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 E. L. HATFIELD, *Vice-President and General Manager.*
 BERNARD L. JOHNSON, *Editor.*
 ROLAND D. RADFORD, *Secretary.*
 DELBERT W. SMITH E. B. WOLFROM..... } *Advertising*
 C. R. W. EDGUMBE O. H. SUTTER..... } *Staff*
 L. H. REICH HOWARD W. DEXTER..... }

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Some Facts About the June American Builder

Eighty-five thousand copies of 530 pages each. Paper required to print this issue more than 260,000 pounds of paper, or 130 tons.

If each page was placed end to end the strip would reach 8,532 miles. If the books were piled on top of each other they would be 7,083 feet high.

We have interesting booklets for
Architects, Contractors and Dealers.
Please tell which booklet you want.



The double shoulder on the sill
makes the Andersen Frame
waterproof and windproof.



Look For These Shoulders On Frames

WHEN you buy window frames see that you get Andersen Standard Frames with the raised shoulders on the sill. The storm sash or screen sets against the first shoulder, and when the window is closed the sash rests directly in front of the second shoulder, making it impossible for wind or water to enter the house at these points. The Andersen Frame is the only stock frame having these shoulders. The Andersen Lumber Company also makes Subsill Frames.

Reasons Why Andersen Frames Are Preferred:

1. Immediate delivery—no expensive delays waiting for special frames.
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7. Modern machinery, methods and specialization lower costs at the factory; quickness of assembly saves you time, labor and money on the job.
8. Better results in frame, brick or stucco buildings.
9. White Pine preserves original accuracy and gives continuous service.
10. Made by largest exclusive standard frame manufacturer. The trade-mark is absolute protection.

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FRAMES

Three Notable Chicago Buildings of the Year



The Straus Building, on Michigan Boulevard, is Valued at \$18,000,000 with Its Site. Graham, Anderson, Probst & White, Architects.

Above All Else on Chicago's Skyline is the Cross of the Chicago Temple Building, Which Houses the Congregation of the First Methodist Episcopal Church and a Number of Stores and Offices. The cross is 556 feet above the sidewalk. Holabird & Roche, Architects.

The London Guarantee and Accident Building Was Awarded a Gold Medal as Architecturally the Best Building Erected in North Central Chicago in 1923. Alfred S. Alschuler, Architect. Just across the bridge from the building shown stand the Wrigley buildings, and across the boulevard to the north the Chicago Tribune Tower is under construction.



Home Building Development

Greater Convenience and Better Quality Are Predominating Demands of Majority of Home Builders in Market Today

TWO powerful forces now characterize American homebuilding. These tendencies—greater “liveability” and improved quality—are more pronounced than ever before. As the result, the home-builder of today looks more attentively to the interior of his house than formerly. Equipment which saves labor and provides comfort and convenience, and careful planning to secure maximum use of space, rank in importance with the consideration given the selection of building materials and the choice of house design.

This is truly a healthy condition, one founded on the soundest of logic—common sense—and is evolving better buildings. And, let it be emphasized here, at no sacrifice of attractiveness or ideals. The architect has kept pace with the manufacturer, so that today the average American home is as pleasing to the eye as it is comfortable to live in.

Compare this with the home of our grandfathers. Contrast it with the residence of even 50 years ago. Who can fail to appreciate the progress made? The transition from the log cabin of the early settlers to the modern American home marks a period of great development; but, it must be acknowledged, the greatest advancement has occurred in the past quarter century. The introduction of new and improved building materials and home equipment has largely brought about this development.

Progress made in homebuilding since the days of the pioneers to the beginning of the twentieth century can be termed little more than normal. It merely followed the general trend of educational and industrial development, but occasionally took erratic turns with resultant structures that were chiefly notable for their shocking extravagance in design and use of materials.

Take, for instance, the incongruous assemblage of towers,

turrets, spires, arches, verandas, balconies, alcoves and multitudinous folderol which were incorporated in buildings following the civil war.

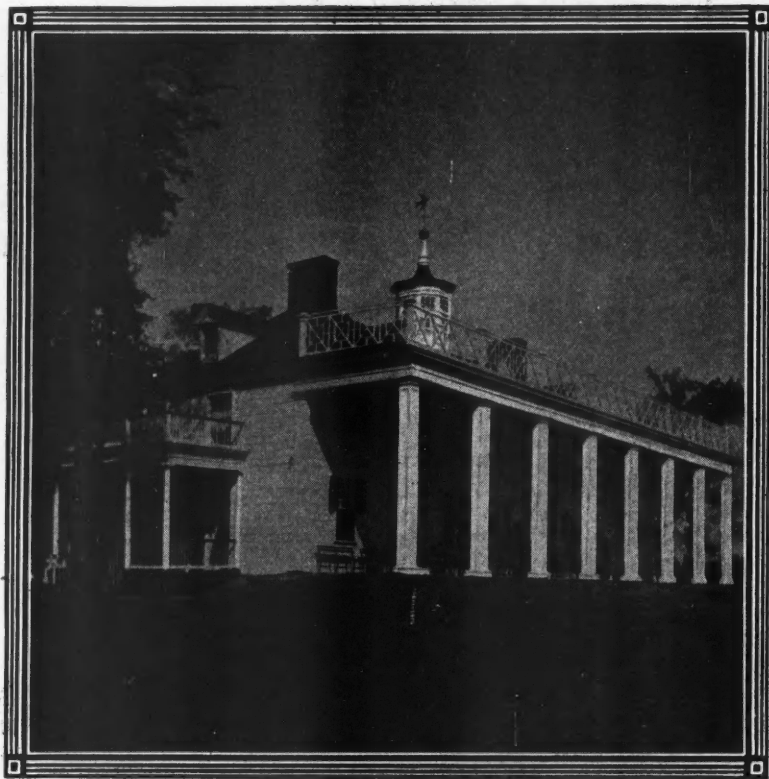
In the main, American architecture has always been influenced by European standards, though modifying them to conform to tastes and conditions in this country. The Colonial or Georgian type, created in England during the era of the four King Georges, was most widely adopted in New England about the time of the Revolutionary War and is still highly popular, though in various Americanized adaptations and combinations. The modern Dutch-Colonial house, so popular today, is an example of American designing ingenuity which possesses irresistible and enduring charm.

Spanish, Italian, Greek, Moorish and English Renaissance, the ultra-ornate L'Art Nouveau from France, the castle-like German structure, the handsome English half-timbered house of the Elizabethan period and the wide-roofed Japanese type have served as inspiration for American architects and builders, though seldom copied literally. This accounts for the charge: “America has no distinctive type of architecture.”

Perhaps it is better this way. Results count, and the result of American home-building thought is the modern American residence, undoubtedly the most attractive, as well as the most “liveable” house on earth.

American home builders are not entirely bound by conventions and traditions of past generations, but have used the best and discarded the worst features of the older types.

In the early development of home building in this country, European ideas of proportions, contour and room arrangement quite naturally crept into American designing. Thus, the unnecessarily large and inconveniently arranged rooms of the older residences, and greater building expense. Rising cost of building materials has brought



Mount Vernon, a Home Worthy of the “Father of His Country.” Published letters of George Washington, written while away from Mount Vernon, reveal his care in building the home beautifully and for permanence. Its survival as a shrine of American patriotism justifies his pains.

about space-saving consideration to such an extent that it is now the aim of home builders to utilize every square inch. Relation of the position of one room to another, and the convenience of the whole arrangement, are studied now as never before.

Perfection of the modern small home began early in the twentieth century with the appearance of the California bungalow.

This handsome little structure not only appealed strongly to the artistic sense of the public, but centered attention for the first time upon home equipment. It has opened up avenues for the manufacture and use of new and improved devices which provide comforts and conveniences of which our forefathers never dreamed. As the result, home building interest was given a great impetus, which has gained in volume as time went on.

Bungalows come the nearest to establishing a distinctive American type of architecture, though they really are not of American origin. Spain and Mexico furnish the present-day motif while the word "bungalow" comes from India. The American type of bungalow is, therefore, a development rather than an original American creation. American designers, nevertheless, have conceived so many attractive styles that in effect, their work has been creative.

So popular has the bungalow become that its principles of design have been injected to more or less extent, in the majority of small homes built in this country in recent years. Magazines, periodicals and books on home building subjects have contributed more, perhaps, than any other factor in popularizing modern homes. Pictures and descriptions of interesting residences, suggestions from experts in the construction, decoration and furnishing of homes, and the advertisements of material and equipment manufacturers, have been made available through the medium of printers' ink, for the prospective home builders in even the most remote sections of the country. Great increase in vacations spent in California has also inspired returning tourists to duplicate certain types of homes which struck their fancy.

The modern home likewise offers an incentive for the production of more attractive building materials. One characteristic of the bungalow and its adaptations is that it may be produced in a variety of materials. Cement, brick and wood lend themselves naturally to the treatment of bungalow exteriors. These materials, in fact, have undergone as extensive development in

recent years as has the houses into which they are placed.

Concrete, perhaps, has experienced the most sensational development. Broader knowledge of aggregates and mixing methods has removed all doubt of its suitability for home building. Cement has been used in increasingly enormous quantities since 1898, when the American product had begun to win the confidence of builders. Although factories were established in Pennsylvania and Indiana as early as 1872, it required 25 years for the American manu-

facturers to establish a reputation for the home product, during which European cement was used almost exclusively. American-made cement now supplies the entire home market, and over 137,000,000 barrels were manufactured in 1923.

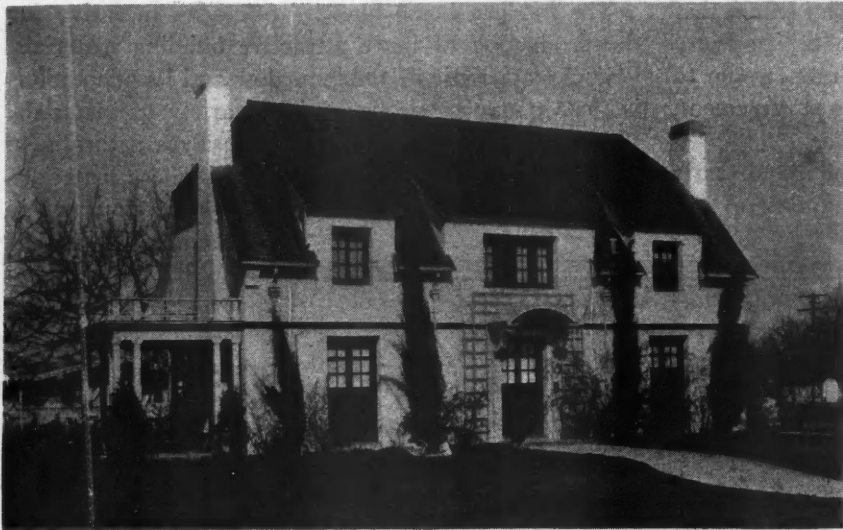
Popular impression is that cement had its origin in the material, called "portland cement," first produced by Joseph Aspdin in England in 1824; and named after the Portland stone of that country. The fact is that Aspdin merely succeeded in reviving a lost art.

Centuries before Christ concrete was made by the Romans who used lime, sand and stone as the ingredients. The bathing pools of Solomon, the 142-foot dome of the Pantheon of Rome (still in good condition) and many other structures were built of concrete by the ancients. The Appian Way, over which the Apostle Paul entered Rome, was constructed of stone slabs laid on a concrete foundation.

The work of these early users of concrete would seem to detract from the accomplishments of the builders of the present age. It is to be doubted, however, if these experimenters progressed at so rapid a rate as those of today. The discovery, in 1895, of the principles of reinforcement, the recent perfection of



"Home, Sweet Home," the Song Which Has Come to Express All of the Longing of an American for His Roof Tree, Was Inspired by the Home Shown Here, the Birthplace of John Howard Payne, at Easthampton, Long Island.



The Modern American Homebuilder Insists on Retaining That Which Is Pleasing in Architectural Types and Combining It with the Ultra Modern in Convenience, as Has Been Done in This Home Which Plainly Shows Its Colonial Origin.

the concrete block, tile and brick, the production and application of stucco, and the creation of machinery to produce and handle the concrete mixture will establish and forever maintain the fame of concrete builders of the present generation.

Progress in brick making is typified by improved manufacturing methods and by the numerous and beautiful brick faces that now adorn modern home buildings. Brick, like cement, has been made for centuries. It is, perhaps, the oldest manufactured building material, going back fully 2,000 years before the time of Abraham. Even in America the use of brick dates back to the time when the Indians in the Southwest made adobe brick thousands of years before the white man came.

Bricks were first made by the settlers in this country in Virginia in 1611, in Massachusetts in 1629 and in Pennsylvania in 1683. History shows that the brick walls of Fort Duquesne and Fort Pitt afforded protection against the savages, and that other structures of the time were built of brick. Commercial production, however, did not attain any importance until the latter part of the eighteenth century, the first successful brick plants being located in the New England states.

It is a long cry from the primitive method of mixing and molding brick by hand and drying them in the sun, to the modern technical methods and power machinery used by the American manufacturer. Determined by the kind of material—whether surface clay, fire clay or shale—and the kind of brick wanted, there are three chief methods of manufacture, namely, slop-mold, wire-cut and dry-press. Modern brick plants turn out hundreds

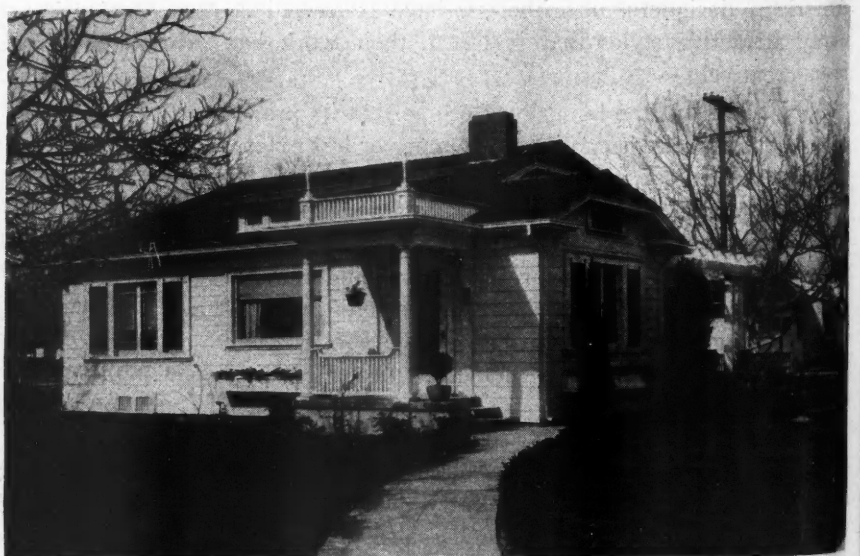
of thousands of bricks daily.

The American manufacturer of face brick has far outstripped the rest of the world in the wide range of color tones and textures he offers. The prospective builder today has before him the possibility of giving to the exterior wall surface an enduring color scheme of monochrome uniformity or polychrome blending, as his taste may dictate. The whole sweep of color, in smooth and rough textures, is at his command—from the pure, severe tone of pearl grays or creams, through buff, golden and bronze tints, to a descending scale of reds, down to purples, maroons and even gunmetal blacks. Face bricks may be had in various sizes as well as textures and colors.

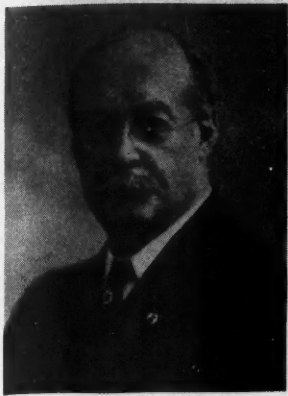
Every American is familiar, in some degree, with lumber, and in a general way recognizes the wonderful progress of lumber manufacturing in this country. However, he has but little understanding of the comprehensive study of the tree and its structure, the physical properties of woods, the preparation of lumber for use in buildings, and of market conditions that has been necessary in the development of the lumber industry.

Like cement and brick, it may be truthfully asserted that the availability of lumber as a building material has been fully as dependent upon inventive genius in the design of machines as upon the supply of raw materials. Also, new ideas of artistic effects in finishing and decorating both the interior and exterior of frame houses have appeared as a result of the studies and experiments of manufacturers of paints, varnishes, and stains, and of such special materials as pat-

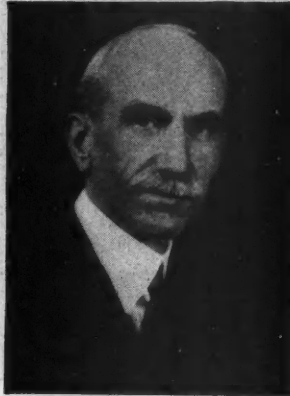
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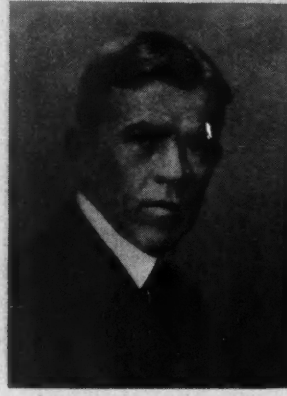
The Simple Beauty of Colonial Types Has Been Adapted to the Bungalow in a Happy Combination by Builders Who Declare That the Small Home Can and Should Be as Well and Conveniently Arranged as the Larger One.



JAMES A. WETMORE
Acting Supervising Architect U. S.
Treasury Dept.



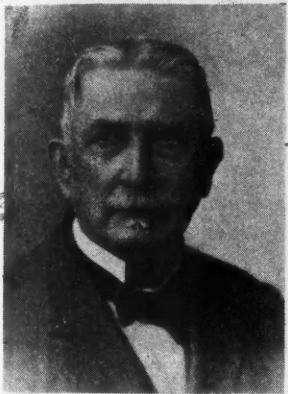
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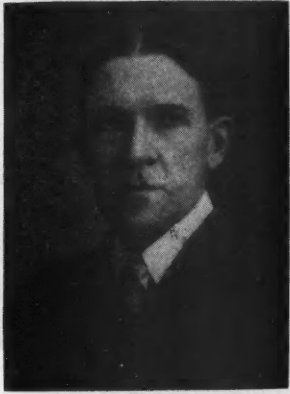
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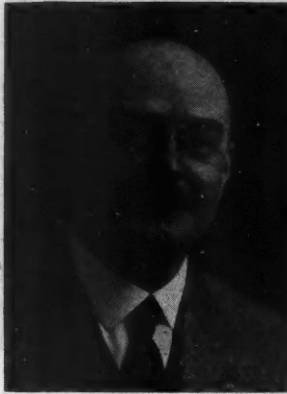
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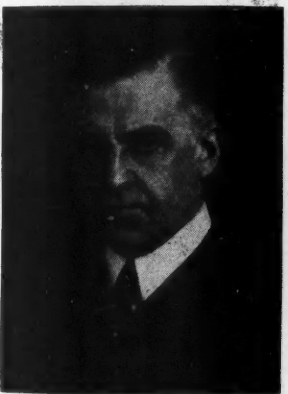
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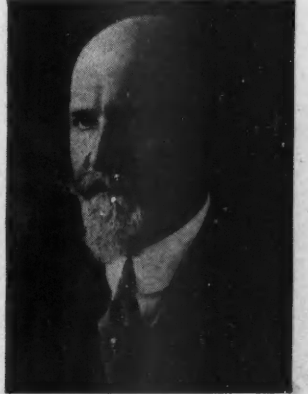
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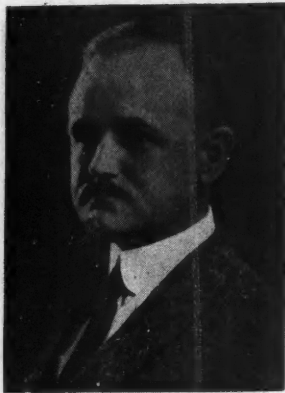
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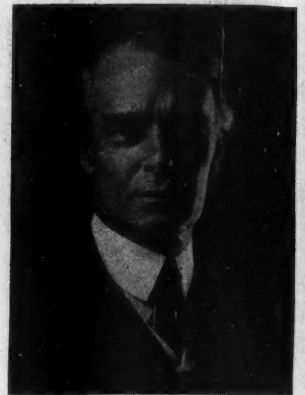
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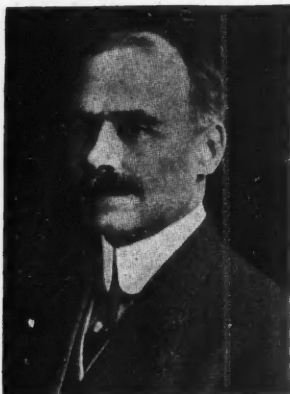
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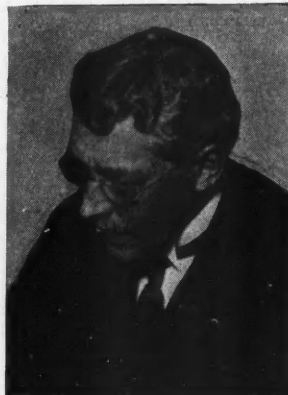
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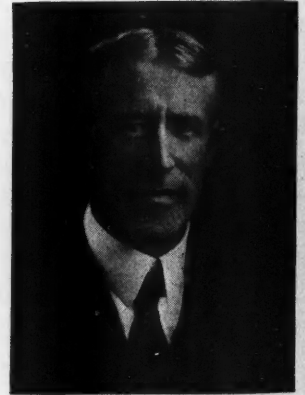
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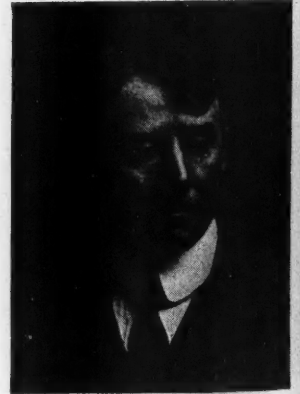
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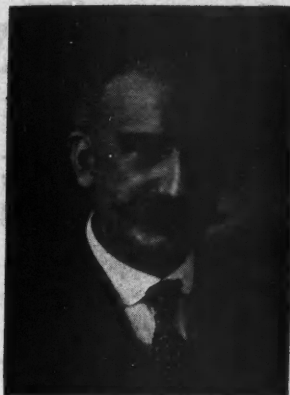
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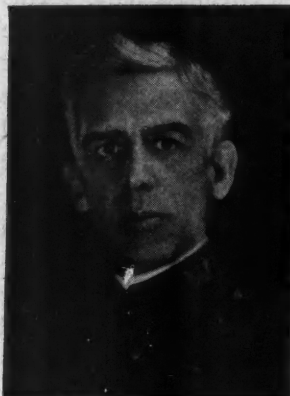
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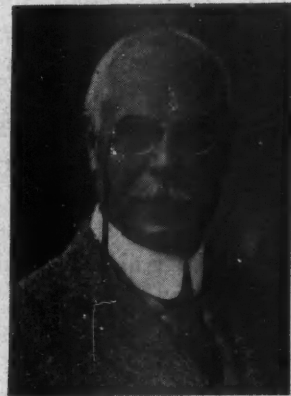
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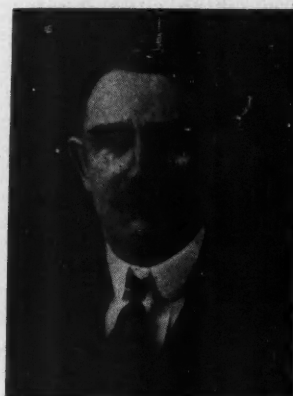
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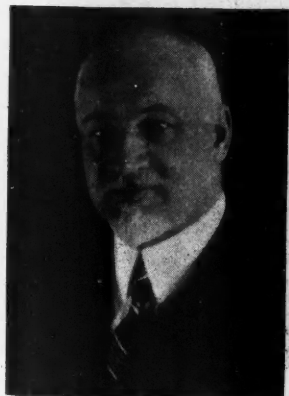
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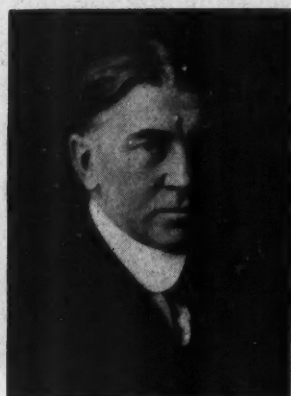
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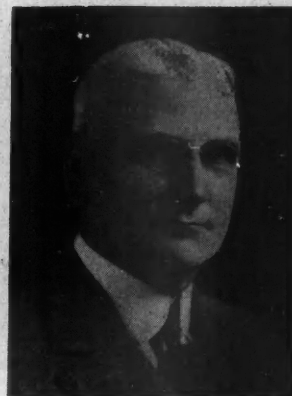
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Skyscraper Building Typically American

Due to Wonderful Development in Foundation Work and Steel Framing, 100-Story Buildings Are Said to Be Possible

THE origin and development of the skyscraper has created a new architectural era and revolutionized construction methods. While purely American from its inception, its use is spreading to other shores.

We have heard considerable criticism by foreign architects of the great height of American buildings which, at first, they found extremely ugly. This defect, if it existed, has certainly been remedied in the graceful structures which now adorn so many of our cities. The European is commencing to acknowledge this and praise the skyscraper, both for its beauty and its utility. American architects will appreciate the deferred compliment.

Certainly, the skyscraper has brought about a revision of real estate values in the business districts of American cities. The value of a piece of property is based upon its earning power. Each floor added increases the value of the ground space and the potential value of surrounding property.

When the skyscraper is great enough, it becomes the nucleus for a large additional population in the central, or downtown, district. In metropolitan cities it must be admitted that this has resulted in new problems of traffic congestion. This, in its turn, is being solved by subways, tubes and elevated railways. A likely development for metropolitan centers in the immediate future is that of sidewalks elevated above the street level with bridges, both ways, at street intersections.

The skyscraper today is by no means confined to the very large cities. The really remarkable development of recent years is its universal erection in so many of the smaller cities. There is scarcely a town of 10,000 or over but has a number of steel frame buildings of considerable height. It is, however, to the metropolitan cities that we must look for the extreme type of skyscraper, or tower construction.

While the cast iron I-beam was introduced in France and England in 1853, it was not a success as a fireproof method of construction. Tried out in this country, it proved not only extremely heavy but was apt to collapse when the heat reached 1,000 degrees, Fahrenheit, or over.

Previous to 1883, a height of nine to ten stories was very nearly the practical limit in building construction. About this time it was found that isolated piers could be used effectively in foundation work, on which could be erected a light steel frame or cage, the steel members being riveted together. Before this, footings and walls had been compelled to carry their own weight, which limited the height to which a building could be carried.

In the new type of construction, with reinforced concrete piers and caissons resting on bed rock, the framing for each floor carries the weight of the walls around it. For this reason, only light curtain walls are necessary. Each steel member is protected from fire by several inches of clay tile or concrete.

This type of construction was first extensively used



Photo by Underwood & Underwood

The Famous Skyline of Manhattan, Showing Some of New York's Most Notable Skyscrapers. The Woolworth Building towers above all in background at center, right.

in Chicago. The "Rookery," erected in 1883, was an early example of the steel frame building. In 1890 the first twenty-story building—the Masonic Temple, now called the Capitol Building—was erected in Chicago. The Manhattan Life Building, New York, was probably the first notable example of the skyscraper in the East.

But, if Chicago set the style, New York soon eclipsed the earlier efforts. This is due to several factors: Manhattan Island is almost a solid rock; the conditions are most favorable for foundations and the municipal authorities have set no limit on the height of buildings. Then, too, it is the financial center, has an enormous population and realty values are almost fabulous.

The Park Row Office Building, erected in New York, 1897-8, astonished visitors to our shores by its towering height of 390 feet—30 stories. The era of the sky piercing tower may be said to have commenced about this time. Today, the skyline of Manhattan is made up of scores of these buildings—many of graceful architecture, as well as imposing appearance. Approaching New York from any direction, the sky contour is broken by such buildings as the following: Hudson River Tunnel Terminal Building, Trinity Building, City Investing Building, Park Row Building, Manhattan Life Building, Empire Building, Exchange Building, Bowling Green Building, Whitehall Building, Singer Building, Metropolitan Tower, the Woolworth Building and many others.

Holds Record at Height of 792 Ft.

Competition for height reached its climax with the latter three: first the Singer Building, at Broadway and Liberty streets, went to 47 stories, or 612 feet in height; then, the Metropolitan Tower, at 1 Madison avenue, which reached a height of 50 stories and 700 feet; finally, the Woolworth Building, at 233 Broadway, which topped them all with 51 stories and 792 feet. The Eiffel Tower, in France, 984 feet high, is the only structure which surpasses it.

Our former ideas of height must be revised when we consider that Cologne Cathedral is 516 feet high, Rouen Cathedral 490 feet, the Great Pyramid 485 feet, the Philadelphia City Hall 537 feet and the Washington Monument 555 feet.

It is told of Mr. Woolworth that the following conversation took place between himself and his architect:

"How high do you want the tower now?"

"How high can you make it?"

"It is for you to make the limit."

Mr. Woolworth had on his desk plans showing the height of the Metropolitan Tower. He studied these intently and then answered:

"Make it at least 50 feet higher than the Metropolitan Tower."

What would the ancients have said to this tenth wonder of the world, which is a city in itself, for it



Photo by Underwood & Underwood

The New Standard Oil Building at 26 Broadway, New York. Height, 505 feet; 32 stories; cost, over \$7,000,000.

houses 13,000 people? Fifty thousand persons pass in and out of its doors every day. It cost \$11,250,000. Its upkeep cost amounts to \$700,000 per year. It requires 14 window washers, constantly at work, to keep its 6,500 windows clean, and it has a visiting list of 375,000 persons per year.

The office space in the tower above the 30th floor is most in demand and brings the highest price. This is no doubt due to the better air and light in the upper stories and to the excellence of the express elevator service. New Yorkers, apparently, have unlimited confidence in the safety of the building and it is justifying this confidence. It is built to withstand a wind pressure of 160 miles per hour, although there is a slight sway during ordinary gales. This amounts to four inches each way, or eight inches in all. This slight sway is merely an indication of the natural elasticity of the steel.

The Singer Building, too, presents some interesting features. It weighs 90,000 tons, supported on caissons of solid concrete resting on bedrock, 92 feet below street level. In calculating the wind pressure, the engineers found that a wind pressure of 30 pounds per square foot would produce an overturning moment of 128,000 foot tons. This enormous pressure might lift one side of the building off its foundations. So,



Night Picture of the Beautiful Wrigley Building, Chicago. The light at the pinnacle of the tower flashes alternate red and white signals, which are visible to steamers across Lake Michigan.

wind anchors were devised, consisting of heavy steel rods which anchor the framework by being carried 50 feet down into the concrete piers.

The cantilever principle is made use of in the foundations so as to distribute part of the great weight and pressure resting on the outer piers to the inner foundation piers.

The Singer Building contains $9\frac{1}{2}$ acres of floor space, 15 miles of steam and water piping and 15,000 incandescent lamps. It contains no wood, either in construction or finish.

Beautiful lighting effects for high buildings were introduced with the completion of the Metropolitan Tower, which is flood-lighted nightly by a battery of lights directed against the tower, making it visible for 20 miles.

The tower of the Woolworth Building is even more brilliantly illuminated. From the roof of the main building at the 30th floor, and some other points, 600 automobile lamp projectors, each with a 250 watt light, play over its white glazed tile surfaces. An enormous lantern forms the pinnacle, 792 feet above the ground. It is illuminated from within by 24 lamps, each of 1,000 watts capacity. It flashes alternately

from red to white, the white light being particularly brilliant and visible 100 miles away.

From the standpoint of sheer architectural beauty, the Wrigley Building, Chicago, ranks very high among recent examples of skyscraper construction. It, too, is flood lighted and the tower surmounted by a brilliant light which flashes alternately red and white. It is visible as a lighthouse signal many miles across Lake Michigan. This building has proved so popular with tenants that the owners have found it advisable to add a sister building, or annex. Just across the Chicago River, on Michigan Boulevard, stands another new skyscraper of graceful design—the London Guarantee and Accident Company's new building.

Across the street from the Wrigley Building the new "Tribune" Tower now is under construction, the design for which won the first prize in a \$100,000 architectural contest. The plans call for a building of great height and beauty. For size and massiveness, two new Chicago buildings are also remarkable—the Federal Reserve Bank Building and the Illinois Merchants Bank Building.

Three main factors have made the skyscraper possible—concrete piers, steel framing and high speed elevators. In fact, without efficient elevator service, the upper floors of these structures would be vacant. The Woolworth Building has an elevator installation the schedule of which is maintained on the basis of seconds—not minutes. There are 28 elevators from the basement to the 12th floor; 12 elevators from the basement to the 27th floor; six "high rise" elevator shafts from the basement to the 41st, 46th and 51st floors; two service elevators to the 28th floor; a shuttle elevator to carry passengers from the 51st to the observation tower on the 54th floor.

There is no "starter." Instead, a dispatcher is



Photo by Fairchild Aerial Camera Corp., N. Y. C.

An Airplane View of a Part of Chicago's Loop. This picture was taken from over Grant Park. The building in the foreground is the Art Institute. The new Methodist Temple, with its spire, shows in the background.



Photo by Fairchild Aerial Camera Corp., N. Y. C.

Hartford, Conn., as Seen from the Air. Only a portion of the business district shows distinctly and yet a number of imposing skyscrapers are visible. This is typical of medium size American cities as well as the large and small ones.

located on the second floor with a flash indicator panel in front of him, similar to that in use in railroad terminals. There are 27 rows of flash signals, which show at a glance the location of any elevator. Communication is maintained with the operator in each car by means of loud speaking telephones, as well as flash signals manipulated by a bank of push buttons in front of the dispatcher. An automatic dispatching machine starts the cars at proper intervals in a balanced up and down movement. These cars are of the "traction" type of electric elevator and have a speed of 700 feet per minute, which enables a car to travel the entire height of the building in about one minute, if it makes no stops.

Besides the other safety devices, a pneumatic cushion is formed at the bottom of each shaft by a well which, in depth, is about one-tenth the height of the shaft. Into this, a "free" car may fall without injury. In an actual test, a "free" car was dropped from the top of the building into one of these wells without spilling a drop from a full glass of water which had been placed in the car.

Electric elevators of the gearless traction type are almost universally in use today for high speed elevator service. The hydraulic elevator reached a consid-

erable vogue some 12 to 15 years ago because it offered an unusual degree of safety and seemed better fitted for the power equipment of that day. It was high in first cost, difficult and slow of installation and the long plungers were always a source of trouble because of their tendency to get out of plumb.

The first electric elevators had a winding machine located usually in the basement, on which the cables were wound as the car ascended. Sometimes, these were located in an overhead pent house at the top of the building.

One of the first installations of high speed traction elevators was in the Majestic Building, Chicago. These cars had a speed of between 450 and 500 feet per minute. The elevators for the "Tribune" Tower, Chicago, will set a new speed mark—800 feet per minute. Each car will have its operator, but the stops will all be made by push button control. When a passenger pushes a button on the tenth floor as a signal for a car going up, the car will stop there without the volition of the operator. Further, a micro-leveling feature will cause each stop to be exactly flush with the floor. As passengers enter the car and call their floors, the operator presses the proper buttons to insure

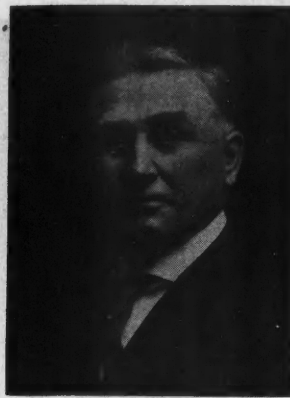
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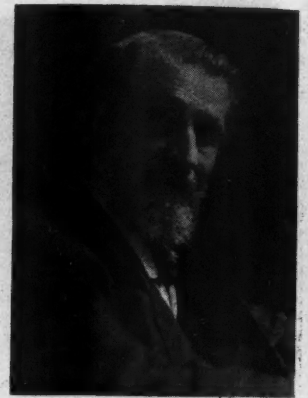
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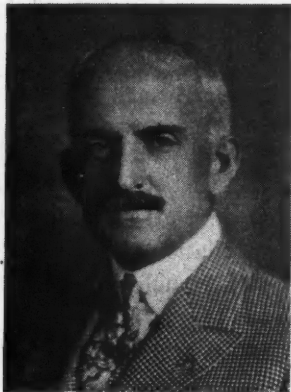
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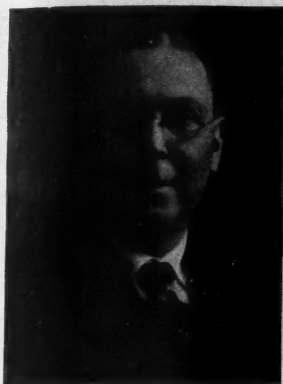
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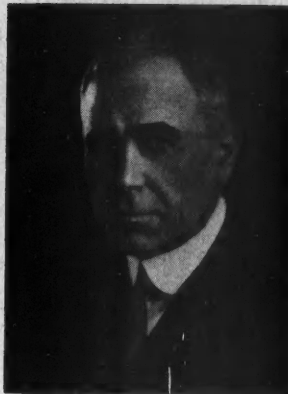
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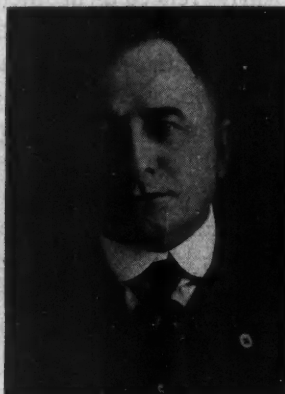
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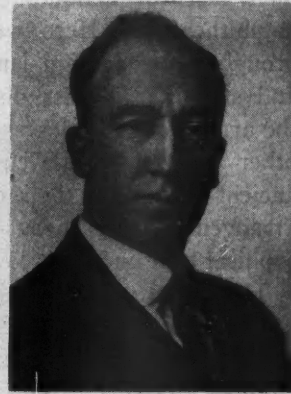
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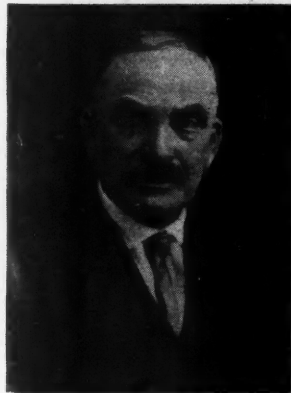
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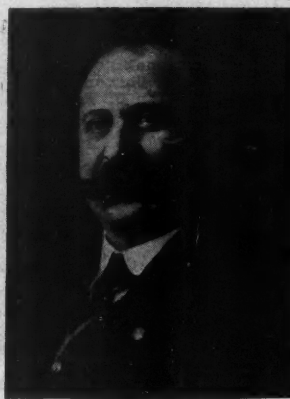
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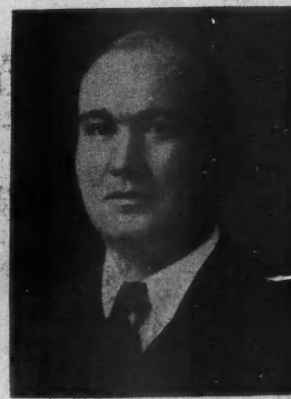
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Influence of Moving Picture Theatres

The Public Now Demands Fine Architecture, Luxurious Fittings and Decorations in All Places of Amusement

THE theatre has had an interesting evolution. Just as the actors reflect human life and "hold the mirror up to nature," so the buildings which house the theatre reflect the advancement of the human race.

The warlike character of the ancient Romans and their lust for conquest is clearly reflected in their amphitheatres. Here we find dens for wild beasts brought from foreign lands and facilities for combat and slaughter. Class distinction, too, is revealed by the arrangement of boxes and seats and there are many other indications of customs and character. The ancient Greeks, in their early theatres, showed by the arrangements for chorus and declamation their philosophical bent and their love for poetry.

The theatre is said to have originated in China, but little is known regarding its arrangement and use. The first recorded stone theatre in Rome was built by Pompey, 55 B. C. The first Greek theatres were located in surroundings which formed a natural amphitheatre—usually at the base of a hill. At the outset, it is probable there were only the natural seats provided by nature. Later, the seats were of wood and, still later, of hewn stone. Many of these stone seats are still to be seen at the site of the early Theatre of Dionysius, at Athens.

Thespis was the first to introduce professional actors, who declaimed the plays of Aeschylus, Sophocles and Euripides. Their theatre was not enclosed by walls or roof. The Roman amphitheatres were enclosed by walls only.

Even the early English theatres of Shakespeare's time had no roofs except over the stage. They were operated only during warm weather seasons. Spectators stood or brought stools, principally for use during intermissions. A large public stoup of ale stood at the entrance, where all might quench their thirst free of charge.

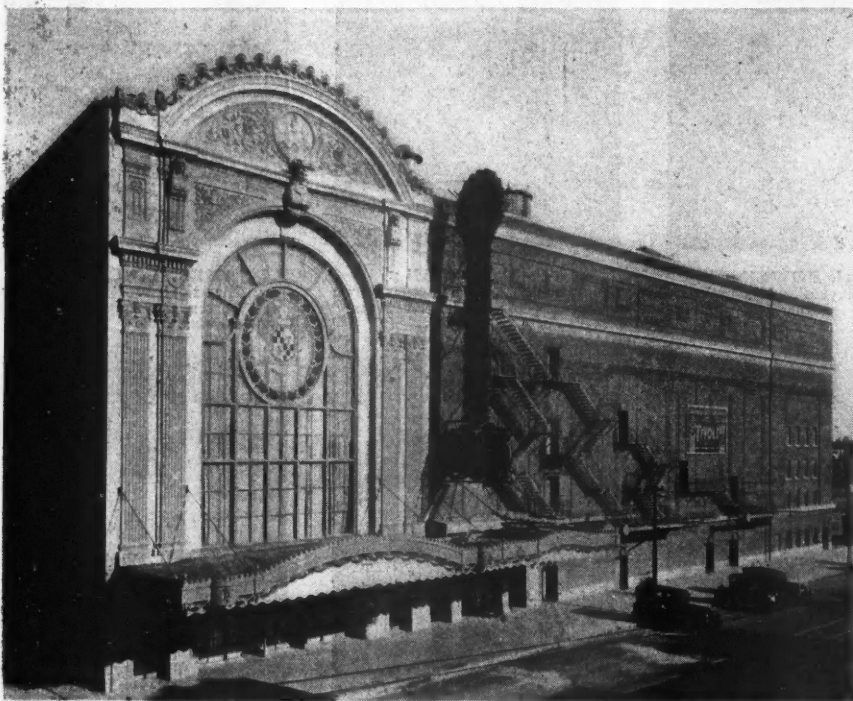
Shakespeare, himself, was manager of the Globe Theatre. At first, being an innovation, the theatre was frowned upon by the more conservative. It was not considered proper for a young woman of good repute to be seen there. This resulted in velvet masks being worn by those women who did attend.

The box was an early development of the English theatre. The rabble stood in the pit but spectators of the upper class were accommodated in boxes or even on the stage. As time went on and the patronage of the aristocracy increased, additional boxes were installed in double tiers. This led to a complete wall of boxes surrounding the pit and adjoining the proscenium arch at both sides. Class distinctions were probably

responsible for the installation of galleries when seats were installed in the pit, prices advanced and a better class of patrons occupied the "orchestra seats." There was then a somewhat reduced demand for boxes and the partitions were torn out, which left the balcony—a shallow affair at the back of the house.

When the partitions were removed from the boxes, it left the structural columns exposed. As balconies were enlarged, additional supporting columns were needed, which obstructed the view from many seats on the lower floor. This has been a serious defect in American theaters, only remedied within recent years.

Today very few theaters are being constructed with more than one balcony and this is partly due to the influence of moving pictures. The popularity of moving pictures has enlarged the field and the possibili-



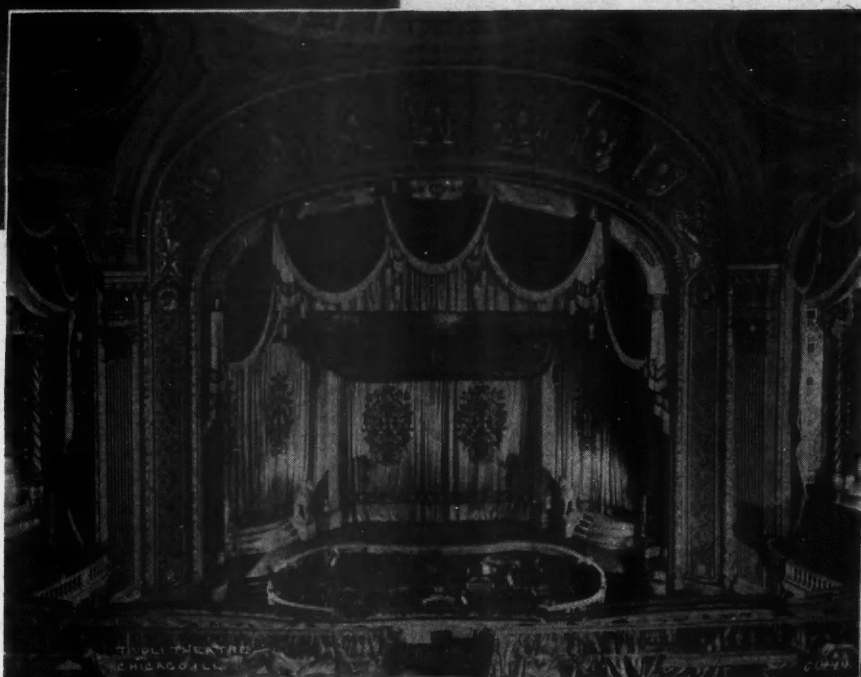
The Tivoli Theater, in the Woodlawn District, Chicago, is typical of the extensive plants not at all unusual of moving picture theaters. No class of buildings command more architectural skill or engineering ingenuity. Rapp & Rapp, architects.



Luxury Has Found No greater Development Than in the Moving Picture Theater. Above, a corridor of the Tivoli, Chicago.

brick or masonry walls but the flooring, "stepping," bridging and furring were of wood. For this reason, the galleries were firetraps. It was found that 75 per cent of all lives lost in theatre fires could be traced to gallery and balcony patrons. The effort to eliminate this danger has been an important factor in causing designers of theatre buildings to omit all but the first balcony. As now designed, the danger of trampling on stairways in case of panic is small indeed.

When steel construction was first introduced, it had a profound effect on theatre design. Not only did it reduce the fire risk—it greatly increased the loads which could be carried and made longer spans possible. This led to the substitution of one large balcony for a number of balconies and gallery, without cutting down the seating capacity. There remained, however, the obstruction of the columns. Engineering skill has now



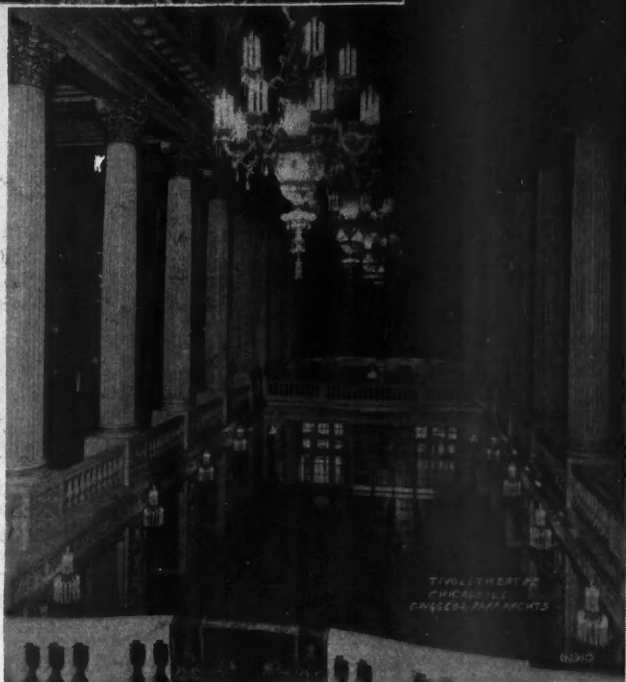
The Proscenium Arch is a Field for Luxuriant Color, Heightened at Will by the Skillful Use of great Batteries of Multicolored Lights, Which Vary the Lighting Colors, Tones and Intensity at the Will of the Operator.

The Foyer of the Tivoli (Below) Rises to a Vaulted Ceiling of Cathedral-like Height and Reveals a Wealth of Architectural Ornamentation.

ties for profit and brought about keen competition. This competition has led directly to many improvements, to make these theatres more attractive. The gallery, with its long, toilsome climb, has passed into history.

The angle of vision to the screen is an important factor in present-day design of theatre buildings. There must be at least 35 feet between the curtain line and the balcony rail, so that the "stepping," or pitch, will not be too great. The picture booth is usually placed on the mezzanine or balcony and the optical rule is that the angle of the light rays must not exceed 25 per cent. If this is exceeded, distortion results. Also, the front of the balcony must not obscure a view of the entire screen from the back.

Early theatre construction in this country often had





Douglas Fairbanks—You Can Almost See Him Bursting Into the Room Through the High, Balconied Windows, Laughing His Defiance at His Enemies or Doing a Dizzy Dive to the Floor in Such a Home Interior as the One Pictured Here. Living rooms of the vaulted ceiling, two-story type are becoming more and more popular in all types of homes. Though they originated in the architecture of the Mediterranean countries and were brought to America by the early Spanish immigrants, the spread of their vogue is traceable directly to the movies. And in their American manifestations, such rooms well may be classified as the "Douglas Fairbanks" type of home architecture.

completely solved this problem and theatre patrons do not have to peer around posts in modern auditoriums.

The method of supporting balconies without obstructing columns is frequently by means of the "K" truss—very similar in shape to a letter "K." This truss is a cantilever supported on columns close enough to the side walls and rear walls to avoid any obstruction of view. The "K" truss has a bearing in the side walls and also in the wall at the back of balcony. It has the advantage of requiring less head room than a plate girder and, consequently, allows a greater seating capacity in the balcony. Second balconies are sometimes hung from roof trusses.

Fires and panics have taken a heavy toll from the lives of theatre patrons, which has led to strict municipal supervision and regulation of theatre design. This applies particularly to the number, location and size of stairways and exits and to the fire resisting qualities of the building material and finish. It requires the marking and lighting of exits, regulates the number and size of aisles, the grouping of seats, the "stepping" of floors and many other details.

The width of corridors is fixed by the Chicago building ordinance at a minimum of 4 feet and of stairways at 20 inches for every 100 persons in the room served by the stairway. Thus, where the seating capacity of a balcony is 800, the stairways would have to be 13 feet 4 inches wide. All stairways must have handrailings on both sides, and, when over 7 feet wide, must have double intermediate hand rails. Stairways can only extend 13 feet 6 inches between landings. Treads must not be narrower than 10 inches nor have a rise greater than 8 inches.

A solid brick wall is required between the auditorium and the stage, with a steel curtain in the proscenium arch. There are many other stringent provisions in this ordinance relating to the construction and equipment of theatres. It is so thorough in its public safety provisions that it has been adopted as a model by a large number of cities in the United States.

Practically every theatre erected today is equipped for the showing of motion pictures. In fact, the "movies" have been responsible for a theatrical building boom. A number of years ago there was a tendency to cheap, small structures. Today remarkably fine structures are being erected for this purpose. Many are scientifically designed, beautifully adorned and classic in their architecture. Lobbies frequently have graceful columns, artistic sculpture, mosaic floors and tile ornament, while foyers, lounges, corridors and smoking rooms are often adorned with murals by accomplished artists. Stairways, passageways and aisles have resilient, silent treads. The plaster decoration, painting, color and lighting effects of these auditoriums are usually of great beauty and harmony. They are frequently equipped with large, expensive pipe organs, in addition to orchestras. Heating and ventilation are often ideal, providing 30 cubic feet of fresh air per

person per minute. In winter and summer, the air is kept at 70 degrees.

The modern theatre is more perfectly ventilated, heated and cooled than most other structures. In winter, fresh air is drawn from outside through steam tempering coils, which warms it. From here it goes to air-washers located in the basement, which remove dust or other impurities.

These air-washers are of galvanized, non-rusting metal and, in them, the air is passed through a fine water spray. This spray, from a number of specially designed nozzles, fills the spray chamber and falls into a sump below. From there, the water is passed over scrub plates, strained, goes to a circulating pump and is again forced through the nozzles in the spray chamber.

The entrained water is now removed from the air by means of eliminator plates and the air passed over steam heating coils and a steam ejector, to heat and humidify it. It is then forced by a fan into a plenum, or air chamber. From here, ducts take the warm, fresh air to the auditorium, where it is usually admitted through openings under the seats and the vitiated air drawn out by exhaust fans located in the ceiling. The inlets for the warmed air in the winter and the cooled air in the summer is usually through mushroom openings raised above the floor far enough to prevent dust or refuse from falling into them when the fans are not at work.

In the summer, refrigerating coils take the place of the tempering and heating coils. By this means, delightfully fresh and cool air is delivered to the auditorium during warm weather.

The heating and ventilating problem in the average theatre can be better appreciated when it is remembered that between 5,000,000 and 6,000,000 cubic feet of air is passed through the heating and ventilating system of a large theatre in one hour.

It is impossible, in an article of this length, to describe or even mention all the beautiful new theatres which have been erected in the United States during the last few years. One of the most recent examples of fine theatre construction is the B. F. Keith Palace Theatre, of Cleveland, designed by Rapp and Rapp, architects, of Chicago.

This theatre is located in a 21-story office building of steel frame construction, with concrete floor slabs and with foundations resting on concrete piles. The building stands on a lot which measures 135 feet by 300 feet and the area of all floors totals 200,000 square feet. It is imposing in appearance and of modern design and equipment throughout.

The theatre, itself, is one of the most beautiful in the United States and seats 3,600 people. Its main lobby, staircases and mezzanine constitute an art gallery of rare beauty in architectural design, decoration and paintings by original masters. The main lobby is 18 feet wide by 75 feet long. The walls of the lobby

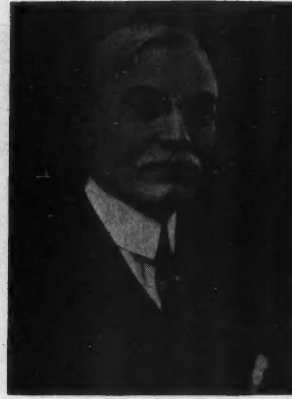
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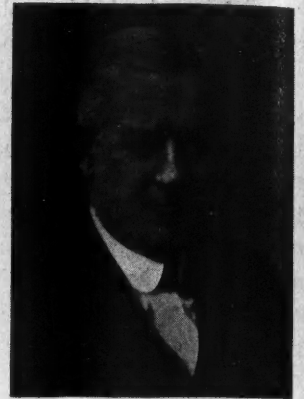
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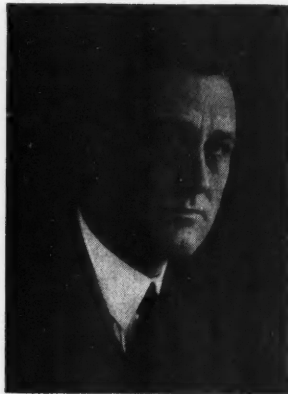
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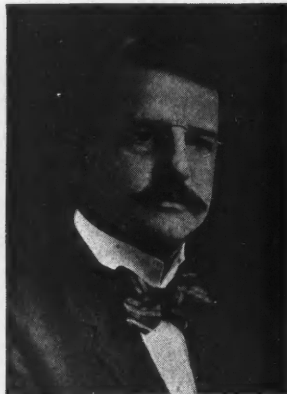
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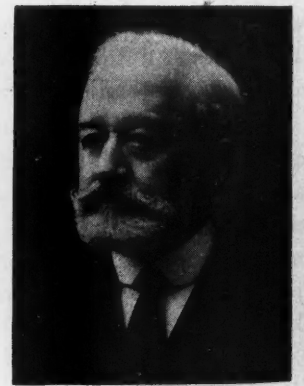
FRANKLIN D. ROOSEVELT
Pres. American Construction Council.



D. KNICKERBACKER BOYD
Exec. Vice-Pres. American Construction Council.
Gutekunst Photo



DWIGHT L. HOOPINGARTNER
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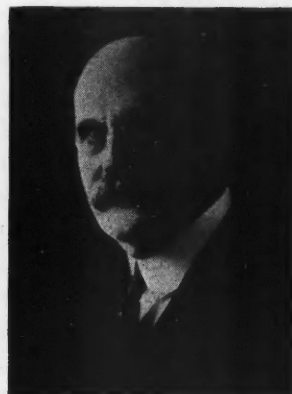
ADELBERT E. COLEMAN
Pres. National Assn. of Building Trades Employers.
Varney Photo



WILLIAM WOOLLEY
Secy.-Mgr. National Trade Extension Bureau.



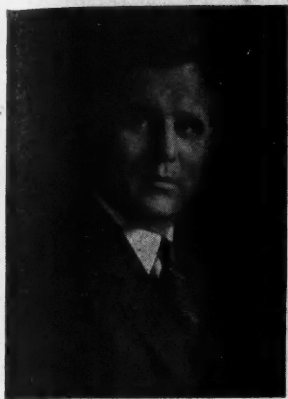
ALLEN W. WILLIAMS
Secy. National Warm Air Heating and Ventilating Assn.



HENRY B. GOMBERS
Secy. Heating & Piping Contractors' National Assn.



JOS. W. CANNON, JR.
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Mecca Photo



WILSON COMPTON
Secy.-Mgr. National Lumber Manufacturers' Assn.
Harris & Ewing Photo



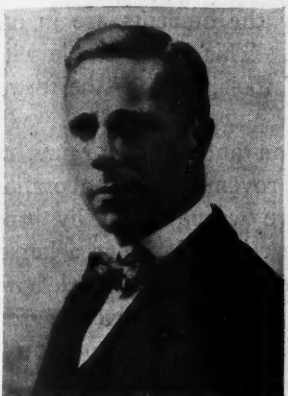
H. C. BERCKES
Secy.-Mgr. Southern Pine Assn.



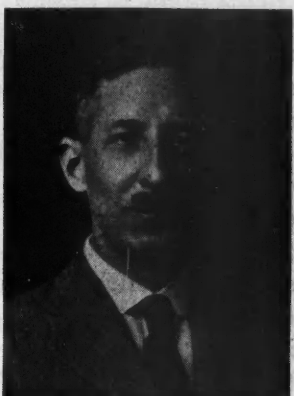
E. W. MCKAY
Secy.-Mgr. Southern Cypress Manufacturers' Assn.



JOHN M. GIBBS
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Moffett Photo



R. F. HAMMATT
Secy.-Mgr. California Redwood Mfrs. Assn.
Hartscock Photo



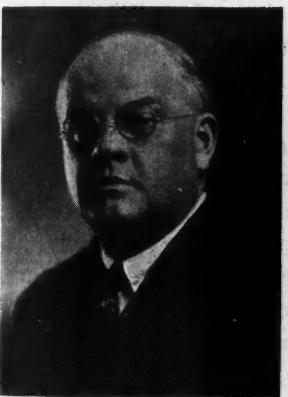
C. STOWEL SMITH
Secy.-Mgr. California White and Sugar Pine Mfrs. Assn.



ROBERT B. ALLEN
Mgr. West Coast Lumbermen's Assn.



A. W. COOPER
Secy.-Mgr. Western Pine Mfrs. Assn.



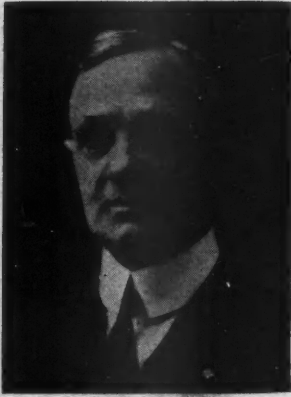
R. S. WHITING
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F. S. FULWILER
Secy. Western Red Cedar Assn.



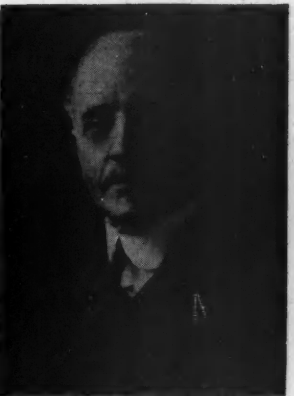
F. C. SCHMITZ
Secy. Mahogany Assn., Inc.
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J. C. KNOX
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Secy. Millwork Cost Bureau.
Brual Photo

Tools Since the Stone Age

Hand Tools a Heritage from the Early Days of Man—Many Hundred Varieties Now Used in the Building Trades

MANKIND emerged from barbarism largely by the fashioning and use of tools. The history of that early struggle is plainly shown by fossil remains and excavations at the sites of ancient villages. These have been wonderfully preserved in the buried treasures of nature through many centuries—probably millions of years.

Tools first appear among remains of the latter half of the Stone Age—the Neolithic Era. The kitchen middens of Denmark, the lake dwellings of Switzerland and the “crannogs” of the British Isles contain specimens of stone weapons and tools. By this time, early man had learned, not only to fashion rude implements of stone, but to polish them, as well. From that time forward an improvement is revealed in the variety, design and material of the early tools—first of stone, then of bronze, then of iron, then of steel and now of alloy steel.

The human hand, of course, came first, and many tools in use today reveal the evolution of tools from primitive conditions. For instance, the hammer clearly imitates the closed fist and arm striking a downward

blow. Some of our cutting and boring tools doubtless owe their inspiration to the fangs and horns of wild animals as adapted by semi-barbarous man.

A wonderful step in advance was made when man first found metals which he could fashion, such as copper. Tools of bronze were used in many parts of the world even before the ancient Egyptian civilization, when they were intensively developed. The early builders of the ark must have had woodworking tools, and it is likely that these were of copper. Some of the early tools developed by the ancients are in use today with but little change. This is noticeable with some plasterers' and masons' tools, such as the trowel and the float.

With the discovery of iron and steel forging, of course, came the greatest improvement and elaboration of tools. At first they were wrought out by hand forging, very much as a blacksmith fashions a horse-shoe on the anvil. With the discovery of steel, however, progress in the making of tools received a great impetus. Accidental quenching in water brought the first knowledge of the hardening and tempering of metals, as it was soon noticed that, when iron was cooled rapidly, it became harder than if allowed to cool slowly. However, iron or steel so quenched was apt to be brittle and easily broken. It was noticed that iron so treated had a different fracture from iron which cooled slowly—that it showed crystallization. So started a study of metallurgy, to which is due the edge-keeping qualities of our modern cutting tools. Oil tempering was found to give a tougher hardness to steel and is generally used in the manufacture of tool steel. Metallurgical chemistry soon revealed that, by controlling the different elements in steel mixtures, the quality of the steel itself could be controlled. Hardness, toughness, brittleness or softness, could be gained by proportioning the carbon, silicon, manganese, rate of cooling, etc., which led directly to the use of alloys and high grade, modern tool steels. Nickel, chromium, carbon, silicon, titanium and molybdenum are some of the alloys by means of which wonderful improvements have been effected in the hardness, toughness and other necessary qualities of tool steels.

There are so many varieties of hand tools in use today that it is scarcely possible to enumerate them all. Merely those tools used in the building trades make a formidable list and run into hundreds of items. Stonecutters, masons, bricklayers, lumbermen, carpenters, cement and concrete workers, lathers and plasterers, plumbers, tinnerns, roofers, slaters, electrical workers, and so on, all through the list of craftsmen, each have tools peculiar to their craft, in addition to those which are used in common.



In the Sudan, Africa, This Crude and Primitive Method of Sawing Is Still in Common Use.

The results attained by any craftsman are in direct proportion to his skill and his tool equipment. The efficiency of the worker is profoundly affected by the convenience and balance of the tool to his hand. And every good craftsman is most particular in his selection of tools and meticulous in his care of them. Even the farmer uses great pains to keep his plowshare smooth and bright. He knows that a good plow will be easier on his horses than a poor one and will turn over more acres in a day.

The woodsman's axe and adze must have almost as keen an edge as a razor. The bricklayer is most particular about his trowel, its shape and balance, the swing he can get with it to break a brick, the angle of its smoothing edge, the shape of the handle and other qualities which he cannot analyze but can only feel. A lather will do more and better work with his favorite hatchet, and a plasterer has more skill with his accustomed tool. A carpenter cannot saw as true a cut or as many of them in a day if deprived of his favorite saw. Indeed, it is said that a good workman loves his tools and it is almost as true that the ability of a workman can be gauged by the tools he uses.

A progressive workman will keep his tool-box up to date and have as many time-saving or quality-improving tools in his kit as he possibly can. For instance, there are small automatic hand drills on the market which will drill a hole for a nail or a screw before an auger bit and brace could be adjusted; also, reciprocal drills which revolve in the same direction on the backward as on the forward stroke, thus providing continuous drilling action. This doubles the efficiency of the one-way drill. Screwdrivers of the same automatic type can also be had, which speed up the work of putting in screws. Convenient corner braces and angular braces are manufactured with which auger holes can be made in locations approachable only from a difficult angle. Mitre boxes are on sale which are instantly adjustable to any angle, quick-acting vises which can be tightened in a fraction of the time needed with the old style vise, and many other improved tools which speed up the work. Good tools multiply the efficiency of the worker, just as the jack with one man will raise a greater weight than a gang of men without jacks.

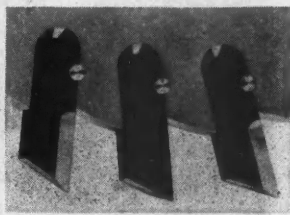
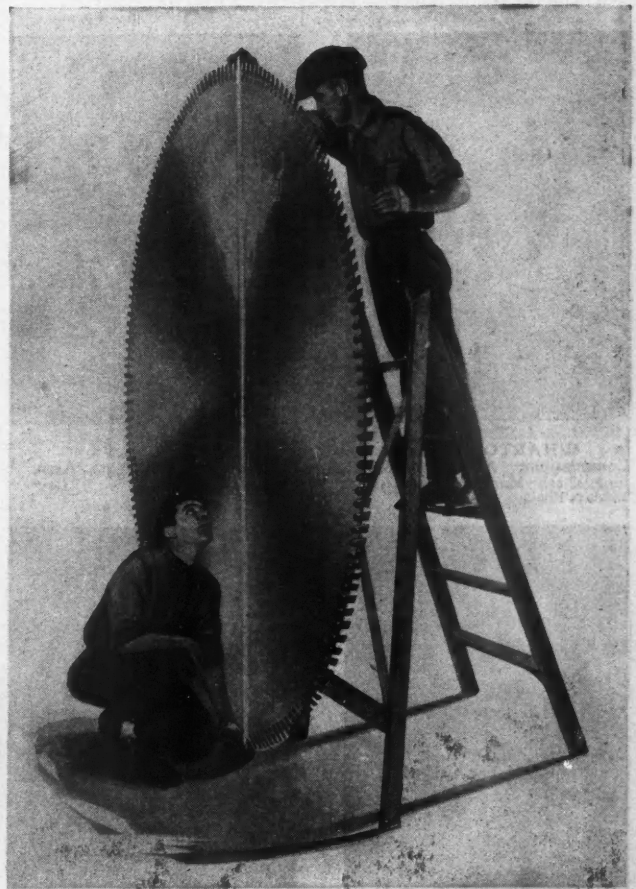
Perhaps no tool used by the carpenter has such a bewildering variety of uses as the plane. For instance, smoothing planes, jack planes, jointer planes, mitre planes, oar planes, astragals, side beads, center beads, torus beads, cove, quarter round, moulding planes, coping planes, dados, filletsters, ogees, ogee quirk and bead, Grecian and reverse ogees, Grecian ovolo and fillet, Grecian ovolo and bead, hollows and rounds, matched planes, nosings,

panel plows, rabbet planes, reeding planes, snipe bills, sash planes, weather strip planes—this is but a partial list of the many types of planes in use. Both wood or block planes, aluminum top and steel planes find various uses. The wise carpenter, while he may be conservative in his original assortment, possibly confining it at first to a jack plane, a smoothing plane and a few small block planes, will be sure to add special planes as his need for them arises. American made planes are unsurpassed for quality and convenience of design.

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There is indisputable evidence that saws were in use during the Bronze Age, chiefly in ancient Egypt, whence their use spread to Greece and other countries. The use of steel saws is also indicated, at a later date, in ancient Egyptian paintings. These were one-handed saws, with the teeth inclined toward the handle, and

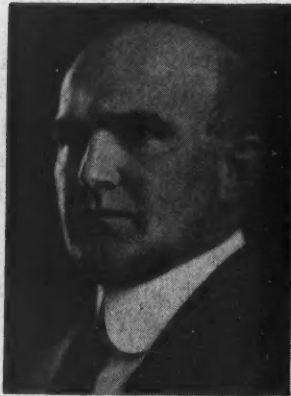
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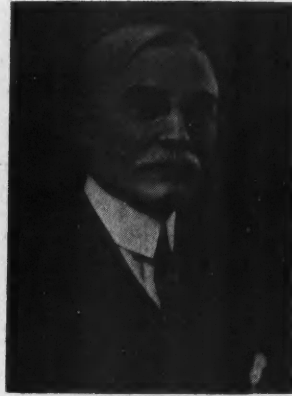
Type of Giant Size Circular Saw Now Employed in American Saw Mills. This one of the inserted tooth variety measures 108 inches in diameter, the largest yet made.



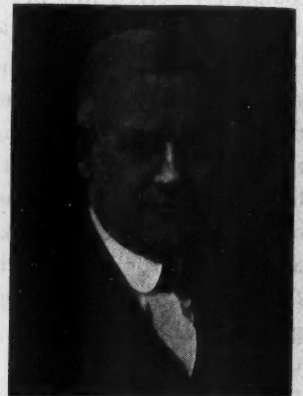
FREDERICK L. CRANFORD
Pres. Associated General Contractors of America.



GEN. R. C. MARSHALL, JR.
Gen. Mgr. Associated General Contractors of America.
Harris & Ewing Photo



E. M. CRAIG
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J. H. CRANFORD
Pres. American Road Builders' Assn.
Moffett Photo



H. R. ENNIS
Pres. National Assn. of Real Estate Boards.
Moore Photo



H. U. NELSON
Exec. Secy. National Assn. of Real Estate Boards.
Dague Photo



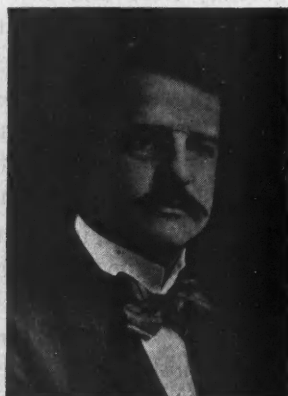
WM. F. CHEW
Pres. National Assn. of Builders' Exchanges.



EARL F. STOKES
Executive Secy. National Assn. of Builders' Exchanges.



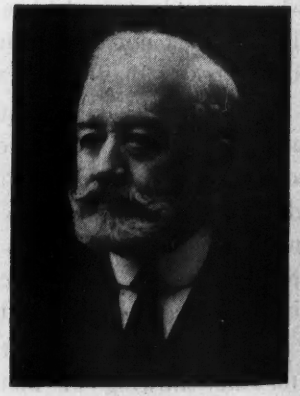
FRANKLIN D. ROOSEVELT
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Gutekunst Photo



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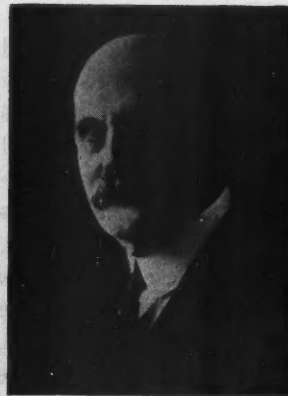
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Pres. National Assn. of Building Trades Employers.
Varney Photo



WILLIAM WOOLLEY
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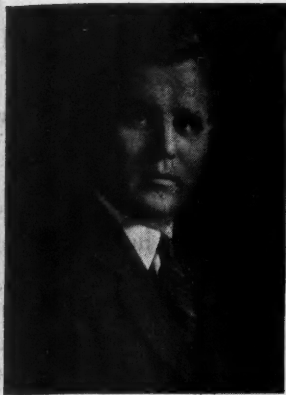
ALLEN W. WILLIAMS
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Mecca Photo



WILSON COMPTON
Secy.-Mgr. National Lumber Manufacturers' Assn.
Harris & Ewing Photo



H. C. BERCKES
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Moffett Photo



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Secy.-Mgr. California Redwood Mfrs. Assn.
Hartsok Photo



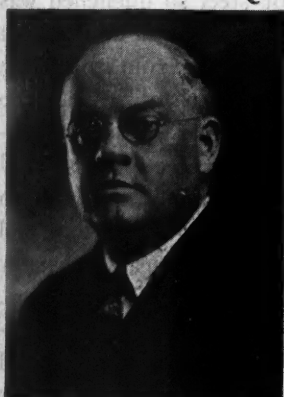
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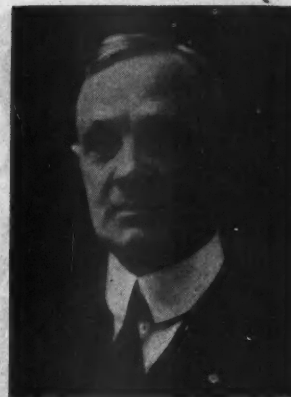
R. S. WHITING
Mgr. Red Cedar Shingle Bureau



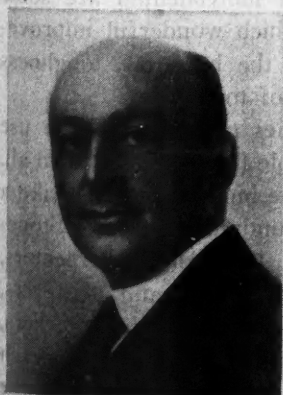
F. S. FULWILER
Secy. Western Red Cedar Assn.



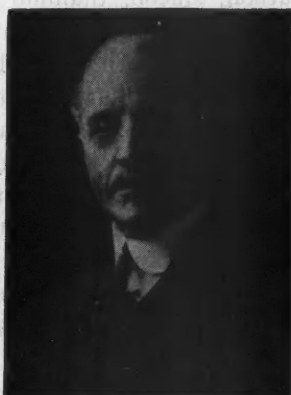
F. C. SCHMITZ
Secy. Mahogany Assn., Inc.
Mersereau Photo



J. C. KNOX
Secy. Michigan Hardwood Mfrs. Assn.
Noble Photo



FRANK F. FISH
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Steffens Photo



FRANK J. MOSS
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E. J. CURTIS
Pres. Millwork Cost Bureau.
Moffett Photo



W. P. FLINT
Secy. Millwork Cost Bureau.
Bruuel Photo

Tools Since the Stone Age

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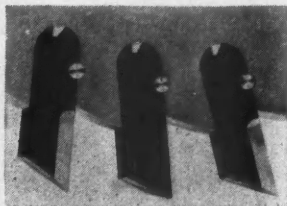
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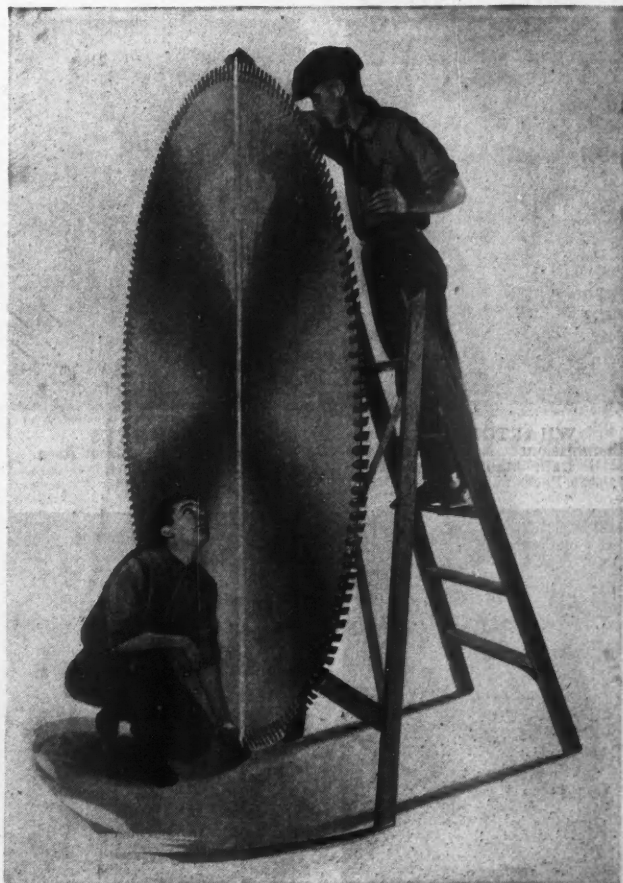


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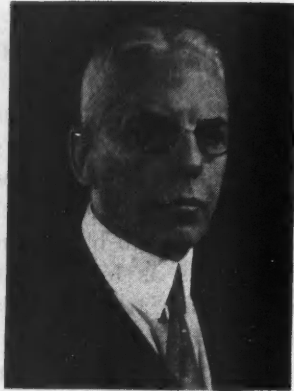
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Type of Giant Size Circular Saw Now Employed in American Saw Mills. This one of the inserted tooth variety measures 108 inches in diameter, the largest yet made.



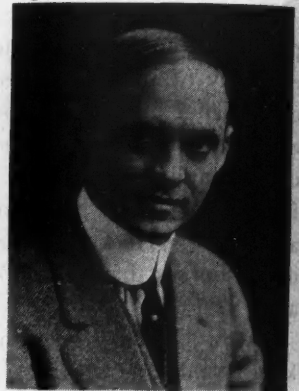
WM. M. KINNEY
Gen. Mgr. Portland Cement Assn.
Underwood & Underwood Photo



H. COLIN CAMPBELL
Mgr. Adv. and Publication Bureau,
Portland Cement Assn.



BURTON A. FORD
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facturers' Assn. of America.



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Secy. Hollow Building Tile Assn.
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F. W. WALKER
Secy. Associated Tile Manufac-
turers.
Graule Photo



F. S. LAURENCE
Exec. Secy. National Terra Cotta
Society.
Clinedinst Photo



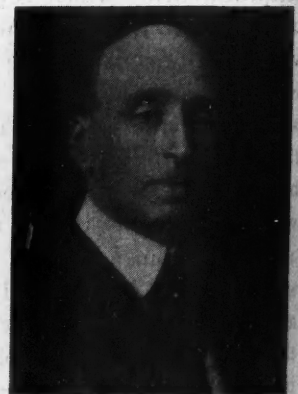
WHARTON CLAY
Commissioner Associated Metal
Lath Manufacturers.
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W. S. HAYS
Secy. National Slate Assn.
Bachrach Photo



A. P. SANDLES
Secy. National Crushed Stone
Assn.



T. R. BARROWS
Exec. Secy. National Sand and
Gravel Assn.
Brooks-Stevens Photo



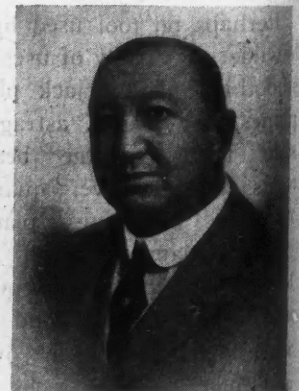
WM. A. WILLIS
Mgr. Copper and Brass Research
Assn.
Underwood & Underwood Photo



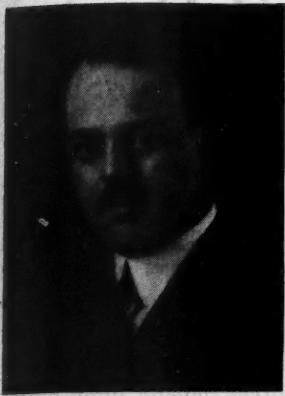
W. W. SCHUPNER
Secy.-Directing Mgr. National-
American Wholesale Lumber Assn.
Farony Photo



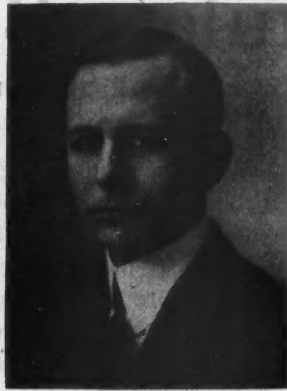
N. L. GODFREY
Secy. Wholesale Sash and Door
Assn.
Melvin H. Sykes Photo



H. F. CELLARIUS
Secy. U. S. League of Local
Bldg. & Loan Assns.
Benjamin Photo



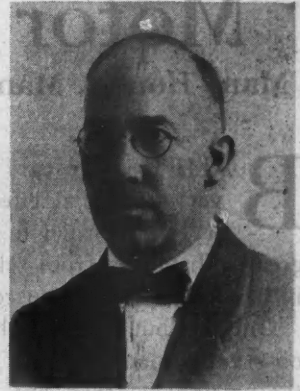
GEO. N. LAMB
Secy. American Walnut Manufacturers' Assn.
Steffens Photo



O. T. SWAN
Secy. Birch Manufacturers' Assn.
Moffett Photo



H. T. DIDESCH
Managing Director Millwork Institute of California



P. R. HICKS
Secy.-Treas., American Wood Preservers' Assn.



J. M. PRITCHARD
Secy. Hardwood Manufacturers' Institute.
Poland Photo



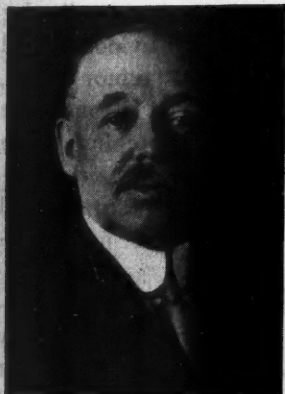
WM. L. CLAFFEY
Secy. & Treas. Oak Flooring Manufacturers' Assn. of the U. S.
Spellman Photo



C. W. COUSENS
Adv. Director Wallpaper Manufacturers' Assn.



JOHN LIND
Secy. Prepared Roofing and Shingle Mfrs.' Assn.
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Pres. National Paint, Oil and Varnish Assn.



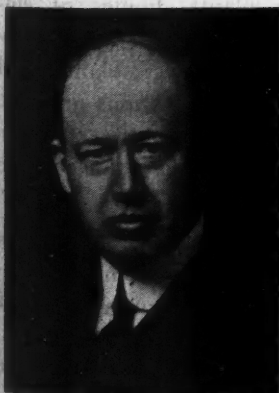
GEORGE V. HORGAN
Secy. National Paint, Oil and Varnish Assn.



ERNEST T. TRIGG
Chairman National Save the Surface Campaign.
Photo-Crafters Photo



ARTHUR M. EAST
Bus. Mgr. Save the Surface Campaign.
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MILAN R. BUMP
Chairman Joint Committee for Business Development.
Mrs. L. Hill's Photo



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Director Joint Committee for Business Development.



W. L. GOODWIN
Operating Vice-Pres. Society for Electrical Development, Inc.
Brown Bros. Photo



CHAS. H. HOFRICHTER
Secy. National Council Lighting Fixture Manufacturers.
Bachrach Photo

Motor Cars Stimulate Building

Many Homes, Manufacturing Plants, Garages, Filling Stations and Repair Shops Are Result of Automobile Development

BOTH pleasure cars and auto truck have had a very beneficial effect upon the building industry—the former in influencing home building at greater distances from settled districts, and the latter in handling materials in construction work.

One has but to drive through suburban districts to observe residences of all kinds so far removed from their neighbors that, but for the automobile it would mean virtual isolation and loneliness. Owners of these houses, in many cases, would prefer to live in town were it not for the convenient transportation facilities provided by motor cars. If distance were the only consideration the average motor car owner would not hesitate to build his home "out in the woods."

This condition is common to all cities and towns, and makes a huge total investment in home building, when the whole country is considered. It also answers effectively the complaint heard during the early days of automobile development that people desiring to invest money in homes might be persuaded to spend it for pleasure cars instead. That home building and automobiles would progress hand-in-hand was not generally anticipated.

Suburban development for which the motor car is chiefly responsible includes business buildings as well as residences. Naturally, when a district increases in population, the erection of stores, churches, lodge halls, moving picture houses, garages and other business and social structures quickly follows the building of homes.

This situation is by no means confined to suburbs of cities, but exists in all communities. Medium-sized towns now have their suburbs, and in numerous instances "new town" has outgrown the older section. Thus it may be truly stated that the motor car has brought about an enormous quantity of construction work which otherwise would have not been under-

taken, or else would have been long deferred.

Probably the well-informed automobile man could have much to say about the increased benefit upon the health of motor car owners, who get out into the open air more than formerly. The inherent desire to seek the woods and streams for recreation has resulted in the building of countless summer camps and private cottages, whose owners or renters depend upon motor cars for transportation during week-end outings. These summer structures, while not generally very substantially built, are often quite artistic and of particular interest to the building industry, they provide a great amount of work for building contractors.

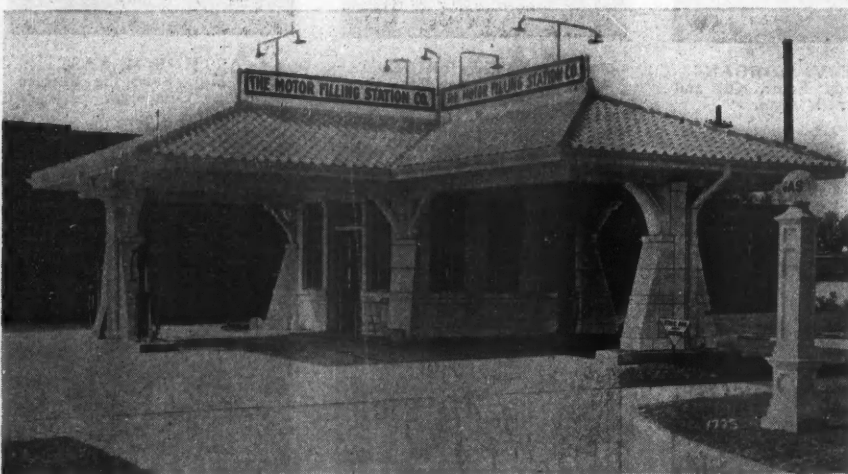
In studying the effects of the automobile upon the building industry, the building contractor is more likely to consider only the motor truck. This is natural, as it is used directly in his own operations. There is no doubt that a tremendous impetus to building has been given by the auto truck. It supplies that factor most important in modern industry, namely, service; and in no kind of commercial activity is service valued higher than in construction work, where it even takes precedence over operating expenses.

Where Speed Is Economy

In the interest of their sales departments the motor truck manufacturers for years have been collecting cost data on motor and team hauling. In dollars and cents the findings do not always favor motor trucks, but the ever-increasing demand for speed has made the horse-and-wagon practice almost obsolete in a large part of the building industry. Under certain conditions, such as long hauls, bigger loads, endurance and emergency deliveries, motor trucks are more economical.

The building contractor can also look to the automobile as the direct source of many of his important jobs. A great number of public garages and countless private garages, as well as automobile manufacturing and assembling plants, homes of employes, sales buildings, auto accessory manufacturing plants and salesrooms, filling stations and auto repair shops, have been erected in recent years—all new business to the builder.

To comprehend the building work in connection with automobile manufacturing would mean a survey of the whole industry—a sizeable task, since that industry has become the world's largest, according to state-



Motor Filling Stations, Occupying so Many Prominent Corners in Cities and Towns, Are Often Built in Such a Manner That They Add Attractiveness to Their Immediate Neighborhood.



This Typical Garage Building Was Recently Completed in Lansing, Mich. Space for service, washing and overhauling is usually provided in the rear, sales display in front. Thousands of them are being erected all over the United States.

ments of its own leaders. Automobile manufacturing plants are necessarily of mammoth proportions and call for a vast quantity of plans, materials and labor. Whole cities are built about them and, in some instances, exist wholly upon the activity of these places. In fact, there are examples of great increase in population as the direct and indirect result of establishing plants in certain sections.

One appreciable contribution of automobile making to the building industry is the growing disposition of manufacturers to require their employes to become more substantial citizens—in other words, home owners. Admirable progress along this line has been made in some localities, and the uplifting moral effects and stabilizing industrial influence coming from the pursuance of this policy has prompted its increasing adoption.

A visit through the home sections in automobile manufacturing centers reveals unusually attractive and well-kept residences and public buildings of all types. Prosperity has partly brought this about, of course; but the point is that it has been well-placed prosperity, in which the building industry has shared to a considerable extent. And this is increasing every year with the coming of new types of motor cars and the building of new plants.

Garages Important in Construction Program

The public garage, with its special construction features and built-in equipment, and its immaculate car and auto accessory salesrooms, is now an important part of the building contractor's operations. The garage owner has become a progressive business man in recent years, and in many cases devotes as much attention to the selling of cars and accessories as to repair work.

Into the construction of the modern public garage the builder is called upon to install certain special features. These include display windows, shelving and tables for the car and accessory sales departments; and elevator, charging benches, air compressor foundation, etc., for the repair shop.

Garages require careful planning, especially where the lot is narrow, to provide maximum storage space for cars. If the planning is not done intelligently too many parking spaces may be displaced by poorly locating the office, salesroom, accessory store or elevator.

Two admirable features of the modern filling station are the wonderful attractiveness and surprising compactness that have been put into such small structures. Ranging in style from the tiny square, neatly trimmed type to much larger ones having a cathedral-like aspect, their design, and the growing extent of such work, are of special interest to the building contractor. The majority are of medium size and represent an investment which, in addition to the service feature, recognizes the value of building attractively in order to draw trade.

The contractor is particularly interested in the floor plan and ground layout when figuring on a filling station job, for nearly every lot has its own peculiar conditions regarding approaches and proper location of storage tanks, air supply, as well as the main building.

Salesroom, storeroom, toilet and spaces for heating plant, air compressor and pump stands go to make up the average filling station. Indeed, manufacturers of filling station equipment emphasize the importance of carefully planning these rooms. Their convenient arrangement has much bearing upon the prosperity of the station.

Filling station construction has become fairly well standardized since the first one was built about a dozen years ago, though the variation in plans and layout, together with the wide range of acceptable materials and the architectural possibilities appeal to the imagination of the designer and builder. And, despite the great number of stations already erected, it is predicted that many more will be needed, due to the increased use of motor cars.

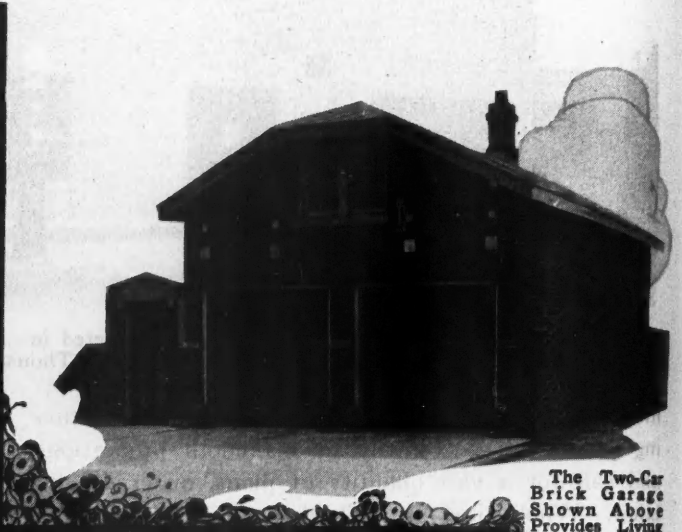
In the building of filling stations it is necessary to take certain factors into consideration. One of these concerns covered driveways. This type adds 25 to 40 per cent to the cost of building a filling station, but that

(Continued to page 278.)

Garages for Cars of All Types

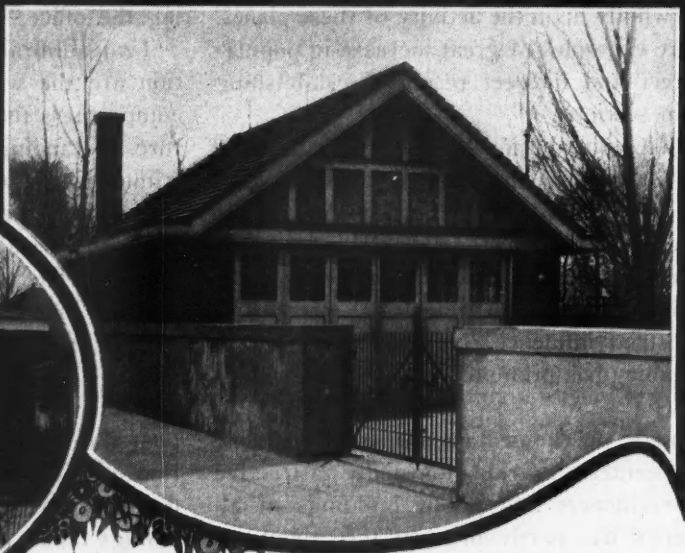


For the Larger Stucco Home This Two-Car Garage Will Be Suitable.

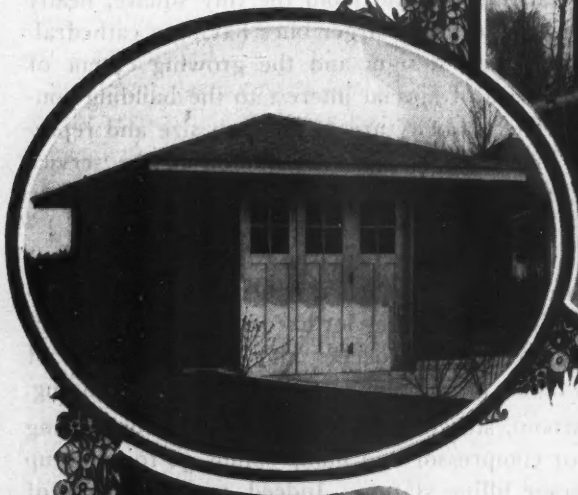


The Two-Car Brick Garage Shown Above Provides Living Quarters for the Chauffeur on the Upper Floor.

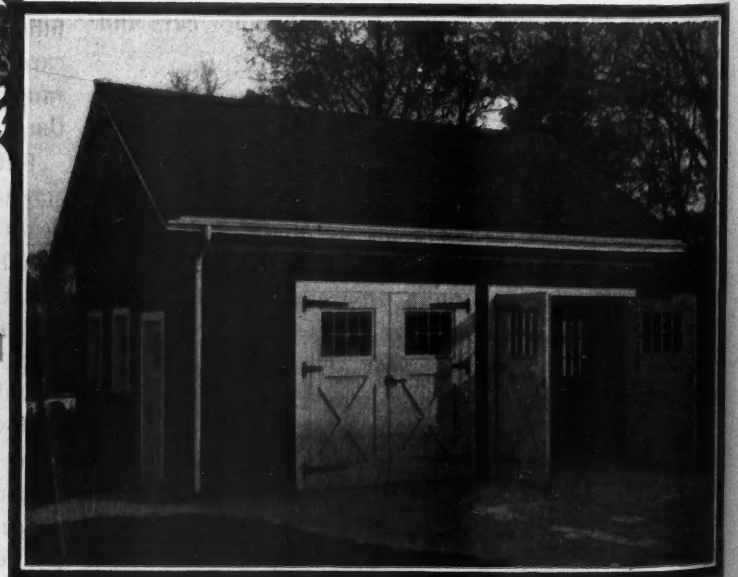
In the Oval Below Is a Design for the Brick Bungalow to House One Car.



The Gateway to the Street Makes This Garage Suitable for the Home Built on a Corner Lot.



Shelter for the Automobiles of Apartment Dwellers Often Presents a Difficult Problem. A practical, convenient and attractive solution is shown above.



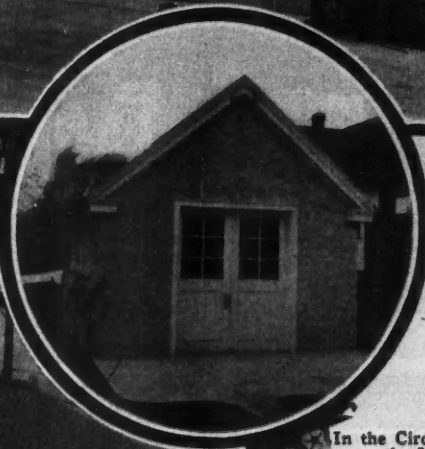
Ample Space for Two Automobiles and a Well Lighted Workbench Are Provided in This Attractive Shingled Building.



The Good Proportions, Simple Lines and Attractive White Trim of the Garage Above Make It Suitable for the Colonial Home of Brick.



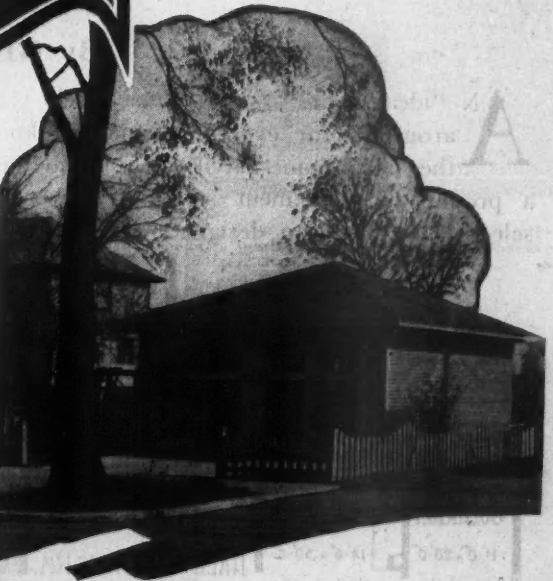
For the Large Stucco Home of the Spanish Type the Two-Car Garage Above Will Be Found Fitting.



In the Circle Is a Stucco Design for the More Modest Home.



The Tile Roof of This Brick and Stucco Garage Will Strike a Common Note with the House for Which It Is Built.



For the Square Frame House the Two-Car Garage Above Will Be Practical and Economical.

Three Automobiles May Be Housed in the Frame Garage Presented Here, with Living Quarters for the Driver on the Second Floor.



This Home, Built to Display Home Fittings Under Ideal Conditions, Offers Many Ideas for Builders of Houses. Francis A. Nelson, Architect.

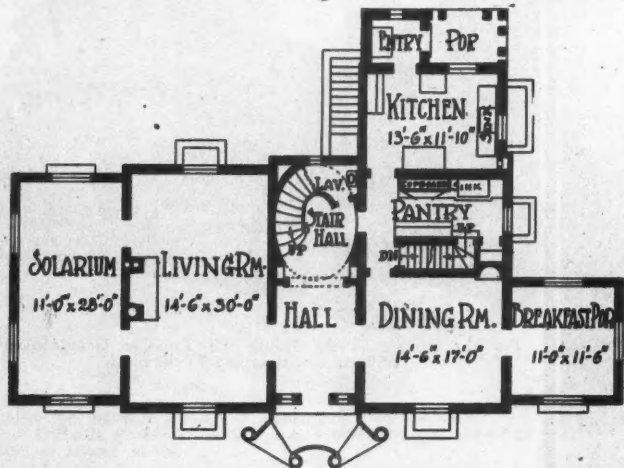
Store Builds "Ideal Home"

Newark, N. J., Department Store Erects Home to Show All That Is Desired in Home for Modern Well-to-do Family

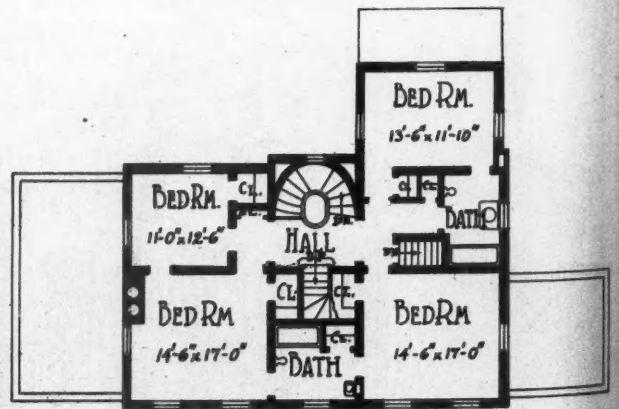
By GILBERT I. STODOLA

AN "ideal home." The phrase itself is interesting, for everyone wants to know what the "ideal home" is like. L. Bamberger & Co., a prominent department store of Newark, N. J., selected the name to designate a house which they

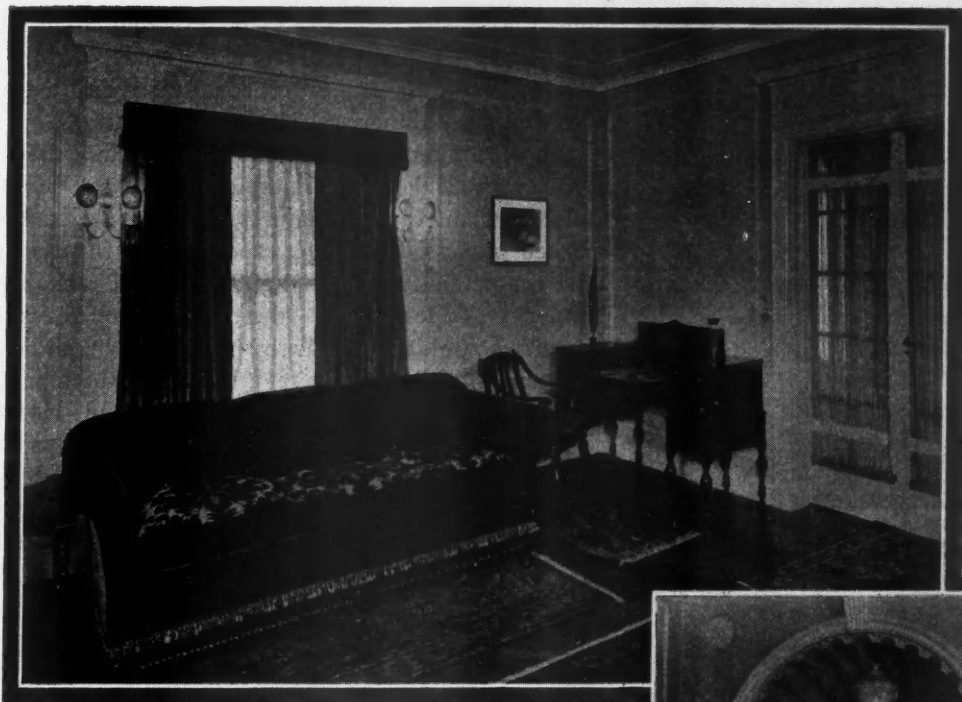
had especially designed and built as a model for a real home—a home artistic beyond criticism, yet thoroughly livable and comfortable. Although the primary purpose of the "ideal home" is to bring business to the Bamberger store, its interest for



The First Floor Plan of the Bamberger "Ideal Home" Reveals Its Spacious Arrangement.



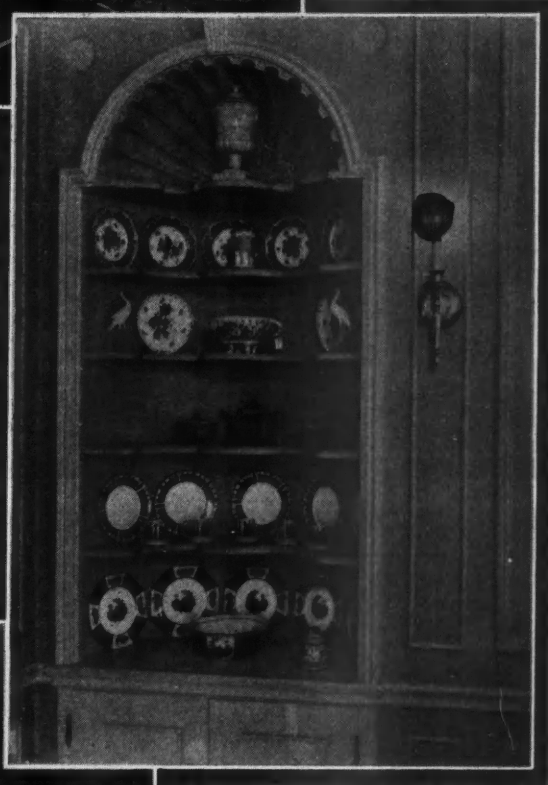
The Second Floor Plan Shows Four Bed Rooms Well Arranged with Reference to the Two Baths. Servants' rooms are in the attic story.



A corner of the living room, at the left, shows the carefully planned simplicity and decoration.

builders and architects lies in the fact that not only has the house genuine architectural merit, but the project shows the possibilities of profitable co-operation between various home-building and home-furnishing interests.

The house was designed by Francis A. Nelson, architect, of Montclair, N. J. It is an exceptionally attractive Colonial two-story and attic house of tapestry brick, modeled after the best examples of the style, of the period about 1800. It is built on a lot 100 feet by 160 feet and stands at the corner of Elizabeth and Vassar Avenues, Newark, opposite Weequahic Park. It has grass plots, terraces and a flower garden at the front; at the rear an oval garden and an orchard of dwarf apple trees. Although the best material has been used through-



Above is shown the "shell cupboard," a truly Colonial feature of the dining room.



To the left is the dining room of the Ideal Home. Note that the woodwork of the door in the rear left corner balances the cupboard shown above.



"The Most Appealing Room in the House" Was the Verdict of the Visitors After they Had Inspected the Completely Equipped Nursery Shown Here.

The Second Floor of the Ideal Home is Reached by the Charming Elliptical Stair Hall Shown at the Top of the Page. Below is a view of one of the bed rooms, notable for its spaciousness and well chosen appointments.

The Beautifully Appointed Tiled Bathroom has a Recessed Tub With a Shower Behind the Door, With the Full Mirror Shown at Right.

out, the utmost care was taken to avoid luxurious extravagance, the aim being to provide a model for the family of moderate means—the professional man with a good income, for example—rather than the man of wealth.

The planning, construction and furnishing have been carried out with the greatest thought and care. The house has numerous interesting features. Heat, for example, is furnished by an oil-burning, vapor-system furnace installed in the concreted cellar, the 1,500-gallon oil tank being located under the sidewalk. A thermostatic control automatically regulates the fuel supply by means of an indicator in the upper hall, which may be set at any desired temperature. The cellar, incidentally, has a pitch of 10 in., thus insuring perfect drainage. Here, too, is found the laundry, capable of taking care of the entire family wash, and equipped with most modern appliances, including a gas-operated clothes drier, electric washer, mangle, etc. A chute from the upper floors facilitates the sending down of soiled linen. There are also in the cellar: an incinerator for burning garbage; a playroom for the youngsters, equipped with a variety of play apparatus; and an electric switchboard for the entire house, its exceptional size minimizing the inconvenience of possible blowouts.

The first floor comprises entrance hall, dining room, living room solarium, breakfast room, kitchen and pantry. The service equipment includes the latest labor-saving devices. The kitchen has a 6-ft. electric range with automatic timer; also kitchen cabinet, white enameled tables; a variety of closets, including one for brooms, etc. The pantry has an electric dish-washer, plate-warmer and similar conveniences. An iceless refrigerator has also been provided.

The solarium or sun porch is especially fine, with its large arched French windows, its golden color scheme, its marble floor, stone wall-fountain and handsome wrought-iron lanterns.

The dining room is simple and dignified; a shell-topped niche holding rare china, helps to give distinction. The living room has been carefully designed. It has a fine mantel, and well-proportioned wall panels. The walls are covered



with canvas, painted, and this treatment has been used in a number of other rooms in the house. The color scheme is a soft fawn color. The five-tube radio set is connected with an aerial in the attic, in most approved manner.

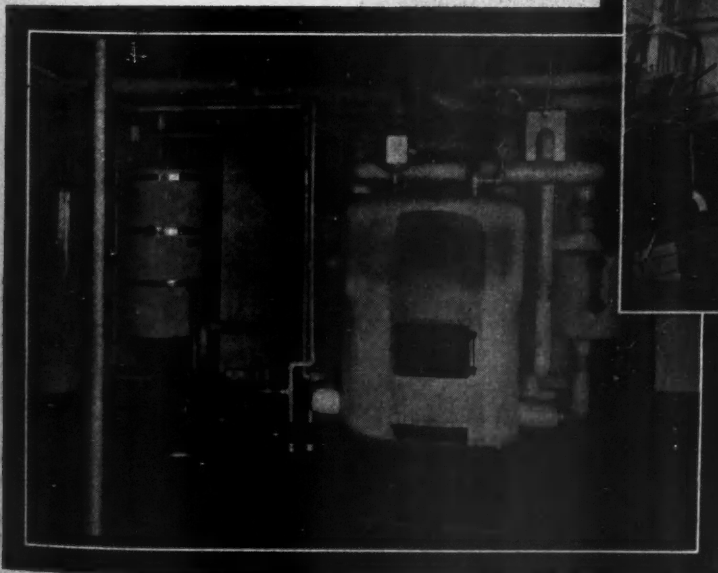
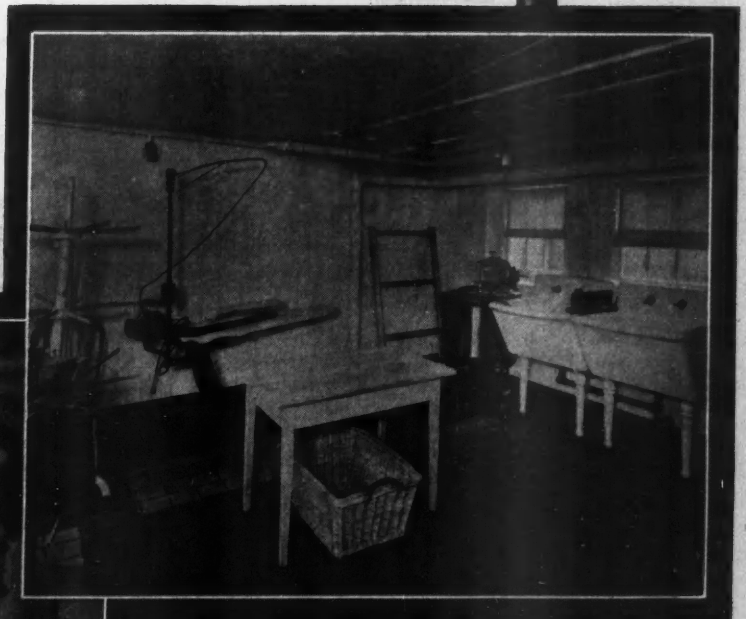
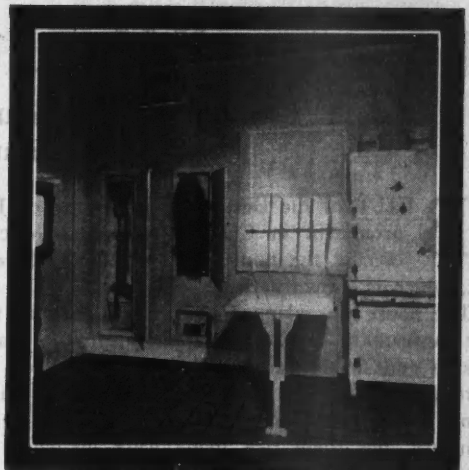
In the breakfast room, with windows on three sides, the soft-toned, lemon-hued walls contrast interestingly with the black-and-white marble floor, the effect being enhanced by appropriate hangings.

A finely-proportioned elliptical stair hall, Colonial in spirit, and furnished with a wrought-iron staircase rail, leads from the entrance hall to the upper stories. The vista from the entrance hall embraces 75 feet, the entire length of the house.

The second floor is given over to the bedrooms. There are also two bathrooms on this floor. The bedrooms comprise a French boudoir, a nursery, a guest room and a master bedroom, all most completely and attractively furnished. Kilmoth closets, each a huge cedar chest, are in every room, while on the third floor are two maids' rooms and bath, besides a large open attic with so many possibilities. A switch in the master bedroom controls every electric light in the house, thus furnishing an effective protection against unlawful intruders. The bathroom equipment is up to the minute, including built-in fixtures of the latest type, and a shower bath with a glass door. As illustrating the attention paid to details, we note that the shaving light in the master bedroom is so designed that it illuminates both sides of the face, thus eliminating annoying shadows.

On the third floor are two maids' rooms, cheerful and airy, such as would delight any servant. Also a bathroom. On this floor, too, we find a cedar-lined storeroom for holding the family wardrobe. Incidentally, all the clothes closets in the house are cedar-lined.

Another interesting feature is the automatic fire-alarm system, which functions in less than a minute as soon as the temperature anywhere in the house goes over 120 degrees. An alarm bell rings and a red signal light indicates the exact location of the fire. The intense interest the "ideal home" has aroused is indicated by the fact that during the first four weeks after the house was thrown open to the public, approximately 50,000 persons visited it.



The Laundry Shown Here Should Rob "Blue Monday" of All of Its Terrors.

Kitchen Convenience and Efficiency Are Insured by the Built-In Features Shown in the Illustration at the Top of the Page. In the central illustration are shown the large electric range and model sink.

An Oil Burner With the Latest Type of Control and an Insulated Hot Water Supply Tank, Self-Regulating, Are Features of the Basement Equipment Shown at Left.

“Built of the Best”

J. A. Gessner Made a Study of All Types of Materials and Features of Construction Before Building

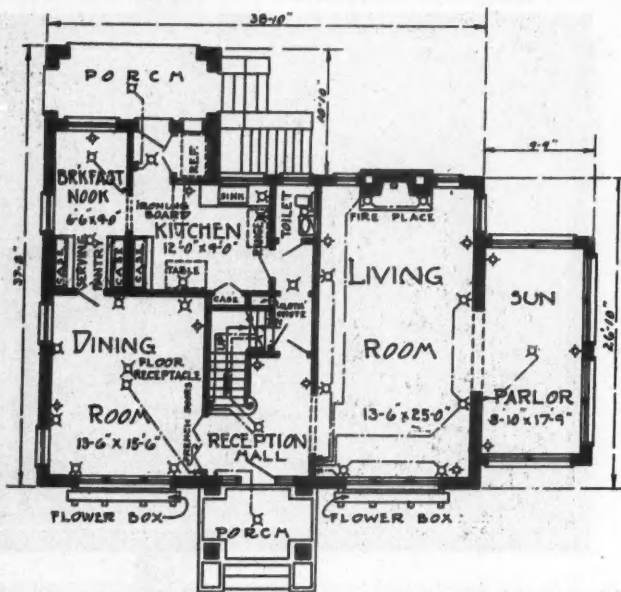
“**B**UILT of the Best,” was the motto of J. A. Gessner, prominent in Chicago real estate circles, when he erected the home at 1301 Lincoln Street, Evanston, Ill., which is shown here.

The house was planned in consultation with the Editor of the AMERICAN BUILDER and many of the features of the design and finish were decided in this office. Mr. Gessner, through his long association with real estate transactions, has come to appreciate the value of building for permanence and comfort, and these two items were his chief consideration in planning this home.

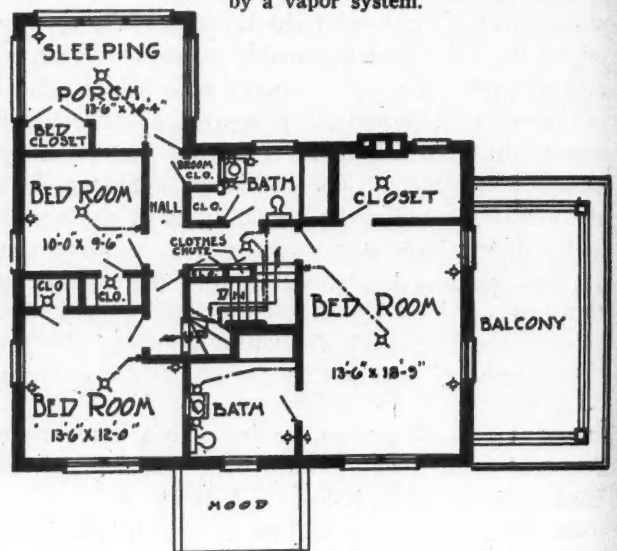
The home is built of brick veneer, with a wall construction which insures six air chambers. Insulating material of the type used between the studding is carried up clear to the ridge of the roof.

The footings of the house are especially heavy, being 2 feet 6 inches wide and 10 inches deep. The basement walls, of concrete, are 12 inches thick to grade. The roofing is of the best grade of tile, with copper decks, gutters and downspouts.

All of the floors in the house are of oak with the exception of the kitchen, which is of maple. The house is heated by a vapor system.



FIRST FLOOR PLAN

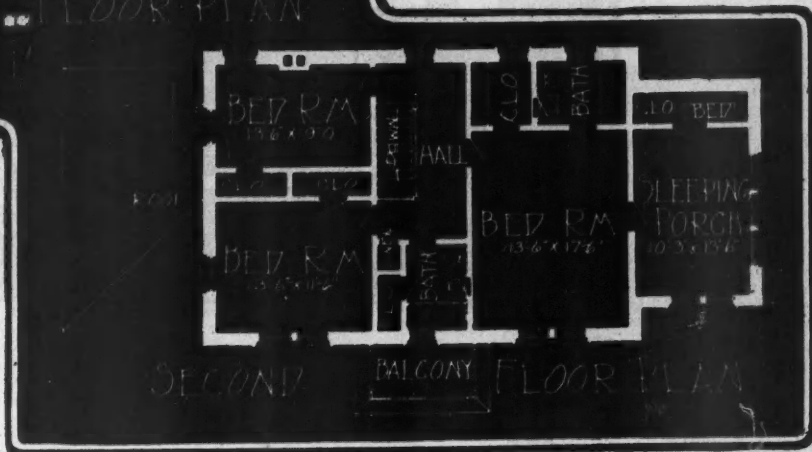
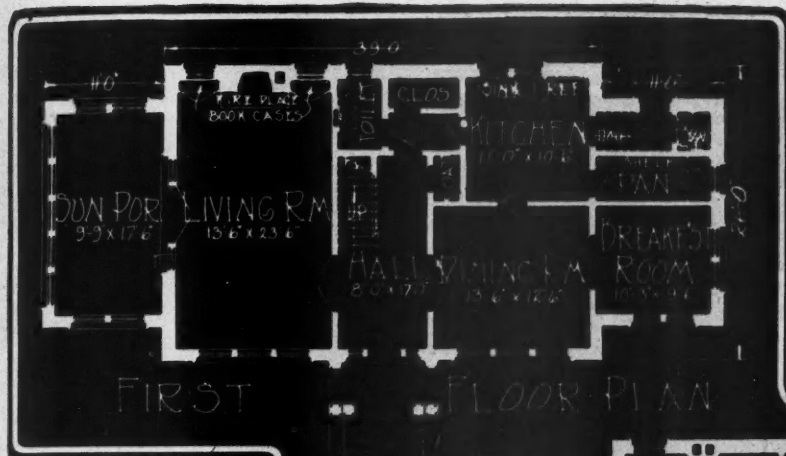


SECOND FLOOR PLAN



Care Was Expended to Make This Colonial Home Perfect in Its Construction Details. The exterior is of wire cut face brick, with a tile roof. Note the generous number of bathrooms in the floor plans, which show the convenience of the home.

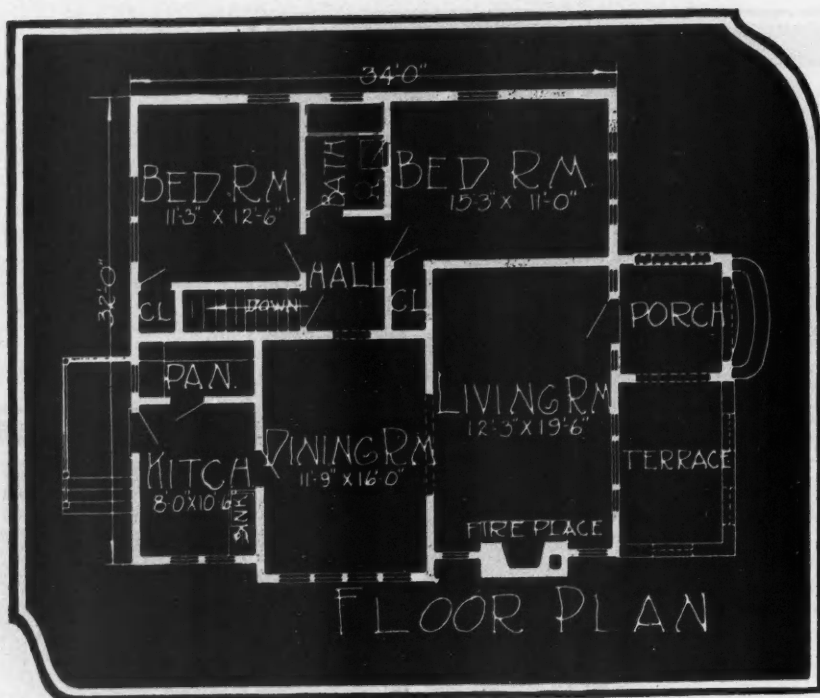
BLUE RIBBON HOMES



FOR THE SUBSTANTIAL FAMILY. A brick home of beauty and character which will mark its owner as a person of standing in his community is shown here. The exterior, with its attractive entrance, speaks for itself. The large living room, with the sun porch on one side of the central hallway and the conveniently arranged dining room, kitchen and breakfast room on the other side form an arrangement seldom excelled. On the second floor are three bedrooms, two baths and a sleeping porch, which is built to house a disappearing wall bed.



BLUE RIBBON HOMES

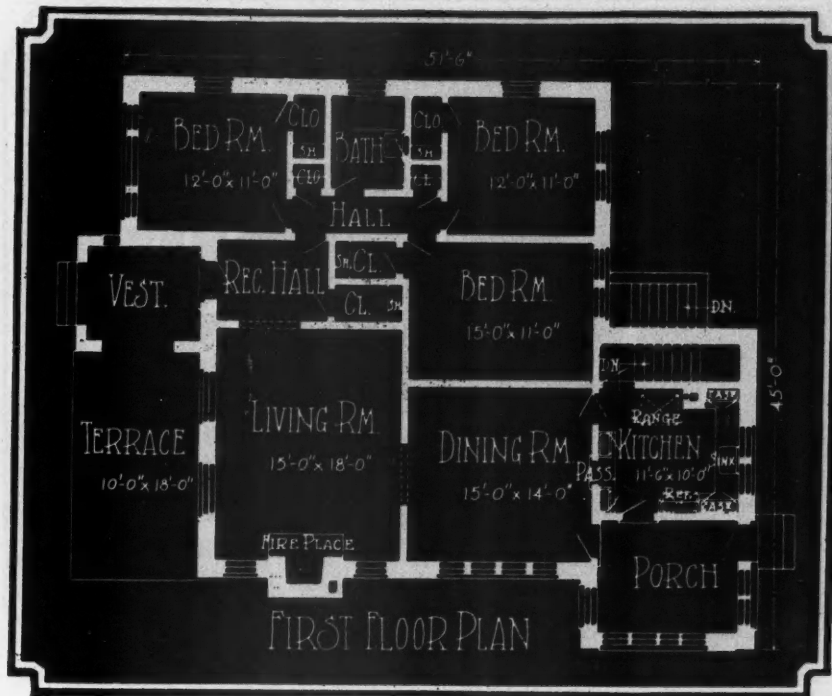


A CHARMING SMALL HOME. Many persons are much in favor of the plan of having the rooms of a home all on one floor as in the bungalow, but do not care for the low and sometimes even squat appearance of that type of home when it is not carefully planned. Here is a design which has the advantages of the bungalow with something of the appearance of the cottage. The use of stucco for the porch and terrace rails of the frame house is an ornamental feature. Notice that a roof of variegated

colors is used. The living room, of a generous size and with an attractive fireplace, is directly in front of the dining room which in turn opens directly on the kitchen without intervening passageways or pantries between the two rooms. The kitchen is provided, however, with a pantry of adequate size. The two bed rooms, to one side of the house, are separated by the bath room. Both of the bed rooms have closets.

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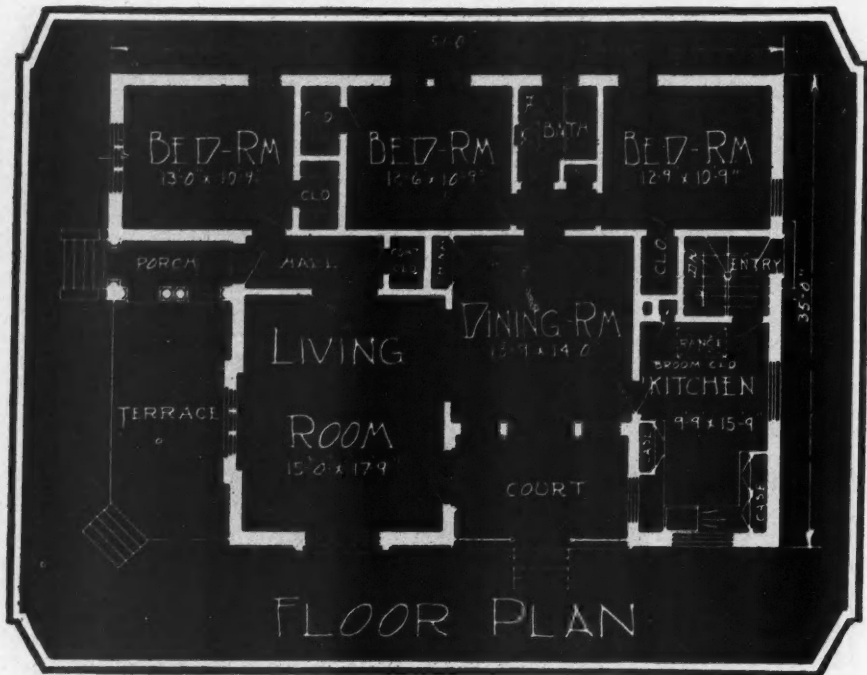
BLUE RIBBON HOMES



SPANISH MISSION BUNGALOW. The artistry of the first white men in California and the Southwest has been adapted to the needs of a modern age and produced the charming home illustrated here. The simple and interesting lines of the exterior of this stucco home have a beauty which seldom is excelled in a home of this size. The combination of a porch with a terrace, such as is used here is growing in popularity. The carefully planned casement windows in the front of the house are interesting. The

reception hall gives direct access to a hall allowing direct access to the three bed rooms and the bath, which are well separated from the rest of the house. A clothes closet in the reception hall will be appreciated. The living room, with its big windows and fireplace, should make a most attractive room. It opens directly into a dining room of adequate size. The kitchen is well arranged and is adjacent to a pleasant porch. This home will require a wide lot, since its dimensions are 45 by 51½ feet.

BLUE RIBBON HOMES

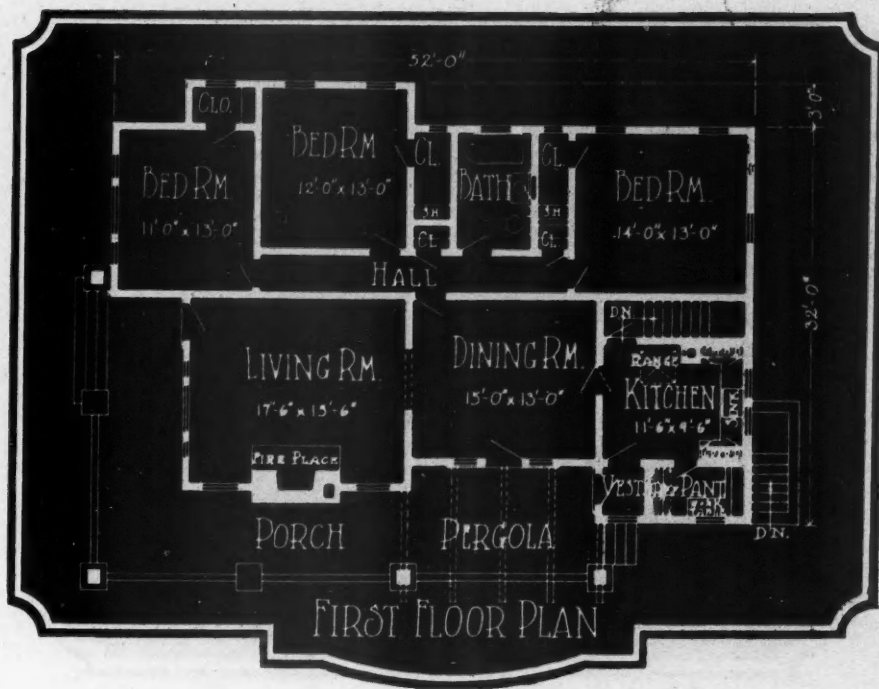


FOR THE CORNER LOT. This six-room house with its interesting and unusual exterior and its convenient arrangement of rooms will prove to be a source of pride for any family. The stucco used for the walls is a fitting material for this design which shows the Italian influence in the high, arched windows and the front door. The porch columns and other details of outside trim are adapted admirably to the design of the house. The brick of the terrace steps, the roof, the awnings and the well planted

flowers give the variegated colors which do much to make such a home attractive. One of the chief features of this house is the living room, of the high, vaulted ceiling type which is attaining an increasing popularity. An idea of the height of the ceiling in this room may be had from observing the height of its large windows. The dining room is pleasantly placed on the open court and the bedroom group is well designed and provided with closets.

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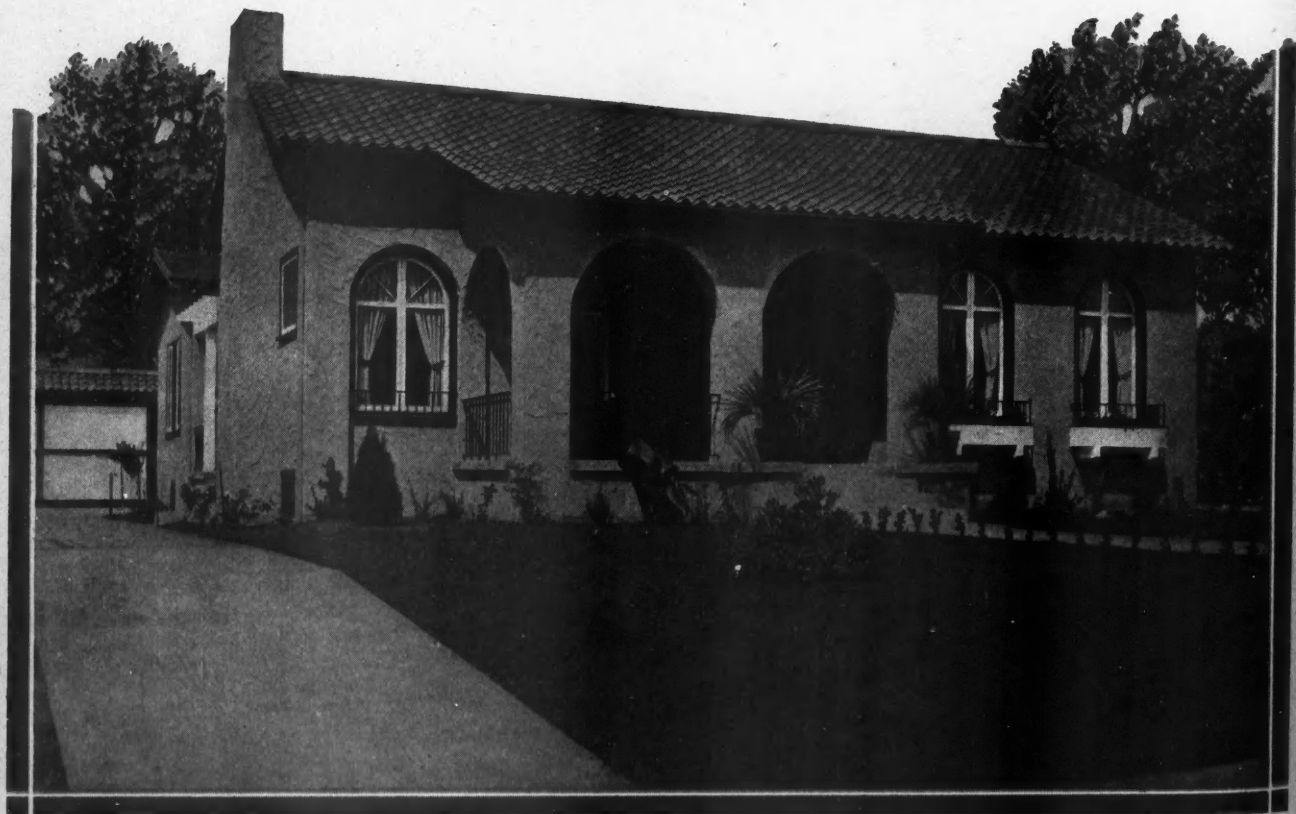
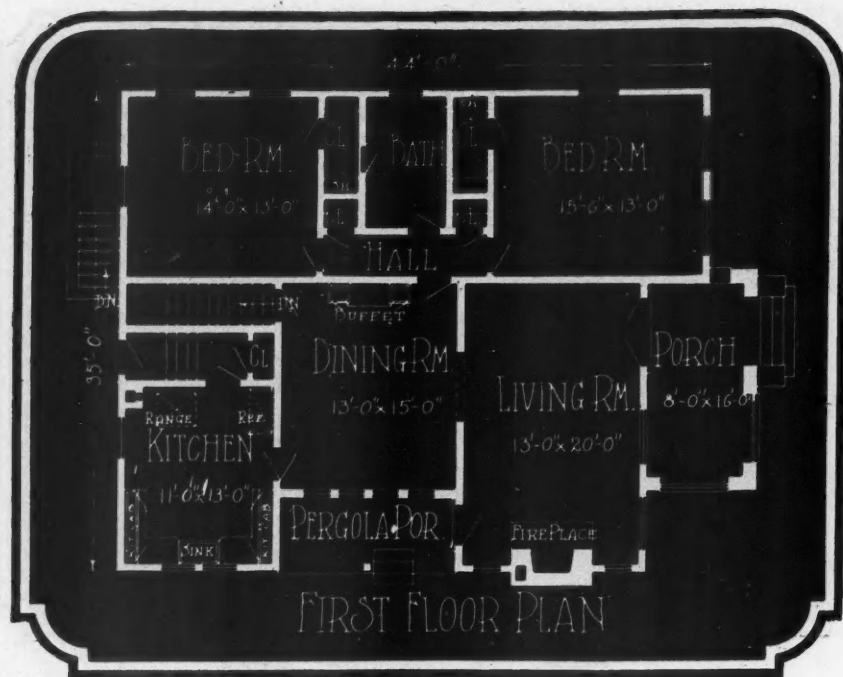
BLUE RIBBON HOMES



A HOSPITABLE BUNGALOW. Wide, overhanging eaves, the pleasing porch and the pergola are features of this bungalow which make it especially attractive. The porch extends along two sides of the house, which makes it particularly suitable for building on a corner lot. Entrance is gained directly into the living room which is well

lighted. The dining room, directly behind the living room, opens on the pergola, suggesting an inviting place for summer evening meals. The kitchen is well planned, with the refrigerator in a pantry where outside icing is possible. The three bed rooms and the bath are isolated on one side of the home.

BLUE RIBBON HOMES

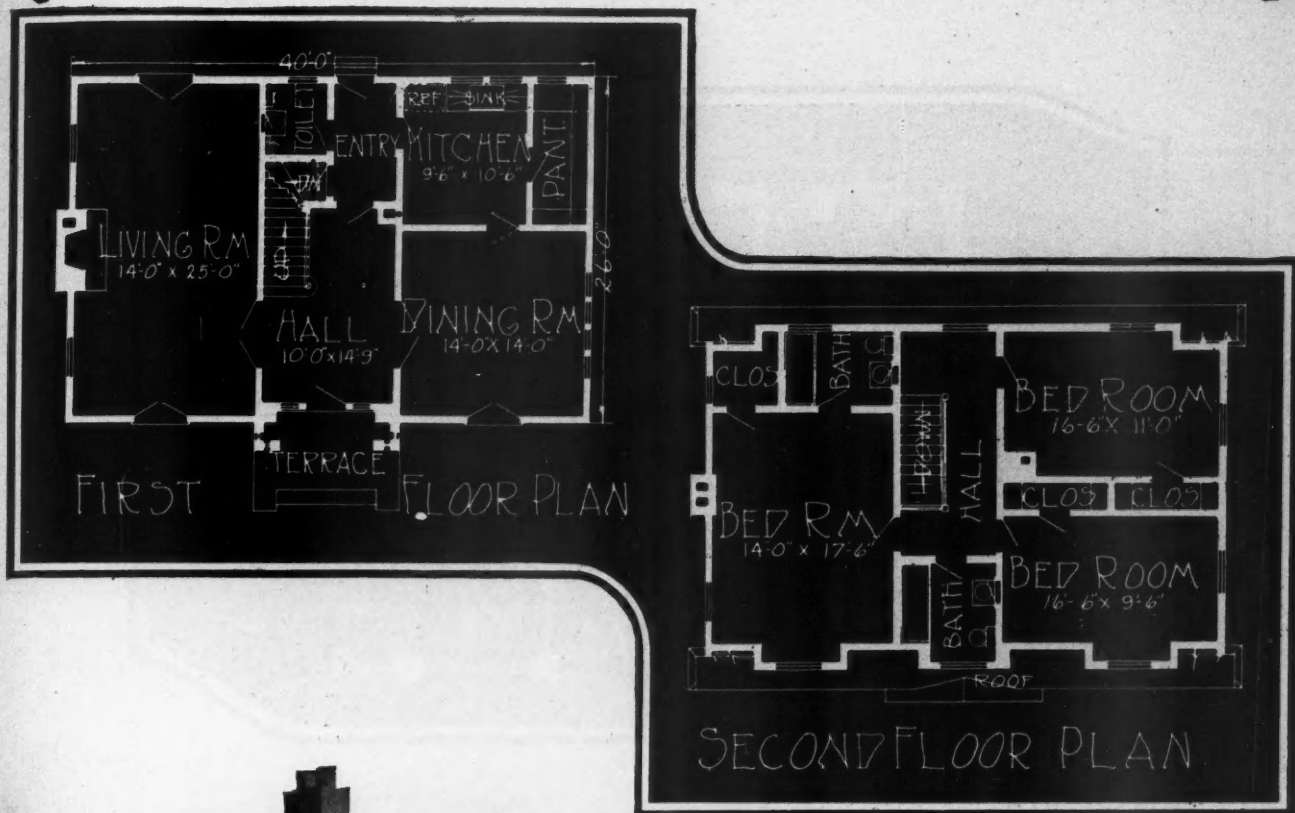


A SPANISH TYPE BUNGALOW. Cool, wind-swept rooms and inviting sleeping quarters are suggested by the exterior of this pleasing bungalow, which shows the influence of Moorish architecture as carried to the Pacific Coast by the early Spanish residents. The graceful, arched windows, the arches of the porch and the rough cast of the stucco with the attractive possibilities of the roof combine to make this home most desirable. Note the attractive use of wrought iron for the porch and under the windows. The pergola porch, opening off the living room, gives added

insurance that maximum comfort will be available on hot days. The front entrance is through the living room, which is well proportioned and opens directly on the dining room. The kitchen, with its built-in cabinets and with the sink directly in front of the windows will appeal to the housewife. Notice that both bed rooms have cross ventilation and large closets. Two additional closets in the bedroom hall will prove useful for linen storage. The overall width of the house is slightly more than 35 feet and the length 44 feet without the porch projection.

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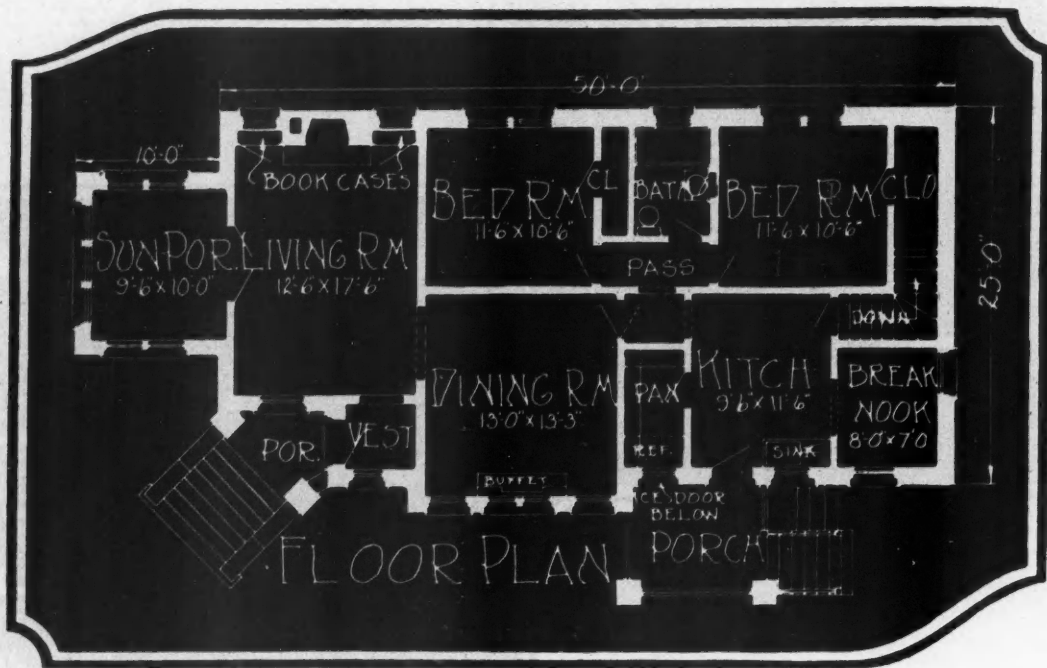
BLUE RIBBON HOMES



MODIFIED DUTCH COLONIAL. The pleasing and practical features of the Dutch Colonial type of home, so long associated with brick and frame construction, have been utilized in a stucco dwelling, which is presented here. The first floor is planned in the conventional Colonial man-

ner, with the hall containing the stairs dividing the long, spacious living room from the dining room and kitchen. On the second floor are two pleasant bed rooms, lighted from two sides and a hall bath, with the master's room and its private bath across the hall.

BLUE RIBBON HOMES

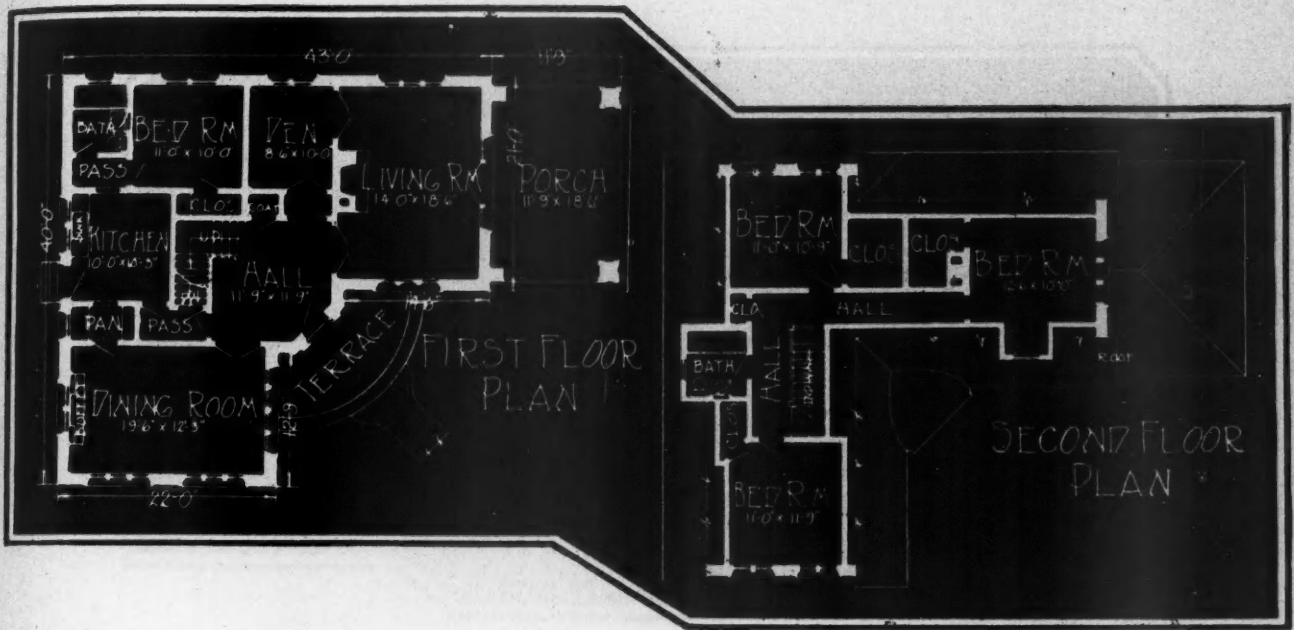


A MODERN BRICK BUNGALOW. Houses of special design are required to make the most of the advantages of a corner lot. Here is a home, built of brick, which is well fitted for that purpose. The corner entrance, with its carefully considered white ornamentation, makes the house attractive when approached from either side. The roof presents a series of interesting angles and the white trim of the windows adds attractiveness to the picture. A

vestibule off the porch opens into the living room, with its fireplace in the end flanked with book cases. An attractive sun porch with double French doors adds to the beauty and comfort of the home. The dining room, of a comfortable size, is directly behind the living room. The kitchen has as one of its important adjuncts, a well-lighted breakfast nook. Two bed rooms, each with a large closet, are placed with a bath room between them, on one side of the home.

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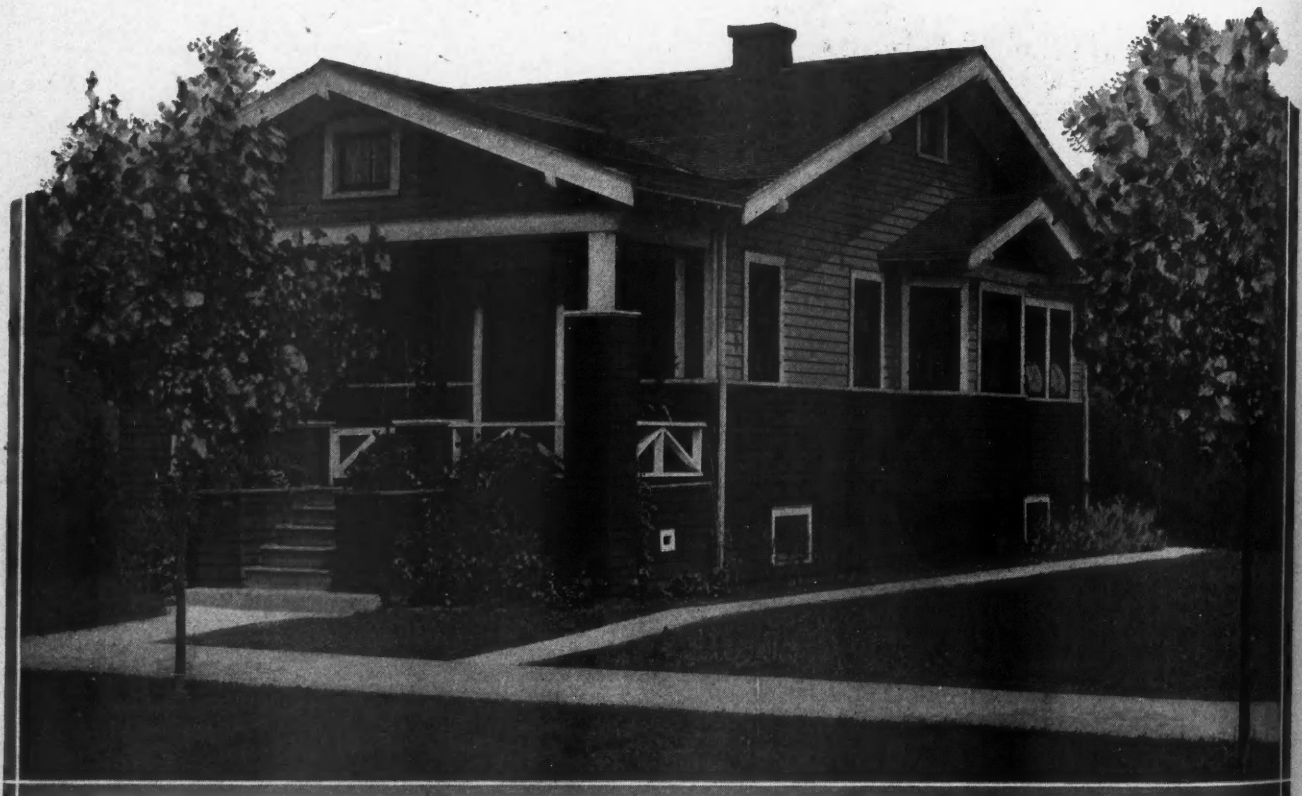
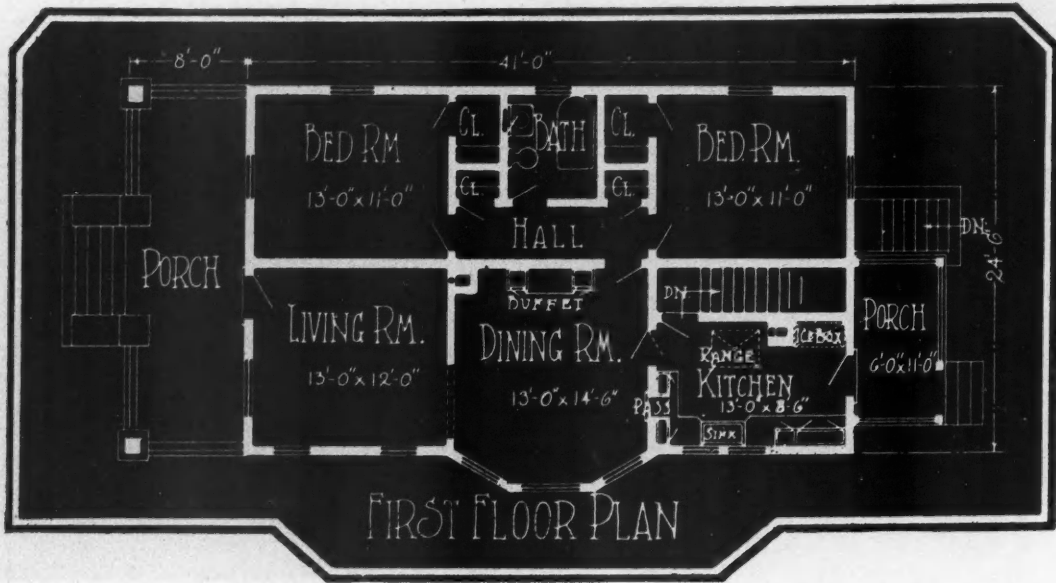
BLUE RIBBON HOMES



AN UNUSUAL HOME. The corner entrance of this brick house is the first of a series of features in the plan which are different from the details of the ordinary house. The door, with its inviting white arched doorway, has the appearance of being snugly sheltered by the walls of the ell-shaped house. The broken roof lines, the curved terrace and the wide porch, with its beautiful setting of boxed flowers, are all things which add to the attractiveness of the exterior. The entry hall, set parallel with the door, gives almost direct entry to four of the five rooms

on the first floor. The living room is exceptionally well lighted and is large enough to make a real center of family life. The den may be made practically a part of the living room through opening the double doors. The dining room, directly across the hall from the living room, is of such a shape as to accommodate best the oblong dining tables which are gaining in popularity. The kitchen is reached through a pantry. A bed room and bath are on this floor. Three bed rooms with large closets and a bath room are on the second floor.

BLUE RIBBON HOMES

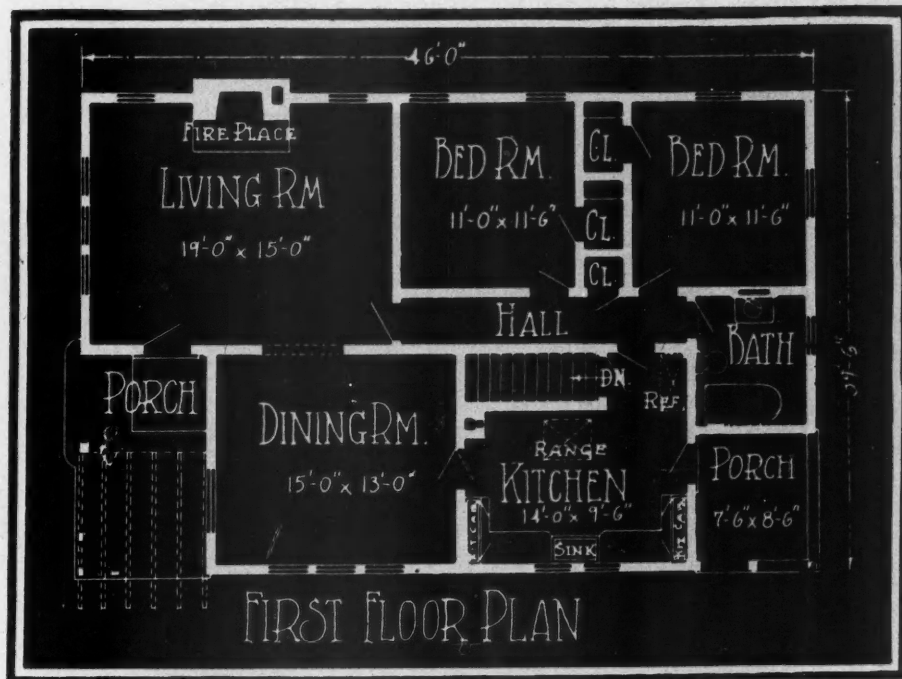


A CAREFULLY PLANNED BUNGALOW. Those who are seeking the comfort and convenience which has done so much to make the bungalow a type of home built in all parts of America will find them in this plan at a moderate cost. The exterior is a combination of shingles and clapboard, so much favored in a number of communities. The wide porch and the bay in the dining room are features which prevent monotony in the lines of the home. The living room, which is entered directly from the porch, has cross lighting and ventilation and at the same time

presents unbroken wall surfaces which will allow attractive grouping of furniture. The dining room is directly behind the living room and is of generous proportions and well lighted. In the kitchen of this home, a great deal of care has been expended in arranging properly the equipment. The bed room group is well planned. The hall to the rooms takes no space from the rooms themselves and is provided with two closets. The bath room is insulated from both bed rooms by closets.

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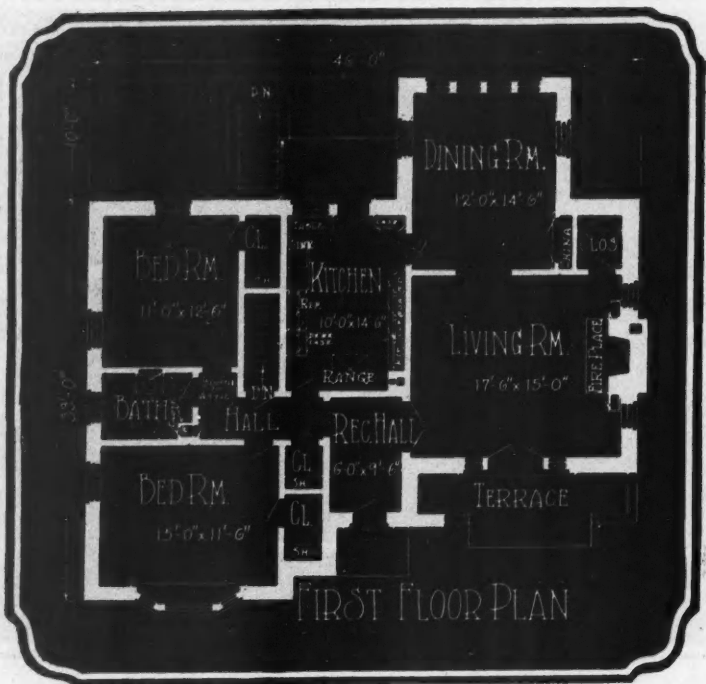
BLUE RIBBON HOMES



A LITTLE "WHITE HOUSE." This five-room home contains many features and a convenience of design which may well be envied by much more pretentious structures. The attractiveness begins with the inviting arch of the entryway and is heightened by the use of wide white clapboards for the siding. The living room, large for a home of this size, is made attractive through the fireplace

at one side and the cheerful light afforded through the generous use of windows. The dining room is large and well proportioned and the kitchen is one planned for efficient work on the part of the housewife. The two bed rooms are provided with closets and a hallway allows them to be reached from both the front and back of the house.

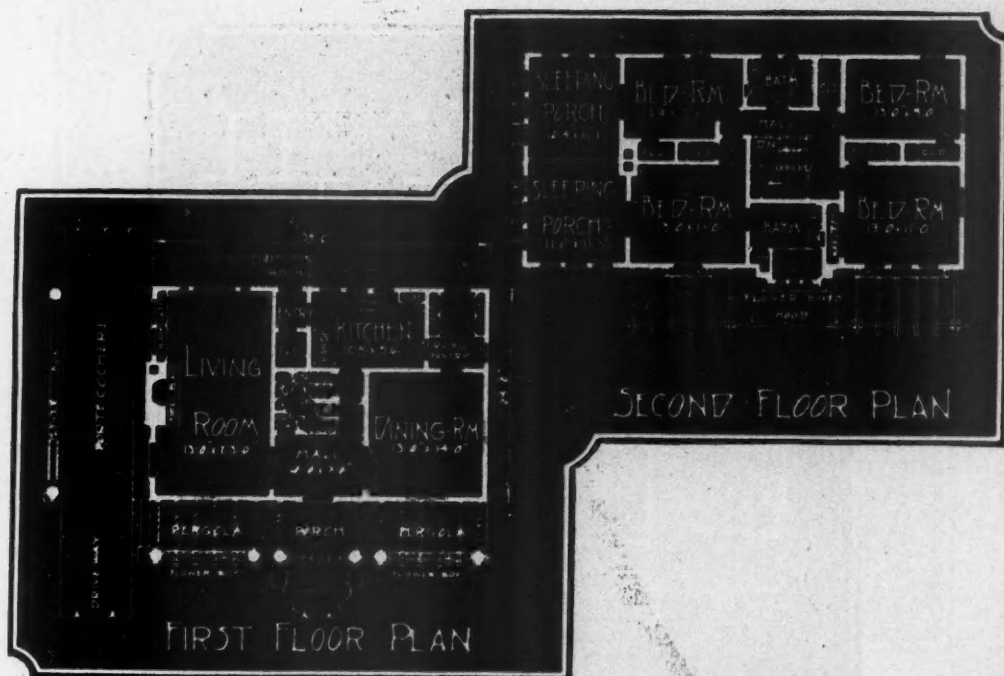
BLUE RIBBON HOMES



A HOME OF INDIVIDUALITY. The happy use of wood and brick for the ornamentation of this stucco home has resulted in a quiet charm which is quite unusual. The use of brick in the arched doorway is attractive in itself and emphasizes the whole entryway, which is a well planned detail of the home. The windows in the front of the house are well balanced and the French doors, opening from the living room to the terrace, show consideration for comfort and convenience. The five-room home,

which is 43 feet deep by 46 feet wide, is entered through a reception hall. On one side of this hall is the living room, with the fireplace opposite the entrance doorway, where it dominates the room. This room is provided with a closet. The dining room is directly behind the living room and is conveniently situated in regard to the kitchen. The two bedrooms and the bath room are combined in a group which occupies one side of the house.

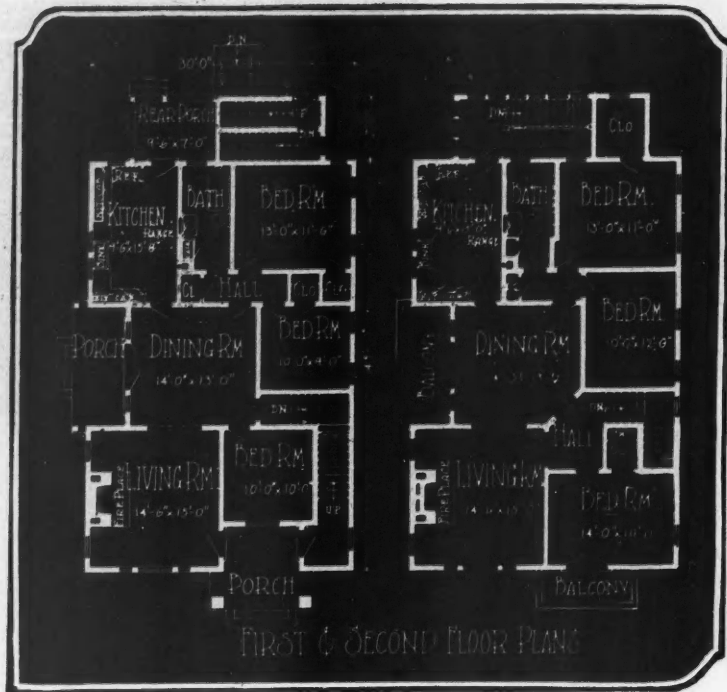
BLUE RIBBON HOMES



AN IMPRESSIVE SHINGLE AND STUCCO HOME. Wide, white shingles, white stucco surface, well designed pillars and judicious use of brick for color relief and trimming; these factors have been combined to make the home shown here an impressive one. Although the home is essentially Colonial in its design, the unusual combination of the materials used make it distinctly individual and saves it from the sameness which marks so many

Colonial homes. The first floor plan is the usual one in the Colonial home, which is retained because of its utility and beauty. The reception hall, with the open stairway, is between the living room and the dining room, with the kitchen and the serving pantry directly behind the kitchen. On the second floor are four bedrooms with two baths. Two of these bedrooms open on sleeping porches above the portecochere.

BLUE RIBBON HOMES

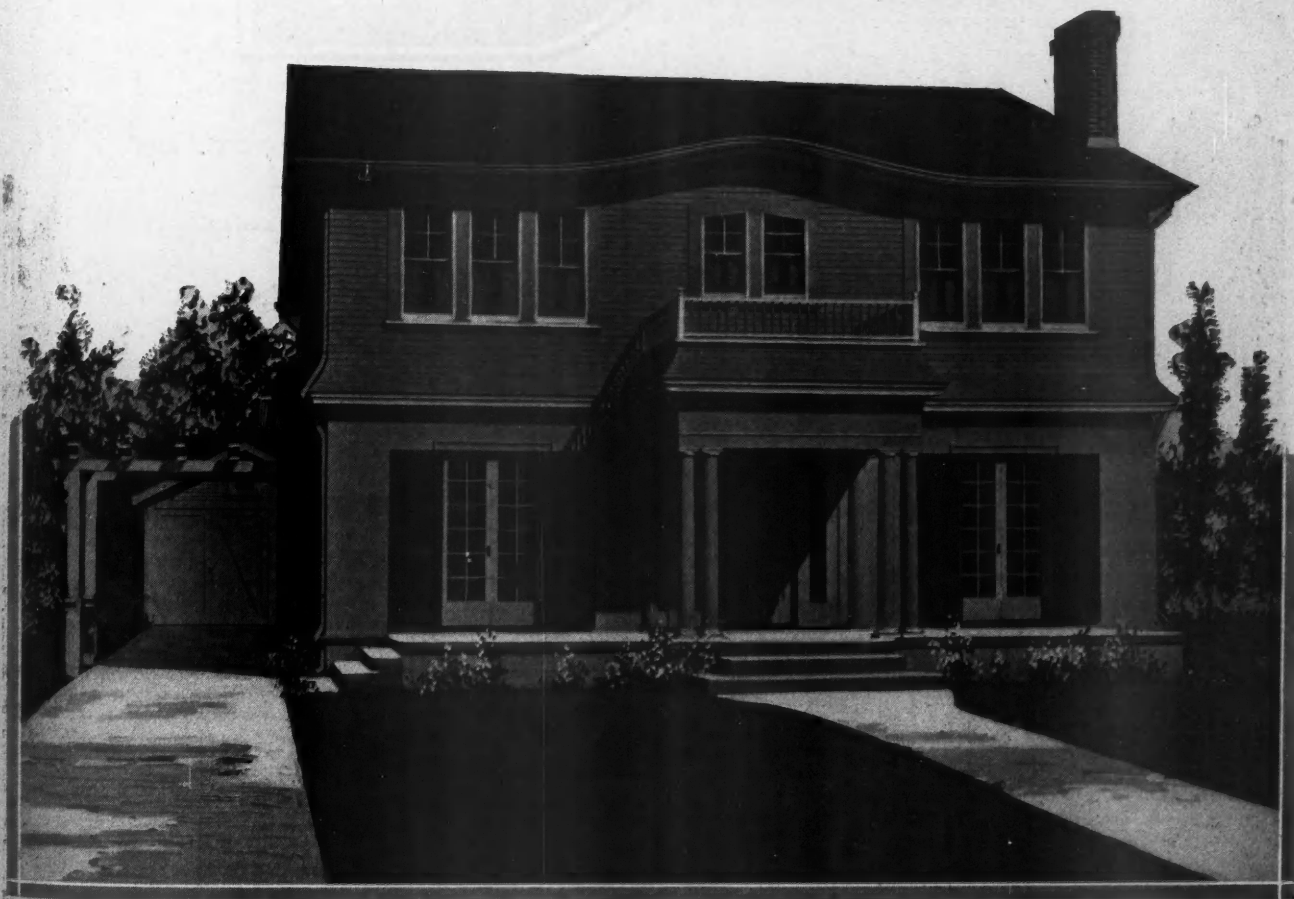
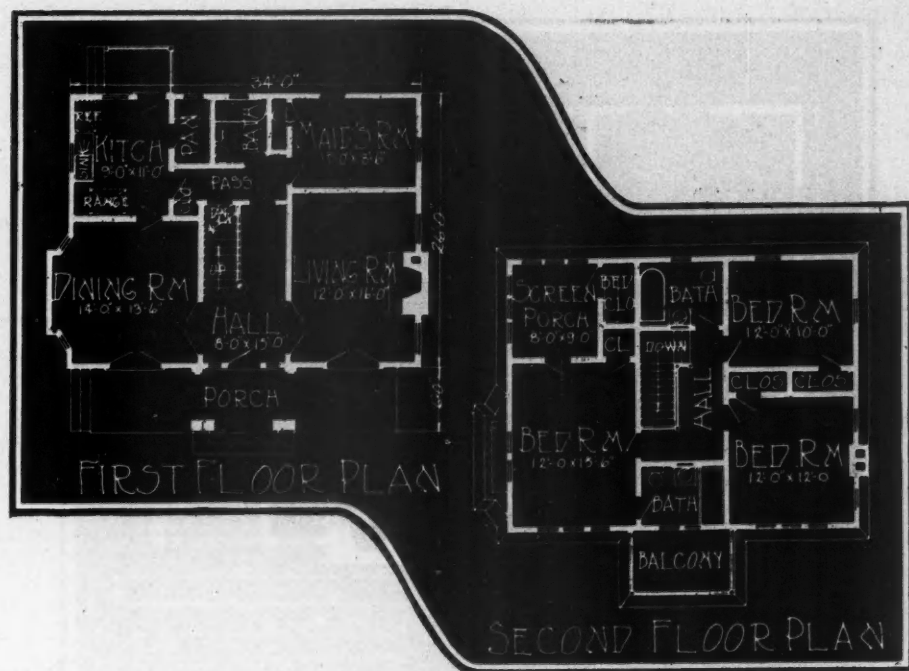


A PLEASING DUPLEX. The square type of home has been noted long for the efficient use of space which it allows. This use of all space to the greatest advantage was a large factor in the planning of the stucco duplex presented here. There is no particular advertisement of the fact that this building serves two families in the unobtrusive double entrance, one door on each side of the

recessed entryway. The floor plans of the two groups are alike with the exceptions of the minor details which were changed to provide space for the stairs. On each floor there are three bedrooms, a bath, a living room, dining room and kitchen. A feature unusual in duplexes is the fireplace placed in each of the living rooms. Notice that a two-car garage has been provided.

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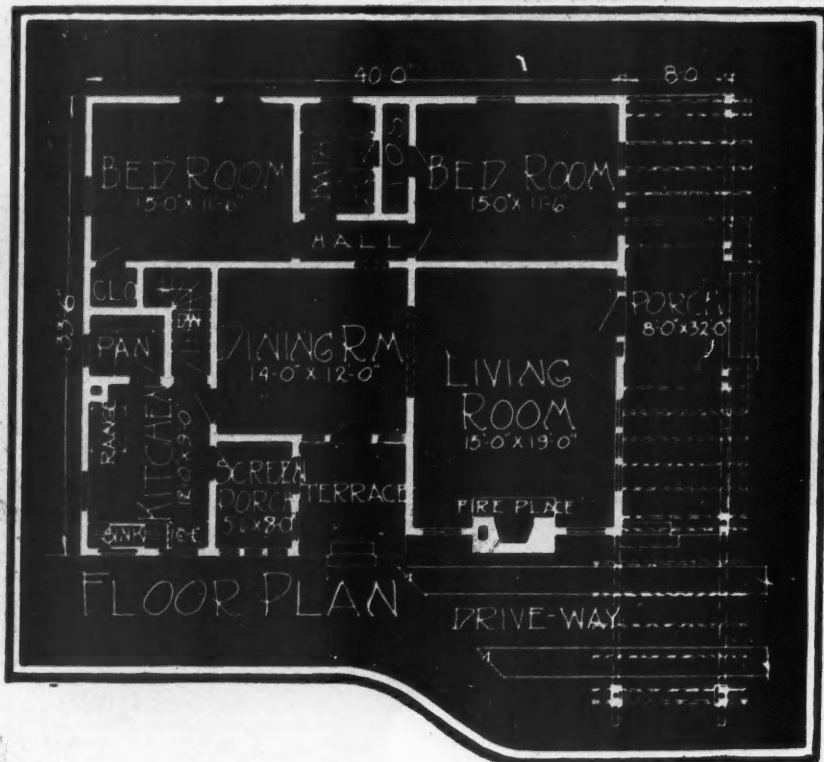
BLUE RIBBON HOMES



A STUCCO AND FRAME HOME. This home, with the first story of stucco and the second of frame construction, contains many of the features of Colonial architecture, particularly in the arrangement of the rooms. The combination of the porch with a terrace on both sides and the French doors opening on the terrace are interesting details of this exterior. The central hall has the living room on one side and the dining room and kitchen on the

other. A maid's room and bath are provided on the first floor. On the second floor are three adequate bed rooms and two baths. All are well equipped with closets. An interesting development is the screened porch, with a wall bed installed in a closet so that the room may be used as a pleasant porch by day and an outdoor sleeping room by night.

BLUE RIBBON HOMES



A FIVE ROOM COLONIAL BUNGALOW. Liberal and intelligent use of white paint and an attractive roof have done much to bring out the desirable features of this home. The combination of the porch with the pergola terrace is a happy one, and adds to the inviting aspect of the front of the house. The front door, with sidelights after the Colonial manner, leads directly into the living room, 15 by 19 feet. The wide doorway into the dining room does

much to create the impression of increased spaciousness in both rooms. The recessed terrace, reached through a French door from the dining room is rather unusual and decidedly pleasant. The well arranged kitchen is reached from outside the house by means of the screened in porch. The two bed rooms, grouped on one side of the house, are well lighted and conveniently arranged with the bath room between them.

How an Expert Builds

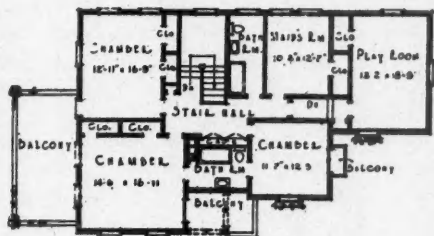
House of Mr. Wharton Clay, Winnetka, Ill., Demonstrates the Principles of the Hoover Code Combined with the Beauty of Good Architecture

THERE has been so much publicity on new types of construction and new methods of utilizing the time-honored materials of building construction as recommended by the various technical committees and testing laboratories that the architect may wonder if it is possible to unite these various recommended practices into an harmonious architectural composition. He may conclude that the engineers and scientists have left him with a hodge podge that is impossible to clothe with architectural beauty, or that is so mechani-

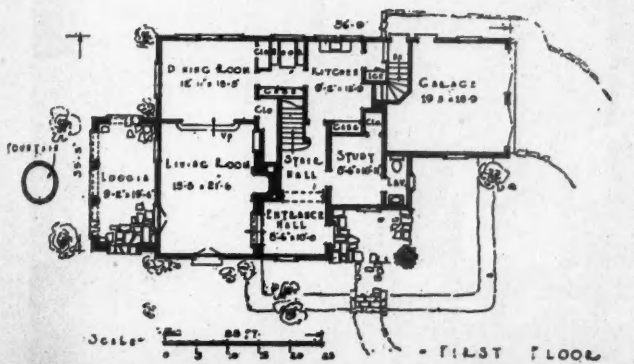
cal in its outward appearance that the housewife will feel a distinct disappointment because of the radical departure necessary to make it fireproof and permanent—there may have arisen a feeling that these new ideas will not produce a livable home.

To exemplify the various recommendations and approved practices and show their artistic possibilities, a house has recently been designed by Zimmerman, Saxe & Zimmerman, architects, and built in Winnetka, Ill. The owner is a member of the Surface Treatment Committee of the American Concrete Institute, Building Construction Committee of the National Fire Protection Association, and as a man interested in materials is in close touch with the developments of the Department of Commerce Building Code, the findings of the Underwriters' Laboratories and other public bodies. Primarily the house was designed to develop the possibilities of utilizing standard lumber construction and finishing the wall and ceiling surfaces in a manner that would make it well-nigh fireproof, if such a term is proper to use for any construction at all.

To carry out the fireproofing opportunities possible through economical lumber construction, dependence was placed on the



- SECOND FLOOR -



- FIRST FLOOR



The Home of Wharton Clay, Winnetka, Ill., Demonstrates that the Best Building Practices, Worked Out in Laboratories, May Be Applied to Practical Construction, and that the Recommendations of Advisory Bodies May Be Followed Without Sacrificing Beauty. The floor plans are shown above. Zimmerman, Saxe & Zimmerman, Architects.

Genuine Antiques Which Have Been in the Possession of Mr. Clay's Family for Many Years Add Just the Touch of Character and Artistry Which One Would Desire for the Interior of This Delightful Home.



Consistent Following of Italian Design in Both the Interior and Exterior of This Home Has Given It a Unified Beauty Which Is All Too Rare in a House of this Size. The view above shows the living room of the Wharton Clay residence from the dining room, raised two steps above the living room level. The graceful archways on either side of the fireplace, one for the entrance and the other for the recessed book case, are distinctive details of the room. The fireplace itself, with the flue lining and the wood framing about it, were designed in accordance with recommended practice of the National Board of Fire Underwriters, and is an excellent example of adapting principles of fire protection engineering to practical and beautiful construction. The floors are of walnut boards, in keeping with the Italian character of the interior.

Underwriters' Laboratories' findings in which they issued a rating of one hour for wood joist and stud construction protected by expanded metal lath. This required the introduction of fire stops at the joist levels wherever vertical flues occurred, a detail of construction which has been advocated widely but seldom used and the practicability of inserting metal lath baskets in the joist and stud spaces and covering them with incombustible material was fully demonstrated. The ceilings of all floors and basement were fully plastered.

To further guard against the vertical travel of fire the stairway from the basement to the first floor was offset from the main stairway. The oil burner, typifying modern residential design, was chosen from among those listed as standard by the Underwriters' Laboratories, and the electric wiring system was carried out strictly in accordance with the Code of the National Board of Fire Underwriters. The floor constructions were identical, including sea-grass quilt deadening, with the floor used in the test furnace of the Underwriters' Laboratories, except that walnut finish was used, in keeping with the Italian interior, instead of pine as in the test panel, and oak finish in the sleeping rooms. When such a floor is subjected to fires of 1,700 degrees the wood construction, fully protected on the underside, is safely able to support its designed load for over one hour.

While the house was designed to show that structural members could be of wood and yet be absolutely fire-safe,

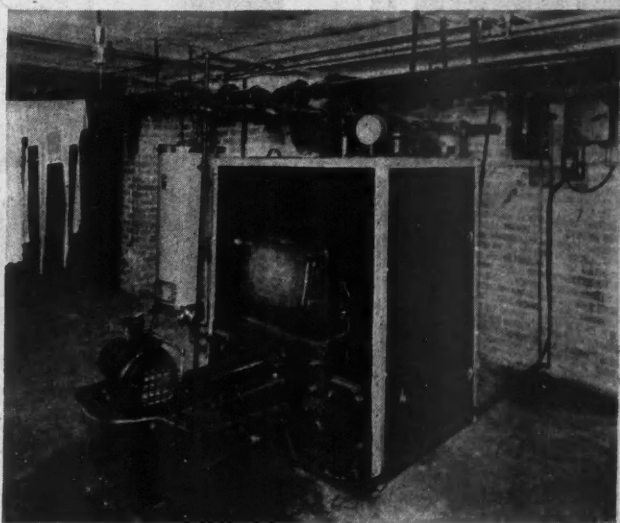


The Stairway, With Its Wrought Iron Rail in Keeping With the Design of the Home, Adds Character to the Hall.

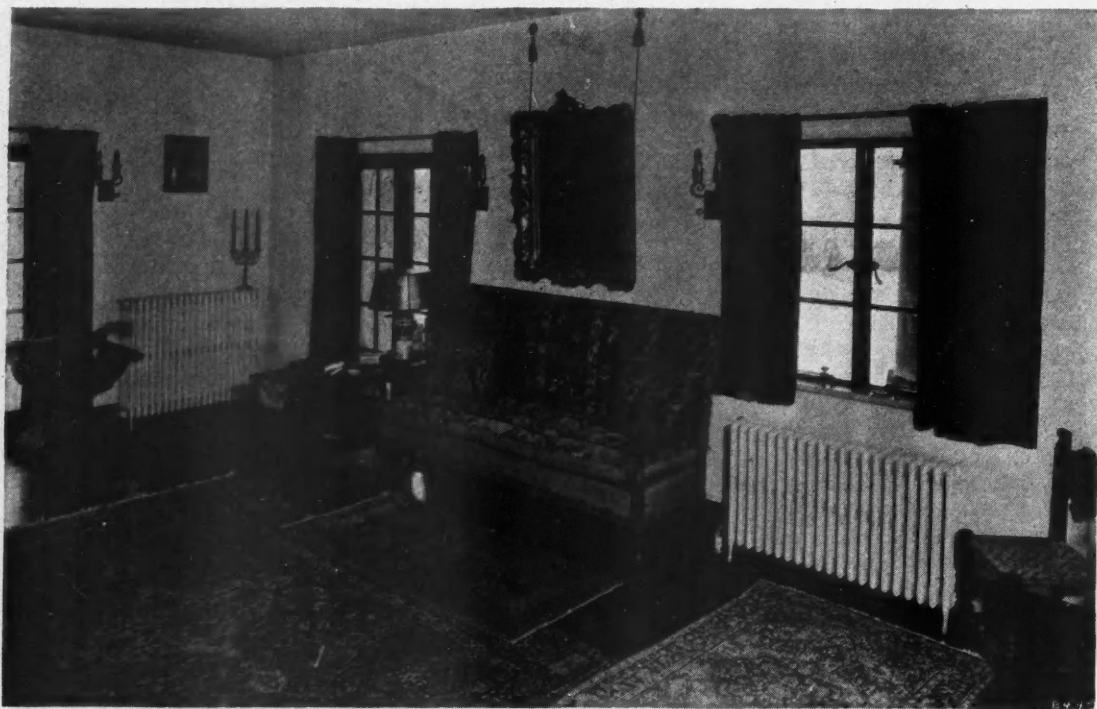
wood trim was eliminated as much as possible on the interior. Through the main portion of the house plaster reveals, marble window sills and steel screens aided in eliminating combustible material. Wherever non-bearing partitions were found, solid 2-inch metal lath and plaster partitions on steel studs were used, again eliminating unnecessary wood and gaining the advantage of 3½ inches of floor space. Shallow electric switches make this entirely feasible.



Close Up View of Characterful Stucco Finish; Also Note That Zinc, in the Form of Small Squares, Was Nailed to the End of Every Window Sill to Prevent Concentration of Water and "Tear Stains" or Streaks on the Stucco Below.



Oil Heating Equipment' Approved by the Underwriters' Laboratories Was Installed to Insure the Proper Heating of the Residence.



Wood Trim Was Done Away With to a Large Extent in the Construction of the Wharton Clay Residence. Notice that the casement windows shown in this view of the living room are of the residence type of steel windows recently developed.



The Living Room and the Dining Room of the Home Are Enclosed in the Same Four Walls, the Portion Used for the Dining Room Being Raised Two Steps Above the Living Room Level as Is Shown in This Illustration. Broad plastered surfaces in sand finish are practical when metal lath is used to prevent cracks and avoid dust marks.

The fireplace and flue lining, together with the wood framing around it, were designed in accordance with the recommended practice of the National Board of Fire Underwriters. It is an excellent example of the success with which an architect can utilize the principles developed from a fire-resistant engineering standpoint and make an architectural success of it.

The plaster on the walls and ceilings of the entire house are reinforced by expanded metal lath primarily for its fire-resistant qualities, but such a base is almost essential if the architect attempts the typical sand-finished plaster of the Italian period, as plaster cracks or dust streaks on such plain surfaces would be fatal.

The successful stucco tests at the United States Bureau of Standards, followed by the approval of the Department of Commerce Building Code, show that expense for the ordinary wood sheathing may be eliminated. Self-furring expanded metal lath was placed directly upon the studs and stuccoed both on the exterior face and on the back of the lath between the studs. This method, termed "back-plastering," not only permits scientific reinforcement of the stucco, but requires a thicker stucco coat having correspondingly greater crack resistance, as well as complete sealing of the lath against exposure to atmospheric conditions. In such construction painted metal lath is sealed by the cement for eternity.

The Surface Treatment Committee of the American Concrete Institute has pointed out that successful stuccoing can only be expected by following certain well defined structural details, the neglect of which will cause disappointment. Among these points are the wrapping of stuccoed brick chimneys with metal fabric, as reinforcement is very essential to permanence in such an exposed position with alternate extremes of temperature. A solid concrete or other impervious chimney cap with a definite drip is necessary to overhang the stucco in order that water may not get down behind. The flashing of all vertical surfaces where they stop at horizontal or inclined surfaces below is an essential construction detail for the permanence of stucco. Such positions, in the case of this house, are illustrated where the wall over the doorway stops at the balcony level and where the high gable wall stops at the lower roof over the garage. Zinc, in the form of small squares, is nailed to the ends of every window sill and every horizontal course of projecting wood so as to prevent concentration of water at the end of these members, thus avoiding the unsightly and totally unnecessary "tear stains" so commonly seen in even first-class residential construction. Zinc flashings were also put over all exposed horizontal wood members and underneath the joints of the wood cap at the top of the loggia walls, preventing water from seeping through between the adjacent pieces of wood and staining, or getting behind the stucco at these points. Down spouts and gutters have also been constructed of zinc, insuring that no metal stain will appear from this cause.

One of the principal recommendations of the American Concrete Institute Committee on Surface Treatment is that the stucco should not extend to the ground, but that a soldier course of brick should be inserted, or the masonry wall should extend up about 12 inches. This recommendation is wise, for earth stains at the base of the stucco and the disintegration by capillary attraction are detrimental to the permanency and good looks of stucco. But in careful hands, stucco can be run closer to grade, and in this Italian type of architecture the construction was sacrificed to favor the design. This was handled by mopping the cement wall with prepared black waterproofing compound to prevent capillary attraction and inserting a projecting sill of thoroughly painted wood set on waterproofed building paper, at which to stop the stucco 2 inches above the grade line.

The elimination of the wood sheathing in the back-plastered method calls for consideration of insulation which has been a subject of thermal conductivity tests at Armour Institute for various kinds of walls, and as a result of these tests,

quilting secured to the inside face of the studs and belled into the hollow spaces between them was used, with the result that even when the oil heater is shut off for the night, and the thermometer registers zero weather outside, the house temperature loss over night is only about eight degrees, showing exceptional insulative efficiency.

Using wood studs for a building in the Italian style of architecture which was originally confined to heavy masonry walls requires some careful thought to produce a satisfactory depth of reveal for the exterior. The steel windows, utilized throughout the house, with their narrow frame, have saved enough in thickness to design satisfactory plaster reveals both on the outside and the interior. Their architectural advantage will undoubtedly popularize the steel sash among architects, whose eyes are critical of architectural detail. An example of this saving is found where the wooden French doors demand that an exterior thickness of stucco, in the form of a pilaster, is necessary to develop an appreciable reveal to compare with that surrounding the nearby steel windows.

From two separate standpoints, the appearance of the stucco is remarkably interesting. First, the finish coat is very much roughened by dragging the trowel during its application. This, of course, deepens the shadows. Secondly, this effect is heightened by the use of two distinct colors. The whole effect is a novelty outside of Florida and California, where stucco textures have created so much favorable comment. The two-tone effect, which in this case consists of a terra cotta color in the low levels, high-lighted in the projections and flat surfaces by a light cream, admirably carried out the variegated effects of the Mediterranean type of architecture. Such a surface can best be created by using appropriate strong pigments in white cement for the last coat, high-lighting it with contrasting lighter cement washes before the last troweled coat is set. It can also be created by troweling on cement of two different colors and letting the lower one appear through the upper one with artistic carelessness. In Florida, Mr. John B. Orr, of Miami, has gained national fame with the simple expedient of using separate color washes on the basic cement. This scheme of brightening up the deadly gray cement by well chosen color effects, keeping it from streaks by the intelligent use of zinc flashings, and avoiding cracks by minimizing the amount of wood and reinforcing the stucco with metal lath will do more to assist builders in mastering stucco than any other three items.

The fame of Florida and California stucco architecture has spread far and wide, but that is only because they have lost their timidity in design and have taken full advantage of plasticity of the material and molded it into attractive forms decorated by brilliant colors, and used a boldness of design that is a welcome contrast to much that is stilted in our stucco houses.



Glazing Steel Sash

THE old familiar saying, "trifles make success, but success is no trifle," may well be quoted in connection with the puttying of steel sash—basement, casement or industrial. In wood sash, the oil in the putty is absorbed rapidly, causing the putty to become dry and firm in several days; but in steel sash, due to absence of a porous surface, the oil disappears slowly. Instead of being absorbed, it must evaporate.

To insure the most satisfactory results in puttying steel sash, it is advisable either to use regular steel sash putty, which is now carried by all well-stocked hardware and plant stores, or if wood sash putty is used, to add a dryer to hasten the process of evaporation.

In tests recently conducted by a manufacturer of steel windows, the importance of properly mixed putty, of good quality and proper consistency, was clearly demonstrated. Such putty not only permits an easier and neater job, but also sets quicker, collects less dust and dirt, and is more durable. Contractors, carpenters, painters, and others who do glazing, should find these suggestions helpful.

Hotel Design and Equipment

Over 2,000 Years of Progress in the Evolution of the Modern Hotel Have Produced Highly Specialized Buildings

THE modern hotel had its prototype centuries ago, before the Christian era. Its development has been intimately connected with travel and the improvement of communications. So, in looking back, we find that early hostelries were located then, as now, on the main traveled highways.

Pilgrimages in early history have at times made necessary the establishment of some form of housing and hospitality for weary travelers. One of the best known of these is the ancient Hospice of St. Bernard, located near the summit of the Great St. Bernard Pass in the Alps. Pilgrims to Rome are said to have taken this route. There, the famous St. Bernard dogs have saved thousands of lives from freezing and exposure in the snowy altitudes of 8,111 feet.

There is much of interest and romance in the early English inns of Shakespeare's time. Many of these inns had central courtyards into which the coaches drove and discharged their passengers, and considerable space was required for conveyances which were stored there overnight. These courtyards were frequently surrounded by galleries on the wings of the inn. It is interesting to remember that, in these inns, Shakespeare and his band of strolling players gave many performances. Much of the coarse humor of his plays was, obviously, for the entertainment of the hostlers, while, let us hope, his poetic passages were appreciated by the patrons of the inn and the ladies on the balconies.

The "Golden Lion," at Avon was known as "Ye Peacock Inn" in Shakespeare's time. The great bard, himself, is known to have acted at the "George Inn," in Salisbury, and many others. The most famous of Shakespearian taverns was the "Boar's Head" and Falstaff's home was the "Garter," fully described in "The Merry Wives of Windsor."

A famous traveler, Shenstone, scratched the following lines upon a window pane of the "Red Lion," in Henley:

"Whoe'er has traveled life's dull road,
Where'er his stages may have been,
May sigh to think he still has found
The warmest welcome at an inn."

In these old inns, the truckle bed was put under the standing bed. The servant slept in the truckle bed and his master in the one above.

However, there were attempts at luxury, even in the sixteenth century, and Pepys records in his diary: "Come to the George Inn where lay in a silk bed and very good diet." This accommodation for the night cost him the equivalent of \$11.25 in our money—an extravagant sum in those days—which incensed him greatly.

Even in our day, American hotels have undergone a wonderful refinement in luxury and convenience. Construction of new hotels has been particularly active in the last few years. During 1923, new hotel construction in the larger cities amounted to \$508,989,000 and the estimated construction for 1924 is even greater. While this construction includes numerous large structures costing fabulous sums, it is also notable for extensive building, in the smaller cities, of modern hotels containing the latest improvements and conveniences.

Of 22,196 hotels in the United States, 16,522 were shown by a recent survey to have 50 rooms or less. This indicates that hotel construction is active in the smaller, as well as in the larger, cities.

It is not so many years ago that the old Astor House, of New York, and the Palmer House, of Chicago, represented the utmost in American hotel size and luxury. Today enormous structures, imposing in design, luxurious in decoration, furnishings and equipment, outrank them, even in the smaller cities.

The old Astor House is but a memory. Workmen are now wrecking the famous old Palmer House and, in its stead, will rise one of the largest and most luxurious hotels of modern times.

New York City is today the greatest hotel city in the world with a capacity of 60,000 rooms. Her best structures are now rivaled, however, in cities all over the United States. Hundreds of modern palatial structures exist and new ones are constantly being added. Each is a completely equipped community embodying the best ideas of practical hotel men, architects, engineers and builders to provide the utmost in human comfort and entertainment.

Each year sees novel features introduced into hotel equipment. For many years, telephones have been common equipment but some hotels are now planning complete radio installation in each guest room. The private bathroom is common today. The cabaret, the roof garden, the swimming pool, can no longer be considered novelties. One well-known Chicago hotel is now planning to install a ballroom floor of glass with colored lights thrown from below, the tints changeable at will of the operator.

There exists a need for new hotel construction in numerous cities which must await successful promotion. Many factors enter into the success of a hotel project. There is one city, credited with a population of only 8,000, which supports one large, modern hotel of the luxurious type, a "commercial" hotel with, probably, 100 bedrooms, besides a number of smaller hotels. However, this is exceptional and, on the other hand, we know of cities of 30,000 and 40,000 which will scarcely support one hotel of moderate size.

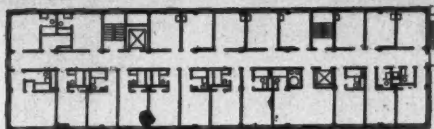
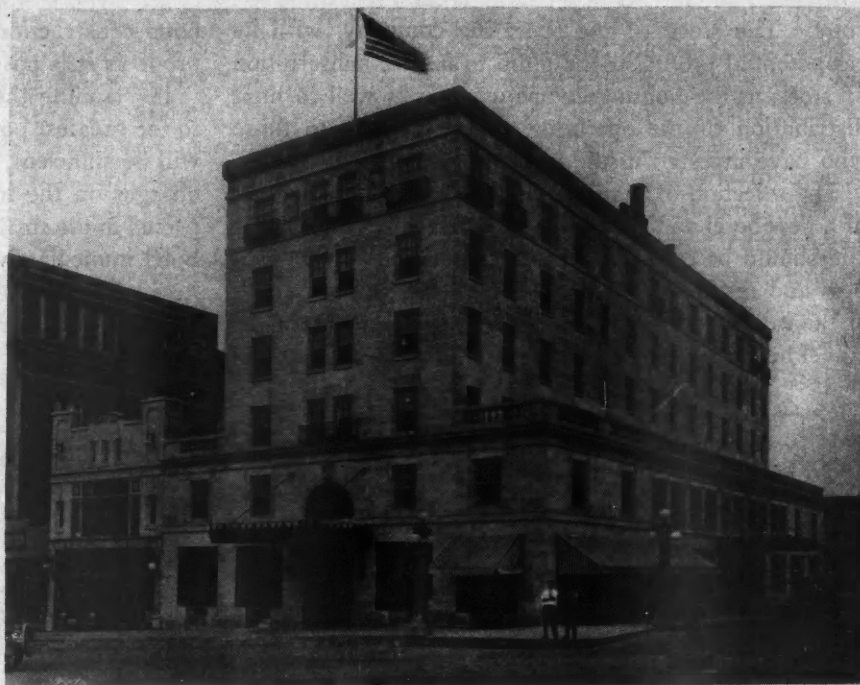
The first factor to be considered is the number of visitors to the city and this is determined by its geographical location and the distance, size and importance of nearby cities. Is the city under consideration on main or branch line railroads? Is it an industrial or distributing center? Is it located on one or more main automobile highways? Has it social activities that could be profitably served by such a hotel? What hotel accommodation already exists there? These are questions which must be satisfactorily determined in considering a hotel project.

Having determined that a new hotel is needed and will be a profitable investment, it is then advisable to enlist all the local support and favorable publicity that can be obtained. After securing the individual support of leading citizens and business men, it will be advisable to secure the support of the local Chamber of Commerce. They will probably appoint a committee to investigate and report.

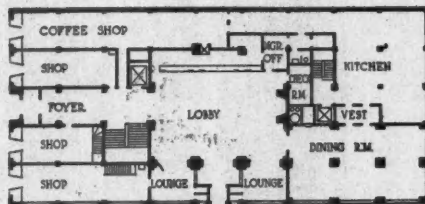
Once enthusiastic endorsement is secured, it will not be very difficult to finance such a project, with the community spirit behind it. It is generally recognized that a good, modern hotel is a big asset to any city and a direct factor in its growth and development. It brings conventions, tourists, visitors and commercial travelers who may, otherwise, pass by. It also forms a center for local business and social activities—meetings, luncheons, dinners, dances, etc.

Large mortgage bonding companies will usually loan to a good hotel project, with local support, 60 per cent

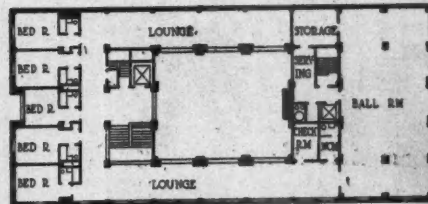
or more of the value of land and building. It is a good plan to form a holding company, which will own the site and building, limited to a 6 to 8 per cent annual earning. An operating company can then be formed which will handle the lease, equip and operate the



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN



MEZZANINE FLOOR PLAN

Photo and Arrangement of the Greystone Hotel, Bedford, Ind., Said to Be Perfection in Hotel Design for the Smaller Cities. Nicol, Scholer & Hoffman, Architects.



Photos Showing the Popular Lunch Room and Dining Room in the Greystone Hotel at Bedford, Ind.

hotel. The stock of the operating company, with its big potential profits, is the plum to induce subscription of stock in the holding company, so it is well to limit distribution of the operating company stock to those who have invested in the holding company.

The selection of a suitable site is vital to the success of a new hotel and should be very carefully made. The site should be centrally located in relation to the business and residential sections. It should, if possible, be at the intersection of main thoroughfares in the line of travel between the residential and business sections and

hotel construction and finish should be as nearly fire-proof as it is possible to make it.

In planning the hotel, consideration should be given to the greatest possible return from store leases. These will be sufficient, in some cities, to pay the entire fixed charges on the investment, but this can hardly be expected in the smaller cities. The erection of a first-class hotel immediately enhances the value of adjacent business property and, through the store leases, the hotel finds its first, and sometimes its only opportunity to share adequately in these increased values.



The Lobby of the Sovereign Hotel, Chicago, is Typical of the Good Taste and Rich Simplicity that is Favored Today in the Best Hotels. Walter W. Alschlager, Architect.

in the line of growth of the best retail section. It should be centrally located with regard to transportation and it should be of a shape and size to accommodate a good hotel building.

A hotel building should, first of all, be fire-resisting. Reinforced concrete, while ideal from the fire-resisting standpoint, is not generally in favor for hotel building, due to the obstruction of the columns. Steel framing is in general use, and, owing to its great strength and adaptability to variation in span and load, lends itself readily to hotel design. Concrete floor slabs are quite frequently used with good results. Needless to say,

A practical hotel man—usually the man who will operate it—should be included in the planning council with the architect, the owners and the builder. In determining the size of the hotel, it is well to be fairly conservative. At the same time, it should be so planned that additional rooms can be added, so as substantially to increase the hotel capacity when needed.

It is more difficult to plan the ground floor layout of a small hotel than a large one. This is due to the heavy burden, or proportion of the public space downstairs to the number of bedrooms which fix the capacity of the hotel. In small hotels, the area devoted to

public and service uses should be not more than 25 to 35 per cent of the total area of the hotel.

The size of hotel bedrooms has become almost standardized in modern practice. Rooms facing the street are usually about 10 to 12 feet wide by 16 feet in length; rooms facing the court, 9 to 11 feet by 14 feet in length. Corner rooms are usually from 15 to 16 feet in width by 18 to 20 feet in length.

Corridors should serve rooms on both sides and there should be ample linen closet, slop sink and maid room accommodation for each corridor.

It is preferable to have the main entrance lead direct to a ground floor lobby, rather than to have the incoming patron climb a flight of stairs or else take a brief elevator ride to the lobby. However, it is sometimes necessary to have the lobby one floor above street level, in which case, elevators should be provided from the downstairs corridor to the lobby.

After the design of the lobby, first consideration should be given to a cafeteria, lunch room or restaurant which, if properly located, should receive a large share of local patronage and prove quite profitable.

The main dining room should be, if possible, on the same or slightly higher level than the hotel lobby. The kitchen should be adjacent to the main dining room, with convenient service elevators to the banquet hall and private dining rooms. The kitchen should also be so located with reference to the lunch room or restaurant that convenient access can be had to it, as well as to the main dining room. The ballroom is usually located on the top floor, although there are exceptions to this rule.

In planning the spaces for the kitchens, dining rooms and cafeteria, at least 20 square feet of floor space per bedroom should be allowed for dining room space and the same amount for kitchens. Thus, a 500-room hotel should have about 10,000 square feet of dining room space and 10,000 square feet of kitchen space. This rule, if followed, should prevent the overcrowding common in so many hotel kitchens and lessen the expense of slow and costly service.

The cafeteria is a growing feature of even the larger and more luxurious hotels and is patronized to a surprising degree by guests who usually demand service. The syndicate, or group hotel companies, are constantly studying public taste and have been the first to sense this development and enlarge their facilities to meet it. These cafeteria are quite luxuriously furnished and the food they supply high class and attractive. This feature might prove an unprofitable feature in a smaller hotel, on account of the competition with the main dining rooms.

An admirable kitchen layout is that installed in the Drake Hotel, Chicago. There is a large central aisle provided with the range and boiler section at one side, and, on the other, the coffee pantries, ice cream pantry, fruit pantry and garde manger. A dish and silver heater is at one end of the aisle and the checker's desk

at the other. The vegetable preparation department is back of the range section and the bake shop, pastry and confectionery sections are at the other side of the room. An officers' mess is provided at the back of the bakery. At one end is a help's kitchen, and across the aisle, with separate partition, a cafeteria for guests' maids and chauffeurs. A large refrigerator for cold meats and salads is located back of the garde manger. A pot washing department is located at one end of the room. Separated by a partition from the range and broiler sections, is a short order counter, with coffee urns and proper equipment for preparing toast, cakes, waffles and eggs.

Efficient ranges and broilers are on the market adapted for coal or gas or both. The electric range is also becoming popular for hotel work.

One very necessary feature of every hotel kitchen is the ventilation. Over every range and broiler should be a hood of ample size with exhaust fans drawing out heat and cooking odors. Ample fresh air inlets must also be provided in every section.

Automatic dishwashers are an essential in every modern hotel. They are usually spray machines which throw hot, soapy suds over dishes suspended in racks. By the turn of a handle, plain hot water is sprayed over the dishes, to rinse them. Automatic conveyors are frequently installed, to carry the soiled dishes to the washers. Both belt and roller types are used.

The number and size of elevators required varies, of course, with the size and height of the building. Generally speaking, the large, modern hotels schedule their passenger cars to leave the lobby floor at an average interval of from 30 to 60 seconds. A less frequent service might be satisfactory in a smaller hotel. In the Hotel Roosevelt, New York City, there is a bank of six passenger elevators in front, with five service elevators behind them and rubbish and linen chutes at the end of the service bank.

Careful attention should be given in the hotel design to the entrance and storage of supplies. Broad stairways and elevators should lead directly to storeroom entrance and main storage refrigerator.

The main storage refrigerator should be ample in size and have, at least, four compartments. It is safe to figure the size at about 8 square feet of refrigerator floor area to each 10 bedrooms of hotel capacity.

Where a hotel is large enough to manufacture its own power, complete artificial refrigeration can be most thorough and economical in its operation. This makes it possible to have running refrigerated water in every room. All the pipes carrying this water should be carefully heat insulated and kept separate, if possible, from hot water or steam piping.

The average hotel guest is said to consume half a gallon of drinking water and a quarter of a pound of ice every hour during the summer months. From three to five tons of refrigerating capacity will be required for each 100 bedrooms in order to cool all kitchen and pantry boxes, chill the drinking water and



Planning and Equipping the Modern Hotel Kitchen is a Specialty Requiring Special Study and Should Be Delegated to Those Who Have Had Experience in this Matter.

supply the ice required.

A large part of the ice and cooled water is used in the service and dining rooms. The steward's policy, therefore, will largely govern the capacity of the refrigerating plant.

Compression refrigeration is used where electrical power is cheaper than fuel. With this system, either ammonia, carbon dioxide or methyl chloride may be used as a refrigerant. The use of the low pressure system, with ammonia as a refrigerant, is the common one. It is advisable to install automatic temperature control to regulate the operation of the refrigerating plant, and thus effect the economy of shutting down the plant when not required. Even though power has to be purchased for its operation, artificial refrigeration is a necessity to a modern hotel, be it large or small.

The grill room is often placed in the basement and, on the same level, must be located the heating plant, power plant, coal storage and laundry. In the smaller hotels, it is usually better to buy power and light from a service company, rather than to make a very considerable investment required for a power plant. Generally speaking, it does not pay to install power generating apparatus in a hotel of 300 rooms or less.

Every modern hotel should have a laundry equipment suited to its needs but only the larger hotels find it advisable to install equipment to launder guests' personal linen. Washing machines of the rotary type are generally used. extractors to take out the water by centrifugal action, flat work mangles and driers will be required. The number and size of these must be proportioned to the size of the hotel. It is well to

start with a minimum amount of equipment and install additional units as required.

Steam heating of the direct type, with return circulation has been found the most practical for hotel installations. Heat must be instantly available in any room and steam heat best answers this requirement.

Not only is steam a necessity for heating, it is also useful for steam tables in the kitchen and for heating water for kitchen, laundry and guest use. A surprisingly large amount of hot water is required for the modern hotel and the subject is worthy of careful thought, study and design, in order to assure a plentiful supply of hot water as economically as possible. Separate boilers for heating water are quite generally used, but, if a sufficient supply of exhaust steam is available from a power plant, it can be some-

times used to advantage for this purpose.

Combined heating and ventilation has not been found practical for hotel use, except in certain large rooms, such as the main dining room and the ballroom. Some guests will open bedroom windows, no matter how much artificial ventilation is supplied and this interferes with proper circulation of the artificial air currents. Then, too, the cost of operating a combined heating and ventilating system in a hotel, with its many rooms, wings and corridors, is almost prohibitive. Ventilating shafts, however, should be provided, with exhausts from each bathroom. Modern practice calls for a separate bath and toilet for each guest room. Sometimes, showers are provided, in place of tub baths, but the better practice is to install tub baths in each private bathroom with shower attachments and curtains over the tub. Where shower baths only are installed guests usually expect a cheaper rate for these rooms as compared with those in which the tub baths are installed. Experience has shown that this difference in rate is not justified.

Private bathrooms are now quite generally installed in the corridor end of each bedroom. One ventilating shaft serves two bathrooms. A slight space under the bathroom door will cause the air to circulate from the bedroom through the bathroom and up the ventilator shaft. Closet room for trunks and clothing is usually provided in the space across from the bathroom and a swinging door is sometimes installed in the space between, forming a private entrance way with the bedroom, itself, screened from view when the outer door is open.

Every hotel has a large amount of piping, conduit,

wiring, etc. A good method is to have these pipes, carefully insulated, rise through shafts in the bathroom walls. The outlet can be concealed behind a bath-room cabinet, arranged to swing out from the wall on hinges. Bathroom walls and floors had best be of tile and thoroughly waterproof.

Steam radiators should all be hung from the walls far enough above the floor to allow for easy cleaning. It is also a good plan to have rounded corners in all rooms and to select wall finish which can be easily cleaned. Most modern hotels provide vacuum cleaning air pipes and connections but portable electric vacuum cleaners are also used.

In figuring artificial illumination for hotels, it is safe to figure 200 watts for large double bedrooms and 125 to 150 watts in the smaller bedrooms. Three-way electric switches to operate the room circuits. In addition to chain-pull reading lights over the beds, a switch can be so placed that the other lights can be switched on and off from the bed.

A telephone in every room is the modern American practice. These telephone installations have superseded the old push button signals which often brought a bell boy with hot water when ice water was required. In addition, of course, it makes telephone connection

with outside points almost instantly available to each guest.

Whether or not to install a ballroom is often a moot question in hotel planning—particularly in the smaller hotels. This, of course, depends upon local conditions but particularly upon the amount of convention patronage which the hotel may count upon. While a good investment in certain seasons, it is sometimes non-productive space during a considerable part of the year. On the other hand, it is frequently a local attraction of great value and may be counted upon to draw considerable business to the hotel.

While there are quite a number of successful hotel roof gardens in operation, these would not be profitable in the great majority of hotels. In southern cities, where they afford a welcome relief from climatic conditions, they are undoubtedly profitable, as experience has shown. In the North, however, they have been profitable in but few hotels.

In every "commercial" hotel, sample rooms are a necessity but it is well to keep the number of these as low as possible and plan them so that they can be used as excess bedrooms during conventions or other times when hotels are crowded. Disappearing beds are now

(Continued to page 278.)



The Bedroom of a Typical Two-Room Suite in Parkway Hotel, Chicago. The furnishings are homelike and inviting.

Two Homes of Concrete

Typical Designs Selected from the New Book, "Plans for Concrete Houses" Recently Published by the Portland Cement Ass'n.



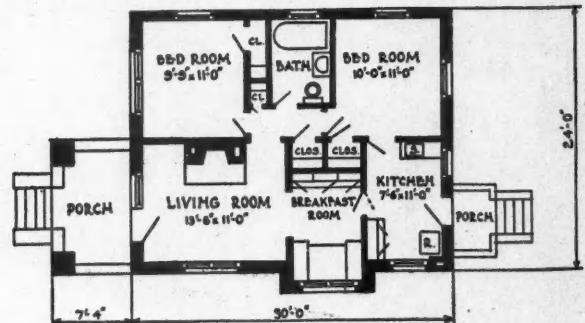
The "Ardmore," a Low Cost Permanent Home. Kane & Sandel, Architects, Chicago, Ill.

THE American home has always been in process of evolution. That is not, as some suppose, merely the expression of desire to substitute the new for the old, but rather an evidence of genuine pride in building and possessing the best that modern science and ingenuity afford. Today the ideal American home is characterized by architectural distinction, weather and fire-resisting construction, and convenience in arrangement and equipment. All of these must be provided with regard for modest upkeep and slow depreciation.

In presenting a second and enlarged collection of house plans, the Portland Cement Association recognizes with gratification a rapidly growing interest in concrete masonry houses.

In presenting this book of house plans, it is fitting that acknowledgments be made to the architects whose plans are shown on its pages. The building public is greatly indebted to the architects

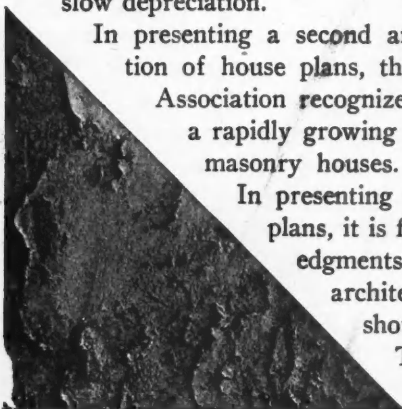
of the country. A successful architect combines two highly developed characteristics. He must be artistic; and at the same time he must be thoroughly practical in order that your home may be soundly planned for convenience and, likewise, planned with the view of being built for the least possible money.



Floor Plan of the "Ardmore."

THIS four-room bungalow above provides the comfort that has satisfied hundreds of home lovers. Although small and compact, it includes all the conveniences of the modern home at a minimum cost.

From the well shaded front porch we enter a comfortable living room with a good fireplace. This can

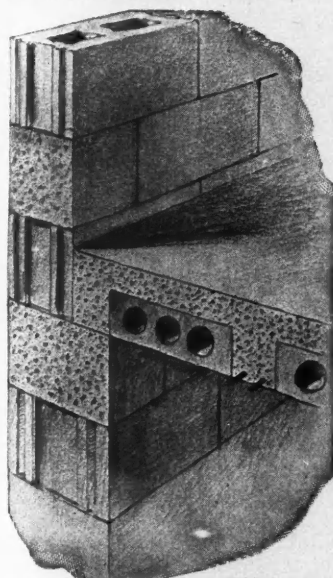


One of the New Rough Stucco Finishes



The "Ann Arbor," a Design Combining Beauty and Economy. Paul Hueber, Architect, Syracuse, N. Y.

be omitted if not desired. Instead of a dining room the architects have adopted the popular breakfast nook, which is large enough for four, with china closets and storage cupboards. The convenient kitchen has room enough for the requirements of a small house.



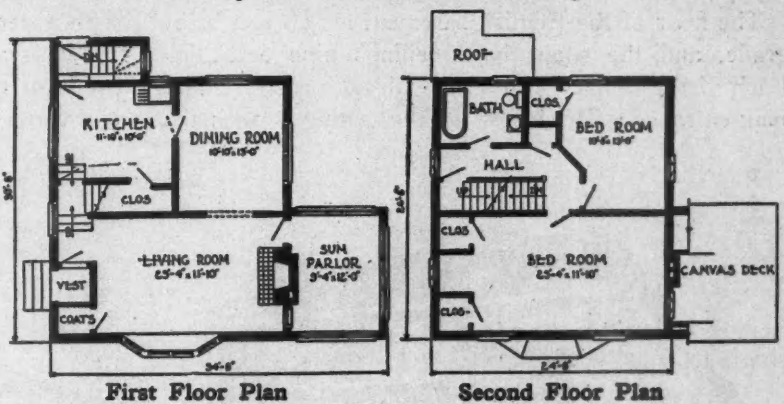
Illustrating Concrete Block Wall and Reinforced Floor Construction.

The trellis shown on the front walls and the treatment of the roof gables add charm to general good appearance. The house occupies an extreme width of 26 feet and should be on a lot not less than 35 feet wide. It is planned for western or southern exposure.

There are two bedrooms with windows on two sides, insuring cross ventilation on hot nights. Plenty of closet space is provided.

The house has been planned with a full cellar containing fuel and boiler rooms, a laundry, work shop and fruit storage closet. If desired the basement can be omitted as this small home can easily be heated by a boiler placed in the kitchen.

IN addition to having produced a concrete house pleasing in design and proportions and very practical in plan, the architect has developed for this struc-



ture a type of fireproof floor construction of more than ordinary interest.

Gypsum partition tile, spaced to the thickness required for floor beams, are laid upon the floor-forms. Adequate reinforcing is then set in the spaces, and concrete is placed to fill in around the reinforcing rods and cover the tile to the necessary depth. The full details of this method of building the floors are covered in the plans and specifications which accompany this design.

The inclusion of fireproof floors is a distinct advantage which will be quickly recognized and appreciated by the wise home builder. The use of fireproof floors is in reality only a natural and logical step in the development of a modern, fire-resistive masonry home.

An Apartment with Shops

Planning Building to Take Advantage of Location Brings Owner Extra Revenue Through Renting Stores

THE greatest possible return for the money invested in land is one of the determining factors in designing buildings of all types where congestion of population has led to land valuations which are figured by the front foot.

Often in cities an apartment will be erected where one side of the lot is in a street where street cars run and which that and other factors make a potential business street; while the cross street on the other side of the property is on a residence or apartment house street.

These factors applied to a Chicago site, at Luella avenue and Seventy-third street, where John Hocke, Chicago architect, was called upon to plan an apartment building for John Smith, the builder of the property shown below.

The Chicago building code will not allow more than one apartment, the janitor's quarters, to be built in the basement of any building, even though it is of the English basement type, as in this building. But there is no objection to store rooms and shops. Hence, Mr. Hocke, through utilizing the space on the business street side of the corner added a considerable rental monthly to the return of the property through utilizing what would not otherwise have been revenue producing space.

The floor of the English basement is two feet below grade, and the shops have ceilings nine feet high. Each of the shops is provided with both a front and a rear entrance. The height of the ceiling is such that

the entrances to the shops do not necessitate cutting into the apartment floor above.

The income from the stores is from \$50 to \$60 a month each, depending on the size and the location in the building. Small grocery stores, delicatessen shops, tailors and hairdressers find such locations good, drawing no small part of their patronage from the tenants of the apartments above them.

That portion of the basement not devoted to the shops is carefully planned for the service of the apartments above. Besides the space devoted to the boiler room, coal room, vestibule and janitor's apartment, three laundries with drying rooms are provided and a locker is installed for each of the apartments to provide storage space.

The apartments themselves are, of course, the most important consideration. The three floors above the basement floor in this building contain twenty-four three-room kitchenette and bath apartments and six two-room kitchenette and bath apartments. The dining room is combined with the kitchenette feature in the apartments and in the smaller ones, closet wall beds are provided.

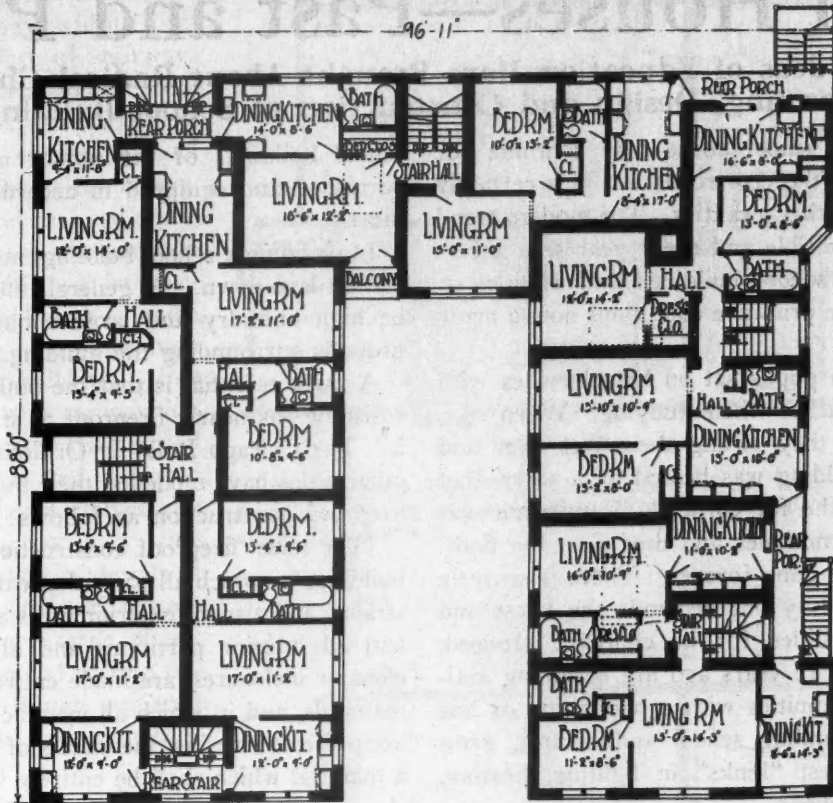
The interior trim is of selected hard wood, as are the floors, except in the entrances and bathrooms, where tile flooring is used. Each kitchen is equipped with a steel cabinet, a refrigerator and a gas range.

The street fronts of the building are of a good grade of pressed brick with cut stone entrances, trim and cornice.

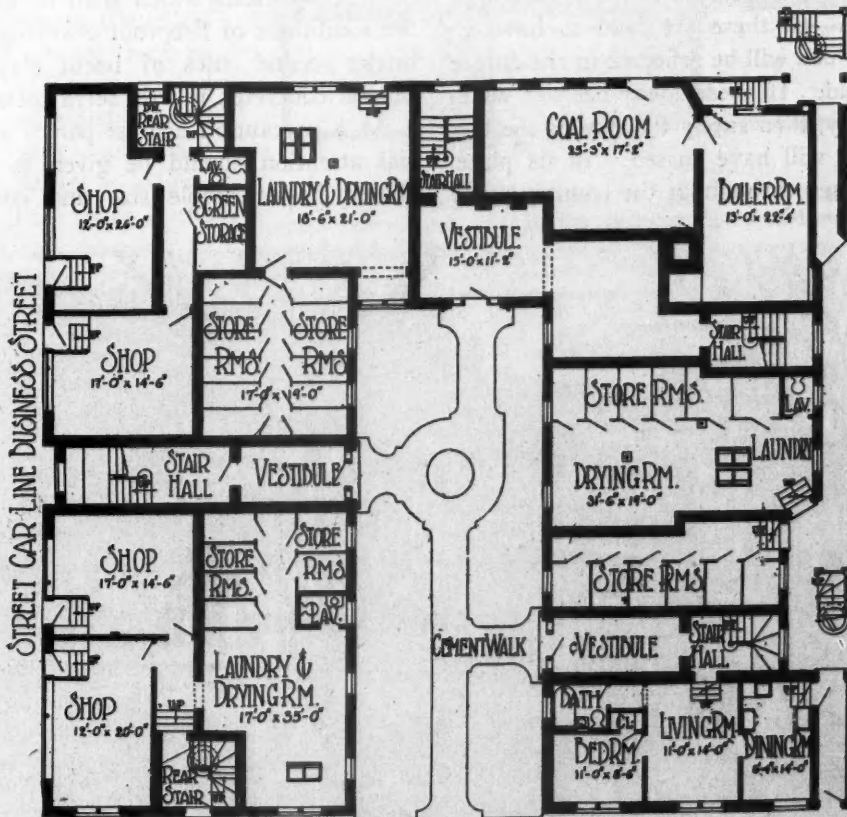


Attractive Three-Story and Full English Basement Apartment Erected at Luella Avenue and Seventy-Third Street, Chicago, by John Smith, Builder. John Hocke, Architect. Because a street car line runs along one side of this property it has some value as being on a business street. To realize on this asset four small shops were built in the basement.

Plans of Apartment With Shops



Typical Floor Plan.



RESIDENTIAL STREET

John Hocke, Architect, Was Called Upon to Take Advantage of the Intersection of a Business Street with a Residence Street in Designing this Apartment. The ground floor, or English basement floor plan shown above, illustrates how he met the problem.

School Houses—Past and Present

Modern Ideas of Education Have Brought About Radical Changes in Planning, Design and Construction of School Buildings

THE little red school house may continue for many years at the crossroads but it is certainly doomed in all other localities. The modern trend in education is responsible and every year sees a further elaboration of school buildings and equipment. Contrast this with the primitive conditions not so many years ago.

In those days, the pupils sat on long benches with their backs to the teacher when studying. When recitations were called, they swung their feet over and faced him. The building was heated by a stove—hot nearby and cold in the far corners. Ventilation was effected mainly by knotholes and drafts on the floor.

But those days are gone forever. There is scarcely an American community but demands the latest and best educational facilities for its children. Indeed, the methods of even 15 years ago are becoming antiquated. Small communities with a population of less than 6,000 are demanding school auditoriums, gymnasiums and the latest "kinks" in lighting, heating, ventilation and plumbing.

Leading educators and thinking architects are today considering earnestly the influence of environment on the impressionable mind of the child. Grace of architectural line, cheerfulness expressed in the furnishings, beauty of decoration—all these are held to have an inspirational effect which will be reflected in the future character of the child. If these ideas become widespread, as seems likely, then surely the day of the box or barnlike structure will have passed. In its place, there have already risen throughout the country many

school buildings of the utmost architectural beauty, furnished and equipped in accordance with advanced ideas.

In planning a school building, no hard and fast rules can be laid down. In general, the site chosen should be high and dry and large enough for ample playgrounds surrounding the building.

A main essential is that the building should be fire-resistant—as nearly fireproof as it is possible to make it. The Chicago Building Ordinance, on which many other cities have modelled their building codes, defines fireproof construction as follows:

"The term 'fireproof construction' shall apply to all buildings in which all parts that carry weights or resist strains, and also all exterior walls and all interior walls and all interior partitions and all stairways and all elevator inclosures, are made entirely of incombustible materials, and in which all metallic structural members are protected against the effects of fire by coverings of a material which shall be entirely incombustible, and a slow heat conductor, and hereinafter termed 'fireproof material.' Reinforced concrete as defined in this ordinance shall be considered fireproof construction, when built as required by Section 564.

"The materials which shall be considered as filling the conditions of fireproof covering are: First, burnt brick; second, tiles of burnt clay; third, approved cement concrete; fourth, terra cotta."

As a precaution against panics and trampling, special attention should be given to the exits. These should be of ample size and conveniently located.



The Wright School, Rockford, Ill., is Typical of Modern School Construction in the United States. The exterior is veneered with a rough texture face brick and trimmed with terra cotta. Peterson and Johnson, Architects.

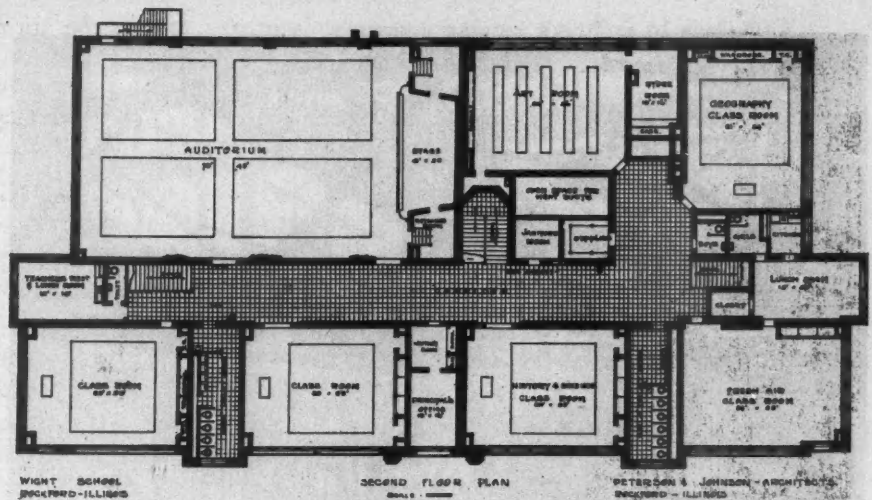
Most city building codes provide a minimum stairway width. Fire-proof ramps, in place of stairways are now being installed in some buildings. Fire escapes should be provided for the second and all floors above. Steel spiral chutes, both of the open and enclosed types, are in general use for this purpose.

The roofing problem in connection with school buildings is much the same as with any other high class, fire-resistant buildings. For the flat roof, built-up composition roofing, using saturated felt mopped on with hot asphalt and surfaced with gravel, is almost universally used. For sloping roofs, a wide choice of fire-resistant materials is offered, including slate tile, cement tile, copper, steel and terne plates, asbestos protected metal roofing, asbestos and asphalt shingle surfaced with crushed rock, and numerous others.

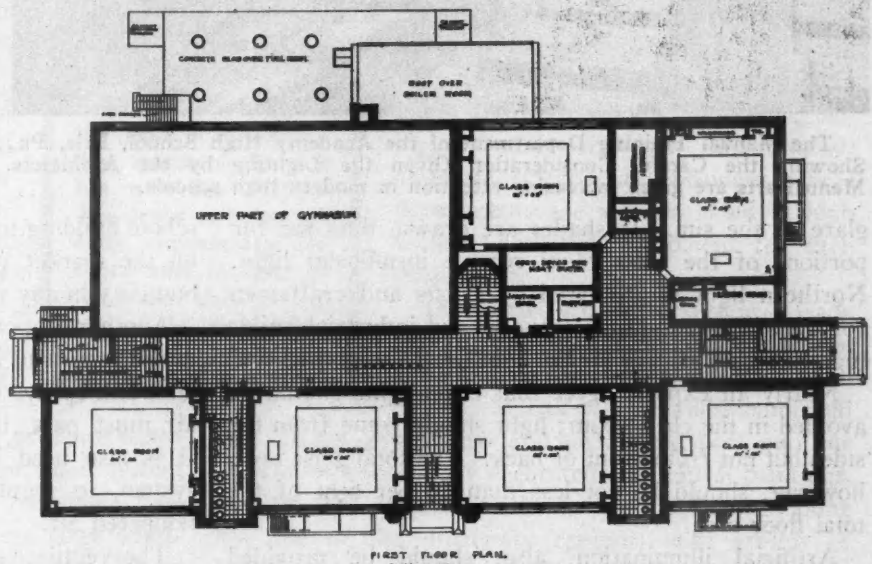
While it is better to have halls and stairways too wide, rather than undersize, nevertheless there is considerable hall space wasted by poor planning. A survey of school buildings made in the city of Cleveland showed 1,250,000 square feet of floor space devoted to stairs and corridors. It is estimated that 40 per cent of this area could have been saved and devoted to educational purposes. This space is the equivalent of 625 class rooms.

There is considerable difference of opinion among experts on the question of the best light for class rooms. All are agreed that kindergarten rooms, gymnasiums, manual training rooms, rooms for domestic economy and similar purposes should have plenty of sunlight and natural ventilation.

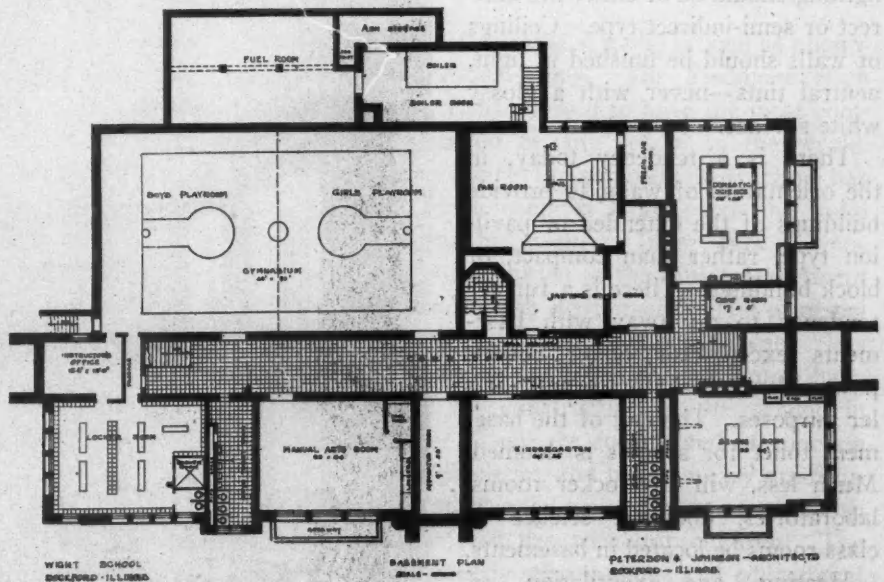
For the class rooms, some favor a southern exposure, some an east or a west exposure. One well-known architect has come out boldly and advocated a north light, and there is much to be said in favor of it. The outer air has already had the purifying action of sunlight and this air is carried to class rooms by the ventilating system. With an eastern, a southern or a western exposure, the pupils, at some time of the day, get the direct



The Class Rooms on the Second Floor of the Wright School, Rockford, Ill., Are Ground About the Auditorium, Which Is Immediately Above the Gymnasium on the Lower Floors.



The First Floor Plan of the Wright School Makes Provision for Three Corridor Entrances. All of the corridor floors and stairways are fireproof and covered with gray tile.



Heating and Ventilation is One of the Most Essential Elements of Successful School Building Design. Note the large space given to the fan room. The rest of the basement is devoted to the gymnasium, locker rooms, domestic science, sewing, kindergarten and manual arts rooms.



The Manual Training Department of the Academy High School, Erie, Pa., Showing the Careful Consideration Given the Lighting by the Architects. Manual arts are given increasing attention in modern high schools.

glare of the sun. If shades are drawn, then the far portions of the class room receive insufficient light. Northern light is preferred by artists and craftsmen for their work, and many studios and industrial buildings are planned for north light.

Nearly all experts agree that cross-lights should be avoided in the class room; light should come from the sides but not from front or back. The total glass area, however, should be not less than 20 per cent of the total floor area.

Artificial illumination, also, should be provided sufficient to furnish three or four candle-power on each desk-top. The lighting should be of either the indirect or semi-indirect type. Ceilings or walls should be finished in light, neutral tints—never with a glossy white surface.

There is a tendency today, in the orientation of walls, to provide buildings of the extended or pavilion type, rather than compact, or block buildings. There is a further tendency to do away with basements except for boiler rooms, power plants, coal storage and similar purposes. The day of the basement toilet for schools is doomed. Much less, will any locker rooms, laboratories, domestic science or class rooms be located in basements.

Heating and ventilation of schools is a subject which has received a great deal of careful thought. It is recognized as an im-

portant factor in health and growth of the children, and as an essential to their mental activity. Foul, sluggish air has a tendency to make the children sluggish also. It is a menace to their health and a potent factor in the spread of epidemics.

Forced ventilation is almost universally favored, in addition to natural window ventilation when the weather is favorable. This ventilation takes the form of combined heating and ventilation, the outside air being tempered by heating coils before it is forced by fans into rooms and corridors. In addition heat is furnished by direct radiation sufficient to offset the heat loss in cold weather through glass, walls and doors. If all the heat is furnished through the ventilator ducts, it becomes a hot blast—hot, dry and enervating. Special apparatus should be installed in every

school building to furnish humidity. There are devices on the market which will automatically regulate the humidity in any ventilating system to the desired point.

Another important feature of the ventilating and heating system is the air-washer. This consists of tank and sprays of water through which the incoming air must pass, thus removing all dust or impurities. It is also used in conjunction with the humidifying system, to regulate the amount of moisture in the tempered air.

The ventilating system should be so designed as to



The Kindergarten Department of the Lincoln School, Toledo, Ohio. In planning such a room the architect has an opportunity for pleasing effects and quaint conceptions.

furnish at least 30 cubic feet of fresh air per minute per person, equally distributed to all parts of the various rooms. The fresh air intakes should be located no higher than the second story. The ducts should be of non-rusting metal or tile. If of rough tile, they should be lined with some hard, smooth finish. When rough tile is used, the mortar is sure to partly choke the interior and reduce the proper capacity of the duct. The roughness also provides lodgment for dust and dirt.

The fresh air is brought into a plenum or feed chamber, where it passes over sufficient heating radiation to temper the air as it is forced by the fan into the ducts for circulation throughout the building. Both inlet and outlet fans should be provided, in order to insure a circulation of air. Fans and motors should be quiet running, the main inlet fan being operated in a chamber of sufficient size to prevent fan noise.

The use of ozone in school ventilation has, so far, proved a disappointment and is, in fact, unnecessary.

All floors and partition walls should have sound deadening insulation in them. Floors of corridors should be covered with some sound deadening composition such as mastic, cork linoleum, elaterite gum and asbestos fibre or similar materials.

Boilers, radiation and heat controlling apparatus should be carefully selected with a view to long service, efficiency and operating economy. Low pressure steam is generally the choice, but the forced hot water system is also excellent. For small buildings, the single feed with gravity return is sufficient. For the large buildings, the two-pipe or return system is advisable. There are a number of vacuum heating systems on the market which have shown excellent results and these are being quite generally installed.

Fathers and mothers are today demanding more sanitary conditions in schools. Foul, dark toilet rooms will no longer be tolerated. Toilet rooms with ample facilities for both sexes should be located on every floor. Forced ventilation of these rooms, with proper exhaust fans, should be used to keep the air pure at all times. The rooms should have plenty of daylight—sunlight if possible. Metal, slate or marble partitions, raised well off the floor, should surround each closet. Floors should be of terrazo or tile. The plumbing should be of the latest and most sanitary type. Drinking fountains should be located freely throughout the building, mainly in the corridors.

Numerous types of sash—mainly steel cash—are being put on the market arranged for convenient and easy opening and for a larger circulation of air. In some of these, there are three separate sash in each window with a translucent shade attached individually, so that, when open, each forms an awning in itself. This gives a combined window opening and awning

feature, protecting against the glare of sunlight.

Physical education and recreation are now being classed among the necessities and greater facilities are being installed, to provide these features. Nearly every modern school has its gymnasium and its auditorium. Architects are cleverly combining these features, as, for instance, in the Dundee Community High School, Carpentersville, Ill., recently completed. Here, the stage of the auditorium is very large and is convertible into a gymnasium, and vice versa. The change from gymnasium to stage setting is accomplished in 20 minutes. Direct stair connection from balcony to stage is frequently installed in modern school auditoriums.

Practically all high school buildings in large American cities are today equipped with shower baths and swimming tanks. The general practice is to divide the use of the tank—devoting several days a week to boys and an equal number to girls exclusively.

Completely equipped lunch rooms and cafeterias are now installed in many grade and high schools. Physical, biological and chemical laboratories; domestic science and business school departments are also provided in high schools, with full equipment for each purpose.

The new Cossitt Avenue Grade School, La Grange, Ill., is one of the most luxuriantly equipped in the United States. It has a large auditorium and

pipe organ, gymnasium and swimming pool and the building is handsomely decorated with mural paintings.

High and technical schools are developing along the line of the university campus, with groups of buildings, as in the Arsenal Group at Indianapolis, and the Roosevelt Group at Detroit. Wichita, Kan., has a high school, built recently, which cost a million dollars.

Radio is now used in some schools, as well as phonographs and educational films. The Piedmont High School Piedmont, Calif., is said to have the most complete radio installation of any school in the world. All equipment necessary for complete instruction has been installed. Each room is linked with the radio receiving apparatus by means of telephones. Thus, a concert may be transmitted to the music department or a speech to the English department. The principal of the school makes his announcements in each class room simultaneously by radio. Fireproof ramps have been provided, in the construction of this school, in place of stairways. They are constructed of concrete covered with cork linoleum, and have an easy gradient.

As the boy of today is the man of tomorrow, so also the future of the race lies with our children. The desire to better the early surroundings and educational facilities of American children, so plainly manifested in better school buildings and equipment, is one of the most hopeful signs of the times.

The boy of today is the man of tomorrow. The future of the race lies with our children. The desire to better the early surroundings and educational facilities of American children—is one of the most hopeful signs of the times.

Development of American Practice in Reinforced Concrete

By **ROBERT D. SNODGRASS**

Chief Supervising Engineer, Truscon Steel Company.

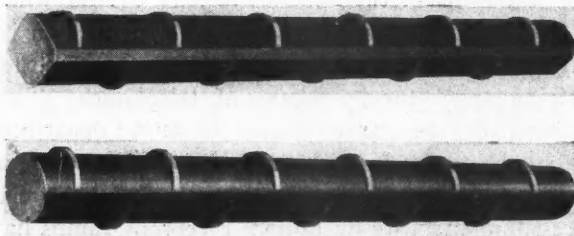
DEVELOPMENT of American practice in reinforced concrete is a story that illustrates in a remarkable manner the wide difference between American and European engineering methods. It marks, as well, the ingenuity of our American engineers in adapting a new idea to our domestic requirements.

The type of construction which combines concrete and steel—so that the two act together as a unit and provide safe load bearing members—was first developed in Europe. Its use was not seriously considered here until many years later. We did not begin to realize its possibilities until the early years of this century. The probable reason is that it has only been within the last thirty years that we have been producing sufficient portland cement of the grade necessary in reinforced concrete construction.

Our first reinforced concrete designs naturally followed French and German precedent, but it was soon realized that this did not suit American construction methods. Our wage rates, being high, necessitate the use of methods which reduce the labor item to a minimum, even if this means slight increases in material quantities. The European builder, operating with cheap labor and without the same speed required by American practice, finds it economical to save material at the expense of labor. Consequently, European engineers go in for the greatest refinements in their design and, in order to reduce material cost, give comparatively little attention to standardization of forms or reduction of bending and handling cost which are so vital to us.

At the time we began to build in reinforced concrete, we were well equipped with mechanical means for handling large volumes of concrete materials. But the use of these mechanical adjuncts resulted in less careful inspection of workmanship and the consequent danger of a less satisfactorily finished construction. We, therefore, were obliged to assume more conservative working stresses than those accepted by European practice. In order to insure a perfect bond between concrete and steel, the necessity of bending and hooking the bar ends became more important than if we had been proceeding with slower and more painstaking methods.

Existence of this condition was the incentive that led to the invention of the deformed bar. The plain bar used in



Types of Deformed Bars

Europe required long imbedment or hooked ends to insure against slipping. The deformed bar, being one with irregularities or projections rolled on its surface, could not slip through the concrete. Its use made it unnecessary to work the mixture to a degree that would produce the maximum adhesion between steel and concrete. The deformations made possible a continuous and more rapid transfer of stress from concrete to steel, thereby providing, not only a safer construction, but a more economical one in both labor and materials, by the elimination

of hooked ends, and by reducing the necessary amount of embedment.

By far the greatest amount of labor used in bending and placing reinforcing steel is applied to the stirrups. These consist of small cross-section bars, usually bent in U-shape, spaced at varying intervals along the main reinforcing bars and placed with the legs of the U either vertical or inclined at an angle of 45 deg. This is an extremely expensive operation requiring that each individual stirrup be not only wired to the main reinforcement, but that each be securely held in position while heavy loads of concrete are being placed around and over it. This operation is a difficult one and requires constant and careful inspection to insure safe construction.

Perhaps the most notable achievement in reinforcing bar was the production of bars designed to meet this condition. A number have been developed which not only mechanically space the stirrups, but almost entirely eliminate the field labor of bending and wiring. This has been accomplished in a variety of ways: one, by welding the stirrups directly in the main reinforcing; another, by pressing the stirrups into the sides of bars



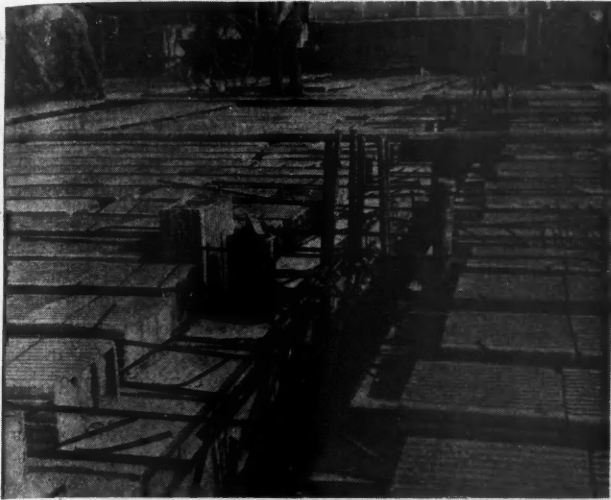
Bar with Rigidly Attached Shear Members.

which are specially designed to permit this; a third, by clamping the stirrups in position, and a fourth, by the production of a specially rolled bar, having two horizontal flanges or wings projecting on opposite sides. These flanges are sheared up at intervals to form rigidly connected diagonals, making a unit of the main bar and the shear reinforcement. Use of this bar saves the labor of placing eight to ten pieces. The bar and its attached shear members is laid in one operation. Instead of making from four to six bends, the sheared diagonals are merely pulled up (a very simple operation) and the labor of wiring and the expense of rigid inspection during pouring are entirely eliminated. At the same time, the accuracy of spacing is absolutely assured, and the connection between the main and shear reinforcement is a positive one that insures the proper distribution of stresses.

Another development that aids in saving steel placing labor is the use of bars assembled into mesh. There are many of these in use which make it possible to lay large areas of slab reinforcement in one operation. Many of these meshes fabricated from small size bars are shipped in rolls so that spacing can be done by setting a roll at one end of a building, fastening the end and unrolling over the forms. The labor saved by this, as compared with placing and tying single bars one at a time, is a considerable item.

No better example of American ingenuity can be found than that displayed in solving the concrete form problem. Lumber is becoming increasingly more expensive year by year and, consequently, the necessity for substitutes more important. While this branch of the art of reinforced concrete has progressed more slowly than the development of labor-saving reinforcement, nevertheless, a very important step in this direction was made in the early days by the introduction of what is variously known as Hy-Rib, self-centering Ribplex, or core mesh, depending upon the manufacturer. This reinforcing material is formed from steel sheets into which V-shaped ribs $\frac{3}{4}$ inch high are rolled and the metal between is slit and

expanded forming a mesh. The ribs are used as reinforcement but are also stiff enough to carry the load of the wet concrete until set. The mesh between the ribs is sufficiently fine to prevent the concrete from flowing through. This combined reinforcement and centering is used most economically for thin slabs and light loads, and is especially adapted for use over



Concrete Joist and Clay Tile Construction.

structural steel beams spaced from 4 feet to 8 feet, center to center.

Our first concrete structures, following European practice, were of the well-known beam and short span slab type, supported in turn by concrete girders. For certain classes of buildings this is not objectionable, but for office buildings, hotels, schools, hospitals and even for certain classes of factory buildings, a flat ceiling between beams is desirable. In long span construction the thickness and, consequently, the weight of solid slabs increases enormously as the span lengthens. The possibilities, therefore, for using these on long spans are very limited.

Efforts have been made to provide economically for this type of ceiling. The first embodied the use of rows of hollow terra cotta tile block spaced from 4 inches to 6 inches apart. The reinforcing steel was then placed in the spaces and concrete was poured between and over the tile to the required depth, forming a series of concrete T-shaped joist, the tile acting as fillers to produce a flat ceiling. Use of this terra cotta (weighing only about one-quarter as much as the concrete replaced by it, and costing only one-half as much) makes it possible to construct longer spans to do so at very much less cost. The concrete eliminated merely added to the dead weight without having any structural value. The economies effected by the use of tile and concrete slabs are not confined to slabs alone. The reduction in dead weight also makes it possible to use smaller supporting beams, girders, columns and column footings. The last is extremely important where foundations are bad.

For a number of years the cost of mixing and placing concrete has been growing at a rapid rate. A comparison with the cost of 1910 shows an increase of about 270 per cent in most parts of the country. During this period structural steel, which is the principal material in competition with reinforced concrete, although subject to wide fluctuations, has had nothing like the same increase. This has made the question of cost

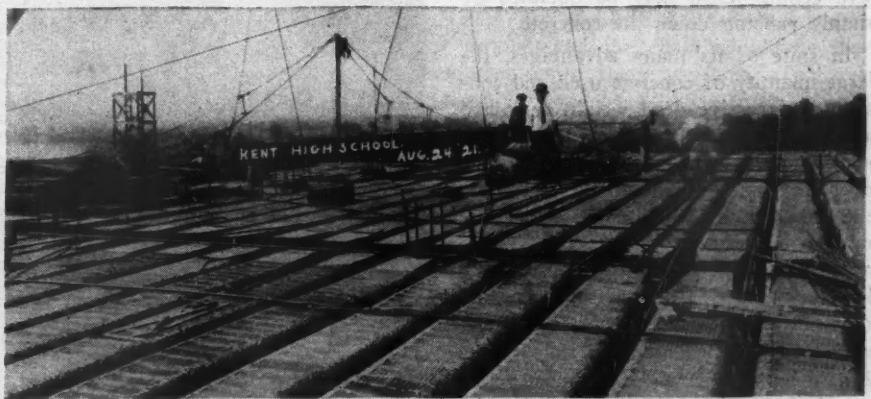
reduction in reinforced concrete methods an extremely important one. The three principal elements entering into concrete construction are reinforcing steel, concrete and form work. In an average building the relative percentage of each of these items is 19 per cent, 39 per cent and 42 per cent, respectively. In each of the last two, labor plays an important part. It has, therefore, been absolutely essential for the concrete designer to reduce these to a minimum if reinforcing concrete is to maintain a leading position in fireproof construction.

As usual, it has been the manufacturer, vitally interested in the sale of his products, who realized the seriousness of these conditions and took steps to remedy them. His first efforts were directed toward saving in concrete materials. The use of terra cotta tile, while intended primarily to produce long span flat ceilings, helped. But the first real step in economy was made by the development of metal tile. This consisted of pressing corrugated sheet steel into an inverted U-shaped form about 21 inches across the base and varying in depth from 4 inches to 14 inches. The metal tile thus formed are placed on the forms in rows with the ends slightly lapping. These rows are set from 4 inches to 6 inches apart and concrete is poured between and over them to the desired depth. The effect of this is to produce a long span slab in which the metal tile eliminates all the unnecessary concrete below the neutral axis, leaving only the minimum amount in the joints between the tile necessary to provide for shear, and to develop the reinforcing steel.

The first efforts at the production of this metal tile were not entirely successful, in that the flat tops, which were about 19 inches wide, sagged under the weight of the concrete over them, thereby requiring more concrete than desired. This was remedied, however, by increasing the depth of the corrugations and also by pressing deep V-shaped ribs crosswise into the top tile. This latter form produces an unusually stiff tile and saves from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch of concrete per square foot over that required with many other types.

Steel tile is now widely used and is particularly well adapted for slabs in schools, hotels, apartments, hospitals, residences and other lightly loaded buildings where flat ceilings are essential. The flat ceiling is attained by placing specially designed metal lath across the bottom of the joists. This lath is designed with $\frac{3}{8}$ -inch hy-ribs to provide a stiff plastering surface for spans from 16 inches to 24 inches.

Simultaneously with the development of long span metal tile slabs, another type of construction designed to produce econ-

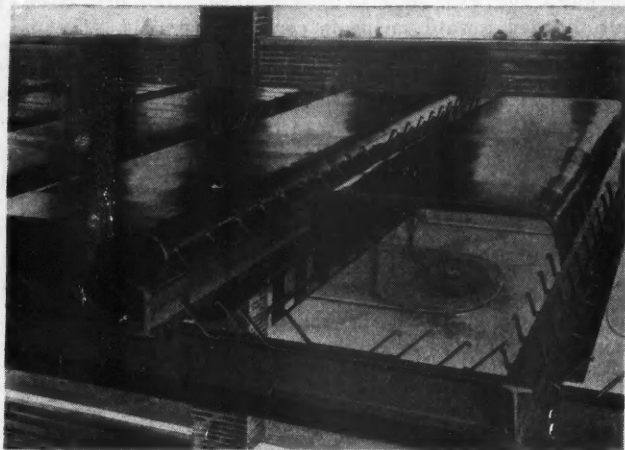


Steel Tile Used in Construction of Kent High School, Kent, Ohio.

omies in heavily loaded buildings began to appear. This is the widely known solid concrete flat slab design, consisting of concrete slabs of uniform thickness, supported at the columns only by flaring column heads and by increased slab thickness around these column heads. This construction does not obtain its economy by saving in concrete. On the contrary, it slightly increases the quantities of this material necessary over an ordinary beam and slab design. But the simplification of

form work is enormous and a large part of the ceiling, being flat, permits building the forms in units which can be used over and over again, either on the same or on other floors. At the same time metal forms for use in columns and in flaring column heads began to be used. These forms are rented by the manufacturer and are used so many times that the amount represented in manufacture and material for each using is extremely small. To appreciate the actual economy in this construction, its relation to other trades must be studied.

Any other type of construction requires deep supporting



Sheared I-Beam Reinforcement Supporting Steel Forms.

beams which cut into the head room. A flat slab, having no beams to reduce the clear story height, cuts the distance from floor to floor substantially. In a building of six to eight stories, this reduction may amount to four feet or five feet. The quantity of brick work in the walls and partition thus saved must be counted. Furthermore, in factory buildings, warehouse and store buildings, where sprinkler systems, heating pipes and wire conduits are carried along the ceiling, the passage of these through or around beams adds greatly to the cost. The same economies are obtained under flat slab ceiling where shafting is required. It also has the advantage of being a construction in which the window heads may be placed close to the ceiling, thereby permitting the maximum amount of light. Furthermore, a very presentable and inexpensive ceiling finish may be obtained by simply rubbing down the concrete.

In spite of its many advantages, the large quantity of concrete used and consequent excessive dead weight remained a disadvantage. In this type of construction the maximum stresses occur over the column head and these regulate the slab depth. At the panel center and midway between the columns, the stresses are much less, requiring considerably less concrete. No design is perfect that does not provide economical use of materials. However, a modified slab is now in use which largely overcomes this objection. This new arrangement uses steel dome-shaped tile where the stress is at a minimum. These tiles divide the center of the panel into series of intersecting joists running parallel to the column lines and at right angles to each other. The domes are removable and consequently may be used over and over again, resulting in a low cost per dome per using. The adoption of this design

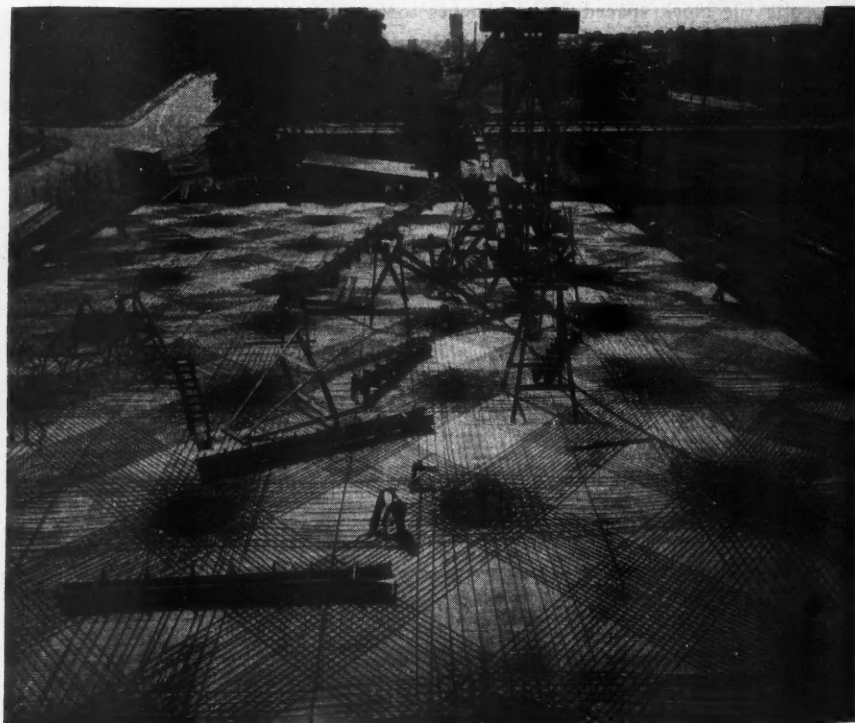
lessens the amount of concrete required per panel, over that used in an ordinary flat slab design, by about 35 per cent. In addition to the concrete saving, there is a very substantial reduction in the dead weight which also reduces the cost of both the footings and columns. This combination of concrete and domes produces a very decided reduction in both labor and material and consequently is an unusually economical floor construction.

As lumber costs continue to increase without any definite limit in sight, the problem of reducing centering costs is becoming increasingly important. The apparent solution seems to be the substitution of steel forms. Since these, however, must be factory built and consequently of high first cost, their economic use requires standardization of design so that the same form may be used many times over. There are many styles of steel forms now in use.

The latest development along these lines almost entirely eliminates wood in form construction. Where a steel deck only is provided, wood supports and braces are still unnecessary. However, a new design, consisting of steel form units which center both slabs and beam sides, is now in use. In this system the beams are reinforced by a combination of bars and steel I-beams. The top flanges of these beams are shown and the members thus formed are bent up to 45 deg. to insure a perfect bond with the concrete. The beam bottoms are formed from steel plates and are suspended from the I-beams so that shoring from the floor below is unnecessary, except, possibly, at the center of each beam. The beam bottoms are flanged on the sides so that they in turn support the steel slab and beam forms.

This form system is sufficiently elastic to meet the majority of conditions encountered in ordinary building construction and owes its economy to the fact that the forms may be used on many consecutive building jobs without alteration or change. Its economy is apparent when it is remembered that at the completion of a job centered in wood, the greater part of the lumber used is useless thereafter, even for fire wood. Development along these lines will eventually entirely eliminate the use of wood, if this material continues to increase in cost as it has in the past ten years.

The high cost of lumber has resulted in still another substitution of sheet steel for wood. Joists rolled from strip steel in



Flat Slab Construction—Reinforcing Steel in Place Before Concrete is Poured.

the form of I-beams and channels have been on the market for a number of years. It is, of course, impossible to substitute this material, joist for joist, at an equal cost in finished construction. But a steel joist is stiffer and better adapted for carrying loads so that it may be spaced at greater centers. Furthermore, where wood joists are used, the floor finish can only be wood, whereas with steel joist over which metal lath is placed, any kind of floor finish desired may be applied.

fireproof construction for light occupancy buildings at less cost than that of non-fireproof wood joist construction. This fact is producing great changes in the design of schools, hospitals, apartments, hotels and even in high class residences.

The effect of reinforced concrete on factory construction has been remarkable. Twenty years ago it was customary to provide heavy brick piers with comparatively small window openings. Many examples of this kind of factory can be found

especially through the Eastern states. Today, because it is possible to carry very heavy loads on small reinforced concrete columns, practically the whole side of a factory is available for lighting the building. The development of steel windows with their large lights, and reduced number and size of mullions has also aided substantially in increasing the light on factory floors as well as improving the ventilation. The factory of today is a bright, cheerful, well ventilated place, instead of the dark, dismal, unhealthy place of the past.

Reinforced concrete has made wonderful strides in the past twenty years, but there is still much room for improvement and there can be no doubt but the next twenty years will show as many and as important changes as the past.

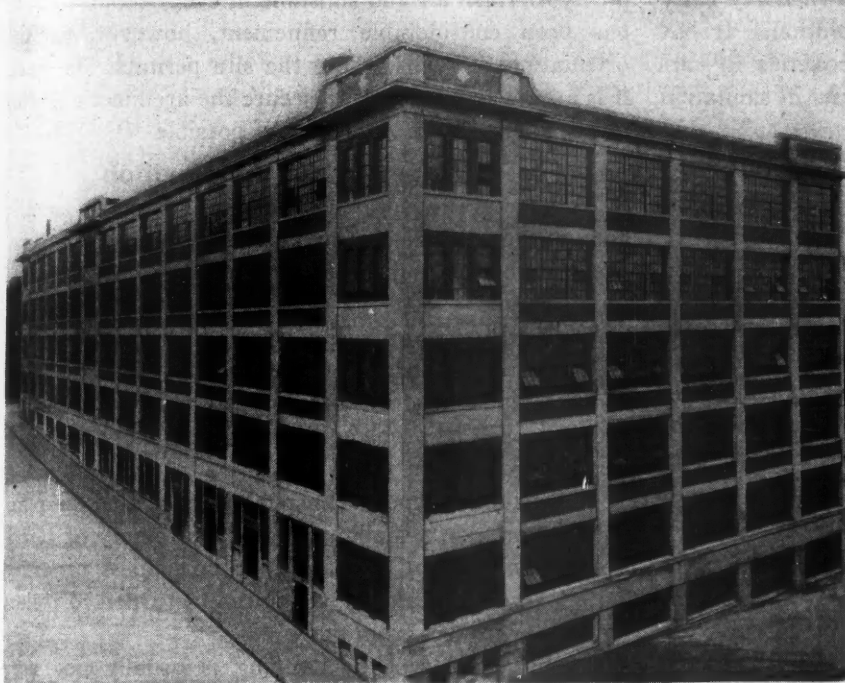


Preventing Chain Failures

HOW can chains—especially sling chains—be kept from breaking? What are safe working loads? Is annealing a good thing and how should it be done? The answers to these three

common industrial plant problems, the subjects of a recent study by the National Safety Council, are found in the following conclusions:

1. Before placing a chain in service, either the total length should be carefully measured or measured sections, say three feet in length, should be laid off with punch marks.
2. All chains should be given careful inspection regularly—daily, if in constant service—for cracks or other defects.
3. The length of the chain, or the distance between punch marks, should be checked periodically—at least once in six weeks if in constant service—and the chain should be discarded if it has stretched more than one-third of a link (for average size chains) in three feet.



Liggett & Myers Tobacco Co. Plant a Modern Daylight Factory Building.

When a cement finish is desired with steel joists, 2 inches of concrete is poured over the lath and the top surface is dressed up to the desired finish. When wood finish is required, sleepers are attached to the joists, either by nailing or by specially designed clips. The space between the sleepers is filled with concrete and the finished floor is nailed to the sleepers in the usual way. Wood flooring is one of the materials which have increased enormously in cost during the last fifteen years—300 per cent does not come far from representing the amount of change during this period. In fact, the cost of flooring is so high that it is possible to build a floor of steel joists and metal lath with a 2-inch cement finish and a metal lath and plaster ceiling at less cost than a double wood floor over wood joists and a metal lath and plaster ceiling. In other words, the use of steel joists make it possible to provide fire-proof construction for light occupancy buildings at less cost than that of non-



Sheared I-Beam Construction, Showing Elimination of Wood Support.



Ordinary Construction, Showing Multiplicity of Wood Supports.

Hospital Planning and Equipment

Higher Standards of Service Require Scientific Planning and Equipment of the Modern Hospital for Better Hygiene, Sanitation and Comfort

THE hospital, as we know it today, is comparatively a modern institution. In its brief history, however, the hospital has outgrown many early ideas and undergone considerable evolution. It has been profoundly affected by new discoveries in surgery and medicine, as well as refinements in sanitation and hygiene.

The first hospitals in this country were somewhat crude in their methods, in the light of medical and surgical knowledge of today. This was especially true during the Civil War when thousands died in war hospitals of "wound fever." In the old days, the crude implements of the operating room were often stored alongside the broom and the mop.

Contrast this with the scene in the operating or clinic theater of any modern hospital. Surgeons and nurses are swathed in white sterilized cotton—even over noses and mouths. Every instrument lies in a sterilizing bath. Every needle, every suture is sterilized. Students must be in a gallery at least 30 feet away and no unsterilized clothing is allowed within the sacred circle. Throughout the building, even the very corners have been abolished, quietness and comfort reigns supreme and the height of cleanliness and care is reached.

There are, in the United States and its possessions, about 7,054 hospitals and sanitariums, with a total bed capacity of 736,175. Of these, 61 per cent have less than 40 beds each, 19 have from 40 to 99 and 20 per cent 100 beds and over.

The hospital is essentially a co-operative institution and architects and builders should be sure that all branches of operation and control are consulted in its planning and equipment. Generally speaking, these are: the board of trustees, superintendent, medical, surgical and nursing staff.

Economy of Operation Important

In the planning and equipment of a hospital, operating economy should outweigh first cost considerations. The best is none too good when it comes to service and usually costs less in the long run. For instance, the building hardware should be of the best and most permanent type. Hinges, doorknobs, latches and locks will have long and hard usage—24 hours per day.

Hospital buildings should be as nearly fireproof as it is possible to make them without sacrificing the service to the sick. Of course, it is not advisable to build firewalls and install automatic fire doors in quite the same manner as in warehouses or factories. But the buildings should be of the best permanent type of construction with the highest fire resisting qualities. The sprinkler system of fire protection is an excellent one and should be more generally installed.

The architect, almost from the beginning, has realized the value of planning hospital buildings with plenty of fresh air and sunshine in every room. There has been considerable refinement, however, in the orientation of walls where the site permits. In fact, it is a wise arrangement to secure the architect's advice on the site before it is selected, if possible.

Two Types—Block and Pavilion

Architecturally speaking, hospital planning usually falls into one of the following classes: the block type, the pavilion type, the cottage type and the connected pavilion type.

The block type of hospital is usually erected in the congested city districts. Of necessity, it is higher and more compact than the other types. Here, the architect has a special problem to provide abundant light and air for every room.

The pavilion type of hospital is elongated in plan, so as to provide a shallow interior and plenty of porch space. In Utrecht, Holland, one hospital is provided with a revolving balcony, which can be turned to follow the sun or protect from the wind.

The pavilion type of building is usually not very large—the larger installations being of the connected pavilion type. In the latter, the buildings are connected by enclosed passages or open porches. The cottage type of sanitarium is often used for tuberculosis and isolation hospitals and has special advantages for convalescent patients.

With the improvement of transportation facilities, it seems likely that city hospitals will, in the future, be more frequently located in outlying districts. The automobile is in such general use that but little time or hardship will be involved in making the trip. In such locations, larger sites will allow the planning of hospitals more ideal in their arrangements and congenial in their surroundings—with plenty of pure air and sunshine; also, far removed from the noise and dirt of the downtown districts.

A hospital must be planned as a unit—the different parts in relation to each other so that there is the smoothest possible operation. Certain departments must be segregated as far as possible; for instance, the noise of delivery rooms, kitchens, laundries, nurseries, elevator shafts and similar places should never be located so as to disturb patients—especially the more serious cases.

On the other hand, a well planned hospital should bring related departments near by; the visitor's entrance should be near the elevators; the operating rooms should be near the surgical wards; the ward utility rooms and linen rooms should be as close as possible to the group of beds which they serve; the

out-patients' department should be adjacent to the admittance ward and the radiographic department; the supply entrance should be near the kitchen.

There is considerable difference of opinion among nurses and doctors as to the respective merits of the centralized kitchen and the ward diet kitchens. With the centralized kitchen, the food is prepared, put on trays and sent up by dumbwaiter for direct delivery to patients.

Where the diet kitchens are in use, the food is delivered in bulk from the central kitchen to the ward diet kitchens. The trays are then prepared in the diet kitchens by the nurses and delivered to the patients. In one 100-bed hospital where a survey was made, it was discovered that the unnecessary walking done in the service of meals amounted to $9\frac{1}{4}$ miles each day.

Walls and floors of hospitals should be rendered as nearly sound-proof as possible. Several types of sanitary floor coverings are in use which deaden the noise of traffic in corridors—linoleums, rubber tile, asbestos composition flooring and various waterproof coatings with a layer of deadening felt between. Contractors are familiar with the various forms of sound-proof insulation built into the floors and walls.

Windows should be so arranged that patients cannot throw themselves out when in delirium. Walls, floors and trim should all be smooth, hard, non-absorbent and easily cleaned. There should be few projecting surfaces for the lodgement of dust. Rounded corners are preferable and sharp angles of floors, walls and ceilings should be avoided. Tile quarter-round and cove are furnished for this purpose.

Lighting fixtures should be of the indirect type, so as to avoid a direct glare into the patients' eyes. Radiators should be hung on the wall high enough to facilitate easy cleaning. Special radiator hangers are now on the market for this purpose.

A hospital, in a sense, is a large hotel, and the facilities for kitchen and laundry should be of the most efficient and modern types. Gas and electric ranges, steam tables and the most durable kitchen appliances and utensils are essential. Power mixers and slicers are economical, both in time and material. A modern refrigerating system is advisable.

The laundry department is most important—a plentiful supply of clean linen being nowhere so requisite. Laundry chutes are decided time savers. The best types of power washers, dryers and ironing machines of ample capacity should be installed. Large washers of the rotary type are used, also batteries of individual washing machines. The driers are two types—hot blast

and spinning baskets.

Several types of elevators are necessary but all should be as quiet-running as possible. Passenger elevators of the ordinary type should be installed, also those with cages large enough to carry stretchers—the latter of the slow speed type. Freight elevators should also be provided.

The power, heating and ventilating plants—as with the kitchen and laundry—should be located a sufficient distance away to render their noise inaudible in the wards. They are often installed in the basement of a separate wing.

Hospital heating and ventilation are often associated. It is probably true that artificial ventilation will never entirely take the place of direct window ventilation. At the same time, artificial ventilation is strongly advisable. Ducts of glazed tile are preferable and outer air should be screened and filtered, to free it from dust.

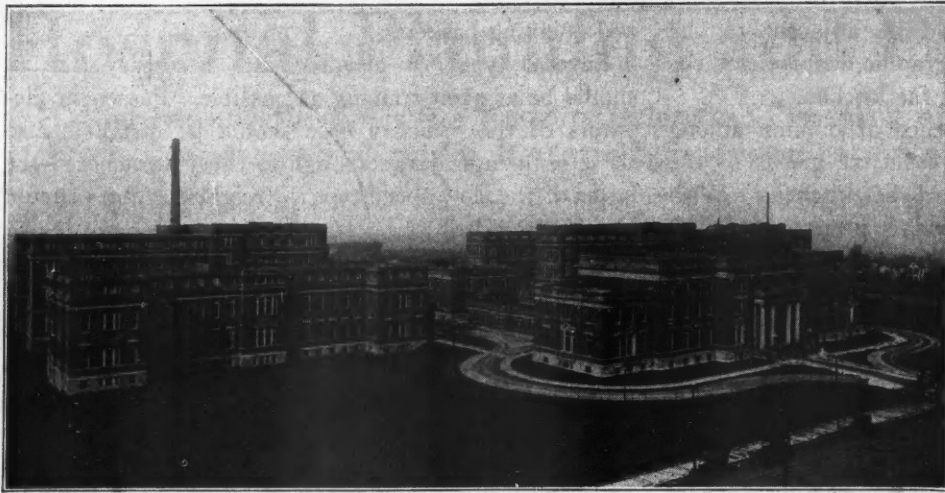
Hot blast combined heating and ventilating systems are in use but the most desirable plan seems to be to have only tempered air blown into the rooms and heat furnished by a low pressure steam heating system with radiators in the rooms.

The ringing of bells, gongs or buzzers should not be encouraged in the modern hospital. Flash systems are used almost universally and many excellent devices are on the market which flash the various requirements of the patient to the eyes of the nurse. Separate systems are also installed which summon doctors, nurses and officials to or from office and waiting room. Telephones are usually only allowed in convalescent wards.

Plumbing is one of the most important items in hospital equipment. The modern practice is to install an increasing number of individual bathrooms and toilets. When installed in a one or two-bed room, a special



One of the Most Recently Built Units of the Michael Reese Hospital, Chicago, Richard E. Schmidt, Gardner and Martin, Architects. This structure is representative of the block type of hospital construction.



The Cincinnati General Hospital, Cincinnati, Ohio, Is an Example of the Pavilion Type Hospital.

folding compartment is often provided which can be drawn across an alcove, thus enclosing the fixture.

A number of plumbing fixtures for various purposes are required in each utility room and each ward bath-room, as well as in the hydrotherapy rooms, nurseries, sterilizing rooms, maternity rooms and operating rooms.

The operating rooms are of two kinds—the clinical operating room or theatre and the smaller room where provision is only made for surgeons, nurses and patient. The number of these, of course, depends on the size of the hospital, but there should be at least one for each ward—usually more.

Separate buildings or wings are usually provided in every large hospital for the accommodation of nurses and internes, including separate bath and toilet facilities. A group recreation room is usually provided in each section—the men's room having billiard and pool tables and some form of musical instrument in each, when far enough from the wards. The nurses are also provided with a large separate dining room, where their meals are served.

Large modern hospitals use great quantities of supplies of nearly every conceivable variety and require administrative, accounting and buying officials, with full office space and equipment. While usually not run for profit, there is every incentive to provide the best possible service at the least possible cost. To do this, it is advisable to install every convenience and labor saving device which shows increased efficiency in the hospital field.

For the benefit of those readers of *AMERICAN BUILDER* who may have occasion to design, build or equip a hospital, we are listing the rooms of each department of the ordinary hospital layout. We will be glad to supply a complete list of furnishings and fittings required, on request.

Administrative offices, general and private; waiting room for attending staff; patients' reception room; attending staff's consultation and examining rooms; special nurses' room; registrar's room and admittance

suite with private rooms and bath room; convalescent rooms or solaria; large ward and adjoining rooms; head nurse's office; ward serving room, linen room, utility room and bath room; operating suite, with operating rooms, sterilizing rooms, nurses' work room, instrument room, physicians' scrub-up room, emergency room and laboratory; autopsy room and mortuary; X-ray dark room; hydrotherapy and electro-therapy rooms; dental department; pharmacy; dietary department;

kitchen; store rooms; purchasing agent's office; laundry department with wash room, drying room and finishing room; distributing or linen room; mending or sewing room; boiler room; engine room; work shop; out-patients' department with registrar's office; nurses' home and reception rooms; principal's suite; assistant's suite; nurses' sleeping rooms; nurses' dining room; class rooms; nurses' demonstration room; library; diet class room; laboratory; recreation room or gymnasium; nurses' hand laundry; nurses' bathtubs and showers; domestic building with recreation and rest rooms; interne's quarters and recreation room.

The present tendency is to erect hospitals in many of the smaller cities which have not heretofore had them. The foregoing list is somewhat elaborate for the smaller hospital but it will have a suggestive value.



Assessing for Road Building

A REASONABLE means of finding how much money should be spent on roads in a given district was outlined by J. E. Pennybacker, secretary of the Asphalt Association. He said that this should be determined by the state tax on gasoline as one factor, and the number of vehicles traveling over a given road as another. From these two factors it could be readily computed, he said, how much the road is yielding to the state in revenue through the gasoline tax, and the road could be capitalized at so much a mile on that basis which would then give a tangible means of determining the amount it would be justifiable to spend on it.



DRILLING holes into concrete floors, with a star-drill, can be made easy by floating the dust with water. If it is left dry, the dust forms a cushion and makes progress slow and difficult. Water, of course, will spatter, but this can be prevented by using a shield. One of the tins taken from a roll of rubberoid roofing has the right shape, and will answer the purpose nicely.

Taste in Painting Elevated

Garish Use of Color of a Generation Ago Gives Place to Refinement of the Present Time

EDUCATIONAL development in painting and decorating has quite naturally occurred, but only in recent years, since paint manufacturers undertook to guide public taste, has there been commendable progress made recently in the appearance of home exteriors. One has only to think back a few years to recall the more or less garish use of colors and what is nearly as distressing to the artistic sense, the wide choice of plain white often rendered monotonous because of inharmony with the surroundings.

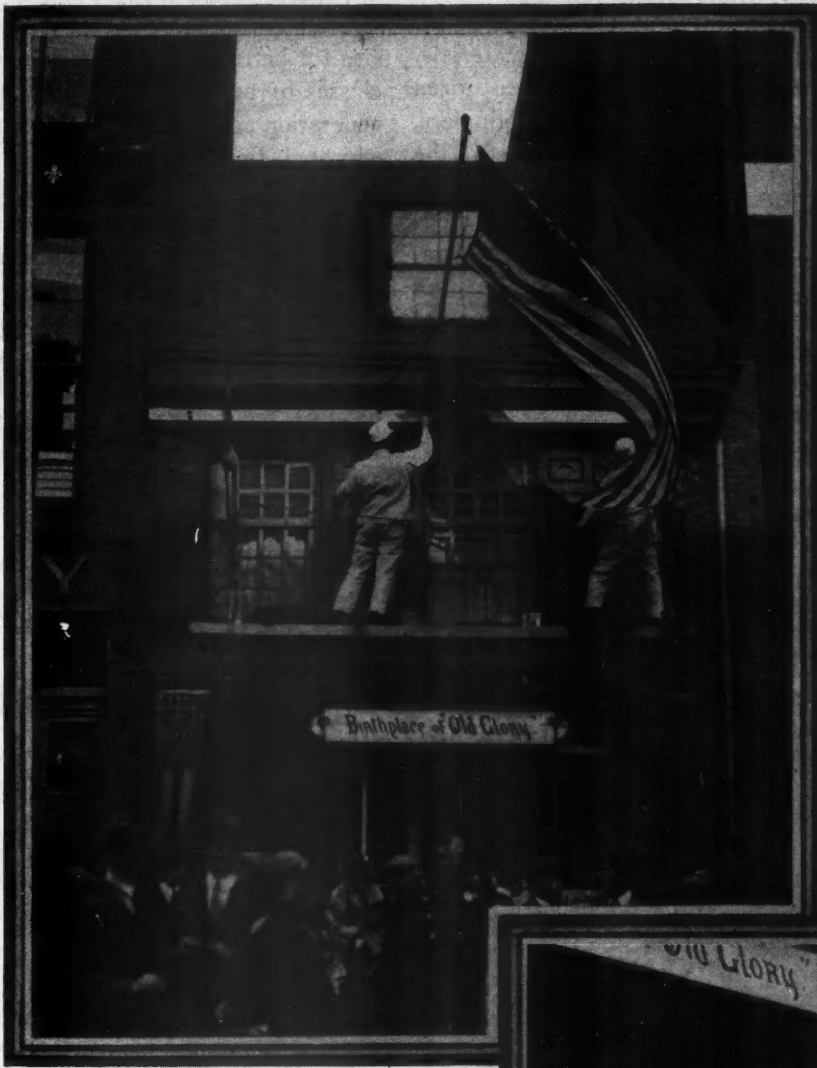
Even today there may be found examples of poor taste and workmanship, due to disregard of good quality materials and the fact that a first-class painting job can only be performed by one who understands such work. It is gratifying to observe, however, that the educational efforts of the paint manufacturers are having certain beneficial results. Present-day home owners, for instance, are more particular about the quality of paint, and their color sense has been elevated.

White houses first gained popularity from their almost universal adoption in the New England villages. Nestling among the green trees, they presented a quaint appearance that has long influenced the preference of white even in treeless locations, and often when not in accord with the surroundings. Correction of this practice is gradually being

accomplished, but at present some home owners unfortunately do not always consider the immediate landscape or appearance of nearby houses.

Necessarily, the educational process still goes on. For example, progressive manufacturing concerns are producing paints, enamels, varnishes and stains which are most suitable for specific purposes. Exteriors of various types of structures, roofs, interior walls, ceilings and floors, foundations, radiators, pipes and other equipment, structural steel, etc., each have special coatings prepared by the paint makers.

In addition, color harmony combinations have been



Painting the Betsy Ross House in Philadelphia Recently Was Made the Occasion of a Celebration. To the right is Mr. James Sibley Felton, a prominent paint manufacturer and president of the Philadelphia Paint, Oil and Varnish Club, making some appropriate remarks.



worked out to such a degree that an attractive appearance may be insured by simply following certain rules. Inside the house the question of what colors and materials to use to match certain kinds of trim or furniture is answered by illustrated advice on that subject compiled by paint concerns after much painstaking experimentation.

One point to be stressed is that only the best quality of paint should be used on important structures. The public does not fully realize the protective value of good paints, stains and varnishes. This factor, however, is ever-present and is demonstrated by the service given, including the economy of using first-class materials.

In the painter's kit of tools are some three dozen different kinds of brushes, knives, grainers, stipplers, veiners, pots and kettles, burning off lamp, etc., the successful use of which gives the painting trade the character of one of the arts. For flat work the modern paint spray gun is perhaps the most important contribution to progress in painting. This device enables the painter to cover a much greater area of surface than possible with brushes.

The growing popularity of stucco furnished the incentive to create a more practical way of painting uneven surfaces. The paint spray gun readily met this requirement, and naturally has been found most suitable for an extensive variety of uses. Certain types have

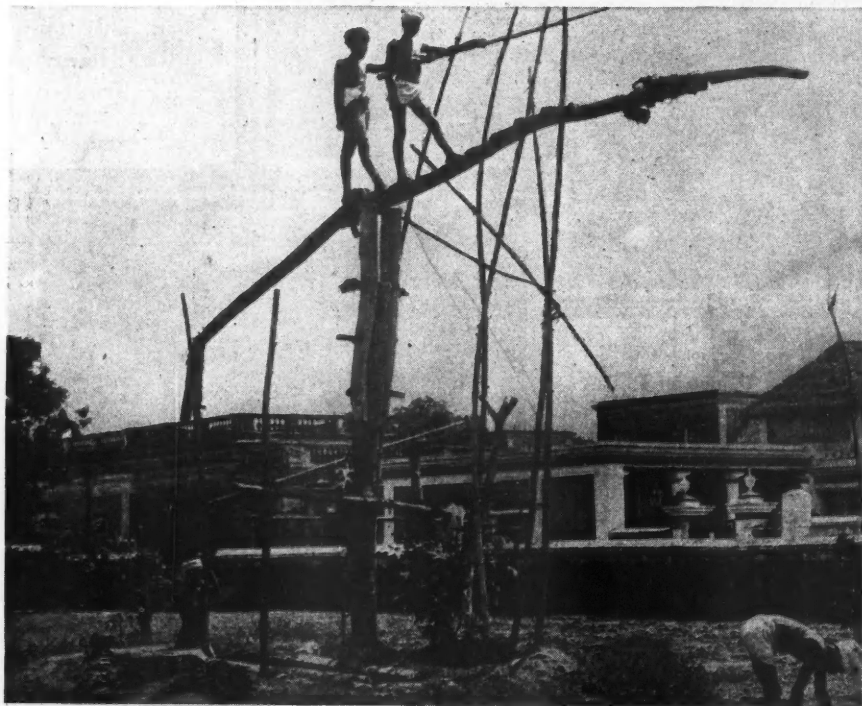
been designed by manufacturers which are admirably suited to jobs requiring fine workmanship, such as residences and hotels. For these reasons, added to the fact that it conserves materials, the paint spray gun is destined to become a very important item of the contractor's equipment.

Vogue in wall papers changes more often than other forms of decoration. Patterns of large figure may predominate for a year or two, and then give place to smaller ones. Vivid hues alternate with modest colors in popular taste.

One outstanding feature of development is the desire for better quality materials which exists among all classes of people. The cheap, gaudy wall paper of a generation ago is gone forever, and the public has been educated to the importance of selecting high-grade paper in making their homes more attractive. This higher standard does not, of necessity, involve more expense, but does call for the exercise of an awakened sense of judgment.

Wood dyes, stains, varnishes and finishes for all kinds of woodwork have been improved to an appreciable extent in recent years. Manufacturers of these products have given much attention to the production of materials which not only color the wood satisfactorily, but bring out the natural beauties of the grain. Their efforts have resulted in products of very evident merit.

From Primitive Pumps to Modern Water Supply Systems



The Old Oaken Bucket in India. This primitive man-power pumping apparatus is used at Madras, India, where labor is cheaper than gasoline or even the machinery of windmills. Three men are required to work the sweep, two of them walking back and forth on it, to draw up the water bucket by sheer weight of body, while a third guides the pole to which the utensil is attached.

IT is not easy to determine just when mechanical appliances worthy of consideration as pumps first made their appearance. It has been the custom to dignify the common water pail if lifted by mechanical means as a pump, and if so, the tiller of the soil who saw his crops about to burn up on account of insufficient rainfall while a great river flowed nearby must needs be the inventor of the pump because he conceived the brilliant idea of taking a goatskin, making a rough bucket and carrying water from the river to his thirsty crops. Development of pumps and pumping machinery has thus come up through the ages through several different epochs, although it was not until a century and a half ago that the present high efficiency type of pumping equipment first began its development.

As far back as 1500 B. C.—in the days of the Pharaohs—the

"Shadoof" of Egypt is authentically recorded as having been in use. This was simply a well sweep composed of a long pole hinged to a stick and with a skin bucket at one end it was dropped into the stream and swung to the bank. Many "Shadoofs" are still used along the Nile, in Oriental countries, and in other parts of the world not yet touched by the refinements of civilization.

For irrigation purposes the "Shadoof" was later superseded by the "Jantu" which was, in effect, nothing more or less than a simple "teeter totter" resting on a trestle in the center of the stream. The "teeter" was a trough and its ends were alternately dropped into the stream, then elevated; and the water ran off through another trough set at its center. By forming basins and setting "Jantus" one above the other the water was often lifted as high as 100 feet above the bed of the stream.

The next development was the windlass and bucket. At first merely a process of lowering a bucket into the well and hauling it up by main strength. Later, and as the depth from which water had to be taken became greater the rope was wound on a windlass operated on a rude pulley and pinion, the motive power being furnished by animals or man power treadmills.

The first type of rotary pump is credited to Archimedes by one of his pupils about 200 B. C. This pump was merely a screw revolving in a tube inclined at an angle of 45 degrees and with the lower end of the screw in the water. By turning the crank the successive convolutions of the screw forced water to the top where it ran off into the desired receptacle. Water wheels also came into use having skins for paddles and being driven by a crude gear arrangement from the bank by men or animals.

Wells were the invention of prehistoric man. The first ones were so arranged that in order to obtain the water it was necessary to go down a flight of steps to the water level and bring up the water by the use of jars or skin buckets. Later it was necessary to make them deeper and deeper; so other mechanical means had to be employed to bring the water to the surface and the fashion of furnishing stair-steps down into the well became out of date. There are many hundreds in existence today which still show undoubted traces of this ancient method of procuring water.

As human ingenuity increased the greater scholars put their wits to work on the question of procuring water and through the ages there has been a gradual improvement. Many hundreds of years ago the idea of raising water by means of compressed air was proposed, although until the perfection of mechanical appliances in later years they could be put to little practical use.

The present era of modern pumps started in 1840 when James Watt first coupled up a steam engine with a pump. His difficulties were many. At that time machines of accuracy were unknown and it is said that the cylinder of Watt's first steam engine, although

only 18 inches long showed a difference of $\frac{3}{8}$ inch in the diameter at each end. Once successfully introduced the steam pump came into use principally for use in mines. Then came electricity and the intensive development of the pumping industry until practically all cities and even isolated farm houses and residences are supplied with water under pressure either from great centralized pumping stations or some individual electric or gasoline engine driven pumping plants.



Home Building Development

(Continued from page 166.)

ented roofing, stucco, and other items too numerous to list here.

American houses are the most scientifically planned and equipped of those in any country. In the best designs proper consideration is given to the beautiful as well as the practical, but construction and equipment are never sacrificed for architectural effect, nor is mere appearance allowed to take the place of actual convenience.

This is the day of the small house planned for comfort and convenience, not for ostentation. Heating and refrigerating plants, the electrical equipment, the plumbing system and the built-in features have contributed to place the star of the little house in the ascendency and to create for it an important and distinctive place in modern life.

The advantages in life possessed by the home owner are undisputed, but he must bear his load of responsibility, nevertheless. Home building must be financed. Perhaps 90 per cent of the homes in this country were built on borrowed money. That it pays to do so is proved by the examples of men on small salaries who own their homes. They have toiled no harder than others, but by economizing have found it possible to apply a few dollars a month on their house contracts.

Four possible methods of financing are: (1) placing first mortgage for one-half the value of the land and building; (2) the first and second mortgage method; (3) the land contract method, and (4) the building loan association mortgage.

Building and loan associations have taken a prominent part in home building because they enable a prospective home owner who has only a limited amount of cash to obtain sufficient funds for building. It is estimated that more than a million American homes have been purchased with money loaned by these associations to their members, and the latest statistics show that nearly \$3,000,000,000 of the savings accumulated by them are invested in dwelling house mortgages.

That the problem of financing, of the decision as to the type of house to build, of the selection of materials and of the installation of equipment can be solved is thoroughly proved by the activity of the home building industry. Back of it all is the inherent desire of every American to own his home, and one of the blessings which this country holds for its citizens is that their hopes can be brought into realization.



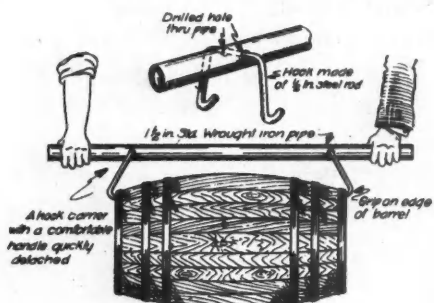
HOW DAN DOES IT.

A Department for Passing "Life Savers" along to other Builders.

\$2 for an Idea

Dan is an ingenious cuss. Nothing ever stumps him. He always knows the way out when he runs into a tough problem out on the job or in the office. Dan is going to edit this Department and will pay \$2.00 each for every good idea he can use here to show and tell other builders "how to do it." Send him a rough sketch and a short description of what the tough job was and how you handled it.
 Address Dan Do-It, care of American Builder, 1827 Prairie Avenue, Chicago, Ill.

Simple Carrier for Barrels



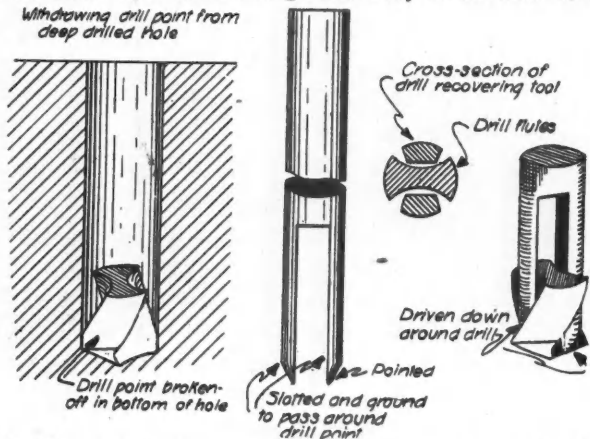
Handy Barrel Carrier.

THE difficulties of handling filled barrels is met with the carrier shown in the attached illustration. In this a length of pipe two feet longer than the barrel has two swivel hooks to permit of readily attaching this for lifting and convey the barrel,

when handled by two men. Metal or wooden barrels are carried with equal facility.

Removing Broken Drill Point

BREAKING the point off an inch drill after reaching a depth of eight inches, caused considerable concern in a steel working shop until the method devised in the below sketch was adopted. About an inch of drill was wedged solidly at the bottom of the hole. The removing tool was made from a seven-eighths inch length of cold rolled steel. This was slotted about two inches and ground away at the sides to fit

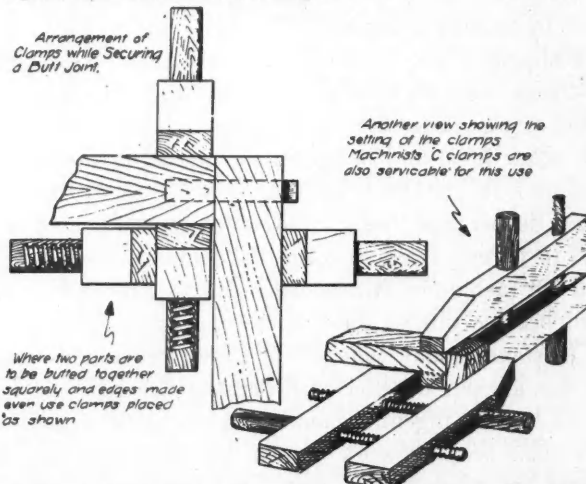


This Diagram Shows the Method of Recovering a Broken Drill Point.

between the flutes of the drill—that is, the recovered portion, after removal of the chips with a magnetized rod, the removing tool was inserted and driven between the flutes, until the points clinched under the drill point. The tool is retained in the shop for possible future use, as it is again serviceable after straightening out the ends.

Arrangement of Clamps While Fixing a Butt Joint

THE method of arranging clamps for securing parts to be doweled, screwed or nailed together, as is shown in the attached sketch, is both simple and a quick means of securing a rigid connection while working.



Parts to Be Doweled, Screwed or Nailed Together May Be Held in Place Conveniently by Using the Clamp Arrangement Shown Here.

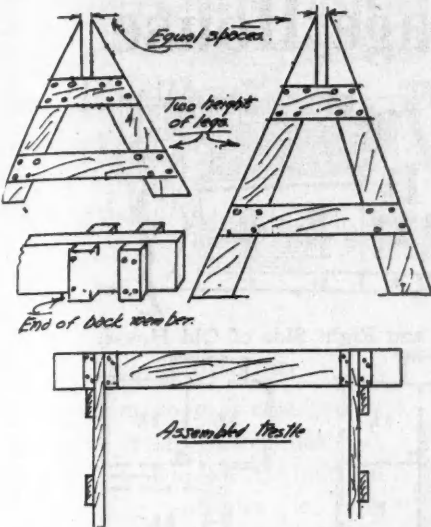
As an example, it is desired to hold a crossbar between chair legs while boring for the dowel. One clamp is placed within a sixteenth inch of the end of the bar. The second clamp then fixes the first clamp against the leg. The parts can be accurately set to make them even and the hole can be drilled for the dowel. After inserting the dowel, with glue at the joint, the clamps can be replaced in position and will hold the parts until dry. Similarly corners of picture frames, boxes, drawers, etc., can be held for attaching them with glue, brads or other fasteners.

Interchangeable Trestle Parts

BUILDERS as a rule make up trestles of a height to suit the requirements of some one job, nailing them up solidly, without consideration to other uses requiring trestles of varying heights or lengths. Another trestle construction, which is representative of forethought and full consideration to future needs, is the device which is made use of by a Washington constructor.

Realizing that it would be economical to have the various trestle legs and backs made with means for dismantling and assembling them into other combinations, he has adopted a construction in which the backs are of uniform thickness, the lengths varying by several feet. The legs are fitted with a slot corresponding to the thickness of the back, but the length of legs are varied.

As is shown in the sketch, the assembly is simply a matter of sliding the back into the slot aperture at the upper ends of the legs. The brace strips, which are close fitted to the back, support the trestles against side shifting.

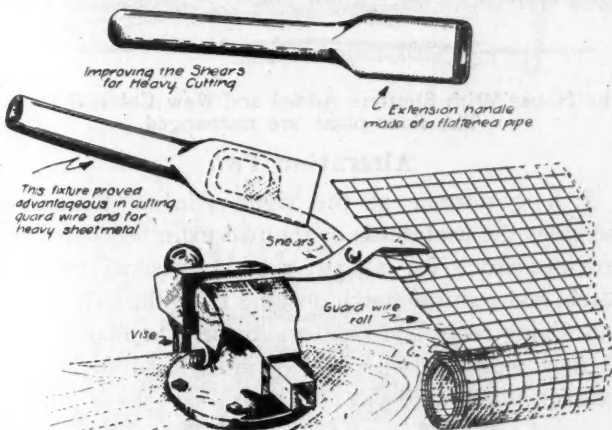


Trestles Which May Be Used for Any Job and May Be Assembled for Different Heights Have Proved Their Convenience to a Washington Contractor.

These trestles, apart from this predominating advantage of saving materials and a multiplicity of trestles, have another important advantage in being readily taken apart for portability.

Shears for Heavy Cutting

WHILE cutting through heavy sheet metal, the shears blades tend to twist and drag the metal between the blades, with an added disadvantage in that the muscular effort



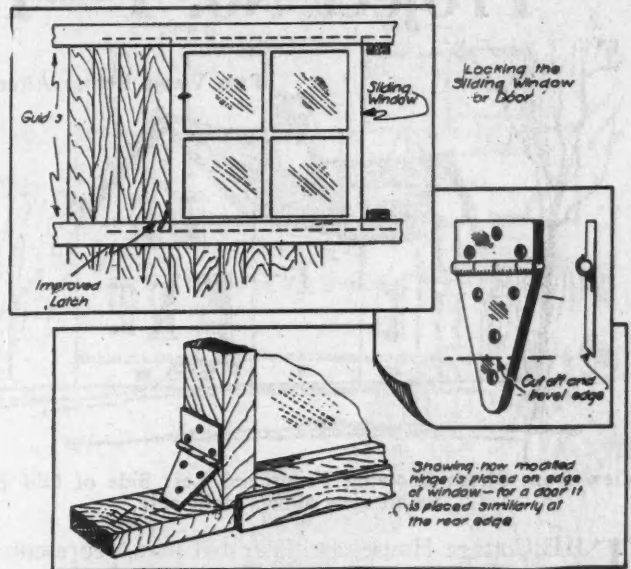
Snagged Hands Are Often the Reward for Hard Labor in Cutting Heavy Screen by the Usual Method. This device will save both hands and labor.

quickly tires the hands. In the sketch is a method recently used in shearing up some guard wire for the protection of outside windows. The wire used was heavy and in addition to being hard to shear, the cut strands would jab the hand. As is shown, one handle of the cutting snips was caught fast in the vise, while a piece of pipe, with one end flattened, was

pushed over the other handle, serving as an extension. With this arrangement the wire was cut through rapidly. This attachment proving so advantageous it is now used for any occasion where heavy plate or wire is to be sheared. With this extension the blade can be held sidewise as well as additional pressure resulting from its mechanical advantage of length.

Locking Sliding Doors or Windows

SLIDING doors and windows as are ordinarily used about barns or in cellars can be locked to prevent opening from the outside by means of the arrangement of a strap hinge as shown in the attached illustration.

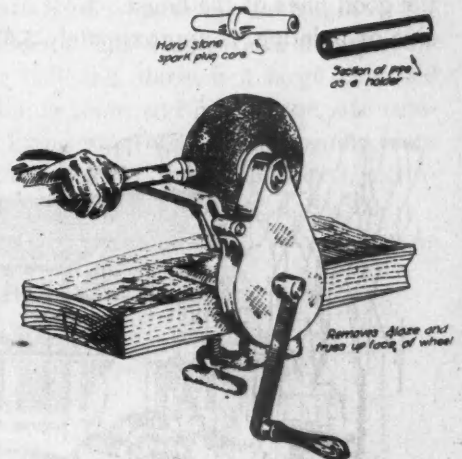


A Strap Hinge, Cut as Shown Here with the Edge Sharpened, Will Provide a Convenient Means for Securing a Sliding Door or Window.

This consists of screwing the hinge at the edge of the window sash or door so that the lower end rests in the trough or guide through which the part slides. To make the lock more effective, the locking edge of the hinge should be cut off and beveled down somewhat like a chisel edge. It is a simple matter to release the latch, the end is tilted up when the door or window is to open.

Truing Emery Grinder Surface

WHEN the cutting surface of the emery grinder becomes glazed or uneven, a simple expedient used in one repair shop is to trim the face with a porcelain from a discarded sparkplug. This is held in a piece of tubing and placed on the grinder rest. With the stone running at its highest speed a light pressure is used to guide this across the face of the wheel. For this purpose use only the hardest porcelain, and it will be found the face of the wheel can be resurfaced and trued up quite evenly.

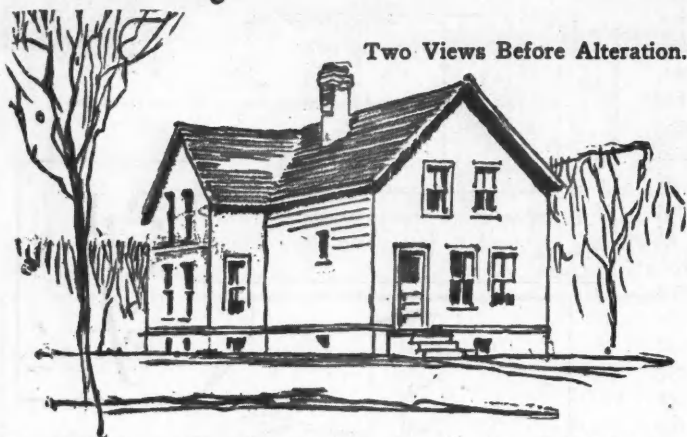


The Core of a Discarded Sparkplug May Be Utilized to True the Emery Wheel.

SUGGESTIONS FOR REMODELING

A series of very helpful drawings from the book, "Better Homes from Old Houses," prepared and copyrighted, 1924, by The Barrett Company. This series will be a regular feature of the American Builder during the next six months.—The Editor.

Project No. 1—The Cottage House



Two Views Before Alteration.

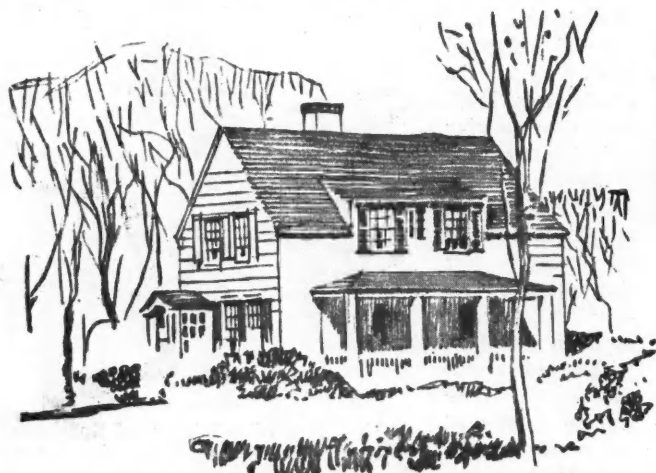
View from Street Showing Front and Left Side of Old House. Small view shows right side.

THE Cottage House, as illustrated here, represents what is probably the most prevalent type of house built.

The accompanying illustrations show how its extreme simplicity lends it readily to remodeling. They indicate plans that range from the most easily accomplished, inexpensive alterations to the complete transformation of the house into a modern luxurious home.

Alteration One

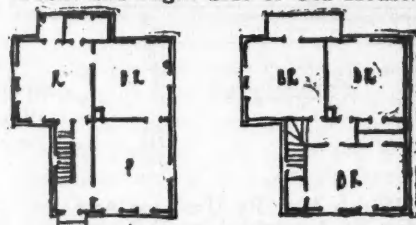
To the original house there is added an unusually attractive entrance porch of Colonial design. Carefully chosen shutters also add charm and a color scheme of white and green with a green roof, supplemented by shrubs about the foundation will bring out the good lines of the house. Cost of new work, exclusive of painting, is approximately \$200.



The House With Side Porch and Long Dormer Seen From the Same Viewpoint as Small Sketch of Old House.



Front and Right Side of Old House.



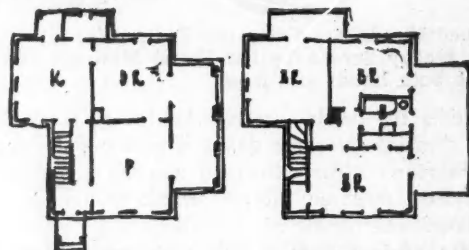
First Floor. Second Floor. Old House Plans.



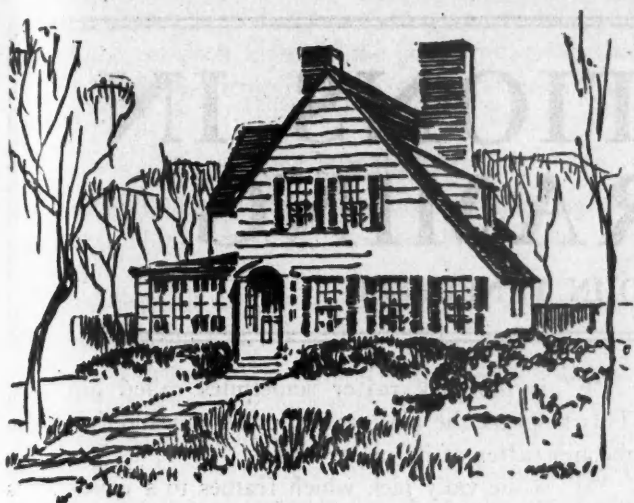
The House With Shutters Added and New Colonial Porch. The floor plans are unchanged.

Alteration Two

A long dormer at the right side of the house increases the usefulness of the two main bedrooms and provides space for a bath room. A small entrance porch, and a sitting porch opening from the living room and dining room add comfort to the first floor. Cost of new work, exclusive of painting and bath room fixtures, is about \$800.



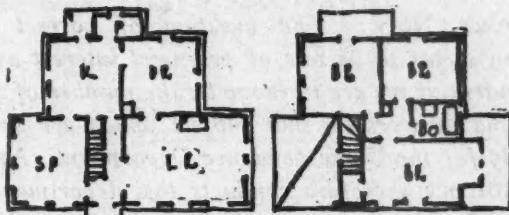
First Floor. Second Floor. Plans Showing Changes in Alteration Two.



View of Front and Right Side Showing Sun Porch and Living Room Extension.

Alteration Three

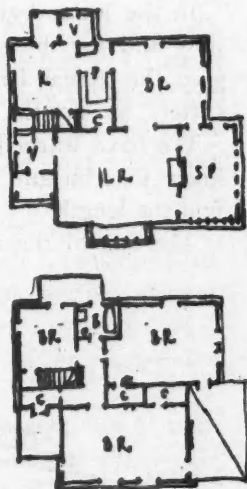
The living room is enlarged by extending the house to the right and carrying down the main roof. This space on the second floor increases the size of the main bedroom and provides a bath room. A new chimney gives a fireplace in the living room. At the left of the entrance with a door to the hall is sun porch and at the old entrance is added a Colonial porch. The approximate cost of this new work, exclusive of bath room fixtures and painting, is \$1,500.



First Floor. Second Floor. Plans of Alteration Three.

Alteration Four

The living room is enlarged by adding to it the former hall. A square bay window is built in front. The entrance is now through a vestibule formed by bringing down the kitchen roof, and the new staircase is reached from both vestibule and kitchen. The dining room is extended to give room for a modern pantry. The old pantry is a vestibule with space for ice chest. The second floor shows three large bedrooms and a bath room. The cost of these alterations would be approximately \$3,500. Coating the exterior with stucco would cost about \$1,000 more.



The Floor Plans of Alteration Four.

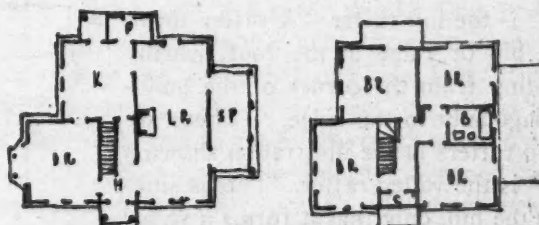


View of Front and Left Side from Street Showing Appearance of Alteration Four.

Alteration Five

Here the house is considerably enlarged by building a new wing at the left, thus doubling the length of the house along the street. This wing gives a dining room at the left of the hall and above it a large new bedroom. The old dining room and living room are combined into a large living room with porch opening from it. The approximate cost of these alterations, exclusive of painting and bath room fixtures, is \$4,500.

Next month we will take up THE BAY WINDOW HOUSE.



First Floor. Second Floor. The Floor Plans of Alteration Five.



View from Street Showing Front and New Dining Room Addition.

INSTRUCTIONS IN ROOF FRAMING

LESSON SIX—By JOHN T. NEUFELD

EDITOR'S NOTE: *The question of correct roof framing seems to be one of perennial interest among our readers, if we are to judge by the number of questions and answers on that subject which are sent in monthly for the Correspondence Department. AMERICAN BUILDER therefore conducts this department for the benefit of its readers who may have roof framing problems. Write in your problem and Mr. Neufeld will answer it, and some questions and answers will appear in this department of AMERICAN BUILDER for the benefit of others who may be interested. We want to make this department the place where YOU can solve your roofing problems.*

The Hip and Valley Roof

THE upper part of Fig. 20 illustrates an ordinary hip and valley roof. The lower part shows this same roof in plan or as it appears when looking directly down upon it.

Again as with the common rafter we emphasize that we must be familiar with the different parts and we must also understand the principles on which the rules are based, before we can do good work in framing a hip roof.

The Different Parts

"A" is the plate on which the rafters rest. This is of importance to us as its upper outside edge is the line from which measurements are taken.

"B" is the ridge board which is generally made from a piece of material of the same thickness as the rafters, only a little wider. The ridge board is not always used and in many cases is not necessary.

"C" is the common rafter. A rafter extending from plate to ridge board, and not connected to any other rafter.

"D" is the hip rafter. A rafter forming a hip or ridge in the roof, usually extending from the corner of the building diagonally to the ridge. (There are six hip rafters in the illustration shown.)

"E" is the valley rafter. This is similar to the hip, only that it forms a valley or depression in the roof in place of a ridge or hip.

"F" is the jack rafter sometimes called hip jack. This rests on the plate at its lower end and frames to the hip rafter at its upper end.

"G" is the vally jack which frames to a valley at its lower end and to the ridge at its upper end. Sometimes this is called a cripple rafter or cripple jack but generally the first term is used.

"H" is the cripple rafter. This frames to a valley rafter at its lower end and to a hip rafter at the upper end.

In the lower figure we are looking down upon the roof and the dimensions that we get from this plan give the actual length of the "run" of the various rafters, but not the "length" of the rafter.

We have learned from previous articles that if we know the run and the rise of a rafter, we can easily find the length.

The run of the various other rafters has a definite

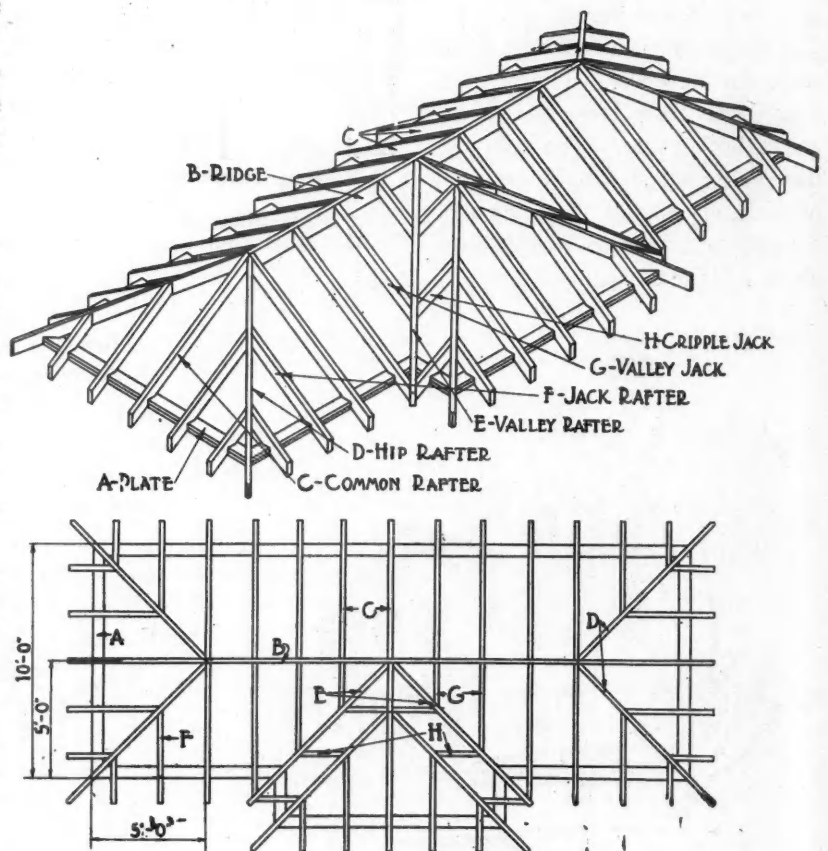


Figure 20, Illustrating Parts of a Hip Roof. The lower figure shows it as it appears from above.

relation to the run of common rafter, and the run and rise of the common rafter is the base from which the run and also the length of the other rafters is calculated.

Length of Hip Rafter

A method that is commonly used for finding the lengths of hip rafters is the length per foot run method.

In this method we use the foot run of the common rafter as a basis.

The hypotenuse of a right triangle whose sides are each 12 inches is 16.97 inches long.

We see from the illustration (Fig. 21) that the run of hip rafter forms the hypotenuse of a triangle whose sides are the run of common rafter and the length of plate. (In the illustration this is the length of the plate from corner of building to first common rafter.)

If we take only 1 foot of run and 1 foot length of plate, we have a right triangle whose sides are 12 inches long and whose long side is 17 inches or, more accurately, 16.97 inches.

The long side or hypotenuse in this case, is a portion of the run of hip rafter corresponding to 1 foot of common rafter. Therefore we can say that the "run of hip" is always 16.97 inches for every foot (12 inches) run of common rafter, if the roof is of even pitch.

The hip rafter always has the same rise as the common rafter, therefore the rise for each 17 inches of run of hip is the same as the rise per foot run of common. In this problem the common rafter has a rise of 5 inches per foot "run of common rafter" or 5 inches for every 17 inches of "run of hip."

To get the length of hip rafter per foot run of common rafter take 17 inches on the blade of the square and 5 inches on the tongue. This is usually stated thus: Run of hip on blade, rise of hip on tongue.

The distance between these two points is $17\frac{3}{4}$ inches. This is the length of hip rafter per foot run of common rafter.

This length can be figured more accurately thus: Length of hip rafter per foot run = $\sqrt{16.97^2 + 5^2} = 17.69$ inches.

In actual work we usually take this length per foot

run from tables in handbooks or from the tables on the steel square.

The common rafter in this problem has a 6-foot run and, therefore, there are also six such lengths for the hip rafter, as can be seen in the illustration.

The total length of hip rafter, therefore, is $6 \times 17.69 = 106.14 = 8' 10\frac{1}{8}"$.

Deducting for the Ridgeboard

In Fig. 22 we show a small framing detail at the point where the hip rafter meets the ridge. This is a view in plan and shows the upper ends of the rafters as seen from above.

The length of hip just found is to the center point O. As the hip rafter does not extend to this point we must deduct a small amount from the length. On a horizontal plane this is $17/32$ inches and is deducted as shown in the lower part of the illustration.

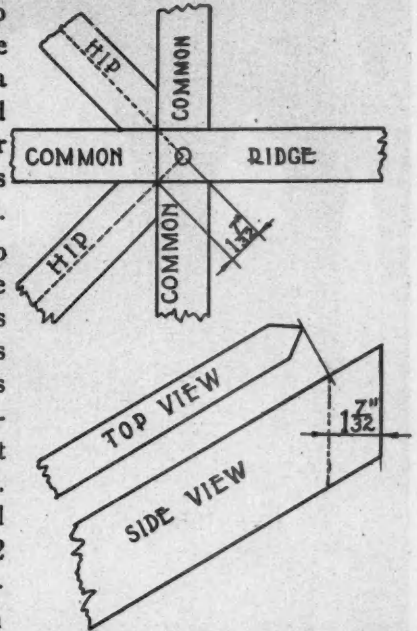


Figure 22, Showing a Small Framing Detail Where the Hip Rafter Meets the Ridge.

Problems

(1) Make out a table giving the length per foot run of hip rafter for each of the following roof pitches: One-sixth, five-twenty-fourths, one-quarter, seven-twenty-fourths, one-third, three-eighths, five-twelfths, eleven-twenty-fourths, one-half.

(2) Find the length of the hip rafter for a roof with a span of 20 feet and with a three-eighths pitch.

Answer to these problems will be found on page 317.



To Gain Shingling Speed

IN order to gain speed in shingling, three things are necessary. First: a sure judgment in selecting the right shingle. Second: The elimination of all false motions. Third: Driving the nail home with one blow, after it has been started. Carrying two or three nails with the hand to the shingle may be made to be a great time saver; for instance, if the shingle needs two nails, one trip of the hand will carry enough nails to fasten it on; or should a shingle need three nails they can be carried to the shingle at one time and driven in rapid succession.

Shingle nails should not be driven closer to the butt-end of the shingle than two times the distance that the shingles are laid to the weather. This will keep the nails dry and prevent them from rusting.—H. H. SIEGLE.

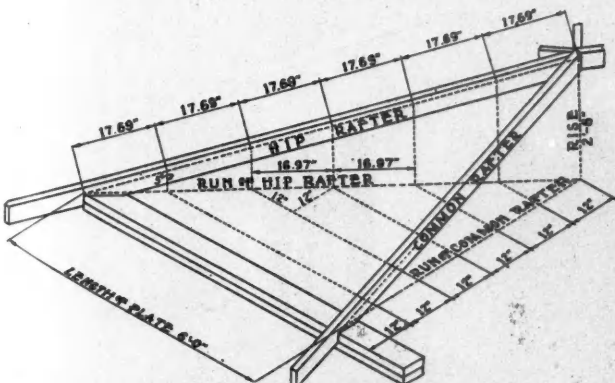
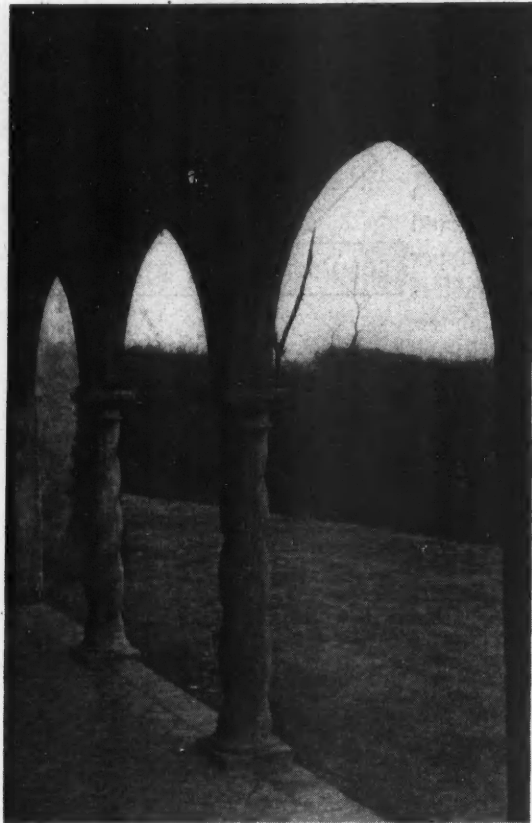


Figure 21. The Run of the Hip Rafter Forms the Hypotenuse of a Triangle Whose Sides Are the Run of the Common Rafter and the Length of the Plate.

Two Fine Homes of Moderate Size

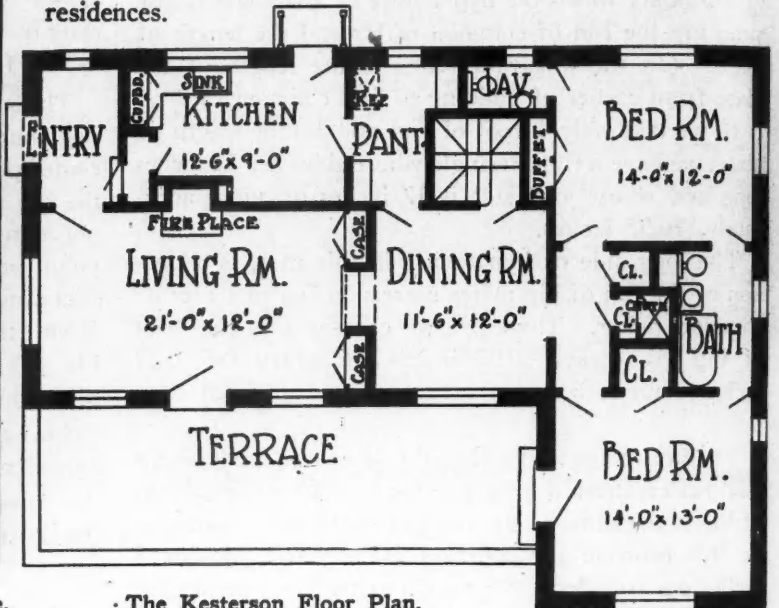
Designed by Barber and McMurry,
Architects



Vista from Arched Porch of the Kesterson Home.

THE hillside home always presents interesting problems to the architect and builder and can be constructed to offer special advantages to the home owner. Here is presented the home built by W. M. Hunt and Company for T. Kesterson, of Knoxville, Tenn.

On the opposite page is shown the home of the French type built by John M. Turner, for Mrs. Harriet Young of Knoxville. Barber and McMurry were the architects of both residences.



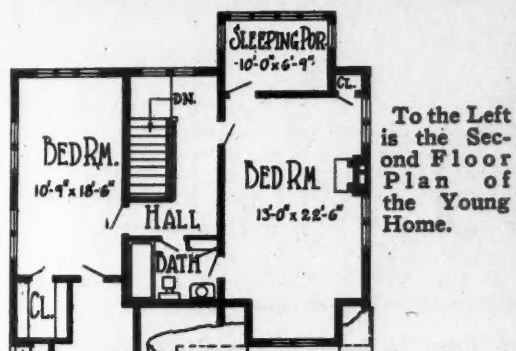
The Kesterson Floor Plan.



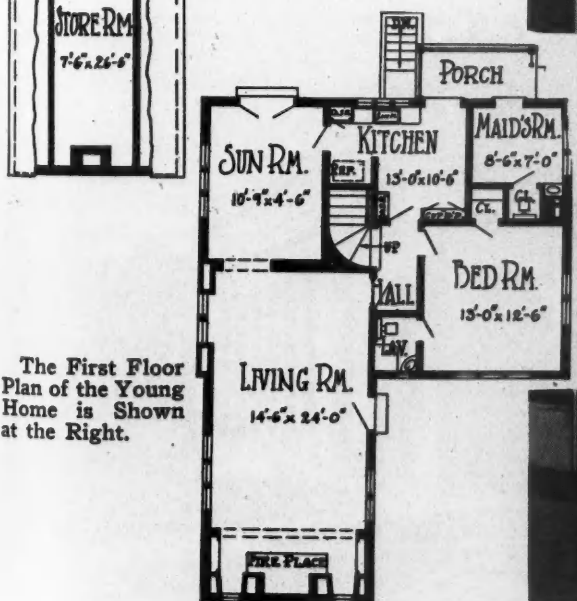
The Stone Steps at the Side of the House, the Use of Brick to Outline the Doorway, the Tile Roof, the Shutters and the Lanterns Are Touches Which Add Distinction to This Unusual Home.



Memories of Towns in France Will Be Revived by this Home, Built for Mrs. Harriet Young, Knoxville, Tenn.



To the Left is the Second Floor Plan of the Young Home.



The First Floor Plan of the Young Home is Shown at the Right.



In the Home Designed for Mrs. Young the Sun Room is Planned to Serve the Purpose of a Dining Room. Notice that the fireplaces do not project out of the outer walls. To the right is shown the dining room of the Kesterson home, illustrated on the opposite page.

An Efficient Church Design

Auditoriums and Class Rooms Well Planned to Meet the Needs of Divine Science Congregation. J. B. Benedict, Architect

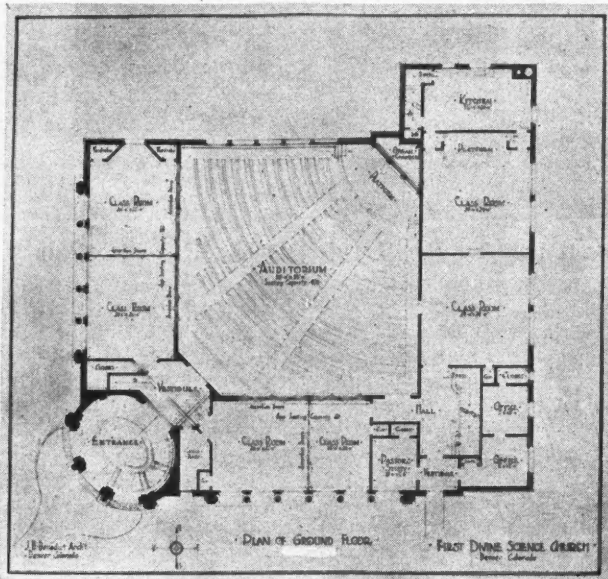
By THEO. M. FISHER

AN interesting western church building is that for the congregation of the First Divine Science Church of Denver, Colorado, designed by Mr. J. B. Benedict, architect. His clients desired a distinctive edifice which would combine facilities for seating an audience of varying numbers together with many classrooms and a number of offices for the educational work of the organization as the latter phase of its activities is the predominating one. The main auditorium seats seven hundred and fifty and by throwing into it the two large adjoining class rooms on the first

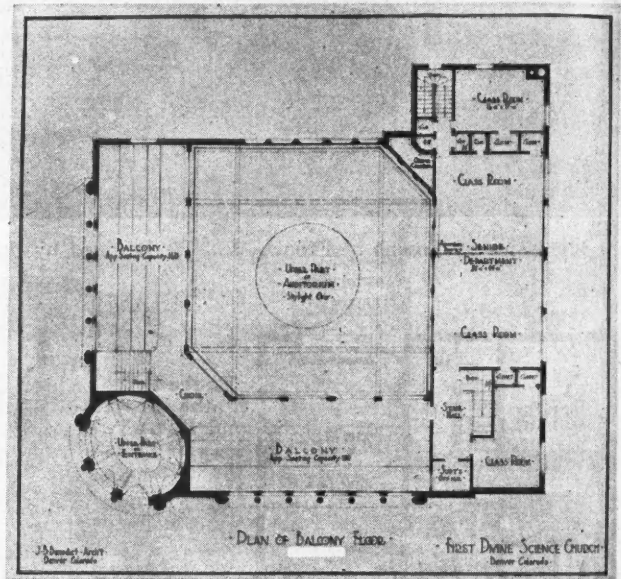
floor, two hundred and seventy more can be accommodated.

Rough cast stucco on brick is the construction with the decoration of the entrance porch and window motives developed in terra cotta. The stone color of the latter combines pleasingly with the buff tone of the stucco.

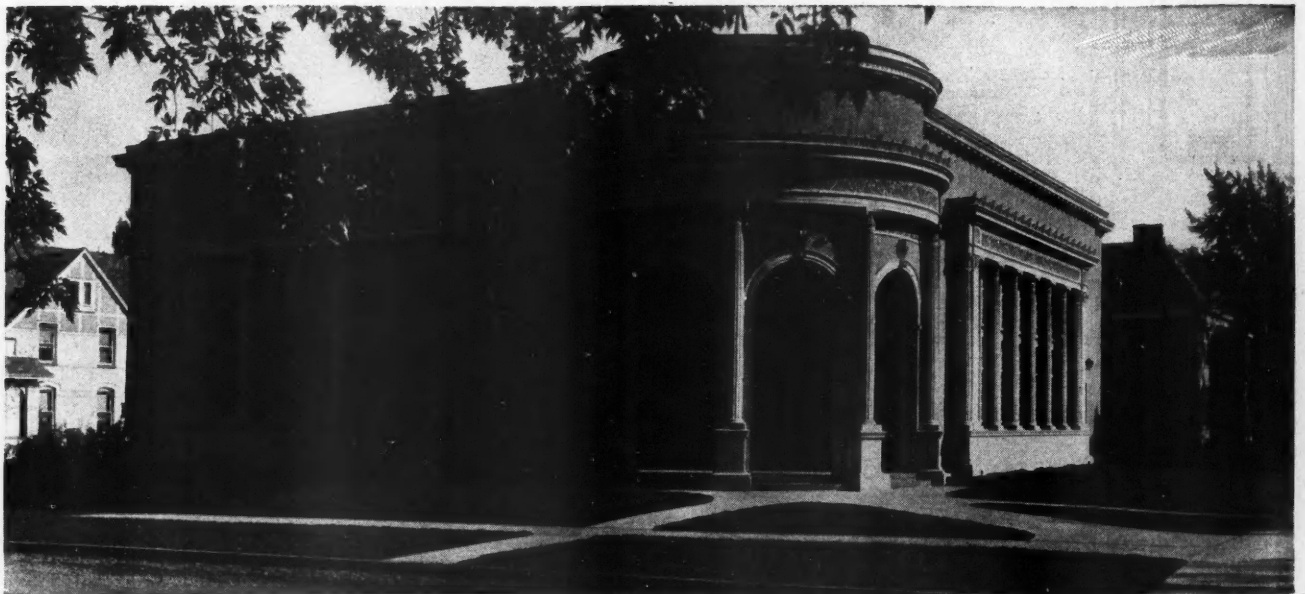
The Italian and Greek ornamentation of the principle facades and entrance is entirely individual, all the terra cotta being made especially for this structure after Mr. Benedict's drawings.



On the Ground Floor Class Rooms May Be Made Part of the Auditorium.



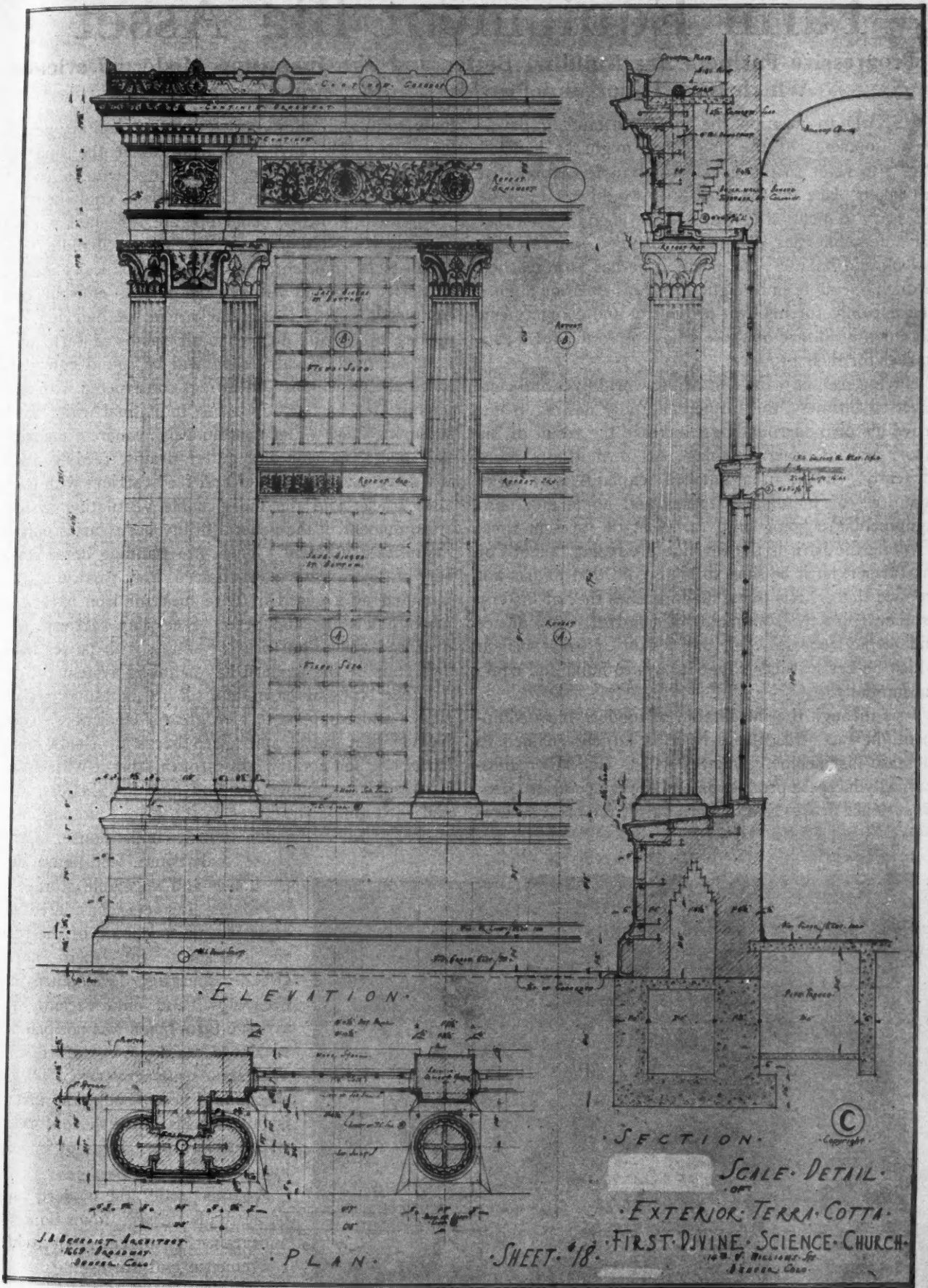
The Balcony Floor Is Provided with Class Rooms. Note the choir loft behind the upper part of the entrance.



The First Divine Science Church, Denver. J. B. Benedict, Architect. The terra cotta ornamentation is particularly well adapted to the simple line and mass of this dignified structure.

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Note



Detail of Terra Cotta Ornamentation Around Window Groups for the First Divine Science Church, Denver, Colo. Design by J. B. Benedict, Architect.

well

Farm Equipment Big Asset

Progressive Farmers Are Building Better and Are Installing Modern Devices Which Save Labor and Provide Comfort and Convenience

ASKED to mention the most outstanding developments of the times, one might be inclined to refer to the wonderful transformation that has taken place on the farm. It would not even be necessary to mention the cause—everybody knows that the automobile has completely changed the farmer's outlook and habits. The position he has now reached through having been brought out of his isolation augurs well not only for his own prosperity and contentment, but for the welfare of those who look to the farm as a market for their products.

Having seen how the rest of the world lives and conducts its business, the farmer naturally desires to improve his own surroundings, increase the result of his labor, and in general manage his own affairs more efficiently. That, in a nutshell, explains why large quantities of building materials and home and barn equipment are going onto farms at the present time.

While the barn is the revenue producing "plant" of the farmer, let it be said, to his credit, that he has not stopped there. His home now matches that of his city brother from the standpoint of comfort, convenience and attractiveness. And one lesson of great benefit which he has learned is that it pays to build and equip substantially.

It is through the installation of modern barn equipment, in fact, that the farmer is largely enabled to increase his income. Devices which save labor automatically increase production and lower operating costs. Experience proves that modern barn equipment secures

these results, in addition to providing sanitary advantages that also have a bearing upon the financial returns. Any farmer may safely invest up to his full requirements in modern factory made equipment.

No factory owner could operate his plant without machinery. Neither could the farmer handle farm products in sufficient volume or economically enough to derive a profit without the aid of efficient barn equipment. This is strikingly true in dairying, but applies, in varying degree, to all classes of farming.

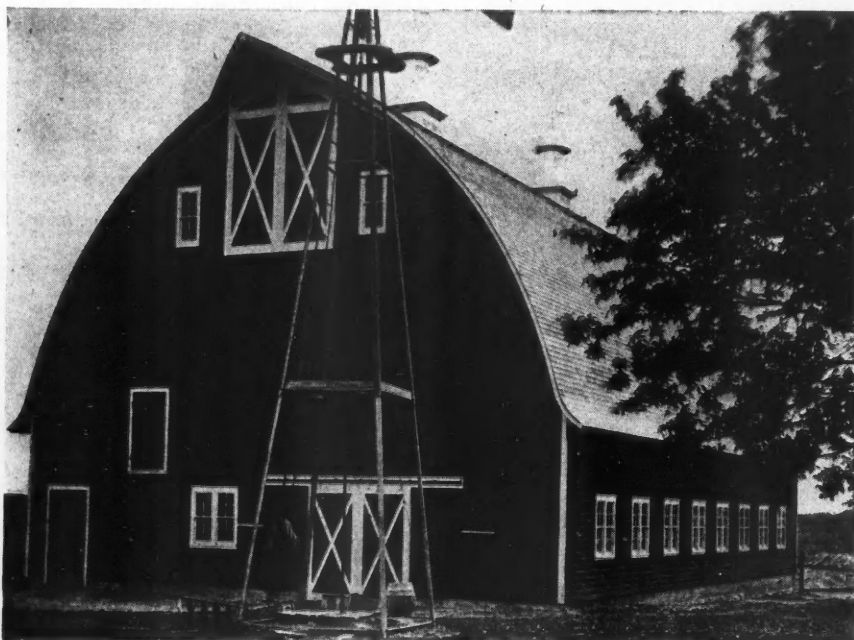
In the modern dairy barn will be found cow stalls and pens, stanchions and fittings constructed with steel piping; steel manger divisions, individual water bowls supplying fresh water continuously; concrete mangers, stall floors, manger and gutter drains, feeding alleys and driveways; steel litter and feed carriers with overhead track; and the indispensable ventilating system.

Equipment in the general utility barn varies only to the necessary extent. There are standing horse stalls, for instance, with steel braced low partitions surmounted by a guard of wire mesh or iron bars; also metal box stalls and pens. Steel hay carriers, with overhead track and forks or slings, with power hoist, are items of the modern hay-handling system.

Other types of barns and service buildings are designed and equipped to give greater efficiency. These include beef cattle and sheep barns or sheds, horse barns, hog and poultry houses, grain storage with elevating machinery, implement and machine shelters, silos and such minor structures as those for smoking meat, pump house, milk house, spring house, scale house, seed house, utility house and vegetable storage.

Pioneer farmers considered the log cabin, or sod house of the prairie, sufficient for their needs. Broadly speaking, development has been slow, and until recently the average farm home was not planned to afford maximum comfort, convenience or attractiveness. That is all changed now. Today the farmer is building his home in conformity with his advanced ideas of importance.

Architecturally, the modern farm home duplicates the town house in appearance, arrangement of rooms, convenience and furnishings. This enlarged viewpoint of the farmer is the natural result of his widened contact with the outside world. The motor car has enabled him to visit his friends, and his friends to visit



Barns Today Are Expertly Planned, Well Built and Thoroughly Equipped to Cut Down the Work of Caring for the Live Stock.

him, though living miles apart, as quickly as do city people who use street cars. In fact, the farmer may, and often does, maintain social connections with city friends within distances of twenty-five miles or more.

Development of farm home equipment has made it possible to place every modern convenience of the city residence in the farm house. Heating is naturally considered first. Stoves and fireplaces are disappearing. Basement heating plants are in common use, one of the most popular types being the pipeless furnace. This is because of the fact that little heat is thrown out except through the top, which allows the basement to continue to be used for storing foods. All types of warm air, steam and hot water heating plants are installed on farms nowadays, however.

Running water is just as essential on the modern farm as in the city, as plumbing systems, sewage disposal and efficient laundries depend upon a constant water supply. Aside from the house supply, water should be available for the dairy barn, feeding yards, garage, lawn and garden, and for fire protection.

It is to be noted that the small water tank in the attic, and the larger water tower outside the house, are being supplanted by steel tank pressure systems located in the basement, or buried under ground.

The pressure system consists of a steel tank, pressure pump or air compressor, power for pumping and the piping system. Air pressure in the tank is obtained with a gas engine or hand pump, but in the automatic electric-pump systems the pressure is maintained between certain limits, without attention.

Sewage disposal systems have been in use on farms for a number of years, but there has been a very important improvement in the method of disposing of sewage after it leaves the house. Wastes formerly passed through the regular plumbing system in the house, and through a pipe under the ground to a cesspool or stream some distance away. The extremely unsanitary conditions thus created are apparent.

The present-day sewage disposal plant not only eliminates the cesspool, but is considered by many to be even superior to the city sewer method. Under the modern farm sewage disposal system the sewage, after it leaves the house, passes through an underground drain tile (with cemented joints) to a one or two-compartment septic tank (of steel or concrete) also underground, twenty or more feet from the house. Here the sewage is attacked by anaerobic bacteria, which change the solids to liquid. This liquid then passes on through a short tile which leads to an exten-

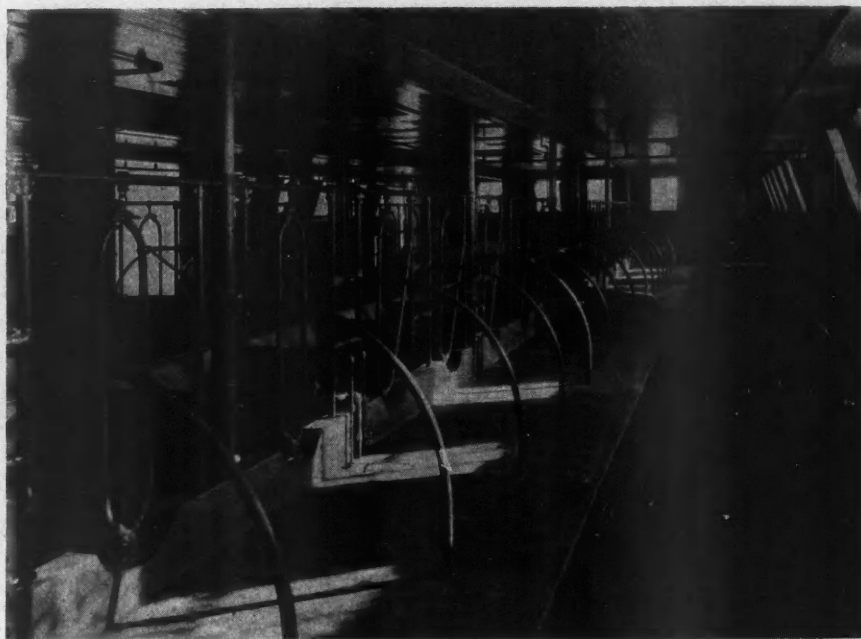
sive system of tile laid parallel on sand beds.

Oil lamps for lighting have passed on, just as have the pine torch and the tallow candle. Artificial systems of lighting have been developed to such a degree that they are both practical and economical. Some of these use gas generated from oil; others use acetylene produced by adding calcium carbide to water. These special gas lighting systems are also adaptable for use in cooking.

Electric lighting on farms was made available some years ago by the advent of the small, isolated power plant. There are now on the market several types. These consist of engine and generator, some having storage batteries and other being automatic—that is, the engine is automatically started every time a lighting or service fixture is used. Farm electric plants for lighting have other uses, such as power for pumping water, washing, ironing, milking, cream separating and churning.

Beneficial as all of these various improvements may be, it is the device that contributes to the farmer's pleasure that arouses his greatest enthusiasm. He is just like other human beings in that respect. The talking machine and the motor car have been joined by the radio, which has been given tremendous impetus recently by simplification of equipment and broader knowledge of its principles. Now that market reports are a part of every day's radio programs, radio becomes a business asset as well as a means of entertainment.

Improved roads and fences, increasing attention to landscaping about buildings, as well as the installation of labor-saving equipment, give evidence of rural advancement that parallels the improvements in property and living conditions experienced by city and town people. These factors, too, have contributed in large measure to making farm life enjoyable and profitable.



The Interior of the Modern Dairy Stable Is a Vision of Sanitation, Comfort and Convenience.

More Display for Retailers

Modern Store Fronts Increase the Area of Show Windows—Prism Transoms Popular for Attractiveness and Daylighting

MODERN store fronts are subtle trade winners. Mr. or Mrs. Customer may not be conscious of this fact, perhaps, as in walking down the street his or her attention is attracted by some article of merchandise displayed in a store window. Let us say, for instance, that it is an item of furniture, or possibly it is wearing apparel. No posts, pillars or high floor obstruct or limit the view. From shoetop to above the head the vision encounters only the goods displayed.

Other interesting articles figuratively beckon from a recessed extension of the window, and soon, without realizing it, Mr. or Mrs. C. has entered a display-lined arcade whose pleasing boundaries narrow down in step-like or tapering fashion until the window gazer is drawn to the doorway of, and often into, the store. And, during this process the "victim" is not aware, very likely, of having turned a single corner. Such is the psychology, backed by special window construction materials, of the modern store front.

Retail merchants have been greatly benefited by the development of bronze or copper window mouldings, and by the introduction of three-way prism glass into store transoms. These two products have permitted radical changes for betterment in the design and construction of store fronts, and many enterprising store owners have taken advantage of their opportunities to secure greater window display and to make their store fronts exceedingly attractive. The installation of such improvements has likewise resulted in providing considerable business for contractors and builders.

Scientifically planned and carefully manufactured mouldings, corner bars and division bars, have made it possible to use much larger plates of glass than formerly, and with reduced danger of window breakage from various causes. Heavy-gauge metal in both gutter and face members gives a rugged strength so that the sash becomes self-supporting. A machine screw adjustment gives easy control of the spring tension between the metal members and the window glass, with the result that the glass is held in a yielding, spring-like grip.

Four main features are considered in installing modern show windows. These are maximum daylighting, ventilating, drainage and ease of installation. It will be realized that water must be drained away from the lower members of the sash, and that such parts must be ventilated. It is principally in the handling of these factors that makers of such equipment vary their designs.

In setting windows the edges of the glass do not, of course, rest directly upon the metal rabbet; there is

always a cushion, usually of leather, to absorb shocks and deaden vibrating sounds. The wood stops are creosoted.

Division bars are used where two wide plates of glass meet. The bars hold the glass between a back piece and face members by means of machine screws. Special bars for angle windows are manufactured in a wide variety. All moulding is produced in a number of designs, in fact.

Metal awning hoods and metal bases are also regular features of metal store fronts, though in the case of the bases, attractive architectural effects are obtained by the use of brick, tile, wood or concrete.

Prism glass light reflectors contribute in both an ornamental and practical way to the modern store front. In most designs the light transom extends clear across the front of the store, located just above the show windows. The glass tile are in four-inch squares, glazed in sections, and are very neat appearing, especially when panelled by tile of a different color.

Sometimes the firm name is embodied in letters of colored glass, making the transom serviceable in the day time for lighting the store, and at night as a lighted sign. Signs of this character make an attractive appeal to the man on the sidewalk.

Under the prismatic lighting system the prisms so distribute the daylight to dark interiors that a uniform diffusion is obtained. Prism glass tile are frequently placed in show window backgrounds so as to gain for the store interior an extra quantity of day light.

In designing the modern store front, the number of lineal feet of display windows and height of their floors from the sidewalk will be governed by the character of each store. The jewelry shop, for instance, will not require as extensive a window display space as the clothing store; grocery windows necessarily have higher floors than those of the furniture store. Larger establishments have "island showcases" in the recessed portion of their store fronts which literally permit exhibiting goods "out on the sidewalk."

Manufacturers of store front equipment maintain engineering departments which co-operate with architects and builders in designing each job. In fact, this service extends to the inside of the store, where showcase doors, mirror mouldings and other fixtures require the use of their products.

Within the store the sales possibilities are greatly enhanced by fixtures which afford maximum display, and which are at the same time attractive. A great opportunity exists for local builders of such equipment for this reason. Progressive retailers are aware of the advantages of special fixtures, but do not always take the initiative in providing for them,

The mission of the local contractor, then, is to create business for himself by promoting these modern display ideas among proprietors of stores lacking in this respect. Work of building special counters, tables, cases, cabinets, shelving, balconies, platforms, display racks and small fixtures of many kinds can be secured in appreciable quantity if the proper effort is made.

Splendid results are obtained with metal ceiling, which quickly and economically transforms unsightly spaces into unusual attractiveness. Metal ceiling is now manufactured in many architectural effects, among which are Louis XIV, Colonial, Romanesque, Gothic, French Renaissance and L'Art Nouveau.

Invisible joints, repressed beads and die-cut nail holes make it popular and easy to apply, even in residences. Metal ceiling has the double advantage of being attractive and practical, as it is useful in withstanding fire, vermin and moisture.

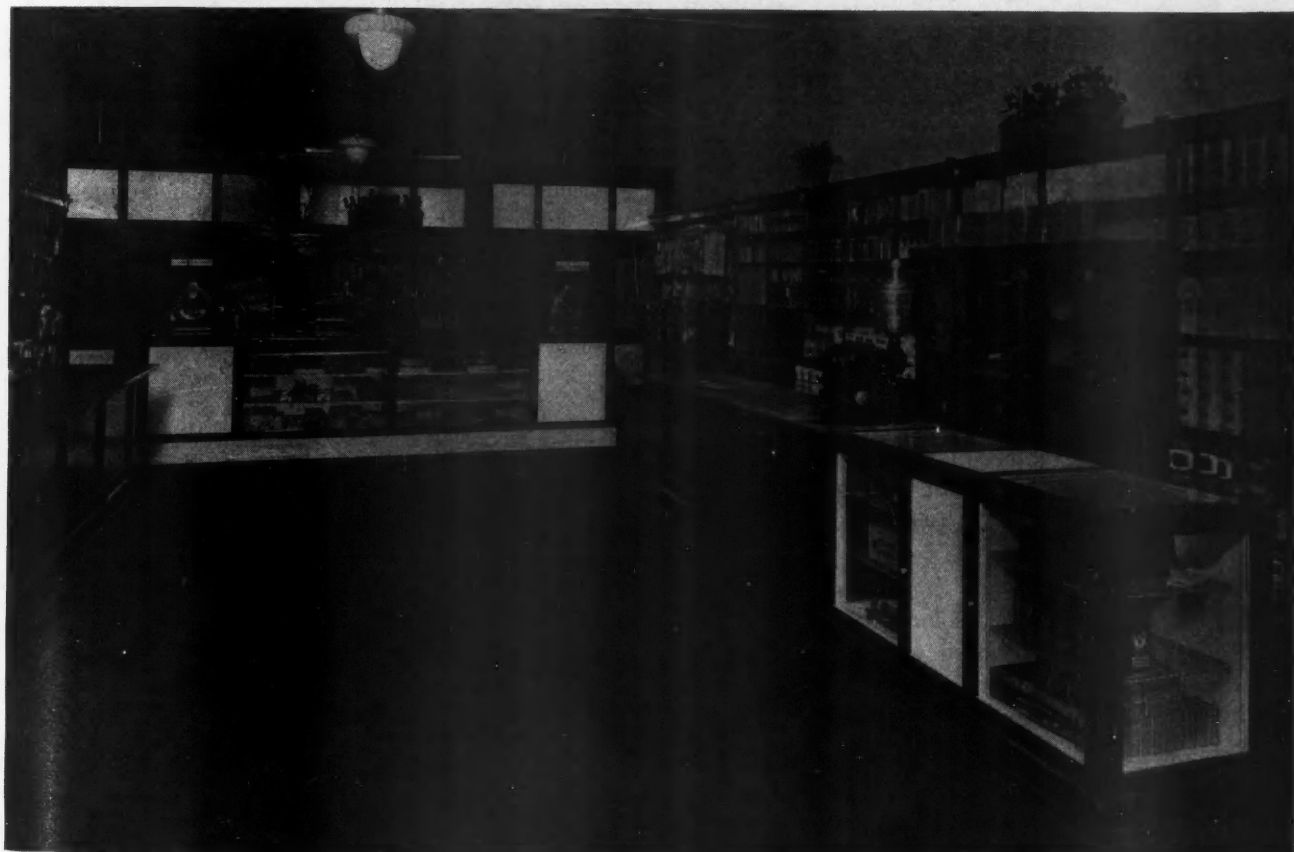
Retail merchants are acquiring a growing appreciation of the importance of proper lighting of display windows and store interiors. By "proper" is meant the selection of such lighting equipment as will give the best results. It has been learned that glaring lights are not as satisfactory as those which flood the window with a uniform light that is not too hard upon the eyes and which does not waste any light on the ceiling or the sidewalk outside.

Reflectors have been developed to a high state of

efficiency by lighting equipment manufacturers. There is a type suitable for each style of show window. In the high, shallow window, for example, a concentrating type is preferable. Deep windows with high trim or background, where the depth and height are approximately equal, necessitate reflectors that give a wide distribution of light. Island windows having glass on four sides should always be lighted with concentrating reflectors.

The construction of each window governs the way in which the reflector equipment can be mounted or installed. The average spacing is 18 to 24 inches. When the neighboring stores are not brightly lighted, this distance may be increased to 30 inches, but in brightly lighted sections it should sometimes be reduced to 12 inches. All lamps should be concealed from the view of anyone standing outside the window or inside the store.

In general store illumination several factors need to be considered. Inspection of goods must be made easy, but unusual brilliance should be avoided as it is uncomfortable for customers and store employees. Showcases, however, may be lighted a little brighter than their surroundings. "Daylight" or blue-bulb lamps are used to show real colors of merchandise, as in daylight. Indirect lighting throughout the store is most desirable since it brings efficiency and comfort which will add to the total volume of sales.

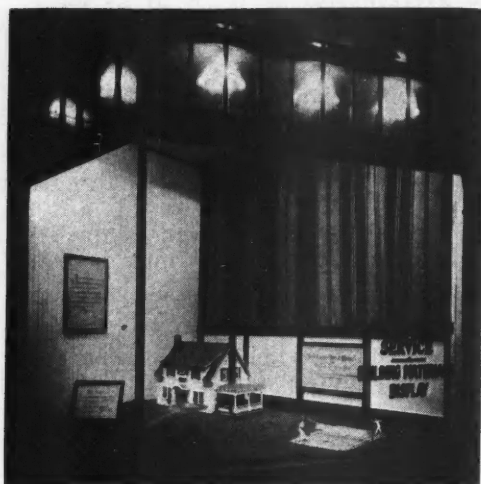


In the Year 1894 the Dunn Brothers Opened Up a Small Grocery Store in Wichita Where Their Expense Was Very Small. They knew very little about grocery business but they learned quickly and it was not long until they opened another grocery store known as Dunn Mercantile Co. No. 2 and from that time on they started to grow and at the present time they have twenty-one stores doing a retail business of two million dollars per year. This is a photograph of their store No. 15 at Wichita, Kan. This is the most up-to-date store in Wichita.

Window Displays Sell Lumber

New Jersey Firm Adapts Methods Used by Successful Retailers of Other Lines to Selling Lumber in Resort Town

FOR generations the lumber yards in the most of the towns of the United States have been situated in that rather vague region known as "down by the tracks," and these yards, in the great majority of cases, had the office in one end of the building used to house the sash, doors and mouldings. Lumber dealers



Attractive Window Displays Brought Thousands Into the Display Rooms of the T. L. Goslin Lumber Company.

fierce competition to sell the material on the basis of the lowest bid.

Last summer the T. L. Goslin Company of Wildwood, New Jersey, decided that the same methods which are so successful in merchandising other commodities might be applied with gain to the selling of building material. They determined that their concern should have representation where the sales of homes could compete with other demands and attractions for the dollars in the pockets of the American public.

Wildwood, thirty-two miles below Atlantic City and within sight of Cape May, is a summer resort. The Atlantic Ocean on the east and Delaware Bay, twenty miles long, on the west, temper the heat of the summer months and attract thousands of vacationists to the city. The long bathing beach and five miles of board walk, lined with shops, piers and places of amusement are thronged by the visitors.

It was on this boardwalk that the Goslin company established its display room and sales office. And, since a pile of two by fours and a sack of lime do not make an especially attractive display, and the company feels that it is selling, in the final analysis, homes and other structures rather

than the materials, the display was for the most part finished homes in miniature.

These miniature houses, in attractive settings, were placed in the windows of the sales quarters. The interior of the sales room was attractively and comfortably furnished and filled with material which demonstrated the advantage of particular details of home construction. Books of plans and pictures of finished homes of all types were placed about the room where they might be referred to with comfort.

Each day a capable representative of the firm was in the sales room and during the evening hours when traffic on the boardwalk reached its height, two salesmen were on the job.

The display was opened on June 30 and closed on September 15. During that time thousands of persons visited the Goslin company's display rooms and from this number many prospects were obtained who later became customers of the company.

After taking pains to establish a sales office and display in an efficient place, the Goslin company had no intention of losing the benefit of this action by failing to take proper care of those attracted by the display. Printed slips in the hands of the representatives listed the name, address and other pertinent facts concerning the visitors.

Among the details made a part of this record were the visitor's Wildwood address, his home address, what particular sort of business he was interested in, whether or not he was an owner of a home or lot and whether he spent his vacation in Wildwood each year.



The Interior of the Goslin Display Rooms Were Arranged to Make the Details of Home Building as Simple and Attractive as Possible to the Prospective Home Owners.

In addition to this record, made in duplicate and kept as part of the records of the office, if the prospect showed a reasonable interest in building he was given a questionnaire to fill out.

This questionnaire is one of the most efficient details of the Goslin plan. It is a four page leaflet, with the first page devoted to a cover design. On the last page is an interesting article on home ownership, which demonstrates the folly of paying rent.

The questionnaire itself opens by explaining that the prospect is not obligated in any way by his action in filling out the blank. It states that the company does not do contracting, but can furnish all of the materials and that the home building service will undertake the perplexing problems of finding the lot, financing the operation and in any other way possible, assist the client.

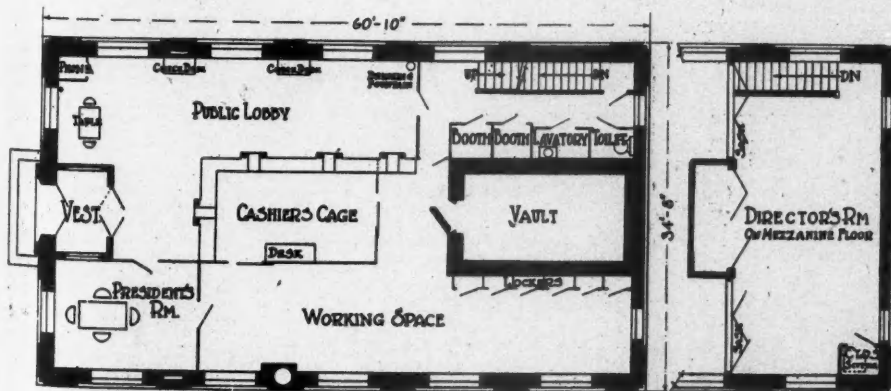
The questions concern the type of building preferred, the selection of the lot, the financing, the picking of a contractor, selection of materials and other pertinent details. Much of the value of this record, of course, is in the record it gives the lumber company, but entirely aside from that the fact that the prospect puts this information down on paper gives him a definite idea of his ability to build and tends to crystalize his desire to build and own a home.

Material dealers in all parts of the United States would do well to consider adapting the plan of the T. L. Goslin Lumber Company to their needs and their communities.



An Up-to-Date Bank Building for a Small Community

THE Coopersburg Bank Building, Coopersburg, Pa., is a good example of the smaller type of up-to-date bank building serving the smaller communities. It is of attractive design and is substantially built, having all modern improvements, such as electric light and water supply and, naturally, an effective burglar alarm system.



Careful Planning Is as Essential in the Designing of Quasi-Public Buildings of Small Communities as in That of the Larger Institutions in the Cities. The floor plan of the First National Bank, Coopersburg, Pa., shows a careful consideration of the functions of the institution. The directors' room, shown in the floor plan, is built as a mezzanine floor, above the vault. A basement has a room for the meetings of the Building and Loan Society.

The exterior is of red colored rough face brick laid up in white cement mortar. Trimmings are of cast stone.

The basement walls are of concrete, finished a light gray color above the grade line. Windows are steel sash, with cast stone sills and lintels. The floors throughout are of reinforced concrete, with heavy steel beams imbedded in the concrete. The roof is covered with a felt, tar and gravel roofing made accord-



The Exterior of the First National Bank of Coopersburg, Pa., Is Pleasing in Its Dignified Simplicity. The exterior is of rough, red, face brick, laid in white mortar. The trim is of cast stone.

ing to manufacturer's specifications, with twenty year guarantee.

The public lobby and coupon booth and toilet space have a 2-inch terrazzo floor. The employes' space has combination cork floors. In the directors' room the floor is of oak over reinforced concrete. Stairways are of iron construction, with terrazzo treads on the one leading to the directors' room.

The ceiling in the banking room is of metal, and the side walls are plastered with a natural sand finish. The vault is furnished with safety deposit boxes and a specially made vault door.

The banking room is finished with birch, finished in mahogany color. The public lobby space has a marble wainscoting the height of the window sills. The banking fixtures are natural mahogany. The basement contains the heating plant and coal storage space, a storage vault under the bank vault, and a large room where the Building and Loan Association meetings are held. The bank was designed and erected by Genaat Jordan, Coopersburg, Pa.

Buildings of this type show that builders of smaller communities are giving as careful a service as are their professional brothers of the larger cities.

Apartments for 11,000 Persons

The Metropolitan Life Insurance Company Erects Three Structures Designed to Rent for Not More Than \$9 a Room

POSSIBILITIES of erecting a large group of apartment buildings in such a manner that they would pay a reasonable return on the investment and at the same time could be rented for a moderate amount have long been considered by social investigators alarmed at the ever-increasing rentals in the larger cities of the country.

The Metropolitan Life Insurance Company has erected three groups of apartments in Long Island City, Astoria and Woodside, Long Island, and are now renting the finished buildings for not more than \$9 a room. The insurance company insists that a reasonable return on the investment can be made on this basis when the proper attention is paid to planning the structure and the building operations are conducted in the most efficient manner.

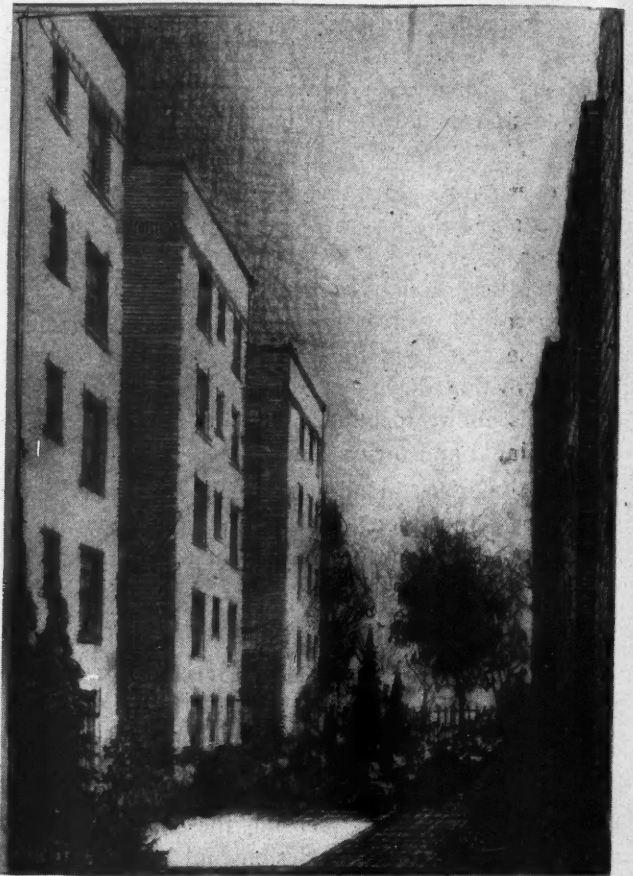
There are approximately 2,150 separate apartments in the three great building operations and they have been declared by experts to be the last word in proper ventilation, sanitation and comfort. Situated within commuting distance of New York City, and connected with the city by subway and elevated lines, these projects are a big contribution toward relieving the housing shortage which has been prevalent in the eastern metropolis for years.

The problem presented to the architects was to plan the individual apartments to serve well the needs of the average family and at the same time to keep the costs of the completed buildings within such limits as would allow the moderate rental rates demanded by the policy of the company.

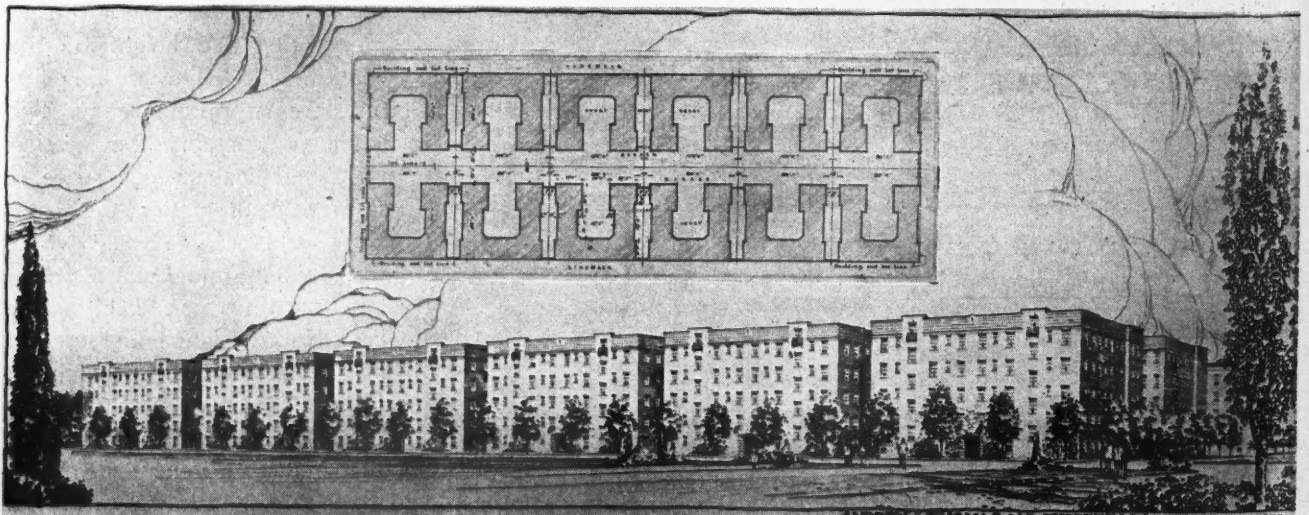
The manner in which the designers met the problem of providing space in the individual apartments can be learned best from the typical floor plan illustrated herewith. It will be noted that in many of the

apartments there is no provision for a dining room, a "Pullman" dining nook being utilized for this purpose. The company has fixed a rental charge of \$6.75 for these rooms, in place of the \$9 which is charged for the dining rooms of the usual design.

All of the heat and hot water for the apartments



An Entrance Court to the Metropolitan Life Insurance Company's Apartments.



Each of the Three Groups of Apartments Erected by the Metropolitan Life Insurance Company on Long Island Presents an Imposing Appearance, Covering an Entire Block. Inset in the picture is a plot plan of the buildings, each "U" shaped section representing an apartment unit as presented in the typical floor plan on page 258.

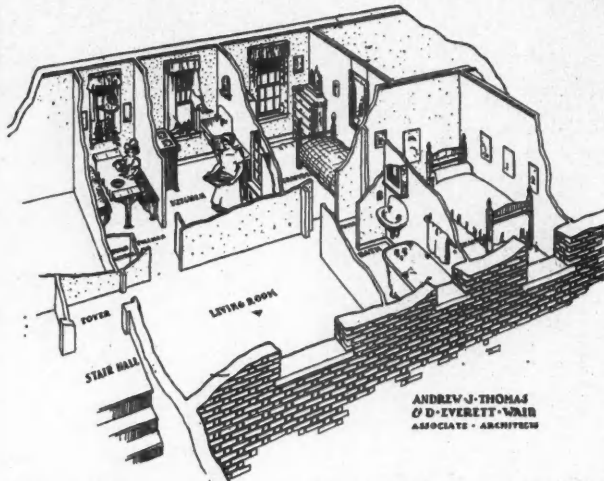


ANDREW J. THOMAS
& D. EVERETT WAID
ASSOC. ARCHITECTS

Entrance to Interior Courts of Apartment Groups Built on Long Island, New York, by the Metropolitan Life Insurance Company. Andrew J. Thomas and D. Everett Wade, Associated Architects.

in each group are provided from a central heating plant. The apartments are lighted by electricity with fixtures of a good grade in each room. Each kitchen is provided with an overhead clothes dryer.

Another feature of the building, one of considerable significance to the parents of children, is that baby-carriage garages have been set aside in the basements of apartments, and that while families with children



The Architects Picked a Graphic Manner of Showing Just How Much Room Would Be Available in the Apartments of Different Sizes. The one represented here is the central apartment to the right in the floor plan.

are welcomed, no tenant will be allowed to keep a dog.

It is planned by the Metropolitan company to plant trees and shrubbery in front of the apartments and to landscape the court spaces to the rear in an attractive manner.

The Metropolitan housing program offers other interesting features, not the least of which is the great quantity of building material necessary for the completion of the work.

In the seven blocks of buildings thirty-two million bricks were used and the steel and iron involved weighed 2,585 tons. Other great quantities of material utilized were as follows:

- Concrete—3,000 cubic yards.
- Stone—16,000 cubic yards.
- Lumber—5,600,000 square feet.
- Copper—20 tons.
- Lead—128 tons.
- Brass—25 tons.
- Glass—235,000 square feet.
- Paint—92,500 gallons.
- Roofing—270,000 square feet.
- Flooring—1,400,000 square feet.
- Tiling—63,750 square feet.
- Doors—15,130 square feet.
- Windows—15,000 square feet.

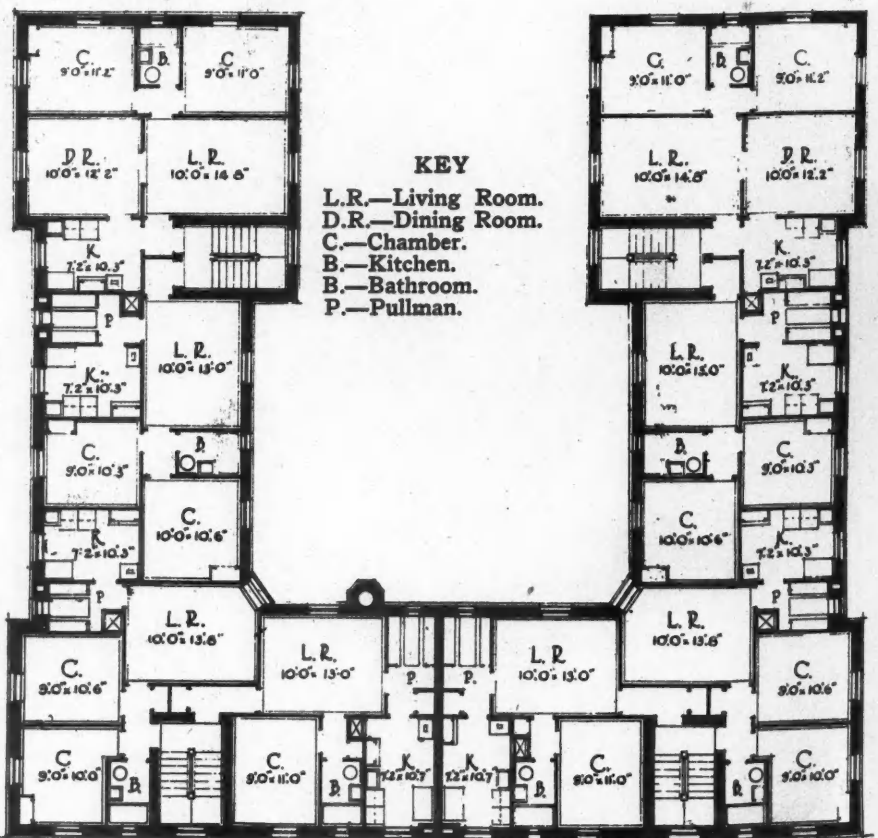
- Trim—7,000,000 square feet.
- Piping—958,000 linear feet.
- Radiators—4,627.
- Lighting fixtures—14,202.
- Hardware—116,000 pieces.
- Slate—250,000 square feet.
- Plastering—600,000 square yards.

Readers with a statistical trend of mind might find some pleasure in comparing the above figures with the quantity used in the erection of the buildings of a sizable town. On the assumption that the families occupying the Metropolitan apartments will be of average American size—five in number—it is seen that the total population of these three groups will be 11,000, or sufficient number to populate a city of considerable size.

So it is evident that with the same quantity of material as the Metropolitan used in Long Island it might be possible to build an entire community.

And if those interested in playing with figures cared to go a little further, they might compute the total length of the bricks used. If placed end to end they would cover a distance of approximately 4,044 miles, or as far as that between New York City and the Pacific Coast and back again to Salt Lake City.

The total amount of lumber used, not including flooring, was 22,600,000 linear feet, or about 4,280 miles. More than 260 miles of wiring, enough to reach from New York to Syracuse, is a part of the materials.



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ANDREW J. THOMAS
& D. EVERETT WAIR
ASSOCIATES - ARCHITECTS

Careful Utilization of All Available Floor Space Was the Object of the Architects in Planning These Apartments Where the Rental Costs Were to Be Kept to the Lowest Figure Possible.

Wholesale Home Building

Frederick A. Cooper, Who Started Erecting Houses After the World War,
Has Built and Sold More than 150

BUILDING and marketing 150 homes with a total value of \$3,000,000 within five years is no small accomplishment for any one man, yet this has been done by Frederick A. Cooper of Chicago, who, at the time the World War closed and he was relieved from duty with the army in December, 1918, had no idea of ever entering the building field.

Mr. Cooper, a member of a real estate firm, returned from the army to find his firm holding several lots which showed no indication of being saleable. The first venture into the building field was the erection of several duplexes. The lots, with the buildings on them, sold readily. There followed the building of a number of bungalows on vacant property which showed no disposition to move. These found a ready market.

Mr. Cooper decided that there was a significance in the fact that a lot was hard to sell while a lot with a house on it found a ready market. And his discovery should hold much interest for all real estate men and all contractors and builders who are in a position to co-operate with dealers in real estate or owners of potential residence properties.

and Locust streets and Cherry and Locust streets, back to back. The prices on the houses and lots ranged from \$15,000 to \$17,500, and although the homes are finished in every detail before they are turned over to the buyer, seven of them were sold at the time of these pictures were taken and the rest soon after.

Through his experience in the past five years Mr. Cooper has gained a very definite idea of the type of house which will sell most readily. The square or oblong type as exemplified by the Dutch and New England Colonials are the first houses in any project to sell, this builder finds, and he attributes this fact to the efficient utilization of space in homes of this type.

"In a project involving a number of homes," Mr. Cooper said, "care must be taken to see that the exteriors are varied and artistic. The outside appearance of the home often is what attracts the buyer first and certainly is what the home will be judged by to a large extent. No two of the homes must have the same exterior because if they have the appearance of being "machine made" or built in "job lots," the better



These Six Residences Form Half of One of Frederick A. Cooper's Recent Projects in Winnetka, Ill. Directly behind them are the houses shown on the opposite page. Mr. Cooper finds the Colonial types of houses the easiest to sell.

Lots in themselves have no appeal or value in the eyes of prospective home builders, Mr. Cooper decided, since buying a lot is only one step in process of acquiring a completed home. When the buyer sees the completed home on the lot, he knows just what he is buying, avoids all of the worry and difficulties of building and at the same time is enabled to move into the completed and brand new home at once. And in all of his building operations there has been no difficulty in finding buyers for the completed homes.

Mr. Cooper's latest enterprise has been the building of twelve six-room homes in Winnetka, Ill., north of Chicago. These homes, illustrated here, are on Ash

class of buyers will avoid them.

"And the houses must be of the best construction," he continued, in listing the essentials of successful building of homes in numbers.

"We use the same care and materials in building these homes which sell for \$15,000 that is used in building our homes which sell for \$30,000.

"The foundations are of concrete of exceptional thickness, the walls are of the best construction, eel grass insulation is used in the walls and between the floors to insure even temperatures and easy heating and heavy joists and framing are used throughout the construction.

"We know that attention to these details pays. All the while our homes are being built the persons living in the neighborhood are watching them. Visitors are attracted and many times neighboring householders will point out the strong points of the construction. And we have established a reputation as good builders that is very valuable.

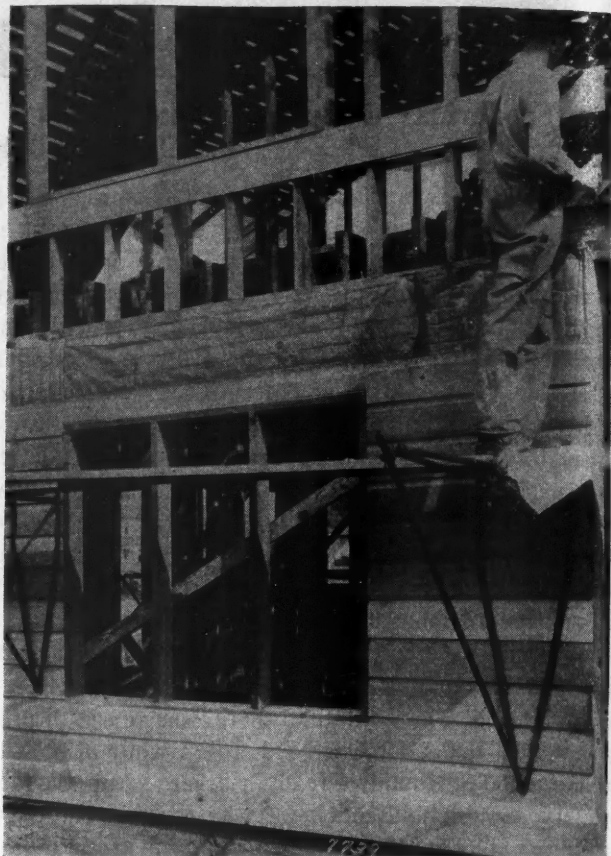
"As an instance of the careful scrutiny some of the homes are subject to before they are purchased, one of the houses in the group on Ash and Locust streets was purchased by the manager of a Chicago store. This man, before he made the purchase, had a friend who is a builder and a good one, examine the house while it was in the course of construction. The contractor, who was disinterested, could suggest no improvement.

"We are careful to finish our homes in all the details. The fixtures which are installed, the way the walls are finished, and all of these small details, are very important when a housewife is examining the home. Hooks in the closets and a nice enamel finish on the kitchen woodwork do much to make a sale easy. Details like hardwood floors and movable stairs to the attic seem to call for an unusual expense on the part of the man who is building to sell, but such features are the ones which sell the homes.

"The homes shown in the pictures are, as can be seen, in the course of construction. When they are finished, the lawns are planted, the grounds are landscaped, back fences are in place and inside the home everything is ready to receive the furniture.

"Under our plan of financing, the buyer must pay 25 per cent as a down payment. The balance, covering the interest charges and the payments on the first and second mortgages, takes the form of monthly payments. We insist that the second mortgage shall be cleared up in five years. A typical case would involve a down payment on a \$15,000 home of \$3,750 and a monthly rate of possibly \$125.

"Our firm is so situated that we can and do handle



The Cooper Homes Were Constructed with Eel Grass Insulating Material. This feature is appreciated by buyers, it has been found.

the second mortgages ourselves. The first mortgages are handled through a bank. We have not lost a cent in the financial handling of homes in five years.

"We handle our own concrete work, carpenter work, brick work, decorating and landscaping. The rest of the work is sublet. This arrangement has proven the most practical in regard to plumbing, lighting, excavating and other details.

"We are building good, honest homes, are making a fair profit and are selling them at a saving."



Quality Materials and Careful Construction Are Essentials to Successfully Building Homes to Sell, Mr. Cooper Finds. All the houses, though of the same general class, are varied as to outward appearance. All were designed by Alfred Manierre, Architect.

Growing Interest in the Use of Stucco

Modern Development of an Ancient Art Has Developed a Popular Fire and Weather Proof Outside Finish

OF all the building materials in use at the present day, stucco, tracing its pedigree back through the plasters, is one of the most ancient and honorable.

The pyramids of Egypt contain plaster work which is at least 4,000 years old, in splendid condition today and comparing favorably with the very rock itself for durability. Indeed, the early Egyptians seem to have brought the art of plastering and plaster products to a high state of perfection, many of the present day tools being the same as used in that ancient day.

They made most of their plasters from burnt gypsum, similar to our plaster of Paris. They used a base of lime stucco which, in partitions, was laid in reeds laced together with cords for lathing.

The ancient Egyptians also used stucco extensively for art and pictorial representations in bas relief—frequently colored. The likeness, or death masks, of deceased, found on many mummy cases, was canvas plaster. Canvas plaster has been claimed recently as a new invention.

The harem of King Amenhotop IV, about 1,400 B.C., had its principal room floored with a plaster pavement elaborately painted. This floor was laid on brick, the first coat of lime stucco about 1 inch thick; the finishing coat of well haired plaster about $\frac{1}{8}$ inch thick, very smooth and fine showing evidences of troweling.

Very early in Greek and Roman architecture, stucco work became prominent. Pliny refers to its use by an artist in the temple at Elis, 450 B. C. One of the few works of art which survived the fire of Nero, A. D. 64, was a bas-relief in plaster work of the Siege of Troy.

Vitruvius, a military engineer with Julius Caesar in his African campaign, 46 B. C., wrote detailed instructions for plaster work comparing very favorably with the methods of today.

Modern Use of Stucco

The use of plaster as an interior finish is an accepted practice which long has been widespread. Rough lime plasters were used to some extent for outside finish of peasant homes in Europe and occasionally in this country.

Within recent years, however,

stucco for outside finish has become increasingly popular with the development of the perfected portland cement and magnesite stuccos, which are much better adapted for this use than former materials.

Magnesite is a magnesium carbonate, found principally in the Mississippi Valley and the Southeast. Many successful stuccos are today being made from it. Perhaps the principal novelty in connection with its use are the chemicals used in the water with which it is mixed. These chemicals are non-freezing and the magnesite has other characteristics which prevent the formation of cracks. Magnesite stuccos are particularly successful and permanent finishes and their popularity is becoming more widespread every day.

The discovery of magnesite is attributed to a French scientist, M. Sorel. In 1866, he discovered, that, by combining magnesite and magnesium chloride, a chemical reaction took place which produced what is known as oxychloride cement, which sets up dense and compact, hard and non-porous. It was first used in the United States as a sanitary flooring in the Austrian Building at the World's Fair.

One reason for its popularity is the variety of color and texture effects obtainable. Granite, marble, and tinted and sparkling stones are ground and pebble-dashed on the final coat. Or the final coat can be effectively spray-painted any tint desired.

Another reason for the popularity of the stucco



A Good Example of Stucco Work on This Garage.



A Beautiful Example of the Use of Stucco in This Spanish Patio Entrance.

finish for homes and clubhouses is its adaptability for surfacing hollow tile, concrete work, stone, brick or even wood covered with metal lath or wire mesh. Hollow tile surfaced with magnesite stucco makes an

economical and durable type of construction. It has the advantage of being fireproof and its upkeep expense is much less than that of wooden surfaces which must be frequently repainted.



Concrete Blocks Ready for Stucco Finish.

Magnesite stucco has great bonding power and is said to adhere firmly without keying. It is thoroughly fire resistant and has a high breaking strength, averaging from 600 to 800 pounds per square inch. It is resilient and can be bent or deflected 2 inches in a span of 6 or 7 feet without cracking or damage.

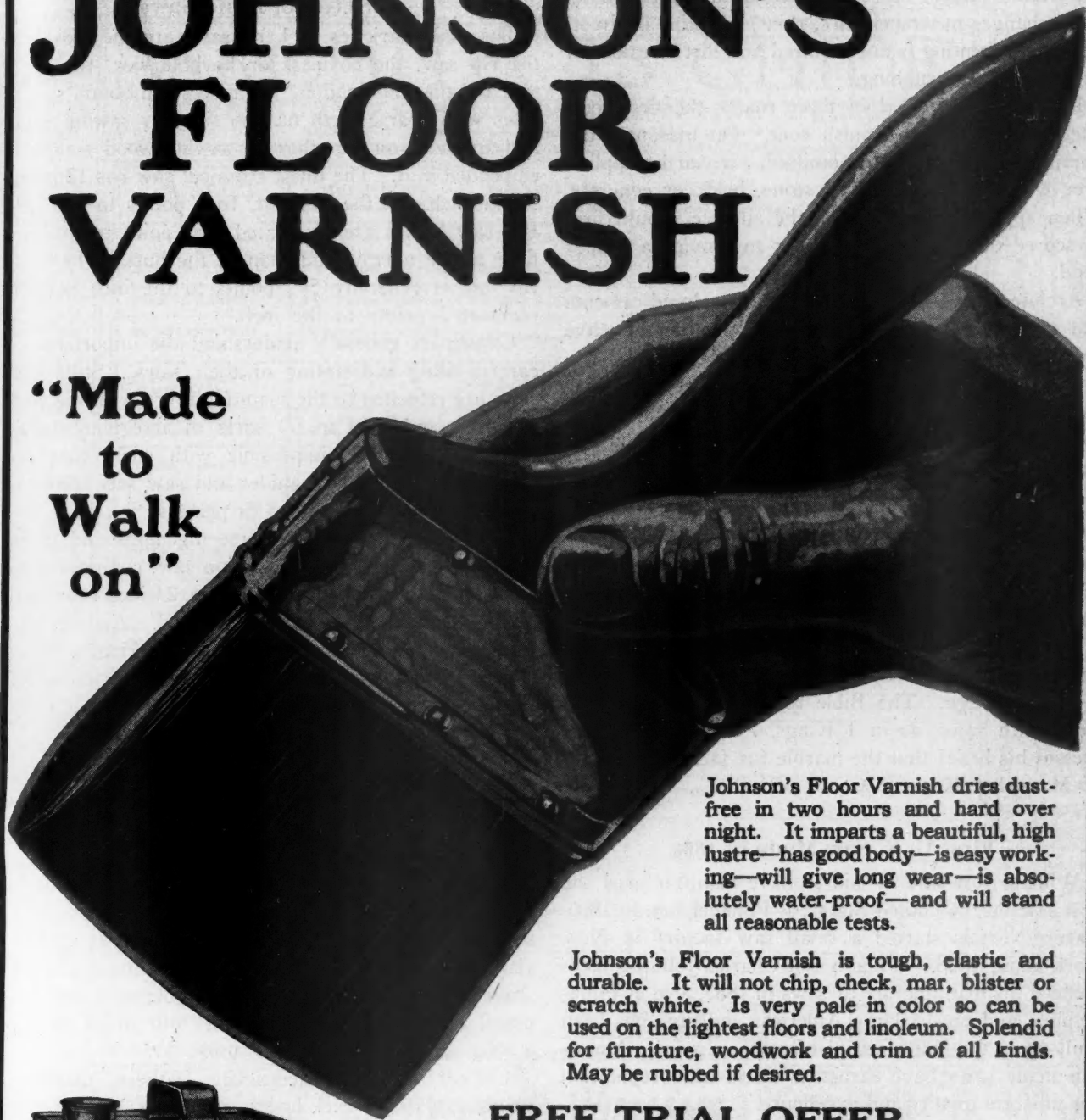
Portland Cement Stuccos

Great varieties of finish and appearance are possible with portland cement stuccos, among which may be mentioned the smooth or troweled finish, the sand floated finish, the spatter dash finish, the stippled finish, the sponge finish and the pebble-dash.

Many colors and effects are possible in the latter finish, limited

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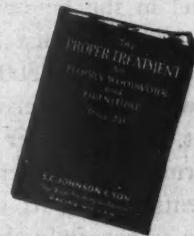
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only by the variety of the aggregate available and the skill of the workman.

Portland cement stucco is said to be unaffected by rapid changes in temperature, rains, sunshine or frost. Periodical painting is not required and dirt streaks can be removed by scrubbing.

It is usually applied in three coats—the first coat, intermediate coat and finish coat. On masonry, the intermediate coat is often omitted. It can be applied over wood, lath, metal lath, stone, brick or concrete. When applied over concrete, the surface should first be scored or roughened, in order to provide a proper bond.

Architects make clever use of brick, colored cements and stonework around windows and at other effective points, to relieve the monotony of gray stuccos.

Solid tints throughout the entire stucco mix are obtained by the use of colored cements, thus affording home builders a wide range of choice in the outside appearance of the building.



Tools Since the Stone Age

(Continued from page 183.)

the carpenters of Japan still work with saws operating on this "pull" principle. An iron wedge embedded in the Great Pyramid proves that the Egyptians wrought iron in the time of King Cheops, more than 5,400 years ago. The Bible refers to the cutting of stone with saws, as in I Kings, 7:9, and Pliny expresses his belief that the marble for facing the palace of Mausolus, King of Caria, 350 B. C., was cut by saws.

First U. S. Saw Made in 1806

William Rowland is said to have manufactured the first saws in the United States, at Philadelphia, in 1806. Aaron Nichols started a small saw factory in New York about 1828. William and Charles Johnson commenced the manufacture of saws in 1833, also in Philadelphia, and now a large American industry has been built up in the manufacture of saws. In fact, American made saws have earned a world-wide reputation for uniform quality and excellence.

American carpenters are extremely particular about the quality of their saws and usually test the blades by bending them round, putting the point through the handle and expecting them to whip back into their original shape.

One large American firm manufacturing saws first introduced the electric furnace for making crucible steel in the United States. They were also the first to build and install automatic machines for toothing saws, cutting 1,500 teeth per minute. Also, to harden saws under specially designed dies which keep them flat, and to temper saws under hot dies, involving uniformity of temper, as well as many other improvements in the art of sawmaking. Saws in this plant are so carefully sharpened and filed that a fine needle will slide freely down the length of the saw between

the teeth. Before sharpening, all teeth are carefully hardened and drawn to the exact temper required.

Varieties of Hand Saws

The main varieties of hand saws are the cross-cut, the rip saw, the compass or keyhole saw, the mitre saw and the combination. Plumbers can obtain special saws with coarse teeth on one side for sawing wood and fine teeth on the other for sawing wood with nails embedded in it. The finest cross-cut saw has 12 points to the inch and the coarsest, four points to the inch. Rip saw blades are graduated, one point to the inch finer at the narrow end than at the butt. The finest rip saw is generally 5½ points to the inch and the coarsest 3 points to the inch.

Carpenters generally understand the importance of careful filing and setting of their saws. Still, some saws are returned to the manufacturers with the teeth distorted and filed in all sorts of irregular shapes. Clean cut work is impossible with such saws and undoubtedly saw filing guides and saw sets would be good investments for some carpenters.

One patented saw has some ingenious and useful features. It is a full combination saw, comprising the additional advantages of the square, 24-inch rule, level, plumb, straight edge and scratch awl. Another is a gauge saw adapted to tenoning, shouldering, dovetailing, curving, cog-cutting, or any purpose where a definite depth of cut is required.

Hack Saws Are Useful

The hack saw to cut metal, while used oftener by plumbers, is a useful tool in any carpenter's equipment. Files of various shapes are also extremely useful to him, especially for tool sharpening.

It is needless to point out the many uses—the indispensable uses—of the steel square, try-squares, levels, augers, bit and brace, screwdrivers, hand screws and clamps, countersinks, vises, wing compasses, draw-shaves, spokeshaves, breast drills, gouges, center bits, pencil compasses, hatchets, bevels and so on through a long list of woodworkers' tools.

Cement finishers, electricians, lathers, plasterers, painters, masons, brick layers, gas fitters, stone cutters, ornamental iron workers, steam fitters, plumbers, sheet metal workers, tile setters and structural iron workers, each are dependent on the fitness of their special tools to deliver full quality and volume of work.

Great pains have been taken by many manufacturers to get that balance in their tools which the mechanic demands, with handles which fit the hand and contribute to steadiness and accuracy. No two, perhaps, will make exactly the same choice but, fortunately, there are many makes and designs from which to choose. There should be one guiding policy for the buyer who wants the most for his money and that is never to sacrifice quality for price. The best will pay in the long run. As long as American standards of craftsmanship are high, the craftsman will feel an affection for the tools which serve him so well.

ARCHITECTS' GUIDE

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IMPORTANT: Each of the products specified below bears our name and trade mark

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BRICK WALLS (ext)....	S-W Concrete Wall Finish	Old Dutch Enamel, Gloss		
CONCRETE WALLS....	S-W Concrete Wall Finish	Old Dutch Enamel, Gloss		
CEMENT FLOORS.....	S-W Concrete Floor Paint	S-W Concrete Floor Paint		
EXTERIOR WOOD SURFACES.....	SWP (Sherwin-Williams Prepared Paint)	Old Dutch Enamel, Gloss	S-W Preservative Shingle Stain S-W Acid or Oil Stain	Resper Varnish
EXTERIOR METAL SURFACES.....	Kromik Structural Steel Primer Metalastic (for finishing coats)	Old Dutch Enamel, Gloss		
FACTORY WALLS (Interior).....	S-W Eg-She! Mill White S-W Fume Resisting White	Old Dutch Enamel or Enameloid		
FLOORS (Interior Wood)...	S-W Inside Floor Paint (the enamel-like finish)	S-W Inside Floor Paint (the enamel-like finish)	Oil Stain or Floorlac Varnish Stain	Mar-Not Floor Varnish
GALVANIZED IRON SURFACES.....	S-W Galvanized Iron Primer (Finish with any Paint)	S-W Galvanized Iron Primer and Old Dutch Enamel		
INTERIOR WALLS AND CEILINGS.....	Flat-Tone Wall Finish S-W Eg-She! Mill White	Old Dutch Enamel or Enameloid		
INTERIOR WOOD TRIM.....	SWP (Sherwin-Williams Prepared Paint)	Old Dutch Enamel or Enameloid	S-W Acid Stain S-W Handcraft Stain S-W Oil Stain	Scar-Not Varnish Velvet Finish Varnish (for imitation rubbed effect)
PORCH FLOORS AND DECKS.....	S-W Porch and Deck Paint			
RADIATORS AND PIPES.....	Flat-Tone Wall Finish or S-W Gold Paint S-W Aluminum Paint	For White—S-W Snow White Enamel For colors—Enameloid		
ROOFS—Metal.....	SWP or Metalastic (if Galvanized, prime with S-W Galvanized Iron Primer)			
ROOFS—Wood Shingle...	SWP		S-W Preservative Shingle Stain	
STACKS AND HOT SURFACES.....	Salamander Smoke-Stack Black			
STRUCTURAL STEEL..	Kromik Structural Steel Primer Metalastic (for finishing coats)			
TO DAMP-PROOF FOUNDATIONS....	S-W Antydamp			
TO DAMP-PROOF INTERIOR WALLS ABOVE GRADE....	S-W Plaster Bond			
WOOD PRESERVATIVE			S-W Carbolic-ol	

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A Thousand Years' Service for a Cent and a Half

Common Brick, One of the Earliest Manufactured Building Materials, Has a Long Record for Endurance

By WILLIAM CARVER, Architect

THERE is only one material in the world today which after going through a complete process of manufacture, and comprising a mass of material weighing from 4 to 5 pounds, will give a thousand years' service and which costs only a cent and a half to two cents. That material is brick, and it is well to bear this fact in mind when one hears a question as to the present cost of building. We are satisfied if most of the things we buy give only a small fraction of the service that brick will give. To this day there are great mounds of brick marking the spot where the ancient city of Babylon used to stand, the brick being the only vestige that is left of traces of that ancient city. The history of civilization may be said to be written in brick.

Common brick has been bound up with the history and progress of the human race since the first dawn of civilization. Khammurabbi, the great lawgiver of Babylon, mentioned in the book of Genesis as Amraphel and who lived about

brick and are now as beautiful and substantial as when built.

In Medford, near Boston, stands the Governor Craddock home, said to have been built in 1632, used today as a residence, its solid walls of common brick as good today as when they were erected, 288 years ago. Also in Boston there is the Old North Church, from the tower of which the signal was flashed that sent Paul Revere on his famed ride of warning. These walls of common brick do not know what time means. They will be good for many more hundreds of years if no external force disturbs them. Throughout the country there are many such examples of the unchanging quality of common brick when built into a wall. Just such bricks are being made in America today—everywhere, and they are just as beautiful and will last just as long—accessible in price and in supply to everybody.

Throughout the world buildings which are outwardly of face brick, stone, marble, granite and terra cotta, owe their real structural strength to the common brick which is used to back up the facing materials. Although many substitutes have been devised to take its place, nothing has proved so practical and satisfactory in every way as brick. Its strength, durability, fire-resistiveness and dryness make it worthy to be called "the partner of all good construction."

Brick is a material of such generally accepted excellence that until quite recently it had not occurred to anybody to catalog its good qualities and advertise them in the same way that manufacturers of other materials were doing, and it is a strange fact that for this reason the manufacturers of substitute materials, by conducting aggressive promotional campaigns, were able for awhile to actually decrease the market for brick. During the last few years, however, brick manufacturers have been awake to the situation and have been systematically promoting their product where a few years ago they would have considered with derision the very idea of advertising such a commonly used article.

That their new policy has justified itself is attested by the fact that the year 1923 saw the largest production and use of common brick in this country that has been experienced for a good many years. Plants were so busy that they could hardly take care of their orders and brick machinery manufacturers report that they sold more new machinery in the year 1923 than ever before. The whole industry is taking on a new lease of life, stimulated by the intense promotional work that is now being done. The building public, and this includes also architects and structural engineers, needed only to be reminded of the good qualities of brick to give this material its proper due when the claims of competing materials were presented.

The promotion of brick, while, of course, a selfish under-



Hampton Court Was Built of Brick in 1515 by Cardinal Wolsey and Later, in 1826, the Splendor of the Building Attracted the Attention of Henry VIII, Who Received the Structure as a Gift from the Cardinal. It became one of the favorite residences of the king. The north front of the palace, shown here, is of the fine red brick architecture of the Tudor period, with quaint gables, small mullioned windows and a collection of moulded and twisted red brick chimneys of varied designs.

The entrance through the gate of the house, as shown here, is approached over a recently restored bridge over the moat. The massive Tudor archway, flanked by the two towers, leads into a quadrangle and hence into a second court.

In parts of the building are housed now a priceless collection of the works of artists of the period in which the palace was erected.

2350 B. C., was probably the first common brick manufacturer to trademark his brick. King Nebuchadnezzar also put his own stamp on the bricks he made. That he made a good product is proved by the fact that many bricks bearing his mark are in the walls of many buildings in actual use today.

The medieval builders of Europe used common brick for many beautiful buildings which are not only standing, but are in good repair and have been in constant use ever since they were erected. Coming to our own day, the group of buildings in Philadelphia, including Independence Hall, where the Declaration of Independence was signed, and Faneuil Hall, Boston, called "the cradle of liberty," are built of common

Home Building Ideals and the Pocketbook

Here are Some Suggestions for Getting them Together

NEARLY everybody wants a home of his own. Nearly everybody wants a home better than his pocketbook will afford. Since the financing of a home is one of the big expenses in connection with a home, it is important for everyone approaching home building or home buying to get, for each dollar expended, the best possible returns.

Now let's forget all propaganda, all long arguments about this material or that, and get right down to cases.

Isn't it reasonable and sensible to apply to the buying or building of a home the same principles that you apply to the buying of clothing, the furnishings of your home, or an automobile?

Would you rather pay two or three hundred dollars more for an automobile when you buy it, or buy the cheaper car with the certainty of having to spend two or three hundred dollars every year with the garage man to keep it in running order?

Does it pay to buy cheap clothing which never looks well and quickly goes to pieces, or pay a little more money and get all wool, well tailored garments?

Can you not give the same answer to this question: Is it not better to spend a little more money when you build your home, if that small added expenditure will save you hundreds of dollars every year in upkeep cost, painting, insurance and fuel? In the case of the home, the good appearance, the comfort, the satisfaction, the standing in your community that you gain by having a real substantial and permanent brick house are benefits that you cannot count in dollars.

You know that the house with walls of brick does not have to be painted. You know that you can have your home comfortable in cold weather with from fifteen to fifty per cent less fuel than in any other type of house except possibly stone. You know that brick houses do not depreciate rapid-

ly, because as you walk along the street you have difficulty in telling the age of any brick house you see. They do not grow old, and consequently they hold their value.

In the matter of beauty, of course, the individual taste enters into the question. But if those who seek the advantages and economies which always go with the brick house will investigate, they will find that they may have almost any color and any appearance in a brick house that they would like. Certainly most people believe that the brick house is by far the most beautiful because it denotes character, standing and good judgment.

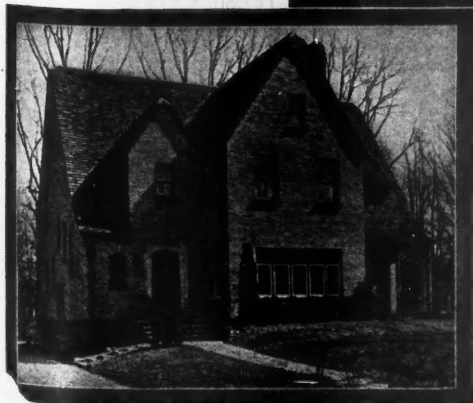
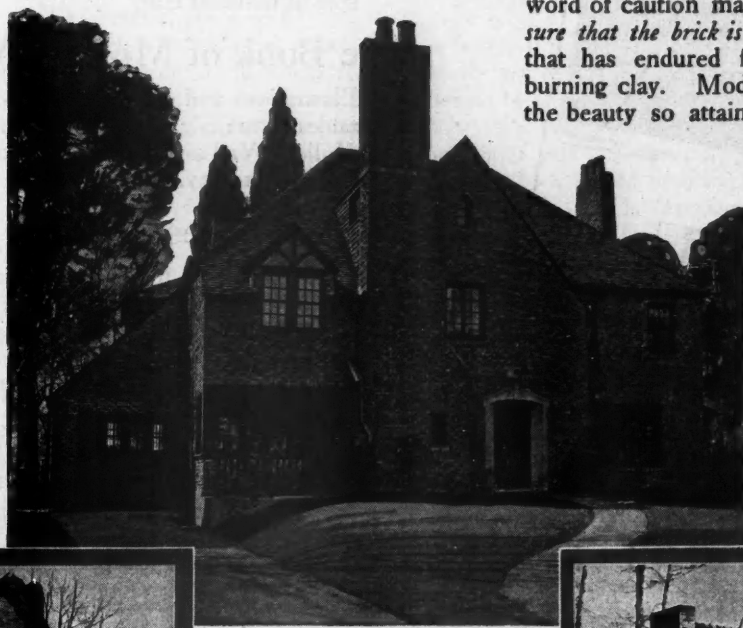
A great variety of plans for small brick houses are available at small cost, through the Common Brick Manufacturers' Association of America, located at 2131 Discount Building, Cleveland. The small expenditure of 20 cents will bring to any address in the world two books, illustrating 122 different houses. These range from bungalows to fine Colonial and English types, and include a few two-family houses. Several garages also are shown. For everyone of these buildings the Association will supply the complete working drawings and specifications at a nominal cost.

By the use of common, local-made brick, always the lowest priced brick in the community, most beautiful effects in home building are being attained. The common brick house is becoming popular and rapidly replacing the less enduring types of construction.

To those unfamiliar with the manufacture of brick a word of caution may not be out of place. *Be sure that the brick is made of burnt clay.* Brick that has endured for centuries is made by burning clay. Modern imitations do not have the beauty so attained nor do they give the complete and lasting satisfaction of genuine brick. Any brick manufacturer will be glad to show you samples of common brick and take you to homes built of this attractive, low priced fire-proof material.

Let us send you the books shown on the next page.

Turn to the next page



Some typical examples of Common Brick construction using varied bonds and patterns. Low first cost and lasting beauty are easily attained.

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*a complete library on
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SIXTY-TWO NEW HOMES, in picture and plan, for every locality—many especially suitable for California, the West and Southwest, two-story singles, two-families and double houses.

The best variety and the latest styles, all in this newest book, just off the press. Beautifully printed in rotogravure. Each designed by a well-known architect for beauty and economy. Working drawings at nominal cost for every home shown.

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THE SIXTY HOMES shown in picture and plan in "Your Next Home" do not duplicate those in the newest book "The Home You Can Afford." Send for both books. All homes actually built and lived in and designed by capable architects. At ten cents each these two booklets give you 122 good brick homes for which working drawings are available at nominal cost.

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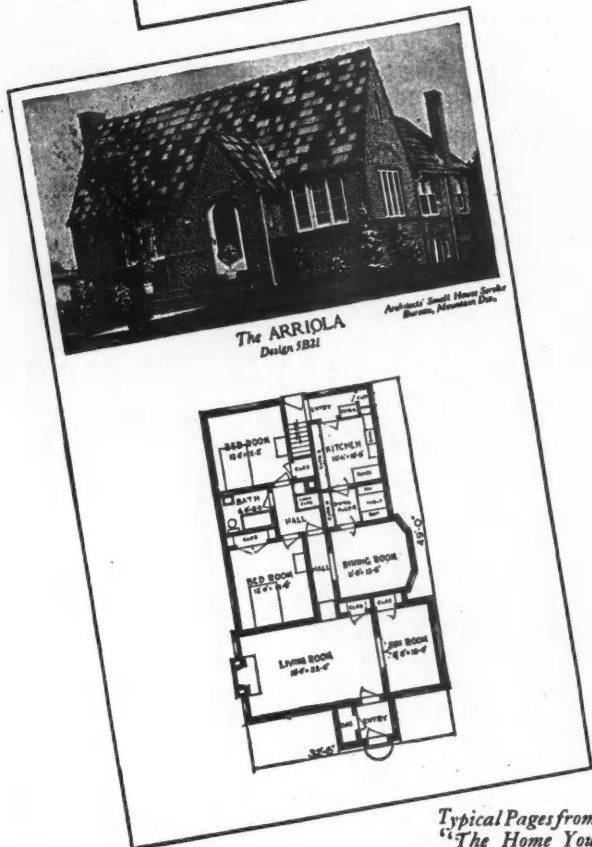
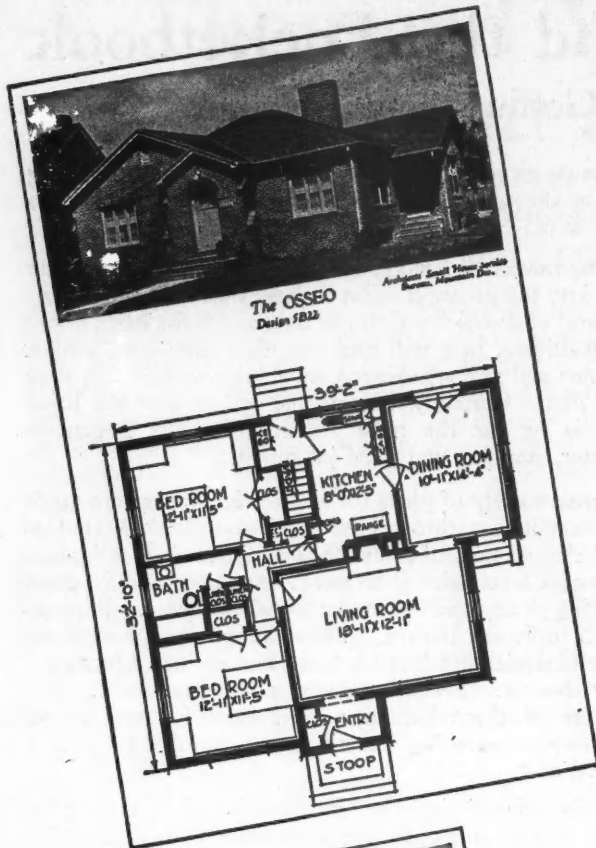
"Your Next Home" (10 cts.)

"Brick—How to Build and Estimate" (25 cts.)

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The Common Brick Manufacturers' Association of America
 2131 CLEVELAND DISCOUNT BUILDING
 Cleveland, Ohio
 The Ideal Brick Hollow Wall
 Made of standard brick—cuts the cost one-third

taking from the point of view of the manufacturers, is also in a broader way of great public benefit. Consider the case of the wage earner who with a small down payment buys his home with the expectation of paying the balance by installments over a long number of years, these installments coming out of his none too large wages. There are thousands upon thousands of such cases all over the country where the home represents the accumulated savings of a lifetime, where payments have been kept up through good times and bad and sometimes at the cost of economizing and skimping on even the necessities of life. It surely is a tragedy when a man acquires under such circumstances a house that has lost one-quarter to one-third of its value by depreciation before it is even paid for.

By disseminating the information among small wage-earners that the small brick house actually costs no more than a house of less durable construction, if the upkeep costs are taken into account for a period of ten or twelve years, we feel that this industry is rendering a real service. And not only the wage-earner but people who are in easier financial circumstances do not always realize the truth of the economics of home building, taking one material as against another. And in the long run building the walls of homes with brick does not work a hardship on the lumber industry. Government experts and others have pointed out that the forests of the country are diminishing at an alarming rate, and the present production of lumber cannot continue for a great many more years. To build homes of brick is to conserve lumber. Just as much wood is used in the interior of the house for partitions, floors and finish as would be used in a frame house. The only difference is that the outside walls are built of a material that will protect the inside lumber from decay and give it a life three to four times as long as if the whole house

were built of wood, and the rate of decay of the whole structure governed by the decay of the wood exposed to the elements.

Brick is of such a permanent nature and its depreciation is so slight that no one could tell whether a brick house is five years old or twenty-five years old. Its beauty and perma-



Common Brick Has Attained a Widespread Popularity as a Building Material in Many of Chicago's Residential Suburbs. Often the homes are painted with paints made especially for brick. The H. W. Branigar residence, 421 Oakwood avenue, Highland Park, Ill., was designed by C. Reinhardt, architect.

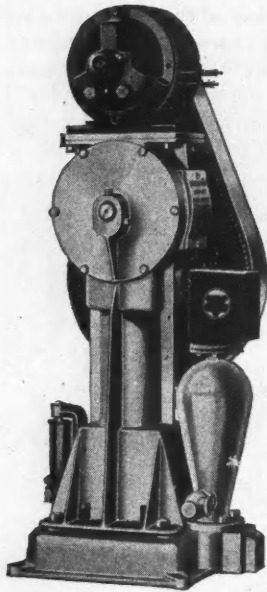
nence endure for many generations, and this is reflected in the sale price of the property whenever it is desired to sell it.

In larger structures architects and structural engineers welcome the use of a type of construction which is so dependable as brick. No engineer need be afraid that the inside of a masonry pier might be defective if that pier has been built up by unit after unit of pre-manufactured burned brick and every unit placed by a skilled mechanic who has spent several years in learning his trade. Insurance companies give true proof of this dependability of brick by issuing fire insurance policies at the lowest rate for buildings constructed with the brick exterior walls and fire walls, assuming, of course, that the rest of the construction such as floors and roofs, etc., are built according to their requirements.

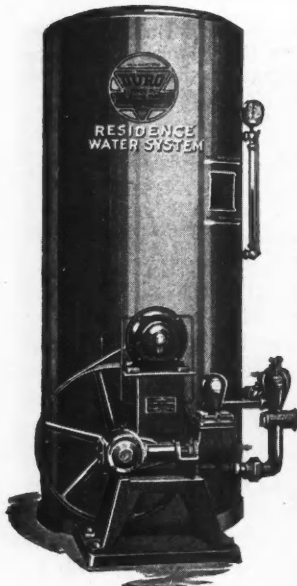
There are few materials in use today in which the skill of the craftsman and his individuality can be so well expressed as in the wall of brick. That is where much of the charm of brickwork has its origin and constitutes some of the reasons why people by thousands visit year after year the wonderful old structures of the old world. We produce the same kind of brick, of the same material, with the same dependability that have been produced through the ages, and they are laid by just as competent craftsmen as has always been the case. The use of brick is destined to increase so that the normal type of building, whether it be a cottage or larger structure, will be of brick.



A Modern Home of Brick Is of Such a Permanent Nature That It Is Almost Impossible to Tell Whether It Is Five or Twenty-five Years Old. If the design is right, age will add the beauty of dignity to the residence. Where homes represent the savings of a lifetime, this quality of permanence is especially desirable.



Style 3000 Deep Well Pump for wells ranging in depth from 22 feet to 500 feet. Made in several sizes with capacities ranging from 200 to 1100 gallons per hour.



Style 300 Shallow Well System is made in several sizes to furnish city water service to summer cottages, suburban or country homes, golf clubs, etc.

Standard

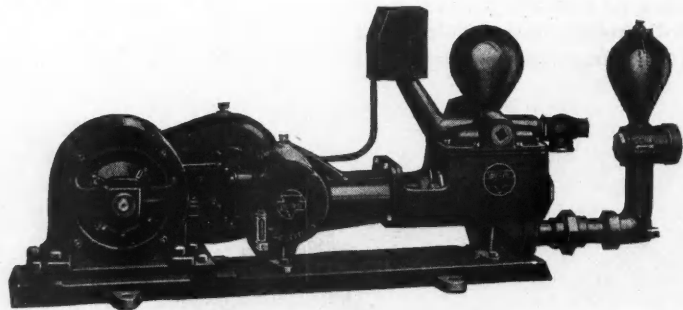
The universal standard of comparison in automatic pumps and water systems is Duro. "Just as Good as Duro" is the final argument many salesmen use.

The Duro line is a complete line — every Duro dealer is able to meet your requirements with a Duro product. There are low-priced Duro systems for shallow wells or cisterns. There are more expensive shallow well units with larger capacity. And there are deep well pumps in several sizes and capacities.

Exclusive Mechanical Features

Duro pumps and systems likewise have many exclusive mechanical advantages—features that assure care-free service year after year. Here are eight Duro features that will appeal to everyone who has used a water system:

- 1—Duro leak-proof stuffing box does not have to be repacked. Packing is tightened by a knurled collar. Water cannot work into the crank case.
- 2—Duro Repulsion-Induction Motors do not burn out or stall under the heavy starting load. They reduce current consumption.



Here is the Style 100 Suction Pump having many desirable features as an individual water plant for larger country homes, market gardens, greenhouses, country schools, dairies, etc.

Duro Pump & Mfg. Co.,
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DURO

Residence Water Systems

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of the World

- 3—The Duro oiling system is gravity feed with splash and wipe system that insures complete lubrication under all conditions and without attention.
- 4—Automatic two-pole switch starts and stops the pump automatically. The Duro two-pole feature eliminates possibility of burned out motor or of switch not operating.
- 5—Duro pumps are automatically primed. The same simple principle prevents air-binding.
- 6—Dirt or foreign matter is prevented from reaching the valves by a special screen, which may easily be removed and cleaned when necessary.
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Every home builder—every architect or contractor—will find it time well spent to investigate Duro before specifying or purchasing a water system.

*We publish two booklets illustrated below.
Send for them—they're free.*

The Duro Pump & Mfg. Co.

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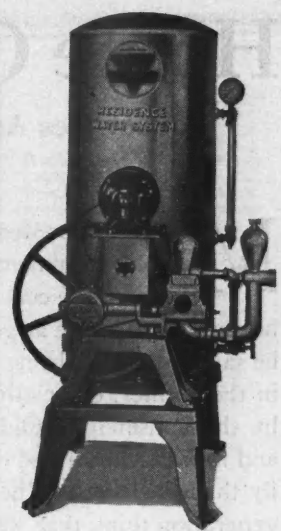
Dayton, Ohio



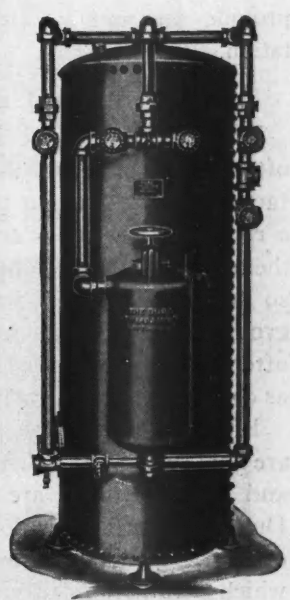
Architects' Data and Specifications Book contains much valuable information on Water Systems for the architect or contractor.



"How to Choose a Water System" is a booklet which states forty questions you should ask before buying a water system.



The New Vertitank Unit System is especially designed for supplying homes with soft water from cisterns or for use with shallow wells, springs, etc. It is compact, powerful, efficient.



The Duro Household Water Softener is simply connected to the city hard water line, no extra plumbing being required. It converts the hard water to velvety softness.

DURO

Household Water Softeners

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Duro Pump & Mfg. Co.,
106 Monument Avenue,
Dayton, Ohio.

Send me "How to Choose a Water System."

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.....

Home Comforts and Conveniences

Housewives Are Demanding That Their Realms Be Equipped As Efficiently As Are Other Scenes of Modern Activity

MONEY invested wisely in labor-saving household equipment is by no means out of proportion to the cost of the construction of the small house as well as the larger one. Such equipment, it may be said in truth, is being studied with even more interest in the former, especially where the housework is done by the housewife. Old traditions are breaking down and new machines and devices are accepted more readily than they used to be. No longer does the younger generation think that what was good enough for father and mother is good enough for it.

The greatest improvement has naturally occurred in the kitchen. The old-fashioned, overly-large, poorly-equipped and ugly kitchen is gone. In its place is the smaller, more compact room equipped with labor-saving machines for cleaning, preparing and handling food, and with built-in features of construction which provide maximum convenience, economy and sanitation.

Built-In Features

There is the built-in kitchen cabinet, for instance, often supplemented by the special cabinet which manufacturers have brought to a high state of efficiency as a receptacle for foods and a working place to prepare them. Some types of built-in "efficiency kitchens" are so complete as to include within a single furniture group the range, refrigerator and sink. They are often made of enameled steel and are sanitary as well as convenient and attractive.

Built-in closets for chinaware and cooking utensils are now considered indispensable; for depositing money and jewelry there are special burglar-proof safes. Dumbwaiters to carry loads from kitchen to basement or overhead dining room; package and milk receivers which permit the delivery of groceries and milk from outside at any time with protection against theft; built-in ironing boards, tables, chairs, etc., are items of equipment now more or less common, but the contemplation of which would have amazed grandmother.

The kitchen range, sink and refrigerator are, of course, most essential, and the homeowner of today may choose from a large and varied line. No improvements have had more beneficial results than those of the range. Gas and electricity have rendered the unbearably hot kitchen a thing of the past, and even the range using coal as fuel has been so improved that it is no longer objectionable. Gasoline ranges likewise have made a place for themselves on their merits.

Kitchen sinks of white enameled iron have displaced the tin-lined wooden affair. Those most commonly used are cast integral, with back and sink in one piece, roll rim in front and drainboard at one or both ends.

Some patterns are hung from the wall on strong brackets, and others have enameled iron legs, and sinks for special locations may be found in great variety. One very clever sink combination has a little revolving seat attached. Porcelain, marble and vitreous ware are used in the more expensive kinds.

A notable development is the increased consideration of refrigeration and the growing appreciation of the importance of that feature of home equipment. Intelligent housewives today will not tolerate the undersized, inconveniently arranged and heavy ice-consuming types of a few years ago. The refrigerator, being recognized as a vital part of the home, is selected with discriminating care as to the service it is expected to perform.

Inexpensive Garbage Burners

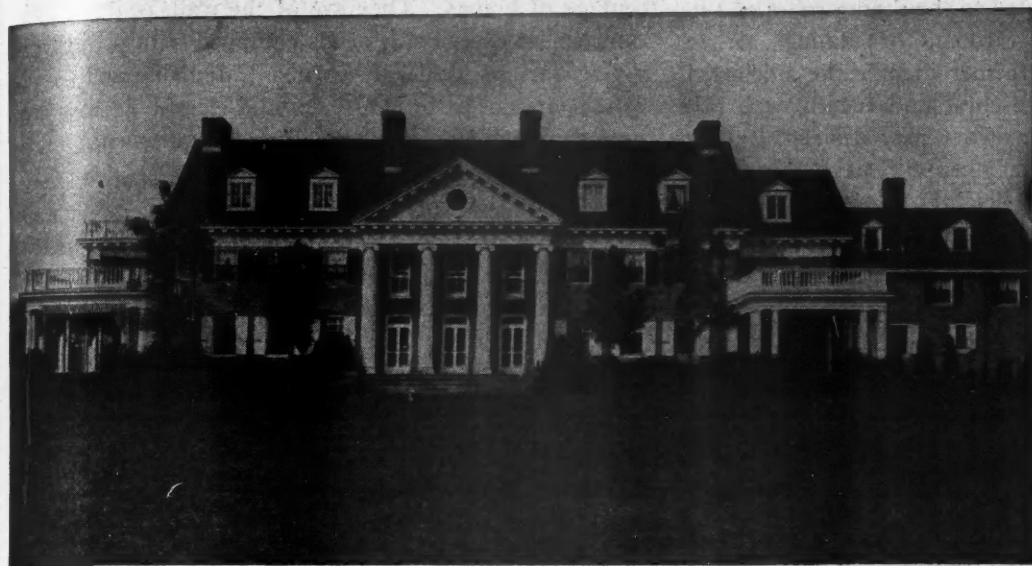
The outside icer is popular, while the use of the new "iceless" system, containing cooling machinery within the refrigerator, or with the cooling unit connected with an electrically operated ice-making machine in the basement, or in the base of the box, is increasing rapidly.

Incinerators (garbage and refuse burners) have been perfected and simplified so as to come within the means of the average homebuilder. These systems permit dumping of garbage or waste into a chimney through wall hoppers, it then falling to a combustion chamber in the basement, where it is burned naturally or by the use of gas or oil in equipment made for that purpose. A portable type has been developed that is especially adapted for kitchens, where it is installed near the kitchen range and uses the kitchen chimney for an outlet. A trapped water grease trap, usually placed under the kitchen sink, is another worthy innovation.

Many housewives prefer to have the water heater located in the kitchen instead of the basement. The "instantaneous" heater, one of the first gas-burning types developed, continues to be used in many houses throughout the country.

In the latest types are automatic devices for maintaining a constant supply of hot water without burning a full head of gas at all times. The mere opening of a faucet at any one of the water fixtures turns on the gas and heats the water. The automatic type is merely a development of the instantaneous heater, with the same principle of heat applied to brass, bronze or copper coils containing water, and connected to storage tank or hot water pipe.

Electrical devices for reducing labor in the kitchen are numerous, the most important being dishwashing machines, coffee percolators, hot plates, toasters, plate warmers and the like.



Residence of Louis Rozman Page, Villa Nova, Pa., Brockie & Hastings, Architects, another of the many fine homes equipped with a McCray Refrigerator.

Most Important of All in the Home

When you build a new home, the most important considerations of your client are comfort, convenience, health. Consider for a moment how much a McCray refrigerator enables your client really to enjoy his home. Also McCray equipped homes are easier to sell.

By keeping foods pure, wholesome and fresh, the McCray assures wholesome, palatable meals—protects the family's health—and does all this efficiently, economically, conveniently.

The McCray can be used, without change, with either ice or mechanical refrigeration. Outside icing features, originated by McCray, available if desired.

Not only in homes of the finest type, but in hotels, clubs, hospitals, florist shops, stores and markets, McCray is the recognized standard. McCray builds refrigerators for *all purposes*.

Send for our latest catalogs for your files. McCray builds to order to meet any requirement and will gladly cooperate with you in every way possible. *Free Blue Prints* of suggested equipment will be provided. Simply send a sketch of your client's requirements.

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LOOK FOR THE McCRAY NAME PLATE

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REFRIGERATORS

for all purposes



For Residences

For Hospitals

For Clubs, etc.

For Larger Institutions

The Dining Room

ATENTION, in both a practical and decorative way, has been devoted to the dining room and its offspring—the breakfast room, or dining alcove. Built-in features in the former include the sideboard, window seat with storage chest underneath, wall safe and such features as the owner may desire. Built-in table, chairs, buffet, flower boxes, etc., painted in dainty tints to contrast with the brightly colored tile or linoleum in the floor, distinguish the breakfast room. Casement windows and French doors add to the attractiveness of both rooms.

The Bathroom

ACLOSE second to the kitchen in the progress of improvement is the bathroom. All of the usual equipment has undergone changes in style and construction methods, and there have been added many accessories which provide comfort and convenience. In no branch of the home, in fact, has there been so extensive study devoted to sanitation, and modern bathroom plumbing has attained a high degree of scientific development.

Modern bathtubs have put to shame the clumsy, unsightly and hard-to-keep-clean affairs of the past. Bathtubs are made in such profusion that the owner who does not find what he wants in enameled iron, vitreous ware or porcelain tub is hard to please, indeed.

Most tubs are made in several styles, sloping on one end and straight on the other, with rolled rim and resting on short legs, or feet. The Roman tub, sloping on both ends, continues to be used, particularly with shower attachments. The built-in tub, located below the floor level or above the floor and having straight, tiled sides, and a new style without legs and with all sides and ends vertical, are gaining in popularity. Still another variation is the "combination," which is a regular, seat, shower, foot and child's tub in one.

Shower bath equipment also varies in principles of design. Some systems use concealed wall supply of water, others have pipes so arranged as to group the streams in various ways. Certain types with converging streams dispense with curtains, while others feature the curtains, particularly the manner in which they are supported. Some types use bathtubs; others require a special compartment with water escape through the floor.

The syphon water closet is rapidly displacing the unsanitary wash-down closet, which depends upon water force to flush it. Some types of the syphon have special ventilation features and seat-operated flush valve. The low water tank, of white enamel or mahogany finish, is usually preferred over the old-fashioned high tank. The mechanism of the tank interior has been much improved, and considerable attention has been given to closet seats, resulting in special shapes.

Pedestal lavatories are more attractive than those having wall hangers. Lavatories are made in every conceivable size and shape, with oval and round wash-

bowls in every degree of simplicity and luxury.

Drinking fountains are being installed in a large percentage of homes. They are of the wall, pedestal and cantonment types, with heads equipped with projectors giving various kinds of streams. Medicine and towel closets, special bathroom scales and electric heaters are now considered as regular bathroom equipment.

Many small built-in accessories, such as soap holders, tumbler holders, sponge holders, towel bars, safety wall grips and paper holders are made in materials to match the bathroom equipment and walls, and add to the convenience and luxurious appearance of the bathroom. Tile floors and walls are now recognized as most appropriate for bathrooms.

The Living Room

THE living room offers greater opportunities for built-in beautification than any other part of the house. Fireplaces, mantles, bookcases, benches, ledges and quaint little nooks, beamed ceilings, half-partitions with ornamental end-posts, panelled walls, French doors and artistic windows give unusual attractiveness. And while there has been notable progress in this part of the house, it must be admitted that some of the old-fashioned ideas have been retained because of their enduring charm. However, the ultra-ornate living room of the past appears decidedly garish when compared to the pleasing simplicity of the present.

Added utility is now often secured by installing disappearing furniture. The concealed bed, for instance, is much more desirably located in the living room than in the dining room, where it is sometimes placed. Modern gas and electric fireplaces, too, have taken the place of the old-fashioned log burner, and although not so picturesque they are more practical. Coal and wood burning fireplaces are still popular.

The Bed Room

THE modern bedroom is an example of compactness that rivals the modern kitchen in that respect. If one desires, he may have much of the furniture built-in, such as the wardrobe equipment, comprising hanging closets with shelf, hanger rod and shoe rack; dressing tables with front and side mirrors and disappearing chairs; tray cases having sliding and open-end trays of various sizes.

Stairs, clothes closets, telephone table and chair, writing desk, benches and radiator enclosures are up-to-date built-in features in reception halls.

The sun parlor is this age's contribution to home building design. Like the dining alcove, it is furnished artistically, containing flower boxes, special furniture to harmonize with colorful drapes and tile floor, French doors and casement windows.

RADICAL changes have taken place in the basement. From the gloomy, dirty place for dumping and storing all sorts of odds and ends in disorderly array, there has emerged the well-lighted, spic-and-

span, efficiently arranged and equipped "machine shop" of the home. The heating plant, garbage burner, laundry machines, refrigerating system and similar equipment now have a definite place in planning the modern house basement. Selection of such equipment is of absorbing interest to the prospective home-builder, and the outstanding development of the times is that he may secure just the kind of machine or device that best meets his requirements.

Heating systems are generally regarded as of first importance and are, therefore, considered under a special heading in this issue. It is fitting to here acknowledge, however, the remarkable progress made by manufacturers of warm air, steam, hot water and oil-burning heating systems, who have developed systems that not only give efficient service but are amenable to the size of the homebuilder's purse.

New Arrivals in Basements

New arrivals in the basement are the garbage burner and the refrigerating plant. These have been perfected in the past few years and are now functioning properly in a great number of modern homes.

Of the garbage burner, one popular system consists of a brick enlargement, in the basement, at the bottom of the regular chimney, into which is built a special arrangement of grates. The incinerator receives garbage and other refuse of all kinds through a hopper in the wall of the kitchen, and the waste thus deposited acts as its own fuel.

There are a number of systems of automatic electric "iceless" refrigeration specially designed for residences. By "automatic" is meant that when the air in the refrigerator becomes too warm, the cooling mechanism automatically starts to operate, and stops when the air is sufficiently cool. Some systems have the entire cooling unit built into the refrigerator, while in others only the refrigerating element is contained in the refrigerator, this being connected with the condensing element (motor, compressor, condensing coil) which is usually located in the basement.

Some systems include a specially designed cabinet (refrigerator), others can be installed in any refrigerator of standard make. The advantages of electric refrigerators are that the air is always dry and, therefore, more wholesome, and that the ice man, drip pan and all the dirt are eliminated. Refrigerator temperatures are normally about 40 degrees Fahrenheit, but in a special chamber for making ice for table use the temperature is low enough to freeze water placed in pans for that purpose. The cost of operating electric refrigerators is no greater than the sum usually spent for ice.

The water softener is an important modern improvement which can be installed in the basement and connected with the regular water supply. Its cost is small compared to its benefits. Water softening is a very simple matter. The water merely passes through a tank which contains zeolite, which is a hydrated sodium

aluminum silicate that looks like sand. When the zeolite has absorbed all the hardness it is able to hold, it is restored to its normal condition by submerging it for 24 hours in a strong solution of common salt.

Other basement equipment includes coal chutes, ash dumps of various types, hoists for lifting the ashes out of the basement, and such other items as the owner believes more properly belongs there—the work bench and tool chest, for instance.

While the laundry is located in the basement, it should be partitioned off as a special department. Clothes chute from kitchen, tubs, washing machines, ironing board and ironing machine, utility table and clothes dryer should be placed about the walls in such a way as to be most convenient and labor-saving.

Windows have undergone such improvement as to be properly classed as a home convenience, when the difficulty of operating the old-fashioned kind is considered. There are now available numerous types and sizes which are shipped from the factory ready to be installed in the building. These come in wood, rolled steel, solid steel and hollow metal, in double hung, casement, French and unit patterns. The main feature of development is the superiority of these manufactured windows. The principles of window designs have been little changed in several centuries.

Development in Home Lighting

ONE thinks first of the lighting system when considering the use of electricity in the home, although many electrically operated devices are now essential to comfort and convenience. Notable development has occurred in electric lighting, both in design and equipment. It was only a few years ago that we marveled at the yellow light given off by the 16-candle-power carbon filament bulb, which today is a feeble attempt at lighting when compared with the Mazda.

Lighting of a house must be studied carefully, and no rule of thumb can be laid down. The living room should be flooded with mellow illumination emitted from a central fixture and wall lights which shield the direct rays from the vision. Opaque indirect reflectors may be used throughout the house, in fact, except in those rooms where work is done. In the kitchen, pantry and cellar it is essential to provide direct lighting fixtures, so that light can be thrown down upon the working plane.

Electrical devices must be provided with baseboard outlets. In the kitchen there should be an outlet to which may be attached a motor for operating the coffee grinder, eggbeater, ice cream freezer, dish washer, etc.

Modern electrical devices for the dining room include the toaster, chafing dish, coffee percolator, egg boiler, etc. In the bathroom there are vibrators, hair driers, curling irons, shaving mugs, electric heaters, etc. In the living room, such electric apparatus as would be carried on a tea table, vacuum cleaners and electric fans, and—wonder of wonders—the radio.

(Continued from page 187.)

the investment pays is attested to by the growing popularity of the covered-driveway type of station.

Where the lot is large enough, it is often advisable to extend the covering so as to span two driveways, with the pumps on a concrete island between them. This arrangement permits quicker filling of cars in rush times, thus relieving the impatience of customers.

While it is true that only a small percentage of car owners leave their machines during filling, yet the covered driveway is justified by the protection, especially in bad weather, given to those who desire to get out to make a hasty inspection of their cars, to purchase other supplies in the station salesroom, or for any other purpose.

An important benefit of the covered driveway is its protection to the station employes, whose health is better safeguarded through reduced exposure to rain and snow. Thus it will be seen that the covered driveway is advantageous to both the owner and the customer of the filling station.

Should Be Permanent and Fireproof

Another important factor is that of substantial, fireproof construction. No builder or owner deems it wise to use inferior building materials—except, of course, for temporary structures or where the entire business possible to transact would not justify the usual investment.

Likewise, attractiveness without garish display should be the aim in designing the station. The good-looking filling station will draw trade, whereas the unsightly one will keep it away. Use of dark materials up to the window sill line, and lighter materials for the upper part, generally results in a pleasing exterior appearance. Decoration of the interior should not be overlooked, either.

Although a basement adds about one-fourth to the cost of the building, yet it is a good investment, as it provides a place for the air compressor, heating plant, storage of coal and general supplies and, oftentimes, the toilet. It is especially useful when housing the heating plant, as this arrangement results in the floor above being warmer.

Arrangement of Driveway

Broad driveways—at least 13 feet wide—containing no sharp turns, are required to take care of cars of all sizes. Where there are double driveways it is advisable to locate the pump stands on concrete islands between the driveways and under the covering, if there is one. Concrete and brick are the most suitable for paving of driveway. Loose materials are never to be recommended, as they create dust, which is not only a nuisance but soon mars the appearance of the entire place.

Gasoline storage tanks may be placed directly under the pumps, though the general practice is to locate them some distance away, not more than a hundred feet, so that when they are being filled the passageway will not be obstructed.

Aside from the pleasing results that may be obtained by the use of attractive building materials in the station proper, the general appearance may be greatly enhanced by installing ornamental light posts and curbing about the lot, and artistic arrangement of grass plots. The posts serve a double purpose as, surmounted by large light globes, they draw trade at night.

The total of construction work involved in automotive structures in the United States every year would, if complete statistics could be obtained, disclose an enormous investment. In 1923 such figures as could be gathered showed \$126,768,000 so invested. The difficulty of obtaining a complete and accurate record will be realized, however, hence the sum quoted falls short of the true amount.



Hotel Design and Equipment

(Continued from page 221.)

quite generally installed in sample rooms, so that salesmen or attendants may also use them as sleeping quarters, if desired. These rooms are usually required to be of a good size with plenty of daylight. They should be placed as near the service elevators as possible, on account of the large amount of samples and baggage to be transported to them.

It is the modern practice to keep the operation of hotel elevators as noiseless as possible. Rubber door stops lessen the noise of elevator doors and hair felt under carpets deadens the noise of traffic along corridors.

So extensively are mural paintings being used in the decoration of modern hotels and theatres that it may be said truthfully that our traveling citizens will acquire a liberal art education. For instance, the ballroom of the Los Angeles Biltmore is beautifully decorated with paintings and the main lobbies and dining rooms are gems of the decorative art.

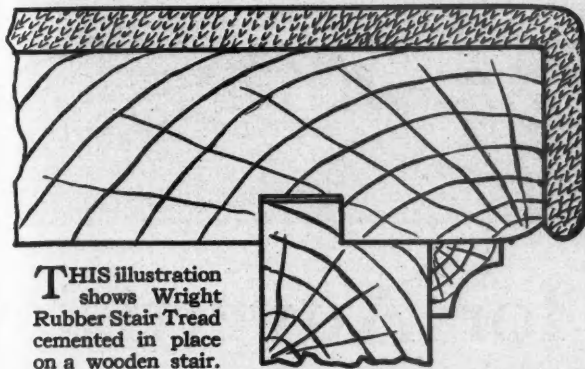
In the Della Robbia Room of the Hotel Vanderbilt, New York, the walls and columns are of tile of a fine Italian blue embellished with cream white faience. Large panels on the walls are painted and decorated, in slightly humorous vein, with tropical birds, foliage, fish and flowers.

The restaurant of the Ambassador has walls paneled in wood and finished in green and gold. The Palm Room of the Ritz-Carlton has walls of stone and a glass ceiling through which the light is thrown. The main restaurant of the Pennsylvania has walls of roughly finished plaster with the trim of the arched windows in decorated faience. The principal restaurant of the Biltmore has its walls in Umberta marble with pilasters.

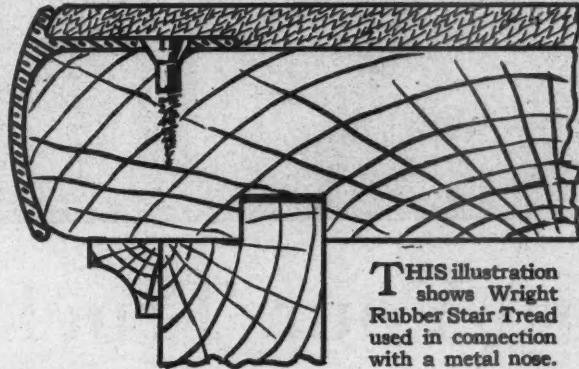
The \$4,000,000 Olympic Hotel in Seattle is built around three sides of a theatre beautifully decorated with paintings. Indeed it may be said that most large American hotels today are beautiful examples of decorative art.

Wright Rubber Stair Tread

Especially adapted for use in Factories, Hotels, Buildings, Stores, Apartments, Homes and anywhere that long wear and safety are desired.



THIS illustration shows Wright Rubber Stair Tread cemented in place on a wooden stair.



THIS illustration shows Wright Rubber Stair Tread used in connection with a metal nose.

Wright Rubber Stair Treads are a composition of rubber and other strong wear resisting materials. Tough and long-wearing, Wright Rubber Stair Treads will not splinter or chip and will not curl or warp. They wipe clean with a wet cloth or mop and are non-absorbent and non-staining. They are not slippery and are noiseless.

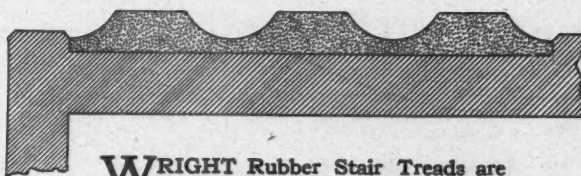
Wright Rubber Stair Treads can be used on either wood or concrete stairs and can be both cemented and nailed or bolted in place. It is not necessary to use expensive hardwood for stairs when Wright Rubber Stair Treads are used. Worn stairs may be evened up with rubber cement and sand before the Wright Treads are applied. Any carpenter can install them.



WRIGHT Rubber Stair Treads are molded to fit the contour of the stair. They are made in 18 inch and 3 foot 6 inch lengths.



WRIGHT Rubber Tile may be had in either plain or corrugated surface. The illustration above shows corrugated tread cemented in place on a metal stair.



WRIGHT Rubber Stair Treads are made in strips to be used with metal, terrazzo or marble recesses.

Wright Rubber Stair Treads may be had in large variety of colors—as plain, mottled or grained effects to match surroundings can be quickly made to order. All colors permeate the entire thickness of Wright Rubber Stair Treads and will appear just as distinct and fresh after years of service as on the day they were installed.

Wright Rubber Stair Treads are ideal for use in Factories, Stores, Hotels, Apartments, Homes, Depots, Theatres, Churches and Buildings where long wear, beauty and safety are desired. Our guarantee covers first-class workmanship, wear and color permanency.

Wright Rubber Stair Treads are made in standard lengths of 18 inches and 3 foot 6 inches—12 inches wide.

Upon request, we will send samples and complete information concerning these long-wearing—noiseless, non-slippery stair treads to Architects, Contractors and Dealers. Write for this material for your files today.

WRIGHT RUBBER PRODUCTS CO.

Dept. A. B. 6

Racine, Wisconsin

Manufacturers of the famous Wright Rubber Floor Tile

The Rubber Tile with the interlapping nailing flaps.



MOTOR TRUCKS *and* TRAILERS



Use Your Truck for Advertising

Contractors and Material Dealers Should Take Advantage of Possibilities of Their Motor Vehicles to Get Business

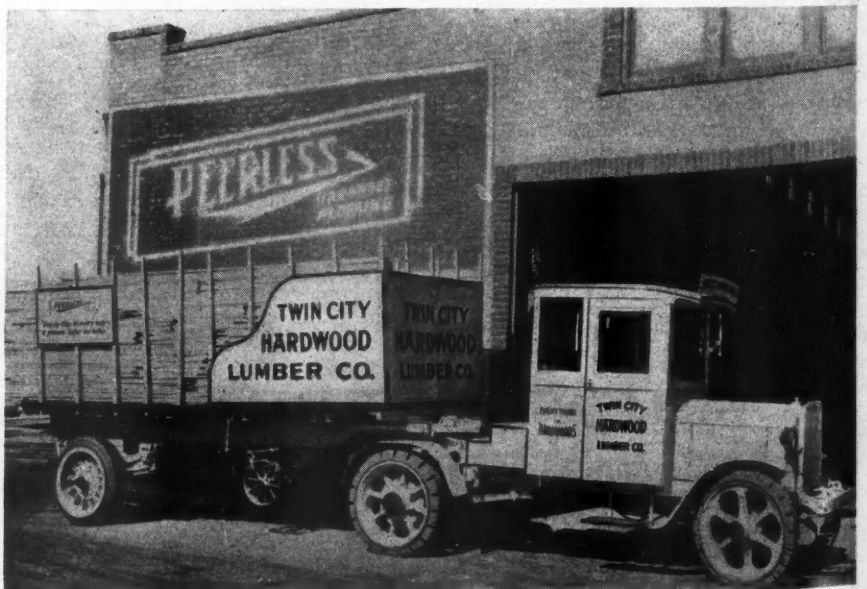
RECENT tendencies in the use of trucks in various lines of business to make these trucks advertise their owners have been so noticeable and generally successful that it is well worth noting that here is an opportunity the building contractor cannot afford to neglect. What can he do to take full advantage of the advertising possibilities of his truck? How can he make his trucks so striking in appearance that they will attract attention as they appear on the street or so neat and attractive that they will create a favorable impression toward the concern whose name appears on them?

By far the most desirable opportunity offered to the builder is cashing in on the advertising value of his truck equipment is that of distinctive and attractive lettering upon the vehicle's body. There are two distinct schools of opinion in regard to the style of treatment such painting and lettering should receive. Both have their advantages for individual purposes. On the one hand some concerns prefer to use novelty effects with colors that "clash" in order to attract attention. Some even go so far as to create a "freak" combination of colors which will create a distinctive originality for the concern. Usually, however, such attempts have been more nearly confined to fancy arrangements of color, with possibly an illustration to impress some particular selling point in conjunction with the concern's other advertising. On the other hand, another school opinion favors ex-

treme conservatism in the use of simple, dignified and characteristic lettering which serves alone to build a character and prestige for the company.

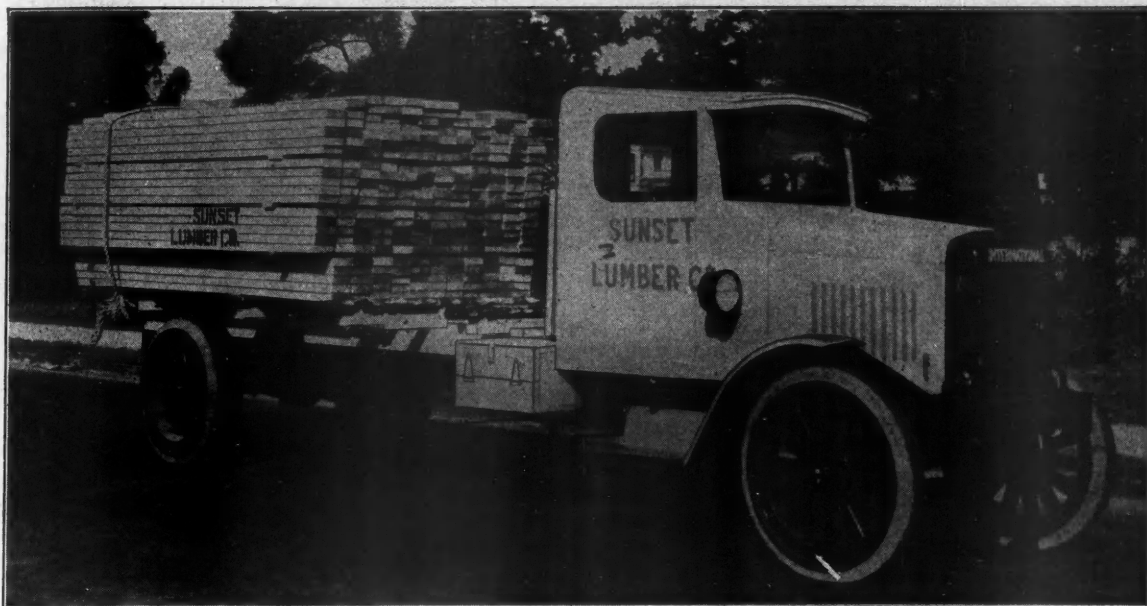
Yet no matter how the individual builder may look upon such advertising, these brief suggestions will prove interesting:

1. As in all other advertising, in order to create interest, the subject must first get attention. Therefore, it is extremely advisable to get away from the commonplace, either in one direction or another. It is usually not enough to merely say that "we will put the firm name, address and telephone number on the body along with a few words to describe our service," and leave the arrangement and color scheme up to the



This Firm Has Made an Advertising Asset of the Truck Shown. Notice how the firm name is displayed and emphasized through repetition. The black lettering stands out well on the white background. The truck also carries the trademark of one of the lines sold. The telephone number is lacking.

An International Motor Truck, Model 63—6000 lbs. Max. Cap.—Serving the Building Industry.



The Choice of Leaders!

GREAT business enterprises study and compare all trucks down to the last detail. The size of their transportation investment makes it imperative that they buy wisely and with a cautious eye to the future.

Such corporations are buying International Motor Trucks in increasing numbers. Not only at the start, but when they buy more trucks they repeat on Internationals. That is the most convincing evidence for the average buyer.

Building and road contractors, transportation companies, public service companies, oil corporations, leading packers, municipalities, retailers, wholesalers—all conceivable lines of industry requiring modern hauling equipment—are served daily by International fleets running up to hundreds of trucks in the service of one user.

International Speed Trucks are built to carry loads up to 2000 pounds. Heavy-Duty Internationals are built in 3000, 4000, 6000, and 10,000-pound maximum capacities. Suitable bodies for every business. Busses are furnished in a variety of chassis and styles of bodies to meet every passenger transportation need.

See these trucks at one of our more than 100 branch houses, or at a dealer's place of business, or write the address given here.

A Few Well-Known Users

The good work of 21 Internationals owned by the **CHICAGO TRIBUNE** resulted in the purchase of 28 Internationals by **THE NEWS** — New York's Picture Newspaper.

BLUE VALLEY CREAMERY CO.

producers of the famous Blue Valley Dairy Products, now have a fleet of 45 Internationals.

BRINK'S EXPRESS CO.

largest operator of armored trucks for transporting money, owns 61 Internationals.

AMERICAN TELEPHONE & TELEGRAPH CO.

FLEISCHMANN'S YEAST CO. and the

SHERWIN-WILLIAMS CO.

are owners of International fleets. Hundreds of Internationals are in the service of **ARMOUR & CO.**, **CUDAHY PACKING CO.**, and other packers.

INTERNATIONAL HARVESTER COMPANY

of America

606 So. Michigan Ave. (Incorporated)

Chicago, Illinois

INTERNATIONAL HARVESTER TRUCKS COMPANY

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

painter. Careful thought should be given to the phrasing and arrangement in each case, in order to provide the most desirable and advertising appeal and in order to best reflect the character of the business. Once having found a good arrangement, it should be used for all trucks in the builder's service.

2. There is much to be said in favor of the adoption of a distinctive "trade mark" or slogan, or both, and the prominent display of this upon the truck. By the association of ideas, expressed either in an appropriate illustrative trade mark or a few well chosen words, it has been found that most effective "selling talk" can be put across in the public mind.

3. The builder's name, address and phone number deserve a prominent place upon the body design. Many concerns have expressed the opinion that they obtain a substantial amount of business by giving good display to the firm name so that it will be easily recalled or easily recognized.

4. Good painting and lettering is always justifiable and this fact is borne out by the experience those who have

always insisted upon it. A cheap job will invariably look cheap and will reflect an unfavorable impression.

5. Experience has shown that a definite system should be established for keeping up the vehicle's appearance. By careful attention to the following four points, the builder will not only keep his trucks in attractive appearance, but he will be assured of obtaining the greatest possible economy in doing this.

(a). Insistence upon good painting and lettering in the first place.

(b). Frequent, complete washing and polishing.

(c). Revarnishing just as soon as the original paint shows the slightest signs of losing its original attractiveness.

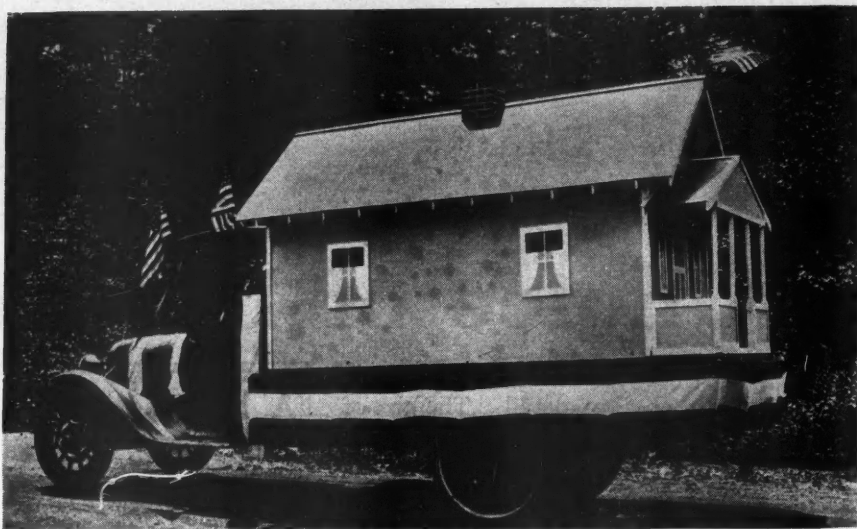
(d). Complete repainting at intervals of from 15,000 to 25,000 miles, according to severity of service and method of care. The old paint should be entirely removed and the vehicle repainted entirely. This not only gives a better appearance than "painting over," but it will endure through a much longer period of service.

How to Avoid Oil Pumping and Detrimental Carbon Formation

1. Use nothing but the highest quality of oil, the body and character exactly suited to your engines in average service.

2. Fill the crankcase carefully to the *proper level daily*. Do not overfill. Overfilling may cause over-oiling and carbon formation.

3. If our instructions on maintenance are carried out, you can expect many thousands of miles service before appreciable cylinder wall and piston wear takes place. When such wear does occur, have cylinder block reground and oversize pistons fitted.



Selling the Home Building Idea Through an Attractive Miniature Home Mounted on a Truck Was the Idea of the Latham Brothers Lumber Company, Port Washington, Long Island, N. Y. Port Washington is a place much used by those seeking summer residences and the type of cottage mounted on the float was picked with the idea of promoting buildings of the sort which meet the requirements of the summer residents. The truck, which, as pictured here, is decorated especially for a parade, is used regularly in the daily business of the firm.

Do not attempt to compensate for wear by using a heavier bodied oil. This indiscriminate use of heavy bodied lubricants is a most frequent cause of fouling spark plugs—sticking valves—prolific carbon formation—and "carbon knocks" or "detonation." Avoid it.

4. Do not shift to a heavier bodied oil in order to increase the oil pressure. If

the oil pressure gradually falls off, the most likely cause is badly worn bearings, permitting excessive bleed. You cannot correct this with a heavier oil. Attempts of this nature to bolster up the oil pressure lead to excessive carbon formation. If the oil pressure is not what it should be, investigate and find out the cause and correct that; do not disturb the adjustment of the relief valve or go to a heavier bodied oil.

5. When bearings are tightened be sure that the shims as well as the bearings themselves are properly fitted to the crankpin. Poor shim fits are responsible for many complaints of low oil pressure, oil pumping and carbon formation.

6. Be sure that the carburetor is properly adjusted. You cannot expect the flame of combustion to burn cleanly the oil reaching the combustion chamber if the mixture is so rich that there is not enough air to consume all the fuel. With a rich mixture, carbon forms from the incomplete combustion of both oil and gasoline.

7. "Missing" promotes both oil pumping and carbon formation. Therefore, keep the ignition system clean and in perfect adjustment.



Knocked 40 Feet By Trolley Broken Spring—Only Damage

That is what happened to one of the nine 5-ton Garfords shown above, owned by The Nelson Brothers, Quincy, Massachusetts, when loaded with four tons of lumber.

The runaway trolley car was traveling at top speed down a hill and struck the Garford on the extreme right of the bumper. The impact completely demolished the trolley car and knocked the Garford forty feet.

Much to the surprise of those who witnessed the collision the two occupants of

the Garford, protected by the closed cab, were not even scratched.

The truck itself after the wreckage of lumber had been cleared away, and a careful investigation made, was not harmed beyond one broken spring.

The stability displayed by this one truck is built into every Garford. It means not only greater safety, but longer service and lower hauling costs as well.

WRITE today for further particulars.

The Garford Motor Truck Company, Lima, Ohio

Manufacturers of Motor Trucks, 1 to 7½ tons.

GARFORD

DEPENDABLE TRANSPORTATION

Keen Interest in Heating Systems

The Efficiency of a Plant May Easily Effect a Fuel Economy Equal to Its First Cost in Hot Air, Hot Water and Steam Installations

MAN first became distinguished from the lower animals by his use of fire. The four-footed ones were all afraid of it—shunned it—perhaps in memory of great forest fires when all life was forced to flee or perish.

The North American Indian artificially induced fire from friction—by the prolonged rubbing of dry sticks. It is likely that all aborigines produced fire in this manner until the time—probably in the Stone Age—when sparks were produced by the striking together of flints. Thus, early in the history of man, bonfires in the open, or at the mouths of caves, became general.

Fire worship is supposed to have originated with Zoroaster, who flourished about 1000 B. C. The ceremonial of a public or private hearth was practiced by all Aryan peoples, by all ancient Greek communities, by the vestal virgins of Rome and in each ancient Greek and Roman family.

Probably the first fire container was the brazier. It is not a great step from the brazier to the salamander, which has survived and is today used by workmen in cold weather indoor construction. The fire on the hearth, however, if not the first, was, at least, the simplest heating plant.

There is something exceptionally cheery about the fireplace, probably because it furnishes light as well as heat and it is fascinating to watch the leap of the flames. The fireplace is still popular in many modern homes.

First Stove Was the Franklin

The year 1844 saw the introduction of the old Franklin stove and, for years, wood was the only fuel in general use. With the introduction of coal for fuel, however, many new types of cooking and heating stoves came into general use. Then followed improved types of heating plants—the hot air furnace, the steam and hot water boiler, vacuum or vapor heat, hot blast heating, central station heating and the air blast oil burner.

The hot air furnace is a cast iron heating unit enclosed in sheet metal to form a warm air space around it with vents above, to allow the heat to circulate through the house. A downtake is necessary of ample size to take the cold air off the floors back to the furnace for reheating. Warm air pipes are usually insulated by covering with asbestos paper. It is also a good plan to use some form of insulation around the furnace itself.

The pipeless furnace has been a great success for small homes or houses where there are no obstructions to the circulation of air from room to room. There is one large central register in the floor over the furnace. This is divided into com-

partments—the inner for the ascending hot air and the outer for the descending cool air. Thus there are no pipes to install.

One important feature of the hot air furnace is the ventilation afforded by the constant air circulation. Water compartments in the furnace itself should be large enough to thoroughly moisten the air.

Heat is a form of energy and reaches us in several ways—by radiation, from the sun or open fire; by conduction, or travel along a conductor; by convection, or the movement of heated particles of gas or liquid. Thus, convection is the underlying principle of heating by the circulation of hot air, steam or hot water.

Radiation Should Be Carefully Figured

The term radiation is used to describe the exposed metal surfaces of radiator coils or pipes. With both steam and hot water heating systems the amount of radiation required properly to heat a building should be figured by a heating engineer, contractor or architect. It should never be guessed at but figured out according to formula.

The insulation of the boiler and pipes is particularly important in either system. Asbestos cement is generally used on the boiler. There are many good brands of prepared pipe insulation, the main materials being magnesia, mineral wool and asbestos.

The vertical type of boiler is universally used for domestic and small installations—the horizontal type for the larger buildings. It is important, in selecting a boiler, to make sure that it has sufficient rated capacity for the amount of radiation in the entire system.

Cast iron sectional radiators are generally used, although pressed steel radiators of lighter construction are somewhat lower in first cost. In order to supply sufficient humidity in the air, some form of water container, or moistener, should be used on the radiators. Radiator covers of art metal are valuable for this purpose and also protect walls and decorations from dust.

The formation of air pockets in pipes or radiators, due to condensation, expansion or contraction, impair the efficiency of steam or hot water plants. Care should be taken to secure the best automatic air valves for each radiator.

The hot blast form of heating is frequently used in buildings where both heating and ventilation are desired or where it is not advisable to obstruct the floor space with radiators or piping. In this type of heating plant, a propellor fan blows the air over steam coils through ducts, the inlets and outlets usually placed seven or eight feet above the floor. Suction

"GMC Trucks Are Seven Steps Ahead"



A Power-Speed Combination That Only GMC Provides

Through the now famous Two-Range Transmission, with which all GMC trucks of two-ton capacity and over are equipped, GMC is able to provide the power-speed combination essential in a builder's truck. No ground is too heavy for GMC to travel provided there is traction for the wheels—and on good roads GMC speed assures prompt, rapid service between the yard and the job.

GMC trucks offer unsurpassed efficiency in every field of hauling service. When extra power is necessary to move an exceptionally heavy load or where grades and heavy going call for an extra pull, GMC can supply the surplus necessary. On long trips and on good roads when time is a deciding factor, GMC can travel just as fast as

is safe for a truck of its size and weight. And, with these profit-building advantages, GMC combines an economy of operation and maintenance that enables GMC to work under conditions impossible to other trucks.

If you are a truck owner or if you are interested in hauling and delivery of any sort, you will want to read about GMC design and construction and a detailed description of GMC special features. A free, illustrated booklet on these has been prepared and this with the GMC catalog will tell you a great deal more about these profit-making trucks. Fill in and mail the coupon today.

GENERAL MOTORS TRUCK COMPANY
Division of General Motors Corporation
PONTIAC, MICHIGAN

General Motors Trucks



Mail This Today

General Motors Truck Co.,
 Dept. 9,
 Pontiac, Michigan

Please send me GMC literature including GMC catalogue and booklet "Seven Steps Ahead."

Name
 Business
 Address

fans remove the cool air through the outlets. In this system fresh air may be taken from outside the building and heated before being blown into the rooms, thus providing superior ventilation.

The vacuum system of heating is very economical where exhaust steam is available from a power plant. This steam has not sufficient pressure to adequately heat a long line of piping and radiators. It is, therefore, customary to install at the power house end an automatic device which sucks the steam and condensation through the radiators and back through the return, as contrasted with the gravity system where the return is by gravity. There are also vapor systems of heating for homes which utilize steam at pressures as low as eight ounces and require special traps to keep water out of the radiators. They are said to be economical of fuel. Effective combinations of hot air and hot water heating in one plant have been devised which are also economical.

Central station heat is in successful operation in some localities but must be confined to restricted areas and the charge is somewhat high. However, it is extremely convenient, affording instant heat at the turn of a valve without firing of any kind. The water from the condensation is metered at each building as it enters the return pipe and charge is based on the quantity of this water.

Economy from Thermostatic Control

One of the most modern luxuries which is, at the same time, an economy, is the heat regulating device. There are a number of these on the market, practically all based on the thermostatic principle. The thermostat on the wall can be set to maintain any desired temperature. This promotes comfort, avoids overheating and waste of fuel. Most thermostats are operated by the difference in the heat-conducting properties of two metals. When the contraction or expansion reaches the desired point, an electric circuit is closed which operates draft or damper, as the case may be. The less expensive installations have a spring motor to furnish power, which must be wound up daily.

One great convenience of the thermostat for the householder is that a clock attachment governs the operation so that the temperature of the house may be raised or lowered automatically at any given time. Thus, cool temperatures and fresh air from outside may be enjoyed during the sleeping hours but at any desired hour the drafts may be turned on without the necessity of early rising.

In those sections of the country where cheap hydroelectric power is available, electrical heating for homes has a wide and increasing vogue. In addition to its use in glow logs and portable radiant heaters, it is also used in convection heaters and sometimes electrical heating units are put into the fire pots of ordinary boilers and furnaces.

A novel form of steam and hot water heating is

now on the market especially adapted for small homes, the boiler being compact, designed and finished for installation in one of the living rooms. Boiler, piping and radiators can all be on one floor and still operate efficiently. These installations can be made at very moderate cost and provide efficient heating at a surprisingly low cost.

One of the latest developments for domestic heating is the air blast oil heater controlled by a thermostat. This can be installed in any hot air furnace, steam or hot water plant and heats the house automatically without firing or attention.

Gas Fired Boilers and Furnaces

In those sections of the country where natural gas is available, it has long been used as a fuel for heating and power. With the frequent advances in the price of coal, the public is turning to the use of oil and gas and avoiding the dirt of coal, dust and ashes in homes. Gas, artificially produced, is now being used in larger volume in connection with hot air, hot water and steam heating systems.

Special forms of furnaces and boilers are required to get efficient heat return from the gas consumed. In practically all of the gas heating devices now on the market, air is mixed with the gas before reaching the burners, producing a Bunsen flame. Long fire and heat travel, with frequent baffles, are used to extract the maximum amount of heat before passing up the chimney. Gas and the products of combustion are kept separate from the warm air circulation in hot air furnaces, in order to keep the gas fumes from reaching the living rooms.

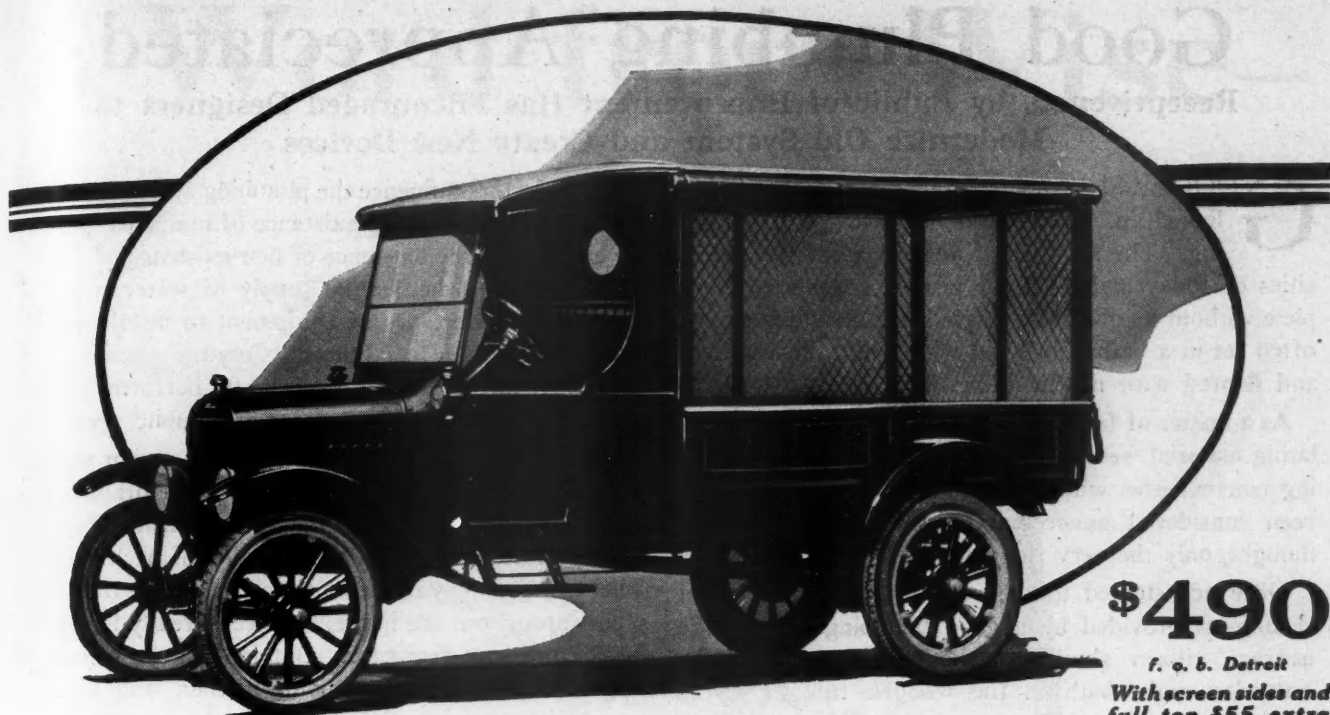
Thermostatic control is now generally installed in connection with gas fired boilers and furnaces, for comfort and economy.

Public service companies in many large cities are now making special low rates for gas consumed in heating boilers and furnaces; for instance, 60 cents for the first 400 cubic feet; 95 cents per 1,000 for the next 2,600 cubic feet, and 75 cents per 1,000 for all over 3,000 cubic feet.

Separate Heating Units

Both gas-steam and electric-steam radiators have been devised, each of which is a separate heating unit without connection to a boiler. Gas logs for fireplaces, as well as gas and oil stoves for cooking and heating, have been in use for some time. The electric range and cooker are a more modern development and are meeting with much favor.

Indoor comfort—relaxation, cheerfulness, health—are all dependent on good heating equipment when the thermometer outside ranges between 65 degrees and sub-zero. Consequently, the selection of a good heating plant is of prime importance and the public is displaying a keen interest in this selection now that fuels are so high in price. An efficient heating plant well adapted to its requirements is sure to return its cost in fuel economies.



\$490

f. o. b. Detroit

With screen sides and full top \$55 extra

Why Ford is the Overwhelming Choice in the One-Ton Field

No more striking evidence of the high regard of truck operators for Ford performance and economy can be offered than the fact that 78% of all trucks in the one-ton class are Fords.

Only outstanding proof of exceptional value could have brought this dominant preference.

Only by demonstrating the utmost dependability and proving its ability to save under any and all conditions could this Ford One-Ton Truck have gained and held the good will

of so many operators year after year.

Lowest in cost, easiest to handle and simplest to maintain the Ford worm-drive Truck is the standard light-delivery unit of American business.

This all-purpose rapid-delivery unit is adaptable to all seasons and conditions of travel, and to the economical haulage of a wide variety of products.

Over 33,000 Authorized Ford Service Stations assure quick, easily available service everywhere.

See the Nearest Authorized Ford Dealer

Ford

CARS · TRUCKS · TRACTORS

Good Plumbing Appreciated

Receptiveness by Public of Improvement Has Encouraged Designers to Modernize Old System and Create New Devices

GOOD health, happiness and comfort are closely linked, in American homes, with good plumbing. The luxuries of yesterday are the necessities of today and no home is now considered complete without its glistening white bath tub and lavatory, often set in a bathroom lined with white tile wainscot and floored with mosaic tiling.

As a matter of fact, the American people are accumulating material wealth rapidly enough to justify adopting conveniences which a generation ago would have been considered unnecessary, or which, it was then thought, only the very rich could afford.

Once accustomed to the comfort, convenience and cleanliness provided by a good plumbing system, the average citizen shudders when he remembers the Saturday night bath in the wooden tub set up in the kitchen near the range, and the morning ablution made agonizing by use of the tin pan at the hand pump on the back porch. Yes, the modern plumbing system may increase the economic burden to some extent, but the alacrity with which plumbing improvements have been accepted proves conclusively that the wooden tub and tin pan are abolished forever as bathing paraphernalia.

Great Refinement in Fittings

Plumbing systems were in use 50 years ago, but the crude, simple hand-wrought equipment bears but little resemblance to the accurately made fittings of today. Open plumbing, the continuous venting principle and modern traps were unknown to our grandfathers.

Progress is further illustrated by the advent of pressure regulators, sewage ejectors, cellar drainers, pumping machinery, automatic hot water heaters, pneumatic water storage tanks, water softening and filtration plants, sewage disposal plants, as well as the remarkable improvements that have taken place in the design and manufacture of bathroom equipment.

In contemplation of the rather extensive array of perfected plumbing equipment and devices, the prospective homebuilder may ask: "What must I look for in selecting my plumbing system?" The answer is: "Simplicity and efficiency. Plan the room arrangement so as to avoid unnecessary piping and connections, and choose fixtures which adequately serve the purpose for which they were designed."

An efficient plumbing system is not necessarily complicated, but there are certain "don'ts" which must be observed in the interest of sanitation. The best advice to those who are studying plumbing systems is to group the fixtures as closely as possible to the main vertical soil pipe, thus shortening the waste lines, which secures greater sanitation and cuts down the cost.

Three factors influence the plumbing system, namely: (1) the existence or non-existence of municipal plumbing codes; (2) the existence or non-existence of a public sewer; (3) whether the supply of water is public or private. The types of equipment to install will be governed by these conditions. Country plumbing, of course, requires certain devices to perform service equivalent to that of city water and public sewer.

The drainage system, consisting of the main vertical pipe extending from the horizontal house-drain in the cellar up through the roof, has been considerably improved in design through the adoption of back venting. The water supply system, which parallels the drain pipes throughout the house, has been greatly benefitted by the pressure regulator. But it is in the connected apparatus, such as bathroom, kitchen and laundry equipment, that the most spectacular progress has been made.

Bathrooms Made Attractive

The bathroom, in particular, has been rendered one of the most sanitary and attractive rooms in the house. The siphon-jet or converging-jet closet with local venting, and the facilities for bathing offered by the modern tub or shower bath have brought about a wonderful transformation.

In discussing the equipment of the modern plumbing system in the average small home, let us begin at the bathroom, which is located, for example, on the second floor. Say that it is furnished with bath tub, shower bath attachment, lavatory and water closet. The more pretentious residence may include the child's bath, sitz bath, bidet, foot bath, urinal and drinking fountain. All of this equipment may be obtained in porcelain, enameled iron or steel, or vitreous ware, and in profusion of sizes and styles.

Probably the most attractive bathroom would consist of built-in, tile-lined, legless bathtub with straight, vertical sides, either sunken in the floor or resting directly upon it; hexagonal pedestal lavatory with oval slab containing oval washbowl; water closet with mahogany finished or white enameled seat and low flush tank to match.

The walls and floor should be tiled, or faced with one of the composition or special materials now manufactured for that purpose; and as it is the "little touches" that count in beautification, there should be wall-contained soap and paper holders, porcelain towel racks, valve turns, etc., to harmonize with the general appearance of the other fixtures.

Growing appreciation of the shower bath is due to the recognition of its hygienic features. Running water has a stimulating effect, due to the impact of the

A Word from Wise—

WISE'S GARAGE
 FORD SALES AND SERVICE
 GLENN WISE, PROPRIETOR
 AUTOMOBILES ACCESSORIES
 FORDSON TRACTORS TRACTOR MACHINERY
 LANARK, ILLINOIS 2/6/24.

Mr. H. H. Tuck,
 Chicago, Ill.

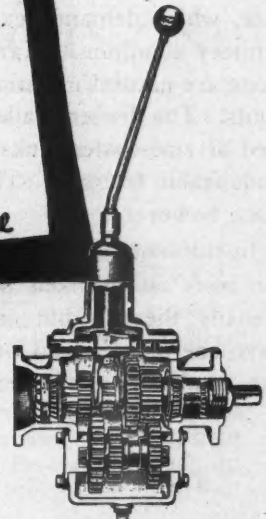
Dear Tuck;-

Replying to yours of the 1st. inst. regarding the performance of Warford equipped ford trucks.

Only the dealer who is located in community where there is yellow clay roads will appreciate the following story. Last spring we were delivering Fordsons on our warford equipped service truck so all the shop men were familiar with this powerful unit. A local horse buyer drove in and made the statement that there was no car made that could travel the roads in present condition. An argument followed which resulted in my employee's pooling their money and making a \$50.00 wager that they could drive to a designated farm three miles in the country in three hours. The result was they drove to the farm, called the office by phone and was back in town in 1hr and 10 minutes. The gentlemen who made the bet started to follow them with a team was about a mile out of town when they met him on their way back.

You can rest assured that we think a lot of the warford because it enabled us to deliver tractors, machinery, and oil to our country trade in the spring when the mud was axle deep and other cars could not navigate the roads.

Glenn Wise



You may depend upon Warford for two ton hauling at one ton cost.

Ask your Ford dealer or write us.

Warford

AUXILIARY TRANSMISSION

The Warford Corporation 44 Whitehall Street, New York City

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

water jets upon the body. The most desirable system involves a specially walled compartment, though in homes where this would be considered too expensive there may be installed certain types of wall fixtures, for use with or without curtains, that give very satisfactory results.

The Much Used Sink

Kitchen plumbing is exemplified by that most important functionary of household equipment—the kitchen sink. Little difficulty should be experienced in connecting it to the main soil and vent pipes, though the present tendency to locate the kitchen sink under a window complicates the process somewhat, and increases the cost. As the sink is so much in use and demands so much hot water, preference in the matter of such supply should be given this fixture above all others.

Probably no item of household equipment is produced in a wider range of patterns. Enameled iron or steel, with rolled rim, are nowadays used most extensively, though some sinks have uncoated or black surface, which demands extraordinary care to keep in a sanitary condition. Marble, porcelain, slate and soapstone are natural materials used in the more expensive kinds. The denser grades are non-absorbent. Galvanized or zinc-coated sinks are still used, but have many undesirable features. They are often installed in pantries, however.

In the most common design of enameled metal sink the back and sunken portion are cast in one piece. Usually there is but one drain board, though some have one at each end of the sink. Other styles have the combination of kitchen sink and wash tub, and

sinks for special locations are also made in great variety. Grease traps are sometimes installed on the floor underneath the sink.

Domestic Refrigerator Drains

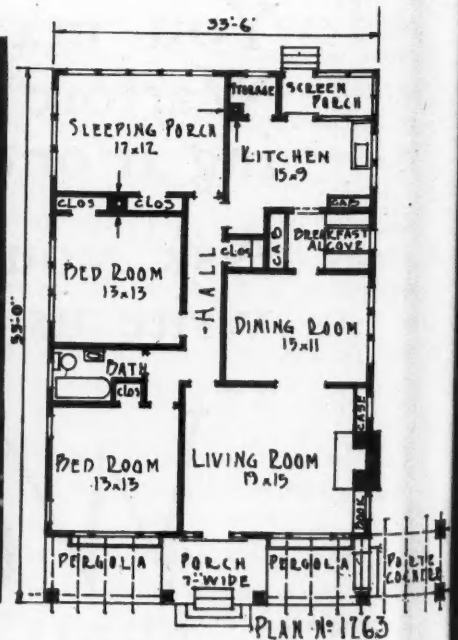
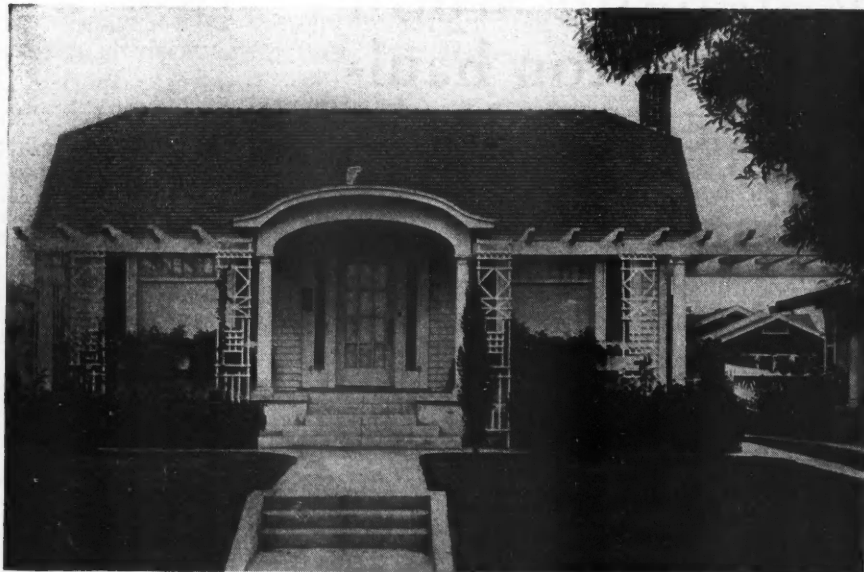
Under no circumstances should the refrigerator connect directly with the house drainage system. The safest way to carry away refrigerator waste is to pipe it to the laundry tub or floor drain in the basement. An S-bend in the pipe directly under the refrigerator, and another in the waste pipe under the laundry tub of floor drain, constitute sufficient water seal against the escape of sewer gas into the refrigerator. Electric dishwashers are connected in the same way as the kitchen sink.

Plumbing finds multiple uses in the basement. Not only does the heating plant, the water heater, laundry tubs, basement water closet, water softener and floor drain of the city house require drainage but in the country home such added equipment as the entire water supply system and the sewage disposal plant are dependent upon good plumbing.

There is nothing complicated about the supply of water to the house heating plant or the water heater.

Laundry tubs are much like kitchen sinks in construction and use. It is good practice to locate tubs as near the house drain as possible, as a short waste pipe has greater tendency to clean itself. This applies, also, to the floor drain and the basement water closet.

An important factor in plumbing is the insulation of pipes to prevent freezing or retain heat. This subject is discussed in detail in another chapter in this issue.



An Unusually Attractive Bungalow. Through the courtesy of the Southern Pine Association we are presenting one of the bungalows its Home Service Department has made popular. One reason for the popularity of this design is that it encompasses an extraordinary amount of usual space in a home approximately 33 feet by 46 feet in size. There are three fine bedrooms, one being a large room almost entirely enclosed in glass and may be called a "sleeping porch" or sun room. This little home can be built on a comparatively narrow lot and still leave ample space for a driveway. The front of the house appears much wider than it really is because of the artistic manner in which the pergola has been designed.



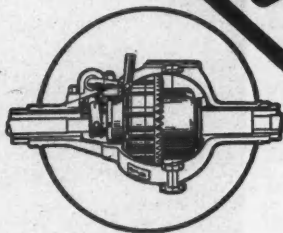
Save \$1000 Per Year Per Truck

60% More Power

—and have nearly 30% MORE SPEED if you need it. The RUCKSTELL AXLE is not an auxiliary transmission —not an “accessory” or “part”.

Speed and Power in One

Contractors,, Roadmen Farmers, Draymen, Merchants, Jobbers, Manufacturers — regardless what business you are in, you can save remarkable money and simplify your hauling by using so-called



“light” trucks with Ruckstell Axles. For inspection work, salesmen’s use, cross-country touring or regular city driving, a light car, Ruckstell equipped delivers astounding performance.

Make Your Truck TWO-IN-ONE

by installing the famous Ruckstell Axle. This wonderful invention is revolutionizing the performance of light cars and trucks and saving contractors big money, month after month and year after year.

Now—for the first time, it is possible to combine POWER and SPEED in ONE. 60% more power transforms a light truck into a regular giant.

Haul practically double load capacity—go through heavy muddy roads, up steep hills. Wiggle in and out of narrow alleys—pull up to any loading dock, etc., etc.

RUCKSTELL AXLE

Mail this Coupon

See your nearest dealer in light cars and trucks. Ask him to demonstrate the Ruckstell 2-Speed Axle and show you how it becomes an integral part of the truck or car when installed. Or, write us for Free Booklet giving full information, prices, etc.

Send Booklet on Ruckstell Axle Two-Purpose Performance and show how we can save \$1,000 per year per truck over equipment we are now using. (38-A)

Ruckstell Sales & Mfg. Co.

Desk 38-A

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San Francisco, Cal.

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Name.....

Address.....

Character of Work.....

Fitting the House to the Lot

Taylor & Bonta, Architects, Plan an Attractive Six Room House for a Lot of Triangular Shape and Irregular Contour

By HARRIET S. GILLESPIE

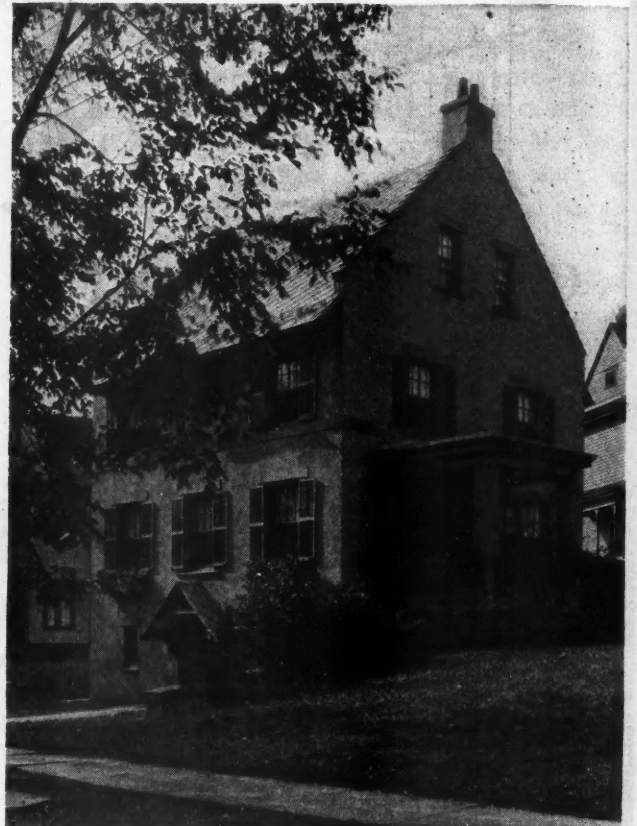
DESIGNING a small house to fit a normal sized or shaped lot presents few of the problems that confront the architect when the proposition is hedged about with annoying limitations such as Taylor & Bonta, architects, of Syracuse, N. Y., contended when called upon to design a six-room house on a small lot of irregular shape. The lot was not only triangular in shape, but part of it was on a lower level than the property on the avenue which it adjoined. While it had a frontage of 50 feet on the side street, it ran to the apex of the triangle at the rear. Since it was impossible to get the necessary ground area, the architects had to build up in order to get room for the living quarters. They dropped the red tile

roof over the second tier windows to overcome the appearance of height in the main facade and repeated the idea in the hooded entrance.

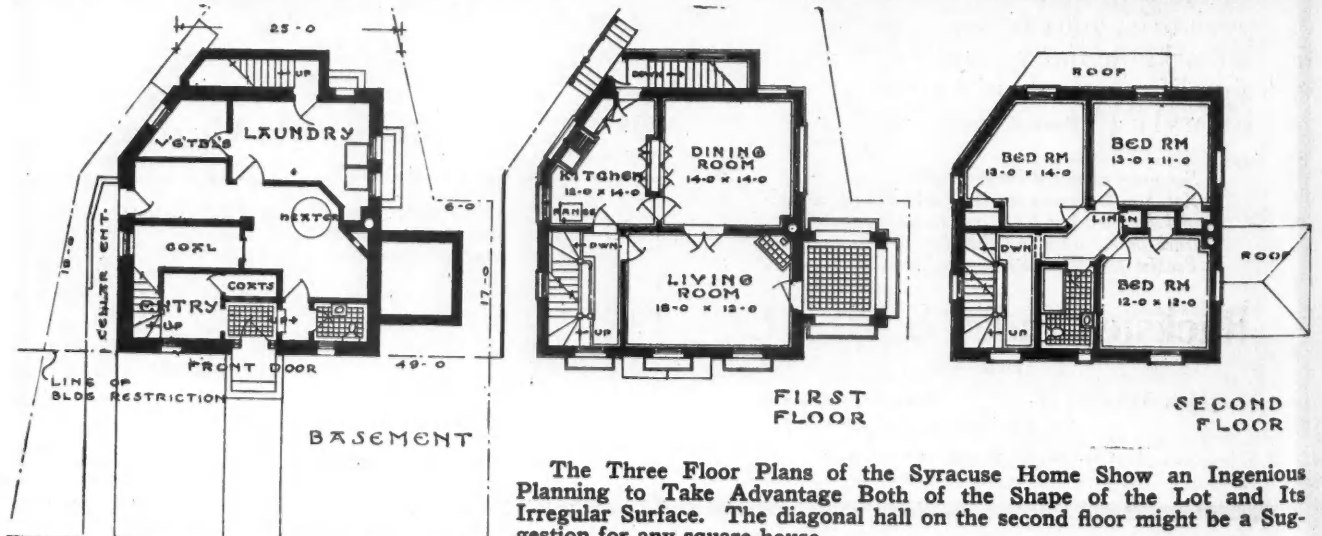
Two steps down, through the hooded doorway, access is had to a small entry from which the stairs rise to the upper floors by two easy turns and two steps ascend to the basement.



The Hooded Doorway, "Two Steps Down" Is a Novel Feature of this Home.



The Combination of Stucco with Brick Trim Gives the House an Attractiveness Despite the Unusual Proportions.



The Three Floor Plans of the Syracuse Home Show an Ingenious Planning to Take Advantage Both of the Shape of the Lot and Its Irregular Surface. The diagonal hall on the second floor might be a Suggestion for any square house.

New Designs in Hardware

Ornamentation and Improved Construction Developed in Past Half Century—Special Items for Present Needs

PROTECTION, convenience and decoration are uses of builders' hardware which require consideration on every building job. In most structures one of these factors, at least, is deemed of greater importance than the others, although none should be neglected. All items of builders' hardware now give such efficient service that many builders are prone to devote too little attention to the selection of it.

In addition to its utility, builders' hardware should be chosen to harmonize with the character of the building into which it is placed. Manufacturers have, in recent years, produced hardware that is designed and executed with archaeological accuracy for any style of home. Considering the simplicity of escutcheon plates, knobs, handles, hinges, etc., the wealth and profusion of designs applied to them are truly wonderful.

Locks—Ancient and Modern

This is the contribution of builders' hardware makers to the progress of home building. Their accomplishments can be better appreciated by comparison of the builders' hardware of today with that of a generation ago. Locks and keys, for example, have been used since the early ages, but not until about sixty years ago was there notable improvement in their design, construction or ornamentation.

Locks are, perhaps, the oldest form of builders' hardware. The first ones were made of wood, some requiring keys three feet long. In the ruins of Nineveh were found some wooden specimens, although the early Egyptians used brass and iron—crudely wrought but, nevertheless, serving the purposes of their day.

To Linus Yale, Jr., son of the noted bank lock manufacturer, is due the credit for inventing a lock which really afforded protection. This was the first cylinder lock, manufacture of which was begun in 1868. A few years later (about 1876) interest in metal ornamentation was given effective impetus.

America has made greater progress in lock making than has Europe. Casting of metals and use of machinery bring manufacturing costs much lower here than in the older countries, where hand methods were persisted in until recently. Compression of bronze was developed in 1872, and with the discovery of the rust-retarding process the builders' hardware industry went forward at a rapid rate. The flat, corrugated key was devised in 1882 and the paracentric key in 1892. Mortised door locks were first used in 1890.

The master-keying system merits careful consideration. The convenience of having a single key which will pass all important openings, such as the entrance doors, basement, garage, etc., is well worth the investment in such locks. Master-keying has been in use for a number of years in hotels, and is rapidly spreading to residences of all classes.

Certain devices have appeared on the market which give such a high degree of service as to place them in the realm of standard equipment. These include electric door openers, door checks and holders, noiseless and invisible lifters, casement window adjusters, garage sash, wall safes and coal chutes.

Of all the subordinate elements of interior decoration there is none which offers a larger opportunity for effective results and for the exercise of personal taste than the metal work for doors and windows.

Efficiency in Garage Doors

Rapid increase in the use of automobiles has brought garage building to an important place in construction activity. It has been truly stated that the garage door is the most important item of the garage, and the efficiency of the door is, of course, dependent upon the way it is supported. Manufacturers of garage door equipment have risen to the occasion by producing types of hangers that not only permit ease of operation, but their cost is quite reasonable.



Practical Pick-Ups

By H. H. SIEGEL

SMALL buildings, such as residences, etc., can be leveled up with a hand-level as easily as with a leveling instrument. Take a lime barrel, or any kind of a stand will do; pivot the level on a small block, and when the level is lined up with the point that you want, take a feather-edged wedge and slip under the level toward the low end. When your hand-level is level, sight over the top, and indicate to the target holder by the usual signals, which way to move the target. After you have the first point, repeat the operation as often as necessary to level up the whole building.

A SIMPLE way to figure the number of studding required for the walls and partitions of a building, from the blue prints, is as follows:

For example, take a plan with a $\frac{1}{4}$ -inch scale; with a rule measure all of the walls and partitions, in inches, shown on the blue prints. Then multiply the number of inches by three and add one for every intersection, and you will have the number of studding required.

The explanation is simple: every inch of drawing represents a distance of 4 feet—4 feet, spacing the studding at 16 inches o. c. will require 3 studding, plus an extra one for every intersection.

The same principle can be applied where the scale is $\frac{1}{8}$ -inch; simply multiply by 6 instead of 3. If the scale is smaller or larger than the two mentioned, the process is the same, of course the multiplier must be kept in the right proportion.

FEBRISCO

Welded Solid

STEEL BASEMENT SASH

The Ideal Basement Sash

Eleven Definite and Conclusive Reasons:

1. 60% to 80% more daylight than a wood sash and frame for the same opening in the wall.
2. Will not rot, warp, bind or shrink.
3. Cannot be broken, material having a minimum thickness of $\frac{1}{8}$ ".
4. Weather-tight and vermin-proof.
5. Neat and attractive in appearance.
6. Cost less set in the wall than a wood sash or frame.
7. Set by the mason, no carpenter being needed.
8. Can be installed in brick, veneer, stucco, masonry, cement block, tile or poured concrete walls.
9. Anchor permanently into the basement wall.
10. No hinges, catches or locks to be attached.
11. Made in standard glass sizes.

2-Light Febrisco Basement Sash installed in concrete block wall.

3-Light Febrisco Basement Sash installed in brick veneer wall.



SKYLIGHTS

WELDED SOLID STEEL

FOR USE wherever overhead light and ventilation is required.

Strong, permanent, weatherproof.

One operator works either one or both leaves.

Made with or without ventilators.

FEDERAL

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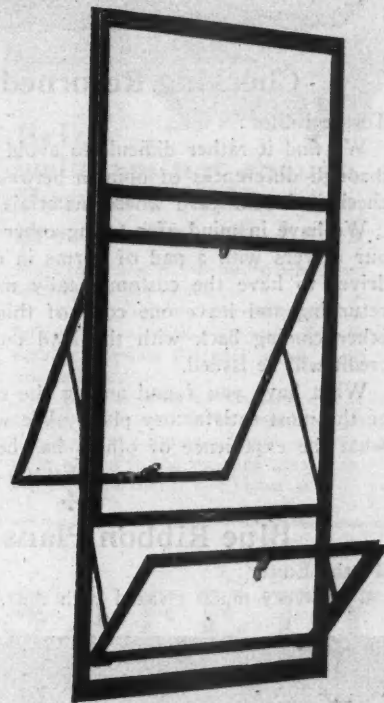
STEEL SASH

Industrial

Our sash offer the utmost in strength, rigidity and appearance. Febrisco sash are all solid steel, with all joints electrically welded assuring users a permanently satisfactory window. Made in standard sizes with large range of ventilator types. Our catalog explains them all.

Architectural

A high-grade steel sash with all the advantages of electrically welded joints, designed for use in schools, libraries, apartments, hotels or in other public or semi-public buildings.



NO BETTER SASH CAN BE MADE

SOLID STEEL STORE FRONTS

There is today a big demand for Solid Steel Store Fronts right in your locality.

FEBRISCO Welded Solid Steel Store Fronts offer the advantages of the more expensive types at a very considerably less cost.

BUILDERS

Do you know the advantages of handling FEBRISCO Solid Steel Sash? For absolute satisfaction to your clients and yourself there is no better sash than FEBRISCO and we want to tell you all about the adaptability, strength, efficient operation and good looks of our sash. Write us now and we'll send you our



A Typical Installation. Febrisco Solid Steel Store Front

Beautiful New Catalog Free

EL SASH
SHA WISCONSIN

COMPANY

CORRESPONDENCE

Questions Answered—Ideas Exchanged

Checking Returned Materials

To the Editor:

Syracuse, N. Y.

We find it rather difficult to avoid customer dissatisfaction through differences of opinion between the customer and the checkers in our yard where materials are returned for credit.

We have in mind after trying other things the equipping of our drivers with a pad of forms in duplicate instructing our driver to have the customer tally materials which they are returning and leave one copy of this memo. with them, the other coming back with the load on the strength of which credit will be issued.

What have you found among the retail yards and mills to be the most satisfactory plan? We would be pleased to hear what the experience of others has been along this line.

WILSON & GREENE LUMBER CO.

Blue Ribbon Plans Approved

To the Editor:

Oakland, Cal.

I am very much pleased with the AMERICAN BUILDER since

it put in the new up-to-date home designs. Why do so many papers and magazines have only one style homes? One would think that all they built in the East were Dutch Colonial and the variations of clapboard homes.

I have finished building nearly two hundred homes in Maxwell Park, a local subdivision. They sold very rapidly and for several months our sales averaged one a day. It pays to keep designs up to date.

OSCAR L. BURRICK.

How Far Back Does Your File Run?

To the Editor:

New Canton, Ill.

I am sending a snapshot of one corner of the Old Man's office. The upper shelf holds a five years' accumulation of the AMERICAN BUILDER, *Farm Mechanics* and the *Cement World*. Radford's Cyclopaedia of Construction, Estimating and Contracting, Steel Square, Cement and How to Use and Portfolio of Plans show on the lower shelf. The file contains a wagon load of catalogs and samples. Yours for a big year.

RAYMOND MINTON.

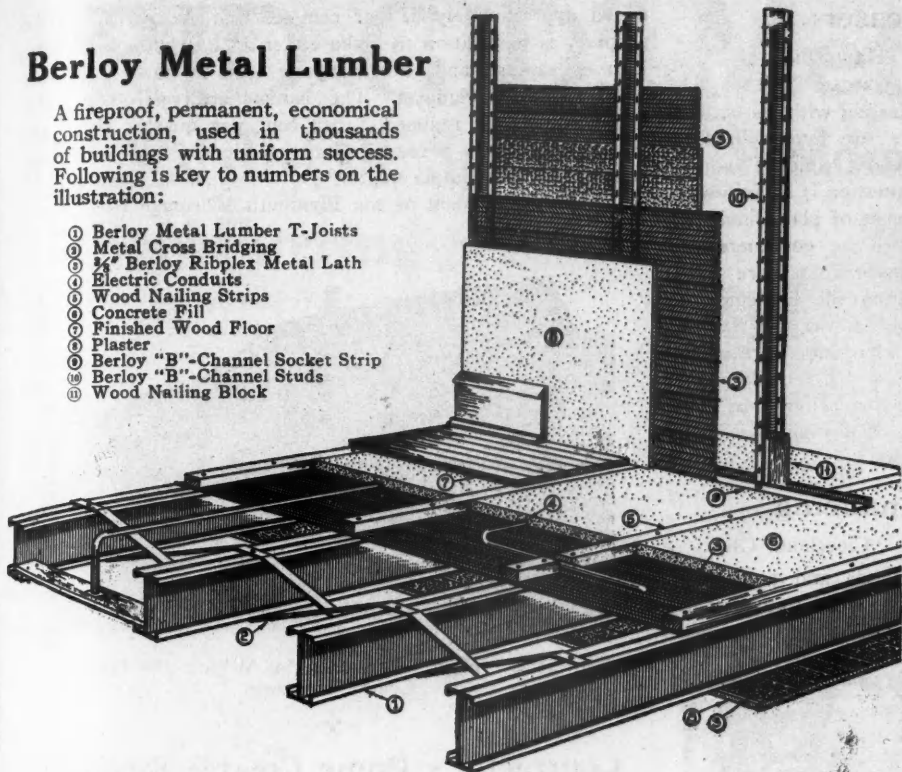


Every Copy of the American Builder Published Within the Past Five Years Is in the Files of Raymond Minton, New Canton, Ill., Contractor. He has a Radford Building Cyclopaedia and other instructional works ready for reference and his files are full of catalogs.

Berloy Metal Lumber

A fireproof, permanent, economical construction, used in thousands of buildings with uniform success. Following is key to numbers on the illustration:

- ① Berloy Metal Lumber T-Joists
- ② Metal Cross Bridging
- ③ 3/8" Berloy Ribplex Metal Lath
- ④ Electric Conduits
- ⑤ Wood Nailing Strips
- ⑥ Concrete Fill
- ⑦ Finished Wood Floor
- ⑧ Plaster
- ⑨ Berloy "B"-Channel Socket Strip
- ⑩ Berloy "B"-Channel Studs
- ⑪ Wood Nailing Block



Brick walls are not enough, Furnace walls, too, are made of brick

More than ninety fires out of a hundred originate on the interior. In view of this fact it would seem that far too little attention has been given to making interiors fireproof or at least fire-resistive. This page tells about fire-safe interior constructions that have been used in thousands of buildings. These constructions also give the building greatly increased permanence and value.

THE WAY TO FIRE SAFETY

Berloy 3/8" Ribplex



Metal Lath with ribs 3/8" high spaced 8" on centers. Ideal for all straight away lath work.

Diamond Mesh Lath



Essential for ornamental furring and other formed lath work. Excellent for all lath purposes.

Berloy 3/4" Ribplex



For work requiring heavier, stiffer reinforcement. Ribs are 3/4" high spaced 4.8" on centers.

Our nearest sales office will gladly give you full information on the Berloy line of Metal Laths for use in any form of lath work as well as with Metal Lumber.

Fire losses continue to mount

In spite of propaganda against carelessness. In spite of efficient fire departments. In spite of brick and stucco walls. In spite of metal or other unburnable roofs our fire losses continue to mount.

One building burns to every four built

This is an average, over ten years. Architects! Contractors! Building Owners, why? Let's face this thing squarely. What is the fundamental weakness? What should we do to save our buildings?

We must stop providing available fuel

It is not an uncommon thing for a building to be a mass of flame within ten minutes after a fire starts. Fire departments have no chance to save the building. Inmates often fail to escape with their lives.

Most fires originate on the interior

Ninety-six percent of all fires are said to originate inside the building. Carelessness, overheated furnaces, defective wiring, and dozens of other causes of fires cannot be controlled. Fires will continue to start. Interiors should be made fire resistive by protecting burnable material, or, better still, fireproof throughout.

Ideal fire-safe interior constructions

Berloy Metal Lumber provides an economical fireproof interior construction. The Underwriters' Laboratories have given an official rating of one hour to wood frame partitions and ceilings protected by plaster on Metal Lath. Our nearest office will gladly give you full information on these materials. Ask for Metal Lumber Bulletin L-3 or Lath Folder F-3.

THE BERGER MFG. CO.

Canton, O., Boston, New York, Philadelphia, Chicago, St. Louis, Kansas City, Minneapolis, San Francisco, Los Angeles, Dallas, Roanoke, Jacksonville

Export Department: 512 W. 25th Street, New York, N. Y., U. S. A.

BERLOY

METAL LUMBER—RIBPLEX—METAL LATH

Here's a Brain Teaser

To the Editor:

Hauppauge, N. Y.

For many years I have read the *AMERICAN BUILDER*, in which time I have seen many problems dealing with roofs, but few concerning floors, which, of course, are much simpler. I have come across one floor problem about which I would like some ideas from the readers. The question is as follows:

A jobber was sent to a house with a piece of plain linoleum to cover the floor of one room. When he got there he found that the room contained one square foot more than the piece of linoleum he had. By cutting the linoleum he found that he gained the extra foot. What was the size of the room, the size of the linoleum and what cuts were made in the piece?

I should greatly appreciate any suggestions offered by our readers.

RICHARD BRUSH.

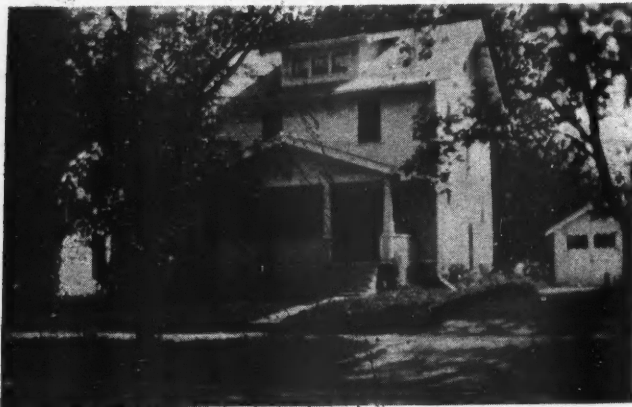


Second Mortgage Financing

To the Editor:

Cleveland, Ohio.

I am sending you some of the methods and points of finance utilized by the Plymouth Mortgage Bond Company in handling second mortgages on real estate properties. We



H. R. Dunnette, Rochester, Minn., Builder, Sold This "Job" by Demonstrating His Own Home to His Client.

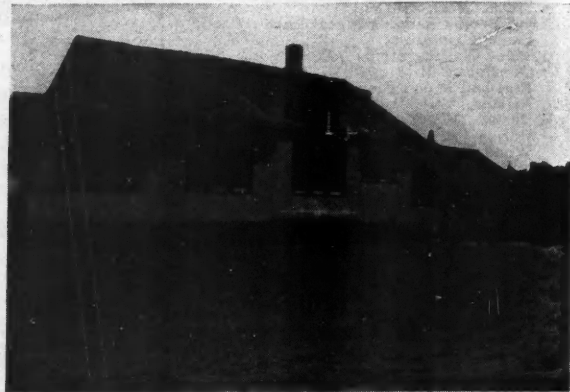
purchase these mortgages, as outlined in the February number of the *AMERICAN BUILDER*, at a discount based on a return of 10 per cent yield to the investor. We allow 3 per cent for sales expenses and charge 2 per cent for guaranteeing interest and principal and approximately 1 per cent per year for collection. Our special mortgage is a six-year mortgage payable at the rate of 1 per cent per month on principal plus 7 per cent interest quarterly. The interest is computed on the amount due at the beginning of each quarter and payable on the last day of each quarter. This mortgage would be purchased at a discount of 20 per cent, rediscounting to the customer \$93.56 per \$1,000, at which discount the customer received 10 per cent on his money. This leaves us with a profit of \$56.35 to pay the collection charge over a period of six years.

At the end of six years the monthly payments will have reduced the original loan 72 per cent, leaving a balance of \$280 per \$1,000 to be refinanced. The building and loan associations require monthly payments of 1 per cent per month which includes interest. At the end of six years this has been re-

duced approximately 37 per cent so that the owner of the property is in position to make either an insurance loan, bank loan or savings and loan company loan to cover both first and second mortgages. The banks locally required first mortgages to be reduced 1 per cent per quarter so at the end of six years a bank loan is reduced 24 per cent and refinancing is a simple matter.

A. E. CORNELL,

Vice-President of the Plymouth Mortgage Bond Co.



The Home of H. R. Dunnette, Which He Uses to Create Business.



Contractor's Home Creates Business

To the Editor:

Rochester, Minn.

I am enclosing two small pictures of houses that I have built this last summer. I drew the plans for these houses as I do for most all I build. The one story house I drew the plans for last winter, and built the house for myself, and that drew the attention of two more customers who wanted homes, and with a little talk, and my own house to demonstrate to them, I got two more just like it.

This is a stucco house, but the picture enclosed does not show it the way it should look, but I will have some more in the near future and will mail you one at this time, as I consider it a neat looking house, and reasonable in cost, as it can be built in this locality for approximately \$3,700.00 complete, including heating, plumbing, and sidewalks.

The two-story house costs approximately \$4,500.00, as it is all hardwood finish on the first floor.

H. R. DUNNETTE



The Attractive Shingle Covered Frame House Shown Here Was Designed by E. Crawford, of Walla Walla, Wash.

"RID-GID" Metal Lath

for W-I-D-E-R Spacing of Studding

Self-Furring

EVERY feature essential to any Metal Lath job has been designed into RID-GID. It is a means to faster work at less cost—and a permanently satisfactory job every time.



Steelcrete Corner Beads and Channels

Used in fireproof construction; a help to good work on every Metal Lath job. Ask your building supply dealer for these handy Steelcrete Accessories.

*Save
with RID-GID*

MODERN construction demands the most modern materials—Metal Lath, for instance. And in Metal Lath, what can equal RID-GID?

This master Metal Lath has 30% greater strength with no added weight. It is the best assurance of permanent perfection in all plaster and stucco work.

RID-GID extra strength permits wider spacing of studding—an economy that is obvious. The bigger the job the greater this saving. Remember, RID-GID is Self-Furring, too!

Its strength and ready adaptability make RID-GID particularly suited for suspended ceilings, for coves, for use over door ways and windows. Where rigidity is essential always use RID-GID.

Weighs no more, costs no more than ordinary metal lath. Saves most, pays you best. Send for bulletin on RID-GID Metal Lath.

Furnished in standard sizes and standard bundles. Sold by leading building supply dealers.



Steelcrete Rib Lath

A DIAMOND mesh Metal Lath designed for the severest use. Solid ribs, spaced 4.8", give stiffness and strength.

The wide strand takes plaster easily, quickly and without waste. The inter-locked ribs fit snug and neat, require less attaching to supports, save time in installing.

Supports can be spaced greater distances where Steelcrete Rib Lath is used. It means a real saving in material.

Furnished in three weights—3, 3½ and 4 lbs. per sq. yd. Sheets 24" wide (c-c of outside ribs) x 96" long. 9 sheets (16 sq. yds.) to a bundle. Sold by leading building supply dealers. Send for Steelcrete Rib Lath bulletin.

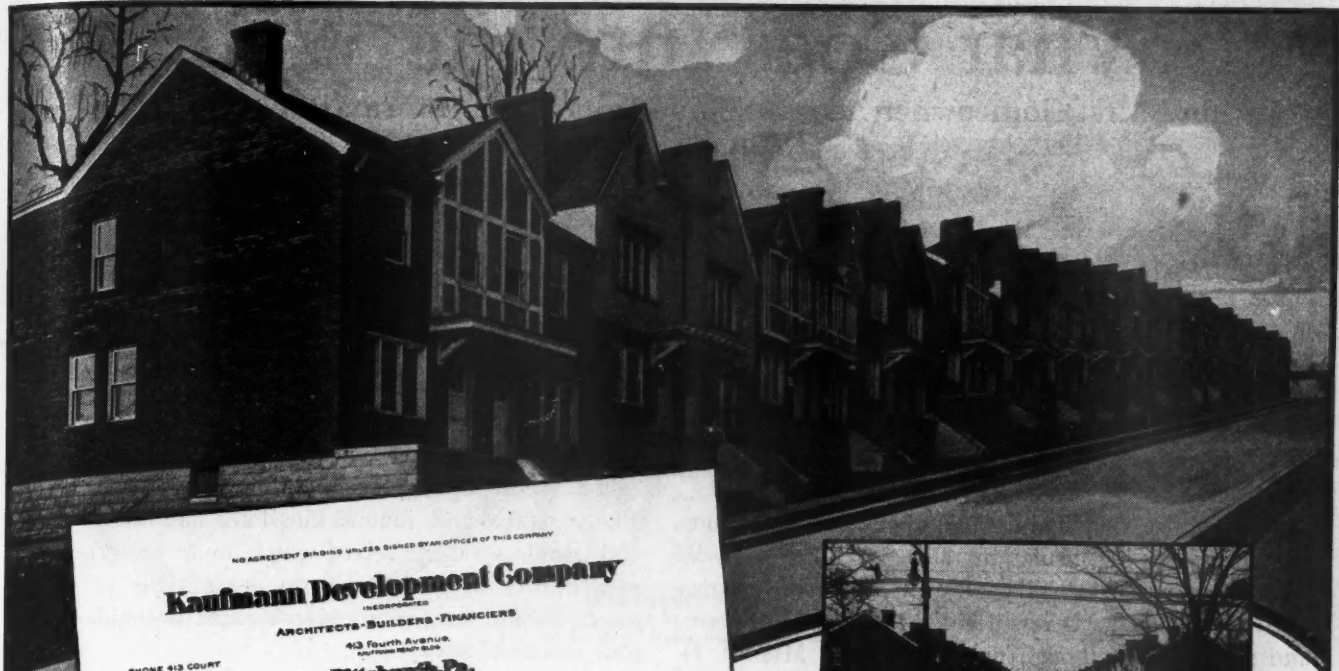
The Consolidated Expanded Metal Companies

BRADDOCK, PA.

PITTSBURGH: Oliver Bldg.
PHILADELPHIA: 1075 Germantown Ave.
CHICAGO: 1234 W. Washington Blvd.
NEW YORK: 103 Park Ave.



CLEVELAND: 450 Leader News Bldg.
DETROIT: Majestic Bldg.
MINNEAPOLIS: Builders Exchange



NO AGREEMENT BINDING UNLESS SIGNED BY AN OFFICER OF THIS COMPANY

Kaufmann Development Company
INCORPORATED
 ARCHITECTS-BUILDERS-FINANCIERS
 413 Fourth Avenue
 Pittsburgh, Pa.
 PHONE 413 COURT

Jan. 30th 1924.

Detroit Steel Products Co.,
 2260 E. Grand Blvd.,
 Detroit, Mich.

Gentlemen:

We are so well satisfied with the Fenestra Basement Windows which we purchased from you and installed in the ninety-six houses which are now nearing completion here in Pittsburgh, that we thought you would like to know of our satisfaction.

The fear that I had that the cost would be greater than with the use of wooden frames and sash was incorrect, and upon completion, we find that the cost was no more in using your steel windows, than the installation of wood.

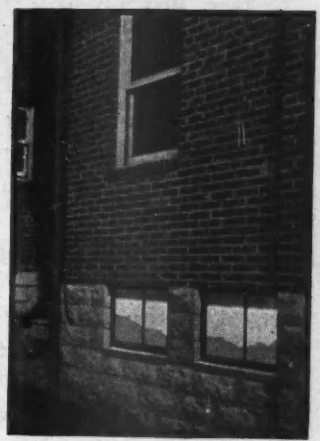
We have made every effort to have these houses as modern as possible in every respect, and we feel that by using Fenestra Windows in the basement, we have been enabled to carry out this idea to the fullest extent.

We are so fully convinced as to the desirability of your window, that we are now specifying same in all the houses that we are now contemplating starting.

Very truly yours,
 KAUFMANN DEVELOPMENT COMPANY
W. Kaufmann
 Pres.



The Kaufmann development includes 96 houses in this block, every one equipped with Fenestra Basement Windows.



Section of one of the houses illustrated above, showing the Fenestra installation.

Fenestra Helped Modernize These 96 Houses

The Kaufmann Development Company, Pittsburgh, Pa., used Fenestra Basement Windows to make these 96 houses more modern, more useful, and so more salable. Fenestra windows admit 80% more light,

they make the whole basement usable and attractive—they add 80% more basement to the houses you build. Builders everywhere are finding that "Fenestra-equipped" is a big selling argument. Write for literature.

DETROIT STEEL PRODUCTS COMPANY

B-2260 E. Grand Boulevard, DETROIT, MICH.

Fenestra

BASEMENT WINDOWS

Fenestra

The name of the ORIGINAL steel WindowWall.

The symbol of superior QUALITY in material, patented design, workmanship and service.

What Goes Into the Wall?

Mr. and Mrs. Homeowner Acquire Some Important Information About Plaster Bases, Insulation and Wallboard

MR AND MRS. PROSPECTIVE HOMEOWNER had determined to build. Indeed, the lot had been purchased and the type of house selected. In it was to be incorporated all of those labor-saving conveniences which had been so diligently thought out. Furthermore, after having carefully thumbed the pages of the large, attractive building magazine which the architect had loaned them, they had come to appreciate the wisdom of building properly.

For instance, they had learned of the additional comfort provided by insulation, also that this material actually reduces coal bills. By all means their house must be insulated. It was decided to have wood frame and stucco walls, though neither Mr. nor Mrs. P. H. could explain this preference, since brick, concrete, tile and lumber all seemed to have high merit. A choice simply had to be made, however, so wood frame and stucco it happened to be.

Thereupon ensued an absorbing investigation of materials. They had not imagined so many kinds existed; but having begun the task, concluded to seek out the main characteristics of each type, beginning at the exterior coating of the wall and continuing through to the interior finish.

Stuccos they found to be composed of portland cement or magnesite. Many attractive finishes, some by the use of colored mineral chips, could be secured with both stucco materials.

There was a surprising variety of stucco bases. All efficient, no doubt, and yet so different. Some even served as the insulating material as well as for the stucco key. At least five general types were featured in the magazine.

One of these was shown to be constructed of heavy asphalt-saturated felt with galvanized steel wires woven through it. Another consisted of dovetail wood strips embedded in toughened asphalt mastic on a background of fibre insulation board, thus providing a stucco key and insulation in one material. Still another was constructed entirely of fibre, so shaped as to form a plaster key resembling lath, and serving as insulation-sheathing, all in one unit.

Metal lath was presented in two general classifications—expanded metal and wire fabric—both coming in various weights. There were several patterns of the former, including square and diamond mesh, others having trough or cup styles of indentations. Some metal lath is self-furring by means of solid ribs, or ribs formed by a bend in the lath, or by means of lateral edges or corrugations. Woven wire fabric comes in square and triangle mesh patterns, some plain and others stiffened by raised ribs.

Of all the many building products featured, none

was more interesting to Mr. and Mrs. Prospective Homeowner than insulating material. In fact, the whole subject of insulation fascinated them, and they resolved to explore into new fields of knowledge. Insulating efficiency, they learned, is based upon the extent of dead air spaces, which accounts for the rather peculiar character of the materials used in the manufacture of insulation.

It soon became apparent that the manufacturers had called freely upon science in developing insulation. The vegetable and mineral kingdoms had been invaded and certain products seized which, upon being reduced to a fibrous or granular form, were made to render man's habitat less submissive to heat or cold. They also deadened sounds.

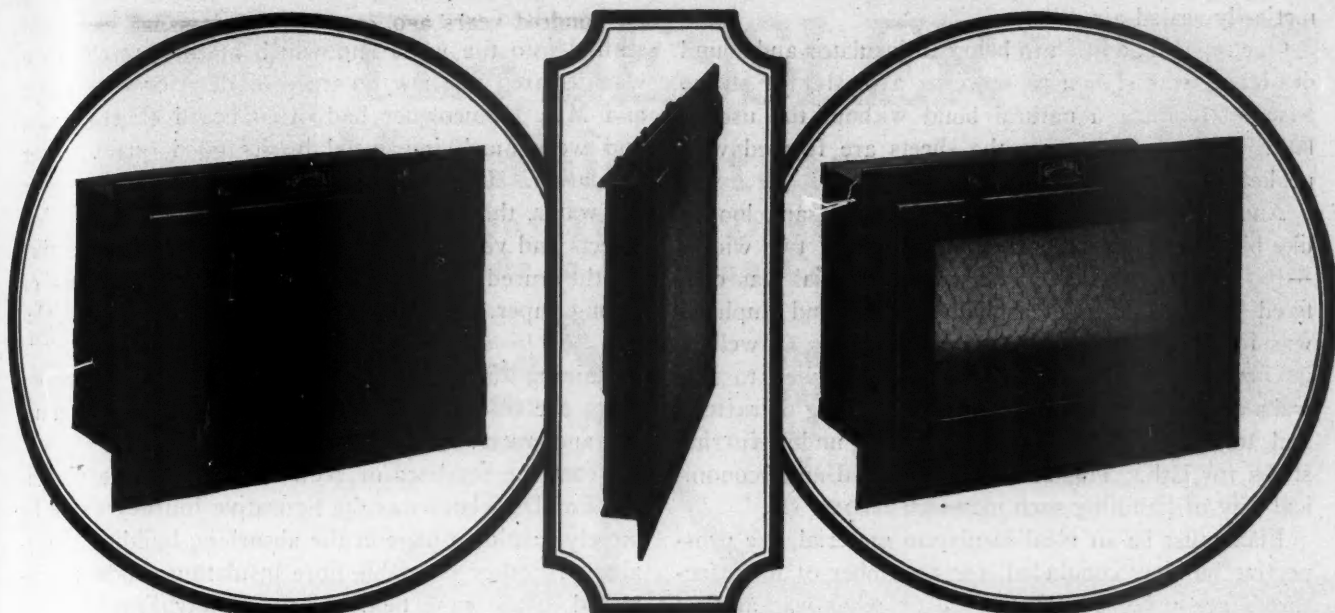
Some half-dozen basic materials are used in making insulation—mineral wool, wood pulp and wood fibre, vegetable fibre, asbestos, pulverized gypsum and cork—and ingenious trade names have been given to the insulating products derived from them.

Mineral wool sounded descriptive. Investigation showed it to be a vitreous substance converted into a fibrous mass, and closely resembling cotton in appearance. How limestone and slag could be reduced to a "wool" state was somewhat puzzling to the now thoroughly interested couple, but that it was being done, and the "wool" further processed in various ways to toughen it and make it vermin proof, was not to be denied, for there was the finished product, as well as illustrations of many attractive structures in which it had been used.

The exact manner in which mineral wool is applied to buildings was described, also. It developed that the loose form of mineral wool is packed into walls between the studding; in ceilings between joists and under the furring strips to which is attached metal lath; in sloping roofs between the rafters, and in flat roofs under the board covering and between the nailing strips.

One type of mineral wool is mixed with vegetable fibre and binding, and is manufactured in the form of boards 1½ by 4 feet, 1 to 3 inches thick. Still another kind, used largely in cold storage insulation, consists of rock wool bound with crude paraffine, and formed in slabs 16 by 36 inches, ½ inch to 3 inches thick.

Then came the presentation of insulating materials made of wood fibre and wood pulp, some with names sounding like those of Pullman cars, but which evidently were significant of the manner of their construction. Again was the interest of Mr. and Mrs. P. H. intrigued when a brief examination disclosed that original wood is reduced to fibre which, after waterproofing and other special treatment, is felted into sheets containing a very high percentage of her-



Gabriel Chute with solid steel door

When collapsible boot is folded, chute is only three inches thick.

Gabriel Chute with glazed door

An Important Feature of the House

You may not think it at the time you are building, but you will realize later that the Gabriel Rolled Steel Coal Chute is a mighty important feature of the house.

A coal chute is a necessity—always. Why not get the best at first and save the repair bills and dissatisfaction which cheap, poorly constructed chutes bring? The Gabriel Coal Chute is made of heavy rolled steel—no brittle castings to break, and is practically indestructible. Rolled Steel hinges, substantial and unbreakable, hold door in position when open. Removable hopper is instantly attached or removed.

The collapsible boot—an exclusive feature—folds against the back of the chute, making its total thickness only three inches. Abundant daylight admitted through heavy wire glass door. Glass protected by wire guard. The chute is fire and burglar proof. The price is low, less than ordinary quality chutes.

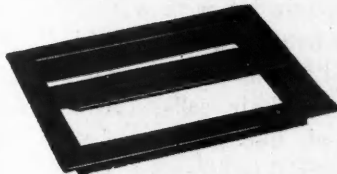
Gabriel Chutes are furnished with solid steel or glazed doors—with or without hopper—two sizes of wall openings 16 x 24" and 22 x 32"—collapsible boot for 8", 12½" or 17" wall.

Used with equal success in any kind of foundation. Return coupon for further particulars.

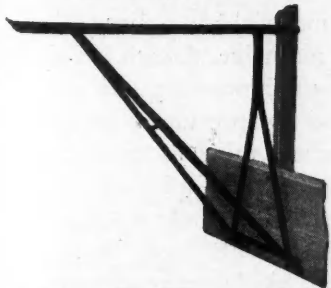
GABRIEL STEEL COMPANY
BELLEVUE AVE. DETROIT, MICH.



Ashpit Doors for the basement



Ash Dumps for the fireplace



Scaffold Bracket for general building

Gabriel Steel Co.,
Bellevue Ave., Detroit, Mich.
Send further information and prices on following:

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Name

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GABRIEL

ROLLED STEEL
COAL CHUTE

metically sealed air cells.

One type, in addition to being an insulator and sound deadener, was shown to serve as a plaster or stucco base by forming a natural bond without the use of lath. For cement stucco the sheets are formed with pockets for keying the stucco.

Another type, made of the fibre of balsam, looked like blanketing goods, and came in rolls of two widths—16½ and 32 inches. The wooly material was confined between sheets of asphalted paper, and emphasis was placed upon its fire-resisting qualities as well as its insulating value. The material is applied to side walls and roofs by nailing between studding or rafters, and to ceiling by attaching to joists under furring strips for lath. This seemed a practical and economical way of handling such material.

Flax must be an ideal insulation material, the prospective builders concluded, for a number of manufacturers are using it. A picture of what was at first thought to be a rolled-up quilt turned out to be such a product, made in 16, 18, 32, 36 and 48-inch rolls. The fibre batt, held between waterproof paper by means of linen thread, had been chemically treated so as to make life unbearable to such insects as might contemplate establishing a home in the fleecy mass. This quilt-like material is applied in the same manner as the type just described.

Another flax product reminded the Prospective Homeowners of a huge waffle, because of its similar color and waffle-like indentations. It comes in stiff sheets, so the description read, in widths of 16 inches to 3 feet, and in length from 8 to 10 feet, and in thicknesses of from ¼, ½, ¾ and 1-inch. For inserting between studding there is a special style having flanged edges. The same company also makes a plaster key-board by fastening keyed or beveled lath to the insulation material.

Insulation and a plaster key in a single unit were provided by still another flax fibre material, which is so formed that one surface presents a lath-like key for plaster or stucco. This material also comes in stiff sheets, 19 inches wide, 48 inches long and 9/16 inch thick.

While all insulation materials are primarily intended to serve both insulating and sound-deadening purposes, yet it was noticed that a few kinds were highly recommended for particular uses. For instance, one type made of vegetable fibre pressed into boards seemed to be especially suitable for use in industrial buildings, such as protecting concrete roofs from condensation through weather changes, and absorbing vibration shocks in structures where machinery is in operation. This material is put up in board form, ¼, ½, ¾ and 1-inch thick, 3 to 10 feet long.

That even the briny deep is called upon to furnish material for insulation was the next fact disclosed. There was an interesting description of another quilt-like product made of non-burning sea grass, also a picture of a New England homestead, built more than

two hundred years ago, in which eel grass had been stuffed into the walls and which at the present time was declared to show no trace of deterioration. Mr. and Mrs. Homeowner had often heard of eel grass, and were much impressed by its good qualities for insulation. It was pointed out that, growing under sea water, the eel grass contains so much silicon that insects and vermin detest it. This "quilt" is a matting of the cured grass stitched between two layers of strong paper. It is made in single, double and triple-ply, ⅓, ½ and ¾-inch thick, respectively, in rolls containing 250 square feet. Asbestos and waterproof types are also produced for extra protection against fire and water.

From the seashore of New England to the plantations of Dixieland was the figurative journey made by merely turning a page in the absorbing building magazine. Another vegetable fibre insulating product originated in the cane fields of the Sunny South. This type was prominently featured as a double-object product—it is both insulation and sheathing, being sawed, handled and applied exactly like lumber. Being made of cane fibre, it naturally is very strong.

Asbestos, besides figuring as a fireproofing material, was shown to have insulating qualities, and is pressed into boards or made in paper form. In some types it is combined with other materials, such as cement and gypsum, to form sheets or blocks. The most extensive use of asbestos is for insulating steam pipes. Magnesia is also used largely for that purpose.

A new type of insulation recently put on the market seemed to the Prospective Homeowners to have magical qualities, so startlingly unusual was the manner of its production. It was shown that by merely mixing a prepared gypsum powder with water, the mixture swells into four or five times its original bulk, then sets into a honeycombed substance of very light weight and having countless dead-air cells. In the wood frame wall it is poured, like concrete, between the studding. The new material is fireproof, and the term "mineral cork" graphically describes it.

Still another unique material having insulating qualities was shown in the magazine, though it is intended for use in masonry construction. Mr. and Mrs. Prospective Homeowner had not previously imagined that there was such a practical thing as cinder concrete, nevertheless here was a picture of a hollow cinder concrete block, looking much like blocks made of cement or clay, and into which nails were being driven. There were also views of handsome residences built of cinder concrete blocks. In addition to being weather proof, fireproof and soundproof, it was stated that the blocks would bond to plaster or stucco without furring or lath, that they were light in weight and that lumber could be nailed directly to them.

Building or sheathing papers are, of course, insulators, the effectiveness of which is determined by thickness and processing methods. The Prospective Homeowners were somewhat informed on the merits

been time Mr. grass, s for under n that atting rs of triple-rolls proof gainst

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qual- ended Pros- d that crete, r con- cement riven.uilt of eather l that ithout d that

insu- ed by ective merits



When not in use the Bessler slides into neat panel in ceiling. It is visible only when you need it.

The BESSLER Movable Stairway

The Greatest Real Development Ever Made in Stairway Construction



In every way a practical, substantially made stairway. So well counterpoised that a child can operate it easily.

Adds at least \$1000 to the value of any home

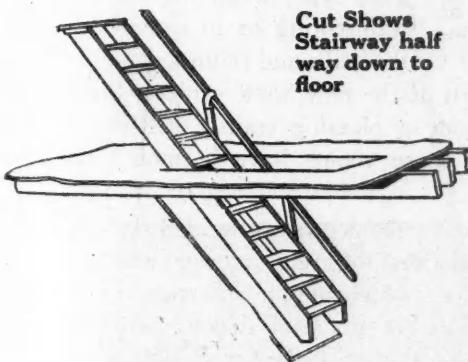
Makes attic usable without taking up valuable space in room below



No home so elaborate and but few so small but that the Bessler will save valuable space and improve the looks of the room below by displacing the old out-of-date box stairway.



Stairway Folded (Upper View)



Cut Shows Stairway half way down to floor

For Homes, Garages, Offices and Public Buildings

Especially is the Bessler prized in bungalows, where it makes the whole attic more easily available. Thousands are in use in summer homes all over the country.

Easy to Install

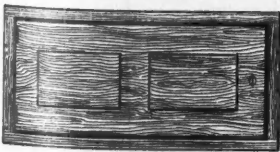
Any carpenter can install a Bessler in a new building, where the ceiling has been prepared, in two hours. In buildings where the

ceiling must be cut out and opening cased up, not more than six or eight hours' work is necessary.



SPECIFICATIONS IN "SWEETS"

It will pay you to get better acquainted with the Bessler. Ask your dealer. Send for descriptive booklet.



Stairway Folded (Lower View) Nothing Visible but this Neat Panel

Panel furnished in pine, birch or oak

The Bessler Movable Stairway Co.

1901 E. Market St. Akron, Ohio

New York Office 103 Park Ave.

Guarantee: You can have the use of the Bessler Stairway for one month and if it does not prove satisfactory or is not just what you wanted, return it to us at our expense. The Bessler is warranted to last the life of the building.

J. E. Bessler

of building papers, having observed that their use had become almost a universal practice in the erection of homes and other structures.

From a news item in the magazine they were made aware of the practical work in developing building materials that is being performed by the government, through the U. S. Bureau of Standards. They were particularly interested in the announcement that recent heat-conductivity and density tests on various types of insulating materials had been conducted.

The heat-conductivity tests were made to ascertain how many British thermal units of heat would pass

to that of the strip alongside, thus giving a laminated result. The wood core rests between layers of specially treated paper.

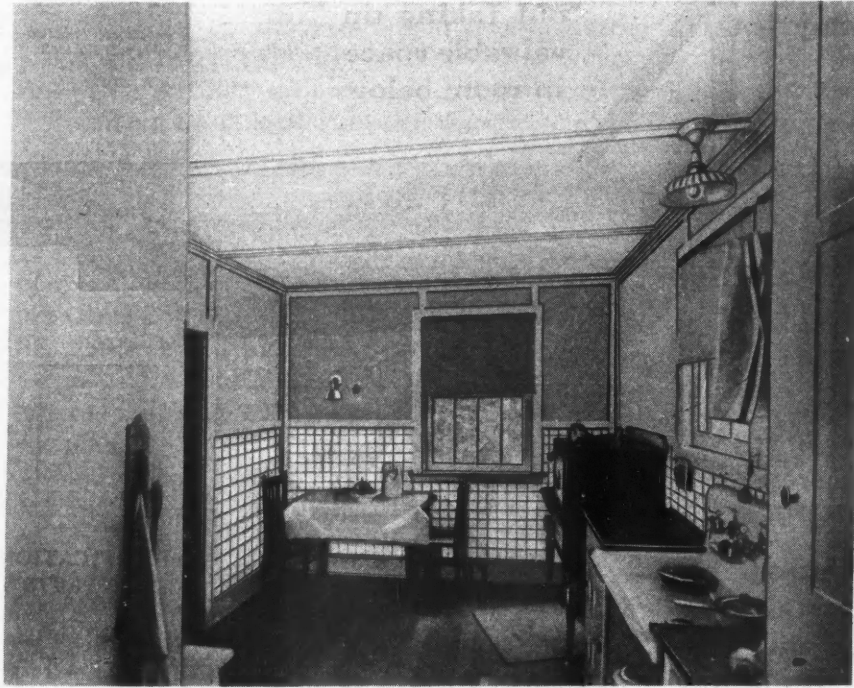
Gypsum wallboard is made by reducing gypsum rock to a plastic state and then moulding and compressing it between two sheets of mineralized paper, forming ceiling-high boards which can be nailed directly to the studding.

Wood fibre wallboard is made by a number of concerns, each brand differing from the others in certain respects. Spruce is the wood considered most suitable. In manufacture the log is cut into short lengths, which

are barked, reduced to fibre and processed. The fibre is then pressed into sheets of various sizes and thicknesses. Some have pebbled surface, others are smooth, while one type is pebbled on one side and smooth on the other.

Wood fibre wallboard manufacturers recommend, as a rule, painting the sheets and covering the joints with narrow wood mouldings to form panels, though wallpaper may be applied on a few kinds without the use of the wood strips. One concern manufactures a special paint for its product.

For bathrooms, kitchens and other places where an enamel finish is desired, some companies furnish a glossy type having brick or tile pattern faces, and which may be enameled and rendered washable. This type, when applied either as wainscoting or to completely cover the walls and ceiling, make the bath-



For Kitchens, Bathrooms, and Other Places Where an Enamel Finish Is Desirable, There Is Furnished a Glossy Type of Wallboard Having Brick or Tile Pattern Faces, Which May Be Enameled and Made Washable. This material may also be utilized as illustrated here, to transform old kitchens.

through a square foot of insulating material 1-inch thick. (Note: A British thermal unit is the quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit.) The tests showed results ranging from 5.3 to 13.5 B.T.U., with 8.1 being the mean B.T.U. for 33 different products.

In the density tests the weight of each insulating material in pounds per cubic foot was ascertained, results showing ranges of from 4 to 31 pounds. The average density was 12.63 pounds for the 33 products tested.

For the inside finish of walls, lime and gypsum plaster are the old reliables, of course, and to Mr. and Mrs. Prospective Homeowner was revealed some idea of the extensive use into which wallboard has come in recent years. In fact, they observed that the builder is enabled to choose the particular kind which appears to him to be most suited to his requirements. It was evident, too, that wallboard is an efficient wall covering, so recognized by architects and contractors.

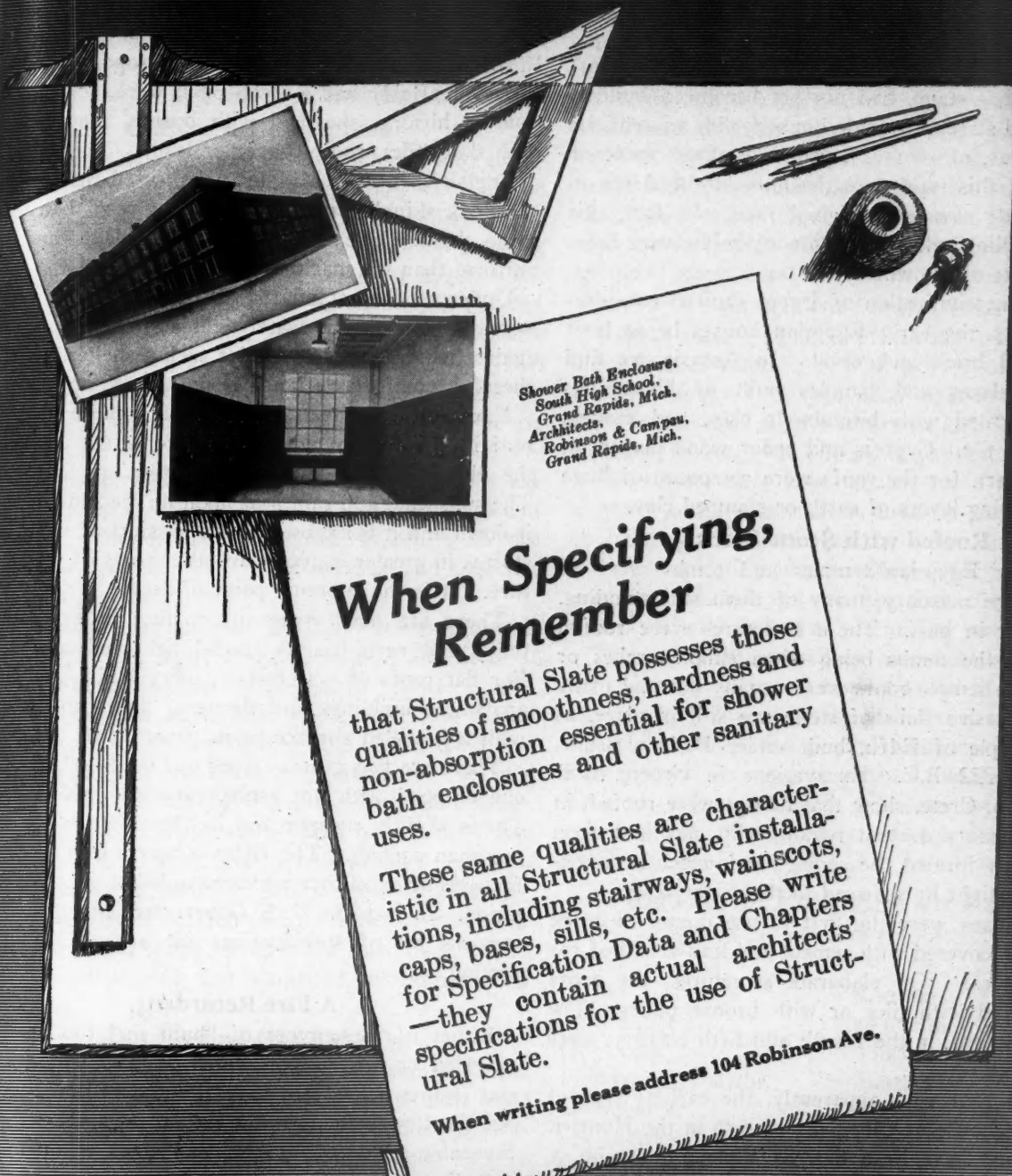
One type of wallboard has a wood core of narrow wooden strips, the grain in each strip running opposite

room or kitchen of the new home sanitary and attractive, and provide a pleasing transformation in older houses where those rooms have become soiled and cracked.

The Prospective Homeowners decided that this matter of finish on the different interior wall materials available was one which might well engage their serious attention, as the material selected would have a direct bearing on the finish they wished to have in the different rooms.

Some wallboards are fitted particularly for producing paneled effects which are pleasing in certain types of rooms.

The availability of all these materials aroused in Mr. and Mrs. Prospective Homeowner the feeling that the knowledge they had gained afforded a better understanding of proper wall construction. Their investigation of materials would be certain to result in lasting satisfaction with their prospective home—of this they were confident—and the pleasant task of making selections was thereupon undertaken.



Shower Bath Enclosure.
 South High School.
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When Specifying, Remember

that Structural Slate possesses those qualities of smoothness, hardness and non-absorption essential for shower bath enclosures and other sanitary uses.

These same qualities are characteristic in all Structural Slate installations, including stairways, wainscots, caps, bases, sills, etc. Please write for Specification Data and Chapters—they contain actual architects' specifications for the use of Structural Slate.

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STRUCTURAL SLATE

Development of Roofing Materials

Progress in the Evolution of Roofing Materials Has Brought Out Many Types of Roof Coverings for a Wide Range of Uses

AWAY back in the dawn of history, Palaeolithic man lived—

"Like little ants in sunless recesses of caves."

Man, at that stage, had not yet become a builder. When he did start to provide himself with an artificial shelter, it was, of course, a primitive affair, made of boughs. Of this type were the huts of the Ainu in Japan—a half savage aboriginal race. In fact, this form of dwelling still survives among half savage races in many parts of the world.

The ancient civilization of Egypt showed considerable progress, the early Egyptian houses being built of sun-dried brick and wood. In Assyria we find gorgeous palaces and temples built of bituminous bricks, cemented with bituminous clay, and casings of enameled tile. Cypress and cedar wood played an important part, for the roofs were composed of huge beams, carrying layers of earth or stamped clay.

Roofed with Stone Slabs

The early Egyptian temples and tombs were of massive stone masonry, many of them still standing, in whole or in part. These structures were roofed with stone, the tombs being often simple arches or vaults. The temple roofs were usually flat and many of these massive slabs of stone are still in place, as in the Temple of Edfu, built under Ptolemy Euergetes, 247-222 B.C. Excavations in Greece, near Palaikastron, Crete, show that houses were roofed, in the early history of that region, with clay laid upon reeds, which formed the ceiling, and which was rendered watertight by seaweed in the upper layers.

The Romans were the first to use domes of brick or concrete, covered with cement and lead-sheathed for water-tightness. On elaborate structures, the roofs were covered with tiles or with bronze plates. The roofs of Athens, in the fourth and fifth century, were covered with tile.

The flat roof was, apparently, the earliest type of roof. The house of Circe, referred to in the Homeric poems, must have been flat, as Elpenor slept on it. Practically all of the houses of which we read in Bible history had flat roofs and it was the custom to sleep upon the house-top in the cool night air. In fact, the earliest building code of which we have a record—the Mosaic—provided that walls should be carried above the roof level, to prevent people from falling off and being injured.

In the New Testament, there is an account of a crowded gathering in one of the houses listening to the teachings of the Great Nazarene. A sick man was brought on his bed but the bearers could not get inside the house for the crowd, so they went up on the roof and let the bed down through the tiling, so that the man might be healed.

Where there is much rain or snow, as in northern countries, the sloping roof is in more general use. In the Mediaeval cathedrals of Europe, the roofs, which invariably had a steep pitch were, for the first time in history, sheathed with boards, then covered with slate, tiles, sheet copper or lead.

England, in the Middle Ages, used for roofing lead, oak shingles, red tiles, straw or reed thatch and stone slates. The slates used were thicker and less uniform than the machine cut slates of today.

Under modern standards of living, a good roof is essential—one that is water-tight and preferably tight against wind and cold. Under such a shelter, a warm, cheerful, comfortable home is possible in any climate.

Excepting architects, few people realize that the roof is called on to withstand more severe attacks of the elements than any other portion of the house. The sun, wind and rain beat upon it; the snow weights it down and it is exposed to the assaults of winds and storms in greater degree than other parts of the structure. It is the supreme point of wear.

There are many types of roofing in general use today and each has its special field and usefulness. For flat roofs of warehouses, office buildings, hotels, apartment buildings and theaters, "built up" roofing, with a graveled surface, is in general use.

There are two general types of "built up" roofing—one mopped with hot asphalt and one with hot tar. Tar is slightly cheaper and has been in more general use than asphalt. The latter is recognized as having features of excellence which have led to general recognition. In fact, the U. S. Government now provides a separate set of specifications for asphalt "built up" roofing.

A Fire Retardant

Either of these types of "built up" roofing, when graveled on top, is considered an excellent fire risk and secures a low rate from the underwriters. Without the top surfacing of gravel, it does not secure so favorable a rate. The "built-up" roof is almost universally used for flat decks. On concrete roof decks, whether flat or sloping, it is always necessary to use a waterproof covering, usually cement or composition.

Reference has already been made to the antiquity of metal roofings and it is only natural that many new forms and varieties of metal roofings should have come on the market. Copper is generally admitted to have unusually enduring qualities and it is now furnished in many beautiful and lasting forms, such as copper shingles, copper Spanish tile, copper standing and flat seam. Being such a ductile metal, copper must be laid on a tight roof deck.

An alloy of copper is now added to some brands of

(Continued to page 317.)

(Continued from page 312.)

steel sheets and tin plates, to make them rust-proof. It is used effectively for roofing, siding, spouting, gutters, culverts, flumes and similar uses. Lead, copper and zinc are effectively used in flashing work and are almost indispensable for this purpose.

Corrugated galvanized iron has great rigidity and can be used in large sheets and fastened directly to purlins where a light roof or siding is desirable. It has many special uses and is in considerable demand.

A Modern Development

One of the more modern developments in roof coverings is cement tile, which is coming into general use on certain types of better class industrial buildings. These tile are reinforced with wire mesh and have a tensile strength of about 300 to 350 pounds per square foot. The interlocking type requires no roof deck and can be laid directly on purlins. A single tile will measure about 2 by 4 feet and weigh 128 pounds, or 1,600 pounds per square. Small cement tile, permanently tinted, are being extensively used on residences of the better class.

Vitreous terra cotta roofing tile are adapted for use on residences as well as other types of buildings and makes a durable, handsome roof, especially in the French or Spanish style. They must be laid over felt on a tight roof deck.

Reinforced gypsum roof tile has the advantage of light weight and high resistance to heat and fire. It will not support combustion or conduct heat.

Wood shingles have been popular in the United States for roofing residential and farm buildings since the days of the 13 original colonies. Probably no other form of roof covering has been so popular. In the early days, these were adzed out by hand but, for many years, have been a mill product. Several woods have been used for this purpose—notably cypress, pine, white and red cedar. When treated with a creosote stain, wood shingles not only have a long life, but are pleasing and attractive for both roofing and siding.

Roll Roofing Has Big Sale

Prepared, or "ready" roll roofing and shingles are a comparatively recent development, but are now used in the United States in tremendous and increasing volumes. The national consumption has averaged 30,000,000 squares annually for several years, having grown to this volume from 8,000,000 squares in 1908. The base of this roofing is a rag felt saturated and coated with asphalt—perhaps the best waterproofing agent known. In fact, asphalt was used by the early Egyptians for preserving mummies, which it has effectively done through 4,000 years.

Roll roofing is furnished either with a plain talc finish or surfaced with crushed slate or colored rock in attractive natural tints. The "slate" surfaced roofings are popular for use on bungalows and residences with sloping roofs, either in the form of rolls, strip shingles or individual shingles. Some of the roll roof-

ings are made with a shingle pattern, in imitation of the shingle effect. These roofings are used principally on frame residences and farm buildings.

Asphalt shingles with crushed rock surfacing are being used in large and increasing volume. The "strip" or four-in-one asphalt shingle patented in August, 1915, reached the surprising sales volume of 5,600,000 squares for the year 1923. When laid on the roof, the strip can not be told from the individual shingles. These roofings are highly fire resistant and spark-proof.

Asbestos shingles are made of asbestos and portland cement. Many beautiful and artistic roofs can be made with these vari-colored shingles in soft, neutral tints. A burning brand cannot set fire to a roof laid with these shingles. They are given Class "A" rating by the Underwriters' Laboratories.

Canvas for Porch Decks

Canvas roofing is used principally on porch decks and surfaces where it is both a floor covering and a waterproofing. It is also used extensively for flashing. It is usually asphalt saturated and coated. When used for flashing, the coating is omitted.

Slate roofs have been applied for a great number of years and are extensively used on permanent types of buildings. Several natural colors are obtainable and create pleasing effects. Slaters' felt is first applied over the roof deck and then the slates are nailed on by means of holes drilled at the nailing point.

The use of galvanized or coated nails is advisable with almost any type of roofing as the life of the roofing is largely limited by the life of the nail.

Architecturally, the general tendency in roofings is back towards the rougher textures and greater irregularity of outline and color. The blending of weathered color effects is extremely effective on high class buildings.



Answers to Problems on Page 244

(1) Length of hip per foot run of common.

Pitch	Rise per foot of run	Length of hip per foot run of common
One-sixth	4 inches	17.43 inches
Five-twenty-fourths	5 inches	17.69 inches
One-quarter	6 inches	18.00 inches
Seven-twenty-fourths	7 inches	18.36 inches
One-third	8 inches	18.76 inches
Three-eighths	9 inches	19.21 inches
Five-twelfths	10 inches	19.69 inches
Eleven-twenty-fourths	11 inches	20.22 inches
One-half	12 inches	20.78 inches

(2) Given span = 20 feet: three-eighths pitch.

Length of hip per foot run = 19.21 inches.

Length of hip = $19.21 \times 10 = 192.1" = 16' 0.1" = 16' 3/32"$.

Correction for May Problem

THE shed roof, used for the problems of the May installment of Instructions in Roof Framing, was given as having a 7/12 pitch roof. The pitch should have been given as 7/24.



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You progressive contractors and builders who pride yourselves on keeping pace with new and better ideas should become acquainted with

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For high-class residence installation the HERO cannot be surpassed.

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ELECTRIFY ALL BUILDINGS

A Department of Up-to-date Information
for all who Plan and Build

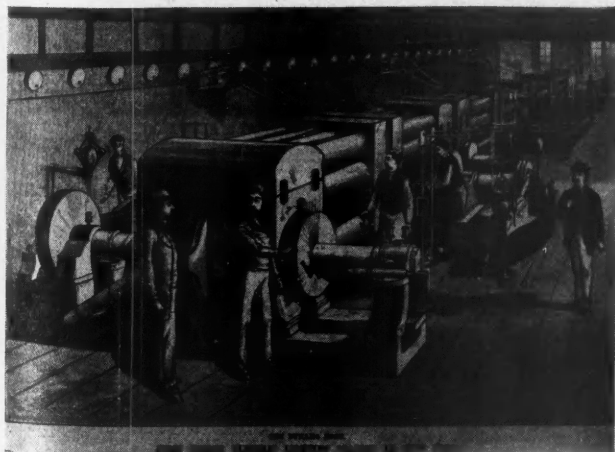
In Less Than 50 Years

The First Central Station with 59 Customers Has Expanded Until Today There is a Central Station in Every Town in the U. S. and Their Customers Number More Than 12,000,000

By ROBERT A. GALE

EDITOR'S NOTE: *The Electrical Section of the AMERICAN BUILDER is written and edited by the experts of the Joint Committee for Business Development, an institution which comprises representatives of contractors, dealers, jobbers, manufacturers and central station organizations. It functions through an Executive Committee and a Headquarters staff, office 29 West Thirty-ninth Street, New York, H. A. Lane, Director.*

CENTRAL station service! To the average citizen these words mean little, for his knowledge and interest in the great mysterious energy which has been made so available to him is usually limited to merely snapping a switch or pushing a button when he wishes electric lighting or power. Beyond the fact that somewhere, whirring machinery is constantly at work furnishing the necessary volts and amperes which are brought to him in a flexible copper wire, he seldom seeks to ascertain just where this current is made or how it is supplied to the numerous sockets and fixtures which surround him at home and abroad in his places of amusement and labor.



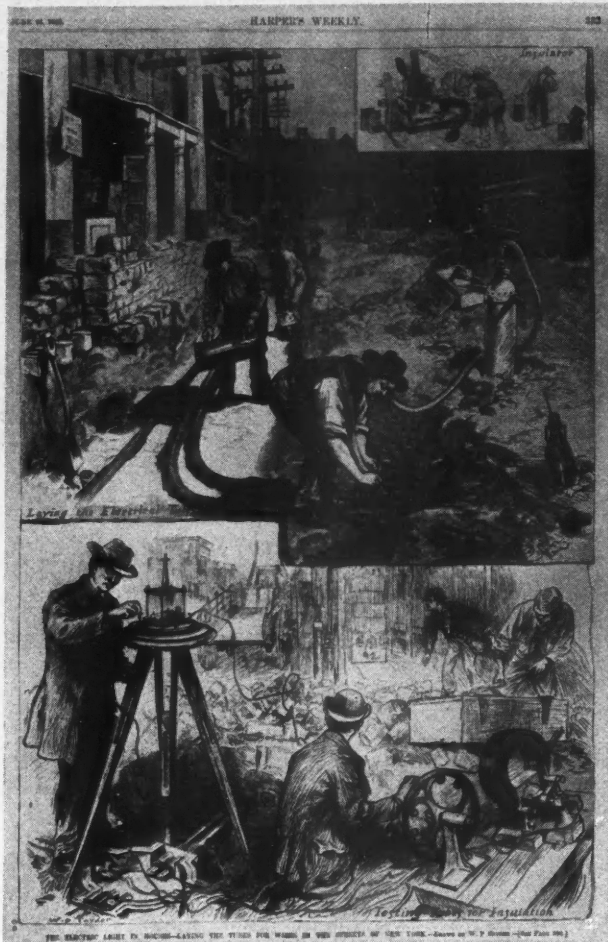
"Jumbo" Generators in the First Central Station, 255 Pearl Street, New York City, Opened Sept. 4, 1882.

And yet today in all large cities, most of the electrical current consumed by the public is furnished by large central stations, each lighting company supplying energy to a large area from main generating plants, as contrasted with the practice of isolated plant operation where individual buildings and industries have their own private systems of generation.

Starting less than a half century ago in New York City where within only one square mile four hundred incandescent lamps were lighted from the first Edison central station, the plan of such service was quickly appreciated and adopted in other cities throughout this country and all over the world, until now the number of square miles covered and the number of lights served this way run up into untold millions.

It is interesting to note that the first central station had fifty-nine customers, while on January 1, 1923, according to an estimate prepared by the "Electrical World," there were 12,353,790 customers using such service in the United States, in the following ways: for domestic lighting, about 80 per cent; for commercial lighting, approximately 16 per cent; and for industrial power, nearly four per cent. The mains and feeders of the original Pearl Street station measured less than fifteen miles covering only a few blocks in the business section. Today there are very few of the thousands of New York streets in which the cables of the lighting companies are not laid, and the same is true of all large cities of the country.

The crowds which inspected the first station marveled at the six generators installed there, nicknaming them "Jumbos" because each of them had the enormous capacity of 125 horsepower and had an armature weighing six tons. In some of the modern plants, single generators rating as high as 67,000 horsepower are now in operation.



Laying the Underground Conductors for the First Central Station, New York City, 1881-1882.

But the great height to which electrical industry and central station service has grown in this short period of years dwindles to small proportions when compared to the probable future use of this great force, for we are told by eminent authorities that our present highly developed system of generation and distribution is but a step in the progress which will one day result in a superpower scheme whereby the entire country will be supplied with current from a few distributing points located in strategic geographical positions. Leaving that subject to another time, however, let us look back at the introduction and early history of the central station system and then trace its development up to the present time.

The idea of such a plan, based on the economic principle of mass production, was undoubtedly present in the minds of more than one of the early electrical engineers and inventors. It was, in fact, attempted in a small way in connection with the arc lighting industry, the predecessor of the incandescent method of illumination. But it remained for Thomas Alva Edison to demonstrate the practicability of the scheme and to make the first commercial venture in the field of central station service.

As far back as 1877, Edison was working on his incandescent lamp and was endeavoring to find a way in which to light a number of them by means of electri-

cal current supplied from one dynamo. To do this he not only had to perfect a large machine capable of generating *high voltages*, but also to devise methods to subdivide the current for use in individual lamps, for the inventor early realized that if his new illuminant was to compete successfully with the gas lighting of that day, he must be able to supply his "juice" in small units to a great number of lights and at a reasonable cost to the consumer.

The announcement in 1879 that the "Wizard of Menlo Park" had perfected an incandescent lamp was immediately followed by another, stating that he was planning to demonstrate its practicability on a large scale in New York City where he would open his first central station.

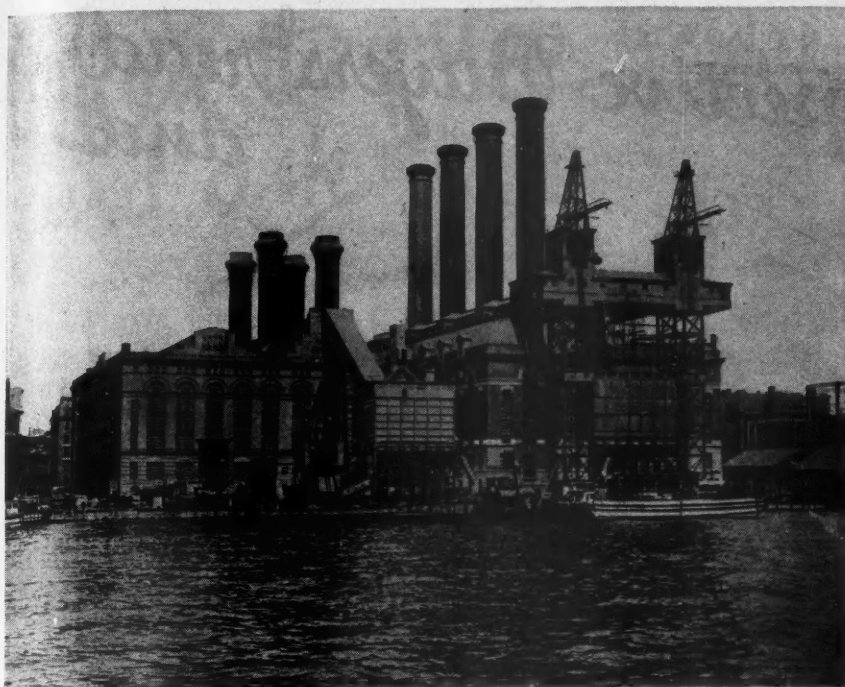
To help him carry out his project a group of financiers and interested citizens formed, in 1880, the Edison Electric Illuminating Company of New York, later to become The New York Edison Company. In May of the following year, an old brick warehouse at 255 and 257 Pearl Street was purchased as the home of the first generating station and work of laying the conductors in the streets of that downtown neighborhood was begun that same summer.

The many difficult problems attendant upon the establishment of any new industry were not lacking in the introduction of the first central station. In addition to numerous mechanical riddles which had to be solved, there were ignorance and prejudice on the part of the public to be overcome, for only a few persons then realized the infinite possibilities of electricity as a servant, once it could be made available to the city's millions.

In considering this period we should not forget that most of the equipment necessary for using the new incandescent lamps on a large scale was not yet invented. Nor were there yet any manufacturing plants which could produce these component parts in sufficient quantities once they were perfected. Then, too, there were no experienced artisans in the electrical field, and to overcome this obstacle, Edison founded the first school of its kind in this country where, at 65 Fifth Avenue, he taught in the evenings those working with him in the new enterprise. The great inventor had, therefore, to literally lead the infant project by the hand and guide its slow steps toward the goal which he but not many others could visualize.

With the lamp itself perfected and the generating machinery being installed in the station building, the next step was to provide a distributing system which should be commercially practical. In this connection, Edison planned to place his wires underground, and here he met difficulties, for such a proposition was unheard of in those days.

At first, he had to demonstrate to the scientific world that the plan was feasible, and then he had to convince the city authorities and the public at large that this scheme was better than the contemporary practice of



The Waterside Station of the New York Edison Company.

supplanted dim flickering gas flames which had long strained their eyes.

Thus did central station service start and the first Edison plant at 257 Pearl Street operated continuously day and night with but two slight interruptions until 1895, when the building was given up because it had been outgrown.

Rapid growth and expansion were only natural to the infant industry which, while becoming more firmly established in New York City each day, was likewise getting a foothold in other cities. Space will not permit a detailed biography of this widespread movement in favor of central station service along the lines indicated by Edison. Inasmuch as we have already witnessed its inception in New York City and because its later development there is typical of its progress elsewhere,

carrying all telegraph, telephone, arc light, stock ticker, burglar and fire alarm wires overhead on a row of wooden poles, thus darkening and making dangerous the city streets.

We are told by those present in those days that in answer to the opposition and ridicule which rose up on all sides, the great inventor used to exclaim, "Why, you don't lift your water pipes and gas pipes up on stilts, do you?" Often he would get down into the ditches in his shirt sleeves to better superintend the laying of his underground conductors.

There was also the question of devices to make the lamps give an even and equal light regardless of their distance from the source of supply, and provision had to be made to measure the amount of current consumed by each customer. Finally, there were safety appliances to be worked out so that injury to persons and property might not result from the new method of illumination.

And so gradually but steadily, the first central station system took shape, until on the afternoon of September 4, 1882, current was turned on in the little re-built warehouse. Instantly, four hundred incandescent lamps glowed brilliantly in the buildings included in the first district, an area of less than one square mile and bounded by Wall, Spruce, Nassau and Ferry Streets and the East River.

Years of planning and research, and months of hard physical toil were at last rewarded in the tremendous triumph which accompanied the opening of the first central station. The following day, the success of the new lights was painted in glowing accounts in the newspapers. And, incidentally, not the least grateful of those receiving the benefits of the lights were the newspaper men who had written those same stories praising the new method of illumination which had

perhaps it would be well to let a few glimpses of its growth in the metropolis suffice for a more lengthy history of its career.

The forty-two years of central station service have been marked by no sudden or radical changes in the idea as mapped out by the great inventor at its start. The tremendous proportions of its present activities might have been anticipated by the leader years ago, but to reach them required a period of logical development during which central station equipment and distributing facilities were rapidly improved to meet the ever-increasing demands.

Thus it happened Edison's original plans (which laid out the city south of Fifty-ninth Street in thirty-six districts, each to be self-centered and supplying its own

(Continued to page 478.)



The Turbine Room in the New Hell Gate Central Station Which Supplies Electricity to a Part of New York City.

When Prospective Buyers read and



The biggest nickel

You can buy one for a minute for a minute.

Or you can buy one for a two ten.




The same nickel that keeps an electric fan running all day will operate an electric vacuum cleaner 2 1/2 hours, or a washing machine for an hour and a half. On the motors of these modern servants look for the General Electric Company monogram. The letters are a symbol of service, the initials of a friend.

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Housekeepers by the millions are getting in these magazine advertisements one reason after another for complete and dependable house wiring.



This finely illustrated book will be sent to you free. Write for a copy to Section G1, Merchandise Department, General Electric Company, Bridgeport, Connecticut.

Increase the comfort of your home by using this book



An important part of your electrical equipment is hidden in the walls of your home. Set your mind at rest regarding electric wiring and convenience outlets by asking your architect and builder to be sure that they use devices made by the General Electric Company.

This book gives floor plans and wiring diagrams, showing just how the electrical outlets and switches can be arranged for maximum convenience in every home.

By adding a few electrical conveniences every year you will make your home a better place to live in, and more attractive to your guests.

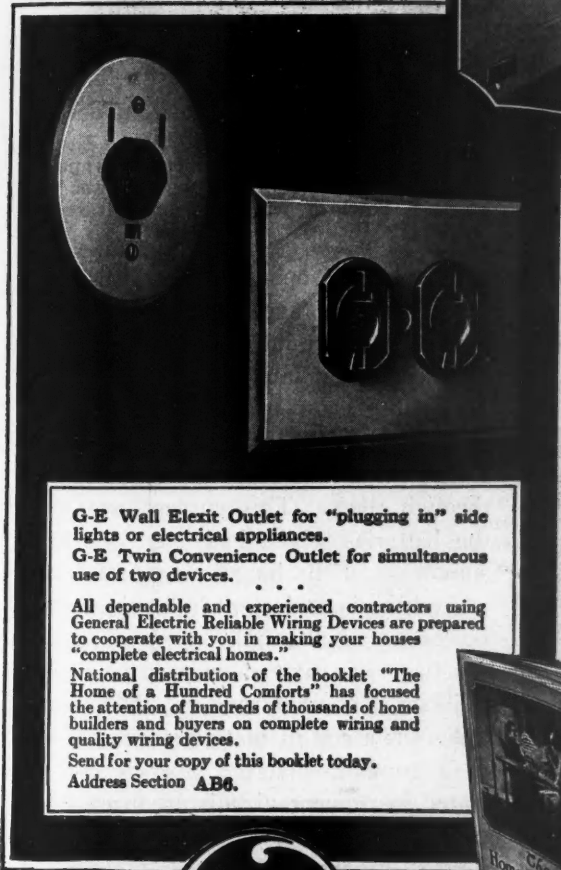
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GENERAL ELECTRIC MERCHANDISE DEPARTMENT

When they stop
and ask

"How about outlets for conveniences and floor and table lamps?"—you take them from room to room and show them that you have anticipated all their needs—both present and future.



G-E Wall Elexit Outlet for "plugging in" side lights or electrical appliances.
 G-E Twin Convenience Outlet for simultaneous use of two devices. . . .
 All dependable and experienced contractors using General Electric Reliable Wiring Devices are prepared to cooperate with you in making your houses "complete electrical homes."
 National distribution of the booklet "The Home of a Hundred Comforts" has focused the attention of hundreds of thousands of home builders and buyers on complete wiring and quality wiring devices.
 Send for your copy of this booklet today.
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How Quality Helps the Sale

The housekeeping demands on electricity today are many and constant. They are increasing every year.

Builders who watch the development are putting in and featuring the most modern and most substantial wiring devices obtainable, so that their houses may give as good service electrically as in other respects.

Dependable wiring helps them make sales just as complete wiring does. Likewise it helps their profits.

G-E Reliable Wiring Devices, nationally known as the standard of excellence are the home buyer's assurance of dependable electrical service.

Merchandise Department
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 Bridgeport, Connecticut



DEPARTMENT

E L E C T R I C

Lamp Rubbing Brought Genie to Aladdin; Light to You

Through Hard Work of Scientists for Centuries Electricity Has Developed to Become the Housewife's White Magic

Illustrations Through the Courtesy of the Smithsonian Institution

DOUBTLESS you remember that Aladdin when he wished to summon a powerful genie to his aid accomplished his purpose by rubbing a lamp.

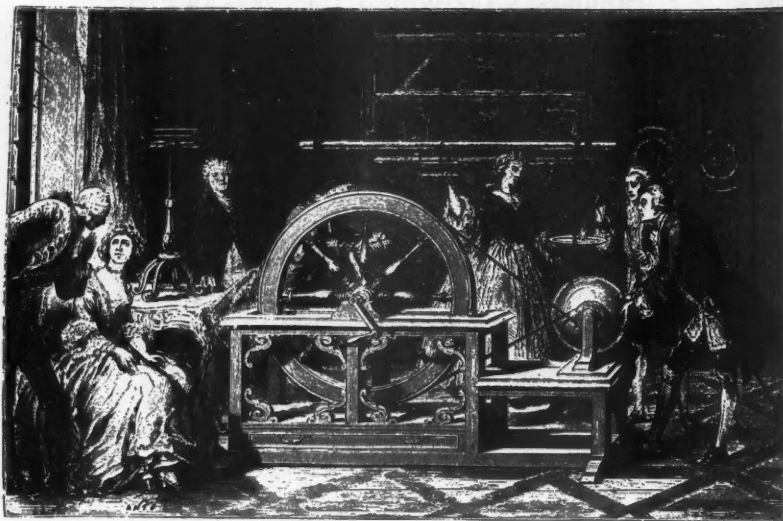
But did you know that the same device of rubbing a lamp was utilized as a step in the progress of bringing the great genie "Electricity" to the aid of all mankind?

It is extremely improbable that Francis Hauksbee, Englishman, ever heard of Aladdin and his lamp, since it was nearly a century after Hauksbee's death in 1713 that the first translations and collections of the Arabian Nights tales began to appear in England.

But Mr. Hauksbee did rub a lamp after the manner of Aladdin and did produce a light which may be considered as the starting point of the lighting industry which plays such an important part in the life of the world today.

It was in 1709 that Mr. Hauksbee constructed a machine which would whirl a glass globe very rapidly. He exhausted the air from this glass globe and when the hand was pressed against the rapidly revolving sphere, it produced a light.

This experiment, performed before the Royal Soci-



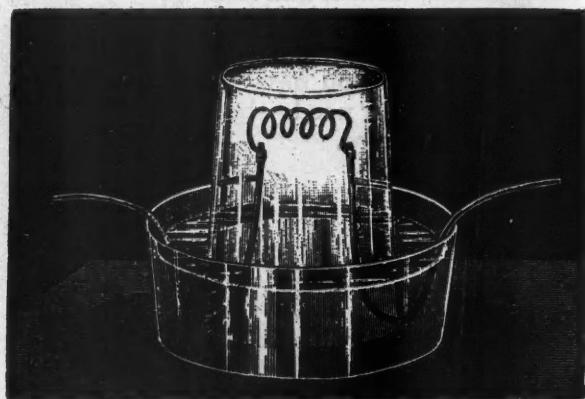
Otto Von Guericke in 1650 Produced Electricity by Rubbing His Hand Against the Large Ball of Sulphur Revolved by This Machine. Hauksbee substituted a glass globe for the sulphur and produced an "electric light."

ety in London, a group of scientists, was the sensation of the year.

Possibly it was because the Englishman did not know the proper words to utter as he rubbed the lamp that the genie he summoned did not come more quickly to the aid of humanity. For it took years of research by many scientists to bring the genie summoned by Hauksbee to light your lamp and make possible modern

industrial miracles.

Hauksbee's work was preceded by hundreds of years of vague groping toward the thing called elec-



This Is the Very Greatest Grandfather of All the Electric Light Globes in Your Home. The current was passed through a platinum coil protected from air currents by a tumbler inverted in a bowl of water. Demonstrated by Grove, 1840.

tricity because a Greek philosopher, Thales, had found, about twenty-five centuries ago, that amber, called "elektron" by the Greeks, would attract light objects.

It was almost a century later, in 1802, that Sir Humphrey Davy made a number of experiments and heated strips of metals to incandescence by passing current through them. This current was from the batteries which had been developed somewhat in the intervening time.

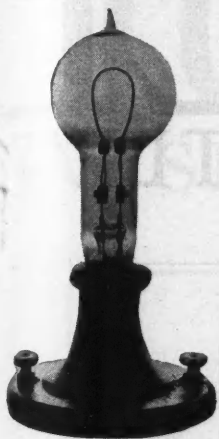
And the incandescent light, the earliest prototype of the light used in modern practice, was first demonstrated by Sir William Robert Grove in 1840. This light was a coil of platinum wire, housed in a tumbler inverted over a dish of water to prevent air disturbances. The cost of the feeble glow produced was several hundred dollars a kilowatt hour, which would be considered rather expensive by modern housekeepers.

There followed a period of experimentation with electric lighting, with the arc light developing more rapidly than any other sort. The first commercial installation of an electric light was in the Dungeness lighthouse, England, in 1862. A single dynamo furnished the current for a single lamp.

It is interesting to know that the dynamo used in this installation was designed originally to decompose water into hydrogen gas to be sold for illuminating purposes.

Electrify All Buildings

A later development of the arc lamp, the "Jablochkoff Candle," was used to illuminate some of the streets of Paris in 1876. Commercial use of the arc lights in the United States followed soon.



Edison's First Successful Carbon Light.

It was early apparent that the arc system of lighting could not be applied to households or places where smaller lighting devices were required. The problem of "sub-dividing the electric light" attracted the attention of a number of scientists. Among them in the United States were Hiram S. Maxim and Thomas A. Edison.

Edison began his study of the problem at Menlo Park, New Jersey, in the spring of 1878. He was well established as an inventor at this time, having to his credit the phonograph, the carbon telephone transmitter and the quadruplex telegraph which made it possible to send four messages simultaneously over a single wire.

The carbon lamp, using many of the basic ideas still used in making lamps, was developed in 1879. This necessitated a revision of the dynamos for generating current and of methods of distribution.

During the holidays of 1879 a demonstration was given of the new lighting system. Wires were run to several houses in Menlo Park and lamps also were mounted on poles, lighting country roads in the neighborhood.

A New York paper devoted an entire first page to a description of the installation and created such a furor that the railroads had to run special trains from New York to the scene of the demonstration.

The first commercially successful installation of the Edison system was on the steamship Columbia, which started on May 2, 1880, from New York to California around Cape Horn, lighted with electric lights.

From this point the history of the development of electric lighting has been one of steady progress toward more efficient lamps and distributing systems and greater convenience for the user.

The development of the modern high efficiency lamp began with the discovery of Alexander Just and Franz Hanaman, of

Vienna, that tungsten could be utilized for light filaments. This form of tungsten was pressed and quite brittle, making the lamps, despite their high efficiency, quite fragile. This lamp was placed on the American market in 1907.

After several years of research, Dr. William W. Coolidge, working in the laboratory of a manufacturing company in Schenectady, N. Y., invented a process for making tungsten ductile, so that it could be drawn into fine wires. Such lamps were introduced commercially in 1911.

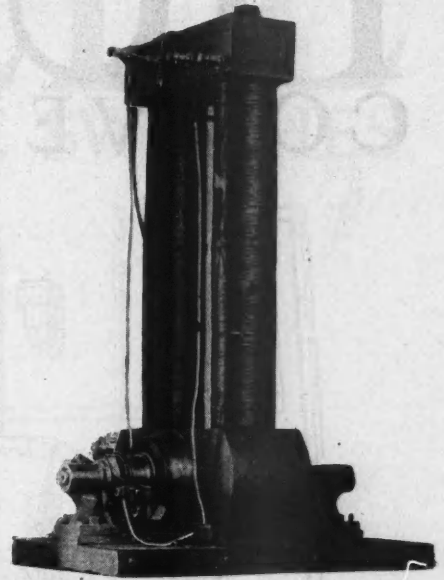
This is the type of filament still used almost exclusively in lamps.

Later developments provided for using gas filled globes instead of the vacuum globe. These have been successful in the larger units, and are being adapted gradually to the smaller lights.

Now there are in the United States more than 350,000,000 incandescent lights in use and as many more in all other parts of the world. The annual demand for incandescent lights for new installations and replacements is more than 200,000,000.

It is notable that the electric light has attained its present widespread popularity in less than fifty years after Edison produced the first practical model.

This information is contained in the "History of Electric Light," by Henry Schroeder, published by the Smithsonian Institution.



Edison Dynamo, Built in 1876, Which Made the Light Successful. This dynamo, installed on a steamship, was part of the first commercial installation.



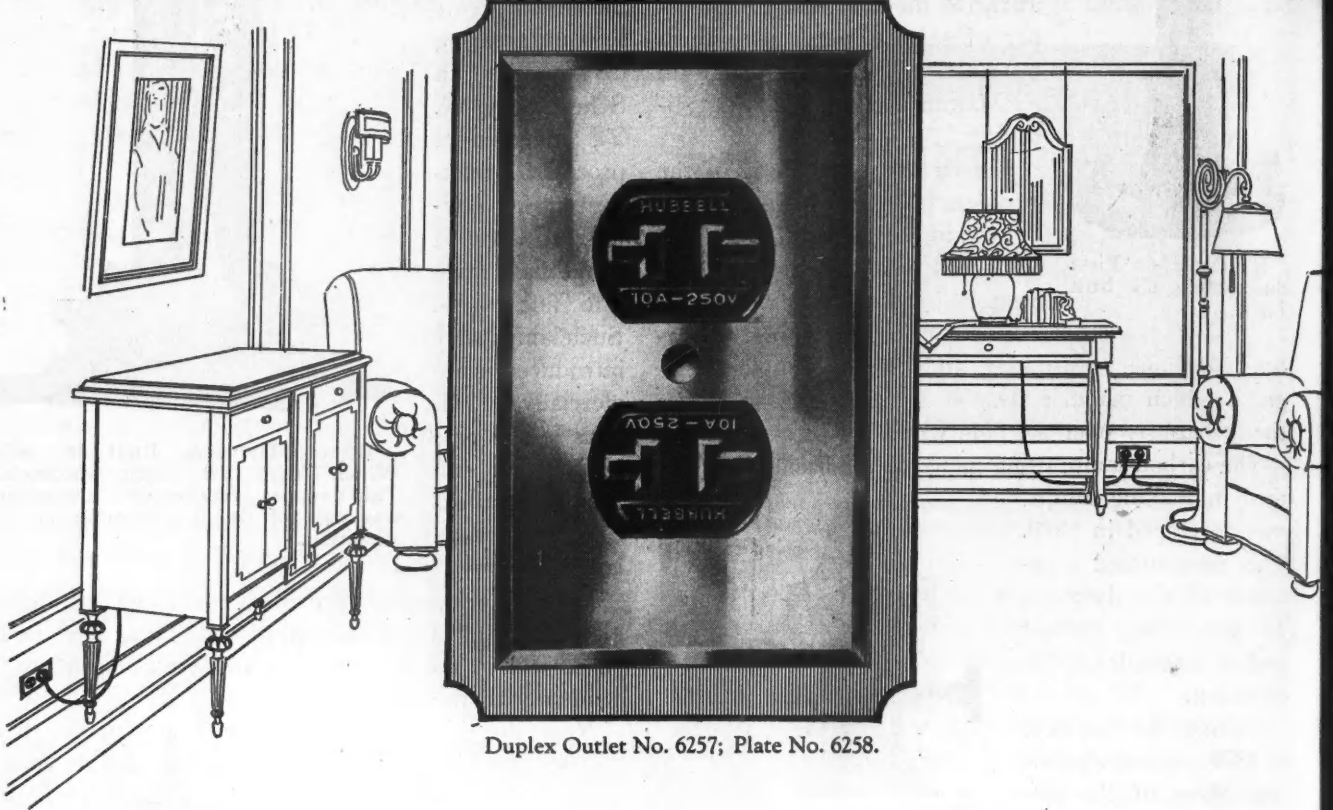
Early Types of Lights and Sockets. Notice the thumb-screw at the side of the socket.



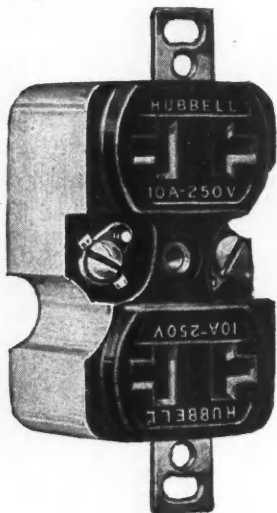
Menlo Park Laboratory and Grounds as They Were Arranged for the Demonstration of Electric Lighting in 1880. Special trains were run from New York City to accommodate the curious crowds.

HUBBELL

CONVENIENCE OUTLETS



Duplex Outlet No. 6257; Plate No. 6258.



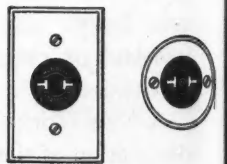
Porcelain Duplex Outlet
No. 6257

Composition Duplex Outlet
No. 5890

CONVENIENCE Outlets make the use of electricity convenient.

Every room in a home should have an adequate number.

Hubbell Convenience Outlets are attractive in design and well-made throughout.



Hubbell Convenience Outlets are also made in the single types above, with round or rectangular plates.

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ELECTRICAL WIRING DEVICES
BRIDGEPORT CONN. U.S.A.

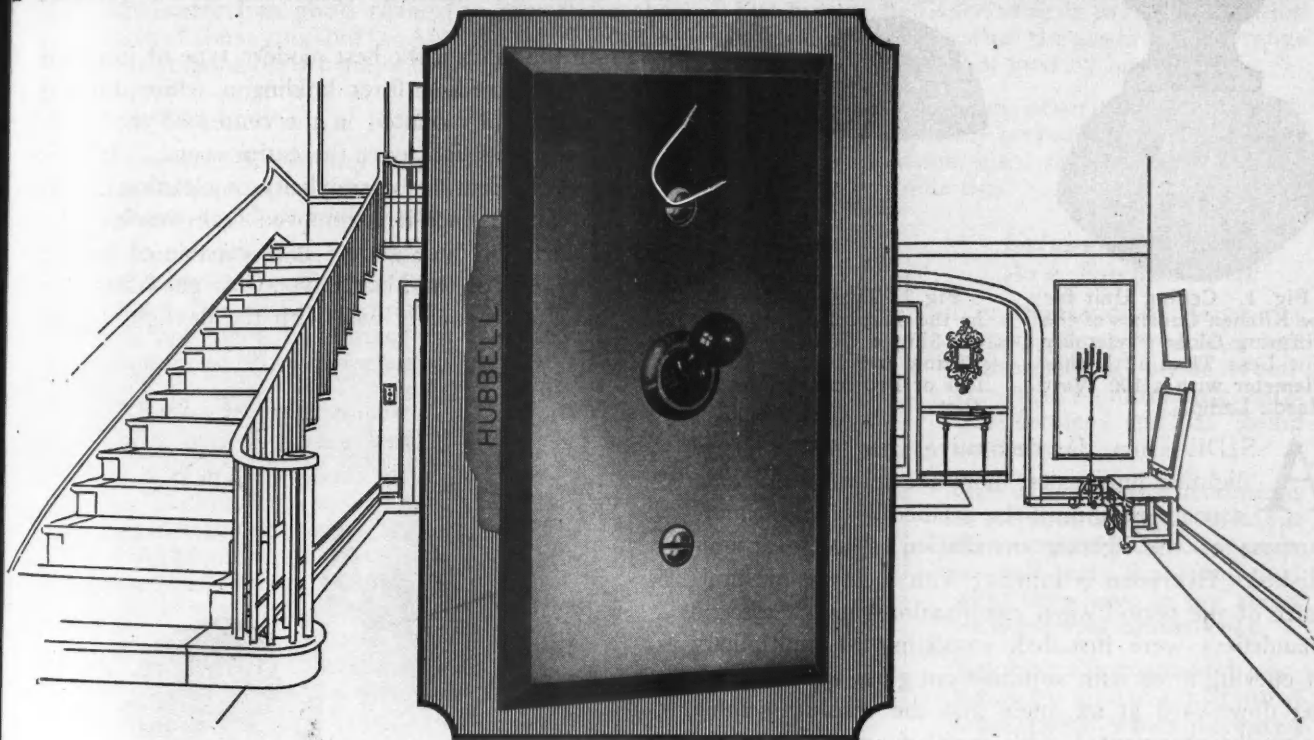


ELECTRICAL WIRING DEVICES

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NEW STANDARD TOGGLE SWITCHES



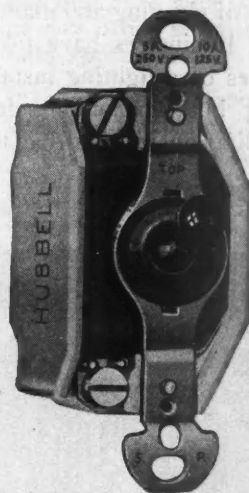
Body No. 8641; Plate No. 8291

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Toggle arm of black "Bakelite".

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Only 1 1/8 inches deep;
suitable for thin partitions.

ELECTRICAL WIRING DEVICES



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

Features of Residence Lighting Units

By S. G. HIBBEN

Illuminating Engineer Westinghouse Lamp Company



Fig. 1. Ceiling Unit for the Kitchen Consists of the Diffusing Globe Preferably Not Less Than 12 Inches Diameter with a 100 Watt Mazda Lamp.



Fig. 2. The Wall Bracket in the Kitchen Should Be of Simple Design, Close Fitting and with no Crevices or Projection to Catch Dirt.

ASIDE from the decorative usés of residence lighting luminaries, there are certain utilitarian aspects that must be studied if the ultimate purpose of the lighting installation is to be accomplished. Everyone is familiar with the type of luminaire of the period when combination gas and electric chandeliers were installed, consisting of multiplicity of curving arms with imitation cut glass shades pointing downward at an angle and the whole assembly painfully ornamented with metal filagree work and meaningless detail that neither hamonized with the furnishings or pleased the housewife who had to face the problem of cleaning and maintenance. Later developments of luminaires have taken cognizance of the twin features of a lighting installation, namely simple and modest but harmonious decorative construction and the utilitarian feature that might be termed "usability."

A few random notes on the utilitarian features that



Fig. 4. The Small Bowl with Narrow Top Opening Hung Close to the Ceiling Is Not an Efficient Unit.

may help to guide the builder and the home owner in his choice of lighting equipment would comprise the following items:

1—In the kitchen the best modern type of luminaire consists of a ceiling fitter holding a white diffusing glass globe and mounted in the center of the ceiling to give diffused light over the entire room. This unit possesses the feature of simplicity of cleaning, is free from breakage since it is removed from reach, and is not liable to produce glare. It is capable of housing different sizes of the Mazda type C or gas filled lamp, and may serve equally well with the daylight of blue



Fig. 3. With the Elexit Outlet the Lighting Unit Can Be Removed at Will.

glass bulb lamps. Having no opening in the glass globe, there is a minimum of dust collecting within the unit and if proper type of glass is chosen, the output efficiency of such a ceiling unit will be about 80 per cent.

2—For the large kitchen and especially over a sink, the type of wall bracket similiar to that shown in Figure 2 meets with good taste and good lighting practice. White enameled finish on metal parts is advisable. The more rugged and fool-proof the kitchen lighting units, the better, especially in the case of brackets having pull chain sockets. Incidentally, the repair bills

American Architects Are Quick to Recommend Kelvinator

Kelvinator has good reason to appreciate the truth of the saying that the American architect has been responsible in a major degree for the superior material comfort and convenience of the American home.

Reports of Kelvinator being recommended for installation in new homes and apartments by architects, reach us continually.

It is perfectly plain that when the American architect is convinced of the utility of a household appliance, he is quick to recommend it to his clients.

Builders Appreciate Kelvinator's Sales Value

Builders and architects recognize Kelvinator as a real necessity in the modern home or apartment, because it greatly increases the value, facilitates a quick and profitable sale and of course, aids wonderfully in assuring maximum convenience and cleanliness.

The appeal of automatic, care-free refrigeration to the American woman, is irresistible.

Whether she rents, or buys, or influences the rental or purchase, she cannot fail to prefer freedom from the fuss and the muss of ice, and the annoyance of waiting for ice delivery.

Women are learning, too, that Kelvinator does more than supply dry, even cold—that it is something more than perfected refrigeration that saves its cost in the food wastage it prevents.

She knows that Kelvinator is to the preparation of food by freezing, what the gas or electric range is to the preparation of food by heat.

Ices, salads, and many other delicious desserts are easily and quickly prepared in the Kelvinator ice trays in which, also, cubes of pure ice can be frozen for table use.

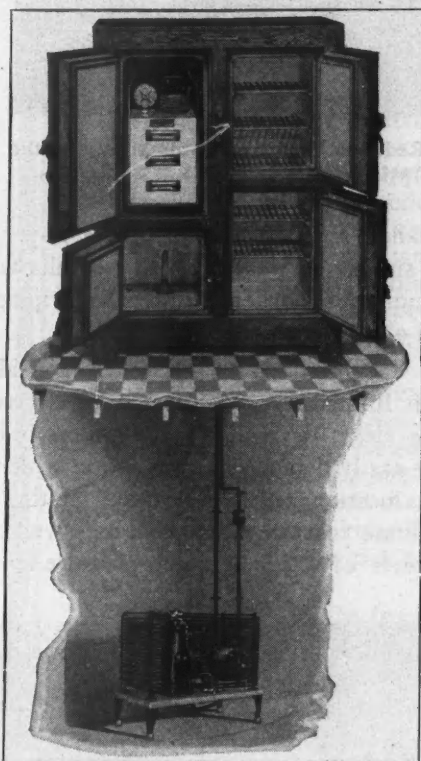
Kelvinator Owners Are Enthusiastic

The thousands of Kelvinator owners throughout America enthusiastically praise its convenience, its automatic, care-free service, and its sound economy.

One of our recommendations to Kelvinator prospects is that they consult Kelvinator owners and learn first-hand just what they have to say about its wonderful convenience.

Kelvinator is made and marketed by an international organization, which pioneered the way to successful electric refrigeration. It is as fully perfected as is the washing machine, the vacuum cleaner or any other accepted household appliance.

It is endorsed by Good House-keeping Institute, the New York Tribune Institute, the Modern Priscilla Proving Plant.



Learn all the facts about Kelvinator. Write today for your copy of "Specifications and Data" and the name of your nearest Kelvinator dealer.

Kelvinator Corporation, 2022 West Fort Street, Detroit, Mich.

Established 1914

Kelvinator

Electric Refrigeration

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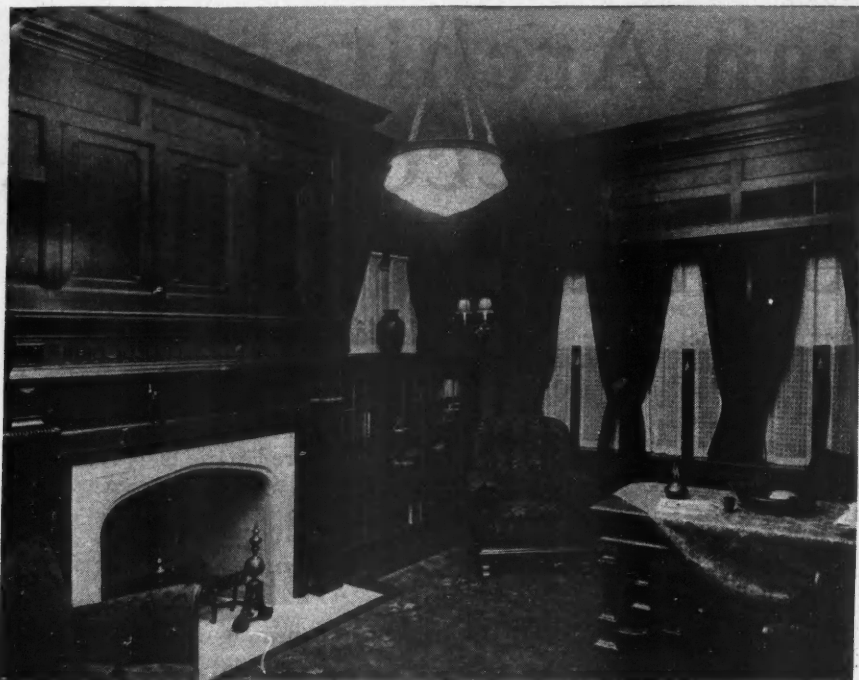


Fig. 5. Large Diameter Glass Bowls Reduces Their Brightness While the Frosted Lamp Bulbs Eliminate Ceiling Shadows.

will be less if wall switches are installed to control the lights since pull chain sockets are subject to wear and disorders. Of course, a radium luminous marker on the end of a pull chain pendant will eliminate groping in the dark.

3—A utilitarian feature of modern luminaires of considerable importance is that of the elexit or wall plate outlet enabling the luminaire to be easily detached and, if desired, removed to separate location. The elexit outlets make for flexibility, facilitate rearrangement of furniture, and enable the renter of a home to own and carry with him his own lighting devices.

4—In the library or dining room the utilitarian features of the ceiling units are often neglected. If as in Figure 4, the small semi-direct bowl is used, one should be particularly careful to have a wide open top and to have sufficient distance between the ceiling and glass to provide for a large area of illuminated ceiling rather than a small bright spot directly above the bowl. The reduction of glare is accomplished by a wide diameter of bowl on the order of Figure 5, and should the ceiling shadows be objectionable, it is an easy matter to use frosted or diffusing bulb lamps within these units.

5—One very important feature of usefulness of a luminaire is exemplified in Figure 6. This is the

ability of the unit to provide considerable light in a horizontal direction, or to illuminate beneath cabinets, tables, and other furniture. Naturally the open bottom direct downward reflector is the least serviceable from this particular viewpoint.

6—In the basement or garage the usefulness of an incandescent lamp is increased twofold by the proper choice of reflector, and in general the enameled metal or RLM type meets the average conditions most satisfactorily.

7—Before making any general choice of luminaires, it is well to keep in mind the fact that the supreme purpose of the lighting equipment is to furnish soft and agreeable illumination which means that bare lamps must not be exposed to view and that ordinarily the lighting units should be inconspicuous and

out of the way. Cleaning has a great deal to do with lighting results and no housewife can afford to neglect dusting or wiping the lighting accessories at least once a month.

If these considerations are borne in mind when fixtures are selected and the advice of competent electrical dealers is heeded, the housewife should have an installation which will require the minimum amount of care and at the same time be a feature of the home which may well be a cause of pride and will be noticed with pleasure by visitors.

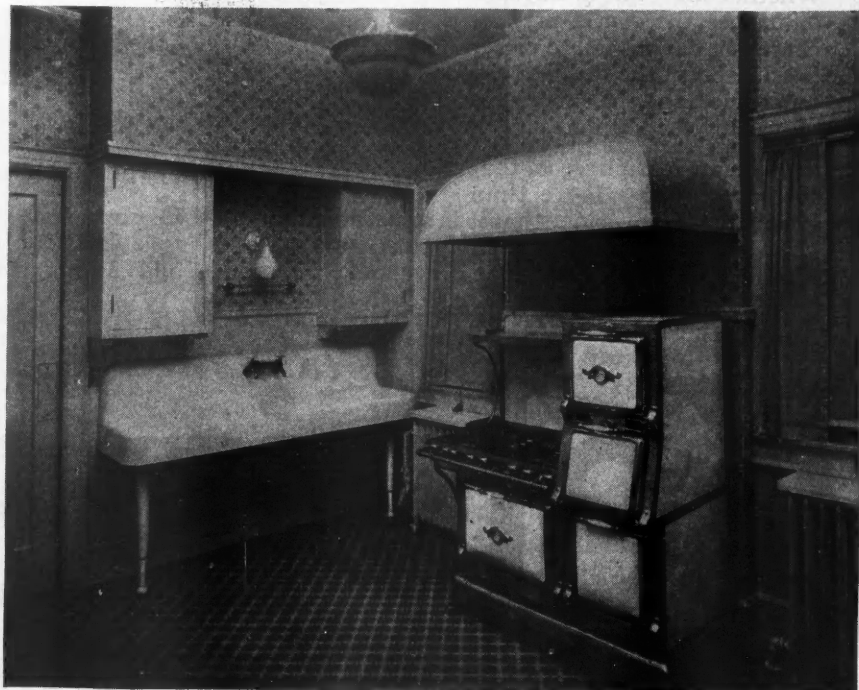
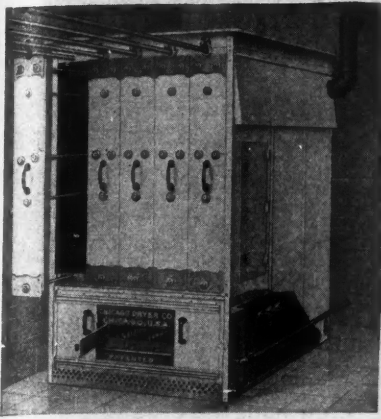
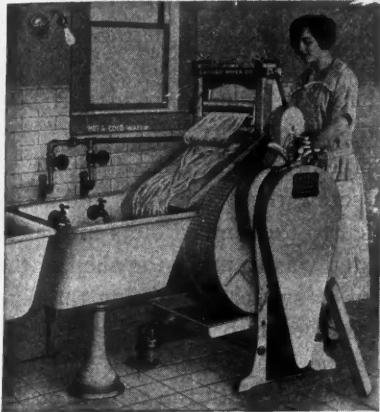


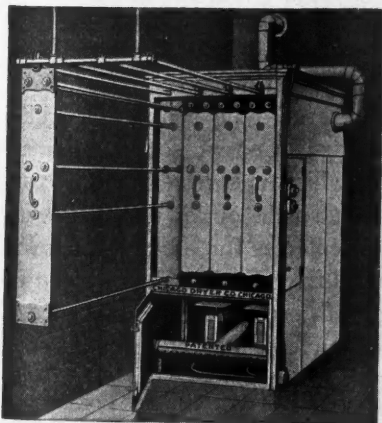
Fig. 6. Widely Diffused Light Facilitates Seeing Beneath Cabinets and Furniture.



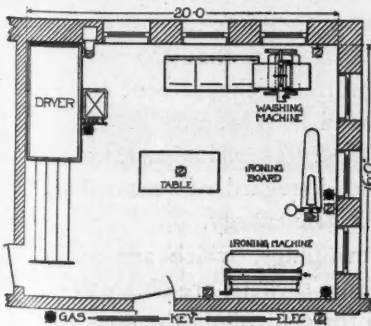
Chicago-Francis Interior Gas Heated Dryer



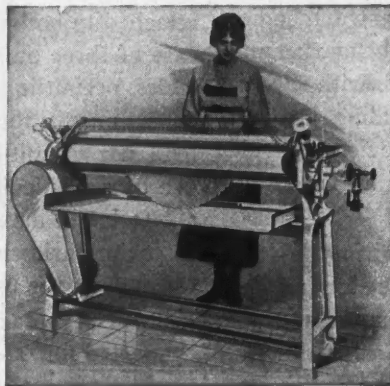
Chicago Electric Washer-Safety Wringer



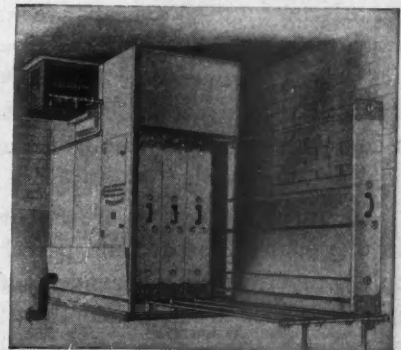
Chicago-Francis Electric Dryer



Typical Floor Plan of Laundry Room



Chicago 3-Roll Ironer, Gas Heated



Chicago-Francis Dryer, Stove Attached, Gas or Coal

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Remember, this service is furnished free. Contractors, Builders, Architects and prospective users, take advantage of it now.

Write for Our Catalog

Chicago Dryer Company

2214 N. Crawford Ave., Chicago

Plugs, Receptacles and Control Switches

REGINALD TRAUTSCHOLD, M. E.

The Society for Electrical Development, Inc.

ELECTRIC service from the viewpoint of public interest can be traced backward to the entrance switch and panel box, just as the central station responsibility for a domestic installation may be said to cease at such point. Fuses and such protective cut-outs are—well, are matters of a technical character in which the public interests itself only when there is trouble, but in plugs, receptacles and control switches every household is vitally interested. Without such wiring devices—and they are far from being familiar to the public—there would be little electric service.

A decade or two ago, lamp sockets and push button switches—perhaps a few snap switches in addition—covered the line pretty completely, but today even the familiar lamp socket has taken unto itself new uses and functions. There are the keyless, the single and the double pole key, the push bar and the chain pull lamp socket bodies of standard types and similar equipment with "current tap," or plug outlet, connections. These socket bodies fit into a large variety of socket caps—female, pendant and angle—or into an equally wide assortment of socket bases and most of these devices can be obtained with locking attachments.

Customarily these sockets have capacities of 250 watt—250 volt or 660 watt—250 volt, a point which should not be overlooked by an electrical contractor in view of the prevalence of attaching relatively heavy wattage appliances to lighting circuits by means of twin and multiple receptacle plugs. Quite aside from the harm of frequent overload upon the receptacles themselves, the functioning of protecting fuses at inopportune times may introduce those annoyances which lead to the regrettable practice of over-fusing circuits or to the bridging of fuses. This is a serious matter which deserves the careful attention of every contractor engaged in building activities.

Switches of the key, pull chain and push button types for connection to socket bases and similar switch bodies for attachment to socket caps are now on the market and much the same varieties in switch rosettes, with capacities up to 5 amperes at 125 volts, including pendant cap type switch rosettes. These latter devices provide a convenient switch within the length of an extension or drop lamp cord.

These specific devices are essentially wiring devices, as they constitute part and parcel of the lighting circuits proper, being independent of the lamps and appliances which are subsequently attached. In addition, modern electrical installations call for the lavish use of plugs, receptacles (meaning convenience outlets for the most part) and control switches, also termed wir-

ing devices, but which, with the exception of the switches, are more or less independent of the lighting circuits.

Plugs

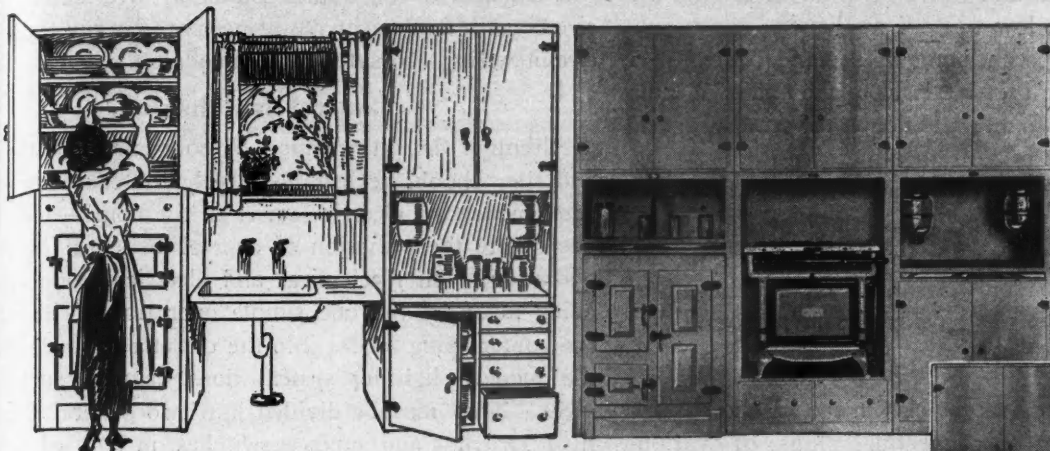
For the attachment of appliances, portable lamps, etc., to lamp sockets, screw plugs are quite generally used and familiar as they have become they have passed through well defined stages of development. Originally they were of the solid one-piece variety, possessing the disadvantage of twisting and snarling-up the lamp cord as they were screwed into the fixed lamp socket receptacles and many appliances and portables are still furnished with the older type of plug. The second step in development was to make the plug in two separable parts, a screw receptacle base and a cap with contact blades fitted to the contact slots in the receptacle, and the final step was to make the shell of the screw plug free to turn, or swivel, permitting the plug as a unit to be easily screwed into or out of the lamp socket without twisting the lamp cord.

The two part plugs are made with the contact blades projecting from the plug cap either parallel or in line with one another, the former arrangement of contact blades being the more usual. A plug cap is also obtainable on which the arrangement of contact blades can be altered to fit screw bases with either parallel or tandem arrangement of contact slots.

A development of the screw plug connection which has met with popular favor is the twin socket and multiple socket screw plug, which is screwed into a lamp socket and so converts a single outlet into one with two or more available receptacles for the accommodation of lamps or connecting plugs. Such a device for two lamps or for one lamp and a low wattage appliance is unquestionably a great convenience and permits of a substantial and justifiable extension of the electric system. When relatively heavy wattage appliances are attached to both the outlet sockets, however, and in the case of three or four socket screw plugs or plug receptacles, permitting the use at the same time of appliances consuming in the aggregate more than the permissible load per circuit—660 watts at the present time—the use of such devices should be discouraged. They are apt to breed dissatisfaction, to say the least, as well as to invite carelessness and disregard of reasonable precautions in the use of electric energy.

Twin receptacle screw plugs, which are advisedly connected to 660-watt lamp sockets, are obtainable with a pull chain mechanism for controlling the operation of one socket outlet without interfering with the operation of a lamp or appliance attached to the other outlet, as

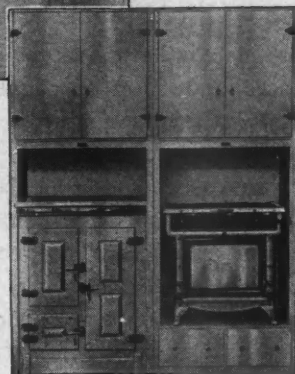
Steel Pantries, Kitchen, Linen, Wall, Broom, Ironing Board, Vacuum Cleaner and Medicine Cabinets



Cabinets can also be arranged to accommodate space for the sink or windows.

Where Steel is Replacing Wood in the Home

This is the age of steel. Its superiority and economy over wood is everywhere reflected in the modern home. Like the enameled iron plumbing fixtures have replaced the old tin and wood tubs so, too, are good-looking, permanent steel cabinets replacing wood in practically every room in modern homes, apartments, hotels and hospitals.



Doors latch independently of each other and fit with dustproof snugness. The Majestic Steel Kitchen not only pays for itself but actually saves \$100 and upwards over the cost of ordinary pantry construction.

STEEL MAJESTIC CABINETS

conform to quality specifications in every respect, yet they are installed at a cost that assures the greatest possible economy. Majestic Steel Cabinets combine the advantages of high grade furniture steel, electrically welded; three applications of the finest enamels both inside and out; rigid heavily nickel-plated hinges and latches; and are designed for time and labor-saving installation. You can find "cheaper" cabinets, but you cannot find greater economy anywhere regardless of cost.

To The Architect

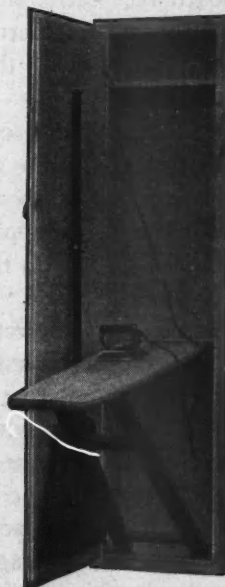
When you specify Majestic Steel Equipment you know that many years of successful quality manufacture backs your recommendations. Permanent satisfaction is your best advertisement. Our engineering department is at your service.

To The Builder

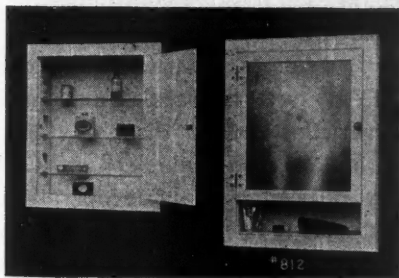
Majestic Steel Equipment has proven its ability in making buildings more saleable, more rentable and more profitable. Old buildings remodeled with Majestic Steel Equipment not only sell quicker but pay a handsome extra profit.

To The Owner

When you install Majestic Steel Cabinets you make an enduring investment. Your initial cost is the only cost. No repainting or refinishing, no warping, sagging or deterioration. Just a lifetime of dependable, economical service. Write for catalog.



It's these little, inexpensive refinements in the home that appeal to the women. They make renting and selling an easier job.



Costs less than completely equipped, wooden medicine cabinets. Majestic quality throughout. One piece—no mitered corners. Automatic door catch. Removable glass shelves. Reversible door swing. 1/4 in. plate glass mirrors. Quantity production—low price. Two sizes 14"x18" and 16"x20" mirrors, with and without recess below door.

Shipped Ready For Installation

Majestic Steel Cabinets are finished when you get them. Steel Pantries come in units for every conceivable arrangement. Special units to fill any part or every inch of floor space. Our Engineering Department is ready at all times to cooperate with you on any installation. Write for detailed specifications and catalog.

MAJESTIC STEEL CABINET CO.
 "Household Steel Cabinet Headquarters"
 4211 Belle Plaine Ave. Chicago, Ill.

MANUFACTURERS' REPRESENTATIVES: Agents who will qualify for representation in the choice territories still available will find Majestic Equipment a highly remunerative acquisition to their present line. The satisfaction and good will of Majestic customers is furthering pleasant business relations for our agents everywhere. This is a high grade line for high grade men, an opportunity for go-getters. Write today.

well as in varieties without such switch refinement. Lamp socket plugs with current taps are also procurable and form a neat and convenient device for the use of a lamp and one low-wattage appliance.

Cord connectors, consisting of a standard two-part separable plug, one part attached to the end of a lamp cord and the other to an extension cord, are useful and convenient when it is desired to increase the length of the attachment cord for any purpose. In addition to which there are a number of safe and useful adaptations of plug connections for specific purposes, including a polarity plug for the convenient attachment of certain motor appliances on direct current circuits.

Baseboard Receptacles and Convenience Outlets

The installation of receptacles in the baseboards for the accommodation of connecting plugs of various types was the first step in the development of the present day convenience outlet. These baseboard receptacles were of the flush type, being set in the baseboards and covered with inconspicuous plates, flush with the baseboard surface. The receptacles were of various shapes, the connecting plugs proportioned correspondingly and when in place concealed by hinged lids, but gradually the screw form of receptacle, similar to the ordinary lamp receptacle, was generally adopted. Such outlets accommodated the standard screw plugs with which the attachment cords to appliances and portable lamps are regularly furnished. This refined type of baseboard receptacle, still in quite general use, marks one of the most important steps in the extension of electric service, being the forerunner of the convenience outlet.

The advent of the separable screw plug made possible leaving the screw base permanently in the screw receptacle of the baseboard outlet, as the connection of a portable lamp or appliance entailed simply slipping the contact blades of the plug caps into the contact slots in the receptacle. Obviously, there was no particular advantage in retaining the screw base of the plug, if it could be screwed into the baseboard receptacle and left there, so the present convenience outlet naturally evolved, in which the contact slots are in the receptacle, or outlet, proper. It was also appreciated that such compact, inconspicuous convenience outlets need not always be placed in the baseboard, but could be installed to advantage at any desired elevation on the wall. In this manner trailing lamp cords are removed from the floor and the actual operation of slipping the contact blades into the receptacle slots made very much more convenient.

Standardization of these convenience outlets has led to the adoption of "T" shaped contact slots for the accommodation of either parallel or tandem blade contact prongs and the tendency at present is to have the convenience outlets of the duplex type—two sets of receptacle slots in the one plate. This duplex arrangement is extremely convenient, as it permits a portable lamp and an appliance—even two appliances—to be

served at the same time from one convenience outlet.

Care should be exercised, however, not to abuse the convenience of the duplex outlet by overloading the circuit with appliances requiring more energy than the circuit wiring can safely accommodate.

Control Switches

Although the introduction of convenience outlets—and they should be installed freely to secure the full conveniences of electric service in the home—does not necessitate the provision of control switches for their operation, both mechanical and electrical connections being made by the one simple operation of inserting the contact plug blades into the outlet receptacle slots, the modern lighting system does demand such devices. They may be divided into two general classes, flush switches and surface switches, in both of which several distinctive varieties have been developed that materially add to the convenience of electric service in the home.

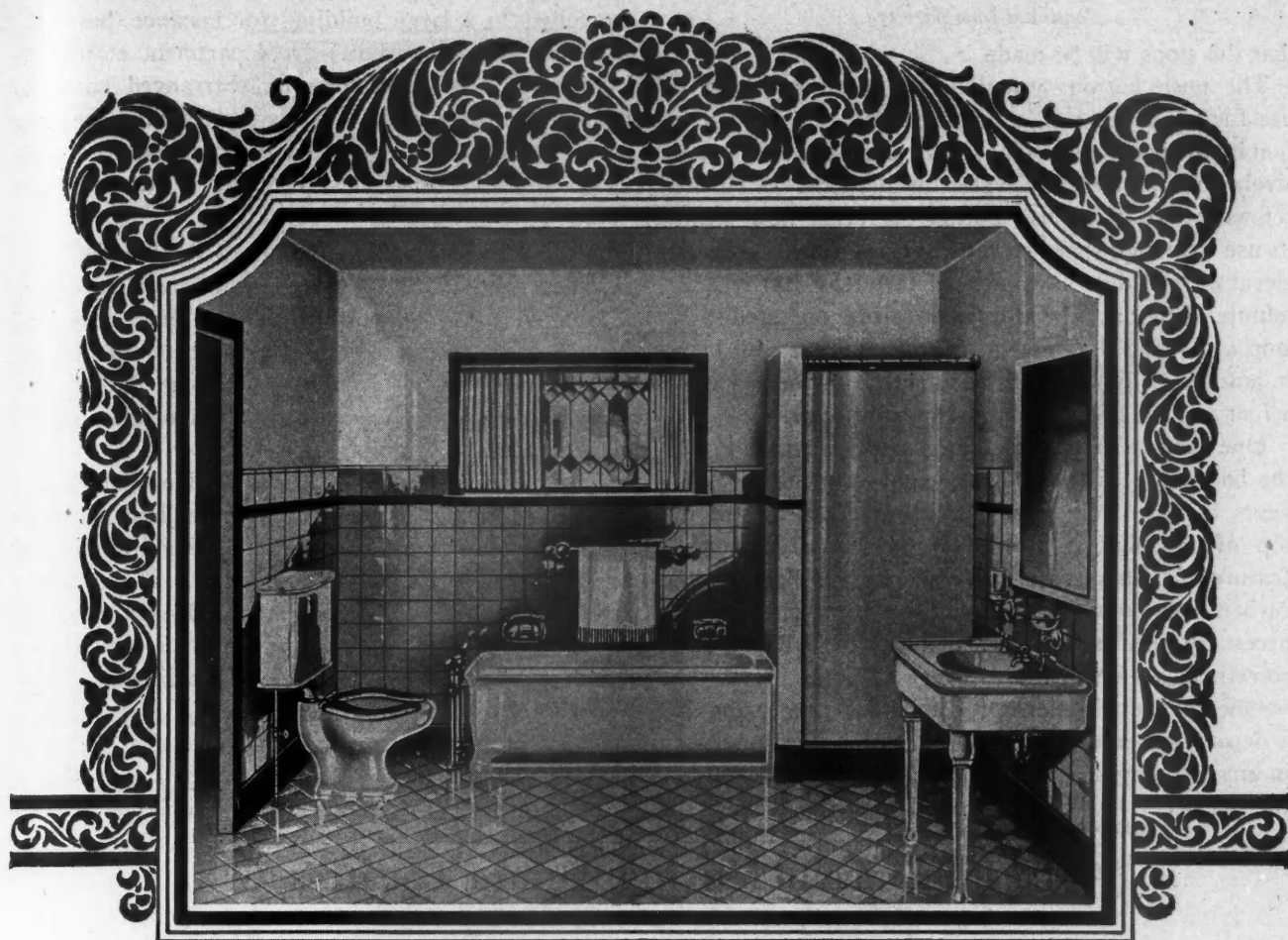
Flush switches are those which are set into the wall and concealed by an unobtrusive flush plate, only the operating mechanism protruding from the wall. Surface switches, on the other hand, project further from the wall, the switching mechanism being on the surface of the wall and enclosed in a suitable saucer like cover. As in both classes similar types, or varieties, of switches are to be found, it is necessary to differentiate between classes in a brief outline of the distinctive features of the more recent developments in control switches.

The push-button switch is usually of the flush type, consisting of on and off buttons, and is procurable in single or double pole, three-point (three-way) and four-point (four-way) varieties. The three-way switches are employed to control a circuit from two different points and the combination of two three-way and one four-way switch permits a circuit to be controlled from four remote points.

A development of the push-button switch, particularly adapted to controlling sets of lights in an electrolier, has an adjustable mechanism whereby the off button can be rotated to various contact positions as well as depressed, in each position controlling the lights on a particular circuit.

Snap, or rotary, switches, in which the handle, or knob, is turned to off and on are also made in single and double pole varieties and for three-way and four-way control, etc., as are also "tumbler" switches. In the latter variety of switch a single operating level projects which only has to be tilted up or down to make or break the circuit. This can be more easily done than pushing in a button or turning a knob, or handle.

Luminous pendants, buttons and tumblers, permitting the switches to be readily found in the dark are now quite customarily employed and there are various pilot light and buzzer reminders to turn out lights, etc., which are deserving of consideration when wiring a building or remodeling an existing installation.



Bathroom in blue and gray SANI ONYX trimmed with black

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A VITREOUS MARBLE

A PRODUCT OF THE MARIETTA MANUFACTURING COMPANY

Recommended for Beauty and Utility

For bathrooms, kitchens, hallways, in fact every place where a sanitary, easily cleaned wall covering is required, choose Sani Onyx.

Sani Onyx is non-porous, non-absorbent, dense, uniform, acid, alkali, stain and weather proof. Repeated cleaning, exposure and severest service leave its original beauty untouched.

It combines the most desirable features of quarried marble, slate, granite and tile with exclusive and valuable advantages all its own. When once in place, is as permanent as the building itself.

Four beautiful solid colors are supplied. Gray, blue, white and black, in either tile

pattern or plain sheets, give splendid decorative effects with no sacrifice of any quality that makes Sani Onyx so satisfactory to both builder and owner.

The same features that make Sani Onyx first choice for the finest and largest buildings make it equally desirable for more modest undertakings. The Marietta Engineering Department is ready to cooperate with you on any size project. Complete details gladly sent on request.

MARIETTA MANUFACTURING COMPANY

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Distributors and Construction Houses throughout the United States and Canada

(Continued from page 173.)

that the stops will be made.

The push button system of operation has been in use for some years on slow speed elevators for operation by the passenger. They have also been used extensively on large freight elevator installations. A further refinement of this push button operation now allows its use with high speed elevator service. The "Tribune" elevators will thus have a speed faster by 100 feet per minute than any elevators heretofore operated. To stop a car traveling at 800 feet per minute and bring it automatically to a flush stop at any floor is quite a feat and calls for auxiliary control mechanism.

One feature of the traction gearless elevator is that the bottoming of the counterweight automatically prevents the car from going into the "overhead" at the top of the shaft. The brake is a most important feature of high speed elevator service. Copper against carbon is the modern practice. Frequent inspection is necessary and the braking surface has to be renewed sometimes as frequently as every 24 hours.

One of the big elevator companies now maintains a department which makes studies of traffic conditions in any building and reports on possible betterments of the service. It has been found that the location of

the toilets in a large building, for instance, has a big effect on elevator traffic. In department stores, the location of the aisles may be rearranged so as to facilitate elevator traffic. While these studies are being made, observers are placed in the building with automatic counting machines, enabling them to report accurately on the traffic.

Elevator Mileage Equal to Railroads

When it is realized that an elevator installation such as that in the Woolworth Building, New York, will have a daily mileage, altogether, of between 600 and 700 miles, or a monthly mileage of some 18,000 miles, it helps one to realize the great importance of the elevator to the skyscraper of today.

The modern skyscraper has been likened to a steel bridge set on end. Structurally, the limit of height apparently has not been reached. Buildings of 100 stories in height are said to be possible. The enormous cost of a building of this height would seem to be prohibitive, but possibly no more so than the 50-story building would have seemed to our forefathers. Therefore, the future historian may regard our present ideas on this subject as antiquated and streets of the future may be lined with 100-story buildings alongside of which our present skyscrapers would look like pygmies.

Influence of Moving Picture Theatres

(Continued from page 179.)

are of black and gold marble with white Italian marble columns and floors. The decorations are in ivory gray and gold, with hangings in red. The stairways are wide and imposing. The paintings hang along the walls of the lobby, at the staircase landings and on the walls of the mezzanine gallery.

From the mezzanine, five stairway entrances and two ramps lead to the balcony seats, the ramps located at the extreme sides. This balcony seats 1,400 persons and is supported on cantilevers.

A combined heating and ventilating system of the modern type serves the building with mushroom inlets under each seat. The air is washed, tempered, heated and humidified in the usual manner, with the main fan mounted on cork and located in the sub-basement so as to prevent any noise of operation reaching the auditorium through the plenum or ducts. The system is so designed that air cooling refrigeration for summer use may be added. There are firewalls between auditorium and stage with a wire woven asbestos curtain in the proscenium arch. The full number of red lighted exits called for by the building ordinance are provided with steel stairway fire escapes.

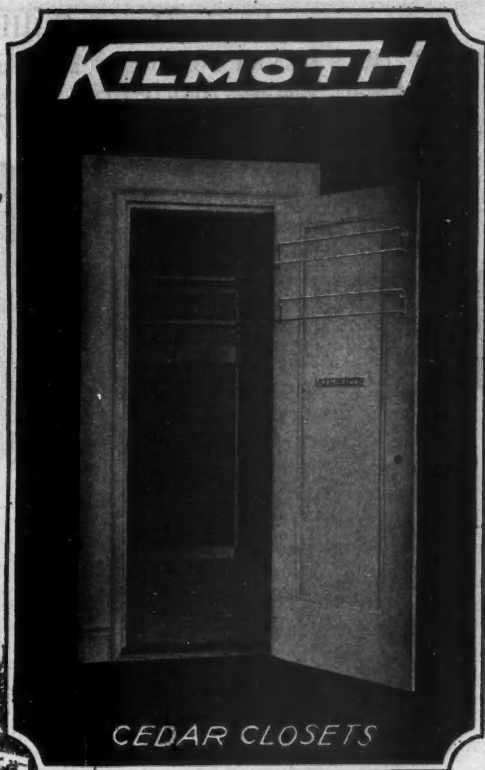
A novel feature of this theatre is that, in addition to finely furnished smoking rooms and ladies' rest room, a play room for children is provided where children may play while their parents are in the auditorium or other parts of the building. It is especially equipped for the entertainment of the little ones.

The Tivoli Theatre, in Chicago; the Fox Theatre,

Oakland, Cal., and many others throughout the United States might be cited as superlative examples of the modern theatre builder's art, of beautiful design and rich in decoration, furnishings and art work. The popularity of motion pictures is directly responsible for the development of a special type of de luxe theatre buildings throughout the United States and some foreign countries. Estimated new theatre construction during 1923 amounted to \$101,891,000 and for the present year reaches the still larger total of \$179,821,700.

What the "Movies" Have Done

The palatial settings so often shown in the "movies" have undoubtedly had a profound effect upon public taste. The great mass of the people have been educated up to the higher standards of architecture and furnishings which wealth can display. They want more of these features in their own homes and likewise demand better appearance and finish in schools and other public buildings. Builders, themselves, undoubtedly feel the effect of this change in public taste and are earnestly striving to give the public what they demand in the way of finer buildings, better finish and equipment. The problem here, of course, is that, so frequently, a prospective owner's purse is not equal to his tastes. It seems certain that much of the "high cost of building" is attributable, in no small degree, to the present-day, public demand for better looking, finer finished and equipped structures.



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BOON BROTHERS
MONTCLAIR, N. J.

December 6th, 1923.

Kilmoth Products Corp.,
50 Union Square,
New York City.

Gentlemen:

Having used your KILMOTH product for the past year we feel that we should inform you as to its merits and values in the construction of homes.

We have used about 20,000 square feet of KILMOTH red cedar and find that the public place a considerable value on a cedar lined closet when buying a house. After questioning our purchasers who have lived in their homes nearly a year, we find they claim that a KILMOTH lined closet is absolutely moth proof.

We honestly believe that KILMOTH has helped us in disposing of 42 houses this year.

Very truly yours,

Jacob Boon

Be Modern! It will pay you to Install and to have KILMOTH

Kilmoth has modernized Colonial cedar wardrobes and made them available in apartments and even the most modest of homes.

Kilmoth is genuine aromatic red cedar.

When installed in clothes closets, Kilmoth offers the housewife lasting protection against moths and makes a most attractive convenient serviceable clothes closet at a very nominal cost.

Kilmoth is "STANDARD." Insist on it. Endorsed by better architects, contractors and builders everywhere. Increases rental and sales of homes, apartments and apartment hotels.

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TIONS

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50 Union Sq., New York

Where can I get it?

NEWS of the FIELD



Big April Construction in Spite of Downward Trend

THE April building record for the country, although very large, confirms the impression of gradual decline that was indicated by the March figures, according to F. W. Dodge Corporation. April building contracts in the 36 Eastern States amounted to \$480,097,300. This was an 11 per cent increase over March and a 19 per cent increase over April of last year. However, there were only two sections, New York State and Northern New Jersey and the South-eastern States, that showed very large increases over April of last year. Residential and commercial buildings decreased in April and industrial buildings and public works increased. The seasonal peak of building operations usually occurs in April. Last month's volume of construction, measured in new floor space contracted for, showed a drop of 7 per cent from March.

Total construction started from January 1 to May 1 has amounted to \$1,514,968,200. This is an unprecedented figure, being 16 per cent over the corresponding period of last year. However, the increase in New York City has been 115 per cent; and, if the New York City figures be deducted, the remainder of the 36 states shows a decline of 1 per cent from last year.

Analysis of the April record shows the following important items: residential buildings, \$219,139,300, or 46 per cent of the total; public works and utilities, \$88,841,100, or 18 per cent; industrial plants, \$56,360,600, or 12 per cent (this group included a single 35-million dollar power plant in New York City); commercial buildings, \$49,724,300, or 10 per cent; educational buildings, \$33,521,500, or 7 per cent.

Contemplated new work reported in April amounted to \$607,639,700, a decrease of 10 per cent from the amount reported in March.



Furnace Manufacturer Dies

DAVID W. BOVEE, founder and the head of the Bovee Furnace Works, Waterloo, Iowa, died recently at his home in Waterloo after an illness of two weeks. He was 70 years old.

Mr. Bovee was born in Richland County, Wis. He established the Iowa Grinder and Steamer Works in 1895 with his brother and a few years later began the production of furnaces.

Louis Henry Sullivan

LOUIS HENRY SULLIVAN, architect, died in the Warner Hotel, Chicago, April 14, 1924. A pioneer in the design and construction of structures of the skyscraper type, Mr. Sullivan's influence on the form of architecture in the United States has been so great that he often was called the "Father of American Architecture."

Mr. Sullivan was among the first, if not the very first, of the American architects to realize the possibilities opened up through the use of steel construction. Throughout his life he protested against following tradition blindly and was an exponent of many original ideas.

Among his achievements are the Prudential Building, Buffalo, N. Y., which has served as an inspiration for many later buildings; the Auditorium Building, Chicago, which for the first time combined the functions of an office building, a hotel and a theater under one roof, and the Transportation Building at the Columbian Exposition. The Auditorium still remains one of the outstanding examples of fine acoustics, unsurpassed by buildings erected later.

Mr. Sullivan died just as his autobiography, named "The Autobiography of an Idea," was coming from the presses. Book reviewers and architects combine in praise of the book.

Mr. Sullivan was born in Boston, September 3, 1856. He came to Chicago in 1880.



New York Desco Quarters Opened

THE Detroit Show Case Company, Detroit, has recently opened a warehouse in New York City, 562 W. 52nd street, according to H. Mallott, secretary and treasurer. A complete stock of Desco store front construction materials will be carried there.

This step was taken in order to insure even more prompt and efficient service than has been offered heretofore.

James H. McKee has been appointed manager of the new warehouse.



The Miller Company Reorganized

ANNOUNCEMENT is made of the reorganization of the Edward Miller & Co., of Meridan, Conn., under the name of the Miller Company. The Miller Company has acquired the Ivanhoe-Regent Works of the General Electric Company, which becomes the Ivanhoe division of the Miller Company.

The personnel, factory, engineering and sales service of the two organizations have been combined.



Bowlus Made Fenestra Sales Chief

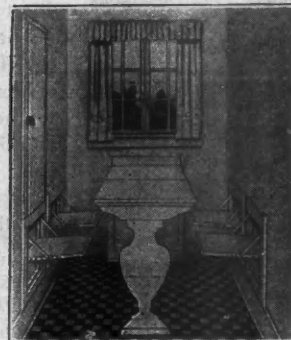
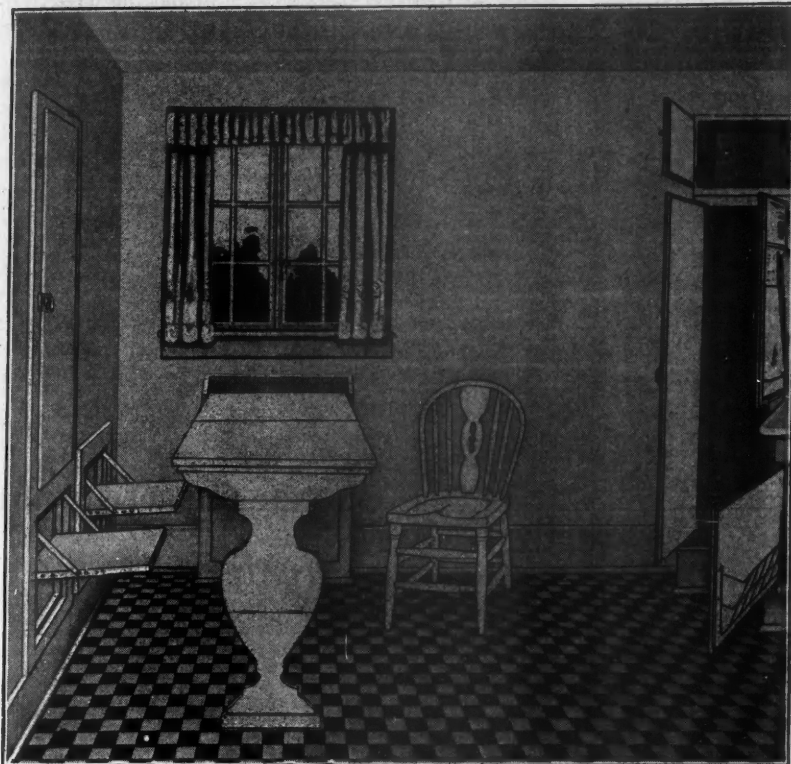
ANNOUNCEMENT has been made by the Detroit Steel Products Company of the appointment of B. E. Bowlus as manager of Architectural Fenestra Sales. Mr. Bowlus has been identified with the steel sash business for fifteen years.



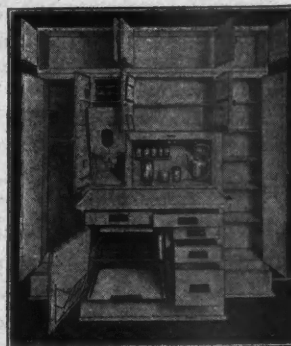
Louis Henry Sullivan, 1856-1924.

KITCHEN MAID

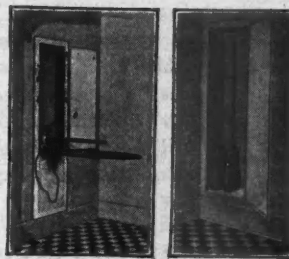
S T A N D A R D K I T C H E N U N I T S



The Pulmanook can be installed with 4 chairs and table, as shown above, where space is available.



Combination 1-X includes a Kitchen Maid cabinet with broom closet at one end, dish closet at other and closet for dishes and staple foods across the top.



The disappearing Ironing Board folds into the wall when not in use. Supplied as a separate unit or as a part of the Pulmanook. Can be installed in new or old homes.

The Broom Closet can be built in or set in any kitchen. It keeps brooms, mops and other cleaning equipment out of the way.

Use Units and Make More Profit on Kitchens

PROFIT ON KITCHENS! Of course you can profit. Whether you're building a home for yourself, to rent or to sell—or building it for someone else—you can profit by installing Kitchen Maid standard units.

They cost no more than old fashioned cupboards—they bring the convenience of having an ironing board which disappears in the wall—dish closets, broom closets, set against or into the wall, or can be used in connection with a standard Kitchen Maid cabinet—and complete dining alcoves which fold away when not in use.

They save time, save wall space, give more modern, more appealing kitchens. They're built by the builders of the famous Kitchen Maid cabinet, and designed to fit between studding wherever possible.

Send for dimensional drawings, catalog, and special price to builders.

WASMUTH-ENDICOTT COMPANY, 1360 Snowden Street, Andrews, Indiana

"Let the Kitchen Maid Be Your Kitchen Aid!"

KITCHEN MAID

STANDARD UNIT SYSTEMS

WASMUTH-ENDICOTT CO.,
1360 Snowden St., Andrews, Ind.

Please send me the book of Kitchen Maid Standard Units.

Name

Address

City

State

Disston & Sons Official Dies

EDMOND B. ROBERTS, a vice-president and secretary of Henry Disston & Sons, Inc., died at his home in Philadelphia, February 22nd.



Edmond B. Roberts, Vice-President and Secretary, Henry Disston & Sons. 1875-1924.

Mr. Roberts was born in Philadelphia, September 17, 1875, and was forty-eight years old at the time of his death. He is survived by his widow, Mrs. Ida de V. Roberts, and a brother, Elmer S. Roberts.

Mr. Roberts' health had been failing for some time, but he had been at his desk only three weeks previously. Death was due to bronchial pneumonia.

The career of Mr. Roberts constituted a romance of modern business. In 1890 he came to the Disston organization as an office boy, at the age of fifteen years. His ability soon won for him a position assisting the secretary of the company, where his efficiency brought steady advancement. In 1908 he was appointed assistant secretary, and in 1914 made secretary and a vice-president of the company, continuing in these capacities until his death.

Celotex Acoustical Co. Takes Over Union Acoustical Interests

THE CELOTEX ACOUSTICAL COMPANY, manufacturers of Acousti-Celotex, of St. Louis, Mo., have taken over the interests of the Union Acoustical Company, also of that city.

The officers of the Celotex Acoustical Company for the current year are as follows: Mr. B. G. Dahlberg, president; Mr. W. S. Trader, vice-president and general manager; Mr. T. B. Munroe, vice-president; Mr. C. G. Muench, vice-president; Mr. C. G. Rhodes, treasurer; Mr. C. F. Dahlberg, secretary; Mr. J. L. Fredrick, assistant treasurer; Mr. E. B. Roberts, assistant secretary; Mr. M. F. Harris, advertising director, and Mr. Edward Hopkins, Jr., assistant advertising director.

The new company will immediately start to manufacture merchandise and sell Acousti-Celotex on a larger scale than that of the Union Acoustical Company.

John E. Parker Dies

JOHN E. PARKER, general manager of the Bell Furnace and Manufacturing Company, Northville, Mich., died in Northville recently after a very short illness.

Mr. Parker had been with the Bell company but a few weeks before his death. His successor has not as yet been announced.

Mahogany Association Elects Officers

AT the annual meeting of the Mahogany Association, Inc., held in Louisville, Ky., recently, the following officers were elected for the coming year:

President, F. D. Sawyer, Boston; first vice-president, Stewart Smythe, Philadelphia; second vice-president, W. B. Martin, Cleveland; treasurer, F. C. Leary, New York; assistant treasurer, J. C. Wickliffe, New York; secretary, F. C. Schmitz, New York, and assistant secretary, A. L. Bahr, New York.

The directors chosen are: D. H. Allen, chairman, New

York; Reuben Arkush, New York; H. A. Freiberg, Cincinnati; C. C. Mengel, Jr., Louisville; Stewart Smythe, Philadelphia; T. R. Williams, New York, and F. D. Sawyer, ex-officio, Boston.

Convenient Joist Scale Available

THE engineering department of the fireproof materials division of the Milwaukee Corrugating Company has prepared a special scale for quickly determining the number of Milcor steel domes required on reinforced concrete construction involving the use of concrete joists.

The Milcor "Joist Scale" may be applied to blue prints of $\frac{1}{8}$ -inch or $\frac{1}{4}$ -inch scale and will tell at a glance the correct number of Milcor steel domes needed for 5-inch joists spaced 25-inch center to center or 6-inch joists spaced 26-inch center to center.

The scale is white celluloid, 12 inches long by $1\frac{1}{4}$ inches wide. The computations are arranged along each edge of the scale, thus furnishing the four standard computations mentioned above. Architects, draftsmen, engineers or contractors can obtain Milcor joist scales free of charge by writing for them on their business letterheads to either the main office of the Milwaukee Corrugating Company, at Milwaukee, Wis., or to any of the company's branches, at Kansas City, Mo., Minneapolis, Minn., or La Crosse, Wis.

Southern Pine Hanger Issued

AN attractive new wall hanger in colors setting forth the merits of Southern Pine flooring, of both the edge grain and flat grain varieties, has just been published by the Southern Pine Association, New Orleans, La. These handsome wall hangers are being distributed upon request to lumber dealers throughout the country.

The new wall hanger is suitable for window display purposes, for exhibits at fairs and for a variety of uses.

Laminex Doors Tacoma Show Feature

A DOOR, which was soaking in water from Monday evening until the following Sunday, was one of the attention attracting exhibits of the recent Own Your Home exhibition.



The Wheeler, Osgood Company Made a Novel Display of Their Doors at the Tacoma Own Your Home Show.

The unique method of illustrating the substantial and permanent nature of their product was the device of the Wheeler, Osgood Company, manufacturers of Laminex doors.

The Tacoma show was under the direction of John Dower, president of the Tacoma Own Your Home Association.

MAIL US COUPON BELOW!

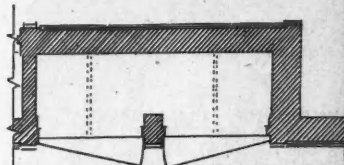
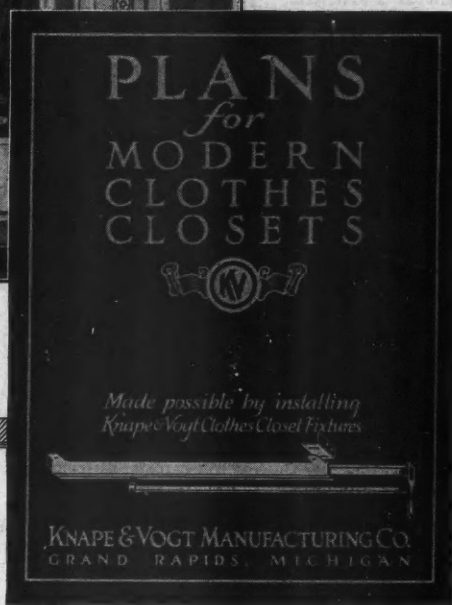


Get This FREE Folder of Closet Plans for The Modern Home

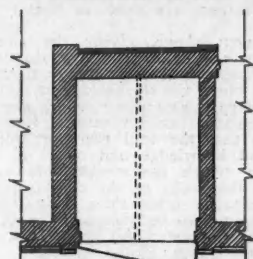
See for yourself how easily you can include Knappe & Vogt Modern Clothes Closet Fixtures and provide in your original plans and specifications for unlimited closet capacity, using less space and at a saving on building costs.

The wide range of uses make Knappe & Vogt Clothes Closet Fixtures adaptable to every closet need. For use in private residences, clubs, schools, lodges, offices, factories, stores, cloak-rooms, etc.

Knappe & Vogt Clothes Closet Fixtures are carried in stock by hardware stores. They are immediately available in multiples of 2 inches from 12 inches to 60 inches in length. Special lengths can be made to order. Send specifications for our quotations. If no dealer in your city, your requirements will be taken care of direct.



PLAN OF
DOUBLE CLOSET
SHOWN ABOVE



PLAN OF SINGLE CLOSET
SHOWN ABOVE

KNAPE & VOGT MANUFACTURING COMPANY

GRAND RAPIDS, MICHIGAN



Please send me your free folder of blue prints showing the easy installation of K. & V. Clothes Closet Fixtures.

.....
YOUR FULL NAME

Address

(Check which)

() Architect

() Contractor

() Builder

Roofing Tile Manufacturing Company Changes Name

ANNOUNCEMENT has just been made that the Mid-Continent Clay Company, manufacturers of high grade roofing tile, has changed its name to the Niels Esperson Tile Company.

The company has a large, well equipped plant and sales office at Peru, Kan., with executive offices at Houston, Texas, and branch office at Atlanta, Ga. The products of the company, formerly sold under the trade name of "Midco Products," will in the future be known as "Invincible Tile." The new trademark of the company shows a reproduction of a medieval castle combined with the trade name.

The company was founded some three years ago by Mr. Niels Esperson, Texas financier. The change in the name of the company is the result of a desire on the part of Mrs. Esperson, surviving wife and new owner, to commemorate the high ideals and progressive policies of Mr. Esperson, and to let the company stand as a worth-while monument to his memory.

At the time Mr. Esperson took over the plant at Peru, the plant was devoted entirely to the manufacture of face brick. One of the first steps taken to insure the growth of the new company's business was the addition to the personnel of the company of Mr. L. G. Nelson, long identified with ceramic industry. Mr. Nelson has spent twenty-one years in upbuilding the tile industry, advancing from the position of pattern boy to that of plant manager.

After a close survey and analysis of the shale at Peru it was found to be ideal for the manufacture of high grade roofing tile, and it was decided, therefore, to devote the plant entirely to this purpose. The plant has manufactured tile exclusively since January 1, 1923.

The company now makes a full line of roofing tile, including plain, glazed and fire flashed tiles, with distribution over the greater portion of United States, and has become a real factor in the tile field.

In changing the name of the company Mrs. Esperson emphasized the fact that there is no change whatever in the management of the company, its policies, or the high quality of its products.

The sales department of the company is headed by Mr. L. E. Wallace, who has had extensive experience in the distribution of roofing tile, and associated with him is Mr. B. H. Miles, who has had twelve years' experience as an architect and entirely familiar with all details of roofing plans. The branch office at Atlanta, Ga., is under the management of Mr. A. S. Lewis, who has had extended experience in handling roofing tiles.



Lumber Officials Named

OFFICERS elected at the twenty-second annual meeting of the National Lumber Manufacturers' Association were: President, Frank G. Wisner; first vice-president, E. L. Carpenter; second vice-president, R. W. Vinnege; third vice-president, E. A. Frost; treasurer, John H. Kirby; secretary-manager, Dr. Wilson Compton.

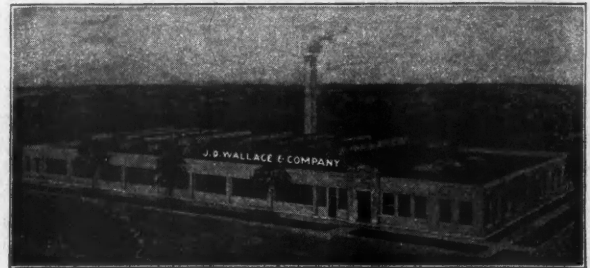
At the ninth annual meeting of the Southern Pine Association at New Orleans, La., March 11-12, the following officers and directors were elected: President, E. A. Frost; vice-presidents, P. S. Gardiner and A. J. Peavy; treasurer, Henry M. Young; secretary-manager, H. C. Berckes. Directors: Alabama, John H. Kaul and E. F. Allison; Arkansas, O. O. Axley and C. A. Buchner; Florida, J. C. Foley and M. L. Fleishel; Georgia, Thomas Hamilton; Louisiana, D. W. Reimers and A. J. Peavy; Mississippi, P. S. Gardiner and W. E. Guild; Oklahoma, D. V. Dierks; Texas, John H. Kirby and F. H. Farwell; Missouri, Charles S. Keith, E. A. Frost and Judge John H. Lucas, chief counsel.

Wallace & Co. in New Factory

J. D. WALLACE & COMPANY, manufacturers of wood-working machinery, have recently occupied a new model plant erected at 134-158 South California Avenue, Chicago.

The firm started making light weight, portable machines for the woodworking and allied trades, designing their product to bridge the gap between handsawing, planing and other wood-working operations and the heavy woodworking machines.

The new Wallace plant is a model of modern manufacturing practice. It is of one-story, fireproof, daylight construction.



The New Factory Occupied by J. D. Wallace & Company, Manufacturers of Portable Woodworking Machinery, 134-158 South California Avenue, Chicago. It is planned for progressive manufacturing and assembling operations. C. W. Lampe, architect.

All of the operations are confined to the single floor. The manufacturing and assembling is done on a highly specialized progressive system in which each machine in the process of manufacture moves ahead steadily until completed, tested and ready for shipment.

Half of the plant is ready now for occupancy and the second section is to be started in the near future.



STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of AMERICAN BUILDER, published monthly at Chicago, Ill., for April, 1924.

STATE OF ILLINOIS }
COUNTY OF COOK } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared E. L. Hatfield, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AMERICAN BUILDER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, American Carpenter & Builder Company, Chicago, Ill.
Editor, Wm. A. Radford, Chicago, Ill.

Managing editor, Bernard L. Johnson, Chicago, Ill.
Business manager, E. L. Hatfield, Chicago, Ill.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.)

Wm. A. Radford, Chicago, Ill.; H. M. Radford, Chicago, Ill.; Roland D. Radford, Chicago, Ill.; Wm. A. Radford, Jr., Chicago, Ill.; E. L. Hatfield, Chicago, Ill.; G. W. Ashby, Berwyn, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is _____ (This information is required from daily publications only.)

E. L. HATFIELD,
Business manager.

Sworn to and subscribed before me this 31st day of March, 1924.

ANDREW JOHN NAUMANN,
(My commission expires Oct. 25, 1925.)



Many builders have proved it!

They have proved in actual tests that you can lay twice as many Genasco Latite Shingles per hour as any other kind—individual or strip.

The self-spacing, quick-covering features of Genasco Latite Shingles, however, are only two of their outstanding advantages that appeal to both builders and building owners.

The weather can't budge them. A metal "key" at each shingle butt clamps them firmly and flatly to the roof deck. No curling, no bulging, no flapping in the wind.

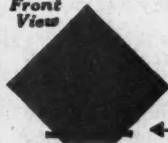
The double butts of Genasco Latite Shingles cast a "shadow line" that gives distinction to a roof. Finely crushed slate—in natural, unfading red, green and blue-black colors—makes them attractive and firesafe.

Genasco Latite Shingles conform to any type of architecture. They are economical for any type of building—home, industrial or farm. Write at once for illustrated folders.

**THE BARBER ASPHALT COMPANY
PHILADELPHIA**

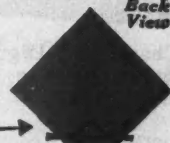
New York Chicago Pittsburgh St. Louis Kansas City San Francisco

Front View



Genasco Latite Shingles are locked tightly to each other. A patented "key" device—invisible on the completed roof—prevents curling, bulging and flapping in the wind.

Back View



← See This Key →



Genasco Latite Shingles

If You Want a Hall Clock—Make It

Plans Make Handsome Piece Available for Homes of Craftsmen

"IT takes a heap of living to make a house a home," Edgar Guest has said in one of his poems. But there are certain inanimate objects around which cluster the associations which make the word "home" mean all it does to American families.

Among these none gives more of an established and comfortable atmosphere than a dignified and useful Grandfather's clock, which, through its very name and its connection with the earliest American traditions, has come to mean all that is fine in the better type of home life.



Charm and Dignity Are Inbuilt Qualities of This Stately Timepiece.

opportunity to combine the pleasure of making such a clock with the profit to be received from the sale of the completed article.

An American concern is specializing in making works and dials for such clocks. They also furnish working diagrams for the cabinet work of the cases, with blueprints as in the sketch and material bills showing the methods of construction and the material required. The works may be obtained with mellow chimes and in a number of grades.

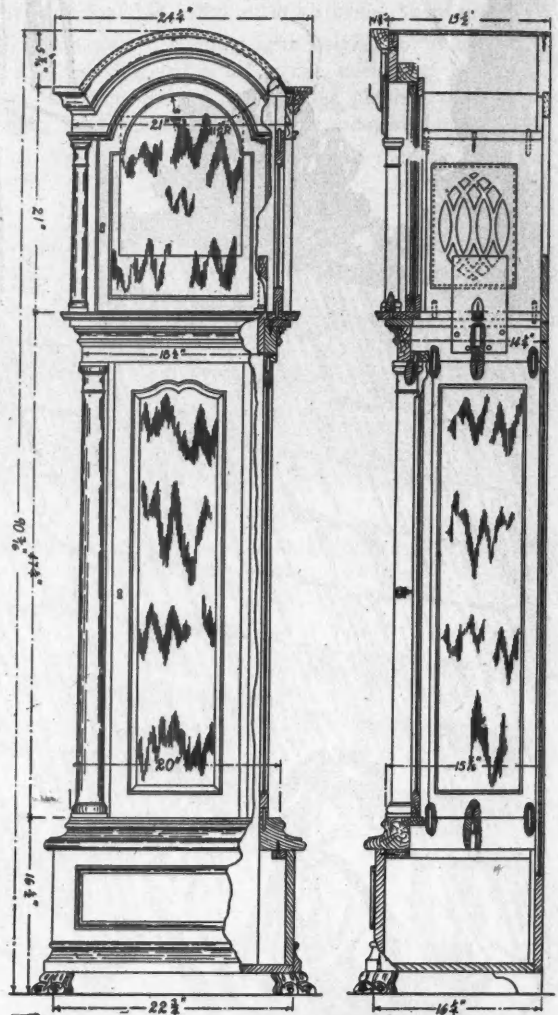
The availability of the working parts of such a clock, together with the working diagrams of the cases, such as are furnished, makes the building of clocks an interesting field for manual training classes which are so popular in many high schools. If the project proved to be too large for an individual student, a high grade clock might well be built for the school as a fitting class memorial.

Grandfather's clocks are expensive because they are valuable. And the best of them are made by hand, the work of a craftsman who loved working in wood and gave to each detail of the construction the care which sought satisfaction in the completed clock rather than thought for the number which might be produced and marketed.

The value of such a clock, carefully fabricated, offers a distinct opportunity to readers of AMERICAN BUILDER, most of them familiar with fine woods and competent to treat them properly. How much more valuable would such a clock be in your home if it had the added satisfaction that you had made it yourself? And how much would its value be enhanced to your children?

Possibly the largest incentive for building such a clock will be found in the satisfaction of working in wood, and the creation of a beautiful and useful article. Many of the readers of AMERICAN BUILDER who now do not take an active part in the mechanics of building often feel their hands itch for the tools of the trade. This may make a satisfactory outlet for that urge.

To others the real value and ready market for a superior hand-made article means an



Details of the Case Ready to Receive Works.



Note How Well This Clock Fits in the Pleasing Atmosphere of This Hallway.



SLATE—the Roof Historical

PERHAPS no other building material is so richly endowed with tradition and historical interest as Roofing Slate.

Being a natural resource and applied to use without any treatment, made it one of the earliest conceptions of primitive man as a suitable and permanent means of shelter.

Although the earliest recollection of Slate, so history says, was in the year 496 A. D., there have been frequent uncoverings by archeologists which would indicate that it was used long before the period of civilization. What a wonderful endorsement of its worth. After thousands of years and still in use, not only as a shelter, but its varied, unimitatable colors and pronounced texture has given it the foremost consideration among modern architects to complete the beauty scheme of their structure.

The accompanying illustration is of Saxon Chapel, Bradford-on-Avon, England, built in the Eighth Century. The slate on the roof, although moss covered and weathered, is still intact, giving the same service today as it did 1200 years ago.



• Largest Shippers of Roofing Slate in the World •
VENDOR SLATE CO. INC.
 • EASTON - PENNSYLVANIA •



Department of Architectural Slate and Display Rooms, 101 Park Ave., New York City

Branch Offices in All Principal Cities

WHAT'S NEW?



EDITOR'S NOTE: *The AMERICAN BUILDER does not accept payment in any form for what appears in our reading pages. In order to avoid any appearance of doing so, we omit the name of the maker or seller of any article we describe. This information is, however, kept on file and will be mailed to anyone interested; address AMERICAN BUILDER Information Exchange, 1827 Prairie Ave., Chicago.*

An Insulation Which Is Poured Into Place on the Job

GROWING interest in insulation and the realization of the need of a provision for making the home less susceptible to the changes of temperature has brought about the production of an insulating material which is radically differ-



Millions of Tiny Air Cells Are Confined in This Insulation Formed of a Gypsum Product and Water.

ent from any of the previous types of insulation, although it serves the same purposes.

This material is a peculiar gypsum product, milled to the fineness of plaster of paris. Mixed with water, it swells to four or five times its original bulk and is poured in place in a liquid form. When it sets, which it does in from 20 to 30 minutes, it is honeycombed with millions of tiny dead air cells, each encased in a thin wall of the gypsum material.

The material can be poured into block molds and the blocks used for insulating walls or it can be poured between the joists of floors, ceilings and roof without first being molded into blocks. It is said by the makers that it will cling tightly to the joists or studding without the use of cleats, making a joint which is impervious to temperature leakage.

The mineral nature of the material makes it fireproof and its use, it is said, greatly reduces the fire hazard of the frame members of a house. The material is vermin-proof and will resist successfully the attacks of rats and mice.

Findings of the Bureau of Standards show that one inch of the material on ceilings (poured on the top side of the lath and plaster) will reduce heat losses 52 per cent, two inches 69 per cent and three inches 77 per cent.

Another use for the material has been found in sound-deadening. It is especially useful for this purpose in thin partitions and around bathrooms in residences.

The type of the product used for ceilings weighs one pound per square foot, one inch thick. The mixture recommended for walls weighs 50 per cent more.

The product is very simple to use, requiring only that it be mixed with water and poured into place. Where the block type is used in walls, the blocks are placed upright between the wall studdings and a small portion of the material used to cement the blocks to the framework.



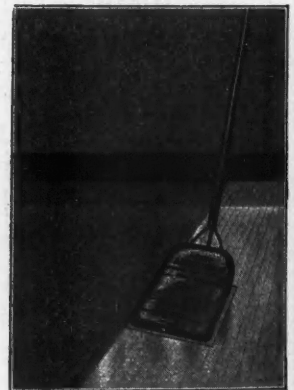
Will Sand, Wax, Polish or Scrub Floors

A HANDY waxer and polisher is now on the market which has a number of convenient features for keeping wax finished floors in good conditions and for re-conditioning old floors without the use of power machines. It consists of a shot-filled canvas bag having a carpet bottom, or polishing surface, and a long, slender handle which clamps securely to the bag.

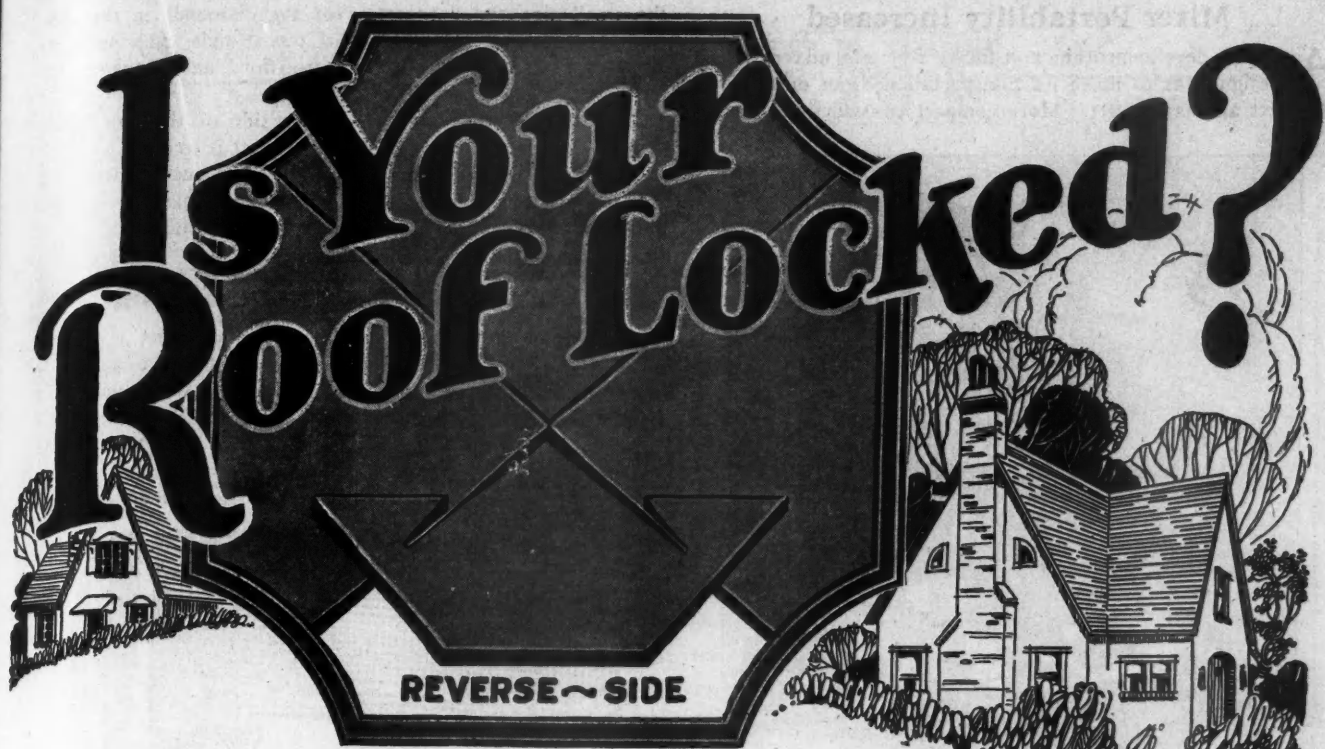
A special waxing pad is furnished which is covered with wax and placed under the canvas bag, which contains ten pounds of fine shot. The waxer is then passed back and forth over the floor by means of the handle, securing an even coating of wax without hard labor or stooping. The waxing pad is then removed and the polisher passed over the floor, which speedily produces a high lustre finish.

The long, slender handle makes it easy to wax and polish under furniture and the fine shot with which the bag is filled protects the furniture from impact or abrasion. By using a sheet of sandpaper under the bag, it is possible to take out dark spots in worn floors by sanding off the old finish. A new wax finish can then be applied over these spots. This device is said to sandpaper better and more evenly than the work is done by hand.

The housewife can also use this tool most effectively and conveniently for dusting hardwood floors and for waxing linoleum. It is also a great labor-saver when used for scrubbing floors. No kneeling or stooping is necessary and water won't hurt the polisher. This is a very practical, inexpensive device which will certainly lighten the labor of caring for wood floors and be useful in any home.



Much of the Labor of Caring for Waxed Floors Will Be Avoided by the Use of This Device Which Eliminates the Necessity of Stooping.



ARRO-LOCK
THE ONLY WAY TO GO
SHINGLES

Are Held in an Unyielding Grip

Sink an arrow into any substance. Then try to pull it out. What resists the pull? The barbs, of course. That's the way with Arro-Lock Shingles. Same principle. Look at the sketch at the top of this page. It shows the under side when nailed on the roof. See how the barbs prevent dislocation of the shingle. Only by complete destruction of those barbs could the shingles curl up—but those barbs won't be destroyed. They're made of asphalt and will last a lifetime.

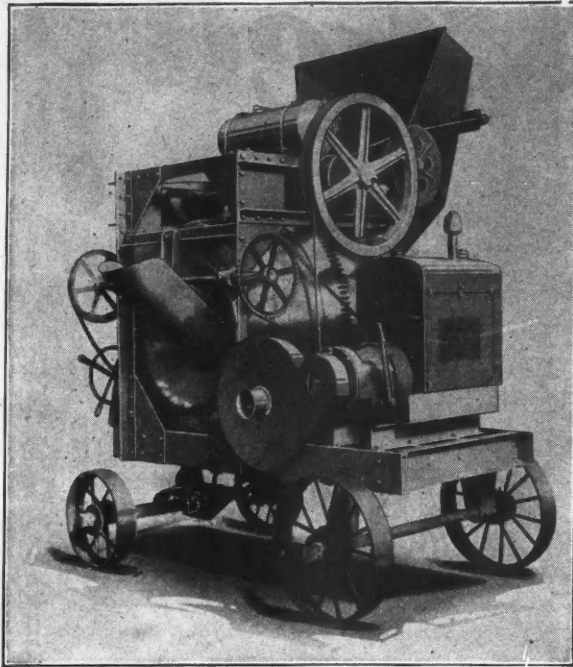
Arro-Lock Shingles interlock one to the other, which really *Locks the roof on*. Besides, they're fire-resisting and exceedingly attractive. Made in mellow toned Red, Green and Blue-Black (natural colors of mineral surfacing) and won't fade. Can be laid over old or new roofs. Simple to apply, and economical.

The illustrations show how ARRO-LOCK shingles are applied and how securely they lock. Get them at your Dealers.

Manufactured by
McHENRY-MILLHOUSE MFG. CO.
 South Bend, Ind. Fulton, N. Y.

Mixer Portability Increased

A NEW development in non-tilting concrete mixers is so designed as to make its transportation from one job to the next an easy matter. More compact construction permits



Rugged and Compact Construction Which Permits This Mixer to Be Mounted on Shorter Trucks Is Designed to Make It Easily Movable from Job to Job.

mounting the machine on shorter trucks, which serves to lighten the machine and generally increase its portability.

The illustration shows the mixer equipped with a power loader, a water tank and a fifteen horsepower, four-cylinder power unit.

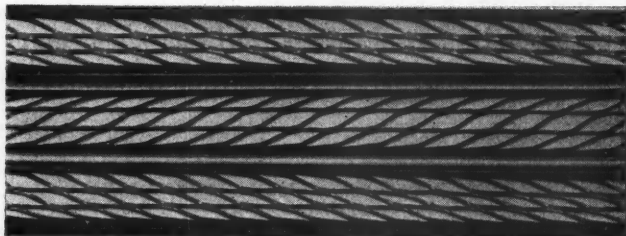
Special attention is paid to the construction of the rear guards, which are of exceptional strength, not only for the protection of the workman, but also to prevent the falling aggregate from coming into contact with the gears of the machine and injuring it.

The mixer has a two-bag capacity and gives a daily production of more than 150 cubic yards.



An Economical Metal Lath

A NEW development in the metal lath field is a product which requires a minimum of plaster, cannot be put on the studding wrong and has special features for preventing plaster cracks and to insure the quality of fire resistance.



This Metal Lath Is Designed to Prevent Waste of Plaster. Only a section of the lath unit is shown. The full unit has ten of the narrow sections like the three illustrated.

The sheets of this material are but one-eighth of an inch thick. According to the makers, since the thickness of the sheet is but the depth of the ribs, less mortar is required for the scratch coat than with metal lath of other types. It is said that because the ribs have wide flanges, and because of

the small size and narrowness of the diamonds in the connecting mesh and the shaping of the strands, only sufficient mortar passes through the lath to afford an adequate plaster key.

The material is reversible. Either side of the lath is the "right" side, so that it is impossible to erect it wrong.

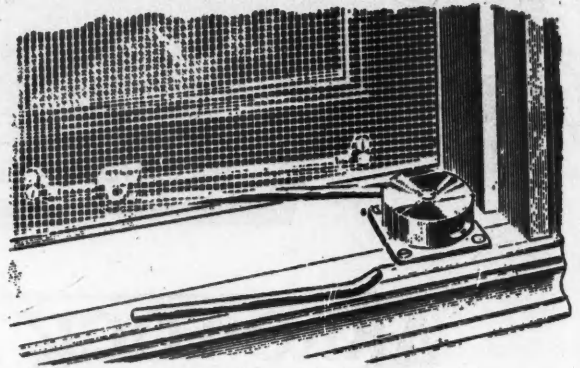
The material comes in sheets 24 by 96 inches, weighing 3.4 pounds per square yard. The accompanying picture shows only a section of the sheet, not its full width.



Convenient Casement Fitting

THE growing vogue of casement windows has created a demand for hardware for windows of this type which is convenient, which works well and which is easy to apply. To meet this need, a line of casement adjusters has been developed for windows which swing outward, with the screens on the interior.

This type of casement adjuster, which is placed under the



screen which is mortised out to receive it locks automatically in any position, holds the window firmly without rattling and works easily and smoothly.

The illustration shows the metal adjuster box which is placed on the window sill. A lever from the adjuster is attached to a bar on the casement sash by a sleeve which slides back and forth as the window is opened or closed. The adjuster is operated from the interior of the room by a simple detachable handle.

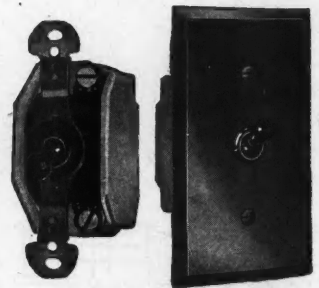


For Shallow Partitions

INCREASING efficiency in the building field, together with a desire to make useful every available inch of floor space, has led to the installation of thin partitions of several types in apartment buildings and homes. Through careful and scientific construction and the use of insulators these partitions may be made as solid and soundproof as the ones of greater thickness.

But the thin partitions present a problem to the electrical contractor as well as to others in the field. For the switch boxes used in the partitions of the ordinary type are too deep to be accommodated in the new type walls.

To meet the need for work of this type, a wall switch box has been developed with dimensions which will accord nicely with the shallow walls. These are made with the convenient and popular tumbler type of switch, and with a number of finishes which are designed to blend with the various types of decorations. The switch, with and without the wall plate are shown in the accompanying illustration.



Thin Partitions in Modern Buildings Call for Special Switches, Such as that Shown Here, Designed to Meet This Need.

SARGENT

Locks & Hardware

Sargent Hardware of brass or bronze is more than harmonious and secure



Builders' hardware for every purpose

There are beautiful Sargent styles to harmonize with every type of architecture and decoration. For Colonial houses, there are door handles which reflect the spirit of early American pieces. Some are distinctive Sargent adaptations of old types especially designed for modern tastes and purposes. For French doors and casement windows, there are artistic lever handles. But no matter what styles or patterns you choose, you are sure of lasting materials and faultless service. Because of this certainty, we suggest that you use Sargent Locks and Hardware on all the doors and windows.

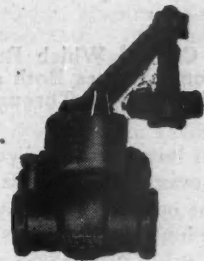
IT IS lasting hardware—built to serve as long as the building stands.

The service records of Sargent locks, handles, knobs and escutcheons, and of Sargent hinges, window catches and miscellaneous fittings on better buildings everywhere bear out our assertion that their selection in the beginning disposes of the important question of hardware once and for all.

No replacements! No upkeep! These are not promises. They are results which you can verify.

But the use of enduring metals and a fine artistry in fashioning them into the desired shapes are not the only Sargent claims for your consideration. Mechanical excellence is another. Sargent locks and padlocks always operate with ease and quiet, and at the same time provide the utmost in security. Sargent door closers function silently and surely over unusually long periods without repairs.

Use Sargent Locks and Hardware throughout the new buildings of all kinds that you will erect.



A small closer for home doors

This is a small edition of the well-known Sargent Door Closer used on the heavier doors of public buildings. Sargent "520" fills the need for a dependable door closer on light doors in the home. Besides being used on screen and storm doors, it is used on hall-lavatory, back-stairs, cellar and refrigerator room doors—all doors that should be kept closed. Sargent "520" is inexpensive, lasting and quickly applied. A diagram in each box shows how to attach it to either right or left hand doors. See Sargent Door Closers at your hardware dealer's and write us for descriptive folder.

SARGENT & COMPANY, Hardware Manufacturers
51 Water Street New Haven, Conn.

This Ironer Relieves Operator of Control Worries

"IRONING DAY" with its wear and tear on the feet and dispositions of the housewives has been robbed of its tiring features by an ironer which features an automatic control of the working units, manipulated by a foot control running the entire length of the machine.



A Foot Control Which Runs Along the Entire Length of This Ironer Leaves Both of the Operator's Hands Free to Guide the Material Through the Ironer.

Makers of this device for lightening household work, emphasize the convenience of the arrangement which leaves both hands of the operator free to guide the progress of the goods through the ironer. All the operator has to do is to trip a pedal which runs the full length of the machine. This engages the clutch and brings the roll into ironing position. Another pressure on the pedal moves the roll back from the work as it stops revolving. The ironer is driven by an electric motor, with the shoe heated by gas.

The entire mechanism is covered, the cost of operation is given as less than 5 cents an hour and the roll is adjusted automatically to uneven thickness of materials.



Wooden Registers Are Attractive

EVERYONE knows that hot air rises upward, and in order to give it a show it must have outlets enough to easily carry its heating capacity, and this same area must be carried on up to the rooms heated. Outlet piping is merely a means of distribution; the distribution of heat ought to be balanced up so that every room gets a square deal according to its needs. What is true of outlets for warm air is equally true of inlets for cold air. No furnace will deliver more warm air than it receives through its inlets.

Wood registers serve inlet needs very satisfactorily, and the kind made by one manufacturer are exceptionally strong. They are suited for floor insertion, or where large registers are required. Being made of oak or any other desired wood, the wood register can be utilized in any size or shape to harmonize with the other woodwork and color schemes. In the baseboard, stair riser, floor, wall, window seat, closet door, pulpit or stage front the square, rectangular, triangular,

round, oval or curved wood register fits in logically and attractively. The wood used is thoroughly kiln dried, and the meshes are always uniform.

Installation is simple. By boxing, wood registers are used in places where metal radiators would be difficult to place, and the cost is very reasonable.



A Handy Vacuum Cleaner

THIS new electric vacuum cleaner weighs but seven and one-half pounds complete, and is built of heavy sheet aluminum. It can be changed from a carpet cleaner to a cleaner of draperies or upholstery in one second.

There are no wheels, springs or adjustments to get out of order, and there are no electric switches or delicate machinery in this new model. Dust and dirt are not drawn through the fan, and the motor is air-cooled.

The terminals, which are a source of trouble requiring service in some appliances, are protected by vulcanized rubber of a special shape fitted to the cord in such a way that the terminals are relieved from strain and breaking caused by bending of the cord. This eliminates one of the greatest troubles characteristic of such electrical connections. This protection applies to the terminal on the cleaner as well as on the plug.



Light Weight and Simplicity Are Characteristic of This Little Cleaner.



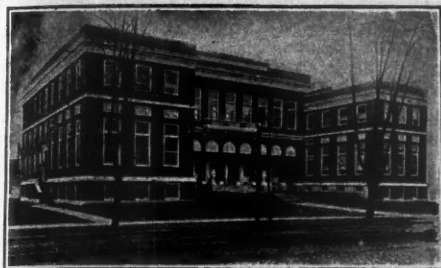
A Small Power Shovel

A LABOR-SAVING device which well may make a big appeal to contractors and building material dealers is a small power shovel mounted on a Fordson tractor, which provides it with the necessary power and insures its portability from job to job, in much the same time it would take to move the gang of unskilled laborers it is built to replace.

The dipper of the shovel has a capacity of a quarter of a cubic yard. The discharge point is 7 feet 3 inches above grade and 6 feet out from the center of the tractor which carries it.



For the Builder Who Handles a Large Amount of Gravel, Crushed Stone or Other Material of a Like Nature, This Power Shovel Will Prove Useful. It also can be used for light excavating work.



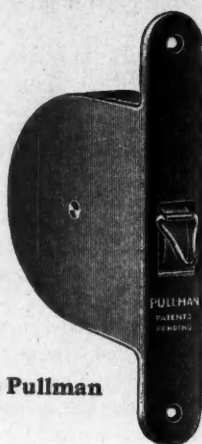
Rochester Free Dental Dispensary, Rochester, N. Y.
Architects, Gordon & Madden.
Contractors, John Luther & Sons Co



L. J. Meroney Residence
Atlantic City, N. J.



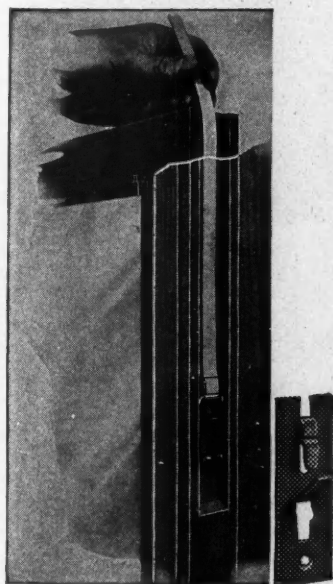
Sisson Hotel, 53rd St. and Lake Michigan
Chicago, Ill.
Architects, E. R. Wilson & Co



The Pullman



Tape and New Pullsteel Spring



Tape Hook

Pullman Sash Balances are giving perfect results in Public Buildings, Apartments, Homes & Factories

We can refer you to installations with a record of more than 25 years of continuous satisfactory service

OVER 6,000,000

now in use instead of weights and cords assure the practicability, reliability and durability of

Pullman Sash Balances

with the TAPE HOOK and NEW PULLSTEEL SPRING

Here are seven reasons why it will pay you to investigate and use the Pullman:

1. Pullman is easier and quicker to install. In fact it cuts the cost of installation more than half.
2. Pullman frames save money when built in accordance with our plans, which are furnished free.
3. Pullman sash are grooved in one operation. Blueprint and details on request.
4. Pullman is more durable, saves space, permits narrower mullions and insures more light area and wall space.
5. Pullman eliminates rattling weights, rotting cords and squeaking pulleys—it is practically noiseless in operation, and balances the sash perfectly at all points.
6. Pullman can be installed or removed in a minute by means of the Tape Hook device, without removing stops or sash. This SERVICE feature makes Pullman the ideal window equipment for all kinds of business and public buildings.
7. Pullman Guarantee—we will replace free of charge any Balances that may prove defective in workmanship or material within a period of 20 YEARS from date of purchase.

Free illustrated catalog full of modern window operating information on request.

PULLMAN MFG. CO.
300 South Ave. Rochester, N. Y.

BRANCH OFFICES

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85 Walker St. New York City
- Charles A. Pipenhagen
208 N. Wabash Ave. Chicago, Ill.
- Clifton E. Harris
132 Pearl St. Boston, Mass.
- Herbert Golterman
722 Wainwright Bldg. St. Louis, Mo.
- Vincent Whitney Co.
365 Market St. San Francisco, Cal.
- Adam N. Stark
225 Plymouth Bldg. Minneapolis
- The Davy Company
100 N. Morrel St. Detroit, Mich.
- T. J. Thornhill
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436 Maison Blanche Annex
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512 Commerce St. Philadelphia, Pa.
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Confederation Life Bldg. Winnipeg
- The Stevens Co.
St. Paul Bldg. Halifax, N. S.
- Chas. D. Fowler Co.
Lavalle 691 Buenos Aires, S. Am.
- The Marshall Agency Co.
528 Collins St. Melbourne, Australia
- Robert Adams
3-5 Emerald St. London, Eng.
- N. F. Ramsay & Co.
Charlotte Square
Newcastle-on-Tyne, Eng.

Our New Specialty

DURNO LIQUID DOOR CHECK

For Screen and Other Light Doors
A Perfect Liquid Door Check
and Closer at a Very
Moderate Price

ASK FOR BOOKLET

The little shovel replaces hand shoveling and wheeling and runs about like a truck. It has a rated loading capacity of 30 tons an hour. It can be used for light excavating, taking a cut three inches below the grade where the footing is solid, skimming along the surface with the trucks alongside and loading as it digs. The manufacturer does not, however, recommend its use where the soil is muddy or sandy.

Another field is the shaping of lawns, cutting driveways and other landscape gardening work which is often done by laborers. It is also used for sidewalk excavation, back-filling trenches and light road work as well as serving road paving concrete mixers.



Concrete Tile for Roofs

OPPORTUNITY for the manufacture of a building material much in demand has been opened to progressive men who are familiar with building operations through the development of a method and machinery for producing concrete tile for roofs.

The increasing demand for a substantial and decorative material for roofs has been realized for some time, and



Demand for a Colorful Fireproof and Permanent Roofing Material Has Led to the Development of Concrete Tile for This Purpose, Used on the Home Shown Here. Recent improvements in machinery for making this product indicate that its manufacture is a coming enterprise.

progressive makers of roofings of various types have been profiting by it. It was not until recently, however, that the methods and machinery for making attractive colored tile from cement were developed to the point where the enterprise of making the material for the market became attractive.

The concrete tile, which can be produced in all suitable colors, are adapted to all types of buildings where tile roofs of other types are used. They are so molded that their application to the roof is simple and interlocking. The tile may be produced both in the flat, French style and the curved, Spanish variety, with the machinery designed to produce all of the forms needed for the complete roof covering.

The fireproof quality of the concrete roofing, the attractive color combinations possible and its permanence have made this material popular where it has been made available to builders. The machinery utilized in the making of the roofing is of an ingenious nature, well worth the investigation of those who know cement manufacturing or are interested in its processes.

A Durable Wall Finish

"SCRATCH matches on it. Smear it with ink. Make it purple with an indelible pencil. As a finishing touch smear it up with grease."

These were the instructions on the back of a piece of wall board finished with a new system of wall painting which came into the office. Instructions were followed. They continued as follows:

"Take some abrasive soap or washing powder and see how quickly the original luster is restored. Notice that the grinding of the grit of the soap does not affect the original luster. Engineers have said that this test equals two and a half years of actual wear."

The panel came through the test clean and with a good appearance.

Two coats of material were used in finishing the panel, without previous use of size or primer.

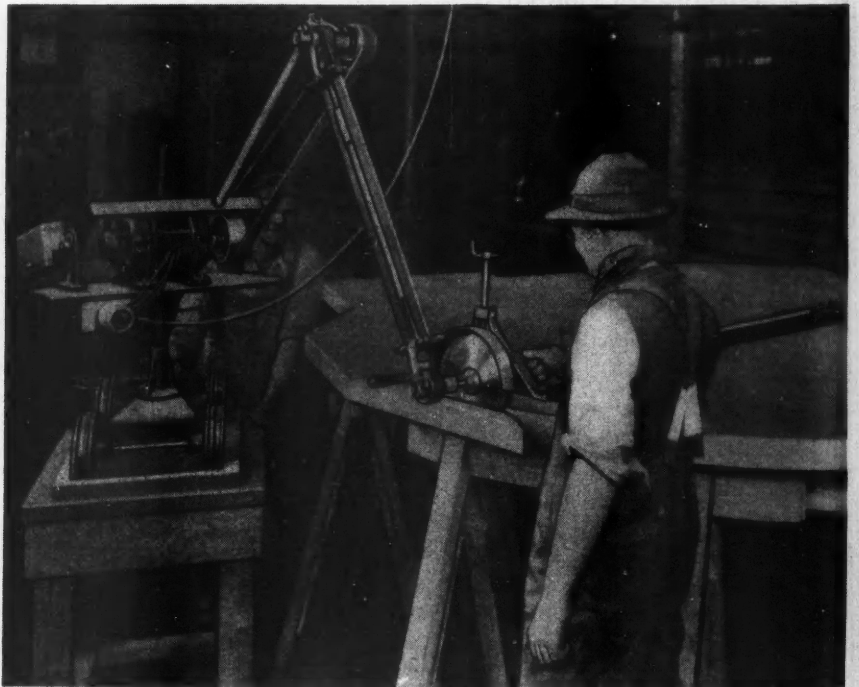


Portable Machine Is Versatile

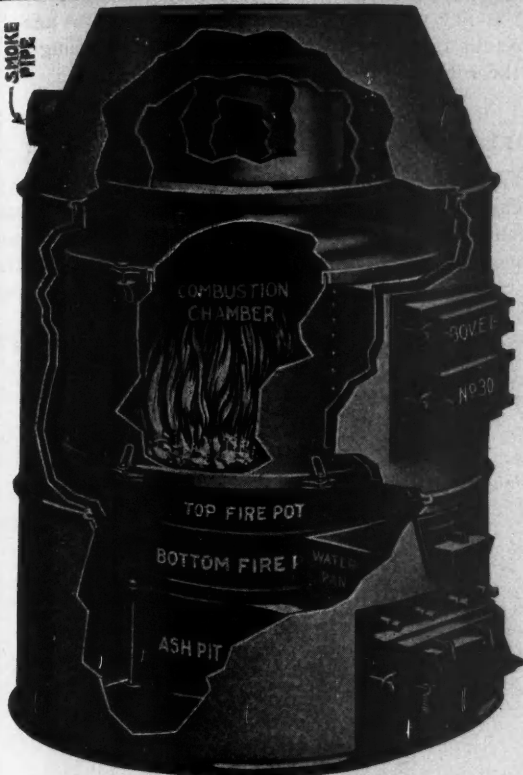
MANY a building contractor has often wished from the bottom of his heart that he had a handy woodworking machine that he could take to where the heavy timbers lay and frame them right then and there. After considerable experimental work, such a machine has been developed. As a result of this invention, butchers can now plane their chopping blocks as they stand; tank and vat makers can frame their heavy timbers as they lie on benches; cutting, boring and gaining on timbers as thick as 12 inches can all be done as the timbers lie. In cutting circles for column head forms, a cleverly designed radius rod is used to make the circle perfect. This rod is instantly adjustable to different size circles. A concave saw is used. This machine is used all over the shop for straight sawing, boring or dadoing when it is not cutting circles.

A four-wheel carriage with roller bearings supports the machine. The weights are adjustable, allowing the operator to "tune" the machine to suit himself. The sawing head can be adjusted to cut any angle up to and including 55 degrees, making it a great tool for cutting jack rafters, etc. The great advantage of the machine is that it is portable and can be taken to any job where electric current is available.

GEORGE F. PAUL.



The Portable Woodworking Machine Can Be Utilized Readily, as Shown in the Illustration, for Cutting Circular Surfaces, Such as the Tank Bottom Shown Above.



BOVEE FURNACES

Save 40% in Fuel
Sold at Manufacturers' Prices

Manufactured in all sizes, having 20-inch to 36-inch fire pots. Combustion chamber more than double the size of the average furnace. Make more friends and more business by installing BOVEE FURNACES in all of the homes you build.

We furnish any style of fittings with all sizes of BOVEE COMPOUND RADIATOR FURNACES at our special manufacturers' prices, quoted on receipt of specifications or description of what is desired, or floor plans of building to be heated.

Furnished with regular piping to each room, with regular pipeless fittings and register or with central heating fittings and registers as desired.

Note the large ash pit with independent shaking grates. A Clean Heating Surface from top of ash pit to smoke collar. A direct heating surface always clean from soot.

Bovee's Compound Radiator Furnace Cased for Regular Piping



SPECIAL PRICES TO CONTRACTORS

STOCK-STYLES-FITTINGS

BOVEE'S HORIZONTAL RADIATOR FURNACES

The most perfect heating plant in use for soft coal and wood. Large doors, large heating surface, save about one-half the fuel. Large double doors, 16 inches square (17x21-inch doors can be furnished when ordered). These furnaces are especially adapted for FARM USE, as they admit large blocks of coarse wood, cobs and lumps of coal and other fuel. They will burn 52-inch wood.

The large grate surface causes perfect combustion, which effects a great saving in fuel. The heavy, independent rocker shaker grates are very easy to operate in burning coal.

The large combustion chamber and compound radiator, which cause the heat to travel three times the length of the furnace before reaching the smoke flue, secure practically all of the heat from fuel consumed and no kind of a heating plant can be more economical than that.

They are made of heavy steel plate with cast heads and fire box lined with fire brick, making them the most perfect, economical and durable furnaces sold. Only one retort joint to connect in mounting the whole furnace.

Our improved methods of manufacturing and large quantity production enables us to sell these furnaces at a very reasonable figure.

Write us today about our special prices to contractors.

BOVEE FURNACE WORKS

150 W. 8TH ST., WATERLOO, IOWA

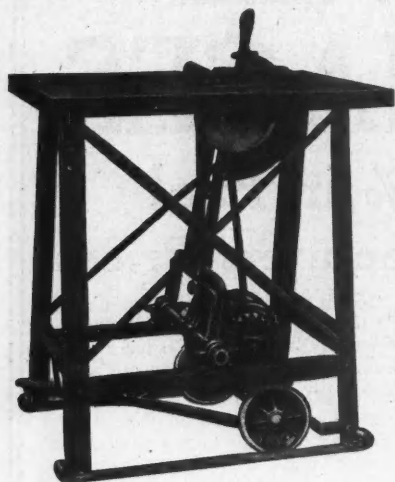
Satisfactory service for 30 years



Bovee's Horizontal Furnace

Easily Moved Power Saw

A POWER saw for use on the job which can be taken from one job to another with ease and which weighs only 150 pounds complete with its motor, is offered to builders to help speed up their work.



This Saw Can Be Taken Anywhere on the Job, the Makers Say.

The saw can be handled by one man, it can be slid through the rough stairs of an unfinished dwelling and can even be moved to the roof if necessary.

The maker of this saw declares that it can be utilized to effect a saving of 85 per cent in saw labor.

Use of a device of this sort changes the entire plan of building progression. For instance, rough boards for siding are counted out and all sawed to size at one operation and passed to the men nailing them in place. Time consumed in the cutting of rafters can be reduced to a remarkable extent by using this tool. In fact, it injects a spirit of speed into the operation which does much to cut the time of building.

Sash Hardware Provides Convenient Method of Inclosing Porches

A SYSTEM of window installation which will permit the entire series of sash used to inclose a porch to be swung to the sides of the opening allows the designers of homes to add a desirable feature.

The makers of the window hardware which will permit this method of building declare that rooms so inclosed may be thrown open to the cooling breezes in the summer and when closed may be utilized as the other rooms of the home during the winter months.

In appearance the windows are of the casement type, with the screens applied outside in the manner usual, with double



Windows Opened Wide to the Summer Breezes or Closed Tight Against the Storms Are Possible Through Use of the System of Window Installation Illustrated.

hung sash. The entire window space may be thrown open or one sash at any particular point may be opened. When open the sash fold together at an angle against the casing at the edge of the window.



Portable Pipe Threading Machine

A NEW portable pipe-threading, cutting-off and reaming machine has as its principal features that it is portable, demountable, has a handy self-contained grinder and three drives, motor, belt and hand, built right into the machine, besides it has a wide threading, cutting-off and reaming capacity.



This Power Pipe Threading and Cutting Machine May Be Moved to the Work.

A unique feature of the machine is the fact that it can be converted into a power unit in 2½ minutes, and by using a flexible shaft it will operate hand stocks up to and including 8 inches.

The weight of the machine complete with motor and all standard parts being only 520 pounds, it is easily removed to any part of the shop or taken out on the job where work is to be performed.

The motor is standard one horse-power mounted on a hinged table in base of machine and the power is transmitted by belt to the flange driving pulley of machine. A distinctive feature is the method of raising motor to release belt and stop machine. The demountable hand crank is used for this purpose and is located in a handy position for operator. Automatic belt adjustment is provided to compensate stretching of belt. When it is desired to stop machine to change pipe or inspect threads the lever can be thrown over and locked. This eliminates the necessity of shutting off current to stop machine and is also ideal for changing gears.

Heavy insulated extension cord with plugs furnished with each machine, which enables the operator to plug in from most any ordinary lighting circuit.



ROCBOND
Exterior Stucco

The "WALL MARK" of Stucco Quality "A Good Half Inch"

The Permanent, Economical Exterior Building Material

Rocbond Stucco is compounded to a denseness that renders it absolutely permanent—therefore economical.

The ever increasing demand for **Rocbond** Stucco through twelve years of successful manufacture proves its popularity as a building material. It has economical advantages over ordinary forms of construction—free from repairs.

Merits Peculiar to Rocbond Stucco

- Has Extraordinary Structural Strength and Unusual Flexibility.
- Is Weather and Fire Resisting.
- Has a Wide Variety of Stone Surfacing Combinations.
- Works Easiest Under the Trowel.
- Spreads Long and Freely.
- Every Bag contains the same Uniform Quality.

Architects select **Rocbond** Stucco as being particularly adaptable in carrying out varied architectural effects. **Rocbond** is desirable for every type and size of building, and gives an exclusive charm and attractiveness.

Rocbond Stucco is handled through **Rocbond** Dealers only, who will be found in nearly every community.

Literature fully illustrating the uses and adaptability of Rocbond Stucco mailed on request.

Four Plants—Write the One Nearest You

THE ROCBOND COMPANY
VAN WERT, OHIO CEDAR RAPIDS, IOWA HARRISBURG, PA. NEW YORK CITY

A New Type of Counter Flashing

THE flashing of roofs where they must be joined to a wall of brick or other material always has been a difficult problem for the roofing contractor and the general builder who handled work of this type. One large roofing contractor, after years of experience, determined to make the "weakest part of the roof the strongest" and evolved a new flashing system and material. His success with his device led him to place it on the general market.

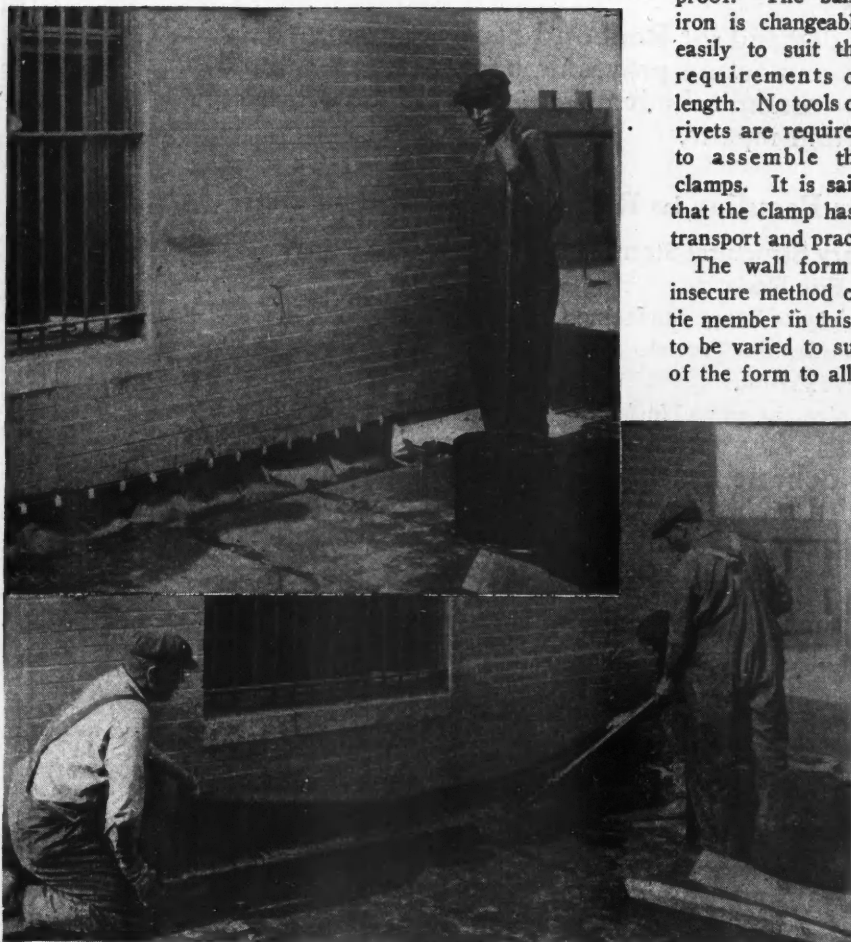
The flashing consists of a doubled strip of asphalted canvas, ranging in thickness from one to five-ply, and in width from 5 to 14 inches. It is supplied in lengths of 10 feet. Along the unbroken, double or folded edge of the flashing metal clips are fastened at intervals of 6 inches from center to center.

In the wall to which the roof is to be attached, a raggle $\frac{1}{2}$ inch wide by $1\frac{1}{4}$ inches deep is to be provided. In brick walls a mortar course can be raked out or a wood strip can be built into the wall and removed later. In concrete work a wood strip can be nailed to the forms at the required height, to be removed when the forms are taken down.

The folded edge of the flashing, carrying the metal clips, is forced into the raggle, the metal clips bending in the center and presenting two sharp, angular edges to hold the material in place. The flashing is then cemented firmly in place in the raggle. The flashing is then cemented to the roofing, care being taken to cement each ply in a workmanlike manner.

The flashing is supplied in two types, the multiple ply type for built up asphalt and tar and gravel roofs and the single ply type for use with prepared roofings and shingle roofs.

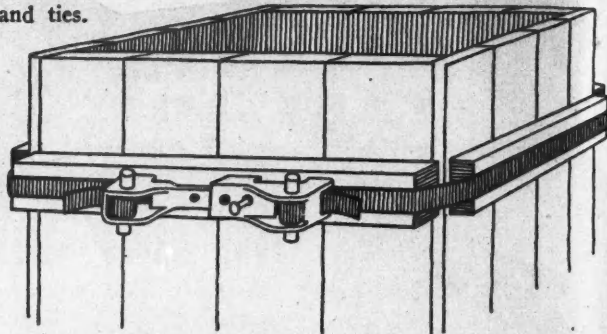
Among other advantages, the makers of the flashing declare that it is easily and quickly applied, that it can be used with all types of roofs, that it becomes an integral part of the roof and that it will outlive the roof.



The View Above Shows a New Type of Counter Flashing for Roofs Ready to Be Attached to the Adjoining Wall. Below the workmen are cementing the flashing to the roof proper with hot asphalt.

Clamps for Concrete Forms

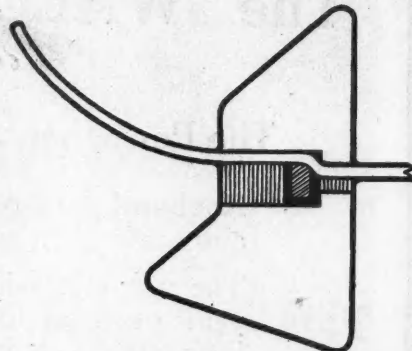
A NUMBER of labor-saving devices for tying together or supporting wood forms for concrete walls, beams and other work of this type make use of new types of clamps and ties.



The Malleable Iron Fittings of This Form Clamp for Concrete Columns Are Practically Indestructible and Will May Form a Permanent Part of the Builder's Equipment.

The column clamp consists of two interlocking malleable fittings, which hook into the ends of a piece of $1\frac{1}{4}$ -inch by 16-gauge band iron. The fittings are drawn together by means of a detachable wrench, capable of applying a strain of 5,000 pounds and secured by means of a locking pin or nail.

Hooking the fittings into the band iron is done by hand and is simple, positive and slip proof. The band iron is changeable easily to suit the requirements of length. No tools or rivets are required to assemble the clamps. It is said



Tie for Wall Forms on Concrete Work.

that the clamp has no breakable parts. It is easy to store and transport and practically indestructible.

The wall form tie is said to eliminate the expensive and insecure method of wiring forms. Band iron is used for the tie member in this system, the length and size of the band iron to be varied to suit conditions. Holes are bored in the walls of the form to allow the band iron to pass through, or where square edged lumber is used the band iron can pass between the boards.

The collars are of malleable iron. They slip over the bands easily and are secured in place by a cut nail, which wedges and crimps the band iron and prevents slippage. The holding power of the collar is said to exceed the breaking point of the band iron. One collar is attached before the band iron is inserted into the form.

The tightening tool is a lever which automatically grips the band iron by means of which the forms are pulled together. The locking nail is driven after tightening.

The cut nails are driven out to remove the collars. The collars and cut nails may be used repeatedly, the band iron remaining in the concrete where it may be broken off even with the surface.

Modifications of these methods of securing forms are used for spandrel beams and for fireproofing steel beams.

If you want insurance against repair bills, specify

"TIDEWATER"

CYPRESS. It is not enough to say "Cypress." It is necessary to say

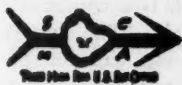
CYPRESS, THE WOOD ETERNAL

AND THEN say YOUR Cypress must be "TIDEWATER."
Then, you identify it by this  Cypress Arrow trade-mark.

This is important to your investment and to your permanent satisfaction BECAUSE there is a species of "upland" Cypress that grows far inland, that is not in a swamp and that consequently lacks the historic rot-resistant trait of the true "Wood Eternal."

Only the responsible mills admitted to membership in the Southern Cypress Manufacturers' Association can apply the Cypress Arrow to their product.

With this protection you cannot be misled and will avoid loss and disappointment. It is a good idea to "let your dealer know you know." He will respect you—and supply you.



Write us if you have any trouble getting
the Genuine Identified "Wood Eternal."



SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1216 Poydras Building, New Orleans, La., or
1216 Graham Building, Jacksonville, Fla.



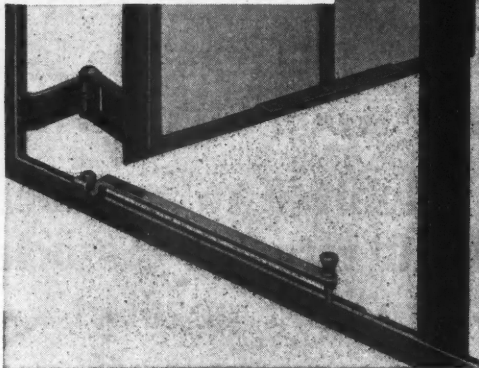
New Steel Casement

A NEW steel casement for homes and apartment buildings comes in numerous individual types, designed to meet a wide variety of casement requirements. Stock types will be carried in company warehouses, and by lumber and supply dealers. In the development of this new casement, the engineers have achieved many little refinements and perfections hitherto unknown or uncommon at least in the casement window field. Further, by the standardization of types and sizes, and the application of advanced manufacturing methods, costs



Not the Least Important Feature of the New Window Is the Ease with Which It Can Be Cleaned from the Inside, as Illustrated to the Left.

To the Right Is a Close Up Showing the Butt Construction and the Stay Bar Used to Hold the Window in the Desired Position.



have been kept at a very low point—comparable, in fact, to those of ordinary double-hung wood windows.

From the design standpoint, these new casements are patterned after the accepted English types which have done so much to popularize steel casement usage. The hardware for each window consists of a locking device with an attractive handle to either bronze or malleable iron and a stay at the bottom to hold the window at any desired opening.

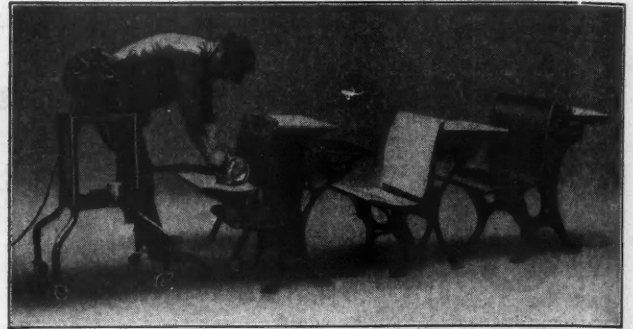
All butts are of special extension type, so designed that one member closes over and around the the other, as a protection against falling dirt and mortar during erection. The butt pins are of solid bronze, with large heads, and are easily removable, so that any leaf may be taken out of its frame and glazed in a flat position, or inside the building in cold weather. Although removable, each butt pin is locked in place by a bronze set screw, accessible only from the inside.

Installation may be made in all types of construction, brick, stucco, stone or wood, with practically equal facility and equal assurance of a substantial, workmanlike job. With the exception of the hardware, each casement is completely assembled when delivered.



A Power Wood Sander

SANDING wood surfaces to bring them to the proper high finish to receive the paint, varnish or other finishing material is a long, tedious job when it is necessary to do it by hand with



Rapid Sanding and Finishing of Woodwork Is Possible with a Power Machine Which Is Designed to Do Away with the Hand Sandblock Method.

the sand block which has been so long a part of the equipment of expert woodworkers.

The sanding is done by a sanding drum, about which is secured a strip of sandpaper or sand cloth. This abrasive strip is held in place by quick acting clamps, which allow the strips to be changed in a very short space of time.

This sanding drum is almost completely enclosed in a casing, which is provided with a handle similar to that of a hand plane, the entire arrangement being made of aluminum to insure lightness and ease of handling.

The power is provided by a one-half horsepower motor, mounted on a portable steel stand, with a ball bearing swivel under the motor which allows it to point in any direction. The power is carried to the sander through a flexible shaft. Large caster wheels on the legs of the stand make it easily movable from place to place.

In operation it is used in the same manner as a hand plane and can be started or stopped instantly with a push of the switch, which is mounted in the handle. A guide shoe on the drum true with the working surface and makes it easy to regulate the depth of the cut.

The machine has also found an extensive use in sanding the old addresses off packing boxes when they are used for reshipping.



Rubber Treads for Stairs

A SATISFACTORY tread for stairs in public and semi-public buildings has been no small part of the architects' and builders' problem in erecting such structures in the past. A surface which would resist the wear to which such stairs are subjected often has proven dangerous through being slippery, with the consequent danger of falls. Wooden treads, unprotected, soon show wear in hotels and apartment buildings.

As a solution for this problem, a manufacturer has placed on the market a fair tread which is a combination of rubber and other wear-resisting materials. The material, which is described as tough and long wearing, will not splinter, or chip and is not subject to curling or warping. The treads of the material may be wiped clean with a wet cloth or mop, are noiseless and not slippery.

The treads are recommended especially for use in hotels, apartments, factories, stores, theaters, churches and depots.

Comparative Engineering Data

Cyclone Shingle

Type of Shingle	Thick-ness on Roof	Sqs. Laid Per Hour During Speed Test	Head Lap	Side Lap	No. of Shingles Per Sq.	No. of Nails Per Sq.	Locked-Down	Wt. Per Sq.	Design on Roof	Dimension of Shingle	Under-writers Label
<i>Cyclone Strip</i>	2- 3- 4-	2 1/4	6 7/10"	5"	72	216	Yes	200 Lbs.	Hex-agonal.	19.1" x 32"	"C"
10" Strip Shingle (4 in 1)	1 thick 2 " 3 "	1 1/4	2"	3 3/4"	112	560	No	200	Square Corner	10" x 32"	"C"
12 1/2" Strip Shingle (4 in 1)	2 thick 3 " 4 "	1 1/4	4 1/2"	3 3/4"	112	560	No	240	Square Corner	12 1/2" x 32"	"C"
12" Giant Strip Shingle (3 in 1)	1 thick 2 " 3 "	1 1/2	2"	4 7/10"	90	360	No	240	Square Corner	12" x 32"	"C"
Individu'l Shingle	2 thick 3 " 4 "	3/4	4 3/4"	2 3/8"	424	848	No	240	Square Corner	8" x 12 3/4"	"C"
Giant Individu'l Shingle Exposed 5"	1 thick 2 " 3 "	1	4"	4 1/4"	274	548	No	260	Square Corner	10" x 14"	"C"

Facts!

If these figures look exaggerated to you—
 “we are from Missouri and will ‘SHOW’ you.”

Write for particulars, prices and samples of the *Cyclone Shingle*. It is the most advanced step in the development of practical roofing made in a century.

A Postcard Will Bring Full Details



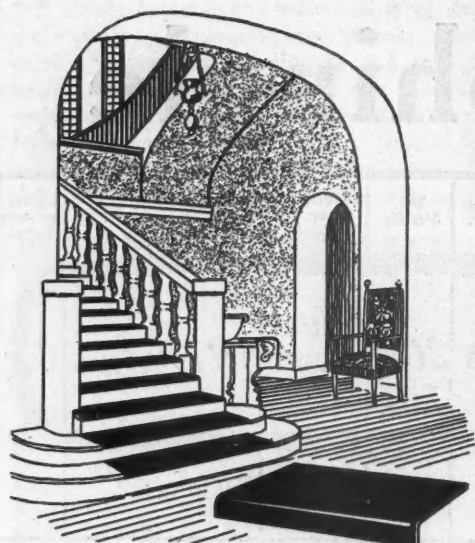
Save this page as a data sheet

This Shows the Design

FORD ROOFING PRODUCTS CO.
 2341 South La Salle St. Chicago, Ill.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

In the form shown in the drawing they are cemented to the wooden stairs. It is also possible to nail them. They are



Rubber Treads for the Stairs of Apartment Houses and Other Public Buildings provide a Durable, Pleasing Stair Surface.

made in a number of colors, plain and mottled. The colors go through the entire tread, so there is no variation of color with wear.

Another type of this tread is made for use with recessed metal, terrazzo or marble construction. The treads are used sometimes to level worn wooden stairs, which are evened up with rubber cement and sand under the rubber tread.

A Useful Decorating System

ROUGH stone walls, brick walls and many other rough surfaces and combinations of a variety of these surfaces long have presented a difficult problem to the decorator who has had to deal with such situations on both interior and exterior work.

A system of decorating now available cares for all such surfaces and allows them to be decorated in a most artistic manner, and in such a way that any desired color or texture can be reproduced.

The product used is a portland cement in liquid form, produced by a chemical process and carrying sand and asbestos in suspension. It retains the natural set, hardening and curing features of the portland cement base.



The Cement Base Paint Applied to the Walls and Ceiling, Overtone with Oil Colors, Pershing Square Cafe, New York, John J. Petit, Architect.

The base color is white portland cement, which may be colored or tinted to suit the operator. The material is applied with a brush to stone, wood, brick, concrete, plaster, metal or painted surfaces. Any smooth, stipple or stucco effects can be duplicated. Rough concrete or brick surfaces first are given a coat of a waterproofing material made by the same firm which manufactures the finishing coat. This first coat is applied with an air spray and fills out the small inequalities in the rough surface as a base for the final coat.

It is declared that the finish will not crack or scale and that it is free from the fine, hair checks which appear in ordinary plaster. It will adhere and bond to painted surfaces and may be used for treating defective stone, brick and cement walls. It may be applied over brown cement plaster, making it unnecessary to apply the usual finish or dash coat for painting, since the material will produce both the color and the texture.

For outside work it can be applied without injury when subjected to a hot sun or winds and after it is applied an hour ordinary showers will not injure the surface. It will adhere to wood and metal, allowing wooden or metal cornices to be finished to match the stucco or stone work.

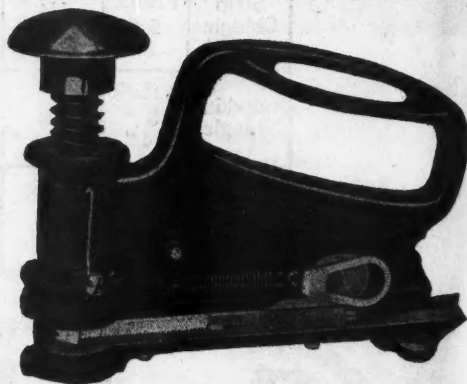


For Rapid Screen Production

TACKING screen cloth on frames by the hammer method long has been one of the most tedious and delaying processes in the manufacture of screen doors and windows.

To overcome this costly and time-consuming drawback to the manufacture of screens, a new device which does away with the hammer and picking up each individual staple by hand has been devised.

The stapling machine, shown



Fastening of Screen Cloth to Screens Is Speeded Up By This Machine, Which Replaces Tacks with Staples and Requires No Hammer.

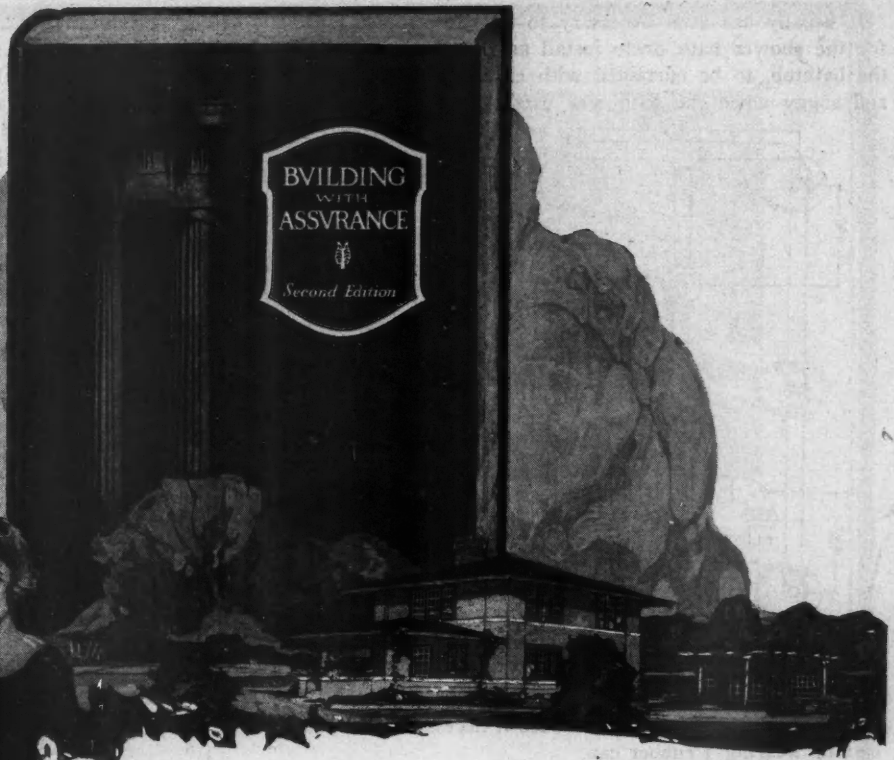
in the accompanying illustration, drives a broad, flat, double pointed staple into hard or soft wood so that the staple straddles five strands of wire. There is no banging of fingers and no waste, and the holding power of the staples is twice that of tacks. The staples are fed automatically from a magazine carried by the machine.

It is claimed to be eight times faster than the hammer and tack method.



Curtainless Shower Baths

SHOWER BATHS, one of the most popular of plumbing fixtures, will find a wider use when it is known that a recent development allows them to be installed with much less expense than was formerly attached to their utilization as a feature of residences and apartments.



440 pages of practical help for HOME BUILDERS

How to avoid the home building mistakes that cost fortunes each year

THE best of us can learn a good deal from the rest of us. "Building With Assurance" (Second Edition), the Master Book, gives you the experience of men who have spent years in the home-building business. It is a big, fine 440-page collection of authoritative, practical, home-building ideas, plans and methods; a volume designed expressly for contractors and home builders such as you; a book that ends groping in the dark—that actually helps you plan ahead wisely, reduce waste, and guard against loss.

"Building With Assurance" indorsed by over 15,000 building authorities

Countless letters praising this wonderful book have been received from architects, contractors, dealers and home builders. They write for example:

- "The book is truly a masterpiece."
- "It means better, prettier homes."
- "Can't conceive of anything finer."
- "Makes home planning much easier."
- "A true home-builder's guide."
- "The book is indeed a gem."
- "Surpasses other building books."

Building authorities everywhere use it for reference. Can you afford to be without it?

Beautiful Homes in colors—with floor plans

Whether the home is to cost \$3,000 or \$50,000 you will get help from the many beautiful homes shown in the Master Book. There are French, Spanish, Modern, Western, and other bungalows; Georgian, Victorian, Tudor, American Colonial, and other houses. All are shown in beautiful colors, with floor plans. You get the help of authorities on arranging living room, dining room, bedroom, hall, etc. The Master Book, together with the price supplement, give you full information when choosing doors, sashes, stairways, built-in furniture, etc. You have stabilized, standardized prices for making estimates. You can show your client exactly what you plan to use.

Morgan Woodwork Organization

"MORGAN-QUALITY"

STANDARDIZED WOODWORK

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

There is no added cost for "Morgan-Quality"

Mail Coupon for Prospectus

"Building With Assurance" (Second Edition), is not for general distribution. It is for contractors and builders. Our prospectus tells all about it—shows beautiful homes with floor plans, reproduces actual pages, letters from readers, etc., The prospectus is gladly sent to those who mail the coupon.

Address nearest office, Dept. T 6

Morgan Sash & Door Co., Chicago, Ill.
Morgan Millwork Co., Baltimore, Md.
Morgan Company, Oshkosh, Wis.

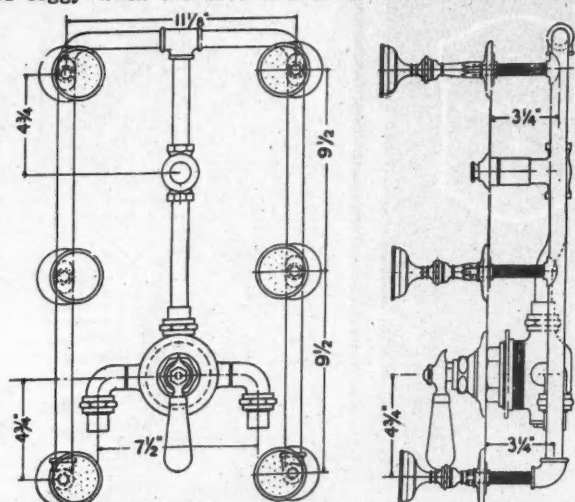
Gentlemen:—I am a contractor, so please send me at once copy of your beautiful prospectus, which describes "Building With Assurance."

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Address

Town State

It usually has been necessary to build a cabinet especially for the shower bath or to install an overhead shower above the bathtub, to be curtained with cloth which became damp and soggy when the bath was used. The overhead shower



The Diagram Shows the Details of the Installation of the Concealed Shower Fixtures. The center of the top shower-heads is 59 inches from the floor.

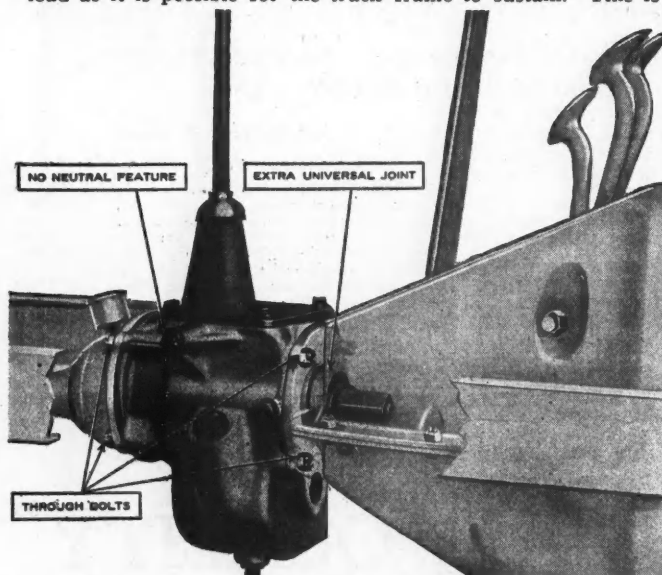
was objectionable to women because it necessitated soaking the hair or wearing a rubber cap.

The type of shower illustrated in the accompanying diagram, to be set in the wall above the tub, has six heads which can be adjusted vertically on ball joints, directing many streams of water inward and downward, enveloping the body of the bather from the shoulders down and preventing the wetting of the floor and walls and doing away with the curtain. The plumbing, with the exception of the shower heads and the control mixing valve, is concealed within the walls of the bathroom. The fixture may also be obtained with hot and cold valves separate instead of the mixing valve. All working parts are accessible from the front. All exposed piping and metal fixtures are of brass, nickel plated.



Increasing Utility of Trucks

BY installing a transmission that provides low gears for the Ford truck, the full power of the Ford engine may be utilized, giving the truck sufficient power to negotiate any sort of going where traction can be obtained and handle as big a load as it is possible for the truck frame to sustain. This is



This Auxiliary Transmission for Ford Trucks Increases the Power and Speed Range of the Vehicles. It is used in combination with the regular transmission.

done by means of the special transmission shown in the illustration.

This transmission is a complete three-speed forward, one reverse sliding gear, selective type transmission such as those used in big cars and trucks. It is a complete unit in itself and has nickel steel gears, ball bearings, oil-tight case and a self-aligning universal joint. Used in connection with the regular Ford planetary, it provides six speeds forward and two reverse.

In trucks the transmission permits the use of a Ford high speed axle, which gives a road speed of thirty-five miles an hour. There is a speed for every road condition, which gives the truck engine its full capacity no matter what the road conditions.

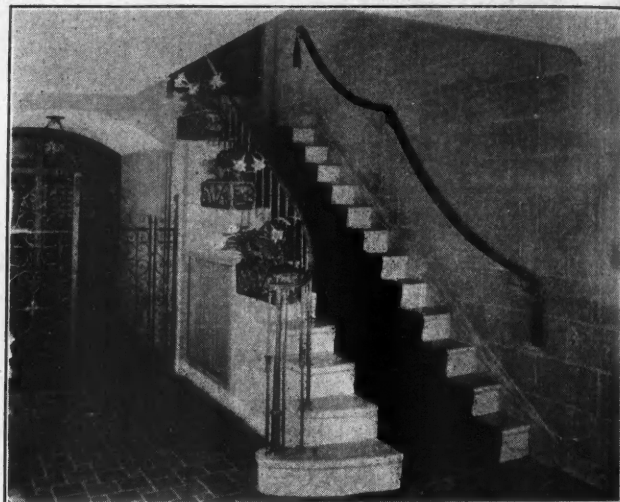
The transmission is easily installed by anyone in four or five hours with an ordinary kit of tools.

A transmission similar to that for the truck is also provided for the Ford car.



A Plastic Finish for Walls

WITH the growing vogue of Spanish style there has come a demand for a finish appropriate for this type of architecture, a finish which will duplicate closely the walls of the



The Plaster Walls of the Hotel Hallway Shown Here Are Finished to Represent Stone Through the Use of a New Type of Wall Finish.

old Spanish buildings which have inspired the American development of this school of architecture.

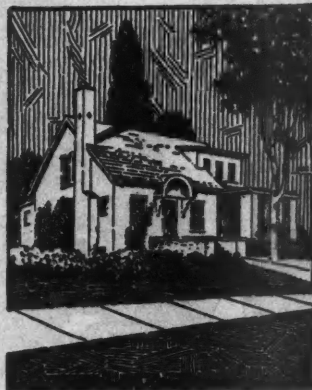
To meet this demand a plastic interior finish has been developed, which is suitable not only for this type of work, but also for interiors where stone wall and ceiling effects are sought. The material makes possible a large variety of color and texture effects.

The material is used for both new and old work and is applied with a brush. On new work it can be applied directly on the brown plaster coat, eliminating the expense of the skim coat. If this procedure is followed, the brown coat should be troweled as smooth as possible.

A special feature of the finish, according to the makers, is its permanence. It does not fade and can be cleaned easily.

All surfaces to be covered with the finish should be sized with a varnish size. In remodeling work, the cracks should be filled with plaster of paris, coloring the plaster approximately the same shade as the rest of the wall. The material is applied to the wall or ceiling with a brush, spread smooth and then worked to produce the desired effect. Stippling, brush textures, sponge and paper textures and troweling effects can be reproduced by following the maker's directions. The finish is then sandpapered lightly, sized with a special preparation, and the finish coat, colored to suit the user, is applied. It is possible to use the material for one coat work by mixing dry colors to the first coat.

No Wonder Portland Cement Stucco Endures



No wonder it is unaffected by weather conditions—that rain only makes it harder. For Portland Cement Stucco in all essentials is Concrete. And you know how well Concrete serves in foundations, in homes, in hospitals, in mighty dams, in roads and skyscrapers.

Be sure, therefore, that you always specify stucco by the full name, *Portland Cement Stucco*, and get the enduring strength which that tenacious binder, Portland Cement, assures.

Architects will tell you that Portland Cement Stucco assures a home of distinction and beauty. No other exterior treatment offers such a variety of color and texture. It harmonizes perfectly with any landscape setting.

And the ideal backing for Portland Cement Stucco is Concrete Masonry—Concrete Block or Tile.

* * *

Watch for advertisements telling about the many other uses of Portland Cement. And remember that the Portland Cement Association has a free personal service to offer you. Whether you use concrete or have it used for you, this service will give you more for your money.

Write today for your free copy of
"A Plain Talk on Beautiful Homes."

PORTLAND CEMENT ASSOCIATION

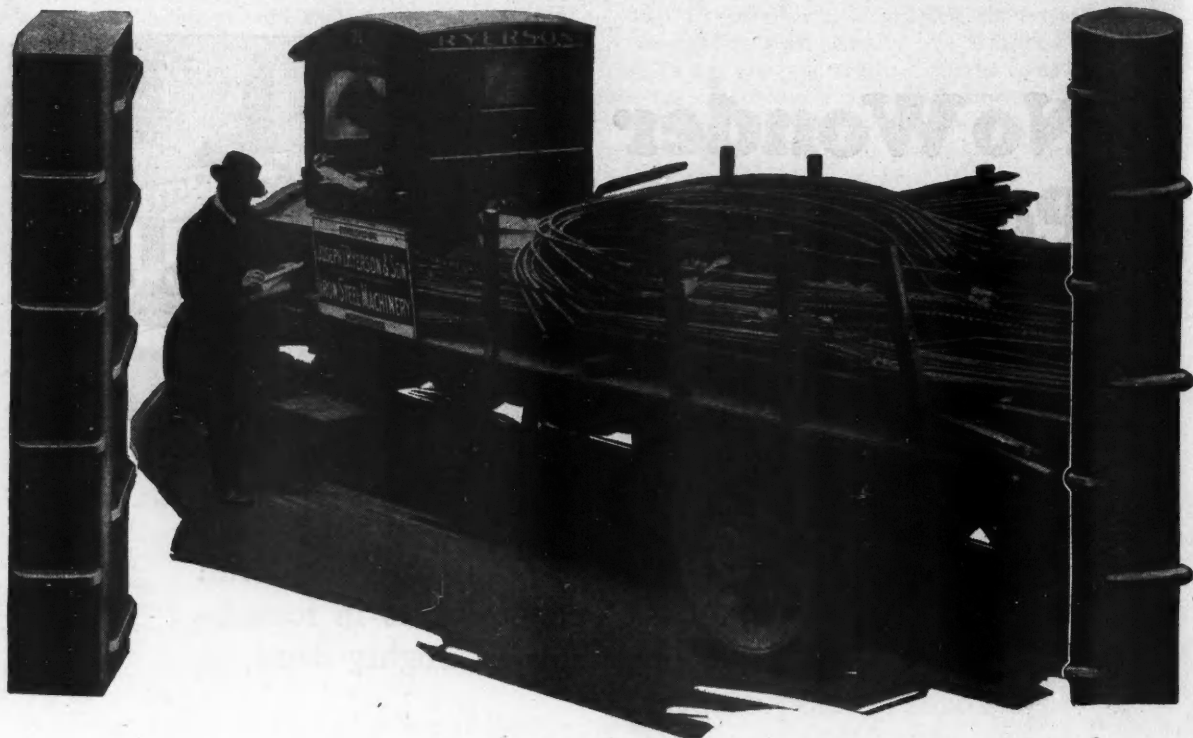
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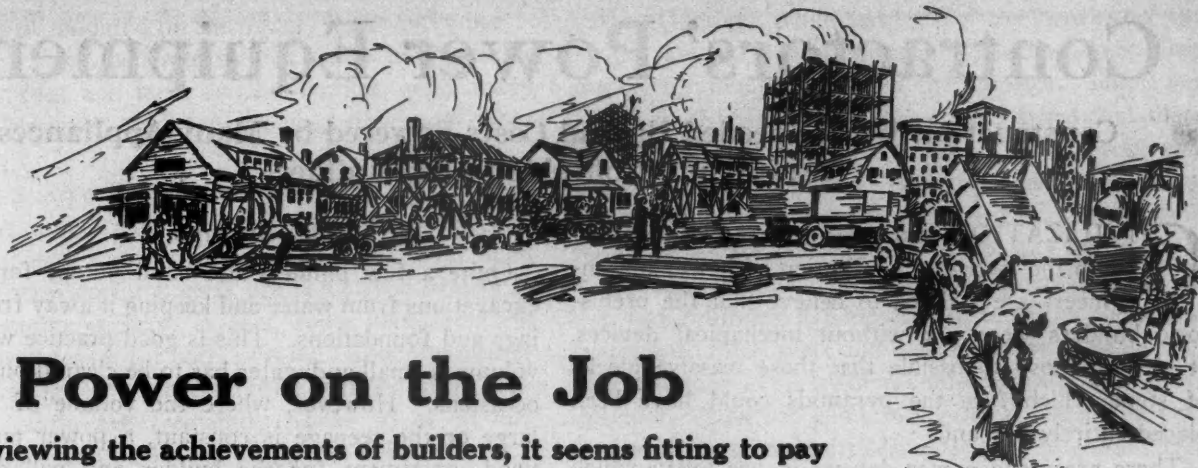
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Power on the Job

In reviewing the achievements of builders, it seems fitting to pay a tribute to "power on the job."

It has already revolutionized building conditions and will probably be the greatest factor in future progress.

Strides have been made in the annihilation of time and space—the railroad, the steamship, the airplane, the telegraph, radio and the automobile have brought it appreciably nearer.

And in the building industry, "power on the job" assumes daily increasing importance in the progress towards absolute efficiency.

The dictionary defines "efficiency" as "the ratio of energy or work gotten out of a machine to the energy put in," or (outside of mechanics), "economic productivity."

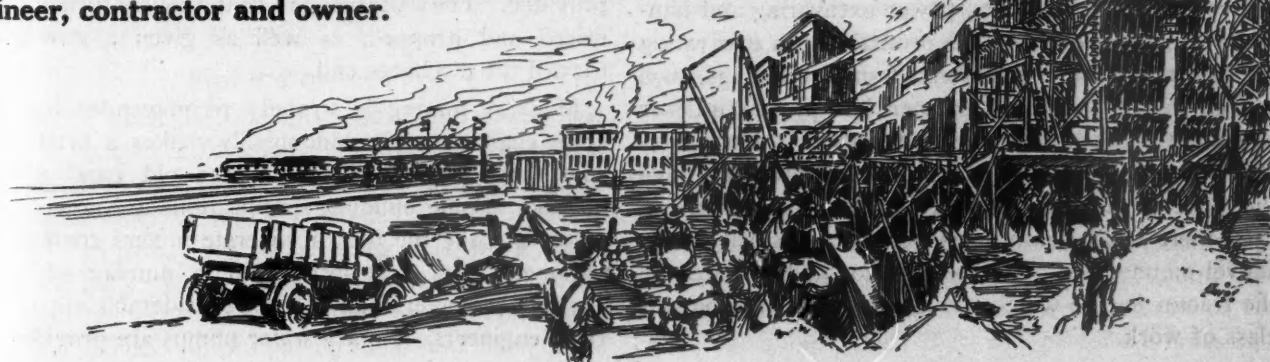
No other factor has so speeded up the work as "power on the job." It substitutes for laborious hand methods, the speed, precision and tirelessness of machinery.

Concrete mixers have superseded the old shovel-board methods and resulted in much better and more uniform concrete work.

Power woodworking machines have not only been remarkable time-savers, but they have produced better fitting joints and greater economy in lumber. Power floor surfacers produce a better and more uniform floor finish in a fraction of the time of back-breaking hand methods.

Power hoists and derricks, trenching machines, motor trucks and tractors, power loaders, air compressors, pumps and concrete distributing towers have made it possible for massive structures to rise like magic from sub-basement to roof.

And the more intensive employment of "power on the job" is almost the only check the contractor has today to hold down rising construction costs and keep them from becoming prohibitive. In its final analysis, "power on the job" is in the interest alike of architect, engineer, contractor and owner.



Contractors' Power Equipment

Construction Work Speeded Up and Costs Lowered by Many Appliances
Useful and Profitable to the Builder

CVILIZATION and progress are closely allied with the increased application of power but engineers are inclined to believe that the prehistoric builders were not without mechanical devices. It seems almost impossible that those massive blocks of stone which face the pyramids could have been placed entirely by hand.

There are many power devices in use today which facilitate the work of the builder. Without the hydraulic or pneumatic riveter, our steel frame buildings would be all but impossible. Nor could the heavy girders, columns, masonry and other building material be swung into place so easily and quickly without the power hoist and derrick.

Manual labor looks expensive when one bucket loader has been found to take the place of 18 or 20 shovelers and a portable belt conveyor has taken the place of as many wheelers in handling sand, gravel and similar commodities. Material which took four men 30 minutes to load has been handled by one man in five minutes with a portable conveyor. An ingenious car unloader has been devised which is large enough to take a freight car in its embrace and roll over with it. Having dumped the car, it replaces it on the track.

Steam Shovels

The first steam shovel manufactured in the United States was probably the one built in 1839 under the Otis patents. It was built by Mr. Otis and Mr. O. S. Chapman and placed in operation near Springfield, Mass. While successful, it was a somewhat crude affair. Mr. Otis was killed while operating it, being struck by a rapidly revolving control wheel at the base of the boom. The power shovels of today are safer to operate, more powerful and efficient in every way, but those first steam shovels of Otis and Chapman did remarkably good work for their day. In addition to steam shovels, electric and gasoline shovels of many types are now on the market, also dragline, clamshell and orange-peel excavators; dipper, hydraulic and elevator dredges, cranes and special hoisting machinery.

Even on small contracts, power excavating and handling machinery can be made profitable. In excavating for basements and foundations of small buildings, such as residences, the horse scraper has proved quicker and more economical than hand labor. It seems certain that a small power excavator will ultimately take the place of the horse scraper for this excavating. In fact, there has recently been perfected a small power shovel mounted on a Fordson tractor and operated by the tractor engine which should prove efficient on this class of work.

Pumps

Quite a few builders use hand pumps for freeing excavations from water and keeping it away from footings and foundations. This is good practice where the volume is small and water has to be cleared on but few occasions. However, where the volume of water is large or the seepage is constant, a power pump is a good investment for the builder and will effect an economy compared with hand labor. One type of power driven diaphragm bilge trench pump is designed especially for builders.

It is mounted on wheels, has an efficient gasoline power unit and is especially adapted for pumping muddy or gritty water. It has a capacity of 3,000 gallons per hour with 3-inch suction pump and 6,000 gallons per hour with 4-inch suction pump.

Concrete Mixers

Practically no concreting or mortar work of any size is being done today without the aid of concrete and mortar mixers. The old method of hand mixing has long been discarded in favor of the more rapid, uniform and economical power mixer.

Mixers are, generally, of the tilting or non-tilting type and range in size from small hand or belt power, tilting mixers mounted on skids or trailers up to the power machines with a capacity of 14 cubic feet per mix. Some of these are mounted with power plant on steel frames and small wheels for towing. Some are mounted on Ford chassis or automobile trucks and the smaller ones on two-wheel trailers. Mixers, from the one-sack size up usually have platform attachments so as to charge from wheelbarrows or else they are provided with power loaders, to elevate and dump the sand, crushed stone and cement into the drum. Then, there is the continuous feed type of mixer, into which the materials are constantly being charged and the aggregate continuously delivered.

Water tanks are usually provided above the drum level and with a measuring gauge attached. Inside the drum, mixing blades or paddles of varying design are provided. The materials are continuously turned over, raised and dropped, as well as given a movement toward the discharge end.

Machine mixing is strongly recommended by concrete engineers and undoubtedly makes a better and more uniform concrete than the old hand mixing method. Some building specifications are now drawn so as to make the use of concrete mixers compulsory although when first introduced, a number of years ago, mixer makers had to meet considerable opposition from engineers. Rotary water pumps are provided on

some makes, mounted on the mixer, for country use.

A great many concrete mixers made by reputable manufacturers are now on the market, with many features designed for convenience, time and labor saving.

Where a large amount of mortar or stucco work is to be done, an efficient power driven mortar mixer is a modern necessity and shows a great saving over hand work. These mortar mixers are somewhat similar to power concrete mixers; in fact, some manufacturers sell the same design for both services. Concrete mixers often discharge into wheelbarrows, but, on large construction work, are frequently placed so as to discharge direct into bucket hoists which elevate the mix to concrete distributing towers.

Concrete Distributing Towers

These concrete distributing towers have so quickened construction and reduced costs that they are now quite generally used on large contracts. One tower will serve a large area from foundation to roof but, on some very large buildings, several have been installed. Wheel barrows or concrete carts are generally used to distribute the concrete for pouring into forms or over floors, where it does not seem feasible to pour direct from buckets or spouting. Of course, wherever possible, the most satisfactory method is to pour direct from the concrete chutes into the forms or over the floors in floor construction.

When the gravity distributing tower and chutes were first introduced, they met with considerable opposition from engineers who thought that the concrete would disintegrate in its passage through the spouting, the heavier aggregate being carried ahead of the grout. On the contrary, it has been proven that concrete properly mixed with all the aggregates held in suspension and liquid enough to pass through these spouts will fill the forms and entirely surround the reinforcement without tamping. This concrete distributing equipment has made a wonderful saving in the cost of concrete buildings. Some years ago, the actual labor cost of distributing and placing concrete on a three-story building with tower and spouting equipment was 19 cents per cubic yard. Previously, when placing the concrete with wheelbarrows, the labor cost to the same contractor had been \$2.50 per cubic yard.

For small jobs, a mast hoist has been evolved which is quite successful and is lower in first cost than the complete tower and spouting.

Power Riveters

In 1898, when the Cincinnati-Covington bridge was being remodeled, a foreman's improvised arrangement led directly to the perfection of the pneumatic hand riveting hammer, as we have it today. The Edgemore Bridge Company, who were doing this work, were using an early type of jam riveter, backed up by an extended tailpiece. J. W. Duntley and Joseph Boyer were the pioneers in introducing these jam riveters.

Mr. Duntley, while inspecting the work on the bridge, saw this improvised arrangement whereby their jam riveter was used without the tailpiece. The rivets had to be driven in such a restricted space that there was no room for the tailpiece. A supporting rope was placed back of a workman's neck, in order to brace him, and a breastplate attached to the rear end of the tool. With this arrangement, the riveting was successfully done. Mr. Duntley perceived the possibilities of the idea, and, returning to Chicago, perfected the pneumatic riveter with breastplate and dispensing with the cumbersome tailpiece. This made a comparatively light, portable tool, which has come into general use. The perfection of the electric drill has also proven exceedingly useful in building work.

The rapid fabrication of steel frame buildings, bridges, ships and tanks is due largely to the pneumatic riveting hammer, which must be accorded an important place among the uses of power on the job.

Engines and Hoists

Power was early found to be a necessity in the construction field and stationary steam engines were first used to fill this need. They are still in general use, greatly improved in economy and convenience, to operate derricks, winches, hoists, pumps, excavators and piledrivers.

Hoisting engines first came on the market about the year 1880. Early steam hoists had their connecting rods of the same type as found on locomotives in those days; i. e., the strap and key type. The modern hoist has a forged connecting rod, solid throughout its entire length and slotted out on both ends to receive bronze boxes and adjusting wedges.

Electric and gasoline motors, as well as compressed air, are more recent in their application to this service. Two, three, four and five drum, as well as single drum hoists are in use, although the two-drum hoist is standard and additional drums are usually bolted on.

Brakes, speed and ease of control have been greatly perfected since the use of power hoists, derricks, steam shovels and piledrivers became general.

Wood Working Machinery

Of all the power machines now on the job with up-to-date contractors, wood working machinery takes high rank, from the standpoint of time and labor saving. The hand saw, possibly, will never be done away with but it is distressingly slow compared to the power saw. This is particularly true on the sawing of large beams, dimension stuff or ripping jobs. Even on ordinary lumber, there are many cuts which can be marked and taken to the power saw at one time. There it will be cut with precision in a fraction of the time required by hand.

Sawing is but one of the uses to which these machines can be put. Some of them will do planing and ripping work at the same time. Here are some of the other operations which they will perform: cross-cut-

ting, ripping, jointing, boring, sanding, dadoing, planing, routing, plowing, mitering, rabbeting, moulding, band sawing, mortising, tenoning, grinding, matching, stair routing, side door jambs, jack rafter cut in one operation. In fact, it is said that there is no cut which cannot be handled on one of these machines.

One power wood worker is said to have cut 815 hip shingles in 18 minutes. Another made the cuts for two double window frames, two triple frames, three transom window frames, five single window frames and five door frames in three and one-quarter hours. Still another cut the roof boards, mitered the ship lap and siding and cut the flooring for one six-room house in one hour and forty minutes. Compare these achievements with the time required for all hand work and it is apparent that these machines soon pay for themselves in the labor-saving effected.

The more intelligent carpenters are, today, in favor of the power wood worker. They know that there is a great deal of construction waiting, much of which is lost if carried over into another building season. Many carpenters prefer to use the machines because they have found them convenient labor-savers and that their uniform accuracy surpasses the most skillful hand work.

Power wood workers are on the market which range from simple saw rigs up to large machines with heads for a number of different tools and on which four men can work at one time. Most of these machines can be bolted to skids, loaded on motor trucks, taken to the job and moved from place to place. Some of the lighter rigs are mounted on trailer wheels with regular automobile tires and can be moved with extreme ease and rapidity.

A great many carpenter contractors and cabinet makers find it an advantage to maintain a power wood working shop. There is an increasing demand, today, in better class buildings for "odd work." Original built-in features are preferred by owners who can afford them. They like to plan their own book-cases, buffets and stairway but turn to the carpenter and cabinet maker to design and install them with appropriate decoration and finish. A carpenter shop, properly equipped with power wood working machinery, is a practical necessity, to handle this fine class of work.

Many lumber dealers are also finding it profitable to install power saws and wood working machines, in order to meet the demand for special lengths, sizes and shapes.

Three types of drives are in general use for wood working machinery—belt driven, gasoline and electric. Where electricity is available, this form of power is generally preferred, and machines for electric drive are furnished complete with motors and long electric cords.

A man is said to exert about one-eighth horse power, and, at prevailing rates, will cost from \$8.00 to \$12.00 per day. One-eighth horse power from electricity will

cost less than 10 cents per day. Then, too, it is untiring and will run at top speed all day. Carpenter work, when speeded up, is very heavy and tiring. Frequently, the men using only hand power tools, are exhausted at the end of the day. This is unnecessary and can be avoided with power machines to take care of the heavy work. Therefore, the machines are a boon to both employers and men.

More extended use of power machinery is the only factor in sight which will keep down the rising cost of construction and keep it from becoming prohibitive. The contractor can make a better profit and afford to pay better wages.

Power Floor Surfacers

For surfacing hardwood, terrazzo, marble tile, cork, composition and many other types of flooring, power surfacing machines have so completely demonstrated their superiority to hand work that they are, today, almost universally used.

Take, for instance, the work of sanding a wood floor; here, one man with a power surfer will do the work of six men by hand. Instead of slow, hard manual labor, first scraping then sanding—an excessively fatiguing job—the power surfer finishes it much better in a fraction of the time and without hard labor. First, the machine is used with a coarse and then with a fine garnet paper. The operator has no heavy work to do, simply operating the controls and rolling the machine over the floor as the motor does the work.

One type of floor surfacing machine consists of a motor driven drum or roller on which the sand paper is clamped. It is equipped with a vacuum dust collector and dust bag and leaves no wood flour or dust in its wake. Another type which is popular is adaptable either to wood, terrazzo, marble, tile, cork or composition floor. It surfaces with a circular motion, using stone surfacers for grinding terrazzo and garnet paper for finishing wood floors. This type is also motor driven. The motor in some of these machines is entirely enclosed, to protect it from dust.

One manufacturer supplies a machine with a small auxiliary device for finishing wainscoting, covebase or corners, operated by a universal joint from the main machine. Some machines of the rotary type are operated by separate controls on the handle—one is operated automatically by raising or lowering the handle itself. It is said that this machine will easily surface 500 to 1,000 square feet of new marble tile floor per day.

Many carpenters are making from \$30.00 to \$50.00 per day with a floor surfacing machine and contractors who own such machines and employ them entirely on their own work state that they soon pay for themselves.

On terrazzo work, a good floor surfacing machine will do more than 10 times as much work in a day as the best hand worker. The comparison is from 30 to

35 square feet per day for the hand rubber against 325 to 400 square feet with the machine.

Floor surfacers are being successfully used for refinishing old wood floors, renovating marble and tile floors with wire brushes; also for waxing and polishing hardwood and surfacing and polishing cement.

Many large industrial and office buildings are being scrubbed entirely by the rotary machine method and one machine, it is claimed, is equal to 12 or 14 men or women with scrub brushes.

Sand Blast

Sand blast machines are found extremely useful to contractors for scouring masonry walls which have become smoke grimed and restoring the natural color and beauty of the stone. They also have a wide variety of uses in the industrial field, principally on castings and similar parts, for removing scale, cinder, etc.

The cement gun occupies a unique place in the building field in connection with concrete work. It operates on a principle very similar to a sand blast machine. The cement gun is mounted on large wheels and can be wheeled about like a cart. Compressed air from an air compressor is connected to the machine and the dry cement and sand, in the right proportions, are mixed with a stream of water just before the mixture leaves the nozzle. This nozzle is held by the operator who can direct the stream accurately over the surface to be concreted.

The resulting concrete, or "gunite," is said to be very dense and impervious. This is due to the even mixture, the uniform hydration and the force with which the stream is projected. This method has been quite successful since its invention in 1908 and is used for water-proofing, fireproofing, protection of steel, the lining of tunnels, reservoirs, shafts, ditches, canals, old walls, stucco work, etc.

It is used in building construction to apply concrete

over wood and metal lath, hollow tile, brick and other building material. The first building on which the cement gun was used was for the covering of the old Field Museum in Jackson Park, Chicago. Since then, cement guns have been used on the Panama Canal, the New York Central Terminal, the Woolworth Building, the Croton Aqueduct and many other structures.

The pebble dash machine is another portable unit which has demonstrated its efficiency on building work. A great variety of pebble dash effects on stucco walls are obtainable with various colors of crushed rock, such as granite, marble, sand-stone, quartz, etc.

The old hand method was to throw the pebble dash material against the face of the wet stucco with paddles. The pebble dash machine will do uniformly better work at a higher rate of speed and a correspondingly lower cost.

The machine is operated by a small electric motor and a hopper is provided in which the pebble dash material is placed. From the hopper, it feeds by gravity against the vanes of a revolving wheel. It is thrown by these vanes and directed through an aperture by centrifugal force against the stucco wall. In addition to its use on new buildings, it is frequently used for applying a new pebble dash coat on re-surfaced mortar where the former finish had become streaked and dingy.

Future of the Industry

Progress in the building industry will undoubtedly be along the line of more extended use of power and the continually greater use of machinery to perform the mechanical tasks. The wiser and more progressive builders will set before themselves the goal of the greatest possible efficiency by mechanical means. History has proven, in other fields, that labor will be the gainer by the more extended use of machinery. The builder will improve his profits and the public will find within its reach better buildings and lower costs.

Growing Use of Concrete Products

Concrete Masonry and Other Products Are in Growing Demand for Strength, Beauty of Finish and Fire Resistance

IN the year 2100 Mr. Average Citizen may wake up in a house built of concrete masonry, eat his breakfast off concrete dishes and drink his coffee out of a concrete cup. Opening the door of a concrete entrance, he will probably pass down a concrete walk past a concrete bird bath, a concrete bench and a sundial on an ornamental concrete standard. Getting in his car, he will probably drive through a concrete portal in a concrete fence and over concrete roadways to the business district. Arriving at a fireproof concrete office building, he will be carried in a fast elevator to the 30th floor and, entering his office, figure on buying a lot of concrete making machinery. At the end of a long and honorable career, he may be car-

ried to the cemetery in a concrete coffin and laid away in a concrete vault.

A really remarkable development in the use of concrete masonry products is revealed by the figures for the last four years—a development which bids fair to continue in growing ratio. The annual output of concrete block and tile increased as follows:

1920	50,000,000 units
1921	175,000,000 units
1922	297,000,000 units
1923	385,000,000 units

This shows a phenomenal increase—670 per cent in four years. And during the same period there has been a great refinement in beauty of design, texture

and finish of concrete masonry products, so that these have now become a splendid medium for architectural detail. In fact, the reinforcement which can be given concrete, makes it possible to produce ornamentation of slender proportions and delicate detail capable of bearing load or stress.

A great variety of texture is obtainable in concrete masonry—either "velvety" or hard, fine or coarse in appearance—and it can be tooled for almost any desired effect.

The method of securing special facing effects is interesting. A machine is used which provides a high pressure. Special crushed facings of granite, marble or other stone, is, by this means, pressed against the face of the aggregate while it is being molded. Some of the effects thus obtained are: Granites in gray, dark gray, pink, yellow, red, dark red, white, black, spotted, light and dark green, green and gray mixed; marble in white, gray, light and dark yellow, green, pink, brown, tan, red, black; fine or coarse marble dust; white quartz; micaspar; white silica sand and white limestone sand.

Concrete Masonry Products

American builders are coming every year to a clearer realization of the merits of concrete building materials. Their great strength, permanence, fire resistance, economy, time and labor-saving features make them increasingly popular, also the fact that they are produced locally and are quickly available.

Columbia University made some interesting tests about a year ago which showed the superior bonding qualities of concrete brick and the wonderful strength of piers built of concrete brick and cement mortar. Concrete brick are not as well known nor as extensively used as concrete block but their use is extending as their merits become better known. The total output in 1923 was 195,000,000. They are almost universally used for fireplace construction, and, in some sections of the country, are becoming extremely popular for facing brick on residence and better class buildings. Their excess weight is somewhat objectionable but they have many advantages which offset this feature. Their good bonding qualities and great strength in a wall have already been mentioned. They can be produced locally in any community where there is a good sand and gravel supply, eliminating freight charges and delay. On account of their light color, they are now being extensively used in the walls of light courts. Good molding machine equipment is necessary for the successful manufacture of this brick. Either wire cut or stippled faces can be produced with a wide variety of texture and in a number of tints of buffs, grays, greens and reds.

Concrete masonry units, such as block, tile and brick, owe their popularity to certain natural advantages which make them peculiarly suitable for the use of the builder. The owner, too, secures great strength and permanence in walls of concrete masonry. Now

that stucco finish is becoming so popular, concrete block and tile are being quite extensively used for wall construction with stucco finish. They are particularly well adapted to take stucco, which bonds right into the pores of the concrete. Three-coat work is not necessary over concrete block or tile, two-coat work being ample. The rigidity of the concrete block or tile wall prevents cracks developing in the stucco finish. This is a feature which gives great satisfaction to owners.

The commonest size block is the 8 by 8 by 16-inch, having 20 percent to 40 per cent air space. Concrete tile is of lighter construction—from 50 per cent to 75 per cent air space. One two-cell concrete block takes the place of 13 brick and lays up about twice as fast.

Built by Women's Clubs

The Hoover "Home, Sweet Home," built in Washington by the General Federation of Women's Clubs as a contribution to the movement for "Better Homes in America" was opened in May, 1923, by President and Mrs. Harding. This model home was of concrete masonry construction with stucco finish. The blocks used were standard 8 by 8 by 16-inch concrete blocks, as specified by the Department of Commerce (Hoover) Building Code.

This model home is a reproduction in modern building materials of the old homestead of John Howard Payne, author of "Home, Sweet Home," the song which has stirred so many hearts. Undoubtedly, it drew its inspiration from his own home at East Hampton, Long Island.

Concrete block and tile have a high degree of fire resistance, especially when coated with stucco. Some special fire tests were made during the last year by a committee of the Concrete Institute at the Underwriters' Laboratories and showed very favorable results.

Concrete Block Useful

In addition to its strength, concrete block first became popular with builders because of the fine appearance of the rock-face block in basement walls, its convenience in laying and economy. Providing as it does from 20 per cent to 50 per cent dead air space, a concrete block wall affords greater protection from the cold than solid masonry and it will not sweat like solid masonry. Many residences have been built entirely of concrete block construction in the walls and they make extremely comfortable homes, splendidly protected from the cold of winter and the heat of summer.

Many ingenious shapes of both block and tile are on the market, with machines to make them, furnished by upwards of 50 manufacturers and offering a wide range of choice. Blocks are made with one, two, three, four and five cells, for walls eight, ten and twelve inches thick. They range in size from 3 inches to 11½ inches in height, from 3¾ to 24 inches in width and from 7¾ to 24 inches in length. Some

blocks are made in two or more separate pieces tied together by four $\frac{1}{4}$ -inch galvanized steel rods, anchored into the concrete. The ends of this block are open. Practically all the block designs provide vertical air spaces and are made to be set on edge.

Cinder concrete blocks are being sold in large quantities for use on all classes of buildings. They have the advantage of better resisting fire than any other form of concrete block. For instance, cinder concrete was found to have withstood perfectly the effects of the fierce fire in the Burlington Building, Chicago. A wall built up of cinder blocks is a splendid fire-resistant as demonstrated by the fire tests made by the Underwriters' Laboratories for the National Board of Fire Underwriters. While strong enough for the purpose, and tenacious, the cinder block is a poor conductor of heat, and for this reason less fuel is required to heat a cinder block house. It is also a first-class sound deadener and is being extensively used for this purpose. It makes a splendid base for inside plaster and outside stucco. Nails can be driven into it readily and will hold there as well as in wood. It does not sweat—therefore calls for no furring or lathing.

A much greater variety of design is offered in concrete tile than in concrete block. The commonest size of tile is the 5 by 8 by 12-inch. Tile are lighter and easier to handle than block. Most of the concrete tile is designed on the principle of the vertical air space, but one design is made of oblong section with a circular opening running horizontally from end to end. Still another has three horizontal cells.

Concrete Tile Which Bonds Well

Tile with a single circular cell are made to lay two to the thickness of the wall, leaving $1\frac{1}{2}$ -inch air space between the walls and providing triple air space, double bond construction. This type of tile provides a much greater bonding surface than those types of block or tile which are set on edge. Consequently, a wall of this tile, set in cement mortar, possesses an unusual degree of strength—almost equal to monolithic construction. This tile affords great compressive strength and unusual resistance to wind pressure or settling strains due to the splendid bonding of the wall joints.

Many types of concrete tile are simply half-size, lighter sections of blocks. Their lightness makes them popular with masons and they greatly cheapen construction costs.

The manufacture of concrete masonry units has grown to a great national industry—but a localized one, nevertheless. These units are rarely shipped over 200 miles. Builders, themselves, in many places, have installed machinery to make concrete masonry units, and are supplying the local markets as well as their own needs. It is getting, however, to be a specialized industry requiring proper equipment and yards, with a corresponding investment of capital. As in any other manufacturing business, the firm with the most

complete labor-saving equipment will have the lowest production costs and will make the most money. Outfits can be secured which range from a small block tamping or brick machine or a row of wet moulds which can be worked by two men with shovel mixing, up to large plants complete with power mixers, a battery of heavy power tamping machines, power transmission, conveying machinery, steam curing rooms and complete yard storage and delivery facilities.

The possibilities for profit in this business are said to be unusually good. One two-machine tile plant making oblong tile of the circular opening type will cost about \$5,000, complete, and it is possible to earn with it from \$20,000 to \$25,000 a year, clear, in addition to operating, sales and other overhead expense.

With this particular type, air glazing apparatus is furnished, by means of which coloring can be sprayed over the face of the tile, producing fine finish effects in a wide range of tints. This obviates the necessity for a stucco finish over the face of the wall and results in a distinct economy in the cost of the building. The dry colors are mixed with cement and water and a fine aggregate dropped through the spray projected by air pressure against the face of the tile. From $\frac{1}{8}$ to $\frac{1}{16}$ of an inch of colored aggregate is thus bonded to the face of the concrete tile, producing permanent tints of gray, buff, green or red.

Increasing Use of Concrete Tile

Concrete tile are being used more extensively every year for backup walls and partitions. They can be effectively tied in to the masonry of the facing wall, making an exceptionally strong, fire-resistant wall.

Thousands of independent, profitable businesses are being built up all over the United States, to supply concrete masonry products. All that is required is a plentiful supply of good clean sand and gravel, the necessary cement and molding equipment suited to local needs. Many builders require a sufficient supply of masonry products to make it profitable to have their own equipment for block and tile making.

Concrete products of today are far stronger and more uniform than those of even a decade ago. Much has been learned in regard to the selection of proper materials, the proportions to use, the proper mixing and curing. Precast units which are made from concrete carefully mixed, molded and cured by experienced concrete workers are nearly always superior in quality to monolithic concrete poured on the job.

The cleanness and size of the crushed rock or gravel is a very important factor and must always be considered in relation to the proportions of sand, cement and water to be used. What is called the "fineness modulus" is, today, the main determining factor in cement mixtures. In a like volume of coarse and fine materials, there is a much greater total area of the combined fine surfaces than of the combined coarse surfaces. The modern concrete engineer aims at a proportion of materials and a complete mixing

which will thoroughly grout each of these minute surfaces with sufficient liquid cement.

The Portland Cement Association, Chicago, is doing splendid work in promoting a wider knowledge of the latest and best methods and formulae. Builders and producers of concrete products should take full advantage of their co-operation. They maintain a force of 350 experts in the field delivering addresses and making demonstrations to chambers of commerce and to builders. These lectures are loaded with fact and illustrated with moving pictures, as well as actual samples of concrete and concrete mixing materials. They also maintain a staff in Chicago preparing concrete data for architects, engineers and builders.

Expert Help on Concrete Mixtures

When the Association is asked to recommend a concrete mixture, they send an expert to make a survey of the local materials which are to be used and will then recommend an exact formula. Without such a survey, they will merely prescribe—"One part of cement to four or five parts of suitably graded material." It frequently happens that the association will cheapen the mixture, and, at the same time, better the quality of the concrete. This is a broadminded type of service which is not only best for the industry as a whole but should also commend itself to the individual builder or producer of cement products.

The wetness of the mixture is another factor which must be varied with the fineness of the materials and the method of molding and tamping. For instance, in making pre-cast concrete art stone, an unusually large amount of water is used in the mixture because it is cast in a sand mold, which absorbs the excess water.

The American Concrete Institute adopted tentatively the following strength and absorption requirements for concrete building block and tile at their February, 1924, meeting:

Name of classification—	Compressive strength pound per square inch of gross cross-sectional area as laid in the wall	
	Average of three or more units	Minimum for individual unit
Heavy load bearing block or tile.....	1,200	1,000
Load bearing block or tile.....	700	600
Non-load bearing block or tile.....	250	200

ABSORPTION REQUIREMENTS

"Concrete building block and tile to be exposed to soil or weather . . . shall not absorb more than 10 per cent of dry weight of the unit when tested as hereinafter specified, except when it is made of concrete weighing less than 140 pounds per cubic foot. For block or tile made with concrete weighing less than 140 pounds per cubic foot, the absorption in per cent by weight shall not be more than 10 multiplied by 140 and divided by the unit weight in pounds per cubic foot of the concrete under consideration."

The proper curing of concrete products is essential to the best results. They must be kept moist throughout the entire setting period. Common block are usually given from 24 to 48 hours of steam curing, followed

by four or five days during which they are kept moist all the time. To simply mold the block and set them out in the sun to dry is a mistake and usually results in an inferior product. In fact, it was just such methods which produced inferior block in the early days of the industry, when it was common to see basement block which absorbed an abnormal amount of water and looked wet for a long time following each rain. With greater knowledge and better methods, the concrete products produced today are of greatly superior quality.

Concrete roofing tile makes a handsome, durable roof with considerable fire-resisting value. A waterproof formula of 1:1:3 is used and sometimes waterproofing compounds are added to the mixture from which they are molded.

Concrete roofing tile are made in small units for the roofing of residences and small buildings, without reinforcement, and in large, reinforced units for roofing industrial buildings. Concrete tile for residences is furnished with an attractive, permanent color-finish—in greens, reds and grays. Sixty-five thousand squares of this roofing material was produced in 1923 and at least 75,000 squares of cement-asbestos shingles.

Concrete floor tile are being extensively used and are furnished in terrazzo conventional patterns and in a number of colored patterns and designs—from 75 to 100 different color and design effects.

Carborundum tread tile, in dark colors, are particularly popular for stairway treads, entrances and places where a secure footing is desirable. This finish does not wear smooth and is useful in front of revolving doors and in similar places.

Useful and Ornamental Products

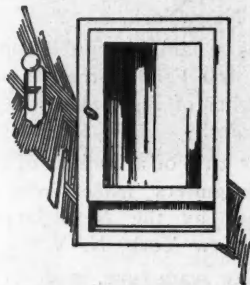
There are a number of decorative and useful pre-cast concrete products on the market, such as lighting standards, fountains, columns, sun-dial standards, bird baths, as well as cast sills, lintels, cornices and other architectural detail in carved stone effects.

Concrete lighting standards are cast in graceful designs, of high grade, dense concrete, beautifully finished, for street, park and boulevard lights. The making of these has grown to be a large industry, concrete standards being more permanent than metal and requiring no painting upkeep. All lighting standards in the city of Milwaukee are of this type and their use has extended to cities and towns all over the United States.

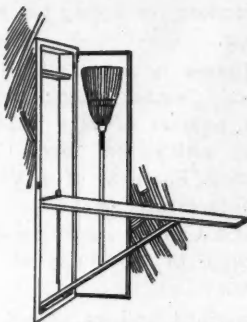
Pre-cast entrances, sidewalk slabs, sidewalk lights, laundry tubs and clothesline posts are in use, as well as a number of articles for farm use, such as fence posts, curved silo block or staves, septic tanks, etc.

It is safe to say that builders, generally, will continue to use concrete products in constantly increasing volume and that there will be a continual improvement in the permanence and fire-resisting qualities of American buildings.

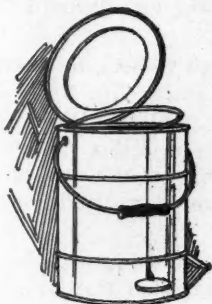
BETZCO BETTER STEEL EQUIPMENT



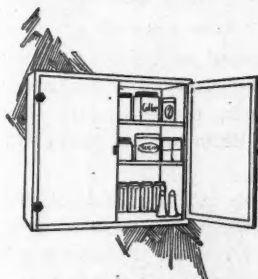
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built-in or exposed type



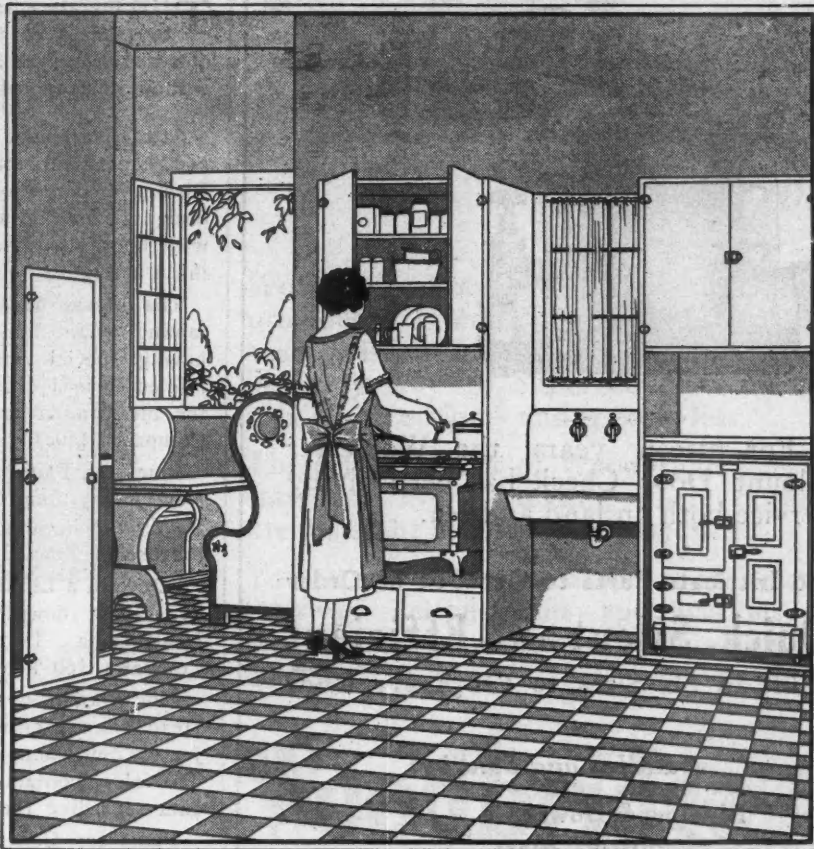
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Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to readers of the American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

Attractive House Plans are presented in a most pleasing and convenient manner in a publication issued by the Bishopric Company, Cincinnati, Ohio. The thirty house designs, with the perspectives in pen and ink drawings and with floor plans, are presented on loose leaves, contained in an attractive holder.

The Mazap Handbook is a pocket size notebook containing useful information regarding paint and painting, having special reference to pure zinc oxide ground in refined linseed oil. It includes a number of blank pages for memoranda and is issued by the New Jersey Zinc Company, 160 Front street, New York, N. Y.

Zinc as a Paint Pigment is a pamphlet published by the New Jersey Zinc Company, 160 Front street, New York, N. Y., which contains a number of illustrations explaining the use of Zinc Oxide in paint.

"Once in a Lifetime" is the title of a booklet of information about downspouts and gutters made from "Horse Head" zinc. It is published by the New Jersey Zinc Company, 160 Front street, New York, N. Y.

Zinc Roofing of the standing seam type, made of "Horse Head" zinc is discussed in a pamphlet issued by the New Jersey Zinc Company, 160 Front street, New York, N. Y. The folder contains instructions for laying the material and data regarding the roofing.

Plans for Concrete Houses is a sixty-four page book published by the Portland Cement Association, price 50 cents, which illustrates a number of very attractive home plans. The book contains articles on "How the Concrete House Is Built," "Desirable Features of a Well Planned Home" and on other interesting subjects. It may be obtained from the Portland Cement Association, 111 West Washington street, Chicago, or from any of the district offices of the Association.

Starrett Tools are described and cataloged in Catalog No. 23, issued by the L. S. Starrett Company, Athol, Mass. The 352-page catalog illustrates many of the tools in the extensive line made by the company and tells much of their use.

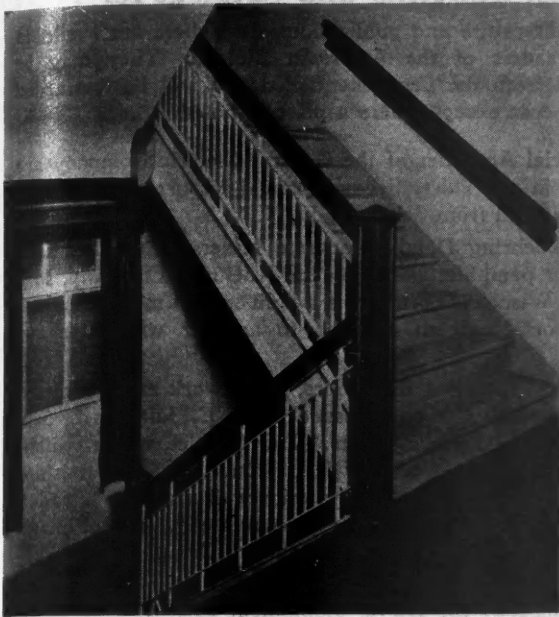
Page Volunteer and Monarch Boilers, for steam and hot water heating are listed in Catalog No. 50, issued by the William H. Page Boiler Co., 141-145 West Thirty-sixth street, New York, N. Y. Beside listing the complete line of boilers and heating specialties of the company, the 120-page publication contains much valuable data for the heating engineer and builder.

Franklin Tunnel Slate is described in a pocket size catalog for 1924 issued by the Slatington Slate Co., Slatington, Pa. Other products of the company listed include roofers' supplies, blackboards and other slate products. The book gives methods of laying slate roofs and other information as to how the product should be handled.

Sewage Disposal is discussed in a health bulletin issued by the United Cement Products Co., Indianapolis, Ind. The Perfection Septic Tank, made by the company is described in detail in the bulletin and its proper installation shown.

Brass Pipe Plumbing is an interesting booklet telling of the advantages of brass pipe installations. The booklet, published by the Copper and Brass Research Association, is being distributed by the Interstate Brass Co., 19 North Peoria street, Chicago, Ill.

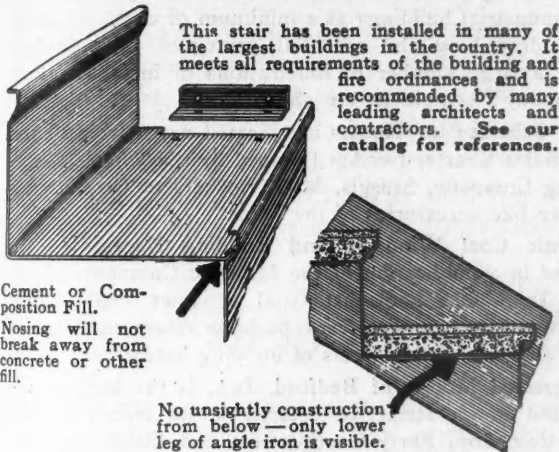
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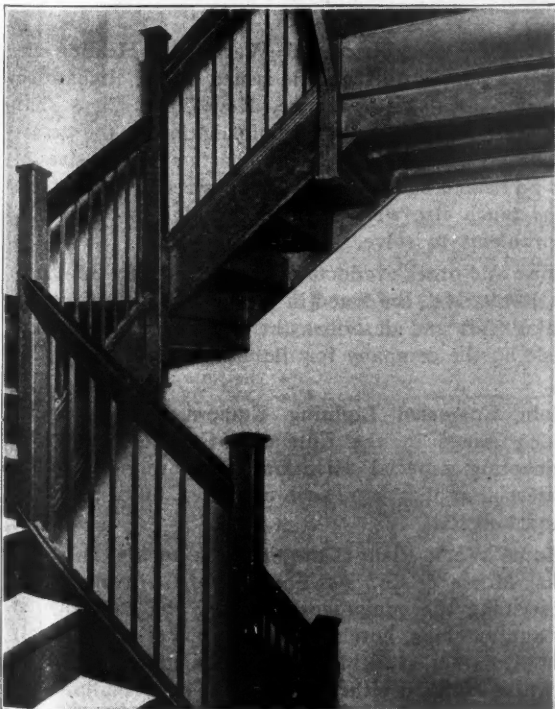
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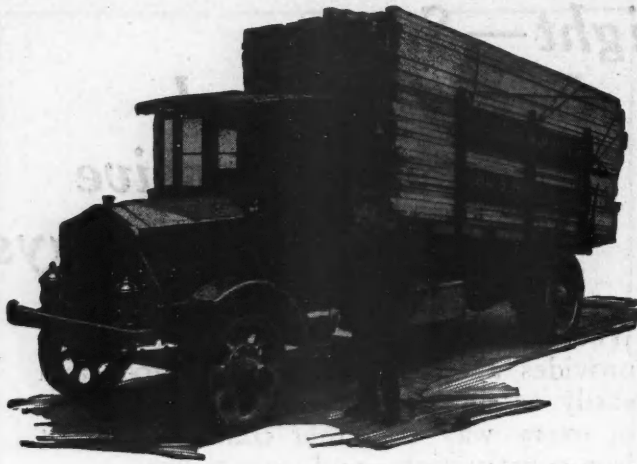
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DO you know about the great savings that other truck operators are making in the maintenance cost of their trucks by equipping them with Gruss Air Springs?

Have you found out how Gruss Air Springs absorb road shocks and vibration thus lessening breakage and repair bills; increasing the life of the truck—and keeping trucks in constant service.

Do you realize that operators of commercial vehicles who have investigated this have standardized on Gruss Air Springs? Among these is one operator who is using over 300 sets on trucks and salesman's cars.

Are you familiar with the fact that during the past two years nine different truck builders have adopted Gruss Air Springs as either optional or standard equipment?

Gruss Air Springs are made in 5 sizes for light, medium and heavy trucks, buses and passenger cars. Write for complete details.

The Cleveland Pneumatic Tool Co.
Cleveland, Ohio

GRÜSS AIR SPRINGS
AS MFD BY THE CLEVELAND PNEUMATIC TOOL CO. CLEVELAND - OHIO
For Trucks - Buses - Passenger Cars

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to readers of the American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

Financial Activities of the General Electric Company are outlined in the Thirty-Second Annual Report of the organization, issued from Schenectady, N. Y.

The Koehring Dandie Concrete Mixer is described in a two-color pamphlet issued by the Koehring Company, Milwaukee, Wis. This product is a light weight mixer designed to be portable from one job to another with ease and rapidity.

Proper Treatment for Floors, Woodwork and Furniture, is described in a booklet issued by S. C. Johnson & Son, Racine, Wis. Price, 25 cents. This booklet, which is illustrated in colors, goes into detail concerning the finishing and refinishing of wood and interior wall surfaces. Readers of the AMERICAN BUILDER may procure a copy without charge by writing to Dept. AB of the Johnson Company.

Twinfan System of Heating is the title of an attractive book issued by the Dwyer Equipment Co., 4534 W. North avenue, Chicago, Ill. The book deals with improved heating for industrial buildings at a minimum of cost. In addition to describing the essential principles of industrial heating, a large number of illustrations of installations of the company's equipment are shown.

Color Schemes for Homes are treated extensively in the Kirsch Sales Booster for April, issued by the Kirsch Manufacturing Company, Sturgis, Mich., makers of curtain rods and other like accessories of the home.

Majestic Coal Windows and Building Necessities are described in a publication of the Majestic Company, Huntington, Ind. The book lists coal windows, coal chutes, underground garbage receivers, package receivers, fireplace fittings and many other items of building hardware.

J. Herschel Moore, of Bedford, Ind., is the hero of the story told in an attractive colored folder issued by the Lehon Company, Forty-fourth street and Oakley avenue, Chicago. Mr. Moore is a dealer in building material and the publication tells of his experiences in handling Mulehide Roofing.

Practical Rules for Successful Warm Air Heating are contained in a booklet of that title issued by the Richardson & Boynton Co., 260 Fifth avenue, New York City. The booklet contains a wealth of such information as the capacity of warm air pipes and registers, charts showing sizes of rooms to be heated and the sizes of pipes required for these rooms and much else which will be of value to those with heating problems to solve.

Brascolite and other products of the Edwin F. Guth Company, St. Louis, Mo., are listed in the firm's Catalog No. 10. The catalog lists and describes the numerous lighting fixtures made by the company for illumination of buildings of all types.

Porcelain Enameled Lighting Equipment is a pocket size catalog issued by the Edwin F. Guth Company, St. Louis, devoting especial attention to lighting equipment for commercial applications, such as stores, offices, schools, lodges and hospitals.

The Home Water Plant is the title of a booklet issued by Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago, describing the equipment made by the company for homes, country clubs, hotels and other places where a city water supply is not available. The automatic action of the system when installed either for a deep or a shallow well is described.

Free Information for Our Readers

THE AMERICAN BUILDER has an Information Bureau for the benefit of its readers. It places those in need of appliances, machinery, tools, building materials and supplies of every description directly in touch with reliable manufacturers.

No Charge is Made for This Service

Upon receipt of a request for information, the name of the inquirer and the product he is interested in is sent to concerns who can supply him.

How it Works

If you are interested in any kind of building materials, contractors' equipment and machinery, power shop equipment, heating systems, plumbing supplies, water supply systems, lighting systems, elevators, school or church or theatre equipment, farm building equipment, building hardware, home conveniences, or anything that is used in constructing or equipping any kind of building—fill out the coupon below, send it to the AMERICAN BUILDER and we will take the matter up at once with the proper parties who will send you their catalogs, prices and any other information you desire.

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Please Help Us to Help You

In order to get the best and quickest results please be sure to print or write your name and address plainly and also check your occupation in the coupon below. Remember—This service is ABSOLUTELY FREE to American Builder readers.

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Gentlemen: I am in the market for the following items: Please put me in touch with manufacturers whom you know to be reliable and can furnish goods promptly:

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Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to readers of the American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

Finishing Room Equipment of the DeVilbiss Spray Painting System is described in Catalog "S" issued by the DeVilbiss Manufacturing Co., Toledo, Ohio. The publication describes and lists the DeVilbiss spray guns and other products used in the painting and finishing of factory products.

DeVilbiss Spray Painting System (Portable) is described in a folder of that title issued by the DeVilbiss Manufacturing Co., Toledo, Ohio. The uses, advantages and economies of the system are outlined with a description of the portable DeVilbiss equipment for such uses.

"The Electric Rotary Machine" is the title of a booklet issued by the Electric Rotary Machine Co., 30-40 South Clinton Street, Chicago. In it are described the uses of the rotary machine for floor surfacing and refinishing on wood, stone and other materials as well as a number of other uses.

Rock Island No Streak Wall Registers are listed and described in detail in Catalog No. 8 issued by the Rock Island Register Co., 2435 Fifth Avenue, Rock Island, Ill. The catalog shows the manner in which these hot air registers are used in walls and lists other furnace supplies.

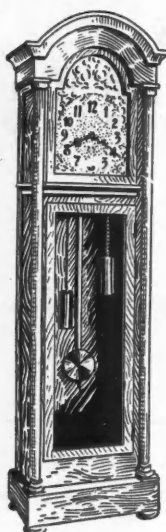
"Color Harmony in Western Window Shades" is the title of an elaborate book issued by the Western Shade Cloth Co., Atlanta, Buffalo, Chicago, Detroit and Indianapolis and William Volker & Co., Kansas City, Houston, San Francisco, Los Angeles, Seattle, Dallas and Denver. The book, 11 by 15 inches, is attractively and permanently bound and profusely illustrated with colored plates giving the colors of the shade cloths and their relations to home decoration.

Kilmoth Products Corporation, 50 Union Square, New York, has issued a number of attractive leaflets and publications dealing with the red cedar closet lining produced by the company and its installation. The publications tell the advantages of the Kilmoth products, which give closets the advantages of cedar chests, to home owners and builders, contractors and architects.

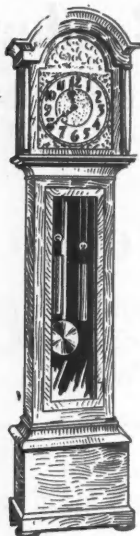
Estimating Building Costs and Appraising Buildings, by Frank E. Barnes, is published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York, price \$5. The volume of 810 pages is 4½ by 7 inches, bound in flexible covers and illustrated. It is intended to aid the contractor or estimator in determining the amount of labor required for the various building operations, to furnish him the prices of labor and materials which will enable him to check his estimates. It endeavors to give full data on present-day costs of replacing buildings erected between 1890 and 1923.

Revolving Door Construction and architectural design is treated with thoroughness in a publication issued by the Van Kannel Revolving Door Co., 250 West Fifty-fourth Street, New York. The publication is of proper size for the architect's files and carries an American Institute of Architects' file number. It details capacity tests made with revolving doors; construction features, designs, dimensions, equipment, specifications and illustrations of types of the doors. It should prove valuable to those designing and installing revolving doors.

Homes of Comfort, through the use of Crane materials, is a 120-page book published by the Crane Co., 836 South Michigan Avenue, Chicago. The book, beautifully printed throughout, illustrates and describes the Crane fixtures for the bathroom and numerous other plumbing supplies. Model bathrooms with floor plans and selected fixtures are shown as well as floor plans of kitchens and pantries.



Style No. 94
7½' x 25" x 14½"
Beautiful Colonial
Pattern



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Pattern

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*Write for catalogue of dials, works,
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Quartered Oak
6' x 17" x 13"

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The World's Greatest Toolmakers
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Complete description (prices, uses, pictures, etc.), of

Starrett Combination Squares, Combination Sets, Steel Tapes, Leveling Instruments, Transits, Scrapers, Hack Saw Frames, Levels, Combination Nail Holder and Set, Dividers, Calipers, Trammel Point Sets, T-Squares, Combination Hand and Bench Vises, Squares of all kinds, Stair Gages and other tools of interest to the Carpenter and Builder.



6631

Starrett Tools

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to readers of the American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

Bringing Health and Comfort to Farm Homes, through the installation of an adequate water supply and modern plumbing, is the subject of a booklet issued by the Crane Co., 836 South Michigan avenue, Chicago. The book gives the details of the installation and use of the Crane automatic water units for habitations where city water is not available and describes a number of Crane plumbing fixtures suitable for such installations.

Insulated Automatic Gas Water Heaters, manufactured by the Crane Co., are described in detail in a publication of the Crane Co., 836 South Michigan avenue, Chicago. Mechanical and insulation details of the Premier automatic, storage gas heaters are discussed at length and illustrated with photographs and diagrams.

The L. S. Starrett Company, tool and hacksaw manufacturers, of Athol, Mass., are distributing copies of their new catalog No. 23. This catalog includes all the latest Starrett tools which have been added to the line since the publication of the last catalog. Many of these are shown here for the first time, as they have just been put in production. Among them might be mentioned the new angle gage, hold downs, pocket micrometer case, dial bench gage, rolling mill gage and others. In all, over 2,200 precision tools, hacksaws and steel tapes are illustrated and described, together with uses.

Home Light Plants, made by the Fairbanks, Morse Co. 900 South Wabash avenue, Chicago, are described in detail in a catalog issued by the company. Uses of the equipment on farms and methods of operation are described and illustrated.



ENVELOPES

for Every Commercial Purpose

From the cheapest that's good,
To the best that's made.

Gaw-O'Hara Envelope Co.
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"SIX LIVE WIRES"—Nevada 1200-1-2-3-4-5

SUPER IMPROVED AUTOMATIC WATER SYSTEM **\$108⁰⁰**

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At half what others ask. Scientifically built right. Easily set up Water Supply System—saves work of carrying water—gives city water convenience at unheard of low cost. Pumps from well or cistern up to depth of 25 feet. Automatically controlled.

ALL MOVING PARTS IN OIL

A product of advanced engineering skill, yet so simple anyone can install it. Compact; has few moving parts. Everything easily accessible. Guaranteed for years of satisfactory service. Nothing to wear out. Complete installing plans and instructions FREE. No guess work. Order yours today and save.

System Operates Automatically and Quietly

Outfit is controlled by automatic switch. When pressure is low, switch throws in motor and starts pump filling tank, then switch turns motor off, requiring no attention. Furnished with low speed, powerful A. C. or D. C. motor (state which is wanted). Tank is galvanized in and out. Pump is super, double acting, brass lined, 140-gal. cap, furnished complete with fitted pipes, gauge, valves, relief valve, unions, automatic air intake, belt idler, and foot valve as shown.

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OUR LABEL PROTECTS YOU

BUILDERS' SPECIAL PRICE

Complete with 42-Gal. Tank, \$108.00

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Order From this Ad. and Save

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coated
copper bearing
steel sheets

then



hand dipped

WHEELING HAND DIPPED ZINC COATED CONDUCTOR PIPE is the best rust resisting, zinc coated pipe made. Triple protection, heretofore unattained, has been achieved by the following combination of features—

- 1 A base of Copper bearing steel, well known for its resistance to rust.
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WHEELING HAND DIPPED ZINC COATED CONDUCTOR PIPE is carried in complete stock and sizes, Plain Round, Round Corrugated and Square Corrugated, at each warehouse. Write the nearest one, or to the Wheeling office for complete information.

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For the materials described and illustrated *will satisfy*, both from utility and economy standpoint.

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The clear, concise descriptions, the clean-cut illustrations, make it an easy matter to select, immediately, the papers, triangles, scales, instruments, etc., that are *best* for your particular use.

Materials that both aid and save.

SINCE 1885



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A policy that explains why many individuals and many of the largest industrials have been, and are, giving preference to our line.

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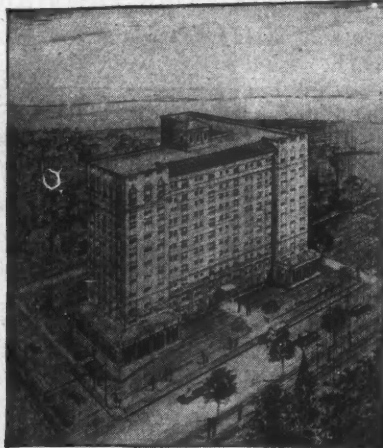
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PARKVIEW APARTMENT HOTEL, MEMPHIS, TENN.

Mr. Architect
Mr. Builder
Mr. Contractor

Here's a story which tells a story—why the Parkview Apartment Hotel people, Memphis, Tenn., specified **KENNEY SHOWERS, CONGRESS CONCEALED MODEL, for EVERY APARTMENT** in this fine apartment hotel enterprise—167 of them.

READ THIS:

BARNETT, HAYNES & BARNETT
Architects and Engineers
Saint Louis

March 29, 1923.

The Kenney Cutting Products Corp.
507 Fifth Avenue,
New York City, N. Y.

Attn Mr. S. J. Cutting

Dear Sir:

Relative to the Kenney Showers for the Parkview Apartment Hotel in Memphis, we are very glad to say that the equipment, we believe will be a very attractive feature throughout the above building, and I am very pleased with the principle involved in your construction.

I believe greater evidence of my opinion of the shower is the fact that being an architect and choosing it for my own building should mean a great deal.

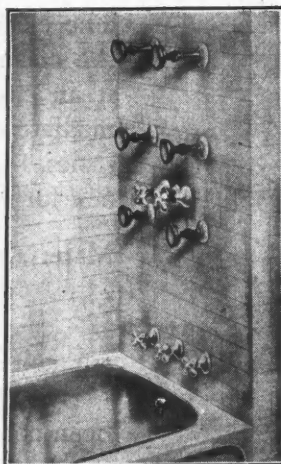
Yours very truly,

BARNETT, HAYNES & BARNETT.
Geo. D. Barnett, Jr. (Signed)

GDB Jr/DW



Portable Model Illustrated.
Can be attached to any bath tub faucet



Congress Concealed Model for Permanent Installation (also with mixer)

ATTRACTIVE, PRACTICAL, ECONOMICAL. Body needle showers, no overhead deluge, no unsightly curtain. **SEVEN MODELS,** the preferred showers of Builders, Architects, and Contractors everywhere.

KENNEY SHOWER CURTAINLESS

IT HAS REVOLUTIONIZED THE BATH

For quick information refer to Sweet's 18th Annual Edition, Page 1763, and for catalog and details write

The Kenney-Cutting Products Corp.
507 Fifth Ave. New York

In Less Than 50 Years

(Continued from page 321.)

little territory) were enlarged upon and made to apply to a huge network supplied from a few generating plants.

This was made possible through the development of generating machinery which could furnish many times the amount of current sent out from the early stations. Simultaneously were perfected high tension conductors which could satisfactorily deliver this "juice" at high voltage to the numerous distributing points. There in substations it was stepped down to the standard low pressure used for domestic and industrial purposes, and dispensed to the immediate vicinity.

Looking again at New York as an example of the present highly efficient system generally being used today, we find that in the entire metropolitan district, which extends from the battery up into Westchester County, a distance of forty-five miles, and from the Hudson River to the outskirts of Queens County, measuring fifteen miles—there are only half a dozen generating plants furnishing all the electrical current consumed in that area. Among these The New York Edison Company has two huge plants called Waterside No. 1 and No. 2 at 38th to 40th Streets and East River and a third soon to be under construction at 14th Street and East River. The United Electric Light and Power Company has one station on Sherman Creek at 201st Street and Harlem River and another new one at Hellgate, 132nd Street, while across the East River the Brooklyn Company has two stations, one on Gold Street and one at Bay Ridge.

These are admirably located on the waterways which surround and divide up the city. The advantages of this situation over an inland one are obvious, including accessibility to coal and ash removal barges.

In conclusion it might be pointed out that due to the development of an efficient central station service, electricity is one of the few commodities consumed by the general public which has not, during the past decade, increased enormously in price. Rather has its progress been marked by a tendency to give more light and power while the cost has been kept consistently low.

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The Honeycomb Mitre Box

Produces a perfect, smooth cut. Users pronounce it the best mitre cutting saw on the market. Write today for catalog!
ROCKFORD MITRE BOX CO., Rockford, Ill.

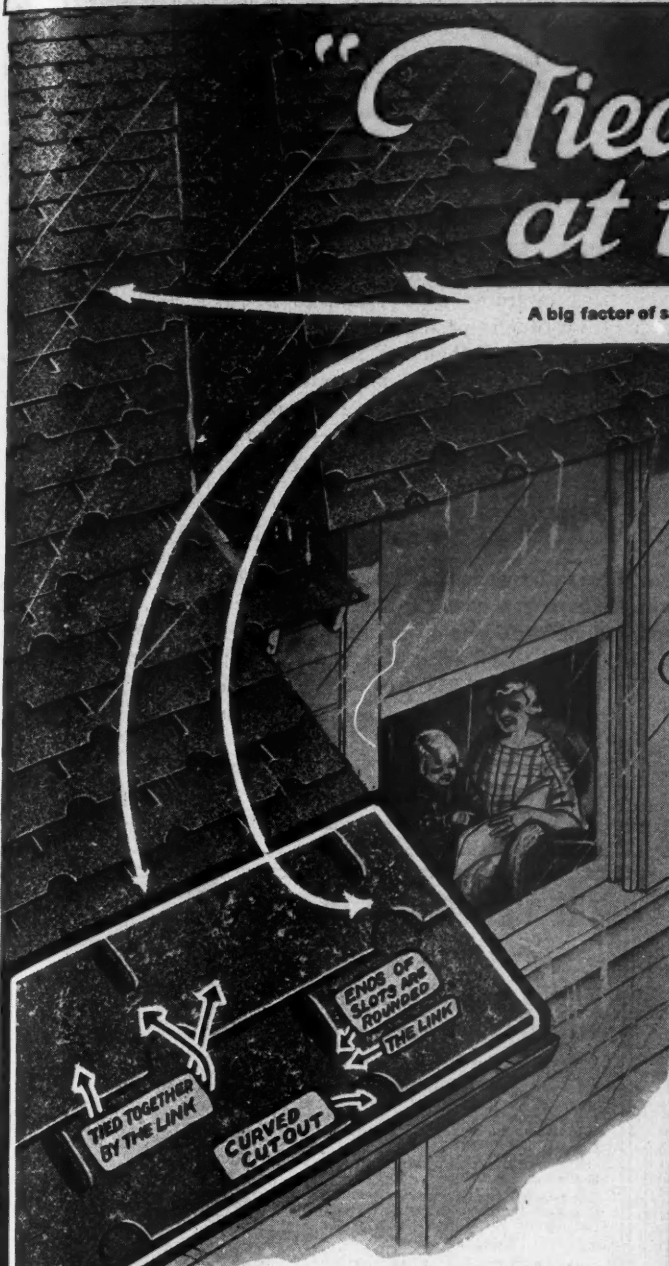
Get a
No-Set Saw

For Your Box

SAL-MO-LINK ASPHALT SHINGLES (Pat'd.)

"Tied together at the Butts"

A big factor of safety when winds and rains are driving the hardest.



Contractors Architects and Builders

SAL-MO-LINKS are the Improved (4-1) Sectional Shingles that give ADDED PROTECTION and BEAUTY.

The Links (little strips of material) tie the butts of the shingles together. This provides greater security against the action of heavy winds and driving rains than is the case with other shingles.

The Slots lend the shingle effect and the shingle is stronger and more beautiful, for square corners have been eliminated at the ends of the Slots and in the Cut-outs at the butts.

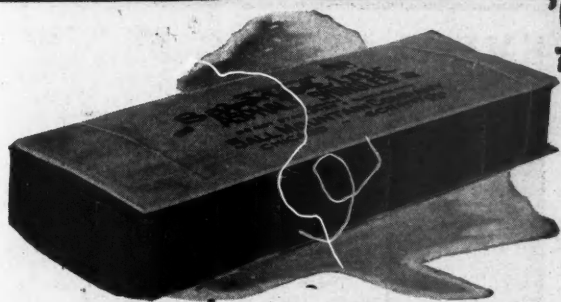
Because SAL-MO-LINK SHINGLES are self-spacing and are made (4 in 1) there is a big saving in labor in making the application. The shingles are 36" wide and only 100 are needed to completely cover one square, 100 square feet.

The same high grade felts and asphalts long characteristic of SAL-MO PRODUCTS are used in the manufacture of SAL-MO-LINK SHINGLES. Every bundle bears the Fire Underwriters' label, practically assuring the owner of a reduced insurance rate.

If you are not acquainted with this LABOR-**SAVING** — PROTECTION **ADDING** — BEAUTIFUL Shingle, see your local dealer or write us direct using the attached coupon.

SALL MOUNTAIN COMPANY
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Factories: Scranton, Pa. Rockdale, O. Porter, Ind.



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140 So. Dearborn Street, Chicago, Illinois
Gentlemen—Please send particulars free. No obligation.

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ADDED PROTECTION AND BEAUTY — No Extra Cost

Good Workmanship Essential to Good Stucco

THE selection of a stucco contractor who knows his business and can show that he has done good work is the most important factor in securing good stucco construction, the Bureau of Standards of the Department of Commerce finds. At least in the present state of the art more depends upon capable workmanship than upon many of the details of the specifications. The successful stucco specialist may be expected to know the requirements of the specifications, and will also have acquired a knowledge of the application of the material which can be learned only by experience. The plasterer trained for interior work does not have this necessary knowledge and experience, the Bureau believes, and the saving in cost by hiring an inexperienced man will be made at the expense of appearance and durability of the job.

Tests on stucco construction have been in progress at the Bureau since 1911. Panels of stucco made in accordance with different specifications have been constructed and exposed to the weather for a number of years. Some of these panels were of back plastered construction; some were made with wooden sheathing. Paper backed construction, plaster board, and other types were also tested. Still others were applied to walls of masonry.

Measurements of the shrinkage of stuccos were also made by means of a special comparator. It was shown that this shrinkage may be controlled to a large extent by regulation of the amount of water used. The general rule is that the material should stiffen from removal of water before chemical set occurs, and the ability to recognize this condition is considered a necessary part of the plasterer's practical knowledge of his craft.

Masonry walls were found to make the best bases for

stucco, and on them the finest stucco textures can safely be used. Fine textures are not recommended for use on frame construction, as they show cracks which are not visible in coarser textures. Where stucco is used on wooden frame the frame should be well braced, and the use of metal or wire fabric or metal lath for reinforcement is recommended. The tests showed that better results were obtained by omitting the sheathing, using special insulation and bracing where required. If sheathing is used it is thought horizontal sheathing would be preferable to the diagonal sheathing which was used in most of the sheathed test panels.

Special attention, the Bureau says, should be given to the tying or lacing of the fabric or lath so that the joints do not constitute a line of weakness in the reinforcement.

Lean mixtures were found to give the best results. A mixture of one part cement, one-fifth part of hydrated lime, and three parts building sand is the richest recommended. Good design is considered essential and involves adequate flashing and overhead protection, and the restriction of stucco construction to vertical surfaces or to those which will drain quickly.



Wider Use of Wood Preserving Methods

THE Department of Commerce announces that according to reports made to the Bureau of Census, the value of products of establishments engaged in wood preserving amounted to \$47,422,000 in 1921 as compared with \$33,239,000 in 1919, and \$21,055,000 in 1914; an increase of 43 per cent from 1919 to 1921, and of 125 per cent for the seven-year period, 1914 to 1921.

This industry includes establishments engaged in treating wood with creosote, coal tar, crude oil, and other preservatives to prevent decay and for protection against fire, etc.

Know The Weatherstrip You Buy



Satisfy yourself and your customers and you pave the way to bigger jobs and better pay.

Quality-Service

You can do this by handling and installing Allmetal Weatherstrip. It is simple, durable and economical. All orders filled and shipped within twenty-four hours after reaching us.

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Gentlemen:—Without obligation, please send me samples and literature.

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New Baffle Plate Radiator

Introduced on this furnace means a non-clean-out radiator—the greatest improvement made on any furnace in twenty years. It eliminates the possibility of a clogged or choked radiator. No cleaning out is ever required.

We consider for size and weight that this furnace has no equal on the market today. We also make this pattern in a smaller size with 20-inch fire pot.

Our line of pipe and pipeless furnaces is most complete.

Exceptional agency proposition for live-wire representatives in unoccupied territory.

Write at once

The Bell Furnace & Mfg. Co.
Northville, Michigan



EVERLASTING



Kitchen Ceiling Fixture
No. 509 P. C.

permanent white—untarnishable Rush Vitrified China Lighting fixtures complete the equipment of the modern, white sanitary bathroom and kitchen.

Rush fixtures are shockproof, moisture proof, washable. They are not porcelain enamel but solid porcelain thru and thru. Their permanent finish cannot tarnish.

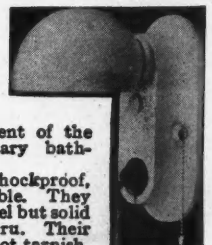
There is a Rush fixture for every purpose—they cost no more than ordinary good fixtures.

Write for our catalog

RUSH PORCELAIN CO.

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Bathroom Wall Bracket and Receptacle No. 76





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ROOF and DECK CLOTH

Standard for 20 Years

For entire satisfaction use BAYONNE Roof and Deck Cloth, the pioneer WEATHER-PROOF, DURABLE, FLEXIBLE covering, for roofs and floors of sun parlors, piazzas, etc. Its dependable quality is proven by those who have used it under trying conditions in all kinds of weather. Requires no white lead, bedding, will not buckle, crack or peel and is guaranteed water-proof.



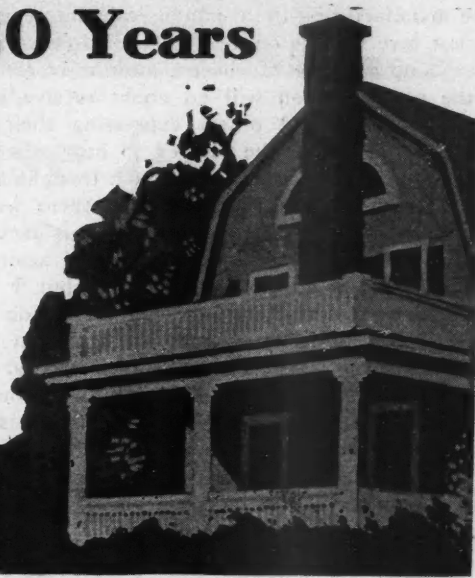
Ask for sample book "R" and full particulars. Gratis—one of our repeat "memo" pads on request. For your desk.

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The Perfect Sash Weight

Contractors, Builders and Architects prefer the Perfect Sash Weight because it saves 50% of the labor installation and about three feet less cord or chain on each window. It enables quick and accurate balance of any window with the use of two weights in place of four of the old type.

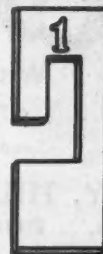
One Weight and One Cord Serves Both Sashes

Weights are manufactured in stock sizes of 3½ lbs., 7 lbs., 10½ lbs., 14 lbs., 17½ lbs. and larger units for large windows.

Intermediate sizes may be obtained by adding one or more ½ lb. or 1 lb. balance slug to each stock weight.

Ask your favorite dealer or write direct for full particulars.

American Sash Weight Foundry Co.
Davenport, Iowa



One half and one pound balancing units, that are used as necessary with the Perfect Sash Weight to adjust different sashes.

In Defense of the "Woods Standard Foot Decimal Scale"

To the Editor: Lincoln, Nebr.
 I wish to thank you for sending me a copy of November American Builder containing a descriptive write-up of the "Standard Foot Decimal Scale." I have received several letters, and some of the writers wished to purchase the scale.
 I have not been successful in finding a manufacturer of scales to make these. Most of them want too high a price; one firm turned down an order because I did not place it until about six weeks later and then said that since they were manufacturing the common scales in general use they did not care to take on any others. However, I have not given it up as there can be no question of the correctness of the system. You will no doubt receive some letters from carpenters and others expressing their opinion of the scale, and I will be pleased to hear what they think of it. I have given the matter much thought and am convinced the theory is right; I know there will be fault-finders but they cannot prove that it is incorrect. The average carpenter will, I know, be dead against it unless he considers its advantages carefully; but I am anxious to know what architects and engineers think of it, since if they adopt it in their work mechanics in general will come to its use later. I am deeply interested in the decimal foot over one that is divided into 1/12ths, and these in turn into 1/12, 1/10, 1/4, 1/8, 1/16, and so on down. The advantages of easier figuring are so plain as to need no comment, and I know engineers favor it. Last January I sent out a questionnaire; about seven-tenths of the engineers written were in favor of the decimal foot scale.
 A. W. Woods, Architect.

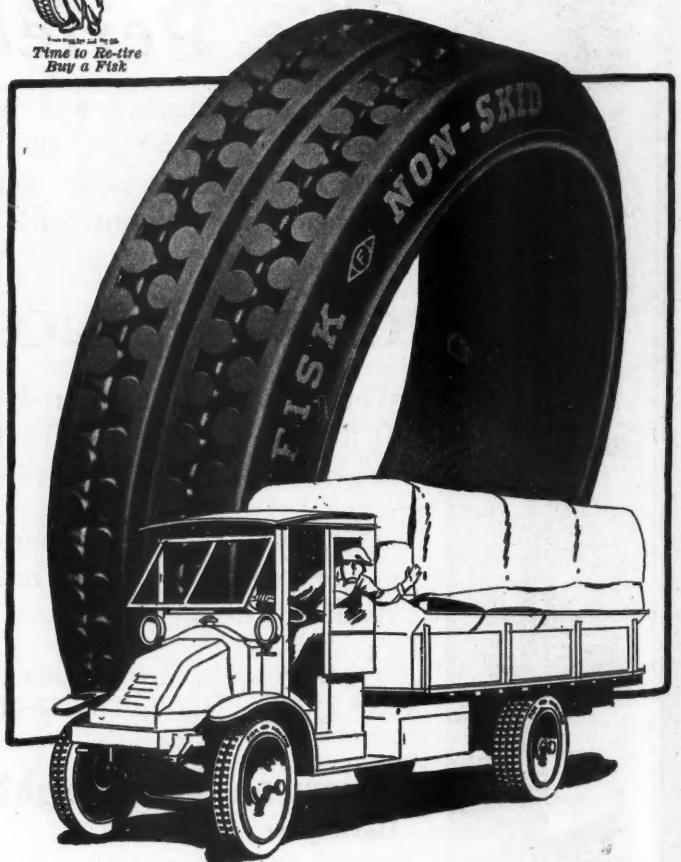


Their Wonderful Cushioning Qualities Prolong Truck Life

The extra depth and toughness of the Fisk Solid Treads account for the extraordinary wear they give. But the particular feature that makes Fisks, by far, the most economical to use is the fact that the remarkable resiliency of Fisk rubber absorbs to a greater degree the destructive vibration caused by road unevenness.
 Thus, the useful life of the truck is greatly lengthened and the load is better protected.
 So when you equip with Fisk Solids—you not only are assured of long wear and perfect safety—but your truck's usefulness will be prolonged and your repair bills reduced.
 Let the Fisk Dealer show you actual records of typical Fisk performance.

THE FISK TIRE CO., Inc.
 CHICOPEE FALLS, MASS.

Fisk also makes Pneumatic Truck Cords in all standard sizes for work requiring greater speed.



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to enable you to discover the ease of application, economy and lasting beauty of Cameo. We want you to try it for yourself.

The attached coupon and \$2.00 will bring you 1 quart each of Cameo White Flat and Cameo White Enamel. Specify whether you wish Gloss or Matte (Satin Finish) (Regular Sales price \$3.55).

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Attached is \$2.00 for which please send me one quart each of Cameo White Flat and Cameo White Enamel Gloss or Matte.

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Name.....

Address.....

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AROUND THE FAMILY TABLE



Honest Words of Praise for June

From Foremost Hotel and Theatre Architects

Chicago, Ill.

Editor AMERICAN BUILDER:

We are in receipt of your letter of June 20th, together with the June Historical and Reference number of the AMERICAN BUILDER, and wish to thank you for your interest in this matter.

You may enter our subscription for the AMERICAN BUILDER for one year, at \$2.00 per annum.

C. W. & GEO. L. RAPP, Architects.
By V. V. Walsh, Secretary to Mr. Rapp.

From the Miracle Door Man

Oshkosh, Wis.

Editor AMERICAN BUILDER:

I have in front of me a memorandum to write you in regard to your de luxe edition. It certainly marks an epoch in the history of Radford Publications and is a great performance in every detail. The Radford section in it is a fine feature. The scheme of it is well devised and nicely carried out.

You should all be very happy in mastering the whole undertaking. You are entitled to congratulations without limit, and it gives me pleasure to extend them.

NATHAN PAINE,
Pres. Paine Lumber Co., Ltd.

From World's Largest Paint House

Cleveland, Ohio.

Editor AMERICAN BUILDER:

The writer wishes to extend his congratulations to you on the June number of the AMERICAN BUILDER, which was very impressive and to thank you for the good position given to the Sherwin-Williams advertisement. We have received a number of inquiries from this advertisement to date.

THE SHERWIN-WILLIAMS COMPANY.
By A. H. Burt, Manager Architectural and Contractor Sales.

From a Southern Retailer

Denison, Texas.

Editor AMERICAN BUILDER:

We are in receipt of the Historical and Reference number of the AMERICAN BUILDER and we want to congratulate you upon getting out such a splendid issue which we shall keep for our reference.

THE LINGO-LEEPER COMPANY,
Lumber and Building Material.

From National Retail Headquarters

Chicago, Ill.

Editor AMERICAN BUILDER:

This is my first opportunity to congratulate you on the Historical and Reference number of the AMERICAN BUILDER. By glancing through it I can readily see that it contains much of permanent value, and it will be my pleasure to take it home with me and read it at leisure. I again congratulate you on this epoch-making achievement in trade journalism.

Yes, we ought to have the AMERICAN BUILDER in this office, and you may enter our subscription.

NATIONAL RETAIL LUMBER DEALERS' ASSOCIATION.

By Adolph Pfund, Secretary-Manager.

From the Millwork Ass'n.

Chicago, Ill.

Editor AMERICAN BUILDER:

The June Historical and Reference number of the AMERICAN BUILDER is a splendid issue and contains material of exceptional interest and value. I can assure you my copy will have a prominent place among our reference volumes.

Kindly enter the Bureau as a subscriber to the AMERICAN BUILDER, sending us invoice therefor and remittance will be promptly made.

MILLWORK COST BUREAU.
By W. P. Flint, Secretary.

From a Prominent Realtor

Glenside, Pa.

Editor AMERICAN BUILDER:

I am this morning in receipt of a copy of the AMERICAN BUILDER on Historic References, etc. It certainly is a very fine copy and I want to thank you for it. It is a book that should be appreciated by every man, especially in the real estate business.

WM. T. B. ROBERTS & SON,
Realty Operators.

By Wm. T. Roberts.

From Prominent Building Material Manufacturer

Youngstown, Ohio.

I received your June Historical and Reference number, and wish to thank you most heartily for same. It is a very well gotten out number and contains a wealth of valuable information for the prospective builder.

THE GENERAL FIREPROOFING COMPANY.
By S. S. French, Vice-President and General Manager.

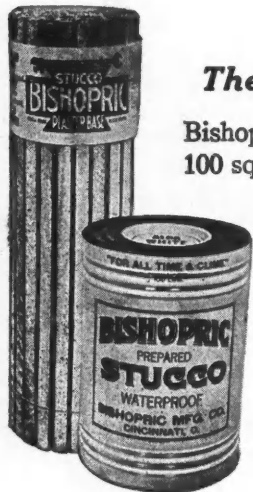
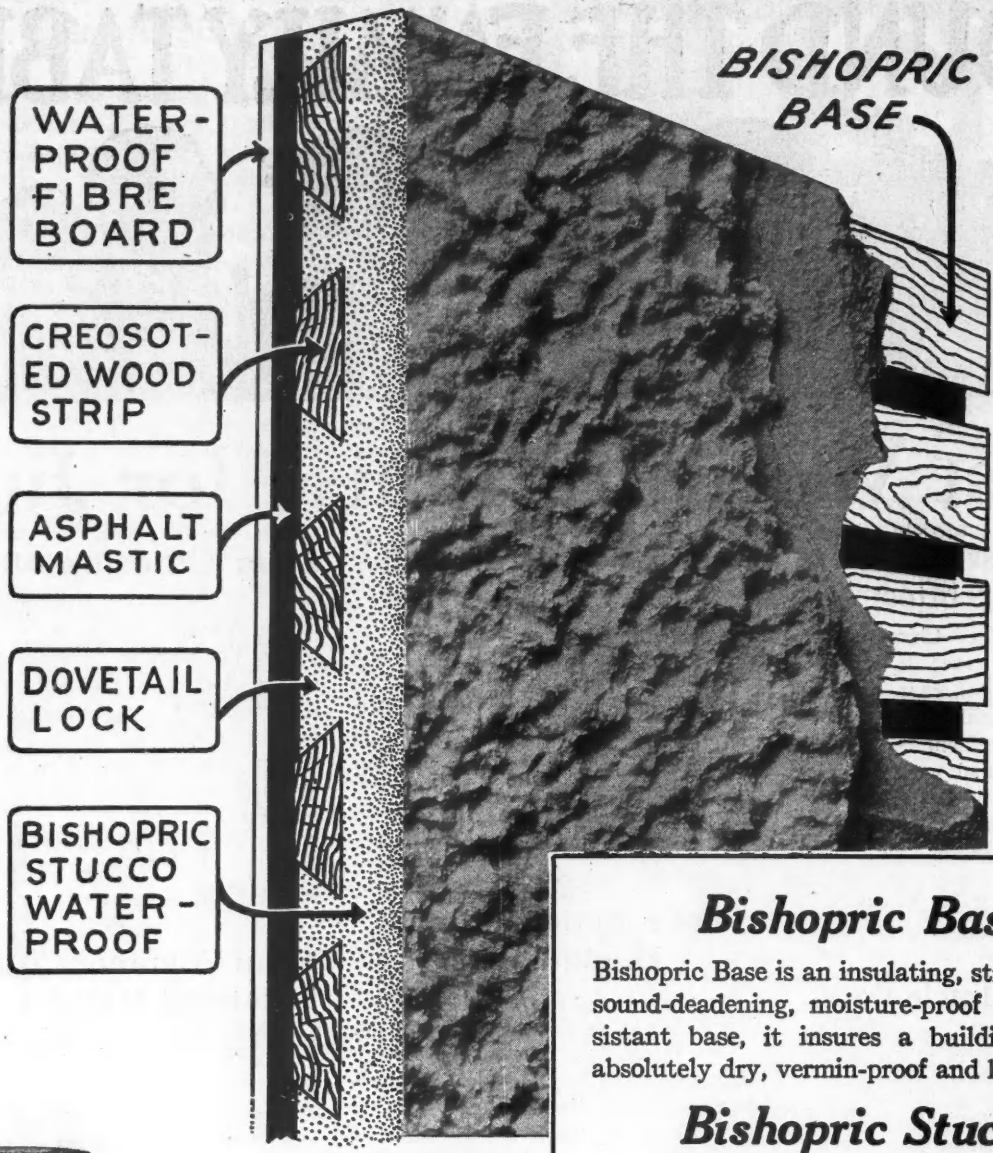
From Illinois Lumber Dealers

Chicago, Ill.

Editor AMERICAN BUILDER:

I have gone through your splendid issue of the AMERICAN BUILDER pretty thoroughly and I want to congratulate you on the success of that issue. It is a wonderful publication and certainly will arouse a lot of interest. The mechanical work is fine; the general plan excellent and the issue contains so much of valuable information and so many inspirational articles that I would hardly know where to commence to enumerate them. It is a splendid publication and I think you are deserving of much commendation for your enterprise and ability of your organization to issue such a wonderful book.

J. F. BRYAN, Secretary
Illinois Lumber Merchants' Association.



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Bishopric Base is shipped in rolls 100 square feet to the roll. It is easily handled, quickly cut to desired size and there is no waste.

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