

THE NATIONAL BUILDER

Price 20c

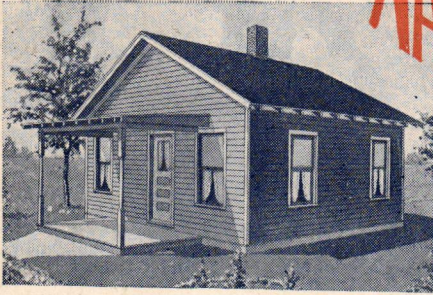
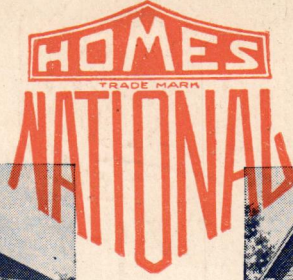
July, 1918



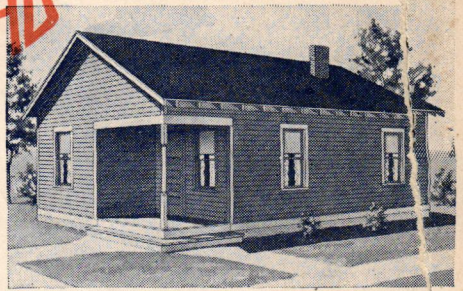
R.B.

INDUSTRIAL HOUSING NUMBER

Containing a Double Supplement with Complete Plans of
Three Types of Industrial Houses and a Ground Layout



Design No. 1183—A one story house with 3 bedrooms. Low in price. Exteriors can be changed with practically no expense.



Design No. 1137—An ideal one story building that will accommodate a good sized family. Design and style can be varied to meet individual conditions.

INDUSTRIAL HOUSING

A Wartime Necessity

THERE'S business to be had and money to be made by contractors who will co-operate with us in securing industrial housing business.

Houses are needed—the building of immense munition plants has brought about the erection of thousands of homes for labor. And the demand is growing daily.

National Homes are shipped ready to erect. They can be erected

quickly and with a minimum of labor, and labor is a big item. Our designs include many houses adapted to industrial housing. Special plans are developed to meet all conditions and needs.

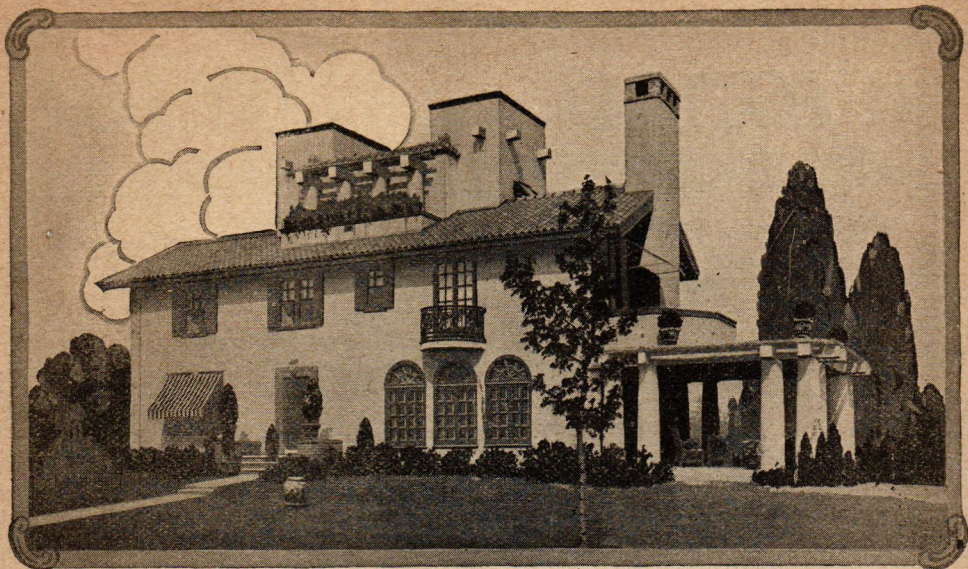
Our plan of co-operation includes help in securing business and we are also in a position to aid in the financing of quantity house business. We back you with complete resources and facilities for the prompt erection of National Homes.

This is a real opportunity for developing big business. Write us for information. Undoubtedly there is an opportunity for such business right in your own locality. Let us hear from you.

National Builders Inc., Saginaw, Michigan



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A Bishopric-Board home at Stamford, Conn.

Architects, Patterson & Dula, New York City

"I absolutely guarantee all Stucco Work done by me on Bishopric Board"

SO wrote one of St. Paul's prominent contractors. Furthermore he says, "I consider it the only lath that will stand dampness and changeable weather."

Absolute dependability is the reason why Bishopric Board today is specified and used by architects, contractors, and builders all over the country.

It builds reputation, secures confidence, promotes more business. Bishopric Board *makes good*.

The construction of Bishopric Board is simple. Its advantages are obvious. Building principles and materials that have withstood the test of centuries are combined in Bishopric Board.

Creosoted dovetailed lath imbedded under terrific pressure in Asphalt Mastic on a background of heavy fibre-board—that, in brief, is Bishopric Board.

The creosote preserves the lath—the dovetail locks the stucco so it can't let go—the Asphalt Mastic on the

fibre-board deadens sound and is proof against vermin, water and weather changes.

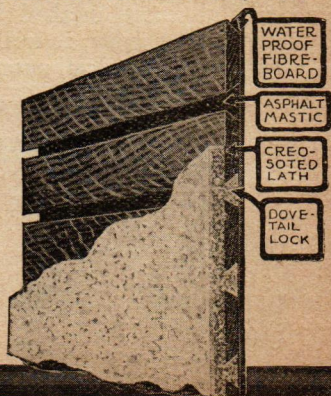
Bishopric Board can be used with or without sheathing and when nailed securely to framework forms a background that can't sag or break away, causing the stucco to crack and flake off.

Bishopric Board insures satisfaction. Don't be contented with anything less. Use a background you can *guarantee absolutely*.

The Bishopric Manufacturing Co., 907 Este Avenue, Cincinnati, Ohio



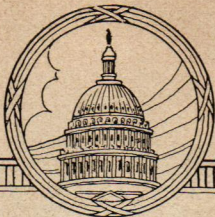
Write for our free book "Built on the Wisdom of Ages," illustrating homes, apartments, factory and public buildings finished in stucco on Bishopric Board. It contains letters from architects, builders and users, and extracts from reports of scientific tests. It also gives full instructions for making a stucco mixture that will last. With this book we send free samples of Bishopric Board. Write today, investigate for yourself, be convinced.



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National Builder



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Fred T. Hodgson.....Editor
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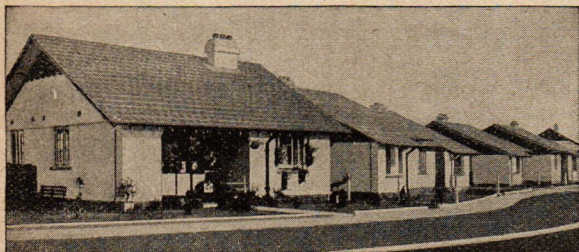
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SUBSCRIPTION RATES

Domestic, \$2.00 per year; Foreign, \$3.00 per year.



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INDUSTRIAL HOUSING

Hy-Rib used as a basis for stucco furnishes an economical fire-resisting construction. Stucco thus reinforced will not crack and presents

an attractive appearance indefinitely. It is therefore a favorite construction in industrial housing.

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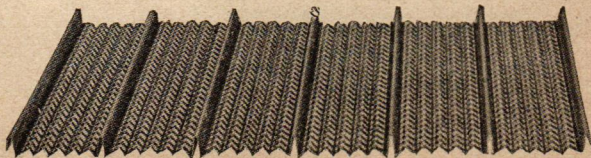
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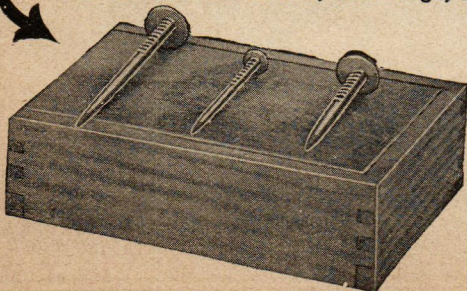
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Write now for our agency proposition for the most complete line of Order-Made

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on the market. We have some good territory still open. Our agents are supplied with a complete outfit of samples, models, etc. We give exclusive agencies to those who make good. This is a splendid opportunity to add considerable to your income. No regular agencies established in towns of less than 10,000. Write now. Address

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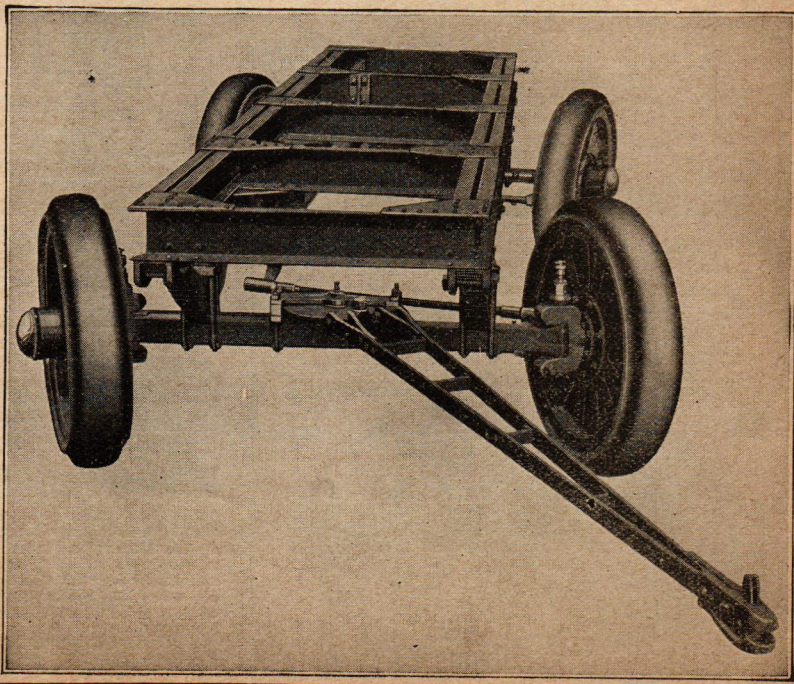
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Ask for the GF Waterproofing Handbook which covers the application of entire line of GF Waterproofings.

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Stocks in
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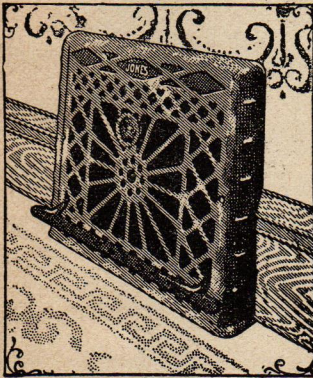


***We can live 3 weeks without food.
We can live 3 days without water, but
We can live only 3 minutes without air.***

Air is not fit for breathing unless it is **Pure and Fresh.**

When you heat your new home the air will be pure and fresh if you have the **Jones System of Warm Air Heating and Ventilation** installed in connection with the **Jones side-wall warm air Registers and Ventilators.**

The Jones Registers are the only warm air registers that provide for **Ventilation.**



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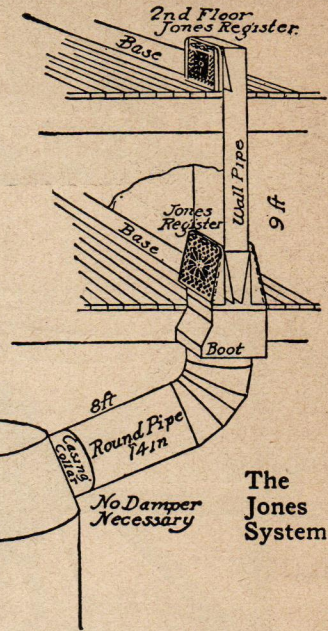
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Our booklet, "Advanced Methods of Warm Air Heating" free.

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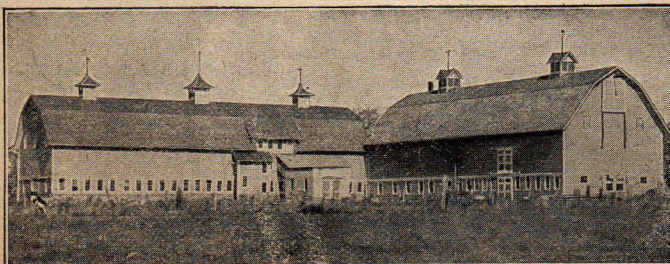
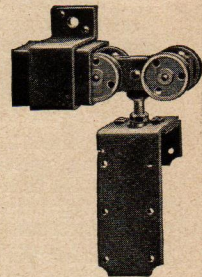


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R-W Barn Door Hangers

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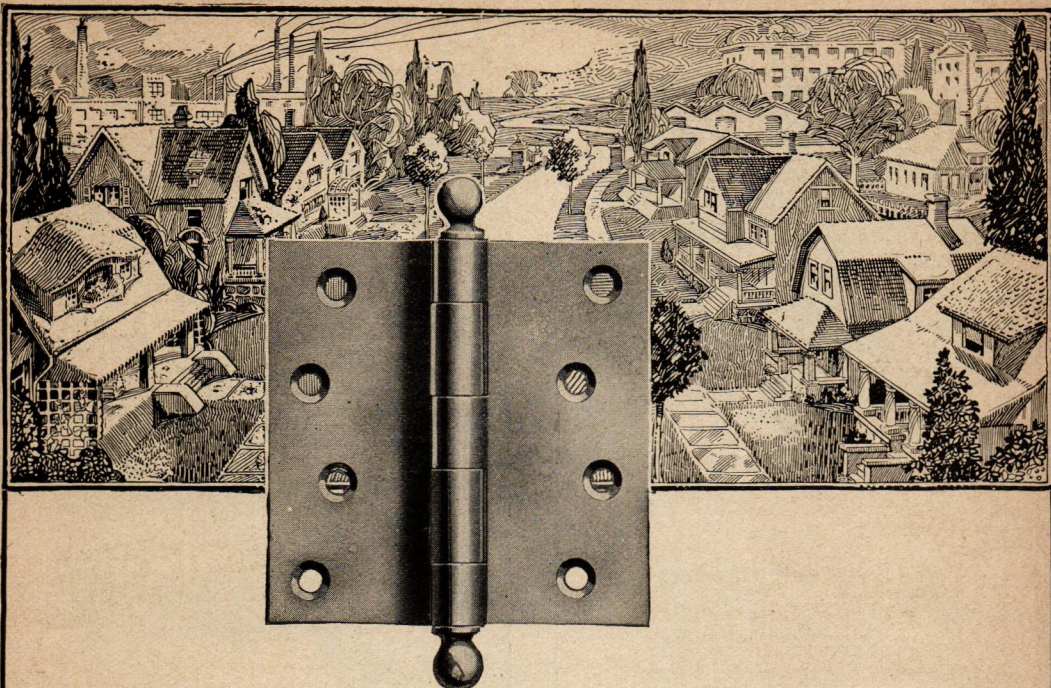
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McKinney Builders' Hardware is ideal for this type of work. It is of long wearing quality and the price is right. Every hardware dealer carries the well known McKinney line or can get it overnight.

The McKinney Butt Hinge Book describes the products and tells about the handy McKinney sets. It also contains valuable tables for matching up wood and hardware finishes.

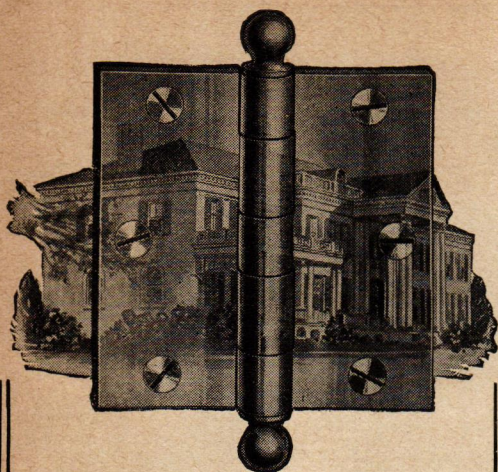
Send for it today.

McKinney Manufacturing Company
Pittsburgh, Pa.



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AS you enter the home what a welcome it is to have the door swing open wide, free and easy on GRIFFIN Butts, and as you move about the house and have the properly hung doors swing free and silently as if by magic, as you observe the beauty of it all, there comes that wonderful satisfaction which can only be explained—"The Comforts of Home."

GRIFFIN

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The Griffin Manufacturing Co.
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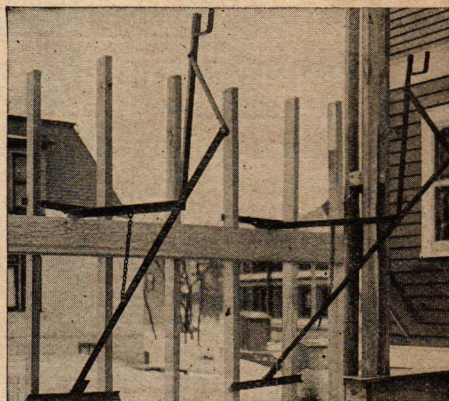
Stock Fire-Proof Doors

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Made of best grade angle steel. Guard rail prevents danger of falling off; no nails to drive, no screws to fasten. Simply hook brackets to studing. Cross arm prevents side sway. Folds compactly for carrying. **Absolutely guaranteed.** If you are not satisfied after 30 days' trial return them at our expense.

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John Faragher, 809 S. Brooks Street, Madison, Wis.



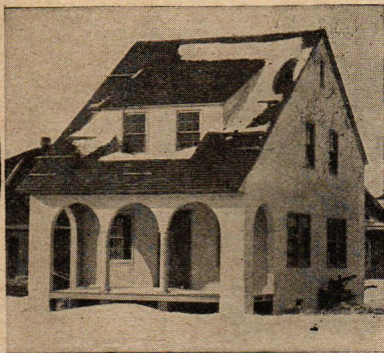
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constructed with "Bostwick Truss-Loop" Metal Lath are distinctive and substantial. The decided saving in framing cost, the great strength and the ease of application are the reasons that

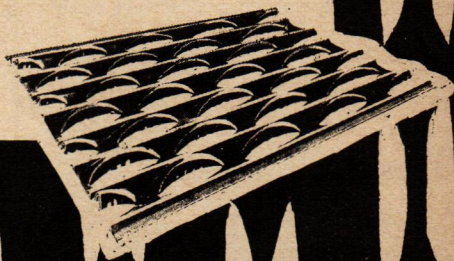
"BOSTWICK TRUSS LOOP"

Metal Lath is used for Industrial Housing construction. You should know all about Bostwick Metal Lath — how you can use it to advantage in either new or remodeling work. It is ideal for transforming old homes into new, modern, fire-resistant buildings.



Send today for the beautiful illustrated "Bostwick" catalog. It gives complete information on the economies of lath and plaster construction.

The Bostwick Steel Lath Co.
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For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood-Carpet, strips, Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for colored sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalog in natural wood colors.

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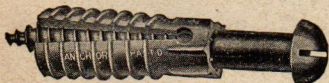


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Examine them and you will find some of the *Diamond* distinctive features in *all*, but you will find *all* in none but the original.



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Mfrs. of Diamond Specialties

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Brown's Race,

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Step by step, through all these 52 years, our service has grown, keeping abreast of our business. Slowly we have built up a big Service Department, whose whole function is to co-operate with architects and home builders everywhere—to show them how our products can be of most value.

In our Nation's present great industrial home-building emergency, the Curtis Companies stand ready with the resources, the facilities, the producing capacity, and the experience required to meet the need.

1866
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Write today for our catalogue—tell us your problem—we can help you.

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Carey

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"I'll stake my reputation on PLASTERGON WALL-BOARD"

YOU needn't dodge any questions at all in recommending this heavy, tough Wall-Board. Goes up easily and quickly. Once up, Plastergon's up to stay.

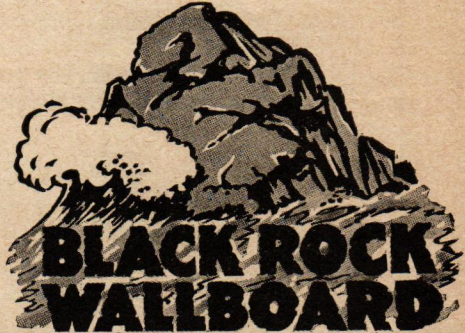
Your work will stand as long as the building stands. Because sturdy Northern Spruce fibre, solidly united and chemically saturated makes Plastergon warp-proof, waterproof, permanent.

It's a pleasure to work with Plastergon Wall-Board—so stiff, firm, cuts so easy. Saves your customers more money too. Plastergon is not merely sprayed—it's saturated with sizing. All ready to paint.

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BLACK CENTRE

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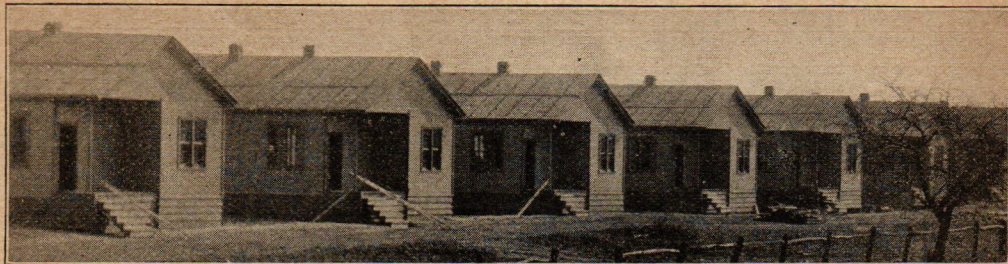
Then he has a wallboard that can be relied upon, the wallboard that stands up even under unusual conditions—the only wallboard with the moisture-repellent Black Centre—the wallboard whose quality helps good workmanship in every step of the job.

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BLACK ROCK WALLBOARD CO.
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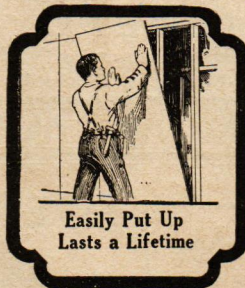


Industrial Homes built by Frederick H. Keiser & Co., General Contractors, Pottstown, Pa. and finished with Cornell-Wood-Board on the interior

Building Homes In a Hurry

Contractors and builders can effect a saving in time, labor, money and materials with Cornell-Wood-Board. Frederick H. Keiser & Co., General Contractors and Builders, write us saying, "We are very much elated with the results. Each bungalow required 2,500 square feet of Cornell-Wood-Board and it took on an average, two men, working 9 hours each, one day to finish up one bungalow."

It will not warp, crack, chip or buckle. Although easily handled and quickly put up, it is tough and durable and resists heat, cold, and moisture. Requires less paint or calcimine than other interior finishing materials.



For Walls and Ceilings of Industrial Homes, Farming Communities, Residences, Garages, Offices, Stores, Churches, etc. Cornell-Wood-Board is unequaled. Increase your business—satisfy your patrons by recommending Cornell-Wood-Board.

Write today for Free Samples, also full details about our Co-operative Service and Selling Plans for Contractors and Builders

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**Excels for Walls, Ceilings and Partitions
Repairs, Alterations or New Work**

Cornell-Wood-Board used artistically in a Dining Room

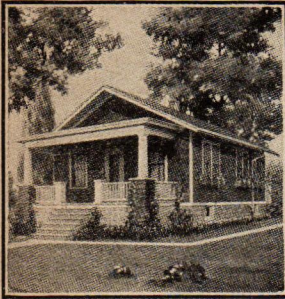
Living Room made attractive by Cornell-Wood-Board



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Our Efficiency Lighting Fixture Service—For Industrial Housing

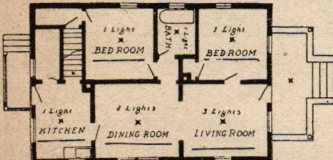
To meet the emergency housing needs for America's workmen—suddenly crystallized by this World's Great War, we have revolutionized the cost of high class lighting fixtures through our production of Vanco Bronze, the New Metal.

\$1525 Will buy complete lighting fixtures for this six room house as follows: Living Room, 13-light fixture; Dining Room, 12-light fixture; Kitchen, 11-light fixture; Porch, 11-light fixture; Bedroom, 11-light fixture; Bedroom, 11-light fixture; Bath, 11-light fixture. Total, 7 fixtures, 10 lights.

All fixtures are cast and spun, wired complete with glassware and tripods (no insulating joints) ready to hang. This includes choice of six standard finishes. We will equip houses of additional rooms at small increase per outlet.

We Will Deliver Lighting Fixtures Up to One Thousand Houses Weekly On 10 Days Notice

There is no higher standard in artistry, design and workmanship than our Vanco Bronze Lighting Fixtures and the same guarantee applies as on our more elaborate products which offer choice of all standard and many other finishes to match every scheme of decoration.



Let Our Special Builders' Service Have Your Blue Prints to Figure On
Quantity Prices Quoted On Application

MITCHELL VANCE CO., Inc.

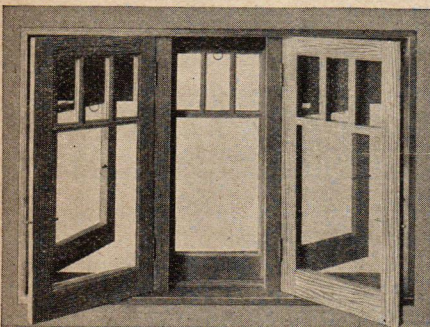
Sole Producers of VANCO BRONZE, The New Metal

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Instantly changed from screened-in to glassed-in porch



SCREEN OUTSIDE STATIONERY SASH OUTSIDE
SASH INSIDE CENTER SASH SCREEN INSIDE

Cost Less Than Old-Fashioned Equipment

Made to fit any porch, old or new. No fitting, no complicated hardware. Send sketches, estimates by return mail. Write for booklet,

The **COMFORT** Porch

Weisse Manufacturing Co., La Crosse, Wis.

FARE \$4.03 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
DAILY BETWEEN
CLEVELAND AND BUFFALO

MAY 1st TO NOV. 15th

Leaves Cleveland • 8:00 P.M. Leaves Buffalo • 8:00 P.M.
Arrive Buffalo • 6:30 A.M. Arrive Cleveland • 7:00 A.M.
(U.S. Central Standard Time)

Connections at Buffalo for Niagara Falls and all Eastern and Canadian Points, and at Cleveland for Cedar Point, Put-in-Bay, Detroit and all points West and Southwest. Railroad tickets reading between Cleveland and Buffalo are good for transportation on our steamers. Ask your ticket agent or American Express Agent for tickets via C. & B. Line.

New Tourist Automobile Rate—\$7.50 Round Trip. with 2 days return limit, for cars not exceeding 127 in. wheelbase.

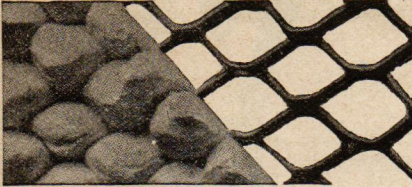
Beautifully colored sectional puzzle chart of the Great Ship "SEEANDBEE" sent on receipt of five cents. Also ask for our 24-page pictorial and descriptive booklet free.

THE CLEVELAND & BUFFALO TRANSIT CO.
Cleveland, Ohio



PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS IT HELPS

In Industrial Housing



The Inside Key—Stucco or plaster is held firmly in place. The Metal Lath cannot warp or shrink and cause cracks or irregularities. It's a reinforcement in every direction.

Low first cost often means a big ultimate loss.

Consider fire risk with its bearing on insurance rates.

Consider upkeep. In this connection read these clippings from the literature of a prominent paint manufacturer.

Statistics show that losses through lack of paint in this country yearly are greater than losses by fire. Over \$200,000,000 is spent annually on paint in the United States and most of the money is for building preservation. Don't forget that.

Wood, unless painted, quickly absorbs moisture and then becomes warped. Soon the building joints begin to crack under the ravages of sleet, rain and snow. Next, the moisture seeps through the plaster. Your home suddenly is an unsanitary, health-menacing place in which to live. By looking ahead a little.

Stucco needs no paint. Stucco exterior and interior plaster on

Berger's Expanded Metal Lath

forms a fire-resistive construction. It gives greater permanence. It makes houses more sanitary, better looking, more comfortable to live in. It reduces upkeep to a minimum.

Such construction will increase first cost only from 5 to 10 per cent. Reduced upkeep will in a few years absorb this increase.

The greater sales and rental value of the houses, the years of added life and lower insurance premiums will roll up a handsome margin of profit. Such houses add to the reputation of the builder because they give the owner real satisfaction.



The Berger Mfg. Co., Canton, Ohio

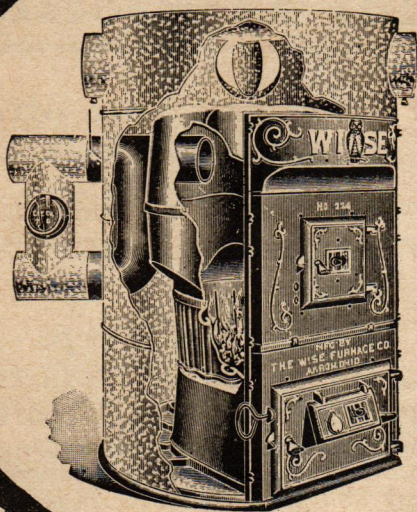
Branches: Boston New York Philadelphia Chicago St. Louis
Minneapolis San Francisco

Export Dept.: Berger Bldg., New York City, U. S. A.

What's
Behind
Your
Plaster

PUT THIS DOME ON
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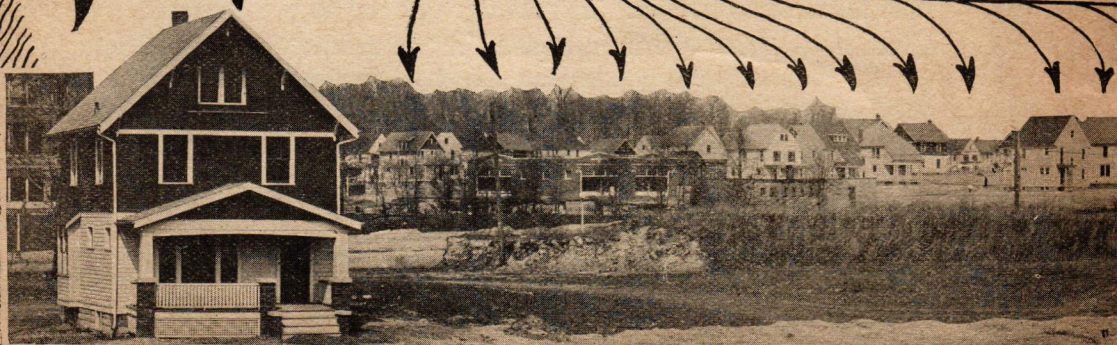




WISE for These

In both the Fire-
stone and Good-
year Industrial
Developments at
Akron, Ohio.

WISE FURNACES
were used for
all the houses
WHY?!



PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS

FURNACES in all Industrial Houses

The men who planned the housing development for the Firestone Tire & Rubber Company and The Goodyear Tire & Rubber Company at Akron, Ohio, wanted to be certain that the houses for their employes would be heated comfortably and healthfully at a low cost for fuel.

Naturally They Selected Wise Furnaces

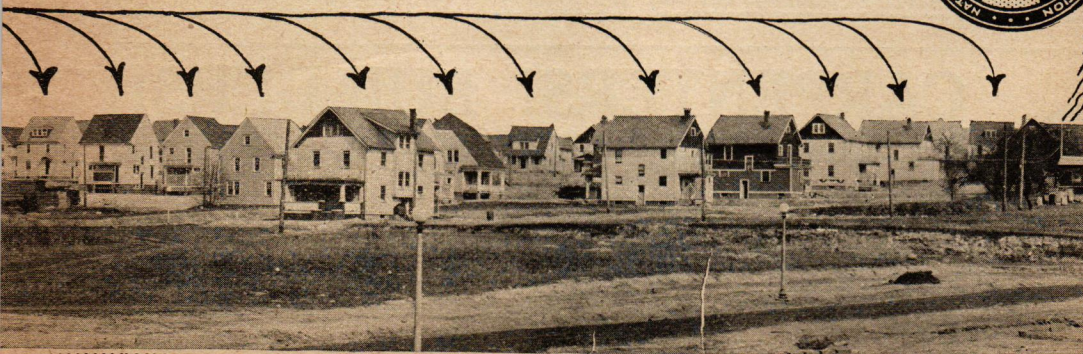
The construction of the Wise Warm Air Furnace is scientifically correct in every part. The fire-pot is so made that all particles of fuel in the pot are subject to a uniform draft. This enables any grade of soft coal to be burned successfully. The admission of air into and above the fuel produces a perfect combustion and complete consuming of the gases, extracting the greatest amount of heat from a given amount of fuel.

Our Guarantee goes with every Wise Furnace.

Send For the Wise Catalog

Our catalog describes Wise Furnaces in detail and tells how you can use them to increase your profits and satisfy your customers.

Wise Furnace Co. 244 Hamilton Bldg.
AKRON, OHIO



PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS



Dahlquist Copper Boilers

are used in homes, hotels and institutions. Ours is the largest factory in the United States producing copper tanks.

We build copper tanks and boilers for pressures as high as 600 pounds. If you require special construction, we can give service and prices to suit your conditions.

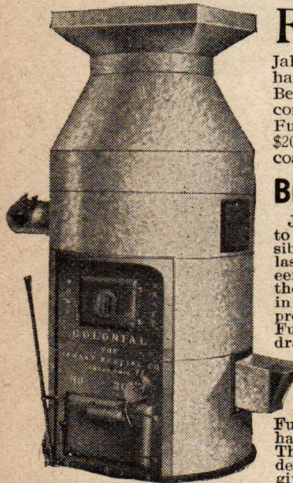
Write for our catalog

Dahlquist Mfg. Co., 42 W. Third St., Boston, Mass.



Jahant Pipeless Furnace

BURNS EVERY KIND OF FUEL



The Jahant Furnace with its Down Draft construction burns oxygen from the air, giving perfect combustion, saving 1-3 to 1-2 on the coal bill.

FOR the heating of the home or building of open construction the Jahant Pipeless Furnace has proven to be the best. Because of its scientific construction the Jahant Furnace will save from \$20 to \$30 on the average coal bill.

Built For Service

Jahant Furnaces are built to give the best service possible to be had and they will last a life time. Our Engineering Department will give their advice absolutely free in regard to any heating problem involving the Jahant Furnace. They will make drawings and plans and advise whether or not the pipeless furnace is suitable for your use. We have been manufacturing and selling Jahant Furnaces for 35 years and have never had one returned. The service we have rendered to others we can also give to you.

Contractors and Builders

Jahant Furnaces give universal satisfaction — once sold they stay sold. We guarantee each Jahant Furnace. We pay the freight when shipping. It will be well worth your time to investigate our proposition—it's a money maker for you. Write today for catalog and literature.

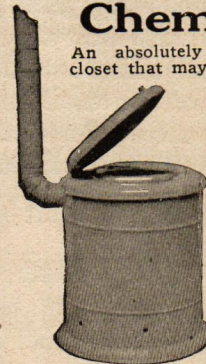
THE JAHANT FOUNDRY & HEATING CO., 127 Jahant Bldg., Akron, Ohio

Mr. Builder—

*Increase your income—right now
THIS Month*

Here's something right in your line—a Chemical Closet that you can sell to a home builder cheaper than a wooden privy and make a bigger profit for yourself. Here's something you can sell at odd times or turn over to your son or your foreman to sell.

RO-SAN Chemical Closet



An absolutely sanitary, odorless indoor closet that may be placed anywhere in the house. Abolishes the germ-breeding outdoor vault. A comfort and a convenience where there is no sewer connection. Germs killed by chemical. Easily emptied as the ash pit of a stove.

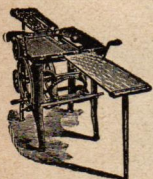
Agents Wanted

We want one live carpenter contractor in each town to act as our agent. Hundreds of builders are selling these fixtures this winter. Good profits for little work. We help you sell them. Write today for complete details.

ROWE SANITARY MFG. CO., 8807 Rowe Building, Detroit, Mich.
Ask about the Ro-San Washstand. Hot and cold running water without plumbing

CARPENTERS! BUILDERS!

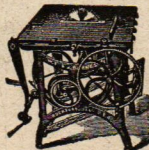
Our new foot and hand power Circular Saw No. 4 is the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.



I. For Ripping.

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

Lathes, Scroll Saws, Formers, Mortisers, 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**



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LETTERS YOU WRITE
ADVERTISERS. IT HELPS

EMPIRE · WARM · AIR · FURNACES IN · THESE · INDUSTRIAL · HOUSES



For Efficiency and Economy

Why were Empire Furnaces chosen for heating the houses in the Lockport, N. Y. Housing Development? Because Empire Warm Air Furnaces are so well known for their *durability, efficiency and economy*. They can be depended upon to furnish at reasonable cost abundance of fresh, pure, warm air, to keep the house comfortable, no matter how severe the weather.

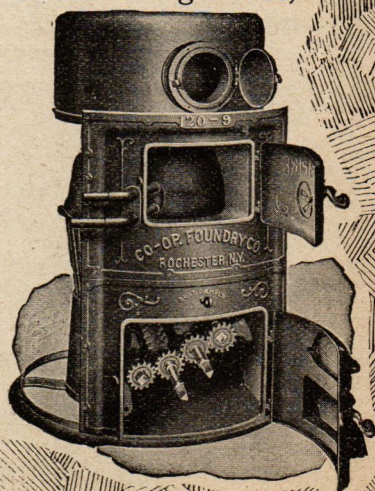
Empire Warm Air Furnaces

outcome of over fifty years experience in manufacturing stoves, ranges and furnaces. All of our furnaces, the Empire, the Bermuda, the Ajax, are made of the same high grade pig iron and materials used in making our famous line of Red Cross Stoves and Ranges. Every piece is of proper size and perfectly fitted so when combined they form a faultless furnace of ideal proportions. When properly selected for size and type, we guarantee our furnaces to give perfect satisfaction.

Write for our catalog and tell us about your heating problems. Our engineering department will recommend just the furnace for your needs. We make furnaces adapted to all the different kinds of fuel.



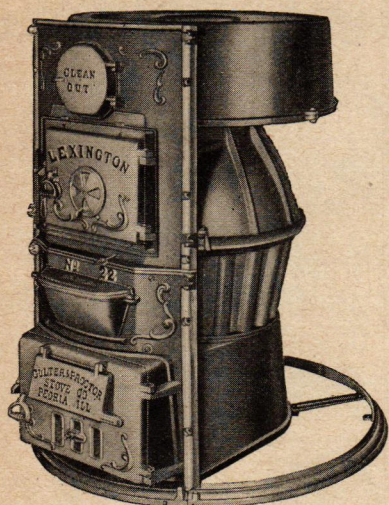
Co-Operative Foundry Co.
Rochester, N. Y.



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LETTERS YOU WRITE
ADVERTISERS. IT HELPS



THE LEXINGTON FURNACE



Furnished with Single Register Equipment

A Positive Fuel Saver

The Lexington has more individual features of merit, which interest the prospective buyer than any furnace you could install.

It has **Double-lap Joints**—it cannot leak.

It is made of **Pure Pig Iron**—it cannot burn out.

Every part is **large** and **heavy**—it cannot warp.

It has the air blast feature in the fire pot combined with gas belt to **burn the smoke**. It doesn't waste fuel.

We desire to place the Lexington with dealers in towns where we are not represented and invite correspondence with any live dealer who wishes to increase his furnace business.

Write today for catalog and prices

Culter & Proctor Stove Co.

Established
1863

Peoria, Illinois

Mr. Contractor—

A point to remember—Increase your income this month

Here's an opportunity to make bigger profits for yourself—a Chemical Closet which you can sell to home builders with a profit at a less price than the wooden privy.

Economy Chemical Closet

The world's best. A sanitary indoor closet which can be set up in the best room in the house—positively kills all germs and odors. It does away with the outdoor privy, and the NU-WAY gives comfort and convenience where there is no sewer connections.

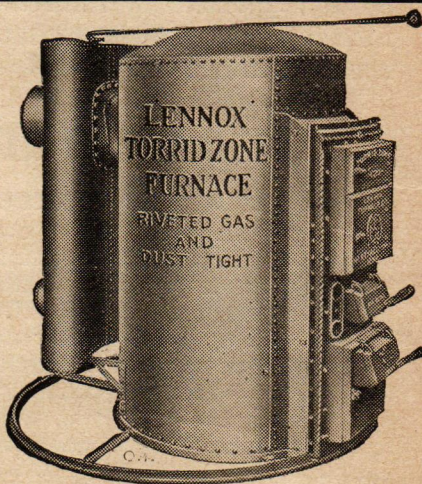
Agents Wanted

We want one live contractor or builder in each town to act as our agent. Good profits on your sales. We assist you to sell them.

The Economy is in great demand. Hundreds of homes have installed them this winter. Write today for catalogue and complete details.



Sanitary Chemical Closet Co., 41-E Bacon St., Hillsdale, Mich.



COAL SAVERS!

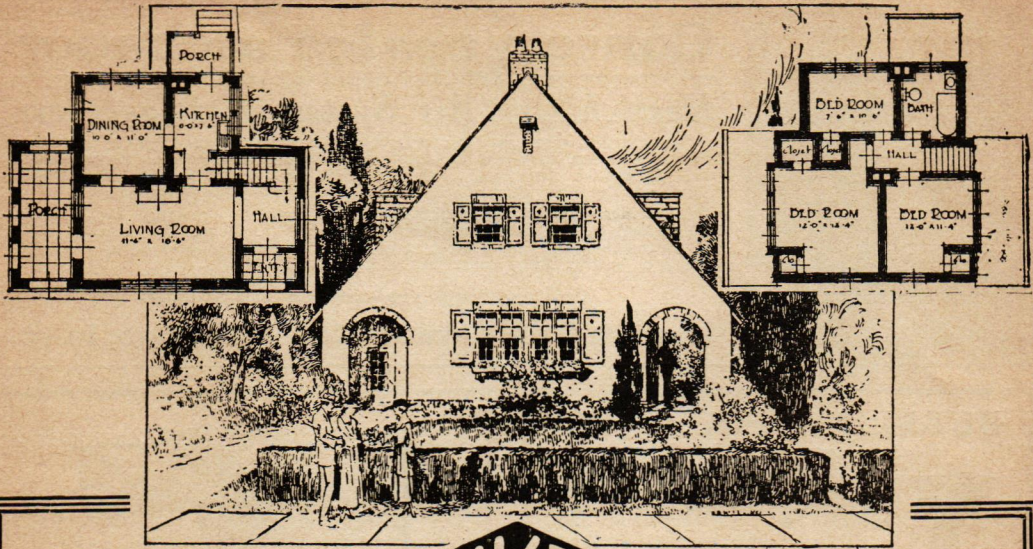
TORRID ZONE FURNACES are coal savers. They consume a minimum of fuel, and deliver healthfully-moistened heat right where you want it.

When you plan heating homes, let a Lennox dealer help you, and lay out the heating plant for efficiency. Ideal for Industrial Houses. Write for catalog.

The Lennox Furnace Company
200 Lincoln Highway, Marshalltown, Ia.



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LETTERS YOU WRITE
ADVERTISERS IT HELPS



SYKES

SYKES Expanded Cup Metal Lath has been used extensively in The Goodyear Tire & Rubber Co.'s Industrial Housing Development at Akron, Ohio. Above is one of the types of houses used.

SYKES

Expanded Cup METAL LATH

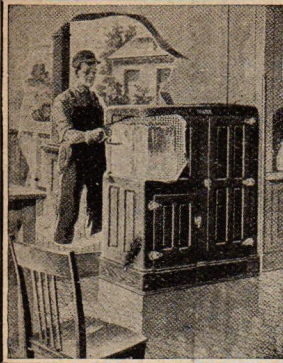
is chosen for Industrial Housing construction because of its well known economy, rigid strength and durability. For interior and for exterior (stucco) work this lath gives the maximum of service. On exterior work the self-furring feature of Sykes Expanded Cup Metal Lath saves a large amount in labor, time and materials. Being cut with a wider strand, Sykes is heavier than other metal laths of the same gauge. Indorsed by architects and contractors.

*Write for Free Sample and Booklet—
Specifications for Stucco on Metal Lath*

Sykes Metal Lath & Roofing Co.
502 Walnut Street Niles, Ohio

PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS





Conserve on Ice and Labor

SPECIFY AND INSTALL

Herrick Dry Air System Refrigerators

Herrick Refrigerators have perfect air circulation and heavily insulated walls. Very sanitary and economical for homes, apartments, stores, clubs, etc. Write for new catalog showing fine line of refrigerators and "Herrick" outside icing blue prints.

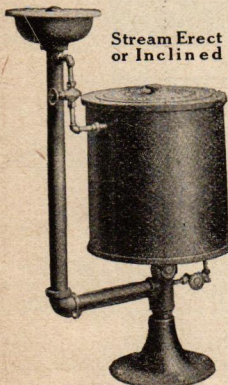
All modern homes and apartments now have outside icing, for it keeps the iceman on the outside of the house, saves the housewife the annoyance of waiting for him, and increasing work scrubbing floors. The "Herrick Way" of cutting icing doors is the right way.

Get these details now—write for Catalog 23 N.

Herrick Refrigerator Co., Waterloo, Iowa

BUBBLING FOUNTAINS

For Attachment to Municipal Supply



Unequaled Keith Bubbler unless otherwise specified.

This cut shows our No. 604—75 lbs. of ice—cork insulation—15½ coils of ½" brass tubing No. 22 gage. Thorough workmanship—selected materials—tested and adopted by those whose judgment is unquestioned.

Many types and sizes. May have coil on bottom as well as on sides. Tasty, convenient and efficient. Very attractive appearance.

Olive brown baked enamel finish. Pure white vitreous cast iron enameled bowl. Fittings nickel-plated.

Wastes above or below the floor.

Our lines include: Sanitary Wash Bowls (in batteries), Bubbling Fountains (plain and ice cooled), Metal Lockers, Metal Stock and Pattern Storage Racks, Metal Shelving, Metal Cabinets, Vault Fixtures, Soda Kettles (40 and 60 gallons), Metal Stools and Chairs, Water Mixers, Work Benches, Bench Legs, full line of Plumbing Fixtures, etc.

SEND FOR LIST OF USERS. Many thousand in use. The best is the cheapest.

MFG. EQUIP. & ENG. CO.

Shop and Factory Metal Equipment Outfitters
136 Federal Street - Boston, Mass.

Send for catalog
Works and Mill Address—Framingham, Mass.



Dryers For Apartments

Conveniences for the Home

means satisfied customers, larger business and bigger profits for you.

Hill Clothes Dryers are the most convenient arrangement for all kinds of houses. They save time and labor—fold up when not in use.

Get details of Hill Dryer for balconies and lawns—also our Cabinet Clothes Dryer for laundry rooms of residences, apartments and institutions.

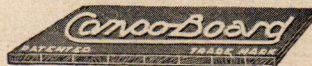
The Hustler Ash Sifter is another convenience for the home.

Send your name and address for Catalog N giving complete information

Hill Clothes Dryer Co., 46 Central St., Worcester, Mass.



For Remodeling



Is Unequaled

It handles easily—saws clean and smooth. Won't warp, shrink, chip or crack. Adaptable to any method of decoration. Keeps out heat, cold and moisture. Compo-Board is the only wall board with the wood core. That is the feature that makes Compo-Board superior to other wall boards and also instantly identifies the genuine. Sold by dealers everywhere in strips four feet wide and in lengths of one to eighteen feet, as desired. Write for interesting book and sample.

The Compo-Board Co., 5776 Lyndale Avenue No., Minneapolis, Minn.



PUT THIS DOME ON
LETTERS YOU WRITE
ADVERTISERS. IT HELPS

It's a Cinch

If you don't make the profit on the furnace for that house, somebody else will.

It's a Snap to Install
**A Modern Way Pipeless
Warm Air Furnace**



All-cast parts; revolving grates; large doors; double inside casing; large air space.

Thousands in use; easy to sell, quickly installed; sure to satisfy.

Write for Our
Proposition

The Modern Way Furnace Company
(Incorporated)
Fort Wayne, Indiana

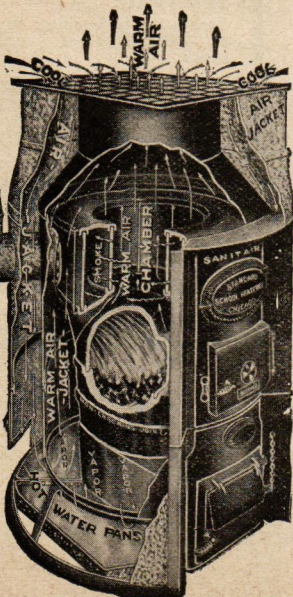
100% More Heat 50% Less Fuel

Sanit-Air Pipeless Heaters for the average building afford 100% more heating efficiency with 50% less fuel. You can install Sanit-Air Furnaces yourself, and deliver a practical, economical heating plant. Clean, profitable business.

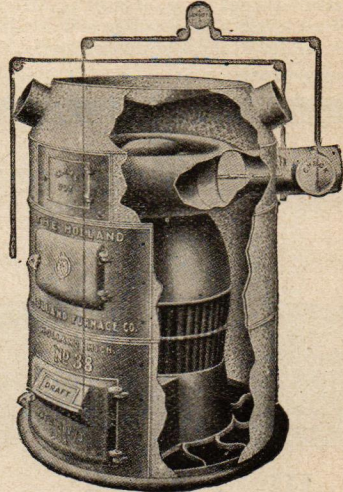
Sanit-Air Pipeless Heaters

You install them quickly and easily. Low cost—no repairs. We simplify furnace construction by using a single register. It distributes warm air throughout the house and returns cool air to the furnace for heating. Each heater is covered by our Standard Guarantee Bond which protects you. Send for information and sales literature.

**Standard Heating
Company**
440 W. Ontario St.
Chicago, Ill.



Holland Furnaces Make Warm Friends



A Contractor is a Good Judge of a Furnace

He knows the furnace is really the "heart of the home;" and he knows that if a man is absolutely pleased with his furnace he naturally is better satisfied with everything else that was done in the building or remodeling of his house.

Carpenters recommend the Holland Furnace because they not only know the advanced principles of its design and the dependability of its construction; but they know that the Holland Guarantee and the Holland Five Year Service Bond positively insures heating satisfaction to every owner.

The Holland Leads in Sales In 125 Cities Where Now Introduced

The reasons are very plain to the man who knows. The Holland is built to burn scientifically—the cone grate breaks up clinkers and compels the fuel to roll to wall of fire pot. Air is mixed with the gas—the fuel burns from the sides and over the top in the only natural way to compel 100% of heat radiation. All gases and soot are burned. No internal explosions or "puffing." The Holland is clean, healthy, efficient.

High test cast iron construction, with the fact that all castings are evenly heated prevent warping or burning out, and have given the Holland a certified reputation as repair-proof. The Holland fire-pot absolutely outlasts any other.

Contractors—Builders—Carpenters

Pass the word along. Write for our special proposition to you. We will also send you our free catalog, free heating plans and full information. Let us get better acquainted to our mutual advantage. Write today.

Holland Furnace Co. - Holland, Michigan
World's Largest Installers of Furnaces
Holland, Mich. — 2 Factories — Cedar Rapids, Iowa
Ask Any Lucky Owner

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ADVERTISERS. IT HELPS

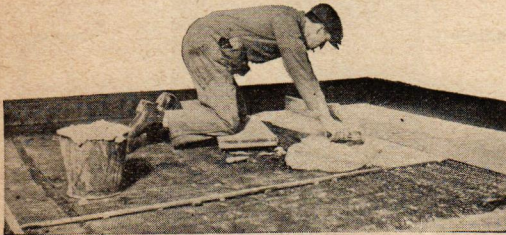


Sand's Aluminum Levels

Always Tell the Truth

The standard of accuracy. And not only the most accurate—but the easiest to read, even in the dark. Never rusts—cannot warp, split or crack—and are easily handled. The lightest levels made—strong and durable because the greatest strength is placed where most needed. Ask your dealer to show you these levels, and also write for our new catalog.

J. SAND & SONS, Originators of 6-glass Aluminum Levels, 1023-29 Rivard Street, Detroit, Michigan



Why Work for Wages?

Be independent. Be your own boss, don't slave for wages. Start now, at once, in business for yourself.

You need no experience; we tell you how, in a plain, simple manner.

We offer you an opportunity to represent us and at the same time make a handsome profit for yourself.

Laying Asbestone floors is both easy and profitable.



Write at once for the territory you want and we will send you full particulars, and also information of what others say about Asbestone flooring.

Franklyn R. Muller & Co.
875 Madison St., Waukegan, Illinois

The Industrial Housing Problem

Interests:

**Contractors,
Engineers,
Architects,
Building Material Dealers**

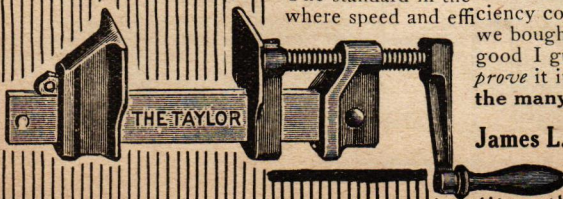
Because it offers a great new field for design, construction and the increased use of building materials.

Perry R. MacNeille, recognized international authority in the "housing of working men" is treating this subject in an intensely interesting and profitable way in his articles that appear each month in "REALTY." The National Magazine of Development.

Scores of big business men are subscribers to "REALTY"—also contractors and engineers.

The Year \$2.50. Single Copy 25c
Send for Sample Copy FREE!

REALTY PUBLISHING CO.
224 W. 42nd St. New York



Taylor Clamps

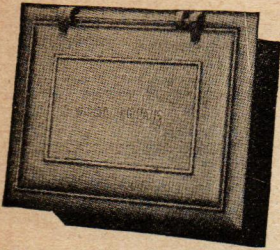
The standard in the U. S. Navy Yard for over 15 years and in all shops where speed and efficiency count. One user says: "Many years ago we bought a lot of Taylor Clamps and they are so good I guess they will never wear out." Let us prove it in your shop. Write for catalog showing the many styles of Taylor Clamps.

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



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LETTERS YOU WRITE
ADVERTISERS. IT HELPS

IOWA COAL CHUTE



Mr. Contractor—Have you ever noticed basement windows “stuffed” with a sack of straw, or old clothes and the side of the building all “splintered up?” That’s where coal was unloaded into the basement.

Iowa Coal Chutes will remove such winter scars, and prevent them in the future. A neat, durable and popular size chute at a minimum price.

Write today for our Special Offer and prices to Contractor Dealers

Iowa Foundry & Manufacturing Co., Fort Dodge, Iowa



Accept this book with our compliments

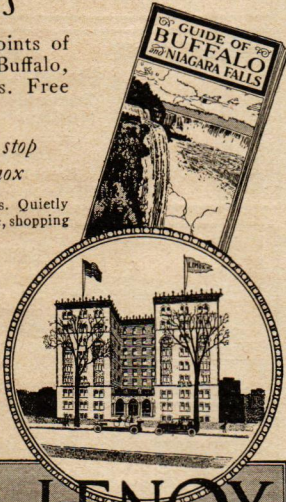
Illustrated guide to points of interest in and around Buffalo, including Niagara Falls. Free on request.

When in Buffalo, stop at the Hotel Lenox

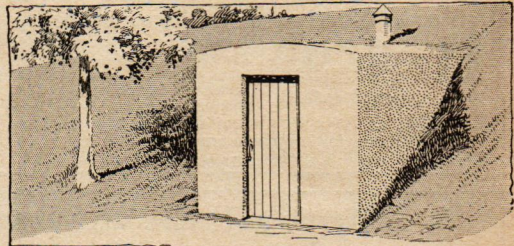
Buffalo’s ideal hotel for tourists. Quietly located, yet convenient to theatre, shopping and business districts and Niagara Falls Boulevard. First-class garage.

European plan. Fireproof, modern. Unexcelled cuisine. Every room an outside room. \$1.50 up. On Empire Tours. Road map and running directions free.

C. A. MINER
Managing Director
North St. at Delaware Ave.



HOTEL LENOX
BUFFALO N.Y.



Concrete Makes the Best Storage Houses

The current issue of Alpha Aids is devoted to practical ideas and plans for various storage buildings.

The Alpha Service Sheets and Special Bulletins give details of construction on the subjects listed below. Any one of these Service Sheets and also Alpha Aids will be sent free if you live East of the Mississippi.

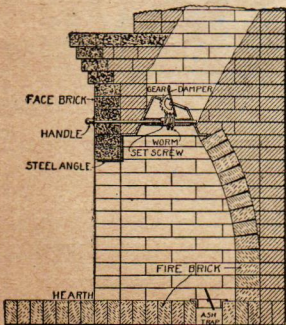
- | | | |
|----------------------|------------------|--------------------|
| Storage House | Ice House | Smoke House |
| Storage Cellar | Manure Pit | Tanks |
| Milk House | Silo | Spring House |
| | Corn Crib | |

Check the one that interests you

Alpha Portland Cement Company, Easton, Pa.

ALPHA THE GUARANTEED PORTLAND **CEMENT**

CONCRETE for PERMANENCE



Stover Mfg. & Engine Co.
Freeport, Illinois

Build the Fireplace Right

Don’t try to reduce the cost by leaving out a good damper. It results in an expensive fireplace to operate and allows rain, wind and birds to enter the room when the fireplace is not in use.

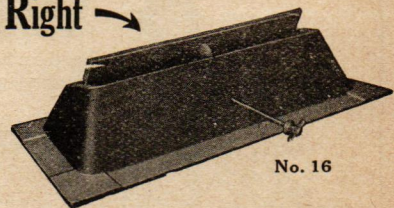
Stover Dampers support the brick work, form a smooth throat, regulate the draft perfectly, and reduce the labor cost of erecting fireplaces.

The price is low enough so a Stover Damper can be used in every fireplace. Made in several styles for all size openings.

Send for catalog No. 1740 showing our fireplace fixtures.

Stover Mfg. & Engine Co., 35 East St., Freeport, Ill.

Send us Catalog 1740.

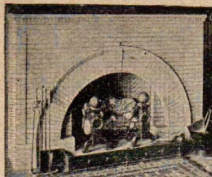


No. 16

Name..... Business.....
City..... State.....

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ADVERTISERS. IT HELPS





CONTRACTORS

Our Catalog, "Everything For the Fireplace," sent free on request. Valuable information on Fireplace Equipment and Building Specialties.

Colonial Fireplace Company
4618 West 12 Street Chicago

CRESCENT Woodworking Machinery

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

For shop and job. Crescent Woodworkers lead for convenience and economy of operation. We also make a full line of shop equipment.

Write for free catalog

Inform Yourself — Save Money

Degrah

TRADE MARK REGISTERED

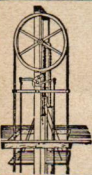
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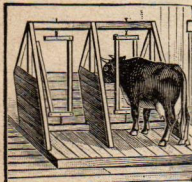


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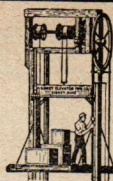
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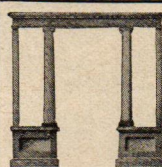
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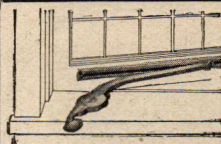


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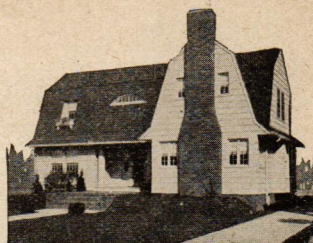
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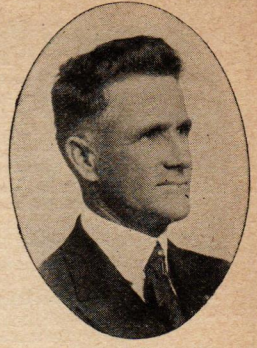


Our Sub Men

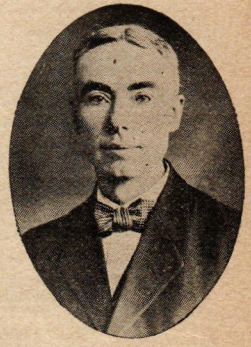
¶ They are all good fellows — these subscription representatives of the National Builder. If one of them should call on you, give him the glad hand. He may have some information about building that would interest you. Naturally these men are well informed on building conditions, after talking with builders, contractors and carpenters all over the country. Besides, most of our men have, at one time, been engaged in this line of work themselves.

¶ The photos on this page identify these men as our representatives and they are authorized to solicit and collect money for subscriptions to the National Builder. Money should not be paid anyone claiming to represent us unless he has an identification card signed by the Porter-Hodgson Company.

¶ Contained in the National Builder each month is a supplement showing complete drawn-to-scale plans which are ready to build from and are used by our readers to land contracts. These supplement plans are alone worth many times the subscription price of the National Builder — the builder's business paper.



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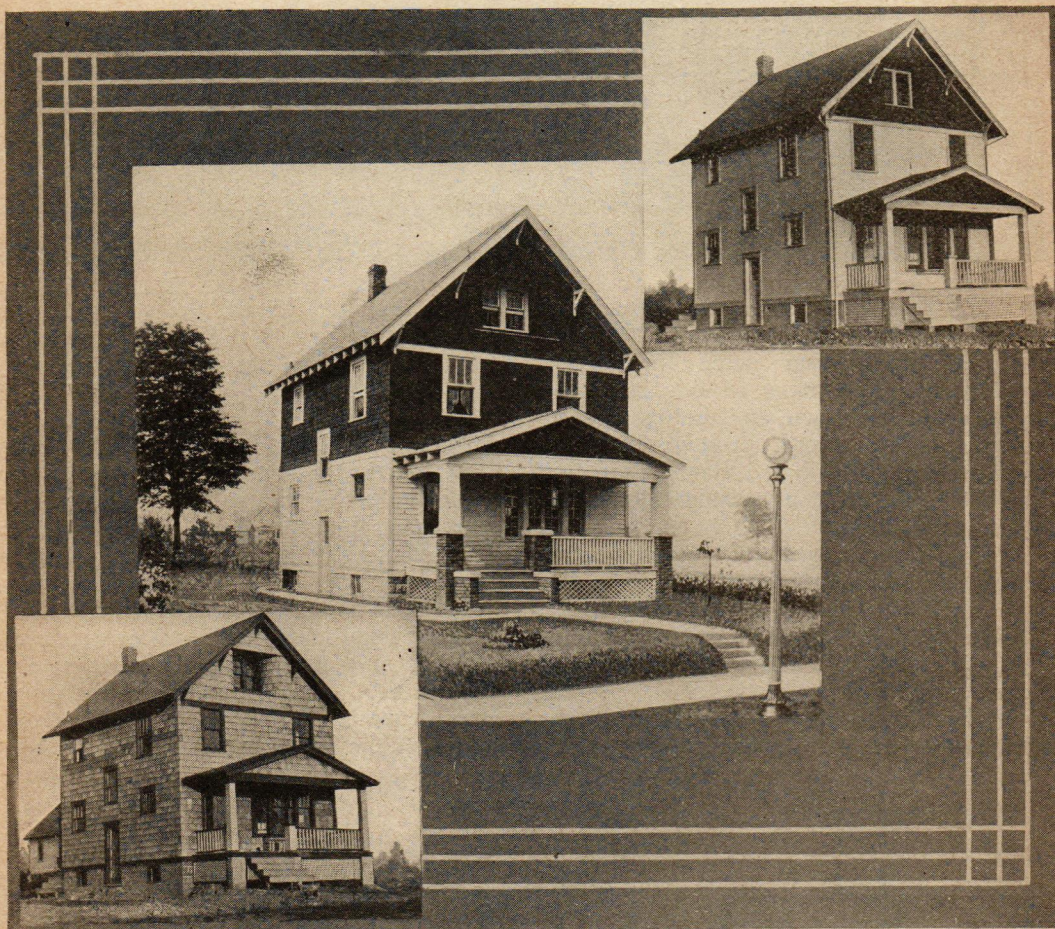
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THE NATIONAL BUILDER

Volume 60

Chicago, July, 1918

Number 7



NATIONAL BUILDER DESIGN No. 451

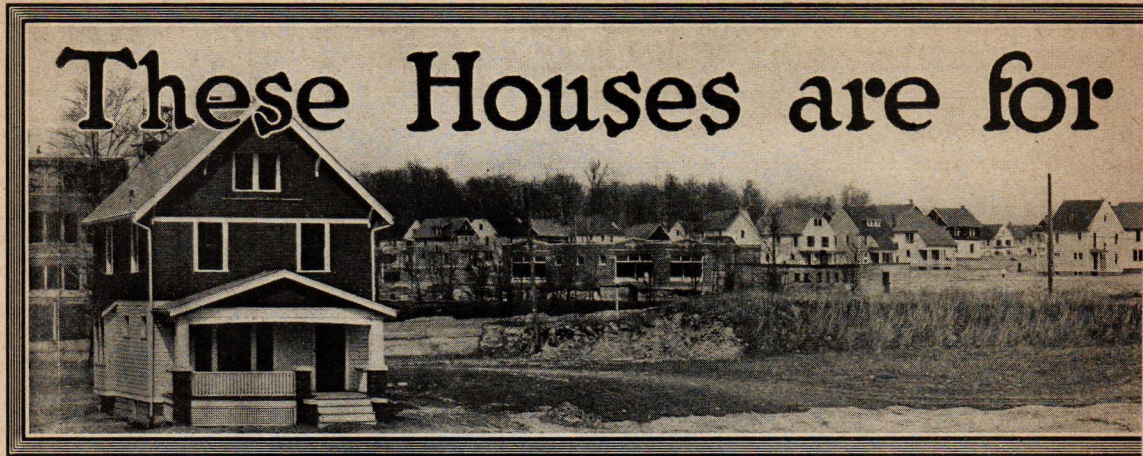
Built by the Coventry Land and Improvement Co., for the
Firestone Tire and Rubber Co., Akron, Ohio.

For Floor Plans, Sections, Elevations and Working Drawings, see Supplement of this
month. Estimate on page 86 of this issue.

Estimated cost, \$3,332.58

THIS house has been built on the Firestone development in Akron with several different exterior treatments, three of which are shown in the above illustration. It has proven to be one of the most popular types on this extensive operation, largely because it combines extreme simplicity and low cost with the most desirable qualities for convenient and comfortable living. It

is entirely free from eccentricities which might make one tire of it, or of intricacies which would add to the expense of construction. It could be made into a fitting home for some of the best paid people around a manufacturing plant, while its cost is so low as to make it within the reach of a majority of such operatives. See article on pages following.



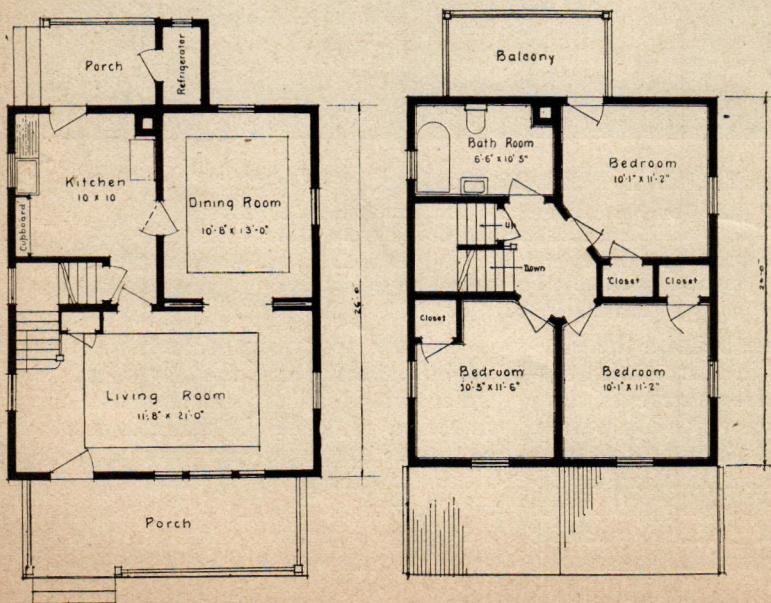
IT IS said that there are people who really believe that the word "Akron" is simply another name for rubber. At any rate, the name of this busy and prosperous Ohio town, and the name of its much used and elastic product, have become so closely associated, that the mention of either one almost invariably calls up the other.

The Akron Chamber of Commerce recognizes 168 industries in the town, giving work to about 70,000 employees. These employees represent in round numbers the total population of the city of Akron seven years ago, tho at the present time they are a little less than half the population. It is by such a giant stride

as this that the city has grown; and from these figures it will readily be recognized that housing facilities have had difficulty in keeping the pace.

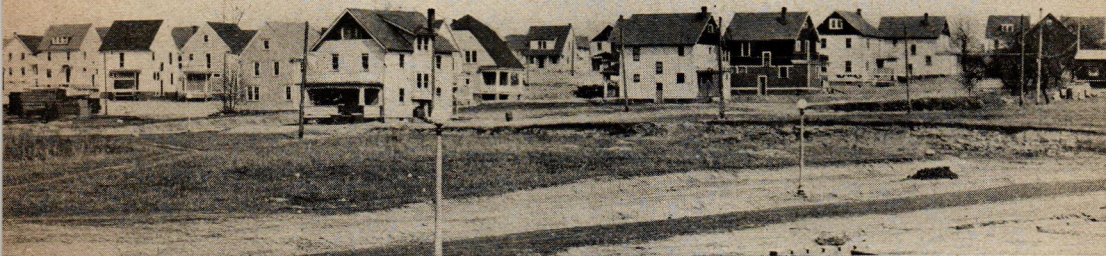
But of the 70,000 employees in the industries of Akron, it is stated that fully three-fourths of them are in the various rubber industries of the town. Upon these companies, therefore, has devolved a larger share of the burden of providing homes for these workmen. The result has been some well-planned and attractive subdivisions, some of them in advanced stages of developments and already in use and proving their worth, while others are just being entered upon.

One of the important developments is at



Floor plans of the house on preceding page. Full working plans are shown on the Supplement and Estimate on page 86.

Akron Rubber Workers

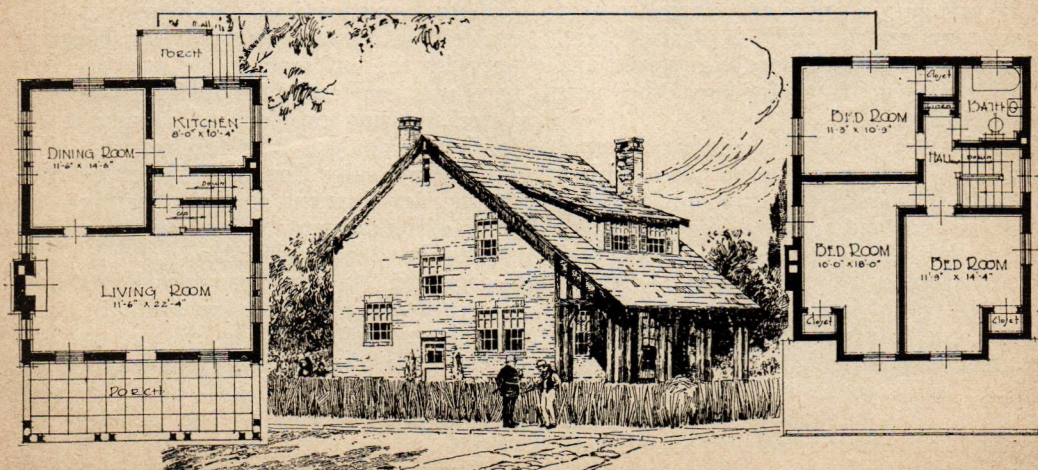


Firestone Park, designed as the home of employees of the Firestone Tire and Rubber Company, and being developed by a subsidiary concern known as the Coventry Land and Improvement Company, with Mr. William H. Kroeger as general manager.

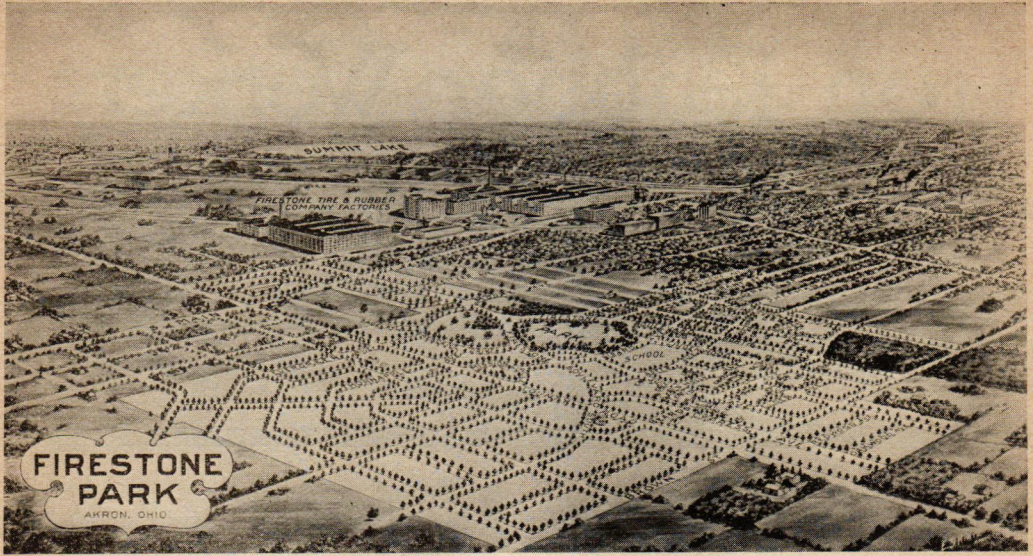
Firestone Park was laid out by Mr. Alling S. DeForest, a landscape gardener of national reputation. Fortunately, he had a tract of 615 acres at his disposal, so that the place could be made one of beauty and attractiveness and not merely a living quarter. The tract is laid out with paved streets on curves following the natural contour of the ground. The sidewalks are shaded by trees selected for the beauty of their form and foliage. Touches of shrubbery are added here and there. An entire lighting system has been installed. There are recreation grounds and social centers

and the size of the lots, varying from 40 to 60 feet in frontage, and from 120 to 140 feet in depth, makes it possible for each family to have a comfortable plot of ground which it can call its own.

Work was started at Firestone Park in October, 1916, at which time the territory was ordinary country acreage. Since then 562 houses have been built, as well as some of the public buildings which are to form a part of the community. The houses have been of 37 types. Seven or eight modifications of each type have been made, so that any appearance of monotony has been avoided. These modifications consist of the use of different materials for outside finish, a change in the shape or in the slope of the roof, the method of placing the house on the lot, or some other equally simple and economical expedient for securing diversity.



A comfortable cottage on the Goodyear development



The houses are set back from the street 15 to 25 feet, and are mostly of frame construction, tho there are some of brick and some of stucco or tile. The roofs are principally of slate. The houses have oak or gum trim downstairs, white pine upstairs, oak floors, and white, smooth plastered walls.

Each house is equipped with an Akron made furnace and has complete kitchen and bath-room plumbing of good quality. The type of furnace used has an extremely large fire surface; and in addition to this, perfect combustion and economy in fuel are accomplished by means of the admission of heated air into and over the fire, consuming the smoke and gases. The door of the ash pit is sufficiently large so that an ash pan can be used, if desired; and it also allows the grates to be removed and replaced without disturbing any other part of the furnace.

The fire-pot is of a somewhat unusual type. It is cast in one solid piece with a series of cells and slots cast in the walls of the pot, extending from the bottom to the top, into which the air is admitted and heated before entering into and above the fuel, thus supplying the fire with heated air and enabling the furnace to consume the larger part of the gas and smoke. Any grade of fuel can be used, as the admission of air into and above the fuel at the point of combustion cokes the fuel and makes a clean fire.

The cost of these dwellings, exclusive

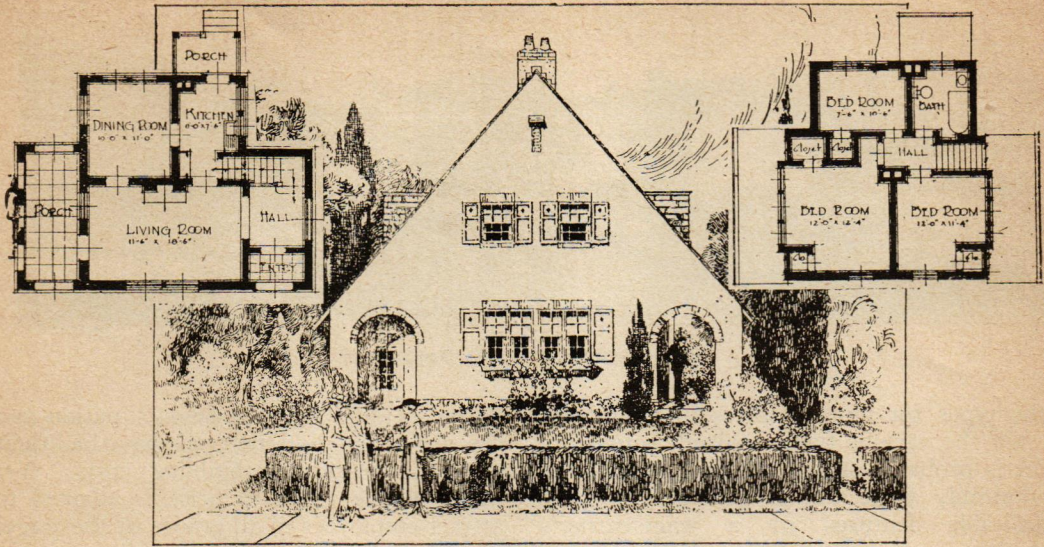
of the lot, runs from \$2,000 to \$3,000—in fact a few of them have run over \$3,000. It has been found, however, that the moderate priced houses find a more ready sale.

The average income of the families occupying these houses is \$25.00 per week. The houses are sold at cost to employees of the Firestone Tire and Rubber Company, but the sale is not restricted to employees. Firestone Park is within easy distance of a number of other manufacturing establishments to whom houses are sold at a reasonable profit.

One of the most popular types of houses in Firestone Park is shown on this month's Supplement.

Previous to 1914, the Goodyear Tire and Rubber Company had developed a considerable tract of land at Goodyear Heights; but with the outbreak of the war the company was confronted for the first time with a real housing problem. The number of employees doubled in a few months. The Goodyear Realty Company thereupon took up the development of the remaining 350 acres of its property lying to the northeast of the first tract. The landscape plan, by Warren H. Manning, provides 1,500 more lots, averaging 50 feet by 115 feet each, and is so laid out as to be properly integrated with the area previously platted and developed, and with the probable future development of the general city plan.

Playgrounds and small parks, totaling 28 acres, within the property area, and two



This Goodyear house has more room than one would expect

other park areas contiguous thereto, of 28 and 40 acres respectively, give a total park area of nearly 100 acres. Of the entire Goodyear development 23 per cent is given to streets, 18 per cent to parks, and 63 per cent to saleable lots.

The architect for the Goodyear Heights Realty Company is George H. Schwan, of Pittsburgh, who has planned 1,000 houses, 500 being started during 1917. Including all houses erected since the beginning of operations in 1913, 926 dwellings are now either completed or are in course of construction.

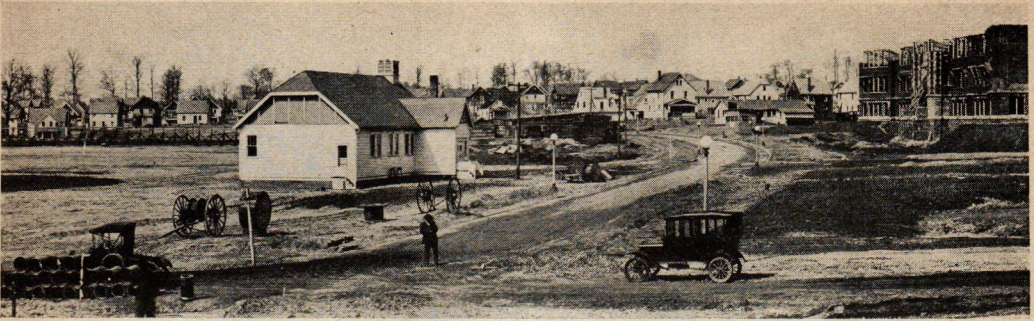
The dwellings are of the single-family, detached type, with five or six rooms, bath, cellar—but no attic. Houses have sewer connections, water supply, gas, electricity, and hot-air heating; no washtrays or tubs, but a hot and cold water connection is left in the basement.

Wall construction for the houses now being completed is brick backed up with hollow tile, or stucco on hollow tile. This has been varied in some cases by making

the second-story walls and gables of shingles, of clapboarding, or of stucco. Frame construction has been used in a few of the latest houses. Foundations are of hollow tile, with concrete footings. Roofs are of slate, and porch floors of cement. The first story flooring is of double thickness, the wearing surface of hard pine and oak, and interior trim of the same material.

A study of the floor plans will show that for convenience and compactness they are for the most part excellent. The rooms are of good sizes, and studied with a view to arrangement of furniture. Ample clothes closets are provided in nearly all bedrooms; and a linen closet in the upper hall or bath-room. All bedrooms have independent communication with the stair hall and bath. The living room, of comfortable size in each case, generally has a fireplace. Also, all the houses have a front porch and an enclosed rear porch. In houses where the front doorway is not protected by a covered porch, vestibules are provided. Head room has been sacrificed in some of





Entrance to the Fir estone Development

the types for more picturesque roof lines.

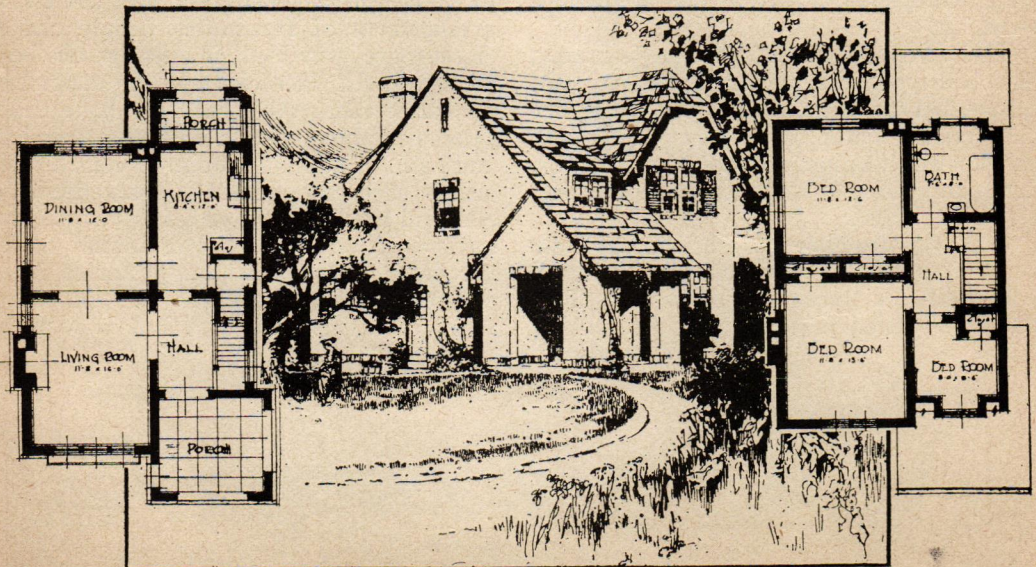
Of the various types evolved, house No. 2A is probably one of the best, and shows admirably what are, in general, the most desirable features of a wage-earner's house.

There are between forty and fifty different types of houses selling at from \$2,400 to \$4,450. In the 500 houses begun in 1917, 100 are priced at from \$2,400 to \$3,100; 130 at \$3,200; 55 at \$3,300; 55 at \$3,500; 135 at from \$3,600 to \$3,800, and 25 in excess of \$3,800. A large proportion lies between \$2,400 and \$3,200—which best conforms to the average wage paid in the Goodyear factories, which is \$27 a week, tho many earn a much larger amount.

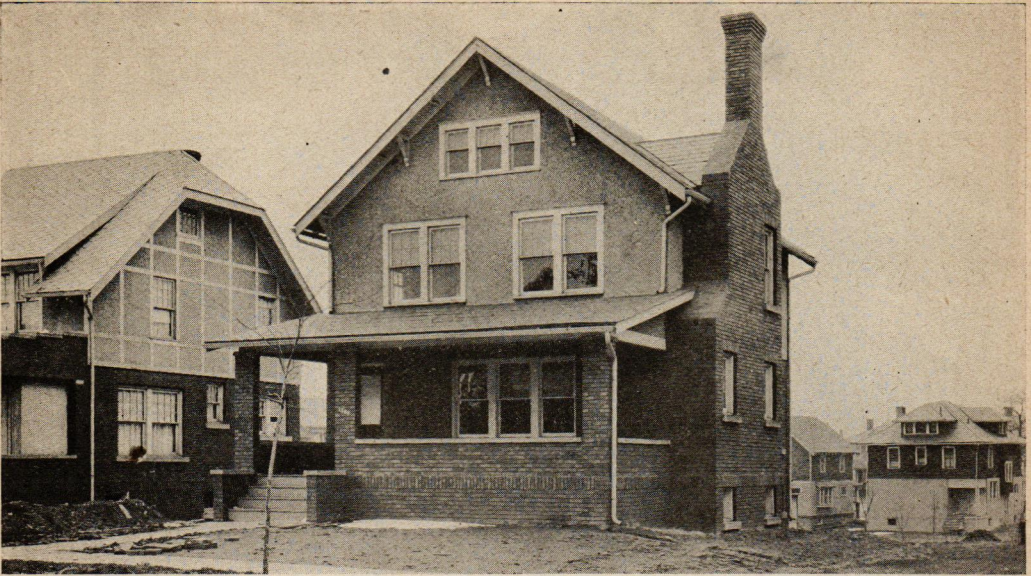
In considering the prices at which these Goodyear houses are to be sold, it must be

borne in mind that the labor situation and the cost of building materials have had their effect in increasing building costs. Yet the available range in price is adapted to attract employees in all grades of the wage-earning scale.

In the thirty or forty different houses devised by the architect, the rectangular plan predominates. Yet there are a certain number of designs—tho but a small percentage of the whole—that depart from the rectangular plan. In a development of 1,000 houses, the architect is justified in introducing a few houses to relieve monotony and produce a picturesque effect; but it is important to note that such variations in plan, and the introduction of bays, receding porches, ells, offsets, and the like, give less available floor area than could be



Several houses of this general type have been built



NATIONAL BUILDER DESIGN No. 452

Built by the Goodyear Heights Realty Company for the
Goodyear Tire and Rubber Co., Akron, Ohio.

George H. Schwan, Architect, Pittsburgh, Pa.

For Floor Plans, Sections, Elevations and Working Drawings, see Supplement of this
month. Estimate on page 88 of this issue.

Estimated cost, \$4,742.40.

A VARIETY of the best materials for residence construction are combined in this house. The basement walls are monolithic concrete, while the walls of the first story are of hollow structural tile. Both of these materials are covered, however, with a well applied veneer of face brick. Above the first floor the walls are stucco on metal lath.

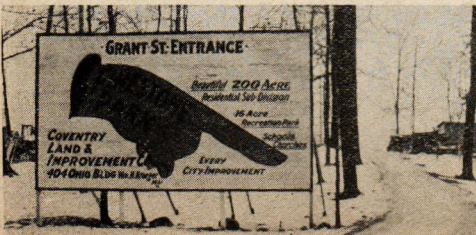
Altogether, the house is one which will require little attention to the exterior in the way of upkeep.

A careful scrutiny of the plan on the Supplement will reveal this design as a model of simplicity, accounting in some measure for the very low cost, as indicated by our estimate, which seems at first glance somewhat inconsistent with the attractive appearance of the exterior.

It is a house which is adaptable to many different locations, and can be very readily given modifications of materials, porch design, etc., so that it can be used a number of times without monotony.

enclosed with the same extent of wall surface on a rectangular plan, and, in many

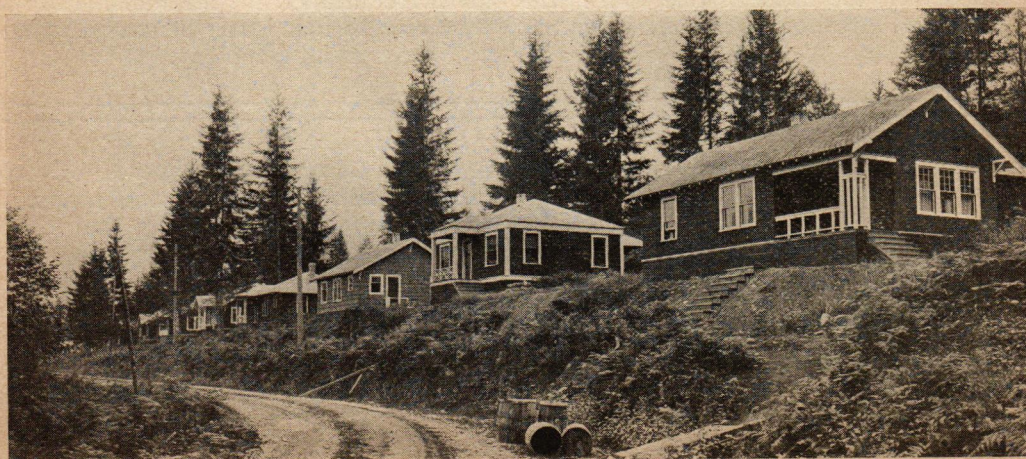
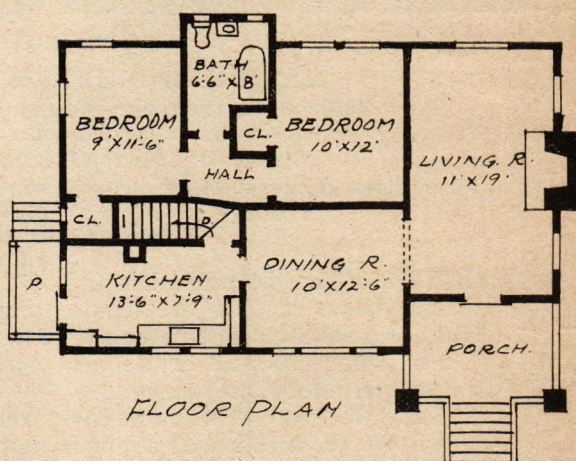
instances, increase the expense by complicating the form of roof construction. In most cases, desirable variety and charm may be obtained without departing from the rectangular plan by the adoption of carefully studied variants in roof slopes, eaves, porches, lattice, doorways, fenestration, color, texture of materials, and the like, and then utilizing to the fullest extent the possibilities of grouping, road-planning, and landscape development.





For Lumbermen

THE picturesque setting of these cottages is one of their greatest charms. They are houses built by the Snoqualmie Falls Lumber Company, Snoqualmie Falls, Wash., for the employees of that company. The plan shown is that of the cottage in the foreground in the upper illustration. This design has been used many times in this development with a number of changes, both exterior and interior, accommodating them to the location and the desire of the occupants.



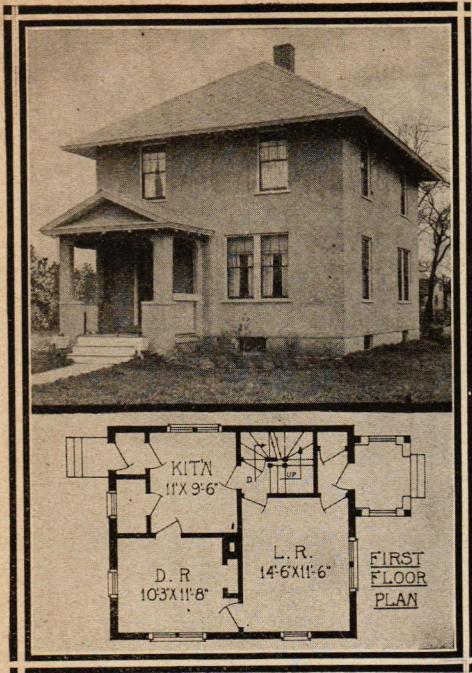


Fig. 1

Two Houses of Tile and Stucco

The two illustrations here shown are two industrial housing designs worked out in hollow tile and stucco.

Fig. 1 is a design developed by Joseph M. Darling & Sons, architects, Fall River, Mass., for the Mt. Hope Finishing Co., North Dighton, Mass. Fig. 2 is a double house occupied by some of the workers of the Remington Arms Union Metallic Cartridge Co., Bridgeport, Conn. It will be noted that on the left side of the plan, the first floor is shown, while the second floor plan is shown to the right. The plans of

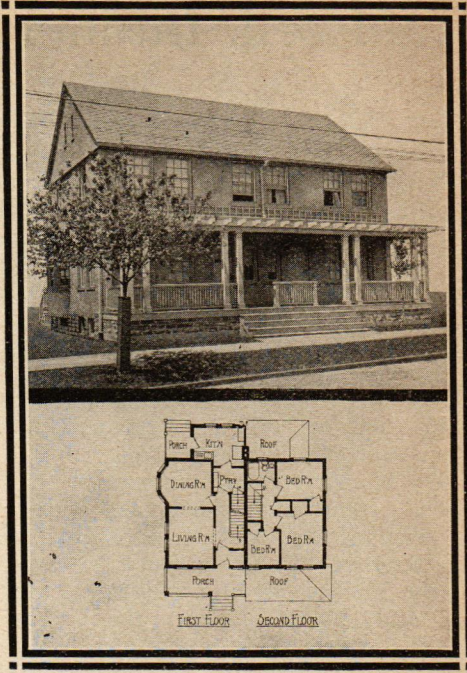


Fig. 2

each side of the house are identical, except that they are reversed.

The outside walls and division walls of these houses are of 8x12x12 tile, with exterior finish coat of cement stucco plaster, and ordinary wall plaster applied directly to the interior surface of the tile. The roofs are of slate or asbestos shingles. The interior finish is varnished cypress; floors are long-leaf yellow pine, scraped and shel-laced.

These illustrations are shown by courtesy of the National Fire Proofing Company, Pittsburgh, Pa.

Restrictions in Company Towns

A model mine town in the soft-coal region of Pennsylvania was erected from the ground up by the employing company and about a year or two later was turned over to the community after the inhabitants had voted for incorporation. Another employer—a steel company—left it to the employees to place restrictions upon the property, but in this particular community only a building-line restriction was established, and

conditions reverted to a state of disorder and untidiness. Thus there are absolutely controlled company towns where conditions are ideal and others where conditions are disreputable. On the other hand, there are small industrial towns without any company control, the companies confining their housing activities to a minimum, where conditions of disorder and community slothfulness prevail and others where high ideals and efficient community control exist.

Caldwell, Builder of Village Beautiful

By Lewis Allen Browne

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"CALDWELL'S got a hobby; he wants to build a 'village beautiful' for the factory operatives. Imagine it." One of the townspeople of Danielson, Connecticut, made the remark to a fellow townsman not so very many years ago.

"They never work out right; the people keep the coal in the bath tub and hang the wash on the front fence. He'll find that it's one thing to build up a business, and another to dabble in philanthropy."

The comment reached the ears of R. J. Caldwell, the vice-president and general sales agent of the Connecticut Mills. He didn't approve of the "it can't be done" criticism, and so he just naturally went ahead and did it. Today the "village beautiful" at Danielson is one of the most attractive of its kind in the country and the best kind of insurance against labor troubles—that's the Caldwell idea: make men comfortable and their families happy and you get service and production.

To a man of Caldwell's various activities, together with conducting a \$13,000,000-a-year business, it was no great task to create such a village. He believes that he is his brother's helper. He preaches that doctrine and he practices it. That he contributed his share toward the work of making 1,500 upright, useful citizens out of former convicts—entirely aside from his commercial life—goes a long way toward proving the assertion. That is one of his methods of being his brother's helper which has no connection with his "village beautiful" activities.

To see that he has other things on his mind besides perfecting his "village beautiful" plans, one has but to run over a list of his business connections. He is vice-president of 11 concerns, and director of one more for good measure.

Caldwell's office is in New York, according to the directory; but in fact his office is "under his hat" and his home wherever he happens to be. His wide interests keep him hustling; and he transacts a large share of his business "on the wing."

He himself is all energy, and he looks for the same quality in others. He is a

square-headed, do-it-now type of executive, and he knows men. His ability to "size up" men is an asset of great value. He is an expert on methods. "There's always some better method," he says. "If it cannot be done this way, find some other way and be sure the new way is an improvement on the old."

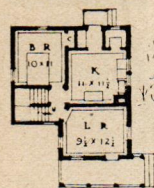
Characteristic of the man is his method of carrying about with him data on a dozen different business interests. As an idea comes to him, he makes a note and dictates the result to his secretary. If they are in an automobile they may stop at the nearest telephone booth long enough to pass on the information to factory or office. If they are on a train they telegraph or send a long letter from the nearest station. In this way Caldwell keeps up with his business connections and finds time to devote to his pleasures—to work out new plans for his "village beautiful," to help some ex-convict get a job and make good, or to boost some employee along to better salary and more valuable service to the company. It was this unusual method that enabled him to find time to observe housing conditions about his own and other factories, and to evolve his "village beautiful" plan.

"We formed the Danielson Construction Company and went at it," is Caldwell's terse summary. And, thru his direction and effort, they made a real model village. No two houses are alike; every one is a home. There are single and double houses. Eight rooms are provided, finished in hard wood, with bath, open plumbing, hot and cold water, electric lights, a cellar, an attic, and a garden patch.

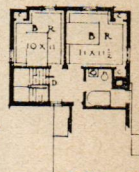
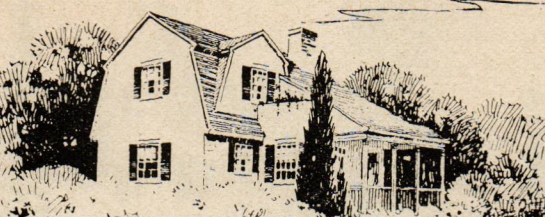
The single houses cost around \$1,900 each; \$3,600 was the price of a double house. By an ingenious arrangement the same general inside plan was used but each of the handsome exteriors is different from every other. They rent for \$3 and \$4 a week, or about 10% annually of the cost of the house.

"I'd like to own a home like this," one old-time employee remarked to Caldwell.

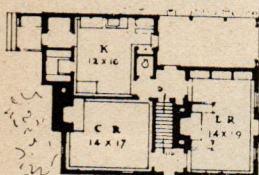
"You can buy this house if you wish," he answered.



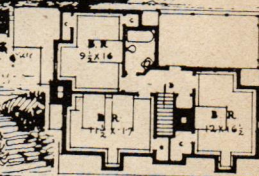
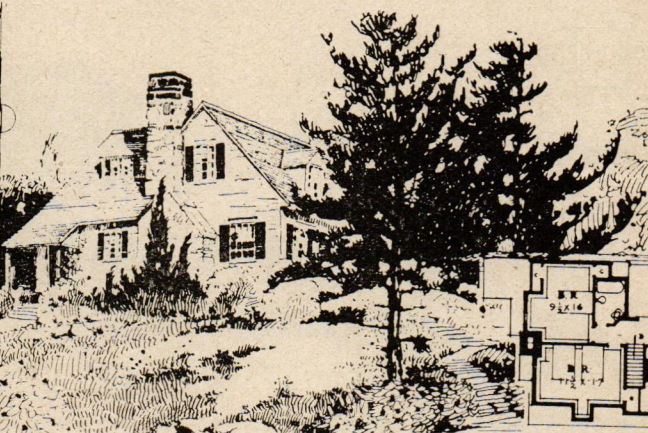
FIRST FLOOR



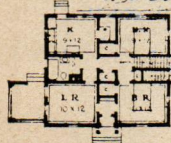
SECOND FLOOR



FIRST FLOOR



SECOND FLOOR

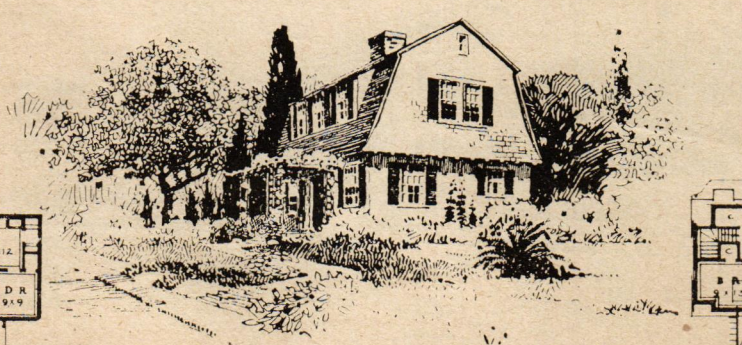
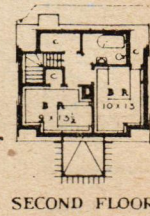
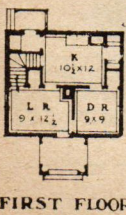
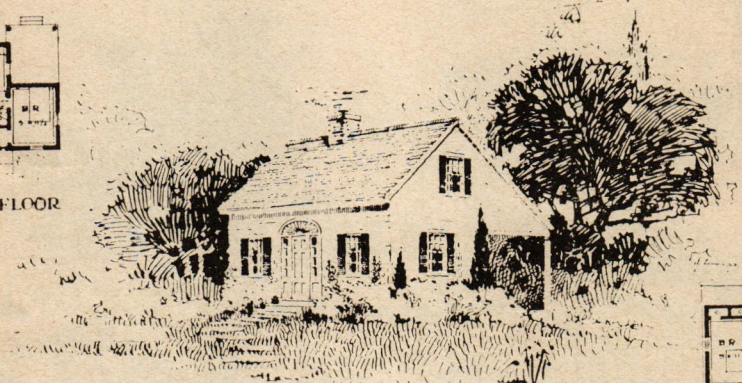
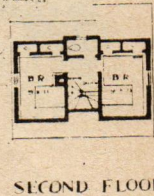
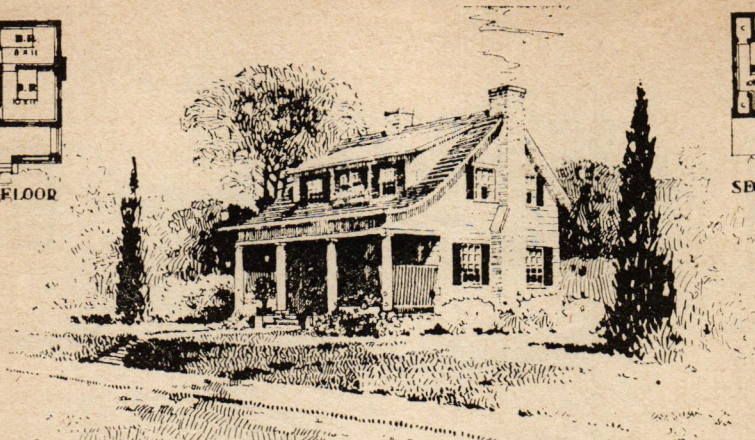
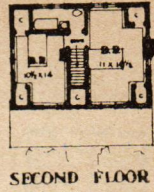
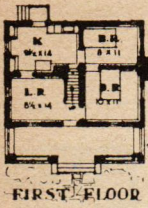


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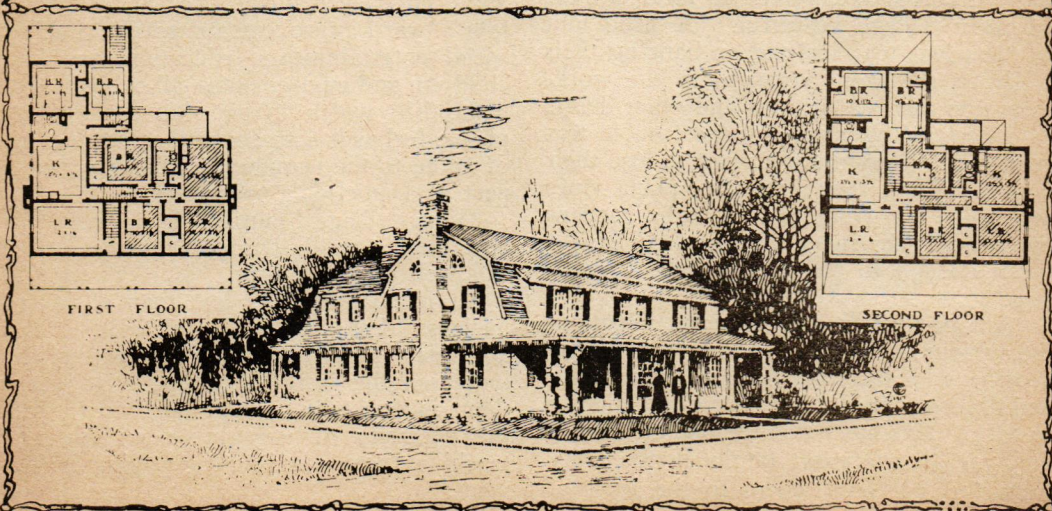
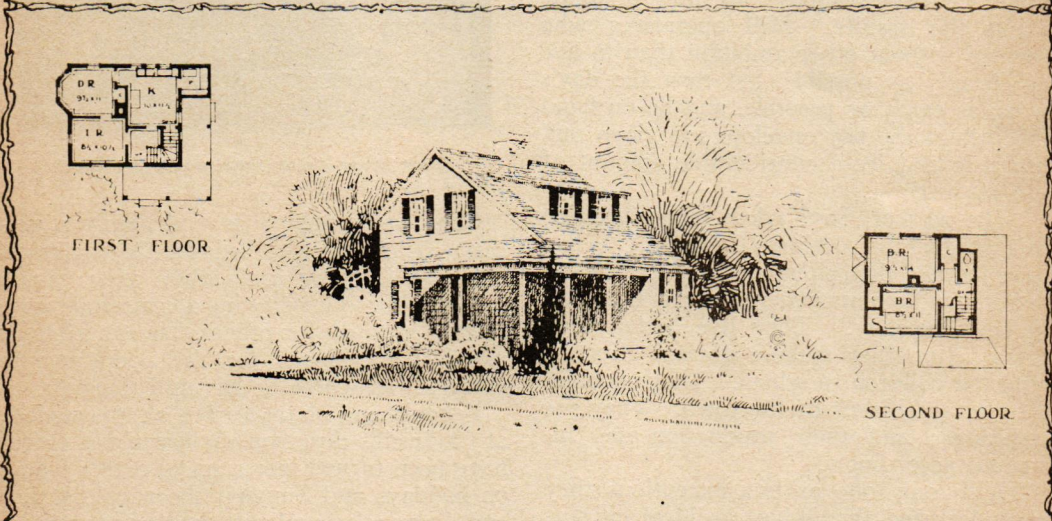
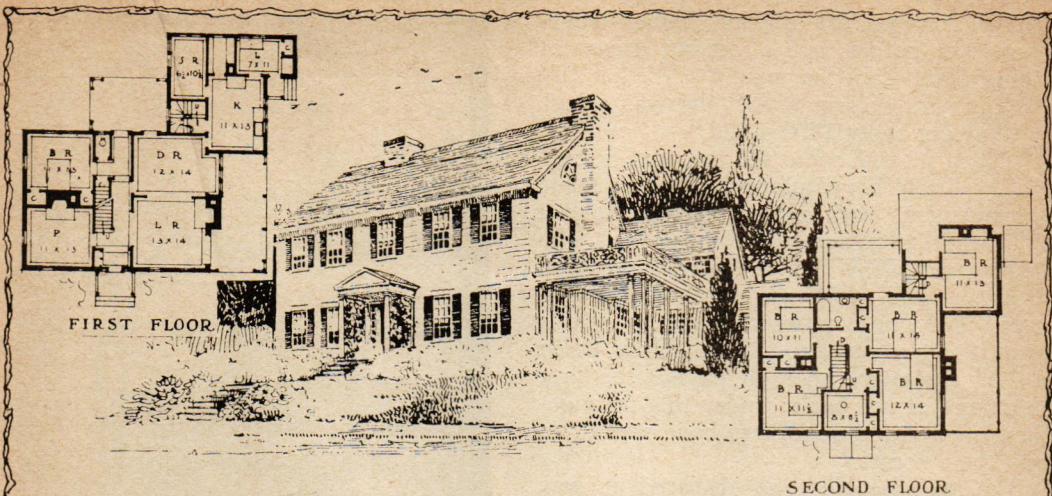


SECOND FLOOR

These are some of the houses Caldwell built



These Connecticut Mills houses are simple, compact, but with good lines



Above and below are some of the larger types

"I know we are making higher wages than ever before, but I couldn't dream of doing that," said the man.

"Can you dig up \$570?" he was asked.

"I've got about \$400 saved."

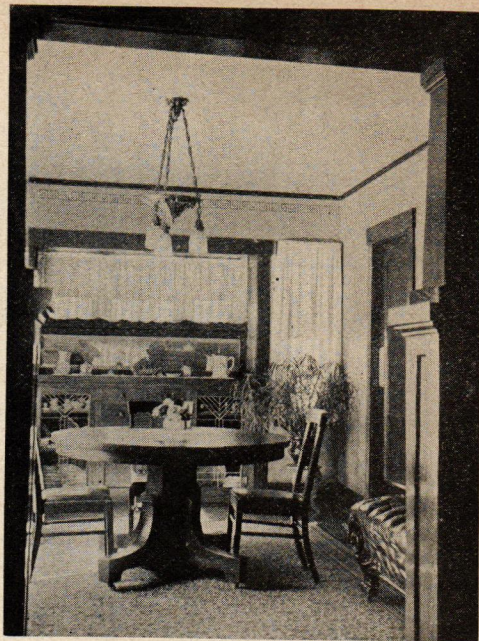
"Keep it, and come see me next week," Caldwell told his employee. Then he made arrangements with a local bank to take a 70% first mortgage. The employees who cannot pay 30% down borrow the sum from the mill, which takes a second mortgage, deducting proportionately for this from the pay envelop. When this is taken up the operative goes on paying the first mortgage at the bank; under this arrangement many of the workers have started to buy their homes.

The townspeople who declared it was only "Caldwell's hobby" are now bragging about the results. Mill operatives who seemed without other ambition than to live as cheaply as possible, get thru the day's work as easily as possible, and be on hand the instant the pay envelopes are given out, began to acquire a considerable amount of self-respect.

"The workers have taken immense pride in their homes," declares Caldwell. "They have learned the difference between a place to bunk and a home where there is incentive to be 'somebody.' They live better, they dress better, they make a greater effort to send the children to school. They consider themselves citizens of the town. They are ambitious; and their production has increased accordingly.

"With only one or two exceptions they have deported themselves as ideal citizens of their 'village beautiful.' A little hint to the wives who insisted on hanging their wash on the front veranda, to the workmen who allowed tin cans and other debris to collect in the yard, and the trouble was remedied. They did not want to lose their homes. Then they began to plant vines and roses out front and to make gardens out back. They saved themselves in garden truck enough to pay nearly half a year's rent.

"Among them live the superintendents of the various divisions. Their houses are in keeping with the workmen's, a trifle larger and different inside, but no more attractive or cosy. This has made the operatives feel they are all one great family in the mills, from the 'big boss' down to the least of them."



What better dining room would one want?

"Caldwell's hobby" is undeniably a success. The man who believes that he is his brother's helper, and who, after doing enough for himself in a material way, started in to do for others, has started four more such villages for the operatives in other towns where he has mill interests.

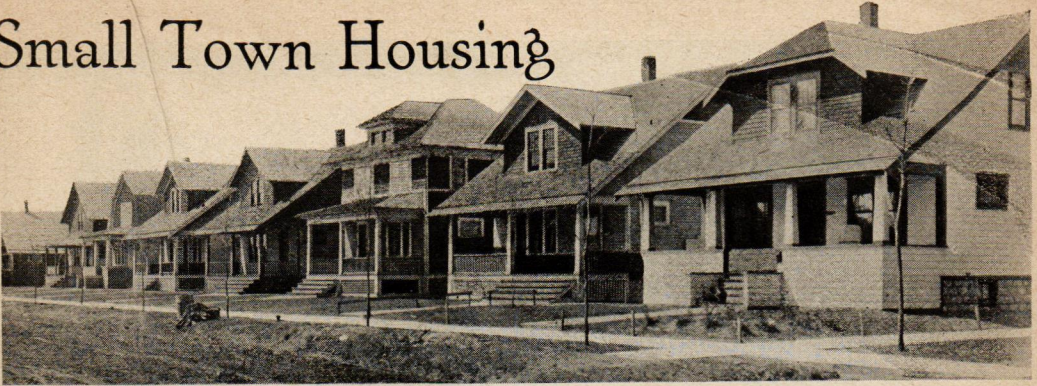
Schools and churches are also provided; at Caldwell's direction the great mill offices have been turned into a social center where on holidays and Sundays the people gather and discuss their village, go over new plans, talk of yard improvements, garden making, social entertainments, education for their children, and amusements—all subjects that make life worth living, that make these people feel as is actually true—that they are of value to the community, that they are a part of Danielson's prosperity.

"Your 'village beautiful' is no more nor less than a philanthropy," someone told Caldwell not long ago.

"It is no more nor less than a shrewd business deal," insisted Caldwell. "You see, this village, with its decent homes, has increased the workers' ability. It keeps them in our mills, and it does away with the necessity of engaging new help and teaching them. It is a big paying investment."

That's the Caldwell way of explaining it.

Small Town Housing



THE small manufacturing town has a housing problem which in some respects is peculiar to itself. Take such a town, for instance, as Waukesha, Wis., with a population of about 10,000, and perhaps a half dozen manufacturing plants—most of them of considerable importance, it is true, yet none of them sufficiently large to enter upon a housing development of its own.

The method of handling the matter in this town is typical, to a certain extent, of the work done in many other towns of this class. In almost every instance, the Association of Commerce is the first to take official cognizance of the housing shortage and acts as the clearing house of information, and usually crystallizes the movement into action.

In Waukesha the movement has been along remarkably intelligent and conservative lines. Thru the action of the Chamber of Commerce, there has been organized what is known as the Manufacturers' Building Company. Its purpose is to provide homes for industrial workers in the various manufacturing centers of the community, and these concerns are financing the company to the extent of being the owners of practically all of its capital stock.

This company is opening up no new subdivisions, but is simply taking available lots thruout the city, as it finds them, building houses upon them as its capital affords, and as the demand arises. It is building principally small bungalows, which can be sold at a very reasonable price.

Kenosha, Wis., has done practically the same thing, forming the Kenosha Homes Company, which has so far built about 200 houses of the modern type.

This company has brought construction costs near to the minimum by building in quantity, so purchasing its materials on the

most favorable terms, and by starting a new house almost every day, so keeping a small force of labor steadily employed at a low cost per hour. The labor employed was specialized, some carpenters raising the frames, others shingling the roofs, others hanging doors; when the share of each particular group in each house was done it moved on to the next, bringing to each an expertness that resulted in better and quicker work.

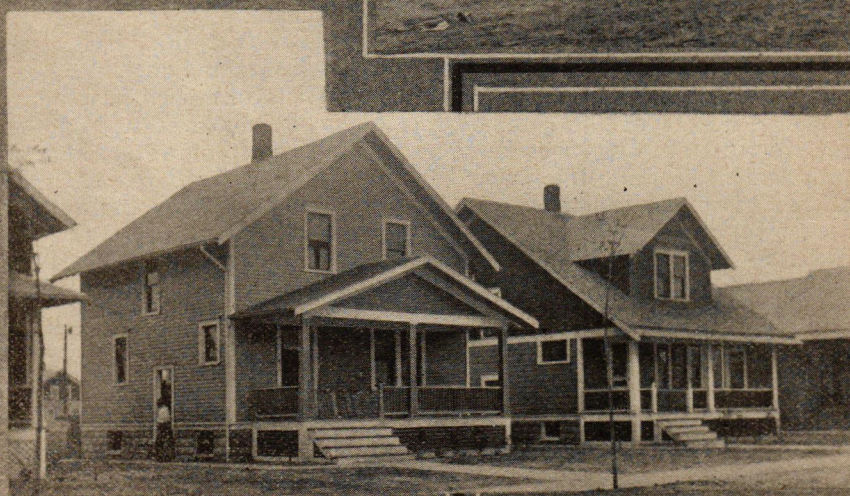
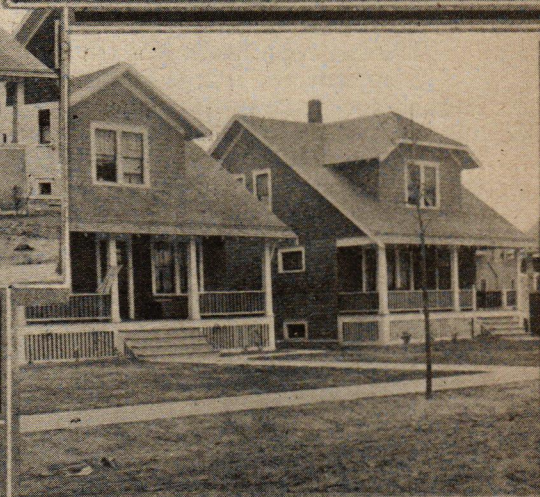
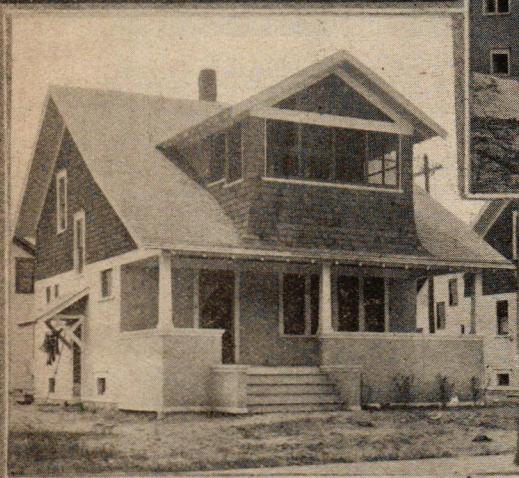
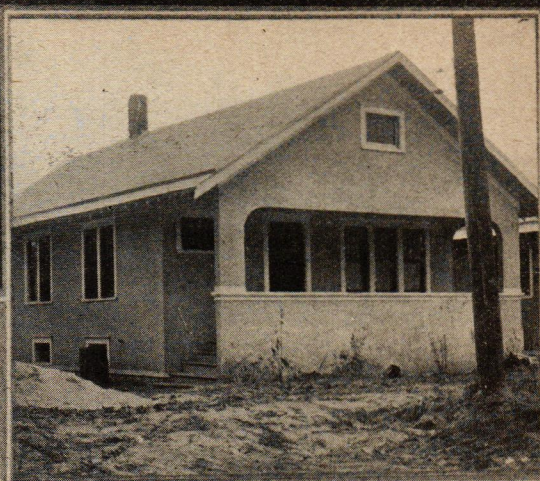
Coatesville, Pa., is another town which has a housing company organized by the Chamber of Commerce. This company has a capitalization of \$100,000, one hundred local citizens agreeing to take \$1,000 worth of stock each.

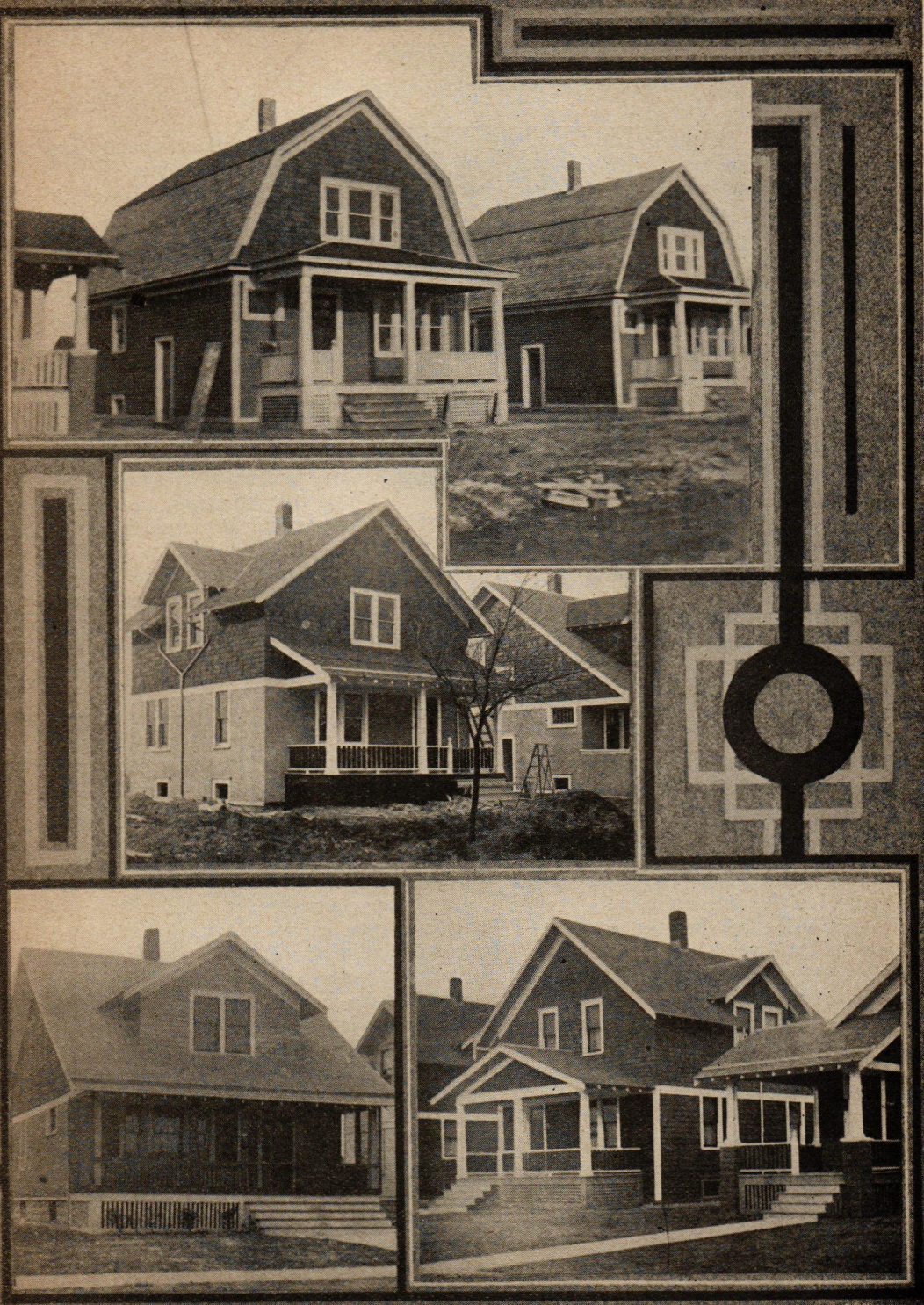
The plan of the company is to sell houses to persons regularly employed in the city's industries, and to make the sale on such terms as to permit the man of small means to purchase.

Williamsport, Pa., has a population of about 45,000, and an active Board of Trade which has succeeded in inducing a number of small industries to locate in that city. One of these, however, is a subsidiary of one of the large rubber companies, and within the last year and a half, on account of labor shortage, they threatened to dismantle their Williamsport plant. As this would have been a great calamity for the town, the Board of Trade, after considerable preliminary effort, started a campaign and interested enough people of all classes in the city to form a stock company having a capital of \$500,000.

In Bucyrus, O., the seven principal manufacturing industries have formed an Employers' Association to handle the housing problem and also to look after labor, there being a shortage of both labor and housing in the city.

Industrial Homes at Kenosha, Wis.





How We Started a Building Campaign

By Mark Hambleton

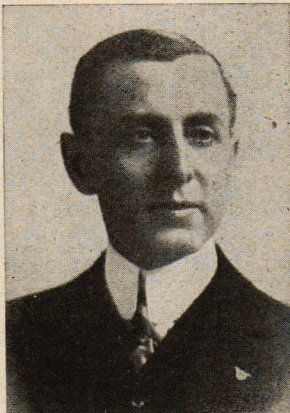
President Canton Home Building Commission
Canton, Ohio

IN any discussion of our home building campaign, the fact should first be established of Canton's unwavering patriotism and its hearty support of the Government in all war activities. There has been no thought of competing with the Government for men or materials needed in war work; while the fact that Canton is an over-subscribed city in an over-subscribed state, so far as Liberty loans are concerned, should be sufficient evidence that we are willing to give of our money, too, in the righteous cause of making the world safe for democracy.

But taking all these things into consideration, we have not been able to get away from this additional fact, for it has forced itself upon our attention at almost every turn: that Canton needs 2,500 new houses this season to house its steadily growing population; indeed it must have them if its industries—most of them legitimate and useful industries even in war time—are not to be seriously hampered. Our population has increased approximately 10,000 during the past year, and a growth of equal size is anticipated for the present year.

It has been well said that the war cannot be won by the men at the front alone. Behind the fighters there is required a vast organization, supporting and supplying them. Men, munitions, hospital supplies, food, comfort and even cheer must be kept moving forward in ceaseless streams from the great reservoir at home. That the reservoir may be equal to these demands upon it, challenges the nation's patriotism and forethought. To this end, the administration has commandeered, and has had ready response from the best intelligence of the country.

It is probably true that a lot of the attempts to shut off industrial activity, to curtail trade and cripple commerce, are merely the result of silly sentimentality, but some



Mark Hambleton

of them unquestionably are Prussian propaganda.

In one of these classes or the other—and it does not matter much which—belongs the effort that has been made in recent months to curtail the legitimate building activities of the nation.

War necessarily shuts off purely speculative building operations. In fact, it renders them quite impossible without any prohibitory legislation; and this is as it should be. But the American people today stand in actual need of

many millions of dollars' worth of building improvements that are in abeyance largely because a few people who pose as economists, but who in reality are either thoughtless or pro-German, have hinted that it is unpatriotic to proceed with such projects under present conditions.

No building project ought to be undertaken during the war if its prosecution will hinder the government by taking either materials or labor needed in war work. That is axiomatic Americanism. But no legitimate building project should be deferred if it can be carried into execution without interference with the country's war work.

Many paper-analysts have jumped to the conclusion that because England was forced to curtail building early in the war the United States must do likewise. They have overlooked the fact that England's situation and ours are in nowise alike.

How do they differ?

Before the war, England imported building materials to meet her requirements—steel from the United States, France, Belgium and Germany; cement from the same sources; timber from the Baltic and from North America. A continuance of building after the exhaustion of the stocks on hand at the beginning of the war would have meant the continuance of imports of materials. Every foot of cargo space obtainable was needed for imports of food-stuffs and munitions. Obviously, under

CANTON BUILDERS PREDICT BUSY SEASON
Officers And Directors Of Canton Builder's Exchange Lead

BUILDERS' EXCHANGE HEAD SAYS YEAR WILL BE BIGGEST IN CANTON
President O. H. B. Gies Transference Of Laborers As Important Factor In Builders' Service.

INDUSTRIAL LEADERS INQUIRE FIRST ABOUT CITY'S HOME SUPPLY
Secretary L. E. Double, Of Canton Home Building Commission, Says Little Spent In Building Will Be Tract Wealth.

HOME OWNERSHIP MAKES CITIZENS
Helen Gies, Proprietress Of City News Commission, During Campaign.

TEACH VALUE OF INVESTMENTS HERE
BANKER ADVOCATES

CITY PLANNING IS TASK FOR BUILDERS
Former President Of Exchange Says World War A Great City Corporation For Housing Is Urged

BUILDERS' WORK HERE IS WELL ORGANIZED
State Committees Have Charge Of Various Phases Of Activities Of Exchange—Mark Hamilton, Trade Officers For 1918.

LARGER QUARTERS BEING REMODELED
Builders' Room To Occupy First Floor Of Quince Hotel.

HEADQUARTERS FOR DEALERS PLANNED
Cleveland Committee To Be Organized.

OUTSIDE MONEY TO BUILD HOMES
New York To Interest For Cash Capital For Mortgage.

NEW HAVE COMPANY
From To Forward Building Project And Make The

BONDING DEPT. TO BE ENLARGED
State To Pay For

Sen. Pomerene Opposes Any Action To Curtail Workers' Home Building

MORE MORTGAGES NEEDED TO AID HOME BUILDING
Bankers Here Mortgages Are Being Paid Off Too Fast.

SPRING BOOM
Plastering, Painting, Etc., Active

Building Of Home Affects Many Lines Of Activity
Canton Housing Commission Favors Out Healthy Plan To Campaign More In Progress

Civic Duty and Good Business Sense Demand that You Build NOW

BUILDERS' EXCHANGE

CANTON DAILY

NINE KILLED IN RAID ON PARIS
Launch Movement To House Canton's New Citizens

CITY NEEDS 2500 HOMES THIS SEASON
Start Campaign To House 1000 Foreigners Arriving During Past Year

Home Owners Good Citizens
Housing Commission Says

Builders Expect Much New Money In Circulation Here
Say Profits From Government Bonds Will Be Turned Into Building

Urge Building Now To Avoid Congestion After War Ends
National Real Estate Assn. Says

BUILDING COSTS MAY GO HIGHER
Lumber Prices Seen Rising Here Soon After In Progress

BUILDERS PAY OUT \$5 MILLIONS YEARLY
The Thousand Employees General

PORTS FOR FLOUR

How the newspapers helped in the Canton building campaign

such conditions as this, building must yield. able-bodied man who could be induced or The problem with England was one of forced to serve, barring only those needed defense against sudden and violent on-to maintain war industries. slaughter, for which the nation was almost The building industries and trades of the wholly unprepared, and the obvious thing United States furnish a living to hundreds to do was to draw into active service every of thousands of men and women who are

not now needed for war service, but whose ability to provide for themselves and to help carry the financial burdens of the war is of the highest consequence.

The fabrication of materials used in building, in the aggregate, represents an industry capable of paying in taxation the cost of maintaining a great army. But a dead or dormant industry is not taxable.

If the industries and labor dependent on building are to stagnate until peace comes, the country thereby must lose one of its great war resources, the ability of those industries and that labor to produce revenue for the furtherance of the war.

The figures which I have given as to Canton's needs are not a haphazard guess, but are based on a careful survey, made by our Commission and by the Canton Chamber of Commerce before this Commission was organized. In fact it might be stated right here that the Canton Home Building Commission was brought into being under the auspices of the Chamber of Commerce as a result of its investigations, and cannot be blamed upon any set of supposedly selfish real estate promoters.

The various surveys have also provided us with other interesting data. They have given us a fairly accurate line on the stocks of building materials on hand in the city or immediately available, for one thing. And this is a most important item; for it shows what our resources are, without asking the aid of the railroads to bring in new materials. In the lumber yards of Canton, for instance, we found enough lumber actually on hand to build several hundred houses complete. We also have in our territory a number of factories for the manufacture of clay products, such as brick and structural tile; we have a cement plant only six miles away; we have steel plants which can provide sheet steel for roofs if needed; and we have good roads over which all of these materials can be assembled by motor haulage.

But materials are not the whole of the problem. To build, one must have labor; and we are told that able-bodied builders ought to be building ships or otherwise aiding in the great world struggle. True; but there are in Canton a seemingly unusual number of building mechanics who are past their prime—men who would not be accepted on Government work, and indeed many of whom would be pushed aside even in the general run of building in ordinary times. But they are men who have several good hours of work in them each day; and they can earn better money, and maintain greater self-respect, by building the homes so sorely needed in the city than by doing the ordinary odd jobs to which the old men are relegated, beside feeling that in this way they are allowing younger men to go to the front and are thus indirectly but none the less effectively doing their bit to down the Huns in their attempted conquest of the world.



How You Can Help to Secure 2,500 New Homes for Canton

- 1st. Write letters to your relatives and friends outside of Canton and tell them that you can place their savings at 6% interest on First Mortgage securities on Canton Homes.
- 2nd. Write and tell them that Canton Building & Loan Associations and the Canton Savings Banks will pay them from 4% to 5% for their money and that every dollar will be secured by First Mortgages on Canton Homes.
- 3rd. Tell all your friends who want to see Canton grow, to either invest in Canton Mortgages or deposit their savings in the local Building and Loan Associations or banks where it will help to build Canton and Canton Homes.
- 4th. Do not invest your funds outside of Canton and insist on your relatives and friends keeping their funds at work in your own Home City.
- 5th. Other cities are working in our midst with smooth salesmen and tempting interest rates to draw Canton capital to their offerings. *Safely First*—place your money where you know it will be safe and under your own watchful eye.

Keep the Home Fires Burning

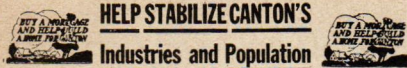
You cannot do this unless there is a home built for the fire to burn in. Many people are in Canton and others still coming who must be housed and taken care of if Canton is to continue to grow and prosper.

Get busy—it can be done and Canton can do it.

THE CANTON HOUSING COMMISSION

Ask Any Architect, Builder, Realtor or Material Man At Once!

This helped to get investors aroused



Invest Your Idle Money In Canton Mortgages To Provide Funds For Homebuilding

What the present lack of Homes means to Canton—

One of the city's larger industrial corporations maintains a working force of 4000 men. During 1917 to keep this number of men employed it was necessary for the company to hire 16,000 men. The same percentage holds true with the many other manufacturing here. This condition was in a large measure due to the inability of persons brought here by our industries to secure homes. Skilled mechanics, the backbone of the city, men with families, were glad to take advantage of the opportunities offered here, but unable to find homes for their families, were compelled to leave.

For present needs 2500 homes are required immediately. At the present rate of building this number will increase each year until our industrial plants, for that one reason, must cease to expand.

This great need for homes makes a mortgage doubly secure. Your money will bring you a good return and you will perform a civic duty.

"Buy a Mortgage and help build a home for Canton."

Ask any architect, builder, realtor or material man at once.

THE CANTON HOUSING COMMISSION

sound and advanced position today that real estate offers a more attractive investment during the next 10 years than it produced in the 10 years just past because your country is going to make progress, you will build more permanent buildings and more permanent improvements of all kinds.

The war has shown that no nation can be free until all nations are free; and in the same reasoning we must see that no man can be free until all men are free. Therefore, we must go on fulfilling our duty of promoting and encouraging home owning and making them become a partner in the affairs of our country, for only thru this channel, in my judgment, can we effect a permanent remedy for the conditions of housing which exist and provide a dependable supply of wage-earners for our communities. This will stop most of the keen competitive bidding for laborers' services from other cities; for a man will not easily be lured away from the city which provides everything he needs and in which he has a comfortable home for himself and family, which he is purchasing on some installment plan within his ability to pay.

The people as a whole are to blame for the conditions that now exist in your community and mine, of whatever nature it may be, and as the people as a whole are to be benefited by the improvement of that condition, therefore, the people as a whole should lend their support, encouragement, and finances to improve that condition.

The time has come when we must raise the home to the dignity of an economic factor in our community and national life; for we see the need for homes and decent living conditions as we could never measure them before, and we must not be led to believe that this question is only a war problem, for nothing is more certain than that it will last over into peace.

It was gratifying to us that Mr. Hawk

dwelt at length on the fact that building will not be cheaper, for this is one of the main things which has retarded building so seriously, and which we have tried to combat in our campaign. By hammering on this persistently we will not only get the prospective owner to understand it, but will also get it before the capitalist in such a light that he will be willing to put his money into this kind of investments. For the principal objection that there has been in recent months to so invest is the fear that after the war is over the cost of building will be so reduced as to depreciate the value of such investments and render them unsafe. The impossibility of such a condition is now beginning to be generally realized over the whole country, and has been placed before our own citizens very forcibly in the publicity matter which we have sent out. With this basic fact generally understood—that building will not be cheaper for many years to come, if at all—the atmosphere will be pretty effectually cleared, and then



Why Is a First Mortgage on Well Located Canton Real Estate the Best Investment?

- ¶ Because the basis for all value, for all wealth for everything of tangible worth is land.
- ¶ A first mortgage is the first lien on land, the basis of all value.
- ¶ The worth of the mortgage naturally depends upon the land upon which the mortgage is placed.
- ¶ A first mortgage drawn upon well located Canton Real Estate is, therefore, the best and safest investment you can possibly make.
- ¶ A first mortgage is the most acceptable collateral any man can present in applying for a loan as savings banks invest a great part of their funds in first mortgage securities.
- ¶ Any one who knows Canton knows the value both present and future of Canton real estate. A mortgage placed now on a property will increase in its desirability in direct proportion, as Canton real estate values enhance.
- ¶ For the past five years Canton's growth has been unprecedented, really unparalleled. Our industries have increased in invested capital, our employees DOUBLED in number and payrolls have almost TREBLED.
- ¶ But, Canton cannot continue to grow unless she houses her workers. The need for homes in Canton is imperative. You can do your share in assisting others build the 2500 homes needed now by investing your money in first mortgages on well located Canton real estate. Therefore,

"Buy a Mortgage and Help Build a Home for Canton"

Ask any architect, builder, realtor or material man at once.

THE CANTON HOUSING COMMISSION

With such arguments as shown in the advertisements on this page, the Commission continued to work on the investor

Water-closets to be porcelain and wash-down, siphon, or siphon-jet type, with individual flush tank. Open-front seat recommended. Outdoor water-closets will not be accepted. Privies will not be accepted. Cellar water-closets not permitted, except where complementary to accommodations herein required.

Access to water-closet compartments to be from hall or vestibule, never solely from a room. Plunger, pan, long-hopper, and range closets will not be accepted.

Hot and cold water to be provided to all fixtures, with proper drains and shut-offs. Wooden sinks and wash trays will not be accepted.

All fixtures to be separately trapped except in batteries of wash trays and combined sink and wash tray, where one trap is sufficient.

Venting of traps to conform to approved practice, except that the back venting of the top or only fixture on a line is not required. Sink and lavatory traps to be connected direct to the vertical wastes, and not to floor branches. Exposed pipes preferred, and, when exposed, wrought iron preferred. Where possible, lines to be concentrated and kept from outside walls.

12. *Porches.* Desirable. To be of durable construction, particularly the foundations; to be restricted from encroaching on minimum side yard or unduly darkening rooms.

13. *Rear Entrances.* In the case of row or group houses there may be access to the rear thru minor one-way public streets. Such streets to be not less than 12 feet wide; to be properly paved, curbed, drained and lighted. Private alleys will not be accepted.

14. *Roof Air Space.* In every house there shall be a minimum clear air space of 8 inches between the ceiling and the roof; this space to be provided with adequate waterproof openings for ventilation, at both ends if practicable.

15. *Rooms, Number of.* Bathrooms are not to be counted as rooms.

16. *Stairs.* Risers to be not more than 8 inches high and treads to be not less than 9 inches wide. Winding stairs will not be accepted except in types 1, 2 and 3. Not more than two winders will be allowed in series. Treads must measure at least 9 inches wide 18 inches from rails.

17. *Ventilation.* Every room to have at least one window opening directly to the outer air. Two windows in each room generally preferred; one window sufficient in small bedrooms. Each room to have a window area of not less than 12 square feet.

Cross ventilation as direct as possible to be provided for all rooms thru windows, transoms, or doors; communicating door recommended between bedrooms in row houses.

Every bathroom to have a window of not less than 6 square feet in area opening directly to the outer air.

Every water-closet compartment to have a window of not less than $4\frac{1}{2}$ square feet in area opening directly to the outer air. A skylight in the roof, with an equal amount of glass area and provided with adequate ventilators, will be accepted in lieu of such window, but skylights are not desirable.

18. *Windows.* Minimum area to be measured between stop beads. Window head to be as near ceiling as practicable. Windows may be double-

hung, pivoted, or casement. If double-hung, upper and lower sash to be the same size. In cities with soft-coal smoke nuisance, minimum area to be increased.

Window frames to be designed to accommodate screens and outside shutters. In cold climates, weather strips are recommended.

II. SPECIAL PROVISIONS FOR TYPES 1, 2, AND 3.

In addition to complying with all general provisions, types 1, 2 and 3 are to comply with the following provisions:

Type 1. Single-family house.

Type 2. Two-family house. ("Two-flatter," one family upstairs, one down. For "double house" see "Single-family house, semi-detached.")

Type 3. Single-family house with rooms for not more than three lodgers or boarders.

1. *Agreement.* Types 1 and 3 not to be over $2\frac{1}{2}$ stories high. Type 2 not to be over 2 stories high.

When detached or semi-detached, types 1, 2 and 3 normally not to be over 3 rooms deep; when in rows or groups, not to be over 2 rooms deep except that the end house of row may be 3 rooms deep.

2. *Cellar.* To be well lighted, cross ventilated, dry and paved or cemented. Minimum clear height under joists, 6 feet 6 inches. When hot-air furnaces are used, minimum height 7 feet. Cellar not essential under whole house. Where climatic or soil conditions make cellar inadvisable it may be omitted, in which case adequate provision is to be made for storing fuel. Where cellar is omitted, house to be set up on masonry piers or walls 2 feet clear from ground; space to be drained, inclosed, and ventilated.

3. *Grouping.* Single-family houses of the more expensive type preferably to be detached houses, but may be semi-detached or even attached in rows or groups. In other cases where land values permit, detached or semi-detached are desirable; otherwise attached in groups.

4. *Heating.* Provision to be made for heating houses. If not otherwise heated, bathroom to be heated from kitchen stove.

5. *Materials of Exterior.* Brick, terra cotta, stone, or concrete preferred; but wood frame clapboarded, shingled, or stuccoed permitted for detached or semi-detached houses not over $2\frac{1}{2}$ stories high. Party walls between attached houses in rows or groups to be of brick, terra cotta, stone, or concrete.

6. *Plumbing.* Bathtub (shower is not sufficient).

Lavatory, to be preferably in bathroom.

Sink to be in kitchen; rim 36 inches above floor.

Washtubs with covers, preferably two, rim 36 inches above floor, to be set in kitchen or in well-lighted, dry, and ventilated cellar.

Water-closet to be inside the house in well-lighted and ventilated compartment, with window of $4\frac{1}{2}$ square feet minimum area to outer air, and preferably with impervious floor not of concrete.

7. *Rooms, Height of.* Minimum, 8 feet.

Sloping ceilings and "knee walls" will be accepted only under the following conditions: Roof space above flat portion of ceiling to be of ample size and adequately ventilated; spaces between rafters of sloping portion to be adequately venti-

(Continued on page 104)

CAN'T BUILD FAST ENOUGH AT ERIE

*Government Will Construct
Many Homes in this Busy Town*

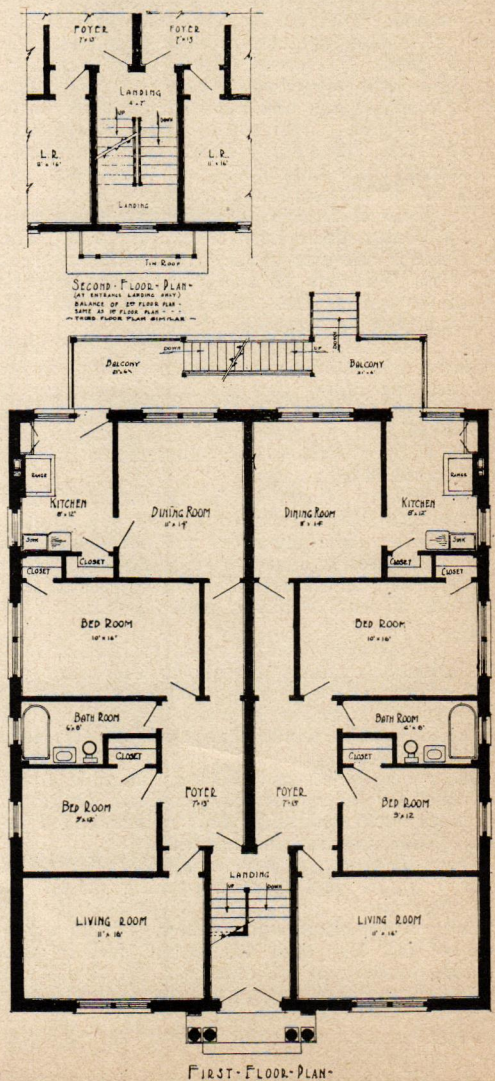
ERIE is a town which does not have enough daylight to do all the work it has on hand to be done. It has, to be sure, adopted the daylight saving schedule, along with the rest of the country; yet the war is making such demands on this manufacturing town of northwestern Pennsylvania that as one enters the city by night, he sees almost the entire industrial part of the city illuminated to as near an approach to daylight as one ordinarily gets, while the wheels of industry continue to turn without cessation. Erie has, as a matter of fact, 42 different industrial plants working on Government work, devoting from 60 to 100 per cent of their capacity to turning out guns, shells and other valuable supplies for carrying on the war.

All this unaccustomed activity means that the city must take care of a large in-rush of new people. The leading hotel of the city, so the writer was informed, has about half its space occupied by Government men—technical experts, inspectors, business administrators, etc.; while smaller hotels have been taken over entire by some of the manufacturing concerns.

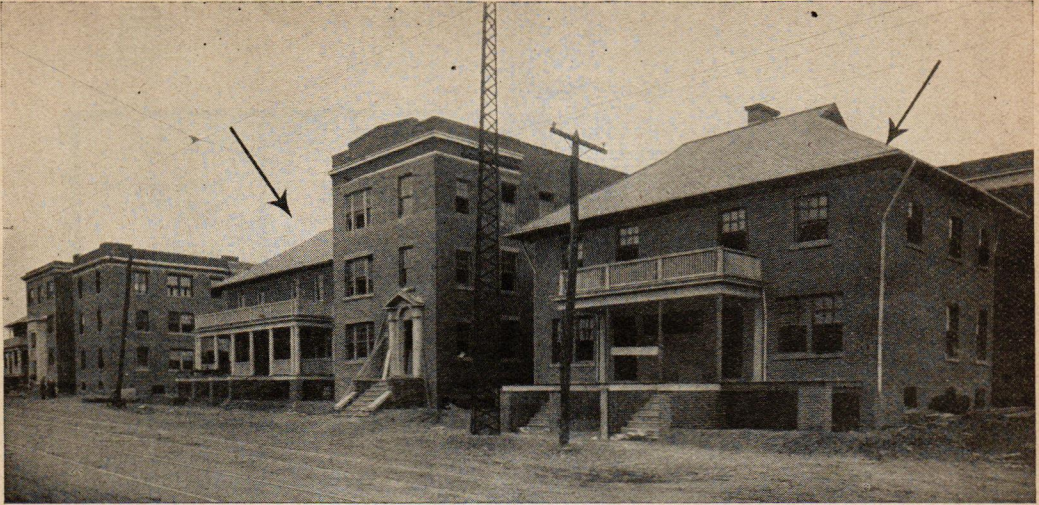
The housing situation has thus become as acute as at any point in the United States, and its importance to the Government cannot be overestimated. But the people of Erie are not the kind to sit around idly and wonder what to do. For some time the Board of Commerce of Erie has had a Housing Committee with D. W. Harper of the Harper & Russell Co., as chairman, which has been taking such steps as seemed possible for immediate relief, while it planned bigger things for the near future.

Erie is, according to authorities, the third city in the United States in point of density of population, so that there is comparatively little vacant property scattered thruout the city on which individual building can be done. Any extensive housing will therefore have to be done on acquired

tracts outside of the city limits. The committee has accomplished considerable temporary relief, however, by making a survey of property which can be purchased or rented, also of vacant houses which can be put into livable condition for temporary



Six-family house for Erie Brake Shoe & Foundry Company



NATIONAL BUILDER DESIGN No. 453

Built by James Stewart & Co., Inc., for the American
Brake Shoe and Foundry Co., Erie, Pa.

For Floor Plans, Sections, Elevations and Working Drawings, see Supplement of this
month. Arrows indicate the two types of this Two-Family House
as shown on Supplement.

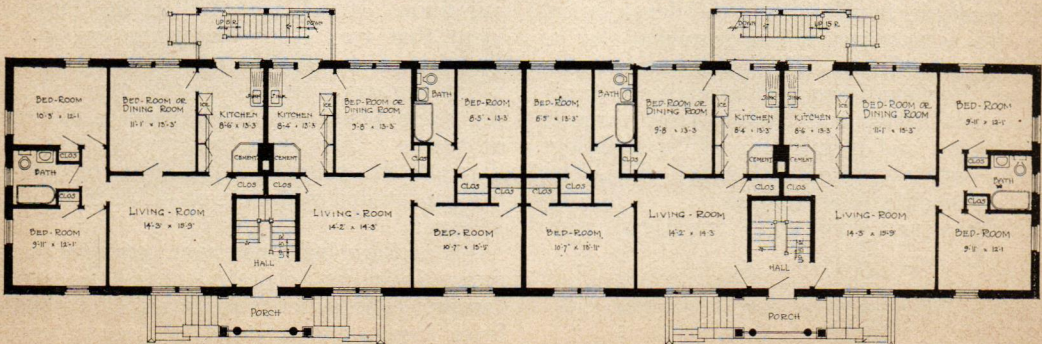
use. The committee has also induced many people to take boarders or roomers into their homes, so that practically every place where a person may live is now being utilized. In spite of this, workmen are every day coming to Erie, and ignorant of the housing conditions, are bringing their families with them, only to go out on the next train, leaving work on which they are badly needed, because there is no place for them to live.

The committee of which Mr. Harper is chairman has been very successful in interesting the Government in the Erie situation; and a fund of \$3,500,000, of which

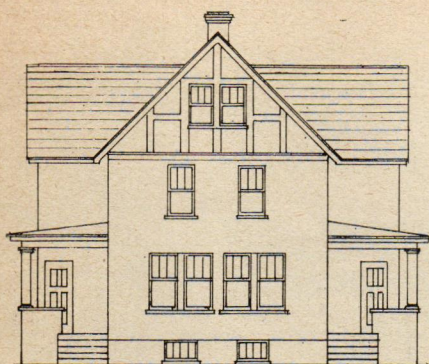
80 per cent is Government money, will be invested in Erie housing.

This \$3,500,000 will be used to provide for one thousand families in three different locations. The program will probably comprise detached one-family houses of frame construction, and as this is an average of only \$3,500, which must include the land, it will be necessary to work out an economical program, so far as design and construction are concerned.

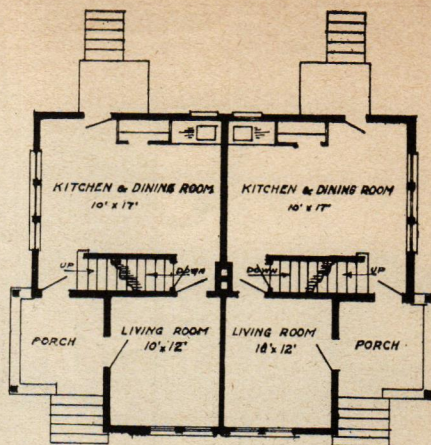
In the meantime some of the leading industrial concerns of Erie are working hard on housing projects of their own. Promi-



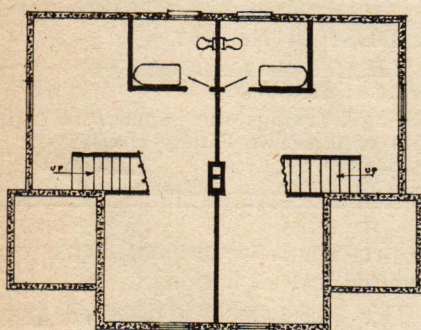
Twelve apartments of five rooms each



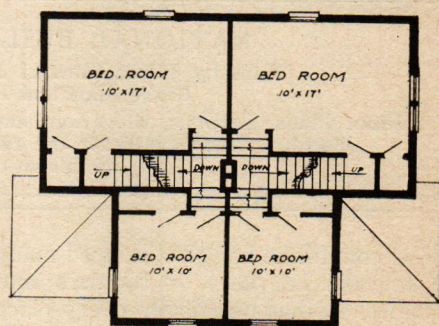
• FRONT ELEVATION •



• FIRST FLOOR PLAN •



• BASEMENT PLAN •



• SECOND FLOOR PLAN •

Double house on General Electric Development—G. Wesley Stickie, Architect

ment among these is the American Brake Shoe and Foundry Company, which has a development nearing completion which will provide for 280 families. This is necessarily a closely built, intensive development, as the company had only 6 acres of land available for this purpose.

It has been necessary, therefore, to adopt the multiple family house, the development in this respect resembling somewhat that at Bridgeport, Conn. The houses are of nine types, housing from two to eighteen families each, giving each family from three to six rooms, and from one to eleven buildings being constructed of each type. The complete schedule is as follows:

5 houses type A housing 2 families, 6 rooms					
3	"	"	B	"	3
10	"	"	C	"	6
4	"	"	D	"	6
11	"	"	E	"	9
2	"	"	F	"	12
2	"	"	G	"	12
1	"	"	H	"	18
1	"	"	I	"	12

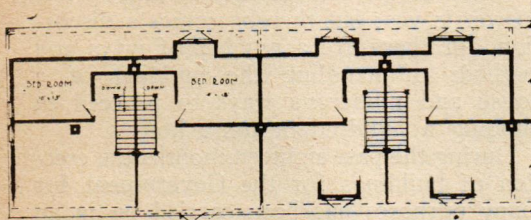
The two-family type of house being built by this company is shown on this month's Supplement. As will be noted, it is a true double house with a party wall between the sections occupied by the different families. The buildings above this size, however, are more of the apartment building type, with the rooms for each family all on one floor. It will be noted on the Supplement that two front elevations are given for the two-family house, so that variety of appearance can be secured even where the same plans are being used a number of times. This same scheme is followed thruout, the plans for each type of house being provided with two or more front elevations.

All of these buildings have concrete basements, including separate laundries for each family. The superstructures are of rough brick-faced tile, a type of construction which is very popular in that part of the country. The smaller buildings have slop-

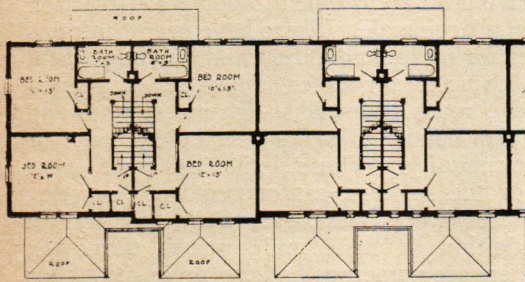
ing roofs, covered with slate; the larger buildings have flat roofs covered with built-up roofing.

Pine, cypress, and gum are used for trim in a variety of finishes, while the floors are stained yellow pine.

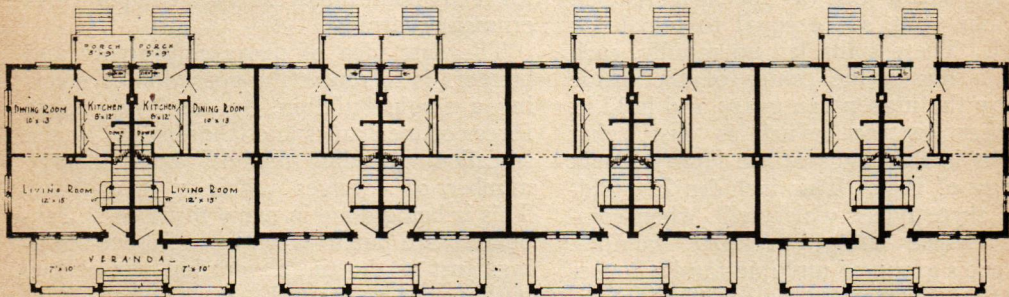
In spite of the fact that the houses are necessarily closely built, every room is an outside room, and has direct light and ventilation. Every apartment has complete kitchen and bathroom plumbing.



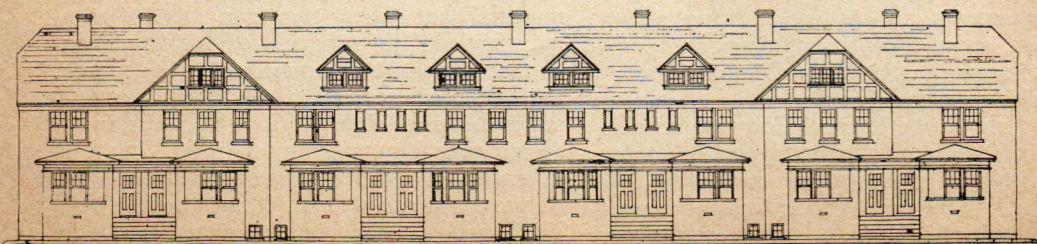
HALF-ATTIC PLAN



HALF-SECOND FLOOR PLAN



FIRST FLOOR PLAN



Multiple dwelling for General Electric Company—G. Wesley Stickle, architect

This is necessarily a development which must be rented rather than sold. Equipment for supplying steam heat and hot water for domestic purposes, from a central plant, have therefore been provided, and these commodities will be included in the rentals, which run from \$21 to \$40 per month.

The plans were developed by Mr. C. D. Pettis, vice-president and works manager of the American Brake Shoe and Foundry Company, and Mr. D. W. Harper, of Harper & Russell, real estate operators, who have charge of the construction and will manage the property after it is ready for occupancy. The building is being done by the James Stewart Company.

Another notable housing development in Erie is that being done by the General Electric Company at Lawrence Park. This company is fortunate in having about 800 acres of vacant land in the immediate neighborhood of its plant, and in addition to the erection of temporary living quarters for some of its employees, and small scattering contracts, it has two main contracts for permanent houses, one of which is now being completed and the other recently started.

The contract which is being completed is by the Industrial Homes Company of Erie, of which J. A. Maahs is manager.

This contract consists of thirteen 8-family houses and ten 2-family houses, or provisions in all for 124 families. In addition to this the contract includes a 50-room club house, with barber shop, pool room, bath, social rooms, etc.

The houses are of the multiple family type, each family having its own furnace, laundry, etc.

These houses are the same as on the work previously described, rough texture tile brick, and the interior trim is yellow pine.

The material which has been referred to as tile brick, or brick-faced tile, is manufactured in various sizes and is of a rough texture face similar in appearance to any face brick. The units used on the General Electric and American Brake Shoe & Foundry Company jobs are known as "splits," which are the same size in face as a solid brick, but twice the size in width, the size of these splits being $2\frac{1}{4} \times 8 \times 8$ inches. The texture of these splits is of the wire cut variety. They are made in both the buff and red shade, the red being used exclusively on the General Electric operation. Some are a deeper red than others, and when a variation of shades is obtained the finished wall presents a very pleasing and beautiful appearance.

Tile splits will construct a hollow tile wall with a brick face, corners, window jambs, arches, etc. They afford a saving in mason labor, due to the fact that in laying one split, space equal to two brick is filled. These splits lay up rapidly, each having a lug in the center of the inside whereby the mason can grasp and hold it.

Another contract which is just being started is in the hands of the Henry Shenk Company of Erie. This includes 79 buildings of three types, which will, when completed, house altogether 470 families. These are a group of multiple-family houses rather than apartments, as each building is two and one-half stories high and each family has rooms on all three of the floors. The basements are of interlocking structural tile, supplied with laundries and individual furnaces, and the buildings are covered with asbestos shingles.

The Erie Forge & Steel Company is also planning to build immediately on 200 acres which it holds close to the site of its new plant. On this property individual houses will be built which will be sold to employees of the company without profit.

Systematizing the Building of Workmen's Homes

By Daniel J. Hauer

IF a man can build one house, cottage or bungalow, is he not competent to build a hundred such houses at one time? The answer is yes; but thereby comes a discussion, for there are a number of ways and methods of handling the building of a house and numerous ways to proceed in building a hundred or more houses.

During the past eighteen months the erection of buildings for the Government for many purposes has been carried on in an unprecedented manner, and upon a scale unheard of in this country, even where we have been accustomed to doing construction on a large scale. There have been contracts let for more than a thousand buildings each, with necessary water supply, sewerage system, roads, sidewalks, lighting system, and other details to make a complete town or community. Those built last year were for the soldiers, cantonments of barracks, offices, warehouses, etc., while this year in addition to these and various terminals, there are numerous housing propositions for caring for the workmen and their families, for many manufacturers engaged upon Government contracts.

The first idea of many contractors and builders is to repeat the operation of erecting a single building, by employing large forces of mechanics and laborers and by the so-called "speeding method" build a large number of cottages within a given time. This is being done in many instances. Carpenters are put to work on different buildings just as tho there were but one or two buildings to be erected.

Thus men are placed so close that they frequently interfere with one another. The material that one or two men may be using may impede the progress of half a dozen, so that such material may have to be moved and handled several times. The cost of supervision is high, as it is difficult for a foreman to look after many men. Time is taken up with changing men from one kind of work, as they finish it, to another, and in showing mechanics how work should be done, and having mistakes rectified.

Much work that is done is bound to be poor or not according to plans; and altho a single building may be erected quicker in this fashion, yet the cost for labor and waste materials will be higher and the entire project can not be done in as quick time, as when the construction is done along systematic lines and according to the most approved modern management.

A short outline will show how both time and money can be saved by following the proper system.

The first consideration is to obtain and properly distribute the construction materials. This is the most important feature of the entire undertaking. A lack of material means not only a delay but a break in any well thought out plan or system of building. The material once obtained must be properly distributed. The success of the job will depend upon this.

Take the proposition of erecting two hundred houses—ten of these to be boarding houses of twelve rooms, twenty to be eight room cottages, forty to have six rooms and the rest five room houses. Thus there are four types and sizes of buildings. Forces can be organized to work on each type or size of house. If material in plenty for all the houses is being received, then the gangs or crews can be so arranged as to number and size that they can finish all the buildings of each type at about the same time.

Power saws, boring machines and such tools for working up the material can be arranged conveniently to material yards or points of receiving materials, so as to work up much of these materials without interfering with the construction of the buildings. If some 2x10-inch planks are to be cut 16 inches long, and altogether 800 of such pieces are needed, it is evident that these can be cut up by one operator on a saw, and the pieces can then be hauled and enough for each building delivered to it and neatly piled until used.

This is a common practice, as it saves time and money. Consequently if this can be done, then it is just as practical to cut a thousand roof rafters of 2x6-inch plank 16 feet 9 inches long and deliver them in the same manner to the buildings. Thus it becomes only a step to have framed and cut in this manner the greater part of all the material to be used, except special pieces or something that must be measured and fitted at the building.

It is this that starts the system. Some

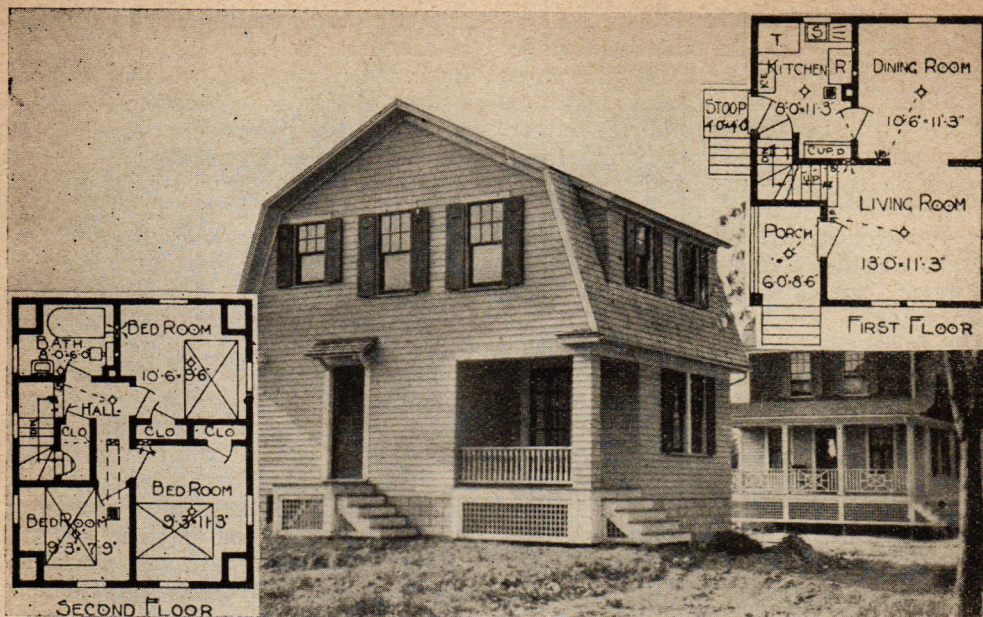
carpenters and mechanics are given the job of framing alone, others that of erecting. As a man running a power saw and cutting a piece of timber to a certain length, with notches and at given angles, is able to repeat this operation a thousand times if necessary, better than another who must start at it anew, so it is logical for another mechanic to place floor joists over and over again on the same type of building, while another set erect studding, a third place roof framing, another flooring and so thru each class of work.

This is the logical and practical system of erecting houses in large numbers. It means the repetition of the same operation by the same men as often as possible. It means the cheapening of work; the speeding up of a job with the greatest economy; the saving of much material; the lowest percentage of mistakes; the best workmanship possible; the handling of large bodies of laborers and mechanics with the least supervision. It means better satisfied workmen, and the easy selecting of competent mechanics.

The actual planning of carrying on such a job must depend upon the plan and character of the building to be erected. The crews and their tasks can only be decided upon from the plans. A few mistakes may occur, and for the first few weeks some changes may have to be made in the arrangement of the men and their number, but this is insignificant as compared to the numerous changes made in the crews during each day and for the entire life of the job. The building of workmen's homes is a large problem and one that will occupy the attention of many builders for several years.

Maintenance

Good company developments are found to be greatly marred by a failure to maintain the houses and their surroundings properly. Relatively poor housing accommodations are redeemed to an extent by a good system of upkeep. Employers are practically one in their belief that problems of maintenance are the most important ones for the success of any housing undertaking. The old style type of miner's house in anthracite and bituminous regions of Pennsylvania is being rejuvenated, by repainting and repair, construction of white-washed fences, the planting of trees and shrubbery, systematic garbage collection, etc.



Building Homes at Lockport

A LARGE manufacturing concern in Lockport, N. Y., which is ordinarily engaged in the manufacture of saws, is now, with a largely increased force of workers, manufacturing helmets for our soldiers in France. Other concerns at this busy manufacturing center are also engaged in war work, making necessary increased housing facilities for the town.

To assist in meeting this condition, an organization was formed known as the Lockport Homes Company, Inc. Many of the manufacturers have stock in this company, and some of them are on its board of directors. The company has a capitalization of \$100,000.

Eighty-five houses have so far been built, most of which are now completed and sixty-two of them are occupied.

In regard to the selling plan, Mr. L. B. McDannell, Manager of the Lockport Homes Co., Inc., made the following statement:

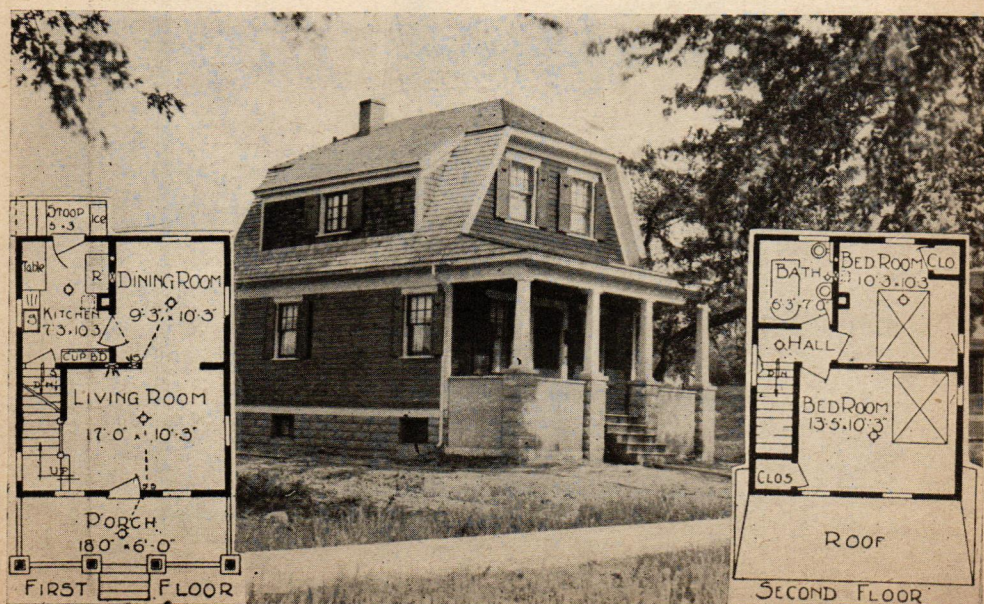
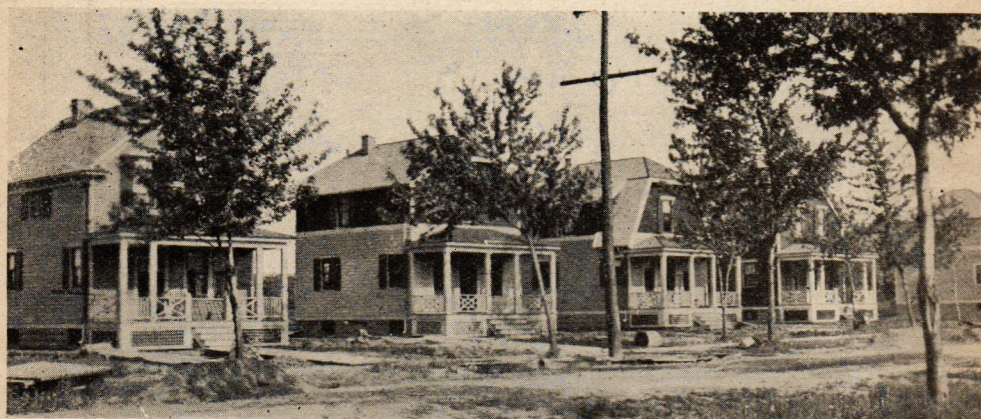
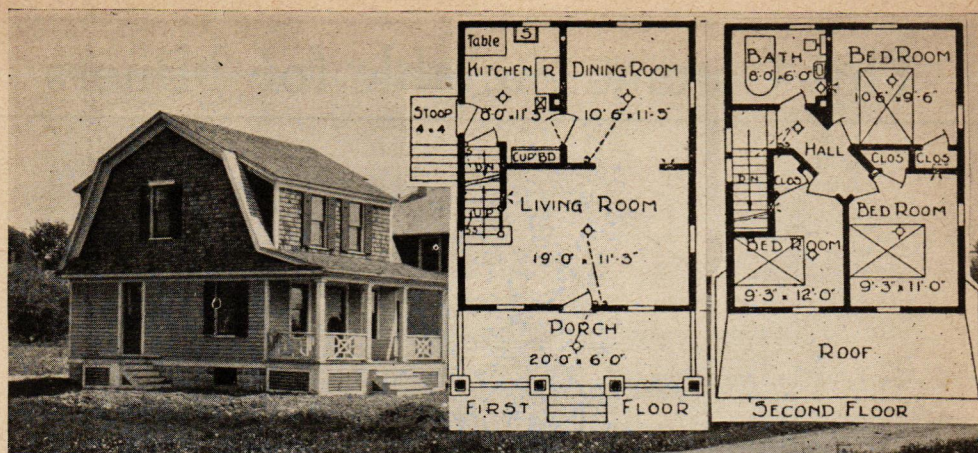
"We have a selling plan on which we take down payment of \$200 and the balance on monthly payments of \$18.00 on a five-room house and \$20 on a six-room house. The selling prices are \$2,650 for a five-room house and \$2,950 for a six-room house. The purchaser pays his taxes and

maintains his property in addition to the monthly payment. The interest is included in the monthly payment. We simply figure his interest on his unpaid balances each six months and charge him with it and the first monthly payments after the six months term are used to pay the interest first and the balance is applied on the principal. He may take up his contract at any time. We are only too glad to have him do so."

These houses have been built up around a comparatively small number of floor plans, but the exteriors have been so varied as to avoid monotony.

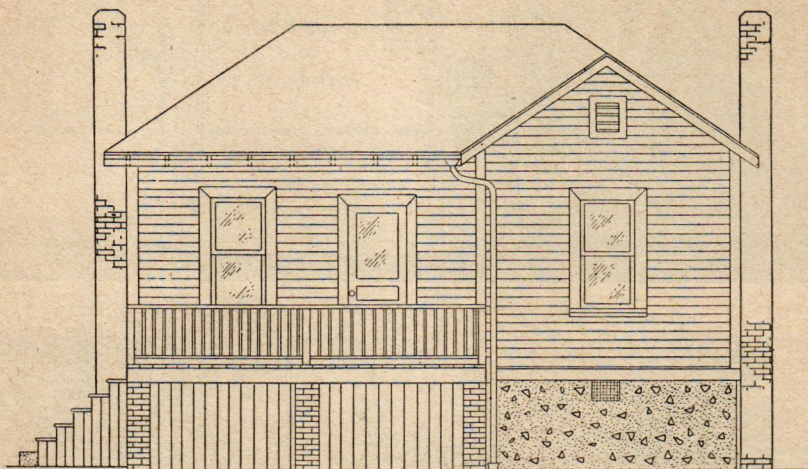
The basements are of concrete block or brick. The outside walls are for the most part covered with redwood or red cedar siding laid about $4\frac{1}{2}$ inches to the weather. The outside finish is cypress, poplar and white pine. The floors and inside trim are of southern pine. Ten of the houses have interior walls of wall board.

Where the material furnished for scaffolding in the repair of the employer's building was not suitable, and the scaffold was too heavily loaded by lumber placed thereon under the supervision of one carpenter, who was intrusted with superintendence over the work, entitling the other carpenter, injured by the collapse of the scaffold, to recover of the employer.—77 So. (Ala.) 65.

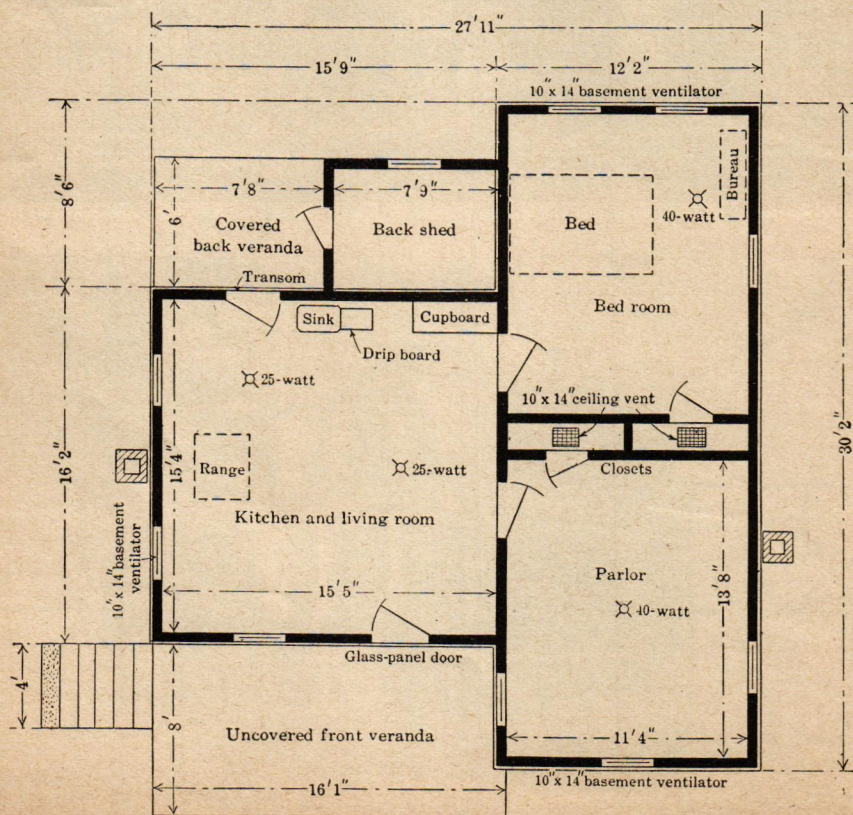


Some of the houses at Lockport, N. Y.

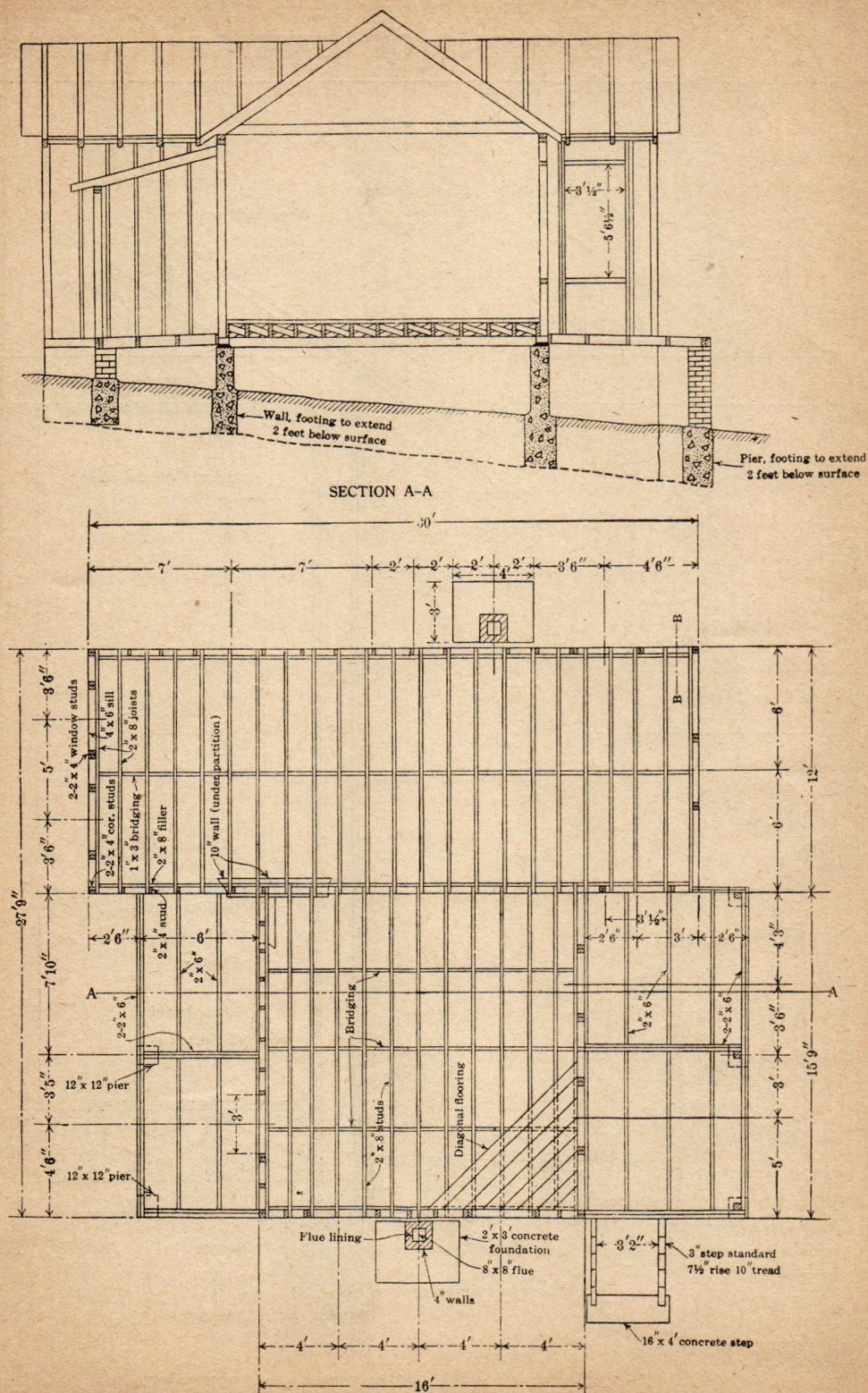
This Cottage Suitable for Miners



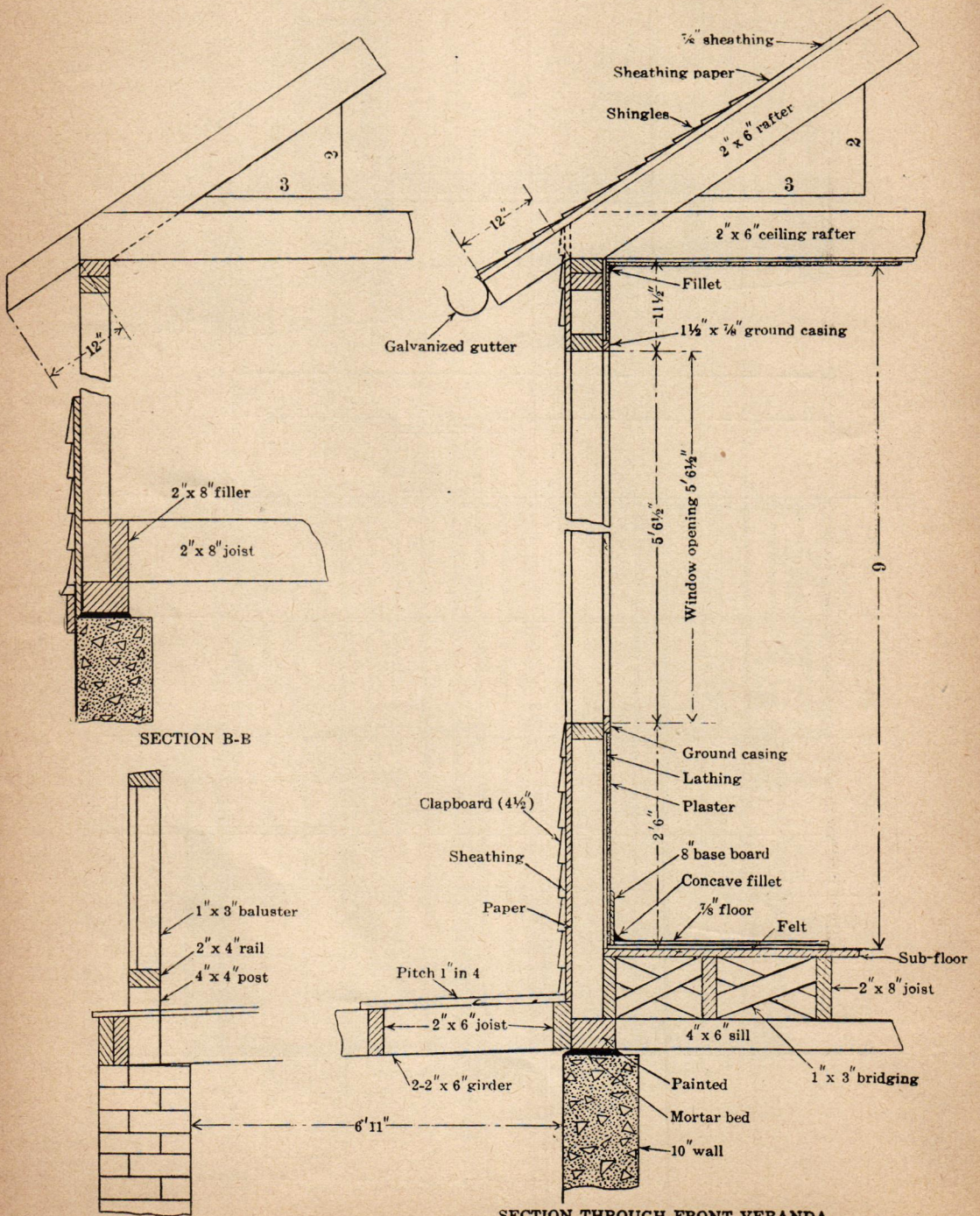
FRONT ELEVATION



FLOOR PLAN

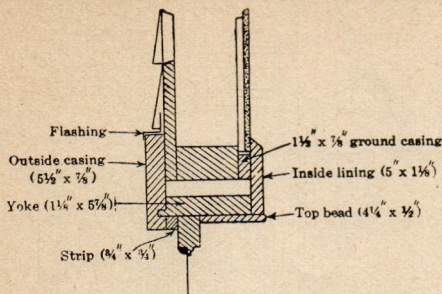


Details of Typical Cottage

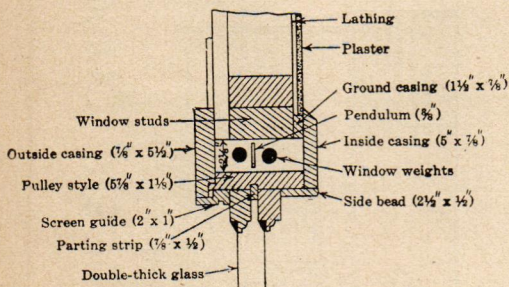


SECTION THROUGH FRONT VERANDA

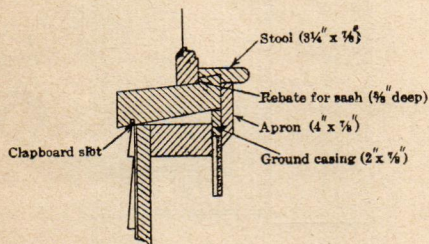
for Miners



SECTION THROUGH TOP OF WINDOW



SECTION THROUGH SIDE OF WINDOW



SECTION THROUGH BOTTOM OF WINDOW

MINERS are a low paid class of labor, usually foreigners, many of whom would not appreciate the American house with its so-called "all modern improvements." It is essential, however, that the foreigner have a house which is at least sanitary, comfortable and in accordance with the best living conditions which he knows anything about, if not indeed, a little beyond them.

The Bureau of Mines of the Department of the Interior has made a study of mining houses, as a result of which study it has presented the type of house shown on the accompanying plates, as perhaps as near standard as it is possible to reach for this class of labor.

Some of the Problems of Housing

Industrial housing in this country is only in its infancy as yet and what has already been done, and much that has been suggested, is more in the nature of experimentation than it is of constructive value in solving the problem.

The problem is much more complex in this country than it is in the countries across the water, from the number and diversity of requirements to be met and overcome, and because of the variety of nationalities that must be dealt with here. While we can, no doubt, obtain many valuable suggestions from what has been done over there, we must realize that these are suggestions only and must be restudied and adjusted to our needs.

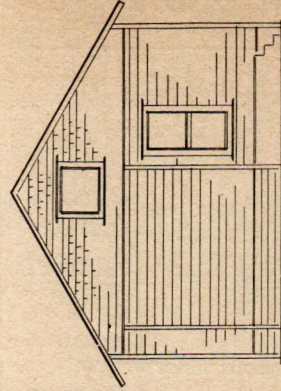
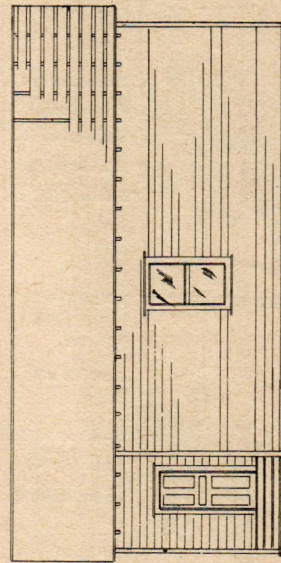
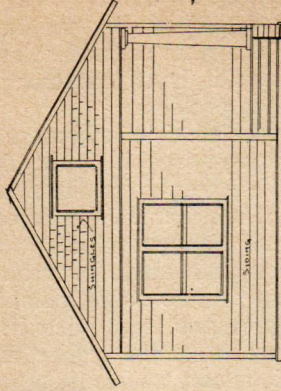
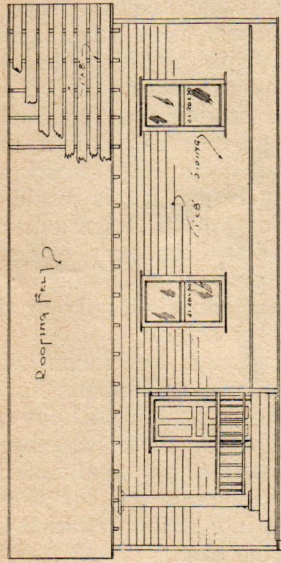
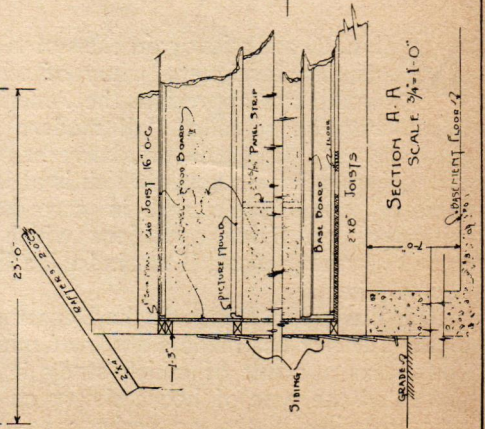
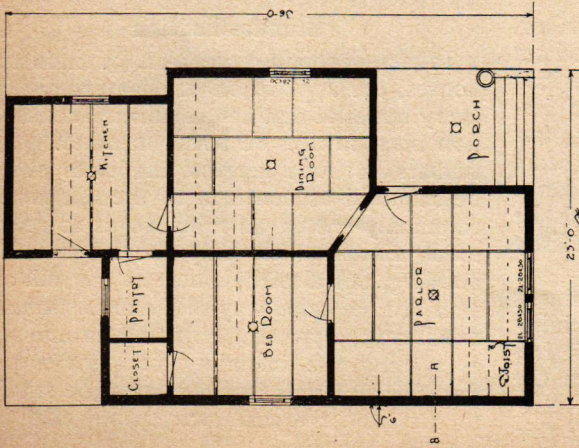
Americans, as a rule, have very little patience with anything that differs from their way of looking at a subject, so instead of studying a suggested change to get its good or bad points, they are very apt to cut it short by remarking, "Oh, yes, that may be so, but it would be infinitely better for you to learn our way." This attitude has been very evident in all the housing projects with which we have come in contact either actually or thru descriptions in the press.

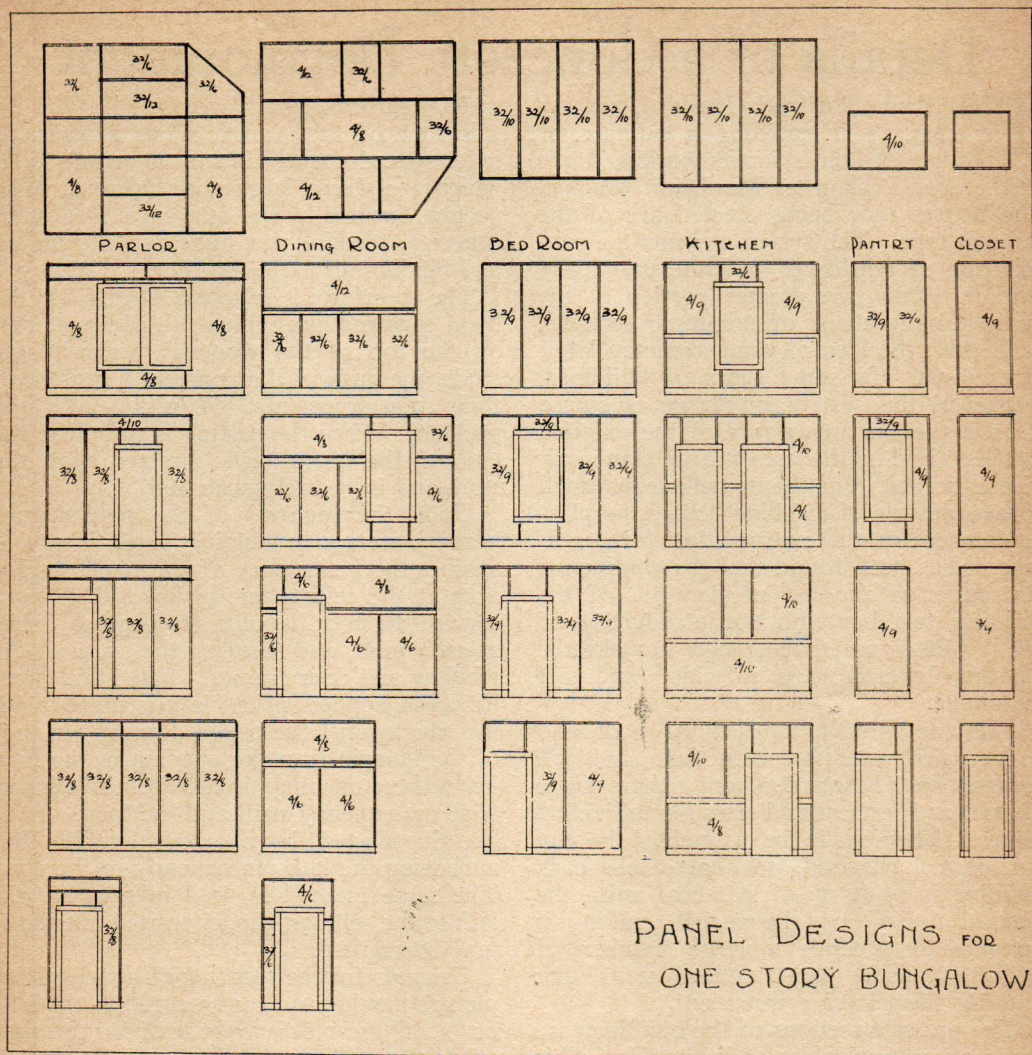
Working men are human beings and not machines and as humans have their own standards and habits of living. In the majority of cases these have been developed in the school of personal experience so that in providing housing for them this must be taken into account, which has not been done in the past.

Standardization

In standardizing the plan of industrial houses, the application of that principle to every material that enters into the construction must always be borne in mind. Only timbers of such lengths and sizes should be required as conform to the dimensions commonly cut by all mills, so as to reduce to a minimum not only the labor at the building, but also the waste at the mill and site. In the same way mill work, plumbing and heating apparatus, lighting fixtures and everything else, including the labor of putting the materials in place, must be studied to cut from the cost every penny that can possibly be saved.

ONE STORY BUNGALOW





THE illustrations here shown are the result of an effort to reduce the construction of houses for low paid workmen to the very lowest cost and at the same time give them homes which will be serviceable, comfortable and homelike. A number of houses from this plan were erected by the McClintic-Marshall Construction Company at Pottstown, Pa.

The outstanding feature of the design is the fact that it calls for the use of wall board thruout, doing away with the trouble and expense of all plastering. In this way the same set of workmen will be able to build the house complete from the foundation up.

The designer has carefully laid out the wall board scheme, fitting the design so

far as possible to the standard sizes of board, and then laying out each wall and ceiling to make a good appearance in paneling and also to use the board in the most economical way. He has then tabulated the requirements of wall board for each cottage as follows:

No. Pan	Size	Sq. ft.
16	32x 6	256
12	32x 8	252
15	32x 9	360
8	32x10	216
2	32x12	64
8	48x 6	192
10	48x 8	320
8	48x 9	288
5	48x10	200
3	48x12	144

Total, 2,292

Details of a Concrete Development

THE Alpha Portland Cement Company is engaged in building a number of permanent homes for its working force at the No. 5 plant at Manheim, W. Va. The houses now being erected are of the pre-cast type. The system permits the construction of reinforced concrete practically without forms, the greater portion of the work being pre-cast of minimum sections, made with the idea of using common labor in erection. In some types of buildings, erected by this system, no plaster or stucco is used, tho the appearance of the exterior can be varied by the use of large plane surfaces stuccoed. For the miscellaneous small houses, outside of dwelling houses, no plaster is used for the exterior, but for dwellings, it has been found that the continuous air spaces within the outside walls of the building, together with the introduction of heavy waterproofed felt, helps to make the building dry and warm in winter and cool in summer.

The construction consists of wall and floor slabs, together with belt and sill courses, floor beams and roof rafters made of standard sections and sizes for individual pieces. They made be assembled in any combination desired, so that while each building is made up of standard units, the general design may be varied, making it possible to produce a large number of buildings, using the standard units, but varying the exterior treatment.

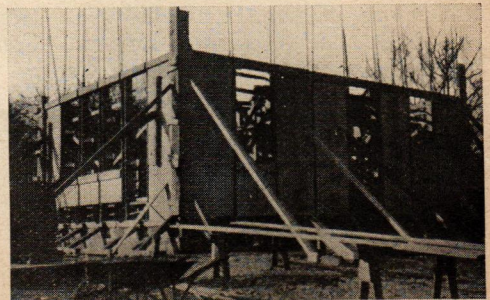
The pre-cast sections of the buildings are made on casting tables or in moulds. This may be done either at the building site or in the yard or shop, and shipped to the site. If they are shipped, the sections may be packed in fine broken stone, sand or gravel, and the latter may be used at the site as an aggregate forming the studs, which are field-cast and form the binding element for the buildings. All of the pre-cast members entering into the construction are so designed that the metal with which they are reinforced projects beyond the end or edge of the pieces. In assembling the pre-cast sections in the buildings, they are spaced at intervals on the walls, leaving a space between the two sides of sections, and are then clamped together temporarily by means of channel shaped wood or metal forms covering the two open sides of the intervening spaces and forming a pocket into

which reinforced bars are placed. The inside face of these pockets has a series of holes spaced about 7 inches on centers, into which are placed large wire hairpins. The pockets formed by the forms are filled with concrete, forming the studs of the building and binding all parts together.

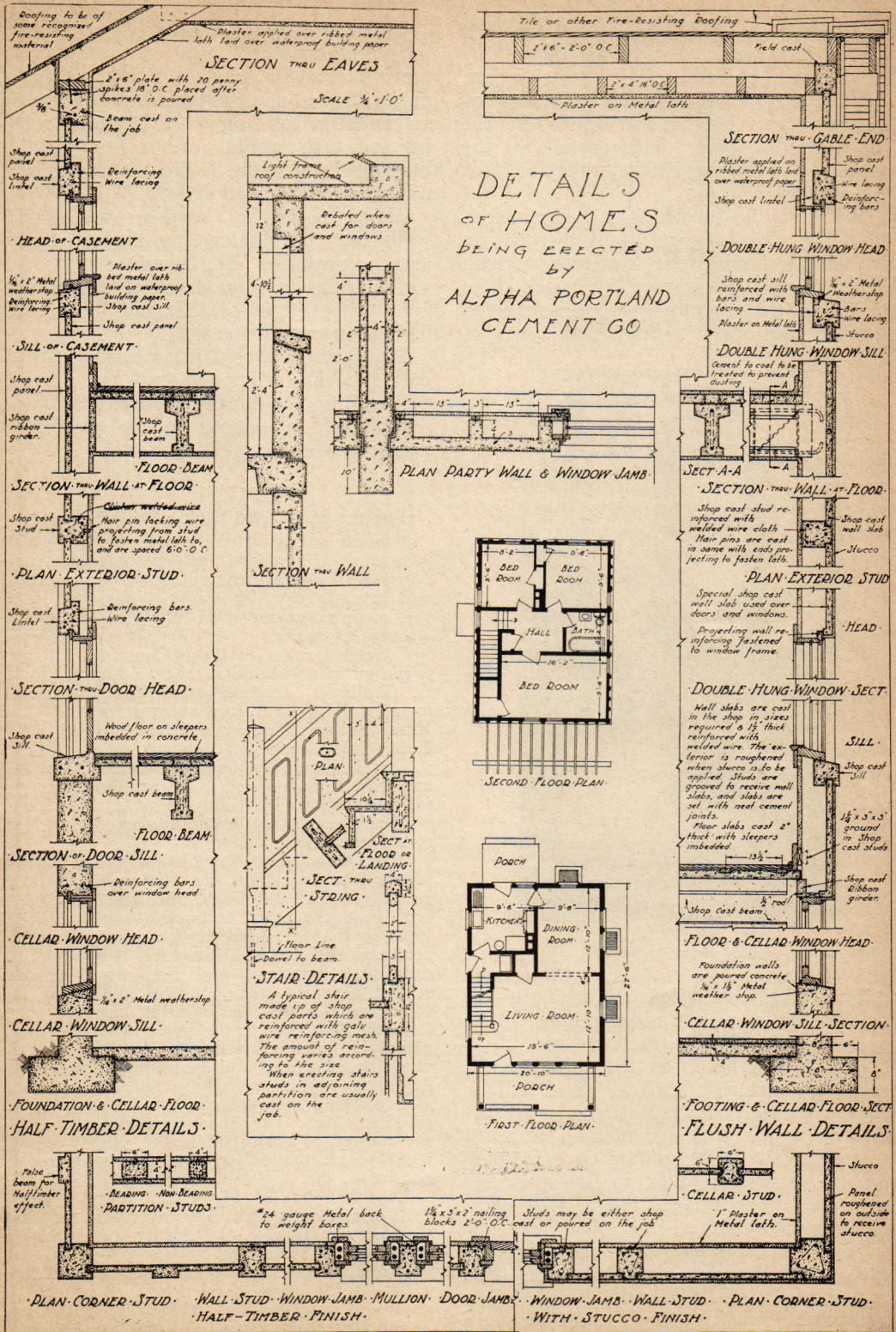
The reinforced concrete beams of the floor construction, which are pre-cast, rest on the top of the wooden forms of the studs, the ends of the concrete beams, with their reinforcements, projecting into the pockets. When the casting is complete, the end of the beam rests directly upon the stud, and is securely anchored.

Upon the removal of the field forms, heavy waterproof building paper is placed against the inside face of the studs, beginning at the ceiling line and working down toward the floor, lapping the paper 4 inches at each joint, and securing the edges to the window and door frames. After this paper has been applied ribbed lath is placed with the ribs against the paper, forcing the ends of the hairpin thru the opening in the lath. Thru these openings is then placed a heavy wire or tenpenny nail, and the loops of the hairpin twisted down onto the wire, thus anchoring the lath permanently to the stud. The same method is used in securing the lath to the ceilings, tho, if desired, the paper may be omitted.

Grounds for the securing of wooden base, picture moulds, etc., are secured to the lath, or "spot" grounds may be used for this purpose; the walls and ceilings are then ready for plastering. Studs for the interior partitions are all pre-cast. Reinforcement for these studs project from the upper ends, the stud being of full height between the top of the floor slabs on which it rests and

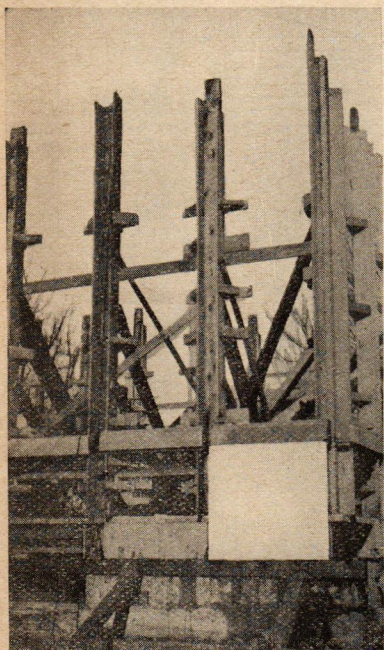


How the sections are erected



the under side of the floor beams. Between the top of these studs and the top of the floor beams, a distance of twelve inches, is cast a girder or plate, binding the ends of the floor beams together and distributing the load over the studs. This permits of the variations in spacing of the studs for door openings, etc.

Roofs may be formed in a manner similar to the floors, using slabs directly on top of the reinforced concrete rafters. Where cement tile is used for roofing, the tile may be laid directly upon the reinforced concrete roof slabs. For other types of



Stud forms in place

roof covering, dovetailed lath are built into the top surface of the roofing slabs, forming nail spaces for the roofing material.

The finished floors of the building may be of any material, such as wood laid on sleepers in the standard way, plastic surface, or by the standard method of using a wood base with the sanitary cove, forming a carpet strip and filling in the space between the cove and the floors with Portland cement finish.

Treads and risers forming stairs for this type of house are pre-cast in one piece, also sections of the chimneys, mantels, and other parts of the building; they are set and built into place as the buildings progress.

The foundation walls may be either a solid 8-inch concrete wall on top of a concrete footing, or formed in the same manner as the walls in the building above grade. In the latter case, however, the slabs forming the walls would be 2 inches thick instead of 1½ inches, which is the standard thickness of the wall slabs.

Many designs of surfaces for outside walls may be obtained by the use of selected aggregate. The standard method is to finish the slabs under wood float, touching up the edges of the studs after they have been cast in the field.

Dry joints are used in assembling all the parts, tho in casting the studs, all parts of the building are thoroly grouted, forming a construction analogous to the placing of panels in the doors.

For the Man Who Builds School Houses

A great many of the states of the Union have devised standard designs for rural school houses. These are the result of careful study and investigation by leading investigators in the various states and are therefore well worthy of study.

A large number of these have been brought together in a volume recently compiled by F. A. Challman, commissioner of school buildings for Minnesota, in a volume entitled, "The Rural School Plan," published by the Bruce Publishing Company, Milwaukee.

This is, however, but one feature of a volume which is destined to be wonderfully helpful to those who are interested in the design, construction, equipment and maintenance of rural schools.

It is stated that Mr. Challman has himself planned more than one thousand city and country school buildings, and has visited several thousand rural schools of the modern type, so that the book is the result of his experience and observation. He has presented only such principles and methods of country school planning and construction as he has found to be workable in rural districts.

In the first chapter he takes up some of the primary considerations which govern the planning of school houses, telling what are the desirable types and why they are desirable, also offering suggestions as to the selection of sites, etc. The second chapter discusses the matter of costs; while the third takes up legal requirements, sale of bonds, forms of contracts, etc.

Another chapter gives building standards, and discusses heating and ventilation, sanitation, care and use of building, furniture and supplies, etc.

It is a book which, in the hands of builders, will help the rural districts of the country to secure a much better type of school house. The book covers 256 pages, and has 143 illustrations. It sells for \$1.50.

Apartments and Boarding Houses

There is always some demand in a large manufacturing center for small apartment-houses of two or three rooms with bath, etc., for married couples without children. They are not so desirable as homes for the workingman, and yet there are some mechanics who prefer them just as so many well-to-do people in our cities are content with and prefer this class of dwelling.

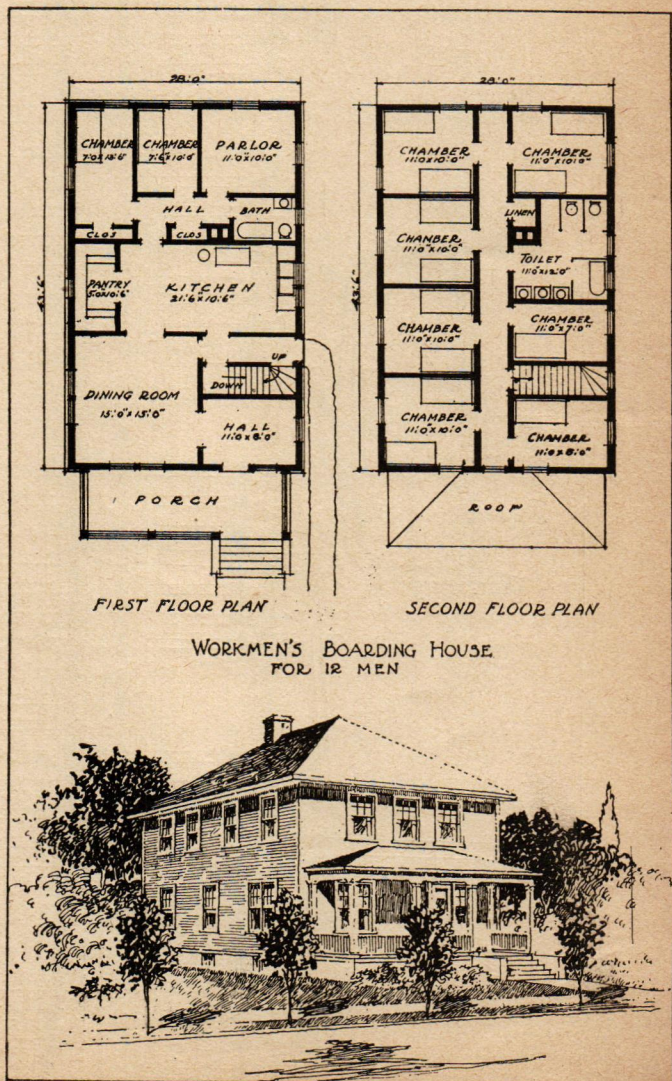
In rural districts many mills have built small boarding-houses large enough to take care of from eight to a dozen boarders. The advantages of a small boarding-house are that a man and his wife can run them, and the mill has no further responsibility. The men also prefer this sort of lodging to big company houses. The big disadvantage is that it is difficult to exercise any supervision over this sort of boarding-house, and they may be misused or over-crowded. This far outweighs its advantages.

The old style of mill boarding-house or hotel taking in a large number of employees has gone somewhat into disfavor. Under proper regulations this is a much better method of housing than in boarding-houses or by allowing the families to take lodgers, but it is difficult to popularize it among the men. It will generally be found that the single worker prefers to lodge with a private family if he can possibly do so, but if this is impossible or if he is prevented by the owner and can be induced to take up his quarters in a large boarding-house, he can be very comfortably housed at a very moderate cost.

The good points of the boarding-house for fifty to sixty men are that one effi-

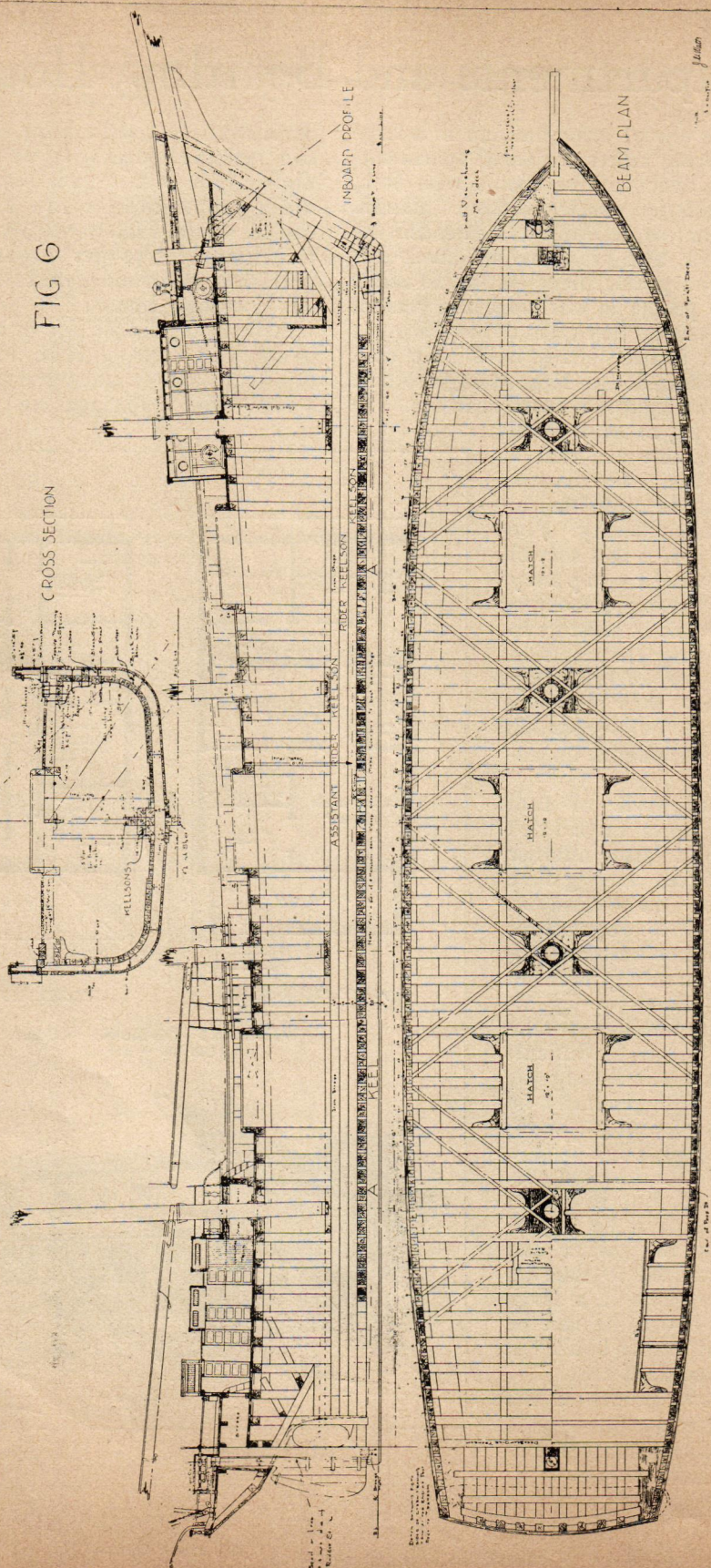
cient married couple with three servants can run the place without difficulty. A higher type of tenant is required to handle a proposition of this kind but they can be secured fairly readily. It is easier to arrange for proper inspection and supervision, as in most cases these are run as "company houses."

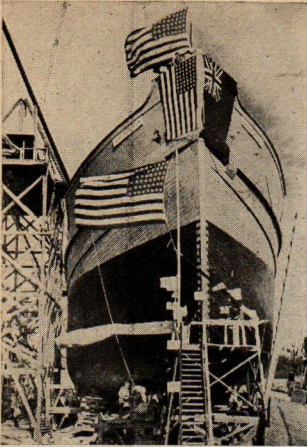
A boarding-house for more than sixty is too big a proposition to be handled this way, and would have to be run like a hotel with a manager and regular staff.



Design by Aberthaw Const. Co., Boston

CROSS SECTION





HOW WOODEN SHIPS ARE LAID OUT AND BUILT

By John Davenport

Part II

AS the keel and floor construction of a ship are the foundation or backbone of the entire fabric, and as upon them depends to a very large degree the strength of the vessel, and furthermore as the operation of building commences with the laying of the keel, it is these parts that I shall first describe.

Referring to Fig. 6, inboard profile, the keel is designated as *A*. In this particular craft, which by the way is a 220 foot 4 masted schooner designed by J. Murray Watts, the lines of which were shown in the June issue, the keel is built up of two members each 10x14 in., making the finished keel 14 in. wide by 20 in. deep. It is of course quite impossible to obtain any kind of lumber anywhere long enough for the keel of a vessel of this size in one length. It is therefore necessary to build it up, joining shorter sticks end to end.

The joinings of these short lengths are called scarfs and they are formed in like manner to that shown in Fig. 7. Sometimes the jog *A* is in the form of a tenon

only, but the plan shown is the better with the tenon *T* in parts of the scarf. The letter *W* denotes a stop water and is a plug of soft fir or pine driven tightly into a hole bored thru the keel at the upper jog, as shown. When the vessel is put afloat this plug swells and prevents leakage. Stop waters are also placed in the junction of stem and keel, and stern post and keel.

The length of scarfs depends upon the depths of the keel; as a rule they should be cut so as to make an angle of 13 deg. with the top, or of the under side of the keel.

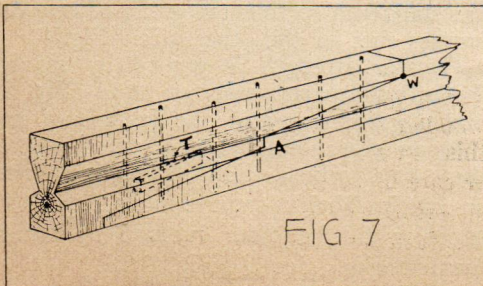


FIG 7

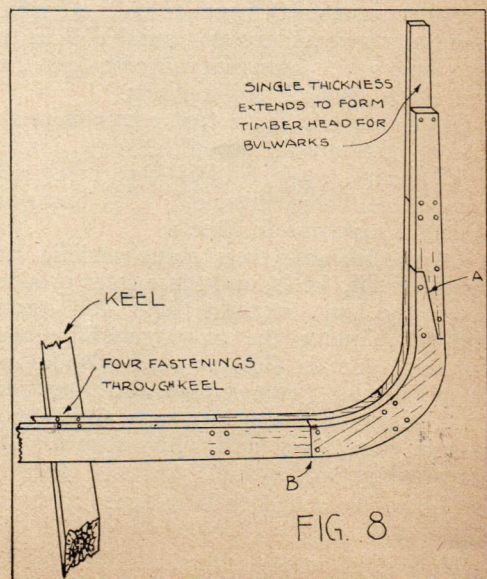


FIG. 8

It is very good practice to fit to the bottom of the keel a hard wood shoe, especially if the keel is yellow pine, Douglass fir or one of the other soft woods. Oak or birch is best suited for this purpose.

The keel having been sawn out according to the plans, the next thing to do will be to get it into place on the building blocks.

Oak is one of the strongest and most durable of shipbuilding woods which grow in the United States, and most favored of all species of oaks is the live oak, a compact, fine grained and heavy wood that is the material par excellence for the making of keels. However, it is difficult to obtain in large quantities because the trees seldom attain large dimensions and never are found in forests, so therefore are scarce.

Next in value to live oak is white oak, a wood that grows in great abundance in the eastern half of the United States; it is durable both in and out of water, and possesses great strength.

Other varieties of common oaks, of which there are several, are less durable than the live and white oak, but nevertheless they are often used in shipbuilding.

Rock elm is a large tree common in the United States; its wood is very fibrous, flexible and tough, and if kept constantly wet, exceedingly durable. It is therefore splendid material for keels.

Of the resinous trees many varieties are used for ship keels, and these trees produce especially long, straight, light and strong timber. Among the more generally used for ship keels are Georgia pine—also known as pitch pine, yellow pine and long leaf pine—Oregon pine, sometimes called Douglass fir, and black and white spruce. Always when soft woods are used for the keel a hard wood shoe is fastened along its under side.

Nowadays in the shipyards, because of

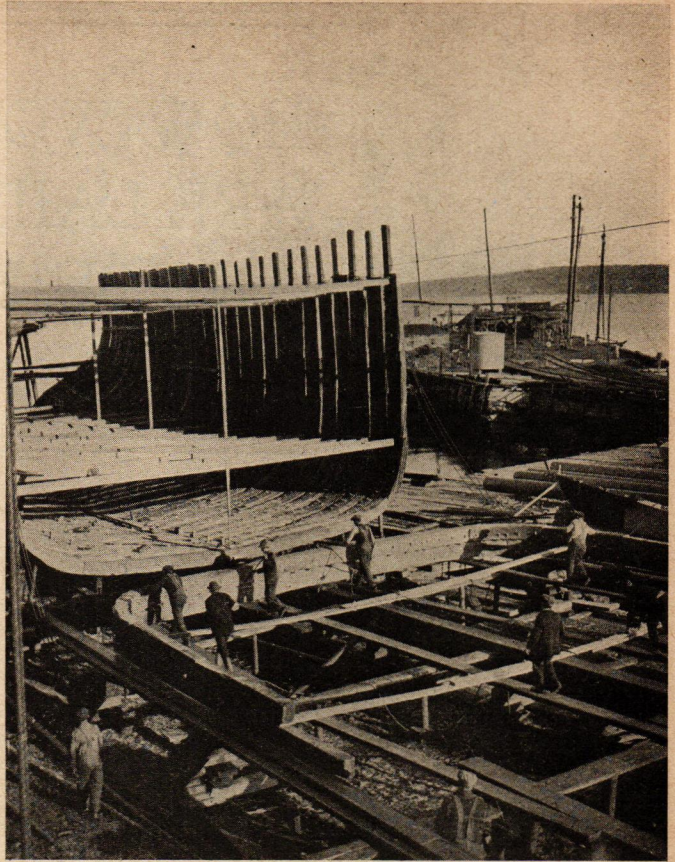


Fig. 9—One of the 552 wooden ships in the U. S. shipbuilding program

the great haste with which ships must be built, as soon as one vessel is launched the keel blocks are reset and the keel of a second craft is laid. The keel is laid piece by piece and the scarfs permanently bolted as the laying continues until it is complete from the foot of the stern post to the heel of the stem.

The frames or timbers are cut to shape from moulds prepared in the mould loft. Each frame is doubled—built up of a number of pieces called futtocks, and the joints or butts between the parts of the frame are staggered so that the grain of one half crosses that of the other. See Fig. 8.

Greater strength is gained by scarfing these frame parts as shown at *A* (Fig. 8), and a great many of the frames of new wooden ships building now are joined in this way, which, altho requiring greater care in fabrication, and more time, is far superior to the older method of butting the futtocks. See *B* (Fig. 8).

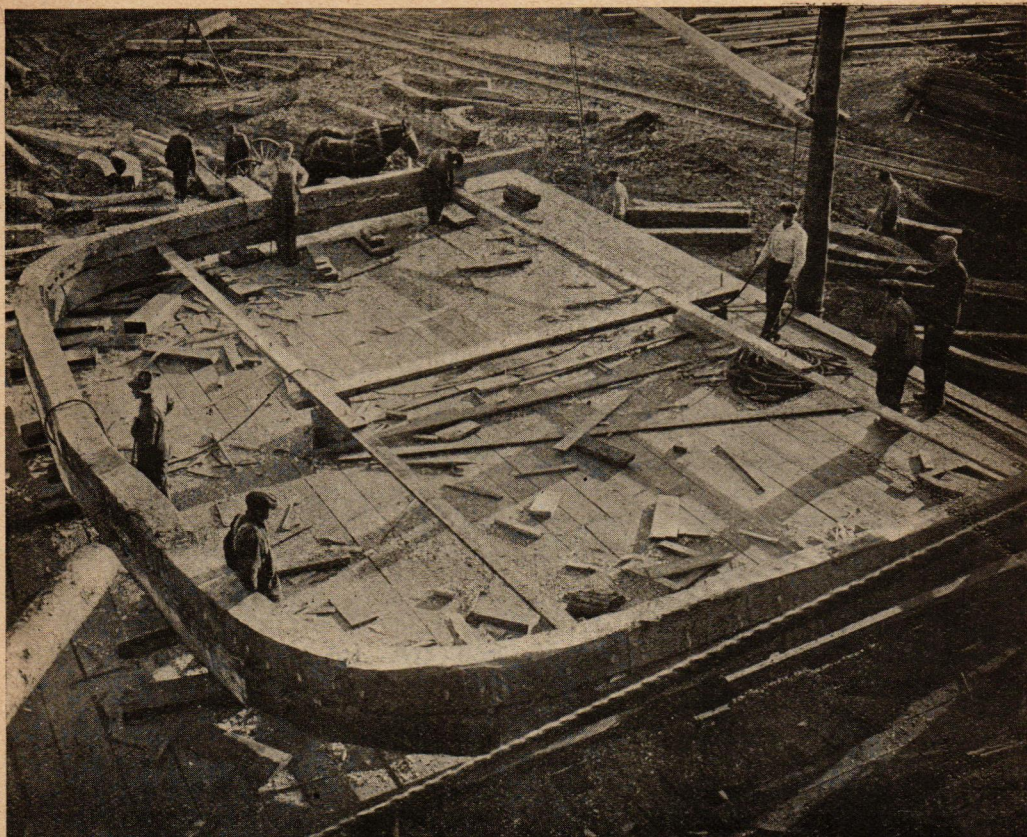


Fig. 10—A rib ready to be placed on the keel. The pieces are all fastened together with wooden pins

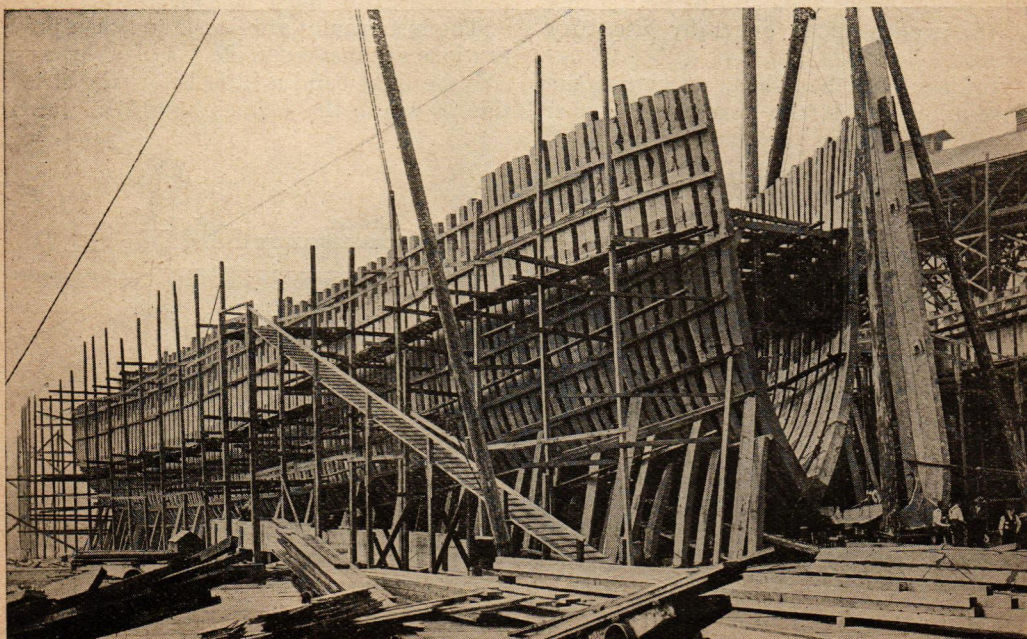


Fig. 11—The stem is a mighty stick of wood, in this case in a single length, with a one-piece apron bolted to its after side. It is joined to the keel with a 6 to 8 foot scarf. (Photo by courtesy of Tams, Lemoine & Crane)

Frames are always designed to be parallel in thickness in a fore and aft direction, called the moulding, and to be tapered from the keel, or heel to the deck, or head, called the siding. In other words, the frame is moulded to similar dimensions and sided to varying dimensions.

Each half is fastened to its counterpart by locust wood dowels. In a 250-foot vessel, where the frames are sided 20 in. when doubled and moulded 26 in. at the keel and 12 in. at the deck, $1\frac{1}{4}$ in. dia. treenails, 8 to each futtock, hold the parts secure. Treenails are driven thru auger holes bored thru the double frames and split wedged at both ends, just as an axe handle is locked in its iron. The heads of the frames are held in proper relation to each other by a temporary beam.

When the frames are finished and marked they are raised upon the keel and plumbed and squared into position as shown in Fig. 9. They are spaced at 2 ft. 3 in. on centers in this particular craft, which leaves but 7 in. between their faces.

There is no regular rule applied to the order in which the frames are erected. There are, however, certain advantages in setting up the amidship frames first, as then it is possible to progress both forward and aft in the operation of erecting the other frames.

Live and white oak, chestnut, red cedar, larch, yellow pine, Douglass fir and spruce are the woods more generally used for frames.

Workmen have been busy on getting out the stem, which is the foremost member

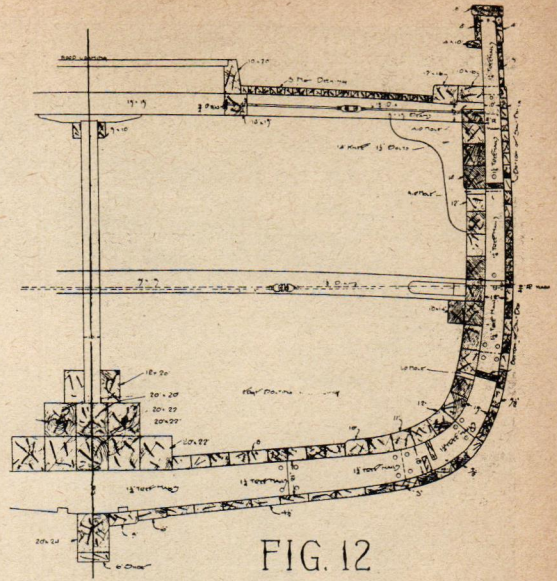


FIG. 12

of the vessel's skeleton, and the stern framing, which is the aftermost part of the craft, and these parts are erected and fastened securely before the last three or four foreward and after frames are set in place. Fig. 11 shows how the completed stem, which is a large piece of timber, is lifted by means of sheer legs and tackle and deposited plumb and true to its appointed place. The stem is rabbited, as may be seen, and into this rabbit the forward end of every plank must fit snugly and secure.

The last frames are fitted, and then preparations are made outside for planking; notice the light band a little below the sheer; this is where the frames have been faired

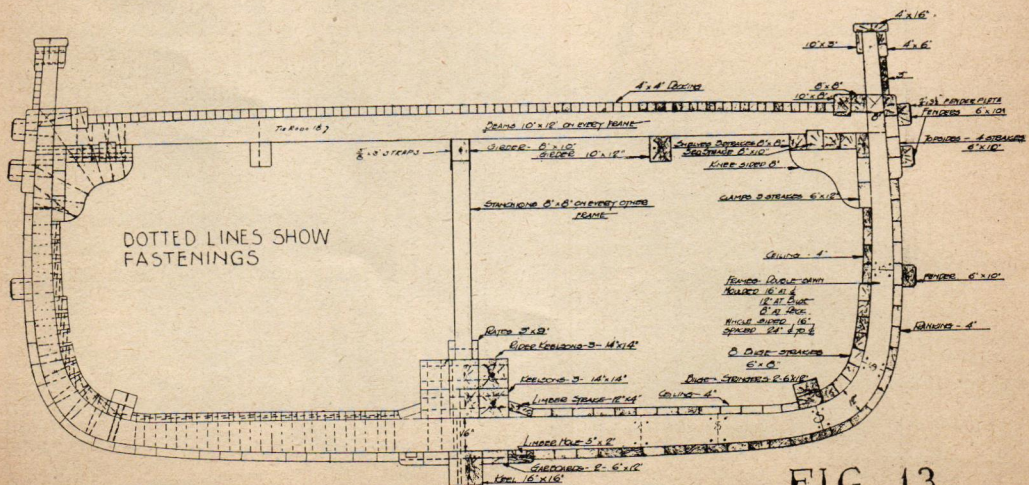


FIG. 13

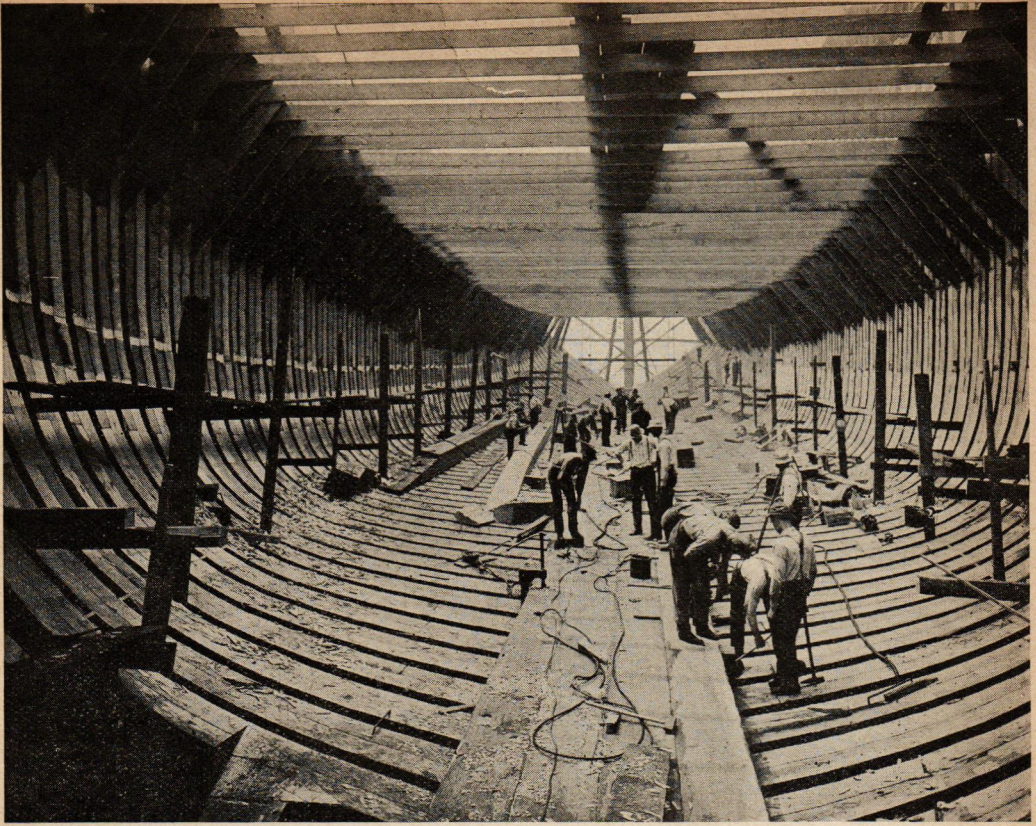


Fig. 14—After the frames are erected the various keelsons are laid over the keel. Comparing any part of the vessel's frame with the workmen demonstrates the hugeness of the various parts. (Photo by courtesy of Tams, Lemoine & Crane)

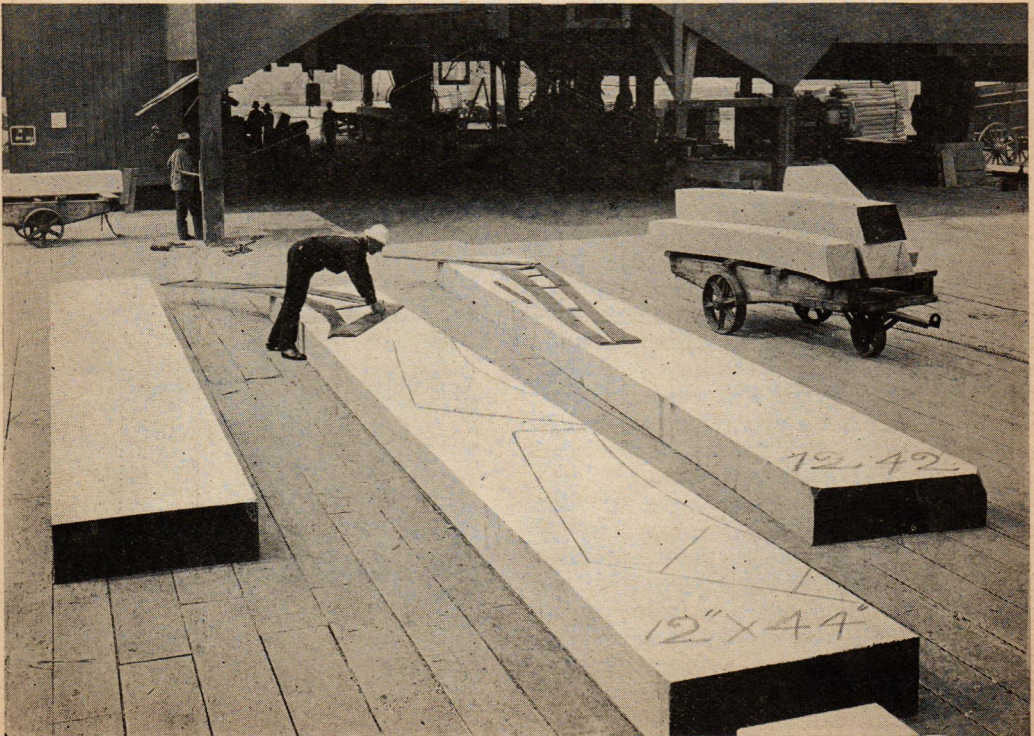


Fig. 15—Shipbuilding timber is cut from the largest trees, and timbers 12x40 inches or more are the rule rather than the exception. Incidentally, it requires a well equipped saw mill to handle sticks like these. (Photo by courtesy of Tams, Lemoine & Crane)



Fig. 16—A pair of ship knees in an Oregon knee yard

to take the planking. Formerly hand labor and an adz accomplished this work, but now handpower cutters do the trick.

Meanwhile, inside timber is being fitted which forms the keelsons. These are constructional members that extend fore and aft on top of the frames. The Watts schooner, Fig. 6, has six, while the schooner designed by Tams, Lemoine & Crane, Fig. 12, has eight. The center one over the keel is called the main keelson and the two each side sister keelsons, while the ones atop these are respectively rider and assistant rider keelsons. These are all wallopig big sticks scarfed together from the longest lumber procurable. In a 250-foot vessel they should be at least 20x20 in. square. (See Fig. 14.) Keelsons are bolted with $1\frac{3}{8}$ in. bolts vertically thru the frames and keel, and horizontally thru each other.

Usually the main keelson is bolted with four bolts to a frame, three at least of which are clinched under the keel. The sister keelsons and assistant keelsons are fastened with three bolts to a frame driven to within 1 in. of the bottom of the frame. Edge bolts for keelsons are driven at alternate frame spaces thru each keelson.

The sizes for bolts in the keelsons are governed by the siding, or width of the

timber, rather than its thickness or moulding. A main keelson sided 20 in. should be fastened with $1\frac{3}{8}$ in. bolts, and a 16 in. keelson with $1\frac{1}{4}$ in. bolts. Notice in the drawing (Fig. 13) how these fastenings, represented by dotted lines, criss-cross and hold every part securely to its neighbor.

On top of the rider keelson there is fitted two parallel members spaced fore and aft, called plates. These are securely bolted and between them the feet of the stanchions that extend along the center line between the underside of the deck beams and the center rider keelson step. These stanchions are shown in the cross section and inboard profile (Fig. 6).

Yellow pine, white or black spruce, Douglass fir, live oak, white oak, red cedar, larch and pitch pine are the nine best United States woods to use for keelsons.

The entire inside of a ship's framing is sheathed as well as the outside, and this inside sheathing, called the ceiling, is fitted just as carefully as the planking, is as well fastened, and is of much greater thickness, especially from the turn of the bilge each side thence upwards to the deck. In a moderate sized vessel the ceiling is 12 in. thick and 16 in. wide at the bilges and sides and 8 in. thick thruout the bottom.

The ceiling is applied for the longitudinal strength it gives and not for water tightness. It is therefore very well fastened strake to strake in addition to the fastening bolts thru the frames. Ceiling bolts are proportioned in accordance with the thick-

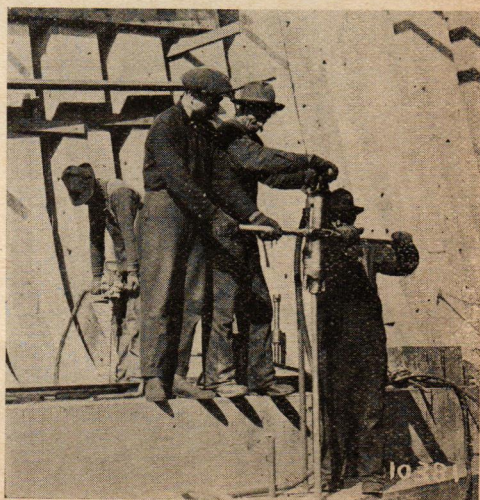


Fig. 17—Drift bolt driver driving bolts through sister keelson of a 3500-ton wooden boat

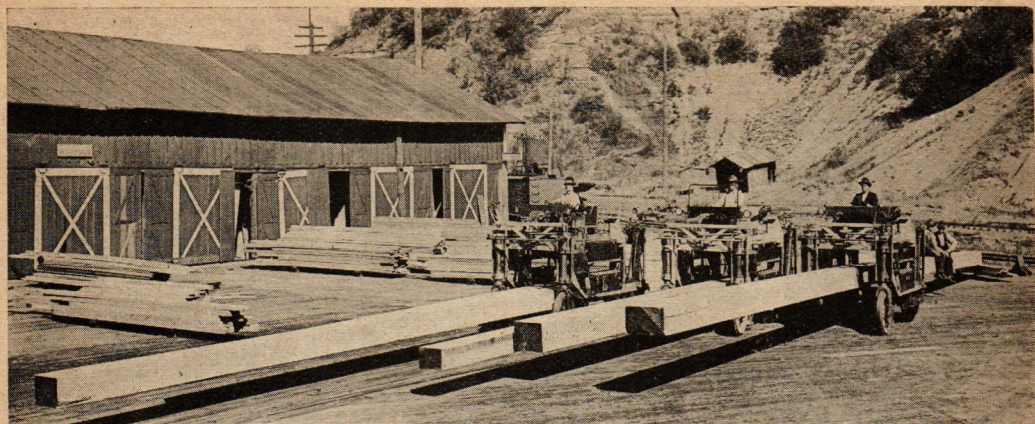


Fig. 18—Modern ship yards employ every practical labor-saving device. At the yards of the Peninsula Shipbuilding Company in Portland, Ore., power lumber jitneys make light work of moving monstrous joists about the yard. (Photo by courtesy of Tams, Lemoine & Crane)

ness of the ceiling. Twelve-inch ceiling cal's for $1\frac{1}{4}$ in. bolts and 8 in. ceiling for 1 in. bolts.

Edge bolts that fasten one strake of ceiling to the next should be $\frac{1}{8}$ in. less in diameter than the bolts that secure the ceiling to the frames. Ceiling is always square fastened; that is, two bolts are driven from the inside to within 1 in. of the outside of the frame and two bolts are driven from the outside and clinched inside. Edge fastenings are driven at alternate frame spaces thru two and one-half strakes.

The best of all wood for ceiling, as it is for almost everything else in shipbuilding, is live oak, and following it come in order red cedar, yellow pine, white spruce, Douglass fir, larch and red pine.

All wooden vessels are built, or should be, in a way that allows proper air circulation in every crannie and corner. The spaces between the frames are ventilated thru openings left in the ceiling (see Fig. 12). Air circulation is needed to prevent dry rot, a disease of growing trees and felled lumber that attacks in the form of fungi which work to the finest advantage in dark, unventilated places. To salt is popularly attributed ability to kill the destroying fungi and for this reason salt boxes are often built between the frames, and salt in considerable quantity poured in to combat the dreaded ravages of so-called dry rot.

While workmen inside the hull are hard at laying the keelsons and ceiling, aloft on the scaffolding others are fitting great deck beams that have been sawn on the ground

from patterns. These in the size vessel we are describing are timbers approximately 15 in. square cut with a crown both top and bottom of 8 to 10 in. in the vessel's width, in this particular case 43 feet (Fig. 12).

Deck beams are fitted at the top of every frame and rest on the uppermost strake of ceiling and two or more heavy shelves or clamps that are sprung inside the ceiling and thru bolted to it and the frames. Heavy natural crooked knees of hackmatac are fitted under these clamps and against the ceiling, usually at every frame thruout the midship sections, and every other one at the ends as shown in Fig. 6, cross section. The method of fastening these great knees is shown by the dotted lines in the drawing Fig. 13; iron bolts $1\frac{1}{4}$ in. in diameter are used for fastenings.

The deck beams and deck framing around hatches are best if made of live oak, yellow pine or Douglass fir.

Modern power hand tools are used almost entirely in present day ship yards. Pneumatic drills worm out in short order bolt and treenail holes $1\frac{1}{2}$ in. in diameter, or over, and from 2 to 4 ft. deep. Of all of them without doubt the portable power saw is the most interesting. Other labor saving tool are the power auger; the pneumatic drift bolt driver which in Fig. 17 is shown at work hurrying bolts 4 ft. long by $1\frac{3}{8}$ inches in diameter thru one of the sister keelsons of a 3,500 ton wooden schooner; and the chipper, which clinches drift bolts over their washers.

ESTIMATES

NATIONAL BUILDER DESIGN No. 451

(See Supplement, also page 35)

Excavating and Masonry

172 yds. excavating at 35c.....	\$ 60.20
108 cu. ft. concrete footing at 30c.....	32.40
320 cu. ft. concrete foundation walls at 30c	96.00
240 cement block laid in wall above grade at 18c.....	43.20
37½ lin. ft. chimney at \$1.90.....	71.25
1 cement cap for chimney.....	1.75
512 sq. ft. cement floor at 12c.....	61.44
1 catch basin	15.00
	\$ 381.24

Lumber Bill

Pcs.		Feet
1 6x 8x18 ft. girder		72
1 6x 6x14 ft. posts		42
14 2x 8x16 ft. box sills		299
20 2x 8x12 ft. first floor joists.....		320
20 2x 8x14 ft. first floor joists.....		373
20 2x 8x12 ft. second floor joists.....		320
20 2x 8x14 ft. second floor joists.....		373
42 2x 6x12 ft. attic floor joists.....		504
22 1x 6x16 ft. collar beams		176
20 2x 6x12 ft. porch floor joists.....		240
6 2x 6x14 ft. porch floor joists.....		84
3 2x 8x20 ft. porch beams		80
3 2x 8x14 ft. porch beams		56
4 2x 8x12 ft. porch beams		64
18 2x 4x12 ft. porch ceilings		144
16 2x 6x12 ft. rafters		192
96 2x 4x18 ft. outside studding	1,152	
30 2x 4x12 ft. gable studding	240	
32 2x 4x18 ft. partition studding	384	
6 2x 6x16 ft. bath room partitions...	96	
40 2x 4x16 ft. second story partitions	427	
24 2x 4x16 ft. plates	256	
14 2x 4x12 ft. plates	112	
30 2x 6x18 ft. rafters	540	
4 2x 6x14 ft. rafters	56	
4 1x 4x16 ft. ribbon boards	21	
20 1x 6x12 braces	120	
20 1x 4x16 ft. bridging and backing..	107	
10 1x 6x16 ft. backing	80	
6 2x10x12 ft. cellar stairs	120	

Total feet dimension..... 7,050

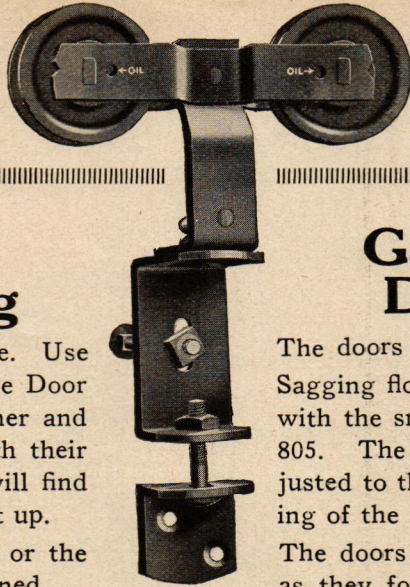
7,050 ft. framing lumber at \$37.....	\$ 260.85
2,340 ft. 8-in. No. 2 Y. P. lap outside sheathing at \$37.....	86.58
840 ft. 8-in. No. 2 Y. P. lap first story rough floor and coal bin at \$37	31.08
1,100 ft. 1x6x12 to 16 ft. No. 2 Y. P. sheathing roofs at \$37.....	40.70
100 ft. 8-in. No. 2 Y. P. lap, balcony at \$37	3.70
1,550 ft. 7/8x2¼ face clear VG. Y. P. flooring at \$65.....	100.75
350 ft. 7/8x3¼ face No. 2 Y. P. flg., attic at \$50.....	17.50

11 M. clear 5 to 2. R. C. shingles for roof at \$5.....	55.00
14 M. clear 6 to 2 R. C. shingles for outside walls at \$4.50.....	63.00
10 rolls R. R. building paper at \$1.50	15.00
185 ft. 1x4x14 ft. clear fir porch flooring at \$60.....	11.10
180 ft. 5/8x4x14 ft. clear fir porch ceiling at \$40.....	7.20
60 ft. 1x4x12 ft. clear fir porch flg. at \$60.....	3.60
60 ft. 5/8x4x12 ft. clear fir ceiling at \$40	2.40
485 ft. 5/8x4x12 to 16 ft. fir ceiling cornice plancer at \$40.....	19.40
4 pcs. 1½x6x16 ft. fir finish cornice at \$60	2.40
4 pcs. 1½x8x18 ft. fir finish cornice at \$60	3.24
4 pcs. 7/8x10x14 ft. fir finish cornice at \$60	2.82
4 pcs. 7/8x6x16 ft. fir finish cornice at \$60	1.92
4 pcs. 7/8x8x12 ft. fir finish cornice at \$60	1.92
4 pcs. 7/8x10x12 ft. fir finish cornice at \$60	2.40
2 pcs. 7/8x10x16 ft. fir finish cornice at \$60	1.62
8 pcs. 7/8x6x12 ft. fir finish cornice at \$60	2.88
4 pcs. 1½x6x12 ft. fir finish cornice at \$60	1.80
12 pcs. 7/8x8x16 ft. fir finish base and step risers at \$60.....	7.68
3 pcs. 1½x12x16 ft. fir finish steps at \$60	3.60
3 pcs. 1½x12x12 ft. fir finish steps at \$60	2.70
8 pcs. 7/8x4x12 ft. fir finish lattice frames at \$60	1.92

Total lumber bill.....\$ 754.56

Millwork

2 front porch columns 10x10x7 ft. at \$4	\$ 8.00
1 newel 10x10x2 ft. 10 in.....	1.75
1 rear porch column 6x6x8 ft. 6 in..	2.25
4 pcs. bottom porch rail, 12 ft., at 6c	2.88
1 pc. bottom porch rail, 8 ft., at 6c..	.48
4 pcs. top porch rail, 12 ft., at 6c...	2.88
1 pc. top porch rail, 8 ft., at 6c.....	.48
60 balusters 1¾x1¾x22 in. at 6c....	3.60
600 ft. porch lattice ¾x1¾ at 80c per hundred	4.80
10 gable brackets at \$2.50.....	25.00
210 ft. 2½-in. crown mold at 1½c...	3.15
350 ft. 7/8 cove, bed mold, etc., at 70c.	2.45
146 ft. 2-in. water table at 1½c.....	2.19
4 cellar window frames 26x12, 1 lt., at \$1.50	6.00
4 cellar sash 26x12, 1 lt., at \$1.....	4.00
1 batten door for coal bin.....	1.50
1 front door frame 3-0x7-0 rab. 1¾ in.	2.50
1 rear outside frame 2-8x6-8 rab., 1¾-inch	2.25
1 rear outside frame 2-4x6-8 rab., 1¾-inch	2.25



Easy Working

depend on the hardware. Use National No. 805 Garage Door Sets to satisfy the owner and surprise his friends with their easy operation. You will find No. 805 sets easy to put up.

One door can be used, or the whole garage front opened.

Garage Doors

The doors are weatherproof.

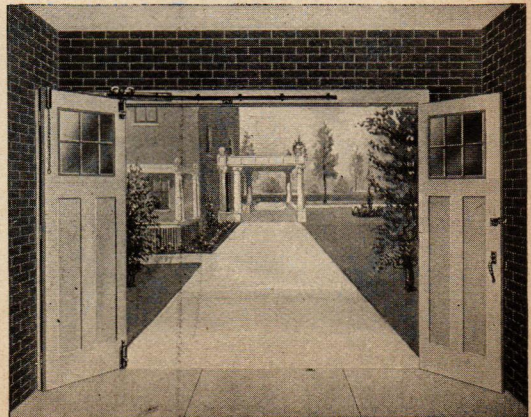
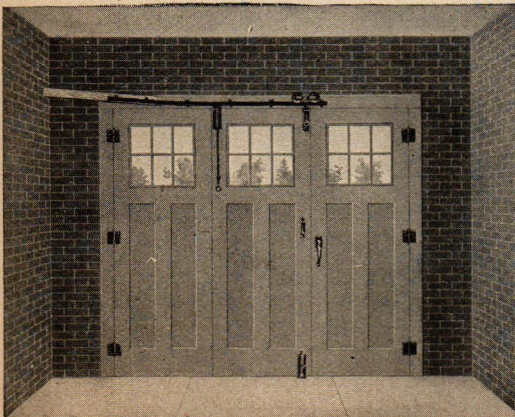
Sagging floors do not interfere with the smooth action of No. 805. The doors can be adjusted to the sagging or swelling of the floor.

The doors require little space, as they fold against the wall.

National No. 805 Garage Door Sets

are durable, handsomely finished, and will add to your reputation as a good builder. Write for our illustrated circular on National Garage Door Sets. When writing, mention your dealer's name.

National Manufacturing Company
Sterling, Illinois



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1 grade door frame 2-8x6-8 rab., 1¾-inch	2.25
1 balcony door frame 2-6x6-6 rab., 1¾-inch	2.25
1 triple window frame center win- dow 36x36 and 36x20, side win- dows 22x36 and 22x20, see plans..	7.00
3 window frames 26x26, 2 lt. at \$2.25	6.75
2 window frames 18x22 and 18x18 at \$2	4.00
3 window frames 26x28, 2 lt. at \$2.25	6.75
1 window frame 26x30, 2 lt.....	2.25
2 sash frames 26x20, 1 lt. at \$1.50...	3.00
1 window frame 24x16, 2 lt.....	2.00
1 window frame 26x18, 2 lt.....	2.00
1 window frame 24x20, 2 lt.....	2.00
1 window frame 20x20, 2 lt.....	2.00
1 window 36x36 top sash 36x20.....	3.50
2 window 22x36 top sash 22x20 at \$2.50	5.00
2 window 18x22 top sash 18x18 at \$1.50	3.00
2 window 26x24, 2 lts. at \$2.40.....	4.80
1 window 26x24, top sash divided, 3 lts.	2.65
3 window 26x28 top sash divided, 3 lts. at \$3.10.....	9.30
1 window 26x30 top sash divided, 3 lts.	3.20
2 sash 26x20 divided, 2 lts. at \$1.30.	2.60
1 window 24x16, 2 lts.....	1.50
1 window 26x18 top sash divided, 3 lts.	2.40
1 window 24x20, 2 lts.....	1.60
1 window 20x20, 2 lts.....	1.40
1 front door 3-0x7-0x1¾ glazed, see plan	16.00
1 rear door 2-8x6-8x1¾ glazed, see plan	5.00
1 grade door 2-8x6-8x1¾ glazed, see plan	8.00
1 balcony door 2-6x6-6x1¾ glazed, see plan	6.00
1 outside door 2-4x6-8x1¾ refriger- ator room	3.00
2 sliding doors 2-6x7-0x1¾ at \$8...	16.00
2 doors 2-8x7-0x1¾ at \$4.....	8.00
1 door 2-6x6-6x1¾	3.50
4 doors 2-6x6-6x1¾ at \$3.50.....	14.00
4 doors 2-4x6-6x1¾ at \$3.50.....	14.00
1 set sliding door jambs 5-0x7-0....	3.20
2 sets door jambs 2-8x7-0 at \$1.40..	2.80
5 sets door jambs 2-6x6-6 at 70c....	3.50
4 sets door jambs 2-4x6-6 at 70c....	2.80
Finish complete for 18 doors at \$3.50.	63.00
Finish complete for 18 windows at \$2.	36.00
370 ft. inside base at 7c.....	25.90
370 ft. floor mold at 1c.....	3.70
Stairs	40.00
Kitchen cupboard	15.00

Total Millwork.....\$ 451.01

The Complete Estimate

Excavating and masonry.....	\$ 381.24
Lumber bill	754.76
Millwork	451.01
Carpenter work	602.88
Nails and hardware.....	80.00
Tin work	30.00

Lath and plastering, 530 yds. at 30c..	159.00
Plumbing	350.00
Electric wiring	55.00
Painting	190.00
Heating plant furnace.....	150.00
Incidentals, 5 per cent.....	158.69

Total Estimate.....\$3,332.58

NATIONAL BUILDER DESIGN No. 452

(See Supplement, also page 41)

Excavation and Masonry

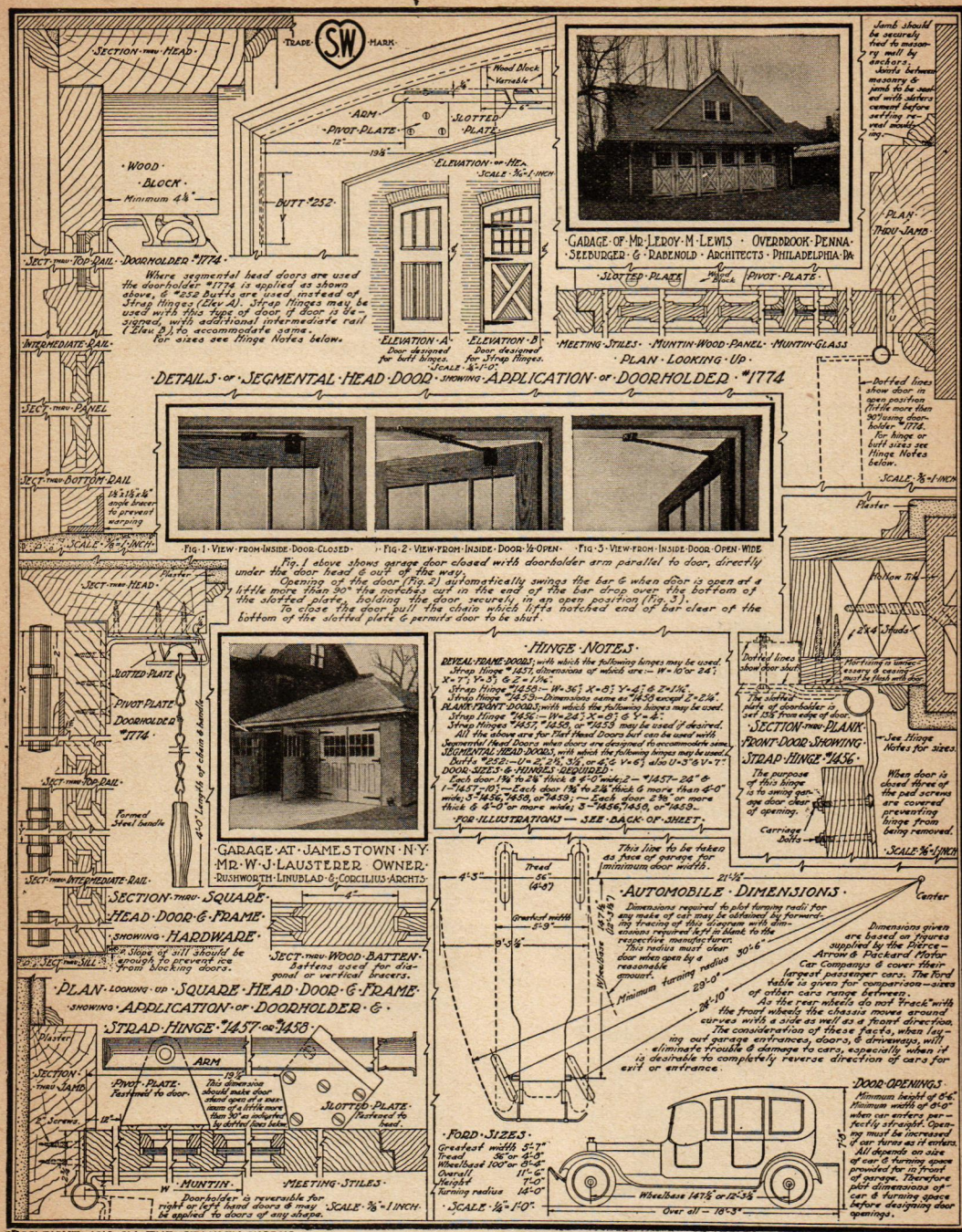
100 yds. excavating at 35c.....	\$ 35.00
460 cu. ft. concrete footings at 30c..	138.00
25,000 common brick laid in walls and chimney at \$16.....	400.00
11,000 face brick laid in walls at \$36..	396.00
1 chimney cap	3.00
562 sq. ft. cement cellar floor at 12c.	67.44
240 sq. ft. cement porch floor at 15c.	36.00
25 ft. porch steps at 60c.....	15.00
19 stone sills, doors and windows at \$3	57.00
30 ft. cement stone coping at 50c..	15.00
1 catch basin	12.00

\$1,174.44

Lumber Bill

Pcs.	Feet
1 6x 8x20 ft. girder	80
1 6x 6x12 ft. posts	36
18 2x 4x14 ft. basement partitions.....	168
22 2x10x12 ft. first floor joists.....	440
22 2x10x14 ft. first floor joists.....	514
36 2x 8x14 ft. second floor joists.....	672
8 2x 8x16 ft. second floor joists.....	171
30 2x 6x14 ft. attic joists	420
16 2x 6x12 ft. attic joists	192
24 2x 4x10 ft. collar beams	160
6 2x 8x14 ft. back entry.....	112
2 2x 8x24 ft. front porch beam.....	64
4 2x 8x10 ft. front porch beam.....	53
3 2x 6x10 ft. rear porch beam.....	30
1 2x 6x14 ft. rear porch beam.....	14
14 2x 4x12 ft. front porch ceiling.....	112
3 2x 4x14 ft. rear porch ceiling.....	28
3 2x 6x12 ft. rear porch roof.....	36
14 2x 6x14 ft. front porch roof.....	196
106 2x 4x18 ft. outside studding	1,272
30 2x 4x12 ft. gable studding	240
30 2x 4x18 ft. first story partitions.....	360
50 2x 4x18 ft. second story partitions...	600
28 2x 4x16 ft. plates	299
18 2x 4x12 ft. plates	144
6 2x 8x16 ft. headers	128
6 2x 6x16 ft. headers	96
42 2x 4x18 ft. rafters	504
4 1x 4x16 ft. ribbon boards	22
30 1x 6x12 ft. braces	180
36 1x 4x16 ft. bridging and backing.....	192
10 1x 6x16 ft. backing	80
7 2x10x12 ft. cellar stairs.....	140

7,755



FULL size sheet measuring 16½"x21½" will be sent on request to any architect or contractor who is not a subscriber to the Architectural Service Corporation service.

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7,755 ft. framing lumber at \$37.....	\$ 286.94
2,850 ft. 8-in. No. 2 Y. P. lap 12 to 16 ft. outside sheathing and base- ment board partitions at \$37....	105.45
1,400 ft. 8-in. No. 2 Y. P. lap, 12 to 16 ft. for rough floors at \$37.....	51.80
650 ft. $\frac{7}{8}$ x2 $\frac{1}{4}$ face plain red oak flooring at \$90.....	58.50
900 ft. $\frac{7}{8}$ x2 $\frac{1}{4}$ face VG. Y. P. floor- ing at \$65.....	58.50
360 ft. $\frac{7}{8}$ x3 $\frac{1}{4}$ face B. Y. P. flooring at \$50	18.00
1,350 ft. 6-in. No. 2 Y. P. sheathing roof at \$37	49.95
1 $\frac{1}{2}$ M. clear R. C. shingles at \$4.50..	6.75
300 ft. $\frac{5}{8}$ x3 $\frac{1}{4}$ face x 10 ft. clear fir porch ceiling at \$40.....	12.00
700 ft. $\frac{5}{8}$ x3 $\frac{1}{4}$ face, 12 to 16 ft. fir ceiling, planceer at \$40.....	28.00
12 rolls R. R. bldg. paper at \$1.50..	18.00
12 1x 8x16 ft. fir finish at \$60.....	7.68
10 1x 6x16 ft. fir finish at \$60.....	4.80
12 1x10x12 ft. fir finish at \$60.....	7.25
10 1x 8x12 ft. fir finish at \$60.....	4.80
4 1x12x12 ft. fir finish at \$60.....	2.88
6 1x 4x12 ft. fir finish at \$60.....	1.44
4 1 $\frac{1}{8}$ x12x12 ft. fir finish at \$60....	3.60
12 1x12x12 ft. Y. P. finish at \$60...	8.64
	\$ 739.37

Millwork

4 porch newels, 4x4x4 ft. at 80c....	\$ 3.20
1 pc. porch rail 10 ft. bottom at 6c..	.60
1 pc. porch rail 7 ft. bottom at 6c..	.42
1 pc. porch rail 10 ft. top at 6c.....	.60
1 pc. porch rail 7 ft. top at 6c.....	.42
50 balusters, 1 $\frac{3}{4}$ x1 $\frac{3}{4}$ x20 in. at 8c....	4.00
250 ft. $\frac{1}{8}$ x1 $\frac{3}{8}$ lattice at 80c per 100 ft..	2.00
10 gable brackets at \$2.50.....	25.00
250 ft. 2 $\frac{1}{4}$ -in. crown mold at 2c.....	5.00
340 ft. 1 $\frac{1}{2}$ -in. bed mold at 1c.....	3.40
50 ft. 2-in. watertable at 1 $\frac{1}{2}$ c.....	.75
60 ft. $\frac{7}{8}$ -in. cove mold at $\frac{3}{4}$ c.....	.45
1 basement window frm., 24x16, 2 lts	2.25
2 basement window frames, 28x16, 2 lts., at \$2.25.....	4.50
4 basement sash frames 24x16, 1 lt., at \$1.50	6.00
1 window 24x16, top sash divided, 3 lts.	2.00
2 windows 28x16, top sash divided, 3 lts., at \$2.50.....	5.00
4 sash 24x16 divided, 3 lts. at 85c...	3.40
2 batten doors in basement, 2-4x6-0	2.50
1 front door frame 3-0x6-8 rab. 1 $\frac{3}{4}$.	2.50
1 rear outside frame 2-8x6-8 rab., 1 $\frac{3}{4}$	2.25
1 grade door frame 2-10x6-6 rab., 1 $\frac{3}{4}$	2.25
1 balcony door frm. 2-6x6-6 rab., 1 $\frac{3}{4}$	2.25
1 window frame, 36x28 top sash die, 8 lts.	2.50
1 triple window frame 26x26, 2 lts. div.	6.75
2 twin frms. 26x26, 2 lts. div. at \$4.50	9.00
2 triple frame 18x18, top sash 18x12 div. at \$6.....	12.00
1 twin frame 20x16, top sash div....	4.00
3 window frames 26x26, top sash div. at \$2.25	6.75
1 sash frame, 2 sash 12x32, div. 8 lts.	2.00
1 sash frame, 24x36 div. 9 lts.....	2.00

1 triple frame 36x28, 2 lts. center to sash divided, sides 28x28, tot. div.	7.00
1 window frame 24x26, 2 lts. top div.	2.25
2 sash frms. 24x36, div. 9 lts. at \$1.50	3.00
2 sash frms. 24x36, div. 6 lts. at \$1.50	3.00
1 triple sash frame 18x36 div. 6 lts..	5.00
1 window frm. 20x16, top div., 3 lts..	2.00
10 windows 26x26, top sash div., 6 lts. at \$3.30	33.00
6 sash, 1 lt. 18x18 with top 18x12, div. 3 lts. at \$1.80.....	10.80
2 sash, 12x32 div. 8 lts. at \$1.70....	3.40
2 windows 36x28 top sash div. 8 lts. at \$4.15	8.30
2 windows 20x16 top sash div. 6 lts. at \$1.70	3.40
3 sash 24x36 div. 9 lts. at \$1.50.....	4.50
2 sash 24x36 div. 6 lts. at \$1.50.....	3.00
2 windows 28x28 top sash div. 6 lts. at \$3.22.....	6.44
1 window 24x26 top sash div. 6 lts..	2.50
1 window 20x16 top sash div. 3 lts..	1.60
3 sash 18x36 div. 6 lts. at \$1.60.....	4.80
3 set door jambs 2-8x6-8 at 65c....	1.95
4 set door jambs 2-6x6-8 at 65c....	2.60
2 sets door jambs 2-6x6-6 at 65c....	1.30
4 sets door jambs 2-0x6-8 at 60c....	2.40
1 set door jambs 2-2x6-8.....	.60
1 front door 3-0x7-0x1 $\frac{3}{4}$	18.00
1 rear outside door 2-8x6-8x1 $\frac{3}{4}$	6.00
1 grade door 2-10x6-6x1 $\frac{3}{4}$	4.00
1 balcony door 2-6x6-6x1 $\frac{3}{4}$	6.00
3 doors 2-8x6-8x1 $\frac{3}{8}$ at \$5.....	15.00
4 doors 2-6x6-8x1 $\frac{3}{8}$ at \$4.50.....	18.00
2 doors 2-6x6-6x1 $\frac{3}{8}$ at \$4.....	8.00
3 doors 2-0x6-8x1 $\frac{3}{8}$ at \$4.....	12.00
1 mirror door 2-0x6-8x1 $\frac{3}{8}$	16.00
1 door 2-2x6-8x1- $\frac{3}{8}$	4.00
Finish complete for 18 doors at \$3....	54.00
Finish complete for 34 wndws. at \$2.50	85.00
490 ft. inside base at 7c.....	34.30
490 ft. floor mold at 1c.....	4.90
Stairs	35.00
Attic stairs	18.00
Medicine cabinet	10.00
240 ft. picture mold at 1 $\frac{1}{2}$ c.....	3.60
China closet	35.00
Linen closet	30.00
Book cases	36.00
Mantel	60.00
Colonnade opening complete with trim	30.00
	\$ 781.38

The Complete Estimate

Excavating and masonry.....	\$1,174.44
Lumber bill	739.37
Millwork	781.38
Carpenter work 50% cost of lumber and millwork	760.38
Nails and hardware.....	87.00
Tin work	35.00
Lath and plastering 590 yds. at 30c...	177.00
Plumbing	240.00
Electric wiring	60.00
Slate roof	212.00
Painting	100.00
Heating plant, furnace.....	150.00
Incidentals, 5 percent.....	225.83
Total estimate.....	\$4,742.40

PUTTING PATRIOTISM INTO ACTION ★ ★ ★

There is no turning back. This nation of ours is in the war against autocracy and militarism *to the end*—until the fight is won and peace is restored for all time.

This is not the time to count the cost. But whatever the price may be, it will be worth it. Hundreds of thousands of our noblest young men of all ranks are today on the firing line OVER THERE. Hundreds of thousands more are waiting and eager to go. And millions more will respond to any call that comes to uphold the principle of righteousness and peace in world affairs.

We who perforce must stay behind "to keep the home fires burning" have a duty no less important to perform. This duty is right at hand—in factory and office and shop and field and home.

Words and good intentions accomplish nothing.

ACTION and action alone will win the war.

★ ★ ★ ★ ★ ★ ★

It devolves upon each and all of us to do our part, willingly, gladly, quickly.

Buy Liberty Bonds.

Invest in Thrift Stamps.

Help the Red Cross.

Support the Y. M. C. A.

★ ★ ★ ★ ★ ★ ★

Do whatever your Government asks at this crucial time and do it with a firm faith in the future.

In the measure that we today serve our Government and the holy cause to which it is pledged, we shall in future reap the benefits of peace and liberty and justice.

WRIGHT WIRE COMPANY

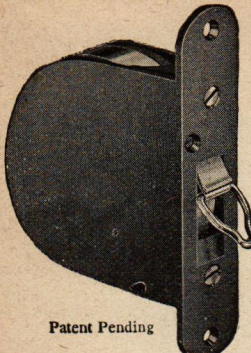
WORCESTER, MASSACHUSETTS ★ ★ ★

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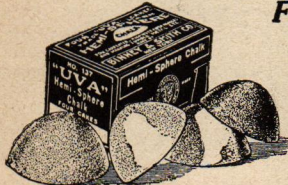
**Caldwell Sash Balances
Uniform Mortises**
*For use in all classes of
new work*

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.

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Patent Pending

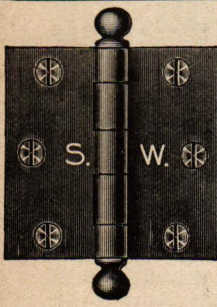
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For every use



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Marking
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30¢ Pair**

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Catalog No. 6 to specify and buy
from. On account of market con-
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list, so send lists for quotation.
(We do not sell to carpenters or con-
tractors in Cook County, Ill.)

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Close-Grain Mar-Proof **Decorative Hardwood** High-Class Low-Cost

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birch

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*Be prepared to talk **birch** when they come to you.*

NORTHERN HEMLOCK & HARDWOOD MFRS. ASSN.
204 F R A. Bldg Oshkosh, Wis.

by the use of a proper nail. The nail that did hold tight is in good shape.

The wood shingle has stood the test of time

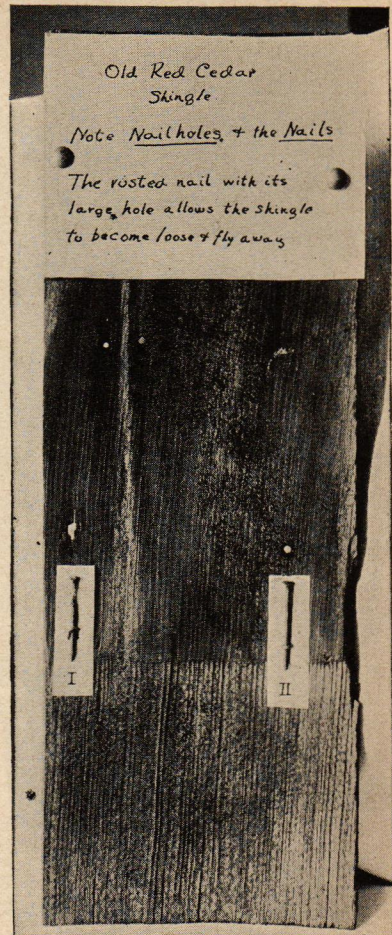


PLATE III

as a satisfactory roofing material. It has many good qualities and when the right nail is used makes a tight roof for even a half century of time.

Where a painter earning \$2.50 a day sustained an electric shock, whereby his wrist was severely burned, so that the thickening of scar tissue thereon might in the future cause some impairment of the use of his right hand, and, by infection of the burn, he contracted lockjaw or tetanus, which kept him in bed for some time, suffering severe spasms of muscular rigidity, etc., and he also incurred medical expenses to a considerable amount, verdict for \$6,000 was not so large as to indicate passion and prejudice on the part of the jury, and judgment for \$4,000, plaintiff having accepted the reduction, is not excessive.—165 N. W. (Iowa) 428.



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Everlasting Shingle Nails

Are now used more than ever before, because roof costs are much higher and builders say they must use Zinclads to be absolutely sure that their roofs will last. Get these everlasting shingle nails from your lumber dealer with every purchase of shingles.

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Builders Are Getting Together

Northwest Association Formed

"We understand ethics to mean a declaration of principles and that members of this association shall regard themselves as being engaged in a profession in which there is well defined duty and obligation toward the public and themselves. The profession demands that the members use every honorable means to uphold the dignity and honor of the same, to exalt its standards and to extend its spirit of usefulness."

Founded upon this general principle and with the object of improving building conditions thru co-operation of employers connected with the industry, the Northwest Master Builders' Association was organized in Tacoma, Wash., when 200 contractors and builders of the northwest, from Washington to the Dakotas and south to California, met at the first annual convention of the association.

Pledges of support of the United States in its war against Germany and autocracy were given by the builders and they pictured a future in the building industry in which dissension and petty strife will have no part.

John Chalmers of Tacoma heads the new organization. At its first election of officers he was chosen to be the first president of the infant association, to serve with E. J. Rounds, Seattle, first vice-president; A. Parker of Portland, second vice-president; S. C. Morine, Portland, third vice-president, and J. B. Warlick, of Seattle, as treasurer.

Committees to handle the various affairs of the association were named and the tentative constitution presented and passed upon by the body of members as a whole.

Any contractor who has provided himself with the three things that make up his stock in trade is a real asset to the community in which he lives. This is what O. L. Willett, Seattle contractor, told the members.

"Such a contractor is a taxpayer, often in large amounts," he said. "He is assessed for industrial insurance and first aid. He is a public spirited citizen carrying weight in the community in which he lives. He contributes to the various charities and adds something to the sum of general good."

"There is no community that has not suffered from the fly-by-night contractors. Their activities are not detrimental to the legitimate contractors only, but the building business and the building owners likewise suffer. A legitimate contractor's stock in trade is first, his experience and ability as a builder; second, his reputation as a conscientious builder and lastly his financial responsibility."

"This does not limit the field to established or wealthy builders, but offers opportunities to everyone who is willing to locate more or less permanently at one place and meet the exact requirements of our profession. The beginner can demonstrate in the fulfillment of a smaller contract his ability to do larger work;

and experience comes with lapse of time and volume of work.

"The reputation of any builder is the result of his own efforts. A builder who is looking to the future expects to put more into any job than a strict interpretation of his contract requires. That excess furnishes him with his stock of reputation."

"Financial responsibility, in its turn, is not a matter of dollars and cents. If a builder has all the money required for handling the largest jobs, he needs no other financial responsibility. But the average contractor must build up a financial responsibility. That will be the sum of his present money worth and the moral risk that he represents. Some men can carry on fairly large undertakings with relatively small capital because their financial judgment has been proved and they are regarded as negligible moral risks."

In his talk on credits and liens, the speaker said that many men are able to engage for a limited time—until they are found out—in the building industry without possessing the three things that make up the builders' stock. He may then move to new and perhaps greener pastures. But he is never investing reputation, and is working on "bluff."

Easy credits and unwise lien laws permit this, he said, to the injury of the building owners and the detriment of honest builders and contractors.

Regarding the lien laws, he said:

"What has been said discloses somewhat my view of liens for materials. Lien laws are really a relic of primitiveness. During pioneer days when building materials were usually ordered by the owners and conditions required the encouragement of home building, it was advisable to allow material dealers a lien as an inducement for credit. While the reason for such a lien has ceased to exist and in logic therefore the lien should no longer be allowed, yet there is very grave objection to material men's liens when the materials are sold directly to the owner. However, in such cases, considering the limited credit now allowed, the matter might better be handled in some other way not so completely out of harmony with normal commercial methods."

"The lien law of this state makes contractors, sub-contractors, architects or any person having charge of the building, the agent of the owner for the purpose of ordering labor or material. This is an arbitrary agency and makes persons agents of the owner who are not so in fact, whose interests are often adverse to those of the owner and lessees and out of harmony with the duties of an agent."

"Liens had their origin in the common sense idea that when a mechanic did work on a chattel, he was entitled to hold that chattel in his possession until he had been paid for his work upon it. If he parted with the chattel without getting his pay, the lien was lost."



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Like other nationally advertised products, Beaver Board is imitated. Its name has become the universal word for wall-board.

Every panel of this knotless, crackless manufactured lumber is plainly printed on the back with the big mark shown above. Each time you order wall-board look for this mark and insist upon having it on every panel you buy—it's your safeguard.

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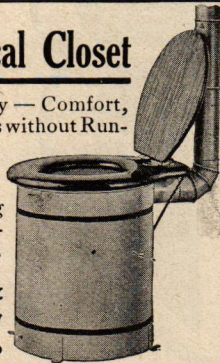
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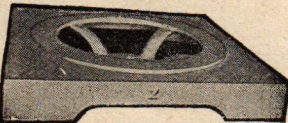


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From that idea developed the lien on real estate for labor and material. There can be no just criticism of the law giving a lien to laborers. The amount that any laborer has against a given building is comparatively small. Laborers usually need their wages for the support of themselves and families, have not the means of enforcing their rights in the ordinary way and work they do does not give them experience in commercial transactions to the extent that they can compete on equal terms with business men. There is, however, no real reason for a material man's lien. A material lien does not furnish to material men the degree of protection usually expected and is a serious injustice to the property owners as well as loss to material men that could and would otherwise be avoided.

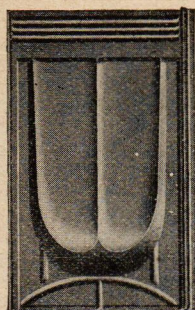
"The material man's lien law is unjust to responsible contractors. Under the workings of that law, an unknown person may come into our midst, claim to be a builder, get a contract for constructing a building at any price he may find it necessary to bid and buy his material on the credit of the property. This enables him to compete with responsible contractors living in our midst and paying taxes, without having any capital himself, and yet to buy on as good terms and for as low prices as can the responsible contractors. Under this law the irresponsible contractor can submit a bid at a price less than any responsible contractor can erect the building. If the building cannot be built for the amount of the bid, the loss does not fall upon the irresponsible contractor because he has nothing to lose, but rather on the owner and on the material men themselves, who often rely upon the deceptive provisions of the material man's lien law, and furnish more material than the amount of their security, considering the fact that labor claims and often mortgages come ahead of material. If the irresponsible contractor can get by with poorer work or material than the owner contracted for, he makes a profit at the expense of the owner, who gets something he didn't want, and of the responsible contractors, who lost the job, but still get blamed in the future by the owner who thinks that because one irresponsible contractor cheated him, all other contractors are of the same kind."

Kentucky Builders Meet

Thomas A. Barker, of Louisville, was re-elected president of the Kentucky State League of Building Associations at the twenty-second annual convention in Covington. President Barker said that notwithstanding the war the associations were prosperous. Other officers were elected as follows: First vice-president, W. A. Patterson, Newport; second vice-president, E. L. Hutchinson, Lexington; treasurer, Tilden Reinke, Covington, and secretary, H. A. Schroetter, Covington. A. G. Renau and C. R. Harrell, both of Louisville, were elected to the Board of Directors.



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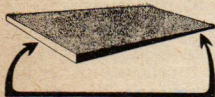
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Furnace Meeting

In accordance with the wishes of the War Industries Board, furnace manufacturers comprising the National Warm Air Heating and Ventilating Association voted at their annual convention in Milwaukee to confine themselves to not more than three styles of furnaces, with not more than five sizes of each style. In this way a smaller amount of capital will be tied up in stocks and also a smaller quantity of materials.

The Association also voted to start a series of tests on warm air furnaces at the furnace testing plant at the University of Illinois. Prof. A. C. Willard of the University was present and told something of the extensive testing plant that the University has recently installed, and what it is prepared to do. The tests which the Association is taking up will extend over a number of years and it is expected that the data thus obtained will be of great value in determining designs of furnaces for better heating and more economical consumption of fuel, and will result eventually in the standardization of warm air heating.

The expense of these tests will be borne by the Association, the members of which voted enthusiastically to tax themselves for this purpose, in the belief that it is to mean a long step in advance in this class of heating.

One of the important papers of the program was by Prof. J. D. Hoffman of Purdue University, under the title of "Better Furnace Heating." In summing up at the close of this paper, Prof. Hoffman gave a characterization of the successful furnace man, as follows:

"The most successful furnace man is a keen observer and a logical reasoner. He learns something by every mistake and he takes advantage of every physical condition around the premises to insure the successful working of his plant. He is inventive and resourceful. Anything short of his best is a failure.

"This man gives such universal satisfaction that his prices are right even tho they are not the lowest and his force of men are always busy. He examines carefully into the house plan to see if there are unusual exposures in any of the rooms. He looks for a possibility of grouping some of the heat stacks around the inside chimney gases. He avoids a butt-end at the top of any heat stack, blocks off air circulation around the stack and never connects more than one room to a stack. He observes the laws of gravitation in running-pipes, marks all dampers so the operator can easily tell if they are open or shut, makes all smoke pipe and short leader connections safe against fire, and among a number of other things that we would like to but have no time to enumerate, he leaves full and explicit instruction on how to operate the plant. If such a man wants a vacation he has to run away to get it."

Professor Hoffman did not, however, blame the furnace man for all cases of inefficient heating. He said one subject which should have extensive treatment is the effect of vari-

ous types of wall construction upon the efficiency of the heating system. He considers that 75 per cent of the residences of the country costing \$5,000 or less are not satisfactorily heated, and that of these 75 per cent are unsatisfactory because of improper house design and construction. He said that too many restrictions are placed upon the heating man by the architect and contractor. The more expensive residences usually have proper design and supervision in construction, but this is not true of the average residence, so that a poorly constructed building may require for the comfort of the occupants from two to three times as much fuel as a well constructed one of the same size. This represents a direct loss to the fuel supply of the country.

Prof. Hoffman said that the wall stack is a joker in all furnace heating work. Regarding this he said:

"Why should we expect a 100 per cent stream of air to go thru a 50 per cent pipe? Probably because it has been the habit of architects for years to say that it could be done. Whatever the reason may be, it is time to think differently. From calculations many times made, it has been shown that it is only the smallest sized rooms and those well located relative to the furnace, that can be satisfactorily heated on the coldest days thru 4-inch wall stacks; and yet I was permitted within the year to look upon a system where two 12x16x18 ft. corner rooms were fed by one 4-inch stack.

"While we are on the subject of stacks, let us make a clean sweep of it and discuss the question of return stacks in the outer walls, along with the heat stacks in the inner walls. There is one fundamental fact which, if kept in mind by the pipe furnace man, will always look toward the success of his plans. That fact is, that the motive force causing upward movement through the warm air lines is due to the plus heat energy in the warm circulating air; that the motive force causing downward movement of the air in the return circuit is due to the minus heat energy in the cooled circulating air; and that these two quantities added together algebraically, represent the total pull to produce circulation. That is to say a complete circuit to and from any room is better than only the half circuit to the room. If anything destroys this plus or minus energy in either line, circulation may be reduced or killed entirely. It may be of interest to notice some of the conditions that tend to destroy circulation. First, a rough leader, duct or stack, such as is usually found in return lines in the outer wall where the only return stack is the rough lath and plaster, rough studding and wall sheathing; or in the overhead return in the basement where the sides of the duct are rough joists, the top rough flooring and the bottom tin. Such methods of construction should be condemned as not only inefficient but unsanitary from the collection of dust and micro-organisms. No duct should be considered satisfactory that is not tin or G. I. lined thruout and so constructed as to be easily cleaned. Second, leaders and ducts having too little pitch. Any conducting air



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The biggest building opportunity today is in constructing homes for labor. Many manufacturers of munitions, big steel plants, coal companies, ship building concerns and other industries are putting up houses for employees. Go after industrial housing contracts at big profits. Let us show you how you can handle any number of houses up to a complete town, laying out entire project if necessary; how you can do it in record-breaking time. Manufacturers are at their wits' end to secure just such help. We can help you to help them.

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experienced in laying out towns and sub-divisions, are at your service. We have been doing this kind of work for years and can guide you through any problems. We carry large stocks of all material.

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For Root and Vandervoort Ordnance Co., East Moline, Ill., we built 50 houses and finished 16 days ahead of time! The Grasselli Chemical Company, Grasselli, Ind., required housing facilities amounting to a complete town. One week subsequent to the order, all material was on its way. Other

operations include the building of a sub-division for Deere & Co., Moline, Ill., a group of houses for The Youngstown Sheet & Tube Co., Youngstown, Ohio, running in price from \$4,000 to \$6,000 and scores of other similar jobs.

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A Hot Air Furnace

you ought to know about. Costs no more than a base burner, heats twice as much on about the same amount of fuel. No pipes, no lost heat. Brick or portable. Write and learn.

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line increases in efficiency as that line approaches a vertical. The value of the horizontal is nil, that of the vertical is 100 per cent. If the average householder realized the value of this one fact there would be more 8-foot basement ceilings. Third, abrupt dormers and offsets in the conducting air lines. Always put in elbows and long radius bends if possible, when a turn is necessary, and avoid floor offsets in stack. Fourth, warm air pipes and stacks not thoroly insulated. Heat lost in passage not only deprives the room of that amount but reduces the convection effect. Fifth, return air lines not thoroly cooled. All return lines should be in the outside wall or in a cool place. A return that follows the basement ceiling and drops to the floor at or near the furnace loses in efficiency as it takes up radiant heat from the furnace. Sixth, conducting lines that are too small to carry the amount of air necessary as a heat carrier. This is our universal fault, in attempting to heat large or heavily exposed second floor rooms thru 4-inch wall stacks. A better way would be to so plan the first floor that 6-inch wall stacks may be used, or better, 8x8, 10x10 and 12x12 air shafts."

Another address of much value to members of the Association was by Dr. E. Vernon Hill of Chicago on, "The Factors That Determine Comfort in a Furnace Heated Dwelling." He enumerated these as temperature, humidity, air motion, dust, bacteria, odors, supply and distribution.

Mr. G. D. Wilkinson of Chicago discussed, "Increased Costs," while Mr. I. L. Jones of Utica, N. Y., presented the question of "Trade Acceptances."

The president of the Association, Mr. D. Rait Richardson of New York, was unable to be present, having been called to Washington by the Government to assist in war work. The Convention was presided over by Mr. W. G. Wise of Akron, O., who was elected president for the ensuing year. Mr. John A. Howard of Dowagiac, Mich., was chosen as vice-president, and Mr. I. L. Jones of Utica, N. Y., and Mr. A. W. Williams of Columbus, Ohio, were elected as secretary and treasurer, respectively. The same executive committee was continued and consists of the following members: Mr. John D. Greene, Detroit, Mich.; Mr. E. P. Miller, Marshalltown, Iowa; Mr. G. D. Wilkinson, Chicago; Mr. W. L. Dabarn, New York.

Where contract for building construction provided that, if changes were made, the parties should agree on the costs, and if they failed to agree, the architect should determine the cost, but each party should then be allowed an appeal, and the specifications were changed, and the architect fixed the cost, and the contractor made the changes without appealing, failure of the owner to arbitrate did not defeat his right to recover for damages by reason of failure to complete the building against the contractor and his surety.—169 P. (Wash.) 593.



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ART CRAFT is a satisfaction builder for your customers, as well as a profit

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ART CRAFT is not a shingle; it is put on in sheets. The standard roll contains 108 square feet and is 32 inches wide. ART CRAFT gives extra years of satisfaction because it has an extra heavy felt base. Tile pattern in three colors—red, green, and silver grey.

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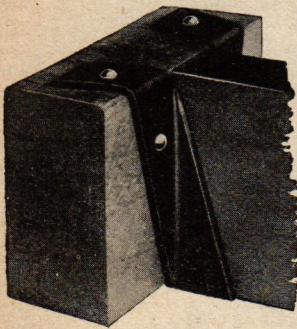
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wood gives such long and
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WHITE PINE



Construction Information Free

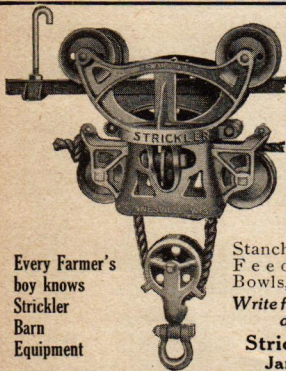
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See what builders and
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No. 29

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Strickler
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No barn is com- plete without **Strickler Equipment**

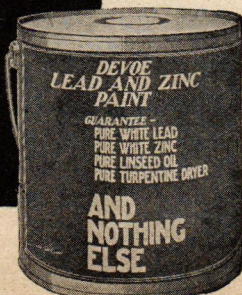
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Government Standards for Housing

(Continued from page 59)

lated into roof space; bedroom to have greater window area and better cross ventilation than the minimum permissible for a standard flat-ceiling room; bedroom to have a minimum height of 8 feet over an area of at least 40 square feet with a minimum flat-ceiling width of $3\frac{1}{2}$ feet, and a clear height of not less than 6 feet over an area of at least 80 square feet with a minimum width of 7 feet.

8. *Rooms in Attic.* As a rule, in $2\frac{1}{2}$ -story houses, only one bedroom to be provided in the attic.

9. *Rooms, Number and Use of.* In types 1 and 2: For higher-paid workers, five-room type preferred, with parlor, large kitchen, 3 bedrooms and bathroom. Dining room and kitchenette may be provided in place of the large kitchen. Four-room type to be provided sparingly for higher-paid workers. Six-room type, with 4 bedrooms, or 3 bedrooms and parlor convertible into fourth bedroom, suited for abnormally large families only, and should be provided sparingly. Six-room type should normally have parlor, dining room, kitchen, 3 bedrooms, and bathroom.

For lower-paid workers, four-room type desirable, with parlor, kitchen, 2 bedrooms and bathroom.

Any house having more than seven rooms to be treated as type 3.

In type 3, in addition to family quarters indicated above, single rooms for lodgers to be provided. In addition to the family water-closet accommodations, a water-closet compartment containing lavatory to be provided for the sole use of the lodgers. Lodgers to have access to their bedrooms and to their water-closet compartment without going through rooms designated for use of family.

10. *Rooms, Size of.* One large bedroom to be provided, size 10x12 to 12x14 feet.

Small bedrooms, minimum size, 80 square feet; minimum width, 7 feet.

Parlor, 10x12 to 12x14 feet.

Dining room, 9x12 to 12x14 feet.

Kitchen (where there is no separate dining room), 10x12 to 12x14 feet.

Kitchenette (only where there is a separate dining room), minimum width, 6 feet; minimum area, 70 square feet.

III. SPECIAL PROVISIONS FOR TYPES 4 AND 5.

In addition to complying with all general provisions, types 4 and 5 must comply with the following special provisions:

Type 4. Lodging house for men.

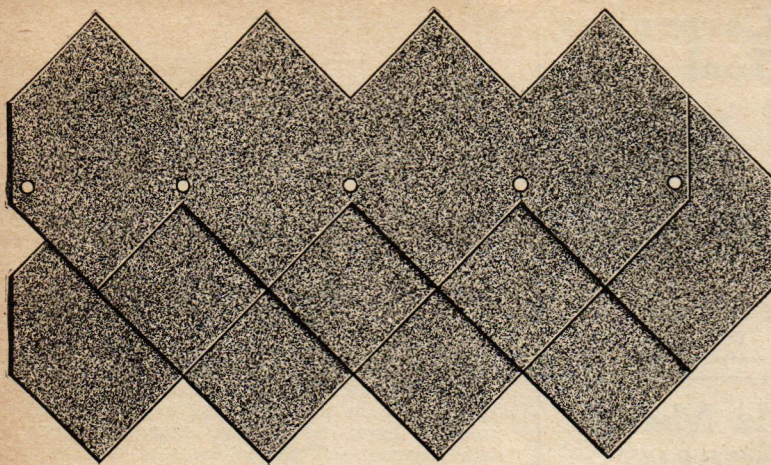
Type 5. Hotel for men.

1. *Arrangement.* Provision to be made for 75 men or more. Height limited to 4 stories, except in large cities.

2. *Cellar.* Minimum height, 7 feet; to be well lighted, cross ventilated, dry, and paved or cemented. Cellar not essential under whole building. Where omitted, building to be set up on masonry piers or walls 2 feet clear from ground; space to be drained, inclosed and ventilated.

3. *Fire Protection.* If over four stories high to be fireproof thruout.

If over 3 stories high, first floor construction to be fireproof.



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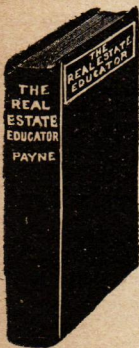
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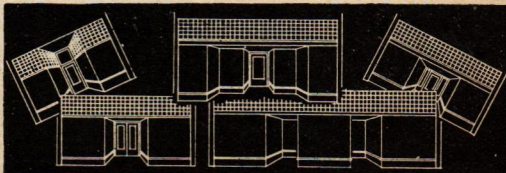
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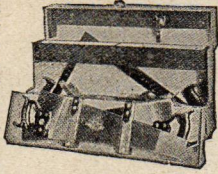
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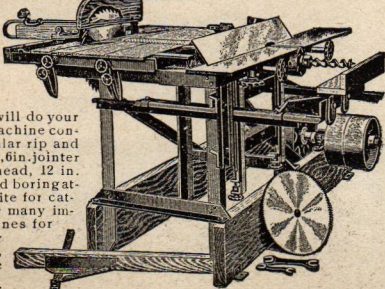
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All stairs and stair halls to be not less than 3 feet wide in the clear and to be inclosed in walls of brick, terra cotta, stone, or concrete, with fireproof self-closing doors at all openings. All doors to stair halls to swing into stair hall without obstructing free passage.

Dumb-waiters and elevators will not be accepted in stair inclosure; they should be enclosed in fireproof shafts with fireproof doors; those for dumb-waiters to be self-closing. Inside cellar stairs to be inclosed with walls of brick, terra cotta, stone, or concrete, with self-closing fireproof doors. Standpipes with hose reels on each floor to be so located that any point can be reached with 75 feet of hose.

4. *Heating.* Except where connected with a central plant, provision to be made for independent heating.

5. *Material of Exterior.* To be brick, terra cotta, stone, or concrete, except that wood frame will be accepted for one-story buildings.

6. *Plumbing.* Minimum provision: One water-closet per 12 men; one urinal per 16 men; one lavatory per 8 men; one shower per 10 men; one bathtub per floor, provided there is not less than one per 50 men. Ratio to be increased where there are less than 50 men per floor. Floor and base of toilet rooms to be waterproof, not of concrete. Sufficient water-closets to be provided in the cellar or basement for the accommodation of engineers, firemen, and laundry workers.

7. *Rooms, Height of.* Height for public rooms, 9 to 12 feet; minimum for bedrooms, 8 feet.

8. *Rooms, Number and Use of.* Each lodger to have separate room. Two-men rooms not permitted. (Cubicles and dwarf partitions will not be accepted.)

Each floor to have a general bathroom containing required showers, tub, and lavatories. Each floor also to have a general toilet room containing required water-closets and urinals. Each of the two rooms to have windows opening directly to the outer air, and to be separate but adjoining and communicating. Service closets with slop sinks and space for brooms and pails to be provided on each floor.

Smoking room, reading room, billiard room, physician's room, laundry for washing clothes, superintendent's office and adequate quarters for superintendent to be provided. Unless provided elsewhere in the community, bowling alleys to be in basement.

Hotel (type 5) also to have dining room and



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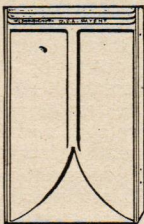
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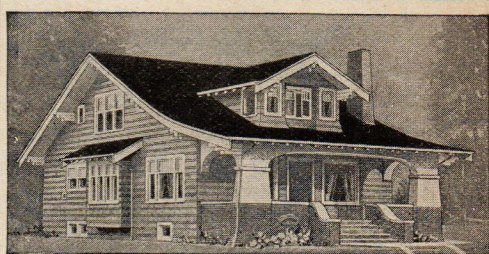
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cafeteria with outside access thereto, and with pantry, service rooms, kitchen and toilet facilities for men and women employees. An additional general toilet room is to be provided conveniently accessible.

9. *Rooms, Size of.* Single bedrooms to have an area of 70 square feet and be 7 feet wide minimum.

10. *Ventilation.* Bedroom doors preferably to be placed opposite each other and to have transoms or slat panels.

11. *Windows.* One window in each room to have minimum area of 12 square feet between stop beads.

IV. SPECIAL PROVISIONS FOR TYPES 6 AND 7.

In addition to complying with all general provisions, types 6 and 7 must comply with the following special provisions:

Type 6. Lodging house for women.

Type 7. Hotel for women.

1. *Arrangement.* Provision to be made for 75 to 150 women (with less than 75 the unit is not economical; with more than 150 there are difficulties in management and supervision).

Height limited to 4 stories, except in large cities.

2. *Cellar.* Minimum height, 7 feet; to be well lighted, cross ventilated, dry, and paved or cemented. Cellar not essential under whole building. Where omitted, building to be set upon masonry piers or walls 2 feet clear from ground; space to be drained, inclosed and ventilated.

3. *Fire Protection.* If over four stories high, to be fireproof thruout.

If over 3 stories high, first floor construction to be fireproof.

If over 2 stories high, a non-fireproof building the area of which exceeds approximately 3,000 square feet. All openings in such walls to be provided with fireproof self-closing doors. Adequate means of egress to be provided to street or yard by an additional flight of stairs, or by fire tower or stair fire escape (fire escape less desirable). All such additional means of egress to be remote from the main stairs and separated therefrom and from other parts of the building by walls of brick, terra cotta, stone or concrete, with fireproof self-closing doors at all openings. Such additional means of egress to be so located that no room shall be more than 40 feet from a means of egress. All main egress doors to swing out.

All stairs and stair halls to be not less than 3 feet wide in the clear and to be inclosed in walls of brick, terra cotta, stone or concrete, with fireproof self-closing doors at all openings. All doors to stair halls to swing into stair hall without obstructing free passage.

Dumb-waiters and elevators will not be accepted in stair inclosure; they should be inclosed in fireproof shafts with fireproof doors, those for dumb-waiters to be self-closing. Inside cellar stairs to be inclosed with walls of brick, terra cotta, stone, or concrete, with self-closing fireproof doors. Stand-pipes with hose reels on each floor to be so located that any point can be reached with 75 feet of hose.

4. *Heating.* Except where connected with a central heating plant, provision to be made for independent heating.

5. *Materials for Exterior.* To be of brick,

terra cotta, stone, or concrete, except that wood frame will be accepted for one-story buildings.

6. *Plumbing.* Minimum provision. One water-closet per 10 women, one lavatory per 6 women, one body shower per 10 women, one bathtub per 25 women. Ratio to be increased where there are less than 50 women per floor. Floor and base of toilet rooms waterproof, not of concrete. Dwarf partitions between lavatories to extend at least 6 feet above the floor and have curtains. Sufficient water-closets to be provided in the cellar or basement for the accommodation of engineers, firemen, and laundry workers.

7. *Rooms, Height of.* Height for public rooms, 9 to 12 feet; minimum for bedrooms, 8 feet.

8. *Rooms, Number and Use of.* Each lodger to have separate room. (Cubicles and dwarf partitions will not be accepted.) Rooms for two women not permitted. Each floor to have a general bathroom containing required body showers, tubs and lavatories. Each floor also to have a general toilet room containing required water-closets. Each of these two rooms to have windows opening directly to the outer air, and to be separate but adjoining and communicating. Service closet, with slop sink and space for brooms and pails to be provided on each floor.

First floor to have matron's office so placed as to oversee the single entrance and access to sleeping quarters; to have reception parlors or alcoves (one for every 20 women), or large parlor with furniture arranged for privacy in conversation; also assembly hall with movable partitions and set stage.

Kitchenette, sitting room, and sewing room to be provided on at least alternate room floors. Matron's quarters, physician's room, and infirmary, laundry in which lodgers can wash their clothes, and trunk room to be provided.

Hotel (type 7) also to have dining room and cafeteria, with outside access thereto, with pantry, service rooms, kitchen and toilet facilities for employees. An additional toilet room is to be provided conveniently accessible.

9. *Rooms, Size of.* Single bedrooms to have an area of 70 square feet and be 7 feet wide minimum.

10. *Ventilation.* Bedroom doors preferably to be placed opposite each other, and to have transoms or slat panels.

11. *Windows.* One window in each room to have minimum area of 12 square feet between stop beads.

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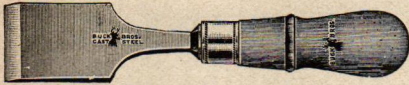


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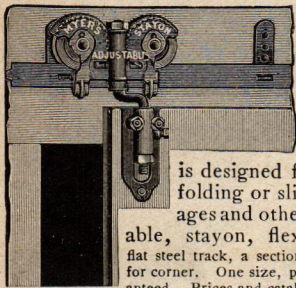
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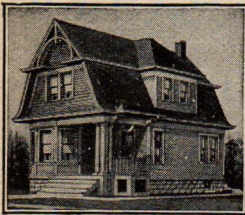


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The proceedings were crowded with references to the war and the unusual problems which it has brought, and there was a genuine disposition shown to help the nation and accept with good grace any limitations put upon the industry.

The convention opened with the singing of "America," and war conditions proved to be the burden of the first words of President George Harms of Peoria, Ill.

In his annual report the secretary, Edwin L. Seabrook, of Philadelphia, said:

"There is but one result to this conflict. The Stars and Stripes are going across the Rhine. Anything and everything that does not contribute to this end will receive less and less consideration. This is the first great outstanding fact in connection with business. The interests of business and the Government are one. The principal business of the Government at this time is war. In the very nature of things some businesses must suffer more than others. The sheet metal trade, dependant almost entirely on the use of metals, is now feeling the effects of this war probably more than any other trade. War demands the use of metals, and these demands must be satisfied before there can be anything left over for commerce and industry. Every sheet metal contractor is fully aware of the shortage of materials that confronts him. In some sections of the country the scarcity of mechanics for even necessary work is acute. There are many small shops with hardly a mechanic left.

"This convention might very well spend a part of its time considering how best to conserve the business interests of the industry. A shortage of material confronts the trade, but this is a problem that very well may be left to the manufacturer and the jobber. This part of the industry is just as anxious to serve the dealer as ever before. Their attitude may be summed up in the single remark of a tin plate manufacturer recently: 'We are looking beyond the war.' This manufacturer is running his plant 100 per cent on Government work."

Changed conditions were also referred to in a paper on "Specialties" by A. W. Williams, secretary of the National Warm Air Heating and Ventilating Association. He said:

"After the lessons of the past winter, buyers in their purchase of heating equipment will be influenced as never before by a new habit of fuel conservation; and if, as Mr. O. W. Hood, of the Federal Bureau of Mines, says, 'coal will never again be cheap,' may I incidentally emphasize our very plain duty to promote in every way the conservation of fuel, which is indeed a comfortable patriotism, only asking us



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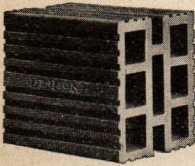


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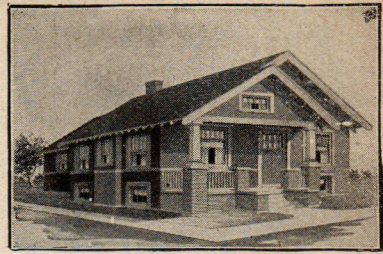
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23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
LENGTH OF COMMON RAFTER PER FOOT RUN	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DIFFERENCE IN LENGTH OF JACKS 16 INCHES	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
FIGURES GIVING SIDE CUT OF JACKS 2 FEET	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CUT OF HIP OR VALLEY RAFTERS 16 IN	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CUT OF SHEATHING IN VALLEY OR HIP 16 IN	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

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

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to make and sell better furnaces and broaden the field for desirable accessories.

"While there will be a continued demand for the so-called standard type of furnace, it would seem business wisdom that all dealers emulate the example of certain very successful ones who carry in their line a heater that will qualify as a real specialty.

"I am asking you to regard the term specialty as applying to the best types of heaters. If the pipeless or one-register furnace does not measure up in results to a good so-called pipe job, it evidently has its place nevertheless, but its qualities should not be exaggerated.

"One particular design of furnace with certain modifications which has become popular during the last few years made it possible to successfully heat many of the buildings in the army cantonments. I refer to the room heater. The result in service and healthfulness is encouraging and will add much to the prestige of warm air heating.

"Probably no accessory has made more distinct impression of late than the automatic humidifier of various types; at least one authority has gone so far as to say the hygrometer is more important than a thermometer.

"We are painfully aware how really deficient and impractical is the old fashioned water pan, with its low position in the casing, suggesting an earnest desire to conserve the water theoretically to be placed in it. Under the most favorable conditions it would hardly evaporate a quart of water each day, to say nothing of the required gallons. Many manufacturers have had the good taste to omit it of late.

"Fortunately, even in the nonautomatic humidifier, there has been vast improvement in the better grades of heaters. Why not encourage in every neighborhood a demand for a reliable air moistener, supplying one built in as part of the furnace, or adding an independent one to your line to be sold with new, or attached to old installations.

"Fans in connection with the average domestic warm air installations are beginning to attract attention. Much is claimed by some very good authorities as to the economy and benefits to be secured from their use. Altho this has not been demonstrated sufficiently as yet to consider them standard equipment, the time may not be far distant when you will find them a help to better results.

"Many dealers profitably feature the sale of some type of thermostat. No accessory more readily appeals to our good friend the consumer. Many of them are nearly if not quite automatic, a feature highly desirable in anything pertaining to furnace heating."

At the rolling mill session a distinctly patriotic address was made by Mr. A. H. Howard of the Chicago office of the American Sheet and Tin Plate Company. His topic was, "New Occasions Teach New Duties—How Shall We Respond?" He applied in a very forceful way the principles of patriotism to the present business situation in the industry which he represents. He compared the situation in the steel industry of four years ago with that



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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.

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Supersedes chisels, gauges, scroll-saws, or late 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.

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Store Front Designs A Model Cow Barn
Factory Construction Miscellaneous Details

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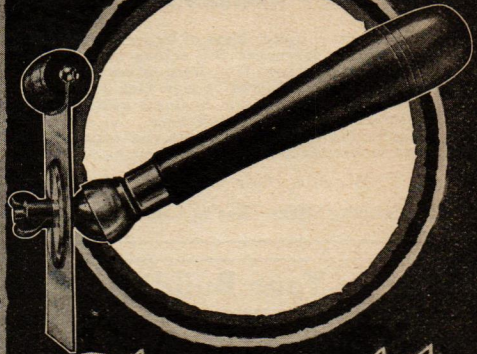


Building Construction Details

Wallboard and Its Uses	Bath Rooms & Kitchens
Trellises, Arbors, etc.	Schoolhouse Details
Additions to Old and	Two Interesting Details
New Houses	Standard Mill Construc-
Kitchen and Bath Ar-	tion
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Oak Flooring

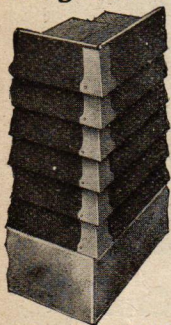
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Always attracts a better class of buyers or tenants and invariably increases the selling and renting values. This is a proven fact. Carpenters and builders during dull periods find $\frac{3}{8}$ -inch Oak Flooring a very profitable side line and business getter to lay over old pine floors in old houses. $\frac{3}{8}$ -inch Oak Flooring is very beautiful, durable and economical. All good lumber dealers sell Oak Flooring.

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prevent your corners warping and will make them permanently weatherproof. Made of heavy galvanized steel with nail-holes pierced, they furnish an indestructible corner with a smooth mitred appearance without the time and expense of beveling.

KEES Metallic Batten Strips

will never warp nor work loose. Will make any building windproof, rainproof and vermin-proof.

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of the present time, when now steel manufacturers are not trying to develop a market, but are making every effort to meet the most urgent needs, and are devising means for reducing the demand for steel. He said that for the past ten years the uses of sheet steel had been increasing, it being more and more applied to purposes for which other materials had previously been employed. This at once suggests the possibility of returning for a time at least to these other materials, substituting them wherever possible and reducing in some degree the embarrassment of those manufacturers who must have steel sheets or discontinue their operations.

He said that loyalty requires that preference be given in this branch of the steel business to:

"First, direct Government requirements, as for example, material bought by the Government for army equipment. We will all admit that this is entitled to first place wherever it is needed immediately;

"Second, indirect Government requirements, an instance of which may be found in work on aeroplanes, ships, and trucks;

"Third, necessities for the health and safety of the nation, such as material required for production and preservation of food, urgent railroad needs, etc.;

"Fourth, work without which other industries vital to the conduct of the war would be seriously handicapped. This class can be illustrated by industrial buildings, machinery and so on."

Regarding standardization Mr. Howard said: "The resourceful manufacturer can frequently accomplish a great deal by standardizing various materials which he uses. In some plants it has been found that where fifty odd different sizes of sheets had been carried previously, slight changes here and there reduced this number to ten or a dozen, to the obvious effect of helping directly in such plants, and also giving the sheet manufacturer a chance at increased production and more rapid handling of his orders. Again it has been found possible to make substitutions in certain parts or shapes (of wood, paper, clay products, and a variety of other commodities) for the sheet steel which was even more acutely needed elsewhere. All of these ways and means to reduce unnecessary consumption of sheets should be utilized to the fullest possible extent.

"We shall not be at war always, and while the thoughts of war are with us continually, we can and should look forward to the time of reconstruction which is ahead of us—how far ahead we do not know. If we will, we can profit from the unusual experiences of this strenuous period as they have brought out certain weaknesses in our accustomed system of business management. I should like to mention a few lines of endeavor which could accomplish results of great mutual benefit.

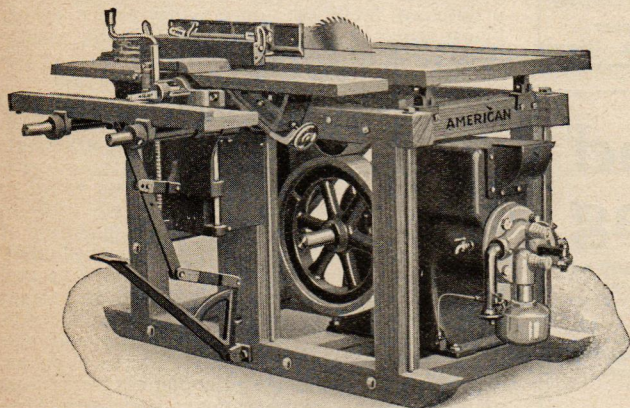
"By what has happened we have been reminded more forcibly than ever before of the need for keeping the steel industry on an even keel. At no previous time has so much havoc been wrought by the alternating periods



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“AMERICAN”

SPEED-MAKERS

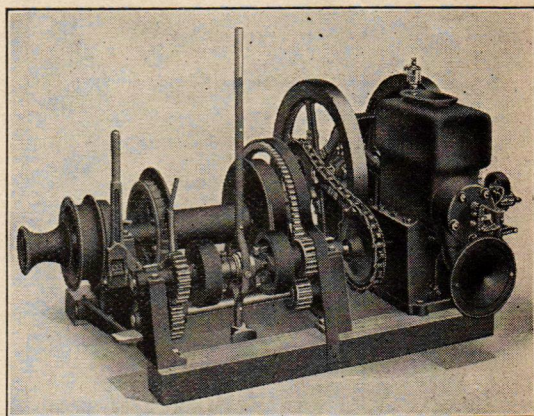


“American” Variety Woodworker—furnished with Built-in Gasoline Engine, Self-Contained Electric Motor, or for Belt Drive

self-contained power or for belt drive. Uncle Sam bought 300 of them, on one order. Both of these speed-makers and cost-cutters are described in Bulletin 67.

“AMERICAN” Contractor’s Hoist

Put one of these high-speed units at your lifting and handling jobs—and watch it cut down time and labor. All-around convenience is the big feature of this hoist, adapting it for quick work. And it has the dependable stand-up-ability that keeps it on the job, working to the limit all the time. Capacity, $\frac{1}{2}$ -ton; speed, 100 feet per minute; weight, 645 pounds; space, 32x47 inches— isn’t this just the size of hoist you need? Safety has been made a special feature in this “American.” Ask for Bulletin 10.

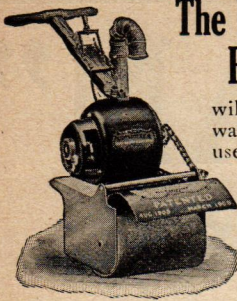


“American” No. 4 Hoist with Self-Contained Gasoline Engine: also furnished with Electric Motor or for Belt Drive

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Acme Brand Quartered White Oak Flooring

\$5.50 per 100 sq. ft. Plain sawed \$4.50 per 100 sq. ft. $\frac{3}{4}$ inch by $1\frac{1}{4}$ inches, $1\frac{1}{2}$ inches or 2 inches. All side and end matched—not one foot of waste in 1,000 feet. Made of high grade, thoroly kiln dried lumber.

Send us a trial order and be convinced of the high quality of Acme Brand Flooring. In figuring add one-third to the number of square feet of flooring to be covered. Shipments made same day received.

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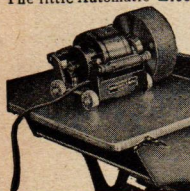
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Stop Making "Borderwork"

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

The Improved Type Automatic Ballbearing Electric Floor Surfacing Machine

The little Automatic Electric Surfacing Machine (on desk) is a wonder for removing varnish from desk tops, counters, etc.



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Because—Every machine we ship surfaces as much flooring as six men can scrape by hand. Every "American Universal" we turn out releases six men for the front or to work on war material.

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of depression and extreme activity, which had come to be regarded as almost unavoidable. Irrespective of the great benefit to the country in the ability to handle war affairs, which would have resulted from a more regular employment of steel producing facilities before the acute crisis came upon us, we know that if we had been blessed with continuous peace, millions of dollars in the aggregate would be saved to the employers and employed in this country if operations in the steel industry and allied industries were carried on steadily and with substantial uniformity from year to year. Not only steady employment of our steel producing facilities, but steady prices would bring about a great reduction of the wastefulness which has marked this line of work in the past. The idea is not a new one. It was one of the compelling forces in forming the U. S. Steel Corporation back in 1901. Judge Gary has given expression to it repeatedly and worked for its consummation unceasingly. But it is especially worth our while to keep it prominently before us as we look to the future, for in it lies the only possibility of making our occupations 100 per cent efficient.

"Another point that comes to mind as one cause for our present embarrassment arises from our past disposition to be unduly confident in our ability as steel makers and distributors to take care of all demands upon us. In both the producing and consuming divisions of the industry, we have never gone anywhere near to the limit in planning ahead, in studying the tendencies of the times, observing where new fields are likely to be opened up, or where extensions in usefulness might be accomplished, or what uses for steel might be approaching curtailment. By so doing we could materially strengthen our links in the chain which binds those who serve us to those whom we serve.

"As we have been discussing some of these lessons from the recent past which can help us in the future, we have not touched on the one more important than all others. It may be described as Industrial Patriotism. Many a rough edge of selfishness is being worn down by the trials of this War-time period. Many an individual and many a company has been aroused to a new and more worthy ambition to do something worth while for the Country and the Flag which means more to them now than ever before. Participation in the war is helping us to attain a more pronounced unity of thought and action than we have known in all our history. And this is as it should be. Business has been in need of a reawakening to its patriotic duty.

"And it is our duty in our trade organizations, and in the conduct of our affairs, to stimulate that sense of intense loyalty without which America can never take its rightful place in world affairs, a place which calls not for self-advancement but for genuine every-day comprehensive service to the rest of mankind."

The subject of trade acceptances was given considerable discussion, but a motion to adopt the trade acceptance as a general business expedient among the members of the association was voted down, apparently because the mem-



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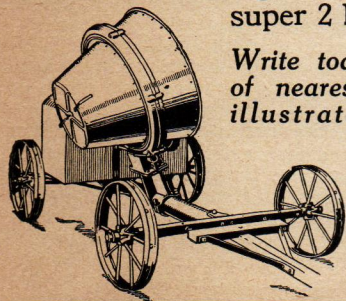
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Capacity 4 cubic feet. Perfect mix in 45 seconds—35 to 50 cubic yards per 8-hour day.

One gear—two universal joints—automatic discharge—direct drive—super 2 H. P. engine.

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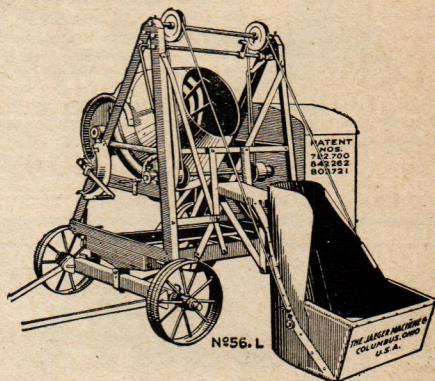
A MIX A MINUTE

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The Jaeger Mixer turns out a mix every minute, thoroughly mixed so the concrete will stand the wear and tear of time and service.

The Jaeger Mixer

success lies in the drum. Power driven plows of special shape give a thorough mechanical mix. Two flat spots on the bottom of the drum flop the material forward, and gravity does the rest. The batch in the Jaeger Mixer Drum is constantly in action. The drum carries no dead weight, to consume an excess of power.



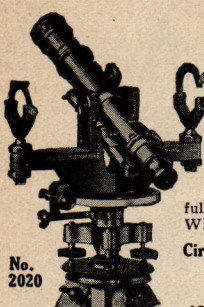
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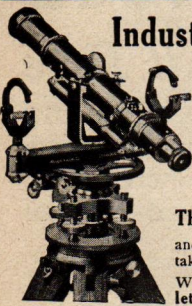
are accurate and durable. Use one for laying out foundations and checking results.

Sold on 10 days' trial. Check your work during the trial period, and get fully acquainted with the quality of White Levels.

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No. 2020



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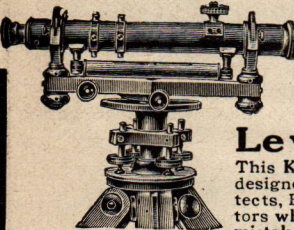
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bers were not sufficiently informed on the matter.

One of the important sessions of the convention was one devoted to furnace heating. This was opened by Dean J. R. Allen of the University of Minnesota. He gave some interesting data from his experiences and investigations with furnace heating, but emphasized particularly the fact that there is in existence no exact information regarding the action of warm air furnaces. He believes that an extensive series of investigations and experiments should be made on which such information could be based, so that the catalogs of furnace manufacturers might be to a certain extent standardized and the information given regarding warm air heating as exact and explicit as that given by the manufacturers of steam boilers.

Some discussion was given to the pipeless furnace. This was opened by Mr. S. E. Riley of Milwaukee, sales manager for the L. J. Mueller Furnace Company. He says that there are in the United States 6,000,000 farm homes using stove heat and he believes that this market can be developed for the installation of pipeless furnaces. A pipeless furnace even in a large farm house will give better service than a stove while in the smaller type of house it will give the same results as a complete warm air installation.

It was stated by some of the delegates that a greater profit can be made on a pipeless furnace installation, as the time necessary for installing such a furnace is very much less while a greater profit can be charged in proportion. It was recognized by many of those present that the pipeless furnace will serve a good purpose in our present national crisis because of the fact that it requires so much smaller amount of sheet metal than a regular installation.

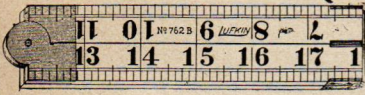
Other sessions of the convention were devoted to selling and contracts, manufacturers and jobbers, fire prevention and window manufacturers and general business topics. A number of ladies accompanied the delegates to Milwaukee and special features of entertainment were provided for them.

American Roofing Paper

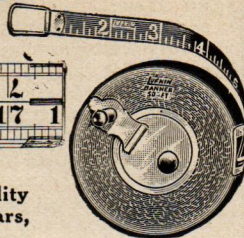
The principal product secured from America is the high-grade roofing paper. American exporters have been able to hold this trade during the war in spite of the high freight rates. On a roll of 216 feet, costing perhaps \$5, the freight charge often amounts to \$7, or more than the entire cost of the goods. The quality of the American article has been found very good, and as the United States is practically the only source of supply now open to the Norwegian importer, the necessary supplies will continue to come from that source. Whether the American product can compete with European goods after the close of hostilities depends largely on ocean freight rates.

LUFKIN

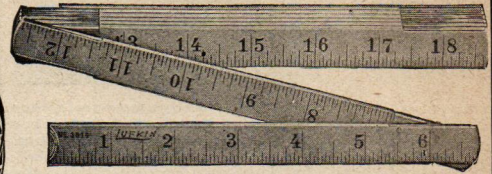
Flexible Spring Joint Wood Rules— Measuring Tapes—Boxwood Rules



☛ All up to the high quality standard, which, for years, the name has implied.



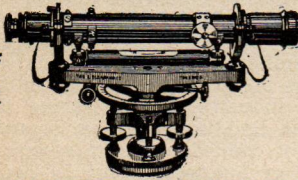
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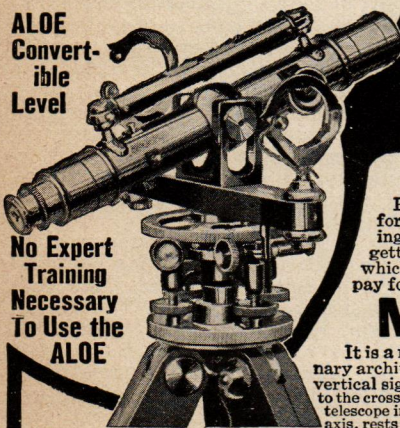
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More Than a Mere Level

It is a modified transit permitting double the range of work possible with an ordinary 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 confidential—we charge no interest. You have practically your own time to pay.

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of Indianapolis, representing Indiana; Jas. Robertson, of Madison, representing South Dakota; Sam Hotchkiss, of St. Joseph, representing Missouri; Henry Bennett, of Topeka, representing Kansas; J. P. Cullen, of Janesville, representing Wisconsin. Upon assuming the presidency, Mr. Lanquist made a short talk that impressed all with his earnestness

and his determination to do everything in his power to make the association a success. He asked the aid of the members and impressed them with the necessity of full support.

Following this a general discussion of some of the possible lines of activity for the new association was had, with talks by Mr. Walters and Mr. Bennett before adjournment.

The Des Moines Builders Exchange were hosts at a dinner for the visiting contractors in the evening. Mr. Young, of Minneapolis, secretary of the Minneapolis Exchange, told of their success in securing wide recognition in the city. E. M. Craig, of the Building Construction Employers Association of Chicago, made a strong talk on the benefits of organization in dealing with the problems now before the contractors.

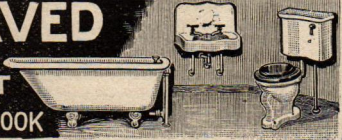
Andrew Lanquist, president, is a member of the firm of Lanquist & Ilesley, general contractors, of Chicago. He has been president of the Chicago Builders association for seven years and thoroughly acquainted with association work. He took an active part in the work of the meeting and his election as the head is an excellent indication of the association's immediate success. Mr. Massard has been secretary of the Iowa association for a number of years and is fully in touch with conditions in the building industry in the territory covered by the new association. He was instrumental in perfecting the details of the organization.

The new association starts with a wonderful opportunity and a large field of development before it. If those who were present can carry to those unable to be present the fine enthusiasm and the real spirit of co-operation shown at the meeting the work will start at once.

The following were present at the meeting:

A. Lanquist, Chicago.
E. M. Craig, Chicago.
Otto Holz, Chicago.
O. H. Ulbricht, Milwaukee, Wis.
Jas. Robertson, Madison, S. D.
V. Ray Gould, Omaha.
Paul A. Haskell, Omaha.
Henry Bennett, Topeka, Kan.
Sam Hotchkiss, St. Joseph, Mo.
C. A. Dubell, Sioux City, Ia.
John Soller, Davenport, Ia.
Chas. Werner, Waterloo, Ia.
J. G. Miller, Waterloo, Ia.
Ray M. Cope, Decatur, Ill.
J. C. Woellner, Alton, Ill.
J. P. Cullen, Janesville, Wis.
Eugene Young, Minneapolis.
F. Jaehn, Huron, S. D.
Grant Parsons, Omaha.
F. M. Spencer, Topeka, Kan.
A. H. Dalton, Junction City, Kan.
H. Walters, Indianapolis.
A. A. Arnould, Davenport, Ia.
J. E. Tusant, Des Moines.
John Thye, Burlington, Ia.
G. C. Mills, Webster City, Ia.
W. F. Kucharo, Des Moines.

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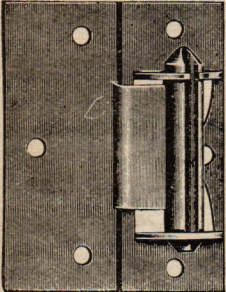


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THE HARDIN-LAVIN CO., CHICAGO, ILL.
40 Years at 4531-41 Cottage Grove Ave.

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Catalog showing this hinge—also fine line of hangers, fasteners, hinges, latches, couplings, etc.—just what every contractor needs—sent on request.

Hardware Specialty Co., Glenbeulah, Wis.

Are You Going to Build?



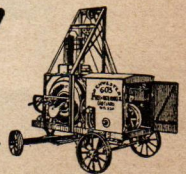
Send 50c stamps or coin for our book of bungalows, cottages and residences, ranging in cost from \$1000 to \$2500. Complete blue print plans, working details and specifications at reasonable prices. Also special plans made from your own sketches and ideas. Fifteen years planning homes by mail.

JENS C. PETERSEN, Architect
240 State Bank Bldg., Traverse City, Mich.

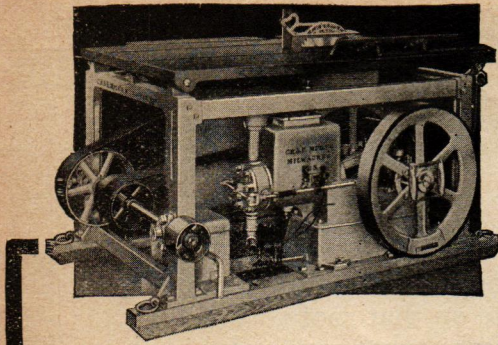
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A sturdy, dependable mixing outfit, honestly built and honestly priced. Sells for less money than other drum mixers but will deliver service equal to any. Frost and foolproof engine; burns kerosene or gasoline. Mixer unequalled for speed and all around efficiency. Save money by reading Bulletin No. 10 before you buy.

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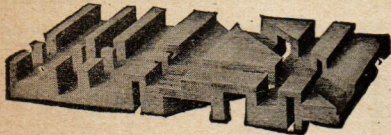
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Do Good Work



because they are designed and built to handle your grooving, matching and moulding, right. Huther Dado and Cutter Heads fit on any saw mandrel, and are used wherever power wood-working machinery is operated.



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Is your shop fully equipped? You can try out a Huther Head at our expense. In this way you can decide for yourself that you need Huther Heads in your shop.

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Write for catalogue and prices.

We also make Band and Circular Saws

Huther Bros. Saw Mfg. Co.
1105 University Avenue, Rochester, N. Y.



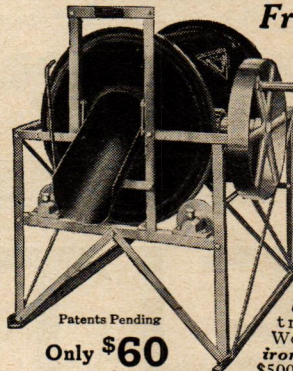
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Only \$60

Just the size you need at a price you like to pay. Does your work in one-fifth time.

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Saves its cost on one job. Capacity about 3 cubic feet. Mixes a batch a minute. Does perfect work, wet or dry; empties clean. Discharges direct to forms, cuts out the wheeling and backache. Satisfaction guaranteed or your money back. Reference: Any La Crosse bank or Dun Agency. Write for circular or order direct from this adv. and avoid delays.

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WONDER MIXERS & HOISTS

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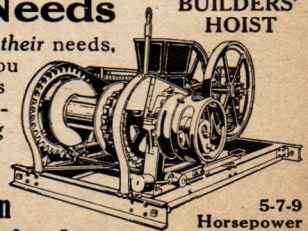
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Built in 4 sizes—with and without Loaders



5-7-9 Horsepower

Mixers, Pumps, Hoists, Backfillers and Air Compressors

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Unnecessary complaints are stopped before they start, if you use "Vendor" Roofing Slate on that roof. "Vendor" service means that you get exactly what you order, and get it promptly. We make it a special point to ship promptly. More than Forty of the largest producing quarries in the country make "Vendor" service.

We still have open territory. Write for our proposition.

The United States Government knows this. That's why they are using such quantities "Vendor" Roofing Slate.

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You can build beautiful homes like these just as easily as the ordinary kind, and if you put character into your work, the business will come to **you**.

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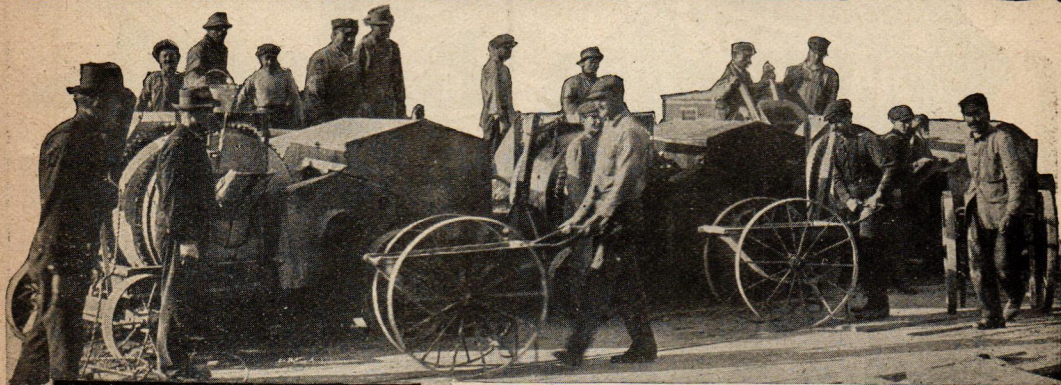
40 Duplex Houses and Flats

Keith's, 694 McKnight Building, Minneapolis, Minnesota



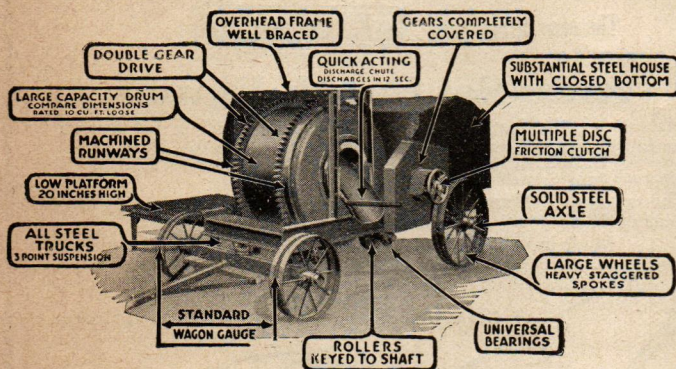
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5 and 10 cubic feet capacities, may be equipped with low charging platform, pivoted charging skip, light duty hoist and automatic water-measuring tank.



Why can't a light mixer be a *lasting* mixer? It *can*. The trouble has been, that light mixers have been built to sell cheap — not to be *lasting*.

Here is a mixer that is both *light*, *lasting*, and *reliable*, and yet at the same time, while it is not the cheapest mixer built by any means, it sells at a reasonable price — gives you a long-lasting, capable mixer at a price that makes it the remarkable value of the industry — the distinctive thing in the light mixer field.

Big volume production keeps the quality up, and the price down. Every part is standardized and made by accurate, automatic machines. It is the introduction of Koehring quality into the light mixer field — and has many features of heavy duty construction which have made the big capacities, heavy duty Koehring Mixers the highest grade mixer, both in the paving and big construction field. The Koehring Dandie has the same place in the light duty field — a remarkable value — a wonderful producer in foundation work, footings, culverts, sidewalks, etc. — a money-making machine for general work. Send back the coupon today and get details about this value.

Koehring Machine Co.
Milwaukee, Wisconsin

Koehring Machine Co., Milwaukee, Wis.

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"Bailey" Iron Planes have been in use for nearly fifty years, and are the recognized standard for Planes of this type.

While retaining all the original features, many valuable improvements in construction have been added from time to time. Only the finest materials and the best workmanship are used in their manufacture.

Always insist that your order be filled with Planes made by THE STANLEY RULE AND LEVEL CO., which carry with them a GUARANTEE backed by a Company that has been manufacturing Carpenters' and Mechanics' tools for over half a century.

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The ease of operating **SARGENT**
Reg. U. S. Pat. Off.

Auto-Set Bench Planes

arises from the fact that the single cutter is held in place more securely than is possible with a double-cutter plane and that the planes are considerably lighter than corresponding sizes of other styles. There is less tendency for these planes to chatter and they are especially adapted to the cutting of end grain.

The auto-set feature by which the cutter can be replaced after whetting without adjustment is a distinct advantage.

Made in six sizes, with both smooth and corrugated bottoms.
Descriptive booklet sent free on request.

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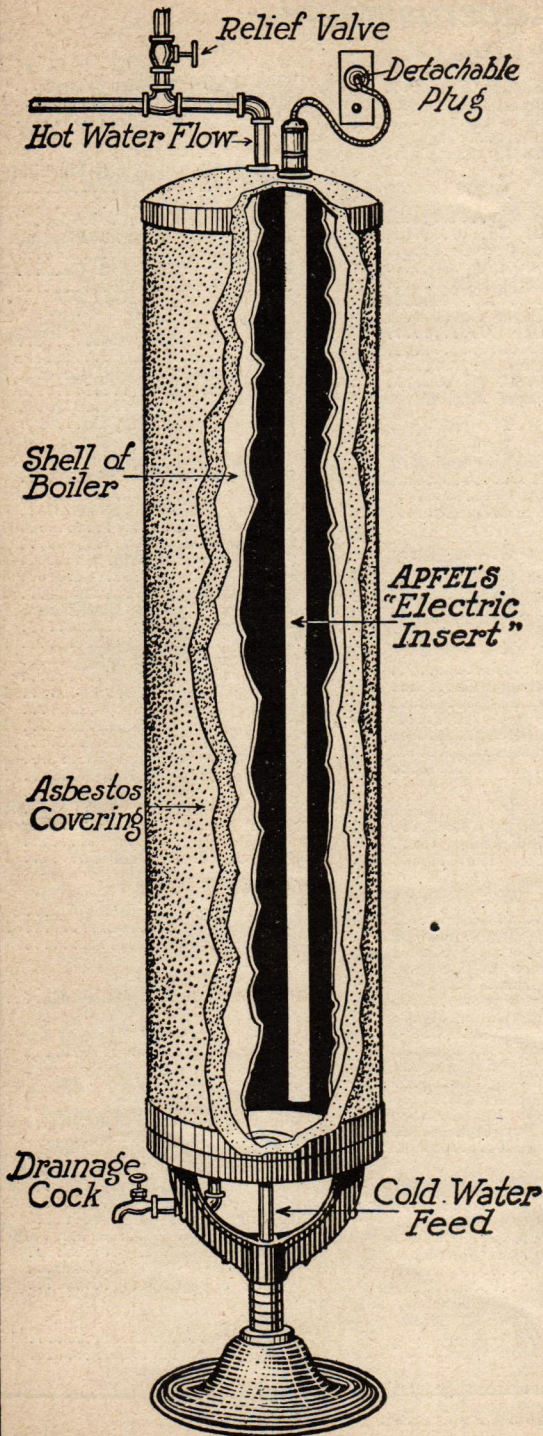
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"A Twist of the Wrist--
Hot Water"

Why not make your bungalow as convenient as an apartment house?

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There is not a single unit of heat lost as it is all absorbed by the water in the tank, ready for use whenever you wish to draw it from the faucet.

It occupies no additional space, requires no exposed pipes or valves, makes no noise, works on either direct or alternating current.

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No lighting of matches. No gas explosions. No noise.

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Special heaters for enameling ovens, glue pots, automobile radiators and electric heating systems of all kinds.

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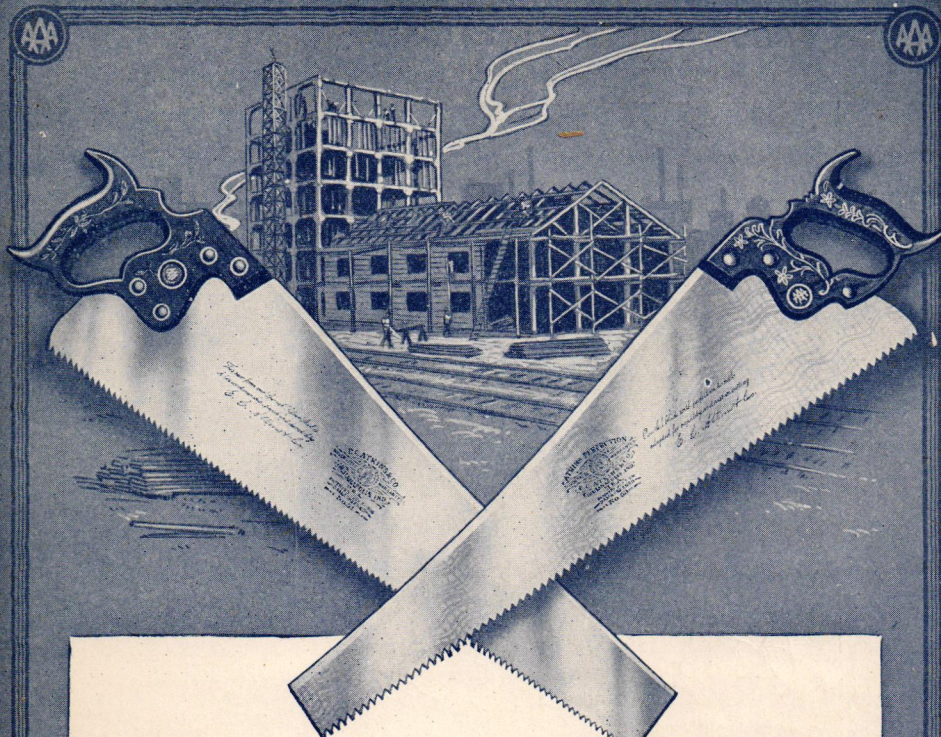
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Atkins Saws are manufactured under the highest standard of quality for the most exacting carpenters and builders.

The best of saw steel "Silver Steel" is used exclusively by us for making the finest saws on earth. The excellent steel is the reason why Atkins Silver Steel Saws take an edge easier and hold it longer.

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Insist on buying saws with Atkins "AAA" trade mark on the blade. You can then be absolutely sure of getting a perfect saw—the kind you'll always use.

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Canadian Factory: Hamilton, Ontario

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has made possible absolute uniformity in building paper manufacture.

There is all the difference between *BERMICO*

Sheathing Paper and common building papers that there is between "surely" and "perhaps"—or between "always" and "sometimes".

Because *BERMICO* is standardized it is sure to be of uniform quality, even thickness and even weight.

Unstandardized building papers may run good—by chance, *BERMICO* must prove good always—by scientific certainty of ingredients, mix and refinement.

To order sheathing paper by the name of *BERMICO* is the modern, economical, satisfactory way. Whatever has kept you from using this excellent *standardized* building paper before, *brush it aside*. Make your next building paper order a *BERMICO* order. It is sold by the leading dealers everywhere.

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Woolworth Building

CHICAGO OFFICE
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BUILD for permanence with *Kyanized* Spruce. Full particulars concerning this "long-life" wood gladly sent upon request.



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