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VOL. XXV

May, 1918

No. 2

The Straight of It

By Charles E. Fuller

Congressman Twelfth District of Illinois

THE future welfare and prosperity of every man, woman and child, citizens of this country, and of their children yet unborn, depends on the winning of this world war.

All the resources of the country are pledged and, if necessary, will be used. The cost is tremendous but what is at stake is of more consequence than any cost.

Let the third great Liberty Loan be subscribed, and over-subscribed, cheerfully for patriotic reasons, and quickly as the best investment possible to be made at the present time and under present conditions. The man who hesitates to do his part as far as his means will permit is not working for his own and his country's best interests.

No slacker is worthy to be an American citizen or to enjoy the blessings of liberty and free government. Now is the time; all get together and all for our country to the last dollar if need be; to the last drop of blood if necessary, that liberty and free government may endure, and shall not perish from the earth.



Go Across or Come Across

YOUR boy is offering his life for you. Show him your appreciation. Lend to Uncle Sam by investing in Liberty Bonds.

Go the limit in supporting the boys "over there."

Liberty Bonds affords the means for your doing so. Smite the mailed fist of Potsdam by investing in Liberty Bonds, the safest and strongest security in the world.

Cast thy gold upon the waters for the Third Liberty Loan, for it shall return in ample dividends of peace and plenty.

"Thy Kingdom Come" is a petition that may be answered thru the Third Liberty Loan. Make your purse and prayers hang together.

Pray and pay for the Third Liberty Loan.

If David did not fear Goliath, shall America, with David's faith and innocence, fear the Goliath of Berlin? Back up your courage with cash for the Third Liberty Loan.

There must be no new cracks in our Liberty Bell now. Support our fighting men with your Liberty Bonds.

Support of the Third Liberty Loan makes a practical patriot of you.

Conscription for the boys who must go. Subscription from those who stay.

Investments in Liberty Bonds will show the lad in the trenches that he is not forgotten and will hearten him to strive for an early victory.

Be patriotic and thrifty by investing in Liberty Bonds. Every dollar thus invested is a step toward world peace and world freedom.

It is not a donation to the government, this buying of Liberty Bonds, but the sanest, safest investment in the world.



ONE of the best investments the people of the United States have made is the generous support given the American Red Cross in the last twelve months. Poor old suffering Europe today knows us as a great-hearted nation because of the magnificent work accomplished by our Red Cross over there. And for that, they will never forget us. Soon again we shall be asked by the organization for another \$100,000,000 that this labor may be continued. We must see that the measure is filled to overflowing. —Just one more little individual sacrifice for the cause of humanity.



FREDERIC M. GRAN

NATIONAL SERVICE
THE ART INSTITUTE
OF CHICAGO



Permanent Construction for Industrial Housing

**"Not bunk houses or barracks
But Homes for Workingmen"**

Homes for Workingmen



Practical Plans for Industrial Housing

The AMERICAN BUILDER takes pleasure in presenting on the nine pages following several authoritative industrial housing articles, the full text of the Government's Standards for War Housing, and a collection of eight industrial housing designs—real homes for workingmen of the sort so urgently needed right now in hundreds of cities and towns in practically every State of the Union. The AMERICAN BUILDER has for years been featuring the type of dwellings wanted at this time to house the nation's war workers; it is the greatest available repository of housing designs and data, and the AMERICAN BUILDER readers—the house building contractors—are the men who are handling the great bulk of this industrial housing work.

Alton, Ill., Is Building 300 Homes

AN INDUSTRIAL HOUSING PROJECT ORGANIZED TO SUPPLY REAL HOMES FOR WORKINGMEN TO BUY OR TO RENT, AND NOT CONFINED TO ONE SUBDIVISION, BUT ALL OVER TOWN

By Herbert C. Crocker

THREE hundred homes with an average cost of \$4,000, are to be constructed at Alton, Ill., during the present year to provide residences for the great number of persons who have moved into the city during the past few months. Carlinville, Ill., only a few miles east is considering a similar plan to be prepared for an increase in population, and Granite City, Ill., 10 miles south of Alton, is becoming uneasy about the housing conditions.

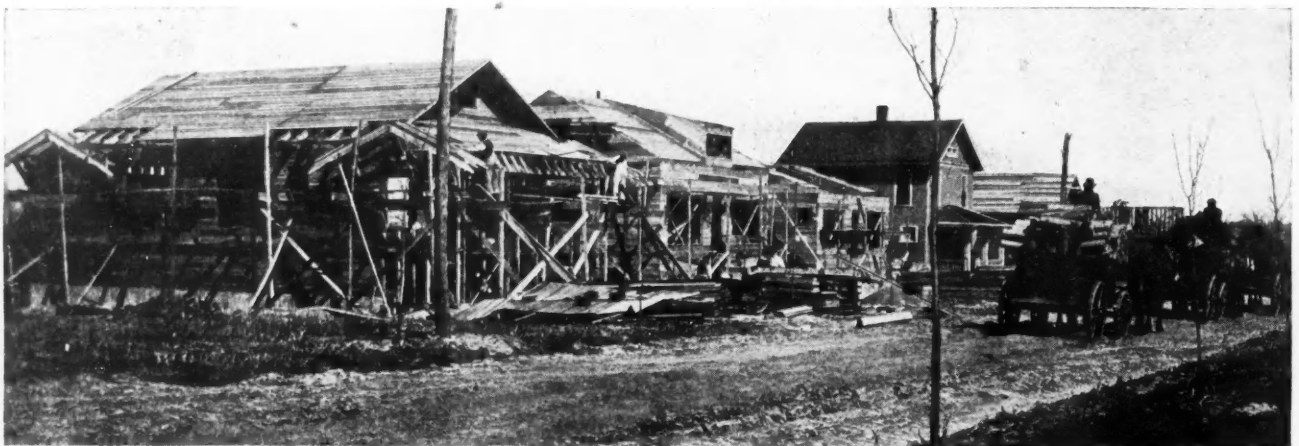
Ground was broken for the first 30 houses at Alton during March, and it is expected to average one house a day until the plans are carried out. If it is found

that 300 dwellings are inadequate to house the newcomers, then additional homes will be constructed as fast as possible.

A plan of action has been adopted and the movement is endorsed by the Alton Board of Trade, the Alton Joint Housing Committee, the Alton Retail Merchants' Association, the East End Improvement Association, the Alton Trades and Labor Assembly, and the Building Trades Council.

Here's what Alton expects to do:

First—To build houses in every section of Alton where the need exists.



Materials Scheduled to Arrive at Regular Intervals on the Alton, Ill., Job.

Second—To build the kind of a house in each section best adapted to the surroundings.

Third—To build houses of as many types and prices as required to fill the demands in all sections of Alton.

Fourth—To build, to order, in any section of Alton, the particular kind of a house desired.

Fifth—Not to confine the operation to any one part of the city or to the exploitation of any particular subdivision.

The majority of the new buildings will be five, six and seven-room structures of frame, brick, stone and composition. A few may probably be smaller or larger, the idea being to build homes for all classes in the various enterprises of the city.

The buildings were begun after two months' consideration and during the time all of the details have been worked out. Renters desiring to own a home may place their order or select one of the many styles erected. Residents of the city or those just moving in may rent or buy, just as they see fit.

The idea is to sell the homes with a first payment of \$200 or \$300 and the remainder will be paid off at rent rates.

The need of the new houses has been brought about thru the enormous industrial activities. With only one or two exceptions the industries will not be affected by a termination of the war, most of the

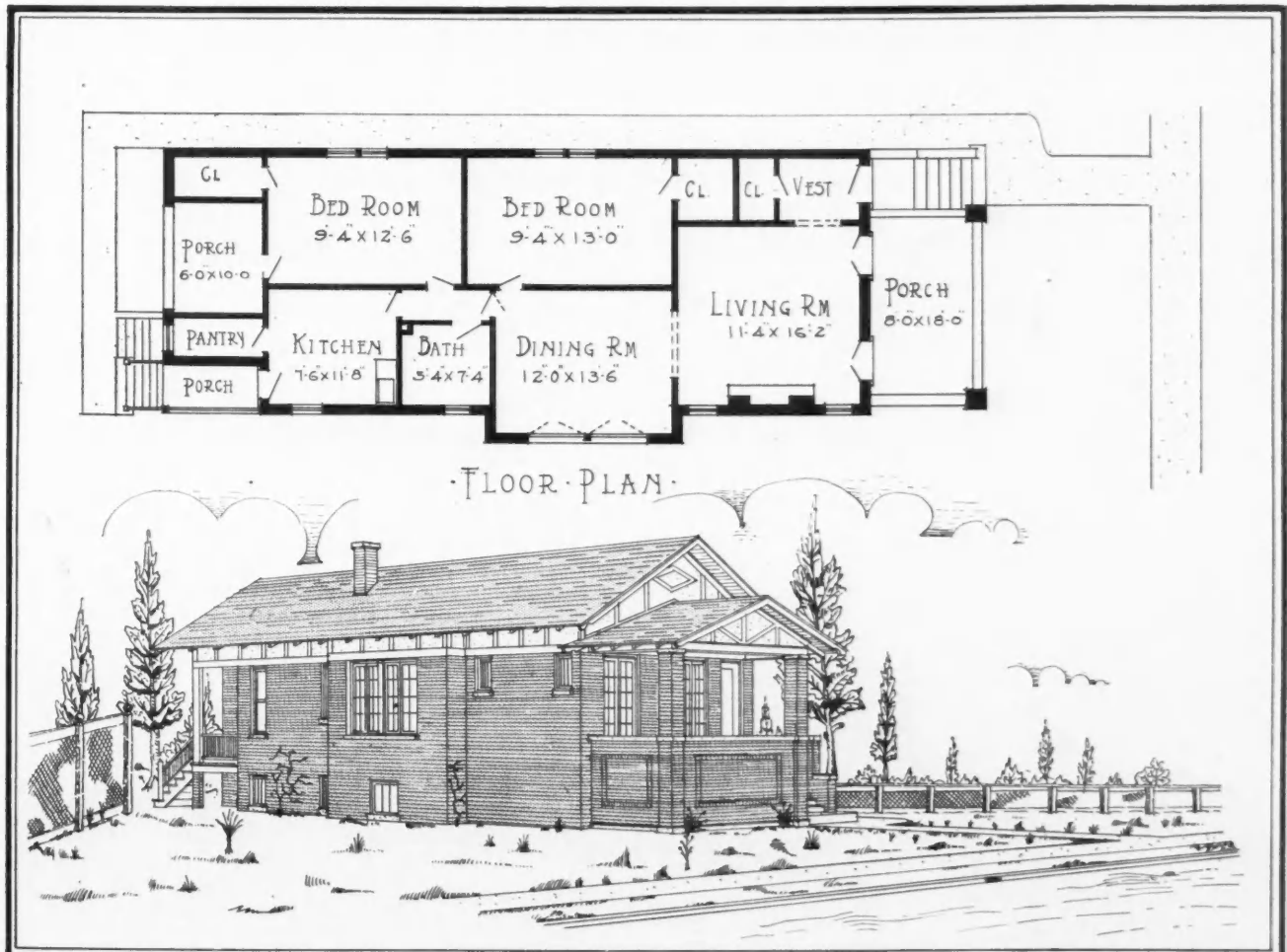


This is Going to be a Good Looking Stucco Job, One of Many Being Put Up at Alton.

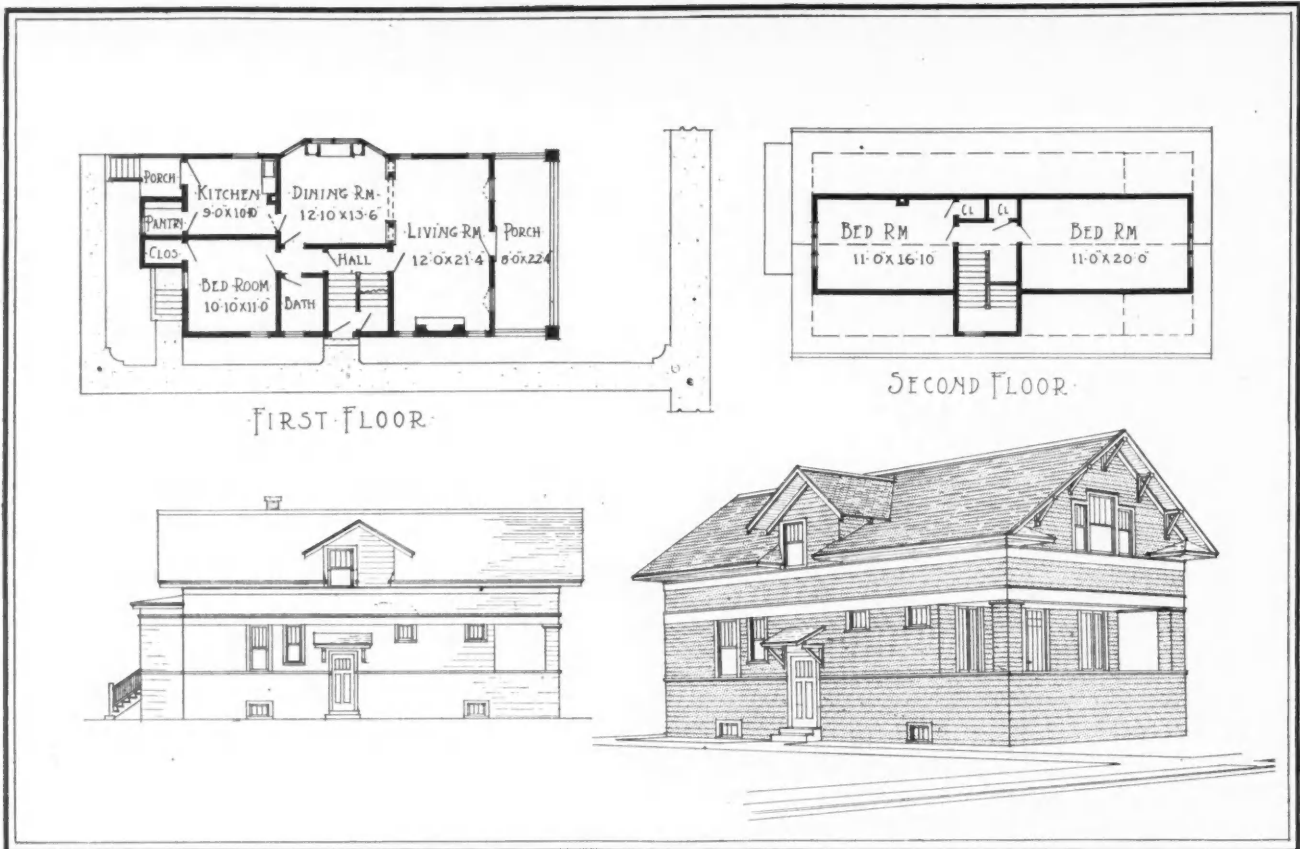
articles and commodities manufactured being a daily necessity.

The 1910 federal census showed Alton had a population of 17,528. An industrial survey was made in 1916 and federal authorities estimated the census at 22,000. Today the census is estimated at 32,400, or nearly 100 percent increase in eight years.

In 1914, when many cities were experiencing near-panics, Alton showed an increase of 50.4 percent in her general conditions. The invested capital in the city proper increased from \$5,585,000 to \$8,695,000. Wages increased 15 per cent and material 18.5 per cent. The value of the products grew from \$10,096,000



A Popular 5-Room Bungalow for Industrial Housing. This Plan with Several Different Changes in the Exterior, is Being Used at Alton, Ill.



Alton Demands Good Homes of the Modern Style. This Design Goes Well. It is a 6-Room, Narrow Lot, 2-Story Dwelling.

to \$12,865,000, an increase of 27 per cent.

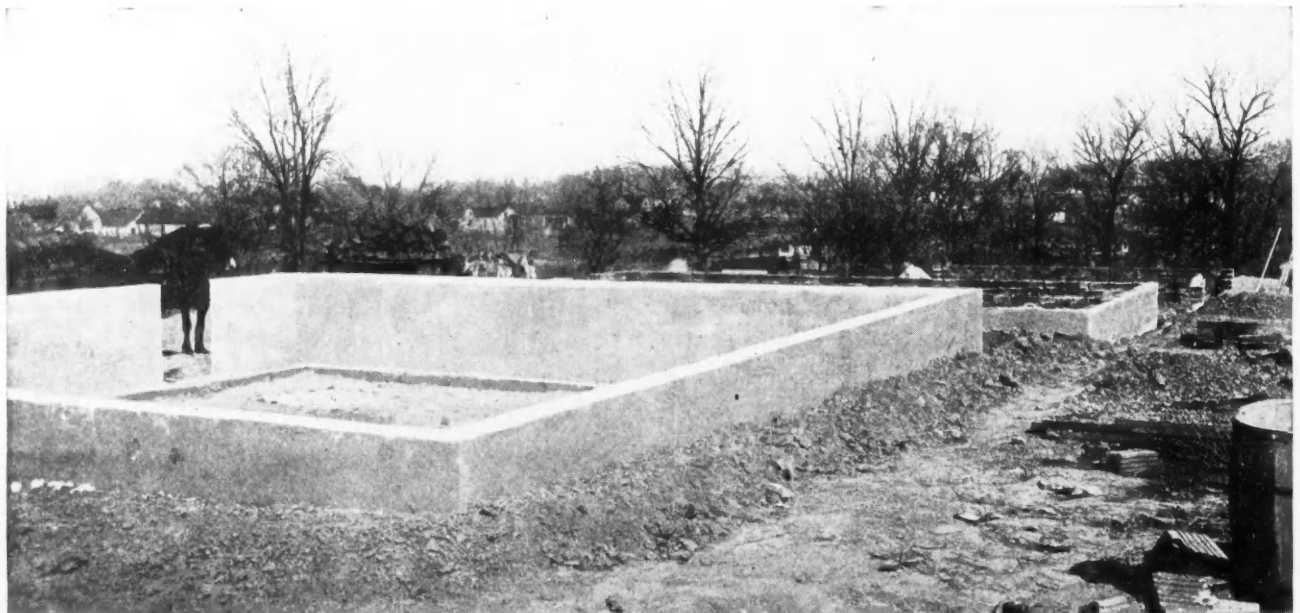
The estimated value of capital in Alton and her industrial territory today is estimated at \$24,000,000. The 105 plants employ 12,000 people and the monthly payroll is \$1,000,000. Carefully prepared data shows that 9600 people ride steam trains or interurban cars daily, most of them to the plants within a three-mile radius of the city.

After their day's work is over they return to Alton

for rest and recreation.

The growth became noticeable shortly after 1910, when the Standard Oil Company erected a \$5,000,000 refinery just south of the city on the Mississippi river, where a barge line service could be opened to New Orleans. At present the Roxana Oil Company is erecting a refinery and the International Shoe Company putting up a big tannery.

The Standard Oil Company is also the cause of



Three Foundations Under Way at Alton, the First Finished, the Second Plastered Outside and the Third Under Construction.

the changes to come over Carlinville. The company has already acquired thousands of acres of coal rights and the first of several coal mines will be in operation this fall. The new coal field will afford better shipping facilities to the plants at Alton, Whiting, Ind., the new refinery at Louisville, Ky., and the Kansas City, Mo., plant.

The increase at Granite City is due to the general demand for steel and other articles manufactured there.

Recently government agents made a survey of housing conditions at Alton and found them alarming. Homes, hotels and boarding houses were found crowded, in some cases three or four girls occupying a single room. There was talk of the government taking a hand in erecting a large number of cottages at East Alton, a neighboring city where 3,800 persons are employed in a munitions plant.

The prospect of losing a large portion of her citizens caused Alton to get busy. Several conferences were held by leading men of the city. The conditions were talked in civic bodies which resulted in the venture.

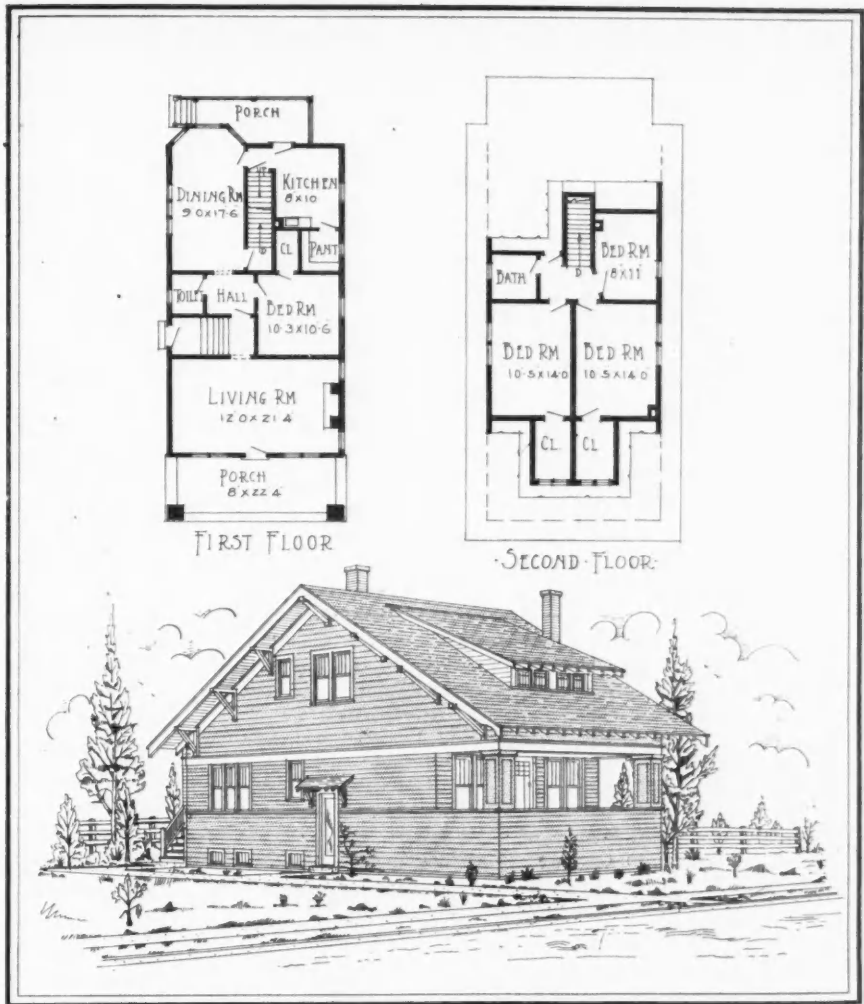
Progress Being Made

Marked progress has been made during the past four weeks; the first group of fifteen dwellings has been finished and the second lot of sixteen is well under way.

The Alton Joint Housing Committee believes the question has been solved in the plan put into effect. Altho barely a month has passed, applications have



Many of the Alton Houses Have Tile Basement Walls. They Are Warm, Dry and Inexpensive.



This Design is Always Popular. It is Being Used Extensively in the 300-Home Project at Alton.

been made for 130 homes. Most will be filled thru the class of houses decided upon by those in charge; but a number will be special orders ranging from \$3,000 to \$6,000.

The matter of financing the project has been carried on under direction of the Joint Housing Committee and a fund sufficient for the construction of the first fifty houses has been created. During the Liberty Loan drive, efforts to raise funds for the plan were abandoned and those in charge were active in the sale of Bonds.

A few days ago the writer visited the first group under construction and was impressed with the progress which had been made in ten days of actual work. In the building of small, one-family residences there are few opportunities to use mechanical devices as short-cuts to economical and rapid construction.

So the saving must be along other lines. In the plan at Alton the minimum in cost is secured thru buying lots in large numbers, buying material in local and foreign markets but thru the lowest prices possible, the letting of sub-contracts with care, and the organization of the working force to avoid clashes

(Continued to page 132.)

Government's Standards for War Housing

FULL TEXT OF RECOMMENDATION FOR PERMANENT HOUSING PROJECTS BY THE BUREAU OF INDUSTRIAL HOUSING AND TRANSPORTATION OF THE DEPARTMENT OF LABOR

Publication authorized by

Otto M. Eidlitz, Chairman

The policy of the Housing Administration is to encourage the formation in each industrial locality of a responsible housing corporation, organized and financed by local business men and to loan to that corporation up to 80% of the funds needed for the building of workmen's dwellings.

The "Standards" which follow, have been formulated to govern all housing construction work to be undertaken with governmental funds.

THESE standards are not intended as inflexible requirements, but any plans which fail to conform to them are not likely to be accepted unless supported by very strong reasons. Local building codes, housing laws, and similar ordinances are to be followed; provided, however, that in case such local regulations permit or require anything not permitted by these standards the express approval of this bureau is to be obtained before departing from the standards as here outlined.

Types of Houses

Type 1, single-family house. Type 2, two-family house. Type 3, single-family house with rooms for lodgers or boarders. Type 4, lodging house for men. Type 5, hotel for men. Type 6, lodging house for women. Type 7, hotel for women. Type 8, tenement house. Type 9, boarding house.

1. General Provision

All types of houses to conform to these general provisions and, in addition, to certain special provisions as later indicated:

1. *Arrangement.*—Row or group houses normally not to be more than two rooms deep.

2. *Basements.*—No living quarters to be in basements.

3. *Closets.*—Every bedroom to have a clothes closet, opening from the room. Built-in wardrobe dressers will not be accepted. Normally such closet to be not less than 22 inches deep and with door. Closets to be supplied with rods to take coat hangers.

4. *Cooking.*—Gas preferred, but fire for coal stove to be provided; all flues to be lined. The question of whether or not cook stoves are to be provided with the house to be considered at the time materials are being ordered.

5. *Fences.*—Board fences will not be accepted. Hedges or open metal fences desirable. Suitable arrangements for drying clothes to be provided. Where there are open metal fences the fence standards can be designed for this purpose.

6. *Furniture Space.*—Beds to be indicated to scale on plans (double beds, 5 feet by 6 feet 6 inches; single beds, 3 feet by 6 feet 6 inches). Location of beds not to interfere with windows or doors. It is recommended that beds be free standing and not located in a corner or with the side against the wall. Space to be provided for two pieces of furniture in addition to bed. Halls, stairs, and doors to permit easy moving of furniture.

7. *Gardens.*—Allotment gardens, conveniently accessible, preferable to increasing the size of the lot to provide for individual backyard vegetable gardens.

8. *Lighting.*—Electricity preferred.

9. *Materials of Exterior.*—Materials dependent on local supplies; brick, terra cotta, stone, or concrete preferred. Outer walls to be insulated against dampness and condensation. Rat noggings to be provided. Roof to be fire resisting; leaders and gutters not essential unless drip will do harm.

10. *Open Spaces.*—Side-yard space between adjacent buildings to be preferably 20 feet; minimum, 16 feet; such space to be increased proportionately for each additional story, or

part of story, above two stories. If this space is not obtainable because of lot sizes or land values, houses should be built in rows or groups.

Rear-yard depth not to be less than height of building, nor in any case less than 20 feet. Minimum distance between backs of houses to be 50 feet. Consideration to be given as to whether sites should be provided for garages. When not an integral part of the house, garages should preferably be at the rear of the lot, should not be located closer than 15 feet to the nearest part of the house, and should not exceed one story in height.

Front yards or setbacks desirable where practicable; minimum distance from front of house to front of opposite house to be 50 feet.

Covered porches to be considered part of building.

11. *Plumbing.*—House drain under house and 5 feet outside to be extra heavy cast iron. It is recommended that soil and waste pipes be extra heavy cast iron or genuine wrought iron. Soil and waste pipes to be extended thru roof. A 3-inch soil stack preferred where not more than two water-closets are placed on one stack.

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 supplementary 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 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 2 winders will be allowed in series. Treads must measure at least 9 inches wide 18 inches from rail.

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 front and rear bedrooms in row houses.

Every bathroom to have 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

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.

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

1. *Arrangement.*—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 rows or 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 clapboards, shingled, or stuccoed permitted for detached or semi-detached houses not over $2\frac{1}{2}$ stories high. Party walls 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 imperivous 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 ventilated 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 the water-closet compartment without going thru rooms designed for use of family.

10. *Rooms, Size of.*—One large bedroom to be provided, size 10 by 12 to 12 by 14 feet.

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

Parlor, 10 by 12 to 12 by 14 feet.

Dining room, 9 by 12 to 12 by 14 feet.

Kitchen (where there is no separate dining room), 10 by 12 to 12 by 14 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

Type 4. Lodging house for men.

Type 5. Hotel for men.

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

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

If of 2 stories high, a non-fireproof building the area of which exceeds approximately 3,000 square feet to be divided by fire walls of brick, terra cotta, stone, or concrete into areas not exceeding approximately 3,000 square feet each. All open-

(Continued to page 144.)

Emergency Fleet Housing in Philadelphia

3,000 HOMES FOR THE HOG ISLAND SHIP BUILDERS OF PERMANENT CONSTRUCTION, 2-STORY ROW TYPE

By Richard Shepherd

Building Estimator on this Project

THE project of building a city of homes covering a tract of 250 acres for the workers at the Hog Island Shipyard of the Emergency Fleet Corporation is the largest of the kind yet attempted by the Federal government.

The shipyard itself, which will have fifty shipways when completed, is of a very permanent character, and it is very gratifying to know that the houses which the government has decided to build will be of like character.

The plans now in the hands of the builders provide for two thousand houses to be erected in the Fortieth Ward of the City of Philadelphia. They call for two-story dwellings, built in rows. Each house will have a frontage of sixteen or 18 feet, and will be built on a lot ninety feet in depth, with ample space for gardens, wash-lines and play-grounds.

The entire project is expected to include about 3,000 homes when completed, giving the section a population of approximately 15,000.

The assumed cost of the homes is \$3,000 each, entailing an expenditure of \$6,000,000, exclusive of the cost of building streets, sewers and water mains, which work is to be done by the city.

The city engineers have estimated that their portion of the work will cost about \$400,000.

It will be necessary to provide a temporary pumping station for the drainage system until a large permanent station in connection with proposed disposal beds is built. More than 12,000 yards of grading will be necessary in connection with the work. Fifteen miles of sewers are to be constructed.

Fire and police stations will also be added by the Department of Safety.

The streets provided by the city will be of asphalt on a concrete base. They will be from 60 to 120 feet in width with four avenues of the latter width.

The improvements will include a double track trolley line along one of the avenues leading direct to the shipyard.

The engineering problems involved, due to the fact that the land is low, caused the engineers to adhere to the "gridiron" plan in laying out streets, in place of a system of curved streets which had been contemplated.

Owen Brainard is the Consulting Engineer connected with the Housing Division of the Emergency Fleet Corporation, and Carrere & Hastings are the architects.



TYPICAL ELEVATION OF PITCHED ROOF HOUSE

Part of Two-Story Philadelphia Row, Each Unit Having a Frontage of 16 or 18 Feet and Containing Four or Five Rooms and Bath; Building Cost about \$3,000 Each.

They were employed by the British Government on a similar project.

The plans provide for a house not unlike thousands of Philadelphia houses of the "air-light" type, but they differ from the usual Philadelphia house in three main exterior features.

Each row will contain several styles, diversified in regard to the design and finish of the fronts, the plan of the porches and the approaches.

The porches do not extend across the entire front and cellars do not extend under porches, as is customary in probably 99 per cent of the newer Philadelphia "row-houses," and they omit the typical second-story galvanized bay.

The advantage of the more private approach is weighed against the lost porch space. The room space lost by the omission of the bay is compensated by a lowered cost of construction and upkeep in regard to painting, repairing and heating.

The first floor, as will be noted in the illustration, contains a living room and a combination dining room and kitchen. An alternate plan provides separate dining rooms and kitchens.

The second floor provides for either two or three bedrooms and a bathroom equipped with all conveniences.

The plans provide for both pitched and flat roofs. The space under pitched roofs is not designed for living quarters.

The basements have direct access from the rear yard by cement steps. The plan is so arranged that

(Continued to page 140.)

Financial Side of Company Housing

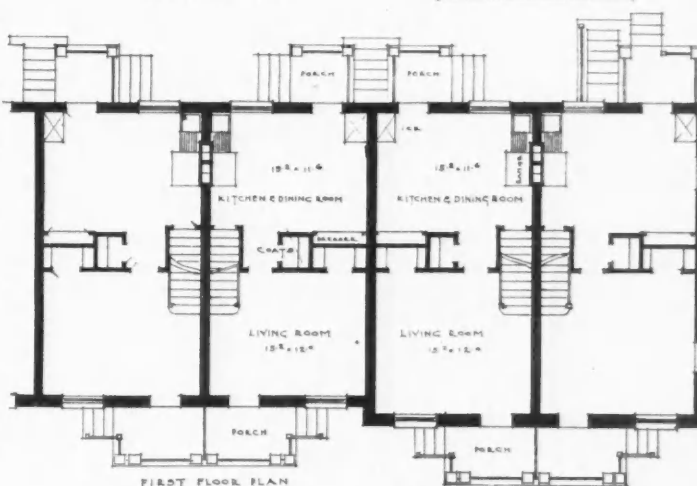
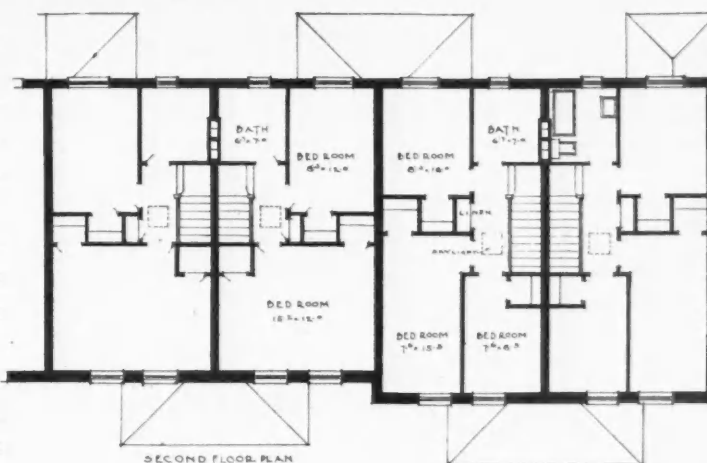
Proctor, Minn.

AMERICAN BUILDER Housing Committee:

Replying to your letter of the 12th instant, asking for certain information in regard to houses for employes, I think perhaps sending you one of our contracts that we use in selling houses to employes, would give you better information than I can write out.

For a four-room cottage with water, but no bath and other improvements, we get \$10; for a six-room house with bath, sewerage, etc., we get \$18, and for a six and seven-room house, but larger rooms and a larger building consequently, \$25, the houses respectively approximating \$1,000 to \$1,200, \$1,900 to \$2,200, and \$3,000, the unpaid amounts bearing 5 per cent interest. The employe can turn back his house if he has been dismissed or in the case of a widow who has lost her husband while in the employ, during the time the payments are still due. We decide what the rent should be, which we would collect in a case of this kind, and remit to the purchaser the balance paid in, excepting interest.

The payments are a little larger than the rent would be. For instance, on the \$10 rent we would not raise the payments much; on the \$18 house we would require a payment of \$25, and on the \$25 house a payment of about \$30 to \$35 per month. On the small houses again, the first payment would be about \$50, or as much more as the employe would pay with the idea of cutting down the interest; on



Typical Floor Plans for Philadelphia Housing.

the next size house, \$150 to \$200 down, and on the third house described, at least \$250 to \$300 down.

The contract is a very liberal one, but it must be remembered that we are dealing with employes and want to do all we can for them. We realize that a real estate agent or an owner of property renting his property could not afford to do this.

As to the best renting and selling houses I would say that our five and six-room houses sell more readily than a four-room house. I would also say that I would not be in favor of grouping, but give each employe a separate house with at least a 50-foot by 140 or 150 lot, and encourage gardening, raising of flowers, lawns, etc. Flats, under these circumstances, I would not recommend at all. I would also recommend that to encourage gardening, flowers and lawns, an annual premium be paid for the best lawn, best garden of vegetables and the best flower garden. We are going to start in on this latter project this spring. Some of our constituent companies have been at it for several years and take pictures of such places and send them to the different constituent companies' offices so as to encourage that kind of work among the employes.

The small houses have not been furnished with heating plants; in fact, some of the five-room houses were not equipped originally with heating plants, but were put in later. From my experience I would recommend anything above a four-room house be supplied with bath, furnace heat, a concrete or stone cellar, sewer, and bath fixtures. Our experience is that a house of this kind will sell more quickly, even tho it cost \$500 or \$600 more, than the same kind of house not so fitted up.

If I can be of any further service to you, advise me.

J. W. KREITER,

Superintendent, Duluth, Missabe & Northern Railway Co.



Our Plain Line Two-Story House. Size 22 by 26 feet. The shingle siding in wide and narrow widths gives this design a classy look.

Types of Utility Homes

Combinations of shingles and siding are almost infinite. The effective use of these two coverings is shown to excellent advantage in the design above. The alternating wide and narrow courses impart a touch of the unusual that makes for distinction.

Another architectural feature of this design, one that in every way is pleasing, is supplied by the porch roof lines which are unusually good.

This is a full two-story house, insuring adequate means for ventilating the sleeping apartments on the second floor.

Arrangement of the first floor plan is well thought out. The entrance at the end or side of the living room insures a degree of privacy for the unexpected caller who finds the room full of unknown company. The passageway to the kitchen is a convenience that will save the housekeeper many weary steps.

These are features of use and sale value of a home which always should be taken into account by the builder.

The small cottage shown at the bottom of this page is of that type for which there usually is an excess demand. It makes a convenient and comfortable home for a small family and, contrary to the usual order of buildings of this class, this one has an inviting appearance, which the perspective view shows to very good advantage.

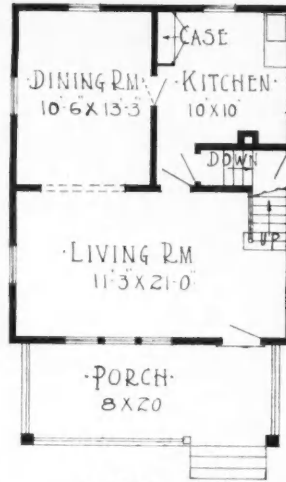
The accompanying floor plan tells all it is necessary to tell about the arrangement of the interior.

These are typically American types of workingmen's homes and the occupants

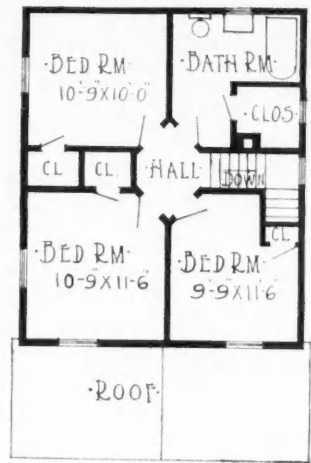
of homes of this order form the backbone and sinew of the nation. That is the one big reason why we are interested in seeing more of them built. It has been our experience that the owner of a home of this type later will own and occupy a more pretentious residence.

Even such simple little dwellings as these are, can be planned for convenience and the economical use of stock lengths of lumber. It costs less and gets a better job to plan everything in advance.

Labor organizations are investigating conditions under which their members live and noting how manufacturers of various cities provide for their employes, and it is time that every city made every provision possible to show various classes of labor that their interests have been carefully considered and provided for, otherwise they will not come.



First Floor Plan.



Second Floor Plan.

Arrangement of Plain Line Two-Story House Above. Size 22 by 26 feet.

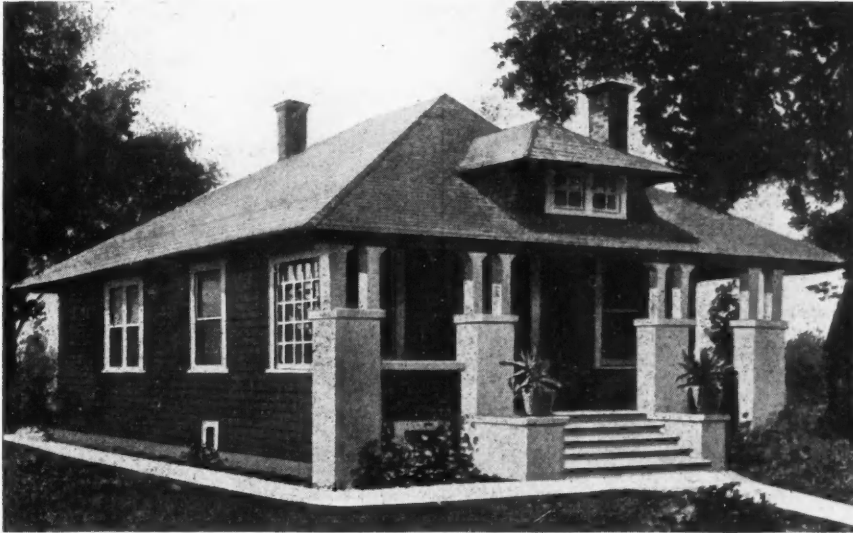
In the present emergency when so many cities and towns find themselves short of dwelling houses—workmen sleeping in tents and shacks—the prompt construction of a few hundred of these neat little houses will save the day.



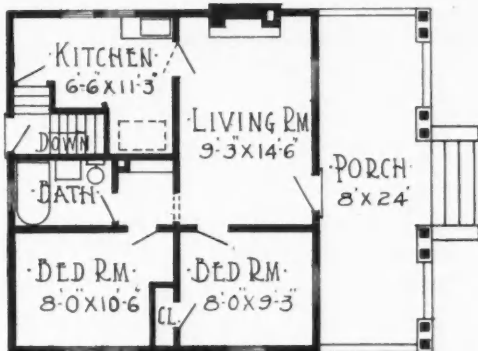
Floor Plan Comfort Cottage. Size 18 by 22 feet.



Comfort Cottage. Size 18 by 22 feet. Three rooms only are in this house. Anyone can afford to build it.



Cottage with Distinctive Porch. Size 22 by 24 feet. This is a modern type four-room bungalow.



Main Floor Plan of Cottage Above. Size 22 by 24 feet.

Combining Beauty and Use

The wise builder is not unmindful of the value of appearance in any structure. The value of any building is governed largely by its desirability and a building is desirable because it is beautiful or useful. It should be both.

For the sake of brevity we have called the design above the cottage with distinctive porch, but it is more than that. The short wooden columns, arranged in pairs on the tops of the pillars is an idea that possibly had its origin in Moorish architectural circles. In this instance the effect is wonderfully pleasing.

The roof lines on this home are simple and employed to excellent advantage. The combination of materials, concrete pillars, steps and rail caps is in excellent taste.

The Open Porch Cottage

The architectural scheme of the design at the bottom of the page is radically different. Here we find siding and shingles used and with them the effective employment of exposed rafters, with a like suggestion given in the treatment of the gables of both porch and main roof. These are concessions to the ornamental that are inexpensive, in good

taste and of permanent value. The extra cost, if any, is moderate.

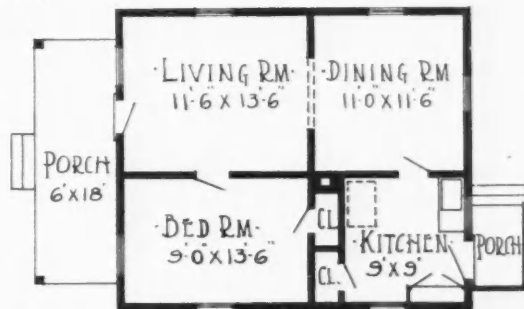
These homes require little, if any, material that cannot be furnished from stocks on hand in any lumber yard, and we urge again the construction of buildings in which stock goods can be used. It is the wisest of wise economy.

Floor plans are given so you may make a tour of both residences. Perhaps the arrangement will not suit you exactly. Changes can be made with no delay, very little trouble, and in all probability without expense.

Every builder assumes an obligation when he begins the construction of a home or any other structure. It is an obligation to add something to the value of the property in the neighborhood in which his structure is reared.

It costs no more to build an attractive home than those which violate every

principle of good architecture. Frequently it costs much less, but the structure permanently is worth much more. Bear that idea in mind when working out your plans. We shall be glad to aid you. When building a quantity of small houses in a neighborhood it is extra important to have them attractively designed and to use a variety of styles to avoid monotony.



Main Floor Plan of Cottage Below. Size 22 by 26 feet.

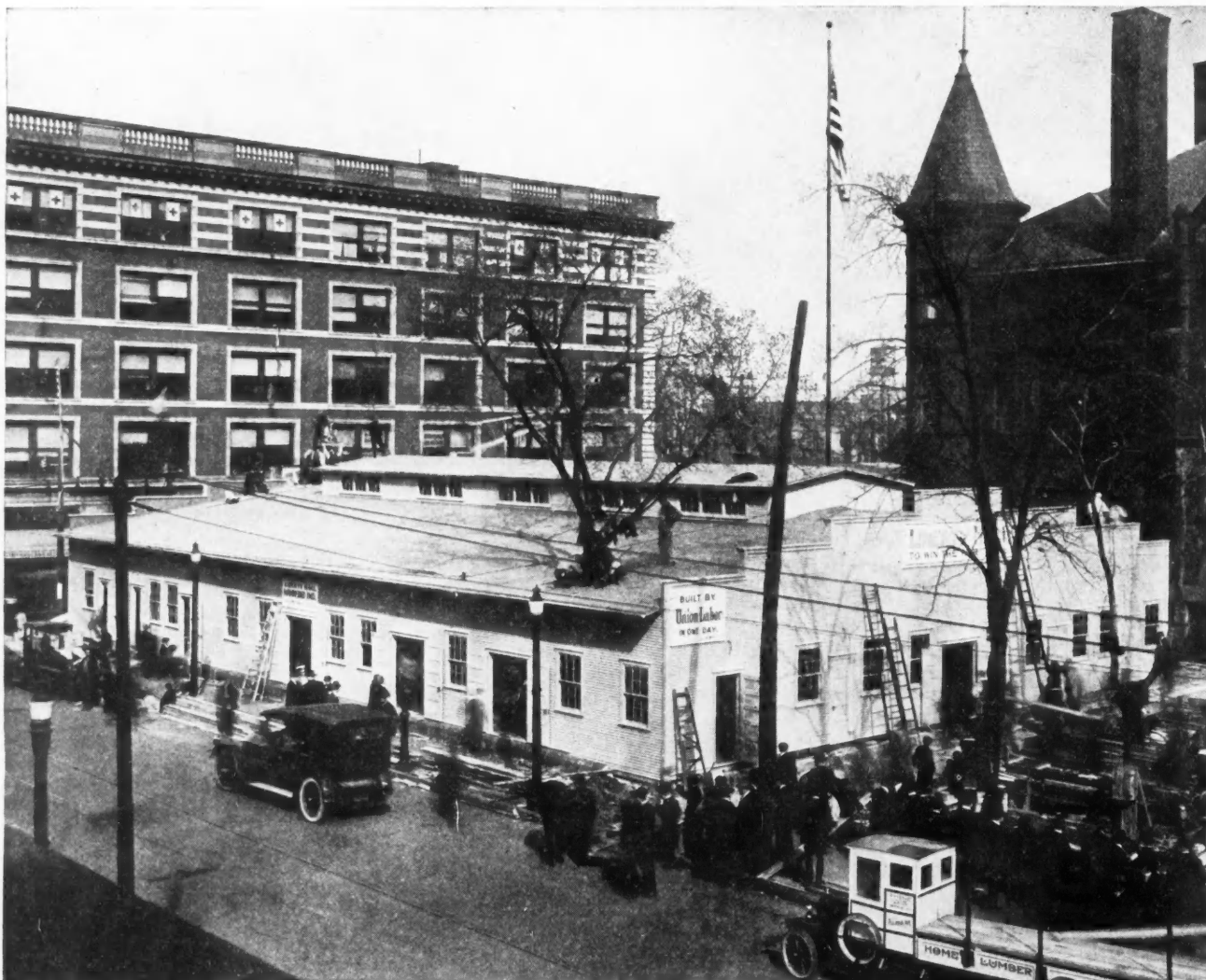


Open Porch Type of Cottage. Size 22 by 26 feet. Four rooms are contained in this little home.

Hammond's Liberty Hall Built in a Day

EMERGENCY OFFICE BUILDING AND AUDITORIUM TO HOUSE ALL WAR ACTIVITIES PUT UP IN RECORD TIME

By Fred Telford

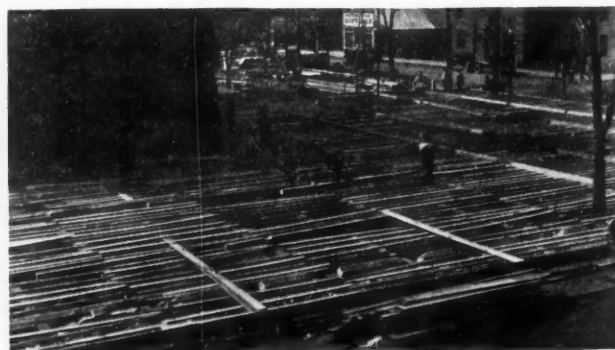


The Building at 3 p.m. Roofmen Doing the "Fine Work" Around the One Tree Left Standing, Liberty Bell in Place at the Left, Permanent Signs Up. Inside the Carpenters and Wiremen Were Working Like Beavers; at This Stage the Partitions Were Nearly All In.

WHEN a building 140 by 104 feet, containing more than 10,000 square feet of floor space, is constructed entirely in one day, no Sherlock Holmes is needed to deduce that some thoro planning was done. And when that building is a Liberty Hall, built particularly and entirely for war purposes, even Dr. Watson cannot fail to see that pro-Germans and pacifists had better not show their heads. Hammond, Ind., with a population of 30,000 to 40,000, did the planning and building, and ever since the kaiser-lovers have been conspicuous by their absence.

Saturday, March 30, was the day selected for putting up the building. At seven o'clock the starting gun was fired, and 250 workers got busy. The ground was bare, the lumber of the stock lengths, and only a little preparatory sawing up of the parts had been done; the lumber, to be sure, was neatly piled in convenient places, with each pile labeled so the work-

men would not be delayed. Long before sundown of the same day the building was completed, with its offices, its wiring, its big auditorium with 1,800 seats sawed out and put together on the grounds. And to prove beyond doubt that everything was shipshape, the carpenters and laborers held their dance in the build-



The Job at 7:30 a.m. The Result of the First Half Hour of Work.

ing, beginning at seven o'clock, just twelve hours after building operations began.

The photographs tell better than words the progress of the building, tho they cannot very well tell how the work was carried out. As a matter of fact, the feat was comparatively simple. Organization, as might be supposed, was the keynote. The workers who reported at work at seven were organized into twenty-five units, each with a foreman, six carpenters, and three laborers to carry lumber and clean up. No attempt was made to instruct the individual men in the gang as to their duties, but each foreman had definite, unmistakable directions. One unit, for instance, put



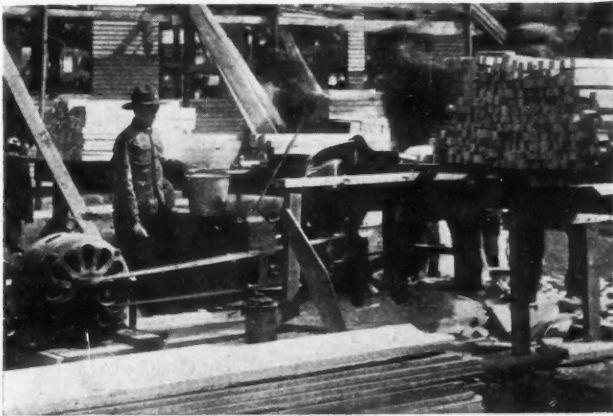
"Close Up" of the Manner in Which the "Fine Work" on the Doors and Windows Was Done in the Workyard so as not to Clutter up the Work of Construction. Gangs of Men Were Put at This Work at Seven, and by Ten had the Doors and Windows in Their Frames so that Each Unit Could be Carried to the Building and Quickly Nailed in Place.

The organization in the workyard was as thoro and interesting as the actual construction work. Gangs of men were set at work putting the doors and windows in the frames, all the "fine work" being done here; even the double doors were put into their frames, planed down so as to fit closely, and otherwise shaped up. Each unit, whether door or window, was then carried to its proper place, and nailing it into position was a matter of minutes only.

One of the difficult jobs was making the 1,800 seats for the auditorium. Just as soon as the other sawing was out of the way, the portable electric cutter was set to work sawing out the parts, and as soon as a considerable number of parts were accumulated, gangs of men began putting them together. Of necessity this job lasted well into the afternoon.

From the very first, the workers ran ahead of the schedule made out by the organizers. At noon, a full hour had been gained, and the same rate of progress

(Continued to page 152.)



The Portable Electric Cutter in the Workyard Sawing up the Parts for the 1800 Chairs for the Auditorium so That They Could be Nailed Together Without Handwork.

down a certain part of the foundation, a second another part, and so on. When the job was completed, the unit was straightway assigned to another specific piece of work. In this way there was no confusion, no uncertainty, no working at cross purposes at any time during the day. The "boss" on the construction work watched operations, assigned work, and if a unit fell behind, shifted men or other units to help out. Needless to say, he was a busy man all day long.

Another feature that expedited and simplified matters was the unit construction. Each "bent" was in effect a unit so that definite work could be easily assigned to each gang, whether it was putting up studding, nailing on siding, or putting down flooring or sheeting. Some of the gangs, of course, had nothing to do for a few minutes, but very soon all were busy.



At 10 a.m. Flooring Nearly All Down, Sheeting Mostly on, a Good Start on the Siding. The Gap at the Left Was Strictly According to Schedule. The Men Working on the "L" Began at the Other End and Worked Toward the Main Section in Order to Make it Easier to Fit the Truss Where the Parts Join. Thruout the Day This Was the "Slow" Point.

AMERICAN BUILDER BUILDING PLANS



Complete Blue Prints for Metal Lath Industrial Housing Design

FOUR FULL PAGE PLATES GIVE FULL AND ACCURATE DIRECTIONS FOR THE CONSTRUCTION OF THIS DWELLING—FOUR DIFFERENT EXTERIORS PRESENTED TO FIT STANDARD FLOOR PLANS.

THE AMERICAN BUILDER Blueprint Supplement has been voted the finest thing we have ever presented. "The building magazine with the red cover and the blueprints" is winning new friends every day because it is giving the building industry the practical features that are really wanted.

The present design is especially timely in that it can be used for industrial housing projects, and at the same time makes an individual home which any man can be proud of. The floor plans show a standard seven-room arrangement, and four different styles of exterior are presented to go with this standard floor plan. This is an idea that works very successfully in real estate building or wherever homes are put up in quantities. The standard floor plan holds down the cost, and the variety of exterior design avoids monotony.

This is a fire-resistive dwelling, being constructed of cement plaster on metal lath. Wood studs are used, but tests and experience have proven stud walls to be highly fire resistive when cement plastered on both sides over metal lath. Alternate construction details on the last sheet show the use of metal studs and joists and solid plaster partitions.

The Associated Metal Lath Manufacturers recommend that sheathing boards be omitted entirely, the metal lath to be nailed directly to the studding, and thoroly back plastered so that the lath is completely embedded. The necessary stiffness is given the exterior walls by nailing in 2 by 3-inch braces between the studs.

The specifications of the metal lath manufacturers should be followed closely if a perfectly satisfactory job is to be had.



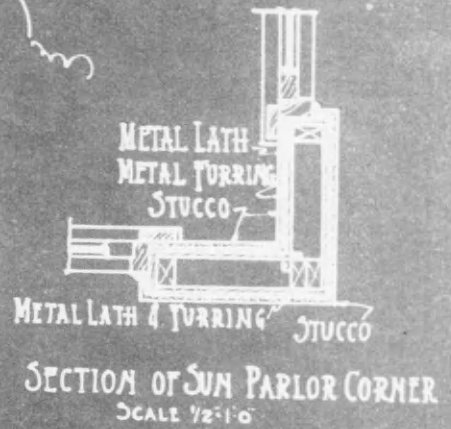
Fire-Resistive Metal Lath Cement Plaster House of Seven Rooms. Complete Working Plans for this Dwelling Are Presented on the Four Blueprint Pages Following.



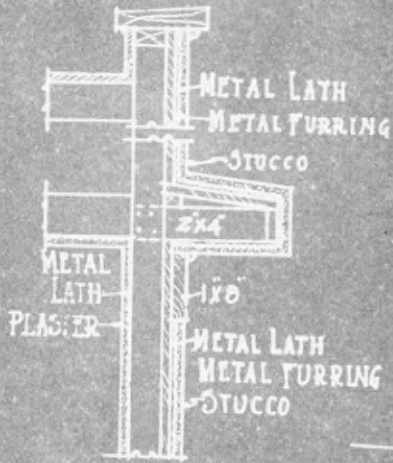
AMERICAN BUILDER BUILDING PLANS



ALTERNATE EXTERIOR No 1



SECTION OF SUN PARLOR CORNER
SCALE 1/2"=1'-0"



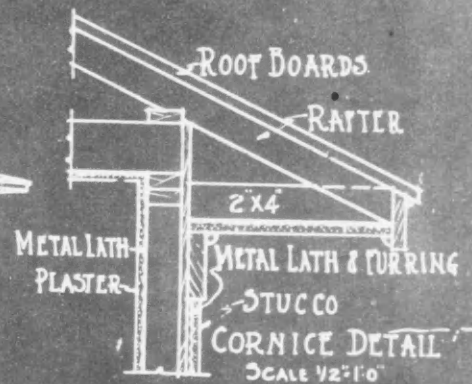
FLAT ROOF CORNICE
SCALE 1/2"=1'-0"



ALTERNATE EXTERIOR No 2



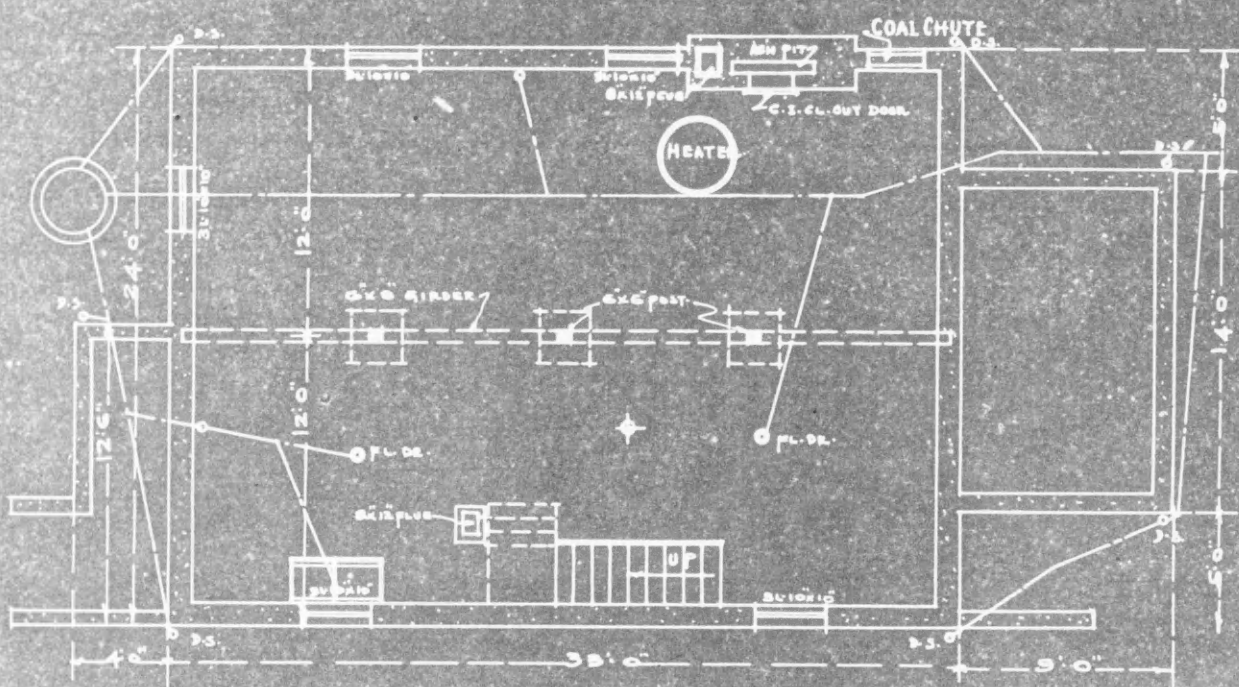
ALTERNATE EXTERIOR No 3



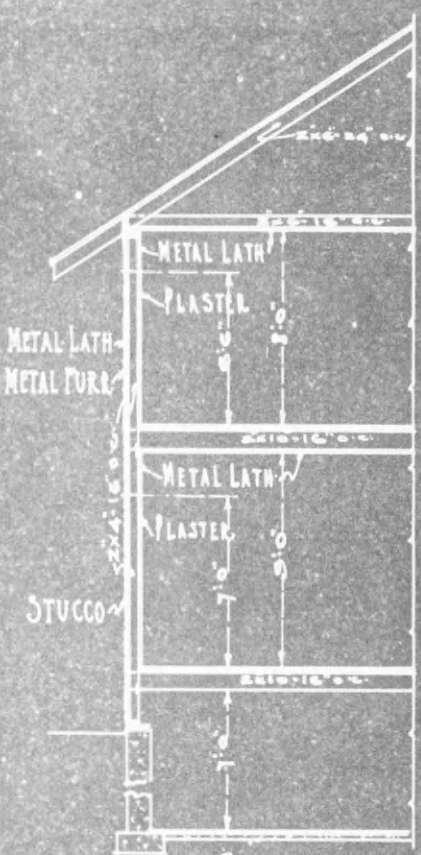
CORNICE DETAIL
SCALE 1/2"=1'-0"

FIRE-RESISTIVE HOME FOR QUANTITY BUILDING SHEET No 1

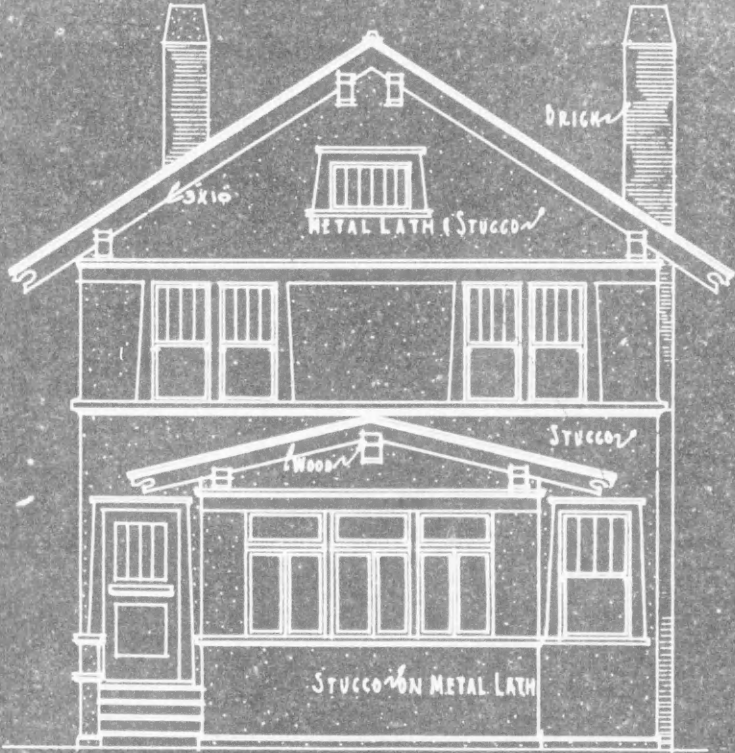
AMERICAN BUILDER BUILDING PLANS



BASEMENT PLAN
SCALE 1/8" = 1'-0"



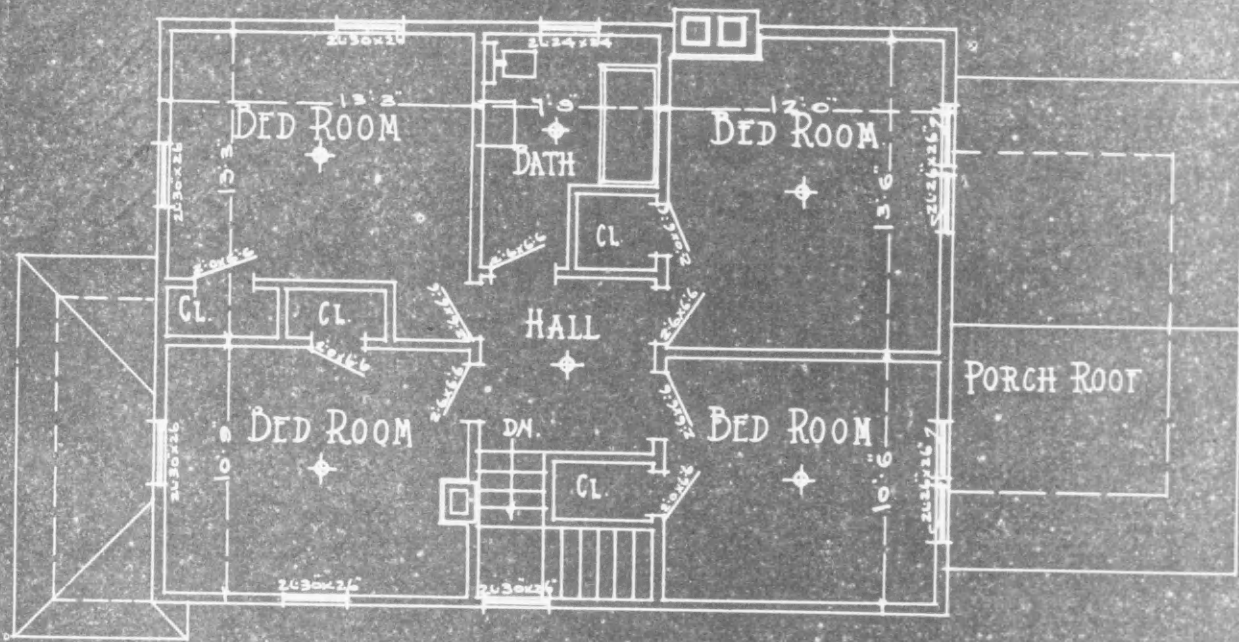
SECTION



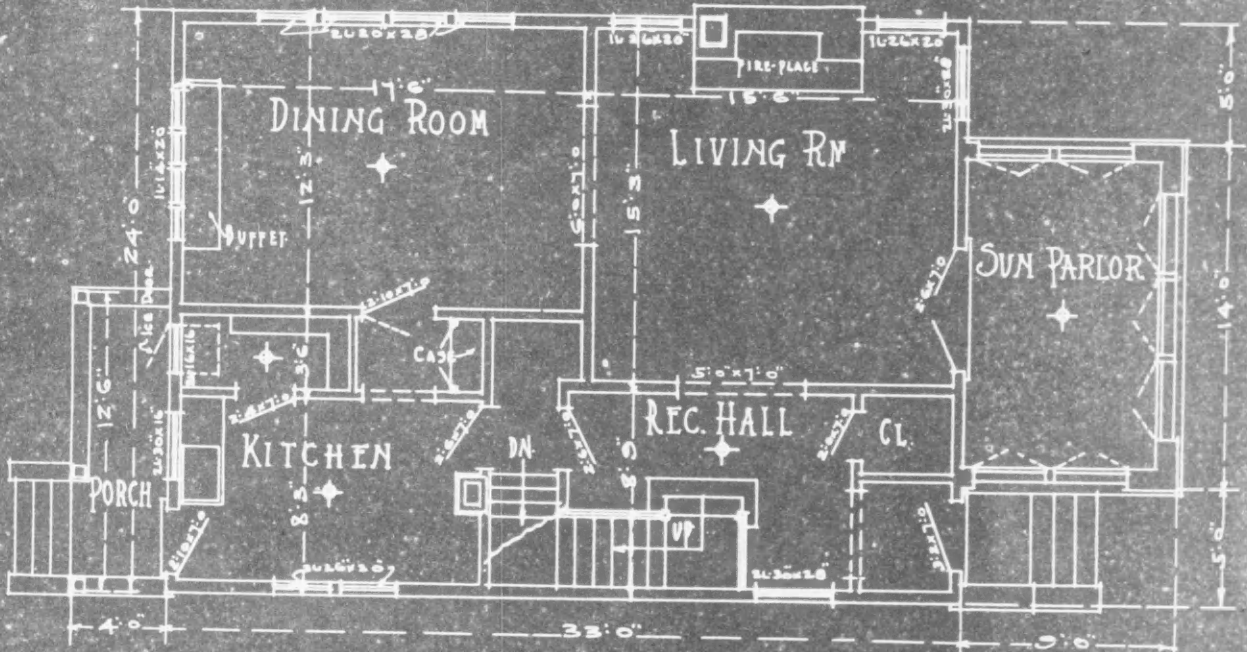
FRONT ELEVATION
SCALE 1/8" = 1'-0"

FIRE-RESISTIVE HOME FOR QUANTITY BUILDING. SHEET No 2

AMERICAN BUILDER BUILDING PLANS

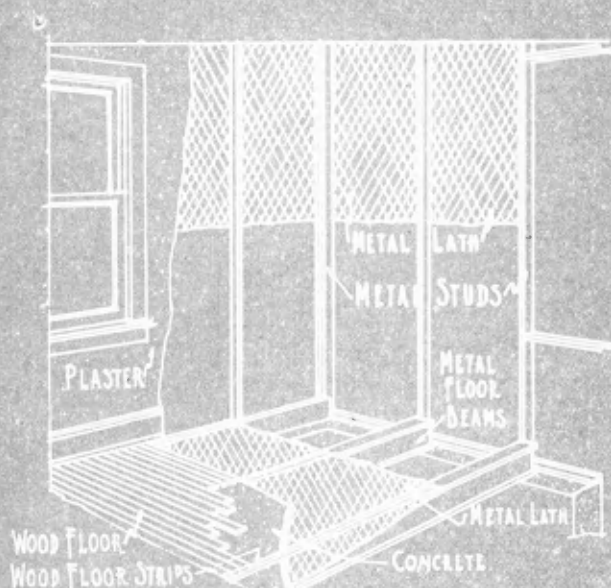


SECOND FLOOR PLAN
SCALE 1/8"=1'-0"

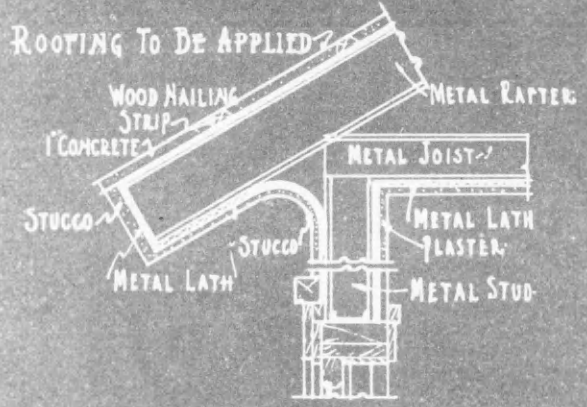


FIRST FLOOR PLAN
SCALE 1/8"=1'-0"

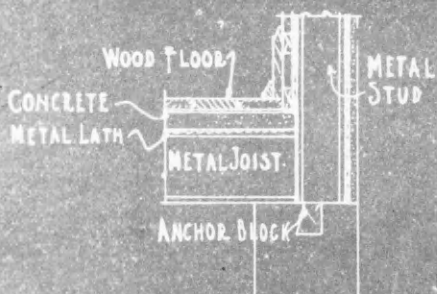
AMERICAN BUILDER BUILDING PLANS



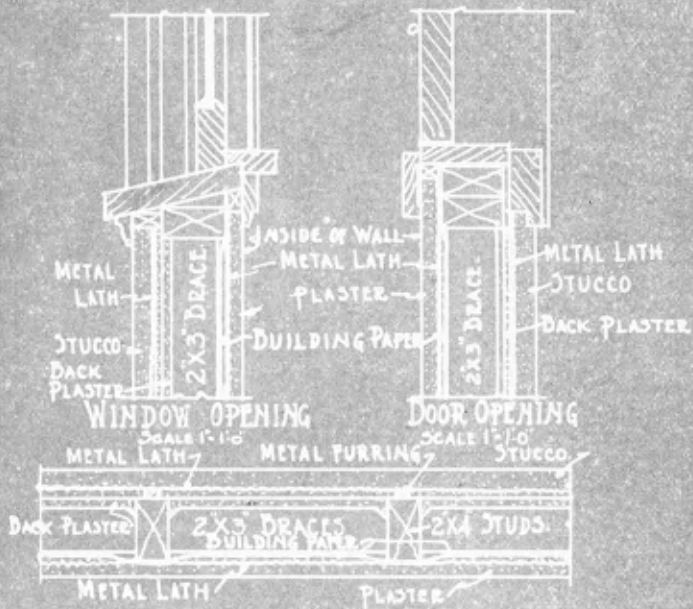
FLOOR & WALL CONSTRUCTION USING METAL STUDS, LATH, & FLOOR BEAMS



SECTION OF STUCCO CORNICE
SCALE 1/2"=1'-0"

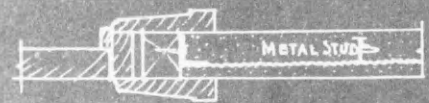


SECTION THRU WALL USING METAL STUDS, JOISTS, & METAL LATH

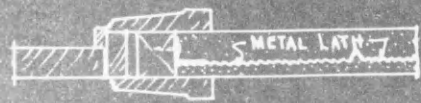


EXTERIOR WALL USING NO SHEATHING
THIS TYPE OF CONSTRUCTION IS RECOMMENDED BY THE ASSOCIATED METAL LATH MANUFACTURERS.

5" HOLLOW PLASTER PARTITION USING METAL STUDS. THIS TYPE OF PARTITION HAS 3" AIR SPACE.



2" SOLID PLASTER PARTITION USING METAL STUDS.

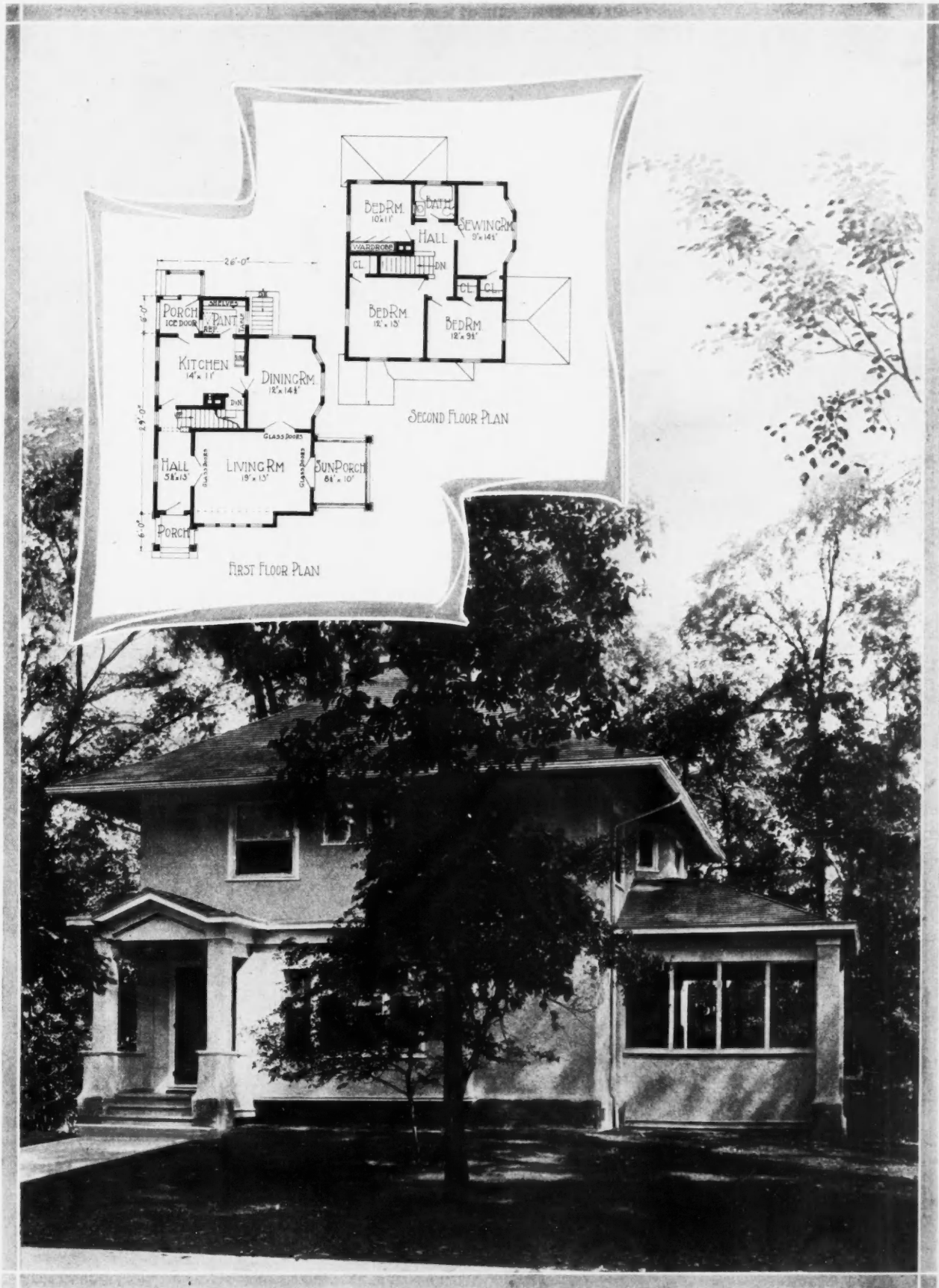


2" SOLID PLASTER PARTITION ON HEAVY SELF-SUPPORTING RIBBED LATH.
SCALE 1/2"=1'-0"

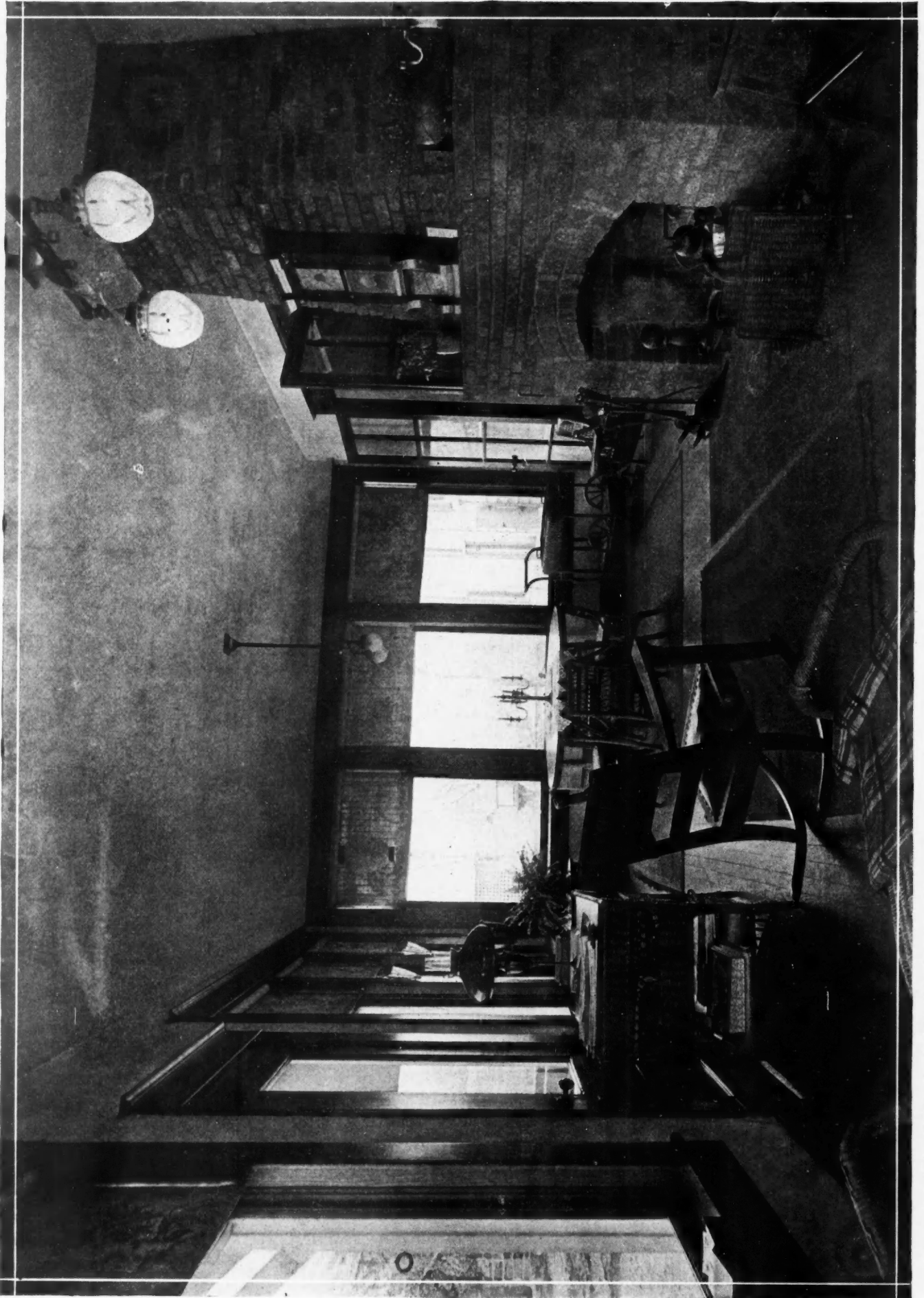
ALTERNATE CONSTRUCTION DETAILS



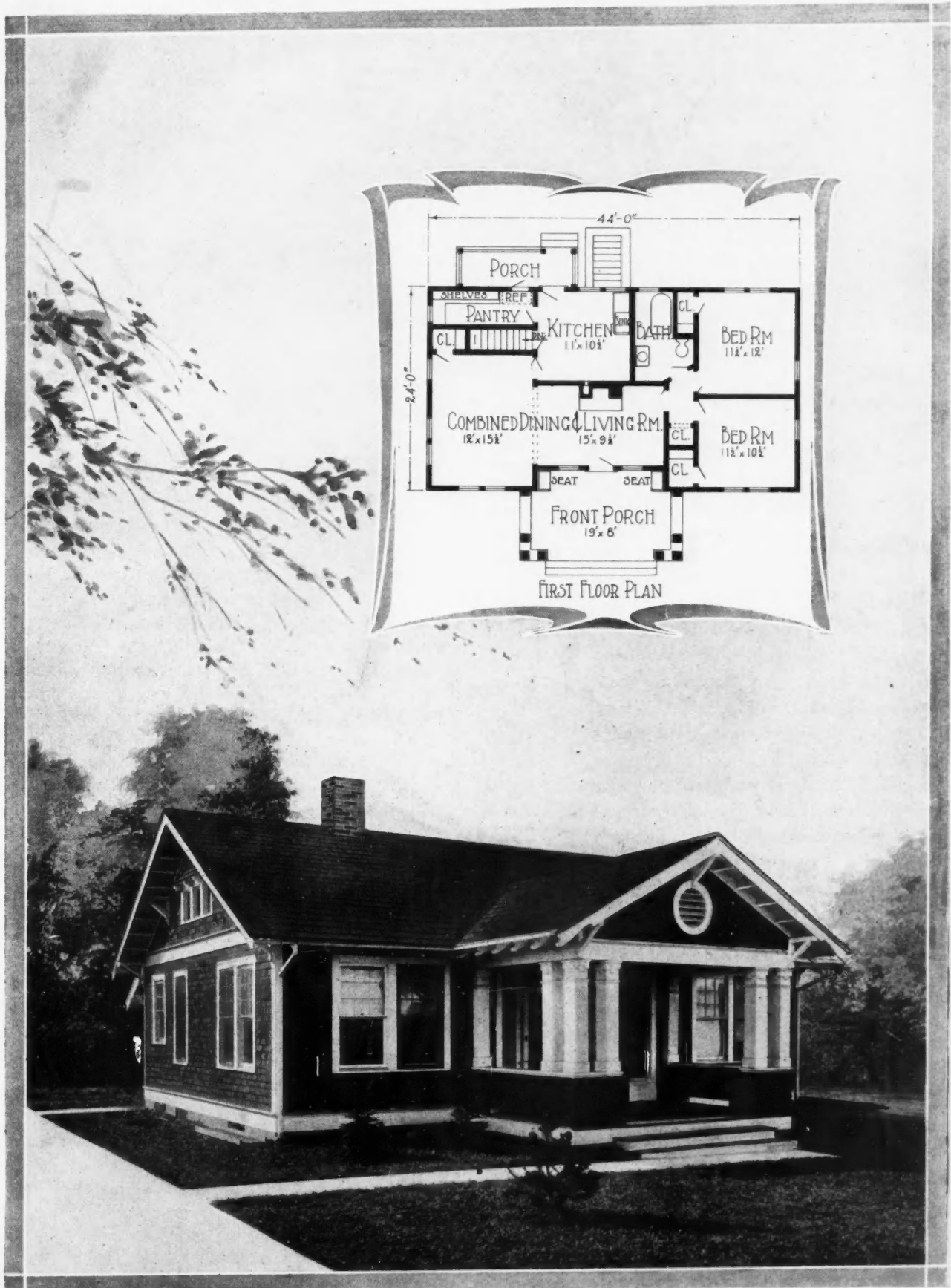




A PRACTICAL STUCCO RESIDENCE at Kenilworth, Ill., containing seven rooms, sun porch, pantry and bath. Size of main part is 26 by 29 feet; side porch projects 9 feet and the back porch pantry addition 6 feet. Covered with a hip roof and wide eaves this house is a typical example of good, modern architecture



Sun-parlor Dining Porch of a Modern Farmhouse in Tippecanoe County, Indiana. Here is the comfort which the hard working farmer and the farmer's wife so richly deserve.

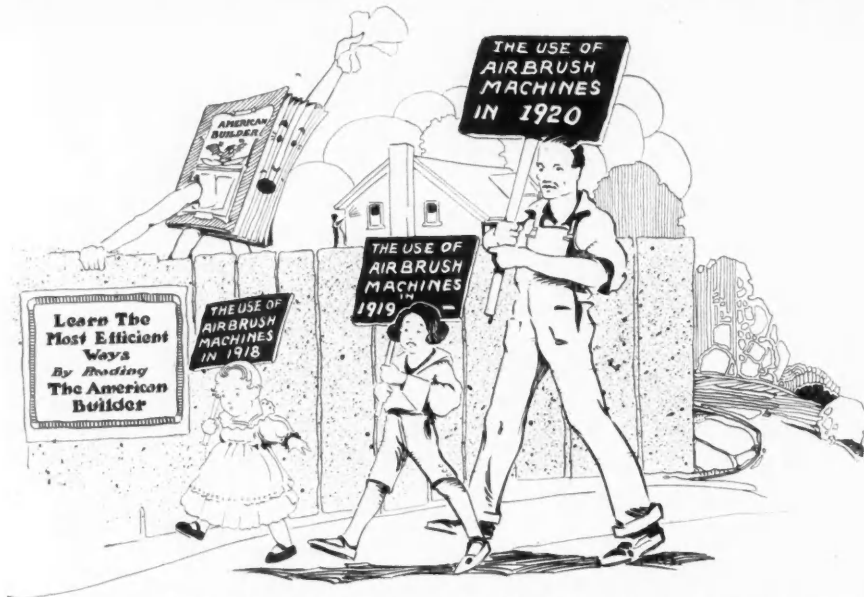


AN EASTERN BUNGALOW erected at East Liverpool, Ohio, Cassius M. Metsch, architect. While keeping the typical bungalow lines, this building is more snug and compact than its western cousin. The contrasty effect of dark stained shingles and white trim is striking. The floor plan works out in a most interesting way.

Sun-parlor Dining Porch of a Modern Farmhouse in Tippecanoe County, Indiana. Here is the comfort which the hard working farmer and the farmer's wife so richly deserve.

History and Air Brush Painting

"SHOOT IT!" EXPLODES THE GET-THERE PAINTING CONTRACTOR—AND A NEW INDUSTRY IS BORN



The Growth of This Industry as Forecasted by the Editor of the American Builder.

WHEN the Chinese saw the work of the sewing machine for the first time they said it was the devil's work. Don't smile at this, because many of our own people for years declared it wasn't practical when Elias Howe, in 1846, brought out the first successful sewing machine.

With the present-day demand on the needle, where would we be with the old hand-work plan?

Who would go back before the time of Eli Whitney's cotton gin?

In 1833 the advertisement of the reaper by Cyrus McCormick was a complete failure from a sales standpoint, because people had no confidence in it. Today 103 distributing centers are maintained in North America and tens of thousands find employment because the reaper is essential.

All of us remember the riots caused by the introduction of the spinning jenny. Civilization could not

be clothed today if it were not for its nimble steel fingers, and everyone in the industry is benefited.

Mergenthaler was refused the support of the union to which he belonged and to which he offered the Linotype that he invented. The earnings of the typesetter in the printing shop is in-

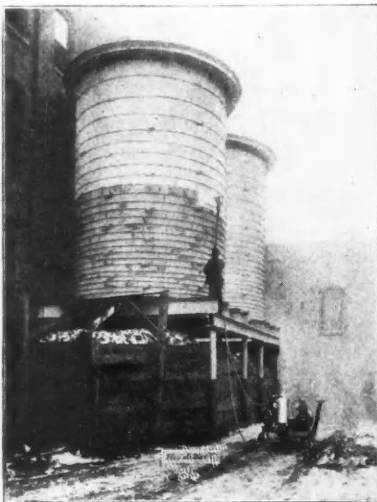
creased, not reduced, because of the Linotype.

It would take too much space to give the history of the use of paint and methods of applying.

Remember the Prediction

Our children and grandchildren will point to the year 1918 on the calendar of time as the date when the use of paint and preservative coatings was multiplied and the method of applying revolutionized by the AIR BRUSH MACHINE.

There will be many doubting Thomases. There will be many who say it can't be a success. There will be some so short-sighted as to waste energy in fighting it.



Most Economical System for Painting Inaccessible Places Easily Reached.



By the Use of This Portable Equipment, Paint Is Forced Thru the Tubing and Sprayed on the Wall by Compressed Air.

Those who do will be in the same position as the buffalo out in Kansas that tried to push one of the first Union Pacific trains off the track.

It is always more profitable to travel with Progress than to oppose her.

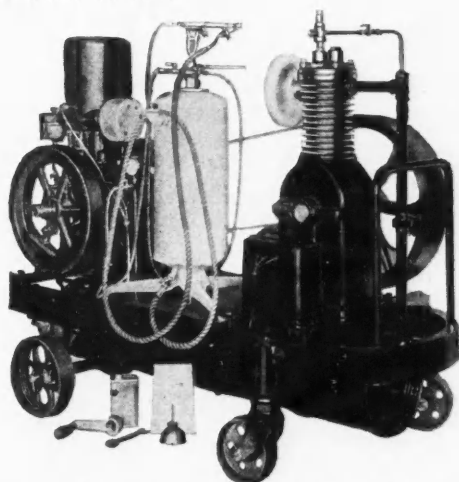
No Experiment

The air brush machine has been successfully used in thousands of factories in the most delicate of work in securing the finest of finish.

The experimental period of the air brush machine has been passed.

Air brush manufacturers have wisely deferred entering the field of interior and exterior house decorating until their product could be offered with full assurance of success.

It is not remarkable that a house can now be painted by air. It is remarkable that with the knowledge which we have had of the working of air this has not been done before.



A Compact Portable Painting Outfit Mounted on Iron Wheeled Truck.

All of us have watched the vacuum sweeper as it swallowed everything in its range. The air brush machine is merely the reversal of the vacuum sweeper.

It is merely nature controlled and guided by the hand of man.

The mere fact that the cost of painting can be reduced from 75 to 90 per cent doesn't mean that any painter need be out of a job, because there will be probably ten times the use of preservatives and beautifiers.

Celluloid Enamels

It is possible that many of our readers are not acquainted with the celluloid enamels. By reason of the fact that these enamels can be applied only by an air spray they are not used except in large plants equipped for



Complete Paint Gun Outfit Which, When Connected to a Suitable Compressed Air Supply by Heavy Tube Leading Off at Left, Will Spray Any Grade of Paint.

turning out the finest of furniture or metal fixtures.

The advent of the air spray will popularize this finish—which, by the way, is a story all its own.

And, moreover, the air spray will be in greater demand as the celluloid enamels grow in popularity.

To paint the farm house, the barn, the silo and the granary meant having a gang of six men to take care of for a week. Today a man and his helper, plus the air brush machine, will do it in two days, and do it better.

It is poor economy to leave unpainted buildings open to the ravages of the weather. There will now be no excuse for such unsightliness.

(Continued to page 126.)



This Outfit is Mounted on an Auto Trailer for Quick Service Onto the Job and Home Again.



Decide Early Regarding the Hardware

AND BE PARTICULAR ABOUT WHAT YOU SPECIFY AND USE. FOR THE BUILDERS' HARDWARE IS THE GAUGE OF THE QUALITY OF THE JOB

By W. R. Hill

Manager Builders' Hardware Sales, The Yale & Towne Mfg. Co.

"NEVER put off until tomorrow that which you can do today," seems to be particularly pertinent to builders' hardware.

With the best intentions in the world the average house builder waits until "the last call" before placing the order for hardware for his home. He is so busy attending to the multitudinous details of heating, lighting, papering, furniture, etc., that the item (too often considered of small importance) of hardware is overlooked until it is actually needed.

When serious thought is given to the fact that

on the sill, is it surprising that one criticises "all doors shall be hung on hinges 4 inches high"?

If the specification reads, "good locks," who shall judge what a "good lock" is? Will such a specification obtain locks that will provide adequate security and give good service for twenty years or more? We all know it will not. Yet that is what locks are not only expected to do but should do.

Again, glass knobs are the fashion. They are the style not only in good houses, but in "mahogany finished" flats. A specification that simply calls for glass

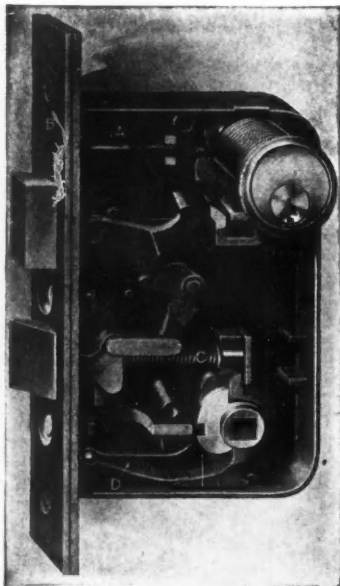
knobs is just as likely to bring knobs with iron shanks "scalped" with sheet brass and with stamped roses. It is obvious which is preferable and more durable.

Like all materials, the most popular articles of hardware are copied and cheapened by those who sell "at a price" to those who look at price only, until it requires care, judgment and

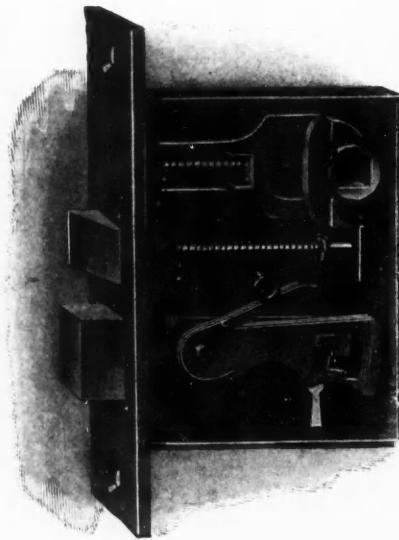
above all selection from a well-known manufacturer to obtain strong, secure and durable hardware.

Another old adage which is true in all materials is "a laborer is worthy of his hire."

That which is cheapest can-



The Interior of a Cylinder Front Door Lock.



The Interior of a Lever Tumbler Suitable for Inside Doors.

correct fastenings for the double hung windows and the casement sash means keeping out not only the sneak thief but the insidious fingers of Mr. Jack Frost or old Mr. North Wind, one wonders at the careless specification "proper window fasts shall be provided."

When one knows that poorly made hinges not only squeak in a manner that will set one's nerves on edge, but will also allow the door in due time to let down



A Colonial Escutcheon and Knob of Unusually Graceful Lines and Simple Mouldings.



A Front Door Handle with Thumb Latch Suitable for Colonial or Craftsman.

A Front Door Handle with Thumb Latch for Use with a Cylinder Front Door Lock with Smoothly Modeled Lines, Forming a Well Harmonized Set.

The Grip of This Cylinder Front Door Set Fits the Hand Very Comfortably. It is a reproduction of a Handle Taken from a Very Old Colonial House.



The Knob Shown Above is of Heavy Cast Brass and When Applied Conceals the Screws Used in Application. It is a reproduction of the Early Colonial Knobs.

not always be best, is a good rule to follow in hardware. Hardware differs in many ways from other materials.

- 1st. The mechanical design of the locks must be right (see illustrations) to insure security, durability and smooth working at all times.
- 2nd. A well-known manufacturer will have shop methods, such as designs, materials, gauges, tools and inspection which produce these, which a cheap manufacturer cannot afford to have. This is true for the same reason that some builders do not care what materials they use as long as they can finish and get paid.
- 3rd. These things cannot be carried out except with long practice, experience and attendant expense, but they repay two-fold in satisfactory service.

Too much stress cannot be laid upon the necessity of knowing beyond question that well made locks are furnished. The owner and architect should, at the beginning of the plans, make a careful selection, ascertain the cost and cover it by an allowance clause in

the specification (given at the end of this article).

The selection should be noted by the architect so that reference can be made to it if necessary. Just as a selection of the architect cannot be made by the commission he charges, neither can the selection of hardware be successfully made thru the medium of price. The selection of an architect is made on ability and faith in his knowledge. The selection of the hardware firm to execute the contract for hardware should be made with full knowledge and appreciation of its ability, experience and reputation, as it is impossible for either an architect or owner to judge values in hardware without careful and actual comparison.

American architecture is constantly changing for the better, and the same is true of hardware. Many beautiful forms are obtainable at very reasonable prices from the leading manufacturers' hardware representatives. Some of those made for use in Colonial homes are shown in the illustrations. They are in thoroly good taste and equally obtainable and

Altho the demand for hardware simulating in proper for medium priced as well as expensive homes. finish pieces that have been in use for a long time has compelled the manufacturer to electro-plate brass, bronze or iron and steel so that is difficult to detect the difference without using a magnet, it is always best to use genuine metal, never an imitation. If the metal is to be brass, see that it is brass; if bronze, then see that it is bronze, not brass or bronze plated or iron or steel. If iron or steel is desired choose designs that are suitable to these metals, and allow the iron or steel to frankly show—do not use an imitation.



The English Use Door Knockers on Their Guest Doors (Possibly to Save Their Knuckles). The Knocker Shown Above Measures 4 inches by 1 11/16 inches over all and is of very graceful lines.

There are many beautiful pieces in wrought iron, which are suitable for certain conditions; for instance, on the old-fashioned Dutch door. A Dutch door can be trimmed with wrought iron hardware attractively and appropriately; and in many other instances also iron is perfectly proper. But bronze or brass plated iron and bronze or brass plated steel are not only imitations, but they are so unsatisfactory in service that they are never worth while purchasing. Like almost everything else and on the same principle that one rotten apple will spoil the whole barrel, just so it is with locks that have iron or steel knobs and escutcheons packed with them. The locks are never worth anything for security and their life is short. Sooner or later the latch bolt refuses to work and



This is a Reproduction of a Very Beautiful Colonial Guest Room Knocker Measuring 2 3/4 by 1 3/4 inches; a Reproduction From a Very Old, Early Colonial House.

(Continued to page 142.)

Determining the Capacity of the Storage Battery

The Third of a Series of Three Articles by this Author on Farm Electric Lighting

Note: Sam's embarrassing experience in figuring out the electric lighting equipment for the Judge's new house, as narrated in the March American Builder, has given other builders as well as Sam, the hunch to study into this farm electrical plant proposition. The following article and the one presented last month get right down to the technic of the matter. Study them.—Editor.

THE sizes of the engine and generator will depend upon the current required. The strength of current will in turn depend upon the total candle-power which is in mind and upon the character of the lights. The carbon filament light is going out of general use, the tungsten filament lamp is taking its place. The electrical energy required per candle-power for carbon lamps is 3.50 watts; for tungsten

lamps, 1.25 watts. There is, accordingly, an enormous difference in the economy of operation. Other superiorities claimed are: a whiter and superior light, longer life, longer life at rated candle-power, etc. The first cost is greater, but this disadvantage is swallowed up in the advantages.

With a 32-volt system, the ampere strengths required for tungsten lamps are as follows:

32-Volt Current—Tungsten Lamps		
Candle-power	Watts	Amperes
8	10	0.313
12	15	0.469
16	20	0.625
20	25	0.781

The amperage numbers are obtained by dividing the number of watts by the number of volts, in accordance with the rule that amperes multiplied by volts give watts. Thus, the amperage required for a 12-candle-power lamp is found by dividing 15 by 32.

With the 110-volt system we have similarly:

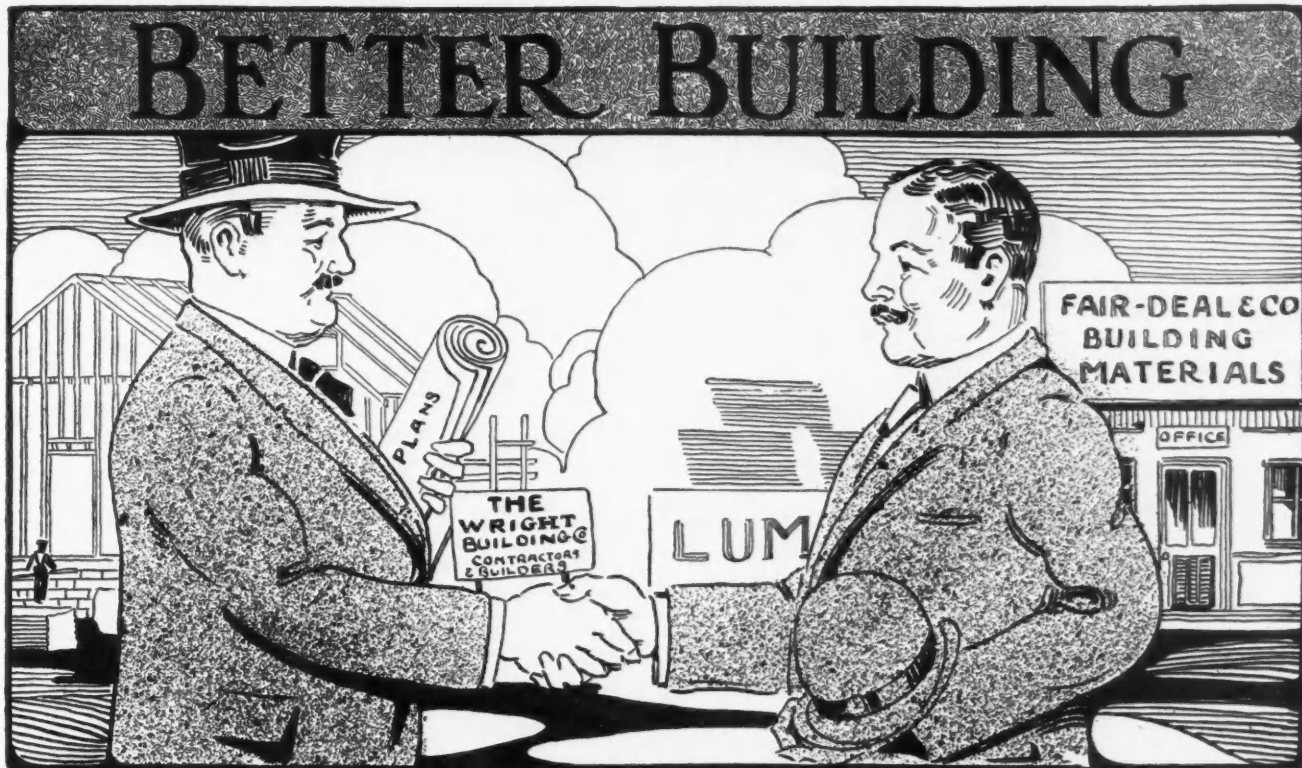
110-Volt Current—Tungsten Lamps		
Candle-power	Watts	Amperes
8	10	0.091
12	15	0.136
16	20	0.181
20	25	0.227
32	40	0.364
40	50	0.455
48	60	0.545
80	100	0.909

Having settled on the *total candle-power* and on the *voltage*, we are prepared to calculate the amperage of the battery. The following example will illustrate how to proceed. Suppose we take the case where we estimate for a mid-winter day that we will use twenty 16-candle-power lamps from 5 to 10 p.m.; two 8-candle-power lamps from 10 p.m. to 6 a.m.; and six 16-candle-power lamps from 6 a.m. to 8 a.m. It is assumed that all the current for this work will come from the battery without assistance from the generator. The total working time of the battery is from 5 p.m. to 8 a.m.—that is, 15 hours. We must, first of all, select a battery that will certainly take care of the heavy work from 5 to 10 p.m., during which period of 5 hours the

(Continued to page 154.)



Comfortable Farm Home Porch in Illinois.



How You Can Sell More Asphalt Shingles

A WORKABLE RE-ROOFING PLAN FOR DEALERS

ON every residence street in your town are houses that need re-roofing. You can re-roof them, and can derive a profit from the materials and labor. All you need is a systematic method of going after the business—and a satisfactory way to handle it—in order to sign it up definitely as yours.

Opportunity for re-roofing is constant. It is limited by the age and number of buildings—by their roof condition. It is not limited by general economic conditions, as new building sometimes is. When a roof wears out a new one has to go on, or the house cannot be lived in.

It will pay you to go after this business energetically. Ally yourself with an experienced roofer who can estimate labor costs and oversee the application. Make him responsible for the quality of work. He may be free for other occupations when not actually engaged in application work. Probably your arrangement will allow him to charge you with a "per square" labor cost, no matter how many men he may hire, or at what figure.

You probably will find it best to set standard figures for the two general classes of re-roofing — (1) directly

over old shingles, and (2) removing old shingles and covering anew. To these standard figures can be added special charges for complicated work. Probably the best way to bid is to submit a lump sum or a "per square" figure for the roof completed.

We reproduce an "Estimate Sheet" that is designed to cover all details of estimating, but its form can be modified to suit your requirements. The amount you set for labor may include a profit for you—or may not—but materials should always be charged to the job at regular selling prices.

(Continued to page 130.)



Residence of Maj. F. B. Barrett; Riverside Drive, Red Bank, New Jersey. Covered With 50 Squares Wide Space Asphalt Shingles Laid Over Old Wood Shingles.

Farm Buildings To Aid Food Production



Lightning Protection Now Doubly Important

BUILDERS AND OWNERS SHOULD ACT PROMPTLY TO SAVE ALL BUILDING PROPERTY FROM LIGHTNING

IF there was ever a time when it is to the interest of the farmer to fully protect every building he possesses from the destructiveness of lightning, it is this year.

The high prices of grain, live stock and all other farm products make protection imperative, to say nothing about the patriotic impulse that should prompt us all to preserve from destruction the foodstuffs that are so badly needed by our country and our allies.

Another important reason for protection is that it will cost less this year to protect your property from lightning than it has ever before, if you consider the increase in the value of the building to be protected. True, good lightning protection has increased in cost, but not nearly to the extent that the value of your building has increased, and the loss would be if you were required to suddenly replace them.

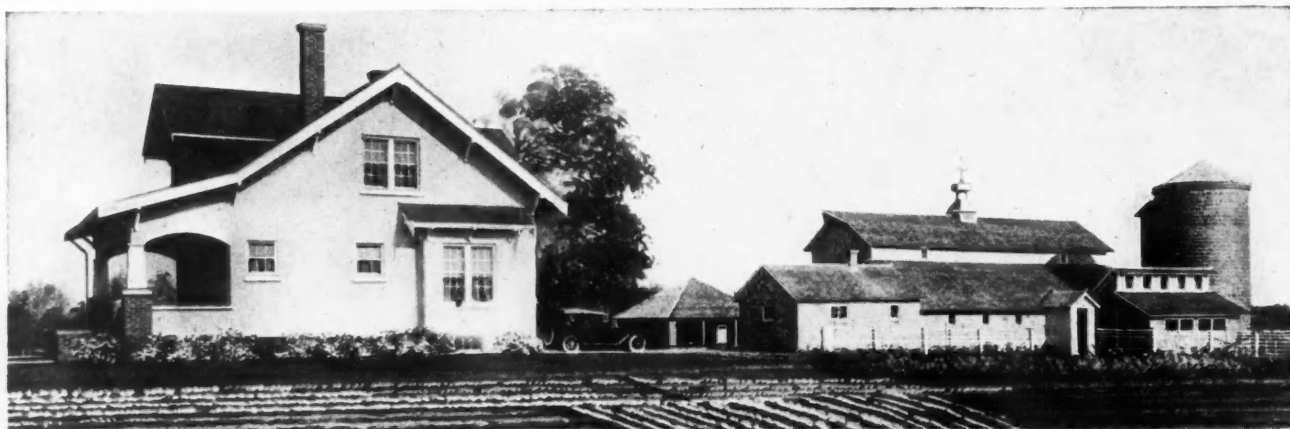
Why Lightning Strikes a Building

As a storm cloud approaches any particular spot on the earth, an attraction sets up between the electricity in the cloud and that in the earth. In simple terms, they tend to "draw" each other. The reason they do not immediately meet is because dry air is a poor

conductor, and the electric force cannot readily pass thru it.

Remember that there is always a great strain between the storm cloud and the earth. The electricity of the cloud is pressing downward; the electricity of the earth is pressing upward. The two forms of electricity are straining against the air between to reach each other. If the air can hold them apart, there will be no stroke, but if they break thru they will meet with a crash and a flash that we call the lightning stroke.

If there is a house just below the cloud, the attraction of the electricity in the cloud, drawing upward on the electricity in the earth, tends to literally "charge" the house with electricity. Therefore, if the electric force should at that moment break thru the air, the building, being directly in line and heavily charged with electricity, would probably be destroyed or damaged by the explosion and set on fire by the heat. In passing thru the building, the electric current would take the shortest and easiest route to the ground, and in the absence of conductors, this might lead down the stove pipe or kitchen water pipe or gas

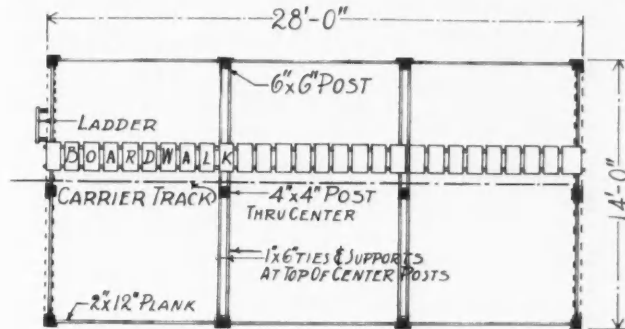


A FIRE-RESISTING FARMSTEAD—Every Building on the place being of Hollow Tile, the farm house stuccoed over, the barns vitrified smooth finish. Farm of Mr. J. B. Schermerhorn, near Mason City, Iowa.

main, and a person standing near any of these routes would probably be killed.

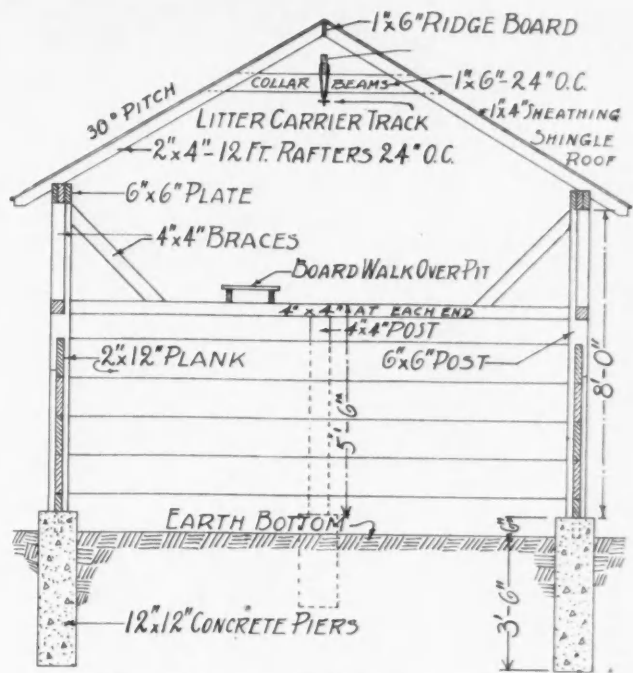
Proper conductors permit the electricity of the earth to pass gradually into the atmosphere above the building as it is attracted by the electricity of the cloud. There is no "bunching up" of electricity in the building.

In this case, the building, not being charged with electricity, will not receive the stroke, or be in the path of the electric current, which will find its route



PLAN OF MANURE PIT

How to Build the Covered Manure Pit Illustrated Below.

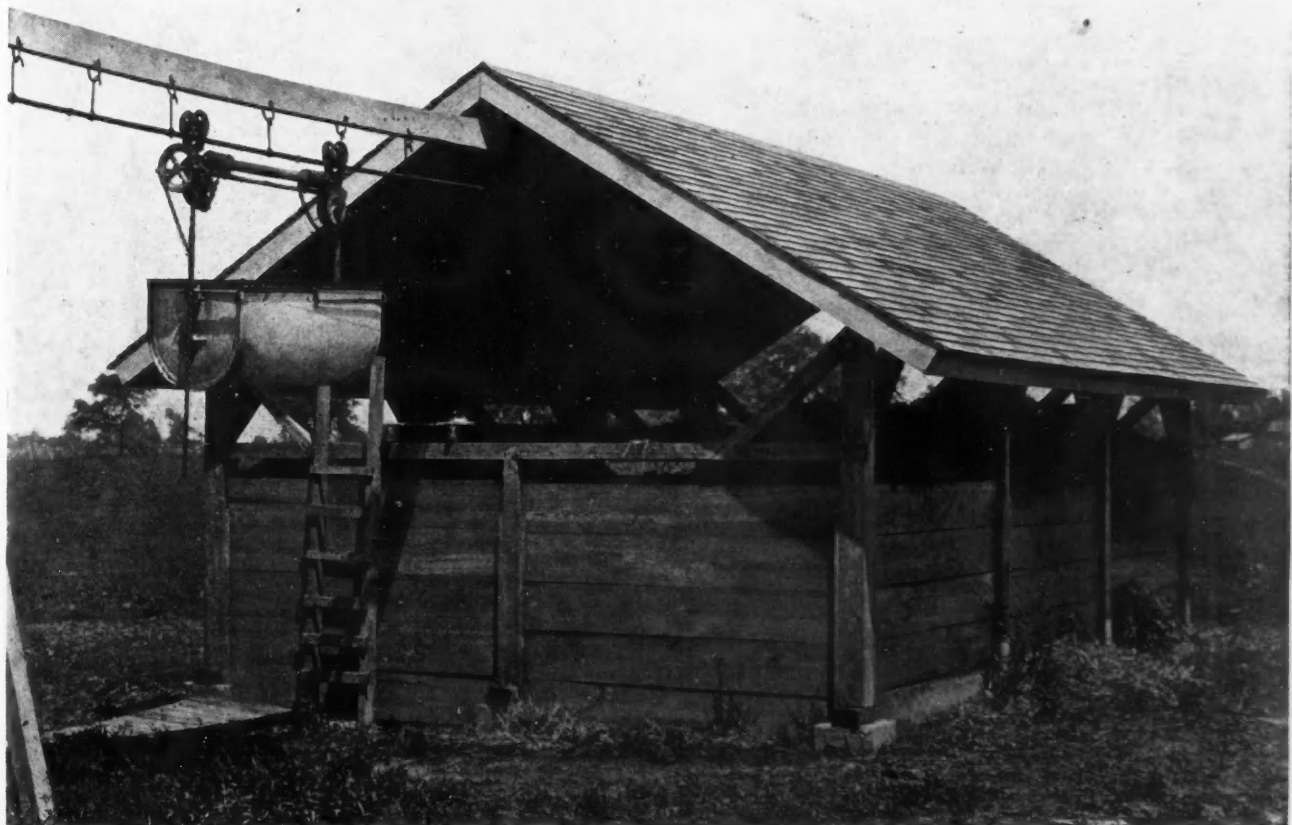


CROSS SECTION OF MANURE PIT

thru some nearby electrically charged elevation, or the discharge may merely take place in the air.

All buildings made of wood, stone or brick should always be protected by lightning conductors. These materials are not good conductors of electricity; they

offer resistance to electric transmission. Remember, the lightning stroke always occurs where the electricity has been impeded or obstructed—when it breaks thru, that is the stroke. If you equip your building with proper conductors, and therefore prevent the elec-



COVERED MANURE PIT of Simple Construction and Low Cost. Stable Manure Should Be Protected from the Rain, Otherwise its Most Valuable Fertilizing Components Are Leached Out. Save the Nitrates this Year and Get Them Out Onto the Land Where They Will Help Raise a Bumper Crop.



Equip Every Hay Shed with Horse Fork and Hay Carrier Track to Save Valuable Time and Labor at Haying Season.

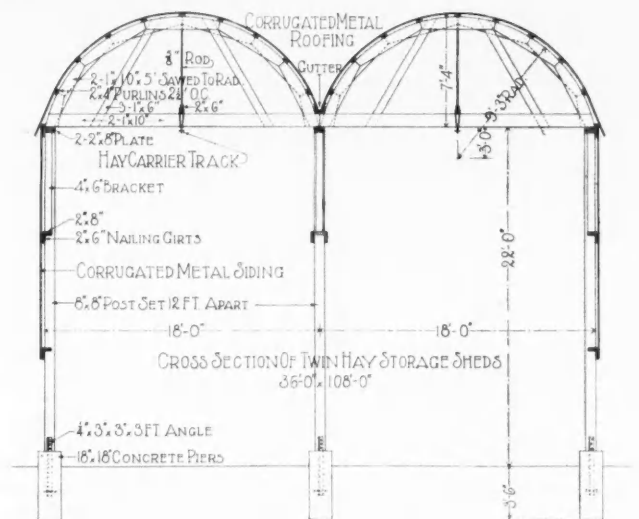
tricity from becoming impeded or obstructed, you need never fear lightning.

However, in order to protect a building from lightning, it is not only necessary to have a conductor of high quality, carefully manufactured, in accordance with modern scientific research, but it is highly important that it be properly applied by a man who understands the principles of lightning control. All interior and exterior metal work, such as heating plants, water systems, etc., should be connected to the electrical conductors.

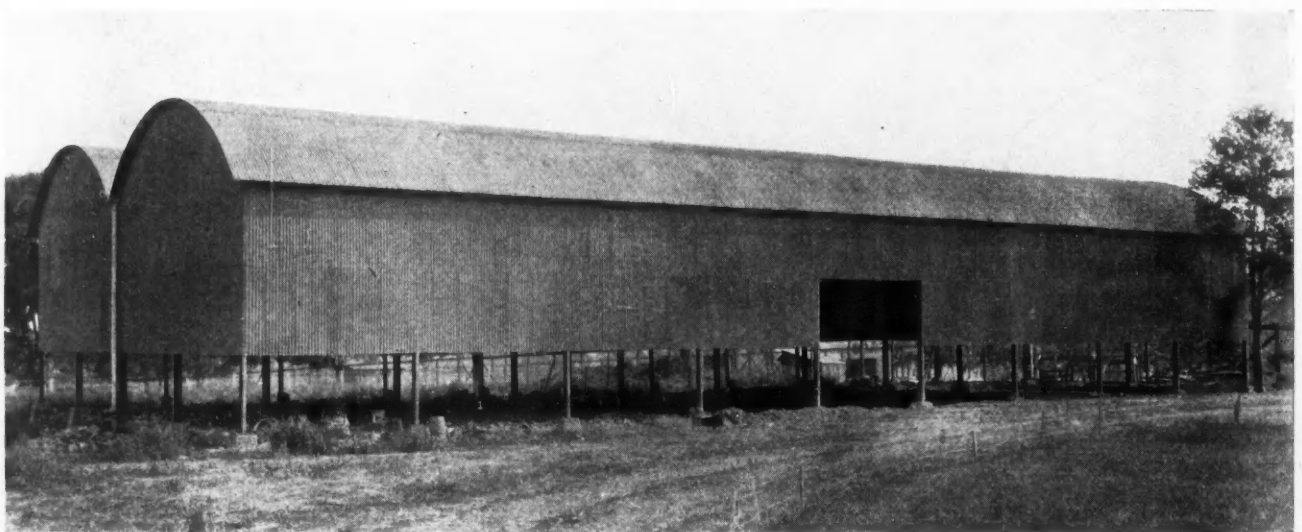
The United States government says: "Even if one is expert at the mechanical work involved, and the job apparently is simple, it generally will be preferable to secure the services of a professional. To plan and execute properly an installation requires an accu-

rate and experienced knowledge of the subject." Builders should study into this subject and become expert at lightning protection, since it is a logical part of building operations and the builder is the proper man to take care of it. Many are acting as installing agents for reputable concerns.

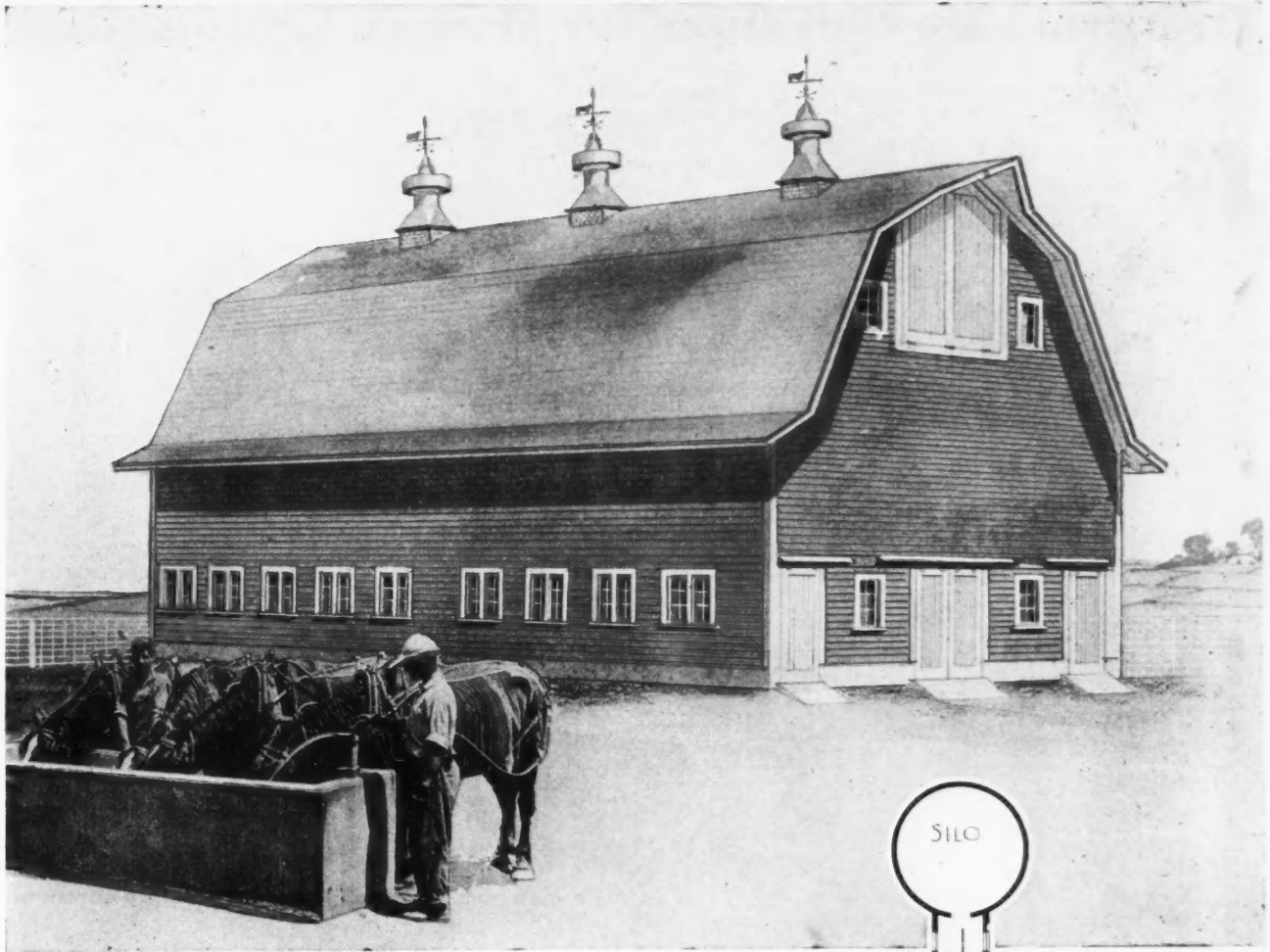
What you want is protection from lightning. There is no use having rods put upon your building unless they are the right kind and are properly put on—and you want to know that they are on right. Then you can forget all about lightning dangers and read your paper while the storm rages outside.



Section Thru Twin Hay Sheds Roofed and Sided with Corrugated Iron as Illustrated Below.



TWIN HAY SHEDS Roofed and Sided with Corrugated Iron. Size 36 by 108 Feet, 22 Feet High from Ground to Cross-tie, Which Carries the Hay Track. DON'T Stack Hay in the Open. A Shelter Like this is Quickly and Cheaply Built and Will House a Big Crop of Valuable Hay.

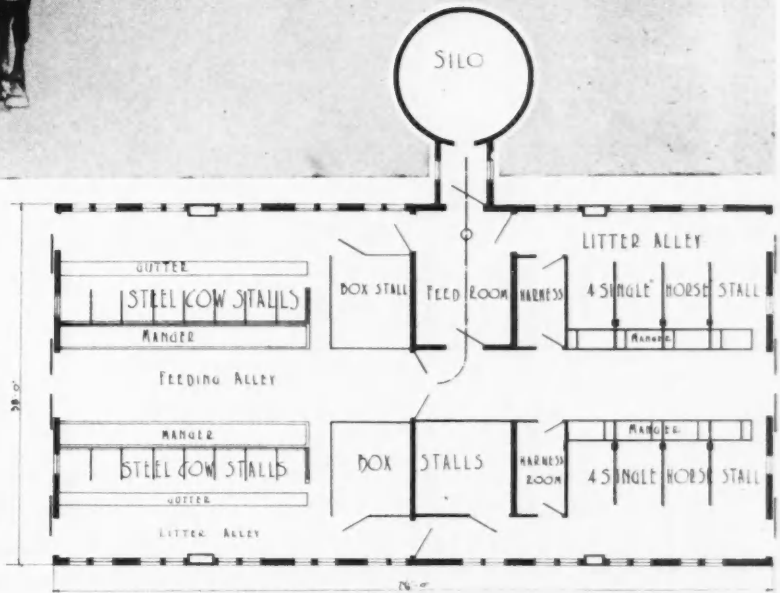


Gambrel Roof Combination Horse and Cow Barn. Size 38 by 76 Feet.

A Combination Barn and a Poultry House

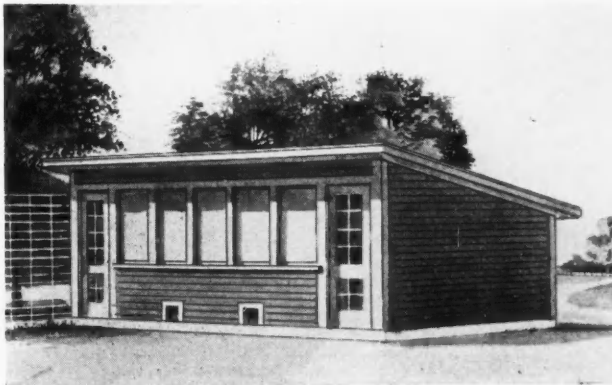
This is a barn of exceptionally fine appearance and will give to any farm an air of worth and prosperity that should be taken into account when figuring the cost.

Combination barns are held in high regard by some and in low esteem by others. This is an excellent example of its kind and has many advantages to recommend it. Attention is directed to the arrangements for handling the silage and the litter from both sections.

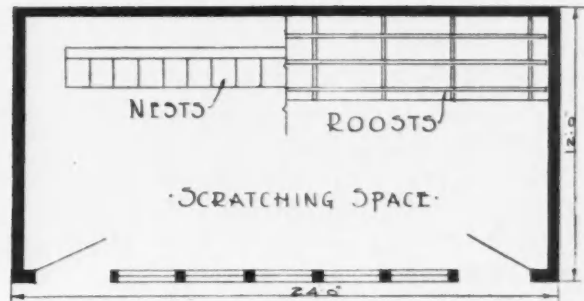


Arrangement of Combination Horse and Cow Barn.

In the poultry house the use of the popular muslin windows is indicated. The brood is worthy of consideration and provision should be made for its comfort and well being.



An Inexpensive Poultry House. Size 12 by 24 Feet.



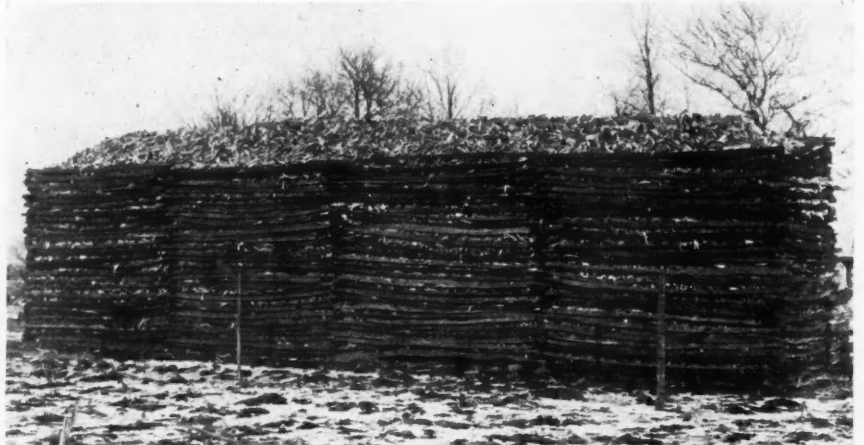
Arrangement of Poultry House.

Built-in Cup Elevators for Modern Corn Cribs

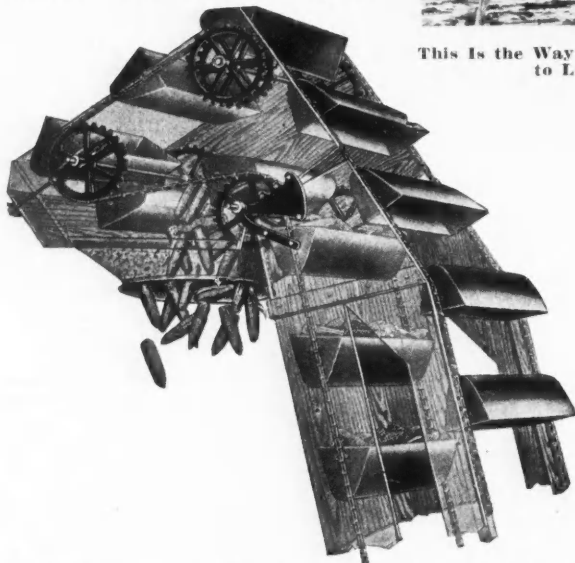
DETAILS OF THE SEVERAL TYPES OF MACHINERY EQUIPMENT IN USE IN MODERN TWO-STORY CORN CRIBS AND GRANARIES AND WHICH EVERY BUILDER SHOULD FIGURE ON BEFORE STARTING TO BUILD

THE rural builder has to be a good deal of a farmer. At least if he serves his clients as well as he ought he must understand their problems, and be wise to the best approved ideas for planning, building and equipping farm buildings in a way that will be best considering the uses the farmer will put them to.

In the Corn Belt the high corn crib and granary is the thing today. It makes use of a built-in cup ele-



This is the way NOT to build a corn crib. It's a crime this year or any other year to let food crops go to waste for the lack of proper housing.

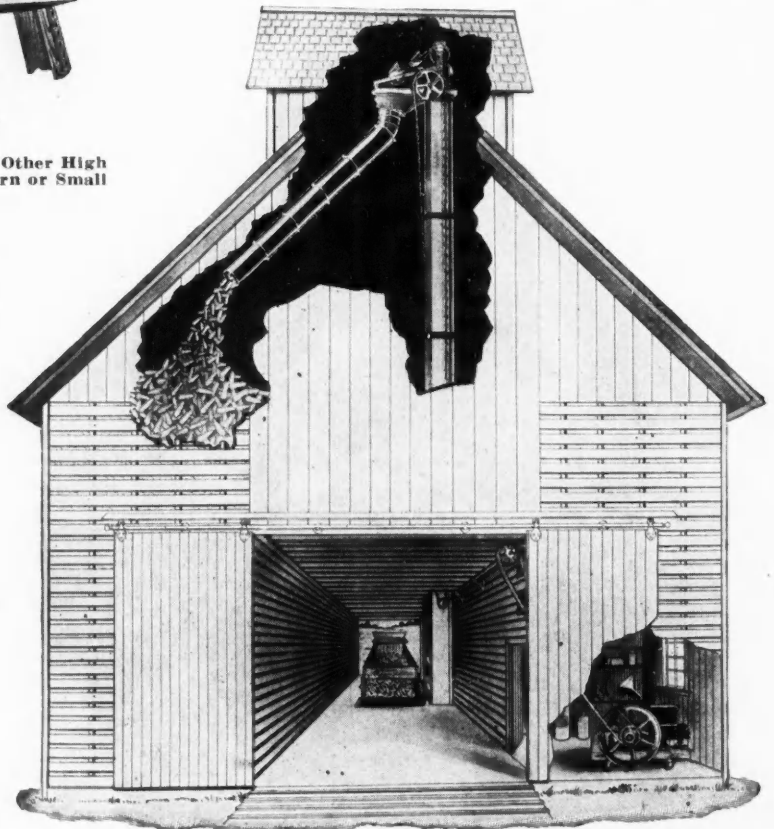


The head of the bucket elevator is in the cupola or other high point of the crib. Carried up to this point the ear corn or small grain is chuted into the various bins.

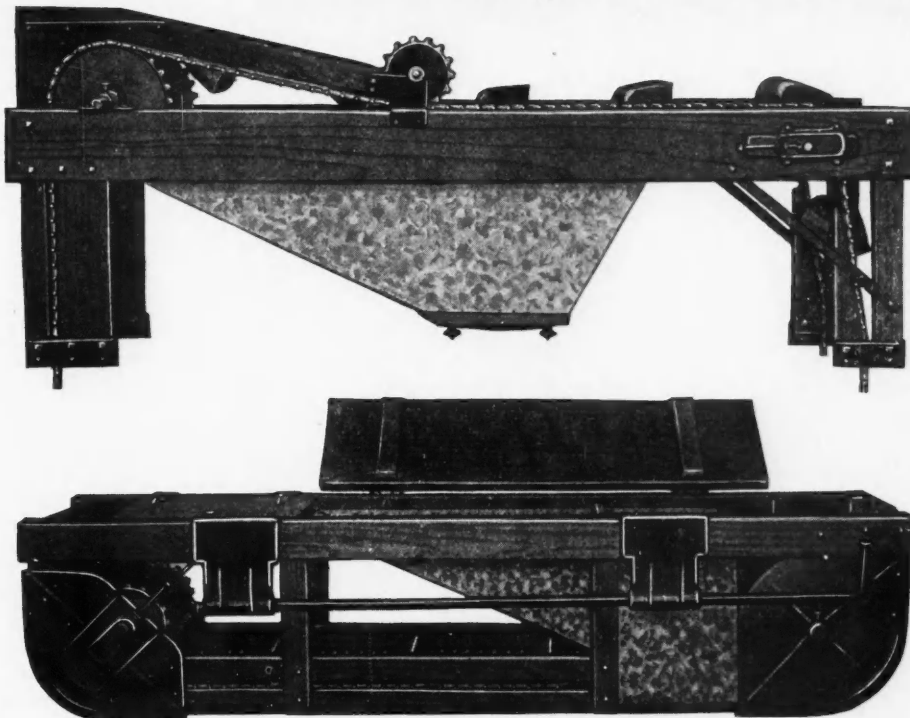
vator to raise the ear corn and the small grains up into the high part of the crib, where it is then distributed by gravity to the various bins. No more scoopshovel work for the busy Corn Belt farmer. There is too much of his corn to shovel it by hand, and the old fashioned low corn cribs wouldn't give them nearly enough capacity. The answer is the high corn crib with power elevating equipment.

There are a number of these mechanical elevators on the market. While essentially alike in their working, each has its special talking points, and its differences of construction, dimensions, etc., which have a bearing on the installation of the outfit in the building. It is very important for the rural builder to understand these differences, and whatever elevator is decided on he should lay out and build his structure *right* for that particular outfit.

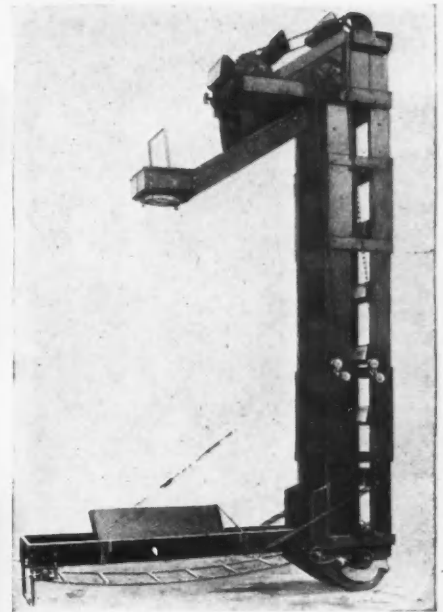
Fortunately, practically every manufacturer of granary equipment has gotten out working drawings, which show clearly how their outfit is installed and what dimensions are required. Some have gone further, and have prepared complete corn crib plans. All of these are interesting and instructive, as they show recommended practice for the framing of a high corn crib, and that is important, because of



General view of modern corn crib with parts cut away to show gas engine operating line shaft, load of corn being dumped at foot of elevator in driveway, from where it is elevated to the cupola and distributed to the bins.



The Dump or Boot Located Below the Driveway Floor, and the Corresponding Elevator Head up Above, Employed in the Type of Elevator in Which the Bucket Chain Goes up on one Side of the Drive, Crosses Over, and Comes Down on the Other.



Cup Elevator Assembled Ready to be Built Into the Crib by the Carpenter. No Pit Is Needed for This Style Dump. The Boot Folds up Out of the Way for Driving Thru.

the heavy weight of grain that it will have to carry.

The manufacturers are glad to send all such information to rural builders, as they want them to be entirely familiar with modern crib equipment, its installation, and its uses.

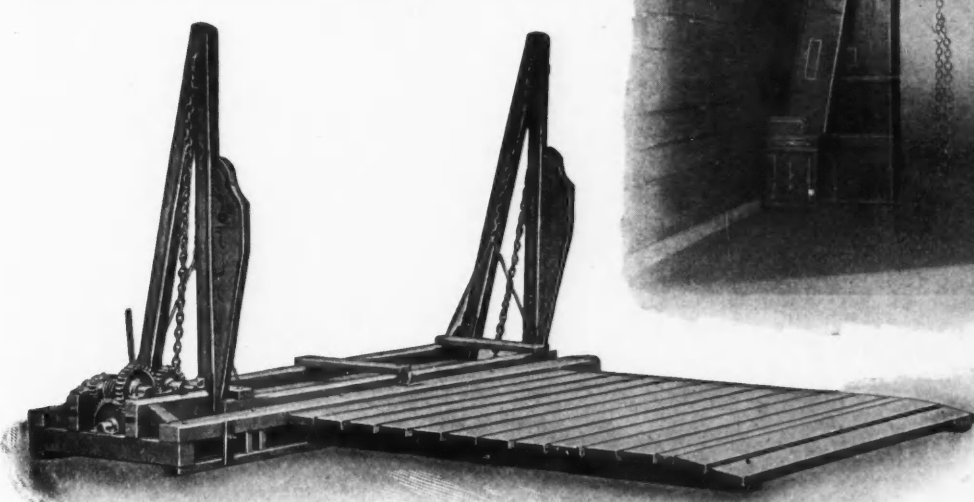
Bear in mind that farmers without an elevator have to pay one and one-half to three cents more a bushel for husking, because where there is an elevator on the farm, workers can pick ten to twenty bushels more a day. That's why many won't husk at all if the farmer hasn't an elevator.

To be able to pick from fifteen to twenty per cent more corn in a day on account of having the elevator is important to the farmer. Farm elevators not only save a lot of hard work and high wages, but they do the work better. They put the grain up

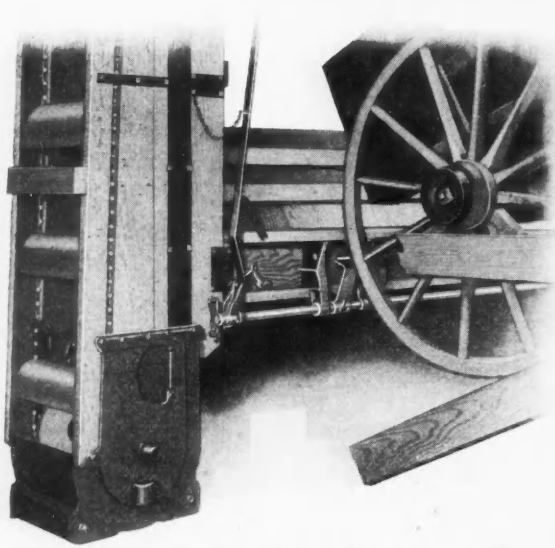
into the farthest corner and highest nook in the building, thereby using every foot of bin space. They save time and labor when most precious.



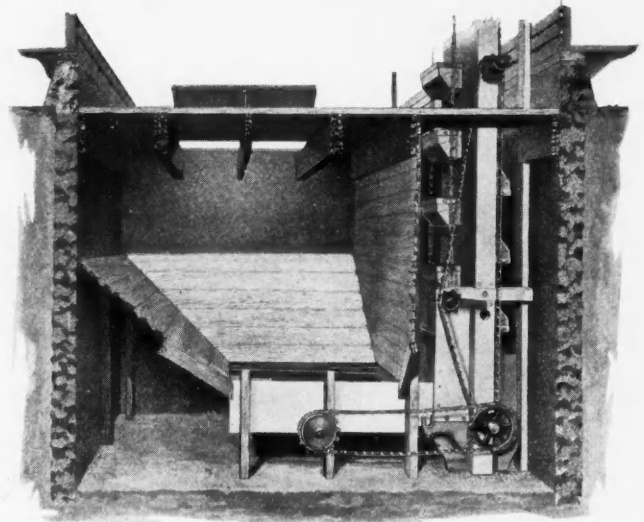
View Looking Thru Driveway, Showing Boot Folded up Out of the Way, and Hoisting Chains Let Down from the Ceiling to Slip Over the Front Wheel Hubs to Tilt the Wagon. Either the Platform Jack or the Ceiling Jack is Operated by the Same Power That Runs the Cup Elevator.



Platform Wagon Jack to Raise the Front End of the Wagon for Dumping. The Wagon Has to be Tilted, and There Are Two Ways of Doing This. Either Raise the Front Wheels with a Jack, or Lower the Rear Wheels Into a Pit.



Gravity Wagon Dump Sunk Below the Driveway Floor. When Ready to Dump the Wagon the Operator Pulls the Lever, Which Permits the Rear Ends of the 6 by 8-Inch Dump Timbers to Sink Slowly Down, and the Wagon Empties Itself. When Unloaded and the Wagon Pulled Forward, the Dump Timbers Rise and Are Automatically Locked in Position.



Some Prefer a Large Pit Underneath the Driveway Floor Into Which an Entire Load Can be Dumped at one Time. The Drag Chain and Buckets Operate in the Customary Manner.

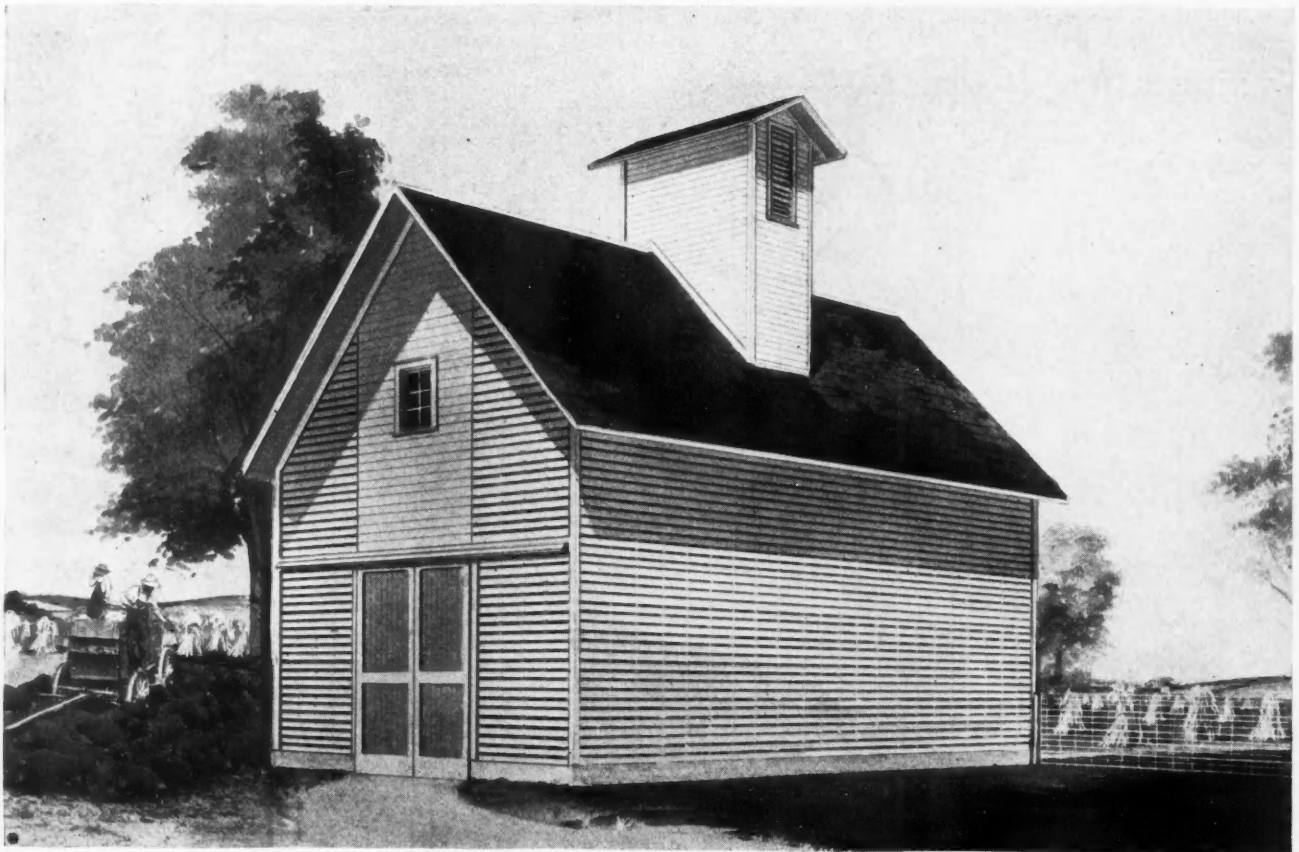
Blue Prints of Modern Crib

THE supplement plans immediately following show fully the construction of a modern two-story corn crib and granary. The dimensions are 45 by 26 feet, side walls using 18-foot studs. The 26-foot width gives two cribs 8 feet wide, separated by a 10-foot driveway. These cribs for ear corn extend clear up to the roof. The grain bins are over the driveway and are provided with hopper bottoms. Gravity

empties these bins when the farmer opens the grain spout.

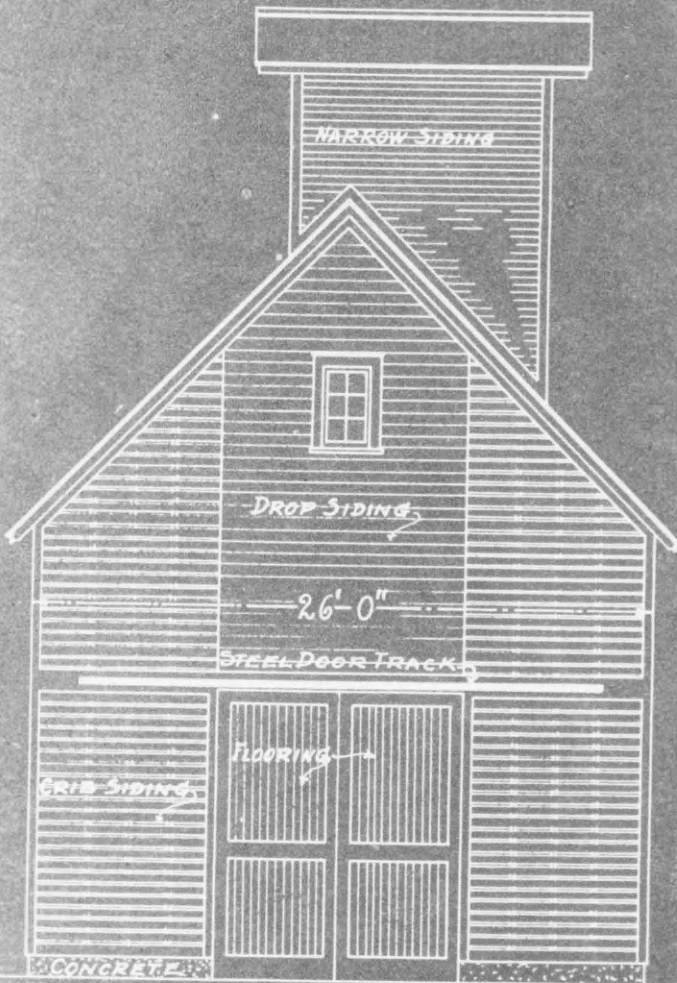
The cup elevator in this design is at one side of the driveway in the crib space. This permits a narrower driveway, which more than makes up for the loss in bin space.

The position and dimensions of the cupola will depend on the particular make of elevator that is to be installed. Consult the manufacturers' catalogs for these sizes before building from these plans.

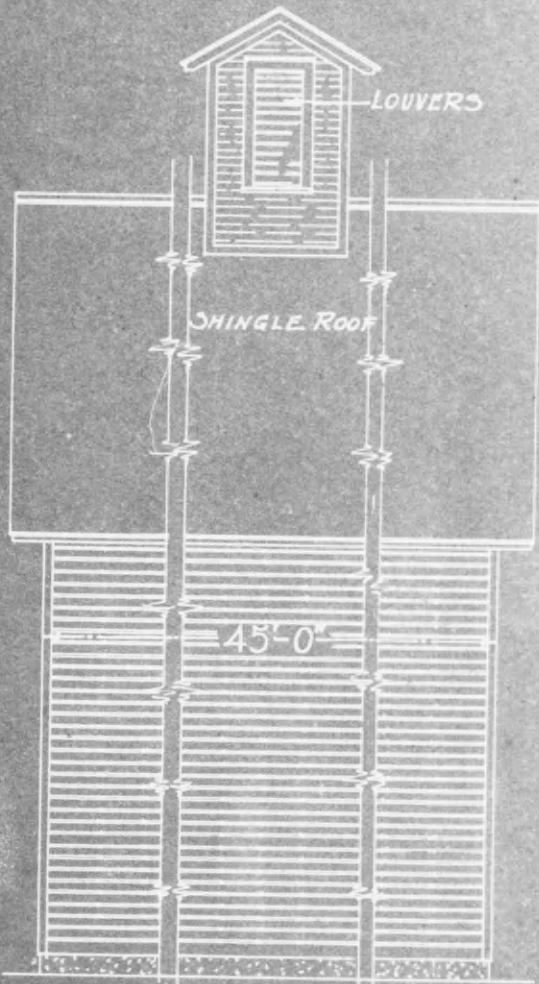


Exterior Photographic Perspective of Modern High Corn Crib and Granary. Complete Blueprinted Working Plans of Which Are Presented in the Supplement Immediately Following. These Plans Were All Drawn to Scale of $\frac{1}{4}$ Inch Equals One Foot.

AMERICAN BUILDER FARM BUILDINGS



END ELEVATION

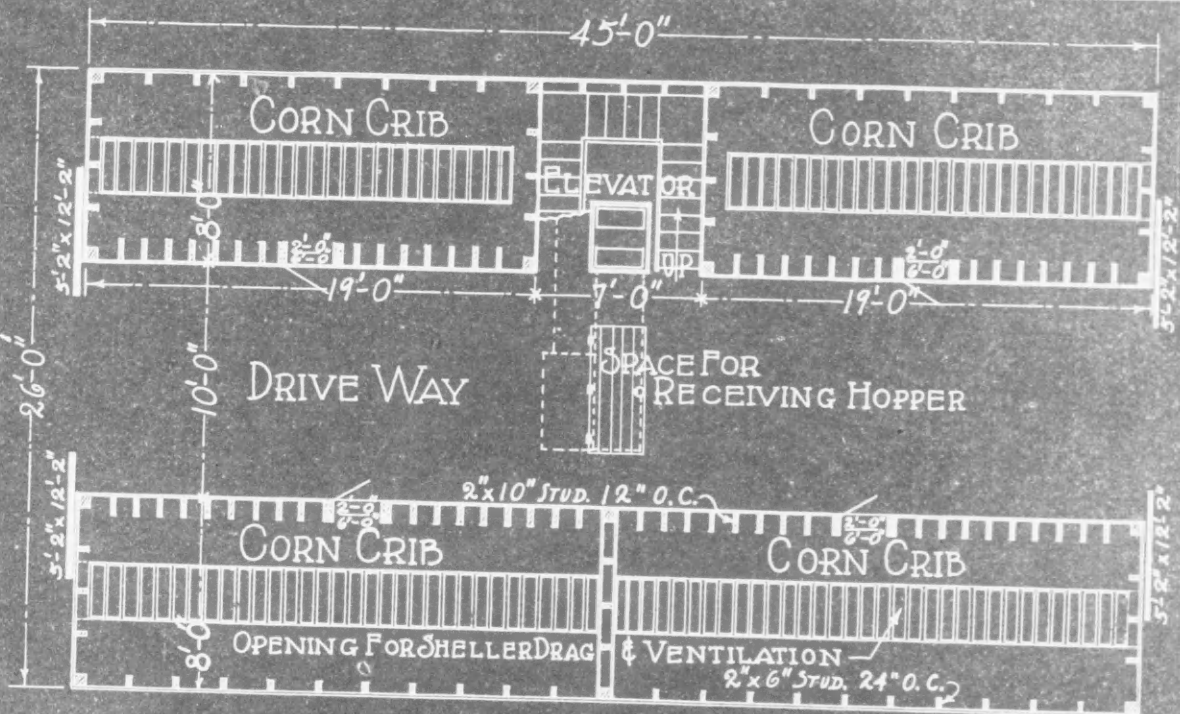


SIDE ELEVATION

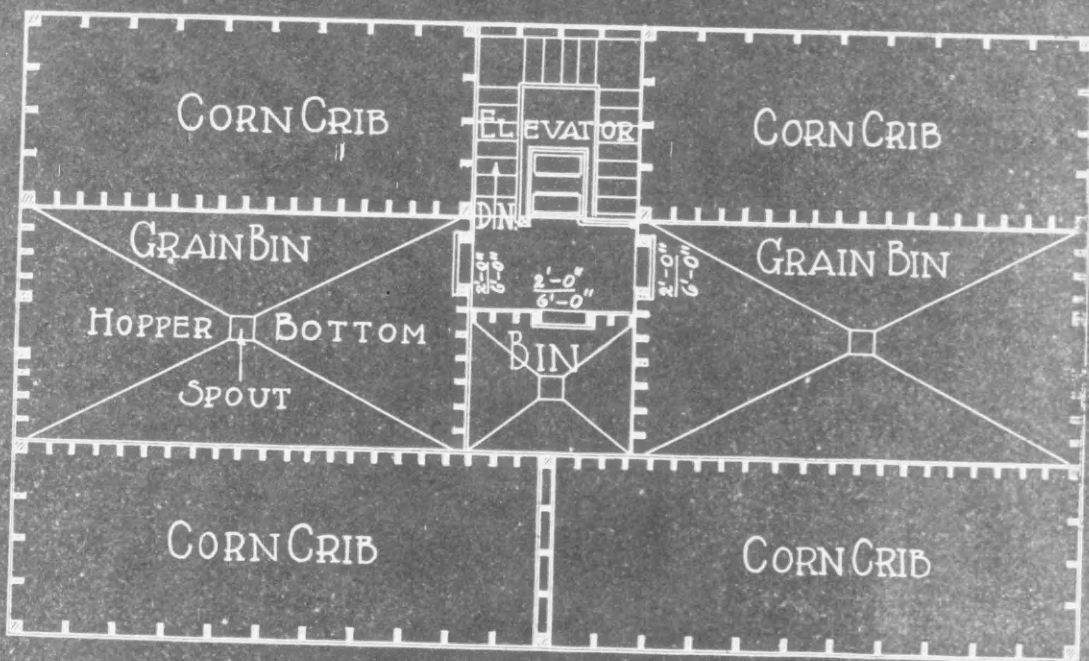
SCALE $\frac{1}{8}$ " = 1'-0"

PERSPECTIVE AND ELEVATIONS OF A MODERN CORN CRIB

AMERICAN BUILDER FARM BUILDINGS



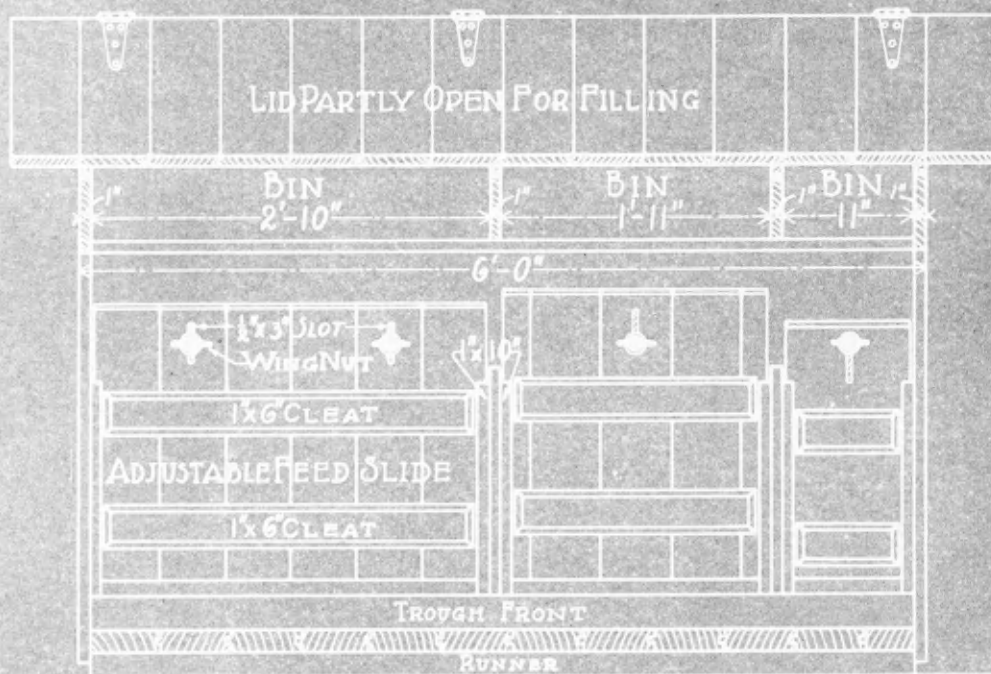
FIRST FLOOR PLAN



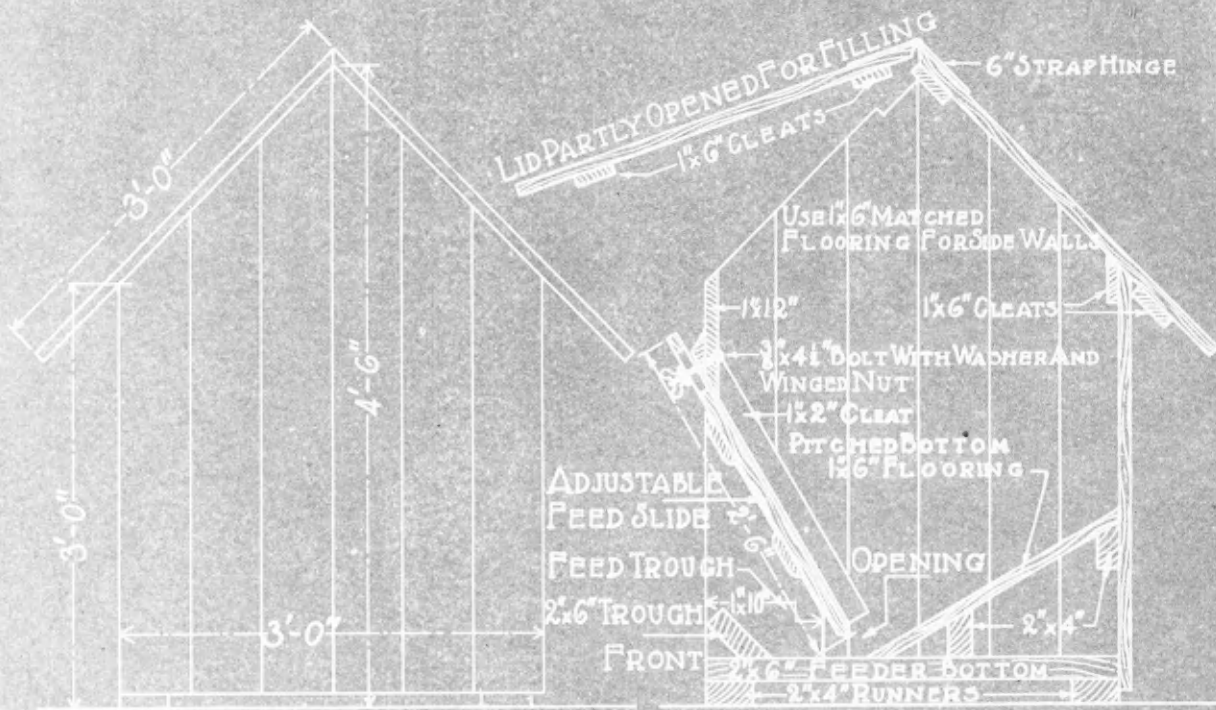
SECOND FLOOR PLAN

FLOOR PLANS OF A MODERN CORN CRIB

AMERICAN BUILDER FARM BUILDINGS



FRONT ELEVATION

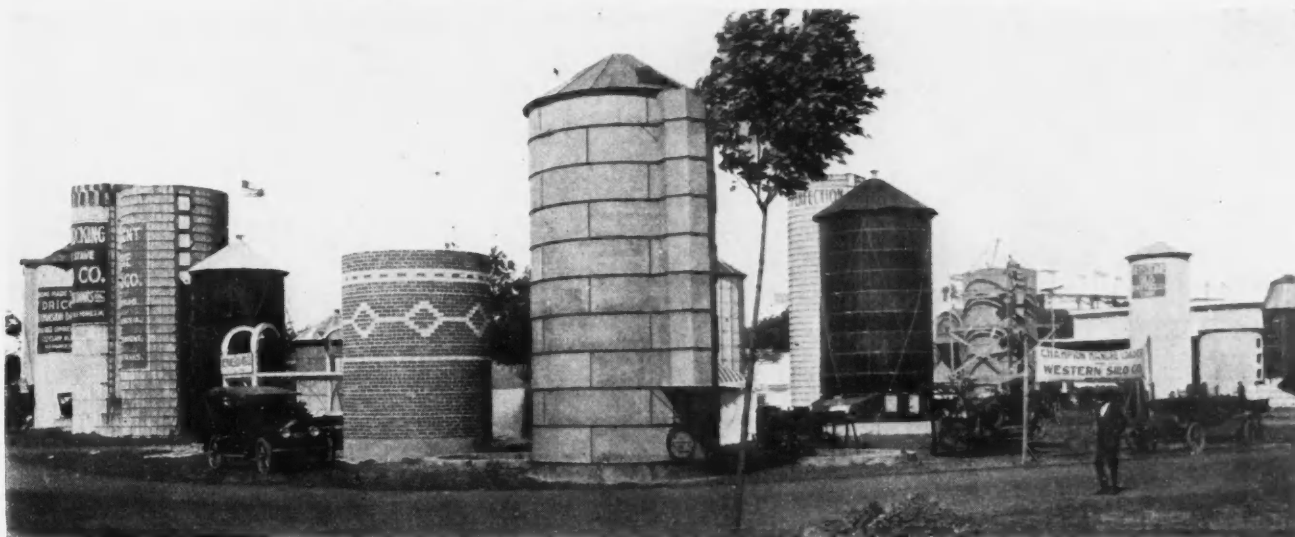


SIDE ELEVATION

CROSS SECTION

IMPROVED SELF FEEDER FOR HOGS





BUILD ANOTHER SILO THIS YEAR. There is no lack of good silo methods or of materials on the market. The United States Fuel Administration and the War Industries Board have placed "Food Containers" on the priorities list. The silo is the world's greatest food container. Preference will be given silo building materials, and every lumber dealer who sells a silo, every builder who erects a silo, and every farmer who buys a silo this year is both a wise man and a patriot. A good slogan for this year is "ANOTHER silo for every farm."

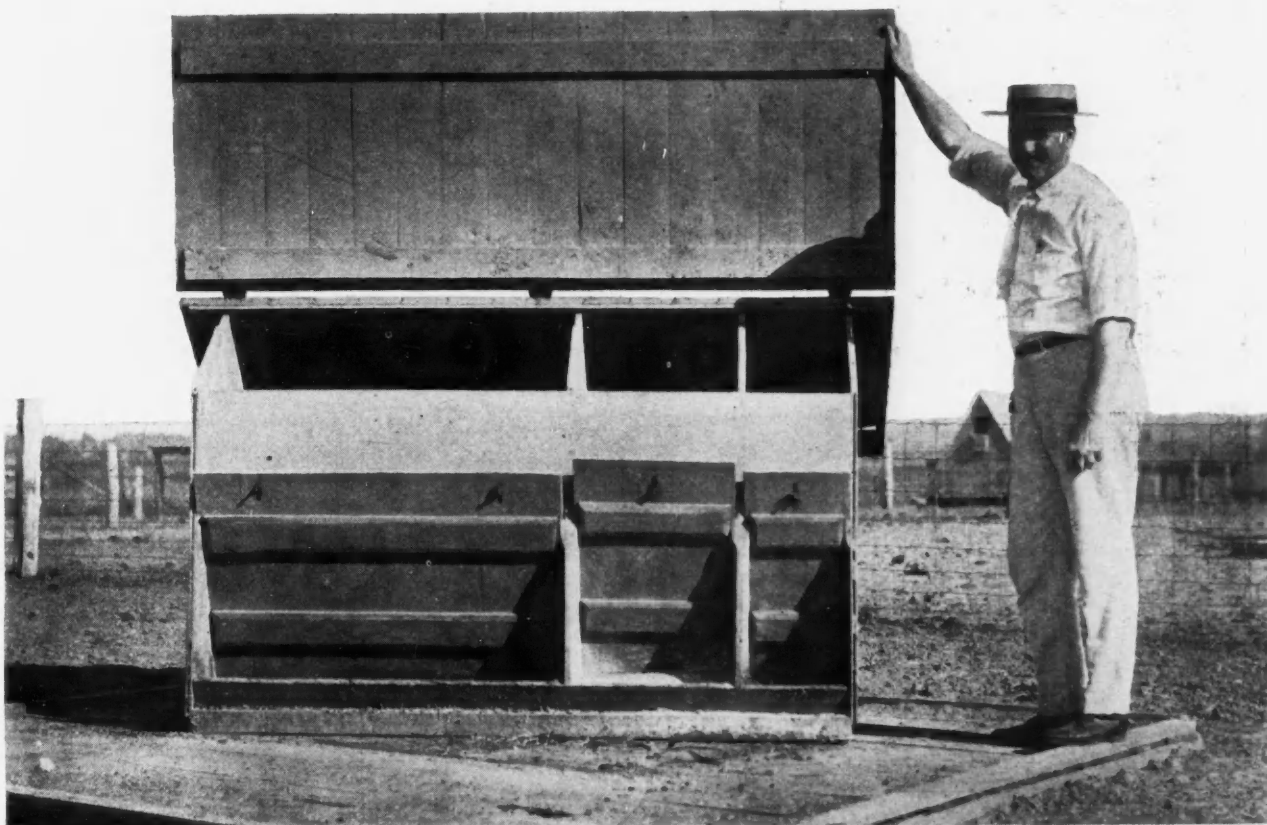
Blue Printed Plans of Improved Self-Feeder

ON the page opposite we present complete working drawings showing exactly how to build the improved self-feeder illustrated below. The scale is $\frac{3}{4}$ inch equals one foot.

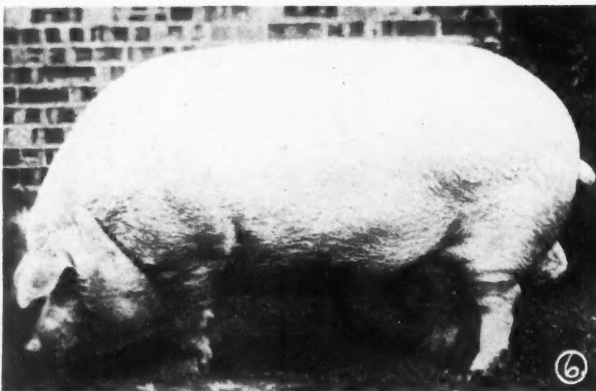
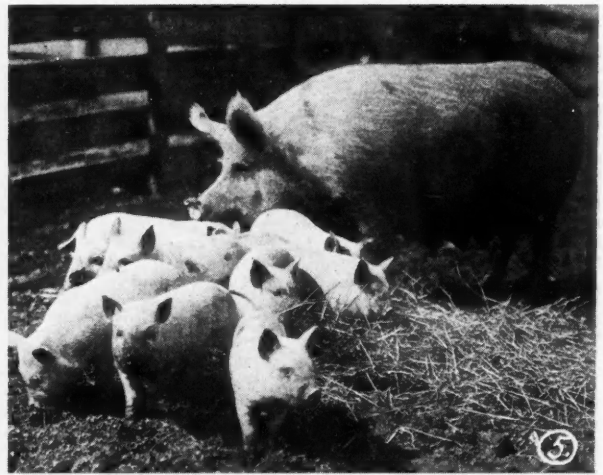
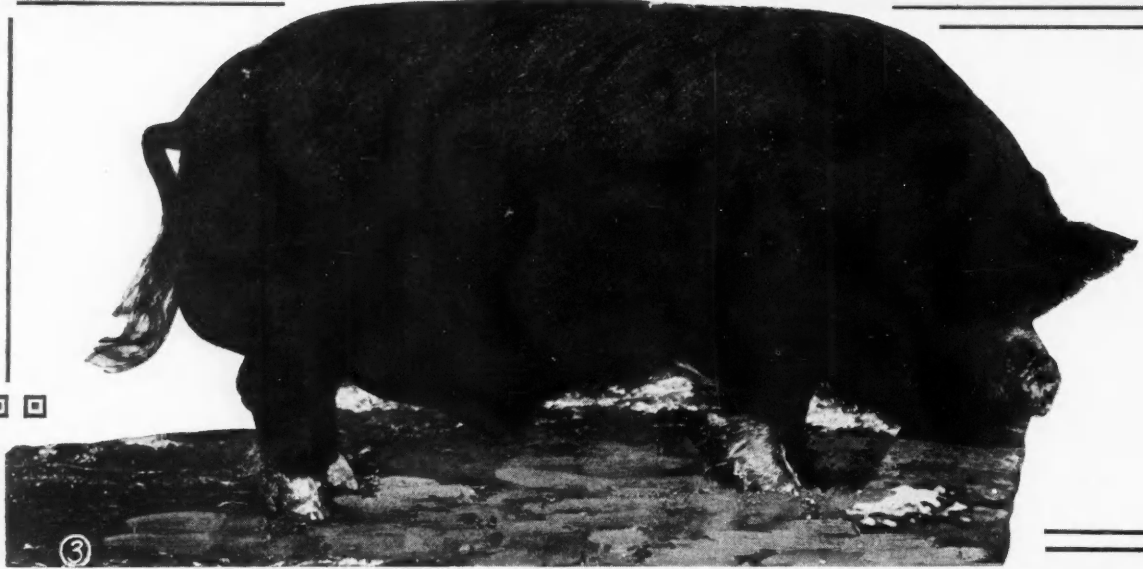
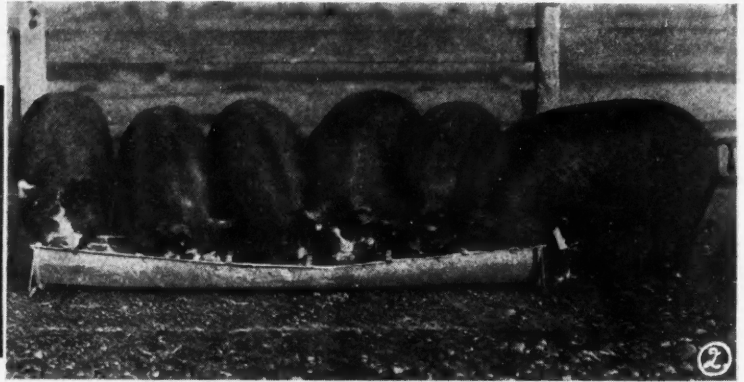
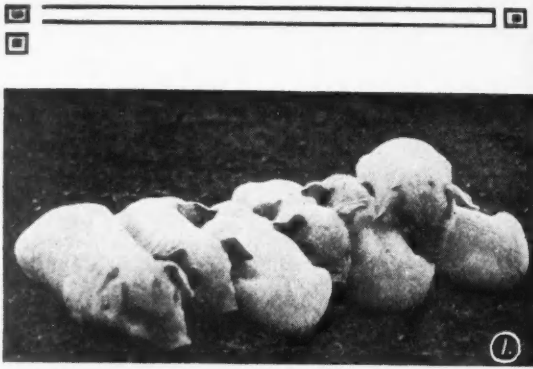
Lumber dealers who will make up a number of these during spare time will sell them readily to farmers. Every hog raiser needs one.

There are three different feed compartments. The slides at the front are adjustable to suit feeds coarse or fine. They work up and down thru a distance of about four inches, and are held fast in any position by tightening down a wing nut.

The construction of this self-feeder is weather tight. It is big enough to hold several days' supply of feed; and it is heavy enough so as not to be tipped over or shoved around by the pigs.



Professor Carmichael of the University of Illinois, and His Improved Self-Feeder for Hogs. Complete Blueprinted Working Plans Drawn to a Scale of $\frac{3}{4}$ Inch Equals One Foot Are Presented on the Opposite Page. There Are Three Compartments to This Feeder, and the Width of the Openings at the Bottom Is Adjustable by Means of the Slots and Wing Nuts.



PROPER HOG HOUSES WILL HELP. RAISE A PIG YOURSELF AND BUILD FOR THE FARMER SO THAT HE CAN RAISE TWO PIGS FOR EVERY ONE HE EVER RAISED BEFORE.

(1) The Seven Sleepers. (2) Six Pure Bred Berkshire Gilts at Feed Trough. (3) "Successor's Longfellow" (No. 180594). Said to be the best Berkshire Boar in America. Weighs 800 pounds. (4) Duroc-Jersey Pigs on blue grass pasture. (5) Yorkshire Sow with nine thrifty pigs. (6) "Wildwood Prince" (No. 28531). Big type Chester White. Grand Champion at Iowa State Fair. Weighs 1,100 pounds. (7) "Maid Wonder," big type Poland-China Sow.

How to Become a Shipbuilder

ANALYSIS OF THE SHIPYARD TRADES THAT ARE MOST NEARLY LIKE THE GENERAL BUILDING TRADES—
COMPARISON OF TOOLS AND METHODS USED—GLOSSARY OF SHIPBUILDING TERMS

Prepared by **Kenneth G. Smith**

Research Division of the Federal Board of Vocational Education

AT the beginning of the war, shipbuilding in the United States was at a low ebb. As a nation we had been building but few ships, whether of wood or steel, and consequently but a small number of men were trained in shipyard occupations. When the pressing need arose for building an enormous number of ships, there were not in the whole country enough men with sufficient knowledge of shipyard industries to turn out 10 per cent of the necessary work.

The program of the United States Shipping Board and Emergency Fleet Corporation calls for the delivery of a heavy tonnage of shipping during 1918. To carry out this program requires the recruiting of approximately 150,000 men for shipbuilding. These men can

rapidly gain experience in the shipyards, but they can not secure the necessary skill and knowledge in the short time available. It follows naturally that the men to be secured in this emergency are those whose previous training has given them some of the skill and knowledge required for a shipbuilding trade or for some special work in that trade.

Shipwright or Ship Carpenter

The work of the shipwright is the most varied of any of the shipbuilding trades. He follows closely and plays a part in the construction of the ship from the laying of the keel blocks until the vessel slides into the water. The work may be roughly divided into

A SUMMARY OF SHIPBUILDING AND KINDRED TRADES.

Trades outside of shipyards.	Shipyard trades in which these craftsmen may be used.	Trades outside of shipyards.	Shipyard trades in which these craftsmen may be used.
Architectural iron worker.....	Anglesmith.	Horseshoers.....	Blacksmith.
Asbestos workers.....	Pipe coverers.	House mover.....	Anglesmith.
Auto repair man.....	Ship fitter.	Lumber jacks.....	Plate and shape furnaceman (or helpers).
Blacksmiths:	Outside machinist.	Machinists.....	Ship fitter.
Railroad blacksmiths.....	Blacksmith.	Molders.....	Shipwright.
Machine blacksmiths.....	Hammer men.	Ornamental iron worker.....	Ship carpenters.
Hammer men.....	Tool dressers.	Painter.....	Lumber handlers and stage builders.
Tool dressers.....	Shipsmiths.	Pipe fitters:	Floor hands.
Boiler maker.....	Anglesmiths.	Steam fitter.....	Bench hands.
Bricklayer.....	Plate and shape furnace men.	Gas fitter.....	Machine hands.
Bucker-up. (See Riveter.)	Ship fitters.	Pile-driver man.....	Machine operators.
Cabinetmaker.....	Boiler maker.	Plumbers.....	Outside machinists.
Carpenter.....	Ship fitter.	Painters.....	Molders of all kinds.
Carvers.....	Flange turner.	Passer. (See Riveter.)	Green sand, dry sand, bench, side floor
Carriage smith.....	Pipe coverer.	Plasterers.....	and floor, cast iron, steel, and brass.
Wagon smith.....	Cementor.	Quarrymen. (See Granite cutters.)	Anglesmith.
Wheelwright.....	Joiner.	Riggers.....	Painter.
Chipper.....	Template maker.	Riveters:	Pipe fitters.
Concrete man.....	Ship carpenter (shipwright).	Structural.....	Shipwright.
Core maker.....	Ship joiner (if he has had experience on	Tank.....	Plumbers.
Coppersmith.....	inside work).	Automobile.....	Painters (wood and metal)
Dock builders.....	Mold loftman.	Bucker-ups.....	Pipe coverers, cementors.
Drop forger.....	Ship fitter.	Passers, heaters.....	Yard riggers.
Engineers, steam.....	Carving (in joiner shop).	Sailors.....	Bolter-up.
Erecting engineer or road man.....	Blacksmith.	Steam fitter (see Pipe fitter)—	
Elevator constructor.....	Anglesmith.	Structural iron workers:	
Electrical workers:	Plate and shape furnaceman.	(a) Structural marker.....	Ship fitter.
(a) Outside man.....	Ship fitter.	(b) Structural fitter.....	Loftman.
(b) Inside wireman.....	Chipper (in foundry).	(c) Structural liner or regulator.....	Assembler or bolter-up.
(c) Telephone installer.....	Chipper (in yard and on ship).	(d) Structural erector.....	Ship fitter.
(d) Wire chief.....	Calker (steel).	(e) Structural template maker.....	Loftman.
(e) Trouble shooter.....	Riveter.	(f) Structural draftman.....	Shipwright.
(f) Switchboard man.....	Cementor.	(g) Structural yard man.....	Assembler.
(g) Motor repair man.....	Pipe coverer.	Sheet-metal worker.....	Ship fitter.
(h) Armature winder.....	Core maker.	Tent and awning maker.....	Assembler or bolter-up.
Galvanizer.....	Coppersmith.	Wagonsmith. (See Carriagesmith.)	Ship fitter.
Gasfitter. (See Pipe fitter.)	Ship carpenters (stage builders).	Wheelwright. (See Carriagesmith.)	Shipwright.
Granite cutters.....	Drop forger.	Wood finisher.....	Sailmaker.
Stone cutters.....	Outside machinists (if they have had		Wood finisher.
Quarrymen.....	erecting or repair experience).		
Heater. (See Riveter.)	Pipe fitters.		
	Outside machinist.		
	Shipwright.		
	Shipwright.		
	Outside wireman in yard.		
	Wireman on ship.		
	Wiring on intercommunicating systems.		
	Motor repairer and installer.		
	Armature winder.		
	Galvanizer.		
	Chipper and calkers.		
	Drillers and reamers.		

Helpers in practically all of these trades can be used.

CHART 3.—Analysis of the shipwright's trade.

[Prepared by the Federal Board for Vocational Education at the request of the United States Shipping Board and Emergency Fleet Corporation. Large copies of this chart may be obtained from the Federal Board.]

Classes of work done.	Men required for each class.	Individual duties.	Jobs done.	Analysis of operations.
Cradle and launching ways.	One leading man. 15 to 40 carpenters. 10 helpers.	Directs carpenters. Perform all construction work preparatory to launching. Handle material as needed and clean up and pile blocking and timbers.	Locate and run lines and grades; fit cribbing, blocking, wedges, and shoring. Grease and clean ways, carry and pile lumber, remove chips.	<ol style="list-style-type: none"> 1. Run line for spread of ways both sides of center line. 2. Run grade line, slope depending on weight and length of vessel. 3. Build cribbing to grade line. 4. Haul out ground ways. 5. Line ground ways to grade and give them transverse slope of $\frac{1}{4}$ inch per foot. 6. Fit bottom blocks neatly under ways. 7. Secure rib bands on edge of ways with lag screws. 8. Install spur shores, being careful not to force ways out of line. 9. Haul out sliding ways. 10. Scrape, plane, and clear all foreign matter from ground and sliding ways, especially grit. 11. Heat grease and put it on the ways. 12. After grease hardens, pull sliding way over onto greased ways. 13. Put strips of template stock over all openings to keep out dirt. 14. Bolt forward end of sliding ways to ground ways. 15. Put in blocking, fitting it to ship. 16. Install toggles and frapping where needed. 17. Put launching wedges in place.
Launching.	Varies according to size of ship. One foreman. 2 leading men. About 80 carpenters. About 10 helpers.	Directs launching. Directs carpenters. Launch the ship. Assist carpenters.	Drive wedges, take out keel blocks, and release ship. Grease the ways and assist carpenters.	<ol style="list-style-type: none"> 1. Grease up overboard ways ahead of tide. 2. When all is ready, drive wedges until ship is firm in cradle. 3. Split out keel blocks, which drops weight of ship to cradle. 4. When all is clear, men are ordered from under the ship prior to releasing. 5. Cut tie plank to release ship. 6. After ship is launched, helpers scrape off ways and remove timbers which are taken apart by the carpenters.
Fairing ship.	10 carpenters.	Do all fairing, shoring, and shifting of keel blocks for riveting.	Lay keel blocks. Frame ship. Keep ship fair. Horn bulkheads.	<ol style="list-style-type: none"> 1. Establish grade line. 2. Lay keel blocks to grade line. 1. Carry center line up from blocks vertically through the ship. 2. Establish base line. 3. Check all measurements on center line and base line. 1. Set bulkheads in ship. 2. Set bulkhead to proper declivity; that is, square with base line. 3. Set bulkhead square with ship by equal measurements on port and starboard side to fixed point on center line.
Building staging.	Stage builders. 2 helpers.	Build staging. Handle material.		
Miscellaneous:				
(a) Deck fittings.	Experienced carpenters. (Number depends entirely on size of ship.)	Do all lining, measuring, fitting, and placing, ready for riveting.	Place all deck fittings, rails, awning, stanchions, railstanchions, pad eyes, lug pads, cleats, chocks, bits, winches, capstan, windlass, stowage of spare anchors, chain plates, cargo davits, etc.	<ol style="list-style-type: none"> 1. Get deck plan. 2. Measure for and line off for various fittings. 3. Locate fittings ready for drilling and riveting.
(b) Laying and calking wood decks.	Carpenters. (Number depends entirely on size of ship.)	Lay all wood decks. May calk seams.	Lay decks. Line off deck for drilling.	<ol style="list-style-type: none"> 1. If mold loft has not laid off holes for fastening decking, carpenter runs check line parallel to center line of ship. 2. Lay off holes from center line with batten. 3. Houses ends of decking into margin at ship's side, where miter exceeds 45°. 4. Squares and planes finished deck to through water to sides, uses machine planer, and finishes by hand.
(c) Lining up.	2 experienced carpenters. 2 helpers.	Do all lining. (In many yards much of this work is done by outside machinists.) Shift line and assist as directed.	Establish line for propeller shaft. Line up stern and bow castings. Do all other lining on ship.	<ol style="list-style-type: none"> 1. Determine position of propeller shaft line from base line and center line. 2. Stretch wire line in place from which measurements may be taken. 3. Lay off for boring castings. 1. Line up stern and bow castings in position from center line. 2. Mark scarpings for machining. 3. Line castings up on ship after they are machined.
(d) Installing.	Experienced carpenters. Helpers. (Number depends on size of ship.)	Measure, line off, fit, and locate ready for fastening. Duties as in lining off.	Locate all miscellaneous fittings, as, cargo-handling gear, cargo battens, pads for lead blocks, belaying pins, fair leads, boat-handling gear and stowage, anchor-handling gear, clech rings, wood grating, pads, chain stoppers, devil's claws, hawse pipe, windlass engine foundations, masts, and rigging.	<ol style="list-style-type: none"> 1. Get drawings. 2. Measure and line off for various fittings. 3. Locate fittings.
(e) Spar making.	One spar maker.	Performs entire operation alone.	Makes and installs square, octagonal, or round spars, masts, cargo booms, etc., and puts on fittings for them.	<ol style="list-style-type: none"> 1. Hews square to dimensions from rough material. 2. Hews to octagonal shape. ($\frac{1}{4}$ squared.) 3. Hews to 16-sided shape. ($\frac{1}{8}$ squared.) 4. Tapers and planes round to shape with drawknife and plane. 5. Mounts with shroud and hound bands. 6. Fits with truck for signal halyards when required. 7. Steps mast in ship. 8. Plumbs transverse and puts to rake as desired. 9. Wedges masts as required.
(f) Calking.	1 calker.	Performs entire operation alone, except in deep seams.	Does all calking on water-tight wood decks.	<ol style="list-style-type: none"> 1. Spreads cracks $\frac{1}{4}$ inch with dumb iron and puts in cotton. 2. Puts in oakum with thread iron. 3. Finishes with making iron. 4. May if necessary in deep seams use horsing iron pounded in by helper with beetle.

CHART 4.—Comparison of shipwright and kindred trades involving use of woodworking tools.

Trade names.		Work done.		Comparisons.	
Ship trade	Kindred trade.	Ship trade.	Kindred trade.	Ship trade.	Kindred trade.
Shipwright or ship carpenter	House carpenter or carpenter	Laying keel blocks, moving keel blocks. Laying and moving bilge blocks.	Laying sills and foundations...	(1) Slope of grade line or declivity depends on weight and length of vessel for launching purposes only. Some ships are built on a level keel fore and aft and athwartships.	(1) Grade or grade line is a horizontal line or grade established by the engineer above which heights are measured. A sloping grade line may be run for drains, pipes, etc.
		Shoring and framing.....	Bracing, blocking, and framing.	(1) Keel of ship is not level but inclined on a fixed slope or declivity in most cases. (2) Framing of ships is squared with the keel. (3) Frames of ship are steel (on steel ships). (4) Uses level, plumb bob, and declivity board. (5) No rafter cutting or roof framing in shipwork. (6) Ship carpenter builds no stairs and does no interior finishing, this is done by the ship joiner.	(1) Foundation of a building is level. (2) Framing of building is squared with foundation. (3) Frame of house is wood. (4) Uses level, plumb bob, and square. (5) Rafter cutting and roof framing are important. (6) House carpenter builds stairs, bookcases, cupboards, etc., and does interior finishing.
		Fairing ship and horning bulkheads.	Squaring frames, studding, columns, partitions, etc.	(1) Center line is carried up vertically from keel. (2) Base line is established. (3) Measurements are checked on center line and base line. (4) Bulkheads are horned or squared by plumb bob and declivity board and by measurements fore and aft.	(1) Lines are run for partitions, columns, studding, etc. (2) Building is plumbed and squared by level, plumb bob, and square.
		Laying wood decks and sometimes calking them.	Laying floors.....	(1) Deck is fastened with bolts or lag screws and must be made water-tight by calking. (2) Deck has fore and aft slope or sheer and side slope or camber. (3) Decking is heavier as a rule than flooring. (4) A deck seam is tight on the inside and open (for calking) on the outside.	(1) Floor is nailed and not water-tight. (2) Floor is usually flat and level. (3) House flooring is light. Heavier flooring may be required in warehouses, stores, etc. (4) A floor seam is tight on the outside.
		Boxing pipe..... Laying ceiling. (A ceiling in shipwork means interior wood casing for the floor, sides, or ceiling of a room, not merely overhead covering.) Putting on cargo battens. Installing wood foundations.	Lays floors and "ceils" rooms and puts on siding.	The operations are the same in the case of the ship carpenter and the house carpenter and the work is practically the same	
House mover.....	Building launching cradle and launching ways and launching ship.	No corresponding work done except the blocking and shoring done in raising or moving a building.	(1) A ship is wedged firmly in the cradle and lowered upon the ways by splitting out the keel blocks. (2) A ship slides down greased ways.	(1) A house is wedged up or raised by jackscrews and rollers placed beneath it. (2) A house is pulled along on rollers.	
Stage builder.....	Bridge carpenters..... Rough carpenters. Dock builders. Piledriver man. Lumber jacks can be used for this work as well as the house carpenter.	Stage building.....	Building scaffolding, staging, trestle work, heavy timber framing for barns, docks, wharves, etc.	No direct comparison is necessary as the work is essentially the same.	
Sparmaker.....	No kindred trade.....	Spar making.....	No kindred work except general shaping of heavy timbers.	No direct comparison can be made. Spar making requires much more care and skill than the ordinary shaping of rough timbers. Much of the work is made to caliper measurements.	
Boat builder.....	Boat builder.....	Builds boats for ships.....	Builds boats, launches, etc.	Work is essentially the same in both cases.	
Calker.....	Calker on small boats and launches.	Calks wood decks.....	Calks seams on small boats and launches.	The work is essentially the same but much heavier on ship work.	

CHART 13.—Analysis of ship joiners' trade.

Classes of work done.	Men required for each class.	Individual duties.	Jobs done.	Analysis of operations.
Outside work.....	1 joiner.....	Erects woodwork on the ship....	Lays joiner decks. (Decks up to 2 inches thick are called joiner decks. Thicker decks are ship carpenter decks.)	Works from blue print and install work according to layout exactly like any carpenter.
	1 helper for every 10 journeymen.	Carry material and assist as directed.	Puts on bulkhead wood sheathing; fits up cabins, staterooms, storerooms, workshops and cold-storage rooms; builds stairways, stepladders, panel work, and magazines.	
Inside work: (a) Joinery.....	1 joiner.....	Makes cabinet work for ship....	Makes all stationary furniture such as tables, seats, berths, sideboards, chiffoniers, cabinets, book racks, toilet cases, and mirrors.	Works from blue print and makes articles according to layout like any other joiner or cabinetmaker. Mortise and tenon work much more common than in outside work.
	1 helper for every 10 journeymen.	Carry material and assist as directed.		
(b) Machine operating.	3 to 6 millmen.....	Operate the following machines: Planer, band saw, tenoner, shaper, molder, mortiser, circular saw.	Form piece according to layout of joiner or turn out standard pieces	

two classes—the carpentry or woodwork, such as the building of scaffolding, building cradle and launching ways, laying wood decks, installing ceiling, etc., and the erecting or millwright work, such as horning bulkheads, lining and installing stem and stern posts, laying off for and installing deck fittings, fairing frames and keeping ship fair upon the ways. The first class of work calls for the fabricating skill and knowledge of woodworking tools possessed by the car-

penyer; the second for the planning and assembling skill of the millwright and erecting man.

Spar making, boat building, and calking wood decks are special classes of shipwright work and are done by special gangs or special men. Inside work, such as the building of stairs, cases, cupboards, berths, and paneling, commonly known as interior finish, is not done by the shipwright but by the ship joiner.

(Continued to page 138.)

CHART 5.—Comparison of shipwright and kindred trades involving erecting skill.

[Prepared by the Federal Board for Vocational Education at the request of the United States Shipping Board and Emergency Fleet Corporation. Large copies of this chart may be obtained from the Federal Board.]

Trade names	Work done.		Comparisons.		Assets of man in kindred trade.	What he must be taught.
	Shipwright.	Kindred trade.	Shipwright.	Kindred trade.		
Millwright, erecting engineer or erecting man, outside machinist or road man, elevator constructor or erector	The shipwright aside from the work done by him similar to that of the house carpenter does other entirely different work similar to that of the millwright or erecting man. This may be briefly described as lining and installing.	The millwright or erecting man is chiefly concerned with the proper erection of buildings and the installation and erection of all kinds of machinery. He is familiar with the processes of laying off for, lining up and erecting machinery, shafting, and all forms of mechanical equipment.	In general the same processes of lining and erecting are used by the shipwright and men from the kindred trades. The millwright is familiar with the erection of machinery and buildings, the structural liner with plumbing and squaring steel structures, the erecting or road man with special types of machinery, and the elevator man with elevators, pumps, motors, escalator machinery and equipment. All are accustomed to lining and squaring and the use of the level and plumb bob. All of them except the structural liner have more experience with machinery than is necessary for the work of the shipwright.		(1) Knowledge of lines and processes of lining and squaring. (2) Realization of the need of accuracy. (3) Ability to measure accurately. (4) Ability to read blue prints. (5) Knowledge of and skill with ordinary hand tools. (6) Ingenuity or ability to do a job in the best way under given circumstances. (7) (Usually.) Varied experience. (8) Self-confidence and sense of responsibility. A good man with mechanical ability and good judgment should quickly learn to do this work. In many cases in this work the shipwright works in conjunction with the engineers and machinists.	(1) Terms and conventions used in ship construction. (2) To construct and use a declivity board. (3) Familiarity with ship conditions.
Structural liner.....	Setting line for propeller shaft. (When not given by engineers or machinists.) Lining struts for propeller shaft and marking scarphs. Horning bulkheads..... Laying off deck fitting such as rails, awning stanchions and fittings, hold and between decks stanchions, cleats, chocks, boat stowage, wood foundations, cargo battens, devil claws, chain stoppers, etc. (In most cases shipwrights install as well as lay off this work).	Running lines for shafting or shaft bearing. Lining shaft bearings..... Laying off for and installing machinery and equipment.	The processes and tools used by the shipwright are practically the same as those used by the erecting man and differ only in their application to ship machinery and conditions. The millwright or erecting man is accustomed to a level or nearly level floor and vertical walls. The shipwright is accustomed to a sloping dock and the curved sides of a ship.			

Assets of man in kindred trade.	What he must be taught.
(1) Knowledge of skill in using woodworking tools..... (2) Ability to read blue prints..... (3) Skill in measuring and fitting..... (4) A general knowledge of timbers, bracing and framing. (5) A knowledge of and skill in using the level, plumb bob, and square.	(1) Terms used in ship construction. (2) The meaning of declivity and how to make and use a declivity board. (This is not necessary if the ships are built on a level keel.) (3) Proper method of placing shoring for strength and to keep ship fair. (4) Method of fairing steel frames. (5) Method of horning bulkheads by declivity boards, plumb bob, and fore and aft measurements (declivity board not used if ship is on level keel) (6) To cut and fit work on a bevel or slant (7) To run grade and center lines. (8) To make water-tight jobs. (9) To use broad ax and adze.
What a house carpenter must be taught depends in a large measure on what kind of ship work he is expected to do. In such work as stage building, boxing pipes, and laying ceiling he would need little if any instruction.	This is steelwork and entirely unrelated to the work of the house carpenter. It would require considerable experience to enable him to handle the work successfully.
(1) As stated above..... (1) As stated above..... (1) As above.....	(1) Terms used in ship construction. (2) To lay off holes for bolts or lag screws with batten and chalk line (3) To handle heavy decking. (4) To work on sloping and not flat surfaces. (5) Method of housing or nibbing the ends of decking. (6) To make deck seams tight on the inside and not on the outside (for calking purposes). This work could all be done by a house carpenter after receiving some explanations of ship conditions and becoming somewhat familiar with ship construction.
(1) Knowledge of methods of handling heavy timbers, wedges, and shoring..... (2) Knowledge of heavy woodworking tools, ropes, winches, jackscrews, rollers, etc.....	(1) Terms used in ship construction. (2) How to run line for slope of ways. (3) Care in cleaning, lining, and shoring ways. (4) Methods of cutting and fitting cribbing and blocking and wedges. (5) Methods of installing toggles and frapping. (6) How to use a broad ax and adze. (7) Duties on launching day.
(1) Knowledge of heavy timbering and staging..... (2) Knowledge of heavy woodworking tools.....	No instruction necessary except a slight explanation of ship conditions and requirements.
(1) Any man accustomed to shaping heavy timbers can probably use drawknife and plane.	(1) How to use a broad ax and adze. (2) Methods of accurately shaping large timbers. (Skill must be acquired by experience.)
An outside boat builder can do the work of a ship boat builder without further instruction.	Use of heavy calking tools and process of heavy calking. Handling of oakum is important.

GLOSSARY.

Air hammer—Hammer driven by compressed air for riveting. Sometimes called an air gun or "gun."

Air holding on hammer—Hammer with air cushion for holding against a rivet.

Anneal—To heat and cool metal for the purpose of softening.

Auxiliary foundations—Supports for pumps, distillers, condensers, etc.

Base line—See Lines.

Bat rivet—A rivet with a cone head.

Batten—A thin strip of wood used in measuring or making templates. (See also Cargo batten.)

Bending floor—Large iron floor on which frames are bent.

Bevel—To change the angle of an angle bar to make it fit in a certain place.

Bevel-faced hammer—A riveting hammer with sloping face.

Bevel-faced holding on hammer—A heavy hammer with sloping face for holding against a rivet.

Bilge—The point at which frames turn from bottom to side of ship.

Body plan—See Lines plan.

Bosom piece—A short angle connecting the ends of two angles.

Boss plate—Plate bent to fit around the propeller shaft.

Braze—To heat and join by means of hard solder.

Breast hook—A plate connecting stringers at bow or stern of ship.

Break in—To bend in a sheet back of a seam by too heavy calking.

Bulb angle—An angle with one edge rounded.

Bulkhead—A steel partition in a ship.

Butt joint—A joint formed by "butting" the edges of plates together.

Butt strap—A small plate connecting ends of two plates.

Bull riveting—Riveting with a compressed air or hydraulic plunger riveter.

Bulwarks—Protection rail along side of ship.

Buttock line—See Lines.

Calker—A man who makes seams tight in wood or metal. Calker usually means a metal calker. If wood calker is meant the term "wood calker" is used.

Camber—The rise or crown of a deck in the center.

Cant frames—A group of frames extending over the rudder forming stern of ship.

Cargo batten—Strips of planking on the inside of the frames in the hold to keep cargo away from shell of ship.

Chalk line—A cord used for marking with chalk.

Chocks—Seats or saddles of wood or metal.

Clinching pan—A flat plate for clinching nails (used in mold loft).

Clip—A short angle connecting shapes and plates.

Condenser head—Connection of exhaust pipe to top of condenser.

Counterplates—Shell plates around the stern at the upper or weather deck.

Countersink—To enlarge the upper part of a hole.

Cradle—A form of plates and angles on which a plate is shaped by the furnace man.

Davits—Devices to launch lifeboats from ship.

Deck house—A steel house on deck of ship.

Deck plan—A drawing showing the layout of a deck.

Development—A full-sized or developed pattern.

Diagonals—See Lines.

Die—A tool for forming a rivet head (applied to rivet dies).

(a) *Flush die*—To flatten rivets into a countersunk hole.

(b) *Snap die*—To form a round head.

Displacement—The amount of water displaced by a ship.

Dolly bar—A heavy bar to hold against a rivet.

Doubling plate—A plate attached to another plate to stiffen it (often put around an opening).

Fabricate—To punch, cut, shear, drill, bend, flange or weld plates and shapes.

Fair—In proper position.

Fair or fair up—To adjust work in proper position.

Fair lead—A guide for a rope or cable to lead it straight to a desired place.

Fair ship—To keep a ship square upon the ways during construction.

Flange—To bend plates to form an angle.

Floor plate—Vertical plates between inner bottom and shell.

Flush rivet—A rivet driven with a flush die. (Has a head even with plate or nearly so.)

Forefoot—The under part of the stem where the center keel rises and joins the stem.

Frame—Steel section forming ribs of ship to which shell is riveted.

Frame lines—See Lines.

Frame mold—Template for the frame of a ship.

Galley dresser—A cook's work table.

Grab stand—A special rig used to hold an electric or air-drilling machine.

Garboard—Strake or line of plates next to the flat keel.

Gudgeons—Projections on the stern frame to hold rudder steady.

Gusset plates—Brackets connecting tank top and frames.

Half-breadth plan—See Lines plan.

Hatch—Opening in deck of vessel through which cargo, coal, etc., is loaded.

Hawse pipe—Hole or pipe through which mooring cable runs.

Heater or heater boy—One who heats rivets.

Heating tongs—Tongs used to take a rivet from the fire.

Hook stick—A rig used to hold drilling machine for light drilling.

Horn—To line or square up.

Hull—Body of a ship.

Inboard—Toward center of ship.

Inner bottom—Inner shell for bottom of ships, often called tank top.

Intercostals—Short plates between frames.

Jam hammer—A special type of holding-on hammer used in heavy riveting.

Joggle—To bend plates and shapes to fit over other work.

Keel—The lowest or bottom part of a ship.

(a) *Flat keel*—Plate on bottom of ship.

(b) *Vertical keel*—Plates and shapes at center line of ship connecting shell and inner bottom.

(c) *Bilge keel*—Plates and shapes fastened to shell at bilge.

Keel blocks—Heavy blocks on which ship rests during construction.

King post—Vertical post to support cargo booms.

Launching ways—The ways or supports on which the ship is supported when launched.

(a) *Ground ways*—Fixed timbers.

(b) *Sliding ways*—Timbers which slide over the ground ways carrying the ship.

Lift—To make a template on ship or in the yard to fit a special place.

Lightening holes—Holes in plate to reduce weight or permit access.

Lumber holes—Holes in floors for drains.

Liners—Short bars filling spaces between plates and shapes.

Lines (on a drawing)—Principal lines of a drawing are as follows:

- (a) *Base line*—A horizontal reference line from which vertical measurements are taken.
- (b) *Buttock line*—A vertical line on the body plan parallel with the center line; a horizontal line in the half-breadth plan parallel to the center line; a curved line in the sheer plan.
- (c) *Center line*—A vertical line in the center of the body plan perpendicular to the base line; a horizontal line in the half-breadth plan through the center of the ship.
- (d) *Diagonals*—Lines running diagonally from center line to frame lines.
- (e) *Frame lines*—Outlines showing shape of frame of vessel.
- (f) *Water lines*—Horizontal lines parallel to the base line in the body plan; horizontal lines parallel to the base line in the sheer plan; curved lines in the half-breadth plan.

Lines (on a ship)—Wires, cords, or chalk lines from which measurements are taken.

- (a) *Center line*—A line through the center of the ship equally distant from sides or a vertical line carried up through center of ship at right angles to base line.
- (b) *Base line*—A reference line for vertical measurements at right angles to vertical center lines.
- (c) *Grade line*—A reference line established on a fixed slope or level.
- (d) *Check line*—An auxiliary reference line.

Linesman—A skilled loftman who does especially difficult work.

Lines plan—Drawing showing general outline or form of the ship.

The lines plan comprises three plans:

- (a) *Sheer plan*—A side view showing length of ship and heights of parts from keel.
- (b) *Half breadth plan*—A top view showing a horizontal or floor plan on any water line.
- (c) *Body plan*—An end view showing curves of the sides or frame lines at any point in the ship. Frame lines forward of midship section are on the right of the center line, aft of midship section, on the left of center line.

Loftman—A man who lays out and makes molds for a ship.

Lugged—A projection on deck with hole for fastening a block for a lead.

Margin—Plate connecting shell and inner bottom forming outboard boundary of inner bottom.

Marking hammer—A tool for marking rivet holes on a template with paint.

Marker—A brass pipe dipped in enamel for marking rivet holes on stock.

Marin spike—A pointed, tapering metal tool for separating the strands of rope or cable in splicing.

Mold—A paper or wooden pattern, a template.

Midship—Center of ship.

Mold loft—A large open room on the floor of which drawings and molds of a ship are laid out full size.

Outboard—Out from center of ship.

Old man—A rig for holding a drill.

Orter—Shell plate around upper part of stern post.

Pad eye—An eye located on deck for fastening cables.

Palm—A guard for the hand used in sewing.

Panhead rivet—A rivet with a pan-shaped head.

Panting—Form of side stringer.

Passer—A man who passes rivet to the holder-on and may put it in the rivet hole.

Passing tongs—Tongs used in passing a rivet.

Plying hammer—A form of hand-riveting hammer.

Port—Left direction when facing forward end of ship.

Rally—Driving wedges 4-5 minutes.

Reverse frames—Angles at top of floor plates.

Rigging—The ropes which support masts, king posts, boat davits, etc. Also the running rigging for derrick booms, derricks, etc.

Rivet set—A tool used in calking around a rivet.

Sail needle—A heavy three-cornered needle.

Serving mallet—A tool used in serving or wrapping cord about a rope or cable.

Serving board—A tool used in the same way as serving mallet.

Scarf—A lap joint in wood or metal.

Serve board—A board or temporary floor on which the body plan of a vessel is sometimes laid out.

Shaft tunnel—Passage through which propeller shaft runs.

Sheer—The slope of a deck fore and aft.

Sheer plate—Shell plate at upper deck. The line of plating is called the "sheer strake."

Shell plating—Plating on the outside of the hull.

Side stringer—A longitudinal girder at side of ship.

Snap rivet—A rivet driven with a snap die. (Has a round or button head.)

Spread—Distance at right angles to the center line.

Spur shore—A slanting brace on either side of ship or ways.

Stanchion—A post or support, as an awning stanchion or a rail stanchion. Also applied to supports under deck beams which in structural work would be called "columns."

Staple—An angle bent around shapes and connected to plate, fitted water-tight.

Starboard—Right direction facing forward end of ship.

Step—To set in place as applied to a mast.

Stern casting or frame—A heavy steel casting or forging at stern of vessel supporting the rudder and to which the shell plate strakes are fastened.

Stowage—Everything for support and fastening, as anchor or boat stowage.

Strake—A line of plates.

Strake (closing)—A line of plates in which both edges fit over other plates.

Strut—Support for propeller tail-end shaft used on boats with more than one propeller.

Symbols—Marks of identification. Following partial list is illustrative:

- V. K. FL. C.*—Vertical keel floor clip.
- FL. FR.*—Floor frame.
- FL. S.*—Floor Stiffener.
- B. B. FL. C.*—Bilge bracket floor clip.
- S. D. B. B.*—Second deck beam bracket.
- E. C. UDK. B. C.*—Engine casing upper deck beam clip.
- CK.*—Countersink.
- CK. T. S.*—Countersink this side.
- CK. O. S.*—Countersink other side.

Tie plank—The fastening holding the ship from sliding down the ways.

Tie plate—Narrow deck plate for securing deck beams in place.

Toggles—Wood timbers around which rope is knotted or fastened.

Tomahawk—A tool used in finishing a rivet.

Torpedo—A steel plug forced through a pipe to expand lead tubing for lining.

Transom—Last main frame of ship attached to the stern framework.

Ways—Supports for ship at time of launching.

- (a) *Ground ways*—Stationary timbers.

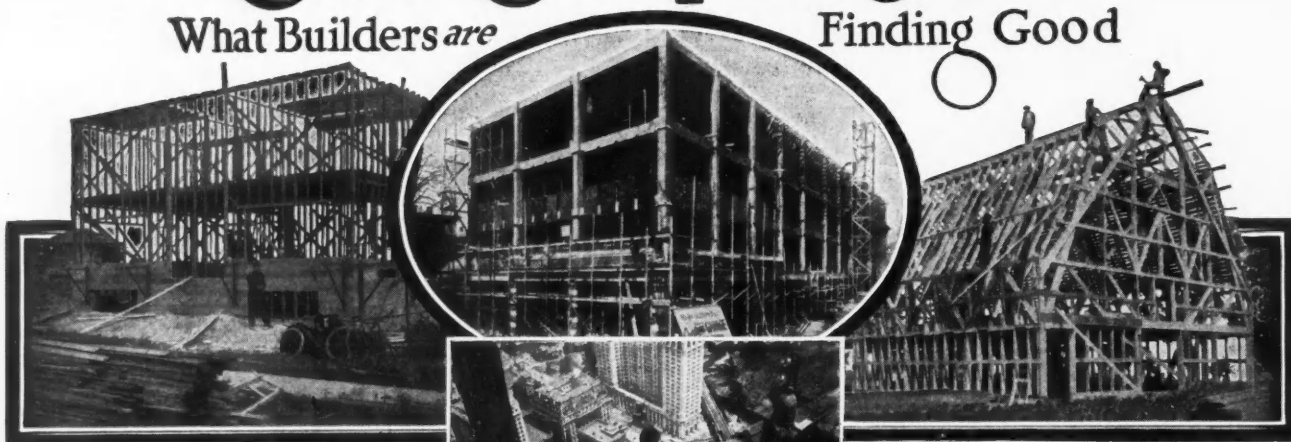
- (b) *Sliding ways*—Timbers moving with the ship sliding over the ground ways.

Weather deck—Uppermost deck running length of ship.

Web frames—Large frames built of plates, used as stiffeners. Sometimes called "deep frames."

OUT ON THE JOB

What Builders are Finding Good



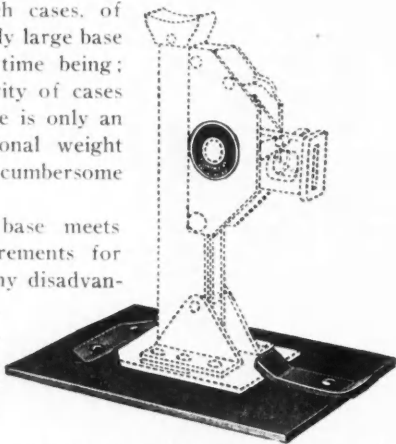
EDITOR'S NOTE: The American Builder does not accept payment in any form for what appears in our reading pages. In order to avoid any appearance of doing so, we omit the name of the maker or

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

Supplemental Base for Auto Jacks

The article herewith illustrated is just being placed upon the market. In an emergency it sometimes happens that auto jacks have to be used on very soft ground. In such cases, of course, an exceptionally large base is desirable for the time being; whereas in the majority of cases this extra size of base is only an annoyance, an additional weight to handle and always cumbersome to carry.

The supplemental base meets these occasional requirements for larger area without any disadvantages for regular use. Being flat it can be carried in the bottom or against the side of any tool compartment without occupying appreciable room, and is not handled at all until needed. To attach for use, the jack is simply placed in position on the supplemental base and clamped by turning a button.

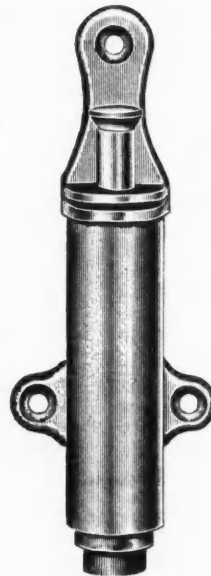


Road Soft so Jack Mires? Slip on the Broad Base.

ornamental corner iron, as made in sizes ranging from 3/8 to 2 1/2 inches to 1 1/2 by 8 inches, and is furnished in bright steel and brass plated. The other, the ornamental mending plate, can be obtained in sizes ranging from 2 to 10 inches in length, and is furnished in bright steel and brass plated. Both packed in a carton with screws to match.

A Junior Door Holder

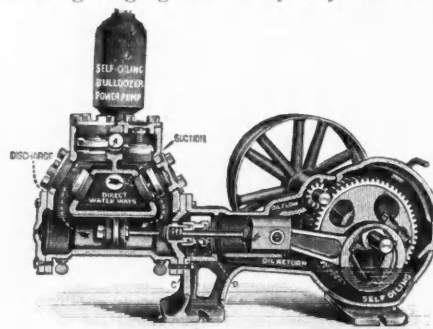
A smaller size holder is offered, suitable for screen and other light doors. It has an absolute, non-slipping device. It is a strong, very neat and attractive holder, finished to match other builders' hardware.



Door Holder (Three-fourths Size).

New Bulldozer Pump

An improved pump is unlike anything else on the market in that the gears are completely covered and thoroly lubricated, needing no attention in this respect aside from the rare occasion of filling the reservoir with oil. Proper measures have been taken in the construction of this pump to provide extraordinary water-ways and large valves, which, together with the self-oiling feature, permit the pump to be run faster than the other types of pump, thus giving greater capacity for the same size cylinders and stroke.

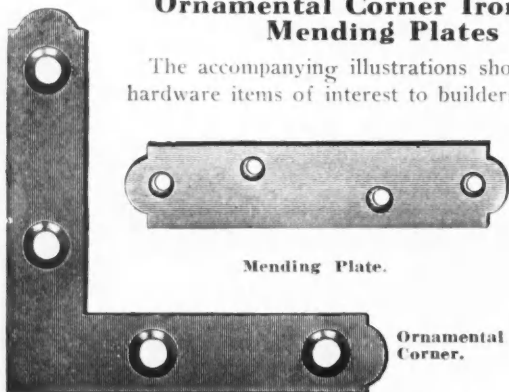


Self-Oiling Power Pump.

This pump is made in three sizes, with capacities from 1,000 to 3,000 gallons per hour and has a large range of work in connection with gasoline engines, electric motors and other power.

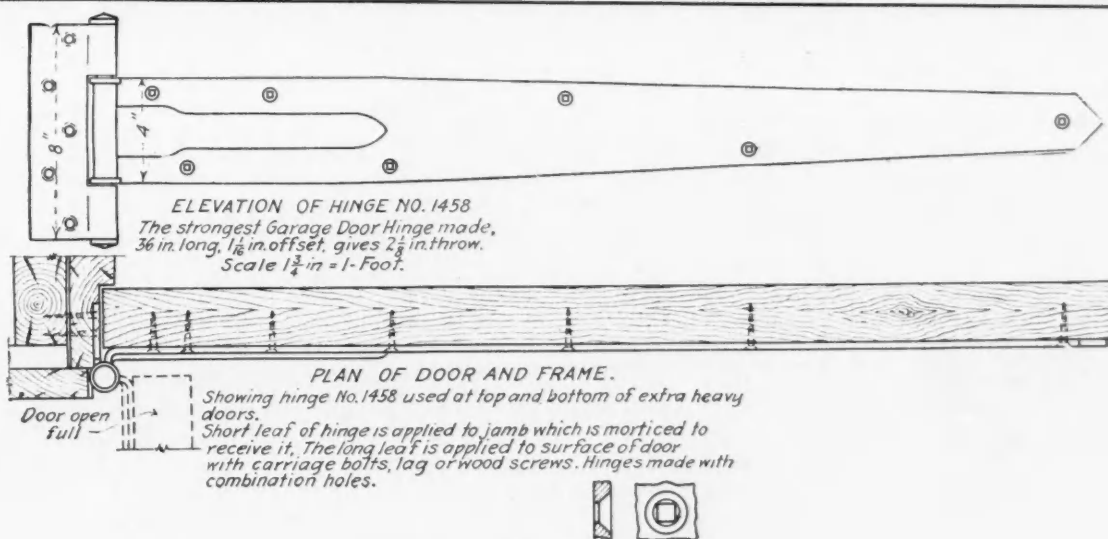
Ornamental Corner Irons and Mending Plates

The accompanying illustrations show two new hardware items of interest to builders. One, the



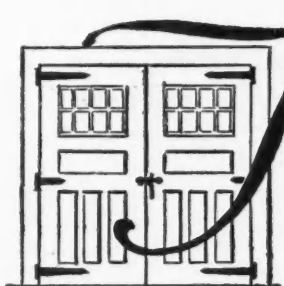
Mending Plate.

Ornamental Corner.



Stanley Garage Door Hinge

No 1458



HERE are times when you have something special to build and at first glance it may seem that special equipment is necessary. But this isn't often the case with Stanley Hardware.

For instance, a Brooklyn man had a solid oak garage door with sheet metal facings, size 10x10 feet, weighing 2500 pounds. Special hinges needed? No, sir! Right out of stock the hardware dealer produced the strongest garage hinge made—the Stanley No. 1458—36 inches long. Four pairs of these hinges swung the massive door perfectly.

Stanley Hinges can be depended on to swing smoothly, easily, without sagging or binding, door of the heaviest character.

Whatever you need for Garage Hardware, the right buy word is **STANLEY**. Ask your dealer for **STANLEY** Bolts, Butts, Hinges, Pulls, Latches and Door Holders.

Write for our complete catalog on Garage Hardware. It will be sent free on request.

THE STANLEY WORKS

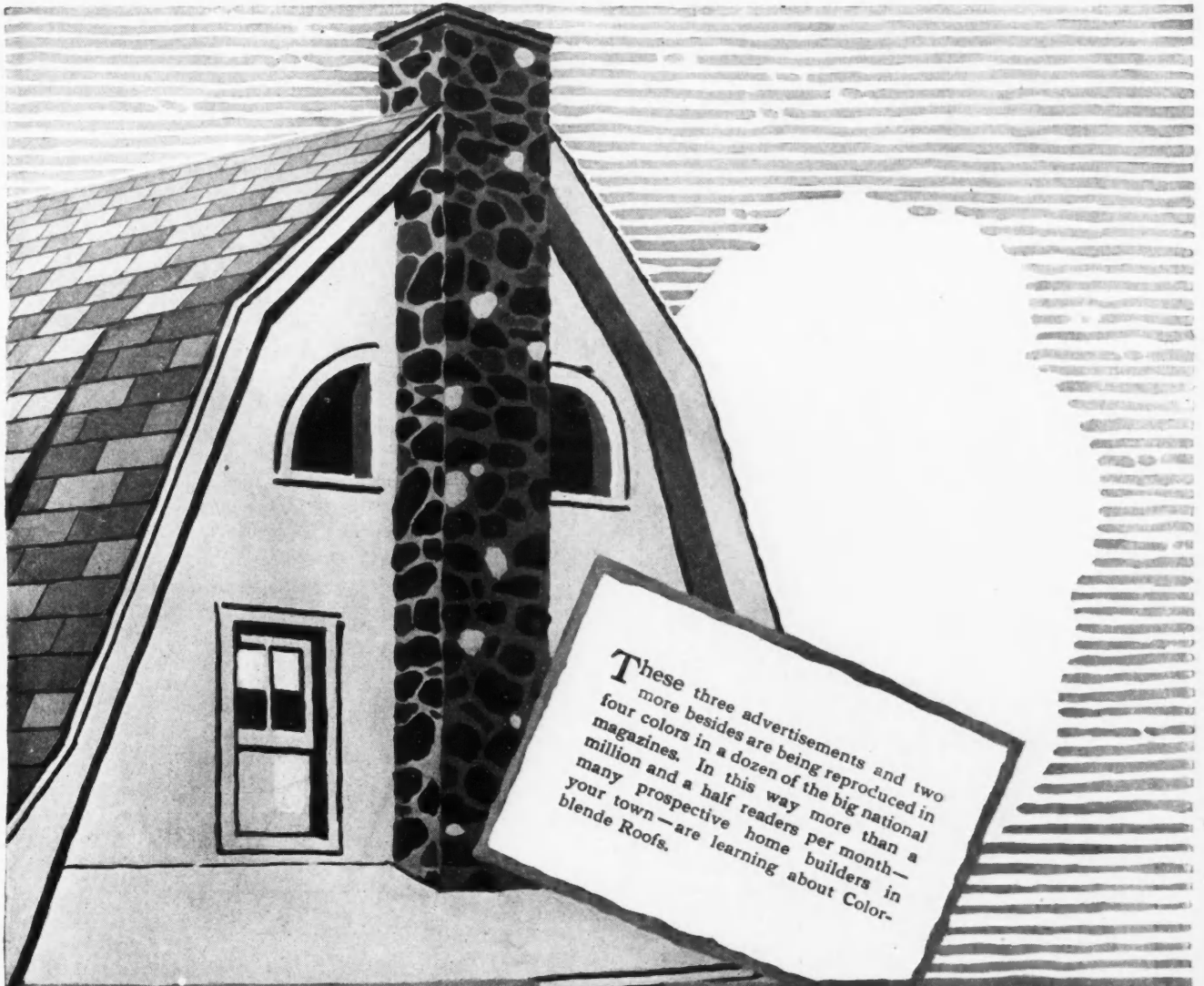
NEW YORK
 100 La Fayette St.

New Britain, Conn.
 U. S. A.

CHICAGO
 73 E. Lake Street

Manufacturers of Wrought Bronze and Wrought Steel Hinges and Butts of all kinds including Stanley Ball Bearing Butts. Also Pulls, Brackets, Chest Handles, Peerless Storm Sash Hangers and Fasteners; Screen Window and Blind Trimmings; Furniture Hardware; Twinrod Box Strapping, and Cold Rolled Strip Steel.

Stanley Garage Hardware is adaptable for factory and mill use.



These three advertisements and two more besides are being reproduced in four colors in a dozen of the big national magazines. In this way more than a million and a half readers per month—many prospective home builders in your town—are learning about Colorblende Roofs.

Asbestos
COLORBLLENDE ROOFS
of **JOHNS-MANVILLE** Transite **SHINGLES**
The aristocrat of fire-safe roofings



A Roof where Beauty and Utility meet

A ROOF made of the asbestos shingles is a roof of real beauty and with enough strength to stand that in all the tests of strength of construction by the U. S. Government is a top.

Asbestos shingles are made of the Johns-Manville Shingles, long and thin, and are covered with a thin, but strong, layer of asphalt.

Colorblende Shingles, Asbestos, Built-Up Roofing, Embossed Shingles, Asbestos Shingles, Fireproofing, Fireproofing, Fireproofing, Fireproofing.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
20 Factories—Branches in 61 Large Cities

How we have dressed a show window to move your shingle stock

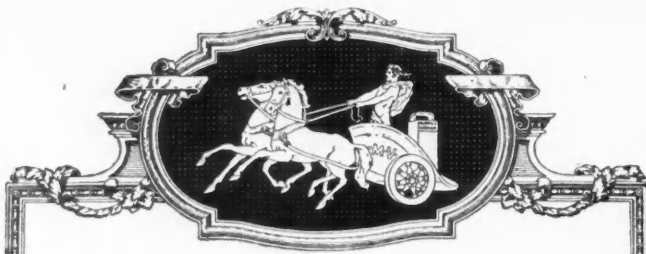
And now, the home-owner is seeing the beautiful new Johns-Manville Colorblende Roof in all its rich coloring, to drive home the fact that a roof of asbestos shingles is beautiful, as well as safe and lasting.

Not every home can afford a Colorblende Roof. But every person that sees the roof reproduced in four colors is bound to think more of and more about Johns-Manville Asbestos Shingles—and that helps you, doesn't it?

Every dealer who stocks Johns-Manville Roofing will sooner or later see in the actual sales-preference of his market that Johns-Manville stands first in the roofing world—which we believe is where we should be and where you want us to be. Push Johns-Manville Roofing—especially Johns-Manville Asbestos Shingles.

When you get inquiries for Colorblende Roofs, take it up immediately with the Johns-Manville Branch nearest you. They can help you land the job.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
20 Factories—Branches in 61 Large Cities



Plan To Use This Varnish

Most contractors *know* varnish. They know it doesn't pay to give their clients *cheap* varnish—the kind that brings trouble later on.

Murphy Varnish

"the varnish that lasts longest"

is the ideal varnish for contracting and large scale use. It flows so freely and is so easily applied that it cuts down labor costs. It is less expensive on a square-foot-per-gallon basis, for a little goes a long way.

Use these *longest-lasting* finishes for economy, beauty and durability.

Murphy Transparent Interior
Murphy Transparent Spar
Murphy Transparent Floor
Murphy Nogloss Interior
Murphy Semi-Gloss Interior
Murphy Univernish
Murphy White Enamel
Murphy Enamel Undercoating

Write for information.

Murphy Varnish Company

Franklin Murphy, Jr., President

Newark

Chicago

Dougall Varnish Company, Ltd., Montreal, Canadian Associate

ANA

CORRESPONDENCE DEPARTMENT

Our Readers Are Requested and Urged to Make Free Use of These Columns for the Discussion of All Questions of Interest to Carpenters and Builders

Likes the Blue Prints

To the Editor:

E. Northport, L. I., N. Y.

The blueprinted plans you are putting in the good old AMERICAN BUILDER are fine. The blueprinting of them makes them a great deal more attractive and gives beginners a good chance to study up a set of plans, who perhaps wouldn't get the chance otherwise.

Now, there is one thing I don't quite understand in the set of plans in the April number and that is what becomes of the kitchen chimney after it leaves the first floor. It must be one of those camouflage chimneys.

I have been getting the AMERICAN BUILDER ever since 1908 and like it better every time it comes, for I think it's the finest building paper on the market.

Good luck to the AMERICAN BUILDER, and I hope you keep those blueprinted plans coming in every number.

GEO. EHRLE.

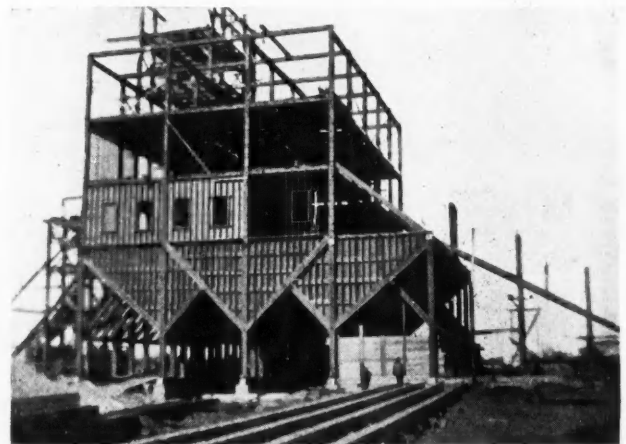


A Mine House

To the Editor:

Lyons, Kan.

Enclosed is a photo of some work that I am doing for the American Salt & Coal Company at Lyons. It is a mine



Mine Building Being Put Up by G. H. Mowery at Lyons, Kan.

building, measuring 80 feet in width by 116 feet long by 125 feet in height.

I have taken your paper from the first.

G. H. MOWERY.



Don't Wait a Whole Year Next Time

To the Editor:

Easton, Pa.

In renewing my subscription, my annual talk goes with it. I think that nothing better has ever appeared in your correspondence columns than what has been written the past few months on jamming, hanging doors, etc. Let me add a few criticisms. One is in regard to speed. The man who can "fit, hang and lock one in 43 minutes" will supply the text. There is a limit to human speed and endurance. The man

(Continued to page 72.)



The GREATEST MOTHER in the WORLD

Stretching forth her hands to all in need—to Jew or Gentile, black or white, knowing no favorite, yet favoring all.

Seeing all things with a mother's sixth sense that's blind to jealousy and meanness; helping the little home that's crushed beneath an iron hand by showing mercy in a healthy, human way; rebuilding it, in fact, with stone on stone and bringing warmth to hearts and hearths too long neglected.

Reaching out her hands across the sea to No Man's Land; to heal and comfort thousands who must fight and bleed in crawling holes and water-soaked entrenchments where cold and wet bite deeper, so they write, than Boche steel or lead.



She's warming thousands, feeding thousands, healing thousands from her store; the Greatest Mother in the World—the RED CROSS.

Every Dollar of a Red Cross War Fund goes to War Relief



This space contributed to the Winning of the War by
BIRD & SON, EAST WALPOLE, MASS.

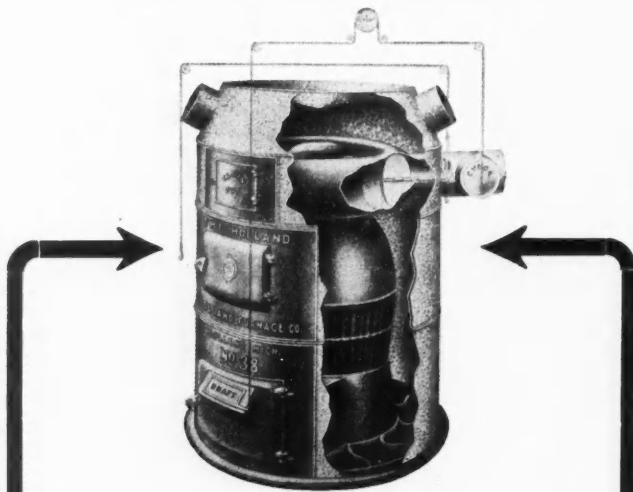
through the Division of Advertising, U. S. Government Committee on Public Information



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

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, Mich.

World's Largest Installers of Furnaces

Holland, Mich.,—2 Factories—Cedar Rapids, Iowa

Ask Any Lucky Owner

Correspondence Department

(Continued from page 70.)

who runs 100 yards in 10 seconds is a wonder. Has anyone ever done the trick in 7, 8 or 9 seconds? So, in all running, jumping and swimming contests, the man who lowers the records by a second or two has his photo in the papers. Carpenter work is athletic, hanging doors particularly so. Speaking for myself, I hang ten doors, size 1½ by 2x6 or 8 by 6-8 or 10, in a day of eight hours. I mention the size of the doors, as that is an important factor. One correspondent says: "A well hung door is a thing to be proud of." This means that the four edges should fit perfectly; hinged stile and lock stile should be smoothed, scraped and sanded, and door should not be "hinge bound." The man who fits and hangs one an hour should satisfy any boss. Thirty minutes for a mortise lock (where no mortising machine is used) is considered average speed here.

I am surprised, from the wealth of information given, that one writer clings to the 7-11 system of spacing the hinges. Note this: The top of upper hinge should line with lower edge of top rail. Bottom of lower hinger with upper edge of bottom rail. Try this system and note the perfect, pleasing alignment. There are so many "short cuts" in the trade, that a man voted slow by using his head is really a fast hand.

One writer says: "Use a plumb level, not a bob." I am looking, waiting and watching for some make of level which will supplant the "bob." It should be worth its weight in gold.

I feel like submitting some more craft talk, but I think I am taking space that belongs to writers who can tell it quicker and better.

FORREST REICHARD.



Wants to Turn Shipbuilder

To the Editor:

Butte, Mont.

What we want most of all now printed in your valuable paper is instructions on shipbuilding as soon as possible. Details of all kinds, telling us the names of the different parts and the methods of construction, as the greater majority of the people who want houses will not build on account of the prices of material. They will buy houses which are built cheaper than to build, so consequently we have to turn our attention to some other work.

A. P. STONE.



A Wide Barn and Some Shop Work

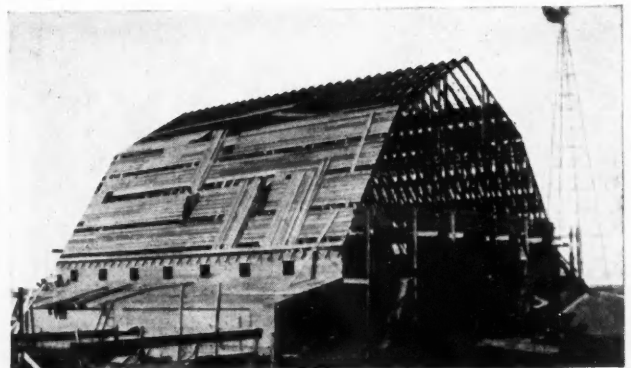
To the Editor:

Pekin, N. D.

It is a long time since you heard from me, so I am going to drop you just a few lines to let you know that I am still enjoying your paper.

I am sending you a postcard taken while we built a barn, which burnt down on October 18. The building is 58 feet wide and 70 feet long. We were eight men on the job.

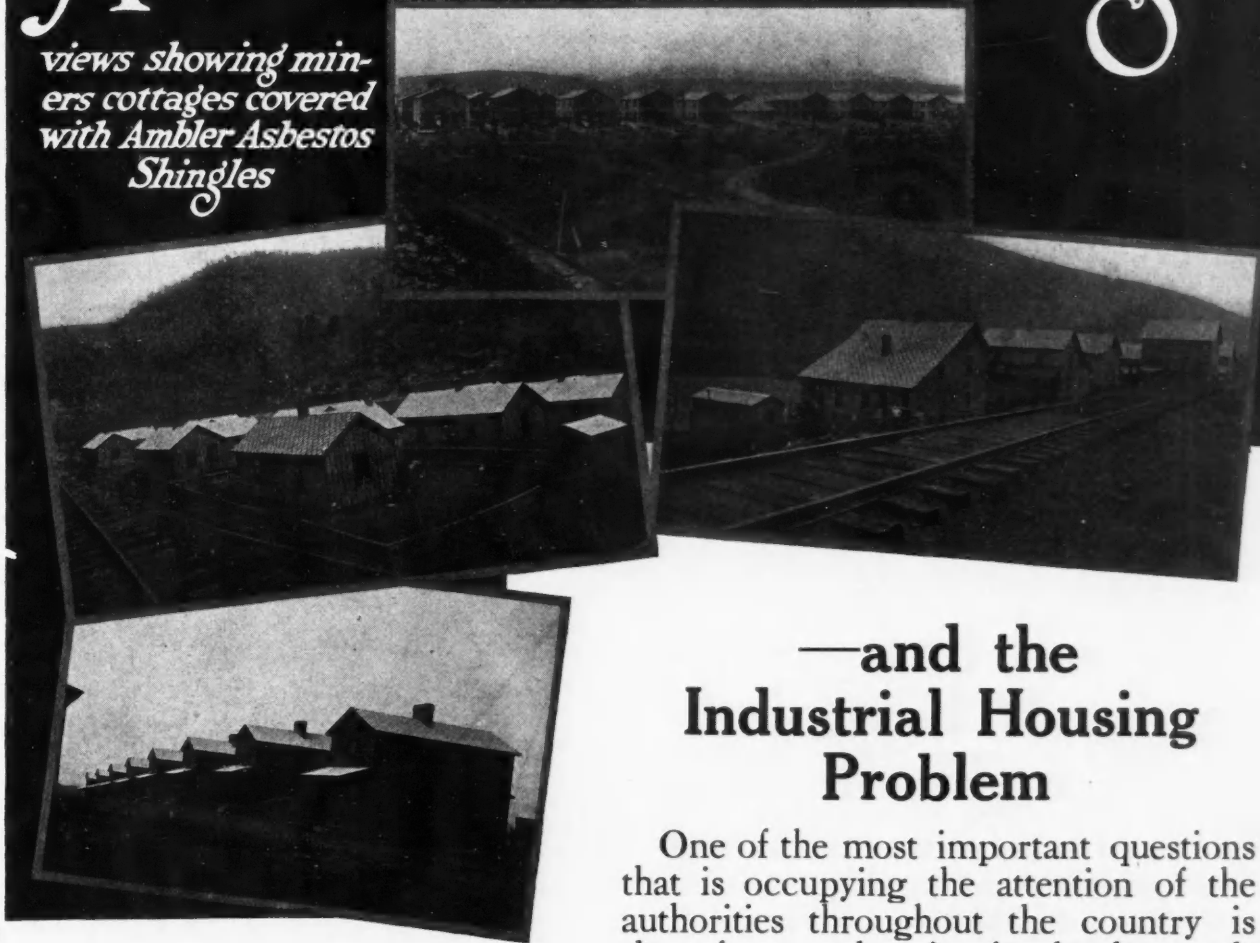
(Continued to page 74.)



Barn 58 by 70 Feet Built by O. S. Houge.

Ambler Asbestos Shingles

views showing miners cottages covered with Ambler Asbestos Shingles



—and the Industrial Housing Problem

One of the most important questions that is occupying the attention of the authorities throughout the country is that of proper housing for the thousands

of laborers at the various centers of industrial activity.

Owing to the "speeding-up" process the danger from fires correspondingly increases. If the thousands of new houses built are not fireproof there is not only danger of a conflagration, but there is also a constant menace to the industrial plants themselves. A spark from a locomotive for instance, may ignite the roof of a house and thereby jeopardize the entire community. Roof the new house with

AMBLER Asbestos Shingles

and the danger will be eliminated because Ambler Asbestos Shingles cannot burn. They are absolutely fireproof, as they are made of cement reinforced with asbestos fibre. Exposure to the elements only serves to make them more durable.

Architects, Contractors and Builders who specify Ambler Asbestos Shingles are doing their "bit" to help reduce the losses from fire.

Space does not permit us to tell the whole story here. Write today for pictures, prices and samples. Estimates gladly furnished free.

Keasbey & Mattison Company, Dept. B-1 Ambler, Pa., U. S. A.

Manufacturers of Ambler Asbestos Shingles, Asbestos Corrugated Roofing and Siding,
85% Magnesia Pipe and Boiler Covering and Asbestos Building Lumber.



Carpenter Shop of O. S. Houge and Some of His Last Winter's Work.

(Continued from page 72.)

I am also enclosing a view of the front of my shop, showing a bunch of furniture for a schoolhouse job which we get out in the winter time when time is not so valuable.

O. S. HOUGE,
Contractor and Builder.



Wants a Glue for Celluloid

To the Editor:

Presidio of S. F., Cal.

Would you tell me what will stick or glue celluloid to wood; also what will glue celluloid to celluloid?

HARRY C. MICHAEL.

More About the Pipeless Furnace

To the Editor: La Fargeville, N. Y.

In regard to the pipeless furnace question by E. W. Cobb, in your April issue, I would suggest that the hot water tank or range boiler could be either in the kitchen or bathroom, as most convenient. It could be set in the partition between the two, so as to warm both rooms, or have one in each room.

An open tank in the bathroom can be used, and will help to warm the room.

Where the pipeless or one-pipe furnace does not seem to meet all conditions it is possible to put in a small pipe, and register, to be used part of the time to give extra heat to some room as desired. There is always the method

of supplementing the heat by a radiator and coil in the furnace.

In our home we have a similar problem, it being practically a double house for two families. When we talked of a pipeless furnace, the furnace man advised two pipes and two cold air return pipes. The furnace has not yet been installed; but this would seem to be the only way.

I should like to inquire how Mr. Cobb is to heat the water for kitchen and bathroom in warm weather, when the furnace is not in use? This might help to solve the other questions. He might use a kerosene, gasoline or gas heater, or stove like a laundry heater, in the bathroom, which would heat the water and warm the room also. One might have a

(Continued to page 76.)

Get the BEST in Lumber—It Costs No More

Lumber that will satisfy and please your customers. Lumber that will work to the best advantage, for there will be little waste. Lumber that looks better and serves better because of its superior quality. That's

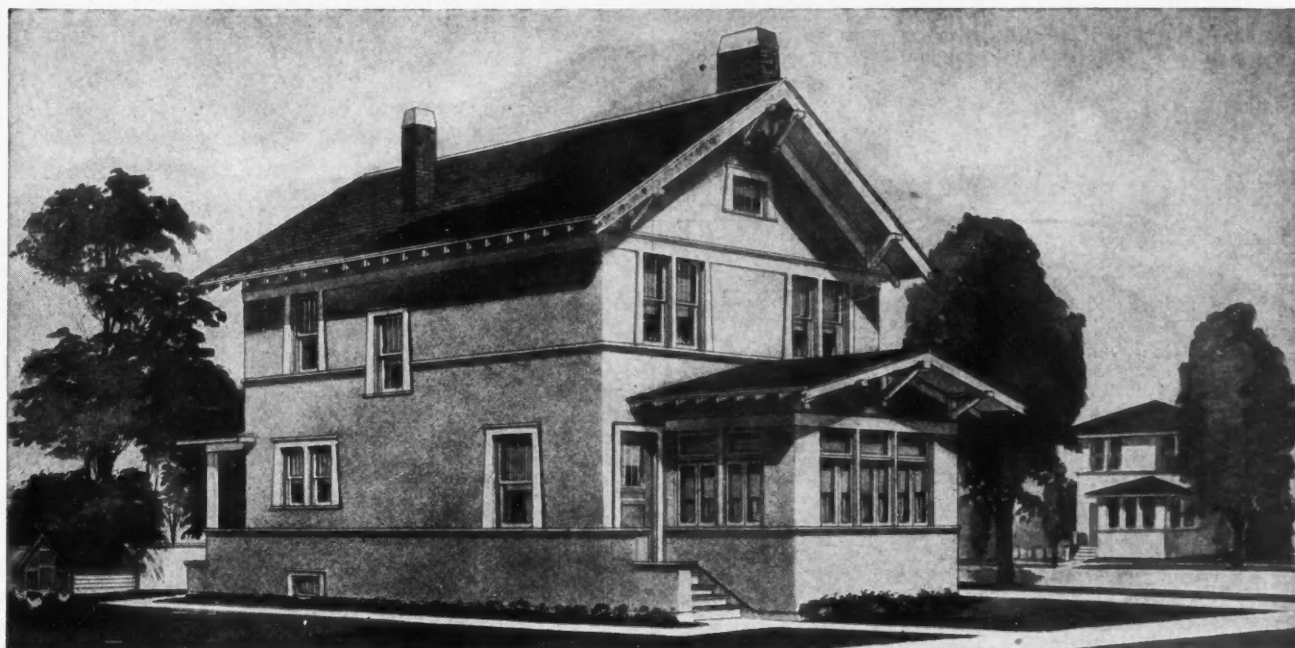
LONG-BELL BRAND LUMBER
"The Kind That Makes Good"

and it costs no more than ordinary lumber! Exactly what you want; properly surfaced finish lumber; perfectly manufactured flooring, ceiling, siding; strong, sturdy, up-to-grade dimension and timbers in Southern Pine; the best of Oak and Gum lumber; famous, above-grade "Forked Leaf" Brand Oak Flooring, and Creosoted Southern Pine fence posts and telephone poles. Let us write you in regard to any or all of our products.

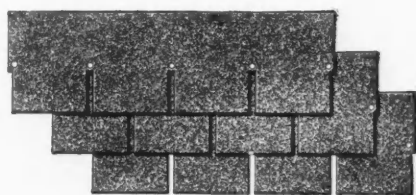
Thousands of good lumber dealers can supply you with LONG-BELL BRAND LUMBER—any good lumber dealer can obtain it for you. Get the best.

THE LONG-BELL LUMBER COMPANY
Dept. T., R. A. Long Bldg., Kansas City, Mo.

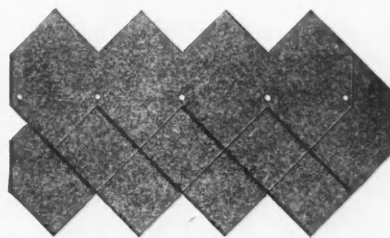
SHORTEN THE ROAD TO VICTORY BUY LIBERTY BONDS



EXPENSIVE roofing materials are prohibited by price for use in Industrial Housing operations. Standards of construction which are being adopted everywhere generally insist upon fire-resistive roofs, and thus practically eliminate wooden shingles. The Asphalt Shingle is the economic roofing for such operations, because it fully meets all requirements.



THREE COLORS—RED, GREEN, MOTTLED



TWO COLORS—RED AND GREEN

REX STRIP SHINGLES

Are the most economical of all styles of Asphalt Shingles. This is true for every operation in connection with their use—first cost—cost of freight—cost of nails—cost of labor to lay them—cost of upkeep. Yet they are so durable—so permanently beautiful—so thoroughly satisfactory that they are used on expensive residences everywhere. They are guaranteed ten years—never require paint—and are approved by the Underwriters' Laboratories.

We make five styles of Asphalt Shingles in two colors—dark red and green. REX STRIP SHINGLES and REX WIDE SPACE SHINGLES are also made in a beautiful mottled combination of red and green slate. These are natural slate colors and are therefore permanent.

Ask for Catalog, samples, prices.



THE FLINTKOTE COMPANY

98 Pearl Street, BOSTON, MASS.

NEW YORK

CHICAGO

NEW ORLEANS

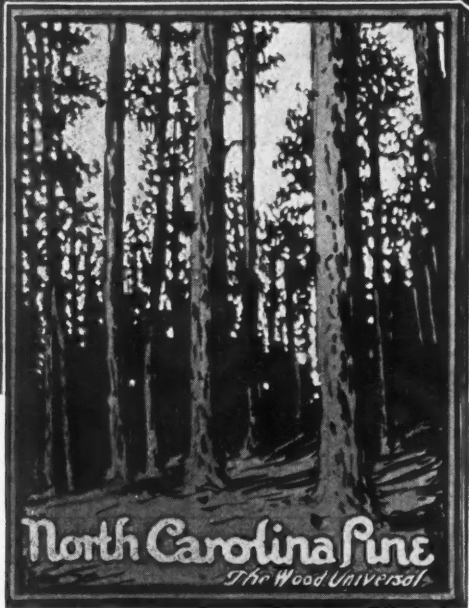
1104 Equitable Bldg.

651 Peoples Gas Bldg.

701 Hennen Bldg.

Factories: RUTHERFORD, N. J. CHICAGO, ILL.





This Valuable Book FREE to You

If you have not already secured your copy of our excellent Reference Book for Contractors and Architects we want you to send for yours today. It's free for the asking, and of such practical value that every contractor, carpenter or builder should have a copy. Besides discussing general building subjects, it acquaints you with the merits of

NORTH CAROLINA PINE

"The Wood Universal"

Without exaggeration of facts, no other wood will impress your customers more favorably or open up to you so many avenues of trade and profit.

North Carolina Pine possesses every desirable quality, particularly when used as interior trim or flooring. Being free from resin to a high degree, it takes stains and enamels in splendid shape. Its cost, moreover, will satisfy the customer who wants economy without sacrificing quality.

Ask for Any or All of These Books

We also have other books, equally helpful, as follows: Home-Builders' Book, containing information on home-planning and building; A Book of Home-Interiors, with illustrations and facts on this subject.

Any or all free on request.

North Carolina Pine Association
72 Bank of Commerce Building
Norfolk, Va.

Correspondence Department

(Continued from page 74.)

portable oil heater which can be used in the kitchen, bathroom or any room as needed.

In conclusion, while the pipeless or one-pipe furnace is admirably adapted to some houses and their requirements for heat, like all good things, it has its limits of service and is not just the thing for an apartment house or hotel.

If we are to be limited to our coal supply and are to have winters such as the last one, it would be well to be a little ahead of the game and be prepared to use such fuel as one can get and a little more than might seem necessary just now.

The article in the April issue, page 65, and illustrations, page 130, may be of help in planning for hot water supply and getting extra heat in kitchen and bath. In fact, this problem seems to be met on page 67 of your April issue.

JOHN UPTON.



Charging for Jobbing Work

To the Editor:

Washington, D. C.

As I have entered the carpenter jobbing business, I would appreciate a few helpful points thru your Correspondence Department, if it does not take up too much of your valuable time.

In doing work where the material is supplied by the owner, what is considered a reasonable charge per hour with wages in this locality at 62½c, and some are paying 65c to carpenters? Is there any gain in my buying the material instead of the owner? If so, where? Some of my customers only pay me for the time the men are on the job and I have to lose the time they travel from one job to the other. How about this? Should I simply refuse to do their work?

I would appreciate a little help from someone who knows.

WM. CARDWELL.

Carpenter and Builder.



Wants to Bind His Magazines

To the Editor:

South Fork, Sask., Can.

"Kicks from a Good Kicker," are extremely good as regards keeping advertisements separate from reading matter; and then at the end of the year have for sale a good, strong binder for the magazine.

About brick work, as you are AMERICAN BUILDER perhaps Kicker made a mistake by writing and asking you to leave it for the masons. Kicker is a selfish man.

J. SAMOULLAN.



Wants Adjustable Weights

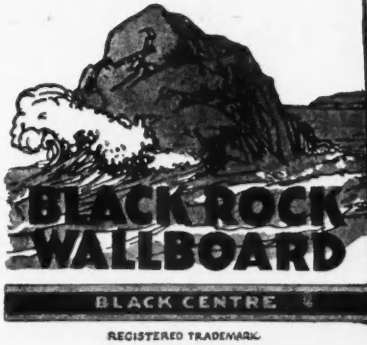
To the Editor:

Lemoine, Pa.

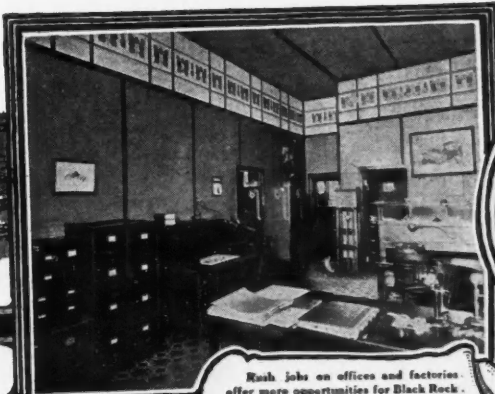
I wish to make a suggestion to the manufacturers thru the columns of the AMERICAN BUILDER, which I think will be of some benefit to our builders. For various reasons, it often occurs that sash weights are either too heavy or too light. If too heavy they sometimes can be broken off a little, but to increase the weight without going sometimes a long distance to the hardware store to purchase heavier weights, is a difficult matter.

I think it would be a good idea if the manufacturers would make, say half-pound or pound weights with a hole thru the center large enough for the sash cord to pass thru, and if the large weight is too light, just place a sufficient number of the small weights on top of the large one to give the required weight. Only a short time ago I had occasion to hang sash in a twin window requiring 1¾-inch weights, and of course, the four weights in the middle weight box, which was only 3¼ inches wide, filled the box full, without any

(Continued to page 78.)



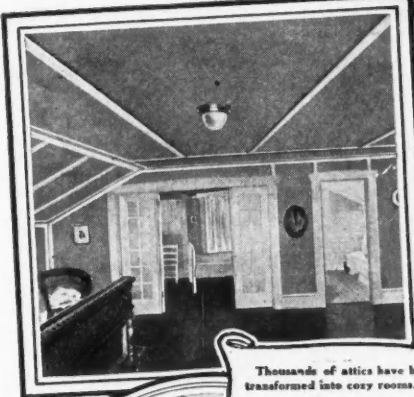
REGISTERED TRADEMARK



Such jobs on offices and factories offer more opportunities for Black Rock Wallboard.



The ideal way to finish the interior of a store—quick, permanent, beautiful.



Thousands of attics have been transformed into cozy rooms.



Many houses are being remodeled throughout with Black Rock Wallboard.



Black Rock Wallboard takes the place of plaster in many a modern living room.

Black Rock Wallboard profits are all extra profits

The plasterer never sees the inside of many a modern building. Instead, the builder gets the work and the profits, by using Black Rock Wallboard.

How many thousand attics have been transformed into pleasant rooms with Black Rock Wallboard—more extra profits!

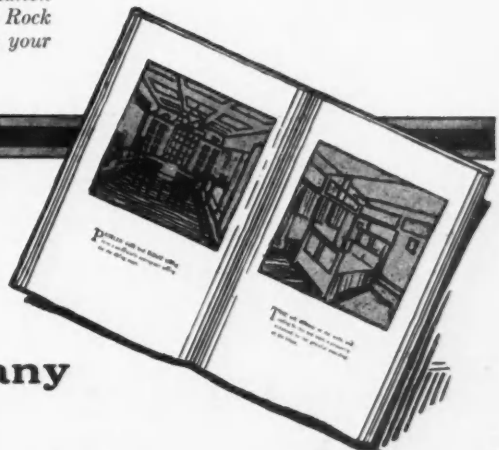
And for the hurry up job in office, store and factory—how often Black Rock Wallboard saves the day and adds again to the builder's profit!

Besides, Black Rock Wallboard handles easily, looks well and stands up wonderfully. **And you can get it when you need it.**

Dealers: Write for information about exclusive Black Rock Wallboard agency in your city.

Send for Free Wallboard Book

Gives you many ideas on ways to use wall-board—shows photos of actual Black Rock Wallboard jobs—and explains our free Plan Department for builders. With the book we send an actual piece of Black Rock Wallboard.



Black Rock Wallboard Company
1505 Ontario Place Black Rock, N. Y.



Frame Work for Skating Rink, 76 by 200 feet, at Campbellton, N. B.

room for working. About the only thing to be done was to get a weight $\frac{1}{4}$ inch less in diameter, which was too light, and I wrapped sheet lead around the cord above the weight to give it the required weight. This sheet lead cost me 75 cents for two weights. If I had had a few small weights, as I suggested, I might have done the work quicker and saved the owner some money. I think a few small weights, as I suggest, always on hand, would help out quite often.

F. E. KENNEDY.



How Do You Use Cobble Stones?

To the Editor:

Would like to have details of cobble stone construction.

Lucerne, Ind.

E. A. SIDERS.

A Canadian Rink Frame

Campbellton, N. B., Can.

To the Editor:

I am sending you a photo of the plank frame of a skating rink I built in Campbellton. The size of this building is 76 by 200 feet; ice surface 62 by 175 feet. This building was destroyed by fire in 1911 and I rebuilt it in 1912.

If you can find space in your always improving "Builder," it may be of some interest to the readers and call their attention that Canada is on the map and we trust with Uncle Sam's help in this great war to share the praise of an honorable victory. With best wishes.

W. H. WALLACE,
Contractor and Builder.



Gothic Roofs for Barns

To the Editor:

LaFargeville, N. Y.

To help T. P. Decker, of South Dakota, in your April issue, who asks about the Gothic roofs for barns, and to answer questions asked by E. G. Opitz and others who might be interested:

Trusses for this kind of a roof, called a "Gothic," "Curved," or "Barrel" roof are some different from those for gambrel roofs, having more layers, shorter pieces, on a curve, and having no braces except at bottom and top; and are entirely above the plate, like those of the braced rafter construction.

The frame up to the plate is the same as for any roof. The plate should be doubled, 2 by 6 or wider, and while there does not seem to be much thrust or tendency to spread

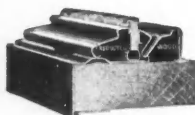
(Continued to page 80.)

Brasco

COPPER STORE FRONTS

Offer Countless Possibilities

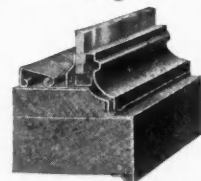
for the development of sturdy, attractive, trade-winning Store Fronts. The contractor who uses Brasco knows its enduring qualities and knows that the simple and practical mechanical principles insures safety in glass setting and provides ample drainage and ventilation.



Brasco Type

SOLVE THE HIGH COST

*of Modernizing
the Store Front*



Brasco-Hester Type

by employing Brasco or Brasco-Hester construction. The initial cost (lower than any other) is the only cost. A careful study of the details is necessary to adequately understand the superior qualities and to appreciate that from all points of view it measures up to every requirement.

The coupon is for your convenience.

COUPON

BRASCO: Please send me Catalog and folio of Store Front Details.

Name _____

Address _____

A B-5-18

Brasco Manufacturing Company

5029 S. Wabash Avenue
CHICAGO

We Build Up a Permanent Business for You

We develop the roofing business in your city. Through all means of advertising and personal selling we go out and get the job or the prospect and turn it over to you.

We want responsible contractors and builders in every town to co-operate with us and the local dealer in selling and applying Art Craft Roof.

Our proposition is absolutely reliable —backed by a most responsible concern, with a reputation of 123 years of square dealing.

Art Craft Roof

RED—GREEN—SILVER GRAY

NAILS RIGHT OVER OLD ROOF OR DIRECT TO BOARDS

The only roof that nails right over old roof or direct to boards.

Art Craft roof is applied in strips, but the effect is that of individual shingles or tile as shown in above illustration.

Art Craft is a guaranteed material. It must give satisfaction. It can't leak or rip off. It costs only half as much as a shingle roof and is many times better.

Art Craft will improve the looks of any home, whether it be a mansion or humble cottage.

Don't delay in sending this coupon for big samples and complete information about Art Craft Roof and our plan for putting contracts into your hands. Your profit is sure and liberal. Send the coupon today—NOW.

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CHICAGO



BIRD & SON,
Dept. C, Chicago, Ill.

Send me samples and complete information about Art Craft and your plan for giving me contracts.

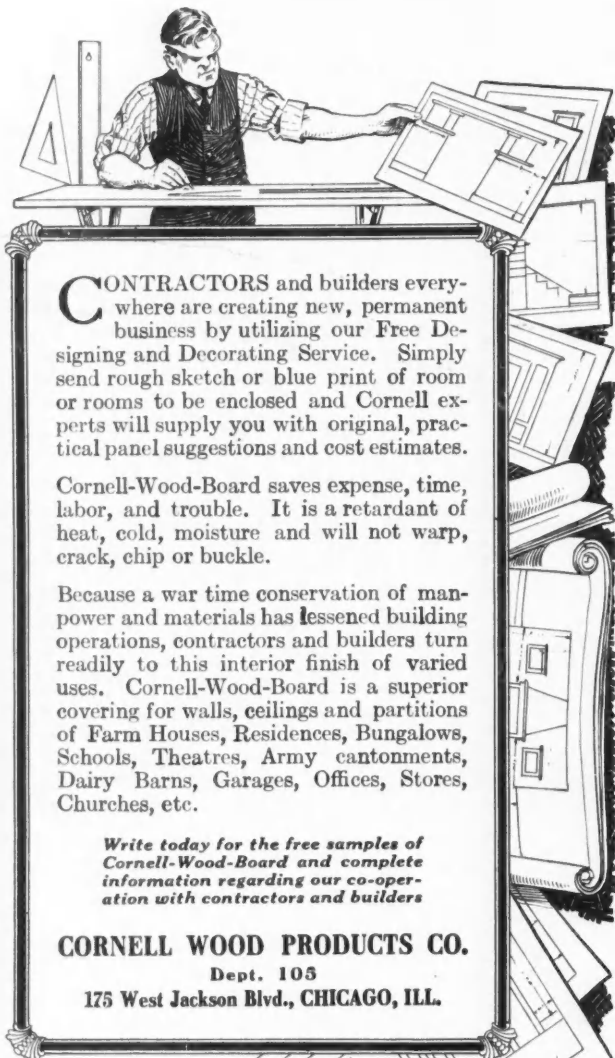
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Cornell-Wood-Board

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

Our Plan Service Enables You to Create Profitable Business



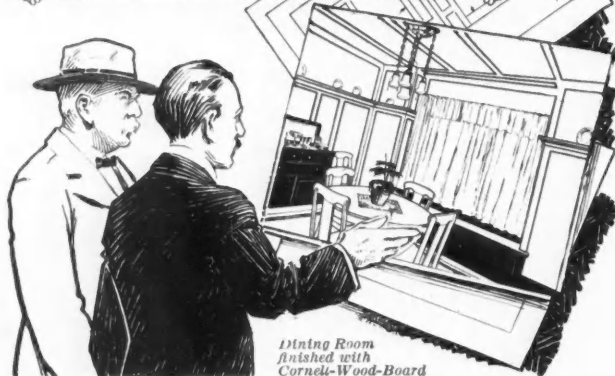
CONTRACTORS and builders everywhere are creating new, permanent business by utilizing our Free Designing and Decorating Service. Simply send rough sketch or blue print of room or rooms to be enclosed and Cornell experts will supply you with original, practical panel suggestions and cost estimates.

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Because a war time conservation of manpower and materials has lessened building operations, contractors and builders turn readily to this interior finish of varied uses. Cornell-Wood-Board is a superior covering for walls, ceilings and partitions of Farm Houses, Residences, Bungalows, Schools, Theatres, Army cantonments, Dairy Barns, Garages, Offices, Stores, Churches, etc.

Write today for the free samples of Cornell-Wood-Board and complete information regarding our co-operation with contractors and builders

CORNELL WOOD PRODUCTS CO.
Dept. 105
175 West Jackson Blvd., CHICAGO, ILL.



Correspondence Department

(Continued from page 78.)

at the eaves, I would suggest that as a precaution one could spike a 2 by 4 on top of the plate at the outside, and notch the trusses to fit onto and inside this, or if the stuff is wide enough the truss could have a shoulder to come down inside the plate.

Of course, the braces running up from the floor joists will help; but for wide spans there may well be some surplus strength, tho I do not see any reason why this roof cannot be used for a wide span, provided the material is heavy enough.

The radius for getting the curve is commonly taken as about three-fifths the width of the barn. On the 30-foot span this would be 18 feet, on a 36-foot, about 21 feet. Forty feet would give 24-foot radius. Forty-five feet gives 27 feet as the height of the peak above the plate.

The curve is generally made from a point level with the plate, but in the February issue it seems to be taken lower down, but still brings the peak up to a good height, because the radius used is more than three-fifths the span; in fact, three-fourths. In all cases the peak is higher than with a half pitch roof. The extra height comes down next to the plate where the roof is almost perpendicular. There cannot be much outward thrust on the lower part of the roof and above this the weight will help to overcome it.

There is a way to figure out the curve of the rafter by a formula, but the most of us, when we have it figured out, would want to prove it out life size, so we may as well get it that way at first. Supposing that the loft floor in the barn is laid or that we have any floor available. Draw a line square across it. From one end of this line measure the span of the roof; that is, the width from plate to plate. Divide this into five equal parts and take three of them. Use a line equal to three-fifths of the span and strike a curve, using a piece of chalk or a pencil to mark with. This gives you the curve for the rafter.

These rafters can be made of two or three layers of 2-inch plank, or four or more layers of inch boards, according to which you can get most readily and can work to best advantage. The length does not matter so much, but they had best be as long as will work well. They can be ripped out by hand or sawed with a band saw, or the corners may be hewed off. Page 52 of your April issue gives one idea, the February issue gives us another.

The sub-rafters between the trusses may be strips of 1 by 3 or 1 by 4 resting on purlins of 2 by 4 set between the trusses and dropped below them to the thickness of the strips, or the rafters may be built up of three or four layers of narrow strips (1 by 2 or 1 by 3 on the flat), which have been built up on the outer curve of the truss and nailed together while sprung to the right shape. These should be cut an inch short at the top to allow for a 2-inch ridge piece set in between the trusses. Where the rafters are built up the purlins are not used, tho it might be well to put in one or two rows, even tho they were in flat.

The cuts at the top and foot of the rafters are easily found by laying out a pattern full size on the floor, or if one prefers a straight rafter can be made of the length and pitch required to get the same height peak, and used for a pattern.

The foot cut is level and the top cut square with it or plumb, no matter what shape the rafters may be between them. Mr. Opitz sets the truss out $\frac{3}{4}$ inch beyond the plate so the sub-rafter can be nailed against the edge of the plate. This is almost necessary where one uses a single strip, as he does, and is all right where more strips are used and purlins omitted, but the rafter must be made accordingly.

I notice that both designs call for a 2 by 8 brace from

(Continued to page 82.)

THE SATURDAY EVENING POST

Make a Clean Job of It
When You Repair or Remodel

See how easily you can cover up old, dingy, cracked walls and build-in perfectly new rooms all over the house—all without muss or fuss.

Quite a contrast between doing your re-paring and remodeling with clean panels of Beaver Board and trying to get a present job with messy bats and plaster.

Possibly you didn't realize that there is such a difference and possibly that's why you have been putting up with old, cracked plaster walls and ceilings instead of tearing them out and plastering them in again.

Now you can use Beaver Board and put it right on top of the old walls and ceilings. With Beaver Board you can make usable rooms out of useless spaces in attic and basement.

Then too it is so good for the new house as it is for remodeling the old one.

Beaver Board is a new form of lumber. It's built up from the strong clear fibre of the spruce tree into large sturdy panels of knottless, crackless manufactured lumber. It's moisture-proofed by a patent process that prevents warping. Beaver Board will last as long as the building.

The booklet "Beaver Board and Its Uses" will give you many practical building hints. Let us send you a copy.

THE BEAVER BOARD COMPANIES
Buffalo, N. Y.

BEAVER BOARD
FOR BETTER WALLS & CEILINGS



You can't expect Beaver Board results unless this trademark is on the back of the board you buy.

Beaver Board Advertising Creates New Business for You—

All Beaver Board advertising is a boost for new building, remodeling and repairing. It is a big force constantly at work stirring up new jobs for contractors and builders all over the country.

Pick up most any issue of the Saturday Evening Post and you'll see a full-page advertisement that is creating new business for you. All you need to do is to let the people of your city know Beaver Boarding is a part

of your work, and that you're ready to figure on any kind of building they may contemplate.

This Beaver Board advertising brings you lots of other work, too. Every Beaver Board job means trim, doors, flooring, etc.

Our Department of Design and Decoration is ready to help you with your plans and estimates. Let us send our interesting literature.

THE BEAVER BOARD COMPANIES
35 Beaver Road Buffalo, N. Y.
Branches in Boston, New York, Baltimore, Cleveland, Detroit, Chicago, Minneapolis, Kansas City and San Francisco.
Manufacturers also of Beaver Greenboard and Beaver Blackboard.
Distributors in Principal Cities. Dealers everywhere.

BEAVER BOARD

FOR BETTER WALLS & CEILINGS

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

Permanent—No Repairs

YOUR INDUSTRIAL HOUSING JOBS SHOULD BE CONSTRUCTED OF BRICK. Brick is the only modern and permanent construction material in existence. No painting. Minimum upkeep expense. Weather-proof. Just as easy to use as frame.

Put It Up To Us

Tell us about your new industrial housing jobs. Use "Artfashioned" brick. Give your client a more permanent home. NUVOGUE "ARTFASHIONED" BRICK is on sale at hundreds of lumber yards all through the Middle West.

"Artfashioned" brick is very popular because of its many advantages. Made in many beautiful colors. A variety of textures. Made suitable for every style of architecture; for bungalow or mansion.

Buy From Your Local Dealer

We want your local dealer to furnish you with NUVOGUE "ARTFASHIONED" BRICK. He should have it, if not—tell us. Write us for further information.

Manufacturers of "Artfashioned" Brick
BOONE BRICK TILE & PAVING CO.
Boone, Iowa

Sales Offices all through the Middle West



WITHOUT OUR ESTIMATE YOU HAVE NO COMPETITION

The Whitacre-Greer Fireproofing Co.

Manufacturers of
**HOLLOW TILE FIREPROOFING
and BUILDING BLOCK**

Waynesburg, Ohio

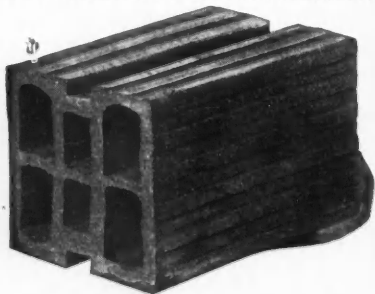
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FIREPROOFING MADE OF PURE FIRE CLAY

"HEAVY DUTY" INTERLOCKING TILE

The **STRENGTH** of BRICK and the **DRYNESS** of TILE are combined in Vigo American Heavy Duty Interlocking Tile to make a **BETTER** wall than solid brick and at two-thirds the cost.



We also manufacture Fireproofing, Building, Arch, Partition and Drain Tile, Hollow Brick and other shale products. Send for our literature.

**VIGO-AMERICAN
CLAY COMPANY**
7th and Ohio Sts., TERRE HAUTE, IND.

Correspondence Department

(Continued from page 80.)

truss to floor joist. Mr. Opitz runs his up higher and a little slanting. I don't think it need be so long. I think two 1 by 8 boards would be better than one 2 by 8, or would use 2-by-5's. Should want one on each side of each end of each truss.

Another point (February design), floors joists are notched to rest on 2-by-4's spiked to the girder. I do not think this is as strong as when put on top. Surely it does not give as strong a tie across the barn. If one compares designs in February and April issues, one will get ideas which the writer has omitted.

How did he get the picture on page 50 of the April issue? (Answer: From top of silo.)

Is there a mistake where it says "three feet thick"? (Answer: Yes. It should be three plank thick or three thicknesses of plank, according to detail on page 52.)

JOHN UPTON.



Wants to Roof Concrete Stave Silo

To the Editor:

Timewell, Ill.

I have been a reader of your magazine for almost two years and find it a great help to our trade in many ways. I would like to have some information on how to frame a gambrel roof on a concrete stave silo. The silo is 16 feet in diameter. Would like to hear from any of the brother carpenters who have done this kind of work. I want to know how the roof can be framed on the narrow walls, which are only 2 inches thick and be made secure.

M. C. MORRISON.

The Housing Committee's Attention

Is respectfully Drawn to the Merits of the Milwaukee Corrugating Co's

"NETMESH"



Non-Rusting
Crack-Preventing
Fireproof
Ratproof

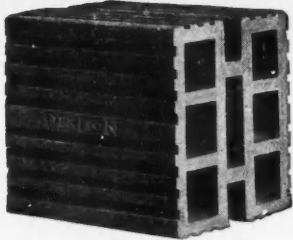
Uniform and Perfect Mesh

All Gauges

Milwaukee Corrugating Co.

Branch at
Kansas City, Mo.

Milwaukee, Wis.



Size 8 1/4 x 10 1/4 x 12"
Patented July 31st, 1917

SAVE-25%

*on all
Permanent
Construction*

Strength—Permanence

These beautiful farm buildings shown in the illustration below are built with

Denison Hollow Tile

The house is constructed with Denison Load Bearing Tile and has a covering of stucco.

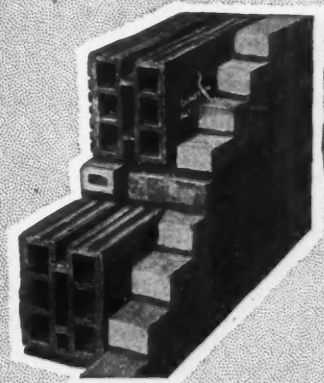
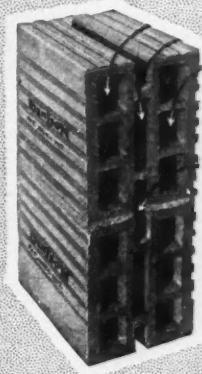
Just think! Carries load of over 70,000 pounds to the square foot of bearing surface. 25% cheaper than brick. Absolute Permanence. Saves mortar. Provides warmth and dryness. Can be finished with face brick, plastered with stucco, or left with the tile exposed. Inner sides grooved to clinch plaster—no furring necessary.

Contractors! Builders!

Big Profit For You. An assured satisfied owner. Send for Portfolio of Construction Details and prices at your nearest shipping point.

Made by the

Mason City Brick & Tile Co.
Mason City, Iowa 900 8th Street



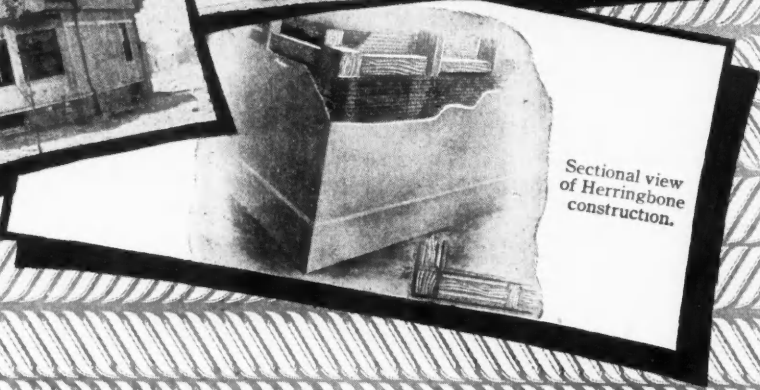
Farm Buildings at Mason City, Iowa. Owned by Mr. J. B. Schermerhorn, Chicago, Ill.



Fire-safe Herringbone construction is helping to solve the industrial housing problem in Ohio.



A group of typical Herringbone homes built by the Indiana Steel Co., Gary, Ind.



Sectional view of Herringbone construction.

Build Industrial Homes of Stucco on Metal Lath

Do you know that this method of building industrial homes is rapidly becoming the standard?

Do you realize that it is one of the most economical types of fire-safe and permanent homes construction in use today?

Are you familiar with the construction? Could you furnish an estimate on it and perform a contract if it were awarded you?

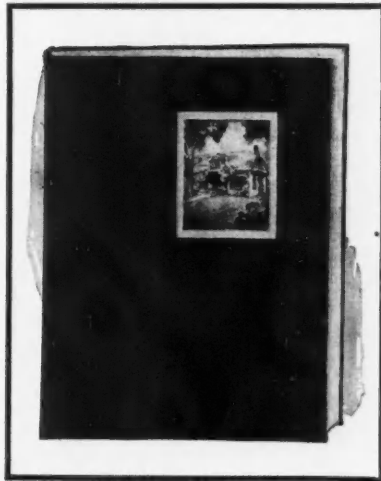
These are vital questions for every contractor, especially if he is located in communities where industrial homes must be built.

Such homes must be built well. Fire traps are a waste of money and a community and the nation cannot tolerate waste.

Houses that require continual repairing, also are bad investments. Low first cost is only a lure that leads to disappointments.

Metal lath and stucco houses are simple to build. The materials required take up the minimum of transportation facilities, therefore benefit the nation in its task of winning the war. Special tradesmen for doing the stucco are made available by the falling off in other lines of building.

If you want to familiarize yourself with this entire Industrial Housing problem and if you desire full knowledge of the best practices in stucco house building, get a copy of the book here illustrated. It shows house designs and contains a large amount of information on how such houses should be built. Sent free of charge to any contractor or executive who writes for it on his business stationery and mentions the housing project in which he is interested. Others desiring the book can secure a copy by remitting 75 cents with inquiry. Stamps accepted.



THE GENERAL FIREPROOFING CO., Youngstown, Ohio

Manufacturers of Metal Lath, Concrete Reinforcements, and Waterproofings

Members of Associated Metal Lath Manufacturers



**Branch Offices: New York City Chicago Philadelphia
San Francisco Kansas City Atlanta Cincinnati Buffalo Utica**

The best dealer in your town has GF Products in stock

Herringbone Rigid Metal Lath



SUPREMACY



The Wedge-Dowel Construction prevents sagging and opening at the joints.

THE great popularity of Morgan Doors among home-builders rests on five things:

- Beautiful, selected woods
- Extra thick veneers
- The All-White-Pine Core
- The patented Wedge-Dowel Construction and
- The positive guarantee of satisfaction

They offer the best value for the contractor because they do not require constant re-trimming and re-hanging. When the job is done it's finished, once and for all; and they insure satisfied customers.

Send for Morgan Millwork Handbook Today

It tells you all about Morgan Doors and Morgan Millwork.

Morgan Sash & Door Company

Dept. 75 Chicago

Morgan Millwork Co., Baltimore
Morgan Co., Oshkosh, Wisconsin



The All-White-Pine Core prevents swelling, warping and shrinking and insures perfect service in a door.

Military Roads Needed Connecting Our Larger Cities

By George A. Kissel
President Kissel Motor Car Co.

The number of registered automobiles has increased from 3,394,314 in 1916 to over 5,000,000 in 1917. The State of Illinois alone showed an increase of 92,000 registrations in 1917 over 1916.

Of the 1,806,194 motor vehicles produced by American manufacturers in 1917, 112,200 were motor trucks, and during the last six months the proportion of trucks has been greatly increased by the government's war orders, which have involved for many builders a big addition to their normal business.

Mars on a Truck Chassis

Three years of war have done much to perfect the motor truck. And at the same time, war has raised the price of horse meat to an almost exorbitant figure. War has already forcibly increased the capacities of American motor truck factories and in case the war continues for any greater period we can look forward to further almost revolutionary changes.

The activity of 1917 is but a foretaste of what may come to American truck manufacturers, for beginning in the year 1917 the program of placing Mars on a truck chassis also included arrangements for producing 30,000 of the new three-ton standardized trucks—an order which alone equals one-third of the entire number of trucks actually produced by all factories during the past year. Contracts for 10,000 of these, amounting to approximately \$50,000,000, have already been awarded.

In addition, the army will need enormous quantities of lighter standardized trucks and thousands of those built according to the manufacturers' individual designs. Many of these also have been ordered during the recent months of 1917.

Military Use of Highways

For years the automobile has been fostering good roads, and now you may truthfully say whatever good highways we have are mobilized for war uses.

The Highways Transport Committee of the Council of National Defense, of which Roy D. Chapin of Detroit is chairman, is sending pathfinder cars over various routes from the central states to the coast, at the request of the Quartermaster's Department, to find the most feasible roads for sending overland the government's standardized trucks. If this plan goes thru, it will be the first great military use of the highways. No doubt there will be much inspiration in seeing these truck trains, with their personnel of soldiers, passing thru the country. Just now the National Highways Association is fathering a system of 50,000 miles of national highways, which would serve 84,000,000 people.

Another feature of road mobilization is prospective legislation fathered by the American Automobile Association and the American Association of State Highway Officials for a marginal national highway around the border of the United States with various radial highways, to facilitate movement of troops, equipment, munitions and supplies in times of war or peace. Altogether, motordom mobilized looms big and formidable in our program of war.

Trucks Relieve Railroad Congestion

Motor trucks, during 1918, will be extensively used in the inter-city and inter-state haulage of freight, and the greater this traffic on our highways the more urgent the need for more thousands of miles of hard surfaced roads connecting:

(Continued to page 88.)

\$10

Brings this latest Improved ALOE Convertible Level

Simple to operate—no technical education needed.

Combination Level and Transit

Think of it—for only \$10.00 we will send this latest improved Aloe Convertible Level, just to prove to your satisfaction that this is an instrument you can't afford to be without. The picture we show you of the Aloe is as accurate as a photographic reproduction can be made. The description we give you and our statement of the work that can be done with it are absolutely accurate in every respect.

But—neither the picture nor the description will so convincingly prove the real merits of this remarkable combination level and transit as an actual trial of the instrument itself.

When you have it in your own hands, carefully examine its fine construction and improved features and finally when you set it up and see how simple it is to operate—how exacting in accuracy it is for doing any kind of leveling work—then and then only will you know for an absolute certainty that the Aloe is the best convertible level you could possibly buy, and that it is without a doubt, the

Biggest Value Ever Offered For never before has there been a convertible level constructed of such high grade material, of such fine workmanship and finish, so complete in every particular and of such absolute accuracy that has ever sold at such an astonishing low price—on such easy terms.

We can afford to give you this bigger and better level value because we make the instrument and sell direct to the man who uses it. There are no middleman's or dealer's profit for you to pay. Therefore you can get this high grade, accurate combination transit and level at actually a bargain price and if after a thorough trial you decide to keep it, you have nearly a year to pay for it.

10 DAYS' FREE TRIAL MONEY BACK

We have such great confidence in the Aloe Convertible Level that we want you to try it 10 days at our risk. Put it to the most exacting tests. See with what minute accuracy you can level up a wall or foundation—grade a walk—survey a lot—or any similar work where accuracy is required. In fact it is so accurate you can detect an error of 1-16th of an inch in 300 feet.

Examine its construction—note the freedom from complicated and unnecessary parts or attachments, how simple it is to operate. Then if at the end of 10 days you are perfectly satisfied that the Aloe is the best instrument you can get for doing your work, keep it and pay the balance (\$55.00) in eleven monthly payments of \$5.00 each. If not perfectly satisfied return it to us and we will immediately refund your \$10.00.

You Save \$5.00 The regular cash price of ordinary convertible levels as sold by dealers is \$70.00. Our price for the Aloe is only \$65.00, but all you need send now is \$10.00. As a matter of fact even if you paid all cash for the Aloe, you would save \$5.00—but we do not ask you to send all cash for it. Send only \$10.00—we will ship the instrument promptly subject to your examination.

Why Pay More? No other convertible level at anywhere near the price begins to compare with the Aloe in material, workmanship, finish, accuracy and all-around adaptability. And you can't afford to buy a cheaply constructed level at any price. On the other hand it is not good business—nor is it necessary for any man to invest a big sum in a highly complicated instrument so cluttered up with attachments that only a trained expert can use it.

The Aloe will do accurately all the work you will ever have for either a transit or a level. We positively guarantee this and leave it to you to be the judge.

USE COUPON NOW

Fill out and mail the coupon to us today with \$10.00 and prove to yourself that the Aloe Convertible Level is just what you have been waiting for. You run absolutely no risk—if you are not perfectly satisfied at the end of 10 days' trial, return the instrument at our expense and get every cent of your money back. If the trial convinces you that it is the biggest value ever offered and that it will prove profitable to keep it, simply pay the balance at the rate of only \$5.00 per month for eleven months. You have everything to gain and nothing to lose, so send coupon right now—today.

A. S. ALOE CO.,
626 OLIVE ST. ST. LOUIS, MO.



SPECIFICATIONS

"Telescope:" Length 12 inches, magnifying power 18 diameters, achromatic terrestrial of good definition focused by rack and pinion. The bubble to telescope is 5 inches long and graduated to facilitate leveling up. Tangent screw is of improved style. Horizontal circle, diameter 4 inches graduated to degrees, numbered 0 to 90 each way with vernier reading to 5 minutes. When the instrument is used for leveling, the telescope is reversed and placed on the fixed bearings on each side. The instrument packs whole and stands erect in a nicely finished box.

Mail At Once

A. S. Aloe Co., 626 Olive St. St. Louis, Mo.

Enclose find \$10.00. Please send me one fully equipped Aloe Convertible Level. If found satisfactory I agree to pay the \$55.00 balance in eleven monthly payments of \$5.00 each. Otherwise I will return the level within 10 days and you are to return to me my \$10.00.

Name.....
Address.....
City..... State.....

Military Roads Needed

(Continued from page 86.)

our larger centers and in the construction of these highways, motor trucks will be extensively used. Then the motor truck becomes an increasingly important factor not only in relieving railroad congestion, but in rushing to economical completion a net work of permanent highways.

The American farmer has been appealed to from every side to increase his crops that the world may be supplied with food and that the price may be kept down. Yet not a bushel of grain nor a pound of meat is grown in this country that does not, at some time in its journey from the point of production to the point of ultimate consumption, pass over some of our American highways on its way to the railroads.

As we were unprepared in shipping and in railway requirements, in munitions and war supplies, so were we also unprepared in the physical condition of our highways for this sudden transformation of trade. But as we have met the other and greater problems so can we meet and solve this one.

Build Highways to Fit Traffic

Thoroughly organized freight and express service might well be adopted by those communities suffering from freight congestion, utilizing the motor truck for the collection of raw materials and the delivery of finished products within a radius of 100 to 150 miles. In fact, this is the immediate purpose to which the recently appointed Highways Transport Committee of the National Council of Defense are giving their attention. The motor truck is not today a vehicle of cities and towns; we see it on every road in the country, improved or otherwise, but in order to realize the maximum from freight haulage via motor trucks, the highways should be built to stand the traffic.

Inter-city haulage of commodities is not an experiment. Its practicability has been established and when the schedule provides for the truck carrying a capacity load on its return trip, such haulage has proved to be a profitable investment.

The federal officials are being urged to declare road-building a war necessity and to formulate a definite plan that will nationalize the work throughout the country. The needs of the federal government might require the designation of certain main roads that are of military or strategic importance to be national roads. Congress should provide that the links and gaps in the roads should be improved at once with all the resources and funds available for that purpose by the federal government. If needed, it should be provided that all bridges and culverts be strengthened for carrying heavy guns and other large loads. Congress might further designate as a secondary system those roads of primary importance to the industrial centers of the various states.

Need of Federal Highway Board

Realizing the transportation congestion crisis, the following resolution was adopted by the Chamber of Commerce of the United States, at its Atlantic City convention:

"Whereas, It is essential that all the transportation facilities of the nation should be brought to the highest state of efficiency in order that foodstuffs may be moved most economically from the farm to the market, that manufactured products be moved at the lowest cost from the factory to the consumer, and

"Whereas, The public highways offer a good, prompt and economical means to supplement transportation by rail and water, therefore

"Be it resolved, That the prompt improvement of our pub-

(Continued to page 92.)



This is the Wrong Way.

USE WALLBOARD BUT—USE IT RIGHT!

Friedel's (Pat.) Flange Moulding for Wallboard
A 100% Improvement

Many advantages — Artistic — Mechanical and Economical Installation. Edges of flange are grooved to receive a stop, which secures the wallboard in proper position. No headers! No nailing! Expansion and contraction are automatically provided for. Makes unnecessary an exact spacing of studding, obviating trouble around doors and windows. Crooked framing does not interfere. Flange provides sufficient furring over old lath or brick walls. Made in stock lengths 10, 12, 14 and 16 ft. Clear yellow pine. Special forms to detail in Oak, Birch, Gum, or Mahogany. Let us tell you of our service.

Write for "New Working Ideas"



The right way.



Tongued Stop secures Wallboard without nailing at edges. Supporting Flange eliminates headers or nailing pieces under wallboard. Expansion Space prevents bulging of wallboard caused by nailing at edges.

W. R. Friedel Company

DEPT. 129
Memphis, Tenn.



MLDG.
FORM
No 7

STOP

WALL BOARD

FLANGE

EXPANSION SPACE

LEADERSHIP

BY INVITATION
MEMBER OF



THE UPSON COMPANY has been chosen, from the entire wall board industry, for membership among The Rice Leaders of the World—an association of 22 leading manufacturers banded together for better business:

A tribute to quality of Upson product and to fairness of the Upson selling policy. The rigid qualifications for membership are:

HONOR A recognized reputation for fair and honorable business dealings.

QUALITY An honest product of quality truthfully represented.

STRENGTH A responsible and substantial financial standing.

SERVICE A recognized reputation for conducting business in prompt and efficient manner.

UPSON-BOARD

PROCESSED

The most Dependable Wall Board made in America

THIS is merely recognition of the quality of the Board which has established the *efficiency record* of **LESS THAN ONE COMPLAINT TO EVERY 2,000,000 FEET SOLD AND USED.** It means that *here* is a wall board *made good to make good*—a board on which the carpenter can *unfailingly* depend for complete, lasting satisfaction.

We could not have won this Mark of Leadership with a *cheap*, punky board made of dozy, rosin-loaded, lifeless "jack-pine" or tamarack or dirty "chip" fibers; or a board skimmed in raw material and "fluffed" to give the impression of thickness and strength.

Nearly TWICE as Strong as Other Boards

Upson Board is harder, stiffer and nearly 100% stronger than other boards, and you can apply at least a quarter more a day. It cuts clean *like wood*. "I used to be dead set against wall board," we've heard many a carpenter say. "It was a nuisance to work, and gave nothing but trouble—trouble—trouble. It was a risk to my reputation. But your **DEPENDABLE** board is no more like ordinary wall board than lumber is like plaster."

Isn't this the kind of board **YOU** want?—to give you your share of the big-paying Upsonizing business that hundreds and hundred of carpenters are doing, month in and month out.

Get started **TODAY**. Write us for your Upson Board samples. Compare them with every cheap, inferior imitation "just as good as" Upson Board. See for yourself how *different* this **DEPENDABLE**, "standardized" board is from any other wall board on the market. Then try it on just one job.

It pays to keep a few bundles of Upson Board handy for use in your shop. In any spare time you can turn out cabinets, screens, store window trims, simple household articles, etc. They are easy to make and sell, and will earn you many an extra dollar.



THE UPSON COMPANY

FIBER BOARD AUTHORITIES

54 Upson Point LOCKPORT, NEW YORK

LOOK FOR THE BLUE CENTER

NOT LIKE OTHER BOARDS: THE LITTLE DIFFERENCE IN PRICE DOES NOT MEASURE THE BIG DIFFERENCE IN QUALITY

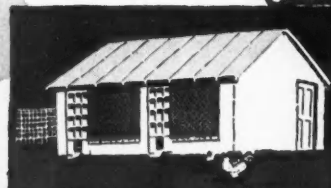
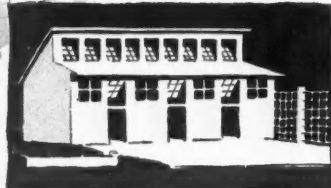
The Upson Company Originated

- 1.—hardness and stiffness in wall board.
- 2.—**STRENGTH: NEARLY TWICE AS GREAT** as that of any other board.
- 3.—*pure*-wood-fiber board that looks, feels and *works* like actual lumber; cuts, fits, and applies more easily and quickly and with less waste than any other board.
- 4.—4-ply, 5-ply and 6-ply board.
- 5.—a smooth, lintless surface, practically free from lumps and bumps.
- 6.—**KILN-CURING**, to reduce wall board expansion and contraction to an unappreciable minimum.
- 7.—**WATERPROOFING**, to effectively resist dampness and ordinary leaks; but containing *no* wax or paraffine.
- 8.—**SURFACE-FILLING**, to give a perfect painting surface and cut the usual finishing cost in half.
- 9.—a board to lie permanently flat on the wall, minimizing warping, buckling, twisting or pulling loose from the nails.
- 10.—the giant 64-inch wide panel, to provide virtually unbroken wall surface when desired.
- 11.—condensed, explicit **DIRECTIONS** for applying, *stamped* on the back of every panel.
- 12.—distinctive construction for *easy identification*: of **COLORED CENTER** with light-colored outer plies.
- 13.—the *efficiency record* of *less than one complaint to every 2,000,000 feet sold and used*.
- 14.—the most complete line: a board for every purpose.

These qualities and the famous square-deal policy were responsible for The Upson Company being the one wall board maker to be invited to membership in the famous Rice Leaders of the World Association.

"What UPSON does today, imitators attempt tomorrow."

Build the Ever



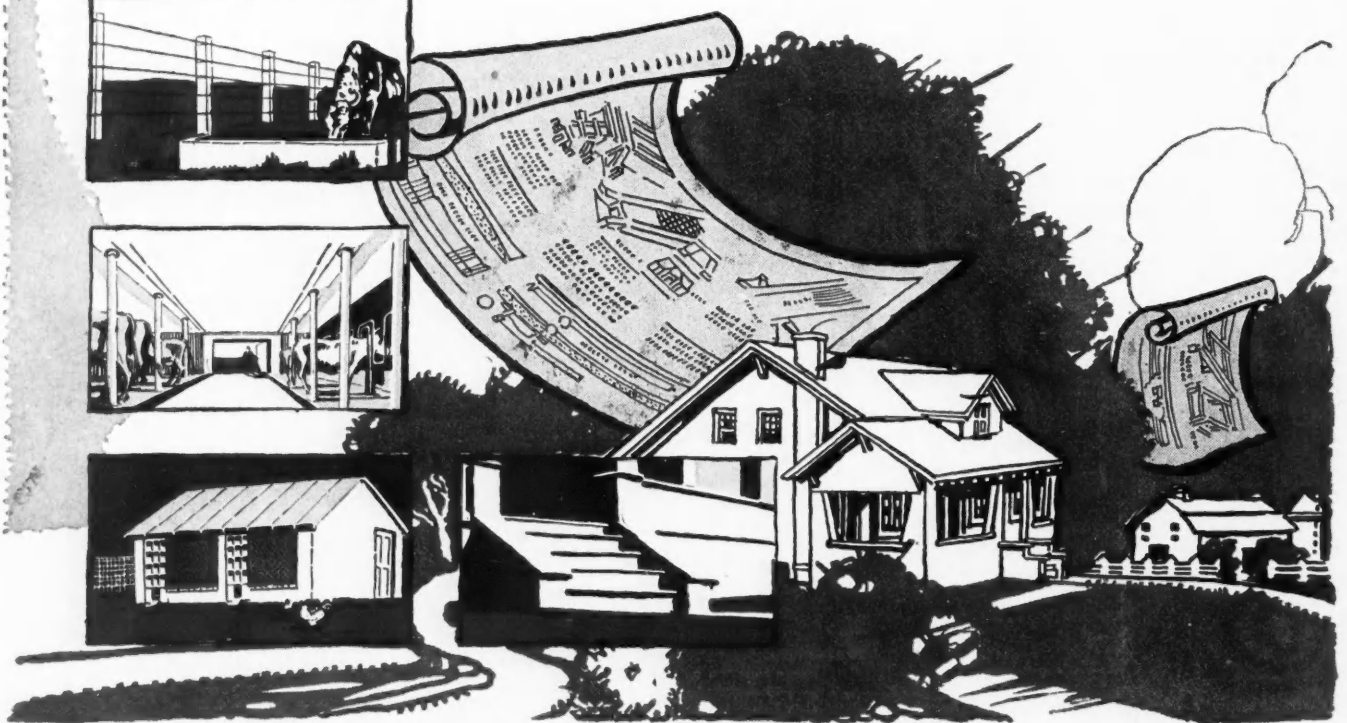
THE concrete way is the saving way to build these days. Concrete can't rot, rust or burn. It requires no painting, no replacing. Water and age merely increase its strength. Yet the cost is not unreasonably more than that of temporary construction.

Concrete buildings add their full cost to the value of the property on which they are put. They stamp a place as being up-to-date.

All you need for the best concrete is good sand, good stone or pebbles and

ALPHA THE GUARANTEED PORTLAND CEMENT

mixed well with water (occasionally reinforcing is also required).



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

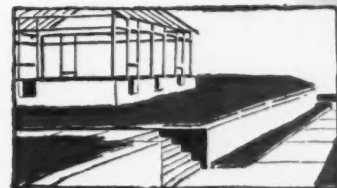
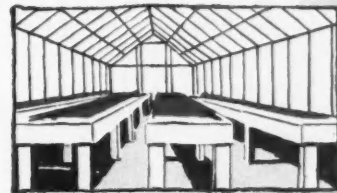
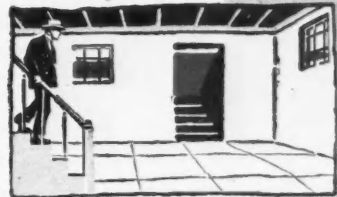
Lasting Way

OUR No. 10 Handbook—*Alpha Cement*—*How to Use It*—which has been compiled at considerable expense, tells how to use *Alpha*, the hourly tested and guaranteed Portland cement, in all kinds of concrete work. It shows how to make forms, how to mix concrete properly, the proportions for different types of work, how to calculate quantities, how to waterproof, how to apply stucco, etc.

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

ALPHA THE GUARANTEED PORTLAND CEMENT

ALPHA PORTLAND CEMENT COMPANY
GENERAL OFFICES: EASTON, PA.



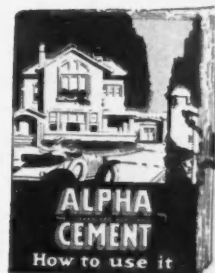
BRANCH OFFICES:

- New York
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There are practical ALPHA Service Sheets on the following subjects. Check the one in which you are interested.

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| Walkway | Greenhouse | Dipping Vat |
| Driveway | Hotbed | Tanks |
| Small Bridge | Hog House | Tennis Court |
| Culvert | Steps | Concrete Roof |
| Foundation | Porch Floor | Piers for Small Boats |
| Barn | Cellar Floor | Garden Furniture |
| Water Trough | Stable Floor | Fence Posts |
| Gutter and Curb | Feeding Floor | Gate Posts |
| Silo | Smoke House | Walls |
| Poultry Houses | Milk House | Sills |
| Corn Crib | Ice House | Lintels |
| Storage Cellar | Spring House | Garages |
| Small Dam | Manure Pit | Concrete Roads |
| | Septic Tank | |



Just write your name and address in the margin below



Big Economy in Metal Lath Construction

The man who builds will appreciate the reasonable cost at which you can construct modern, strong, fire-proof homes by utilizing our metal lath products. You can save the owner time, material and labor expense.

Use Hy-Rib and Rib Lath—and you save forms, stiffening channels and labor. The metal lath is so stiff and rigid that supports may be placed a greater distance apart—saving in the cost of supports and the labor and time necessary to attach the lath. Moreover, streaked and cracked plaster is prevented.

Hy-Rib furnished in four depths of ribs and various gauges.



Hy-Rib

A steel sheathing, stiffened by rigid deep ribs. Manufactured from a single sheet of steel. Its use is decidedly simple. The easily handled sheets are fastened to the supports and the plaster or concrete applied. No forms, stiffening channels nor wiring required.

Rib Lath

A superior metal lath with beaded ribs that span between the studs, making it exceptionally stiff and rigid and permitting the wider spacing of studs. Provides a perfect clinch for plaster and prevents cracking or streaking. Saves time, labor and material in erection.

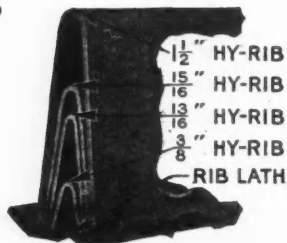
Begin now to build with Hy-Rib and Rib Lath. The line is complete, including Diamond Lath, Channels, Studs, Corner Beads, Base Screeds, etc.

Write today for free copy of Hy-Rib Handbook, with specifications, tables, illustrations, etc. Very valuable to builders. Address Dept. H-44.

Truscon Steel Company
(Trussed Concrete Steel Co.)
YOUNGSTOWN, OHIO



Representatives in
Principal Cities



Military Roads Needed Connecting Our Larger Cities

(Continued from page 88.)

lic highways is important and should be forwarded in every proper way."

Motor trucks are ready at hand; the roads of the nation must be immediately developed and improved. A federal highway board is urgently needed.

American motor truck manufacturers are "doing their bit" in co-operating in every possible way with the federal government and should at the same time continue to use their every influence toward urging the speedy construction of hard surfaced roads between our largest cities during the spring of 1918.



Raise a Pig

THIS year everyone who has a bit of land should raise a pig—as many more as possible. On every farm, large or small, on the small suburban estate, even in the city backyard, there is room to raise enough pigs, in the aggregate, to entirely put an end to the present pork shortage, which, according to government reports, is rapidly increasing.

As a rule, a pig can be raised on what is thrown away by the average family, together with what it can grub for itself. It amounts then to converting waste material into valuable food products, at practically no outlay for labor and, on the basis of present pork prices, at a very considerable profit.

Now is no time for being over-finicky. A pig, properly raised, is no more objectionable than a cat. One is a producer—a direct assistance in winning the war; the other is a parasite that serves no useful purpose whatever. We are limiting our industries to essentials. Why not apply the same rule to our domestic economics?

Many towns and cities have already suspended ordinances prohibiting the keeping of pigs. All others should do likewise. Our duty to the nation is clear.

On farms hog production can, and must, be greatly increased. When labor conditions prevent the raising of crops requiring a large amount of hand labor, hog raising fits in admirably. The same applies to land that is partially cleared. Much of the feed can be furnished by easily grown pasture crops that can be harvested by the hogs themselves.

At the present time, thousands of immature hogs are being marketed every day. At the same time we have a great surplus of soft corn, which is good only for feed purposes. Both represent a great economic loss to the nation and a considerable financial loss to the farmer. By keeping the immature hogs on the farm and feeding them on soft corn, they would soon develop into standard animals and bring very satisfactory market prices, with profit to the farmer and a substantial increase in the country's pork production.

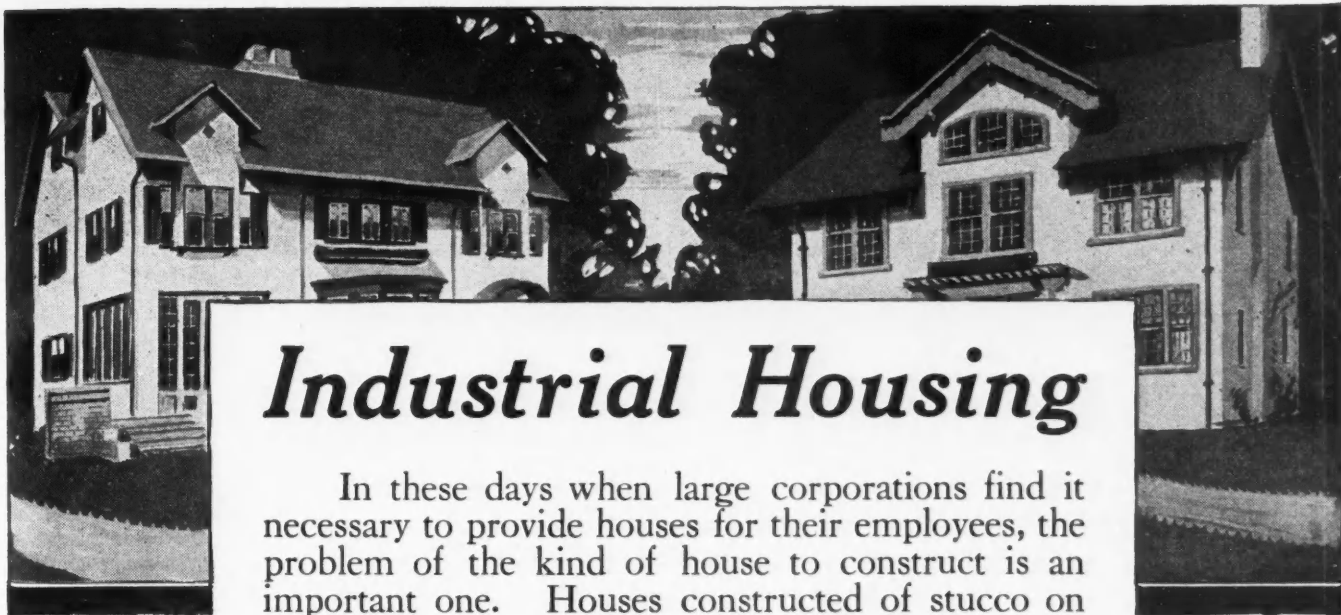
The 1917 corn crop exceeded that of 1916 by 500,000,000 bushels. Even making allowances for the corn that will be used for flour to make up the wheat shortage, there is an increase of over 950,000,000 bushels of cereals of all kinds available for feed over 1916. This tremendous surplus ensures an adequate supply of feed and also reasonable prices for those who must purchase grain.

If we do not take energetic steps to increase our pork production, we will have a still more acute shortage of pork products and even higher prices for hams, bacon and lard will prevail.

We have a remedy in our own hands—Raise a pig.



THE successful man is always busy whether he feels like it or not. Any man can work when he feels like it.



Industrial Housing

In these days when large corporations find it necessary to provide houses for their employees, the problem of the kind of house to construct is an important one. Houses constructed of stucco on metal lath possess so many advantages that they are far and away the best type of construction from practically every standpoint. The best lath for stucco construction is

SYKES EXPANDED CUP METAL LATH

(Self-Furring)

Houses thus built of stucco over Sykes Metal Lath possess permanence and beauty of high character. They also offer high resistance against fire and provide an element of safety that is very desirable in any community, especially where the houses are built rather closely together. The cost of stucco construction over frame is very slight while the advantages of stucco outweigh that of frame tenfold. Sykes Expanded Cup Metal Lath is a favorite with architects and contractors all over the country, who know its distinctive merits, and it is endorsed by the U. S. Government for Post Office work. The peculiar cup formation of Sykes Expanded Cup Metal Lath forms a perfect key and by clutching and holding the stucco assures rigidity, strength, and durability. Being cut with wider strands Sykes Metal Lath is heavier than others of same gauge.

We would like to get in touch with concerns contemplating the construction of industrial houses. We have an interesting proposition for you, and if you will write us we will be glad to send you our booklet of Specifications, a sample of our lath and take up the proposition in detail.

Sykes Metal Lath & Roofing Co.

504 Walnut Street, Niles, Ohio

Bids, Bidders and Bidding

By G. Alexander Wright

Architect, San Francisco.

TO bid or not to bid? That is the question—whether it is better to be idle and save money, or take a job and lose it?

Is it any use to figure? That is the perplexing question of today for the competent and careful bidder, for he knows that the more competent and careful he is, the less chance he has of competing and getting a job with any profit in it. It certainly looks as if our present estimating methods are a failure from the bidder's standpoint. What is to be done?

Is it that there are not jobs enough to go around? Or, are there too many bidders? And are they too aggressive, too eager for the good of the business? One thing is certain, that so-called competition among the building industry has degenerated largely into cut-throat practices, and trade destruction.

If bids to owners are so low that the contractor is unable to make a profit legitimately, what happens, and whose fault is it? Is it the owner's? Is it the architect's? We think not. It is well known that many architects do not favor such conditions. They will, when about to invite bids, prepare their list of bidders, say eight responsible and well-known contractors, sufficient competition surely, one would think (especially as the owner is not paying for the time and

study these eight men will give to his plans and specifications). Then see what happens! First the sub-get wind of it, then the material men; these tell their friends, their customers and other material men that such and such an office is taking figures on a job. Those in the game know what follows. By the time bids are actually received the architect is unwillingly swamped with bids, good, bad and indifferent. Probably fifteen or twenty. The usual result is that the better, or rather more competent type of contractor, is badly beaten by the "uninvited" bidders, who force their way in and crowd them out, by submitting ridiculously low bids, based, generally speaking, upon incorrect quantities, and not incorrect prices.

Such methods destroy what the better class of architects seek, viz.: "legitimate" competition. Where, in the name of common sense, is the logic of this? Nobody is benefited by such methods, not even the uninvited bidders themselves. Such men, however, are largely responsible for the ruinous and demoralized condition of the building business today. These men will beg almost for the chance to figure a job, regardless of anything. There are architects who realize the conditions and will try and stand such bidders off.

(Continued to page 96.)

EXCELSIOR Wire Products

Excelsior Wire Lath Aids in Retaining the Unbroken Beauty of the Walls of San Francisco City Hall

(BAKEWELL & BROWN, Architects)

Why? Excelsior Wire Lath can be made to conform to all shaped openings. Cutting it to fit does not reduce its tensile strength, its ability to stay up, or its plaster-holding abilities. The individual wires of which it is woven are hard, cold-drawn steel of great tensile strength. It has an even selvage that permits easy handling as well as tying, under all conditions.

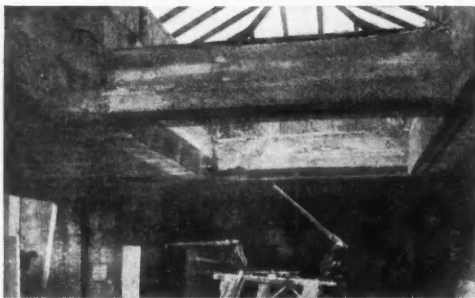
It is not a difficult matter to force the plaster through to the back which then forms a perfect key, holding the plaster and lath on to the furring as one solid unit. Can

be used on iron or wood furring. Fire retarding. Three styles—plain, galvanized or japanned.

Excelsior Wire Lath has been and is now being used in many of the most notable buildings in the country as well as thousands of others, less notable and even humble. Wherever lath and plaster construction is required—inside or out—Excelsior Wire Lath can be used successfully.

Write for Booklet F, giving more detailed and explicit information.

WRIGHT WIRE COMPANY, Worcester, Mass.

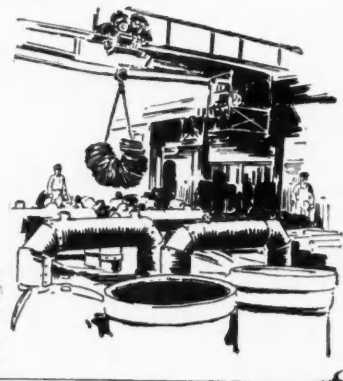


Ceiling Construction

This illustration shows the use of Excelsior Wire Lath in connection with iron furring. The lath is carried around the fascia of the skylight opening and around the bottom of the concrete beam. A smooth, uniform, solid plaster surface being the result.

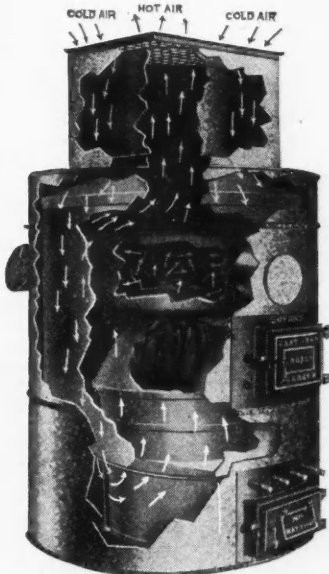
Annealing

As the wire becomes hardened by the drawing process it is annealed, being carried through the great "halls of heat" and dropped by electric overhead cranes into the various earthen furnaces that rise in army fashion throughout the floor space.





Bovee's Upright Furnace



Bovee's Cast Iron Pipeless Furnace

ing and there is nothing more economical of fuel. With this system of piping the basement is always cool.

The Central Heating System

With this system of piping but one large warm air register is used directly over the furnace. It also has two cold air returns that may be taken from other rooms which greatly aids in the circulation of heat in the different rooms and also prevents the cold air moving over the floor to reach the one central register as used with the pipeless furnace. This also allows using a rug in the room as the openings in the floor are not as large as when both hot and cold air registers are one. With the CENTRAL HEATING SYSTEM we use any style of our furnaces and of suitable size to heat the building. With this system a separate pipe can easily be run to a bath room or to any other rooms, which is often very desirable.

We ship everything prepared so that any handy man can install any of the Bovee Furnaces quickly and without the aid of a tinner.

Send us a rough plan of your building for estimate on best system of heating plant.

Bovee Furnace Works
50 8th Street · Waterloo, Iowa

Old Reliable Bovee Furnaces



Large numbers used by the U.S. Government. We can make prompt shipments of any size furnace required.

AT SPECIAL PRICES TO CONTRACTORS

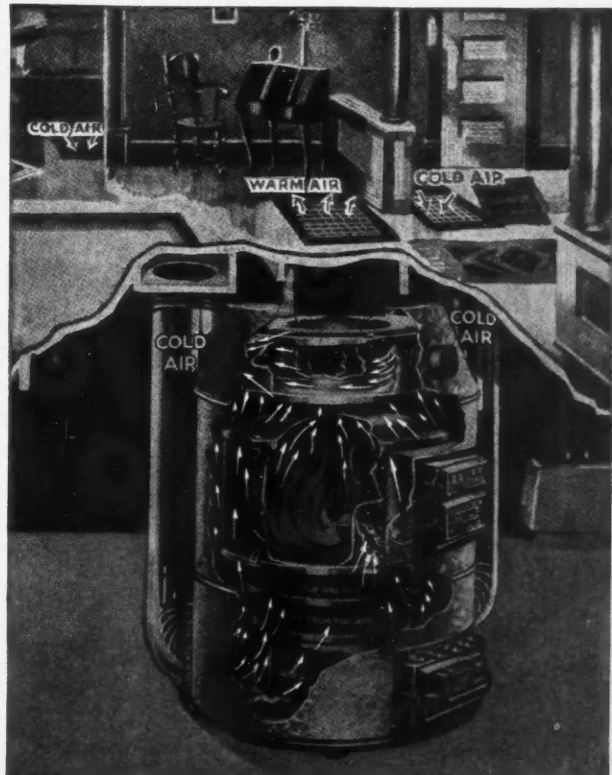
**The Pipeless Furnace With One Register
The Central Heating System With One
Warm Air and Two Cold Air Registers**

Regular Piping to Each Room

We MANUFACTURE a full line of furnaces, both UPRIGHT AND HORIZONTAL, which we furnish with regular piping to every room where the buildings are not arranged to be properly heated by one register. We have had a very wide experience and can tell at once on receipt of a pencil sketch of the building to be heated the best style of furnace and piping to use. The BOVEE FURNACES are well made of the best heavy material and actually use very much less fuel than other furnaces.

The Pipeless Furnace

This style of furnace is especially adapted to houses having large openings between rooms and open stairway to allow free circulation of the warm air. Also for old houses where it is difficult to cut piping into the walls. We use only furnaces having ample capacity to heat the building as we make different sizes suitable to heat any building from a cottage to a large church. They are very easy to install as there is but one register to cut in the floor directly over the furnace and no piping in the basement. The heat is delivered instantly in the building



Bovee's Upright Furnace With Central Heating System

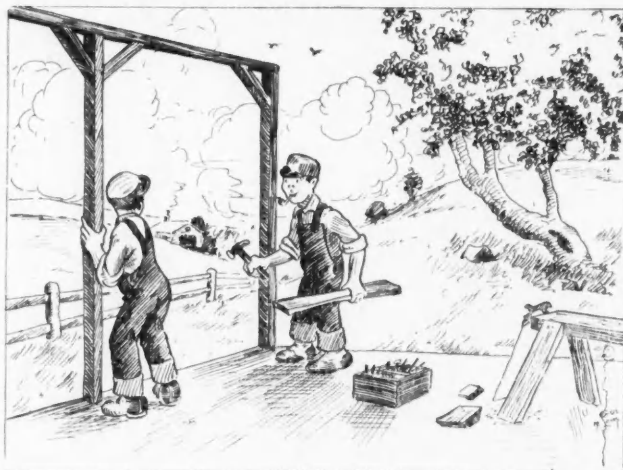
Bids, Bidders and Bidding

(Continued from page 94.)

at the risk of making an enemy. But it is no use. They take it as a personal affront if refused. Sometimes other means have to be adopted, to save these bidders from themselves, to save them wasting their time, but this is seldom appreciated.

Some way must be found of identifying this kind of bidders, if they belong to an organization, and of convincing them of their folly, and of the great injury they do the building business as a whole. Should this prove insufficient, then other means might be adopted. Something must be done, and soon. That is certain.

It is so easy to blame architects for the conditions, but the truth is the remedy lies among the bidders themselves. If the latter want a square deal, they can get it. If they want better conditions, it is within their power to get them. But they must act, and co-operate. Other objectionable features of present loose practices are a source of inconvenience to the architects, the majority of whom would appreciate better methods among contractors. If the architect selects a sufficient number of bidders for a job, why should bidders compel them, almost, to increase their list two and three fold? Then there are the numerous and entirely unnecessary interruptions the architect experiences answering inquiries after bids are opened. Not from the bidders originally selected, nor even from the uninvited bidders, but from the almost endless number of sub-bidders, specialty men, material



"It's great to work in the country for a change; eh Mike?"
"Ye bet, ol' kin at least let out me opinion of th' hammer when she swats me thumb."

men who have given figures to the bidders, and who afterwards keep the architect's office busy answering inquiries about the bids, instead of getting their information direct from the bidders for whom they figure. Even if bids are to be opened at a fixed time in the presence of bidders, it is found that even this does not obviate these objectionable features, as it certainly should.

The whole question is a complex one, it is true, but the bidders themselves can do something, and a great deal, if they will but co-operate towards improving conditions. It is up to the men in the business.



"Beautiful Birch
for Beautiful Woodwork"

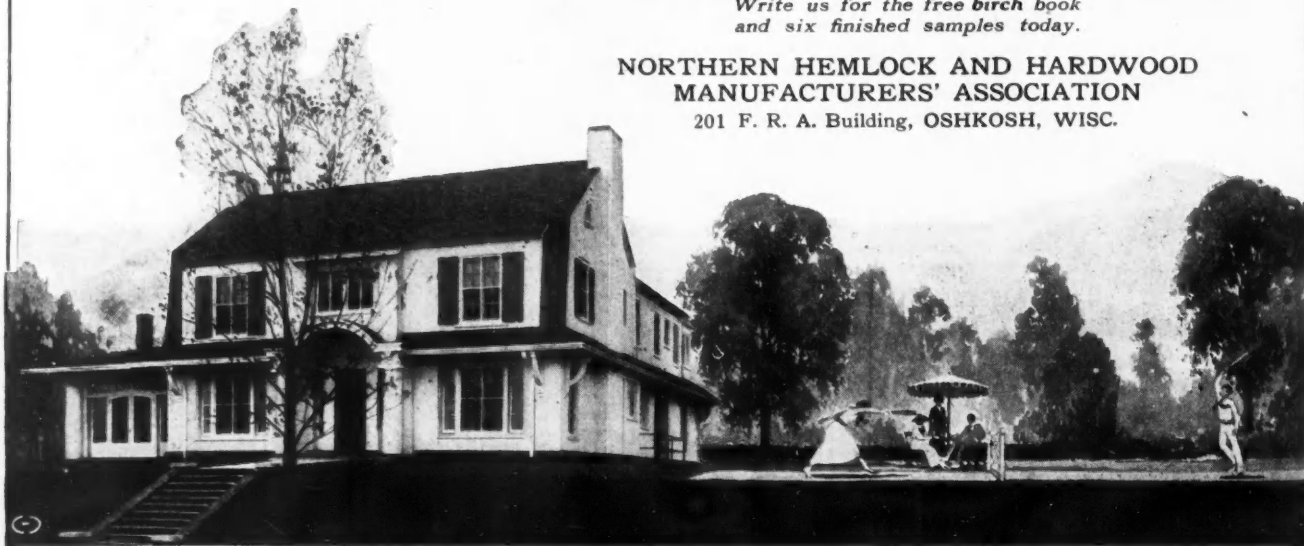
YOU KNOW— BUT, DO YOU KNOW WHY?

Like every live carpenter you know that "Beautiful **birch**" is the homebuilder's ideal because it will give beauty and durability at a price you *can* make money on.

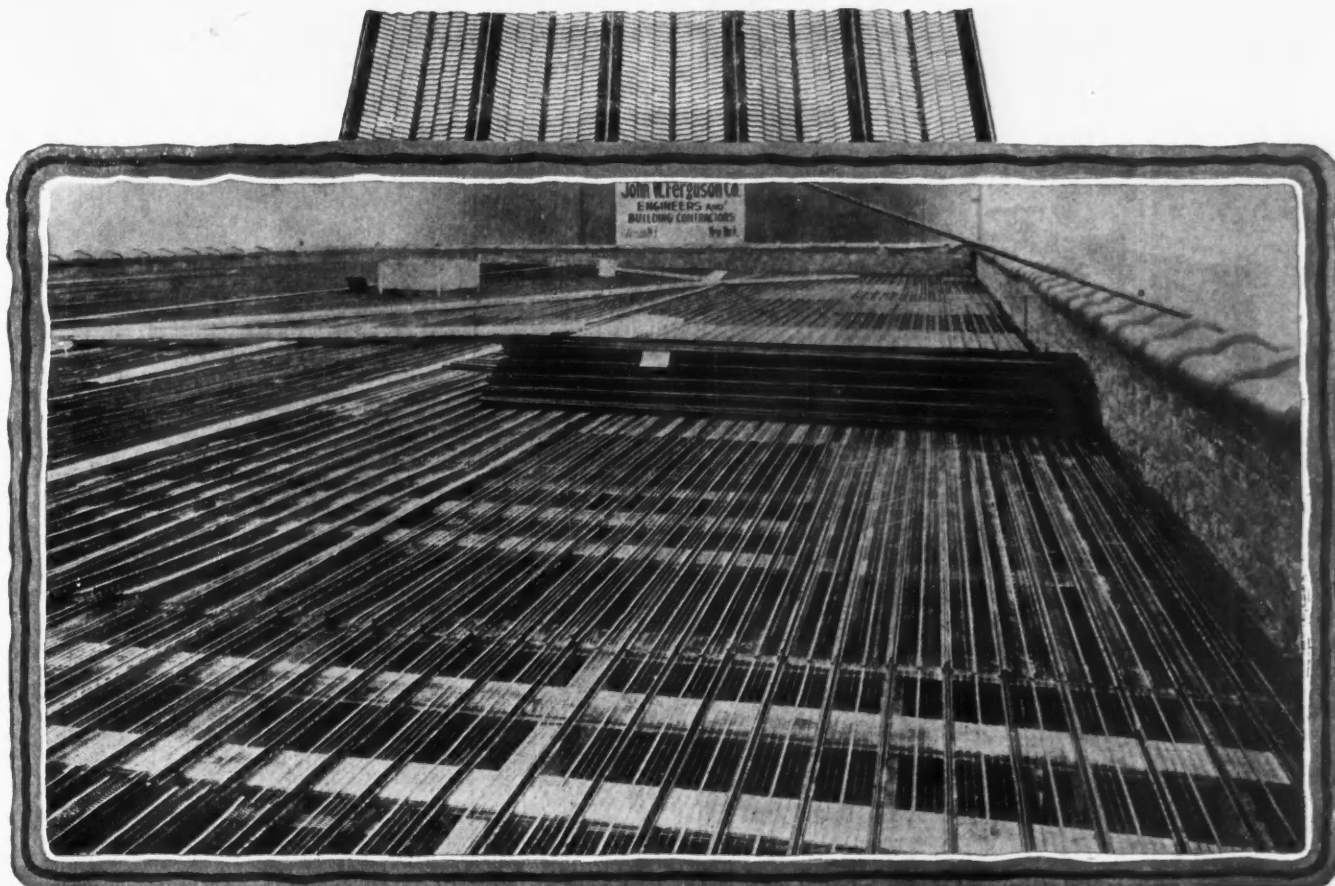
But do you know all the *other* reasons why? Are you prepared to *show* your customer—so you **CAN** make that profit? Let us post you up.

Write us for the free birch book
and six finished samples today.

NORTHERN HEMLOCK AND HARDWOOD
MANUFACTURERS' ASSOCIATION
201 F. R. A. Building, OSHKOSH, WISC.



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



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A COMBINED
CENTERING AND REINFORCING

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of the Spencer-Kellog Company, Paterson, N. J.
to make a light-weight, permanent and economical concrete roof**

Spans were 6 ft. 6 in. and this together with the light weight of the roof made possible an immense saving in supporting structure as well as in the roof itself. On request we'll gladly furnish further information and an actual sample of Ribplex so that you can note for yourself the strength of the ribs—and the bonding qualities of the mesh.

Address Dept. K-3

The Berger Mfg. Company, Canton, O.

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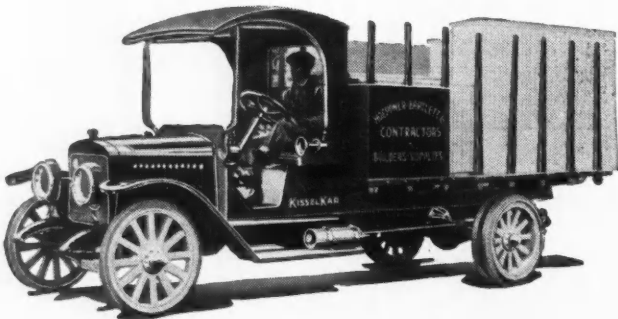


KISSEL Five Sizes TRUCKS

Built for Wartime Service

Meeting average haulage or delivery conditions is no great feat—even with average trucks—but **out of the ordinary** demands are what test the stamina of real truck construction.

It is here that Kissel Trucks give evidence of their real superiority and show the benefits of long experience in truck building.



The unusual strength of the Kissel Truck chassis—the advanced engineering principles of its structural features—its sturdy construction throughout—make Kissel Trucks fully equal to continuous service demands.

Compare the powerful Kissel-built motor—the special heat-treated frame—perfected worm-drive rear axles—reliable brakes and durable springs.

There is a model built to fit every transportation requirement in the building business. Investigate now while your nearest Kissel Truck dealer can make an early delivery.

Kissel Motor Car Company
Hartford, Wis., U. S. A.

KISSEL With the ALL-YEAR Cab TRUCKS

Riding the Bumps of the War News

By JAMES H. COLLINS

DO you ride all the bumps of the war news from day to day? Many good patriots do. Each morning brings its passing changes in the war situation; now gloom, in the form of a setback on the western front, or further disintegration in Russia, or rumors of delay in our own war preparations. Next morning, like as not there will be something of a hopeful nature, such as the checking of the Huns' drive in Italy, or a raid by the British or French, or good news here at home.

To follow and feel all these glees and glooms from day to day is human and exciting.

But it involves much useless wear and tear of the spirit.

There is another viewpoint—that of disregarding the daily shifts and changes in the war situation, keeping one's attention concentrated on the long haul of war and the final result.

That haul is still a long one. For Germany is not beaten yet, but the results are sure, because we have right on our side, and also the largest battalions. If you grow warm and then cold, and alternate between enthusiasm and depression with the daily news changes, you not only waste your energy, but are likely to fluctuate in your policy as a business man and your determination as a patriot. The good resolution to save food, support Uncle Sam financially and cheerfully, adjust your business and habits to the war program, will be stiffened on the morning that you read about some Hun atrocity against our own soldiers in France. But in a week there may be news of a different character, which leads you to let down a little, on the assumption that Germany has begun to crack and that the war is about over.

It is good business, good patriotism, and good conservation to forget most of the headlines in the morning paper and concentrate strictly upon the long, hard grind between today and the final result. That will save your spirit, buck up your resolution, and enable you to do your utmost in winning the war.

Moreover, it will enable you to get out of the war, as a business man and a patriot, the utmost benefit from war adjustments. Those adjustments make for wiser and more economical personal habits, as well as a business grounded in sound economy.

Even should peace come tomorrow you can never go back to the old heedless, wasteful ways, either in business or livelihood.

Don't ride the bumps of the war news!

Settle down in harness for the long, grim haul that counts!



Studies at the Forest Products Laboratory, at Madison, Wis., have shown that Engelmann spruce treated by the sulphite process gives a pulp that compares very favorably in color and strength with that of white spruce.

Meadows
TRADE MARK REGISTERED

Free Plans

YOUR attention is called to this special money-making and labor-saving proposition. Our free plan system is something entirely new. We help YOU save both labor and building material, and at the same time help YOU get more granary jobs.

Every American farmer needs a new crib or granary equipped with the Meadows Stationary Inside Cup Elevator. YOU should reap a profit from this fact. Are YOU a live wire? Are YOU going to pass this over without even an investigation? Just write us a postal for complete information. Request our catalogs, large posters, and free plan offer. Write for them at once. Our elevator can be installed in granary shown in this issue. See Blue Prints following page 34.

Meadows Mfg. Co.
Pontiac Ill.

The picture shows a 40 ft. crib. Cribs 36 ft. or less in length with half pitch roofs require no cupola.



Double Fireplace for Outdoor Evenings

By ALBERT MARPLE

To the fellow who is always on the lookout for novel ideas for the homeplace, possibly the feature shown in the accompanying illustrations will prove



Outdoor Life in California Has Produced this Novelty of an Outside Fireplace. You have your campfire in your own side yard. If the fireplace smokes, the mosquitoes get the worst of it. Or don't they have mosquitoes in Calif.?

interesting. It is a double fireplace, and was originated by one of the mountain cabin owners in the Arroyo Seco, located just west of Pasadena, Cal.

As the name of this feature suggests, there is a fireplace on either side of the chimney, one on the

inside and one on the outside of the house. The one on the outside has been left rough, while the one on the inside of the home is finished to harmonize with its surroundings. This feature enables the home owner to enjoy the log fire within the home on cold winter evenings, while in addition, during the balmy evenings of spring, summer and fall, he can enjoy the "campfire" in the open, the benches and chairs being arranged beneath the trees before the fireplace. Each half of the double fireplace has its own separate flue and firebox.



Some Why's on Prepared Roofing

By H. J. BLACKLIDGE

WHY do the manufacturers put so few nails in their roofing? Most of them tell you to nail 1½ or 2 in. apart, and then put in just exactly enough nails to nail one side of the roll—none at all for the ends, absolutely no allowance for waste—and you are stung when it comes

to running valleys or irregularly shaped roofs, flashing chimneys, fire walls, etc. I sometimes wonder if the makers count the nails—6 to the foot, and leave off the seventh one at the end.

(Continued to page 102.)

Remodeling Work that Pays You a Good Profit

Contractors and Builders in every locality will find that several of their local merchants will consider remodeling their store fronts as a war-time substitute for a new building. This will be particularly true when you show them the attractive designs and the *powerful sales-creating show windows* they may obtain by installing

Kawneer STORE FRONTS

Why not obtain this profitable business in your locality?

Write TO-DAY for full information about how you can secure it.

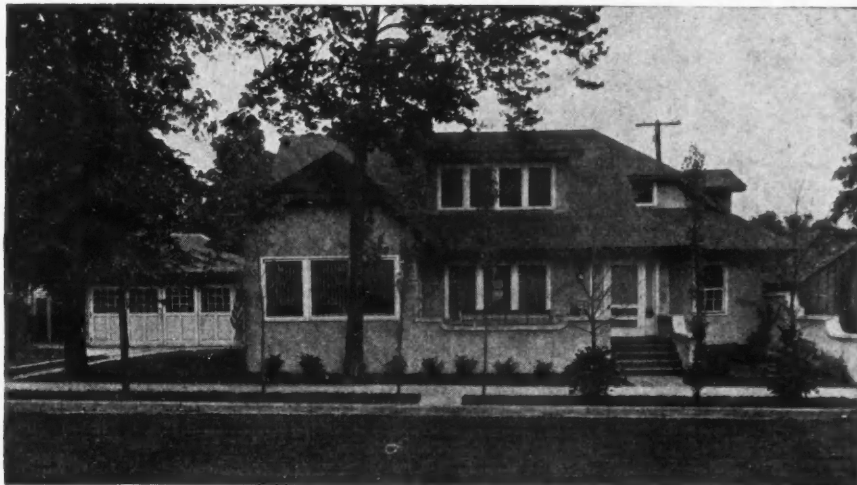
Kawneer STORE FRONTS are well known to your merchants. When you talk of remodeling with a KAWNEER All-Metal Store Front they will know you are offering them the very best obtainable.

Kawneer Mfg. Company
Niles, Michigan

Pin to your letter head

Send me copy of your Catalog J and Portfolio of Designs.

MEDUSA WATERPROOFING



Residence of Mrs. Carson Hamil, Terre Haute, Ind.

“I Cannot Speak Too Highly of It”

Thus writes contractor Carl A. Muehler, of Terre Haute, regarding Medusa Waterproofed White Cement.

Mr. Muehler built the Hamil residence—illustrated above. His extensive experience with cement products makes his endorsement of Medusa all the more valuable.

Are you insuring *your* concrete and stucco jobs against the weather? Are you making them damp proof and weather resisting?

Medusa Waterproofing makes concrete absolutely water tight—it prevents hair cracks and discoloration.

Medusa is the *original* integral waterproofing compound. It is not an experiment—but a thoroughly tried and tested product which has proved its worth through years of satisfactory service.

MEDUSA
WATERPROOFING
PATENTED

Use Medusa Waterproofing and you can't go wrong.

Write at once for our booklet "How to Waterproof Concrete." It is full of practical information that you'll want. Write for it NOW.

The Sandusky Cement Company
Dept. G. CLEVELAND, OHIO

THE SANDUSKY



CEMENT COMPANY



Stop Those Leaks!

THE easiest and quickest way of repairing leaks in radiators, pumps, water jackets, motor head gaskets, hose connections, etc., is to use Johnson's Radiator Cement. This will stop the leaks in just a few minutes without laying up the car. No mechanical experience is required—all you have to do is remove the cap and pour the cement into the radiator.

**JOHNSON'S
RADIATOR CEMENT**

Quick—Efficient—Harmless

Johnson's Radiator Cement contains no powders, cement or anything which can coat or clog the cooling system, and is absolutely harmless in every respect. It will ordinarily seal a leak in from two to ten minutes.

Johnson's Radiator Cement blends perfectly with the water until it reaches the leaks—just as soon as it comes in contact with the air it forms a hard, tough, pressure-resisting substance which is insoluble in water making a permanent seal.

Quarts. \$1.75 Pints. \$1.00 Half-Pints. \$.65

Write for our folder on "Keeping Your Car Young"—it's free.



If your dealer cannot supply you, use attached coupon.

S. C. JOHNSON & SON, Dept. ACB 5
Racine, Wis.

I enclose \$1.00 for which please send me, all charges prepaid, a pint of Johnson's Radiator Cement. Also send me, free your booklet on "Keeping Your Car Young".

Name

Address

City and State

My Dealer is


Some Why's On Prepared Roofing

(Continued from page 100.)

WHY do the manufacturers furnish *spikes* instead of a decent sized nail? They tell you to nail 1½ or 2 in. apart and then supply nails so big that seven of them will split a 16-ft. board. A large head nail with shank the size of an ordinary 3-penny would hold the paper till Gabriel blows us all home. Trying to pull the roofing up would tear it forty ways for Sunday before pulling the nails.

WHY so small a head on roofing nails? If the manufacturers want to furnish us so much nail, why not put more metal into the head and less in the shank? Why not a galvanized bill poster's tack? Or at least one built on that general plan? I believe *the nail* would be three-quarter inch long, shank the size of a 3-penny, head the size of a dime or penny, and made of pure copper or zinc. This ought not to add more than a quarter to the price per roll. But it would be *worth* it. Next to zinc or copper I would prefer a nail made of the same stuff as the old-time cut nails. For I've seen plenty of evidence of their outlasting wire nails by several years.

WHY so much cement? Some rolls contain a quart. A quart will cement five or six rolls if put on with a small swab or brush—and that is the only way to put it on if you don't want to smear it all over and have the roof looking like the back door of a paint shop.



Only \$160.00

for this complete, all-steel, power mixer, including trucks, engine and housing.

A great mixer for any class of work and good for jobs of all sizes.

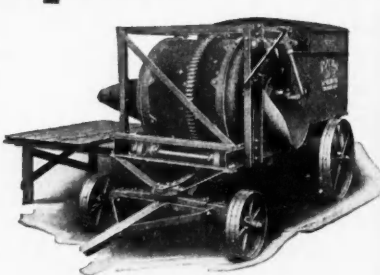
Hand or Belt Mixer \$55.00

Cap. 3½ cu. ft. Weight 900 lbs.

The Republic Line

consists of all sizes and types of machines from 3½ to 10 cu. ft. capacity in both tilting and non-tilting types—**low charging—power loaders—all attachments.**

Prices very reasonable.



NEW 1918 MODELS

TERMS TO SUIT

REPUBLIC IRON WORKS

Box 445 Tecumseh, Mich.

KELLASTONE

IMPERISHABLE STUCCO



REDUCE CONSTRUCTION COST

While lumber, cement, brick and nearly all other building materials have increased materially in price, yet Kellastone, the most permanent stucco material in existence, has advanced less than 8% in the last three years. Therefore by comparison Kellastone Stucco is lowest in construction cost.

More buildings are needed everywhere. Don't wait to pay higher prices, but build now and save money.

KELLASTONE

IMPERISHABLE STUCCO

will keep down the cost, guarantee the permanence of your building, produce the highest standard of beauty.

Kellastone Imperishable Stucco works like magic in transforming old frame buildings into handsome, enduring edifices at small cost.

Write for booklet that tells the story of this wonderful, crackproof, fireproof, coldproof, heatproof and strainproof stucco that is only equaled by marble or granite. Let us tell you where you can see and inspect a Kellastone building nearest your vicinity.

NATIONAL KELLASTONE COMPANY

1330 Mallery Building, Chicago, Ill.

KELLASTONE COMPOSITION FLOORING IS SANITARY AND SEAMLESS

British Government to Aid Housing After War

IN order to house the working classes in England and Wales, financial assistance by the British government will be needed in the construction of 300,000 houses in the year following the close of the war, 200,000 of these houses to be constructed in the urban areas and 100,000 in the rural areas. There is also great need of additional housing in Scotland, and even this program will not do more than make up for the shortage of new houses directly due to the cessation of building activities during the war. There still remains to be met the need for the new construction necessary to do away with unwholesome and overcrowded conditions in both town and country.

The housing authorities of Great Britain recommend that special action be taken to secure the cutting and seasoning without delay of timber in Newfoundland, Canada, other parts of the empire, and in the United States, so that this material may be ready for building purposes as soon as the war closes. It is suggested that the ships which engage in the return of war material to the United States may well carry a great deal of timber for reconstruction purposes on the journey to Europe.

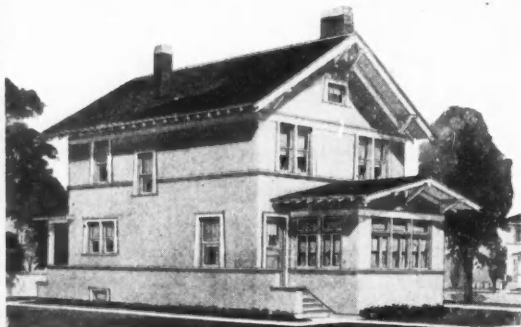
The National Housing and Town Planning Council at a recent conference at Leamington, England, adopted a very complete report dealing with all features of the housing question, such as materials to



The Boy: "Gosh, that dog's gona have an awful big house."

be used, planning of both rural and urban houses, the possibilities of standardization of construction, etc., etc. The conference went on record as expressing the belief that with the exercise of architectural skill in designing, the cost of a well designed and well planned cottage need not be substantially greater than that of the "brick box" in a row built abutting on a street. The council is making plans for a much more attractive and healthier type of cottage than heretofore, and while recognizing the usefulness of standardization in the production of component parts of

(Continued to page 106.)



SPECIFY THE HERRICK Outside Icing Refrigerator

ON THIS RESIDENCE

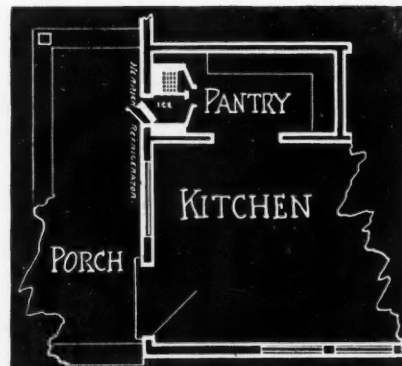
**No Ice Needed in Fall or Winter.
Filled from the Outside in Summer.
Progressive Builders Put Their
Refrigerator Problems Up To Us.**

Our Free Plans

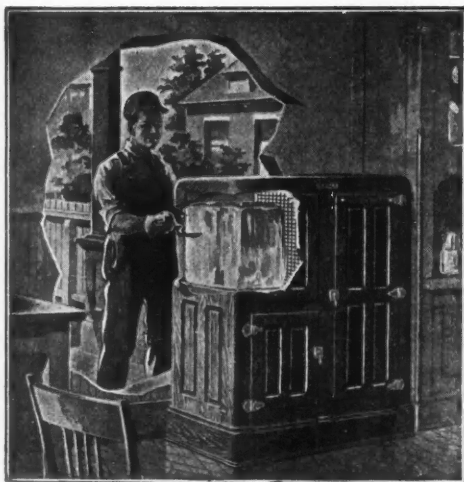
will be sent to you on request. Build up your reputation by suggesting and specifying the Herrick Refrigerator. Scientifically constructed. Assures perfect air circulation. Keeps foods clean and fresh. The Herrick requires no ice in cool weather.

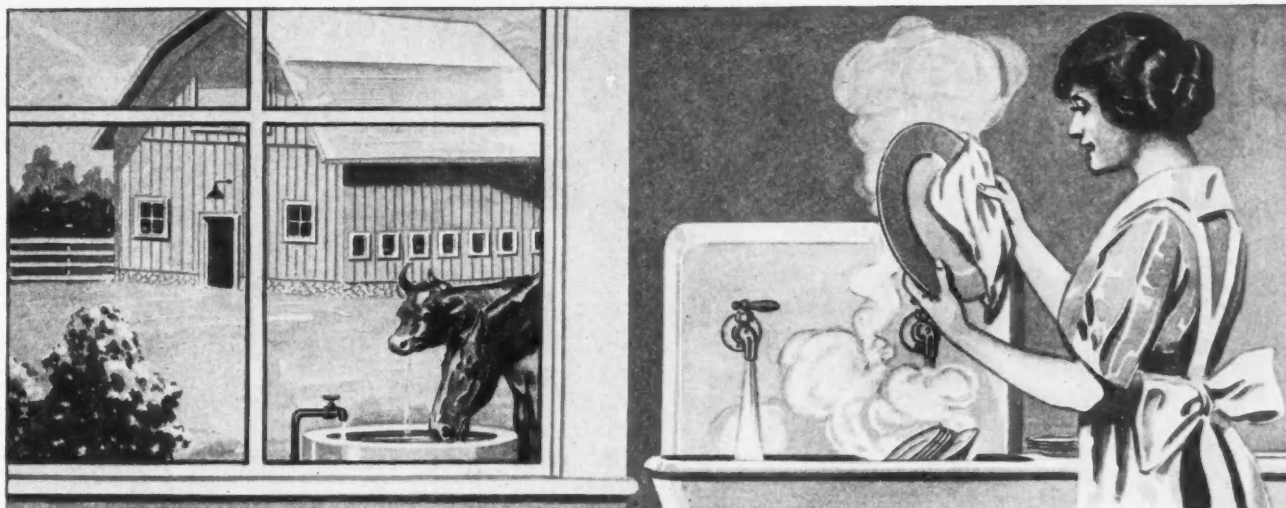
See Blue Print Section. Opposite page 34 of this Issue for **Complete Plans and Details** of this House.

Write for free plans and catalog.



HERRICK REFRIGERATOR CO.
Waterloo, Iowa





The Key to Bigger Business

There is only one key to bigger business for you—and that key is absolute satisfaction for every one of your clients.

When you build—be certain that the comfort and convenience that come from perfectly operating running water and sewage disposal systems is assured.



KEWANEE



Running Water and Sewage Disposal Systems

always give the perfect service that means bigger business for you.

For years they have been making life comfortable for thousands of users, giving an abundance of running water always under strong pressure and taking care of all waste in the most sanitary way.

Kewanee Systems are built **right**—cannot get out of order—and can be operated by anyone. There is a system to fit the needs of every building.

Kewanee Electric Lighting Plants

make all the comforts of electricity possible for everyone. For six years hundreds of satisfied users have been proving its efficiency. The engine in any of the 28 differ-

ent size Kewanee Electric Lighting Plants will give power direct from the engine to run labor saving machines as well as furnish light and power for every purpose.

Write for the cooperation of our drafting and engineering departments and for free bulletins on

Water Supply Systems

Sewage Disposal Systems

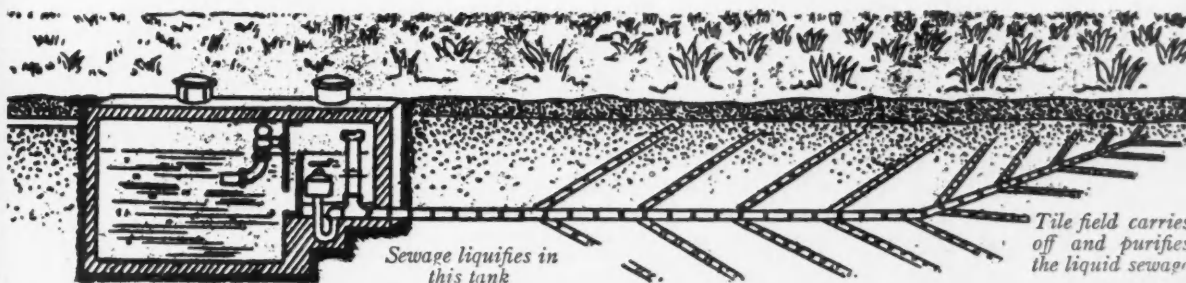
Electric Lighting Plants

KEWANEE PRIVATE UTILITIES COMPANY

(FORMERLY KEWANEE WATER SUPPLY CO.)

424 S. Franklin St.

KEWANEE, ILLINOIS



Sewage liquifies in this tank

Tile field carries off and purifies the liquid sewage



Include the Refrigerator in Your Plans

THE refrigerator is most important in the modern home or building—and it should be planned to suit—as you plan the building.

Convenience of location—outside icing arrangement—drinking water equipment—exterior finish—and many other features can be arranged for most satisfactorily only when the plans are being made.

MCCRAY

Sanitary Refrigerators

are built in sizes and designs for every type of building from the finest hotel and public building to the smallest bungalow. Any McCRAY can be arranged with outside door for icing from side or rear porch.

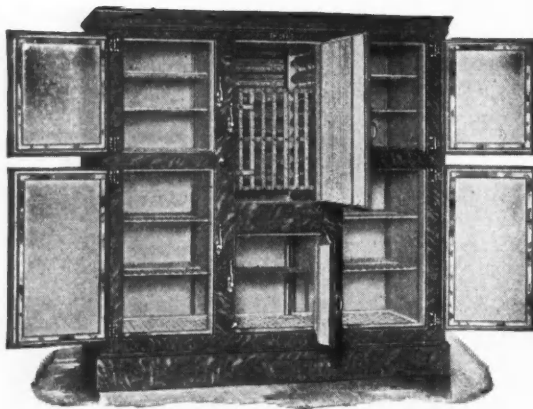
Our Free Plan Service for Contractors and Builders

places at your command the services, advice and suggestions of our large staff of expert designers, who have had long experience in planning refrigerators. It saves you time—enables you to include in your plans the refrigerators best suited to the requirements and arrangement of the building. Write for full information about our FREE Plan Service—and ask us for Catalogs which interest you.

No. 93 for Residences.
No. 51 for Hotels, Restaurants and Clubs.
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No. 62 for Meat Markets.

MCCRAY REFRIGERATOR CO.

860 Lake Street, Kendallville, Indiana
Salesrooms in All Principal Cities



British Government to Aid Housing After the War

(Continued from page 104.)

buildings, was unanimous in condemning the standardization of houses on the ground that standardized houses are tiresomely monotonous—only a little better than those of the present industrial areas of the great cities. The far reaching plans under consideration are well indicated by the recommendations of the council that the local authorities insist in all cases that the following points be observed in the building of workmen's cottages:

(1) The houses should be broad, rather than deep, in order to secure that all the rooms shall have ample light. This will involve the giving of increased frontages, but the additional cost can be met by economy in road construction under modern town planning conditions.

(2) Back extensions are better avoided, and all the rooms should be brought under the main roof. In the old type of workman's cottage the room most used is generally the most gloomy. The kitchen-living room is the workroom of the wife, and should be the sunniest and pleasantest room in the house.

(3) Three bedrooms should be provided in all the new houses. There are hundreds of thousands of two-bedroom cottages in existence, and the members of the conference therefore take the view that the cottages now to be built should be of three-bedroom type.

(4) The houses should, as a rule, be provided with parlors. The working people of this country know what they want in this respect, and the great majority desire the parlor cottage. Wherever possible this desire should be met, whilst securing at the same time that the kitchen-living room shall be of ample size and the sunniest and most cheerful room in the house.

(5) Each house should have a bath, with provision for hot water supply, either in a separate bedroom or in the scullery.

(6) Ample window space should be given, and the windows should be carried as near to the ceiling as possible.

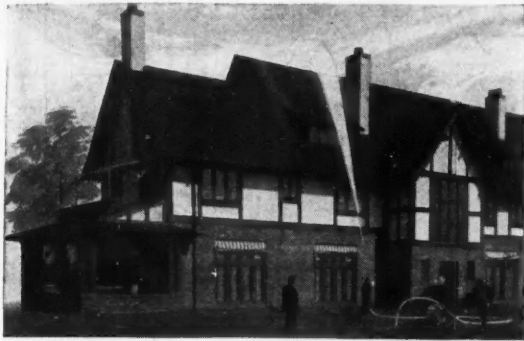
(7) Where the by-laws do not already demand it, an impervious layer of concrete, or other approved impervious material, should be laid under all floors to prevent damp rising, and the proper damp-proof course should be provided to all walls. The neglect of these elementary conditions of good cottage building has been responsible for much suffering amongst the poor in both urban and rural districts.

(8) The level of the ground floor of the house should be above the level of the ground immediately surrounding it. The members of the conference suggest that in the case of all housing schemes for which subsidies are granted the government should insist that the necessary safeguards described in (7) and (8) should be adopted where the by-laws or methods in operation do not already require them.

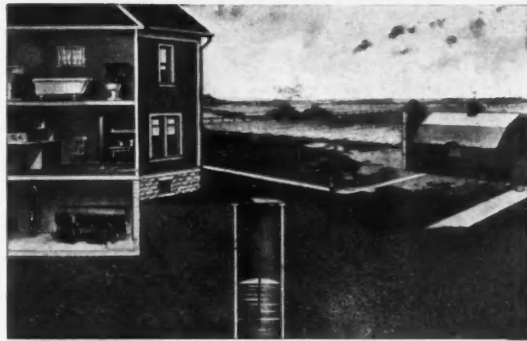
(9) The assistance of women with close knowledge of household economy should be sought in regard to details of interior construction, such as the design of the stairs, the provision of cupboards, larders, and storage accommodation. These and other minor details occupy a prominent place in the domestic economy of the home, and should, therefore, receive great care and attention.



About 200 board feet of wood is used in the actual construction of the average airplane. To obtain this material it is ordinarily necessary to work over about 1,500 feet of select lumber, which often represents all that can be used for airplane of 15,000 board feet of standing timber.



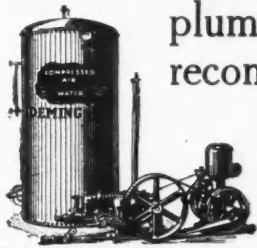
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Makeshift Industrial Housing a Menace

By NOBLE FOSTER HOGGSON
President, Hoggson Brothers, Builders

THE problem of properly housing employees has reached such an acute stage that it is one of the biggest questions of the day. Yet the problem is not a new one. It has been with us for many years; the situation has simply grown more tense.

Last year, in one great factory in the East, 30,000 men were employed to keep up a payroll of 10,000! The men would not stay because of poor living conditions. This tremendous waste of efficiency could have been avoided thru the medium of proper industrial housing. This instance is characteristic of conditions in America today.

Production is greatly handicapped, not by a lack of labor as commonly supposed, but by an utter lack of decent accommodations and the resultant inability to hold labor.

Houses for industrial workers must be provided at once, and the fact that this problem is so urgent there is a real danger—the danger of doing the thing hurriedly, planning for temporary relief only, creating conditions that will be worse in a few years than they are at present.

The large industrial organizations confronted with a housing problem will wisely provide for the future. With the splendid examples of garden city development in England as a guide, and the avoidance of the

paternalism and other errors which characterized certain previous enterprises in this country, there is no reason why we should not proceed on the firmest and most advanced basis.

Each industrial development presents an individual problem. It is not simply a matter of designing two or three typical houses and setting them down on a certain plot of ground. The factors involved call for not only a thoro knowledge of housing developments the world over, but they necessitate an intimate study of the conditions affecting the industry which contemplates a plan for providing homes for its workers.

The matter of financing is one of the most serious drawbacks to providing adequate housing facilities just now. Many industrial concerns would proceed with a vast amount of building were it not for the lack of funds. In England, where it is announced that 500,000 houses are now urgently needed—some authorities say 1,000,000 houses—government aid in financing has been promised. It is reported on good authority that England spent a half billion dollars on industrial housing during the last year, and plans to spend a billion in 1918.

In this country appeals from industrial organizations confronted with the problem of housing their workmen are being made to the government for assistance, and it is absolutely essential that some financial aid be extended, and this assistance will no doubt be arranged for very soon.

To Market in Sixty Seconds



These are abnormal times; your usual sources of supply are crippled. Yet your needs are much the same as in normal buying seasons. Our 1100-page Catalog will be a friend, indeed—a real buyer's help. It is yours on request. Send for it now; it will simplify your buying problems. Address Dept. 1

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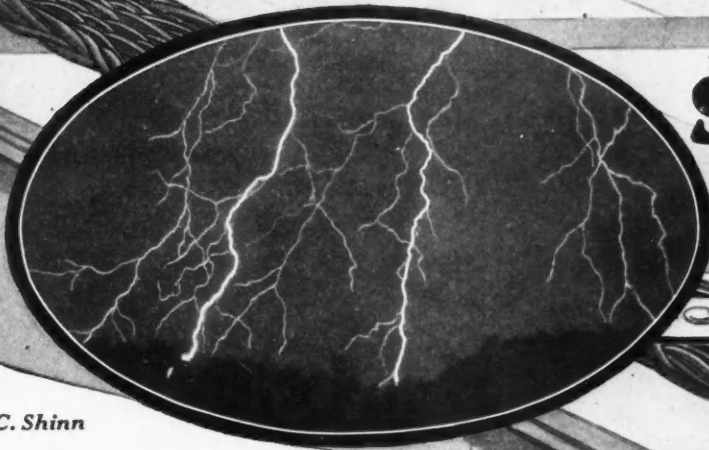
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W. C. Shinn



Will You Do Your Part to Prevent the Big 1918 Lightning Losses?

Why Lightning Strikes

Lightning is the result of attraction between electrical energy in the cloud and electrical energy in the earth, finally overcoming the resistance of the dry air between.

If there is a house just below the cloud, the attraction of the electricity in the cloud, drawing upward on the electricity in the earth, tends to literally "charge" the house with electricity. Therefore, if the electric force should at that moment break through the air, the building, being directly in line and heavily charged with electricity, would probably be destroyed.

Shinn-Flat Conductors permit the electricity of the earth to gradually pass into the atmosphere above the building as it is attracted by the electricity of the cloud. There is no "bunching up" of electricity in the building.

The Lightning Stroke always occurs where the electricity has been impeded or obstructed—when it breaks through, that is the stroke. If you equip your building with Shinn-Flat Conductors, and therefore prevent the electricity from becoming impeded or obstructed, you need never fear Lightning.

1918 losses by Lightning will be the greatest ever known, because of the greatly increased value of the buildings and contents destroyed.

This year the country cannot afford to have millions of dollars worth of grain and live stock carelessly destroyed by Lightning—now that it can be easily prevented.

It is the duty of the Contractor and Builder to see that every building constructed this season, as well as every building already built—is immediately protected from Lightning by

Shinn-Flat

The National Protection from Lightning

The Shinn-Flat Lightning Conductor is made of pure copper wires, woven in the form of flat ribbon-like cables, one inch in width. It is the most modern Lightning Conductor, scientifically, that has ever been devised.

Endorsed by Greatest Electrical Authorities

The form of Shinn-Flat has long been recognized by the highest scientific authorities as the ideal form for a Lightning Conductor. It has greater strength and is much more effective in controlling the movement of electricity, because of its greater conducting and cooling surface.

The U. S. Weather Bureau Says :

"It has long been recognized that wide metal ribbon is a better conductor of Lightning discharges than the same amount of metal in the form of either a cylinder braided or twisted conductor."

Shinn-Flat is Bonded to Protect

Every Shinn-Flat installation is covered by a Cash Bond that Lightning will not strike, paid for by us and issued direct to the owner by a large independent Bonding Company. The W. C. Shinn Manufacturing Co. is the only manufacturer of Lightning Conductors that ever backed up its goods and its work in this practical way.

Make That Extra Profit

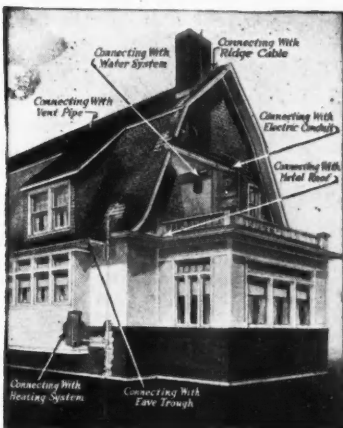
Every community has a great number of homes and barns unprotected, and this year, when building operations are rather quiet, is a good time to get this extra business and extra profit. Write for full information.

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W. C. SHINN MFG. CO.
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I am interested in the exclusive agency for the Shinn-Flat System in this community. Send full information.

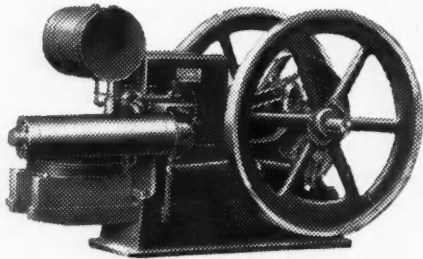
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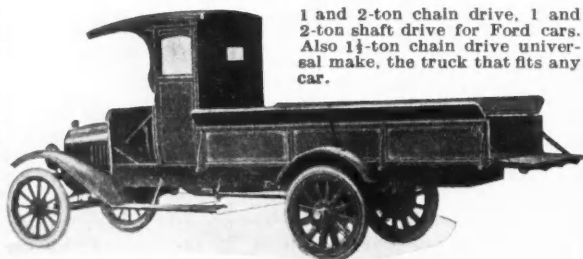
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Permanency in Doors

Use of Hollow Metal, Fireproof Doors Recommended for All Important Buildings, Especially for Openings in Fire Walls, Stair Halls, Elevator Enclosures, etc.

By A. W. ECKBERG

DID you ever stop to consider that the doors are in greater actual use than any other part of a building? This being a self-evident fact, it is of course very important to select them with care, especially for permanent and high-class work, and if any saving in expense of materials is contemplated, it should not be made in the doors. This is a case where the old adage applies that "the best is the cheapest in the long run," even tho a good door should be a little more expensive in first cost.

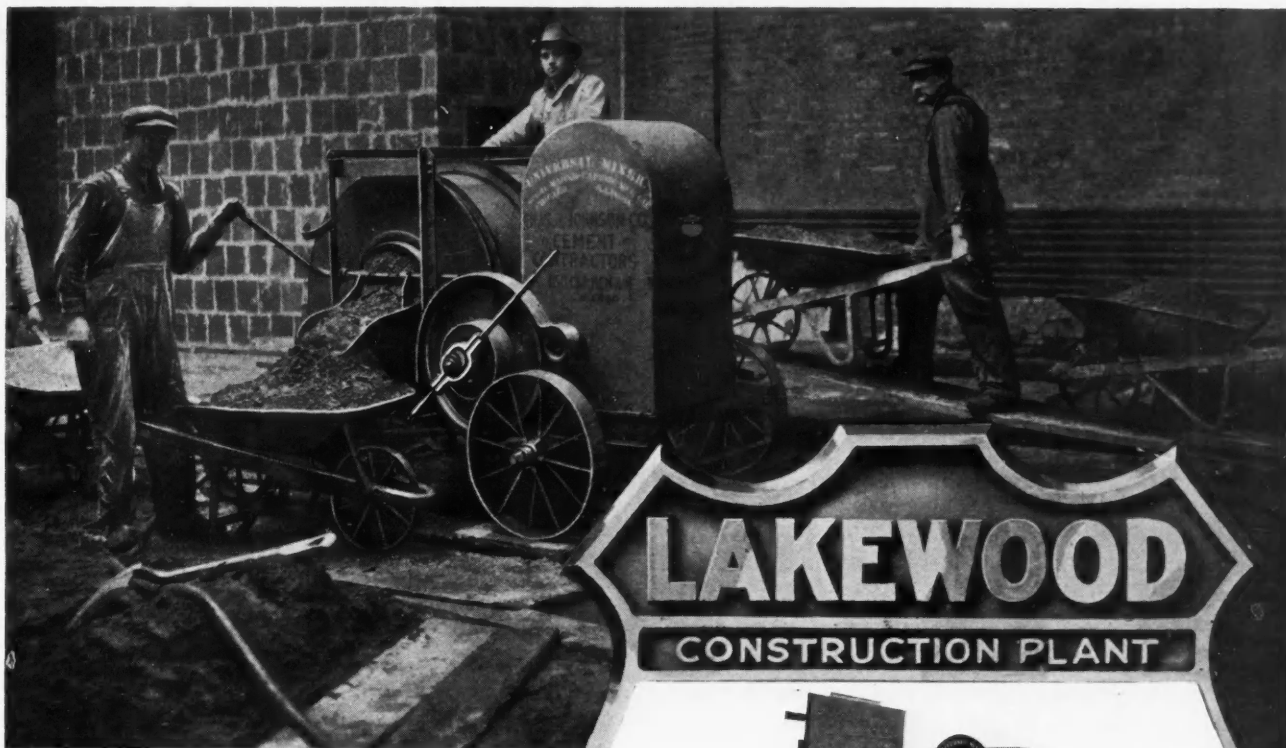
From time immemorial when anyone made a door, be it for a palace or the humblest abode, it was just naturally made of wood. Whole treatises have been written about how to frame it, how to make it beautiful and to resist warping and twisting, the best wood to be used, etc., but of wood it has generally been. If rich beauty was desired the more precious wood was resorted to, but always wood, and well varnished and oiled or painted, which insures its burning more rapidly, if fire ever got to it.

When the fire prevention campaign started some thirty years ago, several attempts were made to protect the wooden door. It was hard to get away from the thralldom of wood, so at first it was painted with preparations of alum and other salts, which was then called fireproof paint, and by this combination wood would not ignite at first, but would not withstand a hot fire for any length of time. Later, experiments were tried to make the wood fire resisting by extracting the resin and other highly inflammable components of wood, leaving only the fibre. This was tried for some time, but was found wanting, as the wood would presently burn and the fire looked very much like an ordinary wood fire.

Later on the method of covering the wooden doors with metal (which originated in Germany), was adopted, and was no doubt the best that could be had for that period. It is, however, impossible with this kind of work to obtain a result that is satisfactory for high-class buildings.

In their place and to more adequately meet the requirements of these modern times, the hollow metal doors and trim were developed and put on the market about 10 years ago. In developing the hollow metal door idea the inventor had to break away from precedent and start out along original lines, by cutting out the weak spots entirely and replacing it with what has proven to be the last word of door and trim construction—a door of cold-drawn steel provided with air chambers to insulate, instead of wood which would char and collapse at the most critical moment. This door has proved itself effectively fireproof, handsome,

(Continued to page 112.)



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This means not just an ordinary mixer, but one that has been especially designed by expert engineers with a full knowledge of your requirements.

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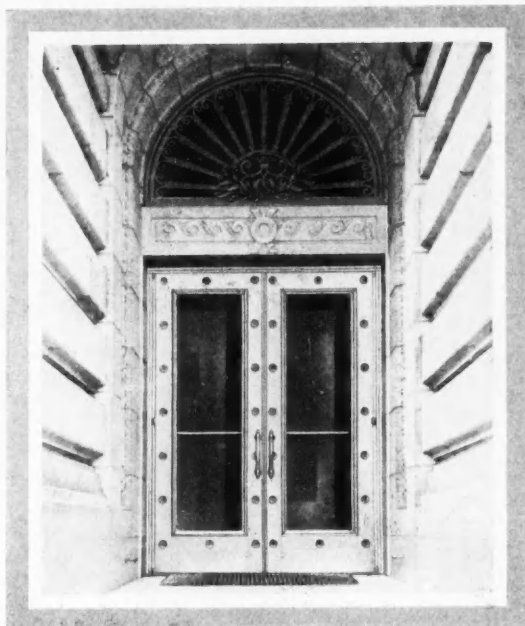


Permanency in Doors

(Continued from page 110.)

economical and where properly cared for, practically everlasting. Therein is the evolution of the hollow metal door. The replacing of wood and all other combustible, or semi-combustible interior trim, with cold-drawn steel was a comparatively easy and simple matter. Wherever custom called for the installation of wood for these purposes, its absolute elimination was now made possible.

A building equipped thruout with hollow metal doors and trim and being, of course, otherwise fireproof, simply means that you have done away with everything which can burn with the exception of the contents of the building. Every room, compartment or floor has been literally converted into an isolated unit. Such an equipment will confine the fire, and combat it by virtually the only possible successful method, namely, starvation. When the contents of the particular unit in which the fire originates are consumed, the fire is extinct because it has nothing more to feed upon. Whatever the structure, be it a sky-scraper, loft or office building, theater, hotel, postoffice, hospital, residence, school, steam vessel, battleship or railroad car, if it is otherwise fireproof, the installation of hollow-metal doors and trim makes it entirely so, or effectively completes the fireproofing by the elimination of those materials which can be consumed by fire.



Bronze Entrance Doors, Mahoning County Court House, Youngstown, Ohio.

A study of this important subject has also brought out the fact that vertical shafts thruout a high building, such as elevator shafts, stairhalls, pipe and wire shafts, ventilator shafts, etc., will serve as flues for a fire starting in any of the lower stories, and allow the flames

(Continued to page 114.)

The "New-Way"

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these war days, is POSITIVELY NECESSARY on every construction job.



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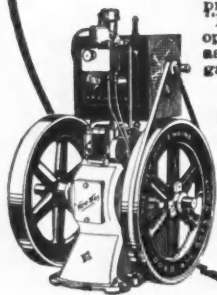
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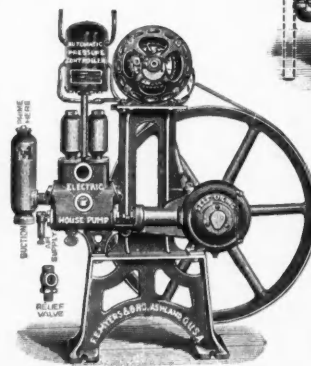
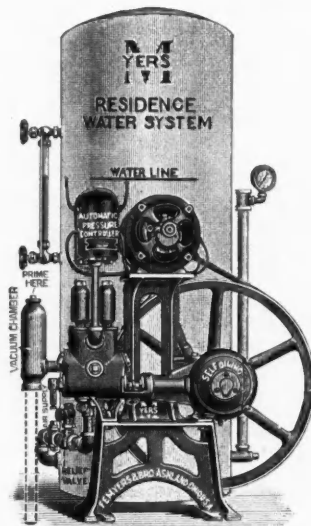
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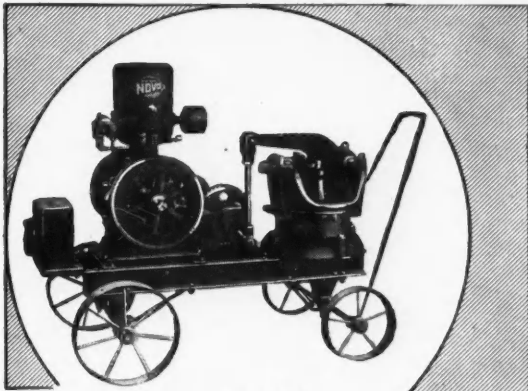


Figure 335—Novo Diaphragm Pumping Outfits, either skid or truck mounted in several sizes, single or double pumps.

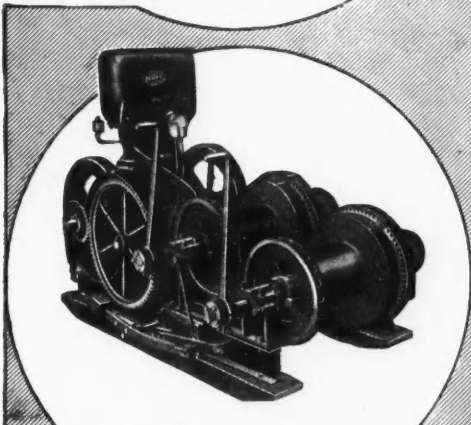


Figure 172—Novo Hoisting Outfits for every hoisting job requiring less than 20 H.P. These reliable hoists are built in various sizes and types.

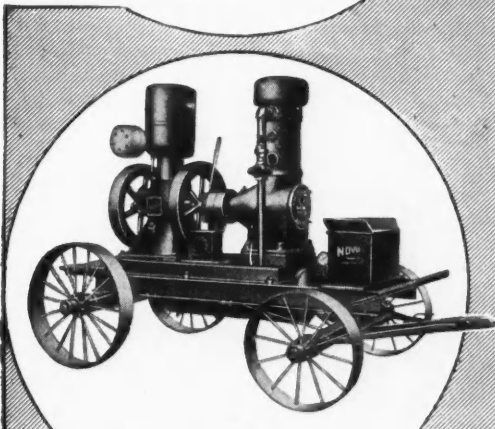


Figure 276—Novo Air Compressors cover a wide range of sizes from 1-2 H. P. 5 ft. machines up to the 15 H. P. 80 cu. ft.

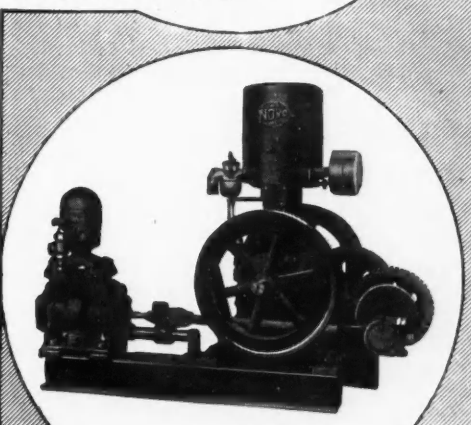


Figure 14139—Novo Pumping Outfits have stood most severe tests. Novo Power Pumps are noted everywhere for reliability under all conditions.

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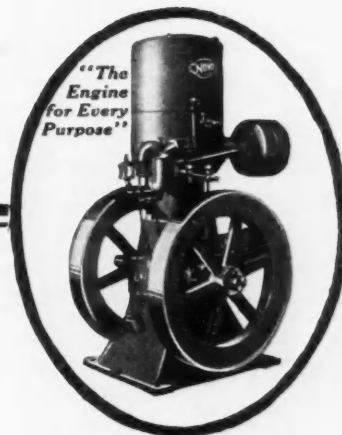
If you are not already acquainted with Novo Engines and Outfits, it will pay you to get in touch with us. Write today for our booklet—"Standardized Power."

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Permanency in Doors

(Continued from page 112.)

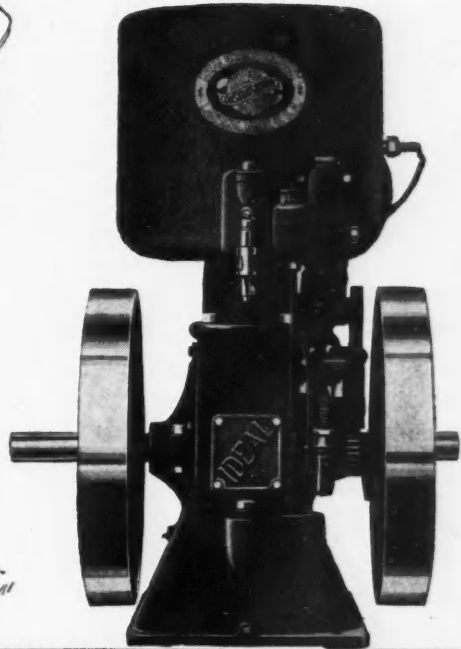
to spread thruout the building. In actual experience in many cases great loss of life has occurred in buildings because escape was shut off by the flames entering the stairhalls or elevator shafts. The fact that openings to such flues or shafts have not been provided with fireproof doors have caused some very expensive fires, for instance, the Equitable Building in New York City about two years ago. This has served to call the attention of architects and builders to the necessity for having fireproof doors for such openings and eliminating the open grill work so commonly used for elevator enclosures in the past, and to enclosing elevator shafts with fireproof walls or metal partitions, with wired glass, if light is required.

The open grill work used for such a long time, has been found inadequate for the purpose, and will not be tolerated in any really fireproof or modern building. The city of Cincinnati was one of the first to adopt a building code requiring owners of buildings having such work to replace it with really fireproof enclosures, and other cities are fast following this excellent precedent. According to the best and most advanced ideas, the stair hall shafts are being located in a different part of the building from the elevator shaft, so that in case a fire occurs near one, the other would be available for exit by the occupants. This idea is a very important step in the right direction, and will tend to increase the safety of a building, especially those of the better class or those of the "skyscraper type."

Because of its beautiful color, durability and ornamental qualities, bronze is the ideal metal to use for entrance or exterior doors in buildings of monumental and permanent character. Beautiful ornamentation can be obtained in bronze, in drawn or cast work for mouldings, rosettes, panels, etc., in simple or in the most elaborate designs. For banks, libraries, museums, churches, office buildings, mausoleums, etc., nothing better can be had, and they will always be a credit to the architect or builder who makes use of them in his work.

The necessity for fireproof equipment for buildings is now so well recognized that specifications for a *really ideal* modern fireproof building generally calls for hollow metal doors and trim thruout; but they should be specified at least for openings in fire walls, stairhalls, elevator doors and enclosures, fire towers, fire escapes and all vertical shafts, the openings to which should be protected against the fire spreading thruout the building, rendering the building semi-fireproof. The quality of workmanship, construction and finish obtainable in this line of products makes them particularly suited for these purposes, for such buildings as hotels, schools, office buildings, theaters, hospitals, public buildings, residences, libraries, museums, club buildings, etc., or in other words, buildings in which

(Continued to page 116.)



NEVER-FALTERING SERVICE

Hopper Cooled, Frost Proof, Dirt Proof, Vertical Engines

Ideal Engines are demonstrating their built-in reliability and fortitude in the day-in and day-out grind of heavy construction work.

They are furnishing power for concrete mixers, power loaders, hoisting and pumping outfits—giving dependable, constant, care-free service. Extreme conditions of weather never hamper their continued performance.

Correct in design—built of right materials with painstaking attention to details, and

supported by years of experience in engine construction—Ideal power is insurance to the contractor against costly engine tie-ups on the rush contract.

Always on the job—Ideal Engines are found in all lines of construction work in every part of the country.

Ideal Power is demanded by the contractor who insists on reliable, dependable, economical equipment.

Ideal contractor equipment includes Reversible Hoists, Single Drum Hoists, Double Drum Hoists, Water and Mud Pumps. Let us send you our catalog containing complete information about Ideal Engines and Outfits. :: ::

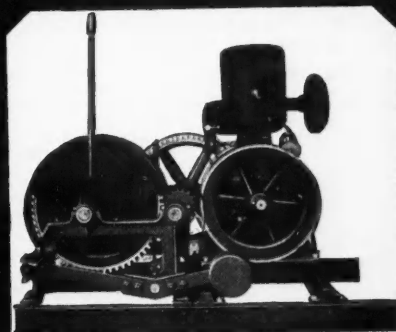
IDEAL ENGINE COMPANY

LANSING

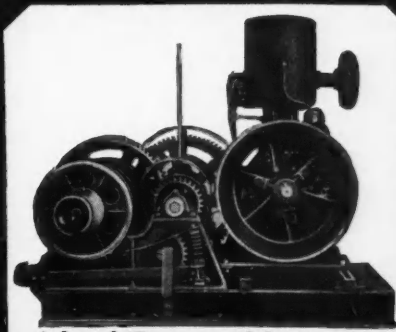
R. E. OLDS, Chairman

805 East Kalamazoo Street

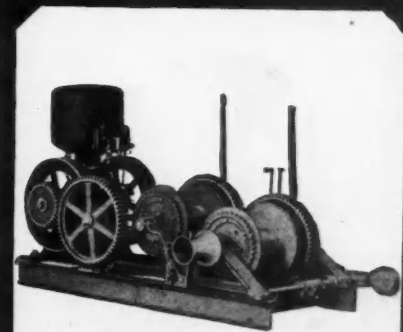
MICHIGAN



Ideal Single Drum Hoist



Ideal Reversible Hoist



Ideal Double Drum Hoist

Permanency in Doors

(Continued from page 114.)

high-class satisfactory finish is required. It is, therefore, no longer necessary to sacrifice a beautiful, pleasing finish in order to make your building "absolutely fireproof," but by installing hollow metal doors and trim of a reputable make, an ideal equipment is obtained—in fireproof qualities, in durability, low cost of maintenance and beauty of finish.



Tables Give Price of Lumber "by the Piece"

AND now comes the "per piece" price of lumber. Not so very long ago it was a common practice in retail lumber yards when a customer asked for the price of a certain kind of wood, to quote him the price per thousand feet, irrespective of whether he wanted enough wood to build a home or just a piece to fix the back door step. Even today 1,000 board feet still is the unit measure in many lumber yards on which prices are quoted.

Thus a man who may want only enough wood to lay a new floor in the kitchen goes to the lumber yards and asks for prices. He is told \$65, or \$45, or whatever the price may be per thousand feet for the particular wood he wants. But he leaves the yard none the wiser as to exactly what it will cost to lay his 6 by 9 foot floor.

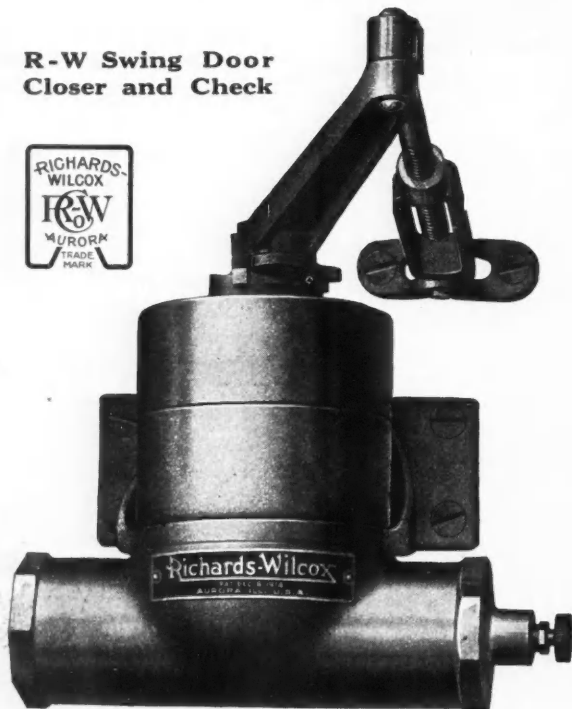
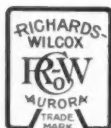
Probably the only reason this system of retailing has persisted for years and years is that no great number of retail lumber dealers could afford the time to work out a system of quoting the price of lumber, not by the 1,000 feet, but by the particular size required. This big problem has just been solved for the retail lumberman and for the small purchaser of lumber by the National Lumber Manufacturers' Association.

This association has published a series of tables which will enable the retail lumberman to quote by the piece lumber costing anywhere from \$1 to 100 per 1,000 board feet and measuring any length, breadth and thickness. The booklet of tables will be distributed without charge to all the retail lumber dealers in the country and the author will be compensated by the knowledge that much time, effort and brain power which hitherto had been expended in "figuring" by individual lumber retailers will henceforth be conserved and perhaps, spent in helping the government win the war.

The tables, for instance, show that a piece of lumber 1 by 4 inches, 10 feet long, of a grade costing \$40 per 1,000 feet, will cost 13 cents; a piece 2 by 4 inches, 16 feet long, of a grade worth \$65 per 1,000 feet, will cost 69 cents. By means of these tables the dealer can at a glance, tell what any size piece of any grade lumber will cost.

Every Building in Your Community Needs From Several to Several Hundred

R-W Swing Door
Closer and Check



The R-W Swing Door Closer and Check meets particular favor among users because—

It is scientifically adapted to the use for which it is bought.

Spring cannot be overwound.

Liquid occupies separate chamber from spring mechanism which prevents leakage of oil.

Adapted to right or left hand swing doors.

Simple and effective spring adjustment.

All parts machined to a perfect fit and are interchangeable.

Made in six sizes for various weights of doors.

Regularly finished in gold bronze. Finished in silver bronze or ivory black without additional charge. Prices for other finishes on application.

Fitted with soffit, flush or corner bracket, or furnished without bracket.

No. 643 Door Closer and Check is a worthy unit of the R-W line and conforms in every respect to the high character established by Richards-Wilcox products. It will sell itself in your community if you give it a start.

Write for folder giving complete description and prices. Sent without obligation.

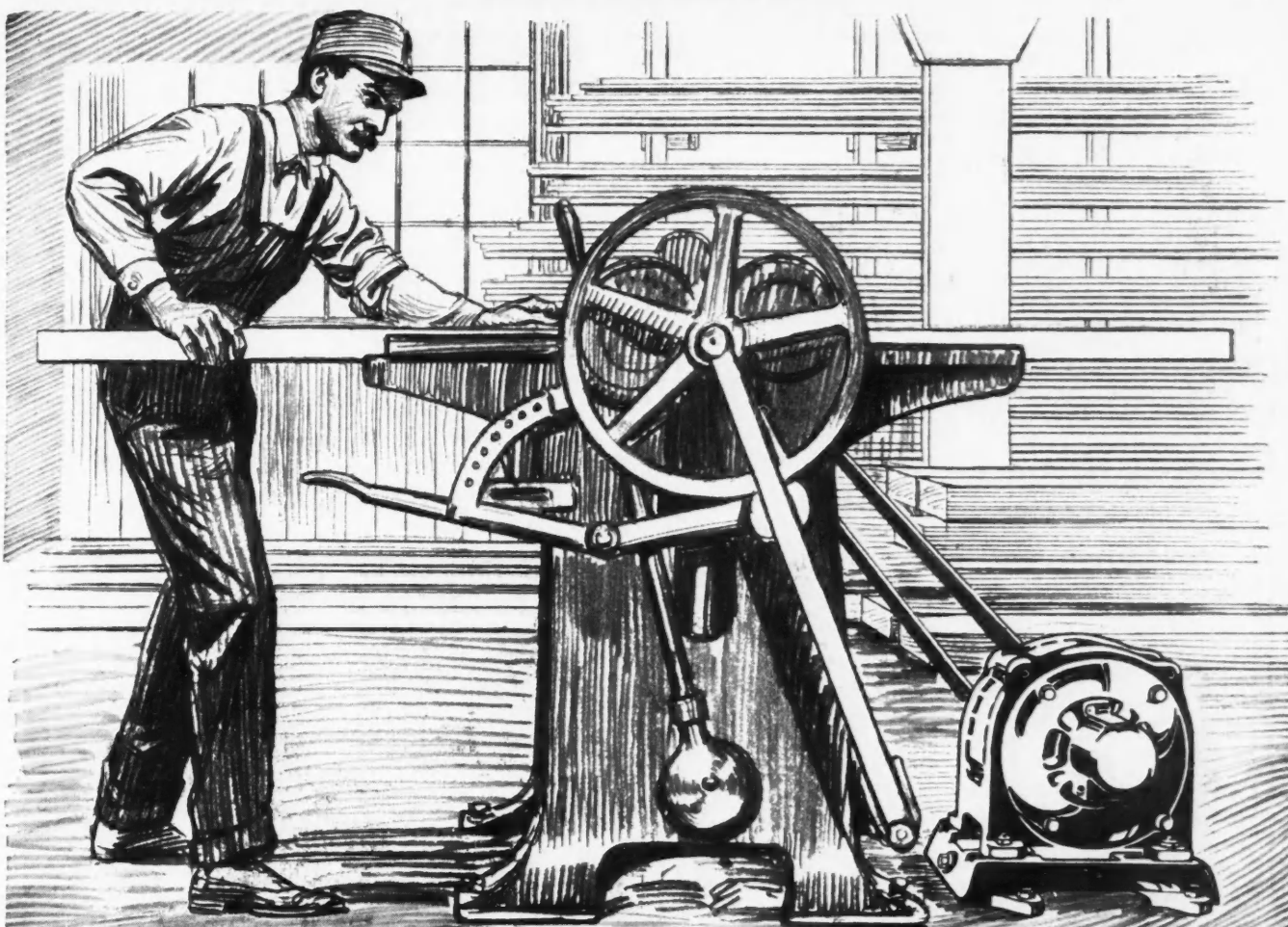
Richards-Wilcox Manufacturing Co

SAN FRANCISCO
LOS ANGELES
NEW YORK
CHICAGO

AURORA, ILLINOIS, U.S.A.

Richards-Wilcox Canadian Co., Ltd., London, Ont.
"A hanger for any door that slides"

PHILADELPHIA
MINNEAPOLIS
BOSTON
ST. LOUIS



Steady Power Makes the Smooth Job

In the old days, the carpenter with the powerful and steady stroke turned out the best job. Now that machines have displaced manual labor, electricity provides the power that turns out the best and quickest work.

G-E motor drive has a certainty, smoothness and sustained speed meaning immediate dollars saved—less wastage—greater safety to operatives—reduction of power loss through belts and shaft, and negligible fire risk. Construction work will progress quickly and the finished job will be done right. Ask your lighting company or the nearest G-E Motor Agency about G-E motors and control.

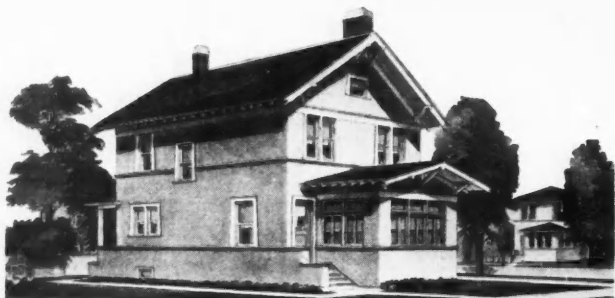
General Electric Company

General Office,
Schenectady, N. Y.



Sales Offices in
All Large Cities

6967



This Paint Gun—Does It!

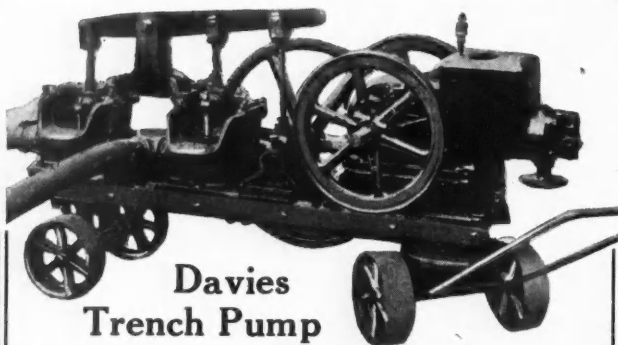
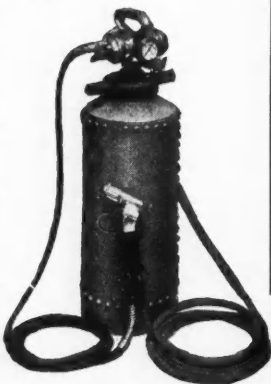
Start your big drive now—against the exorbitant cost of house painting. Enlist this modern method of applying paint and gain your offensive. Blow on the paint!

Just the thing for your industrial housing jobs. And hurry the job along.

One unskilled man does the work of three to twelve skilled painters using hand brushes. Rough surfaces and those extremely difficult to reach with hand brush are easily and rapidly covered. Very little scaffolding or ladders required. Operator's range is increased by eight feet.

Where compressed air is not handy, we are prepared to furnish complete gasoline engine or motor driven air compressor units.

Spray Engineering Co.
91 Federal St., Boston, Mass.



Davies Trench Pump PAYS FOR ITSELF

Study This Cost Problem

The old way, eight men at \$3.00 per day..... \$24.00
The Davies way, 12c per hour, eight hours..... .96
The Davies saves you in one eight-hour day..... \$23.04

Twelve twenty-four hour days more than pay for the complete outfit, and does twice the work of four men, without an engine.

Always running—any kind of weather—day or night. It has independent connecting links between pump and engine. If links should break, it would not be necessary to get a new engine.

The Davies Trench Pump is not an experiment, but has a record of proven ability and value by long practical jobs. Anyone can run it. When once started, it runs by itself. Costs only five cents per hour to operate. Equipped with three horse power gasoline engine, with direct oil and water-proof magneto. Write for information about this money-saving trench pump.

Davies Engineering Co.

Box 12, Station A, Boston, Mass.

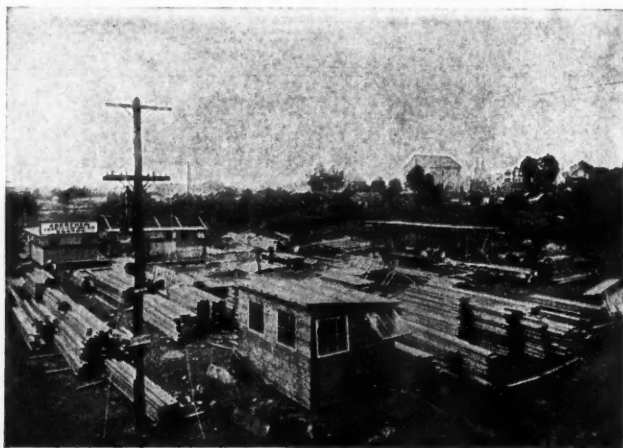
Sales Agents Wanted

Keeping Building Material in Order

THOSE contractors who have carefully studied all the details of their business realize the convenience as well as the economy of very carefully planning in advance with regard to the delivery of material on the site. Among those who have given special attention to this subject as displayed in numerous cases is the Aberthaw Construction Company of Boston.

In advance of beginning work a plan is made in which consideration is given to the track or road facilities, proximity of material to the building, means of handling from one point to the other, and hoisting to position, as well as the relation to the woodworking plant.

In the case of form lumber, for instance, lumber



System in Piling Materials on the Job Lowers Costs for Aberthaw Construction Co.

of a stated size is kept together—in fact, so far as possible, it is ordered of the exact length required for the given form. Likewise, storage facilities are established for brick, stone, sand, cement, etc.

The accompanying illustration shows such a layout, the lumber carefully piled. In the foreground is the routing office. Showing above this office and in the background is the sawmill, while in the left foreground are the engineer's and foremen's offices, the tool room, etc.

As lumber arrives on the job it is piled in the most convenient position for carrying to the sawmill. From the mill it passes forward to the place where it is to be used. The Aberthaw Company says that the limited amount of time spent in planning the lumber properly is much more than offset by the convenience incident to later handling.



The Pantograph Enlarges Drawings

To the Editor: McConnellsville, Ohio.

In the February number of your paper, Mr. C. E. Henderson of La Grange, Oregon, asked how to enlarge small letters and figures.

The quickest and best way I have found is with a pantograph, which can be purchased at most any store that sells art supplies. Cheap ones can be bought for ten or fifteen cents.

L. E. McGRATH.

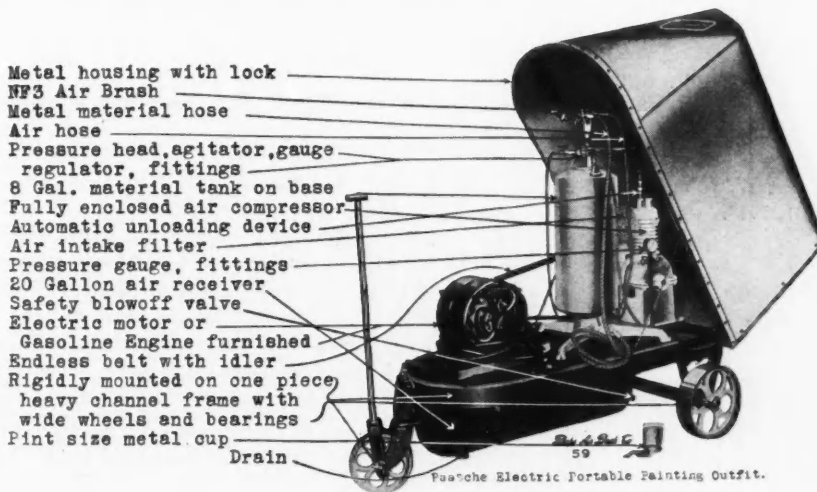
Painting Contractors!

THE extraordinary high cost of labor and material is causing serious damage to the extent that buildings and properties are being neglected at a tremendous loss to the owners due to the lack of paint and other preservatives.

The accompanying illustrations show the ***Paasche Superior Portable Painting Outfits*** which are already extensively used with remarkable success at tremendous saving by the U. S. Government, the railroads, ship building industries and the large plant owners and painting contractors throughout this country.



Speedy Process Eliminates Scaffolding. Most Economical System for Painting. Inaccessible Places Easily Reached.



- Metal housing with lock
- NF3 Air Brush
- Metal material hose
- Air hose
- Pressure head, agitator, gauge regulator, fittings
- 8 Gal. material tank on base
- Fully enclosed air compressor
- Automatic unloading device
- Air intake filter
- Pressure gauge, fittings
- 20 Gallon air receiver
- Safety blowoff valve
- Electric motor or Gasoline Engine furnished
- Endless belt with idler
- Rigidly mounted on one piece heavy channel frame with wide wheels and bearings
- Pint size metal cup
- Drain

Paasche Electric Portable Painting Outfit.

**Save
Hundreds
of
Dollars**

Paasche Portable Painting Outfit

Complete with Gasoline Engine or Electric Motor as illustrated, **only \$325.00**
 Extra for 6-foot Extension Handle..... **9.50**
 Extra for Water and Oil Separator, attached..... **16.00**

A Most Profitable Investment

This Machine with a Live Operator Does the Work of a Crew of Men



Used with remarkable success for painting Cantonments, Gas Tanks, Garages, Battleships, Motor Boats and general Painting and finishing.

These equipments are very simple to operate. Anyone with a little painting experience can do from 6 to 10 times as much work as by the old hand brush process by following the directions that accompany the equipment. One coat applied with the ***Paasche System*** is superior to two hand coats, hence it saves 100% of time for each coat applied. In addition to this the machine will do four to six men's work.

Can you afford to do without one of these Wonderful Painting Machines?

Place your order early as we have all we can do to meet the demand. Write for circular No. 13 describing these equipments.

These equipments made in larger as well as smaller sizes.



Illustration of Paasche's Quick Action Air Brush, showing range of stroke from a line to any size spray produced by the single pull of a trigger only. Paasche air brushes have a marvelous capacity for covering and distributing paints, enamels, varnishes, lacquers, bronzes and liquid materials of all descriptions. They lead in the art of air-finishing devices.

Paasche Air Brush Co.
 MANUFACTURERS

1219 West Washington Boulevard

CHICAGO



NEWS OF THE FIELD

J-M Open Tacoma Office

For the better service of the shipbuilding and allied interests, as well as the constantly increasing number of manufacturing plants, the H. W. Johns-Manville Company have opened a new branch office at 1015 A Street, Tacoma. Here is carried a complete stock of asbestos packings, moulded and in sheet form, and other well-known Johns-Manville specialties.

The Memphis, Tenn., office of the H. W. Johns-Manville Co. moved, March 31, to new quarters at 804-5 Exchange Bldg., corner Madison Ave. and Second Street, Memphis, Tenn.

The Youngstown, Ohio, office of the H. W. Johns-Manville Co. moved to 520 Market Street, April 1, 1918.



Charles Smith Co. Changes Name

After 30 years of heater manufacturing and selling, the Charles Smith Co., of 57 W. Lake St., Chicago, have changed their name to the name that their heaters have carried for years—the Hero Furnace Co.

There is no change in the personnel of the company, for J. P. Patton is still president and H. Hyer, secretary.

Stanley Works Have Remarkable Growth During 1917

Last year was a very remarkable one in the growth of the Stanley Works. The total area of land owned and occupied in New Britain by the Stanley Works on Jan. 1, 1917, was about 33 acres. During the last year 61 acres were added to the New Britain plant, making 94 acres in all. It is now almost a mile from the east to the west end of the New Britain plant.

Two large buildings were put up during 1917, one at the extreme east end of the plant, which almost doubled the warehouse facilities, and a factory building at the west end of the plant. These two buildings alone contain about two half acres of floor space. Besides them there have been constructed several smaller buildings and two large buildings for hot rolling steel mills, making the total floor area in the New Britain plant at the present about 15½ acres.

During 1917, the Stanley Works enlarged its power plant by completing a long distance transmission line to bring in electricity from its new plant on the Farmington River.



Sewer Pipe Makers Optimistic

Users of vitrified pipe are assured of a supply of that product adequate for the curtailed demands of the war period, so far as the decision lies with the Fuel Administration. Such is the word reaching the Sewer Pipe Manufacturers' Association, official announcement of which was made recently. It has been decided to permit sewer pipe manufacturers a supply of coal sufficient for 50 per cent of their full capacity, as ascertained by comparison with an average production for the past three years. The same rule applies to wall coping, flue lining and allied products.

There are four exceptions noted in the general order covering the clay industry, the most important of which perhaps

(Continued to page 122.)



Paint Your Houses In Less Time—At Less Cost

These are the well-established economies and advantages of Aeron spray-painting over the hand-brush method that you can bring to all of your painting operations with the

Aeron System
Finishing
Spray-painting

Portable Painting Equipment

—Wood, stucco and brick houses of any style of construction and in any number, are Aeron-painted with equal facility, speed and uniformity.

—The painting is done at least 5 times faster than hand-brushing.

—All coats are complete and uniform, on both exterior and interior work, and attain maximum penetration. Places inaccessible with the brush are easily reached.

—There is no skimping or slighting. Dripping and other wastes are eliminated.

—There is no costly replacing of brushes, which wear out fast on rough surfaces.

—An extension pole to fit the regular Aeron is furnished in a combination of lengths, saving the necessity of building scaffolding in many places.

The Equipment is clean, compact and easily portable. Its operation is simple and quickly understood. It is sold to you on a strictly guaranteed basis.

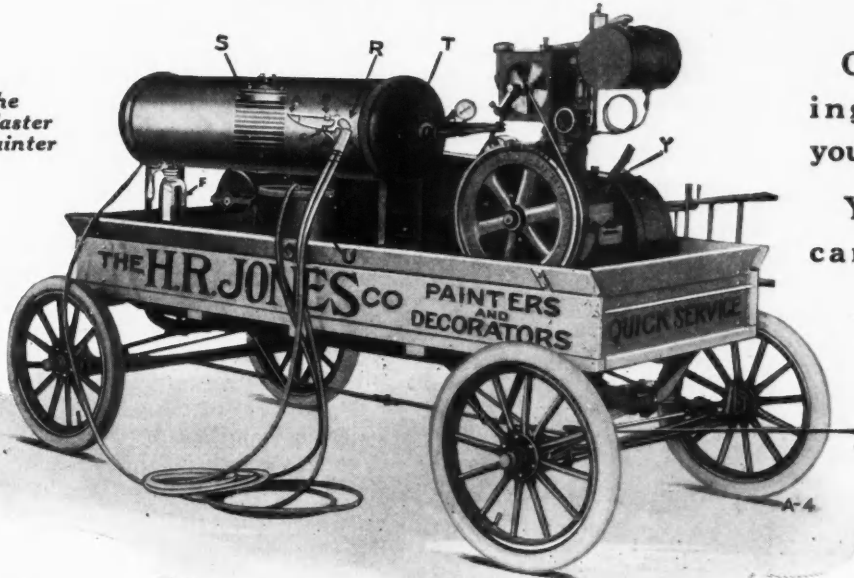
Submit Your Painting Problems to Us

and we'll gladly send complete equipment and operation details as applied to your particular needs, also illustrated and descriptive literature. Address—

The DeVilbiss Mfg. Co., 1276 Dorr St., Toledo, Ohio

MR. CONTRACTOR—YOU Can Make More Money

The
Master
Painter



OWN the paint-
ing business of
your locality.

Your operator
can earn more.

Your cus-
tomers will
have better
work and
lower prices
if you own a
**MASTER
PAINTER**

We have Perfected

The SHORTURN Trailer, which is especially advantageous to Building and Painting Contractors.

The GIRAFFE nozzle attachment for gun R enables operator to reach ceilings and high walls without use of ladders or scaffolding; thus avoiding danger and saving time. Full details to RESPONSIBLE CONCERNS.

Write for Prices on Trailers

The HANDY AIR PAINTING EQUIPMENT complete with a 6 ft. of air hose and 8 ft. of electric socket cord (specify for direct or alternating current) \$96.00 F. O. B. Chicago.

Supplies sufficient air for service of one operator in refinishing radiators, rooms, corridors, fixtures or furnishings in HOTELS, OFFICE BUILDINGS, PUBLIC or PRIVATE INSTITUTIONS.

Can be easily moved from place to place or provided with wheels.

Enables the use of materials that are too quick drying for hand use.

Produces a better finish, uses less material, makes an enormous saving in labor over the hand method.

We build SPECIAL equipments for special WORK. Inquirers will please state specifically the results desired. Our engineering department will submit full data.

THE SURTY GUARD COMPANY, INC.

62 East Lake Street

CHICAGO,

ILL.

The Handy
Equipment



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

**Was \$100
Now \$49**

**NEW OLIVER
NINE FOR
HALF PRICE**

The Oliver Typewriter Company created a nation-wide revolution on March, 1917, when it announced its new plans. No more expensive sales force of 15,000 men! No high office rents in 50 cities! No idle stocks!

But dealing direct with the people—cutting out all middlemen. The old plan cost the buyer a needless \$51 per machine. We now save that and give it to you. So the new price for standard \$100 Oliver is \$49.

The Oliver Nine—our latest model—direct from the factory to you. It is the finest, the costliest, the greatest typewriter ever built. Used by the leading concerns.

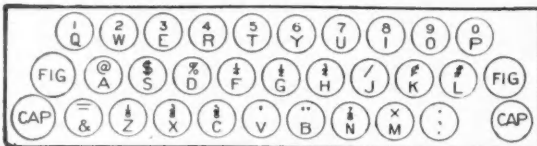
Who would ever pay over \$49 again for a new typewriter? Especially when we not only make a new low price, but also give the lowest terms—about 10 cents per day—over a year to pay.



Over 600,000 Sold

And remember, carbon copies of everything written, for your records.

Our new price and terms ought to sell an Oliver to every contractor. Longhand writing will be out of date among progressive men.



Free Trial—No Money Down
FREE BOOK

Just send for our amazing disclosure entitled "The High Cost of Typewriters—The Reason and the Remedy." Then ask for a trial. You are not put under the slightest obligation. It is our new-day way of selling. It saves money for both of us. You act as your own salesman—the Oliver itself must convince you. You pocket the \$51.

Send in the coupon below today for one copy of this sensational book that exposes the secrets of the typewriter world. (609)

Canadian Price, \$62.65

THE OLIVER TYPEWRITER COMPANY
2405 Oliver Typewriter Bldg., Chicago

Mail me your book and further information—all free and without obligation to me.

Name

Street Address

City State

**STARTLING
FACTS**

**Contractors'
Special!**

For contractors, our Special Oliver Nine is unbeatable. Besides being the best for ordinary correspondence, none can equal it for figure work. It has the characters you need, as shown on the keyboard herewith.

News of the Field

(Continued from page 120.)

pertains to pooling. Pooling of manufacture will be permitted wherever it can be shown that such an arrangement would save fuel.

No new plants may be started without the special permission of the Fuel Administration. No plant is to change the character of its product, if it has not previously manufactured the same, without the permission of the Fuel Administration.

The right is reserved to manufacturers to present their individual claims to the Fuel Administration, and where it is found that the manufacturer cannot supply the demand in his market operating at curtailed capacity, he may be given a special permission to increase operations to whatever extent is necessary to fill the orders on his books.

The 50 per cent order effecting sewer pipe and products usually made in sewer pipe plants is generally acceptable to the manufacturers, who believe that this percentage will meet the needs of the trade in the present year, when building operations and municipal sewer improvements are both very considerably curtailed. The settlement of the coal question which has been at issue for several months past, is expected to have a stabilizing influence on the industry, altho car shortage for the shipment of the product has been the controlling factor in the limited output thru the winter and may interfere with prompt deliveries for some time to come.

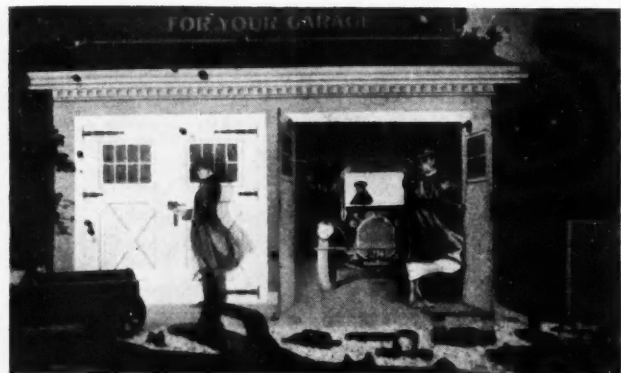
Lakewood in Milwaukee

The Lakewood Engineering Company, Cleveland, Ohio, announces the opening of a district office at 448 Broadway, Milwaukee, Wis., with Fred T. Kern and J. N. Young, both formerly of Kern, Hunter, Inc., as its representatives.

To Deal in Rebuilt Equipment

A new company of national scope, to be known as Equipment Corporation of America, with headquarters in the Lumber Exchange Building, Chicago, Ill., has recently been organized. They will deal exclusively in used contractors' equipment, thoroly overhauled and ready for service.

The trouble heretofore with buying used contractors' equipment comes from the fact that men of no financial responsibility—acting merely as brokers—have sold equipment that had not been overhauled or even looked at since its last job, and frequently this equipment was on its last leg. This new company has elected H. M. Capron, 145 Lumber Exchange Building, for its president and general manager, and G. A. Whitehead, 501 Stock Exchange Building, Philadelphia, Pa., as vice-president and eastern manager. Both of these men are very well known to the contracting trade and behind their company is ample financial responsibility, and under their management the new company should succeed, as it is affiliated with the best known manufacturers of contracting equipment. The AMERICAN BUILDER wishes them success.



Window Display "Cut Out" to Promote the Use of Stanley Works Garage Hardware; Store of Wm. K. Toole Co., Pawtucket, R. I.

Do YOUR Share to Win the War



Need of Conserving the Metal Supply

Bulletin of the United States Chamber of Commerce

"The requirements of iron and steel in the prosecution of the war can hardly be exaggerated. Figures cannot be given but the broad statement can be made that the utmost which can be produced is below the requirements of the United States government and its allies and of business closely related to the war. This condition will continue; for on the one hand no substantial increase in production is anticipated, in fact, even maximum production from existing facilities cannot be expected because transportation, labor and material conditions will interfere with the full operation of plants, and on the other hand, indications are that the war requirements will continue to increase.

"The direct requirements of the government for pig iron are relatively small, but the requirements for steel are enormous and iron is therefore required in corresponding quantities. Steel is needed in the war for ships, railroad cars and locomotives, rails, trucks, containers, etc. Furthermore, there are the requirements for shells and other munitions work, requirements large in tonnage, far beyond what is generally supposed. In addition, business closely related to war, i. e., business producing government materials and supplies, the necessities of life and the materials for producing the necessities of life, require steel in great quantities for buildings, machinery, tools, containers, etc. When all these requirements are met little if any steel will be left for so-called general business.

"The course for business men to pursue is clear. Iron and steel should be used only when the requirement is unavoidable."

USE

Vitrified Clay Pipe "THE PERMANENT PIPE"

For building drains and sewers, Vitrified Pipe, properly installed, gives thorough and lasting satisfaction—and it is not war material.



THE SEWER PIPE MANUFACTURERS' ASSOCIATION
 JOHN L. RICE, FIELD COMMISSIONER SECOND NATIONAL BLDG. AKRON, OHIO

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

No Exemption

By **STRICKLAND GILLILAN**

Author of "Off Agin, On Agin, Gone Agin, Finnigan"

If you cannot launch a bullet at the fiend across the sea
Buy a bond!
It will reach its little target straighter than a homing bee—
Buy a bond!
If you've bought a lot before,
Don't believe you've done your chore—
Buy a half a dozen more!
Buy a bond!

'Tisn't often helping others helps yourself so all at-once—
Buy a bond!
Help the country, help your bankbook—every slacker is a
dunce!
Buy a bond!
If your country's saved, all right!
There's your money good and tight,
If it isn't—well, good night!
Buy a bond!

If the bond should prove a flivver, all the money that you
save
(Buy a bond!)
Isn't worth a single penny—what is money to a slave?
Buy a bond!
It will keep the kaiser's hordes
Back, as well as two-edged swords!
If your pocket book affords,
Buy a bond!
If you are a common tightwad, loving no one but yourself,
Buy a bond!

It's the surest and the savest way to save your measly pelf—
Buy a bond!
If you are a decent critter,
'Gainst the foe of freedom bitter,
God Almighty hates a quitter—
Buy a bond!



Consult the "Official U. S. Bulletin"

Owing to the enormous increase of government war work the governmental departments at Washington are being flooded with letters of inquiry on every conceivable subject concerning the war, and it has been found a physical impossibility for the clerks, tho they number an army in themselves now, to give many of these letters proper attention and reply. There is published daily at Washington under authority of and by direction of the President, a government newspaper—the Official U. S. Bulletin. This newspaper prints every day all of the more important rulings, decisions, regulations, proclamations, orders, etc., etc., as they are promulgated by the several departments and the many special committees and agencies now in operation at the National Capital. This official journal is posted daily in every postoffice in the United States, more than 56,000 in number, and may also be found on file at all libraries, boards of trade and chambers of commerce, the offices of mayors, governors and other federal officials. By consulting these files most questions will be found readily answered; there will be little necessity for letter writing; the unnecessary congestion of the mails will be appreciably relieved; the railroads will be called upon to move fewer correspondence sacks, and the mass of business that is piling up in the government departments will be eased considerably. Hundreds of clerks, now answering correspondence will be enabled to give their time to essentially important war work, and a fundamentally patriotic service will have been performed by the public.

Fine For FLOORS

Degrah not only costs less than shellac by the gallon, but you reduce the expense further by thinning it half with turpentine.

NOW YOU
Degrah
REGISTERED U.S. PATENT OFFICE.
instead of "Shellac"

Degrah does not raise the grain of the wood nor muddy spirit stains. Pore-filling, non-penetrating, absolutely waterproof, elastic, durable, glossy, tough, full bodied and neutral like lacquer. Does the work of all interior varnishes. Resists everything. Say to your Dealer or Jobber "I want Degrah" and insist upon getting it. Send for leaflet showing sample on paper, giving full information on this revolutionary product.

KEYSTONA Washable For Walls Try it alongside of other flat finishes and you'll admit with other painters that it is unequalled for covering capacity and its lime-proof colors. Send for Free color card.

Keystone Varnish Company
2009 Keystona Bldg. Brooklyn, N. Y.

HAVE YOU?

Have you specified Clinton Mortar Colors for that new building yet? Every brick building should have Clinton Mortar Colored Joints.

Clinton Mortar Colors

Clinton Mortar Colors are the very best. They go hand in hand with Permanent Construction. Add to the selling value of your building—so give the proper care and attention to the Coloring of Mortar Joints—same as you would do in ordering the correct quality and color of face brick. Clinton Colors are packed with great care. Request our samples and catalog.

Clinton Metallic Paint Co.
CLINTON, N. Y.

"VENDOR" SERVICE

The Reliable

Roofing Slate Service

<p>Genuine Bangor Albion Bangor Jackson Bangor No. 1 Pen Argyl</p>	<p>Slatington Big Bed Washington Big Bed Trout Creek Big Bed Franklin Big Bed</p>
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The various qualities of Roofing Slate quoted above are the product of the following companies and are sold EXCLUSIVELY through the Vendor Slate Company.

WE CAN MAKE IMMEDIATE SHIPMENTS IN ANY QUANTITY—IN ANY SIZE—IN ANY QUALITY.

Genuine Bangor

- Genuine Bangor Slate Co.
 Old Bangor Quarry
 American Bangor Quarry
 Bangor Excelsior Quarry
 Star Quarry
 Royal Quarry
- North Bangor Slate Company
 North Bangor Quarry
 Bangor Washington Quarry
- Bangor Quarry Company
 Bangor Union Quarry
- East Bangor Consolidated Slate Co.
 East Bangor Consolidated Quarries
- Bangor Central Slate Company
 Bangor Central Quarries
- Bangor Supreme Slate Company
 Grand Central Quarries
- New Bangor Valley Slate Company
 New Bangor Valley Quarries
- Bangorvein Slate Company
 Peerless Quarries

Albion or Jackson Bangor

- Jackson Bangor Slate Company
 United States Quarry
 Valley Quarries
 No. 5 and 6 Jackson Bangor Quarries
- Albion Vein Slate Company
 Stoddard Quarries
- Genuine Bangor Slate Company
 Albion Quarries
- M. L. Tinsman Slate Company
 Tinsman Quarries

No. 1 Pen Argyl

- Hercules Slate Company
 Hercules Quarries
- Hammann Slate Company
 Northampton Quarries
- Shimer Slate Company
 Alpha Quarries

Slatington Big Bed Washington Big Bed Franklin Big Bed Trout Creek Big Bed

- Provident Slate Co.
- Genuine Washington Slate Co.
- Genuine Franklin Slate Co.
- Prudential Slate Co.
- Washington Slate Co.
- Trout Creek Slate Co.
- Blue Mountain Slate Co.
- Blue Valley Slate Mfg. Co.
- Custard Slate Co.
- Carbon Slate Co.
- Thomas Slate Co.
- Ellis Owens Slate Co.
- Lobb, Parry & Co.
- Henry Quarries Co.
- Royal Blue Slate Co.
- Highland Slate Co.
- Manhattan Slate Co.
- Roberts Bros.
- Blue Vein Slate Co.
- Ellis Owens Sons Slate Co.
- Pennsylvania Slate Co.

THE LARGEST SHIPPERS OF ROOFING SLATE IN THE WORLD



VENDOR SLATE CO.

I N C O R P O R A T E D

EASTON, PENNSYLVANIA



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Griffin

Pressed Steel Door Stops

No. 640

Are drawn into shape from one piece of high quality Cold Rolled Steel making them extra strong—guaranteed **indestructible**.

The rubber bumper is made from the best rubber and is backed up by a metal disc, which in turn is knurled, "ENTRENCHED," in place—and will stand all the "Banging" one can possibly give it, and absolutely cannot work out of place.

Beautiful Yet Plain

Compare this beautiful, plain door stop with the ordinary kind. It is modern and when finished in any of the various Griffin Hardware Finishes, it harmonizes with the beautiful interior finish of the Modern Home or Building.

No sharp edges or corner to cut the hand on, catch the clothes, as the woodwork is dusted. This is the door stop your customer is looking for. Have your Hardware Dealer show **them to you**.

*Send for complete circulars
and information at once*

The Griffin Mfg. Co.

Erie, Pennsylvania

30 Warren St.
NEW YORK

17 E. Lake St.
CHICAGO

History and Air Brush Painting

(Continued from page 43.)

The roof has not been painted because it could get along without it. It will now be considered and receive its coating in colors, in checkerboard, or diamond shape, or solid color.

A large Ohio manufacturer writes us in answer to an inquiry:

"The information given you regarding the painting of our factory with the air brush system is correct. We did this with very good results. Our building is brick and the paint we used was the cheapest red we could get. We have not available the actual cost per square yard of doing this work, but we wish to assure you that it was very much less than could have been done by any other method."

Paint With Air, Not Hair

Millions of dollars worth of valuable buildings, machinery equipment, bridges, railroad rolling stock, ships and material of various kinds, go to waste annually that could be saved by the use of paint. The same kind of paint would not do in all cases, but for every need there is a suitable paint or preservative of the paint family. Some of these would be more generally used if the cost of labor were not so high. Often the task of painting is so great that sufficient man power cannot be secured.

Many things such as metal bridges made from steel bars riveted and bolted together are very difficult to paint properly on account of the crevices, corners, etc., which are difficult and often impossible to reach with a brush. Wood which is painted on the outside and the ends not covered will rot from the inside and often serious accidents have resulted from such causes.

The reach of the workman with the hand brush is very limited and much shifting of staging and scaffolds are needed. Ornamental metal parts, covered wood parts, rough lumber, knots, etc., must be stippled with the hand brush. The spray covers the deepest depressions or the roughest surface as easily and quickly as the smoothest object.

Cement walls, stucco houses, etc., have been a stumbling block for the painter.

It is a long, tedious job and wears out many brushes.

The spray covers this as easily and smoothly as a smooth board.

Just as an illustration of how this portable painting machine proposition works, take the case of Jones. When the H. R. Jones Co. has a stucco bungalow to paint, all of the material is loaded into the trailer, which has ample room for everything needed on the job.

The trailer is hitched behind the car of H. R. Jones, who takes it, a head painter and assistant, to the job. All arrive in quick time with all material in prime

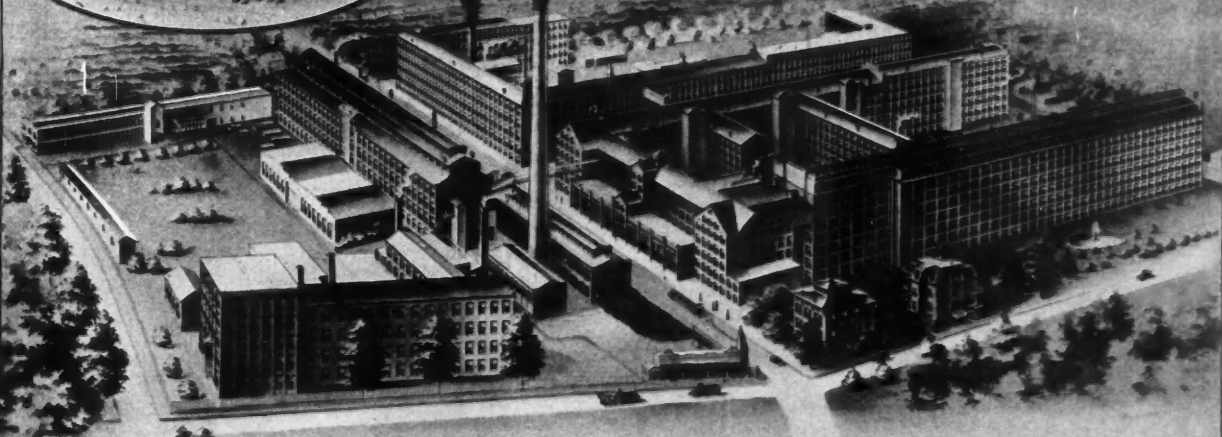
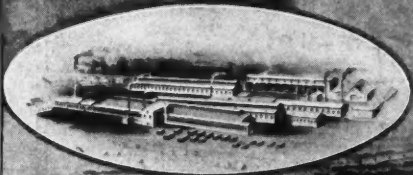
(Continued to page 128.)

CORBIN

Everything in Locks
and Builders' hardware
that you will require to
equip any structure from
a cottage to a skyscraper.
"Hints to Home Builders" sent
on request.

P. & F. CORBIN

*The American Hardware
Corporation, Successor*
NEW BRITAIN, CONN.
U. S. A.



The Home of Corbin Quality - The largest factory in the world devoted exclusively to the manufacture of builders hardware.

(Continued from page 126.)

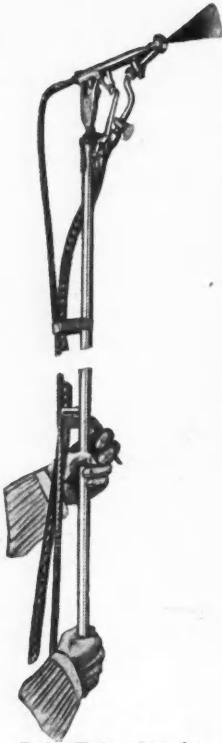
shape. The trailer is uncoupled on west side of house and H. R. Jones goes fishing, collecting or soliciting.

The assistant fastens an extension nozzle onto gun shown at R, which enabled him to place the paint as he wants it, right up under the eaves and finishes the lower part of side with the regular gun. While he is doing this, the head painter finishes the trim.

The north, east and south sides are covered in the same way, and the entire job is finished ready for Mr. Jones to pick up the trailer and take his two men back to the shop or some small job early in the afternoon.

Of course, it takes no longer to paint a frame house than a stucco. Barns, storage buildings, silos, etc., can be finished in record-making time.

It is needless to state that the men do not go home with that tired feeling as if they had done the work by hand. The engine in the front of the trailer does the work at a cost of about 90 cents a day.



Pole Extension for High Painting Without a Ladder or Scaffolding.

An Appeal to the Farmer

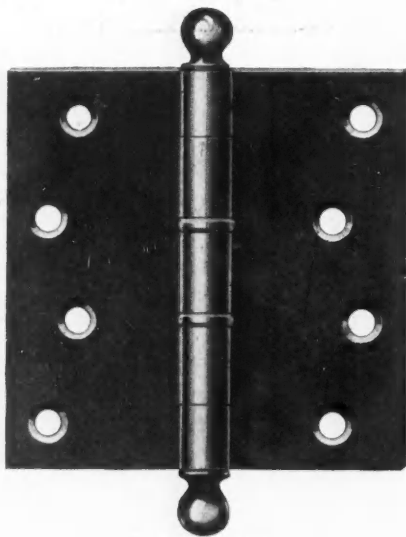
The Sandusky Cement Co. believes that this is the year for the farmer to build and thru an extensive advertising campaign in farm papers, the manufacturers of the Medusa Products are endeavoring to show the farmer why 1918 will be the best year he has ever known for building.

This advertising brings out a number of points which the readers of the AMERICAN BUILDER may have overlooked. It lays particular emphasis on the labor situation—pointing out that as more men are being called to the service, there is very apt to be a serious labor shortage next year. Contractors have, of course, felt this to some extent already, but the farmer seems to feel that the government will supply all the labor necessary for the proper cultivation of farm lands. Whether that will be the case or not, there undoubtedly will be a shortage of labor for doing the "extra work" on the farm—such work for example—as constructing farm buildings, feeding floors, approaches, etc.

The Sandusky Cement Co. is therefore urging the farmer to put his farm on a factory basis *this* year—to build *permanent* equipment *now*—so that he won't have to worry about the extras next year—or for years to come.

Another interesting phase of this campaign to the farmer is that which shows that the farmer can buy cement for less cost this year—figured in terms of his own crops—than ever before. Hogs, corn, rye, etc., have all advanced considerably over 100 per cent in price since the beginning of the war. Cement has not advanced nearly in that proportion—and there can be no doubt that today does present a great opportunity for building at a bargain—if the farmer can only be made to appreciate that fact.

Contractors and builders should see to it that facts—such as these—are brought to the attention of the farmers. This spring and summer should see an enormous amount of building on the farm.



No. 2742

Wrought Steel Anti-Friction Ball Tip Loose Pin Butt with Non-Rising Pin. Swings heaviest doors easily and quietly—requires no oiling—never gets out of order.

McKINNEY BUTTS

You can tell a McKinney wrought steel butt every time by the beautiful rich finish, the smooth even surface of the steel, the clean-cut edges, and the easy operating joints.

When it comes to hanging doors just remember there's a McKinney Butt for every requirement. Specify and use McKinney Butts and you'll never have to go back on the job to make costly repairs. Write now for a copy of catalog "A" II.

McKINNEY MFG. CO.
Pittsburgh, Pa.

Zinclad

EVERLASTING SHINGLE NAILS

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

W. H. MAZE COMPANY, Peru, Ill.



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

Paint
DEVOE
Paint

Guarantee
formula
on every can



DEVOE & RAYNOLDS CO., Inc.
New York—Chicago

SPAULDING-MOSS

Boxwood Scale *only* 19c

A Six-inch Scale for *(Worth Twice This Money)*

Architects or Engineers

Please Specify Which Scale You Prefer

This special offer is made to increase the distribution of our catalog showing full line of

Drafting Supplies and Drafting Room Equipment

Catalog and Boxwood Scale Mailed Post Paid Upon Receipt of 19 cents


SPAULDING - MOSS CO.

Blue Print Paper, Blue Printing, Photostat Copying
44 Federal Street, Boston, Mass.



Dry Foundations!

are assured by having the walls treated with



Carey

PERCOPROOF
DAMP-PROOFING COMPOUND

Applied with a brush direct to foundation walls, concrete construction, masonry, or stucco surfaces. Percoproof forms an unbroken elastic surface, fills every crack and pore and prevents moisture from penetrating.

Unlike ordinary waterproofing materials, Percoproof contains no oil and requires no thinning. It comes ready for use and is equally satisfactory in all climates and seasons.

THE PHILIP CAREY CO.

136 Wayne Ave., Lockland, Cincinnati, O.

How You Can Sell More Asphalt Shingles

(Continued from page 47.)

All styles of asphalt shingles (wide space and strips particularly) are well adapted for use over old shingles because they are flexible and easily laid. Re-roofing over old shingles is actually the chief purpose of such an Application Department. There is a good profit in it because there is so little competition; it costs much less to re-roof a house over the old roof than to remove

Application Department

Date Started _____ Date Completed _____

Name _____

Address _____

MATERIALS SENT OUT

MATERIALS RETURNED

MATERIALS USED (Selling Prices)

_____ @ _____ \$ _____

_____ @ _____ \$ _____

_____ @ _____ \$ _____

Cost of Material _____

LABOR (At Cost)

NAME _____

_____ hrs. @ _____ \$ _____

_____ hrs. @ _____ \$ _____

_____ hrs. @ _____ \$ _____

Cost of Labor: _____

Contract Price per Sq. _____

Trucking Charges \$ _____

Contract Total _____

Estimated Overhead \$ _____

NET PROFIT _____

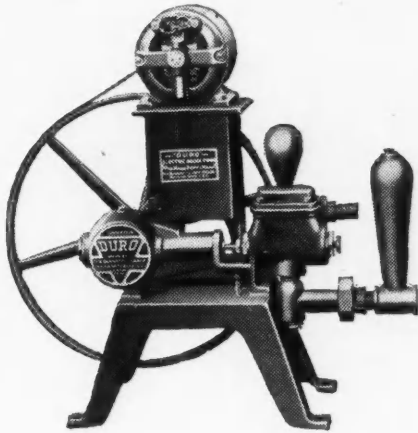
TOTAL COST _____

Handy Ticket for Keeping Track of Re-Roofing Business.

the old roof first. It is a cleaner and a neater process; there is no litter of old shingles around the house—no consequent labor cost.

Home owners have confidence in roofers who are backed by responsible local dealers. Such a plan can do much to increase your prestige and good standing because it helps to advertise your business. This plan—in its main features—has been followed with complete success in many cities in different parts of the country. There is no reason why it cannot be successful in your town. Just match a little of your time against that of the best roofer you can get and both of you will be surprised at the results. Such a partnership doesn't cost a cent; you don't have to incorporate a company. It is simply co-operation by which both of you benefit.

Why not be the one to start it in your town?



The Duro Automatic Electric Residence Water System, made by the Burnett Larsh Mfg. Co., is one of the 200 building products you will find at the Building Material Exhibit.

HAVE you considered the Duro Residence Water System for your building jobs? This is but one of 200 products on display at the permanent

Building Material Exhibit

**Entire Second Floor, Insurance Exchange Bldg.
Jackson Blvd. and Wells St., Chicago**

***“Look
Before
You
Build”***

Here you'll find many ways for making a better building and saving money. Here you can get figures and place orders if you wish and save valuable time. 12,000 visitors monthly. *It's free to see.*

Alton, Ill., Is Building 300 Homes

(Continued from page 25.)

among the craftsmen, causing delays of any sort.

Superintendents for the House of Hancock, the principal construction company handling the greater part of the job, watch their craftsmen carefully. Men who are experts in setting studding do that work exclusively.

Within six weeks streets were laid out, sewer and water mains laid into the basements of all the buildings. Six of the buildings were framed and the rough carpenter work finished on them in two weeks. That was the condition from House No. 1 down to No. 6, all being in various stages.

A little farther down, the basements were ready for the carpenters. Three basements were under construction and a force of men was making excavations for four others.

The writer made inquiry as to the various stages and was told it was a distinctive feature in the Hancock building operations.

The work for a group of buildings is carefully laid out by the superintendent before construction is begun. As soon as the building is raised, the various trades



This Has Proved a Most Popular Style for Industrial Housing.

are brought onto house No. 1 as rapidly as they can do their work without interference with each other. The various trades follow each other in the same way thru the entire group of buildings, so that the fifteenth basement wall is ready for the carpenters as the first house is put in shape for the finish trim.

(Continued to page 134.)



THIS IS THE HAMMER WITH THE PEDIGREE

OF COURSE IT'S A

GERMANTOWN MASTER BUILDER

Expert workmen the country round know and use this hammer. The finest possible quality in material, design and workmanship. Octagon shaped handle of second growth hickory, ideal hardness, and a claw that will grip all size nails with a grip that holds. Positively the **only** hammer for the workman who wants the BEST. Three sizes, Nos. 745, 11 oz., 746, 16 oz., 747, 20 oz., at \$1.50 each.

Price \$1.50

Germantown Tool Works
PHILADELPHIA, PA.
Branch: 62 East Lake Street, Chicago

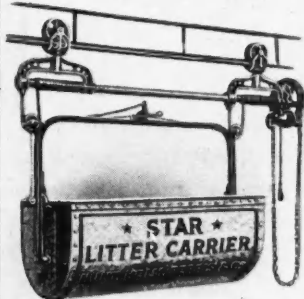
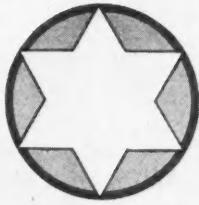


GRASP THIS BARGAIN! ONLY \$3.00

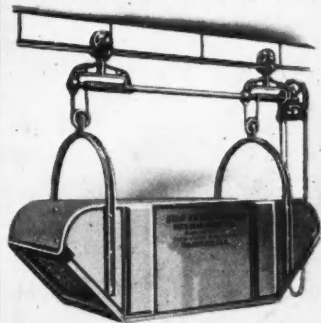
A BIG DRIVE! Use Simonds Blue Ribbon Saw on your industrial housing jobs. **PREPARE!** Let the Simonds Saw help you gain your objective. Have you tried one? Large hand hole. Straight or sway back. 24 or 26 inches. Never fail. Buy from your dealer or direct from us. "The Saw Makers"

SIMONDS MFG. CO.
FITCHBURG, MASS.

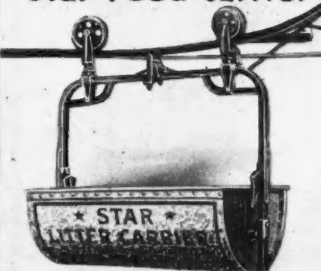
5 Factories and 11 Branches.



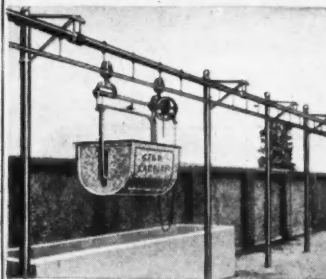
No. 333
Star Litter Carrier



No. 334
Star Feed Carrier



No. 405
Star Litter Carrier



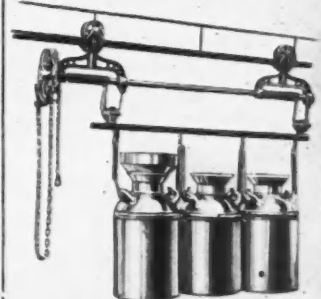
Method of Supporting
Track outside of Barn



No. 592
Star Ridg — Rod
Litter Carrier



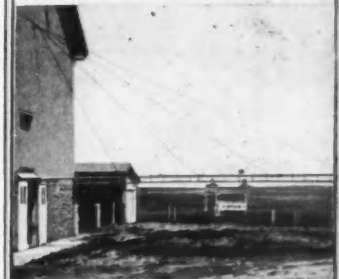
No. 693
Star Litter Carrier



No. 413
Star Milk Can Carrier



No. 443
Star Feed Truck



Star Swinging
Boom

Whatever Your Trade Wants in Litter & Feed Carriers— it's in the Star Line

Different farmers have different ideas about their wants. Requirements in one part of the country vary from those of another.

But no matter what the buyer's idea may be—no matter where you are located—there are Litter Carriers in the STAR Line especially suited to your needs.

This variety backed by sturdy, durable construction and many exclusive and advantageous features, make them easy to sell.

And the profit side is big enough to make a STAR Agency one of the most valuable merchandise lines a dealer can carry.

Write us for full details and complete literature.

HUNT-HELM-FERRIS & COMPANY

59 Hunt St. Harvard, Ill.

STOWE SUPPLY CO., Southwestern Distributors

Kansas City, Mo.

Erecting Good Dairy Barns Brings Big Profits To Builders



Dairy barns so built and equipped that they make for more milk, better milk, cleaner milk—and less work for the dairyman, are in big demand. Dairymen all through the land are either erecting new and better barns or are remodeling their old ones.

James Barns and James Equipment are known to these dairymen. We advertise heavily in farm and dairy papers.

We will be glad to cooperate with you and help you land contracts for building barns in your vicinity the "James Way." We will send you the 312 page book "The James Way," illustrated below—**FREE**. It is packed with valuable dairy barn building facts and directions.



It will enable you to "talk dairy barns" convincingly. It costs you nothing. Simply send us the names of farmers you know who intend to build or remodel barns and the size of their herds, and this valuable book goes to you free. Write today.

JAMES MFG. CO.
EM75 Cane St., Ft. Atkinson, Wis.
(East of Ohio Address)
EM75 Williams Street, Elmira, N. Y.

Alton, Ill., Is Building 300 Homes

(Continued from page 132.)

A big advantage in using this method of operation is the fact that the superintendent may classify his working force and keep each man doing the particular kind of work for which he is best fitted. Classification also gives the workman an opportunity to become an expert in some branch of carpentry.

The houses are not cheaply constructed. Good grades of material are secured and all work is done in a workmanlike manner. The Hancock Company has a policy not to build any two houses in one group of the same style. The houses are substantially built and the variety in design and construction averts monotony of appearances, usually so hard to overcome where groups of buildings are put up at the same time.

One advantage claimed by the House of Hancock is in knowing something which is better and which costs less money. For instance, the basements are built of hollow tile on a substantial footing of concrete, plastered and made waterproof on both sides. This construction furnishes a dead air chamber, being better than a rock foundation and costing considerably less.

On the other hand, where durability, convenience and even ornament are involved, expense is not spared. Every house now under construction in Alton has all of the conveniences of high priced city apartments, with the added advantage of being an individual home.

The House of Hancock is not a pioneer in the use of new and untried building materials, but once satisfied of the substantial character and durability of new processes of construction and new building materials does not hesitate in adopting and recommending them.

A representative of the corporation reasons that many excellent building materials, especially roofing as well as inside and outside wall coverings, have fallen into disrepute and almost disuse thru the ignorance and lack of experience of workmen who have attempted to use these materials without securing all of the desired results.

The larger building organizations can adopt these new processes and materials, using them to the best advantages, thru the large amount of construction being able to keep busy men who are skilled in their use.

The purchasing of real estate for development in quantity, of course, has its advantages over buying a single lot. The buying for ventures of the kind at Alton is handled by R. J. Hancock, of Chicago, head of the House of Hancock, considered among the shrewdest buyers of vacant property in Chicago. He has become an expert in judging the value and the latent possibilities, giving the organization a great advantage in locating and buying property to be improved.

The House of Hancock features the buying of materials and the letting of sub-contracts in large building operations. They are as important as buying the real estate.

(Continued to page 136.)



WAGNER CLOZTITE Hanger No. 78

For Factory and Warehouse Doors

HERE is the hanger that rightly solves the problem of big, wide doors in factories, warehouses, public garages, etc. Doors swinging on hinges are impractical, unhandy, always giving trouble and require too much room. Sliding doors are often out of the question because of lack of room. But, with the Wagner Cloztitle No. 78 you have the problem completely solved.

In using this hanger two or three doors are hinged together and operate as one door. When open, the doors fold up compactly and are entirely out of the way. When closed, the door fits just as snug and tight as an ordinary hinged door in your home, making it dirt-proof, storm-proof and water-proof. Very little clearance room is required—only the width of one door—usually 36 to 48 inches. No sagging, no chance for trolley to come off track, no sticking of doors.

Doors are hinged together and hung to the jamb, being supported at the opposite side by one Wagner Cloztitle Hanger operating in Wagner self-cleaning, dirt-proof track. In four and six door openings, two hangers are used—one hanger for each set of two or three doors hinged to either side of jamb.

Adapted for openings of any width and may be used with any number of doors, from two to six, having a total weight not exceeding 1000 lbs.

Simpler, stronger, easier to attach than any other hanger or device designed for folding-sliding doors. It has a decided advantage over the extended track or adjustable bracket method in that it is much simpler and there are no adjust-

ments to get out of order. There is less strain on the track and brackets, for the track is fastened directly to the wall at all points the same as for ordinary sliding doors.

Substantially constructed of malleable iron. Has roller-bearing trolley wheels and the hanger bolt revolves on a heavy-duty ball bearing swivel, insuring silent and easy operation of the doors at all times.

This same hanger is made in smaller size (Cloztitle No. 58) for private garages, etc.

Write for Circular showing various folding-sliding door arrangements and giving complete information about Wagner Cloztitle Hangers.

Ask Your Dealer for Wagner Hangers

Leading hardware dealers sell the Cloztitle and other Wagner Door Hangers and Tracks. In the Wagner line you'll find the right type of hangers and tracks for every purpose. Your dealer can supply you. Ask for and insist upon **WAGNER** Hangers and Tracks.

WAGNER MANUFACTURING COMPANY
Dept. N. CEDAR FALLS, IOWA



Type of Homes Being Put Up at Alton, Ill., by the Hancock Construction Co.

(Continued from page 134.)

The organization, as far as possible, buys material thru the local material man and places the sub-contracts with local firms. Experts keep in touch with the wholesale market and are in a position to know

the dealer's price, so he may make a fair margin.

The only parts of the work being sub-let at Alton are the plumbing, electric wiring, heating and sheet metal work. Before a contract is closed the sub-con-

(Continued to page 138.)



Moncrief

Pipeless Furnace

A furnace with a tremendously big reputation for successful economical operation.

Built of the best material by experienced workmen.

We wish to send you our complete catalog. Mail us a card today, it will save money for you on your next job.

The HENRY-MILLER FOUNDRY COMPANY
CLEVELAND, O.

SAVE THAT EXTRA SHOVELFUL

For your customer—Install in every stove heated home a HERO PIPE-LESS FURNACE. It will save coal and heat the whole house. Contractors! Keep your men busy—Jobbers, make big wages—putting in these excellent heaters. Write for prices and exclusive territory.

Help Win The War By
Helping Save
Fuel

U.S. NEEDS YOUR HELP



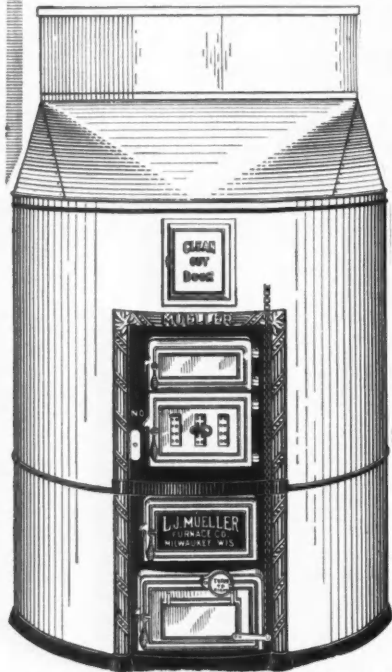
HERO FURNACE CO. 59 W. LAKE ST. CHICAGO

Every Buyer a Booster

EVERY home owner to whom you sell a Mueller Pipeless Furnace will help to spread through your community the news of its economy and efficiency. Every job you sell is sure to sell others. That's because the Mueller Pipeless Furnace *always makes good.*



It is advantages like these that make the Mueller the most desirable Pipeless Furnace for the builder and dealer to sell and install. Besides its splendid record of service and satisfaction, you have as selling factors the prestige and 60 years reputation of the L. J. Mueller Furnace Co. and you are enthusiastically backed up in your selling work by the result-producing Mueller advertising campaign.



You Make a Good Profit on Every Sale

Mail the coupon now and secure complete details of our attractive proposition to builders and dealers.

L. J. MUELLER FURNACE CO.

Makers of Heating Systems of all kinds Since 1857

218 Reed St., Milwaukee, Wis.

Mail this Coupon Now

L. J. MUELLER FURNACE CO.
218 Reed Street,
Milwaukee, Wis. U. S. A.

Gentlemen:
Without obligating me in any way, please send me full details of your proposition to builders and dealers.

Name

Address

City State

(Continued from page 136.)

tractor is required to show that he is in a position to furnish the raw material promptly when called upon without delaying the other crafts. These requirements are considered with as much care as the price and finished work.



How to Become a Shipbuilder

(Continued from page 64.)

General qualifications.—A shipwright is primarily a planner and assembler, and in certain forms of work, such as spar making and boat building, a skillful fabricator. He must be particularly able in keeping the ship and various parts of the ship properly lined, squared, and plumbed. Aside from this, he must have a practical knowledge of timbers and of proper methods of blocking, shoring, and stage building, with particular application to the construction of the launching cradle and launching ways. For this work he needs a knowledge of, as well as skill in, using carpenter's tools on heavy work and, in addition, some skill with the broadax and adze. It is desirable, but not absolutely necessary for all classes of work, that he be able to read blueprints and make rough sketches.

Kindred trades (Charts 4 and 5).—Men for the shipwright trade must be drawn from those requiring planning and assembling skill on both wood and metal structures. Fine skill in woodworking, such as that possessed by cabinetmaker, joiner, and inside finisher, is not required. Experience in any one of the following trades is an asset:

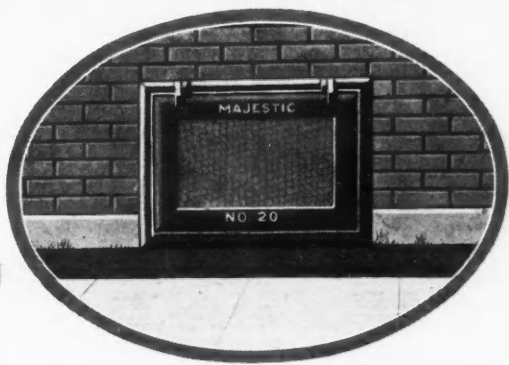
Master carpenter or contractor, house carpenter, rough carpenter or handy man, bridge carpenter, house mover, dock and wharf builder, pile-driver man, lumber jack, lumber yard and sawmill man, millwright, erecting engineer, liner (on structural-steel work), machine erector or road man, structural or bridge erector, elevator constructor.

Ship Joiner

The ship joiner is the cabinetmaker and inside finisher. Painting, oiling, varnishing, and general wood finishing are done by the painter, not the cabinetmaker. Any good cabinetmaker is capable of doing corresponding work on the ship or in the joiner shop. Carpenters with experience on inside finish are useful on the ship and in the cabinet shop. In connection with the ship work they must become accustomed to the slant or bevel cuts and to metal fittings.

Desirable craftsmen for ship joinery: Cabinetmaker or joiner, furniture maker, carpenter with experience on inside finish.

Machine operators for the cabinet shop, such as moulder, sticker, planer, and shaper hands may be obtained from the corresponding occupations in planing mills, sash and door, and furniture manufacturing plants.



Majestic Coal Chutes

EVERY building—new or old—needs a Majestic Coal Chute. It protects the ground, shrubs, lawn, sidewalks and sides of the building from being damaged by the coal man—and adds to the looks and value of the property.

A large glass window gives ample light to the basement—when closed it is absolutely burglar proof.

Majestic Coal Chutes are made in many sizes and designs to suit the requirements of any building. They can

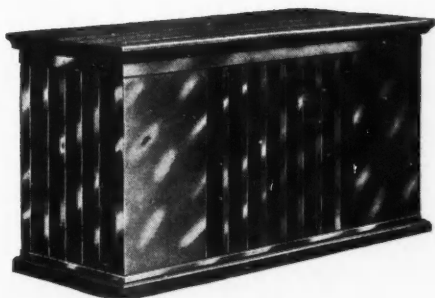
be installed in place of any basement coal window, or built in new foundations.

Majestic Garbage Receivers

keep the garbage clean, sanitary, free from odor—and protect the whole family against vermin and disease-breeding flies.

The Majestic Garbage Receiver comes in three sections, the Ingot Iron Container, the Galvanized Can and the Cast Iron Lid, operated by the foot. The container is sunk into ground close to the kitchen door—only the water-tight and fly-proof lid is exposed. The garbage man simply removes the lid and takes out the can to empty it.

Made in 5 sizes, 9 to 25 gallons capacity—a size to suit every home's needs.



Majestic Duplex Registers

is the greatest improvement ever made in warm air heating.

It saves one-third to one-half your coal bills—yet heats the cold corners and chilly rooms comfortably. Can be used with either pipe or pipeless heating systems.

Majestic Heating System

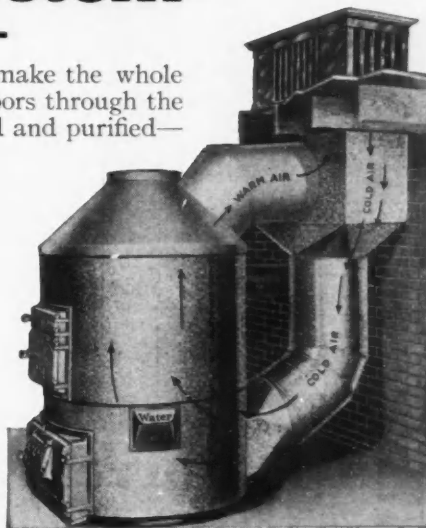
GIVES MORE HEAT WITH LESS COAL—

insures a perfect circulation of pure, warm humidified air and make the whole house cozy and comfortable. The cold air is drawn from the floors through the sides of the Duplex Register into the furnace where it is heated and purified—then the full volume of warm air is forced through the front of the register into the rooms where the heat is evenly distributed to every corner of the house. This improved gravity system of warm air heating insures a uniform temperature, warm floors, pure, healthful air and economy of coal.

Write Now for Catalog

and full information regarding the complete line of Majestic Building Specialties for residences, stores, apartment buildings, etc.

THE MAJESTIC COMPANY
800 Erie Street Huntington, Indiana



Emergency Fleet Housing in Philadelphia

(Continued from page 29.)

one flight of steps accommodates two houses. Laundry tubs are provided in the basement. The floors are cemented.

All draining is below the basement floor, in extra heavy cast iron pipe.

Coal bins are provided of ample size to accommodate a season's supply of fuel.

The contract conditions are of special interest since the Emergency Fleet Corporation is to furnish all materials entering into the construction. A quantity survey accompanies the plans and becomes a part of the contract.

The contracts are to be let in sections or units of two hundred houses to each contractor.

Ninety days has been set as the time limit for the entire completion of each unit, ready for occupancy.

The general contract covers all excavation and grading, masonry, carpentry, painting, etc., plumbing, gas, heating and electric work.

The following work will be provided for under separate contract: Sidewalks and walk, to front or rear steps; curbs and gutters; alley pavement; street pavement; street sewer, water and gas mains; street lighting; street grading; sodding, seeding and planting; fences.

The materials are to be delivered to the contractor at a central storehouse or at a railway siding adjoining the site. The contractor is to pay for all cartage of

materials from storehouse or siding to the site of his work. He is required to receipt for all materials.

If thru wastage on the part of the contractor, or any other cause, additional material is required, the contractor must procure same from the owner, at prices fixed by architects; or he may procure it from outside sources, provided no delay in the construction work is occasioned thereby, and that material so procured is of quality acceptable to the architects.

Should the contractor receive more material than is necessary for the completion of the building, all such material shall be accounted for and returned to the storehouse by the contractor, and will become the property of the owner.

The contractor is required to guarantee his work and make good all defects resulting from defective or improper work discovered within two years of the completion and acceptance of the building. This in itself is sufficient evidence for any contractor that the work is intended to be of the most permanent character.

The legislation which permits the Fleet Corporation to advance money to its agents, secured by mortgages on the houses and ground, also permits the agents to sell these homes to workers upon similar conditions. This should prove to be a great boon to an industry that is destined to remain a leader for a period much longer than the duration of the war.

Other industries would no doubt be greatly benefited by following the plan of the government in erecting permanent and desirable homes.

The user of a HESS WELDED STEEL FURNACE is particularly fortunate this winter in his ability to use ANY KIND OF FUEL



The heat retaining fire box and large-area grate^s make it possible to burn without waste all kinds of coal, hard, soft or lignite—of any size, even of slack and screenings. Wood or coke are equally efficient.

The shortage in the particular kind of fuel he **prefers** need not embarrass him—for anything else will answer, and will warm him up—economically.

The absolute tightness of the welded steel seams prevents escape of gas, smoke and dust, so there are no unpleasant results from the use of smoky fuels, and this tight construction also makes it possible to regulate perfectly the burning of quickly consumed fuel, such as wood, and to obtain a steady and even flow of heat.

We would like to tell you more, by sending you our free book on furnace heating.

Special Rates to Contractors

Hess Warming & Ventilating Company

1220 Tacoma Building, Chicago, Ill.



The Great Bell

-original Pipeless Furnace

Father of Them All

We have thousands in use. Sizes, styles and prices to suit all. **\$50.00 and up.**

Made for the building where a furnace is needed, but where the cost has been prohibited.

The GREAT BELL PIPELESS FURNACE will heat any one or two-story building in the most efficient manner with the least effort and the lowest relative cost. While **Cost** is secondary to **Service** in this furnace, our methods of production and sales have reduced the cost so low that no builder can afford to overlook our proposition.

And we guarantee our furnaces to be and do all we claim for them in both catalog and correspondence.

Write for our catalogs, describing the various styles, prices and specifications of the Great Bell Furnaces.

American Bell & Foundry Co.

27 Cody Street, Northville, Mich.

Sell Your Stoves



YOU can make money selling old stoves and installing a Home Ventilator in their place.

With scarcity of coal, and the prevailing high prices, stoves are too costly. Then too, stoves are dirty, troublesome and space-wasting. The

HOMER VENTILATOR FURNACE
The Original Dismantled Pipes Model - Built by the Homer Furnace Co. Homer, Mich. The Largest, Exclusive Pipeless Furnace Factory in the World

is the modern, efficient heating unit for homes, churches, schools and public buildings. More than 20,000 Home Ventilators in use prove their practicability—their ability to fill homes and public buildings with healthy heat on the minimum of fuel consumption.

No pipes or flues to make work or trouble—and it ventilates while it heats.

Write for our dealers proposition and catalog.

When any other manufacturer claims his to be the "original patented pipeless furnace" compare the dates on the patent papers with those of the Home Ventilator. Copies of our patent papers will be cheerfully furnished. Ask other manufacturers to furnish copies of theirs.

HOMER FURNACE CO.
 101 Byron St., Homer, Mich.



50% Less Fuel Producing 100% More Heat

Guaranteed by Bond

The Only Furnace that Insures Clean Air

Big Money for You

Meets Abnormal Costs of Material and Labor

Simple to Install
 Easy to Operate

We Want Good, Active Men to Represent Us.

Write today for our special agency proposition

MAIL TODAY

Standard Heater Co.
 438 W. Ontario St., Chicago

Send me your Special Agency Proposition to Contractors.

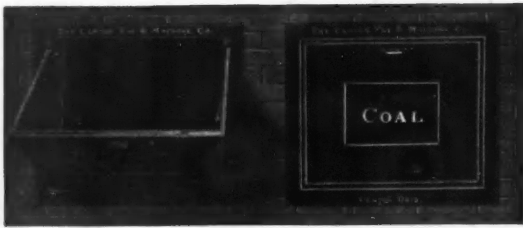
Name.....

Address.....



STANDARD HEATER CO.
 438 West Ontario Street
 CHICAGO, ILL.

Keep Busy



Make Every Minute Count

Let us help you get your share of these extra profits.

Install Canton Coal Chutes on your Industrial Housing Jobs. Suggest to your customers the removing of the old dirty looking coal window, and advise the installation of the new Canton Coal Chute.

Canton Coal Chutes and Canton Sidewalk Doors are built of steel, and are burglar proof. Big profits come easily.

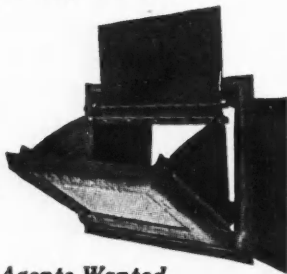
Write for our Catalogue B. 7.

Canton Foundry & Machine Co.
Canton, Ohio

THE AUTOMATIC COAL CHUTE

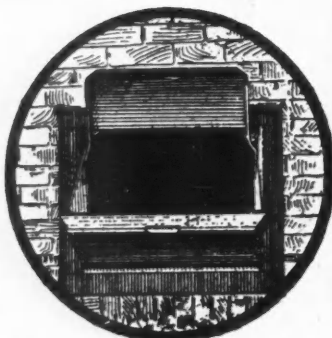
Will Answer Every Requirement

Opens Automatically
Closes Automatically
Locks Automatically
Fool Proof
Order one from your
dealer or direct from



Agents Wanted
THE WESTERN IRON & FOUNDRY CO.
Wichita, Kansas

KEWANEE ALL-STEEL COAL CHUTES



Five good reasons for installing the Kewanee.
It locks automatically on the inside.
Can be opened from the first floor by means of a chain in the lock.
All steel construction, and cannot be broken.
Guaranteed for five years.
Easy to install in an old building as well as a new.

Write today for Contractors' and Dealers' Prices

KEWANEE MFG. CO.
KEWANEE, ILL.

Decide Early Regarding the Hardware

(Continued from page 45.)

stays back in the case. The dead bolt grinds more and more and finally clumps completely away from its duties.

Hardware is one of the most "intimate" materials in a house. If it is cheap, shoddy and not made by a good manufacturer, it will make all kinds of trouble, not only to individuals, but even to stirring up trouble in the family itself, whereas if it works smoothly and performs each one of its duties all the time, it is "a joy forever," as then the doors will not drag on the sills, the bolts will always work smoothly and into their appointed places and the door will not tap and rattle against the stop bead in the vagrant winds that come thru the open window, thus disturbing one's slumber. In fact, there is no material that will return good for good so whole-heartedly as the time spent in making sure one has selected the right manufacturer to supply his hardware.

Specifications Including Allowance Clause Mentioned in the Article

THE FINISHING HARDWARE

The carpenter contractor should reserve the sum of \$.... to be paid under the authority of the architect for the finishing hardware, including all window and shutter fastenings, coat hooks, cupboard catches, cupboard turns, butts, door bolts, door locks with their knobs and escutcheons, complete hardware for all closets, dressers, medicine cabinets and bookcases, together with all of the necessary screws therefor, all in such quantities as may be required for the complete equipment of the building in accordance with the intent of the plans and the specifications and to the satisfaction of the architect and the owner.

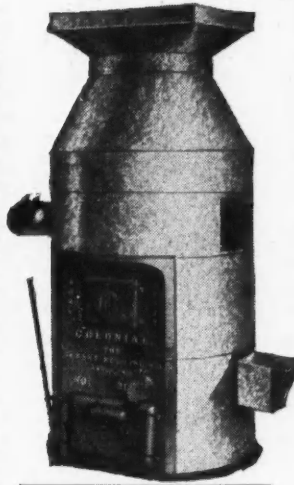
The carpenter contractor shall apply and fit in place all of the above mentioned hardware, in a neat and workman-like manner, to the satisfaction of the architect and the owner and subject to his approval. He shall be responsible for its proper protection and care until the building is completed and accepted by the owner.

All of the finishing hardware so required shall be selected, or approved, by the architect, and no other hardware shall be used save by the consent of the architect or the owner, which is not the product of the one of the following manufacturers:
..... (name those desired).

The right is hereby specifically reserved to the owner of selecting and using finishing hardware of better quality or higher cost than herein contemplated upon condition that in such case the owner shall pay to the contractor such additional amount as, with the sum stated above, shall equal the actual cost, at fair market prices of the finishing hardware so selected, with 10 per cent added to such cost to cover the contractor's work in applying the hardware.

The contractor shall furnish the dealer, or manufacturer, from whom the finishing hardware is purchased, with all of the information as to the details of woodwork which may be necessary or desirable to enable the party furnishing the finishing hardware to understand the requirements and to harmonize the hardware with the cabinet work to such an extent as may be necessary and feasible; or, where interferences are discovered, to have them adjusted before the hardware is made.

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 1/8 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 lifetime. 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 and Heating Co.
105 Jahant Bldg., Akron, Ohio

Does it Pay to Experiment The Modern Way Furnace Company Finished Experimenting Years Ago



Today thousands of MODERN WAY heaters are giving entire satisfaction, because they are scientifically right, and mechanically correct.

With our foundry capacity doubled, we are in a position to give you service with a Real Pipeless Furnace.

Get our proposition today.

THE MODERN WAY FURNACE CO.

Offices: 7th Floor Shoaff Bldg.
FORT WAYNE, IND.

In every summer cottage you build



Absolutely Odorless

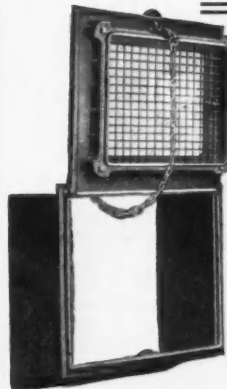
—you can install, at a profit, a Ro-San Indoor Closet

Every building—home, cottage, store or office—that has no sewer connection needs this modern sanitary indoor closet. Absolutely odorless. Act as our agent—this fixture sells easily to your customers—good profit. Hundreds of carpenters represent us. We also distribute through builders the

Ro-San Washstand

Provides Running Water, Hot or Cold, Without Plumbing. Every housewife wants one. Convenient, sanitary. Sells readily with little effort. Carry this work along with your regular business. Ask for terms to agents. "We are prepared to ship promptly any quantity of closets. No waiting."

Rowe Sanitary Mfg. Co., 905 Sixth St., Detroit, Mich.



WRITE FOR FOLDER

Let us send you complete information on this attractive all metal coal chute. Their convenience and neat appearance are sure to please your customers. Rain-proof, flush, and automatically locking. With either wire glass or solid cast iron door. Locks both open and shut. Prices moderate. Write today.

STERLING FOUNDRY CO., 8 Ave. A, Sterling, Ill.

Will Others Get the Cream?

Do you appreciate the opportunity to make big money selling chemical closets to home owners? The possibilities are unlimited, as a side line or full time. They sell cheaper than an old fashioned outdoor toilet.

Sanitary **WOLVERINE** No Plumbing
Odorless Chemical Toilet No Waterworks

An important essential to health, comfort and convenience. Placed anywhere in the house. Over 10,000 in use in factories, business houses, schools, homes and elsewhere. Endorsed by physicians, health authorities, schools, homes. Every town and country building or home needs one. Easy to install—no experience needed.

30-Day Free Trial—Guaranteed

Hundreds of carpenters and builders are making good profits. Write us at once for details of this real business opportunity, and how we help you get the cream of the profits.

Dail Steel Products Co. 4503 Main Street
Lansing, Mich.

Comfort Indoor Closet Odorless Sanitary Germ-Proof

No Sewer, No Waterworks, No Plumbing Needed
This modern home necessity is fast taking the place of the unsightly, unhealthy, inconvenient out-house in the back yard. Thousands now in use and all giving complete satisfaction. Can be put wherever convenient in the house. No odor whatever. Gives city convenience in the country or town.

Cost Less Than Out-House

Anybody can afford one. Saves those cold night trips out-of-doors. Impossible to get same amount of comfort for the money another way. Sold on 30 days' trial and under sworn guarantee to refund all money if not entirely satisfactory. Send for description and prices today. Be fair to your family.

AGENTS MAKE BIG MONEY EASILY

Comfort Indoor Closets sell themselves as fast as people understand about them. Contractors and carpenters are making big money by merely suggesting this closet. Write for details of this exclusive agency offer. Send postal now before somebody else gets your territory.

Comfort Chemical Closet Co., 305 Factories Bldg., Toledo, Ohio



Government's Standard for War Housing

(Continued from page 27.)

ings 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 the 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. 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. *Materials 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 com-

(Continued to page 146.)



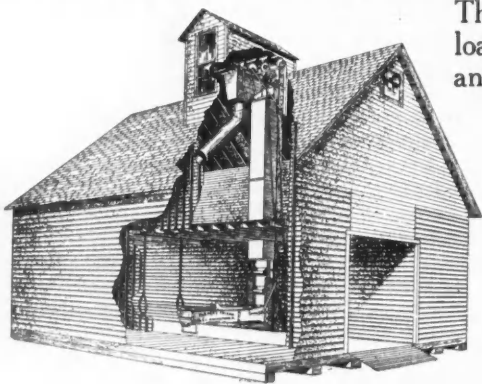
Trap Doors to Release Grain in Case of Fire

An excellent suggestion for saving wheat and other grain in country elevators in the event of fire has been made by T. A. Monaghan, of Faith, S. Dak. The idea is simple. Each bin for grain is provided with a trapdoor in the outer wall of the building, so arranged that in case of fire the door could be pulled open and the grain allowed to run out on the ground. By quick, cheap alterations to many existing elevators, Mr. Monaghan believes it would be possible to save much grain now lost in fires. He is a builder of grain elevators himself and makes this suggestion in the public interest.

Farmer's Friend Cup Elevator

Here is a new, improved, Pitless Elevator; the biggest advance ever made in farm elevator designing.

The contractors' friend, because it can be installed in four hours with ordinary carpenters' tools. No troublesome pit to be dug, cemented, drained and cleaned. Simply set elevator on driveway floor.

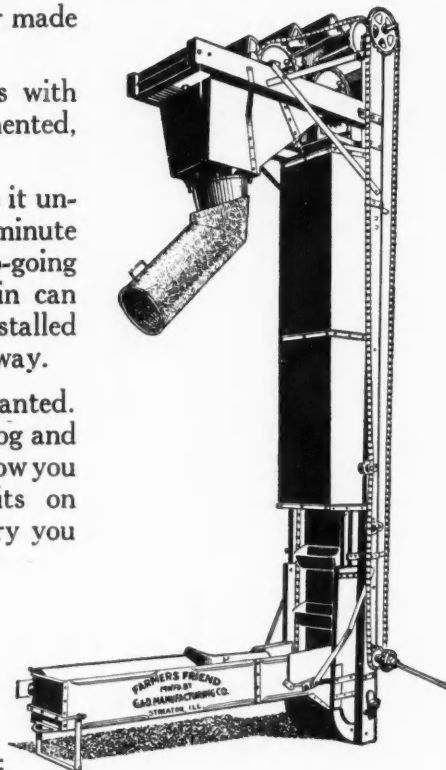


The **farmer's friend** because it unloads 80 bushels of oats per minute and ear corn in proportion. Up-going buckets enclosed. No grain can spill in driveway. Can be installed in any crib having a driveway.

Contractor agents wanted. Write for Free Plans, catalog and agents' discount. Let us show you how to make extra profits on every corn crib and granary you build.

Complete Working Blue Prints shown opposite page 34. No changes required to install our elevator in this crib.

G. & D. MFG. CO., DEPARTMENT K, STREATOR, ILL.





HANDLE your Grain with a Camp Elevator which can be installed in crib as per blue print. Elevator buckets are carried by strongest Pintle chain ever put into a farm elevator.

Exclusive Features—

Oil Lift Jack without a gear or Controllable Log Dump.

*The Camp is made for Service
Write for Agent's Proposition.*

**CAMP BROTHERS & COMPANY
WASHINGTON, ILLINOIS**



There's Money In It—

YOU can make big money installing Whitney Windows in homes, schools, buildings, hospitals, etc. Besides, you build good will. Whitney Windows make satisfied customers. They make homes more comfortable and livable—do away with all the troubles and disadvantages of ordinary sliding sash and hinged casement windows. They can be installed only with

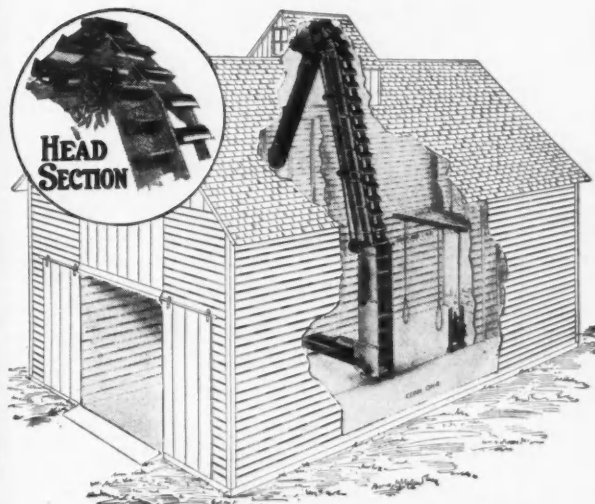
**WHITNEY
CASEMENT
WINDOW HARDWARE**

Made in three grades to meet all requirements. Many folks in your town have already heard of Whitney Windows thru our advertising. Many others will want Whitney Windows as soon as you point out their advantages. New or old buildings can be fitted. Our Service Department will help you adapt them to any unusual requirement.

Write today for our proposition and full information.

**WHITNEY WINDOW CORPORATION
1420 E. FRANKLIN AVENUE, MINNEAPOLIS, MINN.**

**Attractive Proposition
for
Carpenter-Contractors
on the
National Giant Inside
Bucket Elevator**



**The Best and Most Sensible
Inside Outfit Ever Made**

Carpenter-Contractors drop us a postal, please, and we'll be glad to tell you how to make big extra profits by recommending and installing our **National Giant Bucket Elevators** in your crib jobs.

The "National Giant" has more desirable features for you to base your recommendation upon and more **sensible features** for the FARMER than can be found on any other make of inside grain elevator. Why? Because on cribs 30x32 ft. or less, with half-pitch roof, it is not necessary to have a cupola. Saves the farmer money. When cupola is necessary, we can save the farmer from \$15 to \$30 with the National Giant. Ask us why, please. We also save the farmer the cost of digging a pit, and on the length of elevator required.

Elevator is equipped with No. 77 chain. Buckets hold a peck. Does not shell corn, because feeder empties directly into mouth of bucket. Short distance delivery means lightest draft. Has no overhead gearing. Other features just as sensible.

**Get Full Details of Proposition
to Carpenter-Contractors**

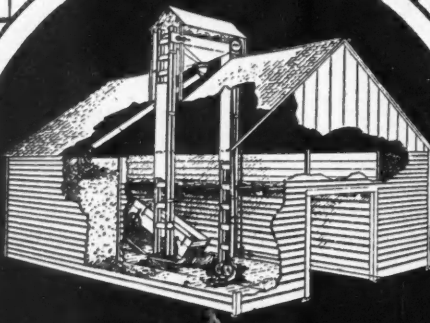
Ours is a good proposition for you and the farmer. It will pay you to look into it. It will bring in more business, greater profits for you. One satisfied customer will bring you many more crib jobs.

**Wonderful New Book
and Crib Plans FREE**

We have just issued a wonderful new elevator catalog, containing pictures and description of every type of elevator. Don't miss getting this catalog—also new Crib Plans—just out. Write and we'll quote you a very attractive price for 1918 and send you name of dealer nearest you, who will be pleased to co-operate with you if you so desire. Write us today. Satisfactory credit terms may be arranged. Get details.



Portable Elevator Mfg. Co., 854 East Grove St. BLOOMINGTON, ILL.



"Meyer" Distinction

A name that means so much more than the ordinary on a **Cup Elevator**. When your customers think of the best Elevator—the one that would elevate their grain fastest and best, that would please them most, it is the "**Meyer**." That is why this machine is so much easier to sell to them.

The "**Meyer**" set the standard years ago and the perfect mechanical construction, with the extraordinary success they are giving, has kept it in the lead ever since.

Today, as then, it is the first choice because of its undisputed superiority. Model crib plans with illustrated catalog showing seven styles sent free. Builders, protect yourself on territory at once and cash in the profits.

A. F. Meyer Mfg. Co.
301 Wilson Street
Morton, Ill.

Government's Standards for War Housing

(Continued from page 144.)

municating. 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 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 a minimum area of 70 square feet and minimum width of 7 feet.

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

Type 6. Lodging house for women.

Type 7. Hotel for women.

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

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 up on masonry piers or walls 2 feet clear from ground; space to be drained, inclosed, and ventilated.

3. *Fire Protection.*—If over 4 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 to be divided by fire walls of brick, terra cotta, stone, or concrete into areas not exceeding 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.

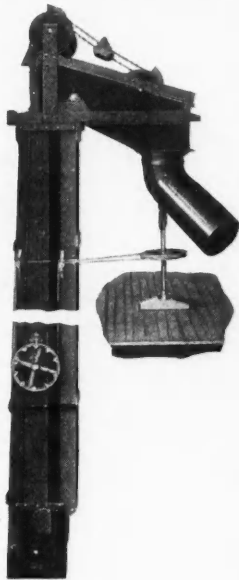
All stairs and stair halls to be not less than 3 feet wide in the clear and to be inclosed in walls of brick, terra cotta, stone, or concrete, with fireproof self-closing doors at all openings. All doors to stair halls to swing into stair hall without obstructing free passage.

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. 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 heating plant, provision to be made for independent heating.

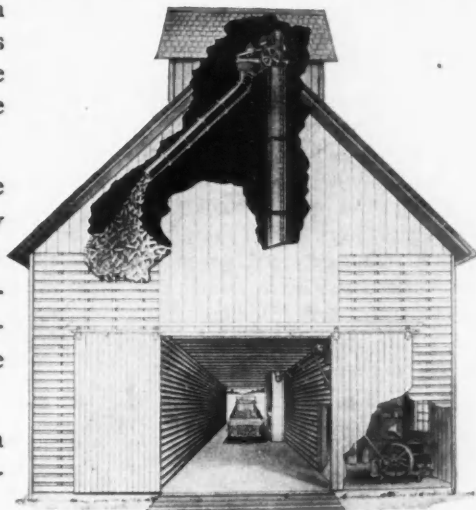
(Continued to page 148.)

A Set of Hart Crib Plans Will be Valuable to You



Show your patrons how to put up short, high cribs with granary over the driveway and Hart Elevator installed at the price of a long, low, ear corn building of the same capacity. Short, high buildings require less ground space, foundation, floor and roof which are the most expensive parts of the building. At the same time they are easier to fill and empty. Don't figure on another job without seeing these plans which give small grain and ear corn capacities of various sizes and heights of buildings. Complete lumber specifications furnished with the plans.

Hart Bucket Elevators require little room in the building, are always ready for use and will last a lifetime. All parts of building quickly and easily filled without the use of the scoop—a Real Elevating Plant for the up-to-date, progressive farmer.



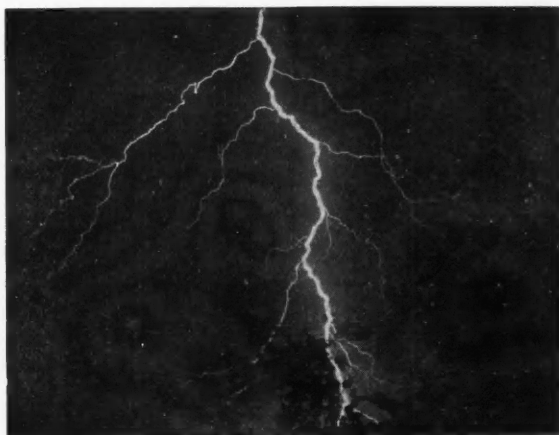
Get a copy of the catalog showing the various kinds of wagon dumps and conveyors. The crib plans and lumber specifications are free for the asking.

HART GRAIN WEIGHER CO.

Dept. 15

PEORIA, ILLINOIS

Protect Life and Property
Cheapest Insurance Known



Lightning Rods

CARPENTERS--BUILDERS
"GO OVER THE TOP" WITH
BARNETT SYSTEM
Guaranteed Lightning Protection

Why let the big extra profit go to the other man after you have done the hard work erecting the buildings? This easy profit belongs to you. You are the logical man right on the job to install this protection on every building you erect. The owner's confidence in you will make it easy for you to secure this additional work and profit on the same job.

Our Rods are in big demand. Made of pure copper endless cable, no rust (no joints) with attractive fixtures. Easily put on buildings. Two hours extra work rods the building, and puts profit in your pocket. Money back guarantee with each job. Hundreds of our Carpenter agents began in a small way, now doing a big business. Secure the agency now. Write today for free Catalog, cable samples, and prices.

JOS. L. A. BARNETT & CO., Cedar Rapids, Iowa

MAKE \$50 TO \$75 EXTRA A WEEK



Northwest
BUILDING MATERIAL EXHIBIT

Look Before
You Build

SERVICE

It's Free to
See

COME to this Exhibit when selecting materials for that new building of yours. It will give us pleasure to show you all the best materials to use.

If you cannot visit us, then write us. Our service is free to you.

Send us your plans and specifications and we will gladly secure such figures as you may desire. No obligation.

Many Exhibitors combine their Minneapolis City office with their displays, making this floor your time saver.

NORTHWEST BUILDING MATERIAL EXHIBIT

4th Floor First National Soo-Line Building
MINNEAPOLIS, MINNESOTA

Look before you build

Government's Standards for War Housing

(Continued from page 146.)

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, tub, 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, physicians' 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 a minimum area of 70 square feet and minimum width of 7 feet.

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.

V. Special Provision for Type 8

Type 8. Tenement house (including flats or apartments), a building occupied in whole or in part by three or more families:

Tenement and apartment houses are considered generally

(Continued to page 150.)



THE H. B. IVES CO.
NEW HAVEN, CONN., U. S. A.
ESTABLISHED 1876 INCORPORATED 1900
MANUFACTURERS OF
BUILDERS' HARDWARE
HIGH GRADE WINDOW AND DOOR SPECIALTIES
Write for Illustrated Folder



Model 5 Power Press
Capacity, 1,500 24 inch blocks or 15,000 brick

Make \$10 to \$50 Daily

We Know of 500 Locations Where This Can Be Done

In 500 American cities, the housing problem must be solved. Helm Press brick and blocks will help you do it, and make you enormous profits. We can put you in touch with one of these opportunities. By making brick and blocks, right on the ground, you will be independent of freight delays and embargoes using local materials.

This is How Mr. Laird Does It

R. M. Laird, of that humming industrial center, Akron, Ohio, is using the Helm Model 5 press in a stationary plant and the smaller Helm Model 8 press, out on smaller jobs. It will be

good business for you to do the same thing. Put in the Model 5 Power Press in a stationary plant, and use the smaller Model 8 Press on smaller jobs, working it right at the building site.

Our Book *Concrete for Beauty, Adaptability and Permanence* gives full information regarding this proposition. Write for it now.

THE HELM BRICK MACHINE COMPANY
475 Mitchell Street
Cadillac, Michigan



Model 8 Hand Power Press
Capacity 500 blocks or
5,000 brick

At 10 Feet From This Pump You Can't Hear A Sound

The "grind of gears," found in other pumps, has been entirely eliminated in Goulds "Hi-Speed" Pump. This feature makes it the ideal house pump.

Goulds Fig. 1695

HI-SPEED
NOISELESS
ELECTRIC PUMP

has no gears whatever—hence no noise. It is a patented pump with original features in design which make possible an exceptionally low price—surprisingly low.

The "Hi-Speed" Noiseless Pump is furnished in connection with 13 different complete outfits—with 110 or 220 volt A. C. or D. C. motors, or with 32 volt motors for operation on current from farm lighting systems, or with ½ h. p. gasoline engines. It is adapted to either open or pressure tank water systems.

There is a big field for the sale and installation of these pumping outfits—for the dealer who gets there first. The "Hi-Speed" in operation makes an attractive window display. Be the first in your community to show it. Write today for complete data and prices.



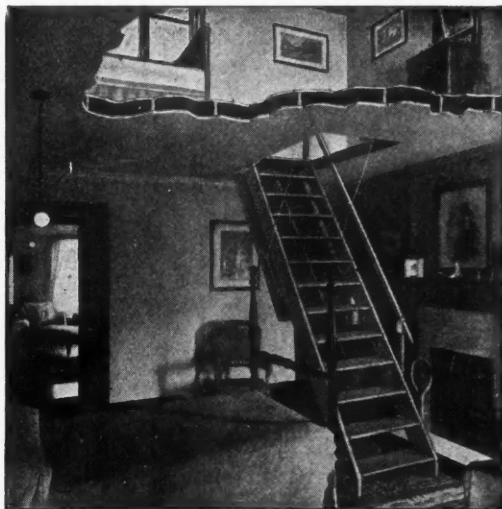
OUTFIT "A"

Consisting of 6 g. p. m. "Hi-Speed" Pump belted to ¼ h. p. motor and mounted on cast-iron drip type, bedplate fitted with removable cast-iron legs.

The Goulds Manufacturing Company

Main Office and Works
Seneca, Falls, N. Y.

New York 16 Murray St.	Boston 58 Pearl St.	Chicago 12-14 S. Clinton St.	Philadelphia 111 North 3rd St.
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The Bessler Movable Stairway as it appears when folded



Nothing visible in room below except a neat panel

Use Every Square Inch of Floor Space by Specifying

The Bessler Movable Stairway

A modern invention of substantial and attractive design that gives all the advantages of the stationary stairway without wasting a single square foot of floor space—a boon to progressive builders.

Made in sizes and lengths for adaption to all ceiling heights and conditions of building. Is ideal in its simplicity and practical in its operation.

Do not complete your 1918 plans and estimates without first investigating the Bessler—the stairway that gives the answer.

Write us today for our Special Contractors' Proposition and our free informative booklet covering all details.

THE BESSLER MOVABLE STAIRWAY CO.
AKRON, OHIO CONTRACTORS' DEPT.

Oak Floors "America's Best Flooring"

Always attracts a better class of buyers or tenants and invariably increases the selling and renting values. This is a proven fact.

Oak Floors are made in ½ inch and ¾ inch thicknesses and in four grades. ¾ inch is used very extensively and economically over old pine floors in remodeling old houses.

Carpenters and builders during dull periods find ¾ inch Oak Flooring a very profitable side line and business getter to lay over old pine floors in old houses. ¾ inch Oak Flooring is very beautiful, durable and economical. The modern woman wants Oak Floors because they simplify house cleaning and housekeeping besides being the ideal floor for the home.

WRITE FOR FOLDERS

OAK FLOORING MFRS. ASS'N.
Union Trust Bldg., Cincinnati, O.

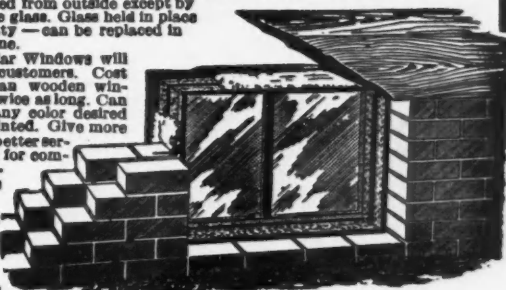


Famous Chief Cellar Windows Will Not Stick, Warp or Rot

The solution of the cellar window problem—a modern, 20th Century Cellar Window made right for service. Made of steel-window, casing and all. No rotting, shrinking or swelling. Fits perfectly all the time. Trouble proof, easy to open and close, leak-proof and fire-proof. Will not rust. Nothing about it to wear out. Fitted with special, inside steel latch—cannot be opened from outside except by breaking the glass. Glass held in place without putty—can be replaced in minute's time.

Chief Cellar Windows will please your customers. Cost no more than wooden windows—last twice as long. Can be painted any color desired or left unpainted. Give more service and better service. Write for complete description, prices and terms.

SHRAUGER & JOHNSON
438 Walnut St.
Atlantic, Iowa



Government's Standards for War Housing

(Continued from page 148.)

undesirable and will be accepted only in cities where, because of high land values, it is clearly demonstrated that single and two-family houses cannot be economically provided, or where there is insistent local demand for this type of multiple housing. In any case, they will be accepted only where the Bureau of Industrial Housing and Transportation is convinced that local conditions require or justify their use. They must conform in general to local building ordinances, to the general provision of these standards, and to other special provisions to be issued by the Bureau of Industrial Housing and Transportation.

VI. Special Provisions for Type 9 (Boarding House)

In addition to complying with all general provisions, buildings of type 9 must comply with the following special provisions:

Where more than 3 and less than 25 rooms for lodgers are provided, building to be classed as boarding house. If 3 lodgers or less, building to be classed as type 3; if 25 or more, to be classed as type 4, 5, 6, or 7.

1. *Access.*—Lodgers to have access to their bedrooms and to their water-closet compartments and bathrooms without going thru rooms designed for use of family. Separate outside entrance for lodgers recommended.

2. *Arrangement.*—Not to be over 3 stories high. Not to be over 2 rooms deep, except that the end house of rows may be 3 rooms deep.

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

4. *Fire Protection.*—If frame, not to be over 2 stories high. If over 2 stories high, 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 least desirable). All such additional means of egress to be remote from the main stairs and separated therefrom and from the 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 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.

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.

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

6. *Materials of Walls.*—Brick, terra cotta, stone, or concrete preferred, but wood frame clapboard, shingled, or stuccoed permitted for detached or semi-detached houses not over 2 stories high.

7. *Plumbing.*—Family living quarters to have:

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 4½ square feet minimum area to outer air, and preferably with impervious floor not of concrete.

(Continued to page 152.)

Wait A Minute!

Do not pass over this announcement to every contractor and builder before reading it and learning of this **BIG MONEY MAKING PROPOSITION.**

SOLD! SOLD!--PROFIT! PROFIT!

Yes, they are sold upon sight. Garage owners appreciate **TOPPING FOLDING GARAGE DOOR HANGER SETS** every time. They are completely sold on the proposition, and all you have to do is to get after their order. Big money is made every day by our thousands of contractor or builder representatives.

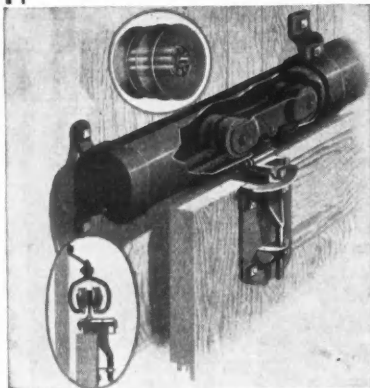
TOPPING FOLDING GARAGE DOOR HANGER SETS are the simplest and strongest on the market today. They offer many new ideas in garage hardware. If there is anything new, the **TOPPING FOLDING GARAGE DOOR HANGER SET** has it. Packed in complete sets. Automatic locking device can be opened or shut by any member of your family. Neat appearance, last forever, and every sale brings another.

Investigate our proposition at your local dealers, and get acquainted with the **TOPPING FOLDING GARAGE DOOR HANGER SET.** It means profit to you.

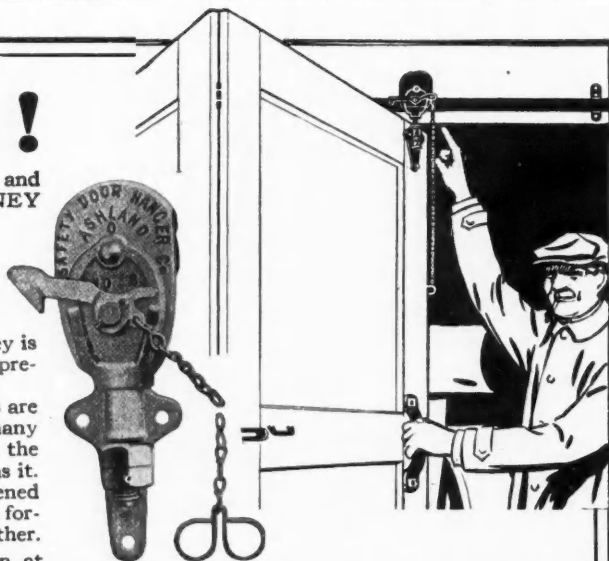
Use Red Rib Barn Door Hangers

They are especially adapted to the use of heavy barn doors. They are designed by experts to withstand the strain and wear brought upon barn door hangers. Consider lasting qualities, and you will find none better than the "Red Rib" Hangers. Solid, double-grooved wheel. Very strong trolley. Sheds water. Bird proof. Tandem wheel. Hinge hanger. Noiseless. Roller bearing wheel. They are absolutely guaranteed. There is money in this proposition for you. Investigate it at your local dealers. Or, if by chance, he does not carry them in stock, write for our money-making proposition to contractors and builders, and descriptive literature.

Safety Door Hanger Company
Ashland, Ohio



Does Not Sag or Bind



BAYONNE ROOF AND DECK CLOTH

in the opinion of all Master Builders who have used it, and their name is legion—

meets every requirement, stands every test, and insures a leak-proof, weather-proof, wear-proof roof.

Typical of hundreds of letters we have received is the following from E. Raynor's Sons, of Westhampton Beach, Long Island:—

"We have only the highest praise for the excellent quality of Bayonne Roof and Deck Cloth. We find that every roll is very even in texture and, as you guarantee, Waterproof."

Bayonne is especially adapted for Sleeping Porches, Conservatories, Verandas and other places exposed to constant wear.

Sample Book "N" Gives Prices and Laying Instructions

WRITE FOR IT!

JOHN BOYLE & COMPANY, Inc.

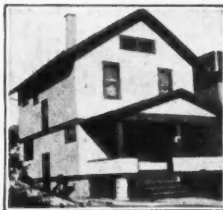
112-114 Duane St. NEW YORK 70-72 Reade St.
Branch House: 202-204 Market Street, St. Louis, Mo.



KRAGSTONE AMERICAN MAGNESIA PRODUCTS CO. CHICAGO STUCCO

For new or old buildings

Big Demand



Dealers Wanted

For beautiful and permanent residences, garages, etc., use **Kragstone Stucco**. Never checks or cracks. 300% stronger than cement stucco. Easy to apply to any surface. Many color combinations.

Send for illustrated catalog, estimate sheets and prices. Write today.

American Magnesia Products Company
3 North La Salle St., Chicago

Makes a Perfect Roof

BECAUSE

- The convenience and lightness of wood.
- All the protection of Asphalt.
- Easy to lay—low in cost.
- Perfectly tight—do not leak.

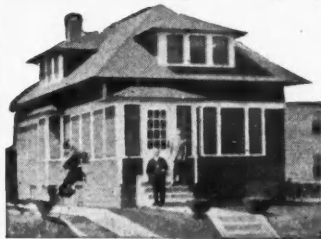
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ASPHALT SHINGLES
The Only Kind Tapered Like Wood

Thick at the butt—thin at the top. Tough, pliable and resists fire and weather. Easy to lay, like wood shingles, with ordinary shingle nails. Ask for a sample shingle.

Beckman-Dawson Roofing Co.
Asphalt Shingles :: Factory, Argo, Ill.
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CON-SER-TEX



This Is Your Opportunity To Make Extra Profits

Use roofing material that gives service and satisfaction, that costs less than most others, is easy and inexpensive to lay, and that makes a neat and durable surface.

On Repair Jobs or New Buildings
your estimates will be much lower, your profits bigger if you use

CON-SER-TEX CANVAS ROOFING

It is a canvas roofing chemically treated to protect the fiber from mildew, and the detrimental action of the oil in paint. It's waterproof, weather-proof, wear-proof.

INVESTIGATE—samples showing widths, weight, prices and complete details sent upon request.

Wm. L. Barrell & Co.
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California Distributors: Waterhouse & Price Co., Los Angeles; The Pacific Building Materials Co., San Francisco.



Government's Standards for War Housing*(Continued from page 150.)*

In addition to above, a water-closet compartment containing lavatory to be provided for the sole use of the lodgers. Floor and base of toilet rooms to be waterproof, not of concrete.

The following minimum provisions to be made:

For men, 1 bathtub per 24 lodgers, 1 water-closet, and 1 lavatory per 8 lodgers, 1 shower per 10 lodgers; for women, 1 bathtub per 16 lodgers, 1 body shower per 10 lodgers, 1 lavatory per 5 lodgers, 1 water-closet per 8 lodgers. Dwarf partitions between lavatories for women to extend at least 6 feet above the floor and have curtains.

8. *Rooms, Height Of.*—Minimum, 8 feet.

9. *Rooms in Attic.*—No lodgers' rooms in attic accepted.

10. *Rooms, Number and Use Of.*—Each lodger to have separate room. Rooms for two lodgers not permitted. (Cubicles and dwarf partitions will not be accepted.) Building to contain more than 3 and less than 25 rooms for lodgers. In addition to living quarters for one family, lodgers' bathrooms and toilet rooms containing showers, tubs, lavatories, and water-closets to be provided; preferably, bathroom containing showers, tub, and lavatories to be separate but adjoining and communicating with water-closet compartment. One of each such rooms preferably on each floor. Each of these two rooms to have windows opening directly to the outer air. Lodgers to have a common room, also dining room; the latter to be located near family kitchen; the common room to be conveniently accessible from the outside.

11. *Rooms, Size Of.*—Single bedrooms for lodgers to have a minimum area of 70 square feet and minimum width of 7 feet. Size of common room and dining room each to be proportionate to the number of boarders.

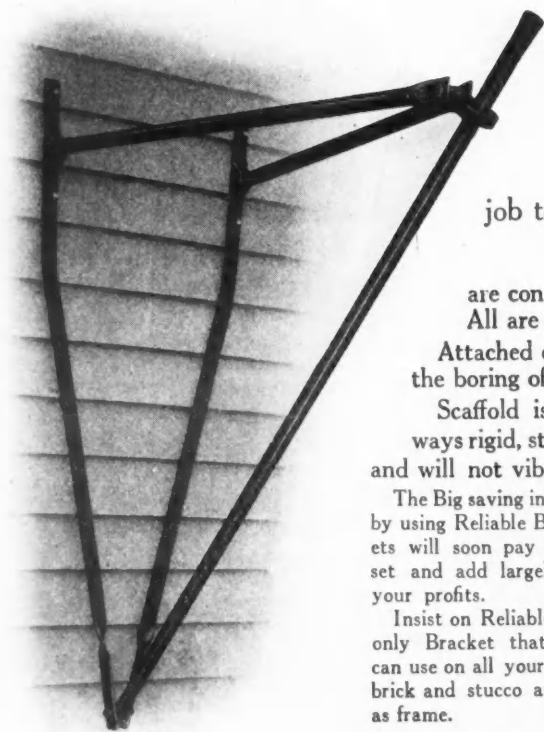
12. *Ventilation.*—Bedroom doors preferably to be placed opposite each other and to have transoms or slat panels.

Hammond's Liberty Hall Built in a Day*(Continued from page 33.)*

continued in the afternoon; the job was complete an hour and a half before six o'clock, the time set. The painters, wiremen, and roofers did not report until one; they found everything in readiness, and completed their work in short order. The painters, in fact, were thru before three, and the roofers and wiremen before four. The interior work—partitions, seats, and the like—went in just as planned.

So rapidly did the men do their work that the "bosses" felt perfectly safe in stopping all work from 11:30 to 12 to allow the women a place in the sun. The women's efforts were responsible, in considerable part, for the putting thru of the plan. Accordingly, at 11:30 a "unit of lady carpenters," consisting of six members dressed in overalls, marched to the grounds preceded by a brass band, were formally "initiated" into the carpenter's union, and at once got busy. While nobody made any complaint as to their work, the six members felt it incumbent upon themselves to subscribe for a \$50 Liberty Bond.

The erection of the building was, as every carpenter or contractor will recognize, a feat in itself. The spirit that made the whole thing possible, however, is even more remarkable, and, unfortunately, not as common as might be desired. Hammond, an industrial city with a large foreign element, has some anti-war sentiment and the usual sprinkling of pacifists.

(Continued to page 154.)

YOU NEED Folding Scaffold Brackets

Every contractor should use them on his new Industrial Housing Jobs. They are easily moved from job to job and take up very little room in moving.

Reliable Folding Scaffold Brackets

are constructed entirely of malleable iron and steel on scientific lines. All are thoroughly tested before leaving factory.

Attached quickly and easily to your building without the use of bolts or the boring of holes. 10-d or 16-d nails fasten them securely.

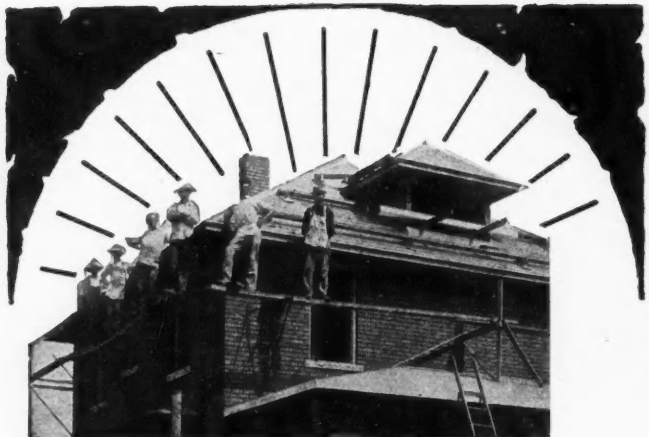
Scaffold is always rigid, strong and will not vibrate.

The Big saving insured by using Reliable Brackets will soon pay for a set and add largely to your profits.

Insist on Reliable, the only Bracket that you can use on all your jobs, brick and stucco as well as frame.

Write for catalog

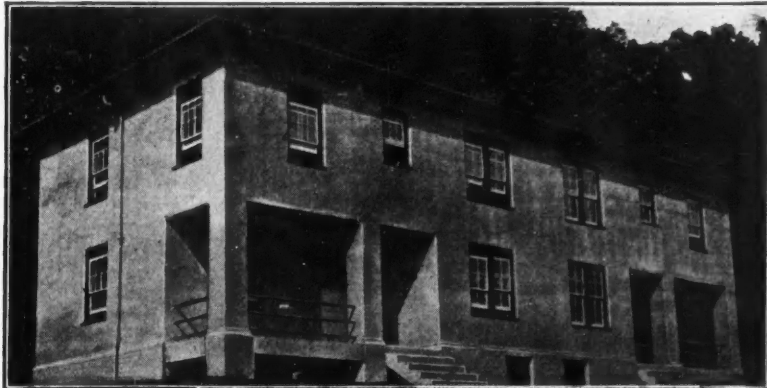
Elite Manufacturing Company
ASHLAND, OHIO



An Eleven Year Test of Berger Industrial House Construction

In the house illustrated Berger's Metal Lumber was used for the frame work, Berger's Expanded Metal Lath being applied thereon to support the stucco and plaster.

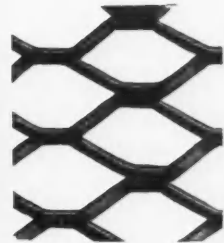
After 11 years of service the house is in first-class condition and in fact more attractive in appearance than when new.



Twin House at Tuxedo Park, N. J. Built in 1907 with Metal Lumber and sided with Stucco on Berger's Expanded Metal Lath. ONE PHOTO WAS TAKEN IN 1907, THE OTHER IN 1918, COMPARE THEM.

OUR SYSTEM OF
Metal Lumber
and
Expanded Metal Lath

construction is ideal for industrial houses, as it is fire-resisting, economical and can be erected with great rapidity.



Metal Lumber takes the place of wood joists and studing piece for piece. It is cut to fit and each piece marked. Nothing could be simpler.

Berger's Expanded Metal Lath gives a perfect bond and reinforces the stucco or plaster in every direction. Cracking is thus prevented.



For the latest information regarding Expanded Metal Lath and Metal Lumber construction, send for our new Metal Lath and Metal Lumber Hand-books. Every up-to-date architect and contractor should have them. Address Dept. F-3.



The Berger Mfg. Co., Canton, Ohio

Branches: Boston
St. Louis

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Philadelphia
San Francisco

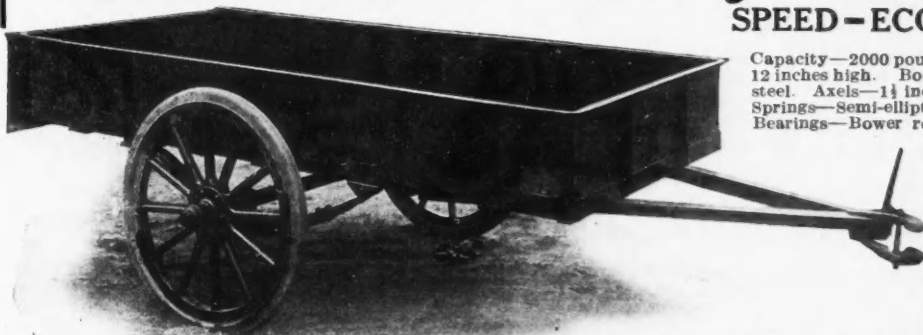
Chicago



Export Department: BERGER BLDG., NEW YORK CITY, U. S. A.

Contractor's Handy Auto Trailer

SPEED - ECONOMY - STRENGTH



Capacity—2000 pounds. Body—8 feet long, 46 inches wide, 12 inches high. Body and under frame built of open hearth steel. Axels—1½ inch square bed, special high carbon steel. Springs—Semi-elliptic, oil tempered and double heat treated. Bearings—Bower roller. Wheels—1½ inch spoke, artillery type, second growth hickory. Tires—32x2, solid rubber. Weight—534 lbs. Other models with gates at front; also extension tongue which permits carrying lumber, poles, ladders, etc. 30 feet long.

Write for Catalog C.

Rogers Brothers
COMPANY
Albion - - - Pa.

Hammond's Liberty Hall Built in a Day

(Continued from page 152.)

Nevertheless, it has already sent 1700 men into the army and navy, out of a population of less than 40,000. Those remaining at home quite properly resolved that it was up to them to see that the men at the front are properly supported. Consequently they planned the building, not only for patriotic meetings, but also for offices for the Red Cross, the Liberty Bond salesmen, the American Alliance, and other organizations devoted to war work. The men and women who conceived and executed the plan are determined to "smoke out" every person in Hammond who is lukewarm in his sympathies with things American, to make him show his true colors—and above all to get him in line to do effective, organized work. The Liberty Hall, to those who planned and built it, and to some extent sacrificed for it, is more than a mere building; it is a practical, tangible means of helping to win the war.



Determining the Capacity of the Storage Battery

(Continued from page 46.)

energy drain on the battery is at the rate of 320 candle-power. This means for tungsten lamps, a watt demand for 400. Dividing by 32 or 110, according to the voltage of the system we have adopted, we get 12.5 amperes in the one case, and 3.64 amperes in

the other. We could get substantially these results from the tables. In the case of the 32-volt system, we have $20 \times 0.625 = 12.5$; and of the 110-volt system, $20 \times 0.181 = 3.62$.

For the 32-volt system we will, accordingly, need a battery capable of delivering 12.5 amperes for 5 hours with a reserve capacity competent to take care of the less arduous work totalling (8 hours \times 2 \times 0.313 ampere + 2 hours \times 6 \times 0.625 ampere) = 12.5 ampere-hours. Standard sizes of battery cells have discharge rates, for 5-hour discharge, at 10.5 and at 14 amperes. The one is, of course, too small. The other has a total capacity of 80 ampere-hours. The discharge at 12.5 amperes for 5 hours will use up 62.5 ampere-hours, leaving 17.5 ampere-hours for the additional service. This additional service will require, according to our calculation, a total of 12.5 ampere-hours. The margin is perhaps sufficient. It may, however, be much better to go to the next standard size. In the case of a leading manufacturer, this is a battery having a total capacity of 120 ampere-hours. This battery consists of 16 standard cells, with or without three special cells. The standard cells have a voltage of about two, so that when connected up in the battery *in series*, we have about 32 volts. The size of the cells is such as to take care of the amperage requirement.

(Continued to page 156.)

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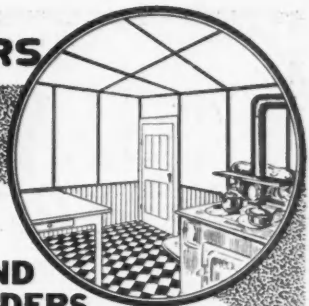
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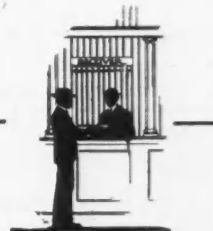
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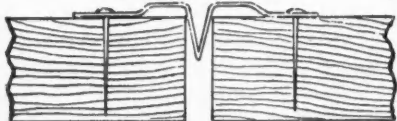
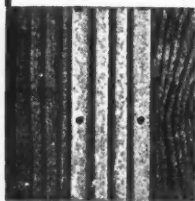
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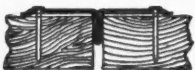
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Shows end view of Chief Batten with joint closed. Siding expanded. Note position of the batten in the crack.



Shows end view of Batten with the joint open and siding contracted. Chief Battens automatically accommodate expansion and contraction.

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Determining the Capacity of the Storage Battery

(Continued from page 154.)

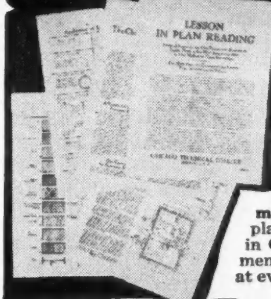
In case we have decided on the 110-volt system, then we seek first to find a battery competent to take care of the amperage requirement of 3.62 amperes during a period of 5 hours. One standard battery is competent to deliver for this period current at the rate of 3.5 amperes; and the next size at 7 amperes. This latter is obviously the battery to select, provided the balance of energy is sufficient to take care of the residue of the lighting. The balance of energy is found by subtracting (5 hours \times 3.62 amperes =) 18.10 ampere-hours from the total capacity of the battery, which is 40 ampere-hours. The total energy required is (8 hours \times 2 \times 0.091 amperes + 2 hours \times 6 \times 0.181 ampere) = 3.63 ampere-hours. We shall, accordingly, undoubtedly have not only enough energy in this battery, but also a big reserve. This will be a good thing.

In the foregoing example, worked out for both 32 and 110 volts, the reader may think that insufficient attention has been paid to the question whether the balance of energy left after the heavy 5-hour run is really sufficient to take care of the remainder of the work. The reader may not wish to guess. The following principles may be stated for those who wish to calculate to a finish. A storage battery is supposed to be charged and discharged in a period of 8 hours. It may be made to give up, in such a period, all its energy. That is, if we know its total energy (in ampere-hours), we may obtain this energy at the rate of 12½ per cent of the total per hour. Further, we may get its total energy at *any lesser rate*. We may, then, apply this rule to any residue of energy. In the case of the 32-volt system, we had a residue of 17.5 ampere-hours, withdrawable at the rate of 12½ per cent of 62.5 ampere-hours, or at any lesser rate. That is, we may withdraw at the rate of 7.8 amperes or less. The heaviest demand we had to consider was that of the six 16-candle-power lamps in the morning. As one lamp requires a rate of 0.625 ampere the six will not require more than 3.75 amperes. This is well within the possible 7.8-ampere rate. The two 8-candle-power lamps will demand current at a very slow rate. Having determined that our rates are right and our total residue of energy is also right, we settle on this battery as quite proper. We may deal similarly with the case where the voltage is 110.

A 110-volt battery will ordinarily consist of 60 cells. It may be desirable to charge such a battery from a current at the same voltage. In general, charging will require a slight initial excess of voltage in the current which will be increased towards the end. In order to deal with a battery whose voltage is too large for the current, we may divide the battery into groups and deal with them separately or *in parallel* thru a rheo-

(Continued to page 158.)

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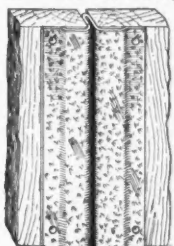
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Determining the Capacity of the Storage Battery

(Continued from page 156.)

stat. Thus, in the present case, we may divide the 60-cell battery into two 30-cell halves and deal with these as said.

The choice of the dynamo naturally turns on the choice of the battery. Dynamos are listed in accordance with their kilowatt capacity. The amperage will be obtained by multiplying the number of kilowatts by 1000 to get watts, and then dividing by the volts. Or, to reverse the procedure, if we want to know the kilowatt capacity necessary for a given battery, we take the 8-hour ampere rate, multiply it by 32 or 110, according to the system selected, and divided by 1000. We then have the bare kilowatt capacity of the dynamo. Suppose the ampere rate is, for example, 15. If the system proposed is the 110-volt one, then we have (15 × 110 = 1780 watts), or 1.78 kilowatts. Of course, there may be no generator listed at the exact capacity required, this fact causing us to select a size somewhat in excess of exact requirements.

The engine power required to operate the generator will perhaps need to be determined in terms of horse-power. Given kilowatts, we get horse-power by multiplying by 1.34. Given horse-power, we get kilowatts by multiplying by 0.746. For example, 3 kilowatts as a power capacity is converted into horse-power by multiplying by 1.34, giving us 4.02 horse-power. Conversely, suppose we wish to convert 5.6 horse-power into kilo-

watts. We do so by simply multiplying 5.6 by 0.746, thus obtaining 4.18 kw. It should be remembered in selecting an engine, that too much excess power will naturally result in uneconomical operation.

I referred, some time back, to a battery requirement as so many cells, with or without three special cells. There is an important matter involved here. Batteries are lead-and-acid or else alkaline. With a certain lead-acid battery, it is possible by means of extra cells to arrange the battery so that the lights may be on at the very same time that the battery is being charged. This will often be a very important possibility. Without the special cells, the plant may, nevertheless, be controlled so as to provide for the lights from the battery alone, from the generator alone, or from both combined.

I may add, in concluding this installment, certain information as to the power requirements for the operation of other apparatus besides lights. Here is a tabulation covering accessories.

When Used on a 32-Volt Current

<i>Name of Accessory</i>	<i>Amperage required</i>
1/12-hp. motor	3.0
¼-hp. motor	7.3
½-hp. motor	12.8
1-hp. motor	23.3
8-inch fan (25-watt).....	0.8
12-inch fan (60-watt)	1.9
3-lb. flat-iron	6.3
4-lb. flat-iron	8.8
⅛-hp. vacuum cleaner	5.6



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WE presume a good many of our readers find themselves in localities where there is a shortage of homes. The unusual rush of war business has brought in many new workmen and their families and there are not enough houses for them. Some of our readers are working with the real estate men, lumber dealers, bankers, and other public-spirited men to organize a home-building campaign to put up a number of houses to meet this situation.

The AMERICAN BUILDER has organized a special department to render assistance where these urgent housing needs exist. We will welcome correspondence giving full particulars so that we can act intelligently. Also we would like to hear from every one of our readers regarding any wholesale home-building project he has handled during the past few months. We would like to see photographs, floor plans, etc.

Editor AMERICAN BUILDER.

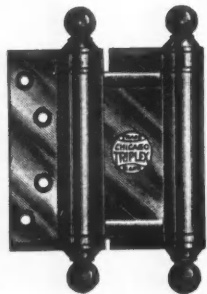
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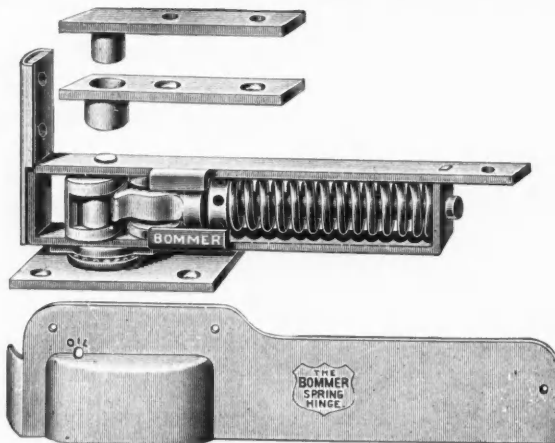
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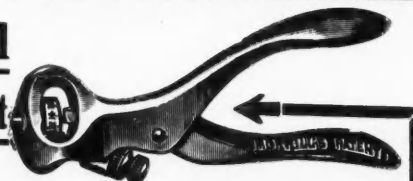
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