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Standard Frames of Genuine White Pine

For centuries, white pine has been preferred for all out-of-doors uses. This preference is based on the knowledge that white pine endures under the most rigid weather conditions without warping, swelling, shrinking or rotting. No other lumber has the enduring qualities that are found in white pine.

All the exposed portions of the Andersen White Pine Frame are made of America’s finest building lumber — Genuine White Pine.

When an Andersen White Pine Frame is nailed in place it will remain as long as the house stands.

Andersen Frames are made in 11 standard sizes from which the dealer can supply 121 sizes of window frames without delay by simply interchanging heights and widths. Each frame is packed in two compact bundles containing seven units. Using only a hammer, these seven units can be nailed up in ten minutes, making a complete frame with pockets and pulleys in place.

Leading builders find that Andersen Frames cut building costs, eliminate delays and give complete satisfaction.

Write for INTERESTING BOOK
We have prepared an interesting book on the qualities and economies of Andersen Frames. Upon request, we will gladly send you a copy without charge.

Andersen Lumber Company, Dept. A-2, South Stillwater, Minnesota
Short Talks by the Editor

What Does the Future Hold?

TODAY we need 1,500,000 homes, 60,000 apartments, 5,000 schools and public buildings, and 150 freight terminals. Those are the building requirements of the United States, according to figures compiled by the National Federation of Construction industries.

This year, according to a survey taken by the Farm Journal among 1,100,000 farmers, they will build:

- Houses: 38,500
- Barns: 40,700
- Granaries: 17,600
- Chicken houses: 72,600
- Hog houses: 35,200
- Tool houses: 33,000
- Garages: 40,700
- Silos: 28,600

Most of these new houses are potential markets for heating, lighting and other home equipment. The barns will call for modern equipment and machinery. These same farmers will paint:

- Houses: 239,800
- Barns: 140,800
- Other buildings: 105,600

Repair or remodel:

- Houses: 15,000
- Barns: 8,250
- Others: 3,800

and build or repair 95,700 fences. Combined with a large road building program this schedule becomes quite formidable and certainly looms promising for the building industry for the year 1922.

More so when we remember that these needs are only those voluntarily expressed. The possibilities in the latent field of building needs which can be developed thru intensive solicitation and salesmanship are several times the above requirements. The potential market of the paint and varnish field alone is $1,200,000,000, of which only 25 per cent has been developed.

Pause for a moment to consider the tremendous significance of these figures. It not only means an enormous demand for building materials, such as lumber, brick, clay products, etc., but for the accessories of building.

The electrical market, for instance, is largely dependent upon construction activities. Today the electrical contractor only gets 1 per cent to 3 per cent of the house building appropriation which can be greatly increased during 1922 if these interests get busy and solicit the business.

Today there are only seven million homes wired—14,000,000 still to be wired; 2,000,000 homes need electrical irons, 4,000,000 need vacuum cleaners, 4,500,000 need washing machines and 6,900,000 need irons and dishwashers. Every member of the building industry should become an active worker in the electrical field—every builder is a salesman whenever he takes a contract for a new home or for remodeling an old one.

The other manufacturers of building accessories cannot ignore the meaning of this projected activity. The hardware, millwork, construction machinery and equipment manufacturers face a promising year and only thru efficient advertising and effective marketing can they reap the benefits which are there for their taking. All of the affiliated industries should be ready to take their proper place in this inspiring picture, co-ordinate and co-operate to make the teamwork of the whole industry more perfect and more productive.

Gazing into the Crystal Ball, I see 1922, a year of great building activity—thousands of homes will be built—millions will be spent. You have a prosperous year before you.

The Builder Has Good Reason to Feel Optimistic Over This Year's Prospects. It Looks Like a "Builder's Year."
STANDARD SYMBOLS FOR WIRING PLANS

As suggested by The Society for Electrical Development, Inc., and Adopted by National Associations

- Ceiling Outlet; Electric. Numeral in center signifies number of standard lamp sockets.
- Ceiling Outlet; Gas and Electric. Upper numeral signifies number of standard lamp sockets; lower numeral, number of gas burners.
- Wall Bracket Outlet; Electric. Numeral in center signifies number of standard lamp sockets; lower numeral, number of gas burners.
- Convenience Outlet; Wall or Baseboard. Numeral in center signifies capacity in number of appliances as described in Specifications.
- Floor Outlet. Numeral in center signifies capacity in number of appliances as described in Specifications.
- Outlet for Outdoor Standard or Pedestal; Electric. Numeral signifies number of standard lamp sockets.
- Outlet for Outdoor Standard or Pedestal; Gas and Electric. Upper numeral signifies number of standard lamp sockets; lower numeral, number of gas burners.
- Drop Cord Outlet.
- One Light Outlet. For Lamp Receptacle.
- Arc Lamp Outlet.
- Motor Outlet. Numeral in center signifies horsepower.

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Amperes</th>
<th>Wattage at 110 volts</th>
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<tbody>
<tr>
<td>No. 18</td>
<td>3</td>
<td>330 watts</td>
</tr>
<tr>
<td>No. 16</td>
<td>6</td>
<td>660 watts</td>
</tr>
<tr>
<td>No. 14</td>
<td>15</td>
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</tr>
<tr>
<td>No. 12</td>
<td>20</td>
<td>2,200 watts</td>
</tr>
<tr>
<td>No. 10</td>
<td>25</td>
<td>2,750 watts</td>
</tr>
<tr>
<td>No. 8</td>
<td>35</td>
<td>3,850 watts</td>
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LIMITATIONS OF LIGHTING CIRCUITS

Adequate and proper lighting of the home is, of course, a highly important consideration and for economic considerations, if for no other, the various branch lighting circuits in a house are usually well loaded and are protected in several ways—protections which also impose certain very definite limitations. In the first place, No. 14 wire is now generally specified, despite the 660 watt rule, in order to insure against overload in lighting service. This size of wire is rated as safe for 15 amperes, but as a further protec-

EVALUATION OF THE ELECTRIC CIRCUITS

The importance of the ampere requirements are thus emphasized, rather than those of wattage, for the reason that the fuses protecting the various circuits, etc., are universally rated in amperes, as they should be, while the compound units of watts and kilowatts, with which the public is perhaps slightly more familiar, are potent only in so far as their ampere components are concerned. So far as the house circuits are concerned—to repeat—it is the number of amperes which the wires can carry without undue heating which control the size of wire to be used and the number of outlets which can be effectively installed in a circuit. With this fact in mind, the familiar table of safe carrying capacities of wires takes on a somewhat different meaning and the reasons for the limitations imposed by the National Electric Code become apparent, particularly when wiring for comfort, convenience and safety.

TABLE I

SAFE CARRYING CAPACITY OF RUBBER-COVERED COPPER WIRES

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</table>
New Electrical Symbols for Floor Plans

STANDARD SYMBOLS FOR WIRING PLANS

(Continued)

Telephone Outlet; Public Service.

Bell Outlet.

Buzzer Outlet.

Push Button Outlet; Numeral signifies number of buttons.

Annunciator; number signifies number of points.

Speaking Tube.

Watchman Clock Outlet.

Watchman Station Outlet.

Master Time Clock Outlet.

Secondary Time Clock Outlet.

Door Opener.

Ceiling Fan Outlet.

Special Outlet; for Signal Systems; as described in Specifications.

Meter Outlet.

Distribution Panel.

Junction or Pull Box.

Motor Control Outlet.

Battery Outlet.

Transformer.

(Continued to page 104.)

that the Ball

New Electrical Symbols for Floor Plans

of

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The electrical market, for instance, is largely dependent upon construction activities. Today the electrical contractor only gets 1 per cent to 3 per cent of the house building appropriation which can be greatly increased during 1922 if these interests get busy and solicit the business.

Today there are only seven million homes wired—14,000,000 still to be wired; 2,000,000 homes need electrical irons, 4,000,000 need vacuum cleaners, 4,800,000 need washing machines and 6,900,000 need ironers and dishwashers. Every member of the building industry should become an active worker in the electrical field—every builder is a salesman whenever he takes a contract for a new home or for remodeling an old one.

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As the voltage of virtually all circuits for the distribution of electric energy within buildings has now been pretty universally standardized at 110 volts and the wattage consumption of any electrical device—lamp or appliance—is equal to the product of this voltage and the number of amperes consumed, it is the value of this latter quantity, the amperes consumed, which is the dominant consideration in planning any electric circuit for household use. They measure, or are proportional to, the quantity of electricity flowing thru the circuits per second, or other unit of time, and hence govern the size of circuit wire and the number of outlets which can be effectively installed on a circuit.

The general public may not appreciate this, nor is it necessary that it should, but the building contractor most certainly should. He cannot increase or decrease the voltage of the electric energy supply, but he can proportion his wiring so that the supply may be used with comfort, safety and convenience. To him falls the responsibility of wiring for comfort and making adequate provisions for the possible amperage demand.

**Safe Carrying Capacities**

The importance of the amperage requirements are thus emphasized, rather than those of wattage, for the reason that the fuses protecting the various circuits, etc., are universally rated in amperes, as they should be, while the compound units of watts and kilowatts, with which the public is perhaps slightly more familiar, are potent only in so far as their amperage components are concerned. So far as the house circuits are concerned—to repeat—it is the number of amperes which the wires can carry without undue heating which control the size of wire to be used and the number of outlets which can be effectively installed in a circuit. With this fact in mind, the familiar table of safe carrying capacities of wires takes on a somewhat different meaning and the reasons for the limitations imposed by the National Electric Code become apparent, particularly when wiring for comfort, convenience and safety.

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**Limitations of Lighting Circuits**

Adequate and proper lighting of the home is, of course, a highly important consideration and for economic considerations, if for no other, the various branch lighting circuits in a house are usually well loaded and are protected in several ways—protections which also impose certain very definite limitations. In the first place, No. 14 wire is now generally specified, despite the 660 watt rule, in order to insure against overload in lighting service. This size of wire is rated as safe for 15 amperes, but as a further protec-
tion, at the present time, a 10-ampere fuse is customarily specified for safeguarding such a circuit. Another limitation, tho one which is very frequently disregarded, is imposed by the type of lamp socket customarily employed for holding the lamps in the fixtures. These are rated as safe for 250 watts—that is, for from 2 to 2.5 amperes—making them really unsuitable for appliances requiring from 3 to 6 amperes or more as many popular appliances demand for effective operation.

Of course, a lighting circuit is rarely called upon to supply current to its full complement of lamps at the same time and a 250 watt key socket rarely fails immediately when transmitting more than 2 or 2.5 amperes. Yet, the full complement of lamps may be used or the key socket may fail when overloaded. However, neither of these objections to loading a lighting circuit with appliances consuming more current than a lamp are as serious in the popular mind as the inconvenience of the screw socket for attaching appliances. Let this really minor objection suffice, for by catering to it possibly more serious objections pertaining to the safe and proper use of electric appliances are circumvented. Furthermore, lamp sockets are rarely, if ever, conveniently located for the attachment of appliances.

Convenience Outlet Circuits

The virtually essential convenience outlets must, naturally, be conveniently located, but this is largely a responsibility devolving upon the architect or designer of the building. The responsibility of wiring these outlets, however, is a responsibility of the contractor quite as much as it is of the architect. In order that the contractor may wire properly, he must be familiar with the Code requirements for lighting circuits, the safe carrying capacity of wires as given in Table I and also have an appreciation of the type of appliances which may be used in the various rooms. In this latter connection, Table II lists some of the electric appliances which are frequently employed in various rooms of a modern home—the average ampere requirements of the appliances consuming more current than it is wise to draw from ordinary lighting circuits being given between brackets after the name of the appliance.

Many of the appliances listed in the following table could quite properly be attached to screw sockets on lighting circuits, provided the circuits were of ample carrying capacity, but they can one and all be more conveniently attached to convenience outlets. Furthermore, all the appliances mentioned are seldom employed in one house, nor are they all used at the same time. However, the list is typical of what demands may be made on convenience circuits in various rooms. Consequently this table, in connection with Table I and familiarity with the "factors of safety" customarily employed in connection with lighting circuits will enable the building contractor who plans his work with

(Continued to page 104.)
HERE are many ways of making the average home quite beautiful and cozy, but few as effective as an artistically arranged sun porch, nook, or alcove with abundant window space to admit plenty of God's glorious sunshine. Darkness is unconsciously shunned by all and the bright spots in the home are the ones that add the cheer and warmth of welcome. These little pockets of sunshine can be provided by the thoughtful builder at very little extra expense. Consider some of the delightful corners shown in the illustrations.

There is an octagonal-shaped sun
Corners

parlor with casement windows, ideally suited for flowers and light furniture. It can serve as a pleasant lounging place or afternoon tea room, where Milady can entertain her sewing circle or intimate friends. Or there is the smaller alcove with its artistic small flower-stand, bench and comfortable chairs.

It may be in the form of an open porch with enhancing lattice work for climbing vines and hanging flower pots, or perhaps only a small window seat set in a bay where many a quiet and restful hour can be spent in reading or sewing.

All of these details are simple and well worth the additional expense. Suggest them to your clients when talking house plans.
SMALL COZY HOME OF PLEASING LINES. Certainly a charming little dwelling that will appeal to thousands of home-hungry families. It is a design worthwhile in any builder’s sample case. It is comparatively inexpensive to build because it does not call for features and materials that are expensive. The siding is shingles with stucco above the first floor under the gables. There is a small, artistically-built front porch opening into a modest living room of good size, 20 by 12 feet, with fireplace and wall bookcases. The windows are well placed and numerous. There are seven rooms in the complete plan, four on the first floor and three on the upper floor. The fourth room on the lower floor is a spare room that can be used for bedroom or library. Three bedrooms are located upstairs. The excellent room arrangement permits of no waste in floor space. Size, 36 by 24 feet 6 inches.
FAMILIAR SQUARE HIP ROOF HOUSE DESIGN. Its charm lies in its plain, substantial appearance, and its popularity is due in the main to its economy in cost. For, in this square type, there is little of the freak or frill to increase costs. This house is built of frame with concrete foundation, front steps and porch. The entrance is Colonial of the heavier type and the interior arrangement is similar to that of the typical Colonial homes, namely, three rooms on the lower floor and four bedrooms on the second floor. The living room is one of those delightfully large and cheerful rooms, 15 by 29 feet with the usual open fireplace that "burns" and small flanking bookcases. Light from three sides makes it a most desirable lounging and reading room. In view of the close attention being paid to costs by prospective homebuilders, this economical design will be in much demand this year. Size 30 by 40 feet.
Building a Gambrel Roof House

By R. C. Hunter, Architect

After the general plan arrangement of the house has been decided upon and the exterior treatment considered in a tentative way, we next turn to the matter of construction.

A little forethought in planning will save much trouble and annoyance later on in the construction end. For instance, in deciding room sizes, unless the house is very small, 10-in. floor beams will be used; this fixes the short side of the room or the maximum span for the beams at about 15 ft. if hemlock is used and about 16 ft. with spruce. This is with beams at 16 in. o. c. and with a reasonable allowance for partition loads and the like, that will rest on the beams. If desired over certain rooms on account of the span, the beams can be spaced 12 in. centers, giving a safe span of about 16 ft. 8 in. for hemlock and about 18 ft. for spruce, or 3 by 10 in. beams could be used at 16 in. centers, but this requires ordering a few 3-in. beams where most of the others are 2 in. Then, too, a 3-in. width does not allow proper clinch for the plaster ceiling, and 12-in. centers give excellent support for the lath, altho 16-in. centers is satisfactory.

Beams 10 in. in depth allow a reasonable amount of cutting for the plumbing and heating pipes, whereas beams that are 8 in. in depth allow for no cutting whatever, even where the span is short. The commercial timber often runs 3/4 to 3/4 in. scant in both dimensions, so that a 2 by 8 in. is often but 1 3/4 by 7 3/4 in. and is suitable as floor beams only for short spans.

To build well and the same time economically requires a very thoro consideration of each and every item of construction, in much the same manner as we have considered the matter of floor joists. The girders in the cellar that support the first floor beams should be 6 by 10 in. in size, and the piers or columns so spaced that the girders will support the floor and partition loads without sag that would crack the plastered walls. This span is generally limited to about 8 ft., depending upon conditions and loading. The girder should be framed flush with the floor beams to avoid the excessive shrinkage that occurs when the beams run over the top of the girder.

Footings under the piers or columns must be of ample size to prevent settlement. With an 8-ft. spacing of the columns the footings should be 2 ft. square and 12 in. thick, of concrete.

Cement filled pipe columns are preferred to brick piers in the cellar, as they take up less room, give a neater appearance and often cost less than the piers.

Next consider the stairs and their relation to the ceiling heights of the house. The accompanying sectional drawing shows how the matter of ceiling heights and stairs can be worked out to advantage.

If we establish our ceiling heights arbitrarily, without regard to the stairs, we find that the risers, in most cases, work out in mean fractions, seven-elevenths, nine-thirteenths, and the like. This trouble can be avoided by establishing the heights from floor to floor so that the risers work out even.

Starting with the cellar, 8 ft. from cellar floor to first floor gives twelve risers at 8 in., which, combined with an 8-in. cut for the tread, gives a good cellar stairs.
From the first floor to the second floor, a height of 9 ft. 6½ in. gives fifteen risers at 7¾ in., which, with a tread of 9½ in., gives a stair that is easy and economical on space.

From the second floor to the third floor, fourteen risers at 7¾ in. gives height of 8 ft. 10¾ in.

With 10-in. first and second floor beams and 8-in. third floor beams, the finished ceiling heights are:

- Cellar, 7 ft.
- First floor, 8 ft. 6 in.
- Second floor, 8 ft. 1 in.

These are good heights for the average house.

The roof deserves careful consideration, particularly the gambrel or Dutch type. The upper and lower pitches should bear a pleasing relation and provision should be made for the use of the attic or third floor space.

The accompanying section shows a lower pitch of 46 to 12 in. and the upper pitch 10 to 12 in.; this gives good proportions and the upper pitch is steep enough to allow usable room on the third floor. The broad overhanging eaves of the roof give the house a low appearance that is pleasing.

The windows in this house are well proportioned, properly spaced and placed; their height from the floor is such that the required privacy is retained and at the same time they are low enough to give good outlook.

Construction interests during 1922 should concentrate on educating the public and owners of property to construct new buildings or rehabilitate old buildings to obtain maximum return and eliminate eyesores of dilapidated structures. The various associations should jointly survey the construction needs of each city and devise ways and means for fulfilling these needs.
STURDY, COMELY HOUSE DESIGN OF PRACTICAL TYPE. Not what we would call extra fancy, but a good substantial home with plenty of room, plenty of windows admitting plenty of sunshine and air. There are six livable rooms and a sun parlor. In addition there is a good-sized front porch with brick railing. The construction is frame on brick foundation. It is really a story and a half, the upper floor getting considerable space thru front and rear roof dormers. No vestibule is provided, the front door opening into the living room, which is a very large and comfortable room, 23 by 12 feet. The day of double parlor has gone, the single large living room now taking up that space. Dining room and kitchen are grouped conveniently while the three bedrooms and bath are located on the upper floor. The house is 38 feet wide and 24 feet long.
CHARMING, ROOMY STUCCO HOME OF DISTINCTIVE LINES. To all appearances a very broad, pretentious home of considerable size, this dwelling is not very large but gets that appearance from its arrangement. The porte cochere, which is becoming quite popular since the advent of the rear garage, adds breadth to the building as do the wings. But in actual size it is only 36 by 32 feet. It is stucco, with front and side porches, several sleeping porches and sun parlor. There are seven rooms, including the large living room, 15 by 15 feet, dining room, kitchen and one bedroom on the first floor and three bedrooms on the second. The first floor bedroom has a sleeping porch addition and two of the upstairs rooms have individual sleeping porches. There is a large fireplace in the living room with wall bookcases on each side. The sun parlor is off the living room.
DETROIT is to have a fountain that will rank among the world's greatest and will probably be the costliest in the United States. Preliminary work is under way.

James Scott, an obscure citizen, died in 1910 and left his entire estate to the city to build it. The site designated in the bequest was Belle Isle, Detroit's famous playground in the Detroit River. There was only one condition to this gift which was that the fountain should include a life-size statue of Mr. Scott.

The city accepted the gift but it was four years later that the James Scott Water Fountain Commission invited competition for the fountain before a distinguished Jury of Awards, consisting of Charles A. Platt, Walter Cook, and Robert S. Peabody, architects, Frederick Law Olmsted, landscape architect and Daniel Chester French, sculptor.

In the meantime the commission has employed as its professional adviser Professor Eugene Duquesne, who had had charge for the French government of the celebrated fountains and gardens at Versailles.

The competition was one of the largest ever held in the United States. In the first stage, ninety-two designs were submitted by architects from New York, Boston, Philadelphia, San Francisco, Detroit, Pittsburgh, Washington and thirteen other cities.

From these the jury selected seven designs which entered the final stage together with designs by McKim, Meade and White, Carrere and Hastings and Cass Gilbert who had been specially invited by the commission.

The awards, from the Scott fund, of $10,000 set aside for the competition, were as follows:
- Cass Gilbert, New York, first prize.
- Carrere and Hastings, New York, second prize.
- Codman and Despreadle, Boston, third prize.
- Guy Lowell, Boston, fourth prize.

The feature which had commended Mr. Gilbert's design to the jury was its large use of water; it was, first of all, a fountain.

A contract with Mr. Gilbert was approved by the city council in 1915 and about a year later, he submitted plans and sketches. The plan submitted was substantially the one which won him the competition, although the competition had been primarily for the purpose of selecting, not a design, but an architect.

The importance attached by the architect to this commission and the thoroughness with which he executed it are attested by the special trips he has taken in Europe to visit various fountains—trips to Italy, France, Germany and the British Isles and two to Spain.

His plans contemplate the reclamation of a triangular area of about forty-five acres at the lower end of the island where the water is shallow. For this purpose and to build a retaining wall, the city appropriated $100,000. The consent of the War Department had to be secured as the river is government water. This work is now in progress by the process of pumping dirt from the bottom of the river.

After some modifications of the plans had been made to reduce the cost, the James Scott Water Fountain Commission recommended on July 12, 1921, that bids be accepted which would bring the cost of general construction to $345,200 and of the mechanical and electrical equipment to $75,785, with the proviso that the general construction be finished in 300 working days. On this basis contracts have been let to local concerns, who have already started with the foundation. The fountain will soon be a reality.

This will not require the expenditure of the entire amount of the bequest, which now amounts to about $530,000; the remainder will be used for maintenance and repairs.

Generally speaking, the plan of the fountain is that of a circle imposed on a large triangle and is the embodiment of simplicity. This triangle of "fill" which will be made geometrically correct by retaining walls, has a base of 1,725 feet passing thru the center of the fountain and a length of 1,500 feet from this base line to the apex.
A large part of the triangle will be taken up by a lagoon for small boats, connecting with the present system of lagoons and into which a cascade from the fountain will flow. On the opposite side of the fountain to the lagoon will be five radial roads, one of which will be the approach from the new $3,000,000 Belle Isle bridge which the city is building.

The general plan includes a ferry house and landing on the north or city side of the triangle as well as, in the future, a harbor for small boats. Roads will run down to the apex, where it is expected there will be, some day, some kind of architectural embellishment.

It has been suggested by Mr. Gilbert to the city council that this embellishment should take the form of a Soldiers', Sailors' and Marines' Memorial, for which he has submitted the very beautiful design embodied in the drawing on this page. This has not been accepted and for the purpose of this description the drawing is chiefly useful to show the general treatment of the lower end of Belle Isle. The fountain is indicated just above the center of the picture and the new bridge at the upper left hand corner.

The fountain proper is to be of white Vermont marble and is to consist of a bowl and series of concentric circular pools one below the other, the outer pool to have a diameter of 112 feet. Around this will be a promenade with a grass slope and steps leading down to a driveway which will encircle the whole. Between the driveway and the lagoon will be another slope, semi-circular in shape, and cut by steps leading to the water's edge, with cascades flowing from the upper to the lower slope and thence to the lagoon. The diameter of the outermost circle is 510 feet.

From the land side of the fountain structure is 28½ feet high. On special occasions a geyser will rush upward from the center of the bowl to a height of 125 feet,—a tremendous volume of water which will be supplied by an eight-inch pipe thru a three-inch nozzle. Twenty smaller jets around the circumference of the bowl will give a continuous play of water.

The fountain's central portion is a shell with a circular arch under the basin of an 8 foot 6 inch radius and with a spring line 12 feet from the floor, making a pump room which is to contain two centrifugal pumps and the water mains.

Four marble lions will spout water from the intermediate to the lower pool and many turtles will throw water back to the lower pool from the outer pool. Other decorative features are dolphins and heads under the bowl.

On the recommendation of Mr. Gilbert, Mr. Herbert Adams of New York was selected as the sculptor for the statue of James Scott, which is to cost $20,000. The figure will be on the axis of the fountain, facing it and on the opposite side to the lagoon.

Groups of statuary have been designed to be placed in the lagoon on each side of the cascade but will not be installed until some time in the future.

Belle Isle is two-and-one-half miles long and the upper end has been left more or less in its natural condition, heavily wooded. The original layouts of roads, canals and lagoons was made by Frederick Law Olmsted, Sr. The fountain, with its very formal treatment is the culmination of the artificial improvements in the way of buildings at the lower end. If the proper kind of a structure, such as the Soldiers' and Sailors' Memorial proposed by Mr. Gilbert is added to the apex of the triangle, the effect will be impressive indeed.

The fountain will be in full view of both the American and Canadian shores and of the hundreds of vessels which ply the river and is therefore to have a very unusual site. At this point the river is about a mile wide.

There is an added interest in the selection of the architect in that Mr. Gilbert has just completed a very splendid building for Detroit, its new public library.

There is an announcement of great importance to every contractor and builder on pages 54-55. Read the story of the man who failed to make the most of his opportunities so that you will not make the same mistake. This is the time of the year when you should be studying and perfecting your knowledge of the building business.
CHARMING SPANISH MISSION TYPE BUNGALOW. This is the style of architecture that came down in modified form from the early settlers of California. It has not only been adopted out there but is gaining in popularity in many parts of the country. Its simplicity recommends it, as does its quaint style and air of hospitality. The exterior is stucco over frame, brick or tile, with arched openings, recessed entrances, and other touches remindful of the days gone by. In this home you can enter the living room direct thru one door or by way of a small vestibule thru another door. The living room is of the large comfortable type with fireplace in center wall. It is connected by an opening with the dining room slightly smaller in size. There are two bedrooms, 14 by 11 feet each. The kitchen is small and conveniently near the dining room. Size of bungalow 28 by 46 feet.
DISTINCTIVE DUTCH COLONIAL HOME DESIGN. There is an air of substantial comfort about this attractive, well-built home. Adding to the inviting impression always offered by a Colonial design is the rather unique wide open front porch extending the full width of the house and recessed under the main roof, which is supported by four stout columns. The other features of the pleasing Colonial design are present, including the regularly spaced windows, quaint shutters, and large fireplace. Seven regular rooms and a sewing room are provided in the floor plans. The living room is 15 by 25 feet with typical Colonial fireplace. French doors connect it with the hall. Another pair open into the dining room opposite which is 15 feet square. A small complete kitchen is in rear of the dining room. Upstairs are four bedrooms of about equal size, unusually well-lighted and cheerful. The building is frame with concrete foundation and is 40 by 26 feet.
FRIENDS, the bungalowette. As charming as the season's debutante and as free from artificial adornment as the country girl of sweet sixteen, it makes its bow to the building fraternity.

It comes close on the heels of its big sister, the bungalow, which so recently captivated the country and still holds its charm in spite of the passing years. It has much in common, including individuality and distinctive qualities, but it is much smaller. When the bungalow first made its appearance, it seemed very small, but it soon demonstrated to many families' satisfaction that it is sufficient for their needs. And as the space-saving idea proceeds apace, the contractor and architect find that a home even smaller than the bungalow will suffice. Of course many building innovations have been necessary to make this possible, many new ideas in space-conservation have been conceived.

The bungalowette is the offspring of Necessity. It comes as a solution to the housing problems of many families of meager means who cannot meet the constantly rising rents. It offers them a home, complete...
in every way, at an outlay that is astonishingly small and understandable.

Let us see why this is so. In the first place, its size means that much less material is needed. Here is a house 24 by 18 feet. You have seen many living rooms that are larger than this. Impossible, some builders will say, to make 400 square feet satisfy the needs of a household. Look at the floor plan on this page.

Each cubic foot in a house means much cost. It does not require the brain of a mathematician or professor in higher sciences to discover that if the number of cubic feet is reduced the expense will be reduced.

Material in a small building like this need not be

of the best grade. Many short pieces of lumber can be used. There are no fancy doors, no bay windows, the millwork bill will be small. Wallboard will serve excellently as walls.

As for rooms, just because a room is labeled dining room in the floor plan is no reason why it cannot serve as something else. Or if it is called living room is likewise no reason for it being restricted to that use. In a small house of the bungalowette type the idea of using one room for more than one purpose means the elimination of just that many rooms. In this bungalowette there are three rooms and bath. They serve as five.

The kitchen is 6 by 6 feet with all equipment and fixtures so arranged as to take up the smallest amount of space. It opens into a dining room 10 feet 6 inches by 10 feet, plenty large enough for a small family.
EVER-DELIGHTFUL COLONIAL FLAVOR. Variation in Colonial design is just as possible as variation in dress. This is the old-fashioned inviting, informal Dutch Colonial type with high gambrel roof. It is built of frame on a brick foundation. A small open private porch has been added to one side, off the den. If this room should be used as a bedroom the porch can be screened in and made a very desirable sleeping porch. The interior room arrangement is quite efficient. There is the customary large living room with its Colonial warmth and comfort, the dining room opposite, the small complete kitchen to the rear of the dining room. A small breakfast nook has been built in one corner of the kitchen. There is a an extra toilet off the hall on the first floor. The bedrooms are large and well-lighted. There is also a sewing room on the upper floor. Size 35 by 26 feet.
SMALL MODEST HOUSE DESIGN. Five rooms, all on one floor, is what this design provides for the prospective homebuilder. It is a well-built, small house, with frame shingle siding, low gable roof, and high basement. The five rooms are living room, dining room, kitchen, and two bedrooms. The living room is modeled along the latest lines in homebuilding, being large and roomy. It is 13 by 23 feet, with fireplace and excellent light from windows on three sides. In fact a living room of this type would be hard to beat even in more pretentious homes. The bedrooms are small but ample and considerable space has been saved by the use of space-saving closets. The kitchen occupies just 100 square feet but has the equipment necessary to maintain this household. The dining room is a very pleasant, well-lighted room, 15 by 11 feet 6 inches. The house is 24 feet wide and 42 feet long.
PRESENT high costs of labor and building materials makes it imperative that the average home-builder of today should build as compactly as possible; that is, to so construct his house that, while putting into it all possible conveniences, there shall be no wasted space. A new departure in the form of built-in permanent furniture offers splendid opportunities in this direction.

It is well known that it takes a good architect to design an attractive, convenient home. The trouble is that the owner of the average small home cannot afford to pay the fee which the good architect is, in the nature of things, obliged to charge. Even supposing that he can meet this charge, he immediately faces another problem; it will cost a lot of money to pay for the beautiful and convenient things which the architect has designed, because they will in all probability have to be made to order to fit the architect's plans.

This problem seems to have been satisfactorily solved by the introduction of "standardized woodwork"; in other words, permanent furniture or details built-in as an integral part of the structure of the house itself. Millwork, or as the average builder speaks of it, woodwork, comprises from ten to twenty per cent of the cost of the completed house. It includes such items as doors and windows and their frames; stairs, base boards, mouldings, paneling, cupboards, window seats, porches, columns, bay windows or dormer windows, roofs, cornices, brackets, and built-in fixtures. These details are the things that give architectural character to a house, and they must be provided, no matter whether the house be of stone, brick, cement, or wood.

"Architect's furniture," as built-in details once were called, has always been in good taste. It lends dignity and character, a sense of having been planned beforehand, that makes the house containing it much more inviting than one with blank walls. But such furniture is expensive when specially designed for a house.

In addition to the attractive patterns now available in "stock trim," patterns carried regularly by lumber dealers, there is now on the market a large selection of standardized woodwork and built-in furniture, which is architecturally correct in every detail, possesses all the beauty and convenience of made-to-order woodwork, and because it is produced in quantities, is very much cheaper.
Built-In Furniture Reduces Building Costs

With the problem of domestic service having reached an acute stage, the convenience of the kitchen arrangement has become a matter of vital importance. Therefore, the makers of the standardized woodwork have provided kitchen dressers and work tables, ironing boards which shut up on a hinge into a niche in the wall, the broom closets in what would ordinarily be lost space. All of these articles are built in such a way as to conserve space, while affording the maximum of convenience and utility. Daylight factories have proved that cheerful surroundings make contented workers and that well lighted rooms are sanitary work places. And since every kitchen is a food factory on a small scale, the housewife should have as pleasant a place to work in as the factory girl. Built-in kitchen furniture comes nearer to providing ideal conditions in this most important room of a house than any other arrangement.

Economies in space have been worked out in the plans of the standardized built-in permanent furniture which only an experienced architect would be capable of devising. These pieces, all built in as an integral part of the house, are really beautiful. For dining rooms there are corner cupboards which look as tho they might have been taken right out of one of those old-fashioned homes of New England; concealed china closets for those who prefer that kind of closet, sideboards in several artistic patterns; and buffets which can be set beneath high casement sash if the room permits.

For the bedroom there are built-in dressing tables with swinging mirrors at either side, a big mirror in the back, several drawers and two cabinets. The woman who knows the comfort and pleasure of sitting down to a dressing table when she performs her toilet could not be persuaded to do without one, but this built-in affair, besides being as attractive and convenient as the ordinary kind, has the additional advantage of being out of the way, not to mention its cheaper cost. In connection with the dressing table a tray case and a hanging closet may be installed, one on either side of the table, or these necessary adjuncts to a bedroom, providing plenty of trays and drawers to hold all of one's personal effects, may be built in somewhere else about the room. The open end trays provided in this article of furniture permit one to see what is in each tray without having to pull it out. There are also compartments for hats and shoes. When the door to one of these cases is closed, everything is hidden from sight, and there is nothing, apparently but a regular interior door.

Positively Swell

Lily—The Jimpson's new house is very pretty.

Tilly—Yes, with that artistic staccato finish.—New York Sun.
A TTRACTIONE. ROOMY HOUSE OF WESTERN TYPE. The first impression this house offers is one of size, yet the actual dimensions do not bear this out. The many wings and projections help to make this house appear much larger than it really is. For instance, there is the porte-cochere, twelve feet wide, extending over the side drive-way, there is a wing on the other side of the house about 10 feet wide containing the sun parlor. Another wing to the rear contains the kitchen. The house is frame on concrete with brick porch balustrades and supports. There are six rooms, sun parlor, and two sleeping porches. These are located in the same wing as the sun parlor on the second floor and are each joined with a bedroom. A small breakfast nook off the kitchen is an added convenience. Overall the house only measures 43 by 34 feet. A two-car garage is located in the rear.
"A GEM FOR ANY SETTING." A snappy-looking stucco home of economical lines with sunparlor. This is the type of home that will appeal to many families who need plenty of room but cannot afford a real large house. The room arrangement of this dwelling has been carefully planned and as a result the house seems quite large, although the actual dimensions are only 28 by 37 feet. On the first floor there are four rooms and sunparlor, not to mention a fair-sized front porch. The fourth room can be used either as a den or bedroom as the owner sees fit. Folding or accordion doors separate the dining room from the sunporch which can be used as a breakfast room. Three bedrooms are located on the second floor and all three open out on to balconies, one in the rear and one in front covered by special canvas flooring. There is a two-car garage in the rear.
Building a School House for the Future

ONE of the big problems of the school board in towns, large or small, is to take care of the rapidly increasing enrollment. Hardly has a new building been completed before it is too small for its requirements. That means either a new building or an addition to the original building, which in turn means quite a bit of expense.

A practical solution to this problem is offered in the Komenky School, Berwyn, Ill., designed by G. W. Ashby the well known school architect, Chicago, and shown in the illustration above. This structure is quite novel in school building architecture, being of the one story type, the reason for which will soon be explained. The arrangement of this one story building is such that new rooms can be added on indefinitely at half the cost of an addition to a higher building. In fact the two end rooms which project beyond the main plan were added at a very small cost.

The building is quite attractive in design, built of brick with ornate cut stone trim. There is no basement, the boiler room and fuel room being on the main floor rear.

Moreover, there are no fire hazards, no stairs to descend in case of fire and consequently no danger of trampling or crowding. This is a big factor to consider in school construction and one that will find favor with parents.

There are six main class rooms with individual coat rooms. All class rooms are equipped with slate blackboards. The lighting facilities are abundant.

Floor Plan of Komenky School Showing Class Rooms. Rooms Can Be Added on Each End to Take Care of Growing Enrollment. The Building Overall Is 60 by 182 Feet.
HE law books contain a great many cases growing out of building contracts which involved a construction of the second provision of the statutes of frauds. This provision is a part of the seventeenth section of the English statute of frauds which has been substantially followed in the majority of the states, and provides in substance as follows:

"That no action shall be brought to charge the defendant upon any special promise to answer for the debt, default, or miscarriage of another person, unless the agreement upon which such action shall be brought, or some memorandum or note, shall be in writing, and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorized."

In other words, providing that before the promise to pay the debt of another can be enforced, the promise must be in writing and signed by the one making the promise.

Now this is perhaps one of the most widely known rules of law, and it may well be doubted if there is one contractor or builder out of a hundred who is not familiar with it. And yet, owing to the peculiar circumstances in which it is so frequently encountered in the building and construction field, it is a point that has been overlooked in hundreds of instances and the cause of many lawsuits. In particular has the point been a trouble maker for subcontractors, where the principal contractor has failed to make good, and the former has relied upon a promise from the owner.

For example:

A building contract is entered into and the principal contractor subcontracts certain parts of the work. Everything goes along fine for a time, when some day the principal contractor fails to pay the subcontractor. The subcontractor becomes alarmed and goes to the owner about it. The latter is financially responsible and assures the subcontractor that he will be paid. This promise was not in writing, however, and thereafter the principal contractor, it seems, failed to pay, and the subcontractor brought the instant action against the owner on his (the owner's) promise to pay if the principal contractor failed to do so.

The higher court in conclusion reversed the judgment rendered in favor of the subcontractor in the lower court. Holding that under his complaint the subcontractor could not enforce the promise made to him by the owner because the promise was not in writing, and did not satisfy the statute of frauds.

As noted heretofore, the law books contain a great number of cases of this kind, and the courts of the different states are not in accord in construing the

(Continued to page 111.)
"A SHADY PORCH FOR ALL HOURS OF THE DAY." It is surprising how important the porch has become in determining the desirability of a home. Progressive builders have soon become aware of this fact and are specializing in this feature. This home, while not particularly striking, has many of the features that make it just the house for the medium-sized family. The exterior is quite simple, part stucco and part shingles. The major part of the large front porch has been screened in and provides an excellent playroom for the children or resting place for the grownups. Living room, dining room, and kitchen are located on the lower floor. Note the built-in-equipment in the small, compact kitchen. Three bedrooms are located on the second floor and there is ample room for more on the third which has plenty of windows and a high ceiling. The house is 24 feet wide and 28 feet long, exclusive of porches.
A COZY HOME, SIMPLE AND ATTRACTIVE. To all outward appearances it is a bungalow yet it has an upstairs, a feature which many people demand. Builders find some people want all the rooms on one floor while others insist on the home with the bedrooms upstairs. This charming little home is built of frame on solid concrete foundation and has a very pleasing exterior trim and a few pergola touches that are worthwhile. There are six rooms in all, and a sleeping porch. The front door opens directly into the living room, avoiding any waste of space for vestibule. The living room is 16 by 16 feet 6 inches, a large room for this size house, and is connected with the dining room by a double doorway giving a stretch of over thirty feet. One small bedroom and a modern kitchen take up the remainder of the first floor. Upstairs are two good sized bedrooms and sleeping porch facing front. The house is 26 by 34 feet.
BATHTHIS are not new. Back before the time of Christ the Romans and Greeks had palatial bath houses; and the bath was one of the important ceremonies of their everyday life.

But bathrooms are new. It seems that after the decline and fall of the ancient civilization, this practice of cleansing the body in public or private baths fell into disrepute and for centuries the bath was not considered seriously by the masses. Today in most of Europe the bathtub is still an unknown commodity and the bathroom only known in the houses of the wealthy. The vast mass of Europeans have yet to taste of the luxury of this simple institution which to us has become quite necessary. Yet if we pause to consider, not every one in this progressive country of ours enjoys the benefits and advantages of a permanent bathroom. Many farm homes have just begun to include this feature, for the problem of running water has always been an obstacle.

It is only within the last thirty or forty years that the old saying, "Cleanliness is akin to godliness," has had a fair working chance to demonstrate its verity. Tales are plenty about the days of our early settlers who very often sewed themselves into their winter outfits and did not change until the following spring. Cold northern winters possessed untold terrors for those bold enough to try the crude methods of bathing in those days, and as a result the custom was neglected to a large extent. Saturday night became a red-letter day in the calendar, for it was the signal for wholesale operations.

But with the rapid advance in medical science came the insistence for personal cleanliness and very soon the bathroom as a separate component of the house plan came into being. At first the equipment was crude, far from artistic, but utilitarian. It was only a matter of time until the old "tin-tub" was replaced by better looking enameled iron or porcelain, ugly lead pipes by polished copper or nickel. Tile floors and wainscoting soon transformed this room into a place of beauty and perfect sanitation.
Many New Ideas in Built-In Fixtures

The development in plumbing and plumbing fixtures within the last ten years has been remarkable, and no one realizes it better than the architect and building contractor. It has helped him immensely in his work of building comfortable, satisfactory homes for his clients. For a modern bathroom is an essential that will go a long way in determining the ultimate comfort of a dwelling.

The size, equipment, and location of a bathroom is no mean question for the architect and builder to decide. In the first place, it cannot take up too much space. Secondly, it must be located where it is convenient to the sleeping rooms. It is not good judgement to locate a bathroom so that it opens into a kitchen, dining room, or even into a hall facing either of these two rooms. Its logical position is off a hall which gives access to the bedrooms.

To make this bathroom as small as possible, the use of built-in fixtures is essential. It does not require a whole lot of room to accommodate the new models of
bathtub, closet, lavatory, or showers, cupboard, medicine chest and can be accommodated quite handily, as many of the illustrations demonstrate.

The advantages of tile flooring or some other composition material that will readily drain water and can be easily cleaned has been pointed out many times in past numbers of The American Builder. This type of floor and wall covering not only increases the sanitary efficiency of this room, but adds infinitely to the appearance.

It may be well for some home owners to say the “old washtub” is good enough, but the satisfaction of many millions who have modern bathrooms cannot be silenced nor denied. The day when every home in the country whether in city or country will have a bathroom is not far distant and the length of this time depends in large measure upon the architects and builders who are building and remodeling homes.

++

Electrical Suggestions
(Continued from page 77.)
care to lay out his convenience outlet wiring upon lines which will not only avoid the pitfalls of inadequate wiring but for that degree of convenience, comfort and safety which distinguishes the electrically finished building.

### TABLE II

<table>
<thead>
<tr>
<th>Some Appliances and Uses for Electricity in the Home</th>
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<td><strong>General House Use</strong></td>
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<td>Lighting</td>
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<td>Vacuum Cleaner</td>
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<tr>
<td>Fan Motors (8 to 1 amperes)</td>
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<td>Bell-Ringing Transformer</td>
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<tr>
<td>Cellar Workshop</td>
</tr>
<tr>
<td>Grinder</td>
</tr>
<tr>
<td>Glue Pot (2 to 5 amperes)</td>
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<tr>
<td>Range (Requires special circuit)</td>
</tr>
<tr>
<td>Tea Kettle (4 to 5 amperes)</td>
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<tr>
<td>Disc. Stove (2 to 6 amperes)</td>
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<tr>
<td>Frying Pan (5 to 6 amperes)</td>
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<tr>
<td>Radiant Grill (5 to 6 amperes)</td>
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<tr>
<td>Toaster (4 to 6 amperes)</td>
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<tr>
<td>Coffee Grinder</td>
</tr>
<tr>
<td>Meat Chopper</td>
</tr>
<tr>
<td>Bread Mixer</td>
</tr>
<tr>
<td>Soldering Iron (1 to 2 amperes)</td>
</tr>
<tr>
<td>Breast Drill</td>
</tr>
</tbody>
</table>

**Main Wiring Symbols**

---
Pole Line.
---
Main or Feeder run concealed under floor.
---
Main or Feeder run exposed.
---
Branch Circuit run concealed under floor.
---
Branch Circuit run concealed under floor above.
---
Branch Circuit run exposed.
---
Circuit for Clock, Telephone, Bell or other Service run concealed under floor.
---
Circuit for Clock, Telephone, Bell or other Service run concealed under floor above.

A

An unprecedented increase was made in the membership and assets of building and loan associations in the United States during the year 1920, according to the Comptroller of the Currency. The figures indicate that the increase in the 1920 assets of these associations was greater than the gain made the two preceding years, while the growth in the membership was almost equal to that in the three preceding years.
MOST of our larger cities are becoming aroused over the danger to business property thru the congestion of streets due to the practice of parking automobiles in the downtown or busy sections. This practice greatly aggravates the fire menace because of the difficulties encountered by fire departments in responding and operating effectively to fight fires to which they are called. A number of fire chiefs in large cities have recently expressed themselves forcibly on this question and have pointed out that the sooner the downtown street parking practice is done away with, the better it will be for the safety of business property. The privileges are being more and more restricted and not until housing facilities are provided for cars will the disadvantages that street parking causes the fire department be removed.

When a downtown alarm rings, it is a practice to send out all available fire apparatus from certain fire stations on the first call. At best, modern fire apparatus is heavy, cumbersome and hard to maneuver, particularly where street congestion is aggravated by car parking. The only practical way of disposing of this menace, therefore, is to build commercial garages and these, from the very nature of occupancy, must be of firesafe materials to afford maximum protection to cars and to adjoining property. A structure built even in part of combustible material threatens the business district and the garage business itself with great possible loss from fire. In a report of the State Insurance Commission of Texas, dated April 16, 1919, the average insurance rate on all garages in that state is shown as $1.53 per $100 for the year 1919. This average rate includes the rates on fireproof, as well as non-fireproof garages, which
Public Garage at Ellendale, N. D., W. E. Hart, Owner, Built of Reinforced Concrete J. H. Finkle & Son, Contractors. It Has a Stucco Coating and Is Designed to Be Fireproof. It Has a Show Room With Office Above.

means that many of the latter type were required to pay much more than the average.

Examples of low insurance rates on reinforced concrete garage buildings, because such buildings are thoroughly firesafe, are the Elliott Street Garage and the Noyes-Buick building, both in Boston, on which the rates are $0.178 and $0.068 per $100, respectively. Two non-fireproof garages in the same city, built in part of combustible material, pay rates of $1.64 and $3 per $100, respectively. These examples show that intending owners of non-fireproof commercial garages cannot afford to neglect comparison of rates on combustible as against non-combustible construction, because the annual saving arising from lower insurance alone will very soon pay for any small additional cost of construction.

The value of a commercial garage as a building is ordinarily much less than the value of its contents. An outstanding example of this is the Hotel La Salle (Chicago) Garage, which cost $230,000 in 1918 under war price conditions. This structure has a capacity of 265 cars, which on the basis of an average valuation of $2,500 per car, means $660,000 worth of property is housed. This structure is absolutely firesafe, being built of reinforced concrete throughout, and a fire starting anywhere in the building could be prevented from spreading to other floors or other parts of the same floor. In some types of buildings it often happens that damage from fire is less than damage from water used to fight fire on one floor, leaking thru to other floors. In concrete buildings this danger is reduced to a minimum, if not entirely eliminated.

Clear floor space, unobstructed by columns is a highly desirable feature in a garage because the movement of cars is facilitated. Buildings of ordinary width may be designed of reinforced concrete so as to omit interior columns. In buildings having extensive ground or floor area division may be into wide sections, the space between rows of columns being wide enough to operate as a separate floor unit of the garage. Long span reinforced concrete construction of this kind may take the form of:

1. Straight girders simply supported at the wall piers and continuous over interior columns where these occur.

2. Straight or arched girders, monolithic with wall piers and columns and forming with them a rigid frame.

3. Open reinforced concrete trusses.

4. Concrete arches with steel tie-rods to take the thrust.

As a general rule trusses should be used only where the span is so great or the load so heavy as to render the other types impracticable.

In addition to being built of the highest type of fire resistive construction, a garage should be planned to minimize the possibility and effect of explosions of gasoline and to prevent spread of fire from whatever cause. The designer or builder should familiarize himself
with the requirements of the building code of the city in which the structure is to be located. Even tho the city or town has no code, he should nevertheless follow the requirements of the building code of some large city and should carefully comply with insurance regulations to secure the maximum benefit of minimum insurance rates. The building should be well lighted and ventilated; wall and column outlets should be placed at frequent intervals for the attachment of lamps and cords in order that cars may be properly cleaned and inspected. Dark corners should be avoided because they invite accumulation of dirty and oily rags, floor sweepings and other rubbish.

Ventilation should be sufficient to carry off exhaust gases from cars which, in addition to being offensive, are detrimental to the health of employees.

If the garage is to be more than one story high, careful consideration should be given to the advisability of substituting ramps for elevators if comparative costs show advantage for the former in facilitating transfer of cars to and from various floor levels.

A few points pertaining to the storing and handling of gasoline, taken from the "Regulations for Storing and Handling of Inflammable Liquids," published by the National Board of Fire Underwriters, New York, should be observed.

1. Tanks should be buried underground with the top of the tank not less than 3 feet below the surface and below the level of any piping to which the tanks may be connected. Tanks should be surrounded with well tamped earth or sand, or encased in concrete.

2. Tanks, if of metal, must be coated on the outside with tar or other rust resisting material.

3. Tanks containing inflammable vapor must be ventilated with a permanently open vent covered with a weatherproof hood and terminating at least 12 feet above the top of the fill pipe, but not within 3 feet of a window or other building opening.

As a profitable accessory to a commercial garage, consideration may well be given to specially built pits for draining customers' cars. Motor manufacturers tell us that the source of 90 per cent of repairs on motors is improper lubrication.

L. V. Nicholas, of Omaha, has installed a system at his service station which has made his company many friends and is getting a big trade in motor oils.

The system involves the use of concrete pits arranged in pairs so that each pit can accommodate two cars at once. The attendants drain the used oil from the cars, flush it out thoroughly and refill with new oil, without cost to the owner except for the new oil. The pits, shown in the accompanying sketch, are so arranged that oil can be easily drained from the crankcase, rear axle, or transmission case without loss of time. Attendants can drain, flush and refill a crankcase in five minutes.

Accompanying illustrations show designs for concrete pits such as described in the foregoing paragraphs, based largely on the fundamental details of the pits described.
In the January number of the AMERICAN BUILDER I gave a discussion of the stresses in a type of roof truss quite commonly used in barn construction. In this article I propose to give an analysis of the same roof truss under a wind load.

The reader will recall from the last article that on account of the collar piece at the top and also the floor beams at the bottom of the truss, the assumption was made that the truss was a three-hinged arch. The analysis was given on this basis:

We will assume that the maximum wind pressure on a vertical surface is 40 pounds per square foot of area. The trusses are assumed to be 12 feet apart. The vertical part of the truss is 10.5 feet high. Then the pressure is 10.5 × 12 × 40 = 5,000 pounds, approximately.

Then joint 2 of Fig. 1 will carry one-half of 5,000 or 2,500 pounds. Joints 1 and 3 take one-fourth or 1,250 pounds. I choose for my force scale 2,500 pounds = one-half inch. These forces are then drawn.

From joints 3 to 4 is 16 feet. Then the roof area to carry is 16 × 12 = 192 square feet. Now the normal wind pressure in this area is found from

\[ P_a = \frac{2 \sin A}{1 + \sin^2 a} \quad (1) \]

Where \( P = 40 \) and \( A = 60 \) degrees. Now \( \sin 60 \) degrees = .866.

Substituting in (1) gives

\[ P_a = \frac{40 \times 1.732}{1 + (0.75)^2} = \frac{69.28}{1.75} = 39.6 \]

For ease in figuring I have called this 40 pounds. Then the pressure is 192 × 40 = 7,680, one-half of which is carried at each joint. These forces are shown at joints 3 and 4.

From the joints 4 to 5 is 12 feet of incline 30 degrees. Then since \( \sin 30 \) degrees = .5, from (1)

\[ P_a = \frac{40 \times 2 \times .5}{1 + .5} = \frac{40}{1.25} = 32 \text{ pounds} \]

The total pressure on this roof area is

\[ 12 \times 12 \times 32 = 4,608, \text{ approximately} \]

There is then a force of 2,300 pounds at joints 4 and 5 each. These are shown in the figure.

Now at joints 3 and 4 there are two forces acting. Their resultant is found by completing the parallelograms as shown. The diagonals are the resultants and are the forces used at the joints. Fig. 1 is now lettered a, b, c—V, according to the notation used in all these articles.

In Fig. 2, the force polygon A, B, C, D, E, F is constructed. The closing line AF is the resultant wind load in magnitude and direction. Now, to find its position we proceed as follows: Choose the pole O and draw the rays OA, OB, etc. At the point y on the first load at the bottom of the truss draw two lines parallel to OA and OB. From where the parallel to OB cuts the load at joint 2 draw a line 11 to OC to cut the resultant load at joint 3. From this point draw a line parallel to OD to cut the load line at joint 4. Then from the point obtained draw a parallel to OE to cut the load line at joint 5. From this joint draw a parallel to OF to cut the parallel to OA, meeting at joint z. Then thru
Design of Safe Construction

Now the entire truss is in equilibrium under the resultant R and the reactions at the bottom of the truss. They must meet in a common point. Since there is no load on the right half of the truss, the reactions at 5 and 10 are in the same straight line. Then R<sub>p</sub>, the reaction at 10 is known in direction as shown. Now produce R<sub>p</sub> to meet R<sub>p</sub>, at w. The reaction at 1 must pass thru w, and R<sub>p</sub> is determined in direction. A force triangle may be constructed and their magnitudes determined.

Another method for determining the reactions is as follows: From the point y draw a line parallel to OB to meet load at joint 2, then one parallel to OC, etc., until the point x is found at the load line at joint 5. Then draw xy to close the funicular polygon. From O draw a ray parallel to xy, to meet line thru F, parallel to R<sub>p</sub>. This locates the point G. Then join A to G. A G is then the resultant R<sub>1</sub> in magnitude and direction, and FG is R<sub>p</sub>. Now at A draw a line parallel and equal to GA. This locates R<sub>2</sub>. If R<sub>1</sub> is produced to meet R<sub>p</sub> it is seen that it will pass thru the point w, that was found by the first method.

To determine the stresses we begin with joint 1, starting with R<sub>1</sub> or force g a. In Fig. 2 go from G to A, then from A to B. Thru B draw a line parallel to b h to meet line thru G parallel to h g. The point of intersection is H. In tracing the polygon G A B H G we went from B to T. This shows B H to be in compression and H G in tension. Now take joint 2, beginning with h b. From H go to B, from B to C. Thru C draw a line parallel to c i to meet a line thru H parallel to i h. This determines point I. The polygon shows c i in compression and i h in compression. Now go to joint 6 and begin with g h. From G go to H, from H to I. Thru I draw a line parallel to i j to meet a line thru G parallel to j g. This locates J. This shows j i in compression and j g in tension.

Now go to joint 7, where there are but two unknowns, while at joint 3 there are three unknowns, and the solution is impossible as yet. Start at G and go to J. Thru J draw a parallel to j k to meet a line thru G parallel to k g. This locates K to coincide with J. That is, so far as the wind load is concerned there is no stress in j k. But there would undoubtedly be stress due to the buckling of the long member which would act as a column. Stress k g is equal to j g.

Pass now to joint 3, beginning with k j. From K go to J, from J to I, from I to C, from C to D. Thru D draw a line parallel to d l to meet a line thru K, parallel to k l. This locates joint L. This shows d l in compression and k l in tension. At joint 8, start with G and go to K, from K to L. Thru L draw a parallel to l m.

\[\text{Fig. 2. Showing Stress Diagram for Fig. 1.}\]
Key Material in Building Fireproof Floors

HOW PRACTICAL FLOOR IS CONSTRUCTED WITH STEEL LUMBER AS BASIS OF JOB

By Gilbert Canterbury

Editor's Note—This is the fourteenth article of a series on the use of steel lumber in modern construction. Readers are invited to ask questions pertaining to this subject. Answers to all inquiries of general interest will appear each month in this department. Write in your problems now.

The first popularity of steel lumber joists came thru the extraordinary lightness of these structural beams, their great strength, their resistance to fire and the fact that they would not warp, shrink or sag. At first they were used in floor construction in just the same manner that wood floor beams were used. Square edge rough flooring was nailed directly to the steel joists, the nails going into the seam at the tops of the joists. Tongue and groove floor finish was then nailed to the rough flooring.

Later, however, contractors and architects began to note that steel lumber joists were the "key material" of a combination of materials with which thoroughly fire resistive floors could be built at less cost than had ever before been possible. It is in this latter field that most steel lumber joists are now used.

In the illustration accompanying this article is shown a non-combustible first floor in which the chief materials used are steel lumber joists, metal lath, rolled steel I-beams and concrete. The view is from the basement of a three-story store and apartment house.

This fire-resistive floor is built without reinforcing rods, without concrete forms of any kind and in fact without any of the intricate engineering and costly equipment usually associated with fireproof floor construction.

A row of brick piers have been run down the middle of the basement. Rolled steel I-beams spaced sixteen feet are run across these piers. When the contractor placed his order for these I-beams he said he was going to use steel lumber joists and an angle was riveted to...
Steel Lumber in Store and Apartment Buildings

the webs of the I-beams to serve as shelf for the joists. The structural steel company riveted this angle before delivery to the contractor and thus when the joists were set in place their tops were level with the tops of the I-beams. The joists could, of course, have been run across the tops of the I-beams.

The steel joists were bridged by weaving steel bands, one inch wide and twenty-guage thick across the tops and under the bottom, and fastening by driving a common roofing nail thru the band and into the joist seam. Then metal lath with a quarter-inch or three-eighths-inch rib and about twenty-four-guage was placed over the tops of the joists. The lath could be attached either with nails, with patented spring clips or by wiring. Two inches of concrete were then spread over the lath and leveled off for the finish floor surface.

Looking at this floor as shown in the illustration from the basement side, it will be noted that nothing burnable is in sight. If a fire is started in the basement by the heating furnace, by rubbish or by any of the other fire hazards usually found in basements, that floor will resist the advance of the fire into the upper floors of the building. Furthermore, that floor will not decay, warp, sag or deflect.

At first thought it will occur to most contractors that the two inches of concrete could not be put on top of the steel joists without some sort of built-up support for the mix while it was wet. But as a matter of fact the concrete is very well supported by the metal lath. It does not go thru the lath and the lath does not sag more than a trifle. In the illustration the steel joists were spaced nineteen inches and for this spacing any good twenty-four-guage ribbed lath will easily support the wet concrete. Furthermore, the concrete keys in the lath and thus the lath acts as a good reinforcement for the concrete.

Where a finished ceiling is desired, metal lath is attached to the bottoms of the joists. Viewed from the upper side, this floor shown in the illustration is a straight concrete floor. If a wood floor surface is desired, nailing screeds are embedded in the concrete.

Income Tax in Nutshell

WHo? Single persons who had net income of $1,000 or more, or gross income of $5,000 or more. Married couples who had net income of $2,000 or more, or gross income of $5,000 or more.

WHEN? March 15, 1922, is final date for filing returns and making first payments.

WHERE? Collector of internal revenue for the district in which the person lives, or has his principal place of business.

HOW? Full directions on Form 1040A and Form 1040; also the law and regulations.

WHAT? Four per cent normal tax on taxable income up to $4,000 in excess of exemption. Eight per cent normal tax on balance of taxable income. Surtax: from 1 per cent to 65 per cent on net incomes over $5,000 for the year 1921.

Law for the Builder

(Continued from page 99.)

the statute of frauds in relation to promises of this kind. The outcome of such cases usually turn on the question of whether or not the promise by the owner was made to secure the debt of another or to obtain something for himself. In a great number of the cases the subcontractor has recovered, but, of course, at the expense of a lawsuit which could in many instances have been avoided if proper precautions had been taken when the promise was accepted.

To sum up, then, it may be said: That the safest course for the subcontractor in situations of this kind, if he proposes to rely upon the promise of the owner, is to have that promise in writing and signed. This will satisfy the statute of frauds and eliminate the possibilities of an after dispute on this point, which is always liable to arise where such promises are merely oral.

ARE you preparing yourself for the big spring drive by studying the long winter nights? Don't be the “Man who stood still!”

Row of Small But Attractive and Comfortable Homes in Rock Island, Ill. They Were Built During the War and Now Help to Relieve Much of the Suffering of Families Who Want to Escape High Rents.
Prevention of Dusting in Cement Floors

CHIEF REASONS FOR EXCESSIVE DUSTING OF CONCRETE FLOORS AND METHODS TO PREVENT DUSTING

A complaint often lodged against concrete floors is the fact that they dust and sand—that they are hard to keep clean. The more sweeping done, the more dusting.

This cement dust, being very fine and abrasive, sifts and filters into everything, and is especially destructive when it becomes lodged into moving parts of machinery. In time this dust may become serious in its consequences to the floor, resulting in such a weakening of the wearing surfaces as to cause crumbling, and the formation of holes and ruts, says a writer in Maintenance Engineer, published by the Truscon Laboratories.

Varying Conditions

The baffling part of this process of sanding and disintegration is that all floors do not wear alike—that given conditions of equal and of the same kind of wear, there will be a big variation in the way two floors may stand up in comparison. Two floors, having been laid by the same contractor at practically the same time, using the same material, with all other conditions apparently being equal, may be of such divergent character that one floor, subjected to very hard wear, might give better service than another subjected to relatively light wear.

Influence of Water

While cement requires relatively but a very small amount of water for its actual hydration, in practice a very large amount of water must be used in order to obtain its proper consistency for the processes of pouring, placing, tempering, etc. This quantity of water is variable, depending on the cement and aggregates and atmospheric conditions.

Where the skill and knowledge of the contractor’s foreman comes in, however, is altho a large amount of water is necessary, an excess of water in a concrete floor is not desirable. Excess water makes the topping “sloppy,” bringing the lighter particles, known as “laitance,” to the surface. This “laitance” has very little binding or adhesive quality. It is one of the chief causes of the dusting of cement floors. Such a floor will dust even before it is worn; it may be set so soft that the surface can be scratched off with the toe of the shoe.

Contrariwise, if too much water is not good for concrete or cement—then too little water is just as bad, because in that event the material has not the required fluidity to amalgamate the numerous particles into a compact mass—causing a weak bond.

Influence of Trowelling

Again, the trowelling of cement is very important. The final trowelling should be done at just about the time of the initial set. This initial set may be any time from 3/4 of an hour to 16 hours after the topping has been placed, depending entirely on cement and atmospheric conditions. A finish trowelled too soon will bring water and laitance to the surface, causing a dusty floor. If trowelled too late, it simply results in breaking down that crystalline structure which constitutes the initial set of the cement. If too much trowelling is done, we have again the appearance of laitance, due to water bringing only the lighter particles to the surface.

Freezing

Freezing, of course, is bound to cause damage and result in a soft, scaling floor, if not a defective structure. Such a floor may be a decided menace.

Influence of Cement and Aggregate

The function of the sand and stone in concrete is to give compressive strength and wearing surface—the cement acting as the binder for holding the particles of sand and stone together. Naturally, if there is a lack of cement or a poor grade of cement, such conditions will result in a soft, crumbling floor. Again, if the sand is too fine or loamy, one will obtain a surface that is unable to bear up under the shock and abrasion of traffic.

To recapitulate, we might list the probable reasons for soft, dusting cement floors, as follows:

Lack of cement.
Poor cement.
Poor sand (loamy—not sufficiently “sharp” or well graded).
Improper proportions cement and aggregate.
Too much water.
Drying too quickly (as in a steam-heated
building, or exposed to direct sun's rays. All concrete and cement surfaces should be kept moist while hardening. This is very important.

Trowelling too soon.
Trowelling too late.
Trowelling too long.
Freezing.
Using floor too soon (before surface has had time to harden and set thoroughly, which process requires from a week to three weeks, depending on local conditions).

Any one, or any combination of these conditions may cause unusually soft, dusting floors.

Hardening Methods

Having sketched briefly what might be considered the major reasons for the dusting and gradual breaking down of the surface of a cement floor, we will now take up in detail the various methods which have been successfully applied and are recommended for putting a cement floor in such shape as to reduce its dusting to a hardly perceptible minimum, at the same time enabling it to give real wear and service, even under the hardest traffic. Practice today recommends one of three methods for protecting cement floor surfaces as follows:

1. Hardening chemically.
2. Hardening mechanically.
3. Surface film treatments.

The first two of these methods perform the function of dust-proofing and crumble-proofing a cement floor thru actual intrinsic hardening of the surface. The third calls for the application of a protective coating or film over the floor, such as varnish, enamel or the like.

METHOD NO. 1

Hardening Chemically

Of the two available methods, chemical and mechanical, of actually hardening a cement floor, the chemical method is certainly the simplest and most convenient, as it is a surface treatment applied to seasoned and hardened concrete. This differentiates it from the mechanical method, which requires that the hardener be incorporated into the finish.

The chemical method consists of simply flushing and sweeping over the surface of a chemical in solution, the intention of which is to react with the constituents of the cement, forming compounds that are denser and more closely amalgamated in texture, than the normal cement floor surface. The chemical is applied in solution, as this insures the easiest medium for reaction at normal temperature, and in order to supply a material which will be readily absorbed by the cement.

Acid-Proofing Concrete

Complaints are sometimes raised regarding the disintegration of cement floors, where such floors are subjected to the action of weak acids, as in canning and pickling establishments. These acids dissolve the free lime in the cement surface, causing rapid crumbling of the structure. Thru its chemical reaction, these preparations “fix” this free lime, rendering it insoluble and hence immune to the action of such acids.

Oil-Proofing (Vegetable Oils)

They are similarly beneficial when applied to floors subjected to splashings of weak sulphuric or hydrochloric acid liquids. In fact, any concrete or cement surface likely to be exposed to mild acid conditions such as those already mentioned, or to disintegration by vegetable oils (cottonseed, coconut oil, etc., which contain fatty acids), can be very decidedly benefited.

METHOD NO. 2

Hardening Mechanically

Contrasted to this method, which can be applied only after the floor has been laid, set and hardened for at least two or three weeks, the method of mechanically hardening usually calls for its work at the time of the final finishing of the floor.

As it is the hard grains of sand in the cement topping which give strength and wear-resistance to the finish—it can be reasoned that by incorporating a much harder and tougher material than sand into the cement finish, a much harder and more wear-resistant floor should result. This is the principle of mechanically hardening ‘concrete floors. It consists of incorporating a floor hardener, a very hard and dense material, into the concrete topping by mixing with dry portland cement, dusting this over the cement finish and carefully trowelling to a hard, smooth surface.

For mechanical hardening, it must be stated that where floors are subjected to unusually heavy abrasive wear, such as the drag-
At the Left Illustrating Surface Film Treatment, at the Right Mechanically Hardening and in the Center Chemically Hardening.

 ging of heavy cases or rolling of loaded trucks, as would be expected in warehouses, foundries, and manufacturing plants engaged in making of heavy articles, which must be shifted across the floor—that the mechanical hardening process is by far preferable.

METHOD NO. 3
Surface Film Treatment

This method is considered very practical, as applied to concrete floors of offices, hotels, apartment houses, showrooms and other such places where the floors are not subject to the hard, abrasive wear and abuse characteristic of floors in a foundry or warehouse.

(We wish to make this point clear, in order not to confuse between materials imparting real intrinsic hardness to concrete, such as Methods No. 1 and No. 2 previously described, and materials producing mere films.)

The advantages of efficient film treatments are many. They are, of course, decorative. They are also sanitary, because they “lay the dust,” avoid staining and absorption of organic compounds. They are washable and their surfaces can be kept fresh and clean.

Enamel Films Best

Nevertheless, it must be recognized that a film, in order to give a measure of satisfactory service on a cement floor, must be a coating of an unusual character. It must have the hardness of the hardest floor varnish.

This hardness is obtained thru the introduction of very tough fossilized gums, such as Kauri, into the material. It therefore becomes an enamel, not a paint. Such gums, blended with the proper oils and pigments form a wonderful floor treatment—an enamel coating, which acts as a binder and filler in between the numerous sharp edges and irregularities, composing a cement floor (see serrated profile, page 112) produc-

ing a surface that is smooth, uniform, hard—a washable surface like tile.

Alkali-Resisting

As has already been intimated, a concrete floor is decidedly alkaline. This is due to the presence of “free” or uncombined lime in the cement. This lime is very destructive to paint, varnish or enamel. In the presence of only a slight amount of moisture, lime combines with the acids in the oil of ordinary paint, forming soapy salts of the fatty acids, absolutely ruining the paint.

On Staining Floors

Where the intention is to obtain a washable, non-staining cement floor at a saving of money, a special transparent floor coating is occasionally used. This material contains no pigment and finds particular adaptability in garages and restaurants because of its washable feature. It covers the floor with an impervious coating that is non-absorbent to staining liquids and oils.

In the application of any paint coating to a concrete floor, it is necessary to take moisture conditions into careful consideration. Any floor laid directly on the ground is apt to absorb moisture. The floor may “appear” to be perfectly dry, but the peeling of the paint coating may too late discover it to be damp.

A test which is sometimes made to ascertain evidences of dampness in a cement floor is to lay a rubber mat on the surface. At the end of twenty-four hours, and sometimes much sooner, if the mat is removed that section of the floor just covered by the mat will be found to be darker in color, if any moisture is present. Such moisture, which would otherwise never be noticed, if imprisoned under a paint film with the active assistance of the lime in the cement would make short work of the paint. Under no circumstances should any paint or varnish coating be applied over a wet concrete floor, or a floor which is known to be wet at any season of the year. Water on top of a good, hard paint does little harm, but water getting behind and underneath a paint film causes blisters and peeling. This is a fundamental rule which should always be borne in mind when using paint coatings.

The greatest building activity in this country next year will be in the industrial states, according to a forecast of the building outlook made by the Committee on Statistics and Standards of the Chamber of Commerce of the United States.

It is pointed out by the committee that there will be a good many business buildings next year, and a large number of them will be in the shape of alterations and enlargements.

According to the committee, California leads the other states with respect to probable construction, while good likelihoods of construction lie in the Central West and in the East.
How to Use the Steel Square

MORE INFORMATION ON UNEVEN PITCHED ROOFS AND ABOUT BACKING HIP ROOFS

WHEN we began preparing the illustrations for our last article, it was with the intention of showing and saying all that we had to say on uneven pitched roofs, but before we got fairly started on our subject we found that it was stretching out beyond our first intention, so we just cut it in two and this is the other half. We could go on and show a lot more illustrations, but what is the use, since they all lead to the same thing and one is as good as another, as far as the results are concerned. When the principles involved are once mastered, the different applications of the steel square in solving the angles in roof framing become legion, and the master is monarch of all he surveys.

In Fig. 1 are shown three squares placed in such a way as to represent the run and rise of the common rafter and corresponding hip. Here the span is represented as being 20 feet 6 inches. By letting inches on the squares represent feet, the run of the common rafters will be at 10½ inches, as shown on the tongues of the squares Nos. 1 and 2. Now suppose the rise is 9 feet, the length of the common rafter will be 13 feet 5½ inches. The heels of these two squares are resting at the juncture of the runs of the hip and therefore act as a pivotal point for the heel of the third square, whose blade and tongue represent the runs of the hip. In this case, it being a square cornered building, the angle formed by the third square with that of the tongues of the other squares, will be of like proportions, as will be seen by the plate lines intersecting like figures on both the blade and tongue of the third square. Therefore 14½ inches represents that the run of the hip is 14 feet 6 inches. As a further proof of this illustration, set a compass with 10½ inches radius (the run of the common rafter), strike a semi-circle and it will catch the plate lines as shown. A 14½-inch radius catches the corners of the plate and this length transferred to the tongues of the two upper squares and a line from these figures to

![Fig. 1. Three Squares Placed so as to Represent Run and Rise of the Common Rafter and Corresponding Hip.](image1)

![Fig. 2. Same Principle as Shown in Fig. 1. Applied to Building Out of Square.](image2)
9 on the blade will represent the hip and is found to be 17 feet 3/4 inches.

In Fig. 2 is shown the same principle as given in the previous figure, applied to a building that is out of square. The simplest way to solve a problem of this kind, is to place the heel of square No. 3 on a center line and at a point that will allow the blade and tongue to intersect with the corners, as shown. In this example, the run of the common rafter being 10 feet 2 inches, the plate lines will intersect at 12 3/4 inches and 16 1/4 inches for the short and long side respectively. These lengths transferred to the tongues of the squares Nos. 1 and 2 represent the figures on those members to use. The rise in this example being 8 feet 3 inches, we take 8 1/2 inches on the blade, and by drawing lines from this point to 12 3/4 inches and 16 1/4 inches on the squares 1 and 2, will represent the length of the respective hips. The question now arises. How far from the corners of the plate is it to the seat of the common rafter? This is necessary to know, because these lengths and that of the common rafter will give the side cut of the jacks. The cut will be found on the side of the square that represents the length of the rafter. In the absence of a diagram, these lengths may be found as follows:

Since one side of the building is 5 feet longer than the other, take one-half of 5 feet, or 2 feet 6 inches, from 10 feet 2 inches (the run of the common rafter), leaves 7 feet 8 inches for that on the short side and 2 feet 6 inches added to 10 feet 2 inches, or 12 feet 8 inches, will be the length on the long side, which is the same as 7 feet 8 inches plus 5 feet, equals 12 feet 8 inches. For the side cut of the hip for the short side, take the run of the hip for the long side (16 1/4 inches) and the length of the hip for the short side and cut on the side of the square representing the length; vice versa for the long side.

Here is another diagram. It is for a square cornered building. See Fig. 3. The run of the common rafter is 11 feet 6 inches. In this example, the movement of the steel square is shown five times. Eleven and one-half inches is taken on both blade and tongue of the squares Nos. 1 and 2 and placed to intersect each other at these figures to represent the plan. To these are applied the squares Nos. 3 and 4 to represent the run and rise of the common rafter and No. 5 is applied with the tongue to the diagonal of the square formed by the first two to represent the run and rise of the hip. The rise being 8 feet 6 inches, we take 8 1/2 inches on the blades of Nos. 3, 4 and 5, and the lengths of the rafters can be found per scale of the lines representing the rafters.
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The Rising Decorating Co., is one of the largest and most successful operators in Chicago. They have built up their business by employing the best mechanics—using the best materials, and giving their customers the finest kind of service. Mr. Rising used Johnson's PerfecTone Under-Coat for finishing the interior of the beautiful new Drake Hotel at Chicago—one of the finest in the country. Johnson's PerfecTone Under-Coat was used only after exhaustive experiments and in comparison with numerous brands.

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JOHNSON'S PerfecTone Under-Coat is the perfect foundation for an enamel job—it is elastic, durable, non-porous, has great covering power, works freely under the brush and dries hard in 18 to 24 hours. It will not run, sag, lap, chip, check or peel. Has wonderful smoothness and opacity and will not absorb the enamel.

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How to Use Steel Square

[February, 1922]

Fig. 6. The Same Principle as Fig. 5 as to Unequal Pitches for the Square-Corner Building.

Note—This is a regular plan—i.e., where the building has right angled corners and the roof on all sides of like pitch, the divisions from the central point are of equal parts, as will be seen by the divisions of the circle, formed by Nos. 3, 4, and 5.

Now we will apply this formula to the building that is out of square as shown in Fig. 4. What we said in the previous figure in placing of the squares also applies to this example, except in this case the building being out of square necessitates a different set of figures to be used on the tongues of Nos. 1 and 2 from that on the blade, which remains 11 ½ inches because the run is 11 feet 6 inches. The figures on the tongues may be easily found by letting 11 ½ inches on the blades act as a pivotal point at the center and open up till the tongues form the required angle of the plates. The run of the hip is lengthened accordingly and being longer than the tongue, it is necessary to reverse the square—i.e., by letting the blade represent the long run, as shown by No. 5, and the figures intersected on the tongue by the plate line will represent the short run, as is proved by the semicircle. This being an irregular plan, see the difference in the division of the large circle.

In connection with this example, it might be well to show a graphical method for the backing of the hip. It applies to any angle cornered building.

Suppose we wish to find the backing lines on the hip for the acute corner, as shown in the last figure. Lay off a diagram of the plan, as formed by the squares 1 and 2, as shown in Fig. 5. Diagonally across this lay off the full thickness of the hip and square across its back at points where the hip lines intersect the plate, and the distance apart of these lines, as at A and B, will be the amount to set off along the seat cut line from the edge of the rafter to obtain the gauge line. In this case, the gauge lines are of like depth on each side.

Fig. 6 shows the same principle applied to unequal pitches for a square cornered building. In this the run on one side is 9 feet and on the other it is 14 feet. The gauge lines will be found as above by setting off A B on one side and C D on the other. This applies to any pitch given the roof and is therefore a general rule.

Design of Safe Construction

(Continued from page 109.)

Now consider joint 10, beginning with R, or f g. From F go to G. Thru G draw a line parallel to g v to meet a line thru F, parallel to f v. This locates V. Consideration of the rest of the truss shows V, M, T and S to coincide, showing no stress in v u, u t, t s.

The reader should now allow wind to blow on the other side of the roof and draw the stress diagram. Both sets of stresses should be tabulated, and the maximum stress in any particular member used in the design. It is possible that reversal of stresses may be found in the two cases.

Income Tax Facts

In making out his income tax return for 1921, the average taxpayer will find a considerable saving in comparison with the amount of tax paid on the same income of 1920.

The exemptions provided by the revenue act of 1921 are $1,000 for single persons (the term including widows, widowers, divorcees, and persons separated from husband and wife by mutual agreement), $2,500 for married persons whose net income was $5,000 or less, and $2,000 for married persons whose net income was $5,000 or more. Under the revenue act of 1918 the personal exemption allowed a married person was $2,000; regardless of the amount of net income. The personal exemption allowed a married person applies also to the head of a family, man or woman who supports in one household one or more relatives by blood, marriage, or adoption.

The exemptions for dependents—a person who receives his chief support from the taxpayer and who is under eighteen years of age or incapable of self-support because mentally or physically defective—is increased from $200 to $400.

The act requires that a return be filed by every single person whose net income for 1921 was $1,000 or more, every married person whose net income was $2,000 or more, and by every person—single or married—whose gross income was $5,000 or more.
This roofing stands the blow-torch test

Flexstone Shingles will stand up under the severe heat of the blow-torch. This proves how thoroughly fire-resistant they are. They are approved by Underwriters' Laboratories, Inc., in class B, and take base rates of insurance.

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The slate-covered Asbestos Shingle

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OTHER composition shingles are rag felt; Flexstone Asbestos Shingles are rock fabric, asbestos fibre, all-mineral and time-proof. They cost about the same as the ordinary kind. There is nothing in Flexstone Shingles to support decay, no vegetable or animal matter. They are fire-resistant and stiff-bodied, as you expect rock felt to be, and good to look at in their finish of red or green slate.

**WARNING—**

They look just like the others

Slate surfacing is a great leveler of composition shingles. They all look alike on the surface. Flexstone Shingles do not depend on the slate coating for their roofing value or fire-safety; the body of the shingle takes care of that—

asbestos fibres waterproofed with natural asphalt.

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Flexstone Shingles offer many of the merits of the well-known Johns-Manville rigid asbestos shingle at a price within a few cents of the ordinary rag felt shingle. There is no longer any reason why every house shouldn't have an asbestos roof.

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Flexstone is obtainable in three forms—individual shingles, strip shingles and in roll form as well.

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Hollow Brick Wall in England

By William Carver, Architect

Unlike the American building mechanic, who on the whole is now producing about as efficiently as before the war, the British workman is apparently turning out only about 75 per cent of his pre-war average. This opinion is based on a hasty tour of England a few weeks ago. The reason, as given by a contractor who served all thru the war, is that the years of army life which every able-bodied man was called upon to put in destroyed a great deal of personal initiative and the wholesale killing of his comrades acted in many cases to dull a man's ambition after he got out of the army. To find himself alive today is an unexpected fact to many a man and there are numbers of men who, prior to the war, were good steady workmen who are now content to get a few shillings ahead and then lay off until this is spent. Only time can cure this state of affairs.

In the meantime, however, England has succeeded in putting thru a comprehensive building program which is relieving the acute housing shortage which became apparent when hostilities ceased. The government, donating huge sums out of the public treasury, and operating thru the local authorities, has stimulated the building of many thousands of homes all over the country. From a narrow business viewpoint, which expects a rental showing a fair return upon the money invested, the government's project is a failure, inasmuch as all these homes were built when prices were at their maximum and must be let at very low rentals; but in a broader sense the new homes were a necessity and will pay at any price, the previous lack of housing manifesting itself in serious unrest.

But even at the heavy cost at which (for England) these houses were built, they may eventually prove a good business investment, for they are, without exception, built along traditional English lines of sound, permanent construction. Where stone is the prevailing local material, the walls are built of stone. In brick sections (and this covers almost the whole of England), the walls are of brick. Temporary construction has found no place in the British building program, and the groups of houses erected are well worthy to stand alongside their venerable neighbors, whose brick walls in many cases bear dates which bring back history book memories of almost forgotten kings and queens and quaint medieval personages. Dividing the cost of these houses by two or three hundred, the number of years which the majority of them will be habitable and serviceable, shows a yearly cost for investment which is so small as to be almost negligible and which would make the similar yearly cost of the typical American house of more perishable construction seem a riot of extravagance in comparison. Moreover, the masonry walls of the English houses will never require any outlay for upkeep.

The ideal wall is found in some parts of England. At Bridgewater, Somerset, for instance, is a terrace of about a dozen cottages of this construction, built sixty years ago. These cottages were visited on a rainy November afternoon. Approaching them, one was struck by the extremely attractive appearance of the brickwork, for the ideal wall, in common with all brickwork, acquires new beauty with the passing years. The occupants (some of whom had lived there many years) were unanimous in declaring that the cottages always had been comfortable and satisfactory in all weathers. Never, they declared, had any sign of dampness or moisture made its appearance on the inside of the walls, which are one brick thick, plastered directly upon the brick. Several ideal garden walls were also noted, one of which is illustrated here. It will be noted that this is laid in Ideal garden wall

Bricklayer's Scaffold in England. They Believe in Lumber Conservation Over There as You Can readily See in Picture.

This Picture, Which Shows How They Fasten Uprights and Cross-Poles with Nails. Nails Would Soon Wear Out the Poles and They Use the Same Scaffolds on More Than One Job.
“ANY time anybody shows me how to make three brick houses grow where only one grew before, I’ll grab it.

“’What if the Ideal wall does cut down the number of brick used on each job and makes the job run $300 to $400 less on material and labor?

“That’s to my advantage. It means a lot more of brickwork. Why? Because it lets me prove to people that a brick home costs less than any other kind.

“I’m able to offer good, old reliable brick construction—which everyone likes and which doesn’t require any painting and repairs and means less insurance—for the price of frame construction.

“It’s going big. Take a tip from me and any of you fellows who are not on to this kind of construction should get the facts and get in on the ground floor.”

The adjacent column describes this kind of Ideal wall construction about which Pat is so enthusiastic.

The Common Brick Industry of America

1306 Schofield Building

Cleveland, Ohio

What the Ideal Wall Means to Builders

It’s a fact, you can now produce brickwork—real-honest-to-goodness brick construction at a lower cost than less enduring and less attractive construction.

And it’s going to mean lots more work because everybody likes brickwork and when they find out they can get it for the price of frame, there’s going to be lots more of this work done.

The Ideal Wall saves one-third in cost of brickwork and makes brickwork the lowest in cost of any construction.

The brick—any standard brick—are laid on edge, as shown in the illustration, thus producing a wall which combines the advantages of the solid brick and hollow type at the lowest cost. Any mason can lay it.

In addition to the 8-inch wall shown, 12-inch and 16-inch thicknesses are obtained by different combinations—all simple and easily handled.

Be Sure to Secure This Important Information

Here’s a book that describes this construction. It’s called “Brick, How to Build and Estimate.” New, revised third edition. Thousands of builders are using this valuable manual. It’s full of data, tests, tables about brickwork. 25 cents postpaid.

Another book that’s a wonderful aid to contractors in interesting people in brickwork is “Brick for the Average Man’s Home”—72 pages. The variety of design and drawings in the 35 homes illustrated are very unusual. For all these designs complete working drawings are available at small cost. You’ll find this a decidedly valuable book. $1.00 postpaid. Send $1.25 to the Common Brick Manufacturers Association, 1306 Schofield Building, Cleveland, and receive both books. The nominal price asked is to cover printing and distribution costs only. You’ll never regret securing these valuable publications.
Ideal Brick Wall Surrounding One of the Old English Estates. This Type of Wall Is Not New, but It Is Just Beginning to Be Appreciated by American Builders.

ideal bond, three stretchers being followed by a header, the header on the next course centering over the space between the headers below. This particular wall was standing upon sloping ground and the courses followed this natural slope instead of being laid horizontal and the wall stepped off at the top, the usual practice here. The wall is about seven feet high and eight inches thick, with buttresses about every twelve feet. The buttresses, by the way, were perpendicular.

Even small cottages in England customarily have their gardens completely enclosed with brick walls. In the front gardens, too, there is usually a brick wall between adjoining property and most generally an iron rail with a gate toward the street. Many such garden walls are built one brick thick, but it is also common practice to build them of 4-inch brickwork, in the latter case the walls being 3 feet 6 inches in height with 9 by 9-inch pilasters about every 10 feet centers. The foundation is constructed according to the sketch, and it will be noted that frost is not a factor much reckoned with in England.

The writer examined many such walls, some of which had been standing upwards of fifty years. They form splendid protection for vegetation from sharp cold winds, and the walls upon which the sun shines provide a splendid surface on which to train vines. Nails are easily driven between the brick joints for this purpose, and the driving of such nails does not seem to injure the walls. The joints in older walls are sometimes full of nails. The writer had occasion to drive some nails into an old four-inch garden wall and was interested to note that the old wall rang as clear as a bell, the lime mortar with which it was built having become so hard as to practically make the whole wall monolithic.

Not only are exterior walls in English houses built of masonry, but interior partitions also are almost invariably constructed of brick, both on the first and second floors, such partitions being four inches thick. This construction is made possible because of the fact that owing to the universal system of heating with open fireplaces the first floor is as much cut up as the second by hallways and partitions, so that the second floor partitions can be located over those of the first floor. The fact that there is no basement further simplifies this feature. Four-inch brick partitions are in universal use in England for bearing and non-bearing partitions and for two and even more stories where each story height does not exceed fifteen feet. The interior plastering is placed directly on the brick.

To save shipping weight, many English brick are made with perforations extending thru the brick in the direction of its least dimension. Some brick contain as many as twenty holes.

Some of the cottages which were being built in various places along the South coast were built with cavity walls, consisting of two four-inch walls with a two-inch cavity, tied together with galvanized iron ties. Plastered directly on the brick, with no furring whatever, this construction is found entirely suitable for the most exposed localities.

Exterior and interior scaffolding is invariably used in England when constructing exterior walls, the brick being laid from both sides simultaneously, two men working as partners, one on each side of the wall. It will be noted from the photographs that the scaffold supports consist of round poles, which are tied together with ropes and are used on any number of jobs. There is quite a knack in building a scaffold in this manner so that the poles will be securely and yet snugly tied together. Note on the large scale photograph the newly applied coat of stucco on the brick backing.
Make Lasting Friends—

Of course you use many other things besides roofing. But there is nothing more important than roofing from the standpoint of dependability and quality.

When you lay dependable roofing, you win and hold the confidence of the men whose good-will is most essential to your business success. The roofing buyers, remember, are the substantial men of the community—the farmers, manufacturers and home owners. Barrett Everlastic Roofings are honest roofings from every standpoint. They're honest in quality, honest in prices, easy to lay. They build good-will, and safeguard your reputation.

Beside the popular, plain surfaced Everlastic "Rubber" Roofing, there are three other styles of Everlastic—two forms of shingles and a roll roofing, all with weather-resisting mineral surface in artistic, natural shades of red or green.

The Barrett Company

When writing advertisers please mention the American Builder
Believes Criticism of Blue Ribbon Home Unjust

To the Editor: Port Jefferson, N. Y.

In regard to Bro. Weber’s criticism on the Blue Ribbon Homes, I think he is unjust.

A good variety and assortment is shown each month in the AMERICAN BUILDER, and if our own “ideal” is not pictured this month it will probably be in the next issue.

I am building a Blue Ribbon Home for myself. When completed I will send you photo of it.

JOHN E. MURPHY.

Needs a Roof to Carry 14 Feet of Snow

To the Editor: Hood River, Ore.

While reading your answers to knotty questions in the AMERICAN BUILDER, the thought came to me that you might be able to be of some assistance in a problem we have in hand.

The writer is one of the members of a club which is to erect a clubhouse on the shores of Lost Lake, situated at the base of Mount Hood. This clubhouse will be a simple, rough building to be used for outing purposes merely and would want to be built as cheaply as possible for strength and durability. No attempt will be made to beautify it in any way. It is to be 16 by 32 in size.

The shores of Lost Lake frequently get a snowfall of 14 feet during a winter and the proposition is to build a roof to carry this load and at the same time have it reasonable in cost. Any suggestions will be appreciated.

P. S.—All material for the above job will have to be hauled by truck from Hood River, a distance of 25 miles.

EMMY LUMBER AND FUEL CO.

Suggestion for Bro. Mangan

To the Editor: Elberton, Ga.

I saw J. J. Mangan’s article in the October issue of the AMERICAN BUILDER, page 101, and had intended to send these sketches in last month, but have been too busy.

As you will note, I have increased the size of his house very little but have increased the number of necessary rooms. These changes will not cost an excessive amount as the main change will be in extending the roof up so as to cover rear addition to plan.

Siding can be used very nicely in this type of Colonial cottage. Green roof stain will add greatly to the appearance and a fresh coat of white paint. Use a Dutch Colonial design of blinds. Select one with some figure cut in the top center, as a half moon, goose or small animal. Round dormers on the roof will also add to the design. Remove old front porch and put down cement or tile terrace. Colonial entrance with hood with brackets is appropriate.

I merely offer this as a suggestion.

HUNTER J. PRICE, Designer.

Suggestion For Thresholds

To the Editor: Fort Morgan, Colo.

I enclose sketch of door threshold I have used for some time, hoping it may help to solve the swelling and curling of wood thresholds in brick buildings. With a concrete sill or basement doors, garages, etc., it works satisfactory if installed according to the sketch.

DAVID CREIGHTON.

Wants Furniture Polish Formula

San Antonio, Texas.

To the Editor:

Would you please be so kind as to give me a formula for making a good spirit furniture polish?

P. M. LONGORIA.
HANGER HARDWARE

for EVERY Special REQUIREMENT

there can be found in the Allith-Prouty lines some suitable adaptation. The builder who requires and demands excellence of material and workmanship, ingenious adaptability of design and extreme ease of installation and operation, finds in the A-P Trade Mark his guarantee of satisfaction.

Folding, Sliding Garage Doors

"1080" sets will hang 3, 4, 5 and 6 doors. Installations permit use of part or all of opening at once. Permit no sagging or binding and require only 12" headroom. Hangers are trolley-swivel type with vertical side rollers. Swivels operate on ball bearings, wheels on rollers. Both hangers and brackets are made of A-P malleable iron and can be locked to any adjustment. Used with No. 60X high carbon steel track which is designed with rounding wheel troughs.

"Reliable" Round Track and No. 2 Hangers

for parallel sliding doors assure a job that costs less to hang—that operates easiest year in and year out.

Hangers are one-piece malleable, heavily reinforced; double wheel type; upper wheel has machined tread, hardened steel axle. Roller bearings. Lower wheel absolutely prevents jamming or derailing.

No. 2 Round Track, heavy, high carbon steel, tube type, slotted for well reinforced malleable brackets. (Reliable Round Track and Hangers are an original basic Allith-Prouty design.)

Catalog No. 91 describing this and other garage door hardware will be sent by return mail.

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Catalog No. 90 contains 140 pages of Hanger Hardware, Light Hardware and Hardware Specialty items.

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"Satisfaction in Hardware"
Correspondence Department

How to Build Two Fireplaces in One Chimney
Bluffton, Ind.
To the Editor:
I would like some information as to the proper construction of two fireplaces on one chimney. Can this be done with satisfactory results? I want both fireplaces to burn either coal or wood and be of real use, one in the basement and one on the first floor. I am enclosing a rough sketch of the dimensions.
F. C. Waugh.

Thinks Our Explanation Satisfactory
Ashley, Md.
To the Editor:
I have read the letters in the correspondence department criticising the editor for not putting the estimated cost on house shown in the AMERICAN BUILDER and agree with the editor as to the variation in prices in different parts of country. But I would suggest that you print a bill of material of the house and then it would be easy to estimate the exact cost in each locality.
Herbert Walker.

How They Frame Barns in Pennsylvania
To the Editor: Fairfield, Pa.
I am sending you two photos of barn framing scenes showing how we do this work in Adams County Pa. Fig. 1 shows the barn under construction at the State Sanitarium at Sabillasville, and Fig. 2 shows a barn built in Fairfield, Adams County, Pa. The construction work in both cases was carried out by myself and son.
A. A. Tresler.

Repairing Concrete Dance Hall
To the Editor: Ashton, Iowa.
Here is a problem on which I would like a little information.
The local Knights of Columbus have formed a club and rented a basement, size 22 by 60 feet, for their clubrooms. We are contemplating putting a floor for dancing purposes.
The present floor will not answer the purpose, as the concrete is of a light mixture and has a rough surface and has several cracks the length and breadth of the floor. Could a new coat of concrete, possibly % inch or 1 inch thick be laid over the old floor so as to make a perfect bond?
All information in regard to strength of material, thickness and method of bonding, method of finishing and surfacing in order to make a good dance floor will be greatly appreciated.
Kindly state if this method, if practical, is better and cheaper than a wood floor of Y. P. edge grain boards 2% laid on 2 by 2 joist laid over the old concrete floor.
Frank G. Wellendorf.

Answer—The AMERICAN BUILDER has referred to us your letter requesting information on the construction of dance floors.
In repairing your present floor it is necessary to ascertain the cause of the floor cracking. If due to settlement and the possibility of further settling is removed the floor can readily be put in good condition by applying a new top course 1 inch thick composed of a mortar of one part Portland cement to two parts of sand. The cracks should be thoroly raked out and the floor cleaned free from all dust. In fact, it would be desirable that the present surface be roughened by means of a cold chisel or stone cutter's hammer. The bond between the old and the new concrete will depend entirely upon the old concrete being free from all dust, dirt or grease. After the floor has been sufficiently roughened it should be made wet and the new finishing coat applied. The mortar top should be mixed to a stiff consistency, struck off to the proper level and floated with a wooden float and then lightly steel troweled. The floor after finishing should be kept from drying out too rapidly in case the work is done in heated rooms. It can be either sprinkled occasionally with a very light stream of
BIRD'S NEPONSET BLACK BUILDING PAPER

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STAYS WATERPROOF
KEEPS OUT DRAFTS AND DAMPNESS
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Architects—R. C. Hunter & Bro.
301 5th Ave., N. Y. C.
water or covered with wet sand. This is further explained in the suggested specifications for concrete floors which is being sent to you under separate cover.

After the floor has become dried out, it can be treated with paraffin, wax dissolved in terpentine, followed by a coating of powdered wax worked into the floor in the same manner as a wooden floor is waxed and polished. Another method is to coat the surface with liquid soap which is worked up into a lather and worked into the floor by means of a scrubbing brush, after which an occasional application of powdered soap on the floor from time to time will serve to keep the surface in good shape. It might be that several applications of liquid soap will be necessary before the surface is filled sufficiently to provide a smooth surface which would be satisfactory for dancing.

The question as to whether it is cheaper to build a wooden floor or refinish the old concrete one is difficult to answer without knowing the cost of labor and material in your locality. However, it is our opinion that the concrete floor finished as suggested would cost but little more than the wooden floor and would be more satisfactory, due to smoothness and resistance to wear. We trust this will give you the desired information.

J. E. FREEMAN
Manager, Structural Bureau Portland Cement Association, Chicago, Ill.

**Correspondence Department**

**Designs and Builds Church**

To the Editor: Auburntown, Tenn.

I am sending a picture with a floor plan of the new Christian Church at Auburntown, Tenn. Auburntown is only a little village and is twenty miles from any railroad, which makes building some problem. Despite these disadvantages, I designed and built this church complete, including the seats, for $6,000.

As we are too far from any market to build with brick, and good framing timber is still plentiful in this country, we build mostly with wood. This church is a frame building with concrete foundation, 2 by 6 studs, storm sheathed with 1 by 8 rough lumber, and weatherboarded with poplar siding, rough ceiled and papered.

The seats are of the circular pattern and furnished by a Chicago concern.

C. M. COOPER, 
Building Contractor.

**Wants Details of Garage Roof Truss**

To the Editor: Orlando, Fla.

As a constant reader of your valuable publication, I am sending a sketch of truss which I wish to submit to your correspondence department. I have only 2 by 8's and 2 by 6's to use. The 2 by 8's are 30 feet long and are good yellow pine; trusses to be 12 feet apart.

This is to be used in a garage. Send me detail of the strongest way to build it and keep it as low as possible so as to make a safe roof.

J. A. HOLLENBECK.

**Building a Home in Spite of Obstacles**

To the Editor: Kane, Wyo.

I am enclosing photo of the house I recently built myself. The blocks look rather "dingy," as they had been piled up here for several years right on the ground.

The upper joists run over the wall to form the 20-inch projection and the rafters rest on the joists. I didn't like to put a return on the gables for the cornice on account of the sparrows using it for nests, so I enlarged the gable facia at the lower end, and it doesn't look bad. I made it a little larger than the lower cornice and let it stick out about 1 1/4 inches. The plates that carry the upper rafters project out over the wall and carry the gable facia. They are boxed up with two boards, and don't show much. I would have used brackets, but couldn't fasten them to the blocks very well.

The chimney at the other end of the house is just barely visible over the roof of the dormer. I didn't have enough corner blocks, so I sawed the ends off the common blocks. That makes them look white alongside of the others. The regular corner blocks are 8 inches by 8 inches by 2 feet. The regular cor-
WHEN you buy SHEET STEEL or TIN PLATES, the products of our great mills—you are buying the combined excellence of good materials and craftsmanship—wrought in by the skill of conscientious and trained workmen.

**KEYSTONE COPPER STEEL**

**Gives Lasting Wear and Greatest Rust Resistance**

For roofing, siding, gutters, spouting, eaves trough, sheet metal and tin work, use Keystone quality Galvanized Sheets and Roofing Tin Plates—Best for both builder and owner. Sold by leading metal merchants.

We manufacture Sheet and Tin Mill products for all purposes. Write for full information and our interesting Keystone booklets—also set of new and revised Weight Cards.

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Design and Plans of Historic Church

To the Editor:

North Tarrytown, N. Y.

Enclosed you will find a little sketch and framing plan of church that was built 1690. This church is the one Washington Irving wrote about in the Legend of Sleepy Hollow. The particular or most interesting thing to me is the framing of rafters. This is hewn timber, 12 by 12 oak, and the joints fit together like a glove at this late date. We have services in this church thru summer months.

The walls are field stone, laid in mud. The interior is natural wood finish with sounding bell over desk.

P. MINNERLY, Architect.

Information on Rafter Problems

To the Editor: Centralia, Ill.

Referring to the article of F. M. Williams in the September issue of framing a roof, I will give my version on the subject, which is so widely discussed.

F. M. W. says 12 on the blade and the rise on the tongue of the square give the lengths and cuts of the common rafter, and 17 on the blade, and the rise on the tongue give the length and cut of the hip, and incidentally the valley, as it is the same thing inverted, and then he is out of gas.

He doesn't tell us what figures to use to cut the bevel at the top of the hip, as there is undoubtedly a bevel cut unless the hip butts against an opposite.

Mr. Williams no doubt is in the same fix that a great many of us have been and are. He has not had this problem explained to him in such a way as to enable him to grasp and remember the reason why.

I will try to tell you as briefly as possible in a common sense way, avoiding all technicalities and hair-splitting details. The reason for 17 being the run of the hip is that 17 is the diagonal distance from 12 to 12. Measure this on your square and see if the hip or valley runs the diagonal of 12 and 12 inches to every foot run of the common rafter, and as your hip does not supposed extend above the roof, it consequently has the same rise per foot run of the common rafter.

For bevel cuts the following rule holds good for any pitch, assuming, of course, that it is an even pitch, or the rise the same all over the house. Uneven pitches is a subject by itself. To find the bevel cut of both hip and valley, and the jack and cripple rafters. (A cripple is a rafter without a seat cut, or one that does not reach the plate, as one from the valley to the ridge, or between valley and hip.) Measure on your square the distance from rise to run, this distance, and the run of the rafter will give you the bevel cut for any rafter, with the only difference, that on the hip and valley you cut on the short side, and for jacks and cripples you cut on long side.

For instance, if you had a half pitch, the bevel cut for your hip or valley would be: measure from 12, your rise, to 17, your run; distance, 20\%. Take 17 on tongue, 20\% on blade, cut on 17.

With jacks or cripple proceed the same way to find the length, only reverse the process, measure from 12, your rise, to 12, your run; distance, 17 (nearly). Take 12, your run on tongue, 17 on blade, cut on 17 on the blade.

For one-third pitch: Distance from 8 your rise, to 17 your run, on hip, distance 18\% on blade, cut on 17 or the tongue; for jacks or cripple, distance from 8 your rise, to 12, your run, 14\% on blade, cut on 14\% on blade.

AUG. C. SCHMIDT.
AMBLER
ASBESTOS BUILDING PRODUCTS

Fireproof, Waterproof, Attractive, Everlasting

Constructed of two of the most indestructible materials—long-fibre asbestos and Portland cement—Ambler Asbestos Building Lumber and Ambler Linabestos Wallboard give the contractor just what he needs for all jobs where permanent, fireproof, waterproof, low-insurance construction of good finish is required.

Grows stronger with age. Can be worked easily with ordinary tools. No painting required unless it is desired to change the permanent, restful, original colors made right in the body of the material.

Ambler Linabestos Wallboard comes in a permanent buff color of distinctive appearance and is made to fit standard joists—48x96 and 48x48.

Send the slip below for practical literature and specimens showing the application of Linabestos to the lining of kitchens, laundries, bathrooms, game rooms, libraries, wainscoting, etc., the use of Ambler Asbestos Building Lumber in half-timbering and all other outside paneling, trim, doors, etc.

Maybe you need right now the interesting information we are glad to give enterprising contractors on Ambler Asbestos Shingles and Ambler Asbestos Corrugated Roofing and Siding.

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I am interested in the items checked and welcome further information:

□ Ambler Asbestos Shingles. Write in three styles, four permanent colors—Newport Gray, Natural Slate, Red, and Green. Line roof to suit roof forming water-tight and fire-tight covering.

□ Ambler Asbestos Building Lumber. For siding, partitions, trim, doors, and wherever fire resistance is essential. Designed particularly for outside construction into a shingle or exterior lap siding, plus windows, doors, and heavy framing. In stock in 20 sizes.

□ Ambler Linabestos Wallboard. For interior construction only—wherever a superior, flame-proof, fire-resistant wallboard is needed.

Samples and literature showing reproductions of installations furnished without obligation.

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
New Device Proportions Batches

One of the newest developments in construction equipment is a device for more accurately measuring concrete aggregates into batches, resulting in more uniformly proportioned and stronger concrete and a saving in men and time. Two of the new machines are already in use by the Parklap Construction Co. on the Sherman Island Hydro-Electric development on the Hudson River for the International Paper Company. One of them is shown in the attached proof.

One cause for varying strength in concrete is the irregularity in quantities of fine materials delivered by volume measurement even with laboratory apparatus. In the field the quantities of fine material are even more uncertain and may be 10 to 12 per cent less than their apparent bulk. Sand "fluffs" or bulks according to its degree of fineness and moisture content. It is, therefore, almost impossible to measure batches accurately and uniformly by volume with the means usually available in the field.

The new proportioner overcomes these difficulties by measuring the aggregates by weight instead of by volume. Only one man is required to operate the mixer and the proportioner.

It is a steel panel of 3/4-inch plate so constructed that it can be framed into any standard bin. At the bottom of the panel are three openings fitted with bin gates. A center gate 18 x 12 inches is for stone. The 12 x 12-inch gates at each side are for sand and cement.

A shaft extending the width of the plate is supported by double ball bearings mounted in dust-proof split brackets. On this shaft are three cams, one operating each gate. These cams are adjustable so that they may trip their respective latches when the proper balance is obtained. Keyed to this shaft and mounted in the split brackets are bell cranks forming the scale beams. To the upper ends are attached cables running over pulleys to the counterpoises. From the lower ends is hung an auxiliary hopper discharging into the batch hopper of the mixer. The bell cranks being keyed to the shaft and connected together thru an endless cable at the upper point of the crank, act as a unit. The top channel, with its braces extending outward from the channel face, supports the guide for the counterpoises and the pulleys for the cable. Two of the counterpoises are normally seated on these angle braces while the third rests on the channel cradled in the table. By means of ropes leading from eye bolts fastened to the gates up thru pulleys supported in the top brace, thence to one side of the panel and thence to the operator, the latter is able, from one position, to open the various gates and operate the proportioner.

Three pans of sufficient size to take care of the counterweight necessary for weighing the sand, stone and cement, ride on a vertical shaft. The bottom pan is for stone, the middle pan for cement and the top for sand. The ratio between the weight in the pans and the weight of the material in the auxiliary hopper is one to five. Therefore, if it is desired to use 1,000 lbs. of stone in the batch, a counterweight of 200 lbs. is placed in the stone pan. Similarly, the weights of the upper two pans may be adjusted to give the correct weights of cement and sand desired.

To measure a batch the stone gate is opened and as the weight of the stone in the auxiliary hopper balances the weight in the bottom pan, the pan rises and a cam on the horizontal shaft automatically closes the gate on the stone bin. The cement gate is then opened. When the combined weight of the stone and cement in the auxiliary hopper balances the weight of the two lower pans, the pans rise and a second cam closes the gate. The same cycle takes place in operating the sand gate except that the weight of the material in the auxiliary hopper is one to five. Therefore, if it is desired to use 1,000 lbs. of stone in the batch, a counterweight of 200 lbs. is placed in the stone pan. Similarly, the weights of the upper two pans may be adjusted to give the correct weights of cement and sand desired.

New Stucco Machine

Mechanical application of stucco, like other mechanical methods, has its decided advantages over the manual method. That is one reason why builders in general will be interested in a new stucco machine which is now available. This stucco machine consists of a hopper into which stucco is poured. The mixture works down into the feeder in which there are located four spring steel blades. There are openings in the feeder thru which the stucco is forced by the

(Continued to page 136.)
The ideal exterior plaster finish for all classes of buildings. During the past fifteen years ASBESTONE Everlasting Stucco has gone forward step by step to a position of unquestioned leadership, due simply to the fact that it is undoubtedly the best Magnesite Stucco manufactured, and the service it has given its users.

It is fireproof, non-absorbing, water resisting, will last a lifetime. Can be applied to wood, cement, brick or stone, is not liable to crack, chip or warp. Its large and varied selection of artistic stone finishes makes it the ideal material for old or new buildings.

Cuts Fuel and Painting Bills
Consult your local dealer: if he is unable to supply you, write us direct.

Send for descriptive literature and free samples.

Franklyn R. Muller & Company
Magnesite Stucco and Composition Flooring Manufacturers
612 Madison Street  Waukegan, Ill.

Established 1926
ANNOUNCING
The new Improved Super-Surface
UPSON BOARD

The BLUE-Center identifies genuine Upson Board.
"The most beautiful board on the market"

SUPER-SURFACE Upson Board, pictured here, is the result of years of patient effort.

It marks the accomplishment of what was deemed the impossible—the pebbling of so hard a board as Upson Board.

It is really two surfaced boards in one! One side is smooth, without the lumps found in ordinary board, and adapted especially for enamel—while the other side has the beautiful "mat" or pebbled surface shown in this announcement. "Super" surface gives the soft, velvety mat finish so necessary for the proper use of flat paints.

Either side can be used!

All printing has been removed from both sides of Super-Surface Upson Board. The trademark appears only on the selvage. Big, ugly trademarks on either side are a thing of the past on good wall board.

The painting surface, even better than ever before—saves money for your buyers. Brush marks are practically eliminated. The paint-saving amounts to from $5 to $15 per room over ordinary boards. Upson Board thus becomes the cheapest board when applied and painted.

Your customers will be quick to detect the difference between this Super Surface and the rough, fuzzy surfaces of many boards. Some makers even seek to capitalize on your credulity by attempting to surround a lumpy, "felt-marked" surface with some fancy name.

In justice to yourself and your customers, insist on using genuine Blue-Center Upson Board. The blue center is your protection against worthless imitations.

Write today for a sample of Super-Surface Upson Board, and a sample of Upson Fibre-Tile for bathrooms, kitchens, restaurants, or barber shops.
What's New

Mechanical Stucco Machine for Applying Stucco to Walls. The Material Is Poured In Thru the Top and Sprayed Out by Turning the Handle on the Side.

blades into a cylinder. This cylinder is walled off entirely from the hopper to prevent any clogging. The stucco is then forced out of the cylinder and on to the building by the blades, which whirl around by means of a handle which the operator turns. This sprays the stucco evenly with no waste and without dropping the material on the ground.

The feeder plate can be regulated and adjusted so that only one opening can be used, thus regulating the width of the stucco spray. This is suitable for trimming up around windows and doors. The machine is very light in weight, about 10 3/4 lbs., and is suitable for all kinds of stucco.

New Fastener Overcomes Wallboard Objection

One of the big objections to the use of wallboard, the use of nails in the centers of panels, has been successfully overcome by the invention of a self-clinching fastener. This simple device consists of a thin piece of specially tempered steel about an inch square. From one side, and extending nearly to the center, is a slot for nailing the device to studs or furring. Four curved prongs and one straight one project from one face of the fastener.

It is the particular curve of the four curved prongs that gives the fastener the "self-clinching" part of its name.

In using these fasteners they are first nailed, about every nine inches, to studs or joists. The panel of wallboard to be applied is nailed firmly to one end (the top if on the wall or the end if on the ceiling).

A piece of 2 x 4 a couple of feet long, with slightly rounded edges to protect the face of the panel, is then placed on the panel directly over and in line with the fasteners. The 2 x 4 is struck a few heavy blows with a hammer. The panel is thus driven down hard onto the prongs of the fasteners. As the curved prongs enter the back of the panel of wall board, they automatically clinch, taking a bull dog grip on the fiber of the board. The straight prong holds the panel firmly, preventing it from shifting from side to side.

The fasteners are used only on intermediate studs. There is no indication of how the centers of panels are held in place. Yet tests have proved that one self-clinching fastener holds more firmly than nine finishing nails driven in to the square inch.

Since the face of the panel is not marred or disfigured in any way, there are no nails to countersink and no nail holes to fill before finishing—both tedious expensive jobs, and seldom done perfectly.

Small, Handy Bench Machine for Light Work

There has always been a real need for a small bench machine for handling light work in wood and soft metals which cannot be handled economically by the larger, heavier.

(Continued to page 144.)
PERFECT HEATING

The inconvenience, labor and dirty drudgery of adjusting a coal burning heating plant is one of the principal reasons why so many people prefer to live in apartments and hotels instead of maintaining a home of their own. This means less building of homes and more congestion in crowded, undersized apartment buildings.

Offer to install a Combustion Fuel Oil Burner for your prospective client and you will remove one of the greatest obstacles that stand between you and a contract.

BURNS FUEL OIL INSTEAD OF COAL IN ANY KIND OR MAKE OF HEATING PLANT

The Combustion Fuel Oil Burner is the most highly developed oil burner made. It burns cheap, low grade fuel oil in stead of kerosene, naphtha, distillate or any of the more expensive oils and is more economical to burn than coal.

The Architect, Contractor or Builder proves that he is progressive, alert and well informed on all building equipment when he recommends that his client install

THE COMBUSTION FUEL OIL BURNER

Can be installed in Hot Air, Hot Water, Steam or Vapor Heating plants with equally satisfactory results, regardless of whether the plant is old or new.

Dealers Notice: There is still some good territory open for General Representatives. Our proposition, to high caliber, financially responsible men is very attractive. Wire for particulars at once

THE COMBUSTION COMPANY

174 NORTH MICHIGAN AVE. CHICAGO, ILLINOIS

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
The old saying “there is nothing new under the sun” does not apply to the building field. Manufacturers of building materials and accessories are constantly improving old products and devising new ones to aid the contractor and architect.

Compare the factory of today with that of twenty years ago. They are in no way identical, yet they are both factories. Windows are responsible for the change.

The question that comes to mind in face of this remarkable transition is what effect will a new steel basement sash have upon the building of homes? This new steel sash is now being marketed for use in residences, stores and apartments.

It is built to admit 40 to 60 per cent more light than an ordinary wooden sash, this extra illumination being secured thru the use of narrow, solid rolled steel bars in both frame and sash, permitting the use of larger glass lights for brighter laundries and more sanitary cellars. This sash operates just like the ordinary basement window with which everyone is acquainted. It is hinged at the top and swings in. The fact that steel cannot warp removes the difficulty experienced by the average home owner in trying to open and close his basement windows in bad weather when the sash has become swollen or warped.

The new window is a complete unit, the frame and sash being machine fitted with heavy locks and hinges rigidly attached. Some have heavy steel spring locks that automatically lock the window when it is closed. Sash glazed with wire glass gives the best assurance of safety. Moreover when windows are glazed on the inside as they are in this steel sash it is impossible for a burglar to remove the pane which is quite simple...
Basement Windows in Steel

They Appeal to Owners, Architects, Engineers and Contractors Because:

- They cost no more than wood windows
- Admit 40% to 60% more light
- Afford protection from burglars
- Never warp nor stick
- Keep out mice and rats
- Are easy to screen
- Provide fire protection
- Last longer

They are very easy to install
Extra frames are unnecessary
Require no planing nor fitting of sash
Ventilators are removable
Hardware is attached
Save time in fitting
Come already painted

Ask Your Dealer
Our book showing how to install these windows in all types of buildings sent free on request

Detroit Steel Products Company
2213 East Grand Boulevard, Detroit
"World’s Largest Makers of Steel Windows"

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
New Steel Sash Gives Basement More Light

Light Area Provided by Old Style Wood Sash

Light Area Provided by This Framed Steel Sash

when putty is on the outside. There is an arrangement in some whereby a padlock may be used instead of the lock provided. This is to prevent burglars from cracking out a pane of glass near the lock and opening the window by reaching in. In sections where mice and rats are particularly troublesome this steel window will be found advantageous.

The steel basement window is glazed from the inside and the removable steel pivots or hinge pins makes it a simple matter to remove the sash from the frame to be sent away to be glazed. The sill member on the frame of a wood basement window slopes toward the outside. This makes it impossible to set the wood frame on a level wall and have it remain upright without bracing. The sill on steel window the narrower than wood is perfectly level and the window may therefore be set on the sill in a bed of mortar with the assurance that it will remain exactly as placed, no bracing being necessary. It is estimated this saves the carpenter at least ten minutes on every window.

Just at present the sash is made in types 2 and 3 lights each.

The windows are shipped without glass, but glazing clips are supplied, these being small wire clips, similar to those that have always been used in glazing steel sash.

The outside bars of the window are imbeded in the building construction in the way usually employed where steel sash is used. If desired the building construction may come up flush and tight against the window on both sides, and at top and bottom. Anchorage is then secured by means of four straight flat pieces of steel about 1 inch wide by 4 inches long. These are laid in the mortar joints in such a way that the ends extend about ½ inch into the frames at the jambs of the window. Two clips are used on each side and these are sufficient to anchor the window.

At last—A steel basement window
— that costs less than wood

TRUSCON
STEEL BASEMENT
WINDOWS

Home builders have always wanted an indestructible basement window like this.

A steel unit ready to install—no fitting of sash to a frame—no hinges and locks to buy—the Truscon Steel Basement Window is fully equipped. There are no extras. Double contact weathering makes it storm proof. It works just like ordinary sash.

Throw in the coal and wood—it does not hurt these rugged, steel, indestructible windows.

—And they actually cost less than wood.

More daylight for the basement

Truscon Steel Company, Youngstown, Ohio

There are Truscon Dealers Everywhere

Get figures before you build your next house

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
STANLEY Wrought Steel

DUPLEX LATCH

No. 1269

With this latch, the door may be operated easily from either side. It is recommended for use on doors of medium size where a small latch is required.

Length of bar, $8\frac{3}{4}''$
Length of escutcheon plate, $9\frac{1}{2}''$
Width, $2\frac{1}{2}''$
Handle, $7\frac{1}{2}''$ long; $\frac{3}{4}''$ wide
Ends of handle, $2\frac{3}{4}'' \times 1\frac{1}{2}''$ wide

Packed singly in box with $1'' \times 11$ R.H. screws for the handle plates, and $1\frac{1}{4}'' \times 11$ F.H. screws for all other parts. One extra flush catch or mortise strike included.
Advantages of Basement Steel Sash

(February, 1922)

Another Type Basement Steel Sash, Showing Permanent Lock Attacked.

Complete booklets showing construction and installation details, describing just how the window is to be installed, have been issued and are being widely distributed.

The manufacturers of the basement window have decided to market their product exclusively thru dealers, and believe that they see a market for many thousands of these windows in all types of residential, as well as industrial and commercial constructions.

Screens may be easily attached to the outside of the frame. Holes are tapped in the steel frame so that it is not necessary to make a special frame for the screen. This item is of importance to builders.

The feature which appeals most strongly to buyers, naturally, is the fact that prices on steel basement windows in standard sizes compare favorably with wood window prices. Wood prices have a wide range but on the average steel windows cost no more and frequently they actually cost less.

B

E careful in driving down hill. Do not go faster than in driving up hill.

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The Commercial Value of the Murphy Idea

Leading Contractors and Builders—whether building speculatively or directly under contract—have proved the "dollars and sense" value of the Murphy Idea. Murphy In-A-Dor Beds in an apartment or small house increase its value and salability.

The extra "selling points" which the Murphy In-A-Dor Bed gives you are of inestimable importance. For instance—both the housewife and husband will be impressed by the flexible advantages of the Murphy In-A-Dor Bed—the possibility of converting any room into a bed room—the saving in furnishing cost—as well as the added ease of housekeeping.

Our Technical Department is always at your disposal. Architects and builders have found it most valuable on account of our fund of practical ideas based on years of experience—and the time-saving features. This service is gratis. Ask for full information.

MURPHY DOOR BED COMPANY

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Detroit, Mich. 205 O'Connor St.
Seattle, Wash. 220 N. St. Paul St.
Kansas City, Mo. Crocker Building
New York City
Denver, Colo. 1140-42 Hanna Bldg.
San Francisco, Calif. 204 Peach Tree Arcade
Ottawa, Canada 915 E. Keating Ave.
Cleveland, Ohio 729 Second Ave.
Akron, O. 415 Fifth Ave.
St. Louis, Mo. 225 O'Connor St.

The MURPHY IN-A-DOR BED

There is only one "In-A-Dor" Bed "THE MURPHY"
Small Handy Bench Machine for Light Work

(Continued from page 136)

more expensive machines. The solution is offered in the form of a compact, serviceable machine combining grinder, polisher, buffer, sander, drill and saw. Its advent on the market will be noticed, no doubt, with interest by carpenters, contractors, cabinet makers, manual training schools and private shops. Its size and the fact that it is driven by a ¾ h.p. motor makes it particularly convenient and economical for this kind of work.

Altho only 10 inches in height and weighing 31 lbs., it is a precision machine handling 4 and 5-inch grinding wheels, 6-inch saws, 6 and 8-inch discs and ¾-inch chuck. The top is easily removed or tilted to 5 degrees for sawing and grinding.

Space-Saving Wardrobe for Wall Beds

The idea of space saving introduced by the wall or concealed bed is carried still further by the invention of a space-saving wardrobe designed especially for this type of bed. It is designed primarily for the recess type of wall bed where no closets are provided but can be used on any type as the illustration shows.

This wardrobe occupies the space between the tubing of the bed out of the way. It holds twelve hangers which can be quickly removed by bringing the rack forward on four pivot slides. When the bed is lowered the doors of this wardrobe close and the device is out of the way. The wardrobe is easily fastened to the bed by means of interlocking clamps. It swings automatically downward and upward away from the spring on four arms, the clothing falls into position without being wrinkled. It is made in three sizes, for the full, three-quarters, and twin bed, and is 36 inches from rack to base, allowing plenty of room for both men’s and women’s clothes.

This wardrobe is used in large apartment buildings and also in small homes where space is limited and none can be used for closet purposes.

A Profit Maker for Builders

GASTREAM radiators make the ideal heat for any type of building—stores, homes, offices, churches, theatres, etc.

They are particularly successful in bungalows and small residences eliminating the expense of basement excavation, chimney, and boiler. They can be sold on installment payments, allowing the user to enjoy their economy, freedom from dirt and the nuisance of ashes, and the trouble of stoking a furnace.

Each GASTREAM radiator is a steam heating plant in itself—utilizing gas for fuel. They are built for permanence and dependability, and there is nothing to get out of order or require attention.

Every building you put up must be heated. Let us tell you more about this modern way of heating, and put you in touch with GASTREAM users in your vicinity.

JAMES B. CLOW & SONS

General Offices: 534-546 S. Franklin St., Chicago

Sales offices in the principal cities
INSTALL Brasco COPPER STORE FRONTS

CONTRACTORS WANTED!

—to transform old store fronts into modern display fronts that will make the crowds Stop, Look and Buy.

Let us help you make more money in the year 1922. There are all kinds of prospects for new fronts right in your neighborhood, and we will help you land the contract if you will just look about you and scare up the prospect.

If you know of any building owner or storekeeper whose store front has gone out of date just send us his name and we will help you land the job of installation.

For complete information concerning Brasco copper store fronts use the coupon. Look us up in Sweet’s, page 728.

Brasco Manufacturing Co., 5029 S. Wabash Ave., CHICAGO

Please send me your FREE book on copper store fronts.

Name:________________________

Address:_______________________

City:__________________________ State:_____________________

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
The KULP FURNACE  
$82.00 Buys  
KULPS CAST IRON TRIPLE CASING  
20 in. Firepot Pipeless Complete  

Lumber Yard Blaze Stopped By Cement

A NEW and novel method of fighting fire was inaugurated by Fire Chief Davyes Troughton of Seneca, Kansas, at a recent blaze which threatened to destroy a lumber yard and adjoining property in Oneida, Kansas, and it was only through the prompt action of the chief in carrying out his new idea that the fire was controlled before it caused more serious damage. By using portland cement he not only conquered a threatening fire, but secured some excellent ideas for future fire fighting.

The Oneida fire had burned beyond control of the local department, and outside help had been called for. The Seneca department answered the call for help. What happened can best be described by Chief Troughton, who tells the story as follows:

"The town has no water system and no special fire equipment so we could only fight the fire with bucket brigades. I suggested the use of cement, there being plenty on hand, as a means of checking the fire, but my idea being new I had to back it up with forceful orders. I had dry cement scattered over the adjacent piles of lumber which were in immediate danger of catching fire, and had this wetted down by the bucket brigade. I had cement mixed with water, making it quite thin, and had this liquid cement thrown on the lumber which was ablaze. The effects were prompt and pleasing, even astonishing. Over 5,000 feet of lumber were afire when we began the use of the cement, but the spread of the blaze was checked almost immediately. No more caught fire, and within an hour and a half the blaze was extinguished. I attribute the saving of about a third of the lumber in this yard to the use of cement.

"The dry cement, which was thrown upon the lumber piles and wetted down, rendered that lumber impervious to fire. The fire did not catch in any of the piles so treated. It almost entirely stopped the flying of sparks and tinder, thus greatly reducing the danger of spreading fire. It caked over the fire, smothering it and shutting out the air so that combustion could not take place, thus more quickly and effectively extinguishing it than anything else available."

Another interesting use to which cement was put in this fire was in the case of a large tank of oil—about 400 gallons—in the cellar of one of the buildings. This open tank was ablaze and canned goods dropping into it were exploding and throwing burning oil about the building. Chief Troughton stated that several sacks of dry cement were thrown into the tank and the danger eliminated.

"Everyone was astonished by the results of the use of the cement," said Chief Troughton. "I believe that we could have made even more effective use of the cement had we had some means of forcibly throwing the liquid cement on the fire. We had great difficulty along this line, and were severely handicapped by lack of facilities, but I feel that by using the cement we stopped a fire which would otherwise have entirely destroyed the lumberyard and possibly other property."

Redwood Starred in Movie

WITHIN the next few months many thousands of Americans will make a film journey to northern California to see with their own eyes just how the famous Humboldt County Redwood is logged in the virgin forest, transported to Scotia, sawed in the mills, seasoned and finally sent forth into man's service. They will be guests of the Pacific Lumber Company at a showing of "Scotia, the Home of the Redwood," in moving pictures. The Pacific Lumber Company industry has just been filmed "from tree to train."

During January, special representatives of the Pacific Lumber Company at a showing of "Scotia, the Home of the Redwood," in moving pictures. The Pacific Lumber Company industry has just been filmed "from tree to train."
Send To-day — for Free Trial Lesson in Plan Reading

If you are ambitious to place yourself where you will earn more because you will be worth more, get this free lesson. It will show you how by studying in your spare time under the direction of the Chicago "Tech" experts, you can learn to handle big building jobs.

The man who knows how to work best with his head is the man who gets the big pay or makes the most out of his business. Don't be a "half-way" man—be an expert. Find out about the Chicago "Tech" way of training. No money to send for this lesson and full information. Just the coupon. Mail it today.

Can You Plan and Figure Costs—Make Estimates and Direct Building Construction?

Ask yourself this question—"How much do I know?" If you have to admit to yourself that you can't do the things which pay best, now is your time to get the practical training which will put you in the money making class. Hard work alone won't do it—it is what you know that determines the size of your income.

Make your start now. At least send for the free lesson and let us tell you all about the Chicago "Tech" way of training men in their spare time.

Complete Courses for Men in Building Trades

Chicago "Tech" Courses are planned for practical men who want to become better informed on subjects which apply to their daily work. No time is given to "fancy" studies or useless theories.

Some of the Subjects We Teach

Plan Reading. How to read a building plan. How to read dimensions. How to read detail drawings. How to lay out work from plans. How to stake out buildings. Practice in reading complete blue print plans from basement to roof, etc., etc. Many complete sets of blue print plans and specifications are furnished to the student.

Estimating. Figuring amount and cost of material. Estimating time and labor. How to figure carpenter work such as stairs, roofing, rafters, etc. Millwork, window and door frames, mouldings, cornices, etc. All about the steel square, lathing and plastering. Excavating. Brick, stone, and concrete work. Fireproofing. Glazing. Plumbing. Heating. Wiring, etc., etc.

Superintending. Methods of work on all classes of buildings. Uses and preparation of all kinds of material. Hiring and handling men. Also Special Courses in Architectural Drafting for Carpenters and Builders and in Plumbing and Heating and Ventilating—all taught by practical men.

Send the Coupon

Only the coupon and you get this free trial lesson. Not a penny to send, no promises to make, no obligation on you at all. We invite every ambitious man in the building trades—every man who wants to get more of the practical knowledge which makes a larger earning power to send for this lesson. It is absolutely free and with it we send complete information about our home study courses—and show how any man can get this training at small cost and on easy terms.

Mark X in coupon and mail it today.

Chicago Technical College
236 Chicago "Tech" Building Chicago, Illinois

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
ber Company took copies of the film on tours to all parts of the country. It will be exhibited at lumber dealers' conventions, before architects' societies, at Home Building Expositions, at gatherings of specialty manufacturers—before any group which is desirous of becoming better informed regarding the lumber that comes from the monarchs of all forests. Other copies of the picture will be sent abroad in order that inhabitants of other lands, too, may visit California and know Redwood. Japan is already viewing this picture.

It will be possible for specialty manufacturers, who use Redwood as a raw material, to obtain copies of the picture, or as many scenes as they wish, for use in their individual advertising campaigns.

"Scotia, the Home of Redwood," produced for the Pacific Lumber Company of Illinois, under the supervision of Austin I. Black, advertising manager, shows a panorama view of the town of Scotia, center of the Pacific Lumber Company activities. Then by "gasoline scooter" the traveler explores along one of the railroad lines which the company has built into the mountains. Transferring to an incline cable railroad, the traveler ascends a mile and a quarter into the clouds and comes to one of the logging camps. A giant tree is felled, the bark pried off with crowbars, the logs transported by high line across a wide valley and loaded onto cars for the trip down the incline and on to Scotia.

In the mills the audience sees the huge logs sawed into lumber and the lumber sawed into widths and lengths. The audience takes a monorail trip thru the air lines and storage yards where millions of feet of Redwood lumber are being seasoned. Then comes a visit to the Leaver Patented Process kilns which supplement curing by the air lines, enabling the company to meet market demands for long lengths and to give to short lengths that particular curing which will best fit them for each specialty manufacturing use.

In the planing mill the audience sees Redwood stock prepared to specification for various specialty uses—for caskets, incubators, tanks, ice cream cabinets, cigar boxes, etc. For the house builder the planing mill provides bevel siding, window and door frames, porch columns, balusters, etc., and shingles.

The picture ends with a visit to Fields Landing, Humboldt Bay, California, where are seen the Pacific Lumber Company's tide-water yards and wharves for foreign shipping.

**Building Conference Plans Standard Construction Contracts**

STANDARIZATION of construction contracts, a goal towards which all far-sighted men in the industry have been looking for the last twenty years, seems destined to be achieved at last through the united efforts of a "conference" held in Washington, D. C., recently.

This conference was composed of delegates appointed by eight national societies representing the engineers, architects and contractors of the United States, and the definite plan adopted was one which would ultimately produce a standard form of contract "agreement" which would be acceptable in all sections of the country and in all phases of this huge industry which now ranks second only to agriculture in national magnitude.

Every contractor and owner who has wrestled with the intricacies of a contract or worried over the exact yet doubtful meaning of its many complicated and legalized phrases will approve this first attempt to frame in simple English an equitable and universal document.

A survey of the situation made by Brigadier-General R. C. Marshall, Jr., chief of the Construction Division, U. S. Army, during the world war, disclosed the fact that today there are...
They never curl —
and Carpenters rely on them

THE Carpenter, contractor, or builder who applies Carey Asfaltslate Shingles knows that they will give satisfaction and lead to future business for him. Experience and careful investigation have proved to those in the trade and to home owners in every part of the country that Carey Asfaltslate Shingles will and do stay flat. They lie just as flat and are as attractive after many years of service as in the beginning. Every year brings in new records of service which Carey Asfaltslate Shingles are giving, and every year adds many more satisfied customers to those who have learned the meaning of Carey quality.

Write for Samples of Carey Standard Shingles (Underwriters' Standard) and Carey Asfaltslate Shingles (that are 10% to 20% above Underwriters' Standard and the shingles that never curl).

“A Roof for Every Building”

THE PHILIP CAREY COMPANY
510-530 Wayne Avenue, Lockland - - Cincinnati, Ohio
in common use throughout the construction industry over 200 different forms of contract.

Expert engineers at the headquarters of the Associated General Contractors of America in Washington were then assigned to the task of analyzing these 200 different forms in order to discover whether the variety of “jobs” involved required any such variety of forms.

After many months of painstaking comparison and research W. P. Christie, in charge of this work as research engineer for the Associated General Contractors, reported that the differences were chiefly superficial differences of words and phrasing rather than differences of meaning or stipulations, and that at least two-thirds of all the provisions contained in each of the 200 documents were common to all documents and therefore could be included in one standard contract form, if rewritten in simple universal style.

In this way it would be quite possible to draft a Standard Contract which would cover all cases of construction work, no matter in what field, and the only alteration that would ever need to be made to it would be in selecting the standard form of “General Conditions” which covered the type of job concerned. Experts believed that a half dozen such forms would cover the main subdivisions involved in the construction industry.

The aim of the conference in beginning work on this difficult task is to achieve the following advantages for the entire construction industry and all its affiliations:

(1) Less expenditure and legal service.
(2) Less duplication of work in the professions.
(3) Elimination of disputes.
(4) Better safeguard for owners and increased public confidence.
(5) An improved standard of construction service through the country.

Secretary Hoover, in addressing the Conference, said, in part:

“This Conference is to consider whether something can be done to standardize * * * or generally improve the whole basis of contract forms used in the construction industry.

“I believe there is a great field there, not only in protection to the public but in the general improvement of ethics in the industry itself.

“I know that at the time I was in engineering work this whole variation and specification of the contract basis for construction work of all kinds was an outstanding sore and I have been in hopes that it was possible to do something.

“It all comes in line with the things many of us are much concerned with, and that is fundamentally the elimination of waste, loss motion, improvement of business practices through the whole of the United States.”

1921 Building Gains

TOTAL expenditure for building throughout the country for the year 1921 was $1,595,163,192, a gain of 14.9 per cent over the record year of 1920, according to Bradstreet's Reports from 150 cities showed that $120,994,839 had been expended for building in December, a gain of 112.8 per cent over December, 1920.

THE American Concrete Institute will hold its annual convention at Cleveland, O., on Feb. 13-16. Some of the subjects to be discussed at length are Concrete Roads, Houses, Concrete Products Manufacture, Practical Field Problems, Engineering Design and Inspection.
Why waste extensive building space for old-fashioned dark, inaccessible closets? Build your houses the space-saving way made possible by the use of Rite-Way Garment Fixtures. In the plan above, the builder cut 6 feet off the length of the house without changing the size of a single room. He saved $168.00 in material and labor.

**You Can Save Your Customer Money On His New Home**

by installing the Rite-Way space saving closet fixtures. They save hundreds of dollars in the small home, thousands in large apartments.

By using Rite-Way Garment Fixtures you not only save on building cost by reducing closet space but you actually increase closet-capacity. More clothes can be kept in better condition in the Rite-Way closet.

No more groping about in the dark for clothes that you cannot find. Like magic, a touch brings the wardrobe out before you into the light and air. Dark closets are dust collectors, the haven of destroying moths. The Rite-Way System protects the clothes. The carrier works on fiber rollers that will not rust or stick. It carries a heavy weight and pulls out easily without noise.

Put the Rite-Way Garment Fixtures in old homes that you are remodeling.

**Here's another money saver**

Nu-Jamb save at least $1.50 on each application because no hanging strip is required. They fasten directly to the jamb giving the door far more solid support and can be more easily and quickly applied. Lawson hinges are adaptable to all standard constructions.
S. C. Johnson Company Opens English Factory

S. C. JOHNSON & SON, Racine, Wis., recently opened a new factory in West Drayton, Middlesex, England, the firm name of which is S. C. Johnson & Son, Ltd. Mr. A. B. Carey, who has been with the domestic firm for nearly 20 years, is resident manager of the new firm. This is a private company, registered Nov. 14, 1921. The capital is £75,000 ($375,000). The entire line of Johnson's artistic wood finishes will hereafter be manufactured in West Drayton.

The English factory is completely equipped and the sales force thoroly organized. Seven salesmen are already covering the British Isles.

New Rural Engineering Course at Virginia College

A DEPARTMENT of Agricultural Engineering has recently been organized at the Virginia Polytechnic Institute (State Agricultural College), and a four-year course in agricultural engineering will be started in September, 1922.

This department is interested in getting catalogues and other descriptive matter from all companies manufacturing farm equipment.

New V-W Chicago Office

THE V-W Ventilator Co., Cincinnati, Ohio, has opened a branch office at 714 Reaper Block, Chicago, with Messrs. Abt & Powers in charge. They will handle the complete line of ventilators for windows, sash bars, door panels, transoms, cars and moving vehicles.

INCREASE YOUR INCOME $5000 IN 1922

Enter a Business for Yourself—Sell and Install Weatherstrip

An opportunity for the established contractor to add a good paying line or for the man who wants to get into a business for himself.

During the past year many of our agents made fine incomes. In normal times they will make more.

Very little money and no experience is required to sell and install Allmetal Weatherstrip. By our sales co-operative plan we help you to land contracts.

It will cost you nothing to investigate this attractive money-making field.

Write for complete information

ALLMETAL WEATHERSTRIP CO.
124 W. Kinzie Street
CHICAGO
Its labor-saving portability is just one of the reasons why the Rex is the best building mixer you can buy. Our catalog describes other Rex advantages. Send for a copy.

REX MIXERS
CHAIN BELT COMPANY, MILWAUKEE
Branch Offices and Representatives in Principal Cities in the United States and Abroad

Here's the Engine for the Contractor

Study the special features of the FULLER & JOHNSON Model "N" Gasoline Engine, as shown on this chart, and see for yourself why this engine is the proper one for operating contractors' construction machinery, such as concrete mixers, saw rigs, conveyors, pumps or hoists.

It is the engine that will stand up under hard, continuous use month after month and year after year. Simple in design; easy to start; perfectly balanced; big surplus overrated horsepower, uniform speed under all loads.

That's why leading contractors are now specifying the FULLER & JOHNSON Model "N." It will pay you to know more about this remarkable engine. Write today for descriptive catalog of Model "N."

Established 1840 FULLER & JOHNSON MFG. CO.
10 Rector Street
Madison Wis., U. S. A.
Advantages of Standardization

There is plenty of room for standardization in the building industry, both in the actual process of construction and in the manufacture of material. A movement fostered by Secretary Hoover to standardize building codes has received quite an impetus and will eventually eliminate some of the obstacles which now interfere with building work in many communities. Standardized materials will eliminate waste and effect an economy that will go far toward stimulating building.

For standardization in any industry stabilizes production and employment, since it allows the manufacturer to accumulate stock during periods of slack orders which he cannot safely do with an unstandardized product.

It reduces selling; enables buyer and seller to speak the same language and promotes fairness in competition.

It lowers unit costs to the public by making mass production possible and decreases litigation and other factors tending to disorganize industry, the burden of all which ultimately falls upon the public. It helps to eliminate practices which are merely the result of accident or tradition and which impede development.

Any movement that will promote more cordial cooperation among the industries in the building field will go a long way in reducing the cost of the process and improving the finished product.

---

New Drum Mixer Now Being Manufactured by Austin Co.

**Austin Announces New Mixers**

The Austin Machinery Corporation, Chicago, have just announced another addition to their line of contractors' equipment in the form of a complete line of popular-priced drum mixers.

Heretofore the Austin mixers have been of the cube design, the mixing being accomplished without the aid of blades or paddles, simply by throwing the batch from plane to plane with a force varying according to the speed of revolution.

The new mixers will be supplied in all standard sizes from one-half bag to two yards, and the paver in sizes from one-half yard to two yards.
We can give you rock bottom prices on all kinds of tiles and mosaics for every purpose.

RICH RED QUARRY TILE
The large Red Tile, so popular for Sun Porches, Terraces, Per-
golas, Fire Places, etc. Made from shale and burned to vitri-
fication, they are dense and impervious, and do not absorb
stains or dirt. Our quarry tile are guaranteed to be free from
defect. They are made in rich, natural reds; also in ivory and
grey.

Write for
FREE BOOKLET
"How to Set Tile"

WHITE GLAZED WALL TILE
The ideal covering for bathroom walls. Once set it never needs re-
pair or upkeep.
Mosaics for floors can be had in a
great variety of designs. Some of
these designs are shown in our pam-
phlet which we will send on request.
We can supply any kind of tile.
Write for prices.

CHAS. F.
LORENZEN & CO.
521-23 W. Monroe Street
CHICAGO

UNION METAL COLUMNS

for Porches
Entrances to thousands of homes
and public buildings are made per-
manently beautiful by the use of these
classic, fluted columns. No splitting,
no rotting, reasonable cost, sizes 5
feet to 32 feet high.

for Remodeling
Union Metal Columns are widely
used for rebuilding porches and re-
placing split and rotted wood columns.
Home owners always welcome them
as a relief from wood column troubl-
Conferences on Electrical Slate Held in Washington

WIDESPREAD interest is being shown in the work of standardization which the Structural Service Bureau of Philadelphia is now doing for the slate industry of Pennsylvania thru the Structural Slate Company, an organization representing the majority of the slate quarries in this region. A specification for slate suitable for electrical uses is being developed from a series of tests upon the physical, chemical and electrical properties of slate, performed at Lehigh University. Conferences are being called to discuss the results of the tests and the minimum requirements which should be stated within the specification. This specification is being submitted to the American Society for Testing Materials, the American Institute of Electrical Engineers, and the Underwriters' Laboratories, in the hope that it will eventually be developed into a national standard specification to be used by the slate and electrical industries and all others interested in the use of this material.

The result of these conferences will eventually prove to be of inestimable value to the producers of building construction and related materials in the United States.

+ The Calendar Crop

THE beginning of each new year brings to the office of the American Builder a new crop of calendars. They are sure of a glad welcome because of their many artistic and novel features. Listed below are some that have been received, with a short description of each:

Radford Publications—Twelve-sheet, four-color offset, bird's-eye panorama patented calendar, showing a representative street thru town and country along which are built the most modern homes, stores, theaters, and farm buildings, barns and garages. This calendar is distributed thru the best lumber dealer in each community, and he is also supplied with twenty sheets of blue prints showing in detail the construction of the 46 buildings illustrated.

Lehigh Portland Cement Co., Allentown, Pa.—Large single sheet calendar in colors with large figure pad in alternating colors. Each sheet on calendar pad contains map of the United States showing location of various Lehigh mills, also small sections showing preceding and succeeding months.

Sandusky Cement Co., Cleveland, O.—Single sheet with calendar pad. Attractive drawing in colors of beautiful home of brick and Medusa cement stucco with trade name Medusa across top. Small decorative detail sketches are inserted in lower margins.


F. E. Myers & Bro., Ashland, O.—A long wall calendar similar to the style so familiar to the friends of this company, illustrating Myers' line of pumps, hay unloading tools, door hangers, etc. This type of calendar has been distributed by the company for thirty years to thousands of customers and dealers. This year an attractive picture of a pretty girl drinking water from a Myers' pump is shown at the top with the familiar slogan, "Take your hat off to the Myers."

Curtis Door and Sash Co., Chicago, Ill.—Twelve-sheet, two-color calendar with Curtis trademark across top and one month on each sheet. Preceding and succeeding months are also shown in miniature on each sheet.

Made on the job
Granite Stone
Stucco
Water Proof

Made of Portland Cement and other materials cheaply obtained locally at a cost of 45c per sack. With our method of mixing and applying no other contractors can compete with you. Any ordinary workman can do the finest of Pebble Dash stucco.

Send for further information and sample
E. W. Holmes Pebble Dash Company
Princeton, Illinois

The American Builder

Circulation of this issue, 45,000 copies.

Publishes More Pages of Advertising
Has the Largest Number of Advertisers
Many Thousand More Subscribers
Than All Other Building Papers
Combined.
"I recently bid on a building here and it being a parsonage for the M. E. Church. I figured very close for them. After estimating the various parts of the work, I cut the bill $50 and charged it up to my Eveready, knowing it would save me that. I put the contract and made a profit on it."

WALTER B. MOORE
Cavour, So. Dakota

Any building that requires much sawing can be erected at a lower cost by a contractor who owns an Oshkosh Eveready Saw Rig. This handy, portable outfit performs twelve important woodworking operations, eliminating hand sawing almost entirely. It does the work of at least two skilled carpenters on every job with a worthwhile saving in time and labor expense.

Aside from ordinary sawing jobs, the Eveready is specially fitted for doing outside trim and inside finish, stair work, window and door frames, panel work, rabbeting jambs, making cupboard doors and medicine cabinets. Makes a profit for you in winter or on bad days, turning out frames, sash and trim in your work shop. An Eveready is economical—costs but a few cents a day for power. Many contractors who have used an Eveready for six or seven years have spent less than a dollar for repairs.

Let us send you our "Book of Evidence". It tells you what Eveready users think of this husky saw rig.

OSHKOSH MFG. CO.
100 Amber Street
OSHKOSH, WISCONSIN
The Speed Marvel

It does such an abundance of work so economically it has been the means by which hundreds of contractors have saved money.

Hutchinson Lightning Woodworker

This machine, buzzing away on your jobs, turns out as much cut lumber in an hour as two men do in a day. It is a complete portable planing mill. It is not just a "saw table." It is a swing saw. It is a parallel saw. It is a big, sturdy miter box that will cut and dado at any angle. It cross cuts, rips, planes, miters, joins, bores, rabbets, grooves, sands and grinds.

While doing this versatile work it is turning time into money and saved man power. You pay for the Speed Marvel whether you buy or not. You will be interested to know about its accomplishments for others and how it will cut costs and prove a wonderful investment for you.

Write for catalog

HUTCHINSON MANUFACTURING CO., Inc.
601 Lafayette St., Norristown, Pa.
Portable Saw Rig No. 16

A NEW MODEL

This No. 16 Portable Saw Rig is the very latest and newest triumph in a combination portable woodworker. It is an outfit all self-contained, ready to operate anywhere, either out on the job or in the shop. It is a combination machine with rip and cross cut saws, right hand operated 12-inch jointer, hollow-chisel mortising and boring attachment, 27-inch band saw, sander, emery wheel and dado head.

Each attachment is individually controlled by clutch. The frame construction of the table is made up of a hot riveted frame, with a steel plate table that has the edges turned down to stiffen the plate. The ripping capacity of this mill is very fast. This is due to the fact that a four cylinder gasoline engine is mounted in this Rig and runs with absolutely no vibration.

This No. 16 Outfit is an improvement over our No. 6 Combination Woodworker, 800 of which are now successfully being operated in the shop and on the job.

Four views of this new Outfit are being shown here, and four men can operate this machine at one time without interfering with each other. It has a ripping capacity of 6-inch lumber, more power than is needed.

Write for our new Portable Saw Rig Bulletin No. 1 describing our six sizes of saw tables. Also our Bulletin No. 2—Power Pumps, Bulletin No. 3—Hoists, Elevator, Mortar Mixers, Bulletin No. 4—Tractors for road and industrial work.

C. H. & E. Manufacturing Co.
322 Mineral St., Milwaukee, Wis.
BACK TO PRE-WAR PRICES

Underslung rip saw, overhead cross cut that works like a swing saw. Boves, mitres, dados, rabbets, planes, moulds, rips and joints on the bevel, makes jackrafters, fire cuts, houses stair strings, and every other cut necessary in building.

Will rip 4 inches thick, without over-load.

No power wasted on countershaft.

A portable universal woodworker driven by special electric motors, developing 31/2 H.P. Can be run from any lamp socket on ordinary house circuit. Catalogue on request.

Designed to be taken right on the job

THE WOODWORKER MANUFACTURING CO.
Cor. Brush and Congress Sts.
DETROIT, MICHIGAN
LOOK!

Here is a New Universal Woodworker at a price which beats everything else on the market.

FAMOUS No. 30 JUNIOR

The FAMOUS line of woodworking machinery has always been the first to incorporate into itself the needs of the trade.

Hence the introduction of the New FAMOUS No. 30 Junior Universal Woodworker. It is built for the man who does not need a larger, heavier machine.

But in building the FAMOUS No. 30 Junior no particle of FAMOUS quality has been omitted. It acknowledges no superior but its own larger relatives of the FAMOUS line.

*Be the first in your community to secure the advantages and profits which this machine will bring you*

The No. 30 Junior carries 27 inch Band Saw, 12 inch Jointer, Reversible Shaper, a Rip and Cut-off Saw Table of ample size and capacity and a boring attachment.

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Write for Catalog No. 77 that illustrates and describes our full line of woodworking machinery.

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"AMERICAN"
Woodworking Machinery
"That machine keeps my boys hustling —"

There's no messing around now when the job calls for a little concrete work. Since I canned the shovel-and-hoe method and got this new Ransome 4-S Bantam concrete jobs are about the fastest thing we do.

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The mechanical reasons why the Ransome Bantam "shoots out mighty good mix" in either concrete or mortar, and "keeps going" are told in Bulletin No. 103. Write for copy.

Ransome Bantam Type CONCRETE MIXERS

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Manufacturers of Mixers, Pavers, Pneumatic Mixers, Chuting Plants, Hoist Buckets, Bins, Cars, Carts, Etc.

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Get Your Share of this Spring's Business

The Dependable Speed of the Jaeger Will Help You Land Many a Job This Spring—and Put It Through—MOST PROFITABLY

There's going to be plenty of jobs this spring to figure on—depend on that. And whether you get your share of this business gets right down to one important factor—the speed of your mixer.

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IT takes a mixer with guts to stand the gaff of heavy-duty operation day in and day out, week after week, job after job.

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Bar Benders

Bar Cutters
Sizes 21 and 14 cu. ft. mixed material—four cylinder truck and tractor type gasoline motor.

Sizes 4, 5, 7, 14 and 21 cu. ft. mixed material—on skids with batch hopper and electric motor.

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Our Wolverine one-bag capacity mixer equipped with 5 HP horizontal gasoline engine with magneto—engine housing—power loader—measuring tank—sells for $750.00 complete f. o. b. factory—low charger $550.00.

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Combination Swing Cut-off and Ripping Machine

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The CROPP will keep your wheelbarrow gang busy. Look at the wide open drum—wider than a wheelbarrow—no delay nor spilled material in loading.

CHARGING—An upward lift of the wheelbarrow and the load is in the drum, where the blades with their 3-way action give a quick and thorough mix.

Discharging high and rapid—a wheelbarrow at each revolution. Discharge chute 30 inches above ground. No need to block up the machine.

Before you buy your equipment, write for the price and complete information on a Cropp low charging mixer.

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Desirable territory still open for active representatives.
DUNN SHOVEL MIXER
PORTABLE
For Mixing
Concrete
Mortar
Plaster

There's nothing new in the principle of the Dunn Shovel Mixer—mixing by shovels is as old as Adam. We have simply applied the principle in a scientific way, making it practical for the present day contractor.

There's nothing mysterious about the Dunn Shovel Mixer—it mixes right before your eyes. You see the shovels scooping the material up from the bottom and flopping it over a hundred times a minute. Simple, but positive mixing.

Watching the batch swirl around makes you think of so many plows at work, or some big spoons stirring, or a group of hoes dragging through it. Every conceivable mixing action is utilized.

The Dunn Shovel Mixer does its work much better than the revolving drum mixers you are familiar with—at least 20% stronger concrete is produced by actual test.

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Mounted on trucks, it makes a portable outfit which every contractor can use for mixing concrete, mortar or plaster.

At the low price which a Dunn Shovel Mixer sells for, no contractor should content himself with an ordinary mixer. We have a way of selling these mixers which will appeal to you. Write for our proposition.

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This machine also makes The Celebrated Two-piece Wall Blocks. For complete information, prices and specifications just write a postal asking for the FREE booklet.

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Write for This Book  
It tells you all about the Helm propositions

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Introducing The Latest

Ideal All-Automatic Building Tile Machine

An exceedingly strong and serviceable machine built on a flat cast iron base upon which all parts are mounted, which insures perfect alignment. And work is just as perfect, the construction providing every opportunity for the production of high-grade tile QUICK.

The machine is entire and absolutely automatic. Only three men are required to operate it; one on mixer at back, and two to place empty pallets in the machine and carry away the full pallet. Three tile—5x8x12"—are made at one time, being delivered on a single wooden pallet.

The machine is speedy—a single cycle taking between 20 and 25 seconds and turning out the three tile—and it is flexible—for by changing the three stripping plates and the cores, the dimensions of tile can be altered.

All in all, the new IDEAL All-Automatic Building Tile Machine is a wonder—and it is going to revolutionize the making of tile. Will you be the first in your community to use it, get the edge on competition and go over the top this Spring? If so,

Write Us Today To Send More Information

The Ideal
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Do You Want An Engine On Your Equipment That Will Last As Long As the Machine?

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ENGINES

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Color — Walnut and Old Ivory

Costs only one dollar more than an ordinary door

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Wholesale stocks of Miracle Doors carried in thirty-five cities. For sale by all dealers or write us direct. Catalogs are ready for distribution.

By invitation, we are the sole Gold Medal Door Exhibitor in the Smithsonian Institute, Washington, D.C.

Paine Lumber Company, Ltd. Oshkosh, Wisconsin, U. S. A.
The Miracle Door

Color—Brown Mahogany and Old Ivory.
Costs only one dollar more than an ordinary door.

Paine Lumber Company, Ltd. Oshkosh, Wisconsin, U.S.A.
The Miracle Door costs only one dollar more than an ordinary door.

The Miracle Door is everything its name implies in quality, construction and price. It combines the simplicity of a one panel door with the richness of a moulded door. It is a cabinet shop product at the price of a stock door. It harmonizes with all styles of trim and all colors of finish. Like all Paine products it is fully guaranteed.

Wholesale stocks of Miracle Doors carried in thirty-five cities. For sale by all dealers or write us direct. Catalogs are ready for distribution.

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Paine Lumber Company, Ltd.
Oshkosh, Wisconsin, U. S. A.
An Extremely Fast Discharging "One Bag" Mixer for Bridge Builders and General Contractors

Over 6000 Contractors, Road Builders and Engineers use

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Write for the big Catalog just off the press—Get our new low 1922 prices and terms.

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Famous Combination Building and Paving Mixer

A Compact, Sturdy, High Drum One-Bag Outfit for Bridge Work, Alleys, Streets or General Work.

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If speed and perfection of mix spell greater profits to you in your 1922 concrete work, you will want to know all about AUSTIN Cube Mixers. Through the cube-mixing principle of folding and kneading the materials uniformly together beneath a full batch pressure, you secure quality concrete—in minimum time.

*Mixer Catalog U-7 gives full description*

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Built in four sizes, 3, 4, 5, 7 cubic feet mixed concrete per batch. There is a WONDER Mixer especially adapted for your work, whether large or small, available for IMMEDIATE shipment from our nearest to you distributing point, avoiding all freight delays.

The WONDER 1922 Models represent the biggest values of their history. Values not entirely determined by the amount of price reduction, for while WONDER prices are consistently lower there has been no compromise with WONDER quality to attain them.

Readjustment in the WONDER factory is complete. We are able, therefore, to offer in 1922 a highly improved product and a new high standard of values.

Ask for Catalog M 34
It contains the biggest mixer values on the market today

Construction Machinery Co.
Formerly WATERLOO CEMENT CORP.
103 Vinton Street WATERLOO, IOWA
It's The Way A Sterling Is Built

The 6 Exclusive Sterling Features

1—THESE TWO EXTRA SPOKES—The only wheelbarrow with ten spokes—others do with eight. The extra two double tire strength, end flattened and broken tires.

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(Patent Applied for)

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Febrisco Steel sash is a real economy—a time and money saver. Apart from giving greater satisfaction, it costs less installed than the ordinary wood sash job.

- It will not rot, warp, bind or shrink.
- It is weather and vermin proof and stays that way.
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- It is anchored permanently into the building.
- It is a complete unit—hardware and fittings forming part of the sash.
- It can be set by the mason and glazed by the painter.
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Febrisco Solid Steel Basement Sash is made in 3 standard sizes, in both 2 and 3 lights and meets all practical requirements. It can be installed in brick, masonry, cement block, tile or concrete walls.

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Back of the enormous and steadily increasing demand for PEARL is its unusual wear quality due to its metallic coating - as special process owned and controlled exclusively by us.

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We have a dealer in your town. See him or write us if you are interested in permanently screening doors, windows or porches. Samples and literature FREE.

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The best hardware dealer in your city sells "PEARL"
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The metal lath is quickly and easily fastened to the channels and forms an absolutely solid base upon which to plaster. The smaller photograph shows how well the plaster keys.

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WHEN an architect and builder achieve distinction in a cozy little home of modest cost there are a hundred prospects anxious to know who planned it, who built it, what materials were used.

Stucco lends itself easily to distinctive treatment that is not expensive.

**Sykes Expanded Cup Metal Lath**

makes that treatment permanent. It is buried in the heart of the plaster. The perfect self-furring design insures it without the expense of furring strips, and with no chance of wrong application through ignorance of workmen. No “upside down” nor “wrong side out”.

Sykes Expanded Cup is an unusual metal lath. It has extra weight and rigidity — wider strands and more metal per square yard. We want you to see it.

*Write today for a sample*

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*Write for full information*
FOR every purpose to which sheet metal is adapted—in the shop or for construction purposes—KEYSTONE Copper Steel Products give superior satisfaction and service. They combine the excellence of good materials and able craftsmanship.

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With "Morgan-Quality" Standardized Woodwork the element of delay is eliminated. You can complete jobs quicker—your turnover is quicker and hence your profits larger.

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Morgan Woodwork Organization
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"MORGAN-QUALITY" STANDARDIZED WOODWORK
Individuality, Beauty and Adaptability Account for its Growing Popularity

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Special tile in full and half lengths take care of lintels, sills, corners, window and door openings, joist and soldier courses, watertables, etc., and readily adapt themselves to any distinctive architectural or decorative treatment.

Write for further information about NATCO Double Shell Tile—a building material easy to lay and install, with every advantage of ordinary hollow tile construction coupled with flexibility, beauty and lasting satisfaction found in no other material on the market today.

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**Heres the ANSWER to How to PLAN, FINANCE AND BUILD YOUR HOME**

Better built small homes—3 to 6 rooms—at lower cost from plans designed to eliminate building waste without sacrificing good looks—this was the ideal of the group of practicing architects who compiled the remarkable new home plan book, "How to Plan, Finance and Build Your Home."

This book and plan service is part of the national small home building movement originating with The Architects' Small House Service Bureau of Minnesota, Inc., and now being extended by The Architects' Small House Service Bureau of the United States, Inc. The United States Service Bureau has the endorsement of the Department of Commerce of the United States Government and the American Institute of Architects. The Minnesota group of architects compiled this book for the Southern Pine Association, which, jointly with the Minnesota Bureau, now the Northwestern Division of the United States Service Bureau, is interested in its distribution.

In endorsing the work of The Architects' Small House Service Bureau of the United States, Inc., Mr. Herbert Hoover, Secretary of the Department of Commerce, says:

"I have looked into the work of The Architects' Small House Service Bureau of the United States with its divisions and branches and have examined its organization and incorporation papers. The complete plans, specifications, documents and bills of materials with the designs worked out for local conditions and to use stock materials and eliminate waste, materially simplify home building problems. The form of control by The American Institute of Architects should guarantee a high standard of service. It gives me pleasure to endorse this work and to assure you that the Department of Commerce will do all it can to cooperate with the Institute and the Bureau."

The book and plans may be obtained direct from either The Architects' Small House Service Bureau, Northwestern Division, Inc., or the Southern Pine Association. The book is sold for $2.50 prepaid. The service includes complete working drawings, details, specifications, quantity surveys, forms of agreement, ready to use, at prices ranging from $17.50 to $32.50, depending upon the size of the house.

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**THE ARCHITECTS' SMALL HOUSE SERVICE BUREAU**
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RA LONG BUILDING Lumbermen since 1875 KANSAS CITY, MO
Where You Should Use Rot-Resisting Moisture-Proof Redwood

For siding and porch work on which climbing vines retain moisture and foster the development of mould and decay, for shingle roofs shaded by trees so that they dry out slowly—wherever moisture lodges you can guarantee freedom from rot and decay if you use Redwood.

In addition to rot-resistance, which is due to a natural odorless preservative that permeates every fibre of Redwood during the growth of the tree, you will find that the high percentage of clear lumber in every car of our production cuts waste to a minimum. There's an evenness of texture and a uniformity about T. P. L. Co. Redwood, a dependable dryness and easy wood-working quality that keeps down labor costs.

You can buy T. P. L. Co. Redwood lumber and mill work at prices not greatly higher than for other lumber which cannot compare with Redwood for rot-resistance, freedom from shrinking, swelling and warping, for good painting surfaces, and low average of knots, splits and other common defects.

For the convenience of builders and architects we have recently issued our “Construction Digest” and our “Engineering Digest,” which our New York or Chicago office will gladly forward on request, together with mill work and frame lists of Redwood items of our manufacture. Write for them.

The Redwood Log was sound and free from decay when dug up after two years' burial in moist soil—proved by the annual rings of the giant tree that grew over it.
**Why MAPLE outwears STONE**

Every shoe in the thousands that strike a stone sill, grinds off its toll of fine particles in an unchanging friction. But Maple builds up its own resistance to wear, because each passing foot increases the polish on this hard-fibred, tight-grained wood, making it smoother and smoother.

That is why Maple surpasses all other woods and all other materials for flooring. Because of its individual characteristics, Maple is used for floors in every good home, office, school, church, apartment, public or industrial building.

Architects, engineers, contractors, builders—all who desire to give their clients the finest of counsel and service, will say “Floor with Maple.” Wherever wear is essential or beauty desired, it is the wood to choose. And to be sure of the grade and quality you should have, see that it is flooring produced and guaranteed according to the rigid inspection standards of the Maple Flooring Manufacturers Association.

MFMA flooring is made from the climate-hardened, slow-growth Maple of Michigan and Wisconsin—the source of the world’s finest Maple for floors.

Kindred woods of Maple are Beech and Birch, produced by the same high manufacturing standards. This trio of flooring woods offers a variety and versatility of surface finish which will satisfy any client you may have.

**Floor with Maple**

The letters MFMA on Maple, Beech or Birch flooring signify that the flooring is made from the climate-hardened, slow-growth Maple guaranteed by the Maple Flooring Manufacturers Association, whose members must attain and maintain the highest standards of manufacture and adhere to manufacturing rules which economically conserve every particle of wood in your production. Look for it on the flooring you use.
The finer the home, the more it needs walls and ceilings of dependable Upson Board.

Upson Fibre-Tile is being applied in both rooms and kitchens of fine homes throughout the country. It is also excellent for the walls of barber shops and restaurants.

"You don't know wall board unless you know Upson Board"

Read what this prominent contractor and builder says —

by John L. Lewis, Contractor and Builder, Binghamton, N.Y.

"For years I did not recommend wall board. I would not let my customers use it except for attics where quality did not matter.

"I believed that all wall board was alike, but I did not know Upson Board! I had not tried it, because I said 'What's the use? Upson Board is no different from all the rest!'

How my eyes were opened

"And then one day a salesman asked me to try some Upson Board. I placed a trial order but even at that I was almost afraid to try it on a real good job.

"My first surprise came when I unloaded the big panels. I expected breakage. There was none. Surprise No. 2 came when we commenced to cut the board. Instead of breaking like a graham cracker and fraying at the edges, we found that it cut and sawed and handled like lumber.

"We finished a whole room without breaking a single piece. You know what that means if you have had experience with ordinary board.

A wonderful painting surface

"The biggest surprise of all was the finishing. I have seen all kinds of wall board painted. Some boards drink paint like a sponge, others have a waxy coating which is the ruination of a good paint job.

"But with Upson Board the first coat of paint covered perfectly, and two is all that is ever needed. I understand that big paint companies use Upson Board for making up their samples of paint.

"I have used it in my own home as well as some of the finest homes and buildings."

"If you are in doubt as I was, I suggest that you get some samples of Upson Board and learn the truth for yourself."
At the right is an actual photograph of the Super-Surface Upson Board. You can identify genuine Upson Board by the famous blue center.

The outstanding feature of this picture is the curved ceiling. It's Upson Board! A carpenter put it up. Every day, carpenters all over the country are installing Upson Board in just as fine homes as this one.

C. H. Barrett, a contractor at Cazenovia, New York, did the very fine job of Upsonizing in the Linkeisen House at Cazenovia, using 7500 square feet of Upson Board. Picture shows only a small part of the work.
UPSON Board advertising, now appearing in The Literary Digest and other national publications, advises home owners to have their homes Upsonized by a carpenter!

It does not say "anyone can apply it" or "any handy man" can Upsonize his home. It says, "let your carpenter do it."

The carpenter's skill and experience are necessary to assure the most satisfactory installations of wall board. He can do good work with dependable Upson Board. Many carpenters are becoming Upson Board Experts. Upsonizing is profitable. It is clean work. It can be done any day of the year. It is a business-building activity because one job usually brings others.

Upson Board is a quality product. It is harder, stiffer and stronger than other boards. It is the only wall board that contains any considerable percentage of chemical wood fiber—a necessary material where strength and quality are of more importance than mere price.

Now, with the improved Super-Surface appearing on one side of every panel of Upson Board, it is also the most beautiful board on the market. The reverse side of every panel is smooth and lumpless and is not disfigured by trade marks or other printing. Either side, therefore, can be used.

You will find it a real pleasure to work with Upson Board. It looks, works and feels like lumber. It is not heavy, like plaster board, which requires extra help to put it in place, and frequently, re-inforced construction to hold it.

You are safe in recommending and using Upson Board for the walls and ceilings of the finest homes, as well as for the humblest cottage. You cannot afford to jeopardize your good name by using cheap, punky fiber boards, or brittle, absorbent plaster boards which so frequently create dissatisfaction, with subsequent blame on the man who installs it.

We shall be glad to help you get started as an Upson Board Expert. Write for "Important Directions for the Correct Application of Upson Board" and samples of Super-Surface Upson Board and Upson Fibre-Tile.

THE UPSON COMPANY
Fiber Board Authorities
307 UPSON POINT
LOCKPORT, N.Y.
To help you make every wall board job satisfactory, the Upson Self-Clinching Fastener was invented.

You know how difficult it is to do a really good job of wall boarding when you have to nail centers of panels. With some boards, a good job is impossible. Even with the best boards, it is tedious work and is seldom well done.

This fact has kept many contractors away from wall board jobs. They did not want to take a chance of having their men do poor work about which the customer could complain.

The Upson Self-Clinching Fastener, therefore, opens up a new field for many contractors. To others, it means "no more complaints." For the one big objection to the use of wall board—disfiguring nail holes in centers of panels—has been entirely eliminated.

The Fastener is simple, quick and easy to use. It should cut the cost of installing wall board one half.

It is another Upson innovation. It has been declared to be the most important improvement ever introduced in the wall board industry. It opens up new fields for the progressive contractor. It has already increased the use of Upson Board.

Write us for free samples of this unique little device and illustrated booklet explaining in a clear, concise way just how the fastener should be used.

THE UPSON COMPANY
Fiber Board Authorities
307 Upson Point, Lockport, N.Y.
and give your customers the most substantial, permanent and economical improvements that can be built.

The cement dwelling below (drawn from a photograph of a house at Syracuse, N. Y., built by Hueber Bros.,) is fire-safe as well as beautiful and comfortable. It saves in painting and insurance.

A cement driveway keeps people out of the mud. A cement barn holds its value and keeps the farmer's stock clean and healthy. A cement silo is a fine investment for him.

See the Local ALPHA Dealer

These and a score of other permanent improvements are described helpfully in the ALPHA CEMENT Construction Handbook, 104 pages, illustrated. Get a copy of this valuable book from the local ALPHA dealer and use it in your conference with property owners about their new buildings and improvements. If you don't know who the nearest ALPHA dealer is, write us, mentioning American Builder.
What Lehigh Service Means to You

“15 Mills from Coast to Coast”

means that you can get Lehigh Cement anywhere in the country any time you need it.

That you are not compelled to rely upon one mill for your requirements — there is always another Lehigh mill within shipping distance.

It means that you can depend upon an adequate supply of uniform, highest quality cement for any job.

It means that the great Lehigh organization with its nation-wide manufacturing facilities is at your service.

LEHIGH PORTLAND CEMENT COMPANY


Kansas City, Mo. Minneapolis, Minn. New Castle, Pa. Omaha, Neb.

Here's Real Help
For Every Builder!

Two new "Medusa" books, packed to the covers with helpful information and ideas. One tells how to build white stucco houses of lasting beauty and service, using Medusa Stainless White Cement; the other shows how to make all concrete work permanently dry with Medusa Waterproofing.

Both give complete, accurate specifications; pages of interesting pictures showing buildings of all kinds, bungalows to grain elevators; facts on every page that will help you make money.

Drop us a line on your letterhead and we'll send both books with the name of a dealer near you who carries "Medusa" products in stock.

THE SANDUSKY CEMENT COMPANY
Department G, Cleveland, Ohio
Manufacturers of Medusa Stainless White Cement (Plain and Waterproofed); Medusa Gray Portland Cement (Plain and Waterproofed); and Medusa Waterproofing (Powder and Paste).
This Is Your Service—Use It!

FREE BOOKLETS ON THE USES OF CONCRETE
ARE YOURS FOR THE ASKING

The Portland Cement Association offers you its service, without charge, on how and why to use Concrete.

Our free booklets contain complete, reliable instructions, in every-day language, on every common use of Concrete.

Some of these booklets are:
Recommended Practice for Portland Cement Stucco
Concrete Basements and Foundations
Concrete Building Block and Brick
Concrete Block Garages
Concrete Swimming and Wading Pools
Concrete Schoolhouses

These are only a few. If none of these covers the job you have in mind, probably we have one that does. Write us about your work and we'll try to help you.

There are no strings on this service. It's free, and you are under no obligation in accepting it.

PORTLAND CEMENT ASSOCIATION
A National Organization
to Improve and Extend the Uses of Concrete

Atlanta    Des Moines    Los Angeles    Parkersburg    San Francisco
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Dallas     Indianapolis  New York     Portland, Oreg.
Denver     Kansas City   Salt Lake City

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Firesafe Floors for Homes at Practically Wood Floor Cost

THINK of it! The same type of floor that has long been used in skyscrapers, at little more than the cost of combustible wood floors, is now made possible by the use of National Steel Joists.

Every home builder will at least want a firesafe first floor. It forms a firesafe blanket over the basement, where the vast majority of dwelling fires have their origin. Such floors are also dust and vermin proof. Won’t sag or warp.

You, as a contractor, are often called upon to submit floor plans for homes. Design those homes with National Steel Joist firesafe first floors. They are easily embodied in plans—economical and easy to build. See detail drawing at the left. Your own men do all the work.

You will be doing the homeowner a favor by suggesting such floor design and will impress him with your knowledge of the most modern method of home construction. Millions of square feet of National Steel Joist floors are in use in stores, hotels, office buildings, garages, schools and homes.

Let us help you. Send in your plans or floor sketches. We’ll show you how to embody National Steel Joist design and quote prices. Ask for special literature.

**The National Pressed Steel Co.**
Massillon, Ohio

**DIVISION OF CENTRAL STEEL CO.**
Write for These Books

They are helping contractors and builders in every locality to obtain more building work through the many attractive house plans presented. They are full of authoritative information essential to the success and profits of your business.

The Story of Brick:
A sixty-page, complete presentation of Face Brick as a construction material, its history, its possibilities and advantages. It describes brick bonds and patterns, methods of financing homes, and gives authentic cost comparisons. Beautifully illustrated. A sales manual containing all Face Brick sales features for contractors to explain to prospective builders. Will be sent free.

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An every day reference book for the practical builder, replete with detail drawings and explanations of the best methods of handling the three kinds of walls—face brick with common brick, face brick with hollow tile backing, and face brick veneer on wood studs—and all phases of Face Brick construction. Supplemented with thirty designs for which plans are available at small cost. Price $1.

Bungalow and Small House Plans:
An exceptionally fine collection of designs for homes of from 3- and 4-, to 7- and 8-rooms has been embodied in this series of four booklets, each booklet being devoted to houses of a particular size. Unique presentation of designs gives a choice of two exteriors for each floor plan. Plans in reverse may be secured for each design. Nearly 200 arrangements shown. Single booklets 25c; set of four booklets, $1.

This valuable building information and the unequalled but inexpensive plan service offered in these books is of vital necessity to every builder. Send for them, addressing Department A. 3.

THE AMERICAN FACE BRICK ASSOCIATION
110 South Dearborn Street, Chicago, Illinois
Fireproof
Saves on Labor
Many Finishes
Wears Forever
Warm in Winter
Cool in Summer
Has Strength

and Remember, It Costs Only 5 Per Cent More Than Wood!

HOLLOW TILE is always used by builders as quickly as they realize this fact.

As our forests disappear, it is rapidly coming to the front to take the place of wood. You get a fire-proof building at only 5 per cent higher cost.

It is the lowest priced of all permanent building materials.

Weighing only half as much as brick, it is strong enough to be used for load bearing walls up to four stories. It will carry ten times the weight ever imposed upon it in residence construction.

You will soon be using tile! Send for our free Builder's Manual and house plan folders. You can use them in your business.

HOLLOW BUILDING TILE ASSOCIATION
Dept. 163, Conway Building
Chicago, Illinois
Armstrong's Linoleum
for Every Floor in the House

"No other floor could be quite so handsome as Armstrong's Jaspe Linoleum, waxed and polished. After two years of wear my floors look like new. In fact, I wouldn't exchange them for hardwood or any other kind of floor," says the owner of this beautiful home.

This Floor is Modern Linoleum

HERE is an example of the growing use of modern linoleum floors in living-rooms, dining-rooms and bedrooms in fine homes. All the floors in this handsome Colonial residence in Lancaster, Pa., are of Armstrong's Brown Jaspe Linoleum.

You can't imagine a better looking floor than this—a soft, pleasing brown of two tones, without a single unsightly, unsanitary crack, always found in wood floors. In the home pictured here, the linoleum floors were cemented down over a lining of heavy deadening felt, to the ordinary pine underflooring. The seams (only two in each room) are practically invisible.

As to durability, warmth, quietness and resilience, linoleum is ideal. On the score of economy, linoleum means money saved to the home builder on refinishing expense. For instance, the owner of this residence says, "I am satisfied that my linoleum floors are much less expensive to maintain than hardwood. After two years my floors are kept in perfect condition by occasional waxing and daily going over with a dry mop. On the other hand, the stairs, which are of hardwood, will have to be refinished this year."

Contractors and architects recommend permanent linoleum floors because they are less expensive than other floors, and because they are so practical. Linoleum floors, laid when the house is built, are a positive recommendation to the woman of the home, because they are so easy to take care of.

A request on your letterhead will bring you a compact handbook, "Armstrong's Linoleum Floors," which discusses the use of linoleum, particularly from the building contractor's and architect's point of view. Samples of Armstrong's Linoleum in gauges especially suited for residence work are also free for the asking.

They Are On to Stay

When you lay Ruberoid Strip-shingles, they are on to stay. Their unusual thickness and cut corners prevent their blowing or curling up.

Felt, saturant, surface and back coating are all Ruberoid quality—the quality that has actually stood the test of time on thousands of roofs for over a quarter century. You can, therefore, unqualifiedly recommend them.

Ruberoid Strip-shingles may also be laid in various attractive designs by combining the soft tones of red or green and reversing the strips. Upon request, you can obtain a booklet showing these artistic designs in color, as well as illustrated directions for application.

There is a Ruberoid Distributor near you. Talk it over with him.
Will Your Shingles Stand This?

Thursday, October 20, 1921, at the Daigle Iron Works, Detroit, Michigan, the following test was made with a Winthrop Tapered Asphalt Shingle Roof. A section, laid according to standard directions and so constructed that one roof board could be withdrawn for observation of the effect of the test, was equipped with a shelf to support a blow torch in such a way that the flame of the torch would be directed against the shingles. The nozzle of the torch was six inches away from the shingles, the point at which the heat is most intense.

Winthrop Tapered Asphalt Shingles give practical protection from the most dangerous fires of all, roof fires. Winthrops are fire-safe, long-lasting and add distinction to the building.

Learn about these wonderful big butt shingles. They are the only asphalt shingles that are tapered. The taper gives weight where weight is needed and it adds to the beauty of the roof.

Write for full information and sample shingles. Address the nearest factory.

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Here's the Silo Outfit That Earns the Big Profits

Did you ever figure the profits of silo building? Did you ever reckon the number of silos that are built yearly on the farms around your locality? Do you know that farmers today prefer solid concrete silos to any other kind? Have you ever driven through a section where a Metaform-equipped contractor has been active, and noted that on farm after farm, for mile after mile, Metaform silos are the only ones to be seen—and that there are literally scores of them.

Here Is a Big-Profit-Business

There is only one fast, economical way to build concrete silos. Use a Metaform silo outfit. Years of evidence from scores of contractors has proved that a silo's capacity to produce profits is only limited by the length of season. Twenty-five silos a season is not unusual. Many contractors keep two outfits going constantly—forty-five to fifty silos is their ordinary record. And every job yields a substantial profit!

These contractors use their same outfits to build grain elevators, coal-pockets, water tanks, and every other form of circular concrete structure.

Study the opportunity for a Metaform-equipped contractor in your own locality. Get full details on these outfits—learn their simplicity, speed, dependability. Write today—in the coupon, or attach it to your letterhead.

METAL FORMS CORPORATION
MILWAUKEE, WISCONSIS
Fresh Wholesome Healthful Heat
—the kind that every home-owner wants

Merely to fill a house with “hot air” doesn’t solve the question of home heating.

That home is best heated which is supplied with clean, pure, fresh air that is gently warmed without contamination with gases and fire poisons. Such is the heat furnished by the FarQuar Sanitary Heating System.

Old fashioned heating ideas are totally disregarded in the FarQuar System of Heating and Ventilating. And the development of the FarQuar System was not a matter of opinions, but of proven facts. Every part in the construction of a FarQuar Furnace is the result of demonstrated principles which have proven their soundness for nearly twenty years.

High Grade Sales Representatives Wanted

In every locality there is at least one man who is always looking for better things to sell. This man is willing to listen and learn by facts, not theory. And having learned through satisfactory proof, he has sufficient faith in himself, in his fellow-men, and in what he sells, to make a success of his efforts.

That’s the man we want to meet, for the story of the FarQuar Method of Heating and Ventilating will appeal to him.

*If you’re that man, and can prove it, write us.*

The Farquhar Furnace Co.
303 FarQuar Building
Wilmington, Ohio
It Assures Their Satisfaction at Moderate Cost

Buyers of those homes in which you install the Round Oak Pipeless Heating System, will have cause repeatedly to praise your judgment. First, the buyer is familiar with the reputation of Round Oak products and from the outset will have a natural confidence in his heating system. Second, the initial cost of the system and its installation is moderate. Third, the splendid manner in which his home is kept comfortable on so little fuel, will immensely please him. Lastly, the continuation of this satisfaction, year after year, will be an uninterrupted recommendation to him of your ability as a builder. His endorsement of you to others will prove one of your most valuable assets.

Equally satisfactory, where adaptable, are the Round Oak Moisair Heating System and the Round Oak Ironbilt Furnace—for pipe installation.

There is nothing that more largely determines the satisfaction of home-buyers than the performance of their heating systems. Install only the best.

The Round Oak catalogs should be in your files. May we, quite without obligation on your part, send you copies?

THE BECKWITH COMPANY  Dowagiac, Michigan

"Round Oak Folks"  Established 1871

The Round Oak Engineering Department and the local Round Oak Dealer will gladly cooperate with you. Heating plans are furnished gratis, if you supply blueprints of the houses.
What's Your Choice?

Would You Buy a Cracked Furnace?

**HERE'S ONE**

Rough castings—piled one on the other. No fitting, but the cracks filled with cement or sand. They warp and twist—expand and contract with heat, distributing gas and dust all over the house. Limited radiating surfaces, unevenly heated; wasteful of fuel; expensive to repair.

**The Hess Furnace Is DIFFERENT**

A solid steel box—with every seam riveted and welded; sealed with melted steel. As tight as a bottle. Firebox, ashpit and grates inside. Seams guaranteed never to leak as long as the furnace lasts.

**COSTS MORE (but not much more) WORTH MORE BURNS ANYTHING. DELIVERS ALL the HEAT**

**THE ORDINARY FURNACE**

Not from any particular maker, but a type, produced, with slight modifications, by many foundries. Just the common, ordinary, cast iron furnace, which established the reputation that furnaces are dusty and dirty, and "lives up to it."

**THE HESS WELDED STEEL FURNACE**

Immense radiating surface, evenly heated, but never over-heated, the firebox being lined with heavy fire brick.

Six sizes—**Pipe and Pipeless.** Ask for our illustrated booklet telling how we heat houses successfully, assuming full responsibility for success, no matter where you live.

Dull season prices, the year's lowest, are in effect now. Contractors everywhere are taking advantage of our special free plan service, and our factory-to-contractor prices. They mean larger business and satisfied customers.

**Hess Warming & Ventilating Co.**

1220D TACOMA BUILDING — — — CHICAGO

Makers of Hess Snow White Steel Medicine Cabinets
Double Security

The contractor who specifies the "HOLLAND" guaranteed heating systems protects his choice on two counts.

1. First, he eliminates all worry as to the quality or correct installation—because we guarantee both by the Holland Bond.

2. He insures customer satisfaction in an all important building unit—because our guarantee is transferable to the customer.

When you install a HOLLAND furnace, you can rest assured that it is the kind you would like to have in your home.

Looking after your customer’s welfare pays today just as it has paid ever since the rule was originated 2000 years ago.

Let us show you convincing instances from fellow-contractors who have entrusted the keeping of their good-will to HOLLAND.

HOLLAND FURNACE COMPANY  WORLD’S LARGEST INSTALLERS
General Office: HOLLAND, MICHIGAN  OF FURNACES
Two Factories: Holland, Michigan, and Cedar Rapids, Iowa
Central Chicago Office: Building Material Exhibit, 6th Floor, Leiter Bldg., 15 East Van Buren St.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
New Art Models Designed Especially to Meet the Requirements of Architects

"Give us an attractive line of gas fires that we can conscientiously recommend for the better homes and apartments—then you will find it easy to have them accepted universally."

It was to satisfy this demand on the part of architects and home builders that we designed the new line of art model Radiantfires. You can now have a gas fire to harmonize with every interior—that will satisfy your most exacting requirements.

Here, at last, is the way to give the home owner complete comfort and convenience. The Radiantfire has all the charm of the old fashioned open fire without any of its disadvantages. Economical; absolutely odorless. Write for booklet and information on how to install two or three completely equipped fireplaces for less than the cost of one of the ordinary type.

General Gas Light Company
KALAMAZOO

44 West Broadway
New York

768 Mission Street
San Francisco

AB-14
Choose Hot Water Systems That Last

Equip Every Home With a "STAR NACO" Boiler

How many home-builders—how many architects and contractors protect themselves and their work by actually knowing whether plumbing is installed to last—to serve satisfactorily year after year without costly replacement?

Every good plumber is glad to explain why one range boiler outlasts another; so, when you build, let your plumber demonstrate the "STAR NACO" boiler. Let him tell you why it serves better and serves longer. The "STAR NACO" gives you six exclusive features. Ask your plumber about it and avoid leaks and replacement.

Detroit Range Boiler & Steel Barrel Company
Detroit, Michigan

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Whether you are planning a modest home or an imposing institution, there is a size and style of McCray to provide the proper refrigeration service. And whenever desired, McCray will build to order equipment to meet individual plans.

Architects especially appreciate this completeness of McCray service. For they have learned that the same efficiency, the same high quality, characterizes every type and size of McCray, whether for the residence, the store, the hotel, hospital, club or institution. And it is exceptional quality, developed in a third of a century’s devotion to the problems of refrigerator building.

Wherever there is need for a refrigerator, therefore, you can specify McCray with entire confidence that it will meet the particular need of your client to his complete satisfaction.

Get These Catalogs For Your Files. Send the coupon for them now, and have the information on hand when you need it. Remember, too, that our Service Department will furnish plans and estimates for specially built equipment, without obligation; just send a sketch of your client’s requirements.

McCray Refrigerator Co.
2260 Lake Street
Kendallville, Ind.
Salesrooms in All Principal Cities
WHAT ARE YOUR BUILDING PROBLEMS?
LET US SOLVE THEM FOR YOU—EFFICIENTLY
All Lines of International Products Are in Service in These Buildings—Designs and Estimates Free

Structural Steel and Iron, Modern Store Fronts, Complete Public Garages, Industrial Buildings, Warehouses, Coal Tipples, Highway Bridges, Reinforcing, Steel Lumber, Steel Windows, Steel Ceilings, Roof Ventilators, Cornices, Elevators, Skylights, Roofing and Siding, Millwork and Glass

INTERNATIONAL STEEL & IRON CO. ADDRESS EVANSVILLE, IND.
Write for "Garage Illustrations" showing about 50 modern buildings designed by us

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
"If I only had this set of books twenty or thirty years ago, they might have changed my whole life. The knowledge in the big CYCLOPEDIA would have enabled me to increase my earning power, to take on big work, paying big money, and possibly have helped me to make a fortune in the building business."

HUNDREDS of letters like the above have come to us, breathing between the lines the same pathetic story of regret—showing how hard it is for the untrained man to really get ahead in life. The opportunity is yours NOW, and the way is easy. Don't wait too long. Don't wait at all.

Read the terms of our NO-RISK, GUARANTEE OFFER over again, and sign and mail coupon today. You risk absolutely nothing, and you will reap the benefit ever afterward.

Mountains and with this order.

2 ON examination without cost to you. * *

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Steel Bridges
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Piping
Sewers and Drains
Wireless Wiring
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Paperhanging
Furniture Making
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"When we started this business more than twenty-three years ago," recently declared Mr. H. A. Leary, owner of the Leary Coal Company, dealers in coal and builders' supplies, Kansas City "we decided that we wouldn't use or handle anything that wasn't the best.

"On that basis we knew we couldn't go wrong in buying trucks from the General Motors Truck Company, one of the biggest and most substantial corporations in the world engaged in the exclusive manufacture of motor trucks. So we bought a fleet of five 5-ton GMC trucks. We haven't been sorry we did so. Not for a single moment. They give us excellent service.

The name of Mr. Leary's company is really misleading, for, although it was started as a coal company, it has grown to be one of the largest and most prosperous firms in Kansas City handling builders' supplies of all kinds. For this reason his experience with GMC's will be of particular interest to builders and contractors as their hauling problems are of the same general character.

100 Tons Daily

The five 5-ton GMC trucks used by Mr. Leary handle about one hundred tons of coal and building material each working day. They are on the go continuously and average about four miles of travel for each ton delivered.

Owing to the variety of products handled by the Leary Company, Mr. Leary keeps detailed records relating to the delivery cost per ton with GMC equipment. In this relation he says: "Although many of our deliveries are miles away, we have found our total delivery costs with GMC to be but ninety-five cents per ton. Quick service, getting materials to the contractor on the job in the shortest possible time is the thing that has made our business proper.

"There is more to confidence in trucks than the mere ability to run them at a low cost per mile, and that is by dealing with a company that has adequate service facilities to keep your equipment running all the time, and a sincere disposition to treat you with the utmost fairness. These are things I purchased with my GMC trucks that cannot be figured in any cost record system — but they are things that count for a whole lot in helping any firm spell 'Success'," he declares.

This is one of the many reasons for the growing preference among wise motor truck users for the GMC. The GMC engine was designed exclusively for motor truck usage with full appreciation of all the essential qualities necessary for the success of such an engine under all conditions — economy of operation — surplus power — and quick accessibility for readjustment and replacement, with the consequential lowered costs for this work.

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As an example of the practical accessibility of GMC construction it is possible to remove a cylinder sleeve from the GMC engine and replace it in a few hours. This eliminates the heavy repair expense that follows when the entire cylinder block must be taken from the truck and re-machined, as in the case of the common type of engine.

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GMC Removable Cylinder Sleeves

No Lost Compression

Moreover, this type of construction insures an absolute and continuous fit of piston rings and pistons, preventing any loss of compression as is the case of the common type of engine when cylinders become out of round.

This is only one of the many features of GMC construction that truck buyers everywhere appreciate because they insure more and better motor truck service at a lower cost for maintenance and operation.

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Do you still shovel ashes out of your furnace in the old way and store them in dirty, unsightly cans and barrels, or—do you dispose of them in the new, clean Sharp way?

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For All Types of Folding or Sliding Doors

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Prevents Sagging and Makes Doors Weatherproof

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If you are not using Carney-made mortar in your walls this advertisement should be worth money to you. If you are, you can appreciate the statement that Carney enables the contractor to build a better wall of brick or tile at a cheaper cost.

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Learn the details on building a more economical and better wall with Carney. Write today for the Carney Catalog.

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Cement Makers Since 1883
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And at Much Less Cost

Building contractors using the Republic Rapid Transit get materials delivered on time and at a substantial saving in hauling cost.

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Lowest first cost, lowest operation and upkeep cost, plus Republic Unequalled Service have gained for Republic Rapid Transit a reputation as the greatest truck value ever offered the building and contracting industry.

Write for Vocational Catalog Showing Republic Trucks operating in the Building Industry.

The Republic Line: ¼, 1, 1½-2, 2½-3, 3½-4 tons capacity.

REPUBLIC TRUCK SALES CORPORATION
Alma, Michigan

REPUBLIC RAPID TRANSIT

Republic has more trucks in use than any other exclusive truck manufacturer.
Let's Hear From You

ONE of our subscribers came into the office the other day looking for information about some building work he was doing. After some talk we found out that he was building four houses out here in a small town in Illinois.

Immediately we suggested that he send us photos of these buildings when they were finished or even while under construction. We told him we wanted to show them to other builders thru our correspondence department.

"That would be a good idea," he said very much pleased, "I did not know that could be done." And he went away with a smile on his face.

Well, if we were not interested in what Bill Jones is doing, what Harry Smith has in mind, and what our other 45,000 readers were doing we should get out of business. We are here to take care of these readers and one way is to show appreciation for their work and let others know about it. This man is a real constructive force in his town, small as it may be, and is entitled to our congratulations. He is building something striking, about this slogan. It reveals an unlimited ambition and determination that is not marked off by any definite boundaries.

When we saw his slogan we stopped—it made us stop.

Here was a Tom Higgins No. 2.

There is much for the contractor to do during the summer rush. Summer homes, bungalows, etc., must be built. But winter time is different. That is why we were in for a surprise when we read a letter from Brother McDearmon, contractor, carpenter and builder, Benton Harbor, Mich., the originator of the very striking slogan.

Mac specializes in bungalows, garages, porches, storm house doors and screens.

He read about Tom Higgins in the January number. Like Tom, he has a message to other builders who are confronted with this annual idleness.

Says Mac:

The thought came to me while reading "Around the Family Table" that I could help some others to be a homes.

The country will be better off with more homes and he is doing his bit to bring this about. More luck to you, Brother!

Winter Has No Terrors For Him

LAST month you met Tom Higgins, the busiest man in Griffith, Ind., a glutton for work, and a builder who made money during the winter months.

We don't know just how big Griffith, Ind., is, but we do not believe it is much smaller than Benton Harbor, for despite its size it is very definitely on the map and has a story that will interest every one of our readers.

Tom Higgins found the magic formula for winter profits in wallboard.

Over in Benton Harbor there is a building contractor by name S. A. McDearmon who has business philosophy that cannot admit of anything but success—for here is his motto: "No job too large—none too small."

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Bishopric Stucco over Bishopric Base

Provides a Unit Wall For All Time and Clime

With the tremendous shortage of homes in this country, wise builders, having in mind the economy by reason of the big saving in material and labor in its application, the rapidity with which you can build, the durability and efficiency of Bishopric, can see in the growing demand for stucco homes an opportunity for conservative and profitable investment. Seldom, if ever in fact, have the builders of the country faced such a splendid opportunity for attractive and permanent returns for their outlay.

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(e) Living Comfort—Winter and Summer.
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Write for booklet “For All Time and Clime”. Beautifully illustrated—working details—specifications. Let us solve your building problems.

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