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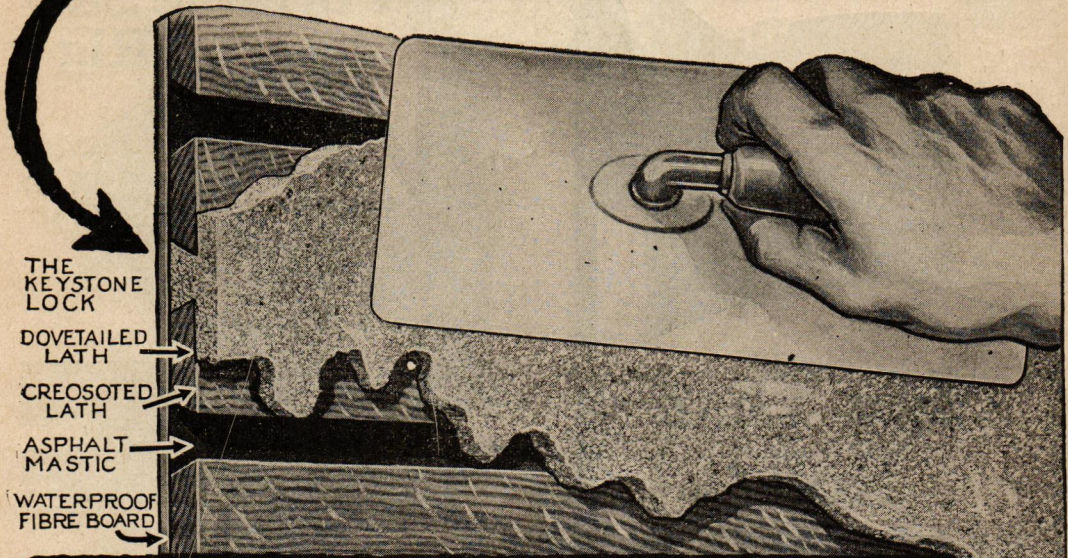
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Will not corrode—cannot break away or sag

Examine well the construction. Creosoted dovetailed lath imbedded in asphalt mastic on a background of heavy fibre board—a combination of materials that possess practically everlasting wearing qualities, water-proof, weather-proof, vermin-proof and sound-proof; put together so as to form a *rigid, permanent* background that *locks* the stucco so it *can't* break away.

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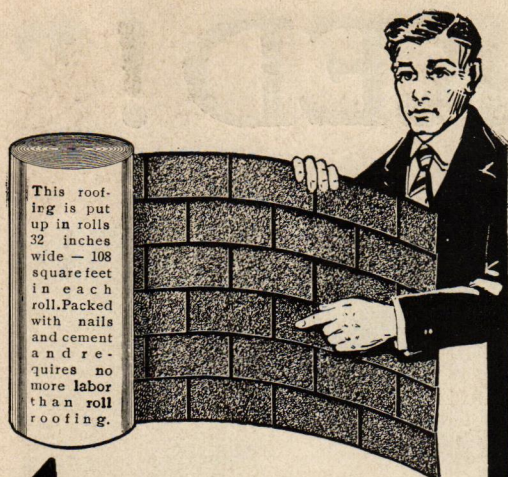
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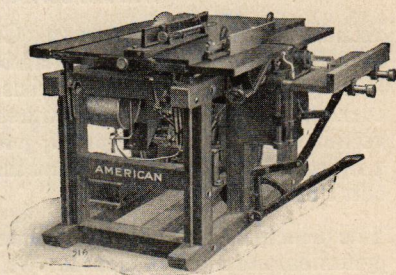


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C. H. & E. Mfg. Co., Inc., 319 Mineral St., Milwaukee, Wis.



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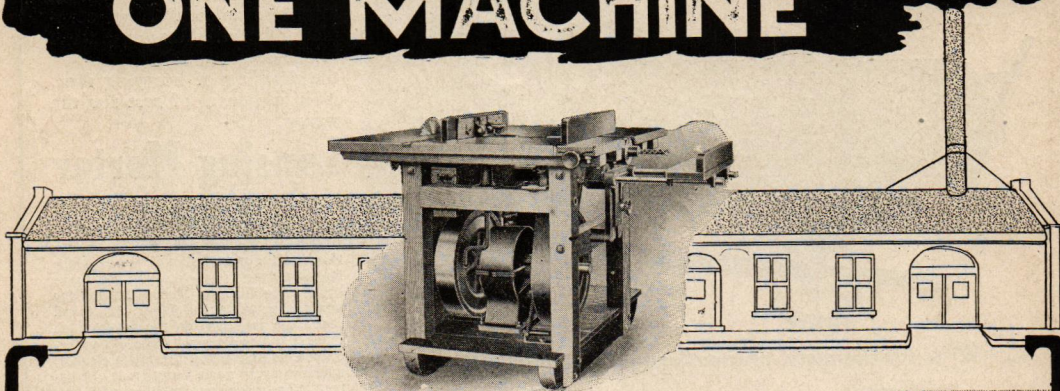
The "American" is a four-man machine—which means that four men can use it at once, on different operations. But it has far more than a four-man capacity for work. It will be equivalent to a big increase in your working gang.

Ask for Bulletin 57

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Out on a Big Job or in the Shop

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During the dull months this machine in the shop will keep the jobbing work going and will make at the same time all the mill work for the big building jobs. Ever ready and always busy this machine will save money every time it is run. *Send for big free book* that tells of all the tools and how you can find savings in them.

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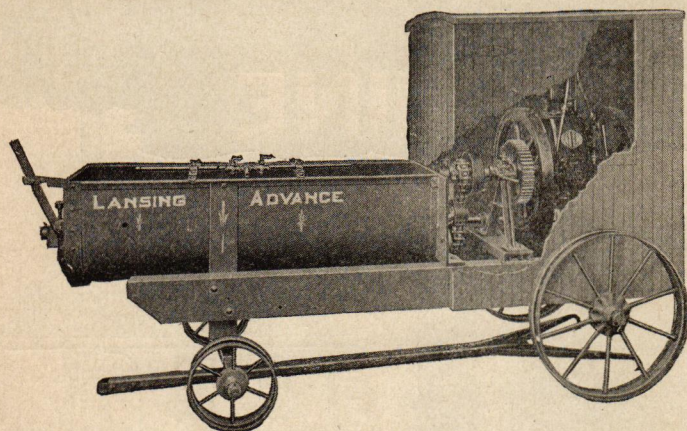
CHICAGO
1440 Monadnock Block

(2SR)

NEW YORK
Dodge & Dodge, 1133 Broadway



Vos You Efer in the Adelphia?



The comparatively new Hotel Adelphia in Philadelphia is a wonderful combination of refined elegance and comfort. It might be called a "super-complete" hotel. Standing in the midst of the roar of traffic and the shuffling of hurrying feet, it is a haven of rest for the weary.

Lansing Mortar Mixers

were used for mixing the plaster used in this hotel. For a number of years past the largest and most up-to-date contractors have been using Lansing Mortar Mixers for mixing their mortar and plaster. It is found that these machines do the work much quicker and do away with the old water-soaked mixing boxes, are much cleaner, and give a very much better grade of mortar. It has proved out that they will save not only material and labor in mixing, but do the work so much quicker and so much better that masons and plasterers can lay or plaster a great deal more surface per day, owing to the fact that machine mixed mortar or plaster does not require retiempering and can be mixed as needed, therefore, does not require frequent turning over to keep in condition.

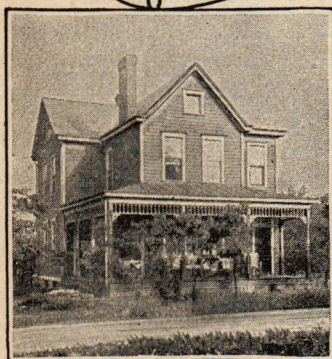
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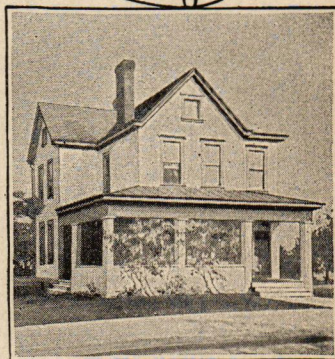


Lansing, Michigan



Give the House an Overcoat of Stucco and you have made a practically new house. But see that it has a lining of

SYKES



Expanded Cup Metal Lath

Self-Furring

Sykes Expanded Cup is the Metal Lath that gives the plaster or stucco a *tight and everlasting* grip. No furring strips needed with this Metal Lath. This saves 5 cts. to 10 cts. a yard in building cost.

Sykes Expanded Cup Metal Lath is heavier than others cut from the same gauge, being cut with a wider strand.

Best for Interior as Well as for Exterior Work

Write for Free Sample and Book of Specifications for Stucco on Metal Lath.

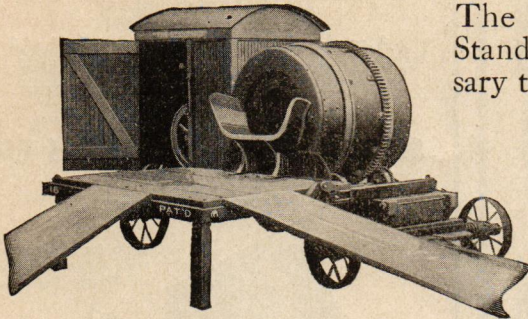
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"The Standard" Low Charging Concrete Mixer

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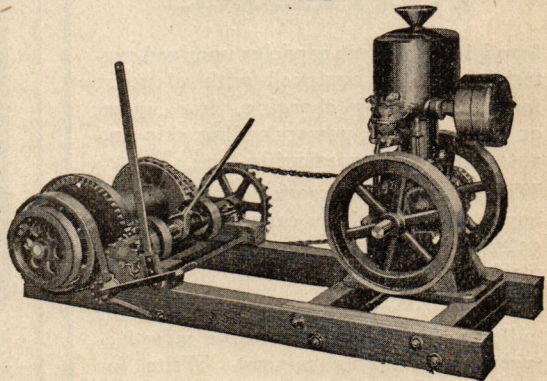
is hinged so that it may be folded up against the drum at the end of the day's run or when moving from one job to another. The elimination of the side loader permits construction to be made exceptionally strong and rigid, maintaining, at the same time, light weight and portability. The mixing blades are firmly riveted to the drum and rotate with it, insuring a perfect and thorough mix at all times without slopping or spilling.

"The Standard" is built in 10 sizes with capacities ranging from 3 to 40 cu. ft. per batch. Complete Catalog No. 32-8 will be mailed upon request to our nearest office.

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Ask for catalog No. 32-8H describing our entire line of hoists of all classes and capacities, either with or without power.

**The Standard Scale & Supply Company**

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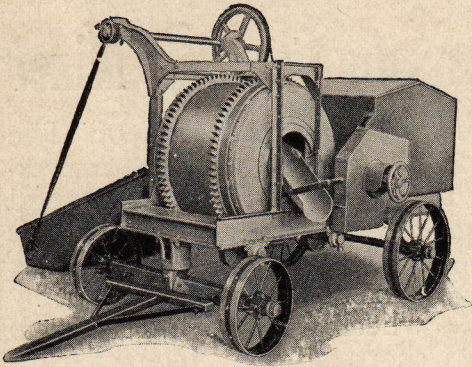
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"THE STANDARD" FOR CONCRETE

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—the same mixing action which in big capacity mixers meets the approval of inspectors and engineers. This is something to consider carefully this year because of generally stricter specifications concerning uniformity of concrete.

—while light and easily portable, Dandie Mixers have the construction which insures dependable service.

—a price based on volume production, and every facility for cost-cutting production of highly standardized quality mixers.

DANDIE MIXERS

5 and 10 cubic feet capacity unmixed material; may be equipped with platform for wheelbarrow charging, feed spout, or batch hopper, power loading skip and automatic water-measuring tank.

Write for Booklet series 36-F. Don't buy a mixer of these capacities, without getting full information about these remarkable values.

The Dandie is not a "new-comer," but is built by the largest, exclusive manufacturers of concrete mixers. Write for booklet 36-F today.

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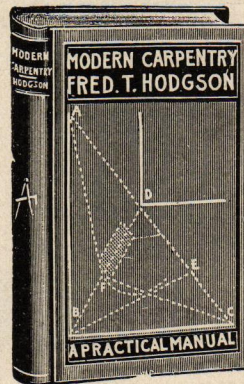
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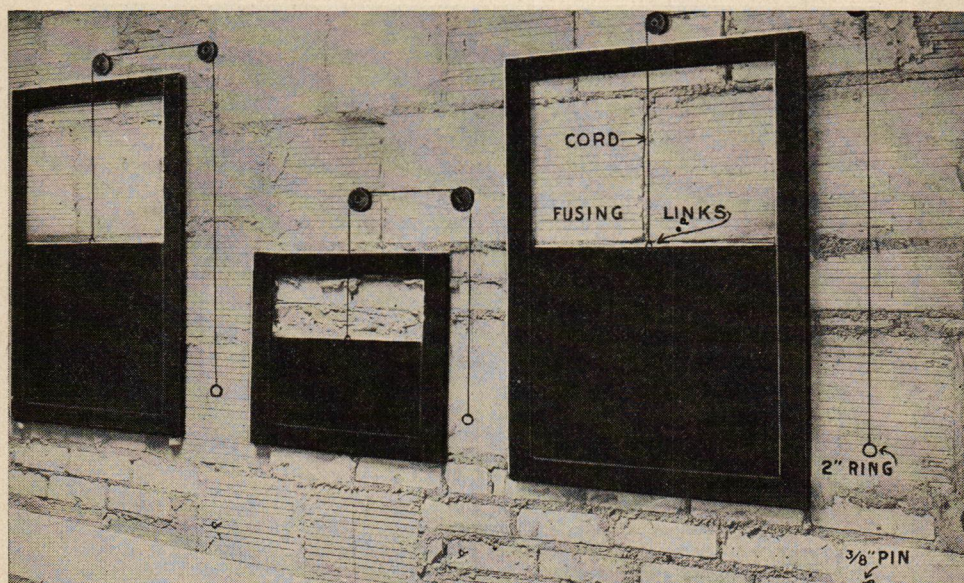


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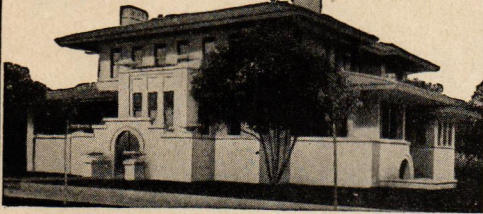
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This gives a rich color tone, white or tinted, without losing the distinctive texture of the material. It makes walls absolutely weatherproof. For interiors, too—especially desirable.

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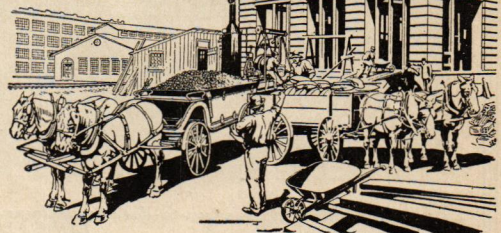
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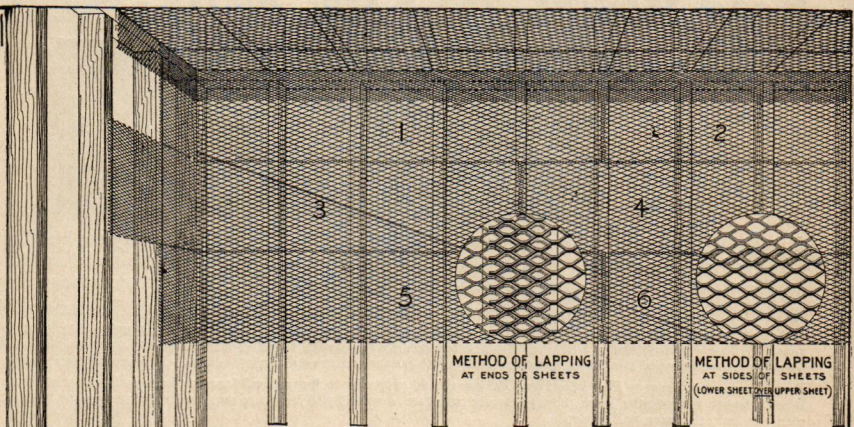
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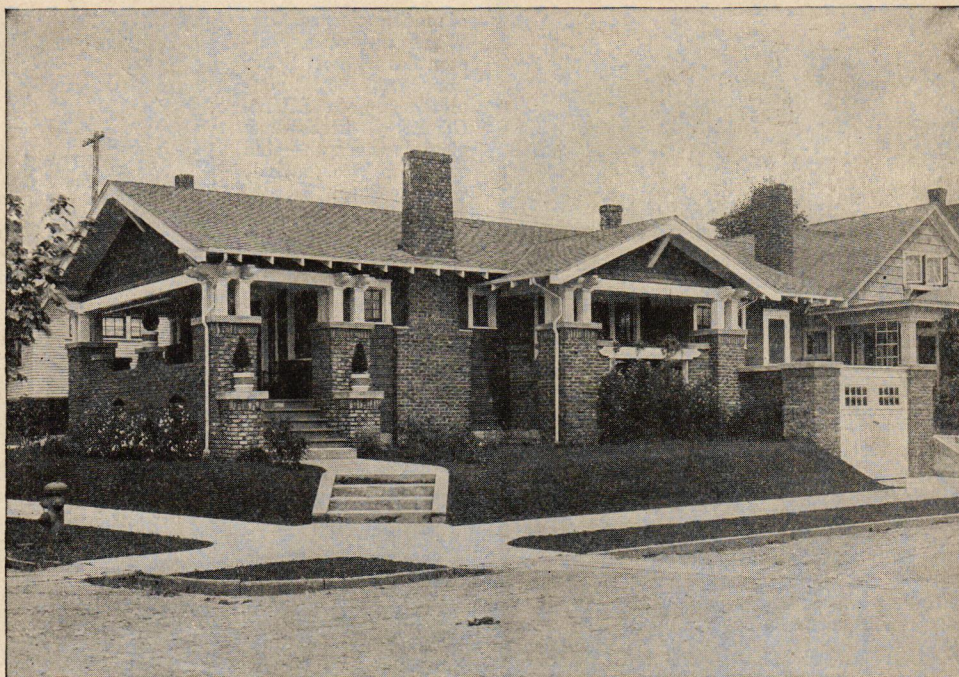


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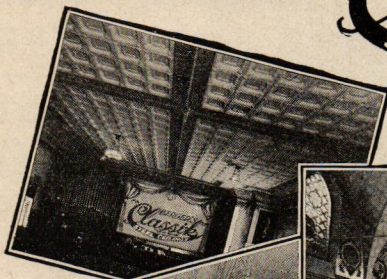
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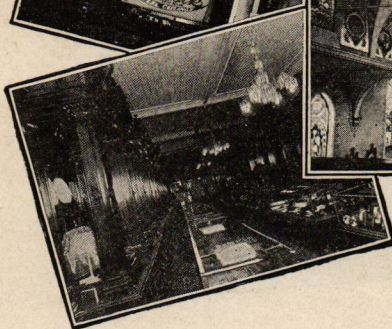
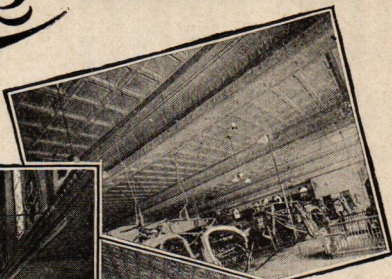
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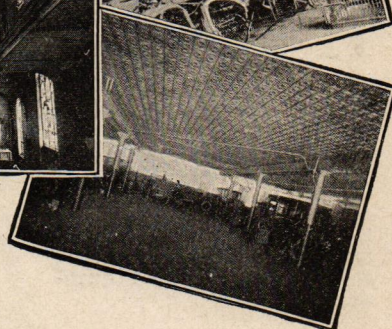
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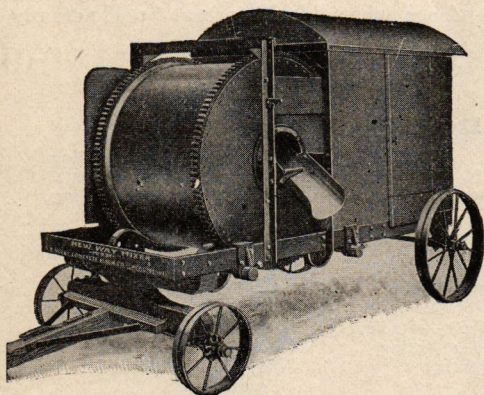


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You can prove these statements of "New-Way" economy by using it for ten days, at our expense.

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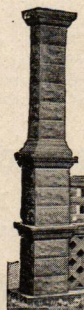
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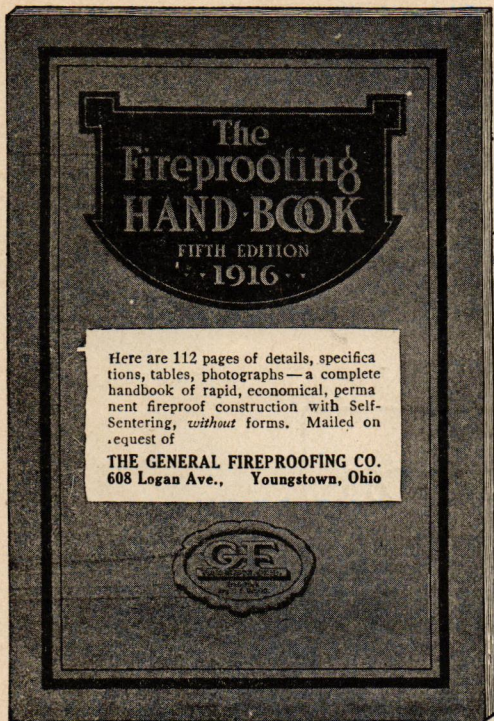
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This book is handsomely bound in Full Limp Morocco Leather, is gilt edged and of a convenient size. Send \$3.00 today and a copy comes to you by return mail, prepaid.

PORTER-HODGSON CO.

537 So. Dearborn Street

CHICAGO, ILLINOIS

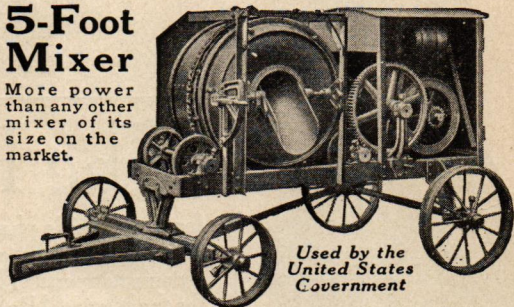


STABILITY
Large Capacity
Responsible Maker
\$198.50

Write for Catalog No. 10

5-Foot Mixer

More power than any other mixer of its size on the market.



NORTHWESTERN STEEL & IRON WORKS

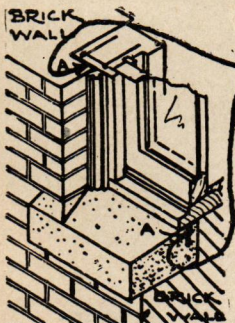
"The House of Good Service"

Capital Stock—\$200,000

Eau Claire, Wisconsin

"NORTHWESTERN"

You Can Save Money



Window jamb for brick wall, showing sill. Points "A" to be caulked with oakum and McCoy's Elastic Cement. Caulk sill from inside.

If you will only
Caulk your
Windows.

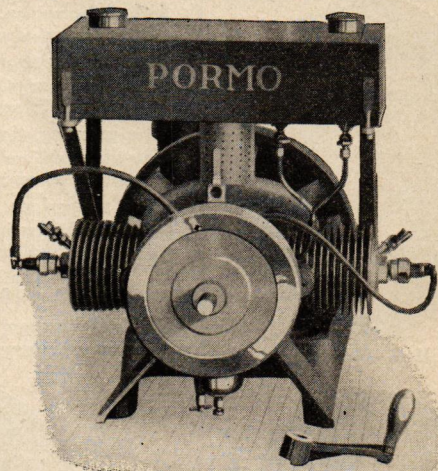
**McCoy's
Elastic
Cement**

does this reliably and permanently.

Our circular will interest you and give you the reasons why you should caulk your windows. It will be sent gladly, together with sample, for the asking.

Hydro-Bar Waterproofing Co.

328 East 23rd Street, NEW YORK CITY



The ideal outfit for pumping out excavations and foundations and for general contracting work is the

PORMO PORTABLE PUMPING UNIT

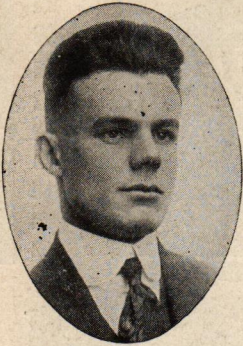
Perfectly portable, does the work quickest, cheapest, best. Pormo engine, complete with Gould Centrifugal Pump. Weight only 150 lbs., capacity 125 gallons per minute.

Write for catalogue and what other contractors say

AEROTHRUST ENGINE CO.

333 Washington Street - - La Porte, Indiana

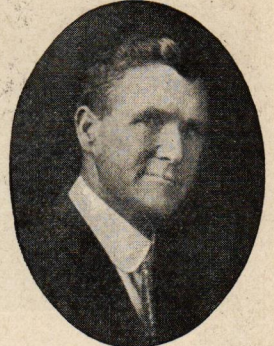




Fred Hellyer



S. Wolstencroft



Homer McFarland



F. W. Logan

The Reason

for these men's photos on this page is to identify them as our *only* subscription representatives. They work exclusively for the National Builder and do not solicit for other publications.

They each carry an identification card and are bonded to establish their responsibility.

These men are familiar to many of our readers as they travel the whole country for the National Builder. Before taking up work with the National Builder, nearly all of them were engaged in the building business. Some are retired contractors, others have worked as foremen and journeymen.

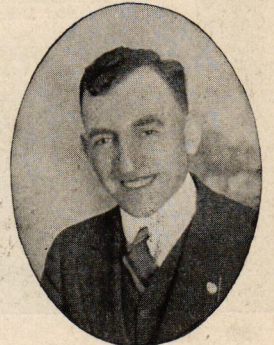
They are authorized to both solicit and collect for subscriptions to the National Builder, giving the official receipt of the company.

The identification card which they carry bears the official seal of the Porter-Hodgson Company and is signed by its President.

Each subscriber is given an official slip out of a bound receipt book printed especially for the National Builder.

The National Builder

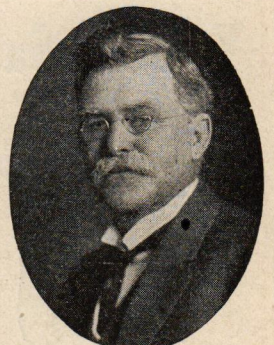
537 South Dearborn Street, Chicago, Illinois



M. J. Mendelsohn



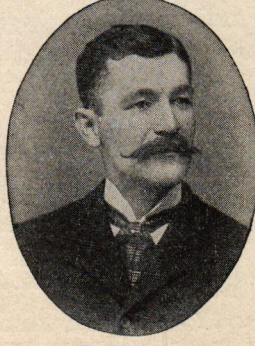
H. C. Chadwick



N. E. Duffey



E. M. Sunleaf



W. W. Werner

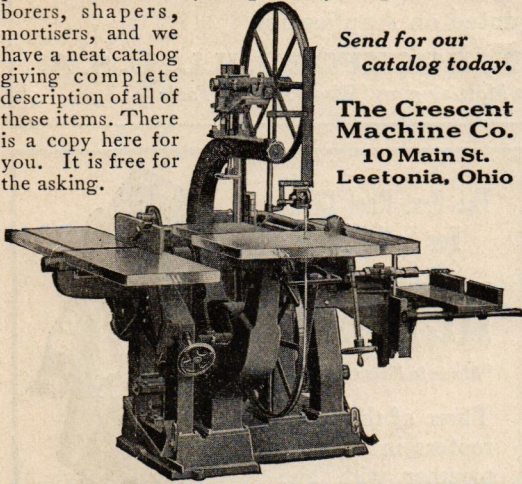


A. Baker Metzger

CRESCENT

Woodworking Machinery

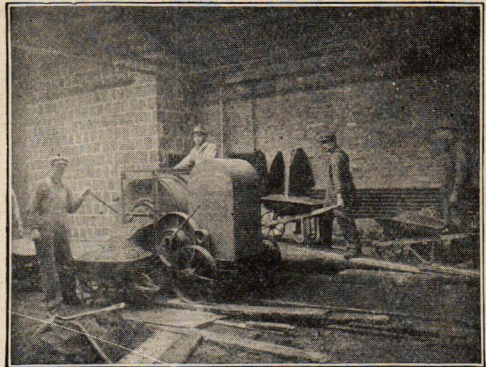
always pleases our customers. It is right both as to price and quality. Our line consists of Universal woodworkers, variety woodworkers, band saws, jointers, saw tables, planers and matchers, disk grinders, swing cut-off saws, borers, shapers, mortisers, and we have a neat catalog giving complete description of all of these items. There is a copy here for you. It is free for the asking.



Send for our
catalog today.

**The Crescent
Machine Co.**
10 Main St.
Leetonia, Ohio

Most Mixing—Least Fixing



The Universal on the Job

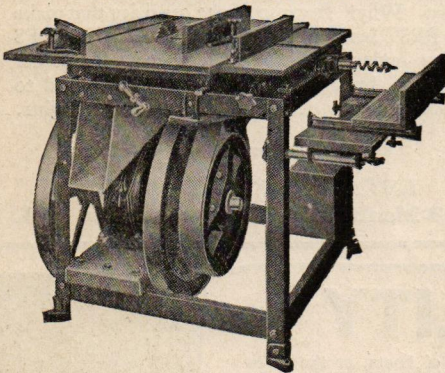
Marsh-Capron Mixers

The Marsh-Capron Line includes seven sizes of mixers, three sizes of pavers, and the Marsh-Capron Grouter.

You should know about the Marsh-Capron Universal Mixer. This one-bag mixer has a capacity of 7 cubic feet of mixed concrete, or 11 cubic feet of loose material, as rated by the **National Association of Mixer Manufacturers**. It is sturdily built, compact—a mixer that will give you years of service, better mixed concrete, less trouble, than anything of its type now on the market.

Marsh-Capron Mfg. Co., 1464 Lumber Exchange Bldg., Chicago
Member of the National Association of Mixer Manufacturers
Our Mixers rated by the N. A. M. M. Wet Batch Rating

SUPERIOR WOODWORKER



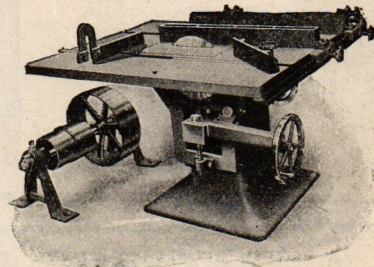
This woodworker is complete in every respect and sold much cheaper than most others. Attachments consist of 1-10" Rip Saw, 1-10" Cross Cut Saw, 1-8" Rip Saw, 1-8" Cross Cut Saw, 1-6" Jointer, 3 pair Moulding Knives, 1-6" Dado Head, 1-10" Disc Sander, 3 Auger Bits—1-2", 3-4", 1", 1-8" x 1-2" Emery Wheel.

Made under the direction of a man who has had practical experience making some of the best known woodworkers on the market. Guaranteed to be thoroughly complete, substantial and the very best value obtainable for the money.

Ask for Description and Low Price

Superior Woodworker & Machine Co.
58 Carlton Street Buffalo, New York

The Famous Line leaves the choice with the buyer



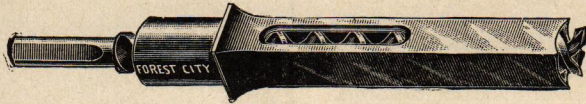
Our line includes band saws, jointers, saw benches of all styles, pony planers, single and double spindle shapers, post borers, hollow chisel mortisers, belt power and automatic feed, combination mortiser and tenoner, wood turning and pattern makers' lathes, swing cut-off saws and the World Famous line of 54 different types of universal woodworkers. A machine for every place and at the price you can afford to pay.

Get the Catalog No. 18 today

The Sidney Tool Co., Sidney, Ohio



Hollow Chisels and Wood Boring Tools



Write for new Catalog M, 1915, illustrating and describing our complete line.

Prices and Discounts Quoted on Application

FOREST CITY BIT & TOOL CO., ROCKFORD, ILL., U. S. A.

Manufacturers of High Grade Hollow Mortising and Wood Boring Tools



Good Tools Make Work a Pleasure

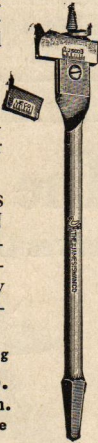
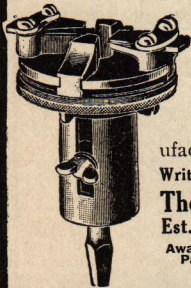
Good woodworking tools save more time, enable better work and will last considerably longer than tools made to sell simply on a low price basis. The carpenter who uses inferior tools is working under a big handicap.

By good tools we mean SWAN tools, which embody the high quality developed by over 100 years manufacturing experience.

Write for free complete catalog

The James Swan Co.
Est. 1810 Seymour, Conn.

Awarded Medal of Honor at the Panama-Pacific Exposition



The Best Roof Cement
For Leaky Roofs

HETZEL'S

"Made in Newark, N. J."

Three of the largest roofers in Chicago, together with hundreds of the best men in the line use



Hetzel's Roofing Cement

and have used it for from 10 to 25 years past. Why? Because of the qualities that make it **BEST** in not only repairing **LEAKY ROOFS** at a saving of 200% at least over the solder method, but also to set slate or tile in and to point up leaky chimneys, windows or skylights.

Write us for prices and circulars

ESTATE OF J. G. HETZEL
63 Maine Street Newark, N. J.

A BIT OF UTILITY

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle, and can be guided in any direction. Doesn't matter how hard the wood is, no consequence

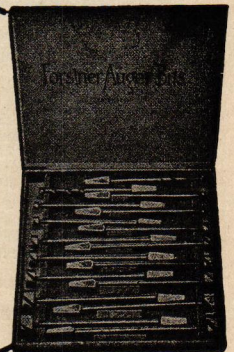
whether it is full of knots, or the grain awkward to negotiate. The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

UNEQUALED FOR DELICATE WORK

Supersedes chisels, gauges, scroll-saws, or lath tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do more work than other bits and

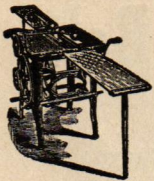
cost no more. We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

THE PROGRESSIVE MFG. CO., Torrington, Conn.



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I. For Ripping.

CARPENTERS! BUILDERS!

Our new foot and hand power Circular Saw No. 4 is the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

SEND FOR OUR
NEW CATALOG
on Foot and Hand
Power Machinery,

Lathes, Scroll Saws, Formers, Mortis-
ers, Tenoners, Etc.



II. For Cross-cutting.

Solid Iron Table
Planed Perfectly
True—Counter-
Shaft if desired



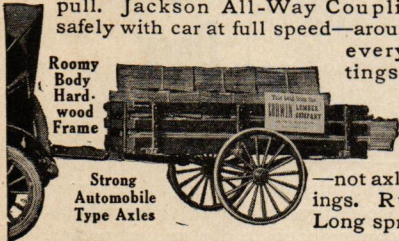
III. With
Universal Mitre Gauge.

W. F. & JOHN BARNES CO., 436 Ruby Street
ROCKFORD, ILLINOIS

JACKSON

Builders: Here's Full Truck Service Without Truck Cost

Instant service; when you are in a hurry for supplies hitch a Jackson Trailer to your car. Works with any car, big or little. Carries any load up to $\frac{3}{4}$ -ton. Actual light-truck construction. Least draw-bar pull. Jackson All-Way Coupling operates safely with car at full speed—around corners—



Roomy
Body
Hard-
wood
Frame

Strong
Automobile
Type Axles

every way. Fit-
tings easily ap-
plied—out
of sight. Hitch to
frame of car
—not axle. Ball bear-
ings. Rubber tires.
Long springs.

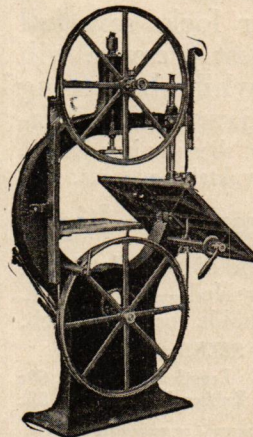
Write for Free Trailer Book and Low Prices

The Miles Manufacturing Company
Department C Jackson, Michigan

Auto Trailer

Band Saws

OF QUALITY



Put them to the test and you'll find that they are no toys. They will do your work and do it well. Their accurate design, rigidity, convenience of operation and moderate price explains their popularity. Catalogue covers full line of Joint-ers, Saw Tables and Swing Saws, also.

The Silver Mfg. Co.
340 Broadway SALEM, OHIO



"I Have a Friend—

who ought to read The National Builder regularly. Send him a sample copy and tell him it was sent at my request."

His name

Address

My Name

Address

The National Builder will benefit your fellow workmen or your employees; boost for it! We will gladly send a free sample copy to any name you care to furnish.

The National Builder, 537 So. Dearborn St., Chicago

Advertisers' Section

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"Diamond X"

"The Expansion Bolt"

for fastening all kinds of material to brick, stone or concrete.

Diamond Expansion Bolt Co.

Manufacturers of Diamond Specialties

90 West St. (Corner Cedar St.,) New York City



Expansion Bolts

of the Future"

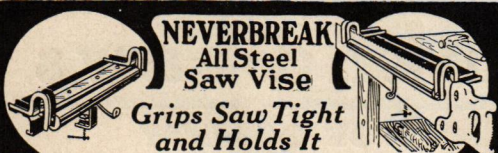
Advantages:

Increased Holding Capacity

Smaller Hole

Lower Price

Send for Samples



NEVERBREAK
All Steel
Saw Vise

*Grips Saw Tight
and Holds It*

Eccentric bar locks saw full length. Heaviest pressure will not loosen saw while sharpening teeth. Rubber jaws make vibration and consequent slipping impossible. Fully protected by valuable patents.

Strong—Compact—Light

Cannot break—made of specially treated steel — all parts welded — not riveted. Adjustable clamp holds tool to bench.

TWO SIZES

No. 57—Weight 1½ lbs. Length Jaw 9½ in., 60c

No. 67—Weight 1¾ lbs. Rubber Jaws 10 in. long, 85c

*If your dealer cannot supply you
— send order to us, mentioning
name and address of dealer.*

We'll prepay.

CLIPPER TOOL CO.

287 Mills Street, Buffalo, N. Y.

"It's the Best Ever"



Topping's Folding Garage Door Hanger

Not a mere novelty but a practical common sense device designed to give every advantage and convenience to the garage owner. Efficient, simple, easily attached.

Write for booklet, prices and builders' proposition

Safety Door Hanger Co.

46 East 4th Street - Ashland, Ohio



WHEN YOU MOVE

send us both your NEW and OLD address. The Post Office does not forward magazines as it does letters.

Name

Street

City State

Old Address

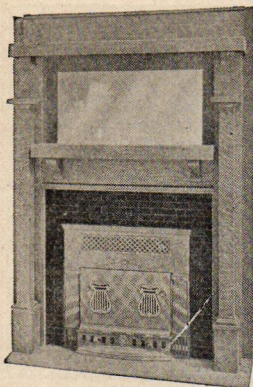
City State

The National Builder, 537 So. Dearborn St., Chicago, Ill.



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ADVERTISERS. IT HELPS

Advertisers' Section



Hornet Mantels Make Houses Sell Better

Here's a handsome Hornet Mantel of selected oak or birch mahogany finish, 82" high and 5' wide with beveled mirror 18 x 36. Coal grate and enamel tile for facing and hearth for

\$25.00

In our large free catalog you'll find illustrated scores of other good ones. Also gas logs, fire-sets and screens, together with complete simple directions for setting wood mantels, tile and fire-places.

Send for it today

HORNET MANTEL CO., 1137 Market St., St. Louis, Mo.

A good mechanic can do a job with *any* tool, but

—not so well —not so quickly —not so easily
as he can with a good tool



DISSTON SAWS

are the saws for the good mechanic because a skilled mechanic takes a pride in his work and in his tools. It's a satisfaction to own and work with a Disston Saw. *Booklet of Sharpening Instructions, free.*

HENRY DISSTON & SONS, Incorporated
PHILADELPHIA, U. S. A.



The construction of this damper is entirely new. The lever rests below the first row of brick, is easily reached by hand or poker and locks instantly when released.

Send for our New Catalog 1590, showing an up-to-date line of dampers, ash drops, chimney thimbles, andirons, etc. Every contractor should have one.

Other Lines We Make—Builders' hardware, kitchen hardware, stove trimmings, wind mills, feed mills, ensilage cutters and gasoline engines.

Stover Mfg. & Engine Co., Freeport, Illinois

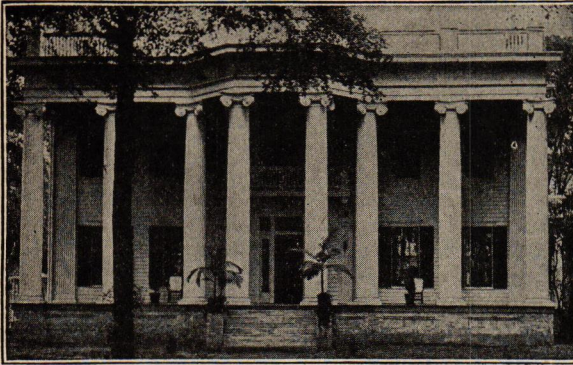
Fireplace Material

Can also be furnished in the dome style or with long bracket so a steel angle can be placed below the edge of the damper.

SEND COUPON TODAY
Stover Mfg. & Engine Co., 35 East Street, Freeport, Illinois
Send undersigned your catalogue No. 1590.

Name.....
Business.....
Address.....





Colonial Columns

The "**Hegener Patent Lock Joint**" in our colonial columns prevents warping, splitting and springing at the joints.

They will outlast any building in any climate. Absolutely not affected by dampness.

Send us your specifications and let us quote you prices.

Write for our free catalogue

Rudolph Hegener Company
9240 Harbor Avenue Chicago, Illinois



SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of \$1.75.

For full description of this and other

SARGENT WARRANTED PLANES
SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
52 Water St. New Haven, Conn.



For United States

\$1.50 one year
\$2.50 two years

THE NATIONAL BUILDER

Published Monthly

For Canada

\$2.00 one year
\$3.00 two years

PORTER-HODGSON CO., Publishers
537 So. Dearborn St., Chicago

Enclosed please find \$_____ for which enter my subscription to The National Builder for _____ years, beginning with the _____ issue.

Name. _____

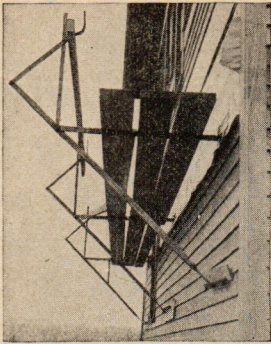
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City and State _____

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SAFETY FIRST

You can protect yourself against accidents and penalty charges at a small cost by using "Safety First" Steel Scaffold Brackets.

They can be used as either Studding or Sheeting Brackets by simply adjusting the brace, absolutely no danger of slipping. Made of best grade steel with extra heavy reinforcements.

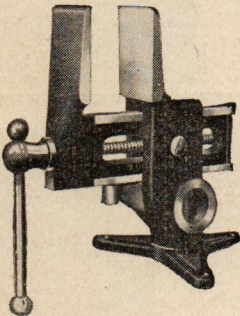
Prices and circular sent on request

JOHN FARAGHER, 809 Brooks Street, Madison, Wis.

The "Carpenter" Vise

Do you know how much time and labor is wasted by the carpenter or cabinet maker who uses an ordinary vise? If he were a "contortionist" it wouldn't be so bad.

The fact is he spends about half his time bending his body around trying to attain a convenient position in which to work. The "Carpenter" Vise is



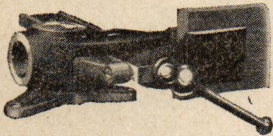
Adjustable to Any Position

and enables the carpenter to place his work at any angle he desires. The movement that clamps the work also automatically locks the Vise on the base.

The "Carpenter" Vise can be used in either a vertical or horizontal position. It weighs only 15 lbs. and can be carried in a regular kit of tools.

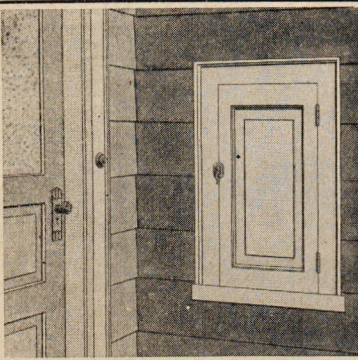
If you are interested in Efficiency—that's the "Carpenter."

Write today for our 30 days' trial proposition. Also prices and folder illustrating the many uses of this new device.



The Will-Burt Company

Orrville, Ohio



HERRICK Outside Icing Plans

will enable you to make the proper openings for outside icing in the most economical way. These plans will be

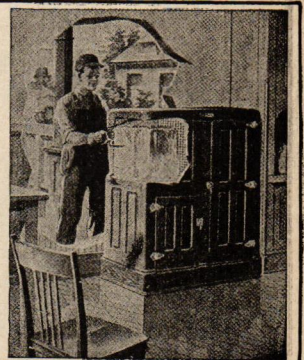
A Great Help to You

and a future satisfaction to the home owner.

"Herrick" Refrigerators have perfect air circulation and heavily insulated walls. Sanitary, clean and economical. For homes, apartments, stores, clubs, etc.

Write for catalog 23N showing blue prints for outside icing, etc.

Herrick Refrigerator Co.
Waterloo, Iowa



Advertisers' Section

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Design No. 327 by Jud Yoho, Estimated Cost \$3200

If you are planning a real home—plan a bungalow and consult my

New Bungalow Book

1916 De Luxe Edition

Compiled and written by a man of experience and reputation. Illustrated with exterior and interior photos, plans, sizes of rooms, cost, etc., of the cream of 1000 pretty, distinctive, practical BUNGALOWS, actually built for \$400 to \$4,000, suited to any climate. Get this largest exclusive bungalow book, 112 pages of invaluable building suggestions. Price **\$1.00** POST PAID

Smaller edition of same, only 50c. Send check, money order or stamps. Money back if not satisfactory.

JUD YOH0, The Bungalow Craftsman
441 Bungalow Bldg. Seattle, Wash.

A Big Advance In Prestige and Profits FOR YOU

You'll actually increase your profits on every home, every farmhouse, school, lodge, church or factory you build or remodel in sewerless districts by installing the

Kaustine Closet System

Makes the home or factory independent of sewer, plumbing or water. Insures modern, up-to-date sanitation—city comforts and conveniences.

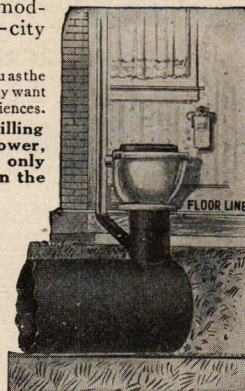
Makes people of your section regard you as the most progressive builder. People today want Modern Homes, with very latest conveniences.

Kaustine, a patented germ-killing chemical of extraordinary power, makes our toilet system the only successful waterless system on the market.

One contractor-agent sold 41 outfits in 6 months—devoting only part of his time! Why shouldn't you do as well?

YOU CAN! Write for Special Offer NOW. Don't trust your memory—address a postal at once and ask for intensely interesting catalog. It's free.

KAUSTINE CO., Inc.
Dept. 1139, Buffalo, New York
Also C. P. R. Building, Toronto, Ont.



12 DAY ALL EXPENSE \$ 60⁰⁰ UP NORTHERN CRUISE

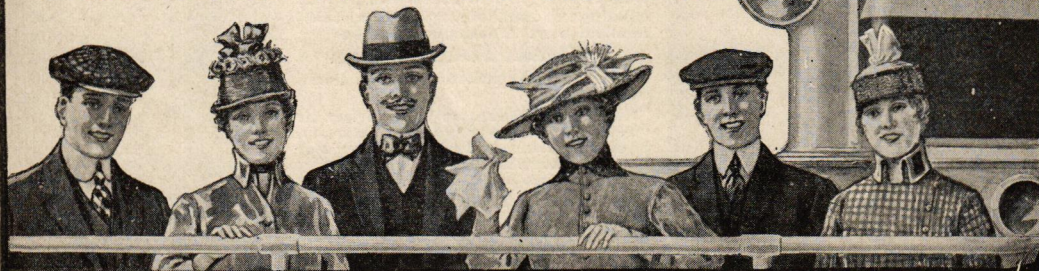
Including all essential expense, visiting **HALIFAX, NOVA SCOTIA**, the truly European capital of this Province, and **ST. JOHN'S, NEWFOUNDLAND**, the unique and busy farthest north city on the Atlantic Seaboard. The splendid steamships, "Stephano" and "Florizel," of the

RED CROSS LINE

are especially built for the accommodation of tourists, having ample deck room, comfortable cabins and lounge, and exceptionally pleasant dining saloon, in which is served to the music of an orchestra, meals, of unusual excellence. The boats are new and able, with every modern device for safety, including full boat equipment for passengers and crew. No cruise on the Atlantic Seaboard gives such novelty and grandeur of scenery and is so health-giving and altogether delightful. Send now for handsome folder 101, giving full particulars of this cruise.

BOWRING & CO., 17 Battery Place, N. Y.

➔ Reduced rates for superior accommodation during June, Sept. and Oct.



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Advertisers' Section



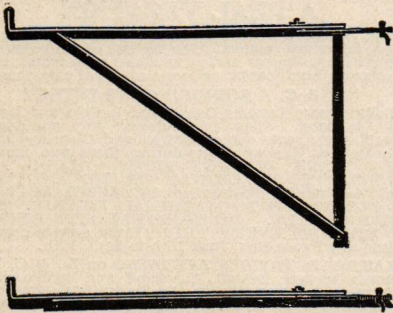
"Trouble Saver" Scaffolds

Stop waste of time, labor and lumber.
Don't throw money away.
Send today for full information. Also our 30-day
Free Trial Offer.

Steel Scaffolding Co.

1101 N. Governor Street EVANSVILLE, IND.

FELSCO Builders' Steel Bracket



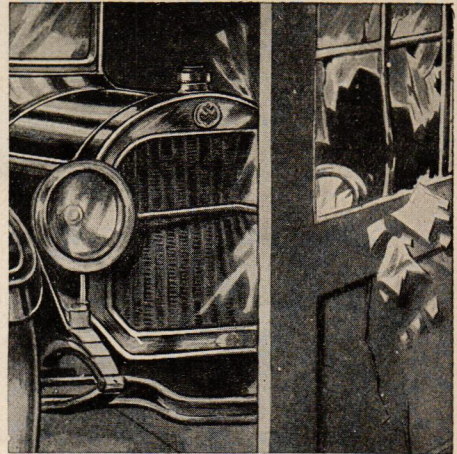
Made of the best angle steel obtainable.
Folds compactly when not in use.
Positively safe and never wears out.

Made in two Sizes:

4-ft. \$12.00 per doz.
5-ft. 14.00 per doz.

Sold under a money back guarantee. Manufactured by

Fellows & Company
127 Portland St. Boston, Mass.



An Unnecessary Accident—

On the garages you build, whether
they are simple or elaborate, you will
find it wise to use Stanley Garage
Hardware and the

STANLEY GARAGE DOOR HOLDER

The Holder is strong and simple in con-
struction, holds the door open against the
heaviest gusts of wind, preventing damage
to car lamps, bending of the fenders or
scratching of paint.

*Our book "N" on Stanley Garage Hard-
ware is really interesting, and contains
much data of value to architects, carpen-
ters and builders. May we send it to you?*

Stanley Works

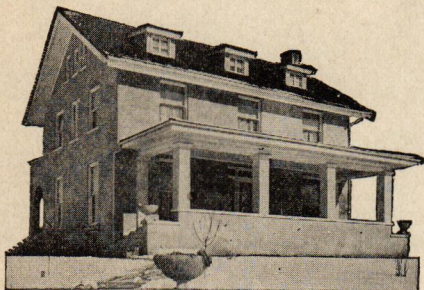
New Britain, Conn., U. S. A.

100 Lafayette Street
New York

73 East Lake Street
Chicago



BERGER'S Expanded Metal Lath For Stucco Work



A WELL designed and properly constructed stucco home has an unusually substantial and pleasing appearance, and this style of construction is in much demand by discriminating home builders everywhere. Stucco admits of a great variety of designs, and when applied over Berger's Expanded Metal Lath is economical and durable—incurring no depreciation or upkeep costs.

This combination makes not only a strong construction, but a fireproof one as well.

Berger's Expanded Metal Lath is extensively and effectively used for both outside and inside walls. It provides a secure foundation to receive the stucco or plaster and hold it in place. The small meshes allow a perfect "key" or "clinch" with the minimum amount of stucco or plaster.

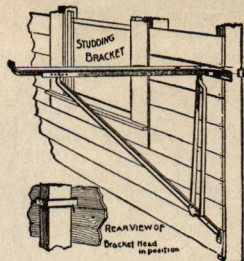
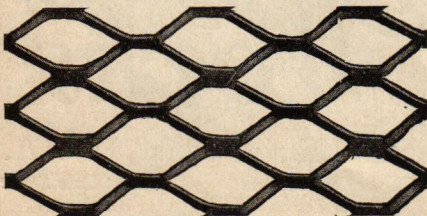
It prevents cracking or falling off of plaster; does not swell, warp or stain the plaster; does not absorb moisture; prevents rats and mice from making holes through walls; and is quickly and easily applied.

Manufactured in sheets 8 feet long and the width varies from 15 inches to 24 inches—the most popular width being 18 inches. Gauges from 22 to 27, the higher the gauge number the lighter the material.

An interesting booklet on Expanded Metal Lath has just come from the press. Want a free copy? Ask for Booklet F. N.

The Berger Mfg. Co. CANTON, OHIO

Branches: Boston New York Philadelphia Chicago
St. Louis Minneapolis San Francisco
Export Dept: Berger Building, New York City, U. S. A.



—will support 2800 lbs.

This Bracket is positively the safest and strongest bracket of its kind made. It will

support a load of a ton and a half which is ten times what it is usually called upon to sustain.

It grasps the studding with a vise-like grip and allows absolutely no sidesway. You do not have to fuss around with screws, nuts, bolts or nails—simply hook the bracket around the studding and press down the arm until the steel strap falls in position.

If you wish a Bracket of unusual strength and reliability and one which has been tested out for years, it would be to your own best interest to try out our Studding Brackets.

We also make 3 ft. and 4 ft. Sheathing Brackets which are perhaps the best known Brackets on the market today and the ones most widely used in this country. These Sheathing Brackets do not pull out on the sheathing board, but 80% of the strain is a direct downward pull. The prices to contractors of our three different style brackets are as follows:

No. 1—3 Ft. Sheathing Brackets.....	\$18.00 per Dozen
No. 2—4 Ft. Sheathing Brackets.....	20.00 per Dozen
No. 3—4 Ft. Studding Brackets.....	23.00 per Dozen

Cash to accompany order. Money refunded if not entirely satisfactory.

Folding Scaffold Bracket Co.

60 W. Lafayette Boulevard, Detroit, Michigan

THE COAST LINE TO MACKINAC

DETROIT,
CLEVELAND BUFFALO,
NIAGARA FALLS.

TOLEDO,
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The D. & C. Line Steamers embody all the qualities of speed, safety and comfort. The freedom of the decks, cool, refreshing lake breezes and commodious state rooms makes life aboard these floating palaces a source of enjoyment.

"D. & C. A SERVICE GUARANTEE"

Daily service between Detroit and Buffalo and Detroit and Cleveland. Day trips during July and August, as well as two boats out of Detroit and Cleveland every Saturday and Sunday nights during these two months. **FOUR TRIPS WEEKLY FROM TOLEDO AND DETROIT TO MACKINAC ISLAND AND WAY PORTS—From June 25th to Sept. 10th, SPECIAL STEAMER CLEVELAND TO MACKINAC ISLAND. TWO TRIPS WEEKLY. NO STOPS ENROUTE EXCEPT AT DETROIT EVERY TRIP.** Daily service between Toledo and Put-in-Bay, June 10th to Sept. 10th.

RAILROAD TICKETS ACCEPTED on D. & C. Line steamers between Detroit, Cleveland and Buffalo, either direction. Send two cent stamp for illustrated pamphlet and Great Lakes Map. Address L. G. Lewis, G. P. A., Detroit. **DETROIT & CLEVELAND NAVIGATION COMPANY** P. H. McMILLAN, Pres. A. A. SCHANTZ, V. P. & G. M.



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The Bessler Movable STAIRWAY

The purpose of our stairway is to provide a stairway to attics and 1/2-stories in bungalows without using any space in the room below. It is a wonderful space saver—for when not in actual use, The



Write us for our booklet

It fully describes this wonderful space saver and gives photographic views of it in various positions. At the same time we'll be glad to quote you prices.

The Bessler Movable Stairway Co.

Dept. 3

AKRON, OHIO



Satisfaction Is Assured when you use

Oak Flooring

America's Best Flooring

Landlords and Builders offering houses "for sale" or "for rent" command the highest of rentals and hence, the highest class of tenants. They always emphasize OAK FLOORING in their ads in newspapers.

3-8 inch OAK FLOORING offers a beautiful and very economical floor at a low cost. It is the ideal flooring for laying over old floors in churches and homes. When laid, it has all the appearance of 13-16 inch stock. 3-8 inch is made in 1 1-2 inch face and 2 inch face.

Contractors and carpenters find it very profitable in soliciting the laying of 3-8 inch OAK FLOORING in old homes during slack periods. Any carpenter, exercising a little care, can lay OAK FLOORING successfully.

OAK FLOORING means "easy to rent" and "easy to sell" and represents the best kind of investment that enters into the construction of a home. Its durable and artistic qualities make it the ideal flooring.

OAK FLOORING laid forty years ago in public buildings after very hard service is still in good condition. For durability OAK is the best.

OAK FLOORING Stands Pre-eminent.

OAK FLOORING is made in seven different grades in 13-16 inch and 3-8 inch thicknesses, representing different prices to fit the pocketbook or condition under which they are used.

All reputable dealers sell OAK FLOORING. Write for Booklet.

Oak Flooring Bureau
1350 Conway Bldg., Chicago, Ill.

Last A Lifetime

With No Repair Expense

THAT'S a great deal to expect from a shingle roof, but it's the very service that can be expected from Cortright Metal Shingles.

Over 25 years ago Cortright Shingles were placed on the market and today many of the first Cortright Roofs laid are still in successful use. That's proof conclusive as to their durability.

The shingles are made of red, green or galvanized tin-plate, and tight coated galvanized sheets. They can be laid as easily as wood shingles. Once laid, there is no patching or repairing—just a permanent roof that gives perfect satisfaction year after year.

Cortright Shingles are an excellent trade maker for the Contractor to recommend. They are most serviceable, permanent and inexpensive. They cost no more than wood and less than slate and make satisfied customers.

You should get our proposition. It's a most liberal one. Write us today—there is no obligation in asking for terms.

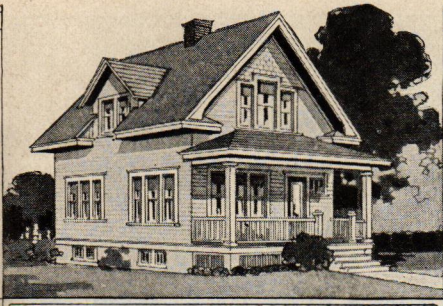
Cortright Metal Roofing Co.
Philadelphia and Chicago



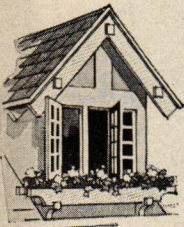
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By recommending Curtis Woodwork, you can be sure of the profit on a speedy job and also of a boost from your satisfied client.

1866 CURTIS WOODWORK

"The Permanent Furniture for Your Home"

Doors
Windows
Window and
Door Frames
Storm Doors
and Windows
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and Windows
Stairways
Newels
Sideboards
Colonnades
Bookcases
Mantels
Window Seats
Wall Panels
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We help you to greater profits by sanding materials at the factory and by making them as nearly ready to put in place as possible. Then our "On-Time" deliveries do away with expensive waiting on your part. There are many features of Curtis Woodwork about which it will pay you to learn more. Drop us a post card today and we will put you in touch with a Curtis dealer.

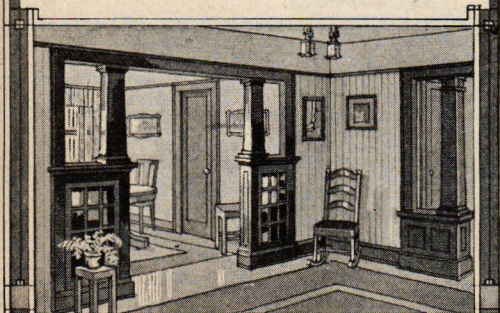
THE CURTIS COMPANIES Service Bureau

1396-1496 S. Second St. Clinton, Iowa

Manufacturing and Distributing Plants at

Clinton, Iowa Sioux City, Iowa Wausau, Wis. Lincoln, Neb.
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The Makers of CURTIS Woodwork Guarantee Complete Satisfaction to its users. "We're not satisfied unless you are."



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Cincinnati Cleveland St. Louis San Francisco
Philadelphia (John T. Lewis & Bros. Co.)
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FARE \$3.00 DAILY BETWEEN CLEVELAND & BUFFALO



The Great Ship "SEEANDBEE"

The largest and most costly steamer on any inland water of the world. Sleeping accommodations for 1500 passengers.

"CITY OF ERIE"

"CITY OF BUFFALO"

— 3 Magnificent Steamers —

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Leaves Cleveland - 8:00 P. M. Leaves Buffalo - 8:00 P. M.
Arrive Buffalo - 6:30 A. M. Arrive Cleveland - 6:30 A. M.
(Central Standard Time)

Connections at Buffalo for Niagara Falls and all Eastern and Canadian points. Railroad tickets reading between Cleveland and Buffalo are good for transportation on our steamers. Ask your ticket agent for tickets via C. & B. Line

Beautifully colored sectional puzzle chart, showing both exterior and interior of The Great Ship "SEEANDBEE," sent on receipt of five cents to cover postage and mailing. Also ask for our 24-page pictorial and descriptive book let free.

THE CLEVELAND & BUFFALO TRANSIT CO.
Cleveland, Ohio

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Entire Fourth Floor, First National-Soo Line Bldg.
Minneapolis, Minnesota

R. W. GRANGE, President
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America's leading manufacturers of building material and equipment maintain elaborate and interesting displays here. This great permanent *Exhibit* is one of the show places of Minneapolis—worth coming far to see. For those who cannot come we have a special market-investigation service. Send us your plans and we will secure bids on any material or equipment for you without charge. Write us today.

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Advertisers' Section

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Our central location insures low freight rates.

Don't let the other fellow underbid you.

*Write today for "Builders Material Book."
Sent free to Contractors and Carpenters.*

Hubers Builders Material Co.
39-43 Vine Street - Cincinnati, Ohio

Kanneberg Metal Ceilings

represent the highest value for the money. Beautiful designs, carefully made and sharply reproduced.

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Mail the coupon today. It will bring special proposition, catalog and prices.

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Send me full information
regarding your Special
Proposition, Catalog and Prices.

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STREET.....

CITY..... STATE.....

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Again! Another New FLEX-A-TILE

It's simply a variation of our Diamond Slab. Identical in quality, materials and wearing properties—but different in shape and appearance.

Style 4 Slabs

This newest style Flex-A-Tile Asphalt Shingle meets the requirements of those who prefer the appearance of rectangular shaped single shingles, but who want the economy and convenience of Flex-A-Tiles in slab form.

As the illustration shows, this Flex-A-Tile Style 4 Slab is really four shingles in one. The 4-inch long slits act as a score to lay to, as well as to mark the usual spaces that occur between single shingles. You simply cannot distinguish a roof of Flex-A-Tile Style 4 Slabs from a roof of single shingles. And of course these Style 4 Slabs are laid quicker, cheaper and last at least as long as single shingles. Size of each slab 32x10 inches. Surfaced with the usual Flex-A-Tile red or green stone surfacings.

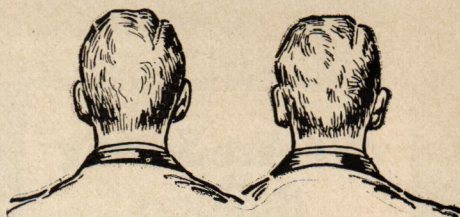
Write today for samples of new Flex-A-Tile Style 4 Slabs as well as the Diamond Point Slabs. Some attractive agency territory still open

**THE HEPPES
COMPANY**
H1012 Fillmore Street
CHICAGO, ILLINOIS

Flex-A-Tile Roll Shingles
No-Tar Asphalt Paints Utility Board
Other Guaranteed Heppes Products



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and the ideas, suggestions, plans and designs of the hundreds of prominent builders, architects, etc., who contribute to the National Builder every month are worth

Real Money

Tell your friends about this and the plans sent each month—explain how the National Builder is a regular "First Aid" to building and let them see your magazine, and they'll want to subscribe.

We'll Send You

without charge a Building Trades Hand Book, a Dahl Inside Measuring Rule, or "Modern Homes," containing 100 designs by M. L. Keith, for each new subscriber you send in at \$1.50 per year (\$2.00 for Canada). Use the coupon and write us which premium you want.

Porter Hodgson Co.
1100 Ellsworth Building
Chicago, Illinois

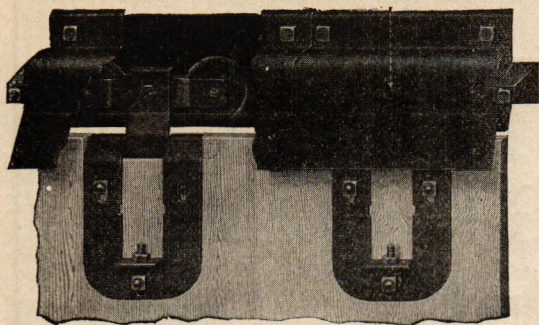
Porter Hodgson Co.,
1100 Ellsworth Bldg., Chicago, Ill.

Enclosed find \$..... for which
send the National Builder for one year to

Name

Street and No.

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



No. 88 Adjustable

Your Reputation

as a reliable contractor or carpenter depends largely on the satisfactory service rendered by material which you use, plus your knowledge of the proper method of installing such materials. If any part of the completed building goes wrong, your customer kicks not only to you but usually to everybody who will listen. As a result your reputation as a reliable contractor suffers.

☞ There is nothing about a barn used more than the sliding doors. There is nothing causes more annoyance than sliding doors which do not work easily.

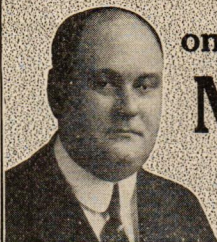
☞ You can avoid a lot of trouble by using Storm-Proof Hangers and Rail. They are easily installed and give long and satisfying service.

☞ Storm-proof Rail requires no housing—a saving to you in labor and lumber. It is strong and sturdy, and will support all the weight the hangers will carry. Holds hangers firmly in place and is bird and storm-proof. Made in convenient lengths.

☞ It is to your interest to investigate the superior merits of these goods. A catalog will be mailed upon request. Your dealer's name will be appreciated.

National Mfg. Co., Sterling, Ill.

Save 50%



on Your Building Material Bill!

LET me send you our Building Material Catalog showing 8000 price bargains on building material, also our Plan Book showing views and floor plans of 50 modern Houses and Bungalows. They will prove you can build, remodel or repair for much less than you expected. We ship everything everywhere in the way of high grade lumber, flooring, roofing, doors, windows, storm sash, mouldings, porch work, screens, hotbeds, building hardware, paints, wallboard, plumbing, heating and water supply outfits, cement machinery and interior woodwork. All at Wholesale Prices Direct to You. Quality, safe delivery and satisfaction absolutely guaranteed. Both Books Are FREE.



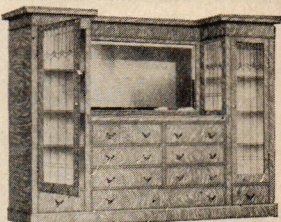
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COPPER STEEL Galvanized Sheets and Roofing Tin



Highest in quality, service, and rust-resistance.
Grand Prize at San Francisco for greatest merit.



←————— Durability—Economy —————→

APOLLO-KEYSTONE COPPER STEEL Galvanized Sheets insure lasting and satisfactory cornices, tanks and sheet metal work. Look for the Keystone added below Apollo trade-mark. KEYSTONE COPPER STEEL Roofing Tin is carefully manufactured and uniformly coated. Stamped "Keystone Copper Steel" in addition to brand and weight of coating, as on MF Brand.

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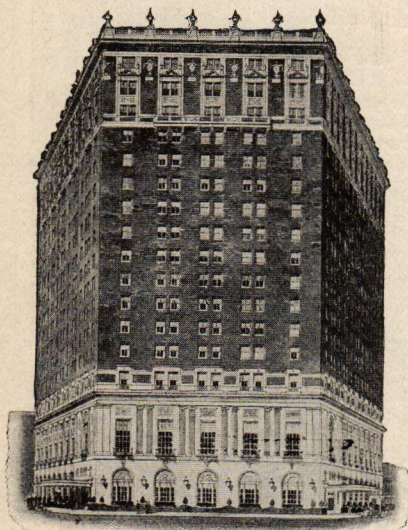
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THE HOTEL STATLER, DETROIT, MICHIGAN
GEORGE B. POST & SON, Architects

RED GUM

THE NEW HOTEL STATLER

was built by a man who has had a great career as a successful hotel man, and when he erected his new hotel at Detroit he brought to it his wide experience and mature artistic judgment.

The typical trim throughout this fine hotel is RED GUM.

In its artistic appointments—its furnishings and the cabinet work which so beautifully harmonizes with it, the dominant period is that established by Robert Adam, 1728-1792.

Not a single detail, however minute, was neglected by the owner, the architect and the decorator to make this building beautiful, and the use of RED GUM, "America's Finest Cabinet Wood," was entirely natural.

LET US TELL YOU WHERE YOU CAN SEE SOME
FINE RED GUM TRIM IN YOUR NEIGHBORHOOD.

Gum Lumber Manufacturers Association

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Memphis, Tennessee



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The National Builder

Published Monthly at 537 South Dearborn Street, Chicago, Ill., by The Porter-Hodgson Company

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Walter S. Packer.....Assistant Advertising Manager
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EDITORIAL

Fred T. Hodgson.....Editor
Charles A. Miller, Jr.....Managing Editor

Builder and Woodworker, Established 1864.
National Builder, Established 1885.
Consolidated 1896.

Member Chicago Trade Press Association
Member Audit Bureau of Circulations

Entered as Second-class Matter April 9, 1896, at the Postoffice,
Chicago, Ill. Act of March 3, 1879.

SUBSCRIPTION RATES.

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A Health Furnace



Hess Furnaces...

Pipeless

For bungalows, cottages, stores, etc. One large pipe carries both hot and cold air. No horizontal pipes nor ducts.

Regular

Separate pipes and registers for the various rooms.

Hess Furnaces

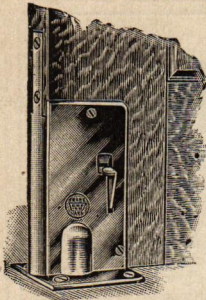
are the gasless and dustless kind — every seam welded solid—never leaks.

Sold direct from factory to user, at factory prices. On payments, if you wish.

Special rates to contractors.

Hess Warming & Ventilating Co.
907 Tacoma Bldg., CHICAGO





Catalog N-32 on
request

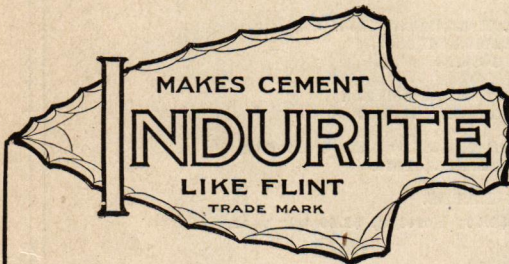
TRADE
CHICAGO
MARK
SPRING HINGES



The Chicago "Relax" Spring Hinge has an *exclusive feature* of spring action release, allowing the door to be placed open at any desired position. It is easily applied and attractive in appearance.

Chicago Spring Butt Company.

CHICAGO NEW YORK



Liquid Floor Hardener

Coalesces, vitrifies, hardens, dustproofs, waterproofs and permanentizes *new and old* concrete floors.

Indurite is easily and quickly applied with unskilled labor—simply poured on and scrubbed into the floor with a brush.

It can be applied at night and the floor will be ready for use the next morning.

It can be used to advantage on any concrete or stucco work and makes an excellent base for paint.

It is a life saver for any floor that is "going to the bad" and an economical insurance policy for all new work.

Get the facts about this remarkable compound at once. No contractor or builder can afford to overlook this profitable work. Write today on your letter head.

CERESIT WATERPROOFING CO.
912 Westminster Bldg., Chicago

Samson Spot Sash Cord



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

We also make cords for other purposes, including Samson Solid Braided Masons' Lines, Chalk Lines, etc. Samples and full information gladly sent.



Samson Cordage Works - - Boston, Mass.

Recommend

MORGAN DOORS

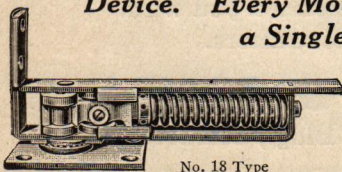
no matter what the size of the house and you'll always have satisfied customers.

Morgan Sash & Door Company
Department A-22, Chicago

Factory: Morgan Co., Oshkosh, Wis. Eastern Warehouse and Display, Morgan Millwork Co., Baltimore. Displays: 6 East 39th Street, New York; 309 Palmer Building, Detroit; Building Exhibit, Insurance Exchange, Chicago.

BOMMER FLOOR SURFACE SPRING HINGES
ARE THE BEST

Has Spring Release and Holdback Features. Ball-Bearing and Alignment Device. Every Moving Part of this Hinge can be Oiled from a Single Hole on Outside of Side-Plate.



No. 18 Type

The most durable hinge of its type; holds the door open when swung to 90 degrees. The spring-action can be entirely released so door will swing free without spring-action, by inserting a wire nail (when the door is open) into a hole provided in the side plates. The spring-action can be restored by withdrawing the nail.

BOMMER BROTHERS, Mfrs., BROOKLYN, N. Y.

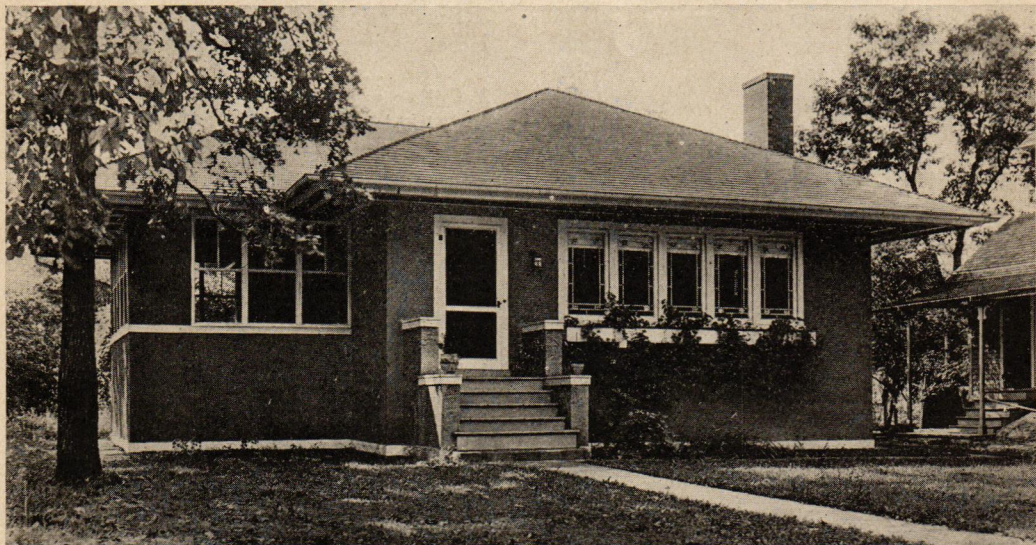


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Advertisers' Section

THE NATIONAL BUILDER

Vol. 58 (52nd Year) Chicago, August, 1916 No. 8



An Attractive Bungalow. Planned for the Location

NATIONAL BUILDER DESIGN NO. 411

Bennett & Lindenfield, Architects, Benton Harbor, Mich.

John G. Klinke, Carpenter Contractor, Riverside, Ill.

Wm. G. Taylor, Plumbing and Heating Contractor, Riverside, Ill.

For Floor Plans, Sections, Elevations and Full Working Drawings, see Supplement of this month. Estimated cost, \$2,889.81. This house is shown in colors on Front Cover.

Estimate of a Three Room Bungalow

I. P. Hicks

EXCAVATING AND MASONRY.

124 yards excavating, 35c.....	\$161.11	22 2x10x14 ft. first floor joists.....	523
132 cubic ft. concrete footing, 30c..	39.60	22 2x10x12 ft. first floor joists.....	440
735 cubic ft. concrete wall, 30c....	157.50	22 2x 6x18 ft. ceiling joists	396
642 cubic ft. cement floor, 10c.....	64.20	22 2x 6x16 ft. ceiling joists	352
18 lineal ft. chimney breast, \$2.75..	49.50	4 2x10x12 ft. porch joists	80
7 lineal ft. above breast, \$2.....	14.00	4 2x10x10 ft. porch joists	67
4 cement steps, \$2.....	8.00	13 2x10x16 ft. porch joists	247
244 yards outside plaster, \$1.30....	317.20	4 2x 8x14 ft. porch joists	75
Total	\$711.11	2 2x 8x16 ft. porch joists	43

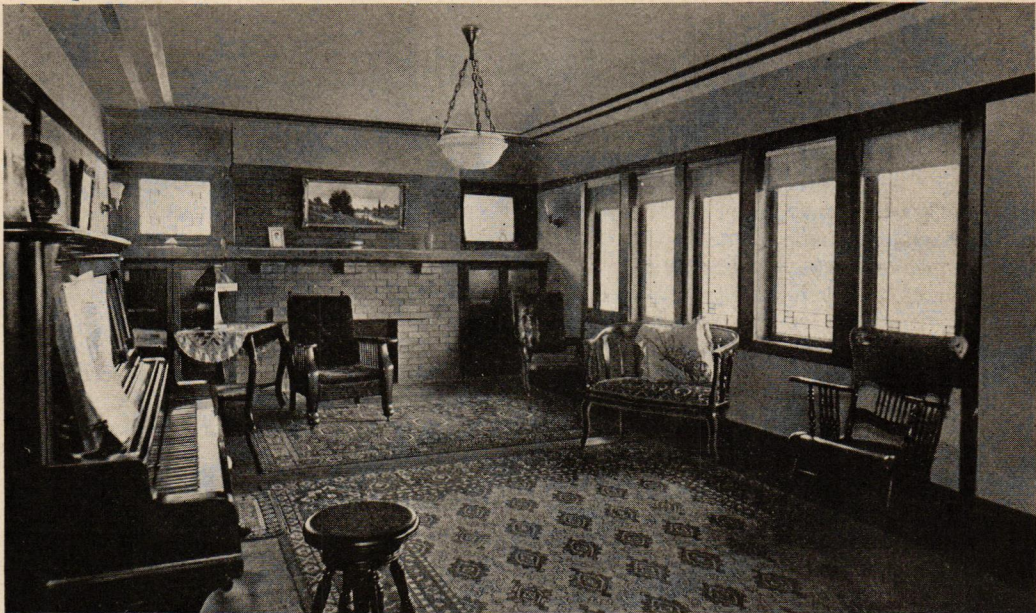
LUMBER BILL.

1 6x 8x26 ft. girder	80	4 2x 8x12 ft. porch joists	64
1 6x 6x14 ft. post	42	16 2x 6x12 ft. lookouts	192
		13 2x 6x16 ft. porch ceiling	208
		14 2x 6x12 ft. porch ceiling	168
		150 2x 4x14 ft. outside studs	1,400
		12 2x 8x16 ft. sill plates	256

30 2x 4x16 ft. partitions	320	1 wd. frame, 2 lt., 30x26.....	2.00
6 2x 6x16 ft. partitions	96	2 wd. frames, 2 lt., 16x16, \$2.....	4.00
16 2x 4x12 ft. plates	128	1 Twin frame, 2 lt., 22x14.....	4.25
14 2x 4x16 ft. plates	149	1 Twin frame, 2 lt., 22x18.....	4.25
10 2x 4x14 ft. porch posts	93	2 Sash frames, 24x24, 1 lt.....	2.00
6 2x 6x20 ft. rafters	120	1 Door frame, 4-0x6-8.....	2.25
8 2x 6x18 ft. rafters	144	3 Sets door jambs, 2-8x6-8, 70c...	2.10
20 2x 6x16 ft. rafters	320	1 Set jambs, cased opening, 4-0x	
14 2x 6x14 ft. rafters	196	6-8	.80
4 2x 6x26 ft. hip rafters	104	3 Cellar sash, 10x16, 2 lt., 90c....	2.70
20 1x 6x12 ft. braces	120	4 Cellar sash, 12x16, 2 lt., \$1....	4.00
10 1x 6x14 ft. ribbon boards	70	5 Sash, 20x52, 1 lt., \$2.50.....	12.50
12 1x 4x12 ft. bridging	48	2 Windows, 28x26, 2 lt., \$2.30...	4.60
Total ft. dimension		1 Window, 30x26, 2 lt.....	2.40
6,541 ft. dimension, \$28.....		2 Windows, 16x16, 2 lt., \$1.20...	2.40
800 ft. No. 2, 8 inch Y. P. lap, 12		2 Windows, 22x14, 2 lt., \$1.30...	2.60
to 16 ft. rough floor, \$28..		2 Windows, 22x18, 2 lt., \$1.40...	2.80
1,750 ft. No. 2, 8 inch Y. P. shtg.,		2 Sash, 24x24, 1 lt., 80c.....	1.60
outside walls, \$28.....		1 Front door, 3-0x6-8x1¾.....	13.00
140 1x2x12 ft. furring strips....		1 Rear door, 3-0x6-8x1¾.....	6.00
1,700 ft. 1x4x12 to 16 ft. No. 2		1 Grade door, 3-0x6-8x1¾.....	5.50
shtg. for roof, \$28.....		2 French doors, 2-0x6-8x1¾, \$10	20.00
16½ M. clear R. C. shingles, \$4.		3 Doors, 2-8x6-8x1¾, \$8.....	24.00
140 ft. 1x2¼ face Y. P. flg., \$45.		1 Mullion screen frame, 3 sash,	
650 ft. 1x2¼ face oak flg., \$85..		24x60	6.00
350 ft. 1x4x12 ft. fir porch flg., \$45		1 Mullion screen frame, 4 sash,	
124 ft. 1x4x16 ft. fir porch flg., \$45		26x60	8.00
350 ft. 5/8x4x12 ft. fir porch ceil-		1 Mullion screen frame, 6 sash,	
ing, \$30		26x60	12.00
150 ft. 5/8x4x16 ft. fir porch ceil-		3 Screens, 24x60, \$1.....	3.00
ing, \$30		10 Screens, 26x60, \$1.10.....	11.00
13 1 x10x16 ft. fir finish, \$45..		10 Windows with oak trim, \$1.40..	14.00
30 1½x 4x16 ft. fir finish, \$45..		6 Windows with birch trim, \$1....	6.00
8 1½x12x12 ft. fir finish, \$45..		13 Screened windows, pine trim, 70c	9.10
6 1 x 8x12 ft. fir finish, \$45..		Oak trim for 8 doors, one side,	
3 1 x 4x12 ft. fir finish, \$45..		\$1.20	9.60
3 1 x 6x12 ft. fir finish, \$45..		Birch trim for 3 doors, one side,	
10 1 x 8x16 ft. fir finish, \$45..		90c	2.70
5 1 x 6x16 ft. fir finish, \$45..		80 ft. oak cornice, 10c.....	8.00
Total lumber bill.....		140 ft. oak head trim, 5c.....	7.00
\$507.49		48 ft. birch head trim, 4c.....	1.92

MILL WORK.

2 Brackets for flower box, \$2....	\$ 4.00	5,541 ft. framing, at \$10.....	\$ 65.41
1 Flower box	6.00	4,250 ft. sheathing, at \$10.....	42.50
3 Cellar window frames, 2 lt., 10x		16½ M. shingles, \$2.....	33.00
16, \$1.80	3.60	Total	
2 Twin cellar frames, 12x16, 2 lt.,		\$299.53	
\$3.80	7.60	CARPENTER LABOR.	
1 Grade door frame, 3-0x6-8....	2.25		
1 Front door frame, 3-0x6-8....	2.25		
1 Rear door frame, 3-0x6-8....	2.25		
1 Mullion wd. frame, 5 wds, 1 lt.,			
20x52	11.00		
2 wd. frames, 2 lt., 28x26, \$2....	4.00		



The Large Living Room is a Music Studio

790 ft. finish floor, \$20.....	15.80	Mill work	299.53
Smoothing	11.00	Carpenter labor	390.08
974 ft. porch floors and ceilings,		Hardware and nails	47.00
\$15	14.61	Tin work	30.00
180 ft. cornice, 10c.....	18.00	Tile floor	22.00
Setting frames	10.00	Lath and plastering, 360 yds., 30c.	108.00
Outside steps	10.00	100 yds. basement plastering, 25c.	25.00
Wardrobe	20.00	Plumbing	240.00
Finishing—50% cost of mill-		Electric wiring	28.00
work	149.76	Mantel	60.00
Total	\$390.08	Painting	74.00
THE COMPLETE ESTIMATE.		Heating plant, hot water.....	210.00
Excavating and masonry.....\$	711.10	Incidentals, 5%	137.61
Lumber bill	507.49	Total estimate.....	\$2,889.81

How to Use This Estimate

This estimate is figured at unit prices, with carpenter labor at 50 cents an hour. To use this estimate for other localities the reader will note that the price of each grade of lumber, as well as all other materials, is given in the regular trade units, that is per thousand feet for lumber, per thousand for shingles, per cubic yard for excavating, etc. It is a simple matter to substitute the prices current in your vicinity for the prices given in this estimate and to extend the quantities and so determine the exact cost

of the same building in your neighborhood. For instance, framing lumber may be \$30 per thousand in your town, while it is figured in this estimate at \$28. Simply extend the number of feet at \$30. Labor may be more or less, and can be readily figured, as 50c per hour means 2 per cent for every cent above or below that rate. Sixty cents per hour would be 20 per cent more than 50c, etc. The owner may want to contract for the furnace or plumbing separately. The detailed estimate makes these changes possible.

The Three Room Bungalow

AT FIRST THOUGHT it would seem that a bungalow of only three rooms would be a little more than a play house, but in this case there were unusual conditions which made such a design not only possible but actually desirable.

The owner, a musician, had no use for more than the three rooms, that is, a combined Living and Dining Room, a Kitchen and one Bed Room. To this was added a large Sun Porch, screened in the summer and enclosed with glass in the winter. For most purposes this could be called another room. The combination of the Living Room and the Dining Room resulted in one large room and differed from many bungalows only in the omission of the colonnade opening, which so often serves as a partition. On the other hand the one large room free from any projection which might conflict with a musical program furnishes an ideal studio either for the lesson to the student or for rendering a piano recital.

These are some of the conditions found. Another portion of the problem included the use of a relatively wide lot and a desire on the part of the owner to use as much of the lot as possible for a garden. It would be an easy matter to simply design a house which would fit a lot, but it was an entirely different proposition to get up a design which would meet all of the special requirements and yet retain the feeling of individuality as well as harmony with the other buildings on the street. This bungalow is satisfactory in that it has the right appearance. There is no attic nor even a suggestion of a half story. Designed for one floor only, it is complete in itself and yet it has a certain amount of elasticity. By various slight changes in the floor plan or by a partition across the middle of the Living Room extra rooms could easily be added. Being wider than its depth, it has an appearance of size which would not be apparent were it turned with the narrow end to the street. With the added width of the house, due to the enclosed porch, a greater depth for the garden is secured as well as far more exclusion of the view from the street.

Some have argued against sleeping on the first floor because it was so close to the ground. Perhaps we would be better off to

get even closer, as the health of campers and those living in tents might indicate. This bungalow, however, for purely architectural reasons seems to humor the ideas of both sides of the controversy, the high basement raising the floor well above the grade. We say architecturally, because otherwise the house would appear too low and too close to the ground. The appearance is aided by the blank wall in the front extending from the water table just above grade, to the casement windows, themselves a trifle higher at the stool than the usual double hung sash. The whole effect is further aided by the rather flat roof with an extreme projection. One therefore sees about as much of the roof as he would of a steeper roof on a two story building.

The wide projection of the cornice has a further purpose too. For one thing it forms a cover for the front door and shades the walls from the sun during the summer months. The very size of the roof would indicate a larger building than is really covered.

Simplicity and dignity are the ruling ideas on the exterior as well as on the interior. The freedom from unnecessary ornaments increases the effects of the lines which appear for purely structural reasons.

But to be entirely satisfactory a house must be more than merely good to look at. Every detail of design and construction must be as carefully considered as the line of the roof. It is obvious that a piano will be in the Living Room and frequent periods of house cleaning would mar a soft wood floor. As result the floors are oak and the trim harmonizes with them. From a somewhat similar reasoning the Bathroom floor is tile to be impervious to the water naturally spilled upon it. Note also the two windows in the Bathroom with the mirror of the medicine cabinet between them. This is not accidental, but the result of unsatisfactory lighting in most Bathrooms.

Probably most of our readers have been under the necessity of opening an outside basement door in the winter months. This architect says "Never again" in this house, and he has designed the basement entrance to be inside and still be outside the house. Could any plan be better? The rear porch

screened in summer and likewise be enclosed in winter, with the consequent saving of time and trouble and heat.

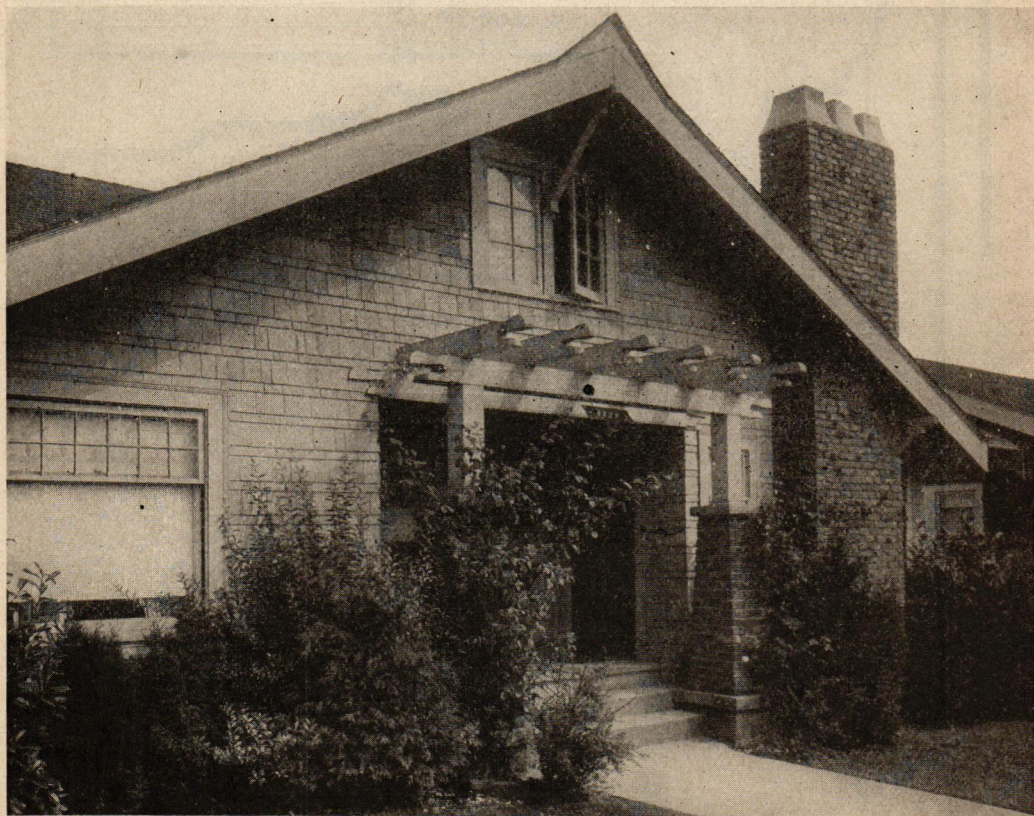
Plans must not only be well thought out, but they must be well drawn also. Here we have an example of both, as well as a plan which would prove satisfactory for many clients. Why have a lot of rooms for show or for use by occasional company? This home is designed for entertainment which will readily be seen from the large living

room, but it is not intended as a home for a large family. Had that been the intent, the plans would have been entirely different. Further, this bungalow is built in a small city where practically all of the guests are from the neighboring houses and can so easily reach home after an evening's entertainment. For those who come from a distance the screened porch as well as the Living Room offer facilities for the ingenious housekeeper to put them up for the night.

It Pays to Keep Posted

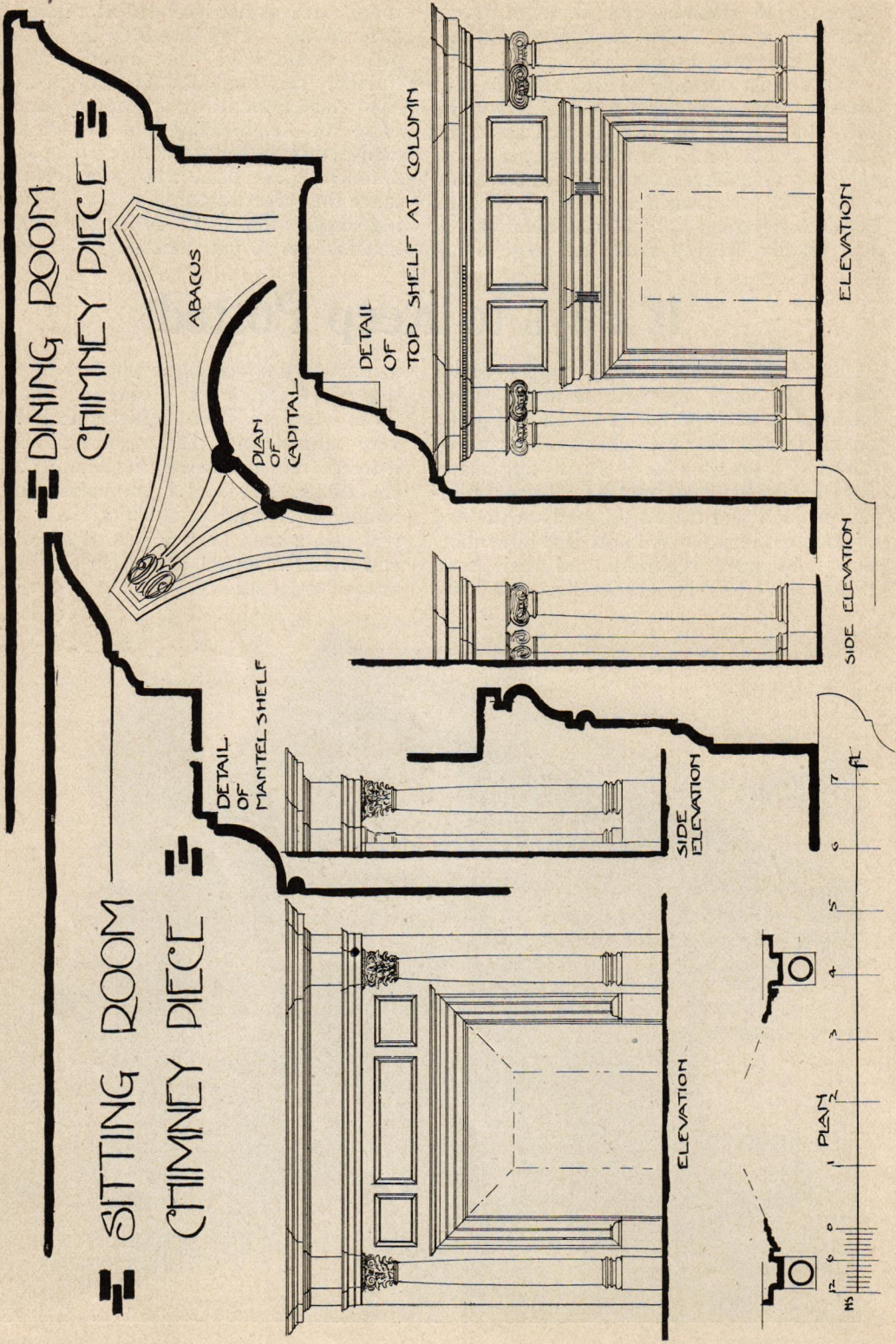
An enterprising builders' supply dealer said a few days ago that he makes it his business to keep posted as to what is going on, and to know just what percentage of building operations he is furnishing materials for. He keeps track of all new building projects and checks up totals at the end of each month so as to know just how many new jobs were reported, and their total value, and then he checks his own sales

against this to ascertain whether he is getting his share of the business. There are times when this custom furnishes him with very valuable information, and all the time it keeps him informed of general building conditions. He said every contractor and builder should adopt a like system. Many real estate men keep a record of all sales and trades reported, and often find the records of great service.



A Unique Bungalow Entrance

Jud Yoho, Architect





A Sitting Room Fireplace and Chimney Piece

Architectural Chimney Pieces

John Y. Dunlop

FROM the householder point of view the interior of the house is of far greater importance than the outside.

A man may take a legitimate pleasure in the picturesque grouping of roofs and gables in the long sweep and warm color of a steep pitch tile roof or in the pleasant texture of a brick wall, but he is not likely to regard those things as compensation for a badly arranged interior or for bad fitments which leave the decorator and the upholsterer to make the place habitable and beautiful.

No doubt the ideal method of furnishing a house is to have the whole matter left in the house furnisher's hands. Thus we have everything fitted into its place in the general scheme. In that case, the architect designs the chairs, tables, fitments and chimney pieces and these are all made in the cabinet shop. Thus we get a unity and an individuality in the furnishing, which is both impossible when the furniture consists

of stock pieces bought from the shop. Such work is naturally much dearer than shop made stock or in the case of the chimney-piece, than the joiner's fitments.

An example of such a treatment is shown in the half tone illustration where the dado, trimming, chimney-pieces and furniture are all the work of the cabinet-maker under the architect's direction.

The chief feature of the furnishing of the sitting room is the fireplace, which is an English Renaissance. In the line drawing of the fireplace, the columns are shown extending up to the entablature on which the mantel shelf is formed. The detailing of the woodwork in this design requires careful study as the jointing of the framing is very important.

In building the chimney-piece, a cased frame is prepared out of 1¼-inch stuff with the frieze panels and a broad rail under the entablature.

On this is built the blocks to form the

base and frieze of the cornice which are well screwed thru the back. The architrave and cornice mouldings are then mitred in position and the pilasters and cornice added.

In each case the capitals are arranged with angular column caps, the volutes growing out from the column centre. The pilaster cap is arranged in much the same way only it has a plain surface behind to receive the volute ends.

In the sitting room mantelpiece the pilaster has only plain mouldings with a plain surface between the moulding at the bottom and top of the capital. The mouldings at the case are formed both on the column and on the pilaster when each is set on a plain base projecting far enough to receive the column, a treatment quite similar to that on buildings.

On each side of the fireplace a cozy corner is arranged with upholstered back and seat while the whole of the wood finishings are coated with white enamel.

In the dining room shown in the half-tone illustrations, the finishing was executed in oak. Austrian oak is largely used at the

present time for such furnishings. It may be brushed to remove the soft parts of the oak in order that the hard parts may stand out to a slight extent beyond the general surface, then waxed.

The columns in this design are built up on staves secured to a pine core.

The frieze of the entablature is mitre dovetailed and glue blocked at the external angles, while the pilasters behind and at the sides of the columns are fixed on to the cased frame.

The mantel shelf is built on to a framework of block which also supports the cornice.

This is a fine example of the oak panelled interior on simple lines with the fireplace a prominent finish.

Of course the important feature of a British home is the open fire. When properly arranged this is not only a cheerful and pleasant means of warming a room, but it is also an excellent ventilator, and for this reason a fireplace is provided in every room in a British home.



A Dining Room Fireplace and Chimney Piece

Diffused Lighting of the Home

Hugh D. Butler, Lighting Specialist

HAVE you ever realized the reason why the evening when playing cards at you always felt like staying later in Christ. Peterson's than you did at Henry Smith's home? The miserable lighting in Smith's Living Room was the reason. Possibly you never noticed it during the first hour, but those bare lamps hanging right where you could not get them out of your eyes, bothered you more and more—and so you went home (or wanted to). But Peterson probably has a good lighting system in his Living Room—a light not all glare but rather, well diffused thruout the room, like daylight; you might even call it “artificial daylight.” Every one coming to Peterson's house (particularly Peterson's family) likes it. Now, do you know why? The difference between the lighting in these two homes is all wrapped up in the magical word “diffusion.”

Lighting, like heating, cannot be too well distributed in a room. This is particularly important in the Living Room and in the Library where the family spend the evening reading, playing the piano, entertaining, etc. Shower fixtures in various forms are generally used today in the living rooms of moderately priced houses and apartments. A very wide variety of designs in fixtures and glassware has been developed, some of which are very artistic. However, the people are tired of showers. Also, they are beginning to realize that they do not provide as good lighting results as some of the newer fixtures.

If you like the design of a shower fixture and also wish to get diffused lighting results this may easily be accomplished by using indirect or dense semi-direct bowl with shower pendant hanging over the sides. By wiring the fixtures in two circuits, you can turn on the lights in the bowl which will give you a diffused, useful reading light, while with the other switch the shower lights can be lighted. Experiments which have been made show that with installations of this kind the shower lights are seldom used except in cases when the house is filled with guests, and all ornaments (lights and other things) are on display. Also we want

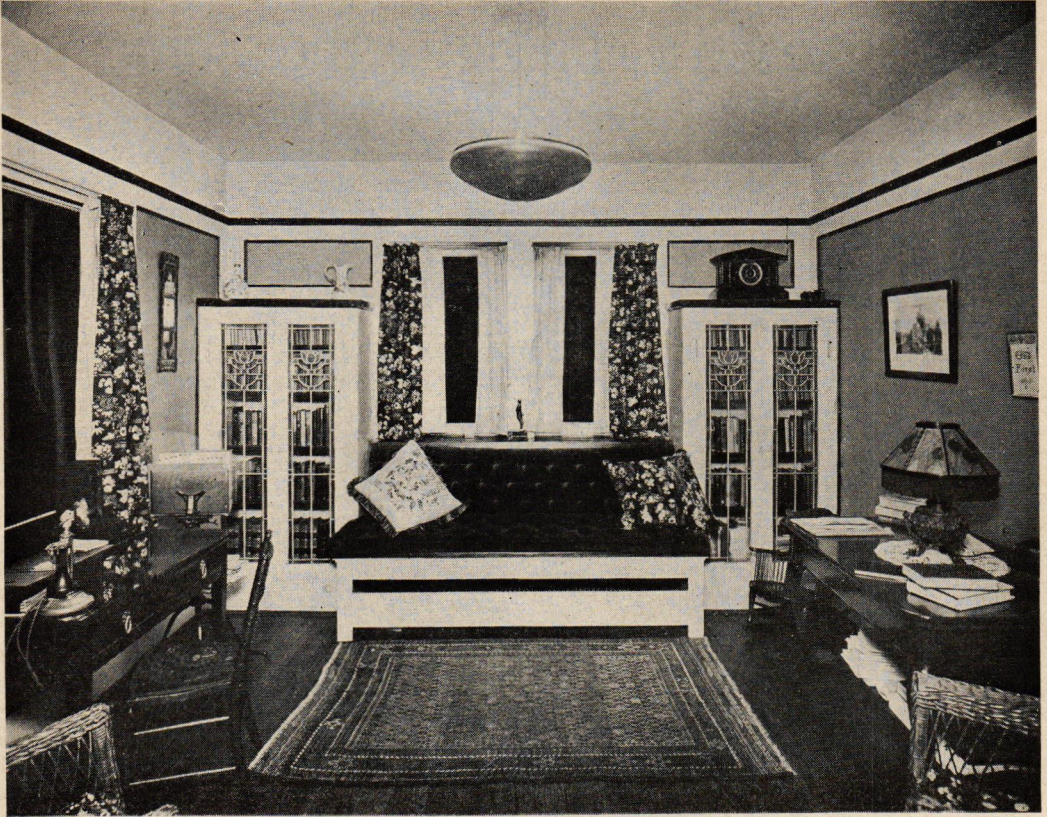
to point out that lamps of sufficient wattage should be placed in the bowl to correctly light the room while 15-watt lamps will be large enough for the shower sockets.

The opaque (or totally) indirect lighting fixtures (see photo No. 1) provide the best diffused light because the room is lighted entirely by reflection from the ceiling. The light is soft, perfectly diffused, and it is possible to read sitting in any corner of the room with one's chair in any position. Also there are a large variety of semi-direct and semi-indirect glass bowls in use. The semi-direct bowls do not give as satisfactory lighting results as the semi-indirect, all depending on the density of the glass used. You can readily see the difference when a lamp is placed first in a semi-direct and then in a semi-indirect bowl. The former bowl is likely to be much more glaring than the latter. If a heavy dense glass is selected, finished preferably in a brown or gold etched finish, very artistic results can be obtained and good diffusion.

Numerous semi-direct and indirect bowls of beautiful design can now be purchased at very moderate prices in 14, 16 and 18-inch diameters. Shallow bowls of 4, 5 and 6-inch depths are naturally the best for 9-foot and 10-foot ceilings.

When selecting bowl fixtures always inspect them lighted with the size lamps which you will afterwards use when the fixtures are in place, otherwise you may be disappointed.

It has been convincingly demonstrated to the writer during several years' experience, that it does not cost any more to light a home comfortably than uncomfortably. The costs referred to are: cost of fixtures and cost of current. Four out of five poorly lighted residences can be re-equipped with properly designed fixtures and the correct size of lamps without increasing the cost of current per month. The same thing is true of a new residence. Correct fixtures producing satisfactory lighting results will not cost more than well made fixtures of the old chandelier and shower type. And as pointed out, you have noticed the great difference in results that can be obtained where a little



A Library with Suspended Indirect Fixture

thought is given to this most important subject of diffusion.

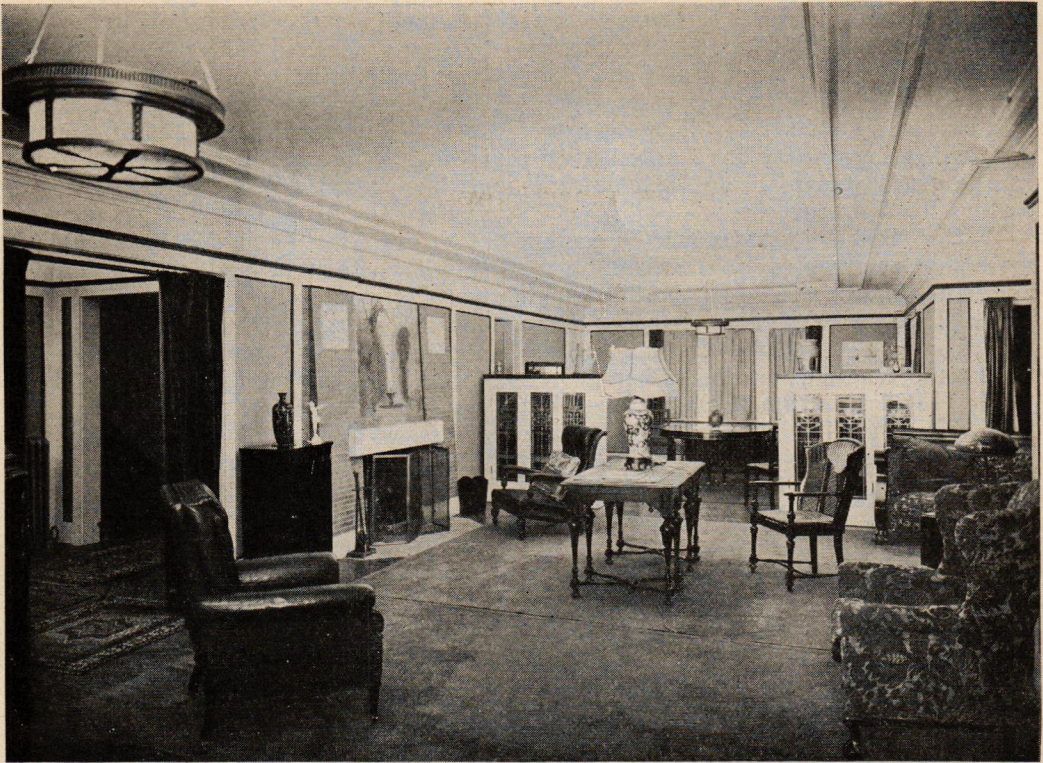
A Living Room or Library 15 feet square can be perfectly lighted with an indirect or semi-indirect fixtures using three 60-watt lamps, and a room 20 feet square with four 60-watt lamps. This figures out between .6 and .8 of a watt per square foot; and these figures may be relied upon for use in any Living Room or Library (unless a beamed ceiling is used with beams at frequent intervals.)

The new high efficiency Type "C" nitrogen lamps can be used in an indirect fixture. In a room 20 feet square two 75-watt lamps of this kind (Type "C") will produce excellent results. However, these lamps are so bright as to practically prohibit their use in direct or semi-direct fixtures. As we have seen the tungsten lamp replace the carbon lamp in common use, so, the next two years will see the new Type "C" lamp replace the tungsten lamp. Consequently, every one interested in building and electrical work

should study the features of this wonderful new lamp.

The art glass dome for Dining Room is doomed to the same fate as its partner, the shower fixture. The defects in the lighting of the Dining Room with a dome fixture are these: Frequently the dome is hung too low or too high (always the one or the other for very tall or very short persons) so that it either interferes with the view across the table, or the lamps inside are exposed to view. Again the room frequently looks dark when lighted solely from a dome, due to the contrast of a brightly lighted table against the dark wood paneling, typical of many modern Dining Rooms.

Much less light is required for the Dining Room than for the Living Room. Where we recommended three 60-watt lamps for the 15-foot Living Room, two 60-watt lamps (or three 40-watt lamps) will prove ample for the same size Dining Room. It is, of course, preferable to use two 60-watt lamps in such a case, as the larger tungsten lamp



A Living Room with Semi-Indirect Lighting from Ceiling, with Reading Lamp on Table

always gives more light per watt than the smaller. For instance, the 60-watt gives 11 per cent more light per watt than the 15-watt lamp.

When brackets are used in these three principal rooms they should be considered for ornamental use only, unless one is occasionally placed to throw the light directly down onto a desk or chair immediately beneath the bracket. Brackets should always be shaded with glass or silk shades, so that no direct light from the lamp is thrown into the eyes of the users of the room. Care in this matter of shading of lamps in these three principal rooms makes it possible to see the furniture, draperies, pictures, etc., to much better advantage.

If for emergency reasons it proves necessary to install gas in certain rooms it is wise to use gas brackets rather than combination gas and electric ceiling fixtures, as such an arrangement will prove less expensive, and electric ceiling fixtures almost invariably are more artistic than the combination fixtures.

As there is a strong tendency in the larger

cities to omit the ceiling fixtures in Living Rooms and Libraries on account of the increased use of low ceilings of $8\frac{1}{2}$ and 9 feet, portable lamps become of much greater importance, both floor and table lamps. An art lamp has been developed, which, by means of a single large lamp and reflector concealed in a silk shade, provides the general light for the room, even better than the proper type of ceiling fixture. The modern house should be wired with a floor outlet beneath the table in the Living Room so as to make possible the use of portable lamps at any later date.

On account of the fact that the Living Room, Library and Dining Room are used so much more than the rest of the house, and because the real "seeing" work after nightfall is done in these rooms, it is advisable to put all the money necessary from the appropriation to have these three ceiling fixtures of the right kind. The Bed Rooms, Halls and Bath Room can be very satisfactorily equipped with simple units. A ceiling ball is usually considered the proper fixture for the Halls and Entrance Porches.

A simple lantern produces a pleasing variation in the Front Hall. In the Bed Rooms and Bath the only successful lighting of dressing and shaving mirrors is by the use of a bracket on either side. These with the general lighting fixtures for the Bed Rooms can be very inexpensive and still be satisfactory for their purpose.

Wicker basket fixtures are becoming more popular every day for Living Porches and Sun Rooms. They can be filled with artificial flowers and vines hanging from the edge of the basket, with the lighting equipment concealed at the center.

The Kitchen in the average house has been very poorly lighted, usually due to lack of care in locating the ceiling light. With low ceilings and a fairly large room the direct lighting shade and lamp should be placed right on the ceiling, so as to spread the light as far as possible. Important points at a distance from this light should be taken care of with auxiliary brackets.

Most people make the mistake of using much larger lamps than is necessary at un-

important points. Fifteen-watt lamps should be used generally in all brackets, porch fixtures, hall lights, etc. Forty and 60-watt lamps are in much too general use where 15-watt lamps will do. (The consumer too frequently loses sight of current costs when getting 40 and 60-watt lamps at very low renewal cost.) It is very good practice to concentrate the wattage in the home at the points where it is most needed, and most frequently used, along the same lines laid down for the distribution of fixture expense. Also the wattage used at minor points, when the new house is first lamped up, should be low and then increased if necessary, as it is never possible to reduce the size of lamps with much satisfaction.

We have tried to bring to the reader's attention in this brief article, that the lighting is as important a feature in the complete equipment of the home, as heating and ventilating, and that fixtures should be selected not primarily because this one or that one is "pretty," but because it gives a more comfortable, usable (diffused) light.

Plastering Information for Home Builder

Wharton Clay

Architectural Engineer U. S. Gypsum Co.

(CONTINUED FROM JULY)

CLAY.

IN our previous article we dealt entirely with the "Rough Coat" of plaster and Gypsum plaster in general, its characteristics and covering capacities. We will now consider the finish coat, used not only to give the desired appearance, but also to cover the inequalities which may have occurred in the rough coat.

The first coat acts as a body or base to hold the thin finish coat. This is put on with the greatest care and as it is the coat which receives all the abrasion and misuse it must be of the best grade obtainable.

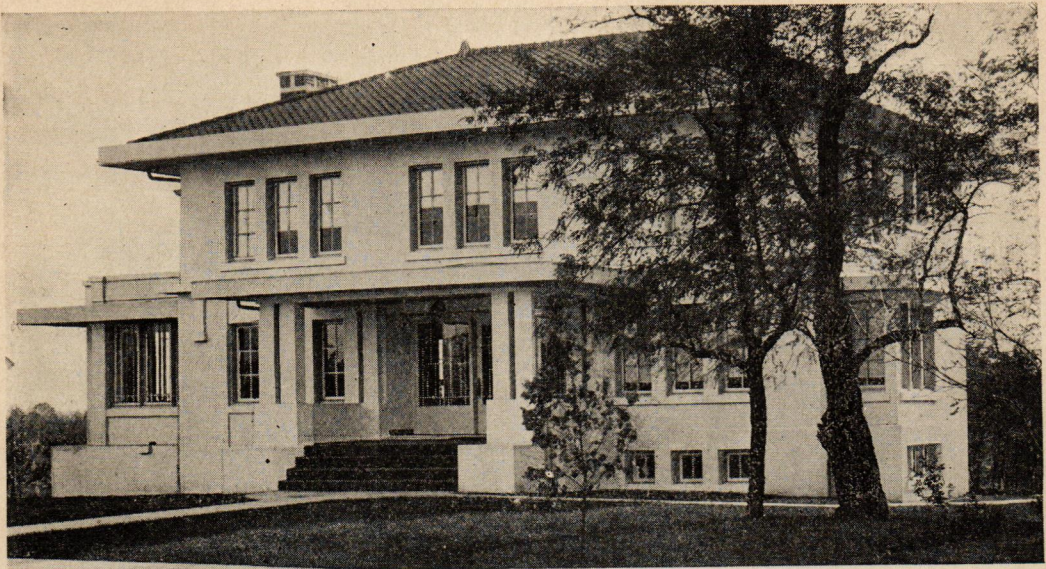
For finishing coats, lime putty mixed with plaster of paris in the proportion of 2 to 1 by volume is very largely used, but to avoid all doubt as to the proportions (as more lime makes a cheaper and poorer job) there have been developed a line of universal fin-

ishes which contain no lime whatsoever and make a hard and durable surface. The elimination of lime entirely, prevents any chance of lime pops and permits of immediate decoration without danger.

These finishing plasters can be had if called for in the specifications, cost slightly more per yard than lime putty finish, but in every respect are preferable.

The use of lime is always subject to the danger that it has not been completely hydrated, and the slightest trace or smallest particle unhydrated will swell, often not until several weeks or months after the job is thought to be finished, and "pops," bursting off the wall paper or decorations and spots of discoloration will appear. This is the reason that the United States Government does not allow any decorations to be done upon lime plaster until two full years have elapsed, while they are glad to have decorations put immediately on walls with gypsum base coat and no lime finish. Lime

The Cuts with these Articles are furnished through the courtesy of the U. S. Gypsum Co., Chicago.



Residence of F. J. Hanlon, Fort Mitchell, Ky.

Bernard T. Wisenall, Architect

sets by a slow process often requiring months or years to complete, and the surface is hard long before the interior, which remains soft. It is this fact that prevents certainty of results.

It is not the difficulties with good lime that cause the trouble, it is the uncertainty of the material. You can never tell whether it is good or not until the damage is done. Gypsum is certain, it sets throughout in a few hours and the results are known. If any defect is ever going to appear, it shows up at once and can be corrected by the contractor before he is off the job.

It is very difficult and treacherous to plaster directly upon Portland Cement with ordinary plaster so a very special mixture has been compounded known as "bond plaster." This has peculiar characteristics which enable it to adhere to concrete even though applied while the moisture is still present in the concrete.

Various refined moulding and casting plasters are also made for special purposes. They are exceptionally white and must be manufactured from especially selected rock.

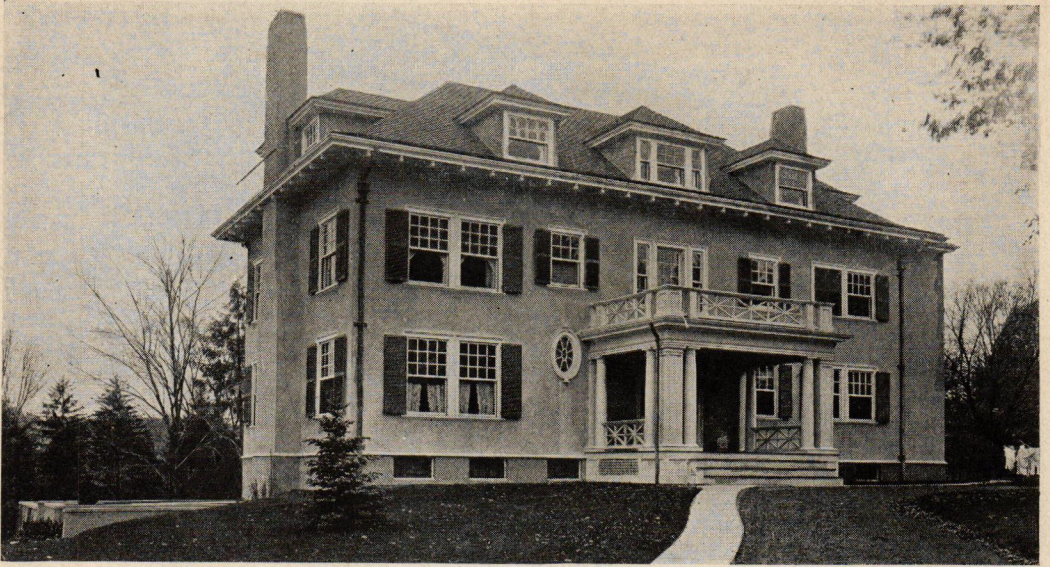
"QUICK" AND "SLOW SET."

Gypsum plaster is not sent out by the better manufacturers unless it measures up to a set standard of quality. For this reason "quick set" or "slow set" is invariably due to local causes. Where hurried or quick

action is required the following remedies may be employed:

QUICK SET—CAUTION.—Do not confuse "dried out" mortar with "quick set" mortar; distinguish carefully. "Dried out" mortar crumbles between the fingers, while "quick set" mortar feels hard and firm. In case of "quick set," if "retarder" is not quickly obtainable, in an emergency dissolve one pound of pulverized glue in one gallon of hot water. Thoroughly mix this solution into the water that is to be used in mixing the plaster, using the proportion of one pint of the solution to the water required for each sack of plaster.

SLOW SET.—If the material is too slow in setting it can be hastened by scraping well the sides and bottom of the mixing box, or by using water for mixing from a barrel in which pieces of set-up mortar have been soaked for two hours or more. Ordinarily the above remedies will suffice. If, however, quicker setting is necessary use "Accelerator," according to directions accompanying it. If this is not obtainable, mix four pounds of alum or two pounds of commercial zinc sulphate to a barrel of water, using from ten to twelve quarts of the solution to the water necessary to mix each bag of plaster, varying this proportion to the amount of plain water used as conditions require.



Residence of W. H. Elliott, Brighton, Mass.

C. K. B. Nion, Architect

HOT WEATHER HINTS.

If wood lath are used, apply them properly—space them one-fourth to three-eighths of an inch apart. Break joints every fifth or seventh lath. Do not allow ends of lath to overlap or even butt, leave space between ends at least one-fourth of an inch.

Before applying plaster all openings should be screened with cloth or other means taken for preventing blasts of hot air from drying up the water in the plaster. Gypsum plaster properly manufactured will set, no matter how long it holds if it is kept from drying out before it sets. If it does dry out before it hardens, spray the wall with water or sprinkle liberally with a brush. Give it plenty of water.

Remember that wood lath get very thirsty in hot, dry weather and require a lot of water. If this thirst is not quenched beforehand, they will drink up the water that belongs to the Gypsum—absorb it right out of the plaster—and prevent the plaster from setting properly, frequently causing soft or chalky spots.

WET DOWN THE LATH, thoroly—all over **EVERY SPOT**. Do this the night before if convenient, or at least four hours before plastering—give them a chance to soak. Then sprinkle them again about one hour before plaster is applied.

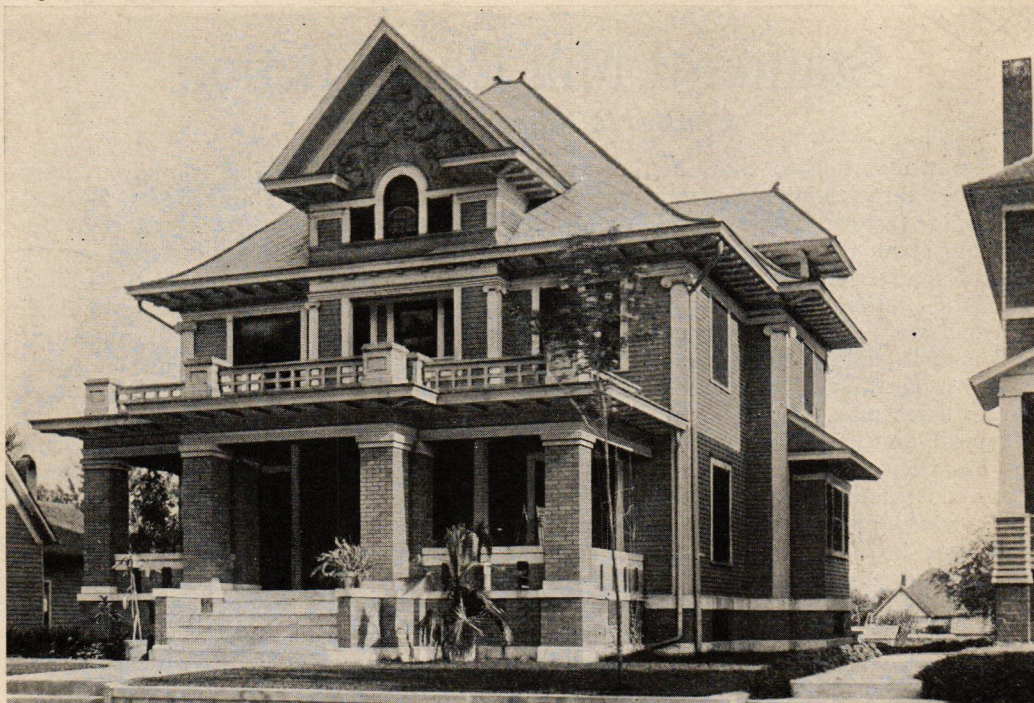
Gypsum plaster should not dry out before

it sets. But don't be alarmed if it doesn't set up on schedule time. Keep damp till set. Should it show signs of drying out before setting, spray with clean water. Soft or chalky spots, when dry, mean lack of water. Sprinkle them—give them plenty of water, and the wall will come out sound and hard. If wall dries out or refuses to set, a solution made by adding four or five ounces of zinc sulphate to a pail of water, thoroly whipped in with a brush, or sprayed, will harden soft or white spots within an hour or two.

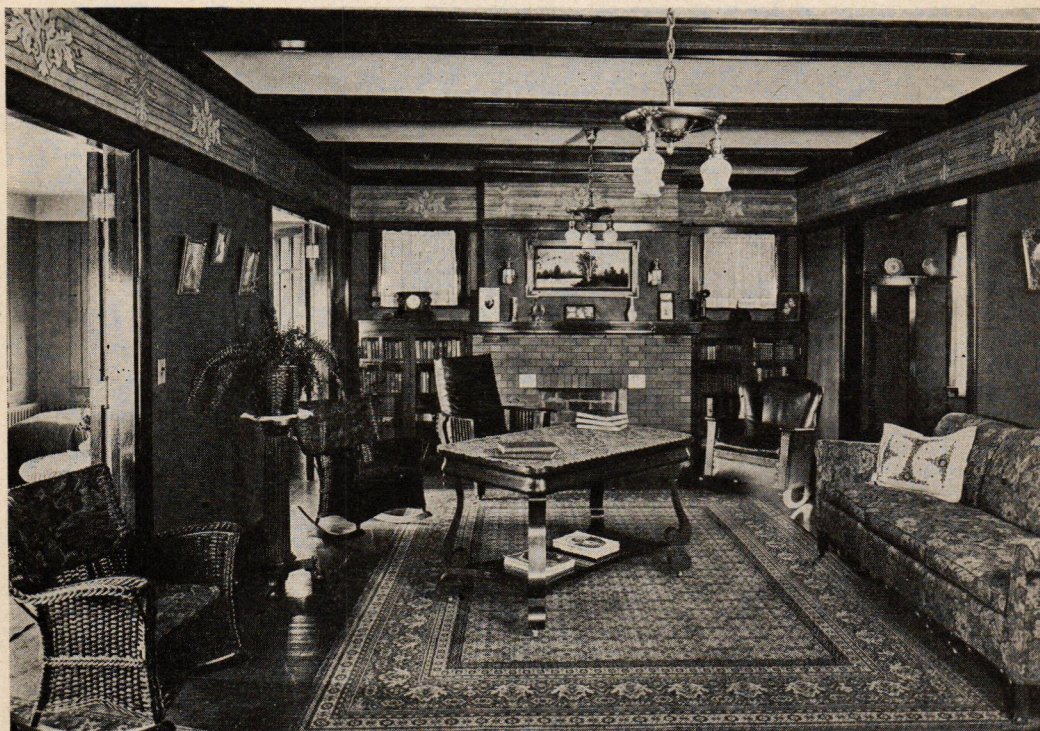
If the plaster is applied too thin the dry lath will quickly absorb the water from the small body of mortar and it will not set until enough water has been thrown on it to thoroly wet the lath and leave enough to set the plaster. *MORAL*: Wet down the lath and use the proper coat of plaster.

CAUTION. After plaster has set, open windows or doors and allow free circulation of air to dry out moisture expelled from the plaster. In damp or rainy seasons provide artificial or other means of drying out the rooms, after plaster has set. This is important.

If the simple directions of the manufacturer for mixing and applying are followed, the home builder will be assured perfect plastered walls and ceilings within thirty-six hours of the application of gypsum plaster.



The Residence of N. F. Scherrer, Rockford, Ill.



Living Room in the Residence of N. F. Scherrer, Rockford, Ill.

Standard Mill Construction

Charles P. Rawson, Architect

IT is our intention to show in the next two or three months something in the way of factory or warehouse details, something about the construction of floors, windows, doors, walls, roofs, skylights, etc. While the buildings of this class vary greatly in size and general arrangement, so that it is impossible to show anything in the way of a typical plan, yet the details of the separate parts may be considered more or less typical, and it will be our idea to show what has been approved by authorities in factory construction as the best. Measurements, when given on these drawings, should not be considered final, but are shown to give the reader some idea as to the dimensions used in ordinary work.

This month the drawings given are those detailing the construction of a standard warehouse window and an automatic interior fire door. The plan, elevation and section of the window are on the first page and enlarged details of the various parts on the next page. It is preferable to have double windows, as more light can be obtained with the same number of brick piers. It is also better to have the windows pivoted rather than slide on account of obtaining ventilation without drafts. The dotted lines show the position of the sash when open, and they are held in this position by chains fastened to the sash and to the mullion bar. The rebate is cut out below the pivot and the stop above the pivot is omitted as shown by dotted lines in the jamb and mullion sections. The transom bar should be housed at each end of the frame and mullion.

An automatic sliding fire door such as is approved by fire underwriters is shown on

the third page. No door frame is required and the track is secured directly to the brickwork. The door itself is made of two thicknesses of dressed and matched material securely nailed together and both running diagonally. This door is then completely covered on both sides and all edges with heavy tin with flat locked joints.

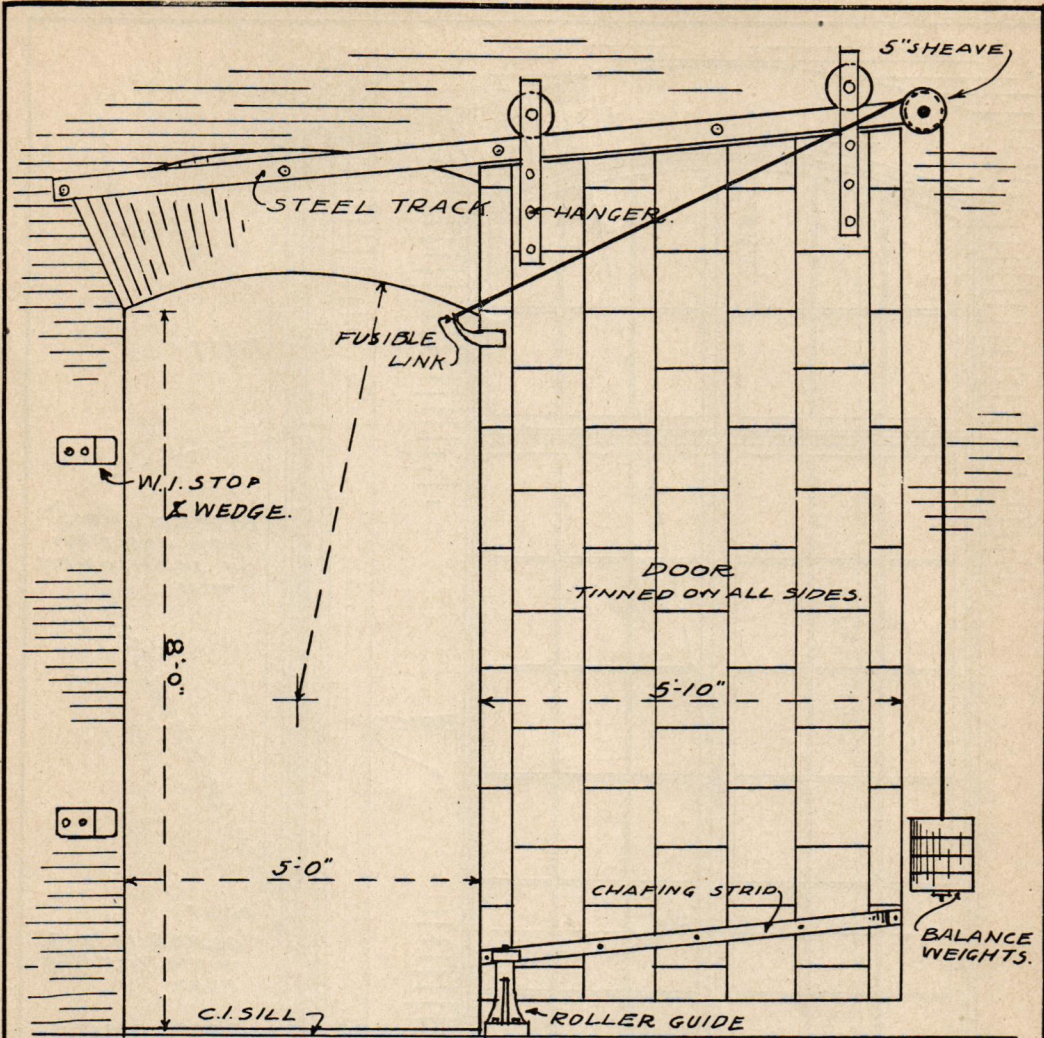
The track is placed on an incline and the door is kept open by weights which slightly more than balance the door. In case of fire on either side of the brick wall, the flames, on attempting to go thru the opening, will melt the fusible link at the top of the door, which will release the weights and the door will close by gravity, wedging itself tight against the wall, and as it is ten inches wider than the opening, there is a lap of five inches on each side. This will prevent the spread of fire from one room to another for a long time. The stops and chafing strips are so shaped that the door when closed by the momentum gained by closing becomes wedged tightly against the wall.

Every factory or warehouse, unless of fireproof construction, should be divided into a series of rooms by fire walls with fire doors. Even in fireproof buildings, the area of any one floor space should be limited, so that a fire in one section will not spread to another section of the building. The laws of most cities state how much space may be included in one room, and anything in excess of this must be separated by fire walls with fire doors as above described.

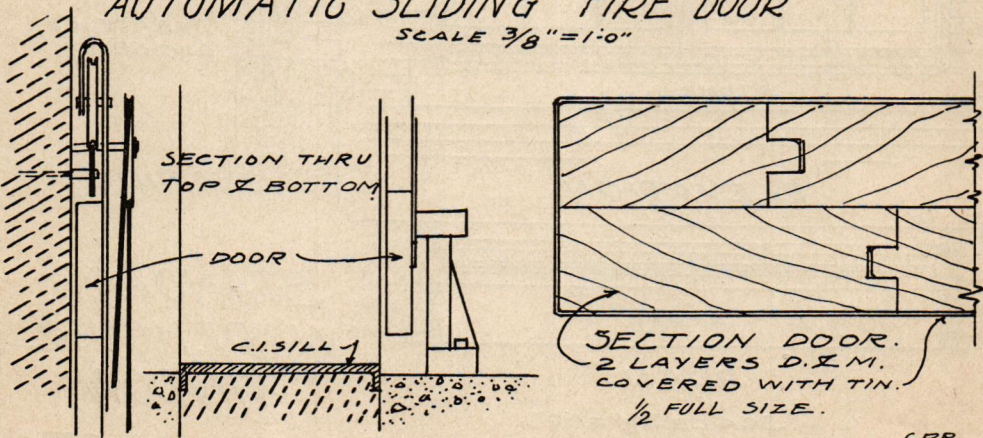
Next month we shall give details of a new tooth roof construction for one story factory buildings, and also illustrate the use of metal windows.

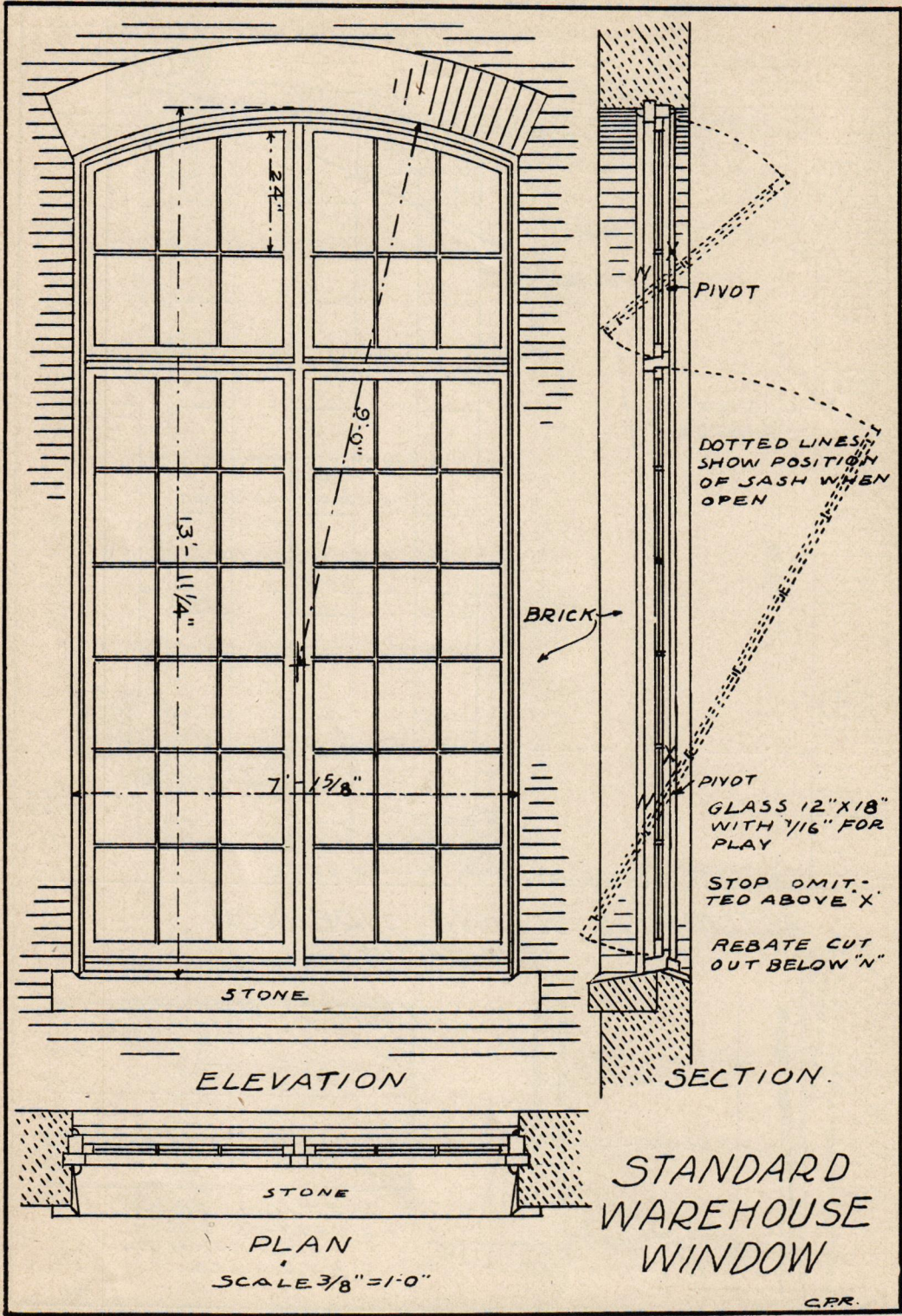
In a building contractor's action for the difference between the amount paid him plus the expense to defendant of completing the building, and the price stipulated for in a contract providing that on the contractor's default the owner could on notice finish the work and deduct the expense thereof from the amount of the contract, any expense incurred by defendant in doing work not contemplated by the plans and specifications should not be deducted.—*Coppola v. Grande*, 96 A. (N. J.) 67.

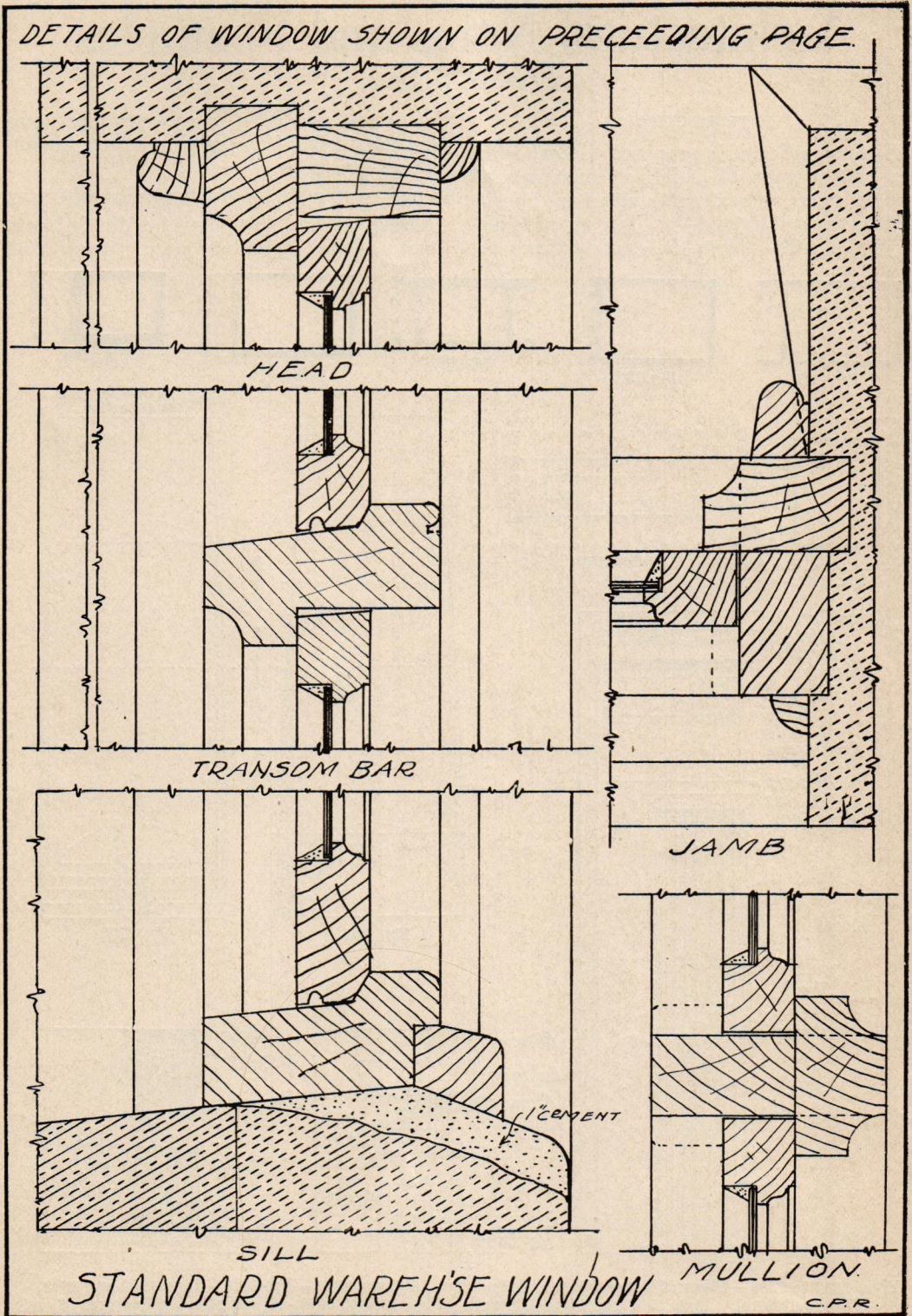
The fact that the contractor for structural steel work had nothing to do with the brick work, and that the ends of beams were bricked in after the contractor had placed them in position, could not relieve it of its duty to exercise ordinary care to make the place reasonably safe for its servant engaged in painting such beams, as it was bound to use reasonable care to discover the dangerous condition of the beams, if any.—*Greenstein v. Christopher & Simpson Architectural Iron & Foundry Company*, 178 S. W. (Mo.) 1179.



AUTOMATIC SLIDING FIRE DOOR
SCALE $\frac{3}{8}" = 1'-0"$







Architectural Notes and Examples

Prof. H. Adams

INTRODUCTION

In this section it is proposed to deal with the artistic part of building construction, and the notes and examples given are classified so as to extend—as far as possible chronologically—from the earliest times to

the present day. In many cases the notes take the form of model solutions to examination questions.

SHORT SKETCHES OF GREEK ARCHITECTURE

Greek architecture may be divided into three periods: its archaic state, its perfected

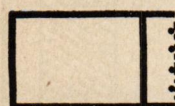


Fig. 1887.

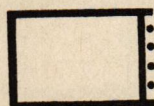


Fig. 1888.



Fig. 1889.

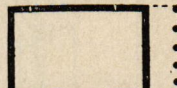


Fig. 1890.

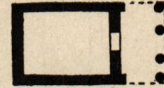


Fig. 1891.

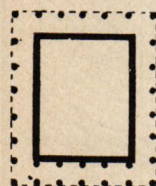


Fig. 1892.

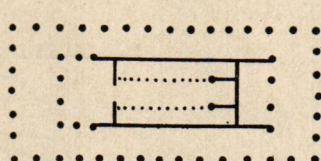


Fig. 1893.

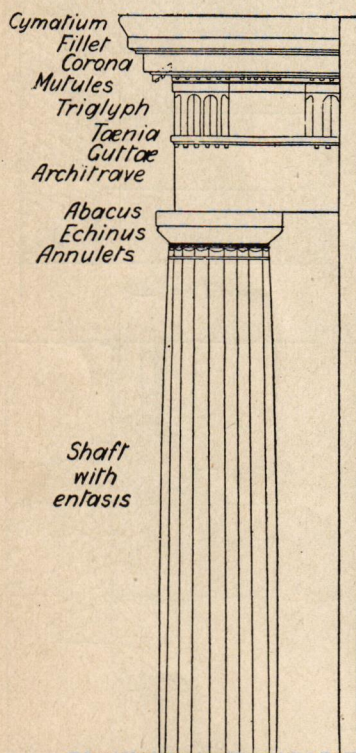


Fig. 1896.

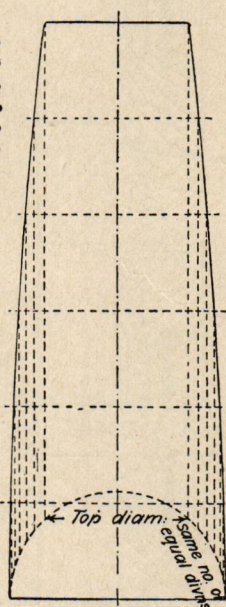


Fig. 1894.

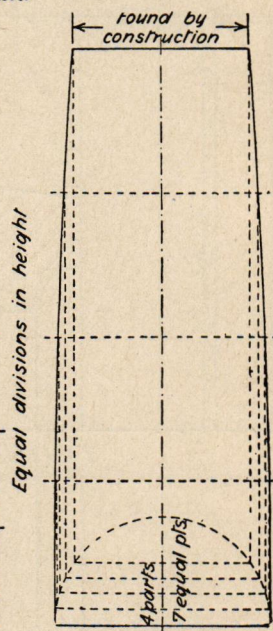


Fig. 1895.

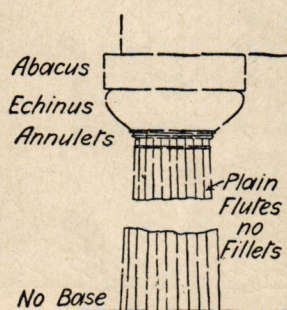


Fig. 1897.

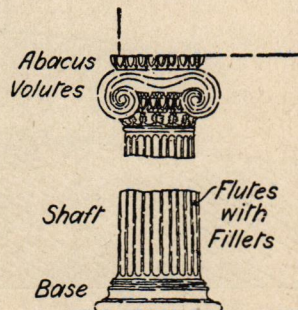


Fig. 1898.

Figs. 1887 to 1889.—Plans of Temple "in Antis." Figs. 1890 and 1891.—Prostyle.—Figs. 1892 and 1893.—Pseudo-dipteral. Figs. 1894 and 1895.—Entasis. Figs. 1896 to 1898.—Distinguishing Features of Columns.

condition, and its decadence. The first period owes its development to the earliest settlers in Greece, who were in course of time displaced by other migrations from the East. The first period, the archaic, dates from the twelfth century B. C. The second period, from 450 B. C. to 300 B. C., is the

temples in the conquered lands, but they transported her chief treasures to Rome. The period of decadence then seemed to begin. The earliest example of a temple of the archaic order is the Doric Temple of Corinth, of which only a few columns remain. It is supposed that the Egyptian

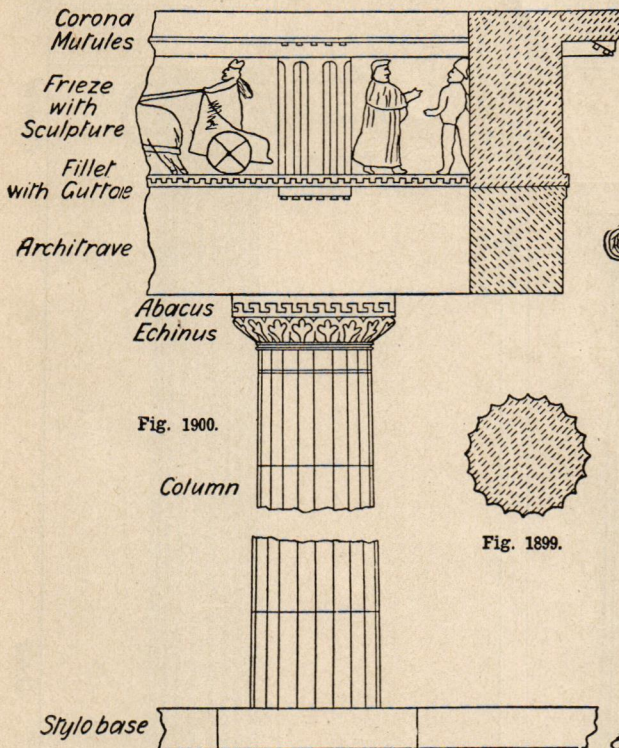


Fig. 1900.

Column

Fig. 1899.

Stylobase

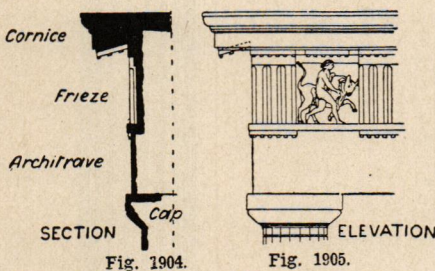


Fig. 1904.

Fig. 1905.

ELEVATION

SECTION

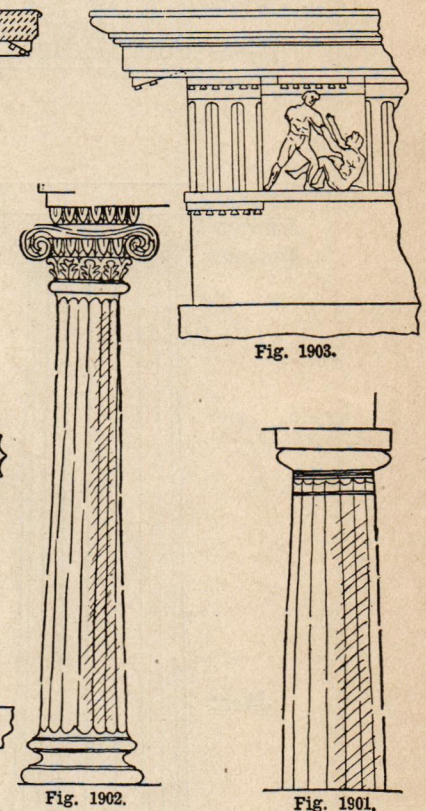


Fig. 1903.

Fig. 1902.

Fig. 1901.

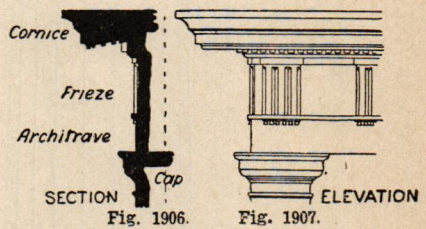


Fig. 1906.

Fig. 1907.

SECTION

ELEVATION

Figs. 1899 and 1900.—Doric Column with Part of Architrave and Frieze. Fig. 1901.—Doric Column. Fig. 1902.—Ionic Column. Figs. 1903 to 1905.—Greek Doric Entablature. Figs. 1906 and 1907.—Roman Doric Entablature.

great temple-building period in Greece and also some of her colonies, as Sicily and the Archipelago. During the last mentioned period some of the finest works of Greek art, sculpture, and painting were executed. After this period there was a long lapse, and then Greece came under the domination of the Romans. The Romans built other

temple formed the model from which all other structures borrowed their leading features. The Egyptian temples were enclosed with lofty walls, but the Greek temple was to be seen from all sides, and appeared isolated. To give the front of the temple a better appearance, or to afford protection to the paintings, by prolonging the side walls

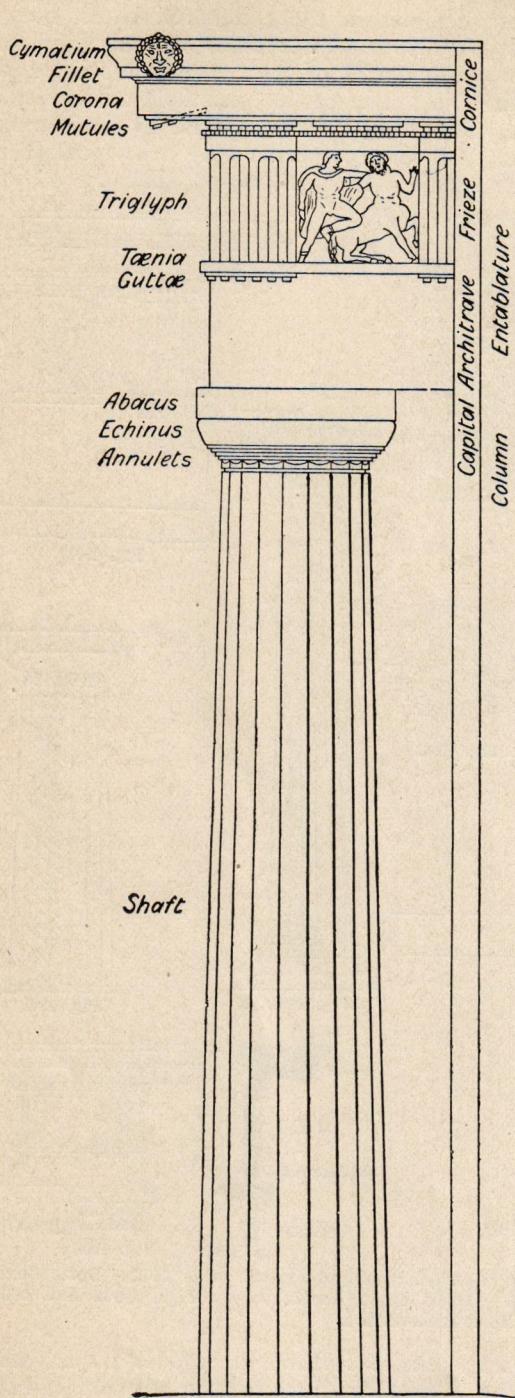


Fig. 1909.—Doric Order.

and providing two columns to carry the entablature, a porch would be formed. This gave the temple a bold appearance, and many temples were found to be built in this

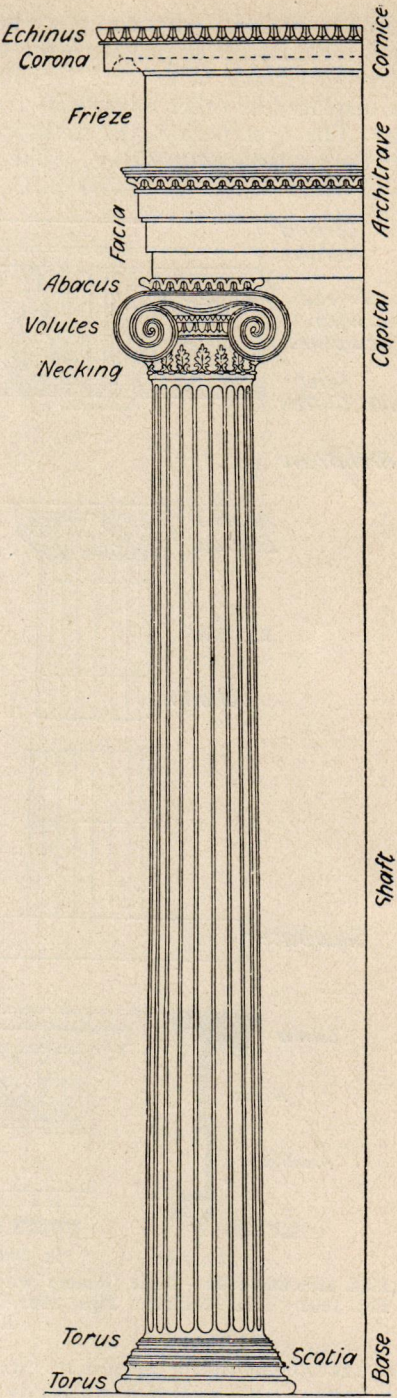


Fig. 1910.—Ionic Order.

way. Sometimes four to six columns would be placed on the front, while occasionally a temple with columns all around it would be found. The temple was placed

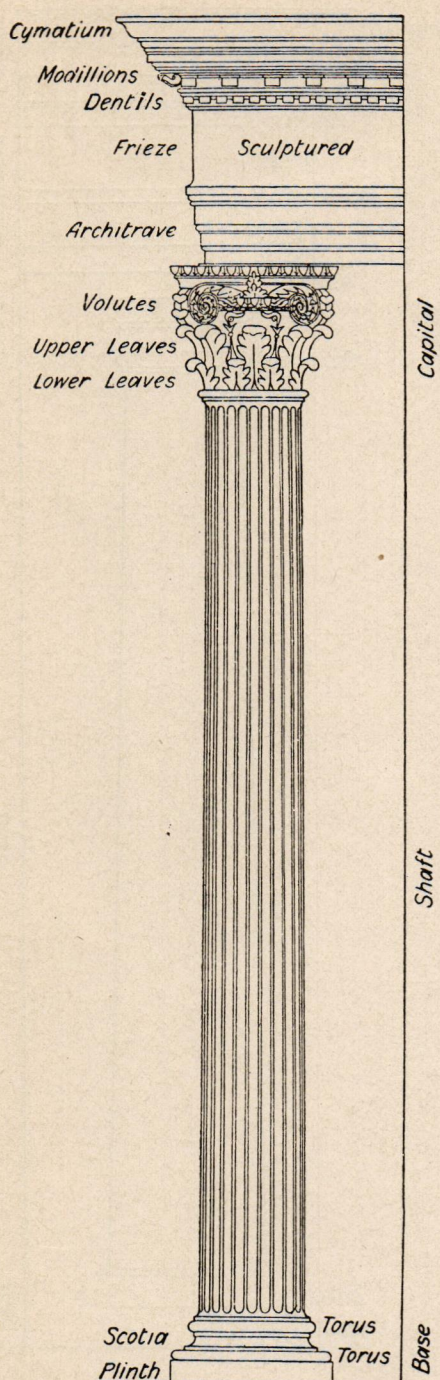


Fig. 1911.—Corinthian Order.

on a base consisting of three steps, varying in height according to the size of the temple, from 6 inches to 18 inches or more. The plans of these temples were of the

simplest and most elementary character. The roof was constructed of timber, with a covering of Parian marble in imitation of tiles. The columns tapered upwards with a slight curve, instead of being straight.

FOUR PERIODS OF GREEK ARCHITECTURE

First Period.—Cyclopean, Early Doric, and Ionic, 1184 B. C. to time of Solon. Examples: Ruins in Greece, Italy, Sardinia; treasure house of Atreus at Mycenae; temple at Corinth; temple of Here and Olympia at Samos.

Second Period.—Extends from 600 B. C. to the time of Pericles, who died B. C. 429. Examples: Temples of Olympic Zeus at Athens and Apollos at Delphi, both Doric; Temple of Diana at Ephesus, Ionic; temples at Syracuse, Selinus, Agrigentum, and Egesta, all in Sicily; Temple at Paestum, 500 B. C.; Temple of Minerva at Egina, 479 B. C., all Dorian, no Ionic building of this period having existed till the present day.

Third Period.—Extends from the time of Pericles to that of Alexander the Great (died B. C. 323). Examples: Temple of Pallas Athene or the Parthenon, on the Acropolis, and the gate called Propylaea, both at Athens; temples at Eleusis, Rhamnos, Senion, and Thorikos (mostly Doric); the triple temple of Erechtheum (in the Ionic Style); Temple of Apollo at Bassae in Arcadia (Doric, Ionic, and Corinthian styles all introduced); Temple of Minerva Alea at Tagea (Doric, Ionic and Corinthian) of which Scopas the Athenian was architect; Choragic monument of Lysicrates at Athens.

Fourth Period.—Extends from the period of Alexander the Great to 150 A. D. Examples: Temple of Apollo Didymaeus at Miletus, Temple of Jupiter Stator at Rome, theatre at Jassus.

CYCLOPEAN ARCHITECTURE

The earliest examples of Grecian architecture are the remains of the circular walls round towns and palaces known as Cyclopean. They consist of huge masses of stone put together with mortar, and may be divided into three varieties: (1) Enormous unhewn boulders in their natural shape laid one on another, and the interstices filled with smaller stones. (2) Gigantic polygonal block of stone, the corners of which fit accurately into one another. (3) Large

regular blocks of equal height, approximately squared, and forming what we should now call heavy ashlar work.

THE FIRST GRECIAN DORIC TEMPLE

It is still a matter of conjecture in what city the first Grecian Doric temple was erected; but Vitruvius states that Dorus, the son of Helen, reigned over Achaia and Peloponnesus, and that he built a temple of the Doric order on a spot sacred to Juno in the ancient city of Argos, 1200 years B. C. The most ancient existing specimen of a temple of the Doric order is that at Corinth, known as the Temple of Athene, of which there are only seven columns left standing. It is a simple, plain, bold design of massive proportions. The date of building is about 650 B. C. The Ionic temple of Fortuna Virilis, now existing as the Church of Santa Maria Egiziaca, is one of the few Ionic buildings in Rome. It is tetrastyle, with half-columns all around it or "pseudo-peripteral," as Vitruvius termed it; date about 140 B. C. The Temple of Concord in Rome is another specimen of Ionic design.

The Planning of Temples.—The arrangement of the columns gives the key to the planning. "In Antis" is the term applied to a temple where the side walls are continued beyond the front wall and the columns placed between, as Figure 1,887, or where the front is terminated by antae or pilasters and the columns are placed between as in Figures 1,888 and 1,889. "Prostyle" is the next step in the arrangement of the columns, and consists in advancing the pediment in front of the main building, the pediment and entablature being carried on a row of columns open at the ends, as in Figure 1,890; or when the columns are advanced in front of the antae, as Figure 1,891. "Pseudodipteral" is as if dipteral or with double row of columns on each, whereas there is only a single row of columns on each flank, giving more space within the colonnades than the dipteral. There is a double row of columns in front, and the others are placed the same distance from the cella as the outer row, and therefore give a pseudo or false appearance, as Figures 1,892 and 1,893. "Hypaethral" is applied to those temples having the cella or naos partially or wholly open to the sky.

ENTASIS OF A COLUMN

The entasis of a column is the swelling

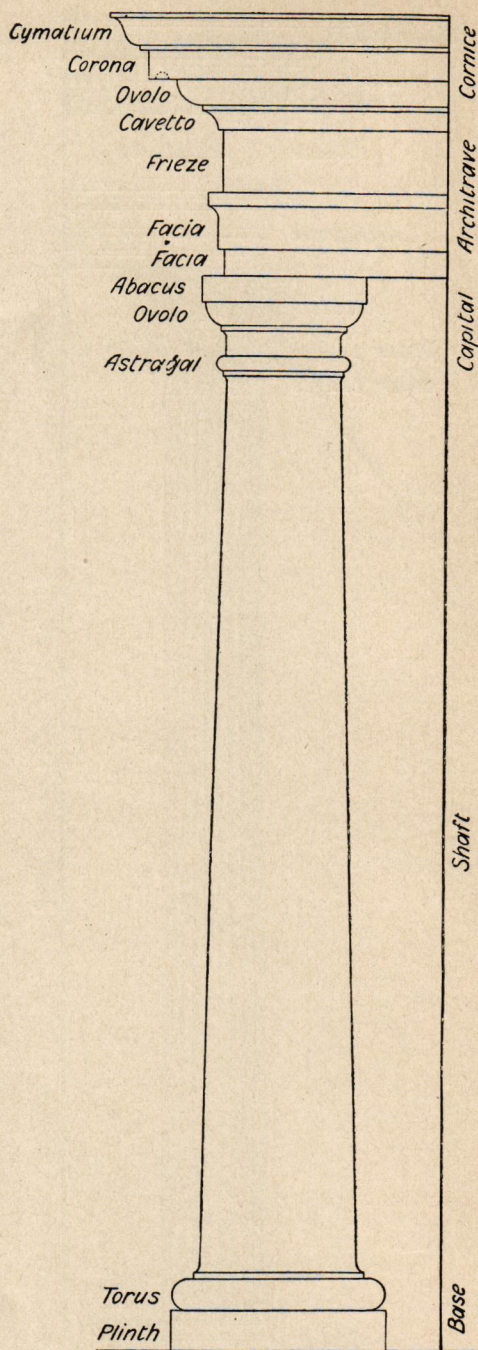


Fig. 1912.—Tuscan Order.

of the diameter beyond the outline which would be formed by a straight taper. "Some authorities make it consist in preserving the cylinder of a column perfect

for one-quarter or one-third the height of the shaft from below, diminishing thence in a right line to the top; while others, following Vitruvius, make the column increase in bulk in a curved line from the base to three-sevenths of its height, and then diminish in the same manner for the remaining four-sevenths, thus making the greater diameter near the middle." According to another account, "the shaft diminishes in a slightly curved line from the base or inferior diameter upwards to the hypotrachelium, leaving it at that place from two-thirds to four-fifths of the diameter at base."

Tredgold's outline of the entasis was obtained by setting off the height and the top and bottom diameter of column, describing a semicircle on the bottom and dividing the portion on each side that extended beyond the top diameter into any number of equal parts, then dividing the height into the same number of equal parts, and projecting vertical lines from the divisions on the semicircle to cut those in the height at points in the curve, as in Figure 1,894. Another modification was to divide the center line of the semicircle into seven equal parts, making the top diameter the same dimension as the third line down, projecting vertical lines from the other divisions as before (see Figure 1,895). The swelling of the column makes it look as if actually supporting the load on top and swelling under the pressure as wrought iron does in compression. It also prevents the sides of the shaft from looking hollow. The taper increases the effect of height by the appearance of diminished size due to distance, and a larger diameter at the bottom is scientifically accurate to compensate for the weight of the column itself.

GRECIAN DORIC COLUMNS AND ENTABLATURE

Entablature in Greek and Roman architecture is the name given to the whole of the parts of an order above the column. It is subdivided into three parts, the architrave resting immediately on the column, the frieze or flat surface separating the architrave from the cornice which forms the outer group. According to Gwilt, the proportions of the columns and entablature of the Greek Doric order in modules and minutes (a module being the semi-diameter of column at base, and a minute the thirtieth of a module) are as follows:

Height of column=16 modules=8 diam.

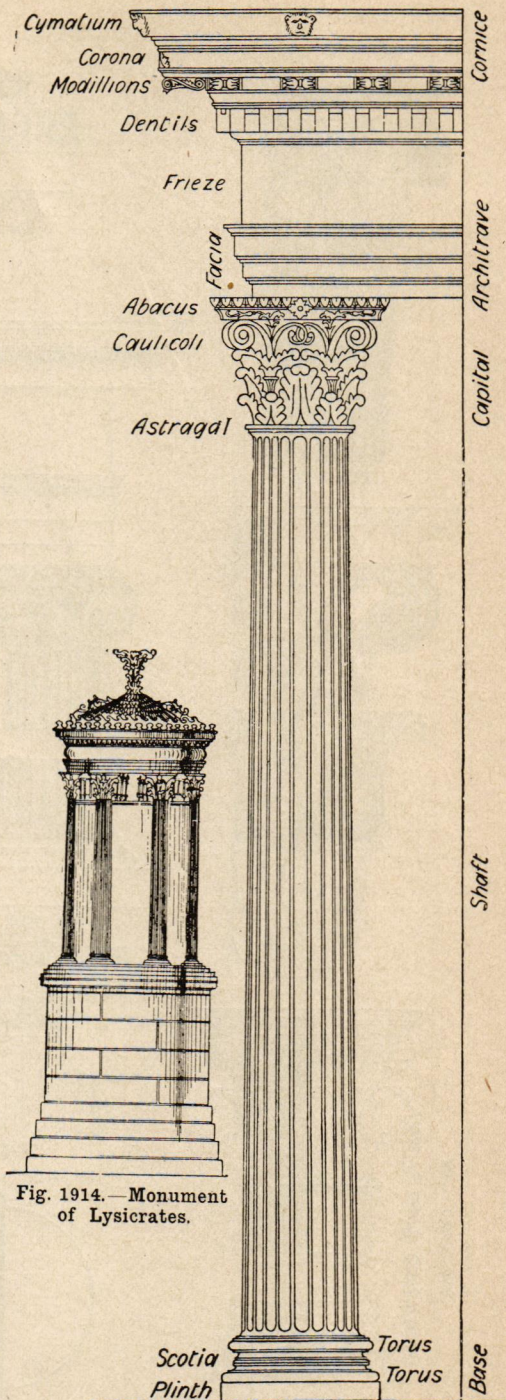


Fig. 1914.—Monument of Lysicrates.

Fig. 1913.—Composite Order.

Height of entablature=architrave, 30 minutes; frieze, 45 minutes; cornice, 45 minutes=4 modules.

According to other authorities, the column

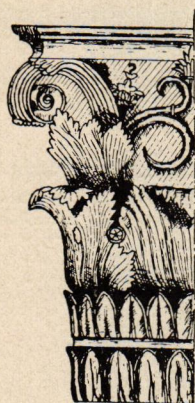


Fig. 1915.



Fig. 1916.

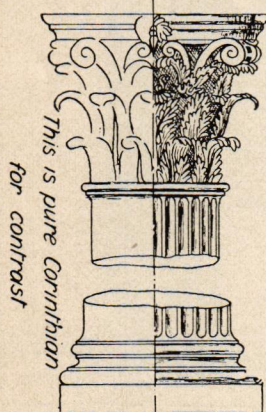


Fig. 1918.

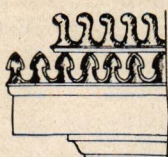


Fig. 1917.

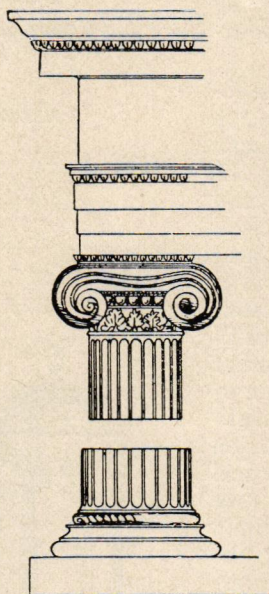


Fig. 1920.

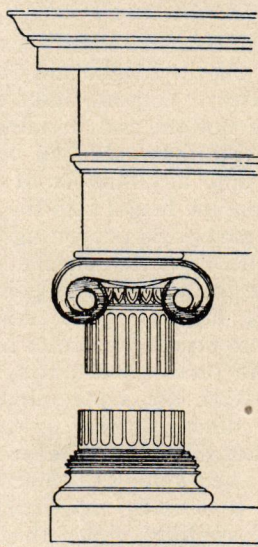


Fig. 1921.

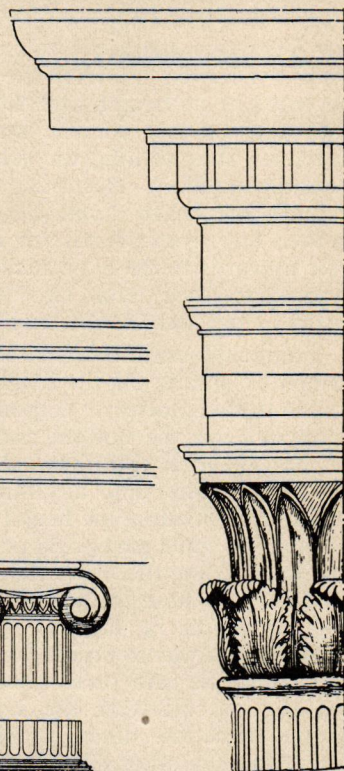


Fig. 1919.

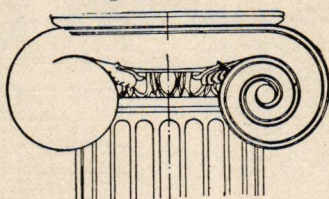


Fig. 1922.

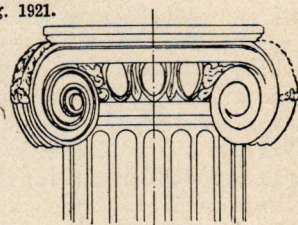


Fig. 1924.

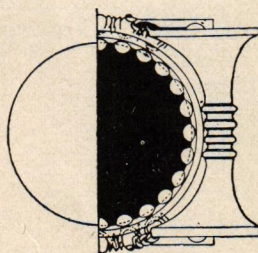


Fig. 1923.

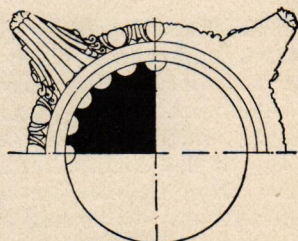


Fig. 1925.

Figs. 1915 to 1918.—Details of Monument of Lysicrates. Fig. 1919.—Capital and Entablature from Temple of the Winds. Figs. 1920 and 1921.—Greek Ionic Examples. Figs. 1922 to 1925.—Roman Ionic Examples.

is from 8 to 12 modules high, the capital and necking occupying two of these; and the entablature $3\frac{1}{2}$ to 4 modules high, of which the architrave occupies two-fifths, frieze two-fifths, and cornice one-fifth



Fig. 1926. — Caryatide Figure.

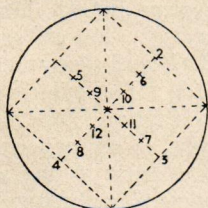


Fig. 1926a. — Eye of Ionic Volute.

(Figures 1,896 to 1,898). The diameter of a Doric column being taken as 4 feet, Figures 1,899 and 1,900 represent its horizontal section and elevation, to a scale of 1-36, the latter showing how the architrave and frieze were treated by the Greeks.

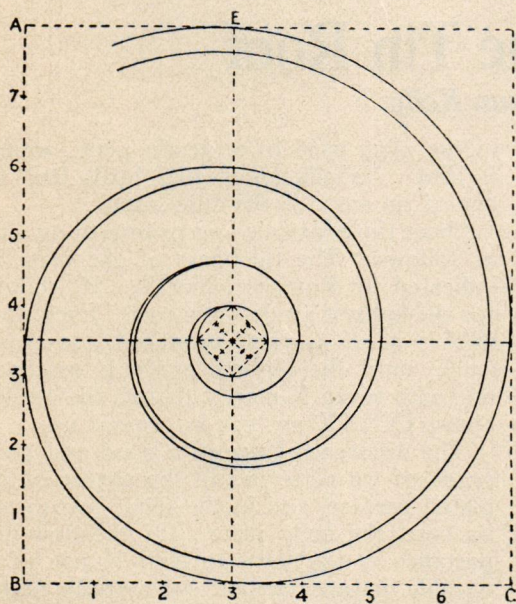
The distinctive features of Doric columns are: Plain square abacus, saucer capital or quirked ovolo, neckings or grooves at top of shaft, twenty flat flutes worked to sharp

separating shaft from capital, twenty-four semi-circular flutes with fillet between; base consisting of two torus mouldings separated by scotia and two fillets. Column $7\frac{1}{2}$ to 9 diameters long (see Figure 1,902).

Special features of the Doric entablature are: (1) Architrave quite plain, simple flat surface. (2) Frieze ornamented by triglyph and square sculptured metopes between, with mutules above both, and guttae below triglyphs. (3) Projecting cornice of shallow depth, with mutules on under side. For Greek Doric entablature, see Figures 1,903 to 1,905, the latter being from the Parthenon. For Roman Doric, from Theatre of Marcellus, see Figures 1,906 and 1,907.

GREEK TEMPLES OUTSIDE GREECE

At Agrigentum, the Doric temple of Juno Lucina, the Doric temple of Concord, the temple of Peace, the temple Jupiter; at Paestum, three Grecian Doric temples, one hypaethral, one enneastyle, one hexastyle; at Syracuse, the Grecian Doric temple of Minerva; at Silenus, the temple of Jupiter in Grecian Doric hypaethral octastyle, and a smaller temple in Grecian Doric hexastyle: these places are all in Sicily. In Asia Minor there were: At Miletus, the Ionic temple of Apollo Didymaeus; at Teos, the Ionic temple of Bacchus; at Priene, the Ionic temple of Minerva Polias; at Samos, the temple of Juno; at Aegesta, a Doric temple; at Aegina, the Doric temple of Jupiter Panhellenius. According to the Earl of Aberdeen ("Principles of Beauty in Grecian Architecture"), the temple of Minerva at Tegea was rebuilt by the famous Scopas of Paros in the concluding years of the Peloponnesian war, on the site of an older temple which was burnt down in the ninety-fourth Olympiad. This later temple was the largest, and, according to Pausanias, the most beautiful building in the Peloponnesus. It was an hypaethral edifice—that is, with the interior open to the sky. The interior of the cell was adorned with two rows of Ionic columns surmounted by others of the Corinthian order, being the first examples of the style in Greece mentioned by any writer. The peristyle was Doric, although Pausanias reverses the position of the Doric and the Ionic columns. A few shattered fragments constitute the only remains of this once magnificent structure; but as the situation is precisely ascer-



arris. No base. Column 5 to $6\frac{1}{2}$ diameters long (see Figure 1,901).

The distinctive features of Ionic columns are: Small ornamented abacus. Capital with large volutes at sides or angles, with egg-and-dart mouldings, torus moulding

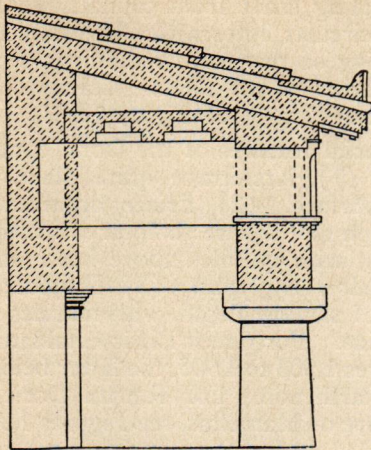


Fig. 1927.

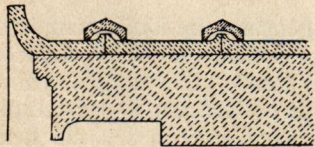


Fig. 1928.

Figs. 1927 and 1928.—Sections of Greek Roof Tiling.

tained, the whole plan might be easily restored.

CONSTRUCTION OF IONIC VOLUTE

Figure 1,908 shows an Ionic volute. To construct it, divide the height A B into eight equal parts, and number as shown in Figure 1,908. Draw horizontal center line at $3\frac{1}{2}$. Set off seven similar parts on base B C, and draw vertical center line through E 3. The eye of spiral is set off as shown in Figure 1,926 a, being one part in diameter. Commence with radius from point 1, and draw as far as center line; then from point 2 reducing radius to continue from last portion, and so on. For the inner spiral, work backwards from where the double line commences, taking the center at one-fourth the distance from 8 to 12 as shown by cross marks on figure 1,926 a; continue with center at one-fourth, 7 to 11, and so on.

FIVE ORDERS OF ARCHITECTURE

What are known as the five orders of architecture comprise the Doric (Fig. 1909), the Ionic (Fig. 1910), the Corinthian (Fig. 1911), the Tuscan (Fig. 1912), and the Composite (Fig. 1913).

Painting the Tin Roof

A. Ashmun Kelly

IT may be well to state first what tin is. Then we shall know better how to deal with it. Tin, the metal, belongs to the class of soft metals, with lead and copper, but, unlike these two metals, it cannot be hammered out in sheet form without alloy, it being insufficiently soft to be malleable. Tin is of a brittle, crystalline composition. To be of use as a sheet metal, it must be used in combination with a tougher and harder metal. This tougher metal must be somewhat porous of grain, and of a texture not too fine, so that when we coat the harder metal with the molten tin the latter must penetrate beneath the surface and form a covering that will prove lasting.

Sheet tin is classed as bright tin and terne tin. The latter is used almost exclusively for roofing, or wherever tin plate is used on exterior work. At one time bright tin plate was used for all purposes that tin can be used for. But terne plate is considered better, standing weather action better than the bright tin. This fact is due

to the alloy used in terne tin plate, which is lead. Usually about two-thirds lead to one of tin metal is the alloy used.

Sheet tin is branded according to quality as follows: The thickness of the plate is indicated by Roman numerals. IC stands for the lightest grade—one coat. Each successive grade is then advanced one cross mark, until the highest grade is reached, one with seven X marks, though the grades above IXXXX are not in general use.

The difference between a good and poor grade of tin plate lies in the nature of its plated surface, and in the fibral texture of its base, the body plate. Of the first importance is the latter, which if not of a durable nature cannot successfully stand under the coating of tin. The best quality of tin plate, both the bright tin and terne tin, show bright tin on both sides. The pure tin will show a bright silvery polish, while the lead and tin coating will show more or less dull. The body of the plate of the metal is soft and pliable, and of the best

grade, free from pin holes or blemishes of any kind, and sufficiently tough in its fibral texture to be worked into locked seams without cracking the body plate or its outside coating.

Prior to 1875 there was no steel base for tin plate in use, and tin roofs began to cause dissatisfaction with the introduction of the Bessemer steel process. This form of steel is very susceptible to dampness, rusting badly even under a coating of tin, saying nothing about paint. Rust makes rust, and once rusting begins scarcely anything will stop it. Hence it is not good practice, as urged by some, that a tin roof be allowed to stand to the weather a while, until it shows some rust. More on this head will be said later on.

Where the base of the metal coated with tin is charcoal iron there will be no rusting. That was the tin we used years before the Bessemer process. There have been roofs covered with this tin that have stood 75 years or more. They never required paint.

New tin sheets are coated with palm oil, and paint will not adhere to the oil. Hence the first thing to do is to remove this oil. Scrape off the rosin left by the tinner, then take cotton waste and benzine and clean off the oil. Sal soda water is also a good cleanser, and cheaper, of course, than benzine. Add about $\frac{3}{4}$ pound of soda to five gallons of hot water; apply a wash of this, and let the roof be until dry. That will remove the grease. Then wash off entire roof with clear water.

Never apply paint while any dampness remains on the tin. As nails in shoes injure the coating, better wear rubber soled shoes. Allow no one to walk on the roof after the painting is on. As soon as the roof has been cleaned and is dry, apply the paint. Use rather thin paint, using raw linseed oil and a good metallic paint. No driers are required, unless rain threatens. The driers tend to injure paint. Graphite paint will not do on a tin roof. Thick paint is liable to expand and crack in contraction. Thin paint is more elastic, and will expand and contract without danger of cracking. No paint containing tar, pitch or bituminous compounds is good for coating a tin roof. The specifications adopted by the National Association of Master Sheet Metal Workers require the initial painting to be carried out as follows: Before laying, the tin to

be coated with one coat of paint on the under side. The upper surface of the tin roof to be cleaned of all rosin, dirt, etc., and immediately painted. Paint to be of pure metallic brown, iron oxide or Venetian red as pigment, mixed with pure linseed oil. No patent drier or turpentine to be used. All coats of paint to be applied with a hand brush and well rubbed in. Apply a second coat two weeks after the first. The third coat to be applied one year later.

An expert painter says he prefers red lead that is ground in raw linseed oil, the cold pressed kind, applied the day it is mixed. Red lead paint is difficult to use on account of its settling badly in the pot, and is usually mixed when ready for the work, not being ground in oil. It is also expensive, and subsequent coats of metallic paint will not adhere to it.

To mix metallic paint for roofs, use in the proportion of half-and-half of oil and pigment; that is, $7\frac{1}{2}$ lbs. dry pigment to the gallon of oil. To mix, place the dry paint in a vessel and pour the oil over it, then allow the oil to soak through the paint; this may require several hours, so that if done the evening before needed for use it will be a saving of time. Then stir to a smooth paste. Thin at the rate of $1\frac{1}{2}$ gals. of raw oil to the 25 pounds of paste paint. Use driers only in cold weather, when from 5 to 10 per cent. may be used, of the best japan driers. Apply evenly, of medium thin consistency, and brushed out well. Choose a clear, bright day, if possible, and do the work preferably in the morning. I am giving you the ideal conditions; of course these do not often present themselves.

Many prefer Venetian red for painting tin roofs. There are at least two distinct kinds of this pigment, one a pure oxide, the other a composition, formed of bright iron oxide and a base, usually gypsum.

Never place tarred paper under a tin roof, for it will surely cause the tin to corrode, but sheathing paper will do.

Use a round paint brush for applying paint to the tin roof; do not attach a brush to a pole or handle, like a whitewash brush, but get down on your knees to it, rub out the paint and rub it well into the seams, but avoid runs.

A cheap paint may be made for gutters, etc., as follows: Take a lot of pot clean-

ings and old paint odds and ends, place in a kettle and add some oil and boil the mass. Then strain carefully and add dry sand until the mass is of the consistency of ordinary paint. It is best applied hot, and a heavy coat is desirable. When dry it has a hard, enamel-like surface, and it may be colored to harmonize with the roof color.

Properly prepared it will be as smooth as glass.

For removing old paint from roofs there are alkalis, such as soda and lye, fire, and the usual paint and varnish removers. Old roofs should be made clean before repainting.

Waterproof, Cleanable Whitewash

One pound of glue is dissolved in $3\frac{1}{2}$ pints of water. To this is subsequently added three ounces of bichromate of potash dissolved in half a pint of hot water. These two ingredients are thoroughly mixed, and enough whitening then added to secure the right consistency. The mixture is applied to walls or roofs in the usual manner, and dries rapidly, while the action of the sun upon the potash and glue serves to render it waterproof.

Such a whitewash is available for a variety of applications both exterior and interior. It adheres firmly to slate, glass, metal, masonry, or plaster, care being taken, if on plaster, to rub it well in with the brush. It not only affords an excellent protection from the effects of the sun's rays in hot weather, but acts as an admirable waterproofing to walls exposed to driving rains. When desired, it can be cleaned with a hose and cold water, or washed with a sponge.

A Distinctive Bungalow

Harold Schoelkopf

THE house illustrated with this article is a suburban home ideally suited to the needs of a small family and possessing distinct individuality and an unusual craftsmanlike beauty.

In this era of commercialism, quality and architectural memberment are too often put second to cost. It is therefore the task of the modern architect to produce plans which allow clients the satisfaction of a beautiful, well built home as well as the advantages of economy. With such end in view, the architect is often confronted by many and varied serious questions. To meet these questions so that mutual satisfaction may be accorded requires conscientious and long study.

It is interesting to note just how the architect is relied upon and held responsible for a satisfied client. It is more interesting to note the architect's compatibility with the dreams of the builder—it is still more interesting to see and understand how it is accomplished. We believe that this plan demonstrates the method.

The size of the house is 24 feet 6 inches by 41 feet 6 inches, allowing it to be built on almost any lot. Every inch of the floor space is utilized so that the house is at once

very convenient and of ample size. It is entered from a small porch with cement steps, brick floor, and flower boxes on either side. The front door, with attractive sidelights, opens at once into a light, capacious Living Room. A large fireplace and two bookcases of pleasing design occupy one end. The large front window and the two windows over the bookcases are casements.

A large, light sun porch with French doors opens off the Living Room. Light and air are received from four sides. The broad openings are equipped with screens and Whitney windows. A large closet containing a Door Bed opens off from the porch thereby really making it a Sleeping Porch when desired.

The Living Room is connected with the Dining Room by a broad opening on each side of which are cases opening into the Dining Room. The main feature of this room is the built out seat which is divided into three parts. The outer two are in the nature of chests, while the center is a cold air duct. A swinging door opens into a white tiled Kitchen. The greatest advantage of this room is the fact that there is only one outside door, thus preserving a great deal of valuable wall space. A con-



A Bungalow at Omaha, Neb.

Everett S. Dodds, Architect

venient, roomy cabinet with a work table and an abundance of drawers and cupboards occupies an entire side. Adjacent to it is a porcelain sink with double drain boards. Immediately off from the Kitchen is a small hall one side of which is occupied by a Linen closet. Two Bedrooms and a Bathroom also open off from this Hall. The

front Bedroom is equipped with a white enameled Wardrobe closet. The rear Bedroom has a large closet over the stairs leading to the Basement. About half of this closet is full height, while the other half is in the nature of a deep shelf about three and one-half feet from the floor.

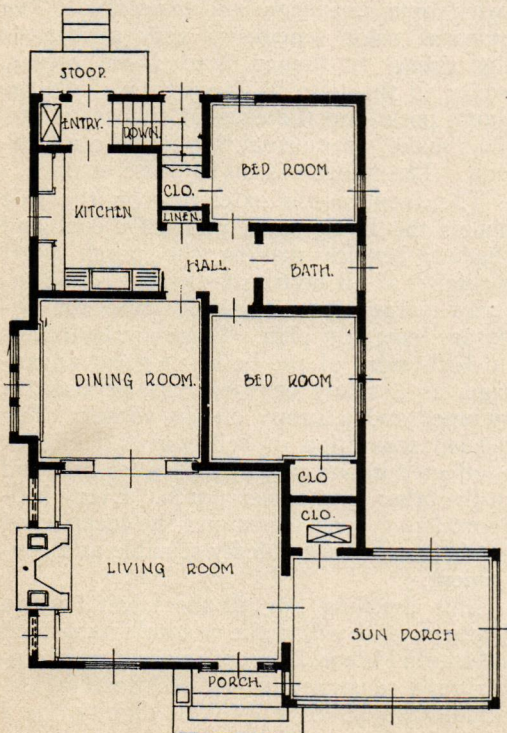
The Bathroom like the Kitchen is white tiled and is equipped with a white enameled tub, toilet and a pedestal lavatory, over which is a mirrored Medicine Cabinet.

The outside door of the Kitchen opens into a small entry in which is located the refrigerator, arranged to be iced from the rear stoop. Another door opens onto a back porch. The stairs to the Basement go down at one side of the entry. There is a grade door entering onto a landing five steps below the main floor level.

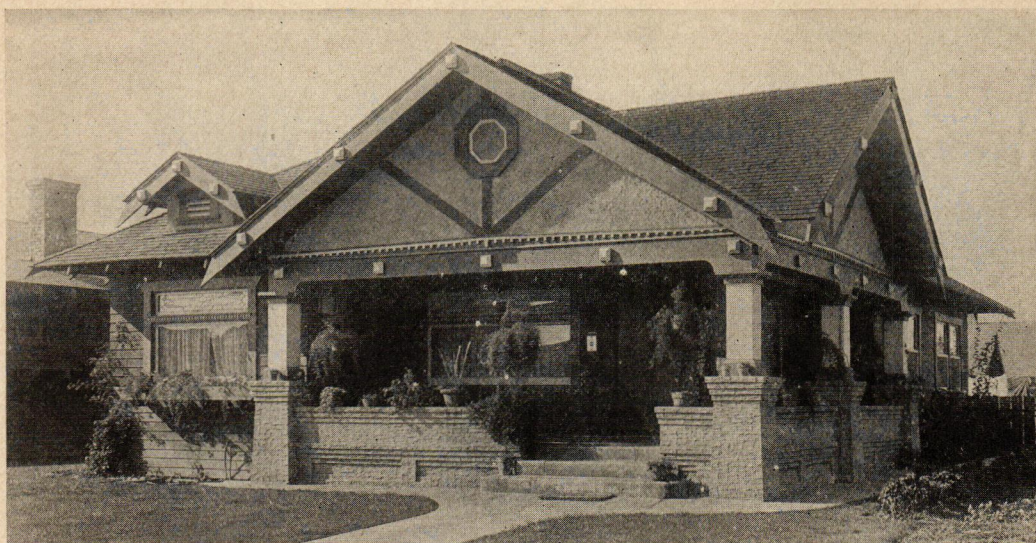
The Basement has a cement floor and is well lighted. There is a large hot air furnace and ample space for coal bins and kindling. A vegetable cellar with a dirt floor and a wide shelf is located under the Sun Porch.

The exterior of the house is white stucco with a chocolate brown trim. The foundation is of rough pressed brick, as is the chimney which has a stucco panel and is cobble stone trimmed.

All in all, the house is conveniently arranged, economically built and possesses many features and characteristics not found in the ordinary house of today. It should therefore appeal strongly to the home builder.



Floor Plan of Bungalow



A Bungalow of Refined Appearance.

Commonwealth Home Builders, Architects

Timbered Gables

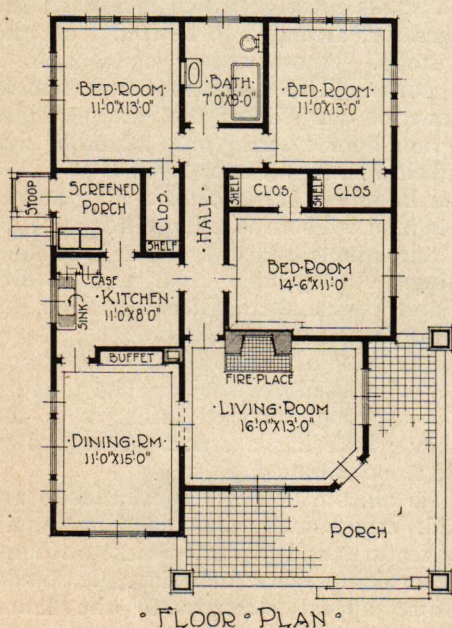
F. Ford

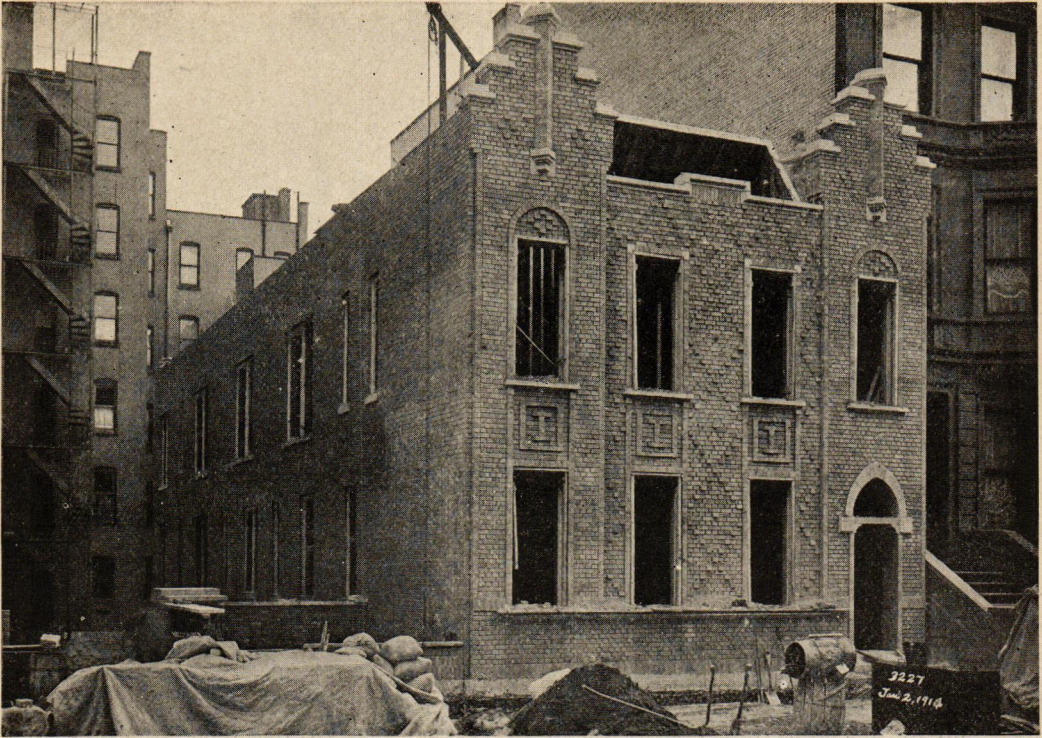
EXTERNAL timber-work, so characteristic of English dwellings, has a great charm for many people. It is used with skill and taste in the gables of this bungalow. There is just enough; any

more would be too much in a one-story dwelling. The rock-faced cement brick-work looks expansive and expensive. The external color scheme is very attractive; the siding is stained Van Dyke brown, while all the trim is olive green, with the porch posts and the ends of timbers white. This makes an unusual but happy combination. The interior is all in white enamel.

The front porch extending on the side makes the living-room unusually cool and shaded, besides making the porch itself available at all hours of the day. The interior arrangement departs from the ordinary bungalow plan. There are bedrooms on both sides of the house, a great advantage, as a shady bedroom can be used in summer and a sunny one in winter. The needed separation of bedroom and kitchen is effected in one case by the center hall, and in the other by a screen porch. Every bedroom has a good closet and the location of the bathroom is decidedly sensible and convenient.

This dwelling has all the latest built-in features, and will make a comfortable and substantial home. The entire absence of gingerbread construction and architectural experimenting gives it unusual dignity for a small dwelling.





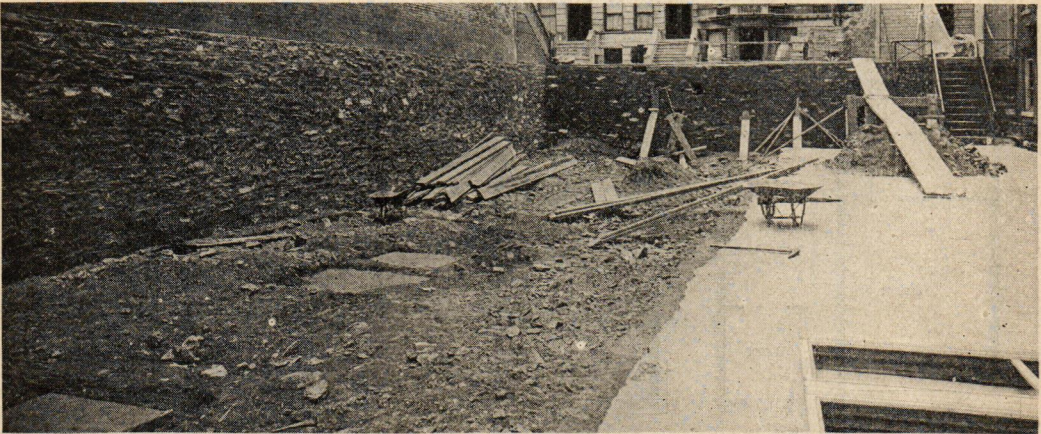
No. 2 Studio Building, New York.

Bing & Bing, Contractors

Big Building Bureau

The restricted area on which many city buildings are erected means that the contractor must use skill and energy to rush a job thru. Messrs. Bing and Bing have built many large buildings, but they are especially proud of this one, as only four weeks

elapsed between the photographs shown on the bottom and the top of this page. The building is shown in process of erection to indicate some of the difficulties found in large cities, where the contractor must make time in spite of all obstacles.



The Site Cleared and Foundation in Place



A Row of Two-Family Houses.

David E. Gring, Contractor

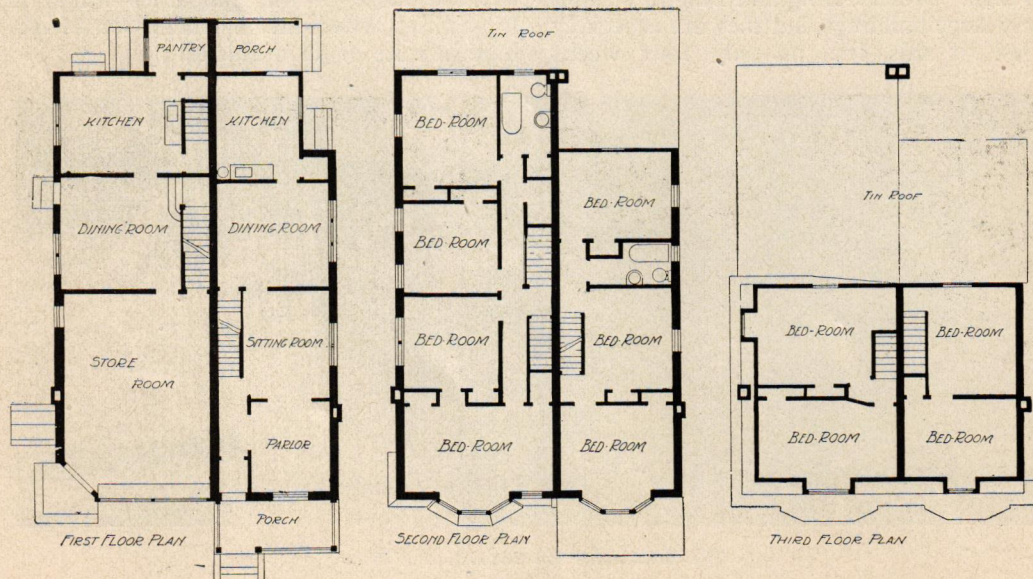
Among Our Subscribers

WE OFTEN wish that we had space in the NATIONAL BUILDER to show all of the many fine houses which are built by our subscribers. This month we take pleasure in showing a row of duplex houses in which the requirements of the particular tenants were carefully observed. The corner building was designed to be a store and in consequence a little more of the lot was used than in the rest of the building. This is entirely satisfac-

tory as some families require and actually prefer less room than others.

These houses prove to be of exceptional interest and we understand from the contractor that they were all sold before they were completed. This is perhaps the real test of a satisfactory house, at a satisfactory price.

These buildings were erected by Mr. David E. Gring, a contractor of Reading, Pa., and one of our faithful subscribers.



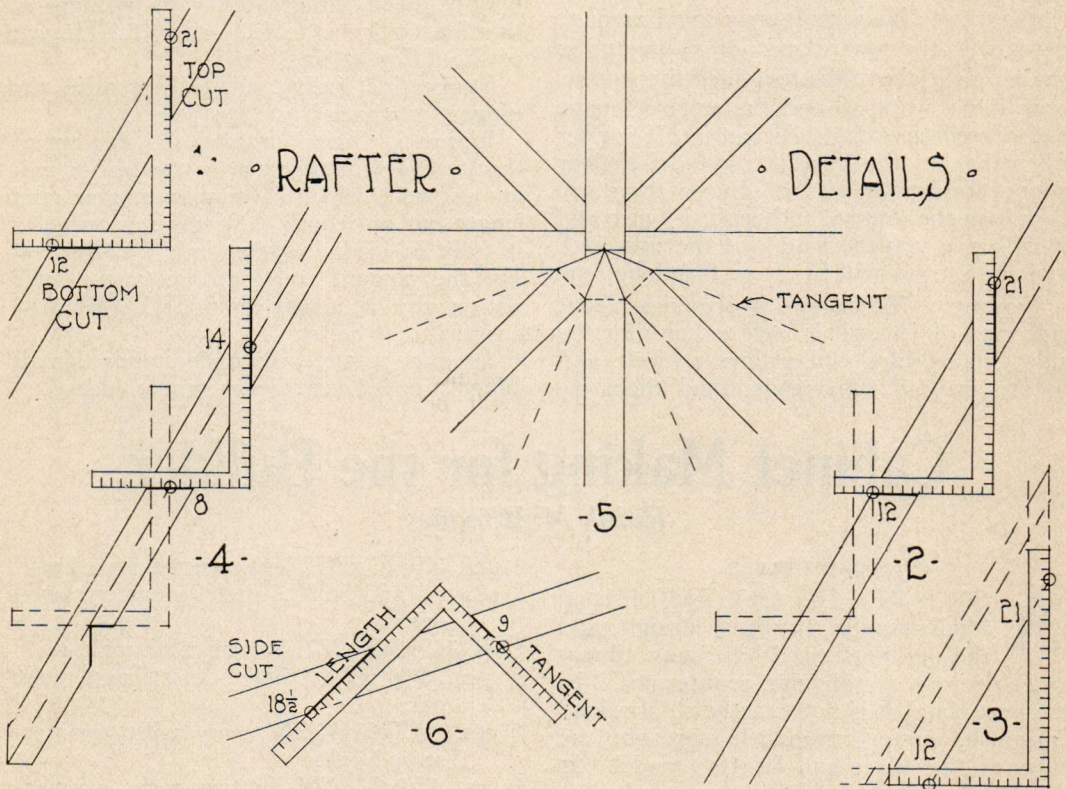
The Cuts and Lengths of Jack Rafters

Dwight L. Stoddard

SOMETIMES as we see these same things told over and over in practically every issue, it seems to us as if there was no use to tell it any more, yet when the question is asked again, what will give the cuts for jack rafters, we more fully realize again it must be told and retold until some one can give it so plain that all can see. One mistake, it seems to me, in ask-

nothing to do with getting the side cuts of jack rafters, it is the *tangent* and not the run.

It is quite true some years ago while I mentioned this same fact in my works on the square, I said there, we will use the run as it has been used so long and in hopes that the reader will better understand it and not be so liable to get mixed up, but as



ing questions, is that the question is not plain enough to give a correct answer, one is left with too much to guess about; when one asks what will give the cut in order to answer right it is surely necessary to know exactly what kind of a cut is wanted.

Now while the run and length for a common roof, cut on length will give the side cut of jack rafters, this rule will not answer for a roof that is in any way out of the ordinary, and while we have used the run for ages in getting side cuts, really the run has

the years roll by it seems they get mixed up more and more, and I have now come to the conclusion that the quicker we all understand that it is the tangent and not the run that gives the side cut of the jack rafters, the quicker we all will fully understand how to get side cuts for jack rafters, for the tangent and length cut on length will give it, and it matters not if it is an ordinary roof, common hip roof, octagon, uneven pitch or any other kind of a roof.

Figure 1 illustrates one foot of the rafter,

you will not 21 gives the top cut while 12 at the bottom gives the bottom cut.

Figure 2. Now for an ordinary roof with the rafters two feet apart two foot of the run, or place the square on 12 twice and it gives you the length of the first rafter. The second length is twice that and so on until you get all the jacks cut clear up to the length of the main rafters.

Figure 3. If you want your rafters 16 inches apart measure across at 16 inches as illustrated and it will give you the length of your first jack, if you want them 18 apart measure across at 18.

Figure 4. Now some may say I want to get it with the square and not go way up in the air clear above the length of the square, now if we want 16 and the square tongue is 16 it will give that all right but if it rises 21 inches to the foot it would rise clear above the length of the square, therefore take 8 on the tongue, and apply it twice and it will give you the length of the first jack and the second will be twice that long, etc.

Figure 5. When one is speaking about side cuts of jacks it is well to consider the side cuts of hips and valleys as well, and before we can fully understand them we

must consider the different cuts that we are coming in contact with.

Note the main rafters may be cut to come together at the top and have no side cut at all, or they might frame a roof with the hip rafters cut that same way and the side cut made on the common rafters, again it might be that all eight of the rafters would be cut with a side cut and all come together just alike, or it might as the dotted lines show and framed with an octagon pole in the center of the roof and none of the rafter have any side cut at all. Now while it is well to think about and study the different constructions that the top of the roof may be given, the greatest value perhaps of this illustration is to fully show the tangent of the different cuts.

Study this fully and fully realize the tangent is what gives the side cut.

Figure 6. This illustrates the side cut of the jack, or for that matter the hip or valley as well, which is simply tangent and length cut on length. Now when one gets it fully in his mind that it is not the run but the tangent and that the tangent will always give it, it matters not what kind of a roof it may be.

As quick as one fully understands this all difficult roofs become very simple, indeed.

Cabinet Making for the Builder

Ralph M. Windoes

LIBRARY TABLE

A SQUARE LIBRARY TABLE is an innovation in furniture design, and the one illustrated has many advantages over its rectangular counterpart. In the first place, it is not exactly a "Mission" design, its curves bringing it more into the class of the "Arts and Crafts" model. It has a large square shelf for papers and magazines, and beneath the shelf a good sized cupboard. Its weight is against it, as it is a rather heavy table when finished. Those of our builders who find it of interest, will surely be well repaid for its making.

The stock bill—all pieces to be planed and sand papered to exact dimensions—follows:

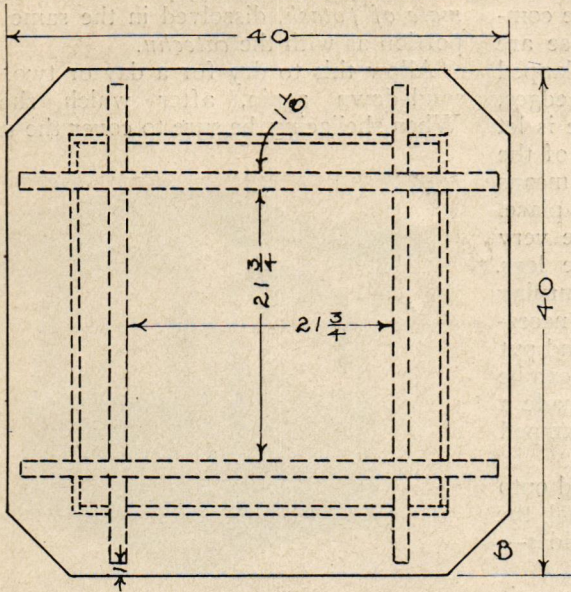
- 1 pc. $1\frac{1}{8}" \times 40" \times 40"$, top, quarter-sawed oak.
- 4 pcs. $\frac{7}{8}" \times 4\frac{1}{8}" \times 29"$, legs, quarter-sawed oak.

- 4 pcs. $\frac{7}{8}" \times 5" \times 29"$, legs, quarter-sawed oak.
- 1 pc. $\frac{7}{8}" \times 33" \times 33"$, shelf, quarter-sawed oak.
- 1 pc. $\frac{7}{8}" \times 32" \times 32"$, bottom, plain oak.
- 4 pcs. $1\frac{1}{8}" \times 2\frac{1}{4}" \times 38"$, cross bars, plain oak.
- 4 pcs. $\frac{7}{8}" \times 6\frac{1}{2}" \times 27"$, top rails, quarter-sawed oak.
- 4 pcs. $\frac{7}{8}" \times 3" \times 27"$, bottom rails, quarter-sawed oak.
- 4 pcs. $\frac{7}{8}" \times 9\frac{1}{2}" \times 24"$, sides of bottom, quarter-sawed oak.

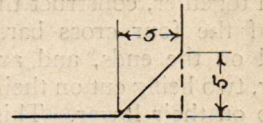
Begin the construction by working up the legs. Notice in the drawing that these are composed of two members each, one of which is $\frac{7}{8}"$ wider than the other. These two pieces are doweled and glued together so that they slant on the outside, but the insides are vertical. This is accomplished by slanting each piece before doweeling them.

The top rails are curved, and both the

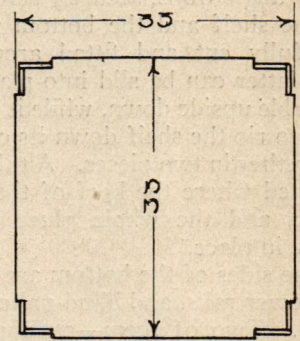
LIBRARY TABLE



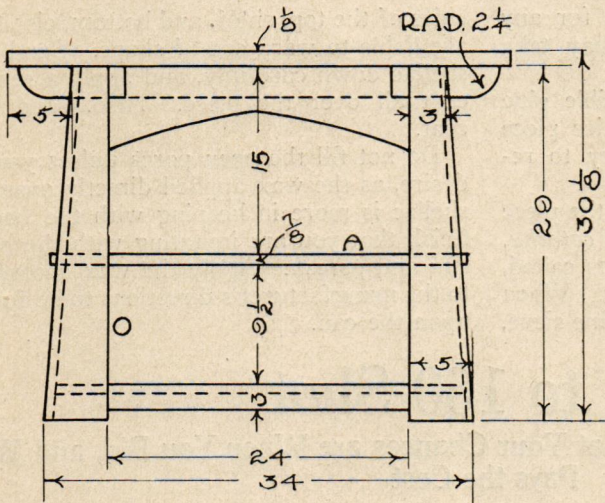
TOP VIEW



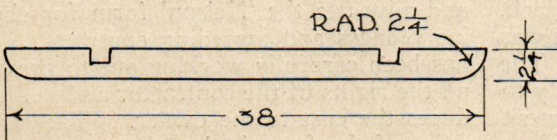
CORNER B



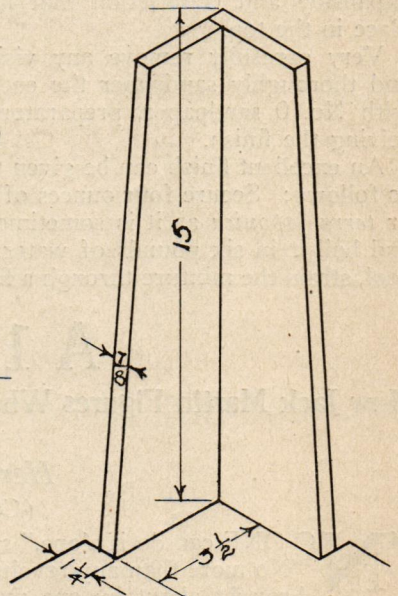
BASE A



FRONT AND SIDE VIEW.



CROSS BAR



LEG WHERE IT INTERCEPTS SHELF

top and bottom rails are tenoned into the legs. When this work has been accurately accomplished, and the pieces glued and clamped together, construct the frame composed of the four cross bars. These are rounded on the ends, and are half-lapped together, two being cut on their upper edges, and two on their lower. This frame is let into the top rails on the inner edges of the legs, and is fastened to the rails by the means of 4" angle irons, securely screwed in place.

The shelf and the bottom must be very carefully cut and fitted around the legs. The latter can be slid into place by turning the table upside down, while it may be necessary to rip the shelf down its center and put it together in two pieces. A thin strip can be inserted where the kerf of the saw made a crack, and the whole glued and clamped while in place.

The sides of the bottom are doweled onto the lower rails, and blind-nailed through the shelf. Two of them—on opposite sides—are hinged, as the photograph shows.

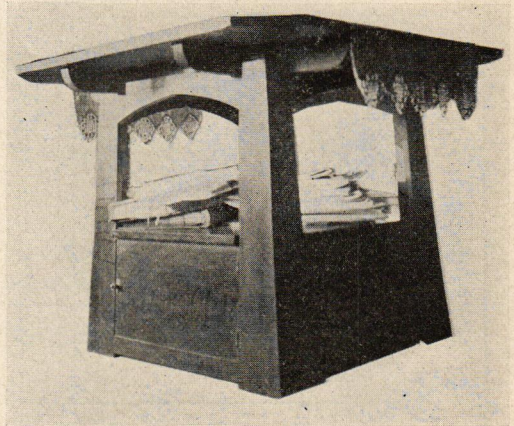
Cut the corners off the top and screw it in place through the cross bars. Be very sure that you bore the screw holes in the cross bars large enough to allow for any expansion and contraction that may take place in the top.

Very carefully remove any visible glue and thoroughly sandpaper the entire piece with No. 0 sandpaper, preparatory to receiving the finish.

An excellent finish can be given the piece as follows: Secure four ounces of *catechu*, or *terra japonica* as it is sometimes called, and boil it in six pounds of water. When cool, strain the mixture through a fine sieve,

and apply this to the wood. When this has hardened, sand it down very lightly with fine sandpaper, and apply a coat of *bichromate of potash*, dissolved in the same proportion as with the *catechu*.

Allow this to dry for a day or two, and sand down again, after which shellac. When shellacing, be sure to cover the under



The Completed Table

sides of the top, shelf, and bottom, else they are liable to warp out of shape. Sand this shellac down carefully, and apply a second coat all over the piece. Also, sand this coat.

Do not fill the open pores unless you so desire, as the wax applied directly over the shellac is more in keeping with the fumed finish that you are imitating with the *catechu* and *potash*. Apply the wax according to the manufacturer's directions to be found upon the can.

A 1 to 160 Shot

How Jack Martin Figures What Your Chances are When You Bid, and Who Pays the Cost

Herman Wallace Nelson

(CONTINUED FROM JULY)

“**N**O ONE can do it alone,” said Jack, “No more than any revolution was brought about by one man. The contractors themselves thru their anxiety to get work have brought about the present condition and the contractors themselves must evolve the remedy. Our local exchange has been working on this problem for some time and we have decided to adopt

and advocate the ‘Nelson’ form for choosing bidders and awarding contracts. This has been carefully working out to preserve all the rights of the contractor and yet it reduces the cost to the owner. The strong point of the form is that the owner pays a definite price for his estimate and everyone has a square deal. Take the form home and look it over.”

"I am certainly glad to know that some one has worked out a really practical plan for bidding," said Mr. Carson a few days later. "Nothing could be fairer, and every contractors' association should consider its use on every job they are asked to bid on. It is as fair to the owner as to the contractor and will relieve that feeling of embarrassment because he is not able to give the job to everyone who figured on it. At the same

time the contractor doesn't make anything unless he gets the job so he will be just as anxious to figure low. I will try it on the very next building I put up, but remember, if you want the job you will have to sharpen your pencil the same as heretofore."

"I will take the chances on that," said Jack laughing. "The entire form is so fair to everyone that I will welcome the day when its use becomes universal."

The Nelson Form for Choosing Bidders and Awarding Contracts*

A form submitted by the author for the consideration of the layman, his architect or engineer, contractors, printers, manufacturers or any and all individuals or organizations interested in either the awarding or procuring of contracts for furnishing material or service under competitive bidding.

INTRODUCTORY.

Estimating costs and establishing prices is an overhead expense involved in any merchandising, but the cost of doing so is generally nominal if not insignificant and can be justifiably distributed. The cost of figuring or estimating work to be performed in accordance with special specifications to meet each case, however, differs materially from establishing a price on each of a thousand hats all made from the same material and from the same pattern; therefore, this form is suggested to meet special conditions; to more justly distribute the cost of competition and estimating and to make each project bear its own proportion of the cost.

It is submitted with the thought that there are three main factors entering into the relations between the purchaser and the seller, viz.:

- 1—Quantity and Quality of Materials.
- 2—Character of Labor and Personal Service.
- 3—Price to be Paid for Both.

The first factor can be determined and somewhat *definitely* set forth in the form of plans and specifications to be furnished by the purchaser to the seller, upon which the seller can base his price.

The *character of the labor and personal service* rendered by the seller or expected by the buyer varies as much as human nature varies and *cannot be so definitely or exactly* set forth.

The *price*, or third factor, can be based *definitely* upon the materials, but must necessarily vary upon the Personal Service, depending upon the value placed upon it by either the seller or the buyer; therefore—

The purchaser should be allowed to exercise his recognized personal liberty in choosing the party with whom he wishes to enter into a contract; basing his choice upon price, his own confidence in the seller, his own judgment of the seller's qualifications or experience necessary to render the service he wants, or any other factor that he may himself consider most important.

And when the purchaser desires competition to enable him to make comparisons or decisions based upon a combination of all three factors, competition which involves labor and expense on the part of the seller, then the purchaser shall *purchase* that *competition* at a fair and just price, just as he purchases anything else.

The author respectfully asks the reader to consider, first, the author's recognition of the fact that there can never be an end to all evils; that the author is fully aware that this proposed form can be and may be improved upon, and that, if the reader credits the form with any merit at all, he consider it as a "Means to an end" rather than the "End" itself.

Further, that the reader in considering the form shall consider it from the standpoint of the individual that awards contracts as well as from the standpoint of the one who bids upon them; bearing in mind that if it works any injustice to either one, it cannot be correct or successful.

The author fully realizes also that no reform as suggested here can be adopted in a day—a week—or a month. There may be existing conditions or, perhaps, existing laws, preventing its immediate adoption or use. (The author claims no authority on

legal matters.) If the reform is correct, however, any laws that then prevent its use must necessarily be incorrect, and laws can be changed or improved to meet new conditions.

The author requests that you, Mr. Reader, accept this form only as his conscientious efforts towards a remedy for existing abuse of present methods, if not the methods themselves, which in his opinion, are unnecessarily most severe not only upon competing bidders but also upon the buyer, his architect or engineer who is frequently and unjustly accused of grafting or discriminating unfairly, or otherwise criticized when he dares to award contracts on the basis of his own honest opinion of the relative merits of the bids presented.

That if the form in your opinion comes nearer to being fundamentally correct than any existing methods of letting contracts or more nearly approaching American ideals, or if it seems more practical for immediate adoption than other proposed reforms such as "Quantity Surveying," etc., and if it does not conflict with any existing laws or conditions, that you adopt it, individually or as an organization, either as a buyer or as a seller. Under this form of choosing bidders and awarding contracts, it is the intent:

First: That the buyer may have just as much fair competition as he wishes to pay a reasonable and fair price for; that he, alone, derives the benefit of competition, and that no one buyer should pay for competition received by another—an abuse that exists under present methods.

Second: That when and after the buyer has chosen his competition in a fair, unprejudiced manner, and further paid a just and reasonable price for said competition, he shall be under no moral or other obligation to the bidders; that he may make his own decision based upon his own opinion of the qualifications of the bidder or the bidder's price, or a comparison of both.

Third: That the buyer may, as he chooses, select a limited or large number of bidders. If the work is of a private nature, he may wish to choose a very limited number, if he wants competition at all. If the work is of a public character, he may necessarily wish to give every *qualified* public citizen bidder an opportunity to compete, but without the necessity of paying more for the competition than he may consider

the competition is worth.

Fourth: If the work be of a public nature, the buyer may have good reasons for first *selecting* a limited number of bidders, because of their residence near the work to be done, or because they may be familiar with or may have had previous experience with the work, or for sundry justifiable reasons.

Fifth: That when the buyer, in case of public work, has then chosen his *preferred* bidders, he may give every other *public* citizen who is *qualified* to bid an opportunity to compete by chance or lot for consideration as a bidder, limiting the number to be chosen in accordance with the value of the competition to him.

Sixth: That the bidder shall in no way be considered as an engineer, but solely in the light of a bidder and contractor capable of doing work in accordance with complete plans and specifications; and that, therefore, in every case where bidders are expected to bid in competition, they, the bidders, shall be furnished by the buyer with *plans, specifications, drawings and instructions* covering the work to be performed *as completely and specifically as commercially possible*, with sufficient details to enable a bidder to fully understand what he is expected to figure and bid upon.

Seventh: That if a buyer cannot or will not provide complete detailed plans and specifications for the work, but wants estimates, measurements, figures or advice of a professional nature then he, the buyer, shall consider such work in the light of a *professional service*, and it shall not be considered proper, fair or just to ask for *competitive price bids*, but that the charges for *such professional service* shall be left solely and strictly for adjustment between the buyer and seller either before or after the work is done. Approximate estimates shall not be considered binding upon either party involved.

That under no circumstances shall the amount of a competitive bid be altered or the intent of the bid be changed so as to equivalently alter the amount, *after the bid has been submitted and before the contract has been let*.

That no reductions or additions shall be made in bids for the purpose of meeting lower bids or because of proposed changes in plans and specifications. That under such proposals by the buyer, either new

bids based upon new plans and specifications shall be asked and paid for—or—the contract shall be let and mutually satisfactory arrangements then made between the

buyer and seller. *That what is now known as "shopping" or "peddling" bids shall be discountenanced by both buyer and seller.*
(To be continued.)

Improved Gable Doors

E. J. G. Phillips

UNTIL recently, the gable barn door, through which the hay is taken to the mow, has been of rather crude form, or at least it has been hung in such a way as to be inconvenient if not difficult to handle. This may be due to the fact that these doors are not used as often as other barn doors and therefore they have been

close or open that it is customary to attach the hay fork rope to the door and raise it with a team of horses in the same manner as the hay is hoisted. There is also danger that, due to corrosion of the screws or the rotting of the wood, the hinges may break away and let the door fall. Another of the older types is a vertical lift door sliding in

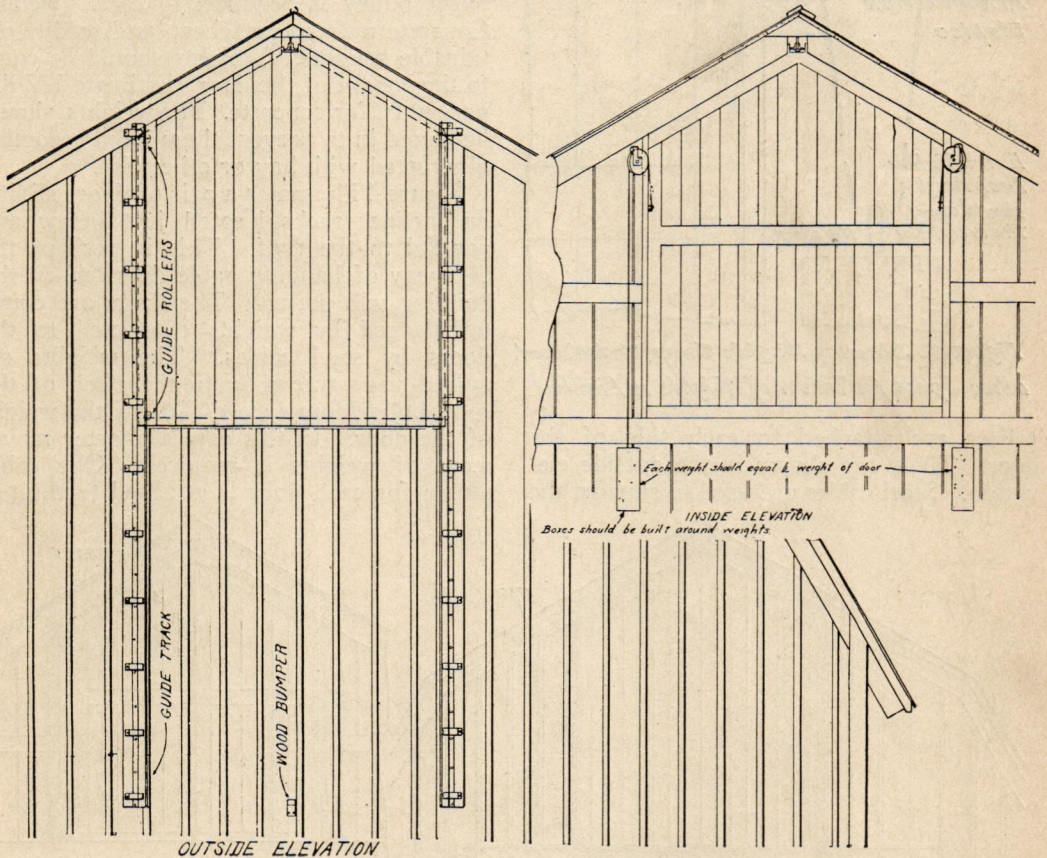


Figure 1. Gable Doors on Vertical Track

neglected and all efforts toward improvement have been directed to other doors.

One very common gable door of the older type is built in one piece and hinged at the bottom. When open, the door drops against the side of the building and hangs just below the opening. This door is so difficult to

wood guides at each side. Ropes which are attached to the door and run over pulleys near the top of the opening, are used to lift or lower the door. Two men are required to raise large doors. Some of these doors work fairly well when rats do not gnaw the ropes and doors do not bind in the guides,

An improved form of vertical doors is shown in Figure 1. The doors are guided by four rollers running in steel tracks. Two

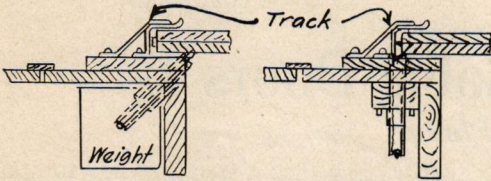


Figure 2. Cross Sections Showing Two Ways Pulleys may be Attached.

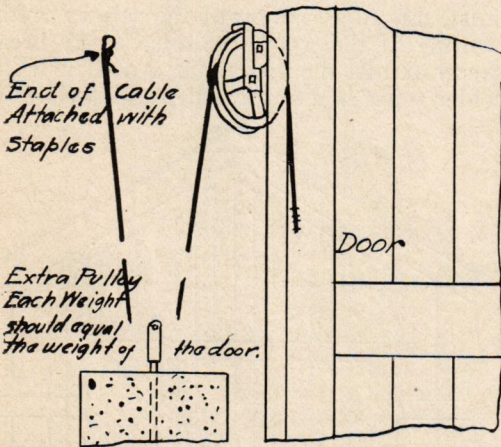


Figure 3. Showing Weights Compounded. Used when Space for Travel of Weights is Limited.

rollers are attached to each side of the door. These are shown in the outside elevation. Steel cables are used to support the

pendents considerably upon the construction of the building. Two methods are illustrated in the detail Figure 2. The method shown at the left permits the use of a square weight and should be used when there is room for the weights above the plate and the end braces of the barn frame. If the weights must hang below the truss, the method as shown at the right of Figure 2 may be used. In this case, attach the cable to the center of the door and set the pulley lower down than shown in Figure 1. Figure 3 shows a method of compounding the weights, which may be resorted to when necessary to work in limited spaces. The weight must then be twice as heavy, as it moves only half as far as the door. An extra pulley is required to each weight. Concrete makes neat, cheap and readily obtainable weights. Weights should be equal to the weight of the door. Estimate 137 lbs. per cu. ft. for concrete. The weights should be boxed in to prevent them from becoming obstructed with hay or otherwise.

Figure 4 illustrates a pair of doors sliding on incline tracks located just below and parallel to the roof. This is perhaps the best way of hanging gable doors when the building will permit. The doors are counterbalanced by weights connected to the doors by steel cables. The weights required vary according to the pitch of the roof, but seldom exceed 50% of the weight of the door. In this case a shorter movement of weights is required. One cable pulley for each door is attached to the top

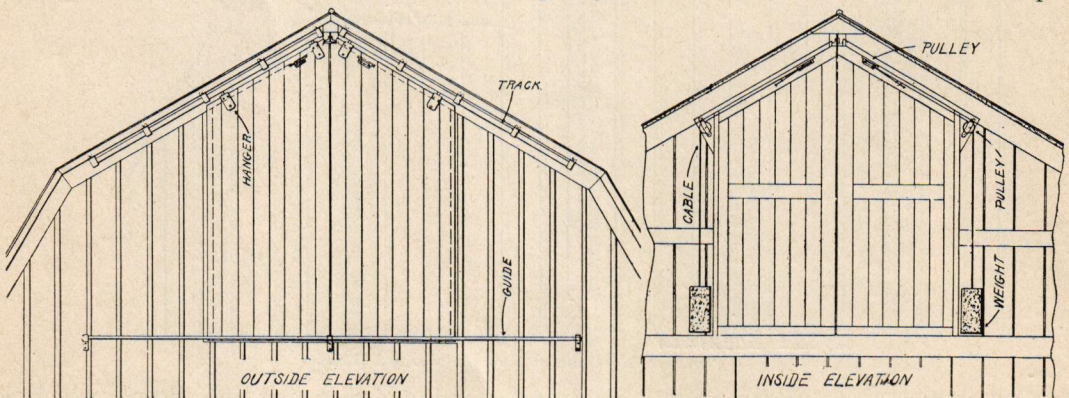


Figure 4. Gable Doors on Inclined Track

doors instead of ropes. These cables run over sheaves of generous diameter, and the doors slide very easily when properly counterbalanced. The exact arrangement de-

of the opening near the center and another pulley is located inside the building in a position convenient for sliding weights. This is clearly shown in the illustrations.

The bottom of the door is confined to the building by a tubular guide. This holds the door close to the building in any position, open or closed. The center and end brackets form bumpers to stop the doors in either open or closed positions.

In roofs of the gambrel type there may sometimes be insufficient space to slide the

doors to the side, especially if the door is wide and the building rather narrow. It would then be advisable to use the vertical door previously described.

These improved doors can all be opened or closed very easily and a comparison with the older types will at once demonstrate their points of exceptional merit.

Our Dictionary of Trade Terms

BEVELLED OFF, in Masonry and Joinery.—Denotes part of the surface as sloping in oblique, synonymous with **CHAMFER** (which see, and also with the expression "taking off the arris," see **ARRIS**)—that is, cutting off the corners so as to expose a flat surface. It is also synonymous with "splayed," as in Brickwork, a splayed brick being one with a sloping side. Thus for bevelled board or plank the Syn. Fr. is *Planche en biais* *sno* pron. *plahnch ang-bee-yea*: Ger. *Gehrungsbrett* (*gehrung*, sloping—from *gehren* (*gahren*), to slope or bevel—and *Brett*, a board)—pron. *geh-roong-brett*.

BEVEL OFF, To, in Metal Work, Etc.—To cut or plane the corner or arris (see **ARRIS**) of a piece of metal. Syn. Fr. *Lever un biss eau* (*lever*, to lift or take away)—pron. *lay-vay ung bee-zo*: Ger. (in metal work) *Anscheifen*, to file or grind to an edge or on the slope—pron. *ann-shly-fenn*.

BILLETT MOULDING, in Architecture.—A peculiarity distinctive of the Norman style. It derives its name from the ornament resembling a billet or piece of cylindrical wood. The billets are placed in the concave part of the moulding in rows, an interval or part space shorter than the length of the billet being between each. Syn. Fr. *Billitte*—pron. *beel-yette*: Ger. *Billet*—pron. *beel-ett*.

BILLIARD ROOM, in Domestic Architecture.—The apartment set aside for the billiard table in large houses, mansions, etc. Syn. for billiard table, Fr. *billiard*—pron. *Beel-lard*: Ger. *die Billiardafel* (*billiard* and *Tafel*, a table)—pron. *bill-yard-tah-fell*: Syn. for billiard-room, Fr. *Salle de billiard*: Ger. *Billiarzimmer*.

BINDERS, OR **BINDING JOISTS**, in Carpentry.—Cross or transverse beams in a floor (see floor), which support on their upper edges the "bridging joists," above, and to the lower edges of which the "ceiling joists"

are notched or secured. Syn. Fr. *poutres*—pron. *pooh-ter*, also *Solive*—pron. *se-leave*: Ger. *Bindebalken* (*binden*, binding, and *Balk*, a beam)—pron. *bin-deh-ball-ken*.

BINDING RAFTERS, in Carpentry.—Horizontal beams or members of a roof (see **ROOF**), notched or secured to the upper sides or edges of rafters and connecting them together and keeping them rigidly apart. Their chief office is to give a bearing or support to the common rafters, which are spaced between the principal ones. Binding rafters are more generally known as "Purlins." Syn. Fr. (for purpins) *Pannes* or *Vernes*—pron. *pann*, *vairn*: also *Chevron*—pron. *shev-rong*: Ger. *Bindensparren* (*Sparren*), *da spar*, rafter—*Sparrenholtz* is timber for rafters)—pron. *sparren-holtz*.

BIRCH.—One of our forest trees yielding the timber so called, used for constructive purposes largely by the cabinet-maker. Syn. Fr. *Bouleau*—pron. *bool-oh*: Ger. (the tree) *die Birks*—pron. *dee beer-keh*: for the wood or timber of the tree, *das Birken* from *Birke*, *holtz*, wood—pron. *dass beer-ken-holtz*.

BLOCK AND TACKLE OR **BLOCK AND PULLEY**. The blocks containing a set of pulleys over which the hoisting rope or chain is passed in order to increase lifting power, or obtain what is called a "purchase": used in connection with cranes, crabs, and shears (which see). Syn. Fr. *Poulie* (pulley) *moufle* (tackled or connected), pron. *pool-ee moo-flay*. Ger. *der Kolbenzug* (*kolben*, a pulley or block, and *Zug*, drag, pull, draught), pron. *kol-benntzoog*: also *das Zugwerk* (literally "drag or draught work") pron. *tzoog-vairk*.

Fortune may not knock at your door, but you can always depend upon undesirable callers.

OUR READERS PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any question or experience will be given proper space.—Ed.]

Answers

STEEL SQUARE

"LAD," Chicago.

It is not very difficult to keep your square clean, and in good order. Never use any emery or sand paper on nickel plated or oxidized coppered finished squares. When you are through using put on a few drops of oil. Do not put your square away with finger marks on it as nothing rusts so quickly as perspiration.

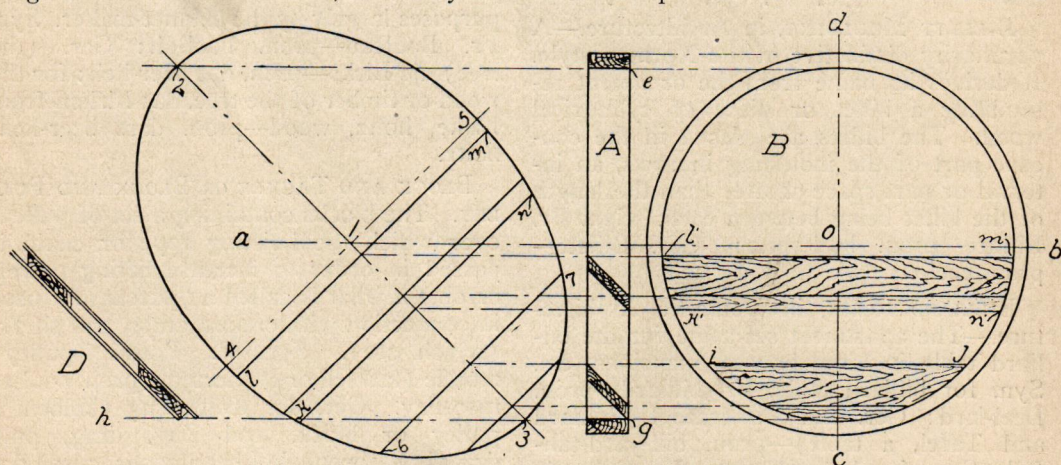
CIRCULAR LOUVRE

B. N., Des Moines, Pa.

Here is a method for laying out and making a circular louvre which, if closely fol-

other, then parallel to a-b draw from e to 2 and from g to h. At any convenient point on a-b, say 1, draw 2-3 parallel to the slope of the slats (in this case 45 deg.), and where it intersects e-2 and g-h will give the length of the major axis of the ellipse required to mark the ends of the slats.

Through 1 draw 4-5 perpendicular to 2-3, and make 1-4 and 1-5 equal to o-c and o-d; 4-5 will then be the required minor axis. Now through the points 3, 4, 2, and 5 draw a true ellipse; this when set at an angle of 45 deg. will fit inside the circular frame and will answer as a pattern to mark the ends of all the slats. Parallel to a-b project lines from the points of all the slats in section A



LAYING OUT SLATS FOR CIRCULAR LOUVRE.

lowed, will lead to success. Mark all the slots required. I have only marked two slots, in order to make it clearer, and to avoid too many lines. Through the center o draw a-b and c-d perpendicular to each

till they intersect the major axis 2-3, and at these points draw lines across the ellipse as shown; then 3-6-7 is the slat required for c-i-j, and k-l-m-n is the piece required for k'-l'-m'-n'. The slats cannot be sawed square

through at the ends, but must be worked out twisted. At D is shown the ends of two slats, between two patterns; notice the distance the face pattern is below the square edge of the slat. Marking them this way will give the required twist at the ends. This ellipse, as stated, will fit inside the circular frame, but do not forget to draw your ellipse $\frac{1}{2}$ in. larger all round, to allow for the depth of the dado. The jambs could be developed by figuring the various distances, as from c to n, or this may be found by stepping it off with the dividers. There is also a graphical method for finding the length of an arc. The points or lengths so found are laid off the straight jambs, but I consider them all too troublesome and not very accurate, therefore shall not explain them. You may bend the jamb in proper shape between blocks nailed on the floor, or a board is better. Somebody else may give a better and easier way, and I shall be glad if they do. To experiment with the slats, you may bore a hole say 3 in. diameter in a 4x4; turn up a piece say 12 in. long to fit loosely in the hole; cut it off on 45 deg. angle, then cut off a piece as thick as your slats will be; then the shape of the face and the twist at the ends, also the distance the patterns must slide on the face of the slat, will be clear to you. Should you fail to understand some of this call again.

SHINGLING AND SHINGLES

From Old Builder.

Furring or lathings for shingling on should be laid not more than four inches on centres. This, of course, will depend somewhat on the width of the furrings or lath and the kind of shingles used. On an ordinary shingled roof the shingles are usually laid four inches to the weather; if the roof is steep or near half-pitch, the distance may be $4\frac{1}{2}$ inches or even a little more. Shingles come in bunches of 250 or less, 1,000 being the standard for four bunches and 1,000 will cover 100 feet surface measure, or a square of 10x10 feet. Either Linseed oil, or Creosote, will lengthen the life of shingles from 5 to 8 years, better still—dip them in paint, formed of linseed oil, white lead and some coloring matter such as Indian Red, or other Ochre; Creosote under some conditions, will injure nails. Cut nails are better than wire but best of all are galvanized nails or solid zinc and they cost but little more than other

nails. The standard shingle is four inches wide, and two nails in each shingle are quite enough for the purpose.

Questions

PLASTERING ON CONCRETE

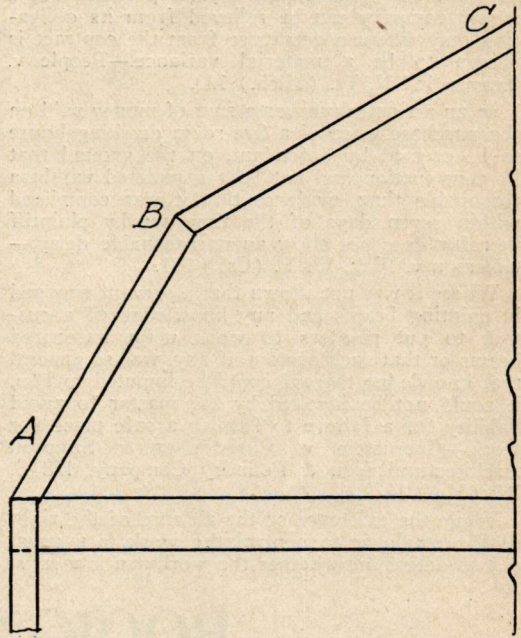
From C. H. W., Massachusetts.

I want to find the process of treating old concrete with acid, to make cement plaster stick to it.

GAMBREL ROOF CUTS

From J. A. N., California.

I would like to get some idea of pitch of gambrel roof, if there is some special rule



for framing, same as ordinary roof like half pitch and so on, like from A to B and B to C, as in sketch.

ESTIMATING FLOORING

From W. K., Chicago.

Will some kind reader give me an estimate including cost of flooring to lay a floor of a room 19 feet by 11 feet.

From W. A. T., Kansas.

I would like if you would publish an illustration of a Pattern Makers' Workbench.



LEGAL DECISIONS OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by **George H. Murdock**

There is a distinction between individual suretyship and the surety undertakings of companies chartered to engage in such business. In the first case the rule of *strictissimi juris* prevails, but a surety company can be relieved from its obligation only where a departure from the contract is shown to be a material variance.—*People v. Traves*, 154 N. W. (Mich.) 130.

In an action to recover a sum of money paid on the purchase price of a five-room dwelling house to be erected by defendant, on the ground that its construction had not been completed within a reasonable time, evidence that it was completed within seven days of the time set by plaintiff therefor does not show an unreasonable delay.—*Giberson v. Fink*, 151 P. (Cal.) 371.

Where it was not shown that a servant engaged in painting beams had any knowledge of a custom to put painters to work upon unsecured beams or that such custom, if any, was so general that knowledge thereof could be imputed to him, it could not be invoked by the master to avoid liability for a failure to furnish a safe place for work.—*Greenstein v. Christopher & Simpson Architectural Iron & Foundry Company*, 178 S. W. (Mo.) 1179.

While the existence or the absence of the right of the employer to control the work is a usual test to determine whether the workman is a serv-

ant or an independent contractor, the right of the employer to discharge him, the absence of an independent occupation, and the mode of compensating him and his subordinates, may be factors indicating the true relation.—*Bodwell v. Webster*, 154 N. W. (Neb.) 229.

Ordinarily a provision in a building contract, specifying a definite time within which a structure should be completed, is to be construed as meaning that the time specified has reference to the building proper, and that it shall on the expiration of such time be ready for occupancy, and does not include the sidewalk in front of the building.—*Giberson v. Fink*, 151 P. (Cal.) 371.

The rule that a substantial compliance with the terms of a building contract is a sufficient performance thereof applies as well where one party binds himself to construct a building upon a lot owned by himself and to sell it to another for a specified price as when the lot is owned by the party for whom the structure is to be constructed.—*Giberson v. Fink*, 151 P. (Cal.) 371.

Under Act No. 180 of 1894, the owner of a building who fails to require the contractor to give bond and security in favor of furnishers of materials is bound *in solido* with the contractor for any balance due for materials furnished and used in the building.—*Alfred Hiller Company v. Hotel Grunewald Company*, 70 So. (La.) 234.

BOOK NOTICES

All books noticed in these columns may be obtained from this office at publishers' prices.
All postage prepaid. (Money and address must accompany all orders.)

HEAVY TIMBER MILL CONSTRUCTION BUILDINGS. By C. E. Paul, Construction Engineer. Published by the Engineering Bureau of the National Lumber Manufacturers' Association, 11 So. La Salle St., Chicago, Ill.

The term "mill construction" as commonly used is the name given to that type of building construction in which the interior framing and floors are of timber, arranged in heavy solid masses, and smooth flat surfaces, so as to expose the least number of corners, and to avoid concealed spaces which may not be reached rapidly in case of fire.

A broad interpretation of the term includes the

meaning given above and adds the specification that the building shall be so constructed that fire shall pass as slowly as possible from one part of the structure to another. This means that each floor should be separated from all the others by incombustible walls or partitions, and by doors or hatchways which will close automatically in case of fire near them. Stairways, belt passages, and elevator shafts are encased, or preferably located in fireproof towers. Openings in floors for passage of belts, etc., are either avoided or fully protected against passage of fire or water. The proper installation of an approved automatic sprinkler system is of great importance. Ceilings

The Handsomest Roofing You Can Use

Asphalt Shingles

These Beautiful Colors Add Charm To The Roof

Rich looking shades of red, green, gray and brown are possible when you roof with Asphalt Shingles. By using them you can give the houses you build as beautiful an appearance as though the cost were a thousand dollars or so greater.

With this roof beauty goes a thorough protection against the elements that is maintained year after year because this roofing **stays young**. It does not dry out or change. It is just as permanent as the unchangeable color of its surfacing of crushed slate or rock products. Water cannot get through a single layer no matter what the conditions. Yet these shingles form a triple thick layer that means three fold protection.

We have a book of new ideas on roofing from which you can get many suggestions that will aid you. Write for your copy of "The Roof Distinctive."

**Asphalt Shingle
Publicity Bureau**

Your Customers Will Like Asphalt Shingles Better

There is a strong appeal in Asphalt Shingles that will interest your customers. They will be quick to see the advantages of a roofing that is handsome, leak proof and repairless. You will have a still greater measure of their confidence for having suggested them.

Every standpoint of roofing value is covered by Asphalt Shingles. From every standpoint of yours, too, they are better. You can apply them faster and at less cost for labor.

They are so much better looking that they make the house you build even more attractive than others near it which are covered with a drab-looking, ordinary roof.

Our other new booklet, "Fire Protection," shows some remarkable tests of various roofings. Proves which roofing gives best protection. Copy sent free on request.

**953 Marquette Bldg.
Chicago, Ill.**



Advertisers' Section

PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS



in rooms where highly inflammable stocks are kept or where hazardous processes are followed, should be protected by the use of a fire-retardant material such as plaster on wire lath or expanded metal. The ceiling should follow the lines of the timbers without an air space between the two surfaces.

Mill construction has always been looked upon with favor for buildings in which ordinary manufacturing industries are carried on. Warehouses and buildings for storage of merchandise, stores, office buildings, factories, shops, and all buildings of moderate height which are not to be used for extremely hazardous purposes, from a fire protection standpoint, are later developments of this type of construction. City building codes limit the height of building and size of open space in buildings. They also specify the minimum sizes of timber which shall be used, and other similar details.

It has chapters as follows: Exterior Walls, Fire Walls, and Enclosures, Floors, Posts or Columns, Roofs, Fire Protection, Cost of Mill Construction Buildings, Standard Mill Construction, Quality and Kind of Timber Used, and Data for Design.

The publishers have prepared a very large edition of this valuable booklet, that they may supply the architects, engineers and contractors among our readers. The request for the booklet should mention the National Builder.

PRACTICAL COST KEEPING FOR CONTRACTORS. By Frank R. Walker, author of *The Building Estimator's Reference Book*. Published by the author. 273 pages, fully illustrated. Price \$2.00.

To some contractors cost means merely the bills one must pay to keep square with the world. To others it is a guide for future estimating. The latter makes the most of every item of expense and see that it is charged against the right account. This leads to care in ordering, as no one will intentionally load up with something which will not be used up promptly.

Cost keeping, if accurately done, enable a contractor to detect any errors on the part of the estimator, and so makes estimating more accurate.

It locates the mistakes of the foreman and the men. It shows the contractor his own mistakes of judgment too, and so helps all around.

Practical Cost Keeping for Contractors is a direct exposition of the methods followed by the better class of contractors, a class we are all aspiring to. If a large corporation must know just what it costs to lay a thousand brick under given conditions, how much more necessary for the small contractor and the beginner.

Lest one go wrong in his cost keeping system, the author gives a great number of illustrations showing exactly how various contractors keep track of every item which goes into the building. He shows how to find the cost of erecting structural steel as well as how to keep the cost of unloading brick. Best of all he gives ideas which may be used by any contractor, big or little, in making up his own cost system, for no two contractors would want systems exactly alike. The contractor doing his own excavating and masonry would have his cost system different from the metal roofer, while the plumber has a system differing from both.

A cost system increases in value with the number of men employed and with the distances the jobs are apart. Out-of-town work makes a cost system absolutely necessary to know how the work is coming out. At the same time it must be accurately kept and this is often difficult to do, as the men keeping it are not experts bookkeepers and cannot realize why the costs are being kept.

A natural suspicion arises that it is a plan to make them work faster and the foreman often must use considerable judgment to get accurate results.

A careful study of Practical Cost Keeping for Contractors by the beginner in contracting will convince him that he has a man's job ahead of him, and also show him that it is simply a case of keeping continually at it to achieve success. Keeping the cost of one job will make him curious to see if the next one checks up the same, and if not, why not. It will show him the hustling foreman, as opposed to a noisy one, and the men who accomplish something besides a continual racket. He can plan his work accordingly.

PATENTS

The following list of recent patents and trade-marks relating to the building interests is especially reported for *The National Builder* by William G. Henderson, solicitor of American and foreign patents and trade-marks, Norris Bldg., 501 F St., Washington, D. C. A copy of any of the United States patents will be furnished by him for 25c.

1,186,263, Operating mechanism for window sash and screens, H. L. Agee, Fort Worth, Tex.

1,186,361, Wind Shield for windows, J. W. Alexander, Spartanburg, S. C.

1,186,060, Foot rest for radiators, A. O. Anderson, South Connellsville Pa.

1,185,871, Concrete building, W. C. Broughton, Kansas City, Mo.

1,186,468, Window ventilator, P. Carlson, Chicago, Illinois.

1,188,410, Window screen construction, E. T. Vurrowes, Portland Maine.

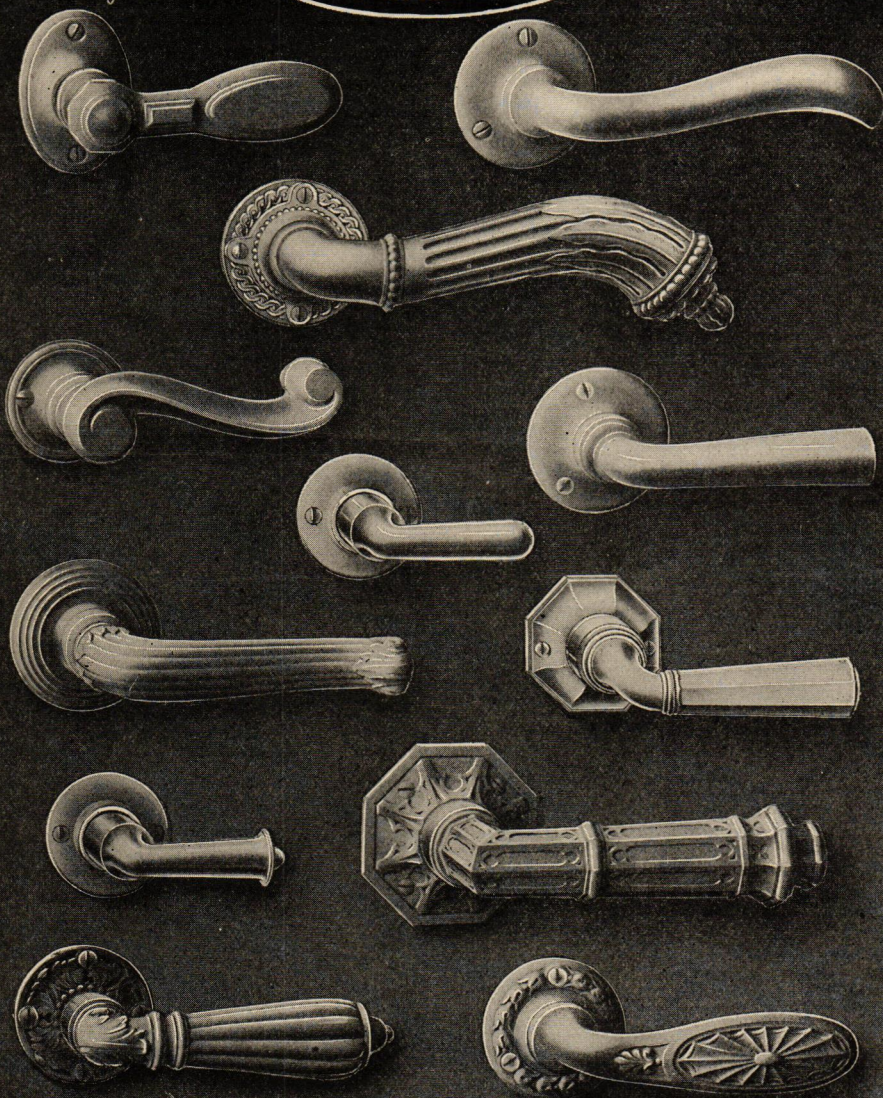
1,186,554, Concrete fence post, mold, B. F. Crisenberry, assor Century Post Co., Indianapolis, Indiana.

1,186,662, Reinforced concrete fence post, W. R. Kirkwood, Seattle, Wash.

1,188,604, Building, construction, A. J. Anderson, Kewanee, Illinois.

1,189,108, Apparatus, for molding and sinking concrete piling, H. W. Hildebrand, Galveston, Texas.

1,188,409, Collapsible window screen, E. T. Vurrowes, Portland, Maine.



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Building Material Price List

Revised to Date

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. crd—Common cedar. cyp—Cypress. bm—Board measure. sis—Sized one side. d4s—Dressed four sides—kd—kiln dried. rg—Rough. c—Clears.

	Seattle, Wash. Corrected by F. T. Bradley. M ft. BM	Chicago, Corrected by J. H. Touchstone. M ft. BM S2S	Omaha, Neb. Corrected by I. P. Hicks M ft. BM S2S	Southern Ontario, Corrected by F. O. Frantz. M ft. BM S2S
Dimensions—				
2x4 in. to 8 in. up to 16 ft., No. 1.....	\$13.00	\$25.00	yp \$28.00	h \$27.00
2x4 in. to 8 in. up to 16 ft., No. 2.....	10.00	22.00	26.00	22.00
2x4 in. to 8 in., 18 and 20 ft., No. 1.....	13.00	27.00	29.00	30.00
2x10 in. up to 16 ft., No. 1.....	13.50	26.00	31.00	24.00
2x12 in. up to 16 ft., No. 1.....	14.00	27.00	33.00	25.00
2x14 in. up to 16 ft., No. 1.....	15.00	28.00	*	26.00
Each 2 ft. over 20 ft., add per M.....	.50	1.00	1.00	2.00
Select stock as above, add per M.....	3.00	5.00	*	*
Exterior Finish, etc.—				
1x3 in. to 1x8 in., No. 1.....	\$30.00	yp \$30.00	yp \$45.00	wy \$40.00
1x16 in., No. 1.....	33.00	45.00	43.00	40.00
1x12 in., No. 1.....	35.00	40.00	46.00	42.00
1½x3 in. to 1½x12 in., No. 1.....	37.00	45.00	48.00	45.00
1½ in. and 2 in., same as above.....	37.00	45.00	48.00	42.00
1-in. drop siding, No. 1.....	25.00	30.00	30.00	30.00
½-in. lap siding, No. 1 cedar.....	30.00	25.00	rdw 30.00	30.00
Enclosing and Fence Boards—				
1x4 in. to 1x8 in., No. 1.....	\$12.00	yp \$25.00	yp \$27.00	wp \$30.00
1x8 in. to 1x12 in., No. 1.....	14.00	27.00	26.00	h 24.00
1x16 in., No. 1.....	16.00	*	26.00	24.00
1x16 in., No. 2.....	14.00	*	24.00	22.00
Interior Finish, Flooring, Ceiling, etc.—				
1x6 in., T. & G. Flooring, No. 1.....	\$35.00	yp \$30.00	yp \$40.00	wp \$40.00
1x6 in. T. & G. Flooring, No. 2.....	30.00	25.00	34.00	wp 30.00
Ceiling, per M.....	22.00	25.00	23.00	21.00
Partition, per M.....	27.00	30.00	35.00	32.00
¾x4 in. Ceiling, No. 1.....	*	25.00	30.00	np 30.00
¾x4 in. Ceiling, No. 2 or better.....	20.00	*	*	*
4¼ in. Moulded Casing.....	100 ft. run \$ 2.00	100 ft. run \$ 2.00	100 ft. run \$ 2.00	100 ft. run \$ 2.50
4¾ in. Moulded Casing.....	2.50	2.50	2.50	2.50
7¼ in. Moulded Base.....	3.00	3.50	3.50	5.00
½x9¼ in. Moulded Base.....	4.00	5.00	4.00	6.00
1½x4½ in. Moulded Window Stool.....	2.50	3.00	3.00	4.00
Miscellaneous List—				
Shingles, No. 1, *A*.....	Per M \$ 2.00	Per M rc \$ 3.75	Per M \$ 4.00	Per M bc rc \$ 4.00
Shingles, No. 2.....	1.25	3.25	3.75	*
Shingles, Fancy.....	3.50	5.00	4.50	6.00
Lath, 4 ft., No. 1.....	2.00	4.00	5.50	wp 5.00
Lath, 4 ft., No. 2.....	1.50	3.00	yp 5.00	s 3.75
Pickets, 1x3 in. x 4 ft. 6 in., dressed.....	30.00	40.00	30.00	*
Pickets, 1x3 in. x 4 ft. 6 in., rough.....	20.00	*	*	*
Hardware List—				
6 in. x 8 ft. Post, split.....	Not in stock	Piece cdr \$ 0.15	Piece cdr \$ 0.25	Piece * *
8 in. x 8 ft. Post, split.....		.20	.30	
8 in. x 8 ft. Post, whole.....		.75	.40	cdr \$ 0.30
8 in. x 8 ft. Post, whole.....		.30	.35	.25
Masons' Supplies—				
Brick, blue, at kilns.....	Cwt. \$ 3.45	Cwt. \$ 2.25	Cwt. \$ 3.00	Cwt. \$ 2.85
Nails, cut, common.....	3.75	2.10	*	3.00
Nails, wire, fine finishing.....	1.60	2.65	3.50	4.00
Sash Weights, cast iron.....	1.60	1.60	1.50	2.25
Tarred Felt Paper, best 2-ply.....	\$2.50 a ton	Roll 1.00	Roll 1.00	Roll 1.25
Tarred Felt Paper, 3-ply.....	*		1.25	1.50
Red Rosin, Atlas brand.....	46.00 a ton		.90	1.00
Red Rosin, durable brand.....	*		.75	1.00
Black Neponset.....	*		*	2.00
Masons' Supplies—				
Brick, blue, at kilns.....	Per M *	Per M *	Per M *	Per M *
Brick, blue, at kilns, No. 1.....	*	*	*	*
Brick, blue, at kilns, No. 2.....	\$ 7.50	*	*	*
Brick, white, delivered, face.....	7.00	*	*	*
Brick, red, delivered, backing.....	\$ 8.50	7.00	\$ 7.50	*
Brick, delivered, dry pressed.....	20.00-35.00	18.00	18.00	17.00
Brick, vitrified, dry pressed.....	20.00	*	24.00	*
Lime, best gray.....	bbl. 1.30	bbl. 1.25	bbl. 1.25	bbl. *
Lime, best white.....	1.25	1.40	1.25	*
Cement, Portland.....	2.30 bbl.	.95	1.85	bbl. 1.70
Plaster, calcined.....	11.50 a ton	2.40	1.80	bbl. 2.50
Hair, 8 lb. per bush.....	.30 a bu.	.25	.25	*

NOTE.—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—Ed.

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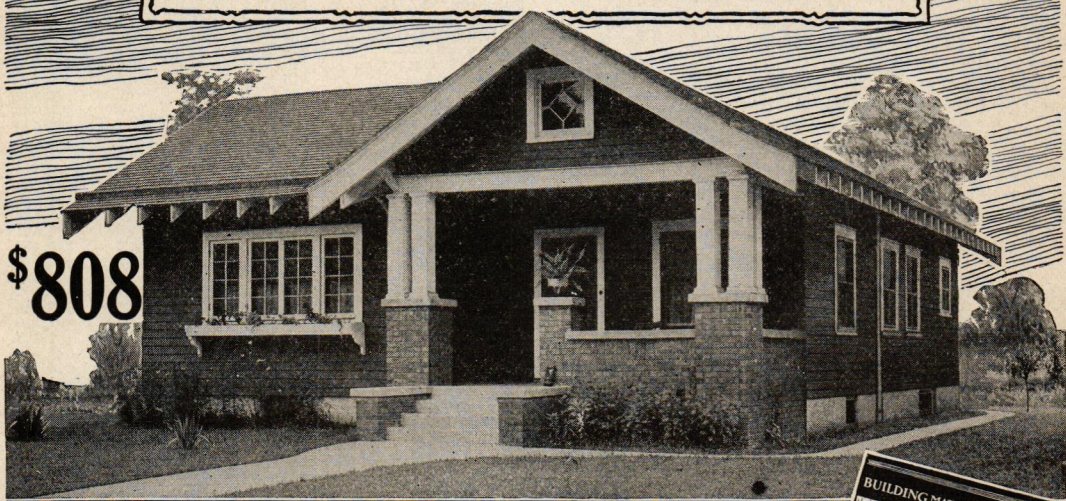
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Comparative Statement of Building Operations for June

Instead of slowing down more nearly to normal, the building operations for the month of June show the most decided gains recorded during the past half year. The official reports of building permits issued in 103 principal cities of the country, as received by the *American Contractor*, Chicago, total \$91,768,080, as compared with \$63,890,866 for June, 1915. This is an increase of 44 per cent. The comparative gain for May was 32 per cent; for April, 16 per cent; for March, 18 per cent; for February, 20 per cent; and for January, 35 per cent. June, therefore, indicates that building activity, instead of shrinking, is speeding up.

This condition is most gratifying when it is remembered that a considerable amount of construction work is held in abeyance, pending a reduction in the cost of iron and steel, and perhaps some other forms of material. There has been a softening of prices for structural material, however, in recent weeks and the date when this withheld business may be commenced may not be far in the future. Not only is the volume of business largely in excess of that a year ago, but the number of building permits show an increase, namely, 26,593, compared with 24,488 for June, 1915.

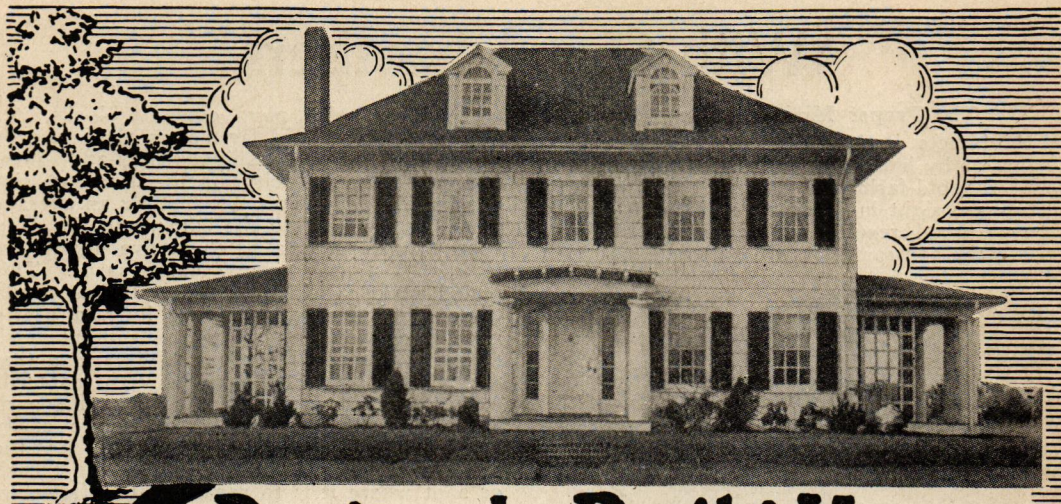
Of the 103 cities included in the list below, 67 show gains and 36 losses. New York, in its five boroughs, makes the substantial gain of 117 per cent; Chicago scores a 45 per cent improvement and Philadelphia one of 33 per cent. There are many other notable gains.

A summary of the monthly building statistics for the first six months of the year reaches the total of \$484,786,616, as compared with \$381,264,854 for the first six months of 1915, an increase of 27 per cent.

The details of the June statement are as follows:

	—June, 1916—		—June, 1917—	
	No. of Bldgs.	Estimat'd cost.	No. of Bldgs.	Estimat'd cost.
Akron, Ohio.....	415	\$1,323,455	192	\$355,225
Albany, N. Y.....	304	307,455	316	359,405
Allentown, Pa.....	44	165,730	34	151,780
Atlanta, Ga.....	224	252,776	234	334,246
Baltimore, Md.....	250	541,791	260	557,979
Bayonne, N. J.....	40	102,594	53	32,784
Berkeley, Cal.....	112	254,475	108	214,650
Binghamton, N. Y.....	302	175,123	201	155,208
Birmingham, Ala.....	577	179,560	250	240,960
Boston, Mass. (vic.).....	477	5,634,000	582	5,628,000
Bridgeport, Conn.....	83	523,300	140	779,899
Brocton, Mass.....	78	256,905	57	83,257
Canton, Ohio.....	89	336,945	72	135,670
Cedar Rapids, Ia.....	54	291,000	41	135,000
Chattanooga, Tenn.....	195	58,645	151	61,435
Chicago, Ill.....	1,028	11,050,700	857	7,613,500
Cincinnati, O.....	1,560	1,082,580	1,479	940,635
Cleveland, O.....	1,296	2,742,570	1,431	2,378,510
Colorado Spgs., Col.....	30	16,583	31	15,355
Columbus, O.....	289	557,370	285	410,370
Dallas, Tex.....	132	311,440	112	142,125
Davenport, Ia.....	61	115,572	59	90,003
Denver, Col.....	224	370,250	316	179,745
Des Moines, Ia.....	68	204,220	77	150,252

Detroit, Mich.....	1,717	4,941,635	884	2,669,265
Dubuque, Ia.....	21	45,134	15	33,650
Duluth, Minn.....	263	420,572	208	398,240
East Orange, N. J.....	57	112,398	56	66,739
East St. Louis, Ill.....	39	68,635	65	98,995
Elizabeth, N. J.....	50	251,464	42	109,614
Erie, Pa.....	149	353,989	124	155,254
Evansville, Ind.....	171	115,452	135	53,717
Ft. Wayne, Ind.....	78	335,875	60	173,250
Ft. Worth, Tex.....	80	87,138	49	52,553
Grand Rapids, Mich.....	173	460,153	180	216,908
Harrisburg, Pa.....	38	126,155	47	221,950
Hartford, Conn.....	121	814,703	128	462,523
Haverhill, Mass.....	52	135,500	42	94,150
Hoboken, N. J.....	18	16,480	26	64,140
Holyoke, Mass.....	27	146,250	22	93,015
Huntington, W. Va.....	73	76,451	52	114,480
Indianapolis, Ind.....	648	779,792	546	526,299
Jacksonville, Fla.....	55	213,307	43	100,830
Kansas City, Kas.....	70	117,547	63	72,531
Kansas City, Mo.....	315	974,425	308	752,245
Lincoln, Neb.....	54	144,935	51	137,257
Los Angeles, Cal.....	603	1,037,532	566	997,240
Louisville, Ky.....	239	260,145	228	332,420
Manchester, N. H.....	127	137,702	94	316,917
Memphis, Tenn.....	231	320,640	258	285,275
Minneapolis, Minn.....	687	1,686,835	745	1,350,535
Montgomery, Ala.....	70	54,245	32	26,286
Newark, N. J.....	275	1,307,541	223	770,884
New Bedford, Mass.....	83	210,925	90	201,150
New Haven, Conn.....	114	257,580	151	451,025
New Orleans, La.....	102	614,932	143	279,731
New York City.....	2,857	26,616,500	2,498	12,265,764
Bor. of Manh.....	449	18,322,110	306	4,392,190
Bor. of Brooklyn.....	1,394	4,102,609	1,200	4,526,677
Bor. of Bronx.....	402	2,322,278	360	1,286,041
Bor. of Queens.....	480	1,346,141	472	1,744,075
Bor. of Richm'd.....	132	523,362	160	316,781
Oakland, Cal.....	272	423,193	265	27,718
Oklahoma City, Ok.....	43	113,675	47	85,327
Omaha, Neb.....	133	604,900	114	594,590
Pasadena, Cal.....	107	103,064	130	163,839
Passaic, N. J.....	44	163,520	24	61,940
Patterson, N. J.....	109	121,114	131	313,748
Peoria, Ill.....	37	116,625	47	178,500
Philadelphia, Pa.....	1,709	5,147,115	1,700	3,873,850
Pittsburgh, Pa.....	368	940,762	377	1,212,472
Portland, Ore.....	320	983,215	391	460,095
Quincy, Mass.....	116	269,139	85	130,612
Reading, Pa.....	57	69,750	71	152,900
Rochester, N. Y.....	280	662,042	284	969,632
Sacramento, Cal.....	84	303,012	96	94,498
Salt Lake City, U.....	145	219,650	112	199,958
San Antonio, Tex.....	165	109,450	173	98,325
San Diego, Cal.....	133	98,725	127	82,578
San Francisco, Cal.....	486	2,046,756	618	891,007
San Jose, Cal.....	...	77,086	...	23,370
Savannah, Ga.....	58	97,050	53	115,580
Schenectady, N. Y.....	118	118,493	79	91,883
Scranton, Pa.....	66	228,086	112	343,491
Seattle, Wash.....	651	447,390	657	631,045
Sioux City, Ia.....	59	526,250	43	150,250
South Bend, Ind.....	80	66,721	40	91,477
Spokane, Wash.....	125	138,415	88	240,390
Springfield, Ill.....	56	95,135	41	157,225
Springfield, Mass.....	168	898,918	157	451,538
St. Joseph, Mo.....	61	35,310	59	74,985
St. Louis, Mo.....	726	1,215,520	782	1,465,695
St. Paul, Minn.....	272	1,206,075	311	1,169,946
Stockton, Cal.....	47	60,800	45	70,611
Superior, Wis.....	94	137,120	82	73,948
Tacoma, Wash.....	105	204,617	107	56,828
Tampa, Fla.....	87	64,320	153	240,266
Terre Haute, Ind.....	69	74,415	61	28,850
Toledo, Ohio.....	380	595,104	273	762,845
Topeka, Kas.....	44	37,625	25	39,065
Trenton, N. J.....	159	286,249	138	486,267
Troy, N. Y.....	63	55,753	62	93,475
Utica, N. Y.....	53	129,725	74	272,400
Washington, D. C.....	424	1,040,437	535	1,142,482
Wilkes-Barre, Pa.....	100	117,351	58	58,111
Wilmington, Del.....	118	231,575	66	105,296
Worcester, Mass.....	200	650,152	194	348,148
Youngstown, O.....	139	279,025	115	433,080
Total.....	26,593	\$91,768,080	24,488	\$63,890,866



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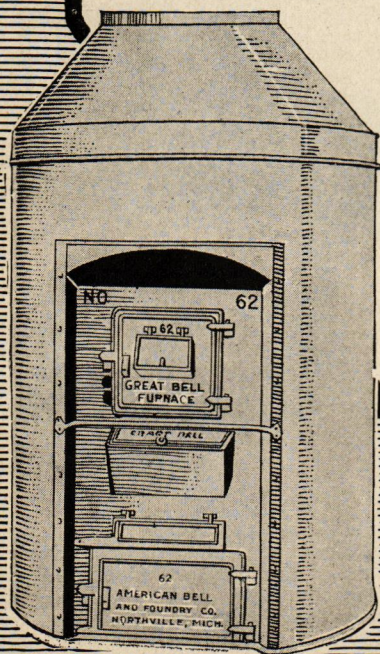
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The Proper Mixing of Concrete

Architects and engineers oppose mixing concrete by hand, that is, by means of shovels and the old-fashioned mixing board or box. They are right in doing so, as it is difficult to secure good results by that method. Even when the contractor is willing to pay the men

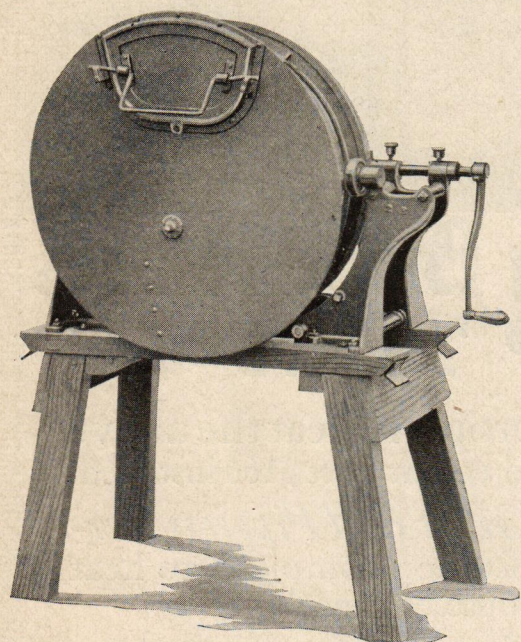


Figure 1. Ready to Operate

for bending over and breaking their backs at this work it is hard to keep up the high standard required by all conscientious architects and engineers. There is a scientific reason for it too. The cement will not readily mix with the sand and stone unless the whole mass is thrown violently together, and this is beyond the power of the ordinary laborer to do without splashing water all over everywhere, and where the water goes a certain proportion of the valuable cement goes also. Neither the water nor the cement can be gathered up again and so is lost, to the detriment of the entire job. A homogeneous mass results only when the whole mass of the ingredients is turned over and over and thoroly mixed during the turning.

The Giesler Patent Hand Power Concrete Mixer, made by the Galland-Henning Company, 1101 Railway Exchange, Milwaukee, Wisconsin, is one of the machines made for the contractor who keeps busy all the time, on both large and small jobs. In space it occupies only the space of the smallest mixing-box, while in weight it is not much more. In capacity it is a wonder, and one man can easily keep a number of men busy on such

work as sidewalks, piers, concrete blocks, etc., and the concrete is far better than can be mixed by the old-fashioned box-and-shovel method. The capacity of the smallest size Giesler Mixer is two cubic feet, or an average wheelbarrow load, to the batch, and the daily capacity, based on a batch at five minute intervals, is a little over 7 cubic yards. This would make a sidewalk three inches thick, three feet wide and 250 feet long, a pretty good day's work for one man. Without much difficulty this could be doubled by seeing that the laborer was well supplied with materials so as to avoid any loss of time on his part. The Giesler Mixer can of course be easily moved along as the work requires, so that the concrete is discharged right into the trench or spot where it is to remain, thus often saving handling two or three times.

The Giesler Mixer is just as handy for the big contractor as for the smaller one. Many jobs, big in themselves, see the concrete work strung along to such an extent that this small mixer would take care of it just as well as a big one with an expensive engineer to run it. On the other hand, the smaller contractor would often find use for two or more of them,

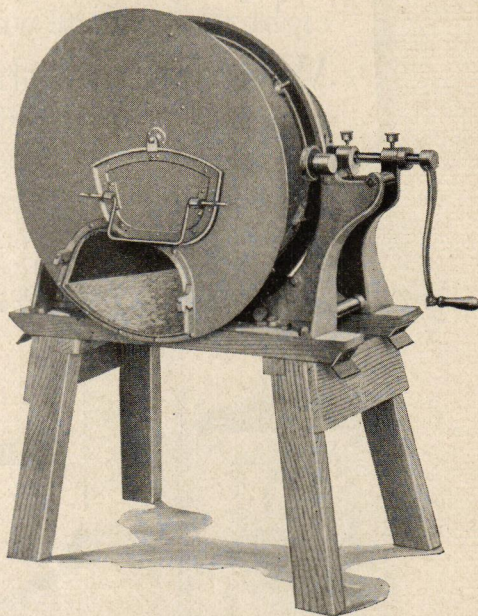
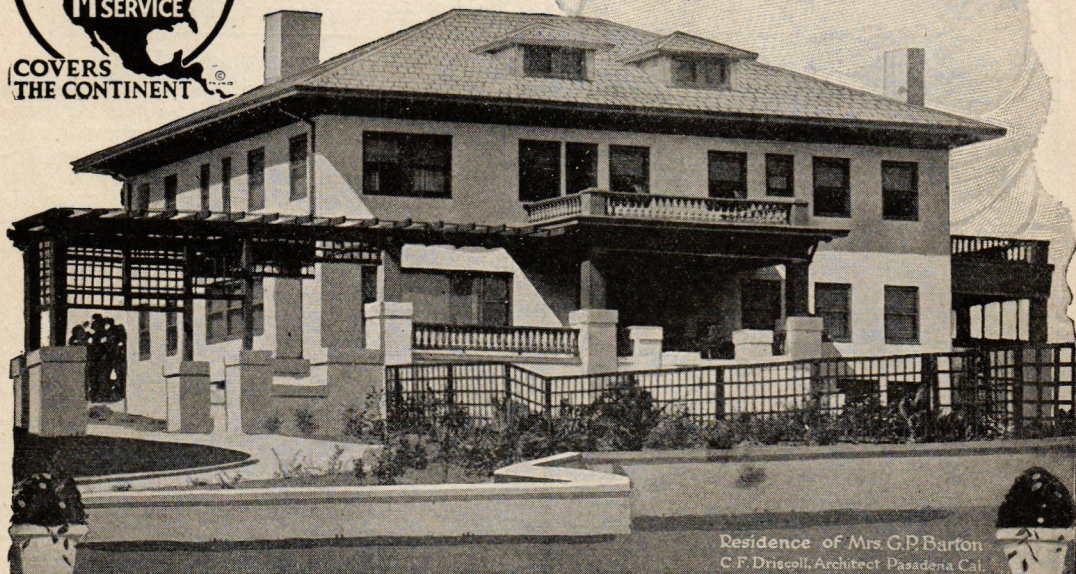


Figure 2. Ready to Discharge

on different jobs, thus carrying each along at top speed, and not being delayed because the concrete mixer was on another job. On many big jobs the contractor could use two or three to advantage, placing them on different floors, and quickly moving them as occasion required.

We have not said much about the Giesler Mixer as to construction, as that part of it is



Residence of Mrs. G.P. Barton
C.F. Driscoll, Architect Pasadena Cal.

When you are asked about a fireproof roofing, recommend J-M Transite Asbestos Shingles

It is alarming to note the thousands of buildings with inflammable roofs throughout the country, each a waiting victim of a stray spark from its own or a neighbor's chimney.

More and more attention is being devoted to safe roofing materials that have all the flexibility of treatment of the more hazardous types.

J-M Transite Asbestos Shingles solve that problem. They are absolutely fireproof, because they are made of indestructible materials—Asbestos (rock) fibre and cement (rock). They actually toughen with age and will not crack, rot, split or warp under the most severe climatic conditions.

Made in two thicknesses, in three shapes and several sizes, and with rough or smooth edges—thus affording a great variety of effects in application.

J-M Transite Asbestos Shingles are examined, approved and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters. Laid American Method, they are given Class "B" rating. Laid French Method, they are given Class "C" rating.

J-M Transite Shingles are furnished in three soft tones—Indian Red, Mottled Brown and Cement Gray. Ask for literature showing where and how the shingles have been used.

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If You Don't Know the Difference Between Right and Wrong as Regards Flooring



The Right Kind



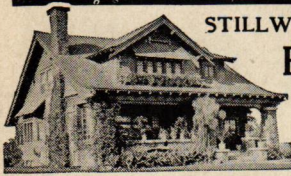
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Write us for information about the right kind.

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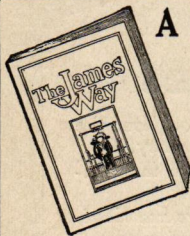
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This book is by W. D. James, America's foremost barn designer, and it tells you how to make more money. It tells about the plank frame construction, the best system of ventilation, perfect lighting, etc. Tells about proper arrangement of floor space, construction of stable floors, site, size, appearance, design, drainage and equipment. Answer these questions and book will come at once:

For whom will you build or remodel dairy barns? When? For how many cows? Address

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or locker finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimmings. Steel or glass shelves.

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Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

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Four styles—four sizes. To recess in wall or to hang outside. Send for illustrated circular.

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Makers of Steel Furnaces. Free Booklet.

fully taken up in the beautiful catalog which the Galland-Henning are prepared to send our readers on request. We do show two illustrations of the mixer, indicating the facility with which it can be loaded and discharged. The catalog mentioned above will fully inform our readers as to sizes, styles, prices, etc., and will prove interesting reading.

The Pormo Pumping Unit

A large part of a contractor's troubles are under the ground, that is until he gets his foundations in shape and the walls up above grade, he is apt to run across a whole lot of disagreeable construction. The soil may not be what the plans show or what a superficial examination of the premises would indicate. Underground experiences, such as flooding of the excavation, and frequently heavy rainstorms, will make more trouble thru caving side walls, etc. The water must be taken from the trenches and from around the foundation at the earliest possible moment. It must not be allowed to accumulate as it will soften the ground and render the footings insecure.

The Aerothrust Engine Company, 333 Washington St., La Porte, Ind., have considered this phase of the contractor's troubles and have designed their steam Pormo Pumping Unit to take care of this very thing. This unit consists of a self-contained, six horsepower gasoline engine to which is connected a pumping outfit. Altho the entire outfit weighs only 150 pounds, it has a capacity of 125 gallons per minute, which will take care almost any conditions met with in the average building.

The Aerothrust Engine Company will be glad to send our readers their catalog as well as a booklet showing what other contractors say about this outfit. The large number of these outfits which are in daily use will probably mean that there is one in the immediate vicinity of everyone of our readers, who can therefore quickly visit it and see for himself just how well it works and how satisfactory the entire mechanism is.

A Complete Carpenter's Vise

About three-quarters of the carpenter's work consists of working lumber or pieces of wood-work, getting them in shape to be applied to the building. The actual application to the building takes up the other quarter of the time. In order to work the pieces properly to dress and plane them to the proper sizes, the work must be held securely in place. Various devices have been tried for this purpose from the carpenter's bench hook to the bench vise and stop. Each of these has a limited use and each perhaps is satisfactory in its place, but the great trouble is that they all fall short of the complete equipment for the carpenter for the one purpose of holding the work while it is being worked into shape. When we consider the great variety of work which the carpenter is put to, we can readily understand why some of the makeshifts in the form of vises, clamps, etc., have not been entirely satisfactory. Not only must the work be held in



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It is beautifully lithographed and has many illustrations in colors, and in black and white. It shows exteriors and interiors of all kinds of buildings. Its object is to demonstrate to carpenters and builders the many attractive features of

NEPONSET Shingles and Wall Board and Other Neponset Products

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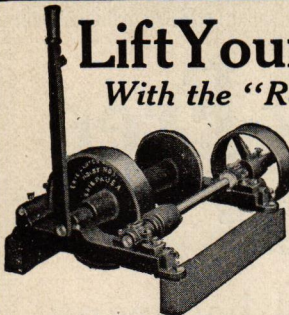
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Lift Your Profits

With the "Reliable Erie"



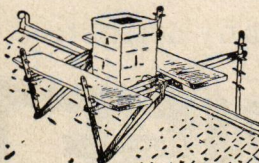
A hoist that will save time and labor on any building over one story. The price is low.

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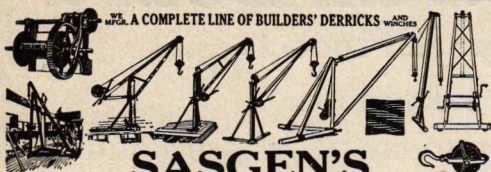
The Neville Adjustable Scaffolds

The scaffold for chimney builders can be on the ridge or side of roof over any kind of roofing without damage to the roof. Folds up compactly in small space, and convenient to handle. The Shingling Brackets for staging for putting on all kinds of roofing. Just the thing for metal and composition shingles. Circulars giving full description and uses of these scaffolds with prices sent on request. **WRITE FOR THEM TODAY.**



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Will show you how to get the right derrick at the right price, and get it quick. **Write now!**

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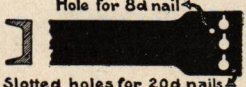
Pat. June 8, 1915

Made in one piece of Channel Iron, in 4, 5 and 6 ft. lengths. Slotted holes make it easiest bracket on market to put up and take down, also the safest. Just drive 20d nails and slip bracket in place.

One Doz. (Standard 4 ft. Length) for \$10

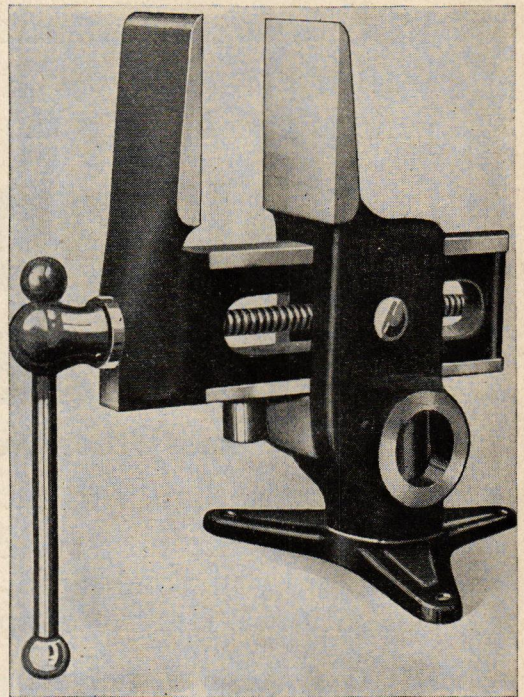
If your dealer does not have them send in a trial order. You will be satisfied. Every one says they are the best.

Safety Bracket Company
F. N. Bank Building
Thief River Falls, Minn.



Hole for 8d nail
Slotted holes for 20d nails

place securely, but it must be held so without damage to the fine faces of the work, and it must be instantly released when necessary. Some work requires far more care than others, some require turning and holding at difficult angles; some pieces are small, while others are large. A carpenter may be fitting and hanging heavy doors three or four feet wide and six or eight feet long and the next job may be fitting picture mouldings or the casings around a small medicine cabinet. He cannot afford a different vise or device for each of the separate operations which he has to do, nor can he clutter up his kit with a lot of tools, and especially those which are useful for only one or two purposes.



The Will-Burt Vise

Catalog N. B. issued by the Will-Burt Company, Orrville, Ohio, describes in detail the carpenter's vise which they manufacture. This vise, as will be seen by the illustrations herewith, is intended to be of the utmost assistance to the contractor and carpenter. The illustrations show the vise applied in a number of ways, but the actual application of this tool or device is practically unlimited. It is to a certain extent limited by the work of the contractor or carpenter, but there are very few places where it will not be found to be of great value and assistance. As will be seen, the vise can be set at any angle from horizontal to vertical, and will take pieces of board either flat on edge or inclined at any angle. It holds them firmly, and yet if the device is not placed just right for the light the entire device can



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THE CONTRACTOR'S REASON

CLINTON WIRE LATH



I WANT YOU TO NOTICE THE ABSOLUTE STATE OF preservation of that *Clinton Wire Lath*. My father built this building in 1864—the year I was born. Now I am tearing it down and am going to put up a modern building in its place.”

“It is needless to say that *Clinton Wire Lath* will be used, not only to support the inside walls and ceilings, but also for the outside walls, as they are to be of stucco. I consider *Clinton Wire Lath* the best plaster support made and the *only* form of lath suitable for outside stucco work.”

Send for our profusely illustrated book, “Successful Stucco Houses;” also “Clinton Handbook on Lath and Plaster.” Both mailed free.

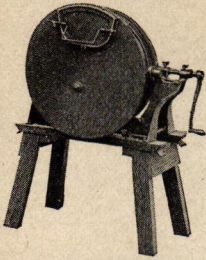
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First Power Loom Weavers of Wire Cloth in the World

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Makers of “Pompeian” and “Golden Bronze”; Screen Cloth, Clinton Painted Wire Screen Cloth, Clinton “Silver Finish” Screen Cloth, Clinton Poultry Netting. Clinton Electrically welded Fabric for reinforcing Concrete. Hunt Corner Bead, Tree Guards, Fence Gates, Clinton Perforated Steel Rubbish Burners, Perforated Metals, Perforated Grilles for all architectural purposes.





SALE!

All mixers being sold out at prices lower than manufacturer's cost.

\$20 BUYS ONE

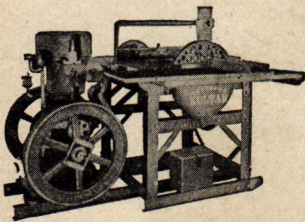
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The Saw Rig that saves money, time and labor.

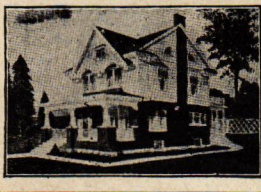
Know about it?

Send for Free Catalog N.B. showing contractors' equipment.

Whitman A. Company

7005 South Broadway, St. Louis, Mo.

Build For An Income



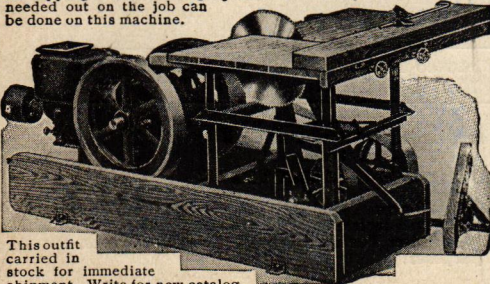
Buy a Plan Book of Flat Buildings and plan an income in your old age. Our book gives you ideas from two-family flats to twelve families, and our prices are reasonable.

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Parks' New Portable Swing Cut-Off Saw can instantly be used for ripping without changing saw. Practically all of the work needed out on the job can be done on this machine.



This outfit carried in stock for immediate shipment. Write for new catalog showing improved machines; also 12-page cat. of mauling knives. Parks Ball Bearing Mach. Co., Knowlton & Fergus Sts., Cincinnati, O.

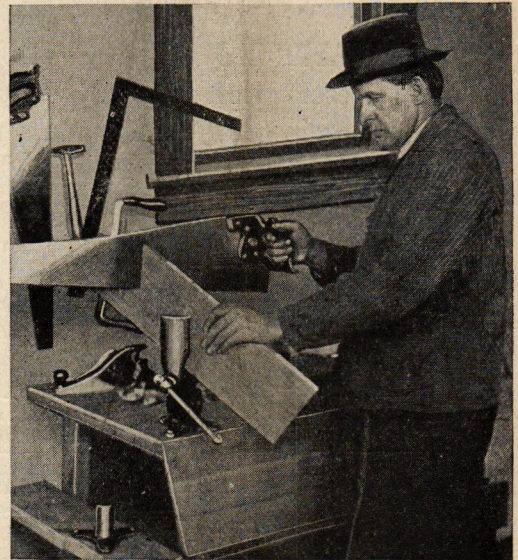
be quickly turned, so that the carpenter is always working to the best advantage.

An unusual feature of this vise consists of the removable base, so designed that a con-



Fitting a Mortise Lock

tractor can purchase a number of these bases and place them at different points on the bench, so that the rest of the vise can be applied to any of these with equal facility. This permits



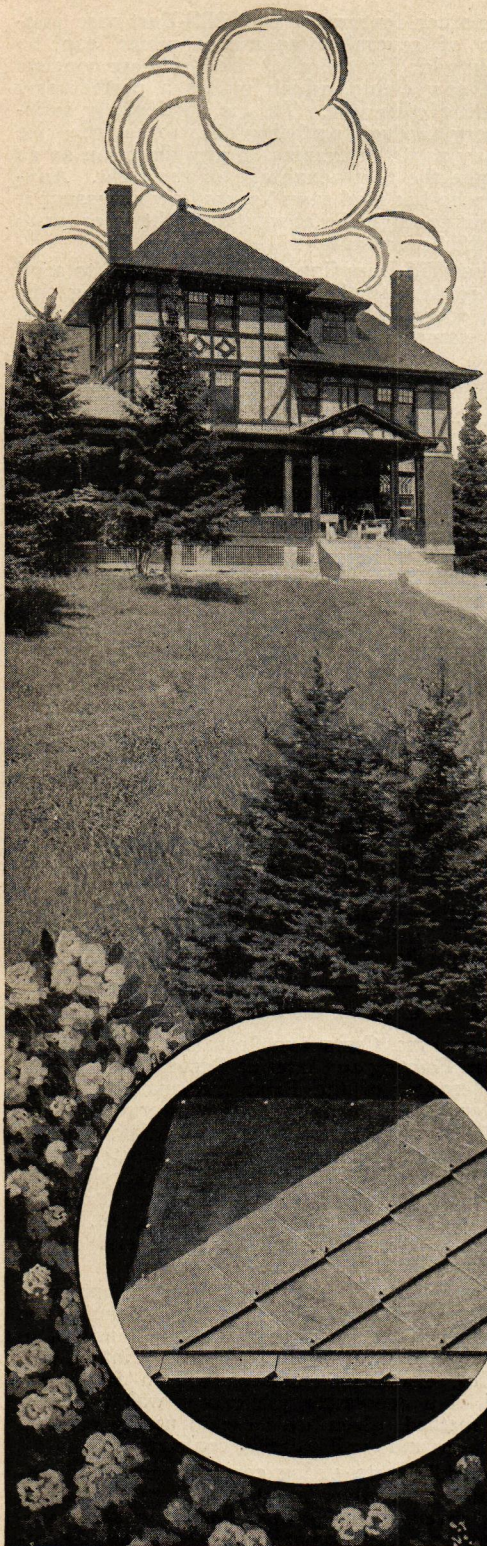
Making Mitre Cuts

of using the device in a great many positions which would be absolutely impossible with any other vise now on the market.

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There's Just One Roof

that combines

Beauty, Safety and Economy

When you roof a building with Ambler Asbestos Shingles "Century Brand" you can safely give a guarantee that as long as the walls stand there'll be a roof overhead—a fireproof, weather-tight, cyclone-defying roof, which will not fade, crack, peel, expand with summer's heat or contract with winter's frost.

AMBLER Asbestos CENTURY BRAND Shingles

*The Roof That Is As Permanent
As The Foundation*

give your customers a degree of protection and economy impossible with any other type of roofing. Ambler Asbestos Shingles, "Century Brand" are made of Portland cement and Asbestos fibre, built up layer upon layer, and, under terrific pressure, are pressed mirror-smooth, and free from air holes. The Asbestos fibre reinforces the cement as steel rods do a wall.

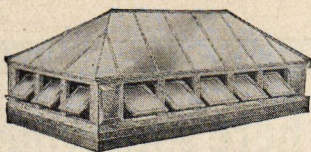
Firebrands fall harmlessly on these shingles; the heaviest gales will not loosen them; summer's scorching sun nor winter's tightest freezes will not cause them to warp, split, crack or deteriorate in any way. On the contrary, Ambler Asbestos Shingles grow tougher and stronger with exposure. They always look like new; they come in the following attractive, natural, non-fading colors: Indian Red, Newport Gray and Blue Black. The first cost is the last, as repairs are eliminated.

*Let us send you our literature,
samples and pictures.*

Keasbey & Mattison Co.
Dept. B-4, Ambler, Pa., U. S. A.



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Service
Reasonable
Prices
Unequaled
Quality**



mean profit for yourself and entire satisfaction for your customers.

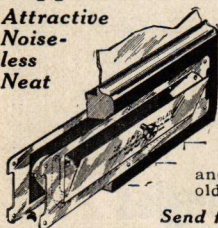
Our new **General Catalog No. 7** illustrates our full line, everything in Sheet Metal Building Materials. Every Builder should have a copy of this Catalog. It is a most complete reference book on Sheet Metal Products. Write for a copy now. You are losing some profitable business without it.

Willis Manufacturing Company
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The New Erie Sash Ventilator

Supplies Pure Air Without Draughts

**Attractive
Noise-
less
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The Erie Sash Ventilator admits air gently yet freely. Inserted in lower sash. Window can be locked.

Rust proof brass screen keeps out dirt, snow and rain. Regulator quickly adjusted to any angle of opening.

You can make money selling and installing an "Erie" in new or old buildings.

Send for booklet and prices

The Erie Ventilator & Mfg. Co.
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You Can Cut the Cost



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KEES Metal Building Corners

in place of corner boards. Give the popular mitre effect without slow work of beveling. Make stronger, neater and more durable corners. Anyone can put them on. Hold paint like wood.

We'll send samples FREE for the asking; also samples of Kees-Gossett window screen and storm sash hangers.

F.D. KEES MFG. CO. BEATRICE, NEB.
Box 811



Big Money for You

In making old buildings look better than new.

Use Compo-Composition. Easy to apply; won't crack or peel off. In variety of lasting colors. (See pages 102-104 May issue.) Write for our proposition.

James E. Kirkwood & Co., 1657-B Monadnock Block, Chicago, Ill.

Another feature of the Will-Burt vise consists of several attachments which can be easily added to the vise. One of these consists of a saw clamp, which makes a perfect saw clamp of this vise. This is particularly satisfactory through its being able to set the vise at any angle or turning in any direction so as to take the best advantage of the light. Anyone who has filed saws knows how necessary it is that the light be absolutely right in order to get the best results.

The Will-Burt Company will be glad to send our readers further particulars regarding this vise, together with prices on the vise, bases, saw clamps and other attachment, etc

The Jackson Auto Trailer

Every progressive contractor looks forward to the day when he will be doing twice his present amount of work, when he will do the work without much additional equipment, and when the increased work will bring him increased profits. To a certain extent he can increase his facilities for doing work without much increase in cost, especially if he already used an auto for getting around to his jobs.

The use of a trailer is connection with the auto is something of a new idea, but it has been well worked out by Department C of the Miles Manufacturing Co., Jackson, Michigan. The Jackson Auto Trailer, made by the above company, is one of the handy pieces of equipment which should be in the possession of every contractor who wants to make money. It can be quickly attached to any automobile and will carry a load of 1,500 pounds, thus doubling the capacity of a 3/4-ton truck, or adding that capacity to the limited capacity of the average runabout or touring car.

The Free Trailer Book, prepared by the Miles Mfg. Co., will give our readers valuable information regarding trailers as well as prices, etc.

A New Book on Estimating Painting

ESTIMATES, COSTS AND PROFITS. A Treatise on House Painting and Interior Decoration. By F. N. Vanderwater of the Paint Information Bureau, Carter White Lead Co., and author of Tiffany Wall Glazing, Mottling and Blending, Interior Decorating, The Stencil and Stenciling, Staining and Interior Wood Finishing. Bookkeeping, Accounts and Records. Published by the Text Book Co., 12127 Eggleston Ave., Chicago, Ill. Case bound in gray cloth with board covers. Price, postpaid, \$1.00.

This book was written for painters but every building contractor who figures the painting too will find in the book the many details needed to accurately and intelligently estimate painting, varnishing, enameling, staining, and in fact every kind of a decorating job except wall papering. The methods given are those in use by present-day large and small painting contractors.

In addition to giving complete rules for estimating, the reading of plans and blue prints is fully covered. Plans of a bungalow are reproduced and the estimate for an average seven-

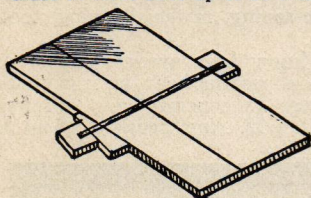


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These High Speed Clamps will satisfactorily handle all your joint, cabinet, door and panel work. They are made in three sizes up to 30 inches. These sizes are all you need, and will do everything a metal clamp will do, at one-fifth the cost. Rotating jaws make size variations of 5 inches. Light, strong, convenient. Write us for prices in dozen lots. We can save you money.



D. R. Stuart - Harlan, Iowa

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Flats and Apartments

FOR INVESTMENT

Special prices on this class of building during July and August.

Petersen's Perfect Plans

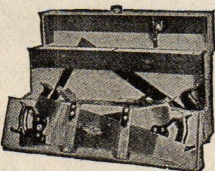
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Correspondence invited

INDESTRUCTIBLE Carpenters' Tool Cases

Stronger than any wooden chest, much lighter, holds tools better, much easier to carry. Same shape as a suitcase when folded and carried like one.

Made of 3-ply veneer, covered with heavy canvas and painted. Edges and corners are bound and reinforced with steel. Two brass catches and locks. Contains a place for every tool. Two sizes—31 in. for 26 in. saws, 33 in. for 28 in. saws. Will last a lifetime. Write for booklet and prices now.



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157 Jefferson Avenue, DETROIT, MICH.

Miller's Bungalow Plans



are used exclusively in our book, "Bungalows and Other Things," which contains photographs and floor plans of many artistic homes that can be built for \$1,500.00 up. Get this book, it is the best of its kind on the market. Pick out the house you want and we will furnish the plans and specifications for \$5.00 to \$15.00. The book is receiving high praise from contractors and builders.

Price \$1.00

Burd F. Miller Co., 25 Brandeis, Omaha, Nebr.

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—But the "good things" must give way to the better things.

Lath and plaster must give way and *is* giving way, for the more durable, stronger, stiffer, more economical and altogether more satisfactory



Trade Mark Reg. 94745

This is no ordinary wall board—it is a wall board in a class by itself, the *only* wall board with a center core of kiln-dried wood slats, else we would not claim it to be *better* than lath and plaster. It does not have to be paneled, but can be made into walls and ceilings smoother than lath and plaster. Can be decorated by any method—even papering—which other wall boards can not stand.

Are *you* going to stick to tradition or give your customers the more modern and more satisfactory wall lining in their buildings. *Talk to us* about some of the common false notions on the subject of wall boards, and let us make clear to you just what you're overlooking.

The Compo-Board Company

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Yes, Mr. Contractor!

You can lay Wood-Mosaic floors of hardwood. Our $\frac{5}{16}$ " flooring can be laid in old houses as well as new. We make all kinds and thicknesses; Wood-carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring.

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

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

Wood-Mosaic Company
33 Hebard St., Rochester, N. Y.

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



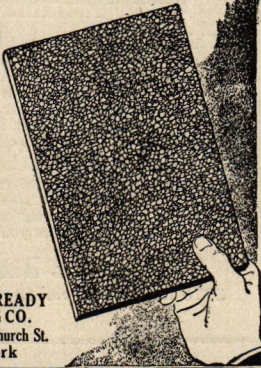
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Write Today For Sample Shingles

Discover for yourself why there is such a demand for Hudson Asphalt Shingles. They need no painting. They will not rot, rust, crack, break or fade; inexpensive and easily laid. Surfaced with Red, Green or Mottled Slate.



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Get our "Handy-Man" Free Book. Every home needs it. Shows new home improvements and everything in plumbing and heating supplies EXCLUSIVELY at wholesale prices—complete heating plants, bathroom outfits, sinks, pipe, fittings, water systems, lighting plants, etc. Any handy man can install our goods with this free book and free easy installing plans. \$500,000 plants behind our guarantee. Write today.

The Hardin-Lavin Co. 40 years at 4531-41 Cottage Grove Ave. **Chicago**

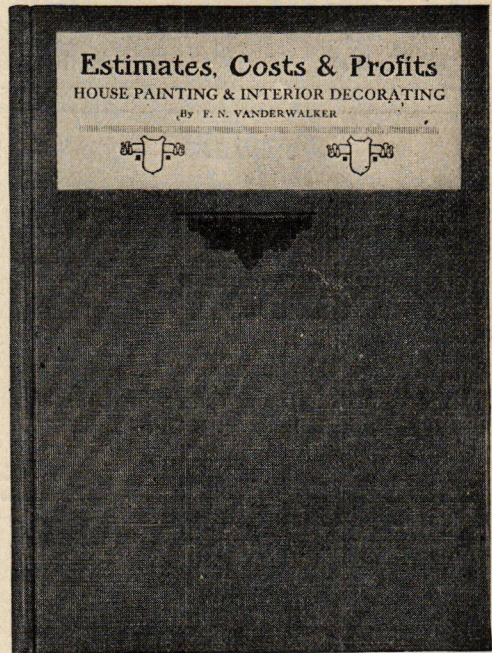


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room house is also given to explain the method of figuring from the house itself.

There is a chapter on Overhead Costs that will give many a contractor the answer to the question: "Where have my profits gone?" There is a chapter on Paint Shop Management with a plan for a modern, time-saving, material-saving, tool-saving paint shop.

If you want to know how much a gallon of paint will cover on weatherboarding, matched boards, brick, plaster or concrete you will find the figures in Section 12. And Sections 34 to 51



The Cover of "Estimates, Costs and Profits"

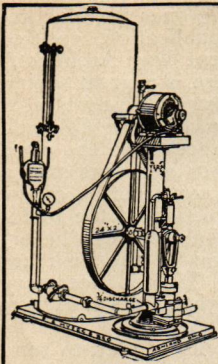
will tell you how much a gallon of varnish, shellac, wax, size, stain, enamel, filler, varnish remover, calcimine or any commonly used material will cover on an average.

Other portions will tell you what constitutes a day's work for a man with every material on the different surfaces. How to figure your price per square or square yard is illustrated and the prices charged by other contractors for all work are carefully tabulated. Altogether there are one hundred and twenty pages of good, practical stuff that will be helpful to any man who feels that his business methods are not as up-to-date as his craftsmanship.

Suggestion for the Architect

Everyone who has ever been about a building during construction has noticed that the contractor had a lot of weighing of sash, tending of sash weights, etc., besides the labor of attaching sash cord to the sash and to the weights. In fact, it seems as though the windows came in for more than their share of the labor on the building.

Advertisers' Section



Myers House Pumps

ELECTRICALLY DRIVEN

A Myers Electric Pumping Out-fit affords the most convenient water supply imaginable. It can be equipped with an automatic switch which controls the pump and motor. The pump, tank and motor are mounted complete on one base, making installation easy. They are made for cisterns and shallow or deep wells. Write for catalogue of Home Water Supply Systems, for country, suburban and town residences.

F. E. MYERS & BRO.
ASHLAND, OHIO
Ashland Pump and Hay Tool Works

E-B Cord Lock

(PATENT APPLIED FOR)

on this carpenter's mouse saves time and trouble. It is quickly attached by simply pressing cord into lock. If you use the E-B, the cord can never slip.

Mouse complete: 25c each
Write today

ERIK BERGLUND
4515 N. Oakley Ave., Chicago, Ill.

Sewage Disposal Without Sewer or Cesspool



A PERFECTLY sanitary system using nature's bacteria to purify and dispose of the house sewage. Far superior to cesspools and less expensive in the end. No chemicals. No odors. All ready to connect to.

A Money Maker for Contractors

Profitable in itself, it also makes possible the building of houses in localities where city sewer systems are not available.

ANDREWS HEATING COMPANY
1496 Heating Building Minneapolis, Minn.

Free book on sewage disposal



Caldwell Sash Balances

Uniform Mortises

For use in all classes of new work

Box frames unnecessary. Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Write for circular
Caldwell Mfg. Co.
2 Jones St., Rochester, N. Y.

Patent Pending

Save 10c per Window

Hanging your Sash with

B. & B. Ready Cut Cords

B. & B. Stock Length Sash Cords are all ready to attach to your sash and weights without a minute's delay. B. & B. Cords need no cutting and no knotting. B. & B. Cords come in stock lengths from 18 in. to 30 in., equipped ready to hang.

Special Trial Offer—Send 25c for a trial set prepaid. State size of sash.

B. & B. SASH CORD CO.
94-100 Clarkson St. Ansonia, Conn.

PATENTED FEB. 9, 1910

Galvanized Iron Cut Nails

For shingles, slating, boat and wharf building, fencing, sheathing and all exterior work use

Anchor Brand Iron Cut Galvanized Nails

as they will outlast the best of wood under all climatic and weather conditions.

Write for Prices
E. & G. Brooke Iron Co., Birdsboro, Pa.

Building Anchors and Hangers

Joist Tee Anchors \$6.00 Per 100

Wall Plate Anchors \$8.00 Per 100

JOIST HANGERS--Popular Sizes

2x8...28	4x10...37	6x12...57
2x10...31	4x12...41	6x14...77
2x12...35	6x8...44	8x12...85
4x8...34	6x10...49	8x16...98

Any Size on Request

CHAS. MULVEY MFG. CO., 1840 Carroll Ave., Chicago, Ill.

Builders' Hardware

In latest designs and standard makes. Write for Catalog No. 6 showing full line—lots of big bargains like this in it.

No. 1496 Antique Copper Finish Cupboard Turn

90c Per Doz.

We do not sell to Contractors or Builders in Cook County, Illinois

REHM HARDWARE COMPANY
1503 Blue Island Ave. Chicago, Illinois



Why Don't You?

Investigate the
"AMERICAN UNIVERSAL"
way of Surfacing Wood Floors

If you can buy a machine that will do the work of four or five men and do it *much better* you certainly cannot afford to continue surfacing floors by hand method or with a mechanical scraper.

The "American Universal" Sander is the machine that is guaranteed not to leave waves or vibration marks.

Saves Time. Saves Money.
Does Better Work.

American Floor Surfacing
Machine Company

519 S. St. Clair St., Toledo, O.
The oldest concern in the business



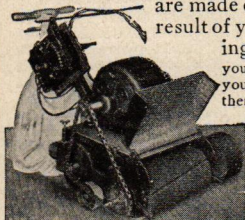
The Automatic Ballbearing Electric Floor Surfacing Machines

are made correctly, built to last—the result of years of experience in building this specialty. Is what you need to profitably surface and polish your floors just the way you want them. Write today for folders telling all about these latest improved models (in 5 sizes) and our free trial offer. Manufactured by

WAYVELL CHAPPELL & CO.

Phone FRanklin 4160
Dept. C.

358 West Madison Street, Chicago, Ill.



For Old or New Wood Floors

Floor Scraper Blades

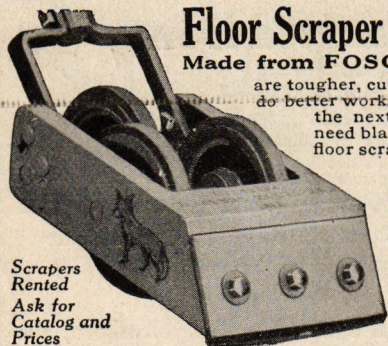
Made from FOSCO Steel

are tougher, cut faster and do better work. Try them the next time you need blades for your floor scraper. Made to fit any machine. Cost no more than the common kind.

Fox Supply
Co.

Dept. N
Brooklyn, Wis.

Scrapers
Rented
Ask for
Catalog and
Prices

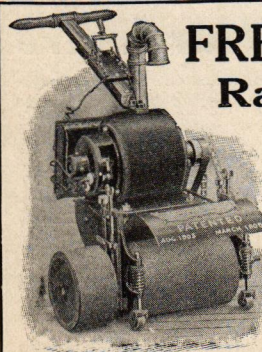


FREE TRIAL Rapid Floor Surfacer

Made in
Several Sizes

M. L. Schlueter

225 W. Illinois St.
CHICAGO



The Caldwell Mfg. Co., 2 Jones St., Rochester, N. Y., in a recent publication, entitled "Suggestions for the Present Day Architect," attempt to show where there is a great saving not only to the architect, but to the contractor and to the owner by the use of the Caldwell Sash Balances. These balances take the place of pulleys, weights and cords and thus save a great deal not only in the construction of the frame, but in the actual erection of the building. In other words, the balances can be ordered just as used, as soon as the sash are made up ready to hang. This is necessary in order that the exact weight of the sash may be obtained.

The Caldwell Mfg. Co. will be glad to send the above mentioned booklet to those of our readers who are interested in seeing how they can economize in the work about the building and in the time for erecting. The booklet shows the various styles of Caldwell Sash Balances and shows those which are especially made for overhead attachment, for narrow columns, and the like.

Sidney Self-Lifting Dumbwaiter

One of the styles of dumbwaiters shown in the catalog of the Sidney Elevator Mach. Co., Sidney, Ohio, is known as the Self-Lifting Dumbwaiter. It consists essentially of a dumbwaiter intended to travel only from the basement to the first floor. As usually installed, it takes up practically no space at all, as the top of the dumbwaiter is really a part of the finished floor when the dumbwaiter is lowered to its usual position. By merely pressing a button or catch with the foot the dumbwaiter rises into the kitchen, pantry or other room in which it is installed. A touch of the hand in turn lowers it through the floor to the basement, with a refrigerator, thus saving the trouble of running to the basement or into an adjoining room every time anything is wanted from the refrigerator. Of course, for taking ordinary fruit supplies, etc., to the basement, it is far superior to carrying them up and down stairs with the consequent risk of accident and loss.

The general catalog of the Sidney Elevator Machine Co. describing this and the other styles of dumbwaiters made by this company will be sent to our readers free on request.

An Entirely New Development in Asphalt Shingles

Messrs. Bird and Son, Department N, East Walpole, Mass., are now putting on the market a shingle which contains features not found in their original Neponset shingle. It is an outgrowth of the built-up Neponset Twin Shingle, and is called the Double-Surfaced Neponset Shingle. While retaining the twin shape, which is characteristic of all Neponset shingles, its construction is quite different from the original Neponset shingle, altho the same materials are used.

This shingle consists of a layer of the highest grade asphalt felt, regular Paroid felt, which has been thoroly saturated with as-



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Advertisers' Section



Get FREE Finished Samples and Big Door and Trim Book

They show you how you can produce the most beautiful effects and finishes in hardwood trim, doors and floors in "beautiful birch." No wood finer though many cost more. birch furniture is standard. Ask your dealer. Send postal card TODAY.

Northern Hemlock & Hardwood Manufacturers Association
204 F. R. A. Bldg., Oshkosh, Wis.

Money Back if ARNESTO PAINTS

are not as represented—Pure Linseed Oil and thoroughly satisfactory.

Get our Color Cards on our various products and let us quote you.

A SAVING of from 25 to 40%
is assured you in your buying.

Let us quote you on what you want.

ARNESTO MFG. COMPANY

Glass and Paints

794 Amsterdam Avenue, New York City

PERSPECTIVES

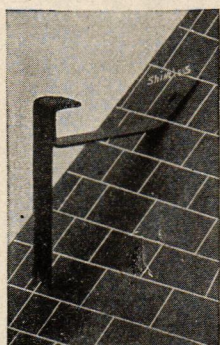
Draw Your Own Perspectives

of the homes you build. It will enable you to land more contracts and give your customers perfect satisfaction.

Every man possesses enough talent to draw perspectives and many of our students develop a profitable business in this line. It's easy.

Write today for large illustrated catalogue

SCHOOL OF APPLIED ARTS
Department B Battle Creek, Mich.



"KANT SLIP" Shingling Brackets

provide a secure foot rest and roof staging that will hold several bunches of shingles. No nails required. Claw feet absolutely prevent slipping. These Kant Slip brackets can also be used for sheeting roofs solid. They will pay for themselves on the first job.

Price \$2.75 per dozen

W. A. Wiley

100 Vine St. Varina, Iowa

Let Us Mail You a Pound of



Whalebone Wall Ties

As Samples and you will become a regular customer. This is our one and convincing argument.

ALLEGHENY STEEL BAND CO.
886-88 Progress Street Pittsburgh, Penna.



Tools Marked Like This



Last a Lifetime and Give Satisfaction to the End!

The Highest Priced Edge Tools Made

Ask for our catalog, book "True Stories" and "How to Take Care of Tools"—free.

Mack & Company

Brown's Race

Rochester, New York

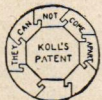


SEND 10c in stamps for Catalog T 40 on Exterior and Interior Columns, or for our beautiful Pergola Album T 28, illustrating pergolas, garages, lattice fences, veranda treatments and garden accessories.

HARTMANN-SANDERS COMPANY

Exclusive Manufacturers of

**KOLL'S
LOCK
STAVE**



**PATENT
JOINT
COLUMNS**

2155-87 Elston Avenue • Chicago, Illinois
New York Office: 6 East 39th Street

TROKAL Liquid Floor Finish

A beautiful, sanitary and durable finish for either new or old floors. Wears like iron. Absolutely moisture proof.

NICE
TRADE MARK REG. U.S.A.

Our catalogs of Liquid and Paste Wood Fillers, Stains, Enamels, Colors, C-M-T Coating, etc. are yours for the asking. Write today.

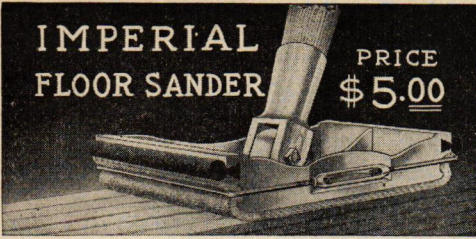
EUGENE E. NICE

Philadelphia, Penna. Camden, New Jersey



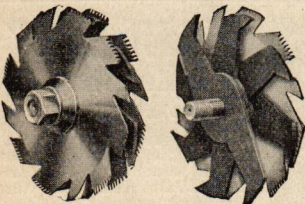
IMPERIAL FLOOR SANDER

PRICE
\$5.00



Weight 14 lbs. Cushions prevent marring base-boards. Load with 6 to 12 sheets of sandpaper. Wavy floors impossible. Write for circular.

Imperial Pump & Tool Co., 2444 W. 12th St., Chicago, Ill.



Huthier Bros. Dado Head Fits any Saw Rig—

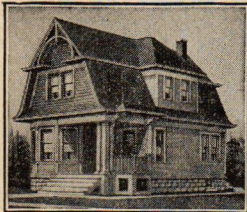
A Huthier Bros. Dado Head consists of two outside cutters and enough inside cutters to make the required cut. This Head will cut perfect

grooves, with or across grain, any width. It is an easy Head to keep in perfect condition, has a simple, quick adjustment, and may be enlarged any time after purchase.

Sent on approval and if not satisfactory, return at our expense.

Huthier Bros. Saw Manufacturing Company
1105 University Avenue Rochester, New York

Are You Going to Build?



Send 25c in silver (and 10c postage) for our big \$1 book of plans. "LOW COST MODERN HOMES," with houses from \$1,000 to \$3,000.

"PALATIAL MODERN HOMES" from \$3,000 to \$10,000, price 25c and 12c postage.

"COTTAGES AND BUNGALOWS" from \$300 to \$9,000, price 25c and 5c postage.

J. H. Daverman & Son, Architects
1342 Murray Bldg., Grand Rapids, Mich.

The Stern Floor Scraper

A practical, efficient machine. Simple—accurate—rapid

Send for our
Free
Trial Offer

Stern Mfg. Co.

Lancaster, - Penna.



Try It
FREE

phalt. To the surface of this is added an asphalt coating in the regular way. Then into this coating is rolled a solid surface of crushed rock. At this stage the shingle is not unlike the ordinary rock-surfaced shingle which are on the market, except that these various processes are planned for what is to follow.

The next process is the application of a solid coat of asphalt over the rock surface, and then into it a final surfacing of crushed slate is rolled. This final surface is a rather fine crushed slate, and a slate which has a high color, red or green. This results in a very attractive surface color that is distinctive and out of the ordinary.

The composition of this shingle makes it extremely flexible. It will bend without breaking and will therefore lie very flat on the roof, and is especially adapted for use over curved hips or other similar places. It is a very easy shingle to lay on account of its twin form, and it can be laid in about half the time of ordinary shingles.

The Double-Surfaced Neponset Shingle is 20 inches wide, instead of 16 inches, as was the original Neponset Shingle. Each shingle therefore covers more surface, and so from this point of view, of ease of laying, it goes further even than the original Neponset, yet it is not too large to be easily laid by one man.

There are three nails to each shingle, and the shingles can be slapped down just as fast as a man can drive the nails. The special Neponset Cut-out enables one to put the shingles side by side very close, the spacing being automatically taken care of.

Every architect, as well as every contractor and builder, will be much interested in this type of shingle. Department "N" of Messrs. Bird and Son, are prepared to send not only information about it, but a full-size sample, which will supplement the brief description given above.

A Novelty in Furnaces

The average conception of a furnace was an immovable type solidly built into the basement floor and connected by many and devious wiggly lines of pipe thru the various rooms in the house. A further conception included the fact that on windy days it was impossible to heat one side of the house, while the furnace had an unquestioned value for ventilation, fresh air and for quickly heating up the house in any kind of weather. Being in the basement the house was of course, free from dust and dirt accompanying the use of stoves and fireplaces, thruout the building, while the care of the furnace was infinitely less than caring for three or four stoves or isolated heating plant.

The circular issued by the American Bell & Foundry Company, Northville, Michigan, indicates that now these suppositions are wrong as they manufacture a furnace which is as easily moved as a base burner, thus making it possible for a tenant to own the furnace and move it from house to house as he moves



PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS

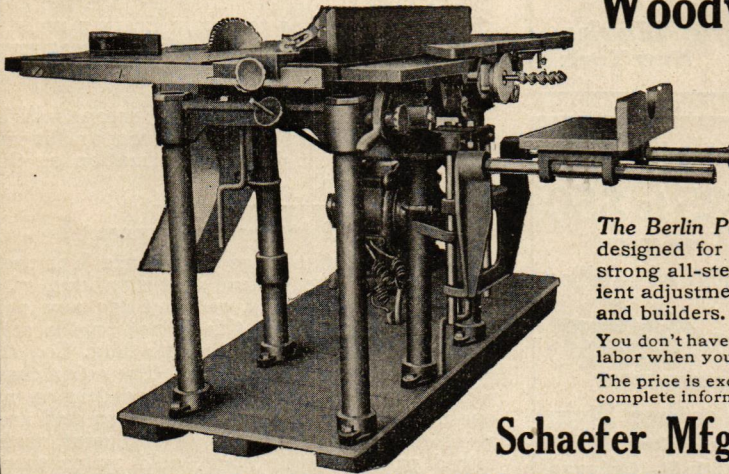
Advertisers' Section



BERLIN



Portable Woodworking Mill



A machine you can take right to the job and make door frames, window frames, interior trim, etc.

It eliminates costly delays. Your material is ready when you want it.

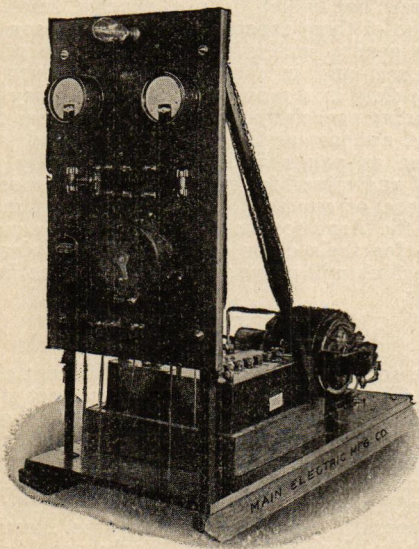
The Berlin Portable Woodworking Mill is designed for service and durability. Its strong all-steel construction and convenient adjustments appeal to all contractors and builders.

You don't have to worry about the lack of skilled labor when you own a "Berlin."

The price is exceptionally low. Send today for complete information and catalog.

Schaefer Mfg. Co., Berlin, Wis.

The Sensation of the Times



A high grade, well constructed, practical 30-volt *Main Electric Lighting Plant* now within the means of all who desire better light.

Write for particulars on larger sized plants. A complete line of *Main Plants* up to the 20,000 light size.

Write for Bulletin No. 41

Main Electric Manufacturing Company
500-520 Aiken Ave., Pittsburgh, Penna., U. S. A

Largest Exclusive Manufacturers of Isolated Electric Lighting and Power Plants in the World

**30-Volt Main Midget,
Type XX, Seven Light Size \$76.95**



SEDGWICK

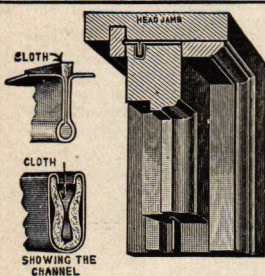
HAND-POWER

DUMB WAITERS and ELEVATORS

Manufactured and Guaranteed by
Specialists.

Send for Catalogue and Circulars.

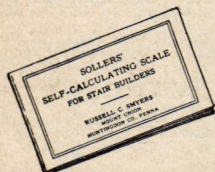
Sedgwick Machine Works
130 Liberty St. New York



Carpenters Make
\$25 to \$50
PER WEEK
Selling and Installing
Athey
Cloth-Lined Metal Weather Strip
Write today for agency proposition
Athey Company, 122 W. 24th St., Chicago

Can You Build Stairs?

It's easy if you have a copy of
**Sollers' Self-Calculating
Scale for Stair Builders**



This book has been thoroly tested and tried by an experienced Master Carpenter. It's a short cut to correct stair building.

Send Post-paid for.... **\$1.00**
(Good Cloth Binding). Write today.

Russell C. Smyers, Mt. Union, Penna.



**We Make Morgan Metal
Weatherstrips**
and
**Sell Direct to You
at Factory Prices**
Send for circular and prices.
You will find Morgan Weatherstrips easiest and best to install.
**The Morgan Metal
Weatherstrip Co.**
2216 Pine St., St. Louis, Mo.

himself. This style of furnace known as the Pipeless Furnace has been in use for some eight or ten years and the American Bell & Foundry Co. have brought its design and manufacture to a high state of perfection.

In the Pipeless Furnace the same general principles are applied as in ordinary furnaces. The location of the pipeless furnace, however, is as near central under the first floor as possible and one register is cut thru to heat the entire house. By a careful consideration of air current as well as of the arrangement of the room it is possible to so arrange the cold air pipes as well as the main heating register so as to do away entirely with the great number of pipes running thru walls, partitions, etc.

The catalog of the Pipeless Furnace will be sent to our readers free on request and it will give them a great deal of information on this style of furnace.

The Paint for the Purpose

We believe that some people are just prejudiced enough to believe that any kind of a paint is the best kind of paint for any particular purpose. That this is not true is seen by the literature of the Arnesto Mfg. Co., 794 Amsterdam Ave., New York. The color chart which they are sending to our readers on request shows a great variety of barn and roof paint, floor and deck quick drying paint, ready mixed paint, shingle stain, cold water paint, varnishes, etc., besides paint and varnish preparations for every conceivable purpose.

When we bear in mind that each of the above preparations is made for a special purpose you will see why it should be better adapted for that purpose than a mixture which is designed for a great variety of purposes in general, but which is not exactly fitted for anyone of them especially. Of course some of these general paints will do for some of the purposes, and in fact they might cover the entire field in a more or less general way, but not being especially made for the purpose they would not last as long or give as good satisfaction as paints which were especially prepared and mixed for that particular purpose.

Those of our readers who are not familiar with the Arnesto line of paint should send to them for their color card and other information which will prove valuable as well as interesting.

Queen City Coal Chute

We sometimes wonder where different cities and different pieces of apparatus get their names. We sometimes think it would be a good plan if cities would wait a few years until their nickname was firmly established and then take that as their established name. However, the city of Hastings, Neb., is famous not only for its general beauty but also for the Hastings Foundry Machine & Iron Works are located there and for the fact that one of their prominent manufactures is the Queen City Coal Chute. This coal chute is designed to be built



PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS IT HELPS

Advertisers' Section

Grilles, Colonnades and Sideboards

Get our prices before you bid

Quality, satisfaction and safe delivery guaranteed. Send today for free catalogue, showing many new designs in Grilles, Colonnades and Sideboards.

Bertelsen Adjustable Grille Company
2117-2127 South Troy Street Chicago, Illinois

\$17 Highwood Dumbwaiter

Don't Pay More!

Complete, ready to install. Nothing to build or prepare. Any carpenter can place. This low price includes everything — car, machine, counterweight, ropes, nails, etc. Satisfaction or money refunded. Write for catalog.

Highwood Dumbwaiter Co., 100 Highwood Av., Leonia, N. J.

ZINOLIN

("Arnold-ized" Zinc.) Use this Zinc, ground-in-oil, instead of white lead. Non-poisonous. Whiter, doubly durable, forever fadeless. Less expensive. Quicker to work. Send for leaflet today.

Keystone Varnish Co., Brooklyn, New York



Kimball Elevators

Passenger and Freight

We furnish all styles and sizes, from a house dumbwaiter to a 40,000-pound electric elevator. Write for catalog.

Kimball Bros. Co., Council Bluffs, Ia.



STOP THOSE RATTLING WINDOWS

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.

HARDWARE SALES CO., Inc., 48 Church Street, New York

Elevators, Dumbwaiters and Sidewalk Lifts

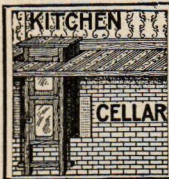
May be operated by hand, belt or electric power. Any capacity. Catalog and prices free on application. Write today.

J. G. Speidel - Reading, Penna.

ELEVATORS

HAND and POWER
DUMBWAITERS

Sidney Elevator Mach. Co., Sidney, O.



Carpenters Wanted as Agents—Act Now
—Big Money—Ready Seller
Sanitary Automatic Dumb-Waiter
saves carrying food to and from cellar. Perfectly ventilated. Top lies flush with kitchen floor. Operates with push button. Also furnished as a refrigerated dumb-waiter. **Assembled Complete Ready to Install.** Three hours time places them in actual operation. In old or new homes. \$16.98 apiece; \$15.75 apiece in one-third dozen lots. Write **York Automatic Dumb-Waiter Works, York, Penna.**

WRITE US—

"I read the N. B.
"If you tell me where I can find a Self-Setting Plane in this town I will try it the first opportunity."

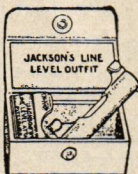
See Feb. N. B. top of Page 122

GAGE TOOL CO.
Vineland, New Jersey

SELF-SETTING PLANE

Sample sent as per circular if not kept by dealers.

GAGE TOOL CO.,
N. J.



A Unique Time Saver

The Jackson Aluminum Line Level; the greatest labor and time saver of the age. Absolutely accurate.

Consists of level with 40 ft. line and spring clamp for attaching to steel square. All in neat leather case to fit in your vest pocket.

At your dealer's or sent postpaid for \$1.00.

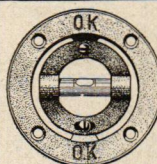
JOS. WOODWELL CO., 203 Wood St., Pittsburgh, Pa.

Figure the Dollars

in your pocket with Hicks' Estimator's Price Book. Enlarged, 217 pages, best yet, \$1.25.

No blundering with **Hicks' Handy Estimate Blanks.** Per book, 50c. Both now \$1.50.

I. P. Hicks, Dept. 1, Ames Station, Omaha, Neb.



Don't Fool With a Plumb-Bob

The O. K. Adjustable Plumb or Level Fixture

Attaches to plumb staff or straightedge for plumbing door jambs, studding, etc. and for leveling sills, joists, foundations, etc.

Made of aluminum. **70c postpaid.**

Best plumb and level fixture made.

Good Money for Carpenter Agents

S. L. Stratton & Co., Box 717, Columbus, Ohio

PHOENIX INSIDE SLIDING BLINDS

Comfort : Convenience : Economy

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

WRITE FOR CATALOG P-T.
Phoenix Sliding Blind Co., PHOENIX, N. Y.

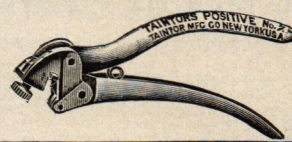
THE ROOF OF ETERNAL YOUTH

SHELDON'S
RED, GREEN, PURPLE, BLACK
SLATES

Our Catalog and Prices will interest you.

F. C. SHELDON SLATE CO., GRANVILLE, N. Y.

Taintor Positive Saw Sets

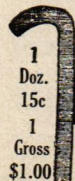


Do these two things today:

(1) Ask your hardware man to show you a Taintor Saw Set.

(2) Send for Free Booklet, "Suggestions on the Care of Saws" to

TAINTOR MFG. CO.
113 Chambers St.
Dept. C New York



JOHNSTON'S Patent SHELF PIN

These Pins are used for supporting movable shelves in Book Cases. Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one.

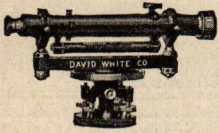
Send for free sample to **J. D. JOHNSTON, NEWPORT, R. I.**

Advertisers' Section

PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS



White's Improved Level



**Accurate—Reliable
Inexpensive**

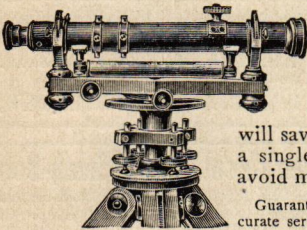
Telescope 12 inches long—magnifying power 25 diameters. Will detect an error of 1-16 inch in 300 feet.

"Try-It Before You Buy-It"

A good level is the most important part of your equipment. You must have a reliable, accurate instrument for laying out, squaring and leveling foundations, plumbing walls and girders, etc.

Let us send you one of our improved levels for free ten days' trial—you don't have to keep it if not satisfied. Ask for details and free catalog. David White Co., Inc., 420 E. Water St., Milwaukee, Wis.

A Point to REMEMBER!



**This
KOLESCH
LEVEL**

will save its small cost on a single job. Try it and avoid mistakes.

Guaranteed to give positive, accurate service and the price is right.

Send for 300 page Catalogue

KOLESCH & CO., 138 Fulton St., New York

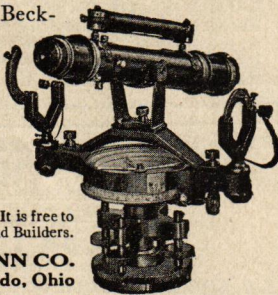
Correct to a Hair

You can depend on a Beckmann Instrument. They are absolutely accurate. No contractor can afford to own anything but a first class level or transit. Beckmann's are made right in every detail. The price is extremely moderate for such high class instruments.

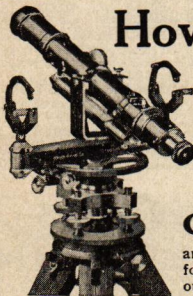
Our Booklet Quotes Prices!

Send for illustrated booklet. It is free to all Architects, Contractors and Builders.

THE L. BECKMANN CO.
102 Adams St. Toledo, Ohio



How to Cut Costs



is the important question confronting you today!

An up-to-date Level or Transit on your Building Operation will save its cost many times over, besides insuring you against costly mistakes.

The exclusive, time-saving features of our

**"Sterling"
Convertible Level**

are worth investigating. Write TODAY for Copy of "Facts" illustrating several of our latest models, and Special Trial Offer.

WARREN-KNIGHT CO., 136 No. 12th St., Philadelphia
All makes Transits and Levels repaired, bought, sold, exchanged

in either old or new walls for the purpose of taking coal and other supplies into the basement. The design is such that it automatically locks and is therefore proof against burglars as well as broken windows. The fact that a building is equipped with a coal chute indicates that the architect and contractor have taken a great deal of pains to see that everything is first class and that everything is included which will add to the general benefit of the building as well as will prevent any damage incident to taking in the coal and other supplies.

A catalog of the Queen City Coal Chute describes the many advantages in detail and we understand that the Hastings Foundry and Iron Works are prepared to give our readers special prices at this time.

A Self-Calculating Scale for Stair Builders

We have seen some of the very best calculators get stuck on a flight of stairs. When you have an uneven number of even inches to divide up into an uneven number of risers somebody is going to make mistakes sooner or later. The one who makes these mistakes is pretty sure to be the one who depends upon a shingle and a carpenter's pencil to do his figuring, especially when there is a much easier, simpler and surer method of doing the work.

Mr. Russell C. Smyers, Mount Union, Huntington Co., Pa., has prepared a scale for stair builder's use which gives instantly the height of riser for any number of treads or risers from a story height of two feet divided into six risers up to a story height of sixteen feet divided into twenty-nine risers. The contractor is thus able to figure the exact height of any number of risers, or the exact height of any one riser for any number of risers for any height of story within the limits above mentioned. The measurements are carried out in two places of decimals.

The book is attractively gotten up in size small enough to fit the inside coat pocket without any difficulty, and the low price at which it is sold, only \$1.00, should place it in the hands of everyone of our readers who are interested in laying out stairways and who are interested in seeing that this work is laid out correctly and quickly.

Saving Both Time and Money

The contractor or his foreman has his choice of two evils on the job. He can give each of his carpenters a hank of sash cord or chain and tell them to go to it, trusting to luck that they will not waste it nor take any of it home for dog chains, etc., or he can go around very carefully and measure each of the windows, cut off the proper length of cord and trust to luck that they will remain where he puts them until the carpenters have time to put them in place. Both of these systems have their disadvantages and these disadvantages are particularly noticeable on the larger jobs where the contractor or his foreman cannot be all over the job at one time.



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Convertible

so that it may be used as a
Level or Plumbing Transit

Dietzgen Architect's Level

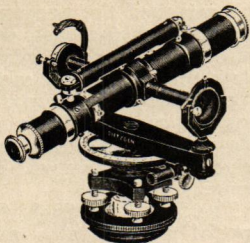
No. 6013

is absolutely dependable
—simple in design—easy
to operate—fully guar-
anteed. Write for catalog N.

Eugene Dietzgen Co.
Manufacturers

Measuring Tapes, Drawing Materials
Surveying Instruments

Chicago New York San Francisco New Orleans Toronto Pittsburgh Philadelphia



Estimators' Price Book and Pocket Companion

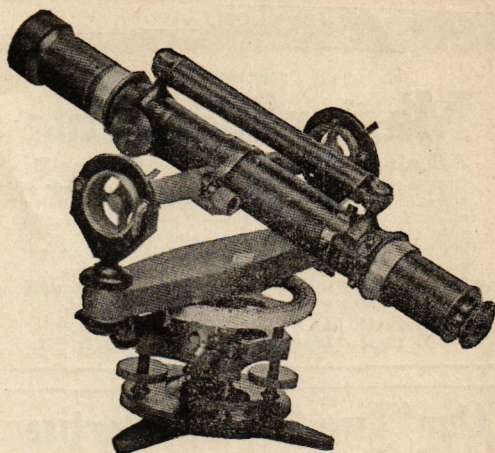
By I. P. Hicks. 2nd edition, revised and enlarged.
Over 180 pages. A guide to prices of all kinds of
building materials, with handy rules, tables and
miscellaneous information. Price, postpaid, \$1.00.

Hodgson Book Co., 537 So. Dearborn St., Chicago, Ill.

BUSINESS OPPORTUNITY

WANTED—A man under thirty-five years of age,
with practical experience as carpenter
or contractor. Thorough knowledge of barn construction
and plan reading essential. Opportunity for ad-
vancement with large concern for right man.

Address K. S., Care of The National Builder, Chicago



An Improved Convertible Level

for Architects, Builders and Contractors

Improved Type, instantly converted into a transit by
means of our patented phosphor bronze axis. An accurate,
durable instrument, converts time and results into money.
Write for Catalog N of Convertible Levels and our full line
of drawing material, etc. Address

New York Blue Print Paper Company
60 Reade Street
NEW YORK CITY

ALOE
Convert-
ible
Level



No Expert
Training
Necessary
To Use the
ALOE

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 for laying out buildings, locating foundation piers, level-
ing 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.

More Than a Mere Level

It is a modified transit permitting double the range of work possible with an ordi-
nary architect's level. Sights above or below the horizontal can be taken. For taking
vertical sights there is 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 specially 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

You owe it to yourself to see and try the Aloe Convertible Level. 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. There's no
red tape about this offer—we ask no embarrassing questions—everything is con-
fidential—we charge no interest. You have practically your own time to pay.

Mail Coupon For Descriptive Circular

Shows how easily the man without the training of the engineer or sur-
veyor may secure the same accurate results as the expert. Send name on
coupon or postal for free copy and full particulars of your original,
unique and popular selling plan.

A. S. Aloe Co., 613 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
613 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.....





"INTERLOX"

Master Slide Rule

All sizes 2 ft. to 8 ft.--18c per ft.

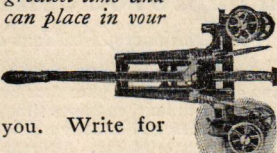
This is the famous Interlocking Slide Rule, made of select imported boxwood, handsomely finished with all-brass, non-rusting slides and locks. This is the only rule that will instantly and accurately give inside and outside measurements. No loss of time; no guess-work; no mistakes.

Send for circular fully describing this rule, or send price for any size desired. Agents wanted.

DAHL MANUFACTURING CO.
51-B East 42nd Street, New York City

Our "Two Minute" Mortiser

Cuts an opening for a mortise lock in two minutes. In any kind of wood. For any size lock from $\frac{1}{2}$ " to $1\frac{1}{2}$ " thick. *The greatest time and labor saver that you can place in your tool kit.*



Built especially strong—easy to operate. Our trial offer is open to you. Write for particulars now.

A. W. MILLER MFG. COMPANY
8th & Vine Sts., Riverside, Cal. 3158 Hillside Ave., Cincinnati, O.
Our Butt Mortiser and Rule Gauge, 75c Postpaid

SYRACUSE Nail Sets 10¢ Each



Each point accurately cupped and hammer tested. Finest quality of steel. **Sizes 2-32 to 5-32.** At your dealer's or 10c each direct from us. Our "NOROL" Square Nail Set is made in the same sizes at 12c each.

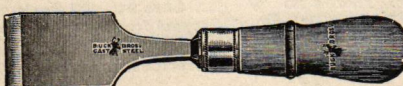
Syracuse Twist Drill Co., Syracuse, N. Y.

1853
1916



BUCK BROS.

**61 Years of Tool Making Behind
Buck Bros. Products**



Our line of tools includes Gouges, Plane Irons, Chisels, Drawing-knives, Nail Sets, Screw Driver Bits, Carving Tools, etc. Our reputation guarantees them all. Catalog shows them all. Write for it.

BUCK BROS. : : MILLBURY, MASS.

The B. & B. Sash Cord Company, 94-100 Clarkson St., Ansonia, Conn., have an entirely new principle in sash cord. In their system it is possible to obtain cut lengths to which are attached the necessary fixtures for attaching to both the sash weight and to the sash. In ordering these cords it is only necessary to state the size of the sash to be sure of obtaining exactly the right length. The proper number can then be portioned out to each of the carpenters and there is no question but what the windows will be properly and quickly hung.

The B. & B. Sash Cord Company have a special trial offer to make to our readers at this time. A postal to them will bring full particulars, prices, etc.

High Grade Hollow Tools and Wood Boring Tools

Catalog M, 1915, of the Forest City Bit & Tool Company, Rockford, Illinois, shows the complete line of hollow chisels, wood boring tools, mortising chisels, standard bits and augers, countersink drills, etc., as well as a straight line of special tools for particular purposes. The catalog will be of exceptional interest to anyone who has a woodworker and who does a variety of special work requiring special tools. It will be equally interesting to anyone who does any kind of work out of the ordinary and who is particular to do it a little bit better than the average first class mechanic can turn it out with ordinary tools.

The catalog will be sent free on request to the Forest City Bit & Tool Company of the above address.

A High Speed Clamp

Every carpenter, and particularly the cabinet maker and the jobber, has frequent use for clamps for holding work together while being grooved or worked into the desired shape. The clamps made by D. R. Stuart, Harlan, Iowa, have proven unusually satisfactory in the cabinet shop, in jobbing work, and in fact wherever they have been used. These clamps are made in a variety of sizes to take work up to 30 inches, while special sizes can be readily had if desired.

An unusual feature of these Stuart High Speed Clamps is that it is adjustable for a number of sizes; in fact each clamp is able to take up some eight different widths of wood or a variation of some six or eight inches in width.

Mr. Stuart will be glad to send our readers further particulars regarding these clamps, a circular showing the clamps in use, and their wide adaptability, as well as special prices which he is making to our readers at this time.

Felsco Builder's Steel Bracket

As it is universally recognized that the contractor must have a folding steel bracket in order to carry on his work to advantage, it only remains to elect the one which is of the greatest value to him in his particular work.

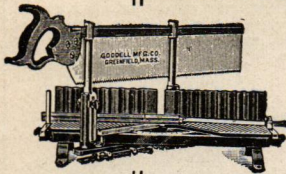
Advertisers' Section



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**GOODELL
PRATT**
1500 GOOD TOOLS

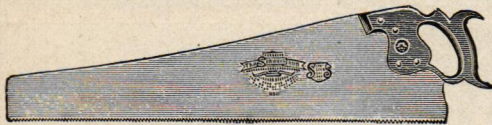
All-Steel Mitre Box



Unbreakable
Many Special
Features
Circular Free

□□

GOODELL-PRATT COMPANY
TOOLSMITHS
Greenfield : Mass., U. S. A.



Why go another week with- out a good saw?

For two dollars and a half you
can now secure a

Simonds Hand Saw

24 or 26 inch length, any point, either
cut-off or rip, wide or narrow blade,
straight or skew back. Surely this is a
remarkably low price for this high grade
saw. At your Hardware Dealer's or if
he does not have it, send your order
direct to the factory. Ask us for a free
copy of the useful hand book, "Simonds
Guide for Carpenters."

Simonds Mfg. Co.

"The Saw Makers"

Fitchburg, Mass. Chicago, Ill.



Pearson's Automatic

Shingle Nailer

Pays for Itself on the First Job

Very Fast on Any
Pitch Roof

For 3d Common or
Galvanized Wire Nails

Write for Circular
Money refunded if
not as represented

Pearson Manufacturing Co.

Makers of Hand Nailing and Tacking Tools
Robbinsdale - Minnecota

List
Price
\$7
but an
order
from this
Ad will
bring the
Nailer to
you post
paid for
\$5



Laying Out Work

WORK well
laid out is
well done. Careful
laying out requires accu-
rate tools.

Accuracy in tools requires
the best possible quality

and workman-
ship. The adjust-
ments must be deli-
cate yet permanent.
Points must be fine
and true—joints must
be firm and enduring.
These are features
that have made

**Starrett
Tools**

and Instruments

The standard tools of
accuracy. Among the
2100 styles and sizes
are many especially de-
signed for wood work-
ers, some of which are
shown here. There are
many others that the
careful workman
will be glad to add
to his kit.

Quick adjustment is a
factor in Starrett Tools
that saves valuable time.

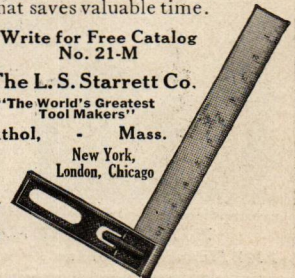
Write for Free Catalog
No. 21-M

The L. S. Starrett Co.

"The World's Greatest
Tool Makers"

Athol, - Mass.

New York,
London, Chicago

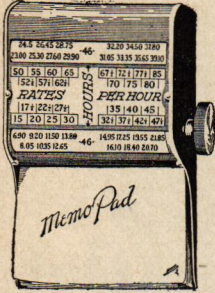


Advertisers' Section

PUT THIS DOME ON
LETTERS YOU WRITE
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Pay Roll in 20 Minutes



easily and accurately made with The "RICHMOOR" Wage Computer

Size 4 in. wide, 6 in. long, and 2 in. thick. Weight 1 lb. Finish either nickel or oxidized steel. Can be carried in pocket. A child can operate it. Turn handle to number of hours or half-hours and instantly the total is before you.

Try it for 30 days at our expense. Money refunded if YOU are not absolutely satisfied. Lasts a lifetime and pays for itself in 1 month. Send today for price, circular and full information.

FRANK D. BASSETT

840 Transportation Bldg., Chicago

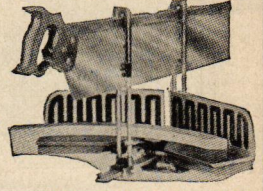
Kawalle Automatic a Superior Mitre Box

Why! Because you can absolutely depend on every cut that you wish to make on being the **true cut** for the purpose for which it is intended. It will **automatically** give the **true cut** of any corner without figuring degrees. It will **automatically** give the **true radius cut** of any circle work without knowing the diameter.

Write for circular

Shipped prepaid, on 10
days' trial

**Kawalle Automatic Mitre
Box Company**
504 North Ninth Street
Manitowoc, Wis.



The Miami Trailer

Here's What They All Say:

*The "Miami" will save
you money*

Write for prices and folder
telling why the "Miami"
is the trailer for you to buy

The Miami Trailer Co.

July 14, 1916

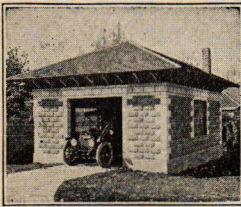
Gentlemen: While building a concrete grandstand near your town we were in need of some kind of a light trailer, which could be pulled by a Ford, also carry about ten men a distance of twenty miles, also do draying on a small scale. The only thing we could find for that purpose was your Model No. 2 Trailer. We have been using this now going on to five months, and have our first dollar to spend for repairs. It has given us very good service and we do not hesitate to recommend this trailer to anybody in need of a light trailer that will carry about 1200 lbs. We at times have hauled 2000 lbs. without any trouble.

Very truly yours,

Hanneman Brothers, Detroit, Mich.

The Miami Trailer Company : : Troy, Ohio

Use Ideal Concrete Blocks



Designs of individuality. Each block exact in measurement and alignment. Reputation established among Builders, Architects and Contractors. Simplicity of machine operation is a guarantee of good profits. We aid our customers with our service departments.

IDEAL CONCRETE MACHINERY CO.

1312 Monmouth Avenue

Cincinnati, Ohio

The Steel Square

Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first--really the only--to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the **Steel Square** for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter.

Single Volume, Part I, cloth, \$1.00. Part II, \$1.00.
Two Volumes, \$2.00. Postpaid at these prices.

HODGSON BOOK CO., 537 So. Dearborn St., Chicago



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ADVERTISERS. IT HELPS

Advertisers' Section

In this connection it is interesting to note that the Felsco Builder's Steel Bracket, made by Fellows & Company, 127 Portland Street, Boston, Mass., embodies some features not found in other brackets. For instance, the bracket is so designed that it can be used on old work as well as new, that is, if the building is to be re-sided or re-shingled, or in fact any work to be done, which requires scaffold brackets, these brackets can be used without damage to the inside plaster of the building. This feature alone should make it of great value to anyone who has work of this kind to do.

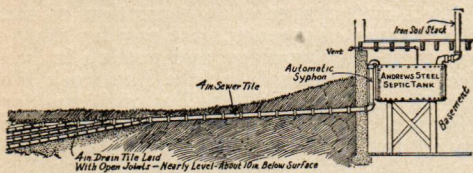
The Felsco Builder's Steel Bracket is also made of the very best of material and is designed so as to fold compactly when not in use. Every part of the bracket is so designed that it is exceptionally strong and there is little or no probability of its getting out of order or wearing out during the course of a long life.

Messrs. Fellows & Co. will be glad to send our readers further particulars regarding their bracket and also prices which they are making to our readers.

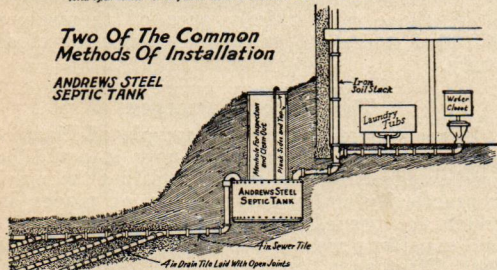
Easy Method of Sewage Disposal

The contractor or home owner who has had difficulty with sewage disposal in suburban districts will find a happy solution of the problem in the Andrews Septic Tank. It is low in price, so low that it doesn't pay to experiment with cement.

There is no experiment with the Andrews Septic Tank. It has stood the test of years and each year brings it new laurels. Not one of these



Two Of The Common Methods Of Installation



How Andrews Septic Tanks Are Placed

tanks has ever failed. Many of them have never required the slightest attention during the several years they have been in service, although its manufacturer states that a bucket or two of sludge will probably need be removed each year.

Andrews Septic Tanks are made of heavy steel plate and are of very convenient sizes to handle. The fittings are standard. The decomposition chamber is exactly the right proportion to handle the sewerage perfectly so that when the automatic siphon forces it out on the filter bed it is in the

Here's Another "YANKEE"

Quick Return Small Size

No. 135

For Smaller Screws

☞ A quick and convenient Tool for Carpenters, Cabinet Makers, Electricians and all Mechanics who frequently have a large number of small screws to drive.

☞ A spring in the handle drives it back quickly for the next thrust and holds it extended, which with the Screw Holder Bit shown below makes it a very excellent tool for overhead work or in places where no other screw driver will reach. Takes the several attachments shown below.



Chuck and Three Drills



Countersink



Bit with Screw Holder



Bit for Screw Eyes

Your Dealer Can Supply You



Let us send you the "YANKEE" Book. A postal brings it

North Bros. Mfg. Co.
Department N, Philadelphia, Pa.

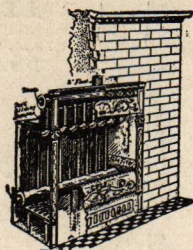
HEITLAND

Hot Water Circulating Fireplace Heaters

Economical and Healthful heat for Bungalows. It is invaluable as an auxiliary heater to a cellar Hot Water Boiler in a large residence.

Any good mechanic can install this system, we furnish a piping plan free.

Write for circular, also catalogue of Fireplace Fixtures and Mantels if interested.



Heitland Grate & Mantel Co.
134 N. Fifth Street Quincy, Illinois

form of liquid which is quickly oxidized leaving no odor or not contaminating the nearby soil. It works equally well in winter as in summer.

Installation is very simple and we suggest that anyone interested write to the Andrews Heating Company at 1496 University Ave. S. E., Minneapolis, Minn., for their folder showing various methods of installation, sizes and full information. Special terms are arranged for contractors which give them a profit as well as enabling them to induce good clients to build in localities where city sewer service is not available.

Suggestions on the Care of Saws

When a high-grade saw comes from the dealer it is a thing of beauty, and an object of interest, as well as a tool of the greatest utility. In a short time, however, its value to the owner is simply what it will do for him, and when it begins to lose its sharp edge, it must be restored by careful filing.

It takes a good man to file a saw, and the greatest care must be observed thru the entire operation. The many points to which the carpenter must give attention are well described in a booklet, which C. C. Taintor, the inventor of the Taintor Saw Set, has written for distribution among our readers. The Taintor Mfg. Co., 113 Chambers St., Dept. C, New York, who manufacture the Taintor Saw Set, will be glad to hear from any of our readers who have not already received one of the valuable booklets.

One must not think that the booklet is merely a description of the Taintor Saw Set, altho that clever tool is fully described in it. The booklet is rather a careful description of the proper manner of preparing the saw for sharpening, correcting troubles, and putting it into perfect condition for doing the fine work for which the readers of the National Builder are famous. Those who consider themselves equipped for handling saws under all conditions will find much of interest in the booklet, while those not entirely sure of themselves will find it a most valuable booklet for close study.

The Use of Plastergon

If one were to examine a sample of Plastergon carefully, and consider how it could be used to advantage, he would find that there are a practically unlimited number of places in which the use of Plastergon is advisable. If one considers merely the expense, he will find that Plastergon is cheaper than lath and plaster. If a saving of materials is considered, he will notice that he can buy exactly the quantity required, and as there is no waste in cutting and fitting there will be a considerable saving in material. If time is an object, Plastergon can be applied easier and much quicker than lath and plaster, in fact it can be put on quicker than the lath alone. If one wants a substance which is most clean and vermin-proof, he will find that Plastergon will supply this, as it is made of clear spruce wood impregnated with a substance which makes it vermin-proof as well as water-proof. The con-

Buy Direct and Save Money

Gibson Furnaces

Are Sold Direct to Contractors

We want your business—

Our prices are low, considering the unusual value of the Gibson Furnaces.

Blue prints drawn to scale furnished.

Write for catalog, prices and special discounts. You will find Gibson Furnaces right for your own home and for the buildings you're erecting.

Gibson Furnace Co.
415 Miles St., Waterloo, Ia.

Saved by buying a

\$50 BOVEE ECONOMY FURNACE \$50

At Manufacturer's Prices

Has a large combustion chamber. Saves one third of the fuel. Has perfect

Ventilating System

The Most Perfect Hot Air Plant Sold

Send pencil sketch of floor plan for our manufacturer's price and illustrated catalog.

Bovee Furnace Works
60 8th Street Waterloo, Iowa

The Queen City

COAL CHUTE

has reinforced lid. Lumps cannot break it. Hinges made of steel.

Send for prices and circulars

HASTINGS FDY. & IRON WORKS
Hastings, Nebraska



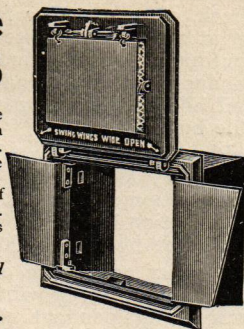
PUT THIS DOME ON
LETTERS YOU WRITE
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See the WINGS

Marvel Coal Chutes are the only ones that protect both the foundation and siding. Made of heavy boiler plate and cast iron. **Prices right.** A reliable chute worthy of your confidence and use. Learn the valuable features of the Marvel.

Write for leaflet "N" and prices

Interstate Mfg. Co.
Oskaloosa Iowa



It Pays You to Install Kewanee All-Steel Coal Chutes

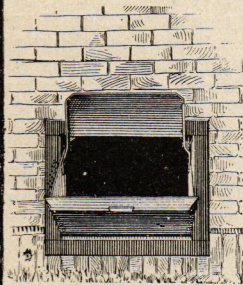
in new or old buildings. You make a big profit and gain the everlasting gratitude and friendship of the house owner. He is absolutely satisfied with "Kewanee" All-Steel Coal Chutes.

They Last and Protect

"Kewanee" All-Steel Coal Chutes are built entirely of sheet steel. No cast iron or glass to get broken. Automatic and easily unlocked from any part of the house with a cord which releases the trip lever lock on the chute. Burglar-proof and foolproof. Easy to install in any building. Never need repairs. Nothing to get out of order.

Write today for special proposition to Contractors and Builders, also Booklet N telling all about coal chutes.

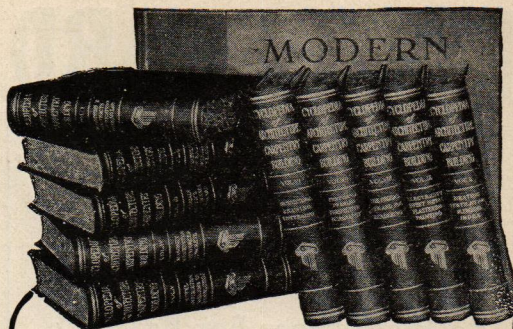
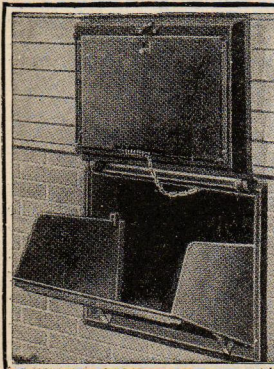
Kewanee Manufacturing Co.
Kewanee, Illinois



"JULIEN" Coal Chute

A perfect coal chute and an attractive looking basement window. Lets light in; keeps burglars out. Locks automatically from the outside; opens only from the inside. When in use the door protects the building, and a steel shield protects the glass. Write for circular, prices and discounts.

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Partial Table of Contents

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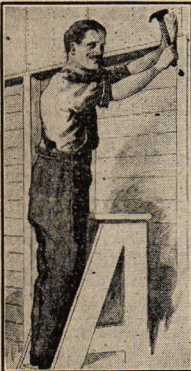
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There are some men who think that economy consists in doing without the things that one does not absolutely need. In other words, they will go without a tool and fix up a makeshift at a cost of time far more than the proper tool would cost. The result is dissatisfaction to the contractor, time is wasted this way, and it is likewise unsatisfactory in the work because the makeshift is not as perfectly adapted



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WALL-BOARD *\$4 to \$6 per*
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That is why, in American home building today, there is more Southern Yellow Pine used than all other woods combined.

Keep That in Mind When You Build!

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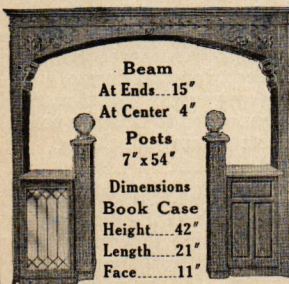
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Second Edition, revised and enlarged. Over 180 pages. A guide to prices of all kinds of building materials, with handy rules, tables and miscellaneous information for the estimator.

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Book Case Colonnade



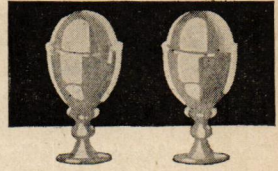
Beam
At Ends...15"
At Center 4"
Posts
7" x 54"
Dimensions
Book Case
Height...42"
Length...21"
Face...11"

This newly designed colonnade is not only beautiful but useful as well.

Send for new Catalog showing many attractive designs in Grilles, Colonnades, Parlor Columns, Consoles and Sideboards.

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GRILLE WORKS
 830 Wells Street
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Which is the bad Egg?



We'll give you two guesses.*

With only the picture before you it's a *guess* at the best.

If you had the actual eggs in your hand, there would be two ways to find out which was the bad one.

You could hold them up to the light and tell.

Or you could bake each one into a cake and tell the bad egg by tasting the cake.

But why spoil the cake?

There are good wallboards and bad. You can't tell a poor piece of wallboard by its looks any more than you can a bad egg. Defects in wallboards only show up on the finished wall and then usually, they are glaring defects. You can't afford to spoil the room in order to test the wallboard. There is one way and only one way, to be sure. There is only one standard and that standard is Beaver Board—the pioneer in its field.

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But you can't expect Beaver Board results unless the Beaver trade-mark is on the back of the board you buy.

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*You were wrong. Both were bad eggs.

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MacAndrews & Forbes Company
 CAMDEN, NEW JERSEY



McCray Refrigerators

There is a McCray suitable in size and price for homes, stores, hotels, clubs—and public institutions.

Ask for Catalog

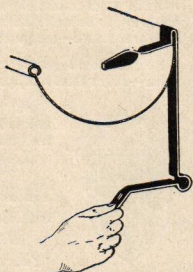
No. 92—For Residences
No. 50—For Hotels, Clubs and
Institutions
No. 74—For Florists

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No. 61—For Meat Markets and
General Storage

McCray Refrigerator Co.
659 Lake Street Kendallville, Ind.

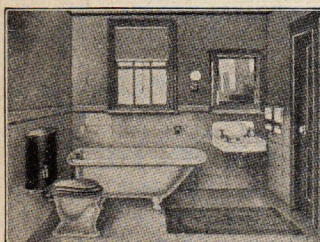
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Saving**

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lavatories, kitchen

sinks, pneumatic waterworks supplies, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. **Write for illustrated catalogue and prices.**

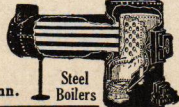
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to the work in hand as the original tool would be.

In this respect the Never Break All-Steel Saw Vise made by the Clipper Tool Co., 287 Mills St., Buffalo, N. Y., possesses unusually good features. Of course, a saw clamp can be made out of a piece of flooring with a wedge-shaped hole cut in it and a couple of boards adjusted so as to hold the saw more or less firmly in place. With this makeshift, however, satisfactory work cannot be done, and it takes far more time, besides costing the contractor a lot of unnecessary money.

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Light Weight, Low Priced, Heavy Duty Concrete Mixer

Some wear and tear on any piece of machinery is to be expected, but as a rule most of the wear is localized in one or two parts. In the concrete mixer the lining of the drum must stand the abrasion of the large mass of materials being constantly thrown against it. It stands to reason that this part will wear faster than any of the rest. The concrete mixer that is designed to withstand this wearing action will unquestionably outlast all the other kinds.

There is nothing particularly novel about the machine mixing of concrete. The general principles are used in any number of machines and it only remained for the genius of particular inventors to evolve machinery which would do the work to greater advantage. The concern which could turn out a better class of machine for less money is able to put into the field a concrete mixer embodying all the good principles and yet at a moderate price.

Department 10 of the Koehring Machine Co., Milwaukee, Wis., is devoted entirely to concrete mixers. The several styles which they make are described fully in booklet 36 F, issued of the above department and sent to our readers free on request. This booklet, or rather a generous sized catalogue, shows not only the various styles of mixers made for various purposes, such as paving, foundations, building construction, etc., but along with the descriptions of the mixers are shown photographic views of the mixers in action on various classes of work. Some of them are being used for road building, for reinforced concrete building, for dams and reservoirs, concrete buildings and various other purposes. Our readers should have this catalog in order to be fully posted on the subject of concrete mixing machines.

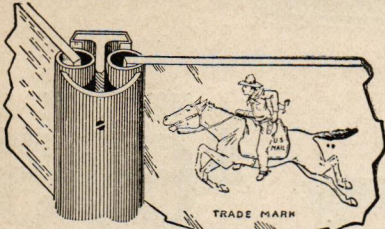
In an action to recover for the furnishing of plans for the mechanical equipment of a hospital for the insane, evidence held insufficient to show that the act of the board in writing "approved" on the plans was an acceptance.—*Moore v. Saunders*, 153 P. (Wash.) 329.



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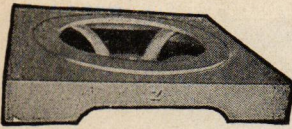
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FLY BREEDING PRIVY CAN BE DESTROYED

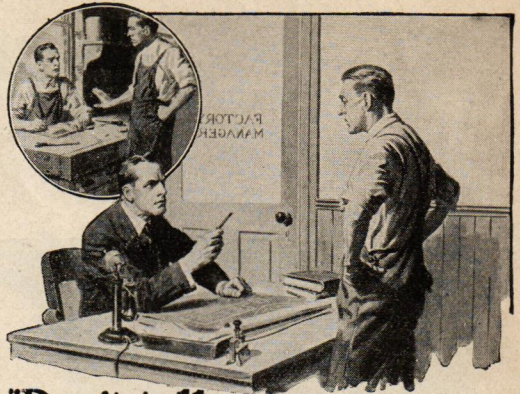
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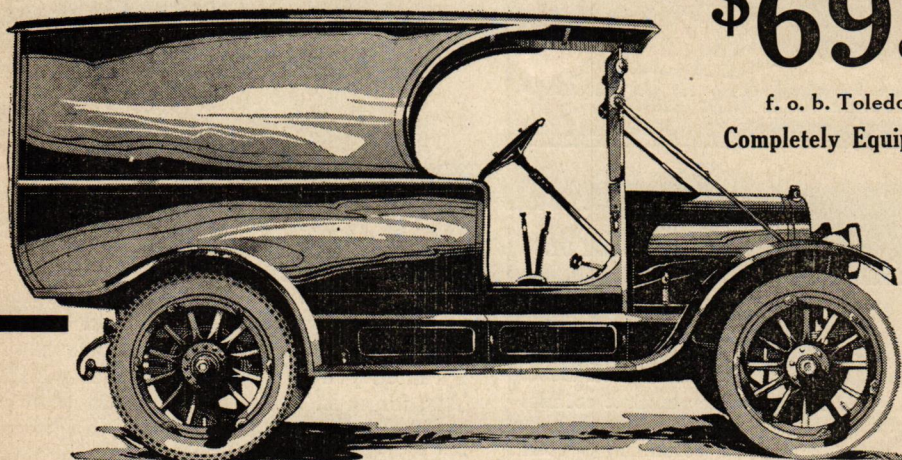
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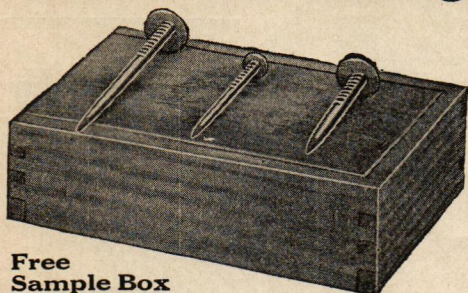
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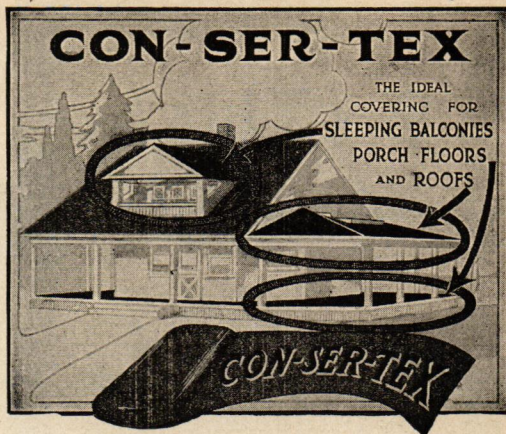
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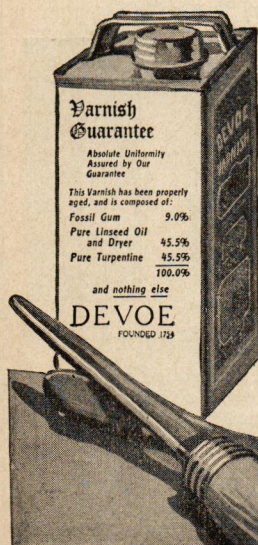
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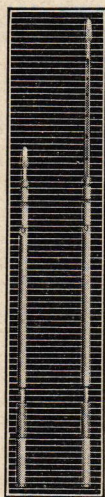
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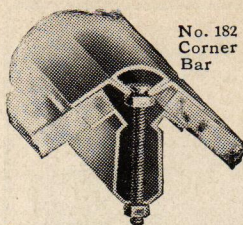
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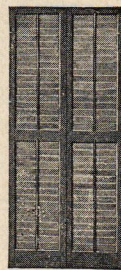
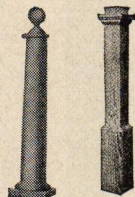
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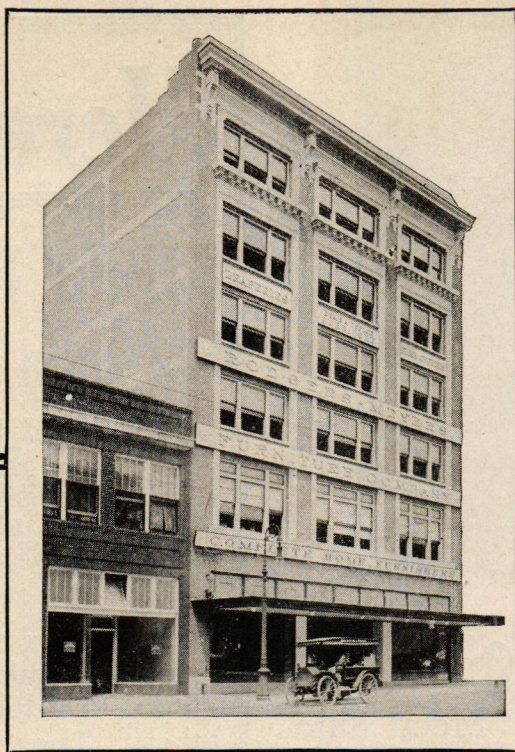
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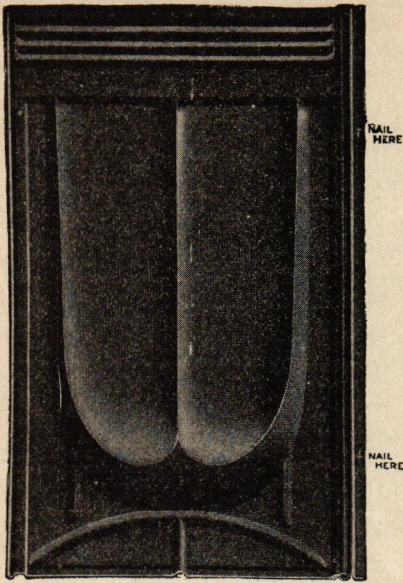
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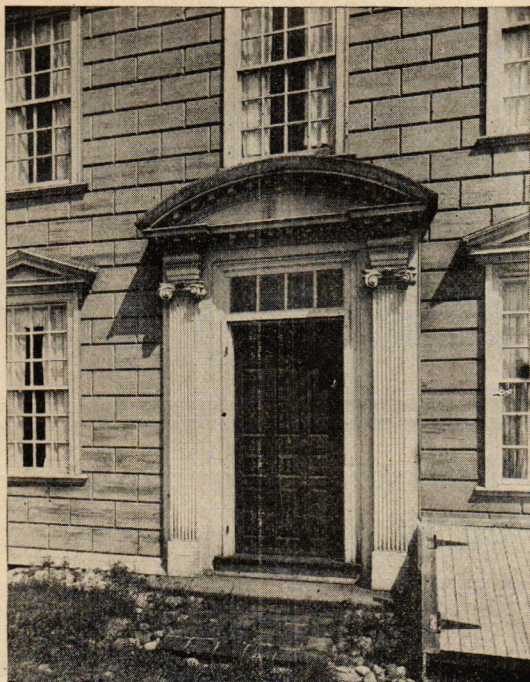
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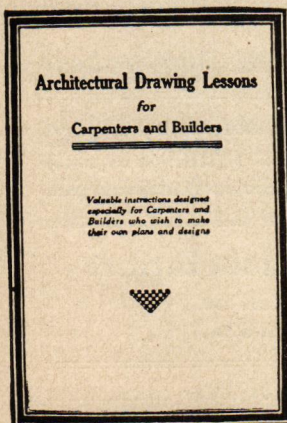
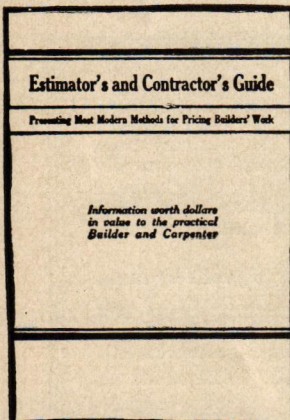
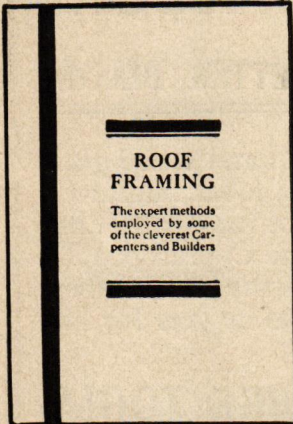
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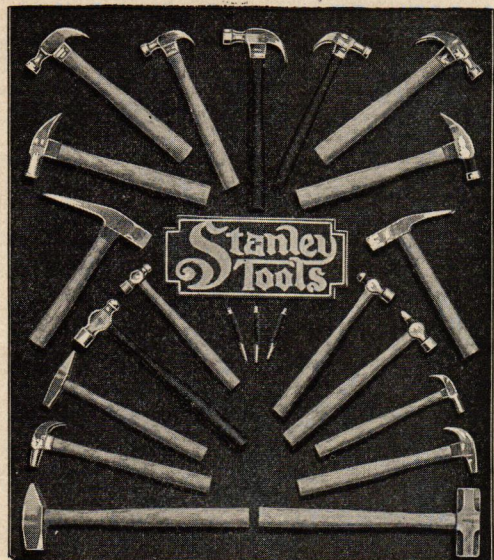
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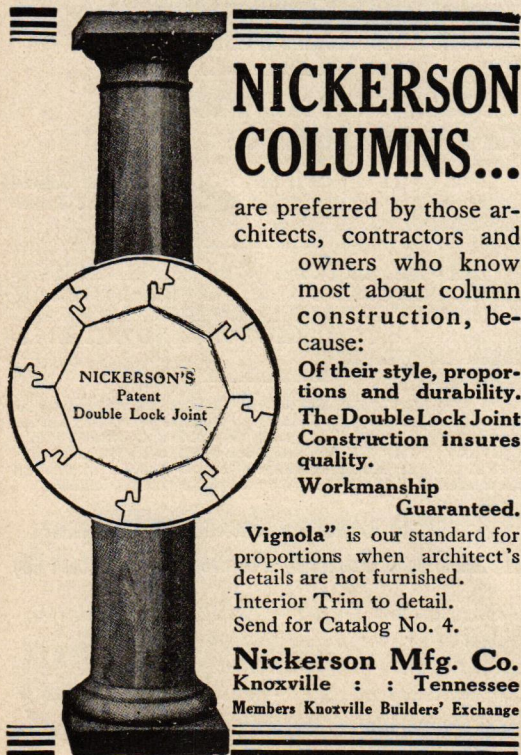




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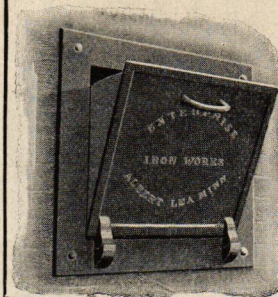
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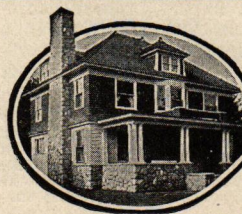
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The National Builder seeks the advertising of reliable houses only, and asks that prompt notice be given by any reader who has cause for complaint against an advertiser, that the matter may be investigated and the advertisement discontinued should the advertiser be proved untrustworthy.

Bargains for Builders

**50,000
MONEY
SAVERS**

Through opportune buying we have secured an enormous stock of building materials at B-U-S-T-E-D P-R-I-C-E-S. Never before have we been able to save the building trade quite so much as we can now, with prices soaring to the clouds. We list below a few bargains selected from our catalogs called "Bargains for Builders." Send for these money-saving books now.

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Bargains**

\$269 Buys a Carload of New Lumber

We ship direct to you from our mammoth lumber manufacturing plant a whole carload of brand new lumber for \$269.00 as outlined in our special DIRECT-TO-YOU lumber bargain offer. Every piece is strictly up-to-grade, brand new, clean stock. Hundreds of builders have profited by our exceptional offers. Buy now! Prices are bound to go higher!

32c for 100 ft. Quarter Round

Real savings on the best grade of Millwork are made when you order Millwork from us. Our Millwork Factory is running full blast, making high grade mouldings, interior trim, as well as doors, windows, colonnades, side boards, buffets, stair material, door and window frames, etc., etc., porch material and woodworking "fixings" of all kinds. Our Millwork Catalog contains 50,000 bargains. You must send for it today. With it we will send you our Quick Action Bargain Sale Circular, and our special Screen and Sash Circular. You will be delighted with the high quality articles offered, some at a reduction of nearly 50%.

By just asking for "Bargains for Builders" ET-63 you receive all the above.

**24
YEARS
Honest
Dealing**

\$45 Buys a HARRIS Pipeless Furnace

The Harris Pipeless Furnace is manufactured expressly for us and is recommended as the most practical and economical of all. In addition we offer tremendous bargains in warm air heating plants priced as low as.....\$59.00 Steam heating plants for 6 room houses.....\$69.00 Hot water heating plant for 6 room houses.....\$79.00 Our "Bargains for Builders" Catalogs give all details.

Standard Iron Pipe 2c foot

No one but us could possibly offer standard iron pipe at the prices we make. We furnish it in various lengths 5 to 20 ft. with one coupling to each length, both ends threaded. We have all kinds of bargains in black wrought iron pipe, galvanized pipe, standard casing, tubing, etc. Following prices are for re-claimed and re-manufactured standard iron pipe as described above.

Size 1 in. 3 1/8c per ft. Size 1 1/2 in. 6c per ft.

" 1 3/4 in. 4 1/2c per ft. " 2 in. 7 1/4c per ft.

Size 2 1/2 in. 12c per ft.

and prices on larger sizes on application.

\$50,000 Guaranteed Plumbing Stock Prices! Busted!

We purchased from a great manufacturer a complete stock of new guaranteed enameled "A" grade plumbing goods. This stock is one of the highest grades we have ever handled and we advise builders to get the benefit of it at once. The following few snaps will give you an idea of the bargains we offer. See our "A" Grade Enameled Plumbing Goods Sale. Ask for our "Bargains for Builders" ET-63.

Deep apron porcelain enameled lavatory, size 18x24, with 12 inch back.....\$ 5.60
"A" grade enameled deep apron corner lavatory.....\$ 6.75
"A" grade porcelain enameled corner kitchen sinks, right or left, size 20x30 inches.....\$ 8.60
"A" grade enameled one-piece kitchen sink, size 22x30.....\$ 6.75
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"A" grade porcelain enameled serpentine deep apron lavatory, size 20x24.....\$ 6.90
High grade white porcelain enameled drain boards, size 18x18.....\$ 2.50
Size 20x18.....\$ 2.75
Others sizes equally as low.

"A" grade porcelain enameled bath tubs, 4 1/2 x 5 feet long. Price complete.....\$16.85

Ajax Roofing 38c Per Roll

Builders will never have a greater opportunity to save money than is offered them in our special roofing announcements. 8500 rolls of extra heavy roofing at.....\$1.75 per roll of 108 square feet. High grade rolls as low as.....38c Our collection of books "Bargains for Builders" ET-63 explains everything in detail.

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We fabricate all kinds of galvanized roofing such as corrugated, "V" crimped, brick, standing seam, etc. With market prices around \$6.00 and \$7.00, you cannot afford to overlook the savings of this re-manufactured stock. Send for particulars.

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We always have on hand large stocks of contractors' machinery such as woodworking machines, concrete mixers, hoisting rigs, saw tables, etc. We offer the high grade McVicker Gasoline Engines at prices lower than dealers used to pay. The 4-horse power is only \$56. The 8-horse power is \$122.50. The 12-horse power, \$183. Send for catalogs "Bargains for Builders" ET-63

Send for Our Free Books BARGAINS FOR BUILDERS ET-63

For the convenience of the building trade we have assembled into one collection our building material Bargain Books. Drop a line today. Ask for our "Bargains for Builders" ET-63. They are all free.

HARRIS BROTHERS CO., 35th and Iron Sts., CHICAGO



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Advertisers' Section

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The Doctor Says—

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A properly installed warm air furnace will provide an abundant supply of healthful heat. The furnace causes pure air of proper humidity to be drawn from outside and forced into every room. This fresh air current constantly dispels the foul air and maintains a perfect circulation throughout the house.

Now, Mr. Contractor, your customers want healthful heat without excessive cost. You can give them what they want by recommending or specifying the furnaces made by the well-known manufacturers listed below. These reliable concerns will furnish you with Heating Plans. Their dealer in your town will install the furnace and take all responsibility. You are assured of a good profit, and your customers of perfect satisfaction.

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Monroe Fdry. & Furnace Co.

Monroe, Michigan

What the heart
is to the body
—a good furnace
is to the
home



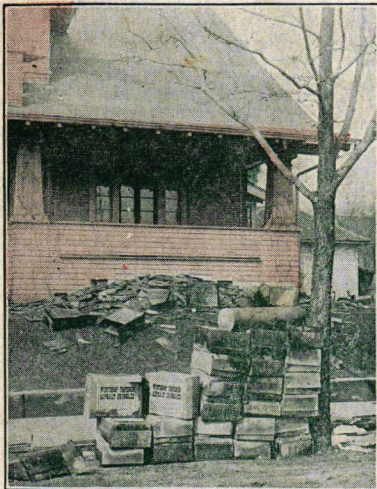
A home in Waterloo, Iowa, less than five years old, originally roofed with wooden shingles, now being roofed with Winthrop Tapered Asphalt Shingles

Not An Expense—An Investment If You Get *Tapered Shingles*

Here's how they feel down in Cleveland; Tapered Shingles are going strong all over Ohio—in one city alone they are on more than 1000 houses.

H. P. Lampert, 1269 West 116th Street, Cleveland, Ohio, writes December 26, 1915:

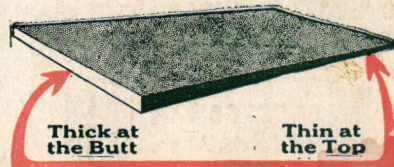
"Have had Winthrop Tapered Asphalt Shingles on my roof since June 12, 1913, and am more than pleased with them. I do not consider them an expense, but an investment. They are neat, durable, non-breakable—therefore do not need repairing. At this time I would consider no other."



Winthrop Tapered Asphalt Shingles
Ready to re-shingle house shown above

That's What They All Say

—and wherever the Winthrop Tapered Asphalt Shingles are introduced, they sell themselves. They win out with less argument than anything you ever tried to sell, for they *look better than wood shingles*, and they have all the protection of asphalt. Drop us a line for samples, prices, etc.



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Asphalt Shingles

Factory: Argo, Ill. 1415 Ass'n Bldg., Chicago, Ill.



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