be swung open below and thus give exit to the heat and gases. This window, too, provides excellent light over the cook stove and would render a hood over the range unnecessary.

A floor of tiling laid in cement is ideal perhaps, but one of cement, covered with good linoleum or rubber sheeting, is better on account of their elasticity, which is less tiresome to those standing a long time on the floor.

The walls should be plastered with cement, and not the rough finish either, but a thoroly well smoothed surface should be put on, that can stand washing. No paint or finish should be used for the purpose of not "showing dirt." The day has gone by when dark or gray or brown colors can be used so that walls or floor may not show dirt.

The range or stove must not stand on the ordinary stove legs, but on a base of smooth finish perfectly inclosing the space under the stove. This space is too difficult to sweep; and to clean with a mop around the stove legs is impossible. And there should be nothing in the kitchen impossible of cleansing and rapid cleansing.

All the lost motion from size of kitchen, bad furniture arrangement or bad form and fashion of furniture, finish of walls, and floor space should be gotten rid of. Every weight should be taken from the housewife's shoulders and she should be given the best chance possible to run her race in patience.

Gentry, Ark.

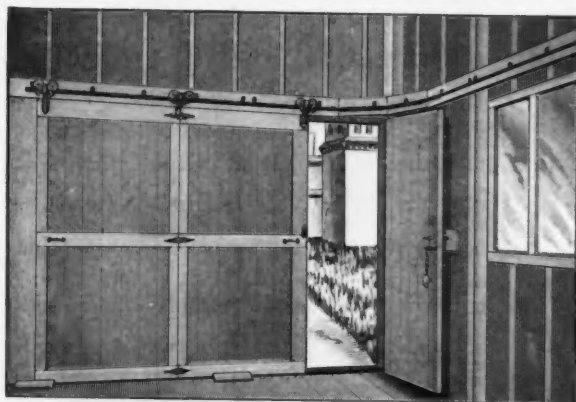
MYERS

Right Angle Garage-Door Hangers

For Inside or Outside Sliding Doors on Any Building



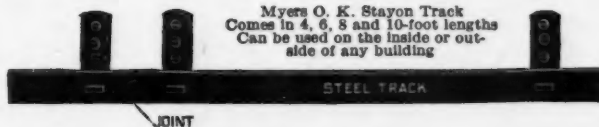
It's the New Myers Right Angle Garage-Door Hangers for you who want modern doorways for your garage, or for any other buildings where uniform all-weather door service is desired.



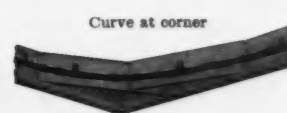
You know that of't times a garage is built in close quarters, sometimes set at an angle with the surrounding buildings so that an easy and convenient entrance can be obtained. No room for swinging doors, or for track extension to left or right for regular sliding doors. Just note how the MYERS GARAGE HANGER overcomes these difficulties. Doors roll along on the inside of the building, and slide around the corner on the curved track, as shown in illustrations, out of the way, leaving the entire front open for entrance; besides, they take up but little space and are entirely free from weather conditions.

Then, too, swinging doors are always of more or less bother the year through. Hard to open and close—must be securely fastened back when opened and latched every time they are closed. If not, they are bound to swing free in the wind, causing much annoyance. And, by the way, it is difficult to open swinging doors after heavy snows or during cold snaps when ice collects, and the ground or cement outside heaves up because of frost action. These troubles are lost sight of when Myers Hangers are used, and here are the reasons—just note how common-sense they are:

MYERS RIGHT ANGLE GARAGE-DOOR HANGERS have heavy malleable iron frame, tandem rollers, mounted engine trucks and revolving on hard steel roller bearings—easy to push and pull. **PATENTED ADJUSTABLE FEATURES** permit of doors being raised or lowered, or moved in or out, as conditions require—a monkey-wrench is the only tool needed. **DOUBLE STAY-ON DEVICE** prevents trolley leaving track. **CRANK SHAPED STEM**, extending through center of frame, permits hanger being used with any thickness of doors. Doors can be hinged together—two, three or four of them in 30, 36 or 42 inch—and intervening sizes work nicely. An ordinary 30-inch swinging door can be used to advantage in connection with the sliding doors. **THIS HANGER WILL OPERATE ON ANY 1½-IN. FLAT STEEL TRACK**, a section of which can be easily curved for the corner, and MYERS GARAGE HANGERS CAN BE INSTALLED BY ANY CARPENTER.



Myers O. K. Stayon Track
Comes in 4, 6, 8 and 10-foot lengths
Can be used on the inside or outside of any building



CONTRACTORS AND BUILDERS—You need this and the many other styles of My. re Stay-on and Tubular Door Hangers in your construction work. Write us for catalog showing all styles, and how they can be obtained. This is building time. Your inquiry will receive prompt attention.

F. E. MYERS & BRO. - - ASHLAND, OHIO
PUMPS FOR EVERY PURPOSE, HAY TOOLS, DOOR HANGERS
[ASHLAND PUMP AND HAY TOOL WORKS]

The Why of Portland Cement Advance

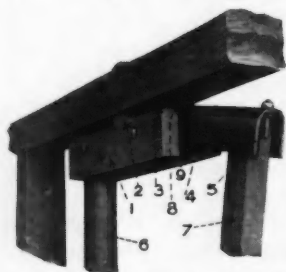
In connection with the advance in the prices of building materials during the last two years, information reaches the public occasionally which indicates that the manufacturer, in dealing with labor and raw materials, has the vexing problem of high prices before him quite as well as the consumer.

The cement manufacturer today is charging for cement from 20 to 50 cents per barrel more than three or four years ago.

One manufacturer of cement, in discussing his difficulties, said: "As compared with 1915, cost results for January, 1917, show that coal for power and burning was 25 cents higher per barrel for finished cement. In other words the amount we are obliged to pay for coal now has increased the cost of manufacturing a barrel of cement 25 cents, as compared with the early part of 1915. We are paying 35 per cent higher wages, which has increased the cost of manu-

facturing cement several cents per barrel. All repair and renewal material has increased in cost by percentages varying from 30 per cent to 250 per cent. The increase in the cost of insurance due to the general adoption of compensation insurance and the increase in taxes have also added to our cost of doing business 1 cent per barrel. We have been compelled to pay higher salaries. Our operating costs are considerably higher than formerly by reason of frequent interruptions due to shortage of cars and delays in transportation. All of these factors and the general increase in the cost of all items entering into the problem of manufacturing cement have vexed the cement makers and have compelled them to charge more for their product, a situation which is not at all relished by them because of the fact that one of their most prominent arguments for the use of concrete is not only its economy and permanence, but its relative low cost as compared with other materials which for many purposes are rivals of concrete."

For Up-to-Date Barns---Wilder Patent Steel-Latch Cattle Stanchions



Study Wilder Construction

Wise contractors insist upon them. All hardwood—except the patented steel latch. Comfortable, noiseless and easy to adjust. Won't rust, rock or loosen at the joints.

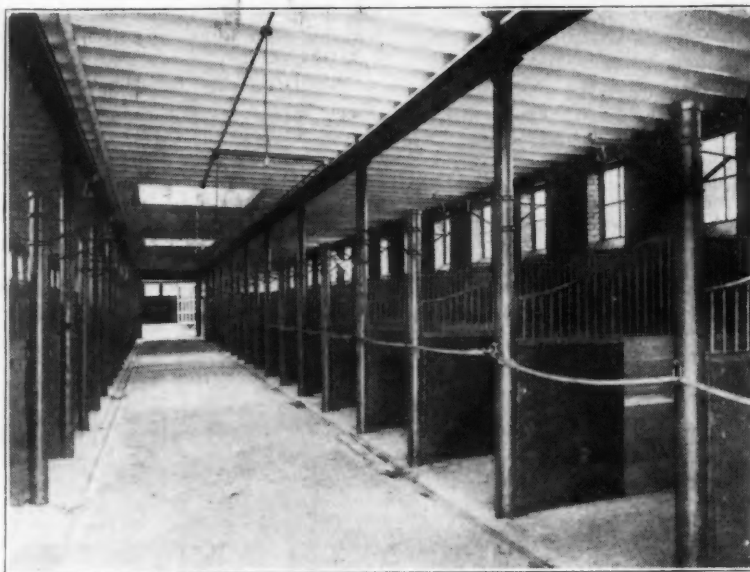
1—Cross-bolted top block; won't split. 2—Top one of the two pins on which stanchion revolves when closed. 3—Cast lug; holds stanchion rigid when open. 4—High carbon rustless steel latch. 5 and 8—Stop bolt and steel clip which limit width of opening. 6—Stationary upright. 7—Movable upright. 9—String piece; mortised for cast lug.

Automatically rigid when open—swings freely when latched. Opened or closed without removing mittens. **Write for full information.**

WILDER-STRONG IMPLEMENT COMPANY
Box K
MONROE, MICHIGAN

KREOLITE WOOD BLOCK FLOORS

The Ideal Floor for Horse Stables,
Cow Stalls, Piggeries and Driveways



Kreolite Wood Block Floors in Horse Stables of Tivoli Brewing Company, Detroit, Mich.

THIS floor replaced a concrete and plank floor. It can be cleaned with a hose, like a cement floor, yet is as comfortable on horses' feet as an earth floor.

Being extremely durable, Kreolite Wood Block Floor will not wear away or become full of holes, as would a plank or concrete floor.

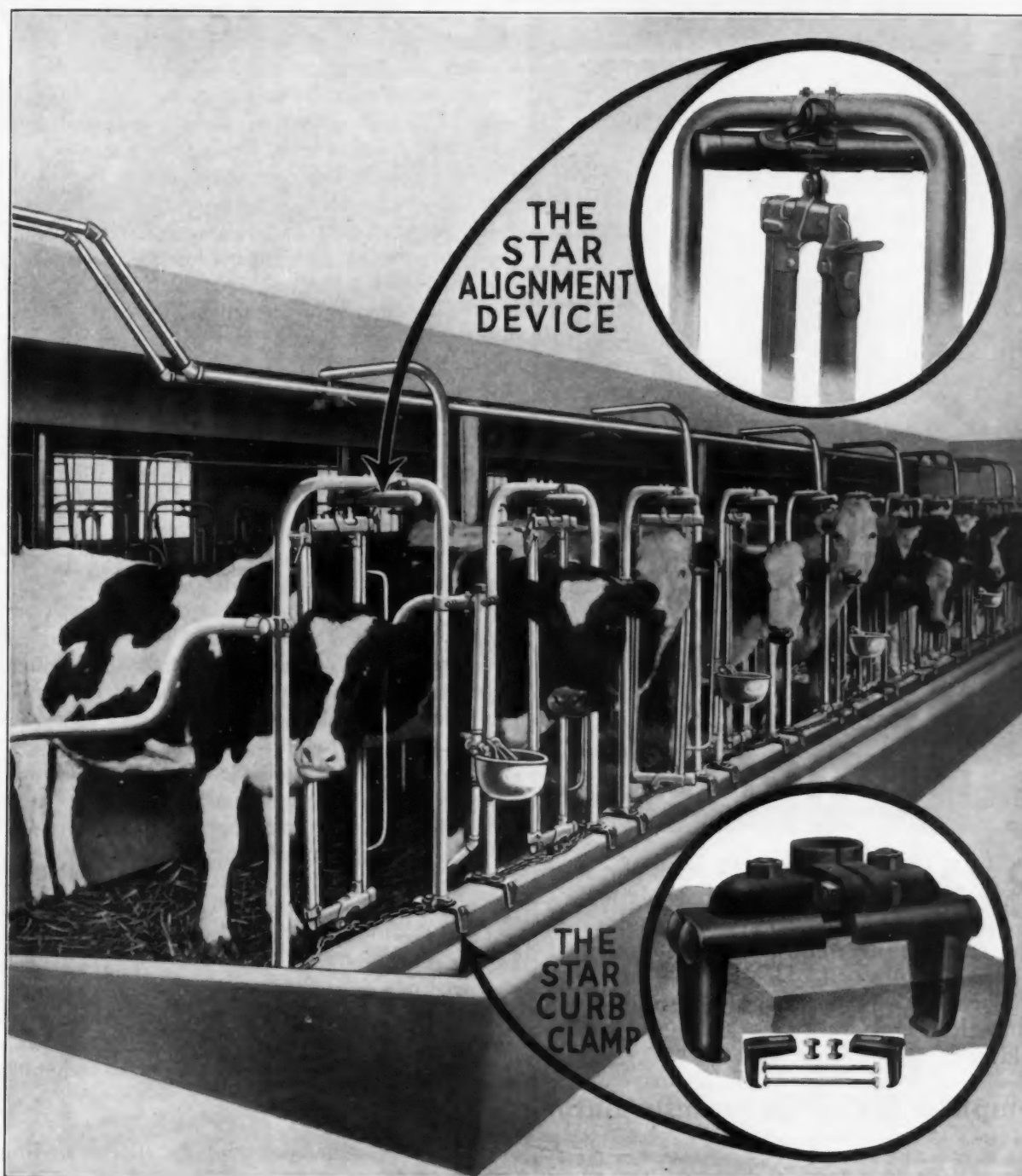
Kreolite Wood Blocks are treated under hydraulic pressure with Kreolite Oil, a high grade antiseptic that is death to vermin and infectious hoof diseases.

Kreolite Wood Blocks are non-conductors of heat, warm and restful to the touch, retaining all the warmth that is produced by the animal's body.

Veterinarians, Agricultural Colleges, Dairy Farms and Stock Raisers use and endorse Kreolite Wood Block Floors.

Specifications for Laying, Samples and Barn Floor Booklet are Yours for the Asking. Write Today.

THE JENNISON-WRIGHT COMPANY, 2472 Broadway, Toledo, Ohio



These Two Great Improvements Again Lengthen The Star Lead

We have always kept the STAR Barn Equipment ahead of the rest by creating and adding features which made it superior to other kinds.

Our patents made these features exclusive with our equipment—acknowledged leader in the field.

And now—on top of all the rest, comes the STAR Curb Clamp and the new Alignment Device. STAR Barn Equipment is positively the easiest equipment to install—costs least in the long run. We can't tell it all here—or even a small part—get our complete catalogs.

The Unit System is so arranged that STAR Stalls come ready to erect no assembling necessary. The STAR Curb Clamp and STAR Alignment Device are new and exclusive with us. The Giant STAR Stanchion is the strongest made—wood lined—with automatic sure-stop and one hand lock.

When it comes to the biggest labor-saver in the barn—the STAR Litter Carrier—you'll find a Double Lock Tub, Roller Bearing Wheels and Winding Shaft and the most complete line of Carriers and Trucks made.

Barn Plans FREE! DESCRIPTION OF THE "HOW" BOOK—

Write for the "How" Book and details of our co-operation. 126 pages

HUNT-HELM-FERRIS & COMPANY - 60 Hunt Street, Harvard, Ill.

—pocket size. Bound in durable Keratol leather. Packed from cover to cover with information that saves the contractor time and money.

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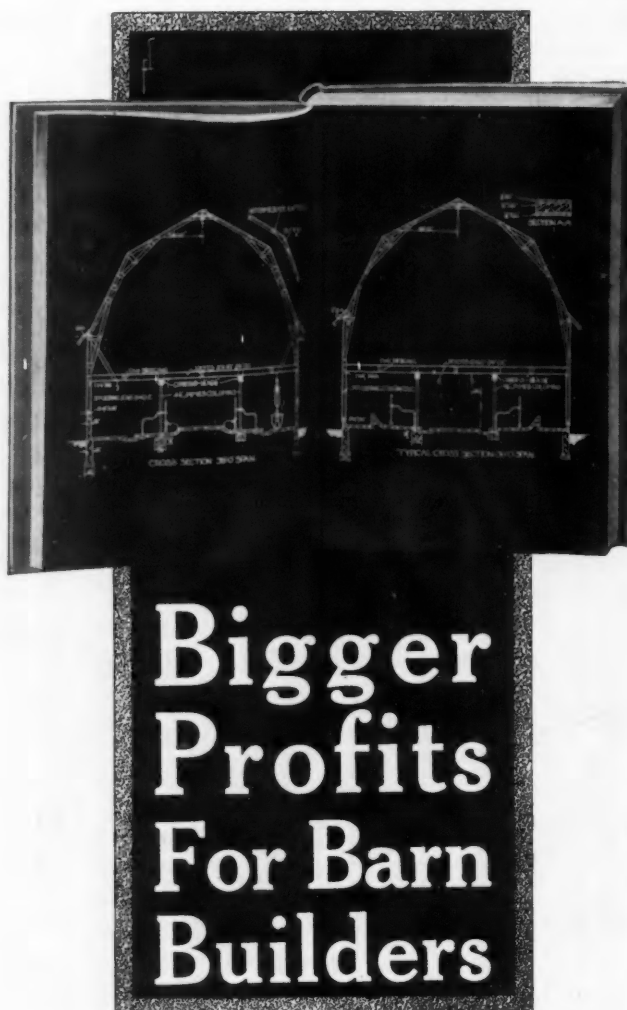
HUNT-HELM-FERRIS & CO.,
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Send me FREE of all charges, the 126 page Keratol leather bound, pocket size "HOW BOOK" and details of your FREE BLUE PRINT SERVICE and co-operation. Enclosed find a list of folks in my vicinity who expect to build new barns, remodel old ones this Spring.

Name.....

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BACK your building skill with the scientific knowledge of our barn experts.

"The James Way" Book gives the practical, helpful suggestions for better barns and barn equipment. It advises as to the best location. Basing its advice on drainage, ventilation and best distance from other buildings.

Complete Dairy Barn Information

From cover to cover "The James Way" is filled with the best, most modern dairy barn facts. Including blue print plans for complete barns, floors,

windows, ventilation, etc. Showing **James Barn Equipment** the equipment used by thousands of dairymen and installed by leading builders everywhere

Write for This Book TODAY!

Just send us the names of farmers who intend to build or remodel, and for how many cows. James reputation added to your skill will do more to increase your income. Dairymen everywhere know the

name "**James**" to stand for the **best** in barn equipment. Get in touch with us as quickly as possible. We have some barn information that will help you land jobs and **beat competition**. Write us **now**.

James Manufacturing Company

EJ75 Cane Street, Ft. Atkinson, Wis.

Elmira, N. Y.

Lumber Branding in a Retail Yard

(Continued from page 43.)

is. Associations of lumber manufacturers have for some time been branding their products. In some cases individual mills have done the same thing. But the retailer or jobber of plain boards and timbers has sold them as such, unidentified as to origin.

Let's analyze this experience of the Sterling Company and Mr. Dodd. Suppose that the officials of this large concern had merely put in a claim for worthless timber and had not put the case up to Mr. Dodd, but had just quit ordering from his concern, giving no reason for the action. Of course, it would have been an injustice; at the same time, it would have meant the loss of thousands of dollars worth of business.

But now there is no chance of the Sterling company being blamed for bad timber which did not come from its yards. It lets the world, and, what is more to the point, its customers know where that lumber came from. Its name is on every piece.

There is a selling psychology in this marking system. Without going into detail you know the value of a trade mark. Practically every thing you buy is trade marked. The reason is that you know what you are buying. When you buy trade marked lumber you know from whom you secured it. If it isn't up to standard you know who to blame; if it is, you know of whom to purchase the next time.

Marking lumber is little trouble. The system adopted by the Sterling Company is simple. The lumber is being loaded onto wagons, trucks or into cars, the checker imprints the name with a large rubber stamp and an indelible ink pad. Rain will not wash it off; it is easily covered with paint and no part of the wood is spoiled by a burned-in mark.

Mr. Dodd is enthusiastic over the plan he has adopted. In telling of it, he declared that it will save his company the possibility of future ruptures with its customers, and it will also advertise to them the fact that the Sterling company stands back of any material the company sells. This he believes is good business.

In the December number of the *AMERICAN BUILDER*, the opinions of two well known men in the lumber world regarding the trademarking of lumber were given. R. S. Kellogg, secretary of the National Lumber Manufacturers' association discussed this phase of lumber distribution and cited the action of the National Association in commending the practice among manufacturers. G. A. Townsend, sales manager of the Great Southern Lumber Company, told why his company brands its lumber.

But it remained for the Sterling Lumber & Supply Co. to inaugurate the practice among dealers and jobbers.

It is usual to end a story with a moral by putting that moral into words. Therein this story is different.



*E.E. Lehmann's Beautiful Barn at Lake Villa, Ill.
Louden Planned and Equipped*

The Loudon Archi- tectural Department



Wm. Loudon
Pioneer Barn
Specialist

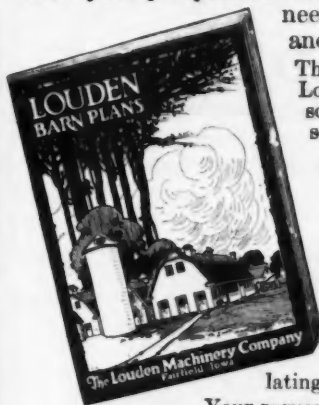
is the most complete organization of its kind in America devoted exclusively to the practice of barn architecture. Every member of the staff is a barn specialist.

This organization can be of material assistance to you in your barn building operations without cost to you. Its service is valuable and comprehensive.

Let These Men Help You Plan Your Barns

Let us show you how complete and convenient, roomy and labor-saving, warm and well ventilated a moderate priced Loudon-planned barn can be.

Show your prospective client suggestive sketches and blue prints specially designed to meet his individual needs. They will give you a decided advantage over less aggressive competition and help you land valuable contracts.



The Loudon Architectural department is in reality a SERVICE DEPARTMENT of The Loudon Machinery Company. Consequently much of the valuable service it renders is absolutely free. There is no charge for preliminary sketches and suggestions or for advisory service. Complete working plans and material lists are furnished at actual cost of production.

➔ This Valuable Book of Plans Free to Contractors and Carpenters

Don't fail to get a copy of "Louden Barn Plans," our 112-page book of practical farm building plans and dollar-saving information on barn construction.

If you build barns you need this book. It contains more than seventy representative plans for barns and other farm buildings, with full description and estimated cost of each; also many pages devoted to grading, drainage, concrete work, lighting, ventilating and other important factors in barn building.

Your request on a post card will bring you this valuable book, postpaid. No expense. No obligation. Write for it.

The Loudon Machinery Co.

(Established 1867)

5511 Court Street, Fairfield, Iowa

The Loudon Mach. Co.,
5511 Court Street,
Fairfield, Iowa

Please send me, postpaid, the
book checked below.

- ☐ Loudon Barn Plans
☐ Your Complete Catalog

Name.....

P. O.

State.....

Manufacturers of
Stalls and Stanchions
Litter and Feed Carriers
Barn and Garage Door Hangers
Animal Pens
Water Bowls
Horse Barn Equipment
Hay Unloading Tools
Cupolas and Ventilators
"Everything for the Barn"



Why the Architect and Contractor Should Advertise

Advertising is selling by means of publicity. If it were possible and economical for you to see all of your prospective clients in person and show your ideas or tell about how you can help them, there would be no need for printed advertisements. But the architect and contractor cannot expect all prospective clients to come to his office voluntarily, nor can he expect all to see samples of his work.

The recommendation of satisfied clients is good advertising, but it is not ordinarily sufficient in itself to build up a large business quickly. The distributing of samples is excellent advertising, but hardly practical in your case. Besides, you may want to sell your experience and your services in other towns and cities than your home location. Therefore, newspapers, street car cards, mailing cards or folders, personal letters or some similar form of advertising should be used. Instead of reaching one or two persons at a time with the spoken personal solicitation, your advertisement, with its printed sales talk and, if possible, pictures of finished work, and testimonial letters, reaches hundreds of readers.

The object of your advertisement is not always to complete a sale. It may do so and require only your personal closing of the deal, but your main object is to attract the reader's attention to you and your work and draw him to you when he is in the market for your services.

You can readily see the advantage of having hundreds of home buyers, business men, auto owners, farmers, etc., thinking of you and your work, rather than the few with whom you could otherwise come into personal touch.—"Doo-R-Ways."

"Caveat Emptor"

By the Man from the Lumber Yard

(Continued from page 41.)

Having always been interested in young men I had quite a chat with him when he came home from school, and in the course of our talk I asked him, what his motto was. With that cocksureness of a young chap just out of school, and with the freedom used in addressing an old friend of the family, he promptly answered: "*Caveat emptor.*" It was too deep for me, but being called away just then I was unable to inquire the meaning which I learned later, was "Buyer Beware."

Juggling vs Merit

About a year later I stopped off to see the C. Schmidt & Son Company, and found that the father had died and the young man was doing a most excellent business. I remarked to him that evidently "*Caveat emptor*" was winning out. He told me that his father had had old fashioned ideas about taking care of his customers, giving full value, etc.; but he was for making the money. The old way was too slow. He figured that with the completion of contracts on hand he would clean up more than his father had in any two seasons. He said that there were always ways to beat specifications. He had much more to say along the same line.

(Continued to page 160.)

Our Free Plans Will Help You—

Meadows
TRADE MARK REGISTERED

Don't figure on any crib or granary without consulting our Free Plans. They will show you how to get greatest capacity at least expense by installing Meadows Inside Stationary Cup Elevators.

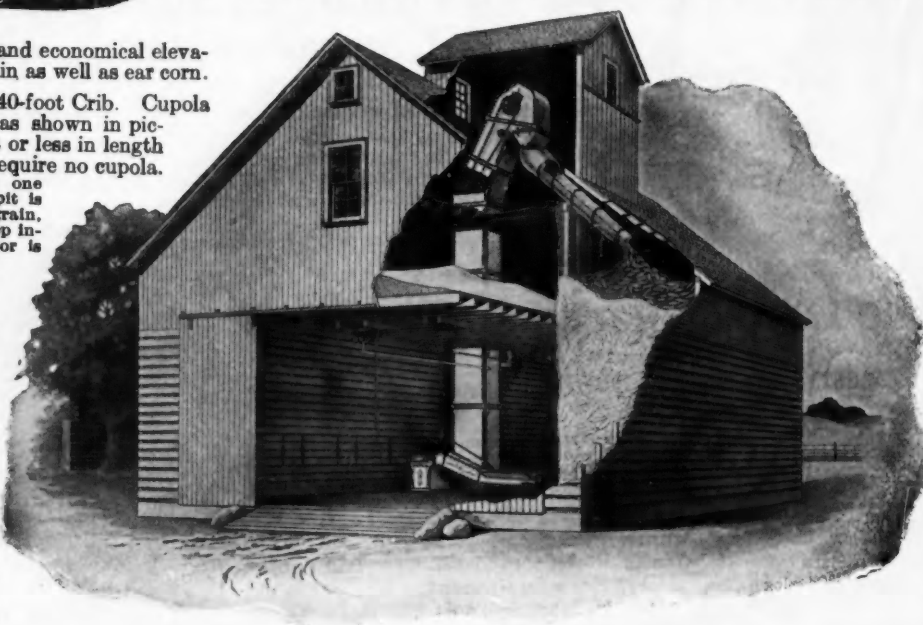
The most convenient and economical elevators, carrying small grain as well as ear corn.

The picture shows a 40-foot Crib. Cupola need not be as large as shown in picture; and cribs 36 feet or less in length with half-pitch roofs require no cupola.

Elevator is confined to one side of driveway. No pit is necessary for dumping grain, just a hole 16 inches deep into which boot of elevator is set. The wagon jack is entirely overhead, fastened to the joists.

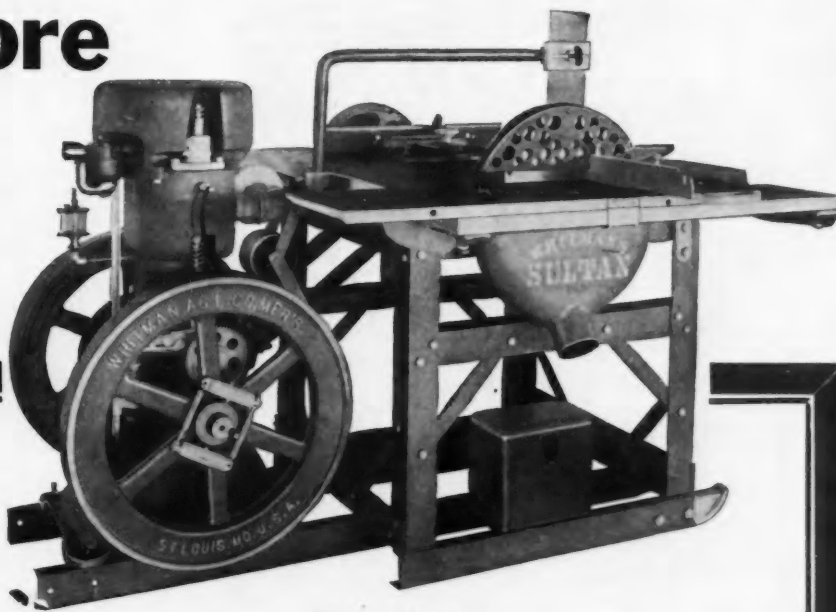
But write in today for our free Crib and Granary plans, catalogs and large posters telling all about our outfits and their application. Valuable information for the builder, and writing for it obligates you in no way.

**Meadows
Mfg. Co.**
Pontiac, Illinois



Look before you buy!

**SEND COUPON FOR
SPECIAL PRICE ON
THE SULTAN**



The Portable Sultan

You ARE or WILL BE in the market for a saw rig outfit! Or maybe you use nothing but hand sawed work or send all work to the planing mill.

Whatever it may be in your particular case you, being in the building field, are interested in the quickest and most economical way of getting your millwork done.

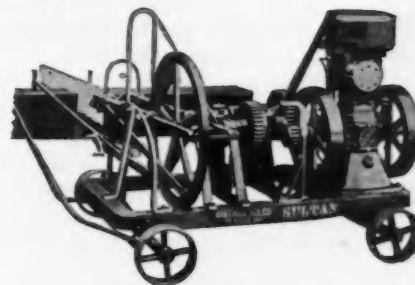
Read this description of the Sultan Portable Saw Rig as follows—study the illustration above—examine a Sultan in operation if possible—before you buy.

The Sultan Saw Rig is made from a good grade of gray iron and the surface is finished perfectly. The frame is steel made from heavy angle iron, hot riveted together, thus insuring perfect rigidity, but light in weight.

The cross cut saw and rip saw is provided with a gravity blower to carry away all sawdust from the engine. The size of the table top is 41 $\frac{3}{4}$ inches by 36 inches, built of iron entirely, to give long life and continuous service. The rip and cross cut guides slide in iron grooves, the rip gauges being adjustable so that lumber can be ripped and planed on the bevel. Belt tightener is fastened to bottom of frame and is so situated to permit easy adjustment at will. The saw has jointer head, dado or groover head

boring outfit, sanding disc emery wheel, and jig saw if desired, but we do not recommend a jig saw because they are not practical from an economical standpoint.

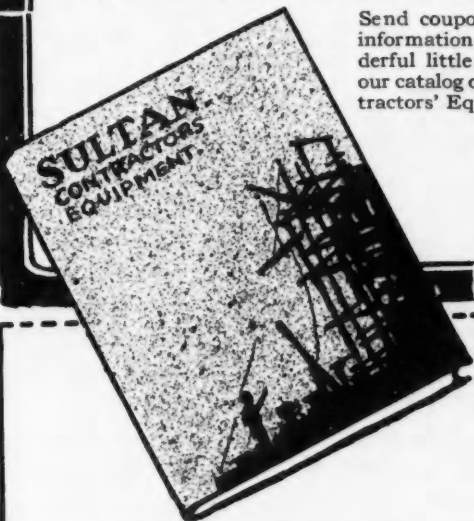
The engine we build for this saw is a special 5-horse power, high speed, 4-cycle water cooled unit engine, and it is low in height to accommodate table.



Combined Engine and Saw Rig

This is the Whitman Combined Engine and Drag Saw, consisting of a Whitman's Steel Drag Saw connected directly through 4 sets of gears to water cooled 4-cycle engine, mounted on a heavy all-iron truck. Ideal for builders, contractors. Saws heavy timbers as they lie on the ground. Slow, tedious handsawing entirely eliminated.

Send coupon for further information on this wonderful little machine and our catalog of Sultan Contractors' Equipment.



Whitman Agricultural Company

7304 So. Broadway, St. Louis, Mo.

MAIL THIS COUPON TODAY

For Our Special Low Prices and Catalog of Sultan Contractors' Equipment

Name.....
City.....
State.....

3WAY DOORS for Sunlight and Safety

**Build to comply with
the ordinances of
your city—**

EVERY requirement of your client has been considered in the construction of 3-Way Sidewalk Doors.

They are watertight and absolutely flush with the sidewalk.

The frame of the Type "C" door is of wrought steel channel construction, welded at the mitred corners and is absolutely watertight. Both types of frames are drilled and tapped for drainpipe connection. Shipments can be made on Type "C" door in 2 or 3 days' time.

The frame of the Type "D" door is cast in one solid piece of iron in the shape of a gutter, and deliveries can be made in from 4 to 6 days' time.

The hinges in both types of doors are of heavy brass concealed in the gutter affording no stub toe.

The door leaves are of exceptionally light and rigid steel construction and open easily without the use of clumsy mechanical contrivances, and are automatically locked when closed.

Both types of doors are furnished in either illuminated or diamond top. These doors are easy to install, and are sure to give your client satisfaction and allow you a good margin of profit on the sale and installation.

*Write today for our illustrated catalogue of
3-Way Prism Products*



Type C Sidewalk Door

**The American 3-Way
Prism Company**

La Porte, Indiana

Eastern Office: Spring & Wooster Sts., New York, N. Y.

"Caveat Emptor"

(Continued from page 158.)

It was four years before I had occasion to visit that section of the country again. Before reaching — I made inquiry as to how Schmidt was getting along, and learned that he was busted.

It was the old story of reaping the sowing. The harvest of sharp tricks is always thorny.

Schmidt kept within the law. His schooling enabled him to do that. Because of his skinning down process, he made more money on his contracts than anyone else, but he finally paid a big price. He lost in one season the heritage of a good reputation which was left him by his father. One instance of his duplicity was especially pathetic. He had bought a lot and put up a showy bungalow. It was equipped to be heated by hot air, but the furnace was not put in. He priced it at \$3,100.00. Learning that an old lady in the town had received some money, with which to buy a home, from her son who had been prosperous, he called on her, secured her interest in this property and took her to see it the next afternoon. This was late in October. He timed it so they reached the house about 5 P. M. He showed her the conveniences of the house, the registers, etc. The old lady talked more about his father, whom she called "Carl," than she did about the house. She knew that what Carl's son did was right. She only had \$3000.00, but Schmidt consented to turn the house over to her for that sum and the papers were drawn and money paid the next day. In about a week the old lady having had coal put in, moved her belongings, and on going into the basement, discovered that there was no furnace in.

She hastened to see Schmidt, but he laughed at her, and told her that it wasn't his fault she hadn't looked in the basement. One of her friends had an attorney look the matter up, but he saw at once that she had no case. Before the furnace could be installed a cold rain set in and she died from pneumonia.

Several other transactions of a shady sort, and his constant skinning of the job placed him under suspicion.

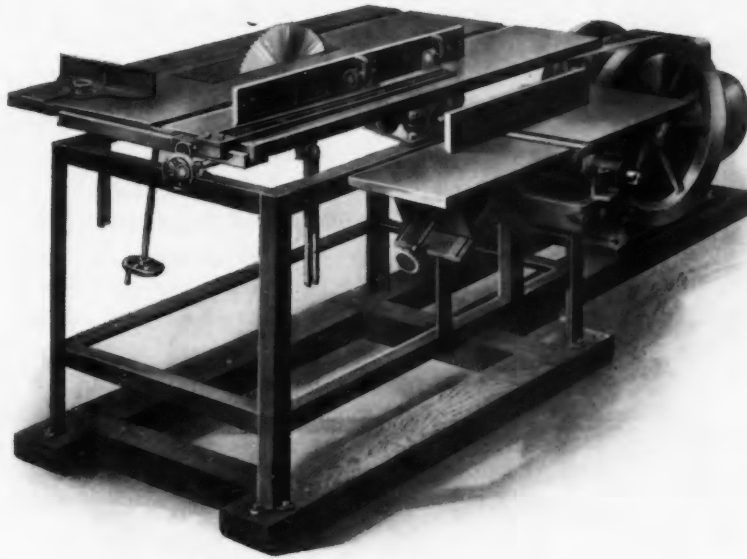
The Political Pull That Failed

Schmidt was quite a politician and when the new Court House was to be built he pulled wires and secured the contract. It was a half million dollar building, but he secured the backing of his bank on the showing of profit that he figured. The unfortunate thing for him was that his gang was thrown out of office just as the building was completed, but before it was turned over to the county.

The new people found that the escutcheons were plated in place of genuine bronze, and that only a few of the vertical steel columns in the frame which

(Continued to page 162.)

The Machine You Are Waiting For!



A New Portable Woodworker

Here It Is!

An iron and steel construction, electrically welded, (except skids of yellow pine) insuring EVERLASTING rigidity.

This practical Woodworker with its PATENTED features is the result of the inventor's ten years' experience and experiment with all types of woodworkers.

This woodworker is faultless in design! It will POSITIVELY perform the work expected of INDIVIDUAL machines.

Ask us about our *new* PATENTED features! Ours is a machine that can be operated RIGHT HANDED, something that has NEVER before been accomplished on a PORTABLE WOODWORKER. Our machine establishes a precedent—do you know what this means? The labor-saving advantages of FOUR separate and distinct machines, combined, each retaining its individual value, AND AT THE PRICE OF ONE.

Write us for circulars and data, with complete information on this efficient, labor-saving woodworker.

You Want It Now

Act Today



Local Agents Wanted

50 Church St.

MANUFACTURED BY
HERCULES MACHINE COMPANY

MACHINERY MERCHANTS, Inc.

DISTRIBUTORS

New York

"Caveat Emptor"*(Continued from page 160.)*

were easily gotten at were fireproofed with concrete, as per specifications.

Of course all this was played up in the press and the bank had to take over all of Schmidt's assets to protect themselves. A settlement was made so that the bank lost very little, but Schmidt was wiped out.

No one save his own family felt any grief.

No man whose motto is "*Caveat emptor*" ever has, nor ever can make a permanent success.

The Ant as a Result Getter

Did you ever consider that every building job is merely the repetition of the same process used by the ant?

It is the same working together along a preconceived plan that makes possible our great railway systems with their magnificent terminals which are the wonders of the world.

Some time since it was necessary for me to meet several men from various sections of the country in New York. I was unable to get reservations on the Pennsylvania train which was being taken by one other delegate to the conference.

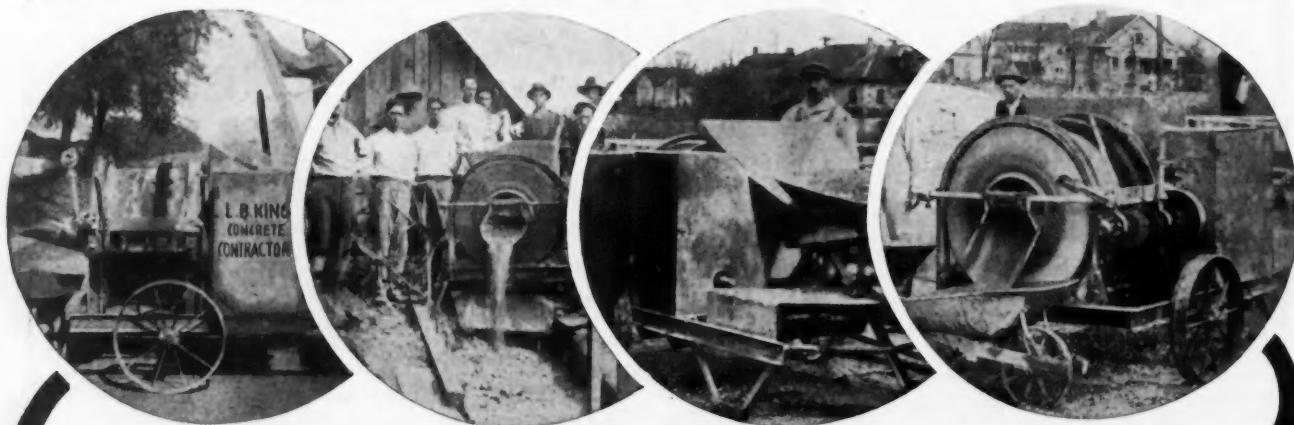
That morning I had over four hours to clean up my work before I stepped onto the 20-hour train at the La Salle Street station, which is no insignificant

pile of brick and mortar costing some five millions. I knew that my friend was leaving that old rookery known as the Union station at the same instant. It naturally brought to mind the sixty million dollar station that is now being built to take its place. When I was a youngster we used to run races around the block, one going around one side and the other around the opposite side. Some times one of the runners would forget that his competitor was on the job and slacked his pace.

A Thousand Mile Race

All the way to New York that kept in my mind. My steed was undoubtedly on the job as he rushed my coach into Cleveland, thence to Buffalo and Albany and began the long home slide down the banks of the Hudson. As I sat with the Pennsylvania folder in hand and followed in my mind my friend from the time he raised a dust in the sand hills around Gary and across Indiana and Ohio, I could not see any handicap for him until he got into the Alleghany mountains, but I knew that he was given an extra horse to get him up over the horseshoe bend down into Altoona.

When I arrived at the Grand Central Depot, a structure that cost as many millions as Uncle Sam has invested in forts, I did not tarry, but hastened into the subway and was soon signing my name in

(Continued to page 164.)***Always on the Job--*****"Little-Devil" Mixer*****A Bigger, Better Mixer for the Same Money***

Capacity 7 cubic feet of loose material. Low Charging—End Discharge—May be used for Paving, Grouting Brick Pavements, Foundations, Sidewalks and will mix and place concrete quicker and at less labor cost than any mixer on the market. Write today for catalogue, prices and terms.

Chicago Builders' Specialties Co.

1461 Lumber Exchange Building, 9 South LaSalle Street, Chicago, Ill.

The Hobbs Block Machine

Positively the Leading Machine

Although the Hobbs is the last word in the art of block making, it is the lowest priced good machine made. Makes common block or the finest Broken Ashlar work, uses the wettest concrete, and positively is the fastest, and we can prove it.



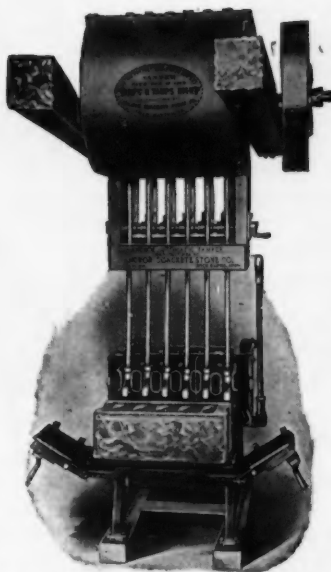
Made in Two Sizes 16" and 24" Machines

Only the Hobbs has Composition Face Plates, Automatic Dividing Plates, and a range of over two thousand distinct sizes of blocks. Can you beat it?

Get our Catalogue and our terms for time or cash

HOBBS CONCRETE MACHINERY COMPANY
GEO. M. FRIEL, Mgr. 234 Hamilton Ave., COLUMBUS, OHIO

Anchor Automatic Tampers FIT ANY BLOCK MACHINE



Anchor Tamper over Hobbs 24" Machine

or any brick machine. These tampers will save enough in cost of labor to pay for themselves in sixty days and also produce blocks perfectly stamped. You can prove this to your own satisfaction in your own way. We will ship an Anchor Tamper on

FREE TRIAL

We will install it and if it suits you we hope to make a sale. And we agree to furnish, free of charge, any or all parts that break or wear out within three years from date of purchase. Each machine has this

THREE YEAR GUARANTEE

Write today for full information as to this GREAT FREE TRIAL OFFER — mentioning the make of block or brick machine you operate.

Anchor Concrete Stone Co., Rock Rapids, Iowa
Geo. M. Friel, Eastern Agent 234 Hamilton Ave., Columbus, Ohio



A 20-in. Hollow Pier of Hobbs Broken Ashlar



Quality Retailers Sell PEARL— the Quality Screen

YOU'LL find genuine G & B PEARL Wire Cloth on sale at the best retail stores in America. No other screen material made offers so many distinct advantages for door, window and porch screening as G & B PEARL Wire Cloth. That's why merchants whose policy is "quality first" sell and endorse it.

The first requirement of wire cloth is—durability. Rust, not wear, ruins screens. G & B PEARL resists rust and outwears painted and galvanized cloths so far that there is no ground for comparison. The process which makes PEARL so durable is a secret of The Gilbert & Bennett Mfg. Co., consequently no similar cloth *can* be "just the same" in wear or manufacture. Make sure you get the genuine by looking for the marks of identification. Two Copper wires in the Selvage and a Round Tag on each roll of G & B PEARL Wire Cloth. Insist on seeing them.



There's a retailer near you who sells and recommends G & B PEARL for permanently screening doors, windows and porches. See him or write us direct for samples and literature. Address Dept. A.

The Gilbert & Bennett Mfg. Co.
New York Georgetown, Conn. Chicago Kansas City

*Pearl is made in two weights—regular and extra heavy
The best Hardware Dealer in your city sells PEARL*

"Caveat Emptor"

(Continued from page 162.)

the big book. As I told the clerk the kind of a room I wanted, a voice at my side said: "Give me a room next to his." My friend had arrived only two minutes later than I. We found our confreres at once, and by dinner time had practically completed our business. The next time I meet one of you fellows in New York, I want you to take dinner with me at the same place. **SOME DINNER.** I can't tell you about it.

By noon the next day we had all of our work cleaned up and my friend having said he enjoyed himself more when I wasn't on the same train, and knowing I could work better if I didn't have him along, we decided to come back on each other's routes.

The Big Man of the Pennsy.

When Cassatt was President of the Pennsylvania R. R. Systems, he was greatly annoyed by the advertising of the N. Y. Central lines that they landed people in the heart of New York. He knew that as far as transcontinental traffic was concerned he could not be in the same class as the N. Y. Central, as long as they had the handicap of the ferry over the Hudson.

Engineer after engineer said it couldn't be overcome, but he said it **MUST**. Finally, one man showed him how to do it, but it would cost millions.

That was the period when markets were panicky and money hard to get. Nothing daunted, Cassatt raised the money, and almost singlehanded against the judgment of the majority of his board of directors, he put it thru. It cost over a hundred million, but now the Pennsy also places her passengers in the heart of New York; in fact, within walking distance of many of the best hotels.

In addition to raising the money for the tube under the Hudson, Cassatt raised the money for one of the most wonderful stations ever built in the world. It is very fitting that his memory should be preserved in bronze.

Honor to a Great Builder

As I stood with uncovered head before this bronze figure in the corridor of this wonderful station, and considered the MAN and the way he had BUILT, and some who met ignominious ends by attempting the short cuts of graft and cheat, I couldn't help but consider that the same law operates, whether in the METROPOLIS or VILLAGE, and no one is swift enough to beat it.

What made the difference in the building by Cassatt and Boss Tweed, who grafted himself into the penitentiary in the building of the City Hall of New York? That same difference is found in every city around the globe. While I care for others, I espe-

(Continued to page 166.)

Better Roofs When Laid With



YOU CAN MAKE better roofs by using Zinclad Shingle Nails. They are cheapest in the long run—for *you, because of easy driving qualities—for the owner, because they are everlasting. Get these nails from your local lumber dealer with every purchase of shingles.

W. H. Maze Company - Peru, Illinois

"Caveat Emptor"

(Continued from page 164.)

cially reach out my arms in warning to my family of readers and shout BEWARE.

Which Do You Choose?

It is easy to lie, hard to face facts.

It is easy to skimp, hard to give full measure heaped up and running over.

It is easy to be bogus, hard to be real.

It is easy to be blind to full specifications, hard to see the full letter of the law.

I would not write one word to a bigot or a Pharisee. But to the men who are responsible for the building of this generation, I would say: Build so your grandson will point with pride to your work.

Let your ideals stand for honesty in building.

From the man who drives every nail home, to the one who writes the specifications of the skyscraper, there goes out an influence that unconsciously affects your fellows.

The MAN of all the world that has touched more lives, made most for the welfare of mankind, was a carpenter. I have never seen a blue print of his structures—I doubt if they were valued at millions. While a carpenter he was a teacher—a teacher who lived as he taught. Let us build as was taught by the Carpenter of Nazareth.

THE MAN FROM THE LUMBER YARD.

Fundamentals of Reinforced Concrete Designs

(Continued from page 47.)

per cent of the area. More than this amount is wasteful, for it adds little strength. The spiral does not act until the concrete begins to fail and as it postpones the total failure the effect is the same as increasing the strength of the concrete in compression so we can use 20 to 25 per cent higher unit stress, depending upon the building ordinance followed. Steel in the form of a spiral, provided it has a pitch not exceeding one-sixth of the diameter, is 2.4 times as effective as the same amount placed vertically. The vertical equivalent of spiral steel is found as follows:

Let c = circumference of the core in inches.

x = pitch of spiral in inches.

a = cross sectional area of steel used for spiral.

A = Area of core in sq. in.

Then the equivalent ratio of spiral per foot of length

$$= 1.1 \left[\frac{ca}{Ax} \right]$$

The strength of the hooped column is

$$P = f_c (A_c + nA_s + 2.4nA_h)$$

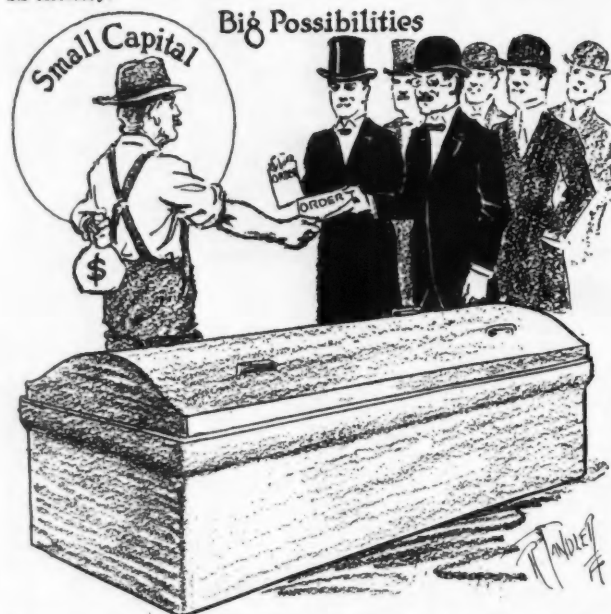
in which A_h = area of spiral steel, in terms of vertical steel.

$$P \text{ or } f = \frac{P}{A} = f_c [(1-p) + np + 2.4np']$$

(Continued to page 168.)

"200% Profit in my Second Year"

UP in a little town alongside the Hudson is a live man. Some day he will be a rich man. For, in a little over two years, he has not only created a business of his own, but doubled his equipment and tripled his territory.



THREE years ago this summer, he first heard of the Norwalk Vault. Scraping together \$450 he took over the franchise for his County. He kept his regular business position, working at his vault business at nights and odd times.

WITHIN a year his profits had paid back his original investment, and left him a hundred dollars or so to the good besides. In his second year he cleared more than 200 per cent profit.

ALL this was done, mind you, outside his regular working hours, and, in a dark, low cellar. He had no one to help him, and no capital. Now, however, things began to change; he moved into a shop with plenty of light and air, resigned his position to devote all his time to developing his own business. In another year, he was independent with money in the bank.

OF course, the man we would rather hear from is the one a little surer of success—the man with enough capital to go into vault manufacturing for his locality in a way big enough to make it a pleasure rather than a struggle. With the Norwalk Vault it is just as easy—and a good deal more certain—to make 200 per cent on an investment of \$4,500 as on one of \$450.

THE amount of money required varies directly with the size of the territory occupied. Even in the large cities, though, the capital necessary is astonishingly small compared with the possible returns. You won't need an expensive factory—any respectable shed will do; nor high priced labor—any intelligent laborers can do the manufacturing; nor any large sum tied up in machinery or materials—a few dollars at a time will keep the work going.

EVERY day, therefore, the franchise to manufacture the Norwalk Vault in any territory becomes increasingly valuable. Nearly half of the United States has in the last six years already been taken over by local manufacturers. If your territory has not, we will invite you to compare the opportunities of the Norwalk Vault with any other business you can find.

Look through the advertisements in this or any other magazine; see if you can discover any other article, patented and trademarked, with a sale based on as unchanging a thing as the human death rate, that you can develop exclusively in a protected territory, and cash in on as fast as the article becomes known to the public.

IF the idea appeals to you—and you have the energy and capital adequately to take care of your territory—write us for the details. We'll be glad to answer fully and frankly every question in your list, no matter how long. No obligation whatever on your part. Address

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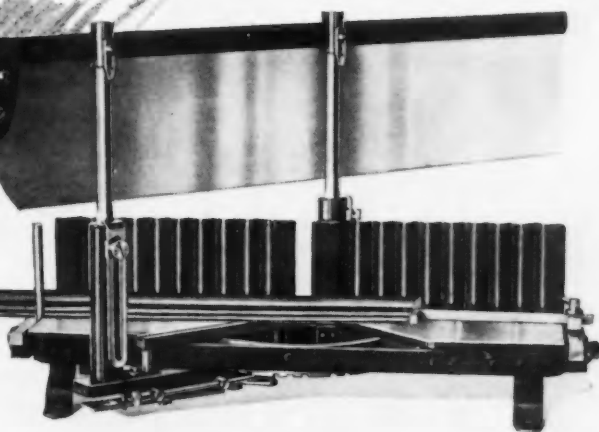
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MADE BY THE STANDARD PAINT COMPANY, NEW YORK, BOSTON, CHICAGO
Look for the "Ru-ber-oid Man" on every roll of genuine Ruberoid

Reinforced Concrete Designs

(Continued from page 166.)

in which $p' =$ ratio spiral steel expressed as equivalent vertical steel.

In Fig. 2 is shown a beam bending under load. In the middle of the span is shown a vertical line Ac , an extension of a radial line. On one side of this line is a radial intercept $A'b$ and on the other side a radial intercept $A''d$.

Provided the material is homogeneous, that is, uniform in quality and strength, and is not stressed beyond the elastic limit, a vertical section plane before the beam bends is plane after it bends. That is, Ac is straight before the load is applied and the lines Ab and $A''d$ are also straight, altho the horizontal separation bc is greater than AA' and cd is greater than AA'' . In Fig. 3 the line $A'b$ is assumed to be moved across Ac so the space $AA' = b'c$. This is equivalent to revolving the line Ac until it becomes $A'b'$, parallel to $A'b$.

In Fig. 4 this is again shown to illustrate the two force triangles, the upper one representing compression and the lower one tension. The material being homogeneous the neutral axis $x \dots x'$ is midway between the top and bottom edges. The force triangles are therefore equal, the stress being zero at the neutral axis and a maximum at the edges. The maximum unit stress (skin stress some men call it), is designated by the letter f . The average stress is $\frac{f}{2}$. The area

of each force triangle is $\frac{f}{2} \times \frac{h}{2} = \frac{fh}{4}$.

We have been considering a thin slice of a beam, and as a beam has breadth we will use the letter b (breadth) to designate this. Our force triangles now become wedges each with a volume $= \frac{f h b}{4}$.

Forces act thru the center of gravity of bodies and the center of gravity of a triangle is $\frac{h}{3}$ from the base. The distance between the center of gravity of the two force triangles is $\frac{2h}{3}$ as shown in Fig. 4.

The total compressive force is equal to the total tensile force exerted to resist bending and each force wedge acts with a moment arm $= \frac{2h}{3}$, so we obtain the

moment of resistance by multiplication, thus:

$$M = \frac{2h}{3} \times \frac{f b h}{4} = \frac{2 f b h^2}{12} = \frac{f b h^2}{6} \text{ for a rectangular}$$

beam of homogeneous material; that is, one in which (below the elastic limit) the tensile strength equals the compressive strength.

(Continued to page 170.)

The Roof You Put On

—can make or ruin your standing with your clients. A shoddy, leaky roof is one of the greatest causes of dissatisfaction. Don't take chances with inferior roofing materials. Use

BAYONNE Roof and Deck Cloth

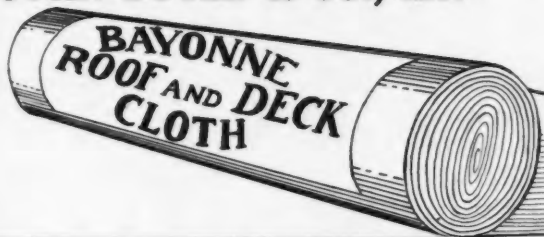
Bayonne makes the roof absolutely water-tight. Laid on dry boards. Can't crack or peel as ordinary roofing canvas does. No buckling as with metal. **Bayonne** is made by a special process that resists the weather. It is the best you can buy—and the most economical. It's honest value.

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Waterhouse & Price Co., Los Angeles
The Pacific Building Material Co., San Francisco

Reinforced Concrete Design

(Continued from page 168.)

In Fig. 5 is shown a beam of two pieces with a hinged joint. In the top of the joint is a block of rubber and at the bottom is a coiled spring. When a load is placed on top the beam will, of course, bend at the hinged joint. It requires no effort of imagination to prove that in the top of the open joint the tendency to close is opposed by the rubber and in the bottom the tendency to open is opposed by the spring. Actually the hinge midway is not required. It merely locates definitely the position of the neutral axis, and to consider the hinge as a necessary feature is likely to confuse one as to the action of resisting forces in a beam. The neutral axis is the point where the character of stress changes from tension to compression, or from compression to tension. In a beam of homogeneous material, that is, one in which the tensile and compressive strengths are equal, with symmetrical cross-section, the neutral axis will be midway between the top and bottom surface, or skin. At the skin the stress is a maximum. At the neutral axis it is zero. A diagram illustrating this is triangular and is termed a force triangle.

In Fig. 6 (a) the compressive triangle has vertical lines and the tensile triangle has horizontal lines. Each triangle overlaps the other and the heavily shaded diamond center indicates a cancellation of one force by another.

The remaining effective stresses are shown in Fig. 6 (b). The neutral axis is therefore the point where the tensile and compressive stresses are definitely separated. In a beam with a finite breadth, for we have been considering only a thin vertical slice, the neutral axis becomes the neutral plane. The use of the word neutral implies a point, place or plane where

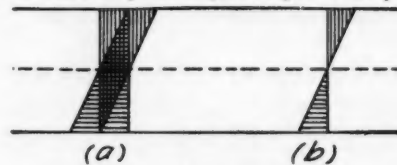


Fig. 6

Heavily Shaded Diamond in (a) Represents Cancelled Forces. Remaining Effective Stresses Are Shown in (b).

there is definite neutralization of opposite forces, or stresses. The force acting along the neutral plane is therefore horizontal shear, for the forces acting on either side are opposite in character and equal in magnitude.

The principle of the lever is evident. The length of the lever arm is the distance between centers of gravity of the opposite forces and the fulcrum is situated in the neutral plane.

In a reinforced concrete beam steel is placed near the lower edge to take all the tension, for, roughly speaking, concrete is ten times stronger in compression

(Continued to page 172.)

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Sinks, Slaters' Tools, etc. Write for our New
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Custom made to “fit” your Roof. A wide
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Slate roofs 50 years old are common.
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Slate is a perfect fire protection.
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Always dignified and attractive.

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Saves 15 to 30 Days' Time in Building

THINK what it means to you to be able to go right ahead with your interior finish without having to wait for plaster to dry. But that's not all—there's no running back to refit windows and doors, as the house is free from moisture. And when the last nail is driven, the house is ready for occupancy, free of all odors or dampness caused by new plaster.

But the saving in first cost of building is not the only thing in favor of Compo-Board. First cost is last cost. It cannot fall off, crack or dent and if the wall happens to get bumped with the corner of a table, chair or door knob, when the door is thrown open suddenly, there will be no hole.

The wood core of the genuine Compo-Board is what gives it such great strength, durability, moisture-proof, non-warping and non-shrinking qualities. No other wall board is made with the wood core, so be sure you get Compo-Board when you ask for it.

Sold by dealers in strips four feet wide by one to 18 feet long.

Write for sample and interesting booklet.

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To The Standard Paint Co., New York.

The Impervite Stucco work is the best job in the County, not a hair-crack in the whole building.

Carbon Cement Block Company.

To The Standard Paint Co., Chicago.

We tried everything to overcome water seeping through the cellar wall. Are now using the room for pianos and there is no sign of dampness.

Bell Brothers Music Company.

To The Standard Paint Co., New York.

The pit goes twenty-five feet below water level. It was originally waterproofed with ten layers of tar and felt, which failed. The Impervite system was decided on and a $\frac{1}{4}$ " inside facing was applied in 1912 and has been absolutely successful.

Isaac Hopper Sons, Inc.

To The Standard Paint Co., Boston.

We ordered 5000 lbs. of Impervite for plastering several reservoirs. We have had no leaks, we have had no cracks and it has held on a stone wall where we very often had trouble in being able to hold the cement plaster.

Frederick & Bradenbaugh.



Your Reputation Demands

UPSON PROCESSED BOARD

—the Most Dependable Wall Board

Made in America

Contains no dirty, black materials or cheap, punky "jack pine" fibers.

Write for Samples and Information

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LOOK FOR THE FAMOUS BLUE CENTER

Reinforced Concrete Design

(Continued from page 170.)

than in tension. In a plain concrete beam the neutral plane will be very high because the tensile and compressive forces must be equal. The tensile stress will be low and the compressive stress will be high, but the lever arm is a constant. The relative volumes of the two force wedges will be approximately as 10 is to 1.

When steel reinforcement is used the area required is computed on the assumption that it will carry all the tension and the value of the concrete in tension below the neutral axis is neglected. The tensile stress, therefore, does not vary from zero at the neutral axis to a maximum, but the compressive stress above the neutral axis does so vary.

The ratio of deformation between concrete and steel prevents the consideration of the value of concrete in tension. Experiments have shown that when steel embedded in concrete is stressed in tension to an amount practically equal to the tensile strength of an area of concrete equal to the steel area, multiplied by the ratio of deformation, the concrete cracks. The tensile strength per square inch in the concrete at the

level of the steel $= \frac{f_s}{n}$, in which f_s = unit tensile steel stress.

These cracks are vertical and fairly uniformly spaced. They probably extend as far into the beam as the neutral axis when the beam is on the point of failure. If the beam is well made and the bond of the concrete to the steel is good the cracks are so small, because numerous, that there is no danger of the entrance of moisture in large enough amounts to cause rusting of the steel. It is therefore possible to use steel with a very high stress, for the ratio of deformation is not a stress ratio as in the case of columns carrying direct compressive stress. In a column a high compressive stress on the concrete may strip it from the steel. In beams a high tensile stress in the concrete merely cracks it and the concrete between the cracks clings to the steel and protects it from corrosion. The vertical tension cracks in beams are shown in Fig. 7.

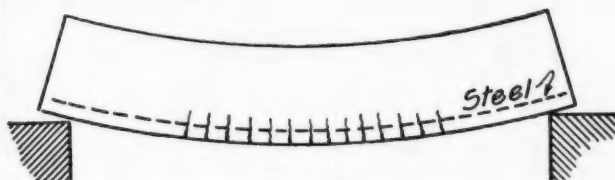


Fig. 7

Showing Vertical Tension Cracks.

The ratio of deformation plays an important part in determining the location of the neutral axis in concrete beams. In the Chicago Building Code the following values are used as a result of experiments:

(Continued to page 174.)

BEAVER BOARD



Count the Walls and Ceilings in Your Town

That would be a big job, wouldn't it? It would be a still bigger job to repair them all. Yet nearly every wall and ceiling in your community is a prospective job for the Beaver Board man. Besides all these, there are the walls and ceilings of new buildings. That makes it a pretty large field in which to work, but no matter how large, it's there and it always will be.

Be a Beaver Board Man

Can you see the possibilities in this field? Do you realize what it means for you?

We want high class workmen in every locality to take care of the demand for Beaver Board work which our national advertising is creating. The demand is growing greater every day.

The application and decoration of Beaver Board walls and ceilings offer endless possibilities to the man who wants pleasant, profitable, interesting inside work.

Write for literature and information regarding the Beaver Board design and decoration service. Free to carpenters and contractors.



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You can't expect Beaver Board results unless this trade-mark is on the back of the board you buy.

This Test
proves that
Moisture
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Ceil-Board
FOR WALLS AND CEILINGS
SUPERSEDES PLASTER

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Be safe, use Plastergon. Our customers say it has no equal at any price.

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Samples and our "Contractors' Practical Working Guide" sent free. Send the name of your Lumber or Builders' Supply Dealer. Write today.

Plastergon Wall Board Co.
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Reinforced Concrete Designs

(Continued from page 172.)

Mixture	Ultimate Compressive Strength Per Square Inch	Ratio of Deformation
1:1:2	2,900	10
1:1½:3	2,400	12
1:2:4	2,000	15
1:2½:5	1,750	18
1:3:7	1,500	20

The allowable safe unit stress per square inch is thirty-five hundredths of the ultimate strength in compression.

In the reinforced concrete we have two materials with widely differing unit stresses. The letter f is used to denote the unit stress per square inch, usually termed the "Fiber Stress." The unit steel stress is f_s and the unit concrete stress is f_c . The stress ratio $\frac{f_s}{f_c}$ is

denoted by the letter m (meaning "measure"). The ratio of deformation is denoted by the letter n (meaning "number"), for it is an arbitrary number which is approximately correct.

Figure 8 is a graphical representation of the effect n and m have on the location of the neutral plane in a reinforced concrete beam. On a piece of quadrille ruled paper plot the depth from the top of the beam to

the center of gravity of the steel by setting off ten divisions. Set off on the same scale the ratio of stresses (m) and the ratio of deformation (n) as shown. The depth of the neutral axis, k , may then be scaled. The

$$\text{exact value of } k = \frac{n}{n + m}$$

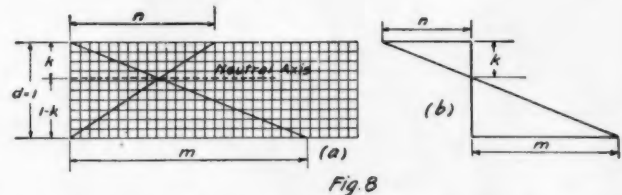


Diagram Showing Effect of n and m on Neutral Plane.

EXAMPLE. What is the value of k when $f_s = 16,000$ pounds per square inch and $f_c = 650$ pounds per square inch?

$$n = 15$$

$$16,000$$

$$m = \frac{650}{15} = 24.62$$

$$650$$

$$15$$

$$k = \frac{n}{n + m} = \frac{15}{15 + 24.62} = 0.378 d$$

Figure 9 shows the force triangle of the concrete in compression and steel in tension. To find the ratio of steel proceed as follows:

(Continued to page 176.)

The Secret of his success-

He gets the Cream of the jobs



"That's Jones the builder. He's making money. Shrewd business man! While other builders are competing against each other for every little job, the best jobs simply come to Jones because he has used Black Rock Wallboard in most of his work."

"His customers know how good Black Rock is, and recommend Jones. Jones says he is using Black Rock because he is building his business for the future. But the fact is, thanks to Black Rock, he is getting the cream of the jobs right now."



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1510 Ontario Place BLACK ROCK, N. Y.

The Black Rock Wallboard Co., 1510 Ontario Place, Black Rock, N. Y.
Please send me stock sample of Black Rock Wallboard and booklet showing Black Rock jobs
Signed (Your Name).....
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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

A
Deming-
Equipped
Home



Don't forget the water system—

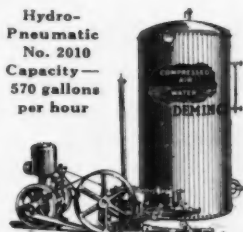
DON'T think that the job is finished or that your profit is decided until you have provided for the water supply.

DEMING WATER SUPPLY SYSTEMS

will please your customers and give them an easy-to-operate, dependable outfit. They are furnished with gas engine or electric motor drive in all styles and capacities to meet every need of home or farm.

Send for Catalog Write for the Deming Water Supply Handbook—a complete and detailed guide for you and your customers. Free on request.

Hydro-Pneumatic No. 2010 Capacity—570 gallons per hour



The Deming Co.
99 Depot Street Salem, Ohio

"More than 1000 types and sizes of hand and power pumps for all uses."

Water Works Plants

We Want, and Will Protect, good agents in every county

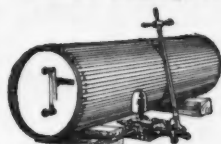


WE specialize in the designing and fabricating of water works systems to meet any and all requirements for which they are intended.

We make tanks (wood or metal) of every kind and towers of any height.

We have filled over 18,000 orders and have made installations in many parts of the world.

We want agents in every county to sell our water works plants and will allot a limited territory with full protection.



Simplex Pneumatic Systems Complete as low as \$42.

These plants have a world wide reputation and sell for as little as \$42 complete. Others up to the largest such as used by railroads, factories, and municipalities.

Send for Water Systems Circular No 49.

The BALTIMORE COMPANY
Baltimore, Md.

Going up?



HERE is your future charted for you, based on the actual average earnings of trained and untrained men.

Which way will you go? You'll either go *up*, through *training*, to a position that means good money and more comforts as the years go by, or you'll go *down*, through *lack* of training, into the ranks of the poorly paid.

It rests entirely with you which way you go. You can make or break your own future. And *now* is the time to decide. Not next year, not next month, but *now*. You *can* go up if you want to. You can *get* the training that will command a trained man's salary. The International Correspondence Schools have helped hundreds of thousands of men to qualify for advancement. Let them show *you* how *you* can prepare yourself, in your own home, for the position you want in the work you like best.

At least, *find out* what the I. C. S. can do for you, by marking and mailing this coupon. It will be the first step upward. Choose your future from this list, then get this coupon into the mail today.

I. C. S.
Box 8141
Scranton, Pa.

INTERNATIONAL CORRESPONDENCE SCHOOLS Box 8141 SCRANTON, PA.

Explain, without obligating me, how I can qualify for the position, or in the subject, before which I mark X.

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| <input type="checkbox"/> Concrete Builder | <input type="checkbox"/> Higher Accounting |
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| <input type="checkbox"/> Heating and Ventilation | <input type="checkbox"/> Common School Subjects |
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Name _____
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Street and No. _____
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If name of Course you want is not in this list, write it below.

This company is operating a Sales Service Department to help Carpenters get more work.

Whenever you install—

"GLOBE" VENTILATORS

you do three things—(1) you make a profit on the job; (2) you make a profit on the ventilator itself, and (3) you make a satisfied customer—which means more work later.

Our Sales Service Department will help YOU do these three things. Just write us on your business stationery and ask "How can you help me make money installing 'GLOBE' Ventilators?" Please address Dept. F.



**GLOBE
VENTILATOR
COMPANY**
TROY, NEW YORK

"STAR" Fire Retarding ★ Ventilators



Patented

"Star" Ventilators are simply designed and constructed from the best materials by expert workmen. The most efficient ventilator on the market.

Storm Proof—Durable—Attractive

Provide good ventilation and prevent the spread of flames upward through the roof. Send for illustrated booklet and prices.

Evans "Almetl" Fire Doors
"Merchant's Old Method" Roofing Tin

MERCHANT & EVANS CO.,
Philadelphia, Pa.

New York
Baltimore
Atlanta
Cleveland



Wheeling
Chicago
St. Louis
Kansas City

Reinforced Concrete Design

(Continued from page 174.)

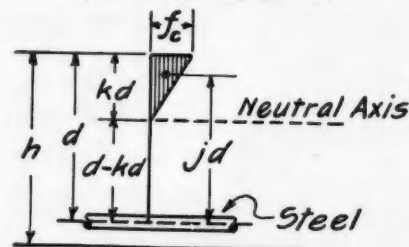


Fig. 9

Force Triangle of Concrete in Compression and Steel in Tension.

The total amount of compressive force is found by obtaining the area of the force triangle. The height

is ka and the average stress is $\frac{f_c}{2}$. The compression = $\frac{kdf_c}{2}$. We use kd for the depth, d , has a definite

value and k is the percentage of d . The moment arm, the lever, has a length = $d - \frac{kd}{3}$ or jd . ($j = 1 - \frac{k}{3}$).

The total compressive force in a thin slice, $C = \frac{f_c}{2} kjd = \frac{f_c}{2} kjd^2$

The tensile force $T = f_s A_j d$, in which A = area of steel in square inches. The steel ratio = $\frac{A}{bd} = p$, so it is necessary to introduce the breadth b , into the expression.

We now have

$$C = \frac{f_c}{2} k j b d^2$$

and

$$T = f_s p j b d^2$$

then $\frac{f_c k}{2} = f_s p$, provided $C = T$, which is the case for a

beam with "balanced" reinforcement.

Assigning values, $\frac{650}{2} \times 0.378 = 16,000p$ and

$$p = \frac{325 \times .378}{16,000} = 0.00767$$

$p \times 100 =$ per cent of steel = 0.767 (0.77%).

By formula $p = \frac{2m}{k}$

Assume a beam 6 inches wide with depth to the center of the steel = 9 inches. What is the resisting moment?

$$C = 325 \times 0.378 \times 0.874 \times 6 \times 9^2 = 52,242 \text{ in. lb.}$$

What area of steel will be required?

$$A = bdp = 6 \times 9 \times 0.0077 = 0.42 \text{ sq. in.}$$

Check the steel:

$$T = f_s A_j d = 16,000 \times 0.42 \times 0.874 \times 9 = 52,859 \text{ in. lb.}$$

(Continued to page 178.)

If you are about to build a

Cornerrib

Granary

Barn

Hoghouse

Coalhouse

Garage

Shed

or any building where you want to fasten studding to concrete, use

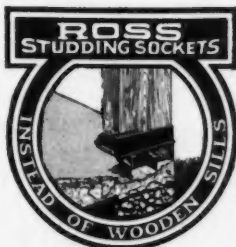
ROSS STUDDING SOCKETS

These post supports hold studding securely and permanently on either concrete floors or foundations. Easy to place, and economical, they please the careful builder and give satisfaction to every user.

Our new catalogue, well illustrated, gives many helpful suggestions for building concrete floors and foundations, setting uprights, etc. Yours for the asking—by return mail.

G. M. Ross & Co.

1434 Park Street
Grinnell, Iowa



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We are Members of
The Audit Bureau of Circulations
A Sworn statement in detail will be sent to anyone upon request.



Use It on the Job

Make it a Valuable Asset as well as a Convenience

Miami Trailers

enable the carpenter or builder to solve his hauling problems without extra expense or injury to his car.

They are equipped with a special shock-absorbing draw bar, attached to the chassis (not the axle) of the car and which prevents any strain in starting or stopping the car. The axles and bearing of the Miami are of the same grade as is used in automobile construction.

The Miami Trailer is made in several designs and special bodies can be furnished to meet the requirements of your hauling propositions.

Write for prices and descriptions.

MIAMI TRAILER COMPANY
TROY, OHIO



How Many Board Feet in 68 Pieces, 2x4--14?

DON'T figure Lumber by Pencil

Which is shorter, surer, SAFER?—
to figure board feet laboriously by
pencil, risking profits on an error—
—OR to take 10 seconds to

find the **RESULT** in this book,

a copyrighted "short cut" for lumber
users. Gives at a glance the number
of feet in any number of pieces, any
size. This 106-page time saver will
be sent on receipt of \$1.50. Use it 5 days
on trial—your money refunded without
question, if not satisfied.

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1202 Marshall Building
Cleveland, Ohio

ON 5-day trial - SEND \$1.50 today



**BANKRUPT
PRICE
\$47.50**

F. O. B. Jackson, Mich.

OUR MODEL 10 Auto Trailer, with 2" solid rubber tires, steel wheels, ball-bearing axle, automobile channel frame, heavy springs, and shackles, drop forge spring links, our famous all-way coupling, combination rack and delivery body 42"x70"x15" deep. Finished in a handsome Brewster green. Can you beat it? No. And neither could we if we had not bought the material from a large Automobile Company—at bankrupt prices!

THE MILES COMPANY
309 E. Franklin St. Jackson, Mich.

The Trailer Way Makes Autos Pay

We furnish an attachment
for Ford Cars at 75c extra



MODEL - 10
MADE BY
THE MILES CO.
JACKSON, MICH.

Reinforced Concrete Construction

(Continued from page 176.)

The greater resisting moment in tension is due to having used 0.42 square inches of steel, the exact area being 0.4158 square inches. The area of steel used is governed by the commercial sizes of bars and rods, or the expanded metal or wire fabric used. The actual steel area used will usually be greater than the theoretical area necessary.

Every reinforced concrete beam has two moments of resistance; one determined by the concrete, the other by the steel. The lesser of the two is the resisting moment which determines the actual strength. In designing slabs a width of one foot is taken, for a slab is merely a wide and shallow beam assumed to be made up of a number of beams each 12 inches wide.

Every reinforced concrete beam has two moments of resistance; one determined by the concrete, the other by the steel. The lesser of the two is the resisting moment which determines the actual strength. In designing slabs a width of one foot is taken, for a slab is merely a wide and shallow beam assumed to be made up of a number of beams each 12 inches wide.

For the Steel $R = f_s p j$. Then bending moment $M = R b d^2$

$$b = \frac{M}{R d^2}$$

$$d = \sqrt{\frac{M}{R b}}$$

To design a beam select stresses for the steel and concrete and find R . The value of M is the bending moment which is equal to, or is less than, the resisting

moment. Assume a breadth and solve for the depth, or assume a depth and solve for the breadth. T-beams are beams in which the floor slab is considered to be a part of the beam and carries the compression. The breadth, b , is the width in the floor slab and the stem below the slab must be wide enough to contain the reinforcement. The width necessary must include space between the bars and on each side to furnish bond and shearing strength.

Below the steel there must be a covering of concrete not less than the thickness of the steel, with a minimum thickness of one-half inch, this being for bond and fire protection. In all building ordinances minimum coverings of concrete are specified; as for example, one-half inch for slabs and one and one-half inches for beams, girders and columns.

(To be concluded in the May American Builder.)



Famous Scotch Bridge Restored

"The Auld Brig of Ayr," the bridge in Scotland made immortal by the poet, Robert Burns, has been completely restored, although the work of strengthening it was quite complicated. Concrete was the material used. The bridge has four spans of slightly more than 50-foot length, and is 12 feet wide between parapets. The piers formerly rested on 12 by 8-inch oak beams placed on firm boulder clay. Some idea of the age of the bridge is afforded by the fact that one of the spans was considered "new" because rebuilt only 200 years ago.

Buckeye Ventilators and Buckeye Service

offer a remarkable opportunity to contractors and dealers.

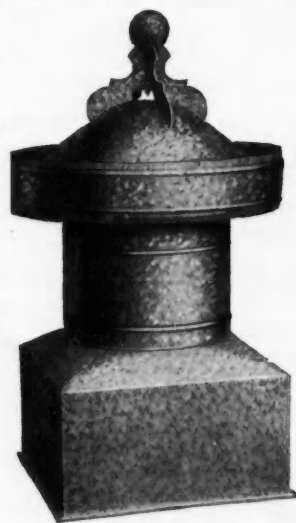
1. The Buckeye Ventilator is the easiest to install. Simply bolt it to the rafters.
2. The Buckeye Ventilator is the most scientific, because it conducts the air in broad curves, with no sharp angles. Storm proof, rain proof, bird proof.
3. Buckeye Service is complete without extra charge. Expert engineering advice, even complete plans, are offered without cost to the contractor.
4. Buckeye Ventilators offer a good profit and exclusive territory—and the first cost is the only one.



Cupola for Barns

Write for our proposition. See how simple and fair it is, how much we will assist the contractor, and you will want to close with us, for our plan protects the contractor and the dealer in every particular.

Write us today. Get a copy of our handsome Ventilator Book. It will help you sell ventilators that will please.



Ventilators for Factories, Storehouses, etc.

The Thomas & Armstrong Company

126 Union St., London, Ohio



ANY OF YOUR MEN CAN ERECT WILLIS SKYLIGHTS

A hammer and screwdriver, the only tools needed. Simple in construction and built from the best grade of sheet metal, heavily galvanized to withstand long wear. Every Skylight guaranteed not to buckle, sag or spread. Designed for the greatest possible glass area. Made in all styles to care for every skylight requirement.

The cost of Willis Skylights is moderate—freight charges are reduced by shipping these skylights knocked-down. Erection cost is low, as anyone can do the work. Entire satisfaction is the result after erected, for your clients and yourself.

THE WILLIS LINE

includes everything you can need in Sheet Metal Building Materials. We supply Ventilators, Fireproof Windows and Tin-clad Doors, Hoghouse Skylights, Canopies and Marquise, Metal Ceilings and Roofings, Ornaments, etc.

Our big illustrated catalog should be in the hands of every Architect, Contractor and Builder. Let us send a copy to you.

Willis Manufacturing Company
Galesburg Department "B" Illinois



MONITOR CUPOLAS

ARE: Made in all sizes and for all purposes. Reliable at all times and in all weather. Storm and bird proof, will not rust nor become dilapidated. Made only from the best grades of materials and are furnished with pure gold leafed weather vane. Shipped with base all put together in the factory, which makes them easy to erect, and they always go up straight and true.

The best Cupola for the OWNER, for the AGENT or for the CONTRACTOR, and the price is right.

We are making a special proposition to contractor agents in territory where we are not already represented. Write for particulars and catalog.

Lichty Metal Products Co.
Station A, Waterloo, Iowa

Get All The Profit

Profit is figured in two ways—that which you make on the job and the jobs your reputation brings you. Get both profits by recommending and equipping the barns you build with

Heavy Galvanized Steel CUPOLAS

They are easy to erect—shipped ready to install. Absolutely Bird, Storm, Rust and Rot proof. Neat in appearance. Every owner

realizes the importance of proper ventilation in his barns. O-K Cupolas solve the problem and sell themselves. Every one you erect adds to your reputation.

Special prices to Contractors and Builders where we are not represented.

Write For Full Particulars,
Sent FREE

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BERNARD CO.**

2400 Floyd Ave.
SIOUX CITY IOWA



"Tip-Top" Ventilators "Tip-Top" More Sun Windows

provide the greatest of all necessities—air and light—and make profit for the dealer and contractor and money for the user.



Constructed for greatest service, neatest appearance and to last. Send today for description of superior practical features and co-operative plan to contractors and dealers which help get business.

Anderson Mfg. Co.
Des Moines, Iowa

Manufacturers of "Tip-Top" Ventilators, "Tip-Top" Sanitary Cistern Filters, Anderson Water and Lightning Conductor, "Tip-Top" More Sun Windows



The boys are warm!

Read the Letter:

Houghton Mich., March 7, 1916.
Gentlemen: In answer to your letter of Jan 29th. I am enclosing you a photograph of the outside of our Club House, in which is installed a MODERN WAY FURNACE. I want to say that we are having entire satisfaction with your furnace—in fact, it is a wonder to all our members. It has been burning continuously from November last, to the present time, and is extremely economical in every respect, and heats the whole building, 2 story, 36x40, at 70 to 75 degrees in the coldest weather, without any trouble.

Yours respectfully,
FRED STOYLE, Houghton, Mich.

A furnace that is easy to sell and easy to install

The Modern Way Pipeless One Register Warm Air Furnace accurately conforms to the laws of nature: hot and cold air can't occupy the same space. It creates a circulation of warm air which goes up spreading out to form numerous warm air currents. Contact with distant or outside walls cools this warm air and makes it heavier, thus causing it to seek a lower level, and eventually returns to the register.

Now as to economy!

The cellar is not filled with furnace pipes cut through your flooring and installed at quite an expense.

The Modern Way Furnace does not heat up your cellar unnecessarily, enabling you to store vegetables without having them ruined by the heat.

You save coal by not having to heat up rooms through great length of piping which must be fairly hot before any heat reaches the rooms.

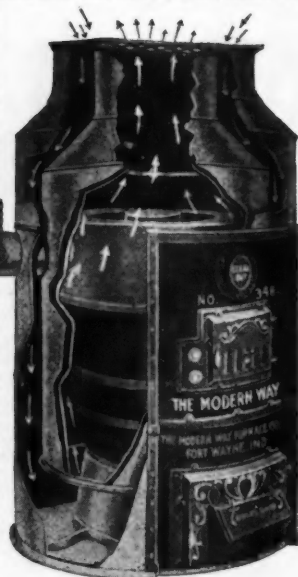
If you want the satisfying assurance of handling a thoroughly modern efficient furnace that will reflect only credit upon your building reputation, let us tell you more about the Modern Way Pipeless Warm Air Furnace. We have many letters in our files from pleased customers who have installed the Modern Way after trying experiences with the old type. These letters would convince you that this furnace equipment is a highly satisfactory business investment.

We would like to give you complete information as to how Modern Way equipment can be a money maker for you. We would like to explain more fully why this equipment is so easy to sell—to say "one register" furnace is enough to indicate that it is easy to install.

Send for complete information of the Modern Way, and our other lines.

We Want Live Agents

The Modern Way Furnace Co.
Fort Wayne, Indiana



Laying Out a Scroll Hand Rail

(Continued from page 65.)

face of the plank all around the edges and joints, and that the bevels are applied reversely thru the center of the plank coming out on top and bottom surfaces at B and B. The piece cut out is shown in Fig. 45 under the process of being twisted.

In this figure is shown the face mould on top and bottom with its tangents upon B and B, the points upon the surfaces determined by the bevels as shown in Fig. 44.

While in the position shown in Fig. 45, the correct form of the wreath is obtained by scribing along the edges as shown by the pencil. After the scribing the

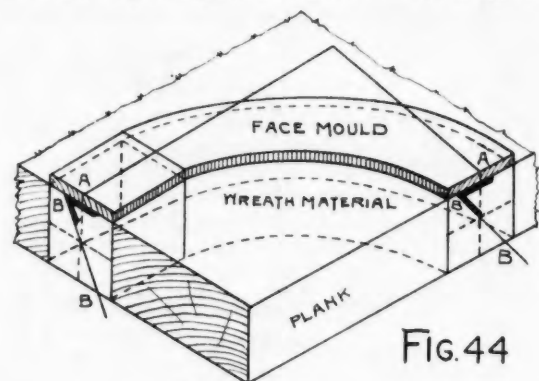


FIG. 44

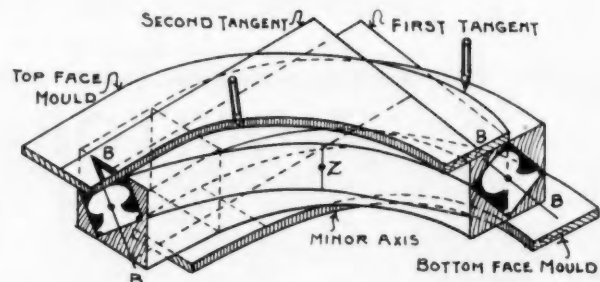


FIG. 45.

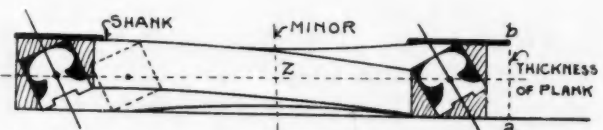
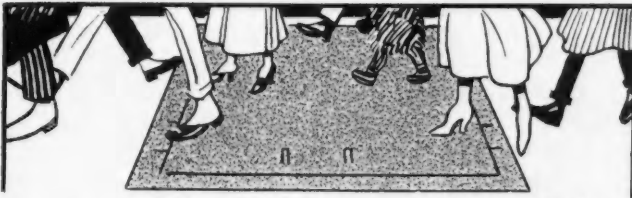


FIG. 46

waste wood defined, is chopped off and the sides of the wreath completed by carefully following the lines of the scribing on both surfaces. After completing the sides, proceed to prepare either the top or bottom surface, and after it is completed, the other may be gaged from it.

Care should be taken to see that the wreath when completed has been kept within the center of the plank, which is an easy matter to accomplish in view of having three guiding points to follow, namely, the two ends and the minor axis.

In Fig. 46, the wreath is shown after the twisting, its center coinciding with the center of the plank.



Unobtrusive!

Passersby don't realize the presence of Canton Sidewalk Doors. They are not jarred unpleasantly by slipping on a smooth expanse of metal. They cannot slip or trip on Canton Doors.

This is the kind of doors thoughtful storekeepers want in front of their places. It's only one of the little things that can help or hinder the best interests of the storekeeper, and it is so easy to get the RIGHT kind of door while you are buying.

The Canton door is made of the finest wrought steel. The entire frame is cast in one piece and is equipped with a water drain to carry the seepage to the curb. It is burglar-proof, efficiently protected when open by stay rods and chains.

The Canton Sidewalk Door is built to comply with city regulations.

Send for our descriptive literature on sidewalk doors, coal chutes and builders' ironwork. Ask for Booklet No. B-4.

The Canton Foundry & Machine Company
Canton, Ohio



**WRITE
FOR
FOLDER**

Let us send you complete information on this attractive all metal coal chute. Their convenience and neat appearance are sure to please your customers. Rain proof, flush, and automatically locking. With either wire glass or solid cast iron door. Locks both open and shut. Prices moderate. Write today.

STERLING FOUNDRY CO., 8 Ave. A, Sterling, Ill.



KEWANEE ALL STEEL COAL CHUTES

Sell the **Kewanee**—the steel chute that is guaranteed for five years. Thousands now in use and the demand still growing for the chute that cannot be broken. Write today for the Contractors' and Dealers' prices.

KEWANEE MFG. CO.
403 N. Tremont St. Kewanee, Ill.

Jahant Pipeless Furnace



COMBINED with the best heating principle known is the pipeless feature. The Jahant Down Draft Furnace uses all the heat units in the coal and saves its original cost in a few months.

**Save \$20 to \$50 on
Coal Bill**

A Jahant will save $\frac{1}{3}$ to $\frac{1}{2}$ on coal bills according to size of house. Remember the Jahant burns air and saves the coal. We have been selling Jahants for 35 years and have never had one returned.

**Get Our Engineers' Help
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Our Engineers will figure out your heating problems, will make drawings and plans for every Jahant Job and give advice as to whether the pipe or pipeless Jahant is best—this service is absolutely FREE.

Contractors' and Builders' Proposition

Jahants are sold on easy payments—we pay the freight. They are easily and quickly installed—each Jahant is cut to fit—blue prints with each job. 360 Day Legal Guarantee Bond. Get our Contractors' and Builders' Special Proposition. It's a money maker—it adds profit to every house built. Write now for Catalog—literature and proposition all FREE.

JAHANT HEATING CO.

104 Jahant Bldg.

Akron, Ohio

THE FORBES WAY

NOTICE THE MANIFOLD

At the back of the Forbes is our coal saving manifold which extracts and retains the heat which usually goes up the chimney. This manifold also provides an immense radiating surface.

Forbes Furnaces are particularly economical of space, our highest furnace being only 4 feet 3 inches high, giving splendid elevation for hot air pipes and making the Forbes especially adapted to low cellars.

We would like to send you further information on the Forbes along with free estimates on your heating system costs.



**Write today
for our catalog**

TUBULAR HEATING and VENTILATING CO.
232 Quarry Street PHILADELPHIA, PA.

Negligence of Owner of Building Failing to Install Fire Escapes

The Court of Appeals, New York, has rendered an interesting and important decision in a case brought against the owner of a factory building in New York City which was destroyed by fire, the action being a claim for damages made by the heirs of an employe who was burned to death. The Court holds that it is conclusive proof of negligence where the owner of a structure does not comply with the law ordering the installation of such fire escapes as may be deemed necessary by the municipal authorities.

The building was a frame structure, three stories high; there were seven vents on the second and third floors with openings 3x8 feet. The Labor Department ordered fire escapes installed, but the owner held that same were unnecessary, and shortly following the building was destroyed by fire.

In its decision, the Court says:

"It was not necessary on the part of the representatives of the deceased employe, in the case for damage, to prove that the owner of the building had caused the death of the employe thru negligence, in order to establish the liability claim against him. Mere non-compliance and neglect with that provision of the city law requiring fire escapes was sufficient to determine conclusive negligence on the part of the owner of the building, altho the structure was provided with stairs, elevators, windows, seven ventilator openings, was steam heated, and there were no stoves. Failure to provide a fire escape thus establishes the negligence of a property owner, as a matter of law, even under conditions as stated."

L. R. W. ALLISON.

Water Supply for Country Homes

(Continued from page 59.)

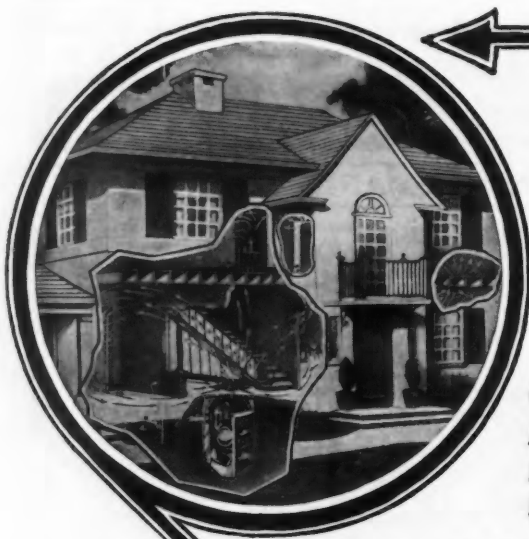
Wind Mill Was Too Short

My next friend I visited put up a wind mill. His house was an old fashioned ten room house down in the valley, surrounded by big trees. I dare say his house to the top of the roof was about 28 or 29 feet. The outfit he bought was good and substantial looking, he wind mill was 20 feet high to the top, and his tank was in the attic. He had a fine flow of water when his tank was full, but low and behold, it was seldom full, because his wind mill was not high enough to get the benefit of the wind; the big trees and the house kept the wheel from revolving and of course it pumped no water. By rough calculation he could have put up a higher mill tower at a cost of about \$35.00 more and saved himself about \$15.00, the expense of taking down and building his first outfit higher, besides the annoyance. This he finally did and now is getting good results.

The Goose Wouldn't Run It

My third friend bought a 20-foot steel tank frame and a 1000-gallon tank for less than \$90.00—this does look cheap because it is a good outfit. Well, after he had bought it plowing season began and he had no time to put it up, but meanwhile he discussed the

(Continued to page 184.)



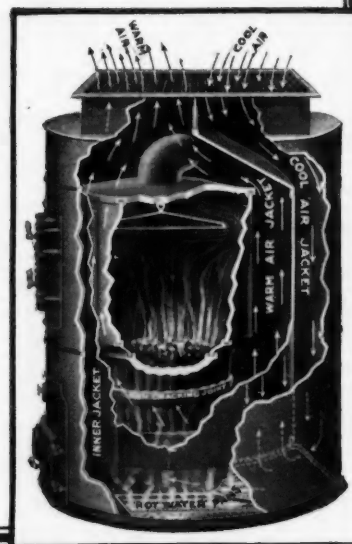
CLEAN-AIR ONE REGISTER SYSTEM

The best of ventilation, an even temperature and an abundance of pure, warm, moist, balmy air. The Ideal Health Heat!

**Get our Wholesale
Prices and the Agency
for CLEAN-AIR Sys-
tems in your territory**

Clean-Air Pipeless Systems are easy to install, and we provide you with free plans, specifications and advice in heating. It is YOUR JOB to install them. One installed means many more sales. Send attached coupon today.

**Standard School
Heater Company**
CHICAGO, ILLINOIS



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**STANDARD
SCHOOL
HEATER CO.,
Chicago, Ill.**

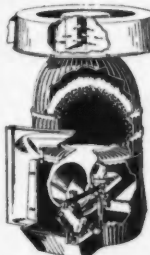
Send me free plan and
heating advice on a Money
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Name.....

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MAIL THIS COUPON TODAY



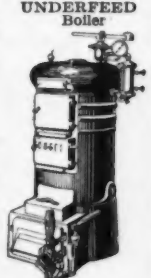
Cut Coal Cost

$\frac{1}{2}$ to $\frac{2}{3}$ Guaranteed

Yes, absolutely guaranteed. Over 40,000 Williamson UNDERFEED Furnace and Boiler users are enjoying UNDERFEED saving and comfort season after season.

Free Book Tells How
A postal brings it to any carpenter, builder or contractor. Book pictures and explains it all. Write for it NOW and learn how you can guarantee this great saving to your customers.

The Williamson Heater Co.
417 Fifth Ave. Cincinnati, O.




The Superior Heating Boiler for Hot Water Vapor or Steam

The Modern Method of heating your residence. Insures comfort in every corner of the house in the coldest zero weather.

It Will Pay You to investigate this Boiler before buying.

Our Estimates and Plans are Free
"A Complete Line of Plumbing and Heating Material"

DUPLEX MANUFACTURING CO.
Send for Free Catalog SUPERIOR, WISCONSIN

The Home Furnace Service to Builders

Why not go into business for yourself? We have a good money making proposition to offer for a hustling furnace man, carpenter or builder. Will give exclusive agency to the right man, with our cooperation.

The Home Hot Blast is a handsome furnace built on the correct principles of combustion and the carpenter or builder will find the selling and installing of them worth part or all of his time.

Below are some of the features that make the Home Hot Blast a distinctive and desirable furnace.

The Home Hot Blast Patented Combustion Chamber, which does away with the smoke, soot or clinker nuisance and effects a saving of 15 to 30% on fuel bills.

The Home Automatic Humidifier, a novel and effective method of retaining the proper relative humidity, so essential to health.

Also the improved shaker equipment, easy to operate and which in connection with the special dust flue, eliminates the dust nuisance. The shaker handle on this apparatus is fixed and is always there.

Be sure to write for complete information on our proposition and full description of the Home Hot Blast Furnace.

HOME FURNACE COMPANY
Holland, Mich.




Draws cold air out Forces warm air in

THE heating problems of every store can be quickly and easily solved with the "Majestic Duplex One-Register Heating System" for stores. No matter how cold the weather, there will always be plenty of heat uniformly distributed.

The cold air is drawn from the floor through the cold air ducts, while pure air is discharged from the main face of the register. Perfect circulation is maintained; and the far corners, usually cold and uncomfortable, get as much heat as any other part of the store.

Majestic Duplex Heating System— More Heat at Two-Thirds the Cost

The Majestic Duplex Heating System not only gives more heat, but it costs one-third less than old-fashioned methods. The furnace occupies space in the basement only four feet square. It has but one register which may be placed anywhere in the store for use as an extra counter or table. The Majestic comes to you all ready for use and is easily installed in one day.

Carpenters and Builders, Get the Agency

Our extensive advertising is making every store owner realize the value of this modern heating system. There are stores in your own locality that should be equipped with it. Get the agency and let us make money for you. Mail the coupon today for printed matter, complete information and terms.

There are other Majestic Specialties, too, including Coal Chutes, Underground and Built-in Garbage Receivers, Milk and Package Receivers, Rubbish Burners, Metal Plant Boxes, Pipe and Pipeless Furnaces, etc.

The Majestic Company 703 Erie Street HUNTINGTON, IND.

Mail This Coupon Today

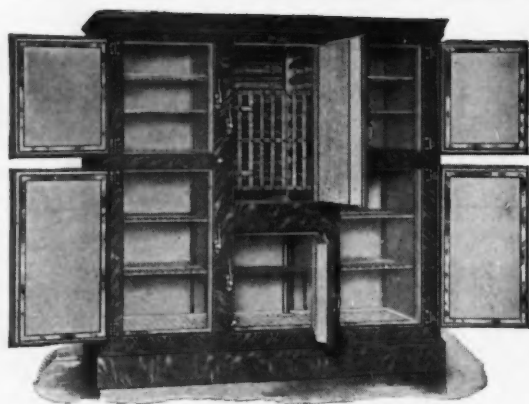
THE MAJESTIC COMPANY,
703 Erie Street, Huntington, Indiana.

Please send me printed matter, complete information, proposition and terms to carpenters and builders.

NAME.....

ADDRESS.....

CITY..... STATE.....



Architects and Builders Choose the Best

Every architect and builder realizes that beautiful buildings and residences are not complete unless they are equipped with scientific refrigeration systems. That is why the great majority of them endorse and specify

McCray SANITARY Refrigerators

For over thirty years the McCray has been used in the finest hotels, clubs, restaurants and residences. It was selected by the U. S. Government as the best for use in the U. S. Pure Food Laboratories, and it is recognized everywhere as the standard of superiority.

The opal glass, white enamel and odorless wood linings of the McCray are sanitary and easy to keep clean. All foods are kept pure, cool and fresh by scientific refrigeration and spoilage is reduced to a minimum.

You can select from a large variety of ready built sizes or we will build special sizes to meet any requirement. In the better buildings and homes McCray Refrigerators are arranged for outside icing and conform to the floor plan and decoration.

Free Plan Service

We maintain a special drafting department to cooperate with architects and builders and to furnish ideas and suggestions for any type of refrigeration equipment.

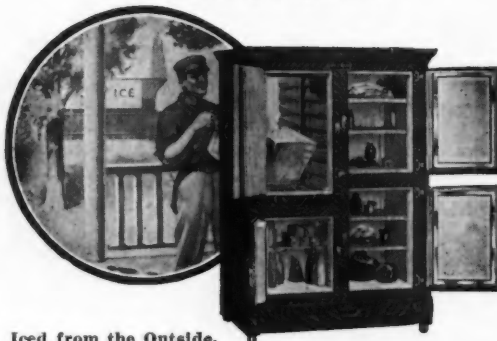
Get these catalogs for your files:

- No. 92 for Residence.
- No. 51 for Hotels, Clubs, Institutions.
- No. 70 for Grocers.
- No. 62 for Meat Markets and General Storage.
- No. 74 for Florists.

McCray Refrigerator Co.

760 Lake Street Kendallville, Indiana

Agencies in all principal cities



Iced from the Outside.

Water Supply for Country Homes

(Continued from page 182.)

installing of his water plant with any number of wise acres. To begin with, he had a fine artesian well 120 feet deep, which produced the finest water, cold and clear as crystal. He bought a pump for this well, one of those combination pumps to use by hand or any kind of power by putting on some extra gear wheels. He found out that it was no easy job to pump all the water he needed by hand, for his house and cow barn, so he finally concluded to put up his tank and steel frame. It was well built—looked as tho a cyclone couldn't blow it over. Now came time to work out some plan of attaching power to his pump. Well, almost everybody he talked to believed that a gasoline engine would be the thing. One man told him that the "Golden Goose" engine selling for \$39.00 would be the right size—well, it was said to be $1\frac{1}{2}$ horsepower. It worked for some time, but it was too much work for the engine; it was not big enough, and he had all kinds of trouble. One of his city friends spent Sunday with him, and to him he told his troubles. The city man said: "Let's look it over; maybe I can straighten it out for you." Well, the city man concluded that the engine was too small, so he bought himself a big, powerful-looking engine, rated at $2\frac{1}{2}$ to 3 horsepower. It certainly was a fine looker and did good work. It cost him \$90.00, and it was cheap at that. He sold his little engine for \$15.00 after using it only a few months, and had he used a little judgment he could have saved in cash \$24.00, not counting his labor and trouble that he had for those two months.

Pump Wasn't Right

The next one that I looked over was a city man's plant who moved to the country for his health. He bought an old farm house and remodeled it, and a nobby way he did it, too. When this was finished he began to put in a water plant. He had a great big boiler sent from town, and when I asked what they intended to do with that big steam boiler, he said: "That's no steam boiler; that's for one of the air-pressure water works that forces the water thru the pipes by air." When I heard that, I sat up and took notice. I neglected some of my work at home to watch them install that plant. They tore a big hole in the foundation wall to shove it in the cellar. After it was in, they put it on big hewn logs about 6 feet long and 14 inches in diameter, gouged them out in the center so that the boiler would fit in snugly and not roll off. Next came a big double-acting pump and a 6-horsepower gasoline engine. The curiosity of the whole neighboring country was aroused, and they came to see his wonderful outfit. It all was built very strong and put in good shape. It was late one evening when they had it finished, and the next morn-

(Continued to page 186.)



The Great Bell -original Pipeless Furnace

Father of Them All

We have thousands in use. Sizes, styles and prices to suit all. \$38.00 to \$94.00.

Made for the building where a furnace is needed, but where the cost has been prohibited.

The GREAT BELL PIPELESS FURNACE will heat any one or two-story building in the most efficient manner with the least effort and the lowest relative cost. While **Cost** is secondary to **Service** in this furnace, our methods of production and sales have reduced the cost so low that no builder can afford to overlook our proposition.

And we guarantee our furnaces to be and do all we claim for them in both catalog and correspondence.

Write for our catalogs, describing the various styles, prices and specifications of the Great Bell Furnaces.

American Bell & Foundry Co.

27 Cody Street, Northville, Mich.



What Did the Contractor Forget?

The Contractor has forgotten Protection. Lightning may come any day and destroy it in a few minutes. Protect the building before you turn it over to the owner and make another Profit on the contract.

The Shinn System of Lightning Protection positively prevents Lightning damage. Remember, **Lightning can't strike if Shinn gets there first.** We are glad to co-operate with Contractors and Builders. Write us.

Shinn Mfg. Company

W. C. Shinn, President
General Offices: 1635 Monadnock Bldg.
Chicago, Ill.
Factories: Niles, Mich.; Windsor, Ontario
Warehouses:
Lincoln, Neb.; Minneapolis, Minn.

MARVELITE

is a "radio-luminous" material, made into switch buttons and door numbers that are findable in the dark.

The buttons are attachable to any ordinary switch button or switch-button plate. The numbers (half-inch by quarter-inch wide) are for inside doors and outside door bells.

Real Radium is used in a base of zinc sulphide and other ingredients; the compound is pressed into the form of buttons backed with brass and faced with celluloid. These buttons can be fastened onto the faces of the switch buttons or onto the plate.

The glow of these buttons is soft, mellow and unannoying to the eyes, but plainly visible in the blackest darkness. Their lasting quality is absolutely guaranteed, and their price very reasonable.



Let us send you descriptive booklet.

Cold Light Mfg. Co.

Commercial subsidiary
to the
Schlesinger Radium Co.
821 Chamber of Commerce
Denver, Colo.

Water Supply for Country Homes

(Continued from page 184.)

ing bright and early they began pumping. In about two or three hours the tank was nearly full. They tried the faucets in the house and the water ran out under good pressure and the workmen went away. There was enough water in the tank to last for three or four days they said, but the third day with plenty of water in the tank it would hardly flow at the faucets on the floor above. The man who put in the plant said the pipes leaked around the joint and the air escaped, and without air there could be no pressure. Our new city friend had all kinds of troubles with his plant; every now and then his tank would not deliver any water upstairs, even tho it was full. I talked with him about it one day, and he said: "What do you think is the trouble?" I said I did not know for sure, but I believed it was the fault of the pump. He said nobody ever suggested that before. Nevertheless, he went to town the next day and consulted with a water works engineer and brought him out with him. He at once condemned the pump. He said: "The pump is good for general pumping, but not for an air-pressure tank." So in less than two weeks a new pump came along and was put in, and now the plant works fine.

I copied the name of the makers of that pump, and wrote them a letter asking them if they could supply

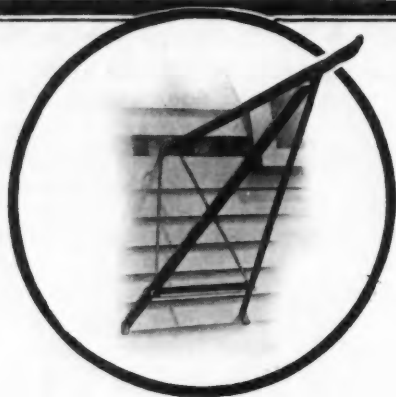
me with a smaller pump of the same style. They replied very courteously, telling me they had all sizes from a little \$12.00 hand-power pump to a \$600.00 power pump.

Satisfaction in Water Supply

They asked me some ten or fifteen questions which I answered about my requirements. I bought the pump and a 500 gallon tank from them. They made me a nice plan, showing me how to go about putting it in my place. Our village storekeeper got me some pipe and a Stilson wrench, and I began to put it in. And it is in these past seven months, doing good work. We only began to realize what our house missed by being without this greatest of comforts the past twenty years of our married life. I would mortgage my house rather than be without it. And to think how easy it was to put in. And what do you think the whole thing cost me, including a 3-horse-power engine that I use for sawing wood and other purposes? It was just \$380.00, and I think it is dirt cheap at that, because it was perfect from the start.

I understand these plants, depending of course on the size, can be bought as low as \$45.00, but when you buy be sure and buy the right size of the right firm that will stand back of what they sell and give you the chance to try it, and if it doesn't do your work, allow you to send it back.

TROUBLE SAVERS please this Builder



READ THIS LETTER FROM MR. BORNEFELD

Gentlemen:—

I cannot express myself too highly in regards to your "Trouble-Saver" Scaffolds. They are strong and safe and the men like to work on them. They are great time-savers. My men put them up on one side of a building while I walked from one end to the other.

For putting up cornices and for working on gables they are especially convenient. Also for putting on the first two or three rows of shingles they are just the trick.

I think I was the first to use the Porch Scaffold and consider them just as handy as the weather boarder and the shingler. I would not care to part with them, as they soon pay for themselves.

You are at liberty to refer anyone to me as to their safety, economy and convenience. Wishing you much success, I remain, yours very truly,

1300 East Louisiana Street.

A. F. BORNEFELD.

BUILDERS all over the country tell us of the satisfactory results that "Trouble-Savers" have brought them.

Quickly applied, they save much valuable time as compared with the slow, tedious erection and dismantling of wooden scaffolding and the saving in waste lumber and nails is a big item in your profits.


It will pay you to investigate the scaffold that the other fellows find so satisfactory.

Let us send you further information on this "Trouble-Saver." WRITE TODAY.

The Steel Scaffolding Co.
EVANSVILLE, INDIANA



"The Tank with a Reputation"



The reputation of every Caldwell Tank is built on merit, because every Caldwell Tank is built strictly according to approved engineering methods. The fact that a tank is Caldwell-made is guarantee in itself of long life, freedom from leakage and permanent satisfaction. *Send for Catalog*

W. E. CALDWELL CO., Inc.
1990 Brook Street
LOUISVILLE, KENTUCKY

Caldwell
TANKS
AND
TOWERS

MIF NAILS

are heavily coated with zinc through a process that insures a strong lasting nail that will not rust.

Try a sample!

Yes, and send for our interesting little booklet entitled "Nail Knowledge."

You owe it to yourself to see that only the best materials go into your buildings. If you agree with this policy confirm it by using M. I. F. nails on your next job.

MALLEABLE IRON FITTINGS CO., Branford, Conn.



VAUGHAN'S Vanadium Nail Hammer

Vanadium is a purifier of steel. The best vanadium obtainable is used in making the **Vaughan Hammer**. Each hammer is tested and tempered individually. The handle is carefully shaped for the hand and has a wax hole in the end for waxing nails to be driven in hardwood. The claw of this hammer grips—it never slips.

If your dealer does not carry the Vaughan Vanadium Hammer we will send it to you prepaid. Let us have the dealer's name, too.

Vaughan & Bushnell Manufacturing Company
2114 Carroll Avenue Chicago, Ill.

The Toughest, Strongest
Hammer Made



\$1.25
EACH

No. 41 1/2 16 oz. Full Polished No. 42 13 oz. Full polished




**THIS IS
THE HAMMER
WITH THE
PEDIGREE**


OF COURSE
IT'S A

**GERMANTOWN
MASTER BUILDER**

Expert workmen the country round know and use this hammer. The finest possible quality in material, design and workmanship. Octagon shaped handle of second growth hickory, ideal hardness, and a claw that will grip all size nails with a grip that holds. Positively the **only** hammer for the workman who wants the **BEST**. Three sizes, Nos. 745, 11 oz., 746, 16 oz., 747, 20 oz., at \$1.00 each.

**Price
\$1.00**

Germantown Tool Works
PHILADELPHIA, PA.
Branch: 62 East Lake Street, Chicago



SIMONDS

Accurate Cutting


Simonds Saws are as near perfection as factory process, quality of material and workmanship can make them.

Simonds Saws have a sharp diamond-like edge that holds the set and cuts perfectly. They are so tempered (by the special Simonds process) that they have just the right amount of spring and stiffness—they are full of life.

You have heard of the Simonds Saws. Have you used one? We have a saw for every purpose. Ask your dealer about the Simonds line when you see him next.

Let Us Send You Our Carpenter's Guide

The Blue Ribbon Price..... **\$3.00**



SIMONDS MFG. CO., Fitchburg, Mass.

You Can Take Hills On High Without A Knock

IF you will keep your motor free from carbon. That knocking in your engine—the difficulty you have climbing hills—poor pick-up—lack of power—noisy motor—pre-ignition—in fact 80% of engine trouble is caused by carbon. Clean it out with

JOHNSON'S CARBON REMOVER

and your engine will run like it did the first 500 miles, quietly and full of "pep". And your gasoline consumption will drop from 12% to 20%.

You Can Do It Yourself

For 25c—five minutes' time—and with no labor you, yourself, can remove all carbon deposits. Simply pour an ounce of Johnson's Carbon Remover into each cylinder—allow it to remain from two to twelve hours and then drive your car 10 or 15 miles. You will be surprised at the wonderful improvement.

How It Works

Johnson's Carbon Remover does not eat the carbon, but releases it from the metal and softens it into a jelly-like, inflammable mass. Then, as the engine is operated, the mass burns, pulverizes and is blown out with the exhaust in powder form.

Use It Every 1,000 Miles

If you will use Johnson's Carbon Remover at regular intervals, giving carbon no chance to accumulate, you will automatically eliminate most valve trouble and your engine will always be at its highest efficiency.

If your dealer cannot supply you with Johnson's Carbon Remover use attached coupon.



S. C. JOHNSON & SON, Dept. A B 4 Racine, Wis.
I enclose \$1.00 for which please send me by prepaid express enough Johnson's Guaranteed Carbon Remover to thoroughly clean an ordinary four-cylinder motor 4 times.

NAME _____
ADDRESS _____
CITY & STATE _____
MY DEALER IS _____

Made and Guaranteed by
S. C. JOHNSON & SON
Racine, Wisconsin, U.S.A.

How to Design Foundations for Small Factory

(Continued from page 71.)

"The design of footings and foundations for important or large buildings should be left to an experienced architect or engineer, altho any of our members who have been able to follow the mathematics and reasoning of the Talks which have preceded this one should be able to do such work with a good degree of accuracy by following the line of procedure given in Kidder's Architects' and Builders' Pocket Book.

"An approximate method which is satisfactory for small buildings and firm soils is to find the total load on the side walls and basement posts or piers separately and proportion the areas of the footings under these parts in such a manner that they will be firmly supported in the ground. This approximate method should not be followed for soft soils where the footings are likely to settle when placed under load.

"We take one of the posts in our previous problem which carried a load of 84,320 pounds to the foundation piers, and see what size of concrete pier will be needed under it. The calculations for the side wall foundations would be similar after we had found the weight of the wall itself, and the load it carries from the girders which rest on it.

"If we use a concrete pier composed of one part Portland cement, two parts clean sand, and four parts of crushed stone or screened gravel, and assume that the soil is dry, firm sand which will support four tons per square foot of surface pressed upon, the lower

$$\frac{84,320}{8,000} = 10$$

(nearly) square feet. This means that the lower face of the pier should be about $3\frac{1}{2}$ feet square for safety. This layer should be from 1 to 2 feet thick and form the base for another layer of the same thickness placed on top of the first. This top layer will not be as wide as the bottom one, but will be stepped as shown in Fig. 14A. The width of the stepped part is from three-quarters the thickness of the lower part to an amount equal to the thickness of the offset. If the lower part is made $1\frac{1}{2}$ feet thick, the next layer can be made 2 feet square on top and of the same thickness as the lower part. The base plate for the support of the post or column rests on the top of this second step as shown in the figure.

"We can check the thickness of the offset and its proper length by the following approximate calculation: Assume that a foot width of the offset part is a cantilever of length equal to the length of the offset from the top part. This cantilever would be figured to carry a uniformly distributed unit load along its length equal to the unit pressure of the soil on the bottom of the footing. In this case, we used 4 tons or 8,000 pounds per square foot. Then fill in the

(Continued to page 197.)

KEES Building Helps Will Make Money For You

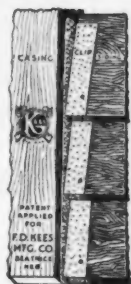
KEES Metal Building Corners—

One contractor saved \$40 in labor on one job by using \$14 worth of Kees Building Corners. They save the slow, expensive work of beveling, yet form a perfect weatherproof corner with popular mitre effect. Hold paint like wood.

For outside and inside angles—plain and fancy patterns. Sizes for all widths lap siding up to 12 in. Corners for drop siding also. Send for free samples and delivered prices.

KEES Sliding Clips—

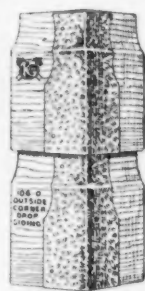
make a weather-tight joint around door and window casings that is not affected by swelling or shrinking of the lumber.



Three Sliding Clips Applied



Metal Corners for Lap Siding



Metal Corners for Drop Siding

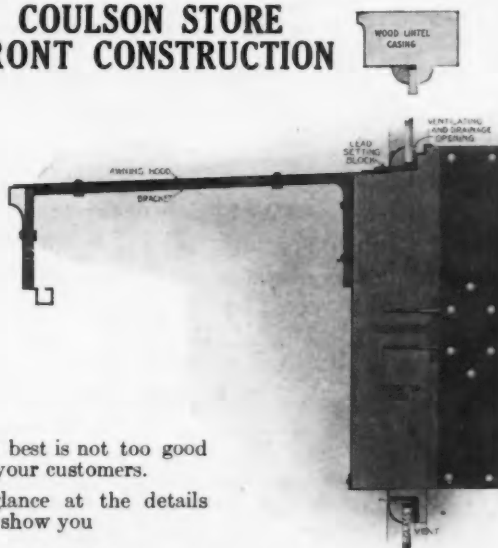


Metal Corners for Lap Siding

Send for Free Samples

F. D. KEES MFG. CO. Box 552 Beatrice, Neb.

COULSON STORE FRONT CONSTRUCTION



The best is not too good for your customers.

A glance at the details will show you

Coulson Construction

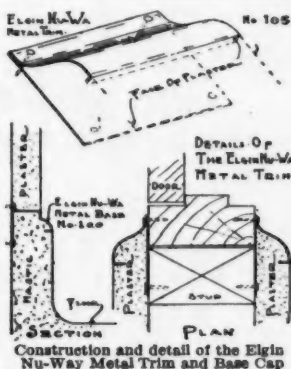
Is the best.

It is not only the best, but is as low in price as any.

Let us send you our Catalogue

The J. W. Coulson & Co.
Columbus, Ohio

Vertical Section. Lintel Casing Covering, Stops, Awning Hood and Transom Bar, and Ventilating Sill.



Elgin "Nu-Way" Metal Trim Co. 1615 E. 35th St., Kansas City, Mo.

Hidden Menace

Few people realize what a "Catch All" lies back of the old wooden door and window casings and baseboards.

The Home of the Bugs, Cockroaches, Germs and Dirt

ELGIN "NU-WAY" METAL TRIM AND SANITARY BASE

is the modern "Cure All" for this evil. Demand "Nu-Way" Metal Trim in your New Home or Building. It will mean absolute sanitation. Keeps Cold Air out. Saves Fuel and "Stays Put."

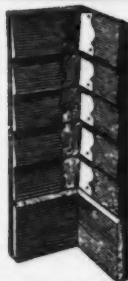
Agents Wanted

Send for Catalog

1615 E. 35th St., Kansas City, Mo.

Chief Metal Building Corners

Warp-Proof—Rust-Proof—Fit Anywhere



They make a corner with the smoothness and neat appearance of a "mitred corner" and save the time and labor of beveling down the siding. Made of heavy galvanized steel. Fit any corner—inside or outside and make a smooth corner that does not hold dust or moisture. Cannot warp or split, and prevents warping of the siding.

Chief Corners protect buildings from injury and are practically indestructible. Furnished ready perforated for nailing to the siding. Put on easily and quickly. Can be painted any color or left unpainted as desired.

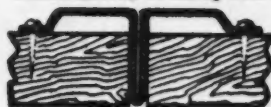
Write for free sample and full information

SHRAUGER & JOHNSON :-: 430 Walnut St. ATLANTIC, IOWA

METALLIC BATTEN STRIPS

PRACTICAL—EVERLASTING—ECONOMICAL

These Batten Strips of Galvanized Metal will never warp, split, or draw away from the boards. Offer no obstruction to sliding doors. Allow for expansion and contraction of the siding. Made in 6, 7, 8, 9 and 10 foot length with interlocking joints. Easily cut; no waste. Nailed directly to siding with small nails.



End view showing joint closed. A perfect fitting Batten at all times, in all weathers. Beautifies any building.



End view showing joint open. Provides for expansion or contraction of the siding so nails will not work loose.

Metallic Batten Strips make strong, neat joints. They make the building wind-proof, weather-proof and rat-proof. Also valuable for lining grain bins or wagon boxes.

Write for Free Sample and see for Yourself

METALLIC BATTEN COMPANY Owensville, Indiana

How to Design Foundations

(Continued from page 188.)

following formula and solve for t , the thickness of the concrete offset in inches.

$$\frac{12 \times p \times t^2}{6} = \frac{1}{2} w l^2 \times 12$$

"In the formula given above, p is a safe value for the modulus of rupture for plain concrete in bending in pounds per square inch, w is the allowable soil pressure in pounds per square foot, and l is the length of the offset in feet. Substituting our values and solving for t , the thickness, we have:

$$\frac{12 \times 40 \times t^2}{6} = \frac{1}{2} \times 8,000 \times \frac{3}{4} \times \frac{3}{4} \times 12$$

$$t^2 = 346$$

$t = 18$ inches (nearly).

Therefore, our $1\frac{1}{2}$ feet, or 18 inches, is a reasonable thickness to use.

"Next, we will test this thickness to see if it is strong enough to prevent failure by shear. The distance around the edge of the top part in inches, multiplied by the thickness of the lower part in inches, and then by a safe value for the unit shearing strength of plain concrete in pounds per square inch should be equal to or greater than the upward pushing effect of the soil on an area equal to that of the top of the lower offset. Using 40 pounds per square inch as a

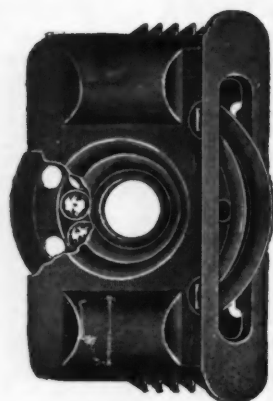
suitable value for the strength of plain concrete in shear, and expressing the other quantities as stated above, we have in their proper order according to Fig. 14A, $[(4 \times 2 \times 12) \times (1\frac{1}{2} \times 12) \times 40]$ is equal to or greater than $[(3\frac{1}{2} \times 3\frac{1}{2}) - (2 \times 2)] \times 8,000$. Solving, we find the first part to be 69,120 and the second part to be 66,000. Therefore the footing is safe against failure by both bending and shear.

"The trenches or pits for such footings should be excavated to about the size of space to be filled with concrete. If the earth is hard and firm, it may be possible to cut the edges of the hole to take the concrete direct without forms. Otherwise, space should be left for plank forms around the finished size of footing. Such forms should be held in place by wood stakes and braces until the concrete has hardened.

"All concrete should be mixed carefully with clean materials and clean water. A small concrete mixer is advisable if any considerable amount of work is to be done. Place the freshly mixed concrete in the forms in layers about 6 inches thick, level it off, and tamp it with a heavy rammer until water is brought to the surface. Then place the next layer before the last one has had a chance to dry out. If the old surface appears dry, it should be sprinkled before depositing any new concrete.

"Do not be afraid to use plenty of cement in your

(Continued to page 192.)



No. 10 Ball Bearing

"Grand Rapids"

**Ball Bearing
ALL STEEL
Sash Pulleys**

**Fasten Automatically
No Nails—No Screws
Just Bore Four Holes**

The automatic saw tooth fastening feature and the simple and easily made mortise will save in labor enough to pay for the pulleys.

The bearing contains eleven $\frac{1}{4}$ -inch Solid Steel Balls running in lubricant, insuring a noiseless, easy running wheel under any load.

**NOISELESS—EVERLASTING
Write for FREE Samples**

Fifty Different Styles

Grand Rapids Hardware Co.

Manufacturers

158 Eleventh Street - Grand Rapids, Mich.

Why Royals are used on big jobs

When institutions, commercial or educational, undertake to add extensive improvements, it is vitally important that they choose carefully the kind of material that is to go into its construction.



ROYAL VENTILATOR COMPANY
417 Locust Street

Ventilation is of prime importance. It involves the physical welfare of those who must spend the best part of the day indoors.

Royal Ventilators are used on most important building jobs. Royals stand the strain—are proof against storms, leaks, birds, insects. They exert a steady up-pull on foul air and introduce fresh air without down draft.

Prominent colleges, factories, power plants, theaters and hospitals in all parts of the country are equipped with Royals. Many of these are listed in our little booklet "Ventilation," which describes the superior construction of the Royal Ventilators. Send for it.

ROYAL VENTILATOR COMPANY

Philadelphia, Pa.



Give Us Air!

"What kind of air?"

"Fresh air!" say the live stock.

"How can it be done?"

"By good ventilation," chorus the fourfooters.

Which brings us to the question of what is the most approved style of ventilator?

Do you know the Gale Ventilator? If not, be it known that the Gale Ventilator means healthier stock because of its simple but most effective system of ventilating. It is handsome in appearance—is built of heavy gauge galvanized iron—is rust-proof—is well screened from within to prevent birds nesting. It's a good ventilator. You will find a ready market for Gales, Mr. Builder. Gale Ventilators are constructed to successfully meet the important problem of proper ventilation.

Gale Ventilators for barns, chicken houses, creameries and the like. Send for our booklet.

Galesburg Sheet Metal Works
GALESBURG, ILL.



Which Kitchen Would a Housewife Choose?

Would she choose a kitchen with a large, clumsy refrigerator taking up a lot of space—where the iceman's daily visits leave a trail of mud and water?

Or would she choose a kitchen where the refrigerator is built flush to the wall with only the face visible—where she only has to buy the ice during the summer—and where the iceman (when he is needed) fills the chest from the OUTSIDE of the house.

The answer is too obvious. And still many housewives put up with inconveniences pictured at the left, simply because they have not heard of

The Herrick Outside Icing Refrigerator

The housewife as you know is a most important factor to be considered in building a new home. It will pay you well therefore to write for our catalog on the Herrick and our FREE PLANS. These plans show you just how the Herrick is designed to fit into the kitchen. And the catalog shows you how it really pays for itself in the ice it saves (by means of the outside compartment where the cold air enters and where the iceman fills the chest).

THE HERRICK REFRIGERATOR CO. WATERLOO IOWA

In every summer cottage you build



—you can install, at a profit, a
Ro-San Indoor Closet

Every building—home, cottage, store or office—that has no sewer connection needs this modern sanitary indoor closet. Absolutely odorless. Act as our agent—this fixture sells easily to your customers—good profit. Hundreds of carpenters represent us. We also distribute through builders the

Ro-San Washstand

Provides Running Water, Hot or Cold, Without Plumbing. Every housewife wants one. Convenient, sanitary. Sells readily with little effort. Carry this work along with your regular business. Ask for terms to agents.

Absolutely Odorless

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Every Agent Can Get an Auto Free. NO CONTEST

AGENTS MAKE SALES EASILY

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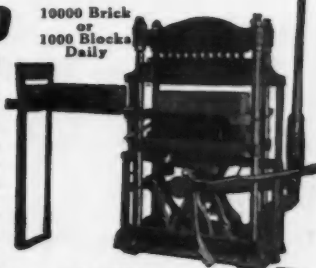
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and

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10000 Brick
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Be independent of the clay brickmaker and dealer. Put yourself in a position to make more money on your contracts, to take bigger jobs—more profitable jobs without worry of delays or lost time eating into your profits. With a Helm Press you can make 10,000 Bricks or 1,000 Blocks a day—\$20 to \$50 daily profit. Operates under 80,000 pound pressure. No tamping—no burning—every brick or block perfectly true. A big demand in your own community for this superior kind of building. Equip yourself to supply it.

Helm "Dry Wall" Building System

Appeals to builders, contractors and architects. It overcomes the opposition to concrete because it offers absolutely Dry Wall construction. It saves money for builders, as no furring and lathing are required, and it makes rigid walls and fireproof walls. This is the system which is bound to get you business and give you the advantage over all other products.

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Let these FREE books tell you all about this great opportunity which is open to you today. It will tell you all the details of this system, about the Helm Press and the Dry Wall building system. It will show you how easy it is to start a profitable business. It tells how each product is made, how it is cured and sold. Write today. Use a post card or coupon.

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Helm Brick Machine Co.
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Gentlemen—Please send FREE the two books on Concrete and Helm Presses.

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Address.....

Was \$100 Now \$49

NEW OLIVER NINE FOR HALF PRICE

The Oliver Typewriter Company created a nationwide revolution on March 3rd when it announced its new plans. No more expensive sales force of 15,000 men! No high office rents in 50 cities! No idle stocks!

But dealing direct with the people—cutting out all middlemen. The old plan cost the buyer a needless \$51 per machine. We now save that and give it to you. *So the new price for standard \$100 Olivers is \$49.*

The Oliver Nine—our latest model—direct from the factory to you. It is the finest, the costliest, the greatest typewriter ever built. Used by the leading concerns.

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And remember, carbon copies of everything written, for your records.

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Mail me your book and further information—all free and without obligation to me.

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City State

STARTLING FACTS

Contractors' Special!

For contractors, our Special Oliver Nine is unbeatable. Besides being the best for ordinary correspondence, none can equal it for figure work. It has the characters you need, as shown on the keyboard herewith.

How to Design Foundations

(Continued from page 190.)

concrete and see that the materials are measured carefully and mixed thoroly. Sand and stone or gravel without cement and water do not make concrete.

"If timber posts are to rest on the top of the foundation piers, a steel, iron or lead plate should be placed between the concrete and the wood. It is often suggested that the cut ends of the posts be given two brush coats of coal tar creosote before putting them in place in order to prevent decay of the wood at the floor line.

"Next time," said the Boss, "we will look into other details of building construction."



Reasons for Hanging All Doors on Three Butts

(Continued from page 62.)

2. The center butt prevents the door from striking or interfering with the door-stop, if used, or the edge of the rabbet, if door-jamb is rabbeted, when the door has a tendency to bow or warp toward the door-stop or the center of the door-jamb.

3. The center butt will hold the butt edge of the door flush with the casing edge of the door-jamb if the door has a tendency to warp away from the door-stop or the edge of the rabbet of the door-jamb.

4. If a door is hung on two butts only, each butt carries one-half of the load or the weight of the door; but when a door is hung on three butts, each butt carries approximately one-third of the load or weight of the door, and the strain and wear of each butt is decreased. The butts, door-jambs and doors will have a longer life and cause less trouble to the operators of the door.

5. When three butts are used, more screws are driven into the door-jamb and the door. This greatly relieves the strain on the screws, the wood in the door-jamb, and in the door, which is an important factor. Often thin lumber is used in door-jambs and the screws have not sufficient stock or lumber to hold them thoroly. In such cases short screws have to be used, which frequently cause trouble.

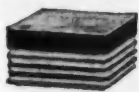
6. When three butts are used the top butt may be set nearer the top of the door, thereby lessening the leverage of the door pulling away from the door-jamb.

7. When three butts are used, the lower butt can be set lower, thereby preventing the door hugging the door-jamb near the bottom of the door.

8. When three butts are used, the top edge of the door remains in line with the head-jamb, and the bottom edge of the door is parallel with edges of threshold. The top and bottom of door cannot be thrown out of line by the door warping or bowing on the butt edge of the door, as it is firmly held in place by the center butt. The bottom and top edges of the door cannot get out of line. This affects the lock edge of door and causes it to remain straighter, preventing trouble with the lock.

9. When three butts are used there are more horizontal bearings in butts to receive the vertical downward thrust of the load and the horizontal movement or wear on the knuckles of the butts when the door is opened and closed. By having more horizontal bearings in the butts it takes much longer to wear out the bearings of the butts than if only two butts are used. If bearings are badly worn the position of door will be lower and cause trouble with lock and door dragging on threshold or floor and the doors will creak.

10. The horizontal wear on the knuckle of the butt has been successfully overcome by using ball-bearing butts.



BERGER'S
Raydiant



"Special" System

WHEN installing sidewalk lights for your clients' buildings, give them the benefit of the Easy Replace feature of the Raydiant "Special" System.

By so doing the installation will not be marred by broken glass due to accidents or other cause.

When glass becomes broken or shaded, it can be readily knocked out by several good blows from the top, leaving a clean-cut opening into which the replace glass is inserted. The latter is not threaded into place, but secures a definite bearing on the base of the construction, being anchored into place and waterproofed.

The Raydiant System is a simple, strong, permanent and effective system.

Write for Blueprints
and Catalog T. A. B.



Merchants National Bank
Bldg., Indianapolis, Ind.,
"Raydiant" System Installed
D. Burnham & Co., Archts.



The Berger Mfg. Co., Canton, O.

Branches: Boston New York Philadelphia Chicago
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The Logical Building Unit

The beauty and effectiveness of this building material bring prices equal to those of Brick, Bedford Stone and similar materials.

Hydro-Stone machinery makes every size and shape stone necessary for the walls of a house, church, school or other buildings.

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The "Standard" Contractors' Universal Woodworker No. 1 B



This machine has three independent mandrels driven with separate belts from the counter shaft

One for the
Jointer

One for the
Saw
Table

One for the
Boring
Attachment

Abernathy, Texas, Feb. 12, 1917.
Standard Machine Tool and Supply Co.,
Kansas City, Mo.

Dear Sirs:—I looked over several catalogues of woodworkers before I selected the No. 1 "B," but I thought when I selected it that it would be the best and handiest machine, and after using it for 3 months I am of the same opinion, for it sure is all right and does fine work.

Yours truly, H. E. RANTZ.

Five Machines at the Price of One

8" joints, rip saw table, cut off saw table, boring attachment, drum sander, emery grinder. Does planing, jointing, rabbeting, moulding, gaining, dadding, ripping, cutting off, mitering, boring, routing, grinding, sanding.

Write for catalogue and prices on our full line of up-to-date wood-working machinery.

Standard Machine Tool & Supply Co.
First and Main Kansas City, Mo.
Established 1896

TROKAL LIQUID FLOOR FINISH

Another member of the "Nice" family. You will like the results it gives. There is nothing more sanitary, more durable or handsomer than bare floors, linoleums, etc., finished with "Trokal."

Send for catalog on Varnishes, C-M-T Coatings, Paints, etc.

EUGENE E. NICE
Philadelphia, Penn.
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BEAUTIFUL OAK FLOORS

Are the source of unlimited satisfaction and pride. Wherever OAK FLOORING is used it means better tenants and better selling and renting values.

OAK FLOORING means satisfaction; the first cost is the last, as repairs are eliminated. With a little care OAK FLOORS will last a lifetime.

¾" OAK FLOORING offers a very beautiful and durable floor at a very low cost. It is the ideal floor for laying over old floors in old buildings, as well as in new buildings over cheap sub-floors. When laid it has all the appearances of 1½" stock.

Carpenters and contractors find it very profitable, in dull periods, in laying ¾" OAK FLOORING in old houses.

All reputable lumber dealers sell OAK FLOORING.

Write for booklet, "America's Best Flooring."

THE OAK FLOORING SERVICE BUREAU

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UNION METAL PERGOLAS

*"The Ones That
Last a Lifetime"*

These pergolas with columns of galvanized open hearth steel will withstand the dampness of vines and shrubbery and the heat of summer sun as long as your house itself. Wood columns placed on the open ground soon swell and shrink, open up at the joints and finally rot out, just as the climbing vines are reaching the perfection of maturity.

Union Metal Pergolas come in any length complete with metal columns, beams, rafters and trellis strips ready to put together on the spot.

Write for illustrated Pergola Book No. 72.



Union Metal Mfg. Co.
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Hornet Mantels

They add 100% to any interior.

The model shown here gives an idea of our line and prices. It is offered in selected Oak or Birch, Mahogany finish, Piano Polish. Stands 7 feet high. Note beveled mirror, enameled tile and grate.

Priced at Only \$29.00

Study our full line of Gas Logs, Fire-sets and Screens in helpful catalog. Gives directions for installing. Get this book for future reference.

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One of 40
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Our Big
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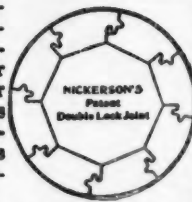


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THE BEST COLUMNS

for Porch, Interior and Pergola use the
NICKERSON Patent DOUBLE LOCK JOINT
THEY CANNOT COME APART

We Special-
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nola" is our
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Clinch you
Trade by
giving them
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Columns.
Ours have
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Construction
and correct
shape.

All kinds of interior trim to detail.
Write for Catalogue No. 4.

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Members Knoxville Builders' Exchange

SPANISH TILE ROOFING

MADE IN

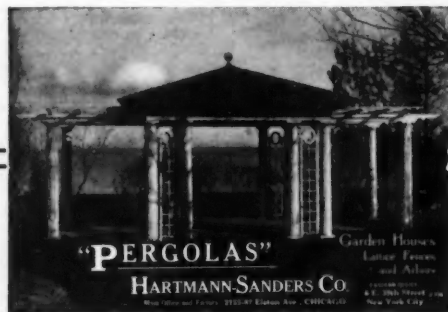
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Stamped in plates of 10 Tile each, 16 plates covering one square. Storm and dust proof joints. Easily and securely laid.

Write for catalogue showing full details of this roof. Prices quoted on application.

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When writing, enclose 20c in stamps and ask for
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Shows many
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Grilles, Parlor
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nade Openings,
Consoles and
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Beam Drops 15" at
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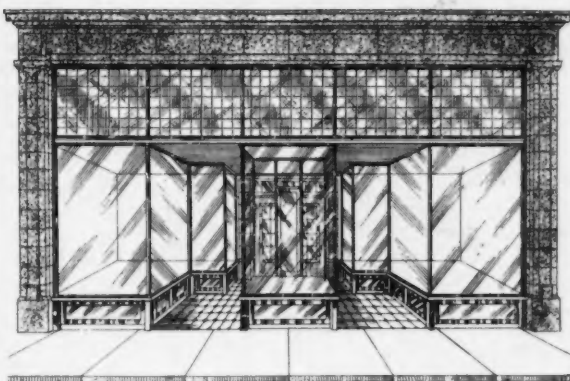
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*Agents in the Principal Cities of
the United States and Canada*

The Puttyless Window is Revolutionizing Modern Window Construction

CRACKING, crumbling, leaky, unsightly, putty windows will soon become a thing of the past. Puttyless windows define a new and higher standard of window service and satisfaction in up-to-date construction. No points, putty or paint. Weather-proof, durable, economical. Over 200,000 already installed.

Made with a lead inlay which gives even pressure on the glass and puts an end to putty troubles—insures firm, snug-fitting window lights—affords a glazing that lasts as long as the life of the building itself. Can be used in all forms of art glazing.

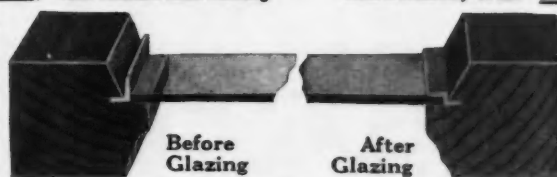
Attention: Sash and Door Manufacturers, Building Contractors and Building Supply Dealers—the Puttyless Window is a business-getter you cannot afford to overlook. Write for full information NOW.

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Make Money Building STORE FRONTS

THERE'S big profit in it and our plan helps you to make it. We sell "Desco" Store Front construction direct to you and at a price lower than you've been accustomed to pay. You'll cut the cost of installation, too—it's so simple. Any of your men can install it right and there'll be no danger of breaking the glass.

Desco
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"Desco" is the result of our 28 years of experience in the manufacture of Store Front construction. Working with builders since '89 has taught us how to handle your orders.

"Desco" is made of solid, heavy-gauge copper; the corner and division bars are reinforced with heavy steel channels treated by the Parker Rust-Proof Process. Safety to the glass is one of the dominant "Desco" features. The glass in the sash rests against creosote-dipped blocks—a veritable cushion.

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Send "Desco" details and prices without obligation.

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display a composition of utility, durability and good, pure architecture without any "gingerbread." No buildings are too large or too small for our personal and prompt attention.

We develop your own ideas into a practical set of plans and specifications which can be executed to the smallest details into a building that can be built within your means and to your entire satisfaction.

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demand a ready sale owing to their attractive appearance, fire proof, durable and portable features. They can be set up and taken down quickly and any number of times without affecting their usefulness, and as they are made of heavy gauge galvanized steel they should last a lifetime. The demand for portable and fire proof garages is growing daily.

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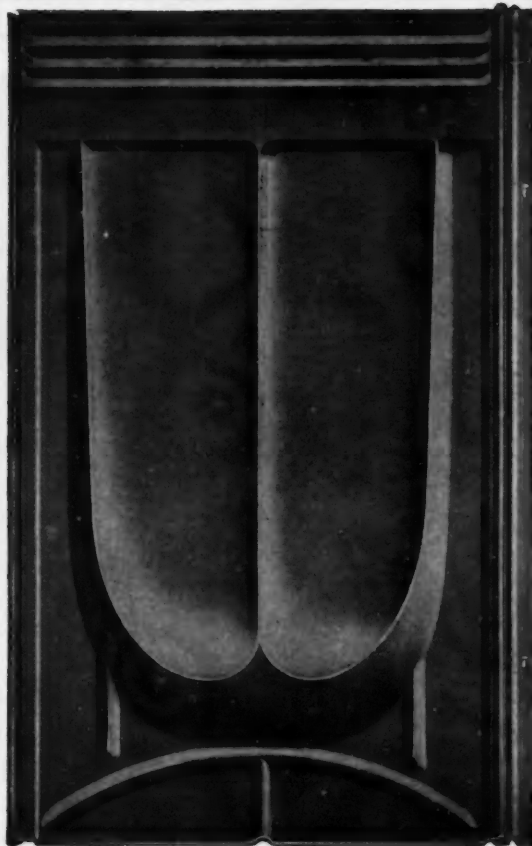
A ceiling design of Steel for a butcher shop would be hardly suitable for a bank or a theatre, yet if only a few designs are available such a mistake is liable to happen. To prevent such errors we offer Kanneberg Service Free of charge to suggest appropriate designs in harmony with the surroundings at the most reasonable prices. We do not need an architect's drawing—the roughest sort of a layout will do. Send us a drawing of your next job and let us show you the possibilities of Decorative Sheet Metal. It won't cost you a cent or obligate you in any way.

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Everything in Sheet Metal**



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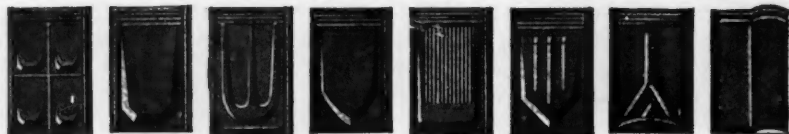
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*The
Shingles
That
Last*



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"Originators of the Asphalt Shingle"

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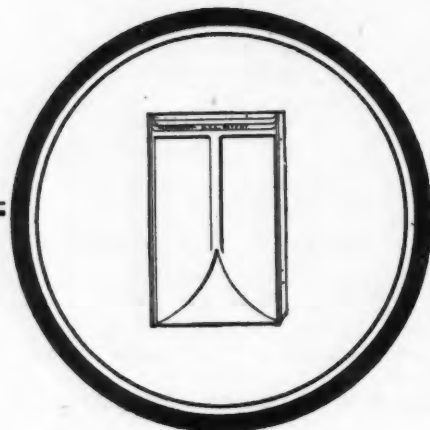
CORTRIGHT Metal Shingles

CORTRIGHT Metal Shingles give absolute satisfaction to your customer. There can be no comeback. CORTRIGHT Shingles defy the weather; and defy most all the other elements that ruin ordinary roofing. They resist zero weather and broiling sun.

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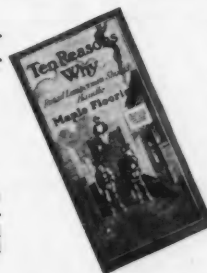
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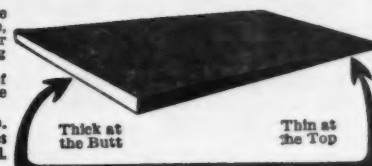
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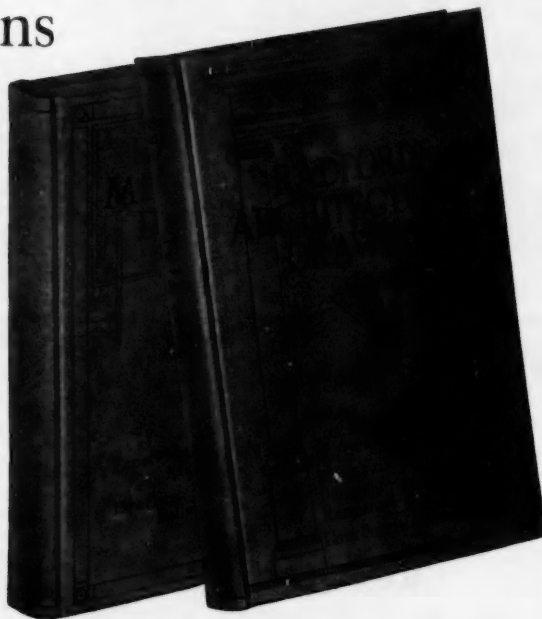
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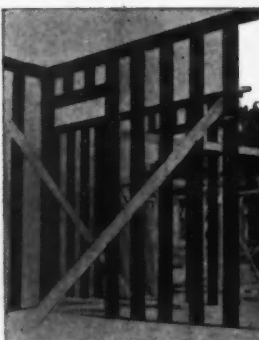
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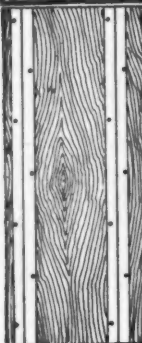
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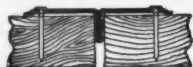
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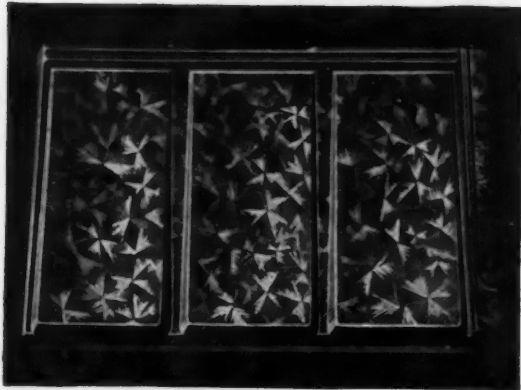
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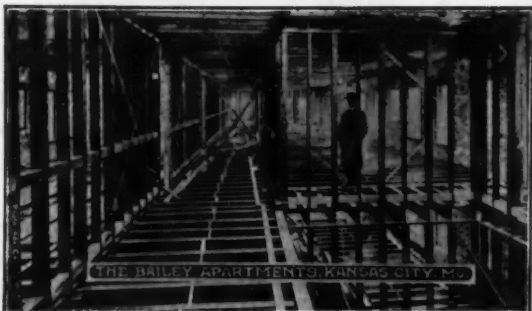
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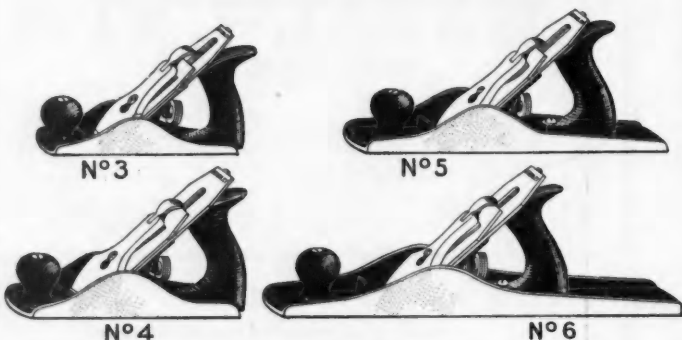
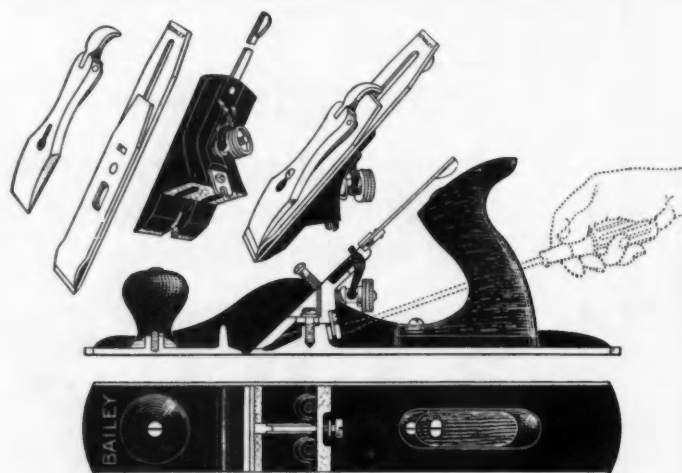
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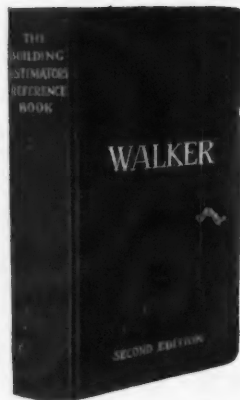
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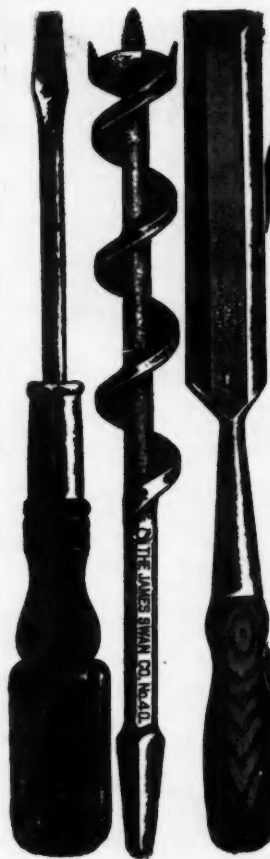
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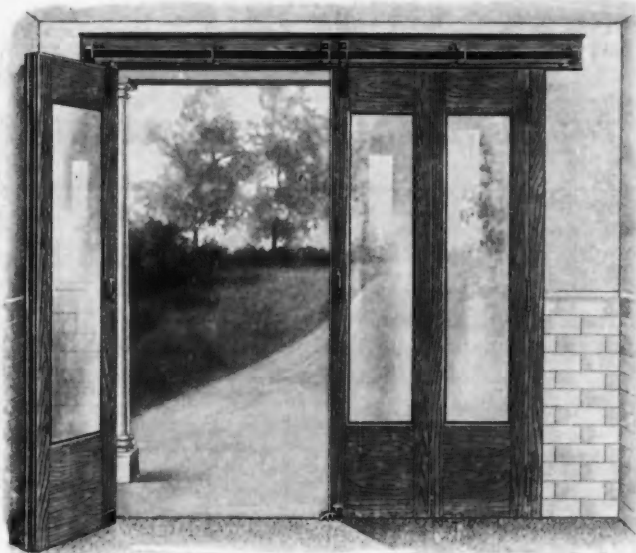


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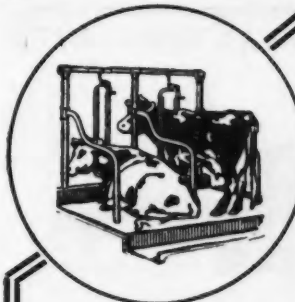
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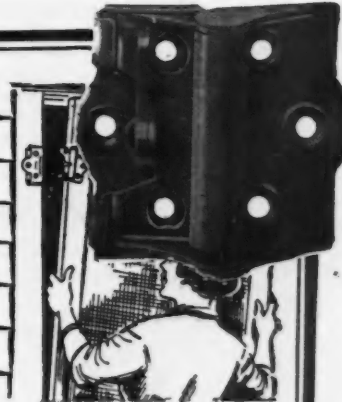
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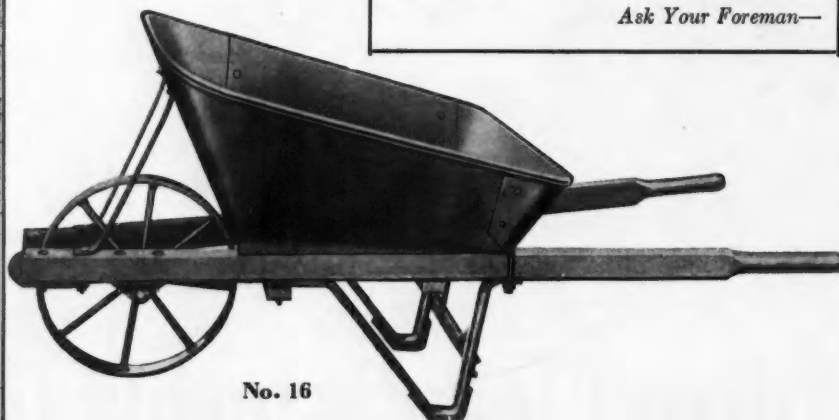
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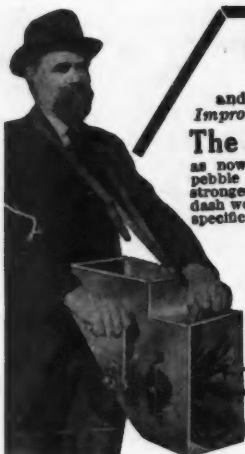
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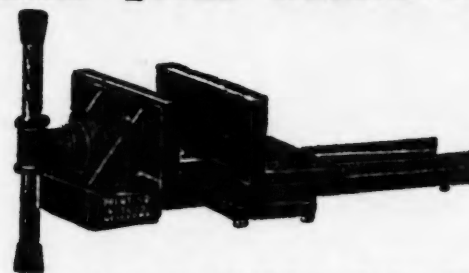
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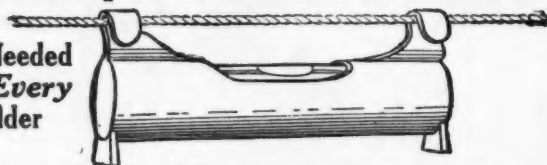
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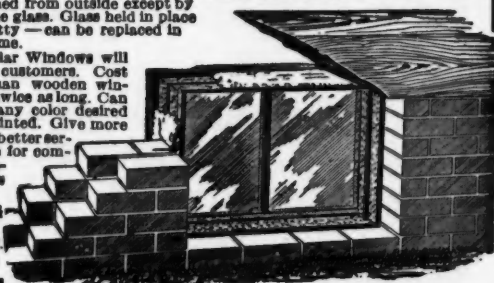
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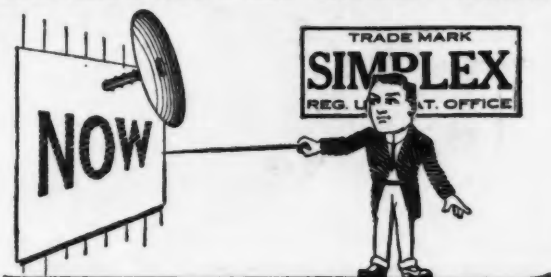
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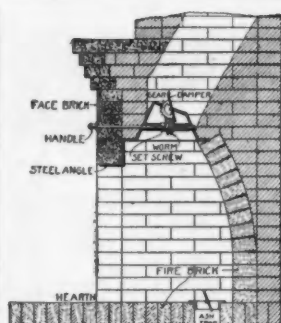
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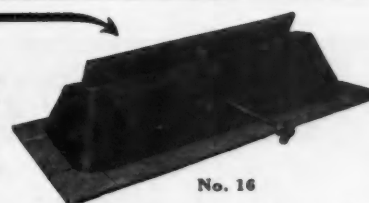
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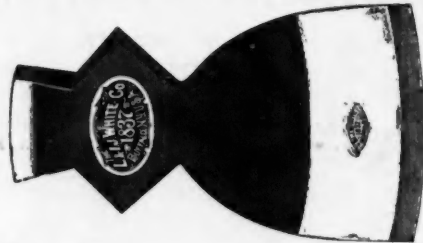


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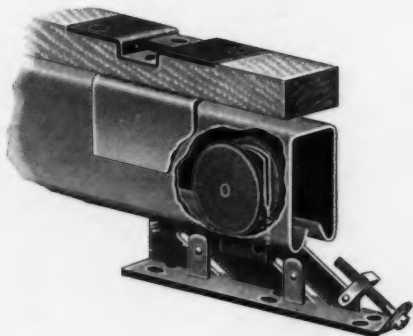
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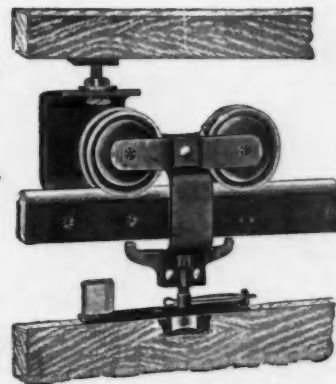
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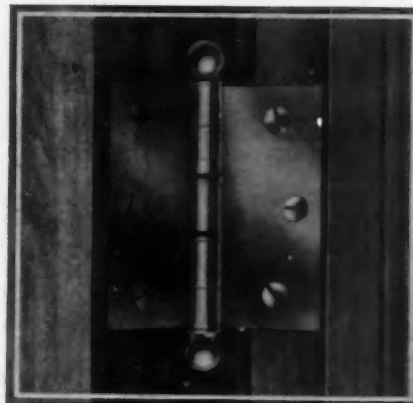
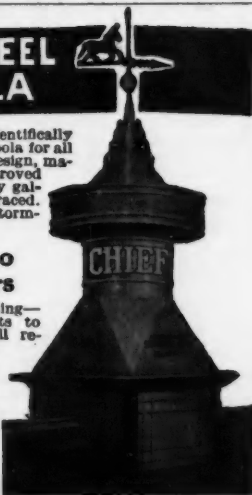
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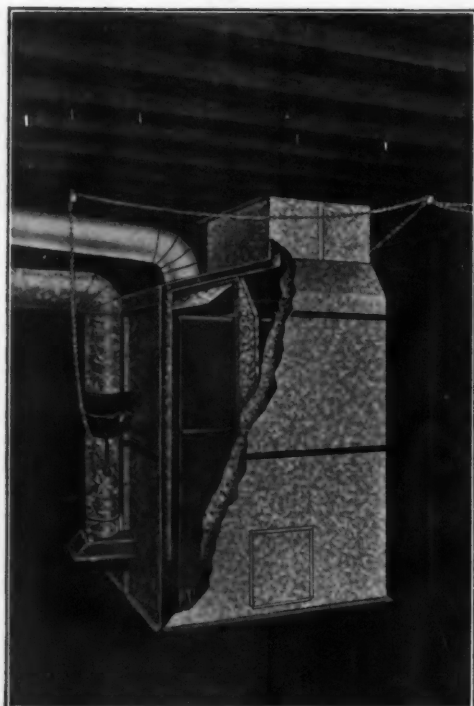
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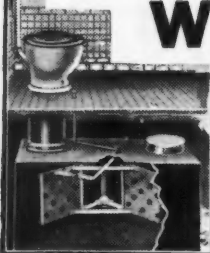
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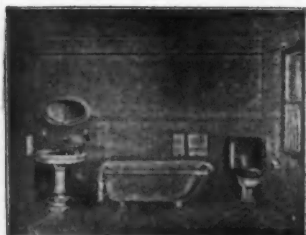


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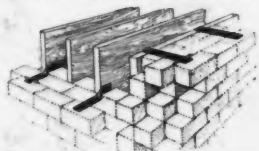
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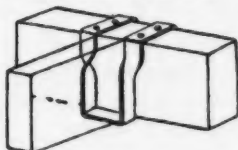
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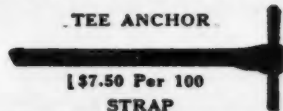


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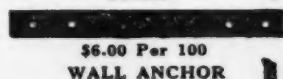
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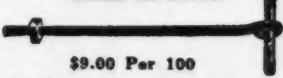
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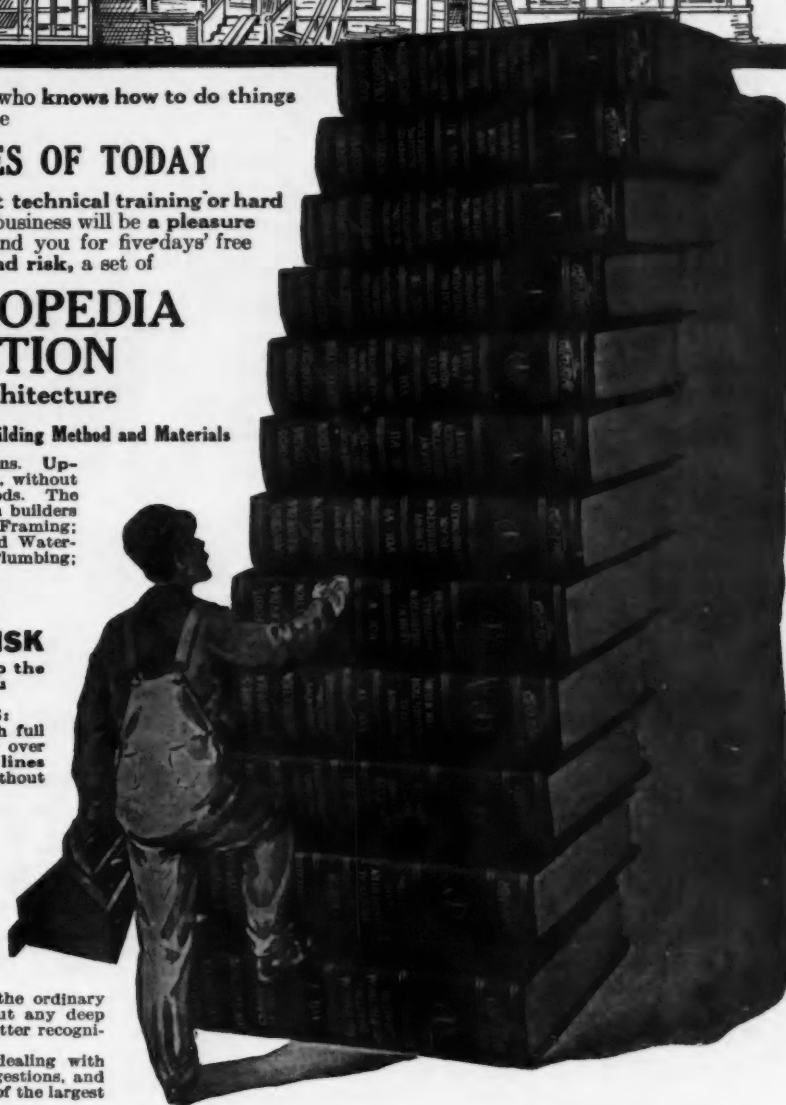
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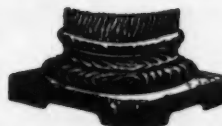
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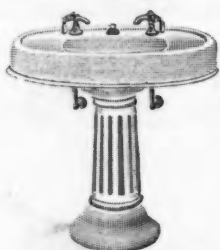
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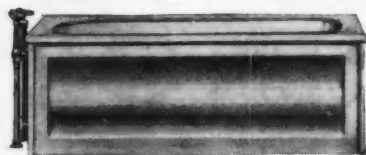
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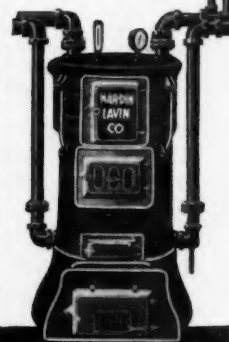
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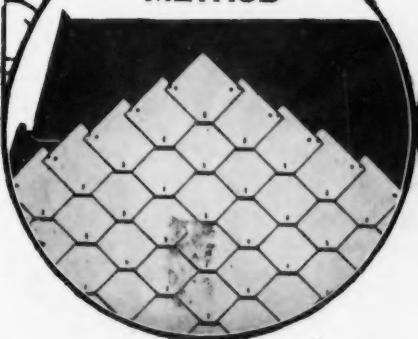
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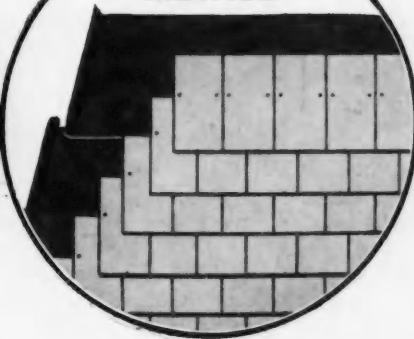
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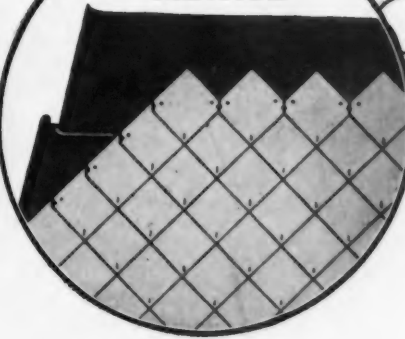
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