AMERICAN BUILDER

Formerly AMERICAN CARPENTER AND BUILDER

1827 Prairie Ave., Chicago—250 Park Ave., New York City

Largest Month on Record for Building in the Central West

BUILDING and engineering contracts awarded during the month of February in 37 states east of the Rocky Mountains amounted to $394,869,000, according to F. W. Dodge Corporation. This was an increase of 3 per cent over January and a decrease of 3 per cent from February of last year. The territory covered by this record includes approximately 91 per cent of the total construction volume of the country.

The Central West (Illinois, Indiana, Iowa, Wisconsin, Southern Michigan, Missouri, Kansas, Oklahoma and Nebraska) had $109,733,000 in contracts for new construction work during February. The above figure is the largest for any February on record. There were increases of 30 per cent over January and 29 per cent over February, 1926.

There were also substantial increases in contracts let in the state of Texas and the Middle Atlantic states. There was a slight increase in the Northwest, but decreases in other sections of the country.

✣

Electricity Becomes a Necessity

A SURVEY just completed by the Copper and Brass Research Association brings out a number of facts which are, at the same time, interesting and important, as indicating the remarkable developing in the use of electricity which has occurred in the past five years, the tremendous field for further development which exists and the importance of adequate wiring in all new construction.

Electric current rates for more than half the homes of the United States are now 15 per cent lower than they were in 1921, according to the survey, and the consumption of power in the United States has more than doubled during the same five year period. In spite of this enormous increase, not more than one-third of the 15,000,000 homes estimated to be using electricity today are adequately wired to develop the fullest convenience of electric light, heat and power. And there are something like 7,000,000 other homes which are not provided with electrical wiring of any kind.

In 1921 only 8,000,000 homes were wired for electricity. The average production of electricity in 1921 is placed by the Geological Survey at 112,000,000 kilowatt hours a day, compared with the present daily average of more than 200,000,000 kilowatt hours. It is plainly to be seen that the use of electricity is rapidly becoming universal in this country and that the near future will call for the adequate rewiring of old homes and the complete wiring of all new homes.

"As the cost of electrical energy becomes less and the use of appliances in homes increases, the problem of rewiring houses equipped with inadequate systems, designed mainly for lighting, becomes greater to provide maximum safety and convenience," says the survey. It might be added that the time is fast approaching, if, in fact, it is not already here, when the new house which is incompletely wired will be hardly salable.

Reports compiled by the association from public utilities commissions of 30 states indicate marked decreases in rate schedules of both hydro and steam electric power companies. Twenty of these states, representing more than 50 per cent of the consumption in the United States, show decreases during the past five years averaging 15 per cent.

✣

May Finance Building

AN important provision of the new McFadden Banking Act permits national banks to make five-year loans on improved real estate. This is of vital interest to everyone connected with the building industry, as it opens up a new source of first importance for financing new construction and covers both city and farm property. Its passage has been urged by the National Association of Real Estate Boards which points out that the previous provision, permitting only one year loans, has been practically inoperative since, as a matter of fact, few real estate loans are or can be made on a one year basis.

It has been calculated that this new provision makes an addition of $1,181,000,000 to the funds which national banks may legally loan on real estate. Heads of Federal Reserve Banks hesitate on predicting the extent to which national banks will avail themselves of the new mortgage loan provision and bankers and economists vary widely in their views as to the degree to which the effect of the new provision may come to be felt.

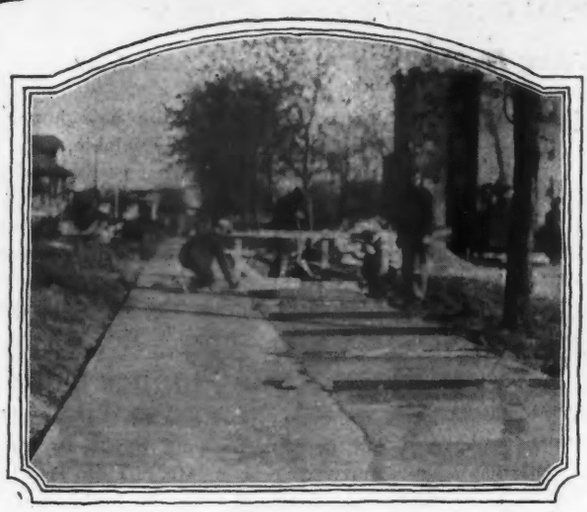
It is commonly agreed, however, that the effect will be measured primarily by the degree to which the individual real estate investment meets the loan appetite of the individual banking institution. The extent to which any bank avails itself of the provision will be largely a matter of the policy of the individual bank. On the other hand, it seems quite certain that there will be an extensive increase in real estate loans from this source, though it will, of course, develop gradually.

✣

Building Most Active in Suburbs

REPORTS show that the 1927 building activity is breaking all previous records in the Chicago district. The city of Chicago is running well ahead of 1926, but, it is interesting to note, the suburbs of Chicago are, so far, outdistancing the city itself in rate of growth as determined by gains in building construction.

In Chicago the building volume for February, 1927, was 40 per cent ahead of that for February, 1926, but the greatest gains were made, according to a preliminary survey by S. W. Straus & Co., in DesPlaines with a gain of 245 per cent, Evanston with 127 per cent, and Gary, Indiana, with 92 per cent. In addition to these record breaking suburbs, five others, out of the 16 listed, made gains over February of last year while 13 out of the 16 show gains over January of this year.



Sidewalk, Flossmoor, Ill. High-Early-Strength *Universal* concrete obtained by J. D. Smith, contractor, using standard [not special] Universal cement, the same quality Universal regularly handled and furnished by Darr Coal & Supply Co., Hazel Crest, Ill.

When the Owner Calls for Early Use of the Job

A sidewalk must be made ready for use in what seems to be an unreasonably short time; a foundation contract has a "Rush" sign hung upon it: a garage floor is to be used almost as soon as concrete is placed. Every builder faces situations like this. What is the solution?

Many builders have found it in High-Early-Strength Universal Concrete. Using fully tested methods and standard Universal cement [which, being standard, not special, sells at the usual price] and with other materials, equipment and labor as regularly on the job, they obtain concrete which is as strong at 3 *days* as ordinary concrete is at 28 days. In addition, this concrete, having a greater ultimate strength, is permanently *better* and *stronger* than concrete as usually placed.

The accompanying coupon will bring full details on High-Early-Strength *Universal* Concrete promptly.

UNIVERSAL PORTLAND CEMENT CO.
210 South La Salle Street, Chicago.

☐ Without obligation, send me detailed information on methods for securing strong concrete in 3 days with standard *Universal* cement

☐ Without cost or obligation send me book showing attractive stucco finishes made with standard *Universal* cement

Name_____

Address_____ AB 4-27

This background shows
Universal Cement Stucco - English Cottage Texture -
Made with Universal *cement - a standard cement for universal use*

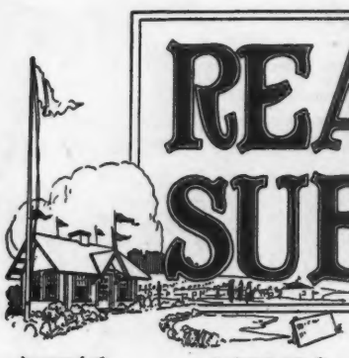
Universal Portland Cement Co.
Chicago - Pittsburgh - Minneapolis - Duluth - Cleveland - Columbus - New York

Concrete for permanence

THE CAPITOL AT WASHINGTON

A New View of an Old Building

Ever the center of American interest, and a constant inspiration to the Building Industry



REAL ESTATE AND SUBDIVISION WORK

The "Visibilt" House Proves the Story of Good Construction

NOW for the stripped chassis house. If you don't know what a stripped chassis house is ask an automobile dealer to show you a stripped chassis and then envision, if you can, an exhibition house prepared along the same lines. Or, better still, take a trip to Drexel Park, a suburb of Philadelphia, and go through the "Visibilt House," built by Thomas Conway, Jr., Corporation, Thomas Conway, Jr., being professor of finance at the Wharton School of Finance, University of Pennsylvania.

The Visibilt House does in a visual way what the salesman tries to do when he says his houses are sturdily built of the best material and in the most approved fashion.

For example, what does it mean to a prospect to be told that there are masonry fire stops, that joist ends are damp-proofed or that there are three thicknesses to the furnace insulation or that all pipes imbedded in the walls are heavily insulated with hair felt?

If the prospect knows what those things mean the chances are he will be skeptical and admonish the salesman to tell it to Sweeney. If the prospect is ignorant of those things he will look wise and let it go at that.

In either case there is no visible confirmation of the salesman's talking points. He may be truthful and he may just as easily be a liar.

After all it's the hidden values in a house that most people buy. Of course, they buy design. So do they buy durability and all those other things which spell future economical upkeep which can only be wooed through sound construction—that last being after all what all of us want.

The Upper Sign Points Out the Importance of Sufficient Roof Pitch Especially Over Doors and Dormers and the Lower Sign Enumerates Eight Superior Construction Features.

Throughout the Visibilt House unfinished sections are visible to the prospect. Over those sections or near them are cardboard signs explaining the feature of the construction and red tape runs from those features to the points brought out on the card sign. It takes two hours for one to go through the Visibilt House if one wants to read all the signs.

The Conway firm goes even farther than that in sparkling sales methods. Not only do they point out the advantages of solid concrete cellar walls by inscriptions on cards but they give the prospect a chance to test the truth of their statement of the strength of the walls.

"Hit it with a hammer," a sign suggests. And attached to a chain is a hammer. Originally, they had the "hit it with a hammer" idea only half worked out. They nailed up the sign but never thought of supplying the hammer. Some wag, one day, laid a sledge-hammer nearby and ran a piece of red tape from the sign to the implement.

This firm has gone to astonishing lengths to compare good with bad construction work. A tour of the house is instructive and like a visit to a museum. If one enters from the rear—through the garage—the first impression made is a lot of unfinished work set up near the walls and a well-like brick structure in the middle of the cement floor. The unfinished specimens are examples of various kinds of brick work, good and bad, and over each a placard briefly points out the salient features of that specimen, explaining how and why it is bad or good.

In the center of the floor is built a brick display case about 4 feet high covered over the top with glass under which are displayed three Babylonian clay bricks more than 4,000 years old, loaned by the University Museum of Philadelphia. Of course, that was done to add interest and also to illustrate the strides made in the brick industry since that time and the manufacturing methods employed to make the bricks withstand the climate peculiar to these latitudes.

In the cellar is an oil burner heavily insulated with asbestos insulation. Beneath a sign explaining the triple thickness, a square section had been cut out clearly showing the three layers.

Another sign draws attention to the 34-inch wide footing extending 8 inches beyond the cellar walls on either side to a depth of 6 inches. A section of that is also visible. On a nearby table are sections of two cellar floors showing the thickness usually found in houses and the particular thickness employed in the Visibilt House.

Further proof of that statement is conveyed by a red tape running from the table to a cut-out section of floor

These Signs Call Attention to the Fact That Portland Cement Association Standards Have Been Followed in the Construction of Basement Walls and Floor and Contrast Quality Work with Inferior Work.

where the prospect with doubts can measure the thickness of the floor for himself. In the same way attention is drawn to the base of an oversize iron column filled with concrete.

Usual and superior floor framing are contrasted by showing sections of each. The accompanying sign, a large one in this case, explains the care with which joists are spiked together to form a double header, how the header is notched to receive the end of every joist to insure maximum support and the greater security obtained by the use of spikes of adequate length. The contrasting ordinary framing is indicated by butted joists, single header and shorter spikes.

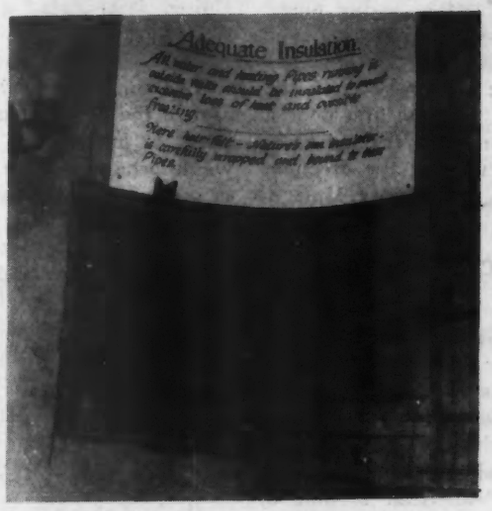
Attention is drawn to correct caulking of half-windows, bonding stone, stone footing, asphalt-pointed joist ends for dampproofing, fire stops and cellar stair construction.

By this time you will realize that the Visibilt House was put up primarily for exhibit purposes and that it is but one of many erected by the firm. Something like 80 houses have been erected by the operators who are the owners and developers of Drexel Park.

Sales resistance has been tremendously reduced, according to Leslie J. Yarnall, sales director. Profound interest has been stimulated.

Many curious go through, become interested and search out whoever may be in charge at that particular time just to tell him "If we ever build or are in the market for a house you people certainly will hear from us," or something to like effect.

Sometime toward the end of the year, after the Visibilt House has served its purpose during the coming selling season, the place will be finished and sold. Lest there be skeptics among the readers of this is can be said without a stretch of the least detail that all houses built by the Conway firm are built of the same high grade materials and by the same approved methods visibly shown in the stripped house.



The Living Room Wall Cut to Show Wall Construction Methods and Insulation of Pipes to Prevent Heat Loss and Freezing.

As everyone interested in house construction knows, the past year has been particularly hard for builders of high-priced houses. Despite the presence of unfavorable economic conditions and the large surplus of dwellings in that section, particularly of the more expensive types, the Conway corporation has experienced a flourishing year. That success illustrates anew the fact that prosperity is assured him who does things just a little better than anyone else.

The same vivid silent salesmanship program is followed throughout the structure. A flood-light in the attic is trained on a copper gutter and flashing through one of the windows. A card draws attention to the 16-ounce copper used, the protection of the flashing and other details of roof construction. On the rafters a card tells of the advantage of 24-inch cedar shingles and how they are laid so that three thicknesses are provided at any one point.

Proper door framing is stressed by signs on the first and second floors over doorways pointing to the jack studs and other methods of sturdy trussing and explaining how that differs from ordinary construction, and how it tends to eliminate plaster cracks due to deflection.

An opening in the flooring in the center of the first floor is captioned "The Backbone of the House." Over the skeleton work is a sign calling attention to: (1) the steel eyebeam, (2) nailing piece, (3) hemlock joists, 3 by 10 inches, (4) concrete filled cast iron columns, (5) adequate footing and (6) bearing partition resting directly on girder. Also side by side and built in are shown two accepted good methods of wall construction—full framing and furring.

An interesting exhibit is housed in the large second-story front bedroom. A multitude of specimens of different out-

A Section of the Cellar with Placards Pointing to Various Features Including Floor Sections Cut Away to Reveal Hidden Values.

side and inside plain and decorative plaster and stucco work is arranged on a long rough table and in panels on the walls. Various coloring effects are also used. The products bear the name of the Portland Cement Association and the various well-known manufacturers. All the known finishes are also portrayed and in adequate-sized samples so that prospects can make a choice with reasonable assurance of knowing what the finished product will look like.

Nearby a frayed end of an electric cable projects from a wall and above a sign bears testimony to the features of modern electric wiring equipment used—another example of hidden values. Another upper room is partly plastered so that a view is obtained of both metal and wooden lath.

Two second floor bathrooms, finished in two kinds of tile, furnish the opportunity to point out a built-in electric heater, built-in fixtures and a third bathroom, unfinished, furnishes the opportunity to point out the hidden construction and methods of laying pipes.

Door Trussing and Bearing Partition Construction That Make for a Well-Built House Are Featured in These Signs.

In another room are shown contrasting sections of stair work, the type used in the house and the type ordinarily met with in operation houses. Those sections occupy the entire length of one of the bedrooms. On the first floor a large sign carries the names of all manufacturers and associations represented in the materials used in the erection.

THEODORE MAISCH.

✣

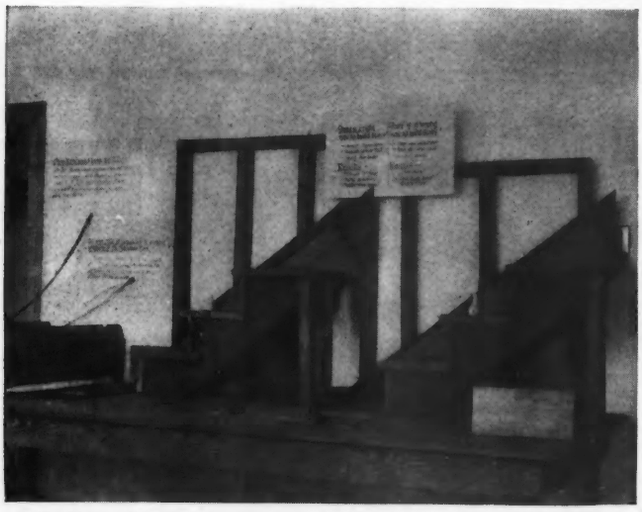
England Studies American Building Methods

53 Netherhall Gardens, N. W. 3.
London, England.

To the Editor:

Considerable interest is being focussed in Great Britain on the efficiency of the building industry in the United States. Recently Professor C. H. Reilly, Professor of Architecture in the Liverpool University, gave a lecture to the Royal Society of Arts on the "American Method of Organization." This lecture was given in connection with the trust founded by Mr. A. C. Bossom, the well-known New York architect.

On February 28th Mr. Harvey Wiley Corbett, of the United States, read a paper before the Royal Institute of British Architects in which he stated that although the wages of building operatives in America are at least four to five times as much per hour as in London, the actual cost of the finished building in New York is practically the same as in London. He explained how in America the whole progress of the building is scheduled with exactitude in order to avoid delay, for, said Mr. Corbett, "when labor is 60 per cent of your final cost, delays mount up in money with terrifying rapidity." He explained that the enormous size of American buildings makes for concentration of effort and permits more efficient systems of handling material and labor to be installed. Wood in New York is much cheaper than in London, and while no wood remained in most of the finished buildings in America it was very extensively used in the process of construction. If this temporary wood could be ripped out and thrown away labor was saved over the case when it was necessary to salvage each piece.



Specimens of Good and Ordinary Work Are on Display in a Second Floor Room, for Example These Two Illustrations of Contrasting Stair Construction.

He said that the increasing tendency in America was to assemble larger and larger plottage whereon to put up larger and taller buildings. This had nothing to do with what other nations were inclined to call megalomania, but was simply necessary in order to get a proper return in rentals where taxes were so high. Mr. Corbett stated that the average life of a commercial building in New York City was said to be 20 years and, therefore, Americans were inclined to build rather sparingly without sacrificing efficiency and strength, while British architects tended to give posterity a fighting chance to admire their handiwork.

At this meeting a progress chart of the new Greybar Building in New York was carefully studied, because it showed the care with which every element is scheduled to arrive and to be put into place during construction. This building, it was explained, contained 22,000,000 cubic feet and yet was built in a year and one month. It has 31 acres of carpet area but covers only 68,000 square feet of ground.

Among other American buildings that are now being studied in Great Britain are the Union Terminal in Cleveland, the Savoy Plaza Hotel in New York, the Trust Company Building at 39 Broadway, the French 32-story building on Fifth Avenue, and the American Insurance Union at Columbus, Ohio.

It is hoped before long in Great Britain to imitate America and to introduce instruction in scheduling as part of the training for British architects and builders.

B. S. TOWNROE.

Tendencies in the Use of Concrete

By I. J. HARRIS, Portland Cement Association

RECENT developments in the use of concrete in building have followed two general lines. The material has been given an increasingly widespread application by practical contractors, and the methods of using it have undergone certain changes. These two aspects of the growth of concrete construction, while interrelated, must be considered separately, as they are essentially distinct from each other.

Consider first some of the many varied uses. Originally cement was mixed with fine aggregate and used as mortar. Later coarse aggregates were added and it was found that these mixtures made good sidewalks and basement floors.

It was not until somewhat recently that builders used concrete reinforced with steel rods in erecting the skeletons of hotels, office buildings, factories and other structures. The new system enabled the engineer in charge of the work to build a strong structure at a comparatively low cost in a short time.

The Growing Use of Stucco Has Been a Natural Result of the Growing Use of Concrete Block as Well as of the Recent Widespread Popularity of Mediterranean Styles of Architecture.

Progress was not all in the field of large structural work, however. The use of pre-cast concrete block in home construction, the popularity of stucco for all sorts of buildings, the widespread adoption of concrete tile for interior walls, the manufacturing of concrete roofing tile, the construction of basement and foundation walls of monolithic concrete, the acceptance of concrete pipe for drainage purposes all extended the popular use of this material.

Ceilings and Beams Frequently Receive Special, Decorative Treatment Where Reinforced Concrete Construction Is Used, Often Giving the Beams the Texture and Coloring of Timbers.

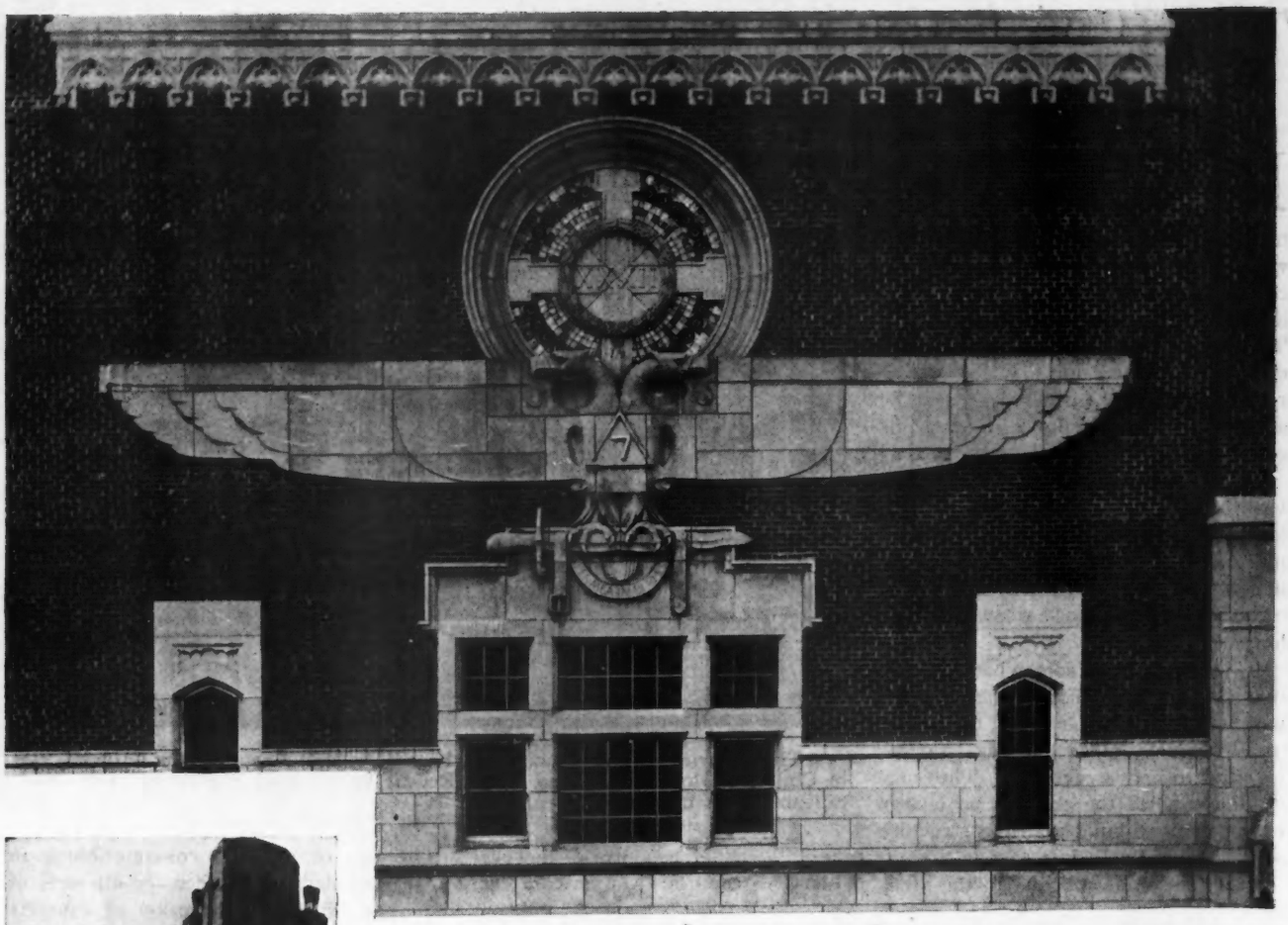
The small home owner was led to use this material in construction primarily as a matter of safety. Destruction by fire has caused heavy losses to property owners throughout the country, and has been responsible for numerous fatalities. As protection against such catastrophes, he adopted a type of construction in which non-burnable materials were used for foundations, exterior and interior walls and roofs. Monolithic and block foundations, block exterior walls, tile interior walls, and pre-cast concrete roofing tile are at present widely used in homes throughout the country.

In the meantime fireproof construction in larger buildings has continued at a steady pace. In a majority of the large cities of the country, this type of construction is compulsory in most commercial buildings.

While the first considerations in building have always been utility and economy, the users of cement and concrete are recognizing more and more the aesthetic aspects of construction.

In home construction, for example, stucco is assuming a new importance. Numerous attractive textures and artistic colors have been developed for it, and in many parts of the country (particularly in California and Florida) its popularity has run parallel to the developments of home architecture.

The use of stucco is a natural development accompanying the widespread adoption of the



A Closer View, Than That Shown Below, Gives Us a Very Good Idea of the Effective Use Which Has Been Made of Precast Concrete Trim in This Building and of the Wide Range and Complexity of Design Which Is Possible with This Material.

The Scottish Rite Cathedral, Fort Scott, Kan., in Which the Architect, William Schmidt, of Oklahoma City, Okla., Has Developed an Elaborate Decorative Scheme in Precast Concrete Trimstone.

Precast Concrete Stone Is Widely Used in Exterior Walls and Frequently the Resemblance to Cut Stone Is so Close That It Is Difficult to Tell the Concrete from the Natural Stone.

concrete building block. Portland cement stucco applied to concrete block forms a structurally sound union since they are essentially the same material.

Roofing tile is being produced in a number of patterns to meet the requirements of different architectural designs. By a skillful use of pigments, the manufacturers are able to produce a wide variety of colors, and a large number of patterns permit the builder to secure a distinctive effect with this roofing material.

Perhaps the most interesting recent development in home building is the use of concrete first floors. The motive leading to this type of floor construction was primarily a desire for fire-safety; however, architectural beauty is obtained at the same time. A detailed discussion of this subject is found in the article, "Concrete Floors for Residences," published in the AMERICAN BUILDER for April, 1926.

In commercial buildings and in the higher class of residences, pre-cast concrete stone is used frequently for exterior walls, as well as for trim. This stone is cast in units, in which varied textures are secured by a careful selection of aggregates. Very often a cut stone effect is obtained by special casting.

Where reinforced concrete construction is used, ceilings and beams are often given special decorative treatment. A common practice is to make the forms of wood, and to treat the resulting concrete with a dark stain, and then to stencil it in colors. As the grains of the wood show in the concrete, a timbered effect results. Steel forms are used to produce a smooth finish and in many cases the concrete is painted or enameled, doing away with the necessity for plaster.

A wide variety of aggregates has increased the adaptability of concrete to the artistic demands of the builder. The use of a marble aggregate has made the terrazzo floor possible and selection of other materials as aggregates, with a view to ultimate appearance, has enabled the contractor to carry out a carefully developed scheme of design in a workmanlike way, producing very beautiful effects.

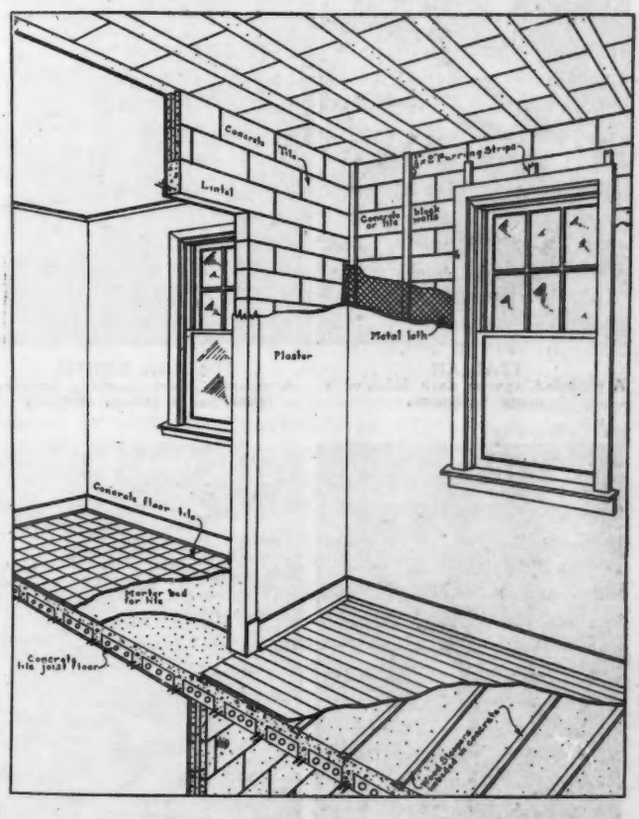
In this connection, it is interesting to note that a definite artistic technique is being developed for the use of concrete in churches, public buildings and other structures where design plays a dominant part. In many cases, the effect of mosaics has been secured. In other instances a complex design has been evolved. A case of the latter is the Scottish Rite Cathedral at Fort Scott, Kansas, where the architect, William Schmidt, of Oklahoma City, developed an elaborate decorative scheme in pre-cast concrete trimstone.

While most of these uses of concrete in building have been recognized for some time, their general acceptance by architects and builders is more recent. They are consequently undergoing a steady growth in popularity.

With the general acceptance of these uses of concrete has come a development of construction methods. Perhaps the most important step made in actual construction has been the discovery and the recognition by contractors of the "water-cement ratio" for mixing concrete.

Formerly, builders believed that the strength of concrete was dependent upon the proportion of cement and aggregate used. Specifications fixed the amounts of cement, sand and gravel in definite relations to one another, but left the amount of mixing water to the judgment of the contractor.

The present tendency is to specify the amount of mixing water per sack of cement since it has been found that for given conditions of manipulation the strength and other qualities of concrete are fixed by the amount of mixing water used with each sack of cement so long as the mixture is workable and plastic. The contractor is given a wide latitude in apportioning the aggregates, provided that he uses clean, hard materials, and secures a workable mix.



Reinforced Concrete Floors Even in Residences, Especially for the Lower Floors, Are No Longer Uncommon and for Them Are Claimed the Advantages of Fire Protection, Insulation Against Sound, Heat and Cold, and Exclusion of Dirt.

During 1926, the "water-cement ratio" received recognition from two important bodies: the Building Code Committee of the U. S. Department of Commerce and the Pacific Coast Building Officials' Conference. Each body recommended that the strength of concrete be controlled by specifying the proportion of mixing water to be used.

Winter construction has been undergoing steady development during the last few years.

The developments in the use of concrete have led to a more effective application of that material to the specific needs of the individual users. The uses have become more varied, and the technique of construction has advanced steadily. Today, a better material is mixed by application of the water-cement ratio law and construction is fast approaching the day when it will be no longer a seasonal, but a year around activity.

ENGLISH
The irregularities are produced by side strokes of the trowel

ROUGH CALIFORNIAN
A rough cast finish reduced by rubbing with a carpet-covered float

MODERN AMERICAN
A texture gained by floating smooth and then roughening with light, vertical strokes of wire brush

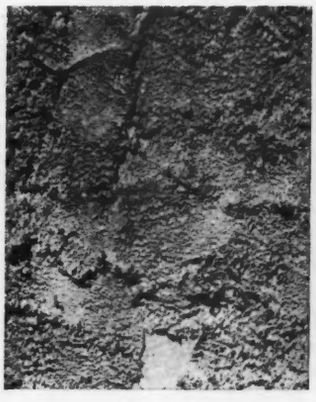
ITALIAN TRAVERTINE
A travertine stone effect, gained by lateral strokes of a wire brush and then smoothing lightly with float

SPANISH
A wavy, trowel-marked finish, smoothly irregular

MOORISH
A surface tooled promiscuously with the rounded corner trowel

ITALIAN
A troweled, spatter dash finish with many variations

ITALIAN BRUSH
A smooth, more carefully finished example of Italian textures



GOTHIC
A float finish rough-torn with the back edge of the trowel

ENGLISH
A soft, heavy texture applied with wood float and brushed

FRENCH
A full, trowel-swept finish emphasizing application

ENGLISH COTTAGE
A fine, leaf-like finish produced by feathering with trowel

FINE CALIFORNIAN
A finish rubbed with burlap and troweled

MODERN AMERICAN STIPPLED
A smooth surface stippled with a soft, short-bristle brush

Types of Finish for Portland Cement Stucco.

Modern Trends in Fireproof Construction

By S. M. FECHEIMER
President, Fecheimer, Frank & Spedden, Inc.

EVERYONE remembers when the word "fireproof" was only associated with the towering sky-scraper and the monumental building. Then came reinforced concrete which brought fireproofness in a practical way to a vast number of other buildings. Keeping stride with other modern developments, the giant, steel, was making its way into other parts of the building—into the windows for daylighting, into the metal lath for the plastering; into the doors, trim and every part of the equipment.

Who would have thought a few years ago that a satisfactory method of securing fire safety and permanence would be available for the most unpretentious building—the modest cottage or the simple private garage? Yet such are the tendencies of the day that steel products in great variety can be used with economy in any building, large or small. Truly the past generation has seen an improvement in building methods which has completely revolutionized previous practice.

Consider for instance the structural parts of the buiding. The first efforts towards fireproofness were to secure some means to protect the structural steel frame work. Then came reinforced concrete, a construction which embodied within itself the fireproof element. Its advantages and economies have made it today the standard construction of innumerable types of buildings.

The development of reinforced concrete has seen the perfection of many improved types of design. The standard beam and slab construction was soon followed by the familiar flat slab design with its flared columns and uniformly thick monolithic slab. Steel floortile construction was another outstanding improvement, providing flat ceilings of long span and of comparatively light weight. The construction consists of reinforced concrete joists separated by steel tiles and with a metal lath ceiling below. Other developments of the floortile type of design are the removable steel tiles, floordomes and locktile lath which holds the floortile accurately in place.

Light occupancy buildings long presented a difficulty for fireproof construction because so much of the strength of the design was required to support the construction itself. The introduction of steel joists presented a happy solution of the problem. This light weight construction entirely eliminates wood form work and special equipment, so that it is adaptable to small buildings as well as large. The metal lath ceiling below insures crackless plaster. The cost of steel joists with cement floors is practically the same as wood joists with hardwood floors. Steel joists are obtainable in both the plate girder and open web types.

Light-loaded roofs for all buildings were a similar problem to the designer of fireproof buildings. Various improved constructions are now available. Rib-stiffened metal lath makes possible thin concrete slab erected without the use of forms. Fractory-made, reinforced cement tile are being used for many buildings. The most recent development in incombustible roofs is the steel deck, which is extremely light in weight, can be insulated to any degree and is waterproof with built-up roofing. Steel decks consist of steel plates reinforced with steel ribs.

A real fireproof building consists of something considerably more than the fireproofing of its structural portion only! For instance, if the windows are inflammable there is the constant menace of the spread of fire. Here again steel has played an important part in reducing the fire hazard. While in the early development steel windows were only made for important structures, today there are types for every building, large or small, and for every requirement of daylighting and ventilation. Standard center pivoted windows and continuous sash with mechanical operators for their control are now almost universally used for industrial buildings. Double hung steel windows of superior workmanship are available for fine buildings including monumental structures, hotels, office buildings, etc. Projected steel windows, architectural, industrial and Donovan types have been installed extensively in schools, hospitals and commercial and industrial buildings. Counterbalanced steel windows have a wide general application.

In residential buildings, the greatest advances have been made. In basements, the daylight is doubled and bothersome wood windows eliminated without extra cost by the copper steel windows. In the upper floors, the copper steel casement windows have come into their own, giving to the home twice as much fresh air, attractiveness, permanence and fire safety. Steel windows make buildings modern and keep them so.

Coincident with the development of steel windows, steel doors have been perfected for both exterior and interior. Types are furnished to meet all requirements. Industrial steel doors are available in sliding, swing and jack-knife types and in all sizes. Finely finished fireproof doors can be had to match any interior.

The interior construction, as well as the openings, must be built fireproof. Metal lath is the greatest factor to insure not only fire safety but also all round permanence. It thoroughly reinforces the plaster to prevent its cracking, streaking or discoloration. Its uses are found in innumerable parts of the building. It provides one of the best methods of fireproofing for structural steel. For suspended ceilings, metal lath is the only practical construction. For non-bearing partitions, metal lath and steel channels are the base of solid plastered walls which save floor space and are fireproof and soundproof.

Metal lath is an approved base for stucco, and for furring, arches and domes. As a fire protection for wood studs and joists, it has a fire rating of over an hour—ample time for safety. Modern decorations today depend very largely on attractive plaster effects. To prevent cracking and ensure permanence, economy demands the use of metal lath. The popularity of metal lath is growing by leaps and bounds, not only in large construction, but among home builders.

The use of steel has extended so as to include complete industrial buildings made of standardized units. The principle of their design is such that practically any type or size of one story building is available with any desired arrangement of doors and windows.

So we have seen the spread of the fireproof idea into all parts of the building. Each year is seeing further advances. Building codes and the public are demanding maximum protection for life and property. It is safe to predict that in a few years from now the building which has not this fire protection will be obsolete. The forsighted builder today is insuring his building against obsolescence by building fireproof.

End-Matched Softwood Lumber

By J. F. CARTER

Note: This Is the Second of a Series of Three Articles by Mr. Carter on the Utilization of Short Length Lumber.—Editor.

FOR many years hardwood flooring has been end-matched—that is, having tongue and groove on the ends of the pieces. Unless he buys the very thin hardwood flooring, the contractor or builder never thinks of its being anything other than end-matched.

About twelve years ago one of the southern pine mills began the manufacture of end-matched yellow pine flooring. It was a long, hard, uphill fight, that of getting this item introduced. Though the dealers in lumber, the contractors, the builders and even architects and consumers recognized and accepted end-matching of hardwood flooring, they offered resistance to the end-matching of yellow pine flooring.

Today a large number of southern mills manufacture the end-matched flooring, and each of them, in its own way, is publishing selling propaganda which illustrates to the retail lumber dealer and to the contractor or house-builder that there is money to be saved by the use of end-matched yellow pine flooring, more especially in the use of short lengths.

New Employees Hotel at Pine Valley, Oklahoma (a New Saw Mill Town), in Which Every Piece of Ceiling, Siding, Flooring and Partition Is Short Length, End Matched, Yellow Pine.

But how about any resistance which might be offered to the use of yellow pine ceiling, sheathing, drop-siding and even common boards end-matched? Has the contractor, or the architect, or the retail lumberman, or the average house-buyer, thought of the wonderful saving (by saving I mean money) in the use of short length end-matched ceiling, sheathing, drop-siding and boards up to 10-inch width?

There are many, I know, who will reject such an idea. But it must not be rejected, and is not going to be rejected.

Let us view it, for a moment, from the angle of sound merchandising. When any of the substitutes for lumber commenced planning the inroads it must make on the lumber market, it did not sell on price; only a few of them actually sold on superior merit as a talking point. But they did use "waste" as their selling argument. And they use it yet. They will continue using it.

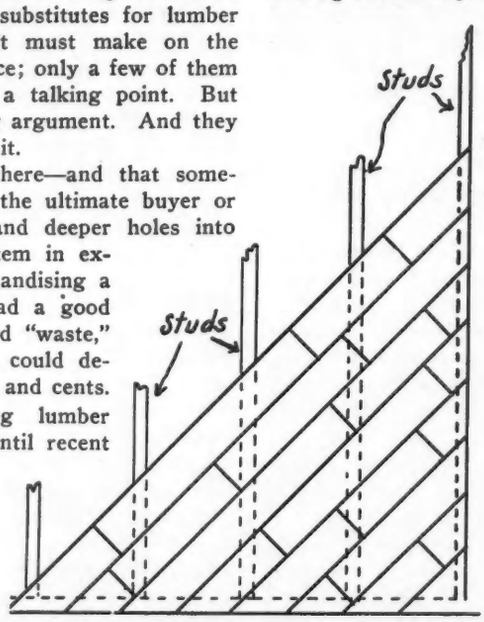
Waste means money loss somewhere—and that somewhere is always, and ever will be, the ultimate buyer or owner. Waste bores more holes and deeper holes into pocket-books than any other one item in existence. The men who were merchandising a substitute for lumber knew they had a good talking point in the use of the word "waste," for they could draw pictures of it, could describe it, could calculate it in dollars and cents.

But the sawmills manufacturing lumber never got down to merchandising until recent years. I might say recent months. Had they been merchandising their product, had they given proper thought to the changes which are constantly taking place in the social fabric, the manufacturers of substitutes would never have gained the strong foothold on the building material market which they enjoy today.

Is there really any advantage in the use of ceiling end-matched and in short lengths?

Most assuredly there is. The first advantage, of course, is to the manufacturer, the sawmill. His waste will be lowered very, very much. The next saving is to the retail lumberman, and the third saving is to the man who builds the house. Whether it be a chicken house, a barn or a dwelling, the use of short length, end-matched ceiling, drop-siding, and sheathing will effect what might easily be termed a gigantic saving.

When using these items of lumber the average farmer or contractor or house-builder purchases the standard lengths —which are in multiples of 2 feet; that is, 10, 12, 14 and 16 feet long. The careful laborer has to square-saw the two butting ends of a piece of ceiling or drop siding at the point where it meets the center of the stud. What is done with the piece sawed off? It is allowed to become waste ordinarily. That waste amounts to 10, 12 and as high as 15 percent. That is a real money loss. It is far too much. Yet the habit is to lose it.



Diagonal Placing of Short Length, End Matched Sheathing on Studs. Each piece has a bearing at some point and can be nailed to a stud. Visualizing the studs as joists shows the use of this material as diagonal sub-floor. Note the decreased need for sawing and also that the piece sawed off the run at the right end can be brought back to start the run at the left.

If end-matched ceiling and drop-siding are used, the end of a piece which juts over a stud is not sawed off. Instead, the next piece is matched into the end, the tongue slipping into the groove, and the run continues. The only piece sawed off is at the end of the run, where a door or window is met, or at the side of the house. What is done with the piece sawed off? No matter how small it may be, it is taken back to the start of the next run, nailed on the stud, the piece end-matched in, and the run continues. The only piece wasted is the very last piece cut when the entire job is finished.

How about strength?

It has been determined that with the end-matched pieces the

Building at Lockhart, Alabama, in Which Short Length Material Was Used, All End Matched. The porch floor is 5/4 stock, three inches wide, end matched.

run is stronger than the same run made from butt-end-pieces nailed at the ends on the studs. Even though the "break" or matching comes between two studs, the run is stronger and will bear a great deal more stress from wind or other source of shock.

In diagonal sheathing (and certainly this is the preferred method of putting sheathing on a house) the saving in material and in time is very great. At the present time the piece used as sheathing lumber is sawed at an angle of 45 degrees at a stud. Then another piece is sawed at the same angle and is nailed to that same stud. By the use of end-matched lumber for sheathing, such time-wasting cutting is not needed. The run continues as if the piece were one long board. When a window or door or the side of the house is reached, the carpenter cuts the piece at an angle of 45 degrees to line up with the studs, but he does not throw away the cut off. He walks back to the start of the run, where he would have to saw a 45 degree angle anyhow, and nails the piece on, matching in the next piece at the end, and continuing the run.

No actual time study or figures are in my hands, but I dare say, after an experience with end-matched short length yellow pine sheathing, that the saving in time (and that is money) is greater than when laying the flooring item. That is, the saving should range between 25 and 50 per cent. This statement has been questioned by one or two parties, but I yet believe it is true.

Someone may raise the question as to appearance.

The appearance of a job of end-matched lumber is far better in every case of reasonably good work than is the better grade of job done with butt-matched lumber—if for no other reason than that the average carpenter cannot cut butt-ends to match up as well as machinery does the squaring and end-matching. After the paint has been placed on the job, the average end-matched piece of work is very much superior to even the best butt-end job.

There is yet another advantage gained by using these items end-matched—that is insulation. Closely tapped up pieces of end-matched stock leave no openings, whereas even a high-grade butt-end job shows many openings.

Sub-floors come in for discussion. Sub-floors should be laid on every dwelling job that is a well-built job. The material for sub-floors, laid at a 45-degree angle to the joists, should be end-matched. Again there is a saving of material, a saving in time of laying, a stronger piece of construction, the first two meaning actual cash money.

Short length, end-matched material must receive attention because it can be bought for less money than standard lengths, lays up faster, makes just as fine a job as standard lengths, and gives just as great structural strength to the average small dwelling job. By short lengths I mean end-matched lumber less than 8 feet long and going down even to 12-inch length. A 12-inch piece of ceiling, flooring, drop-siding or sheathing must not frighten anyone—entire houses have been built of it. It lays up as readily for the builder as blocks do for a child on the floor. The matching is the thing.

The day is not far distant when common boards, 8, 9 and 10 inches wide, will be end-matched—and when that time comes (the contractor can help to make it come more quickly by continually asking for it) better construction will be the rule, and a less amount of money will need to be expended.

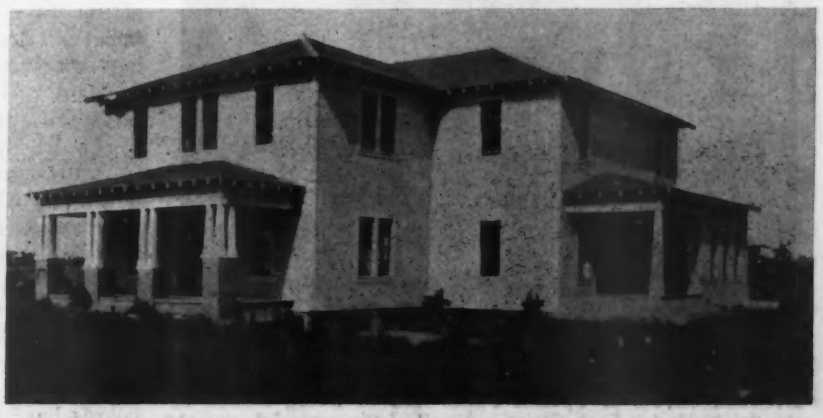
End-matched items such as those mentioned herein have been made by several of the Southern pine mills making yellow pine lumber and, since the installation of the machinery has already been made, the contractor, the builder, architect, etc., can get these items by calling on the retail lumberman to supply them.

Are they already in stock in the yards of the retail lumberman? They are not. The retail lumberman believes in the path of least resistance. He has been nursed to this by the manufacturers of substitutes for wood. They have advertised their items heavily, making it easy for the retail lumberman to sell, without any merchandising effort on his part.

Will the lumber manufacturer, the sawmill, follow the lead of the substitute manufacturers? He has not thus far. He is satsified, evidently, with allowing the retail lumberman to send in orders as stock is needed. He puts the merchandising up to the retail lumberman.

Hence, if the architect wishes to build a stronger house, a better insulated one and a lower-cost one for his client; if the contractor wishes to make a few more dollars on his contract; or the house-builder wishes to have a better house at a lower cost, the use of short length, end-matched items such as flooring, ceiling, sheathing, sub-flooring and drop-siding is the way. And the next thing necessary is

(*Continued to page 192*)



Building at Florala, Alabama, Constructed Entirely of Short Length, End Matched, Yellow Pine.

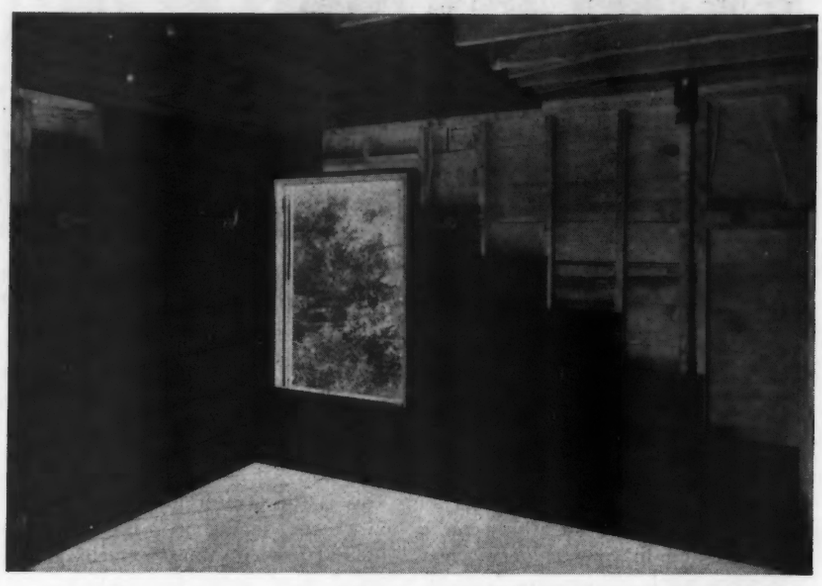
Insulation Pays for Itself in Both Comfort and Dollars

THERE is no doubt about the economy of insulation. It has been demonstrated that it will more than pay for itself if properly selected and applied. From the standpoint of the average home owner, this question is to the point: "Would you rather shovel the money into the furnace or use it to pay off mortgages?" The builder, of course, should consider the best interests of those for whom he builds or to whom he sells and he knows that this policy will pay him in the long run.

A few figures will be given a little farther on showing the actual savings from the use of good insulation, expressed, first in terms of British thermal units and then translated into pounds of coal and cost in dollars. The case is easily proved. But it is equally important to stress, at the outset, the gain in living comfort from the use of good insulation.

A properly insulated house is several degrees cooler during hot weather. The fierce rays of the run beat upon walls and roof and the amount of heat which gets inside is in direct proportion to the conductivity of the wall and roof construction. Everyone knows how hot it is in the attic of an uninsulated house and heat is conducted through the walls of a house in the same manner but in less degree because the radiation from the sun strikes the wall surfaces at a greater angle.

All materials conduct heat. There is no such thing as a "heat stop," but good insulation comes extremely close to it. Small and numerous dead air spaces are necessary to good insulation and its insulating power is, therefore, in direct relation to its specific gravity. It should have other qualities, of course; particularly in its fire-resistance and non-absorption of moisture. What might be called "mineral insulation" is described and illustrated elsewhere in this issue. We are here considering particularly those forms of insulation composed of vegetable fibres or board. Enough of these are pictured to give a good idea of the several types obtainable.



This Picture Shows a Partially Completed Insulating Job, as Installed by John A. Pugh, Builder, at Schenectady, N. Y. Corkboard one and one-half inches thick is being nailed to the studs and two inches thick to the second floor ceiling joists.

The Insulation Here Shown Is a Wood Fibre Quilted Between Sheets of Special Paper and Is Being Nailed to the Studs Under Lath Strips. A roll of the material, revealing its fleecy nature, is seen at the right.

The board type of insulation has the advantage that it can be nailed in place as a sheathing material. It has sufficient stiffness and strength to be used as a sheathing or plaster base and yet it has myriad minute air pockets which make it a poor conductor of heat. Such a material is cork board—the bark of the cork oak—whose dead cells are filled with air spaces and the specific gravity of which is but .24. Cork makes a most efficient plaster base, but has not quite the structural strength of some of the artificial fibre boards and is not used as a sheathing material except over the regular sheathing boards or nailed to the inside of the studding or to the ceiling joists as plaster base. It can be obtained in almost any desired thickness, but is usually 1½ or 2 inches thick. Cork is not inflammable in the ordinary sense and is highly heat resistant.

Another quite effective form of board insulation and one which has considerable structural strength is made from the fibres of sugar cane, felted and pressed together under steam heat. This board is sometimes called artificial lumber, as it has many of the characteristics of good lumber and has sufficient strength and stiffness to be used for sheathing. Asbestos board is also an excellent insulating material and is stiff and fairly strong. It is also said to be an excellent plaster base.

Another type of insulating board is made from wood fibres, felted and pressed into boards. Some of these boards have considerable stiffness and strength, depending upon the degree of compression used in their manufacture.

Their insulating value, however, is in direct relation to their lightness or low specific gravity. They are often used over concrete or metal roof decks, to prevent condensation as well as heat loss. Corkboard is also effectively used for this purpose. When so used, they must be mopped over with hot asphalt for a permanent waterproof roof covering.

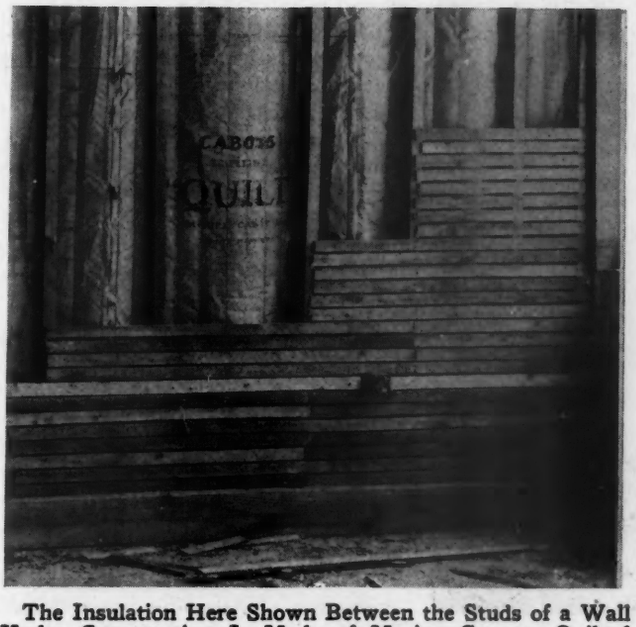
Most of the loose fibre insulations have considerable insulating value, but are usually quilted and have no other function than to impede the passage of heat and the infiltration of cold air. They retain the warmth of a house in winter in much the same fashion as underwear keeps the human body warm and protects it from the chilly blasts of winter.

As shown in the illustrations, most of these quilted insulations are nailed in place between the studs or ceiling joists in such fashion as to create two additional dead air spaces in the wall between the sheathing and the plaster base. The edges are stripped down with lath nailed in place, to make tight edges. Another method is called "threading," the quilt passing first in front and then behind the studs or extra strips between studs.

One of the best loose fibre insulations is made from marine grasses quilted between sheets of waterproof paper. Besides its high insulating value, it is water and moisture-proof, which gives it a long life and adds to its insulating value. This is because wet or moist substances transmit heat readily, even though poor conductors of heat when dry.

Other forms of fibre insulation are made from flax and similar vegetable fibres treated with a fireproofing liquid and stitched between sheets of special paper. Mineral wool is another valuable insulating material and is, of course, absolutely fireproof as it is a by-product of the smelting of iron and steel in blast furnaces.

The invisible loss of heat from a house takes place through both walls and roof. Because of the natural law of gravity which causes heat to rise, the loss through the roof would many times exceed that through the walls were it not for the floors and ceilings below, which have a partial insulating effect. In many houses, however, there is only a lath and plaster ceiling under the roof, and, in such houses, the heat loss through the roof is extremely wasteful. Insulation over such a ceiling should be quite thick—twice as thick as ordinarily used in the walls. This is called "balanced insulation" by some insulation engineers.



The Insulation Here Shown Between the Studs of a Wall Under Construction Is Made of Marine Grasses Quilted Between Sheets of Waterproof Paper. This insulation is impervious to moisture and has excellet insulating qualities.

Here We See the Insulation of a Concrete Roof Deck with Sheets of the Pressed Wood Fibre Type. This insulation is mopped over with hot asphalt as a top finish. It prevents excessive heat loss and condensation or drip underneath.

Of the 22,000,000 homes in the United States, only a small fraction have been protected with heat insulation. The practice is rapidly growing, however, with the prevailing high prices of fuel. If the savings possible by properly insulating the average house are figured on but half the number of homes in the United States, the annual money losses in fuel without this wall and ceiling insulation amounts to $682,000,000—a truly extravagant waste, especially when applied over a term of years. How much better it is to build the new house with good heat insulation in the walls and under the roofs and have the added living comfort, summer and winter, as well as the handsome fuel saving during the life of a building.

After a house is once built, it is impracticable to apply insulation in the walls and full fuel efficiency and economy are impossible in such a house. Therefore, the house with good heat insulation built into it has greater value—is worth more in dollars and cents. Builders should remember this when planning new buildings.

Single dwellings and apartment buildings are by no means the only classes of buildings in which good heat insulation is advisable. From one particularly cold section of the country, a heating problem is referred to the editors of American Builder which showed a shocking heat loss In a community school building. This building had a combined heating and ventilating system by which air was heated over steam coils and rose from the basement through ducts to a hall or auditorium on the second floor which was often used for public meetings in the winter. In spite of burning all the coal they could force into the boilers, it was impossible to keep the temperature of this auditorium above 62 degrees when the thermometer was below zero outside. This was directly due to the tremendous heat losses through the uninsulated ceiling and roof over this auditorium and they were advised to almost double their radiation unless they were willing to install adequate insultion over the ceiling. The people of that community had paid in fuel losses many times the amount which good insulation would have cost in the first place and, probably, the cost of a new boiler as well.

Owners of industrial plants—factories, workshops, foundries and the like—are learning the value of insulating their buildings and many structures of this type are now being

built with heat insulation in the walls and under roofs. Naturally, the dollar argument makes a strong appeal to business men, but there is also the gain in comfort to be considered. During the hot summer weather, employes in the cooler buildings turn out more and better work. Thus there is a double gain.

Thermometer tests have been made which reveal exactly the amount of heat lost through walls of various forms of construction and material. Space is lacking to quote all of these results, but only a few such figures are necessary to show the value of good heat insulation. The figures quoted show the heat losses expressed in B.t.u. per hour per square foot per degree F. difference in temperature between the inside temperature and that outdoors.

	Not Insulated	Well Insulated	Extra Thick
Wall Construction No. 1— Beveled siding, waterproof paper, sheathing, studding, lath and plaster	.218	.105	.090
Wall Construction No. 2— Stucco on metal lath, furring, waterproof paper, sheathing, studding, lath and plaster	.236	.109	.092
Wall Construction No. 3— Brick veneer, waterproof paper, sheathing, studding, lath and plaster	.200	.101	.087
Wall Construction No. 4— Brick (8-inch), furring, lath and plaster	.200	.119	.100
Wall Construction No. 5— Brick (12-inch), furring, lath and plaster	.172	.109	.093

If the weather in the city of New York may be taken as fairly representative of average conditions, the number of day-degrees below 70 degrees in one winter totaled 5256, without including September, October, April or May, which have many days with a temperature below 60 degrees in various parts of the country. The degree-days shown are figured on the "mean temperature" reported for New York by the weather bureau during each of these months.

As our heat losses are figured by the hour, it is necessary to translate our day-degrees into hour-degrees. Multiplied by 24, we have 126,144 hour-degrees temperature difference. This gives us a figure which can be multiplied by the heat losses shown in our tabulation, securing, as a result, the losses in B.t.u. per square foot. Figured on this basis and on an external area of 2750 square feet for the average house, the actual money savings of installing good insulation can be shown.

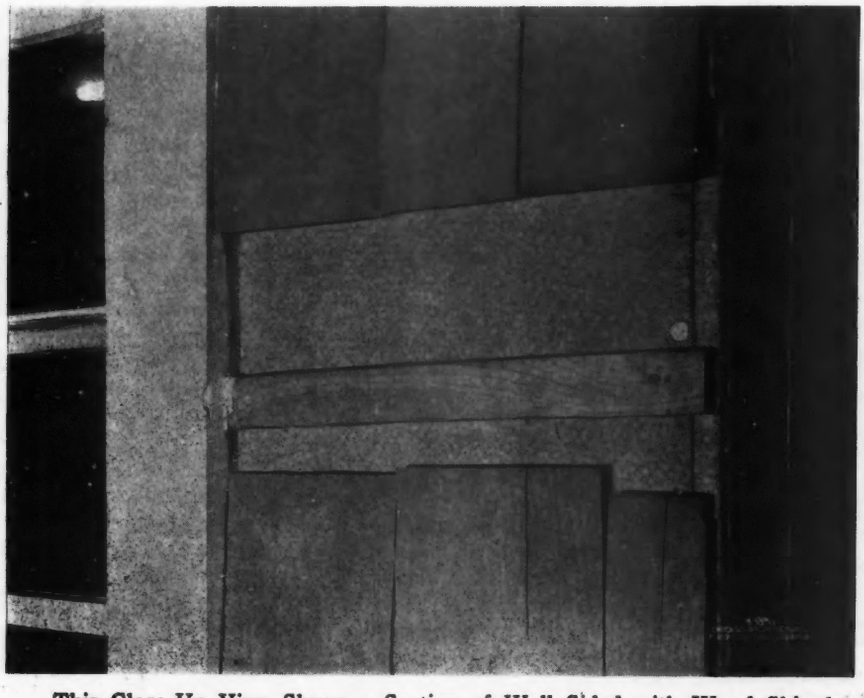
One of the most popular fuels for domestic use costs in the neighborhood of $16.25 per ton in winter. These

The Insulation Used Between the Studs in This Picture Is Made from Flax Fibres Felted and Pressed Into Semi-Rigid Sheets. It has good heat resisting qualities and is non-inflammable.

are the factors on which the following insulation economies are figured.

SAVINGS BY USING HEAT INSULATION IN THE AVERAGE HOUSE

	Saving in 5 Months with Good Insulation	Saving in 5 Months with Extra Thick Insulation
Wall Construction No. 1	$62.08	$70.20
Wall Construction No. 2	69.68	79.04
Wall Construction No. 3	54.28	62.08
Wall Construction No. 4	44.52	54.89
Wall Construction No. 5	34.54	43.32



This Close-Up View Shows a Section of Wall Sided with Wood Shingles Under Which Is a Sheathing Board Made of Sugar Cane Fibre Which Is Rigid and Yet Has Good Insulating Qualities. It is sometimes called "artificial lumber."

As about 50 per cent of the coal consumed in a domestic installation is wasted in unavoidable stack losses and faulty combustion, we have doubled the theoretical fuel consumption, to represent the actual saving in dollars, otherwise expended for coal.

As the savings shown would continue throughout the life of the house—say, from 20 to 30 years—it is easy to see that an investment in good insulation returns a handsome profit, besides its great contribution to living comfort.

✣

ANNOUNCEMENT has been made that the twenty-fifth annual meeting of the National Lumber Manufacturers' Association will be held on Thursday and Friday, April 28 and 29, at the Congress Hotel, Chicago. Some of the committee meetings may be held on the preceding day. This meeting marks a quarter of a century of service on the part of this association. The observance of American Forest Week, fixed for the week of April 24 to 30, inclusive, will have an important place in the program.

Gypsum and Wood Prove Fire Resisting

Unexpected Fire Test Shows Value of Gypsum Insulation Filling

AN accidental but unusually effective demonstration of the hitherto little known fact that a frame house can be virtually as fire resistant as one of brick construction occurred recently in Highland Park, Illinois.

A completed frame house, which was as yet unoccupied, caught fire inside in some unexplained manner, and before fire apparatus could arrive at the scene, the flames had made a furnace of the interior and had ruined floors and partitions.

The exterior of the structure was unharmed, however, and the casual observer could not tell that there had been a fire except by the smoke stains on the windows and by the fact that the windows had been broken out by the intense heat.

This apparent miracle of a wood house in which fire will not spread from the inside out, nor from the outside in, was due to the peculiar construction of the building. Mr. Walter Wilcox, who built the house and four others in a group with the intention of offering them to the general public for sale, had the walls and upper ceilings of the house insulated with a mineral insulation, primarily for the purpose of soundproofing and reducing heat loss. This

After the Fire—Note that the Exterior Is Undamaged Although the Inside Was Burned Out Clean. Gypsum filling between the studs stopped the fire.

(*Continued to page 192*)

After the Fire—Inside Partitions and Outside Wall Lining Completely Burned; Edges of Studs Charred; Gypsum Insulation, Which Stopped the Fire, Still in Place.

Buffalo's New City Hall Will Cost Four Million Dollars

Will Have An Imposing Tower Twenty-One Stories High

FROM the standpoint of exterior design, our readers will particularly admire the perspective drawing of Buffalo's new City Hall. It is a truly monumental structure.

Newark, St. Louis and Milwaukee also furnish fine perspectives for this month's issue.

New City Hall, Buffalo, New York

Col. Howard L. Beck, Architect

Buffalo's new City Hall, scheduled to be completed by January 1, 1929, will take front rank among municipal buildings in the country. This Buffalo civic project will represent an outlay of $4,000,000. The main part of the structure, the tower, will be twenty-one stories high, and will be flanked on the north and south by wings six stories high.

The edifice will occupy an area of one city block. The architectural scheme of the hall will be Italian with classic treatment. The first two stories will be of granite with the remainder of the building sandstone. The whole structure will be fireproof, of steel and reinforced concrete construction, and with door trim, window sash and the like of metal.

The main floor of the new City Hall will be two stories high and will be traversed by the two chief lanes of travel, running north and south, and east and west. The center of this main floor will be a circular concourse surrounded by a gallery. Around this gallery it is planned to have mural decorations depicting the history of Buffalo. Marble columns will feature the architecture of the ground floor.

The city council chambers will be on the fifth and sixth floors in the north wing of the building. The chamber itself will be comparatively small and will be patterned after the Montreal, Canada, City Hall chamber, to lend quiet and dignity to all sessions.

Opposite the council chamber, there will be an auditorium seating 1,500 people, where large public hearings may be held.

The upper stories of the hall will be plain, practical business offices of the most modern type to house the seventy-six branches of city government.

Ten electric high-speed elevators will be in service. There will be a cafeteria for convenience of occupants of the building. In the tower there will be a radio broadcasting and receiving station. Topping the building will be a gigantic searchlight. An elaborate flood-light system around the base of the building will illumine the entire building and the nearby McKinley monument.

Industrial Office Building, Newark, New Jersey

Frank Grad and Henry Baechlin, Architects

Thompson-Starrett Company, of New York, Builders

Located in Newark's exclusive new business center, with a permanent and beautiful outlook over Lincoln Park, the $5,500,000 Industrial Office Building, which is 309 feet long and 206 feet deep with 72 feet open court, has 6,000,000 cubic feet contents and 350,000 square feet of rentable area. It is distinguished by an imposing entrance, spacious artistic foyer, high-speed elevators, and wide hallways. With three street frontages, a mile of wide corridors, all outside offices, 11-foot 6-inch ceilings, the Industrial Office Building claims its place among the best modern equipped buildings.

Many uniquqe features and conveniences are also provided such as an exposition hall, postoffice substation, telegraph offices, telephone booths, public stenographer, barber shop and cafeteria.

Missouri Pacific Railroad Building, St. Louis, Missouri

E. M. Tucker and Mauran, Russell and Crowell, Associate Architects

The west and south sides of the Misouri Pacific Railroad Building will front on the new St. Louis Memorial Plaza and will be in keeping with the architecture of adjacent structures. The main portion of the building will be twenty-two stories high. It will be 250 feet above the street level, with set backs at the twelfth and eighteenth floors. The exterior will be of gray limestone or pulsychrome terra cotta of cream tint. The foundation will consist of seventy-six piers resting on bed rock about 50 feet below the sidewalk. It has been designed to permit the addition of eight stories at some future time.

The volume of this building will be 3,618,750 cubic feet and the total floor area 230,000 square feet available for office space. This floor area is equivalent to five city blocks or a concrete highway 2½ miles long.

The power plant with five boilers and three electric generators will generate sufficient power to supply a city of 6,000 people. Pneumatic tube system radiating from a central station will handle messages to all offices located in the building. The ten elevators will be of the most modern type and will operate at a speed of 750 feet per minute. Their operation will be with push buttons for the operators, controlled by automatic signal system.

Hotel Schroeder, Milwaukee, Wis.

Holabird and Roche, Architects

The new Hotel Schroeder at Grand Avenue and Fifth Street, Milwaukee, will contain 810 guest rooms. Six hundred of these rooms will be finished at the present time and three floors will be left undivided for future development.

The first five stories will cover the entire lot and be devoted to public rooms. The bedroom portion of the hotel is arranged in an H-shaped plan, with large set backs on both Fifth Street and on the alley on the west, up to the nineteenth floor. The nineteenth floor has further set backs and continues up to the twenty-third floor, inclusive, a distance of 247 feet above the Grand Avenue sidewalk.

The first four stories of the hotel will be faced with Bedford stone, and above this point red brick and terra cotta trimming will be used. The style for both the interior and exterior of the building will be modern empire.

The first or ground floor will be devoted as far as possible to high-class stores, barber shop and a coffee shop. Entrances from Grand Avenue and Fifth Street lead into a large rotunda, giving access to monumental staircases and six high-speed elevators.

ART SUPPLEMENT *of* NOTABLE ARCHITECTURE

PLATE 129

The NEW CITY HALL, Buffalo, New York; Howard L. Beck, City Architect.

New Industrial Office Building, 1060 Broad Street, Newark, New Jersey;
Frank Grad and Henry Baechlin, Architects.

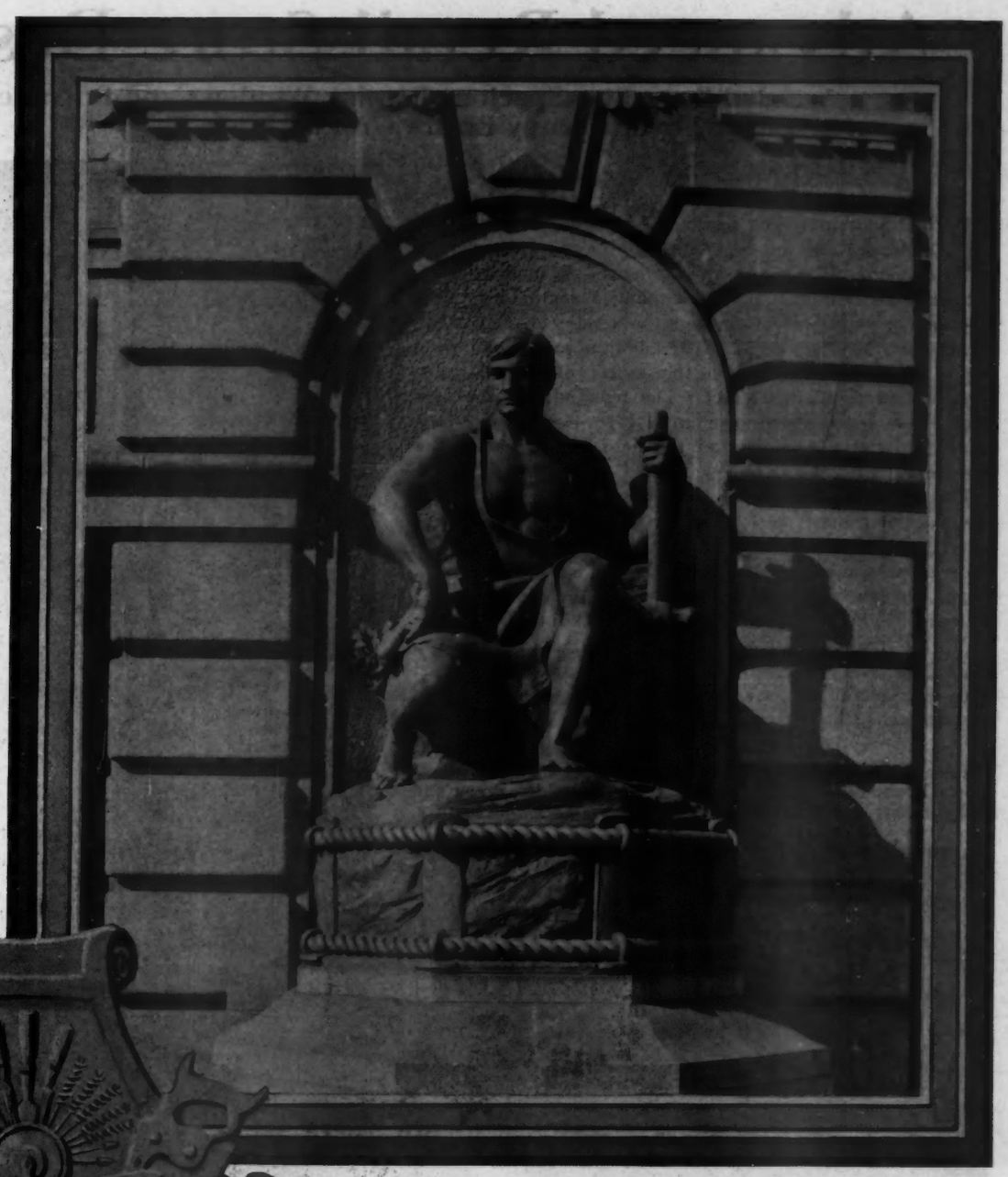
PLATE 130

PLATE 131

The Missouri-Pacific Railroad Building, St. Louis, Mo.; E. M. Tucker and Mauran, Crowell & Russell, Associated Architects.

PLATE 132

The New Hotel Schroeder, Milwaukee, Wis.; Holabird & Roche, Architects.



To the Skilled Workers of the Building Industry:

TO you men whose courage, skill, enterprise and faithfulness have perfected the technique of modern construction, making possible the building achievements of today—whether in modest dwelling or in towering edifice—this special issue of the AMERICAN BUILDER is gratefully dedicated.

Advanced Retail Store Design

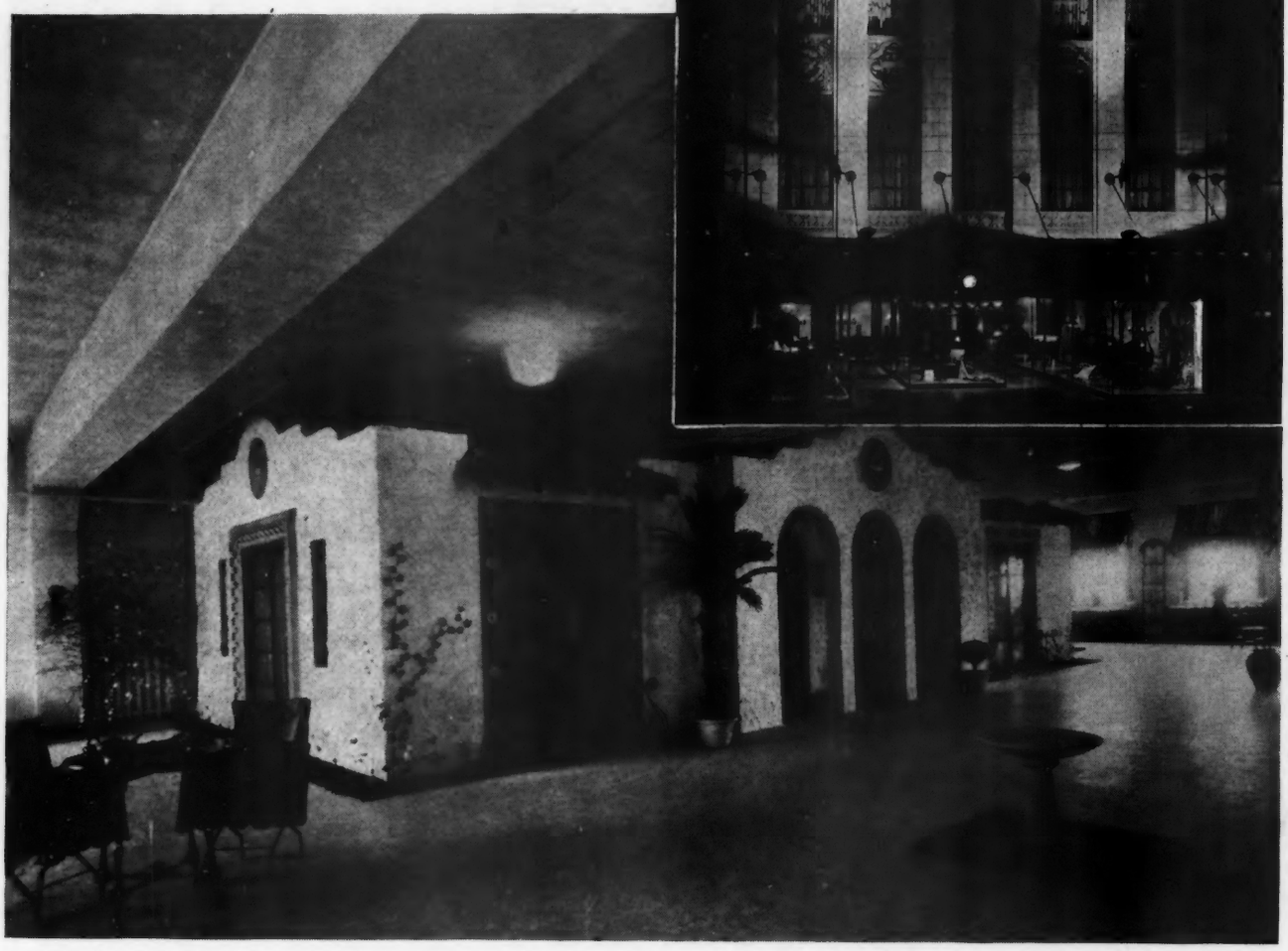
Arcaded Entrance, Spacious Display Windows and Entrance Foyer Occupy Entire Ground Floor Space

A. L. PILLSBURY, Architect

THE most striking feature of the new retail store building recently completed for G. A. Ensenberger & Sons, Bloomington, Ill., is the first floor plan with its show window space occupying a depth of 65 feet. The display windows extend along both sides of the 65-foot arcaded entrance passage and in addition two island windows have been installed in the center of the passage; each measuring 10 by 14 feet. The remainder of the first floor space is all given over to a foyer with easy steps leading to the sales floors on the floor above and in the basement.

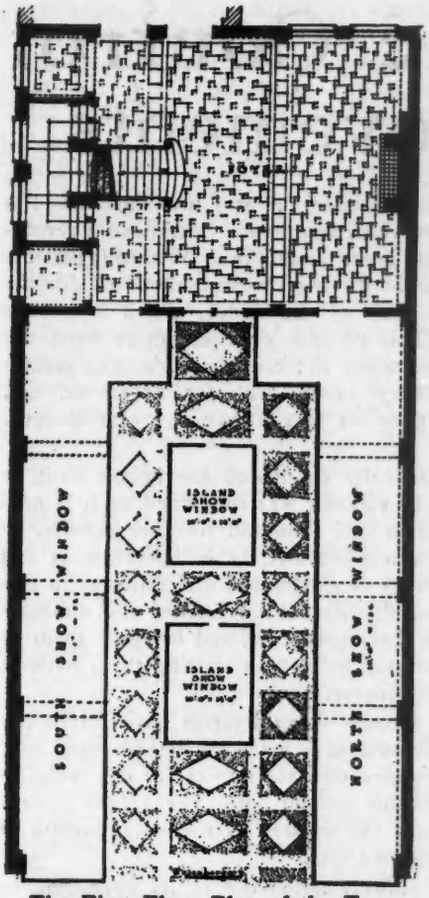
This foyer forms a handsome reception room in which the salesmen may meet their customers and take them directly, by stairs or elevator, to the display rooms. The floor is of black and white marble and at one end is a large fireplace in travertine, opposite the fireplace the stairway. The style of this foyer is old English and the walls are treated with a rough textured plaster with a glazed, old ivory finish. The ceiling is beautifully beamed with ornamental plaster and with coffered sections between the beams. The furnishing is entirely in harmony with

Right—At Night the Illumination on the Glazed Terra Cotta Front of the Ensenberger Store Turns Its Ivory and Polychrome Finish Into an Effect of Remarkable Beauty.



On the Seventh Floor of This Interesting Furniture Store There Has Been Built a Complete, Six-Room Spanish Bungalow in Which Furnishings Are Displayed Just as They Would Be in an Actual Dwelling While the Balance of the Space Has Been Turned Into the Semblance of a Garden for the Display of Garden Furniture and Accessories.

A Modern Store Design



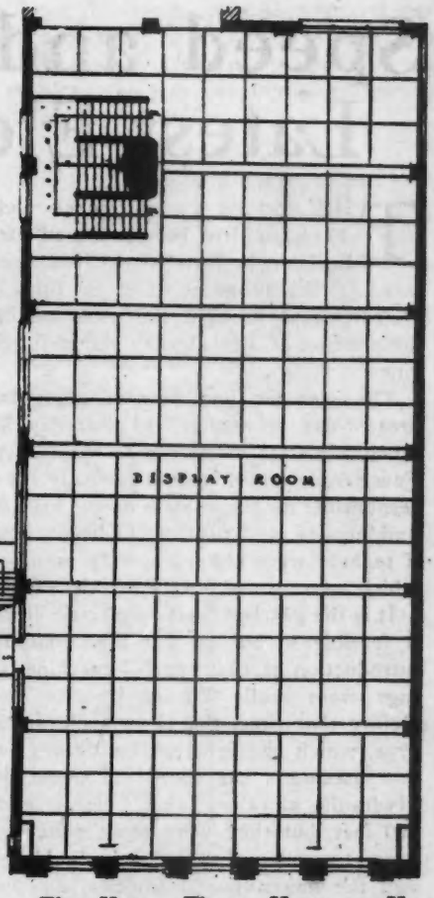
The First Floor Plan of the Ensenberger Store Is Probably Its Most Striking Feature, with the Entire Space Devoted to Display Windows and Foyer.

the tone of a reception room rather than being a display of the goods which this store sells.

This new store building is approximately 46 feet wide by 100 feet deep and connects at the rear with an older portion which faces on the next street, giving a building a block in depth and with frontage on two streets. The new section is seven stories high and the entire space is devoted to the furniture business of the owners. The building is of steel frame construction with girders approximately 16 feet on centers at each floor line spanning the width of the building, so that an unbroken floor space, without the obstruction of columns, is available. The construction is such that an additional story may be added if desired.

The walls throughout this store are treated in rough, sand finish plaster, glazed in tones of old ivory. All floors are terrazzo, divided into square with brass strips. On the seventh floor there is a complete bungalow with rooms for the display of furniture arranged as it would be in a private dwelling. The remainder of this floor is treated as a garden in connection with the bungalow and gives an excellent opportunity for the display of garden furniture and accessories.

The front of the building is of glazed terra cotta. The architectural scheme is that of a long series of vertical piers.



The Upper Floors Have an Unbroken Floor Space Which Is Finished in Terrazzo, Marked in Squares by Brass Strips, Making an Ideal Display Space.

The Arcaded Entrance of the Ensenberger Store Is 65 Feet Deep and, with Display Windows at Both Sides and Two Island Windows in the Center, It Has Already Proved to Be the Delight of Shoppers and an Effective Means of Advertising and Drawing the Furniture Trade of Bloomington.

Speed and Automatic Control Latest Elevator Improvements

THE startling announcement made a few weeks ago that plans had been prepared for a 110-story Larkin Building in New York City, and also the announcement of the proposed 85-story Book Tower Building in Detroit, have brought the attention of the public to the importance of the elevator in changing sky-lines of our cities.

The elevator has become recognized as one of the present-day refinements in everyday life, and is taken as much a matter of course as the subways and street cars. Few people realize that it is really the elevators which are responsible for the success of our high buildings. Certainly, buildings of even the present height could not be successful if tenants were obliged to rely upon elevators of the type which were in use only a few decades ago.

It is the gearless traction electric elevator which has made it feasible to put up our high buildings, as prior to the introduction of that type of machine, the heights of buildings were really limited by the elevator requirements. Before that time, the electric elevators were of the drum type, which had inherent limitations as to height of travel and maximum car speeds of about 400 feet per minute. Hydraulic elevators were able to give car speeds up to 600 feet, but they were more difficult to control, required a great amount of space in the building for pumping plants, and the mechanical difficulties also limited the height of travel of that particular type of elevator.

Photo Copyright Otis Elevator Co.

View Shows Push Button Operating Panel in One of the Fast Passenger Elevators of the Standard Oil Company Building, New York City. The operator pushes the buttons for the various floors as the passengers enter the car.

When the gearless traction elevator was introduced a little over twenty-five years ago, it was considered a revolutionary departure with great possibilities. With this particular type of machine, the driving sheave is mounted directly upon the armature shaft of the motor, which is a very slow speed type. This permits of direct drive from the elevator machine to the car and counterweight, and greatly increases the efficiency of the elevator apparatus, and permits of much higher car speeds than had ever theretofore been attained.

This machine practically eliminated the height limit of buildings as far as the elevator was concerned, as it is now feasible to run cars at one thousand feet per minute, or more, there being a number already in operation at 800 foot speed. The matter of mechanical difficulties as to rise having been eliminated, there still remained the difficulty of controlling the higher speed cars, and bringing them to an easy and gradual stop as well as starting them without discomfort to the passengers.

Here, again, the elevator manufacturers have solved the problem satisfactorily and have made good their claim that they are prepared to give elevator service for any building height which is feasible to put up. The signal control elevator is apparently the answer to the requirements of buildings of the projected type.

This elevator is entirely automatic in its operation, to such an extent that it is known as the "almost human" elevator. The difficulty of making accurate stops at the floors with such speeds has been solved by the micro-drive operation, which automatically brings the car exactly level with the landing, and maintains that level. This eliminates the false stops often made by even the best of operators, and saves valuable time which has been wasted by inching at the floors; and also reduces current consumption and wear and tear on the apparatus. The unit multi-voltage control not only provides the smoothest possible acceleration and retardation, but also makes it possible to use the high speed direct current elevators on alternating current source of supply.

Having disposed of the problem of accurate landings at high speeds, as well as smooth and easy running and stopping, the elevator manufacturers then turned to the question of entirely automatic operation. With this signal control elevator, the operator becomes simply an attendant in the car, whose duty it is merely to press buttons to indicate the floors at which the car is to stop, and to release the doors after the passengers have left the car. As the passengers enter the signal control car at the main floor, they announce the floors to which they wish to go. The attendant presses the corresponding button in the panel in the car, and when the signal to start the car is given, the attendant merely releases the doors, which close automatically. The car immediately starts automatically, without any further action on the part of the operator, and runs to the first floor for which a button has been pressed. There it stops automatically, and is leveled exactly at the floor while the doors are opening automatically. After the passenger leaves the car, the attendant releases the doors, and the same cycle of operation is repeated at each floor at which a passenger wishes to leave the car.

Double buttons are provided in the hallways of each floor, of similar type to those now in use for signaling the

operators of the older style of elevators. These buttons, however, when pressed in the desired direction by an intending passenger, do not signal the operator, but actually set the controlling apparatus to the first car traveling in the desired direction, so that it will automatically stop at that floor.

If the first car, however, is fully loaded, the signal will be automatically transferred to the next car traveling in the same direction. This eliminates one of the great complaints of elevator travel when careless operators neglect their signals and run by the waiting passengers.

A dispatcher system is usually provided, which shows the location of each car at all times, and also indicates the signals made by waiting passengers, together with considerable other information of value to the dispatcher. In this way cars which may run behind their schedule can be signaled to by-pass certain calls in order to catch up, and other cars can be slowed down, if necessary. This makes a very complete system, providing the greatest possible service to the tenants of the building.

Power operated doors are usually considered a very essential feature of the signal control installation, in order that every possible second may be saved in the operation of the doors, which can be opened and closed much more quickly by power than by manual operation.

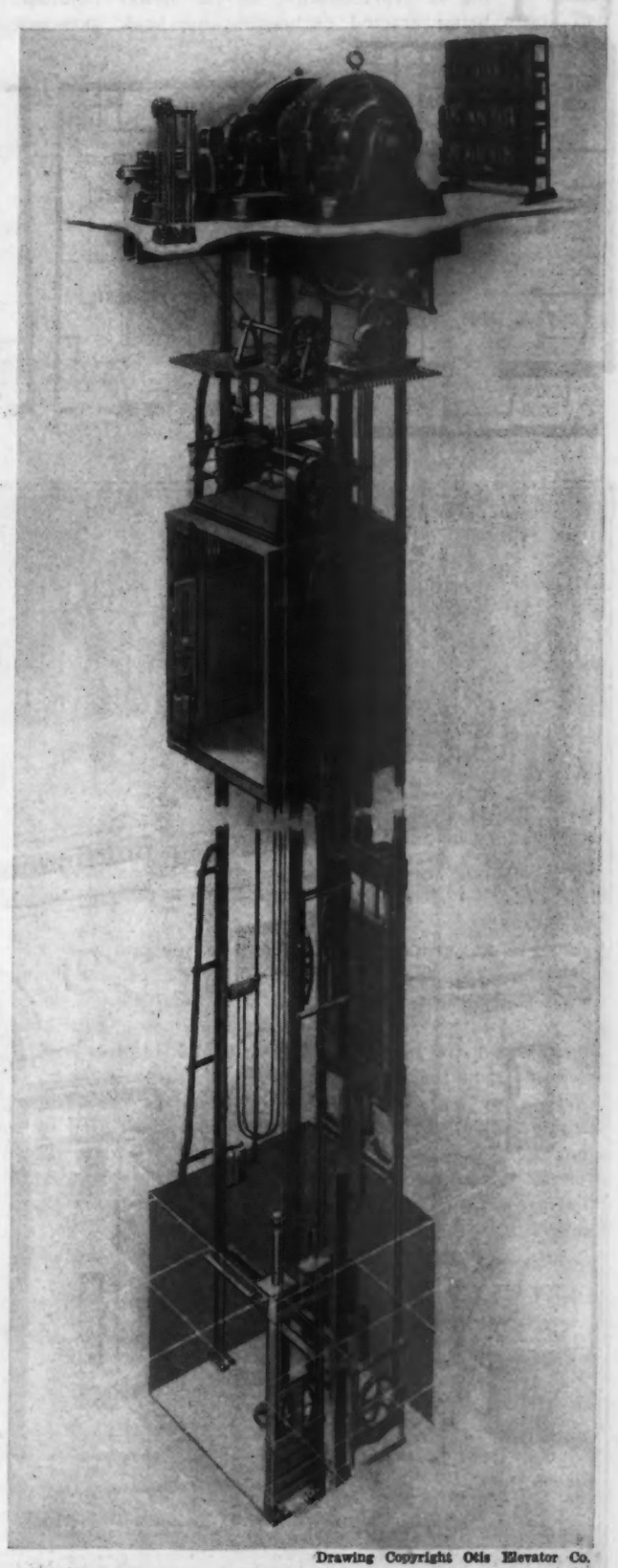
While signal control elevators are primarily designed for the highest class of office buildings, yet they have been found practicable for large hotels, such as the installation in the Palmer House, Chicago.

The immediate success of the signal control type of elevator naturally turned the attention of the same elevator manufacturer to conditions in other types of buildings where it was felt that variations of the signal control might provide greatly improved service.

One of the adaptations of automatic operation is the department store control, perfected by one elevator manufacturer, in which it is usually customary for the elevator to stop at each floor, in both directions. This form of operation works out about the same as though the operator, before leaving the ground floor, had pressed every button in the panel. In other words, after the doors are released, they close automatically and the elevator proceeds up the hatchway, stopping automatically at each floor in turn. However, variations of this control are possible, so that if desired, the operator, by moving a small lever, may run past one or more floors, and may even make a complete trip in one direction without stopping at any floor, as is the case in some department stores where traffic is handled all "up" on some elevators and all "down" on others.

A further development is the automatic collective control elevator, which will eventually supersede the present type of small push button elevator, with which no operator is required. This type has heretofore been confined to private residences and small office buildings and apartment houses of a few stories in height, where a saving in expense of an operator was a large item in the operating cost of the building. In buildings of this type they were also feasible because their inherent condition of serving only one floor at a time and operating at slow speeds were suitable for such types of buildings. With the collective automatic control, there are combined micro-drive and unit multi-voltage control. The micro-drive, therefore, permits of much higher speeds than were possible before. Exactly level stopping of the micro-drive will now permit of almost any desired speed, and with the unit multi-voltage will give the necessary smoothness of starting and stopping.

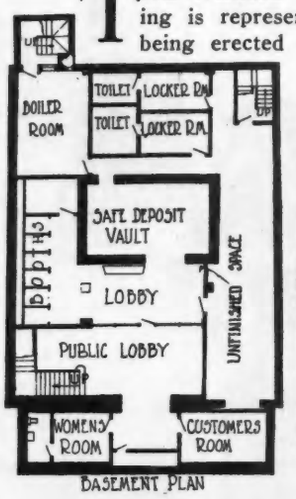
This type of control will now make it feasible to use automatic elevators and save the cost of operators in even the largest type apartment houses, and will greatly broaden the field for that form of operation, thereby saving considerable operating expense in buildings where they are installed. They also permit of the use of the direct current machines through the multi-voltage control, which is particularly desirable in apartment houses, very often located in districts where alternating current only is available, and which heretofore required the use of alternating current elevator motors, with consequent noise.



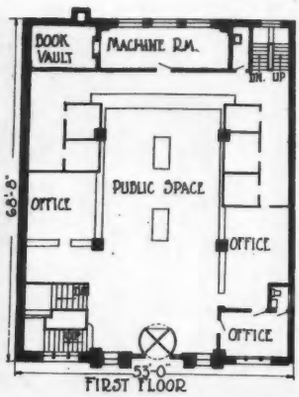
Gearless Traction Elevator and Drive, as Shown in This Drawing Makes Possible Speeds of 1,000 Feet Per Minute to Almost Unlimited Heights. With such high speeds, automatically controlled stops are necessary. In making one round trip, the through passenger elevators in the proposed new Larkin Building, New York, will travel about half a mile.

Attractive Bank Design

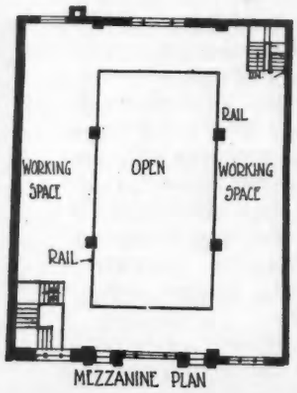
THE Wheaton Trust and Savings Bank Building is representative of the newer buildings being erected exclusively for bank purposes. The lot being shallow, it became necessary to place the safety deposit department in the basement and introduce a mezzanine, to provide for trust department expansion.



BASEMENT PLAN



FIRST FLOOR



MEZZANINE PLAN

These factors have influenced the design of the facade, which was developed in Italian Renaissance, and executed in Indiana limestone with Minnesota granite base.

Foundations and first floor construction are reinforced concrete. Pressed steel joists were used on the mezzanine floor, and gypsum tile laid in tee irons for the roof. Plastering is all on metal lath or masonry surfaces.

The main banking room is handsomely finished, with marble wainscot, ornamental plaster work and terrazzo floor.

Architect's Perspective Drawing of the Wheaton Trust and Savings Bank Building Now Nearing Completion in Wheaton, Ill. This is an excellent example of bank architecture of the type required in hundreds of small cities throughout the country. It presents a fine appearance, of good architectural lines, is of fireproof construction and equipped with the latest banking equipment. Robert H. Salisbury, Architect.

This Church Has Been Accepted as a Model on the Coast

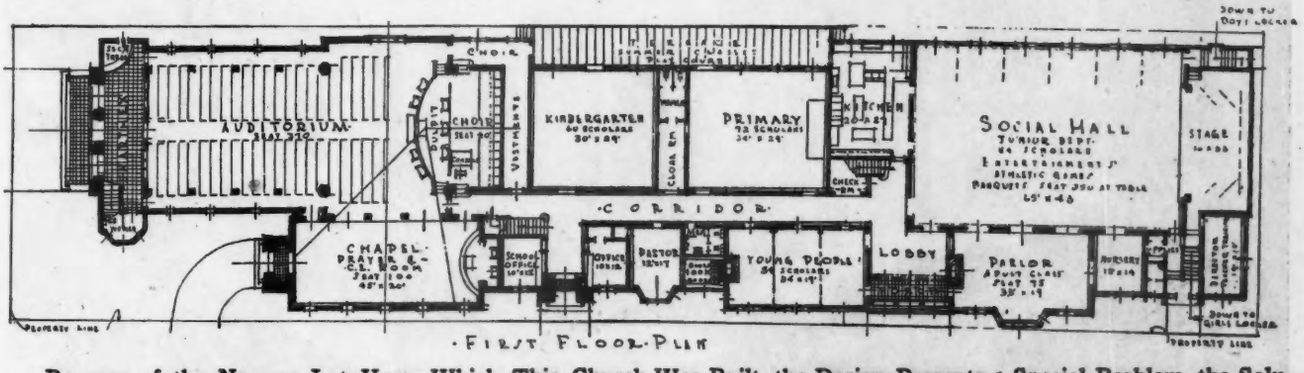
STARKS AND FLANDERS, Architects

The Presbyterian Church of Fremont, Cal., Is an Interesting Building Especially in the Manner in Which it Varies from the Stereotyped Style of Small Churches and at the Same Time Maintains the Essentials and Spirit of Good Church Architecture.

CHURCH building committees have displayed much interest in and paid many visits to the new home of the Fremont Presbyterian Church, of Fremont, Cal., since its completion, as it has achieved a considerable reputation as a fine piece of church architecture. It is the work of Starks & Flanders, architects, of Sacramento, Cal., and has been described as an example of the beautiful effect that is possible when a designer with a sense of harmony is allowed his own way with the co-operation of painters, plasterers, artists and interior furnishers.

The lot upon which this church was built is long and narrow, a situation not infrequently encountered in the planning of city churches, and the manner in which the plan was adapted to this lot is instantly clear from a glance at the floor plan shown at the bottom of the page.

The equipment of this church is very complete and indicates the new conception of what is required of the modern church building. In addition the main auditorium, which occupies the front portion of the building, there are kindergarten and primary rooms, a kitchen and a large social hall, ranged one behind the other. On the opposite side of a long corridor we find a chapel, school office, main office, pastor's study, young people's room, parlor, nursery, supply room and a room for the directors and for teachers' training. The large social hall is provided with a stage and is adapted to use for all kinds of entertainments.



Because of the Narrow Lot Upon Which This Church Was Built, the Design Presents a Special Problem, the Solution of Which May Prove Very Suggestive to Those Who Are Confronted with This Not Uncommon Problem of a Long Narrow Lot.

An Impressive Achievement in Theater Architecture

St. Louis Theater is a Notable Development from the Historic Theaters of France

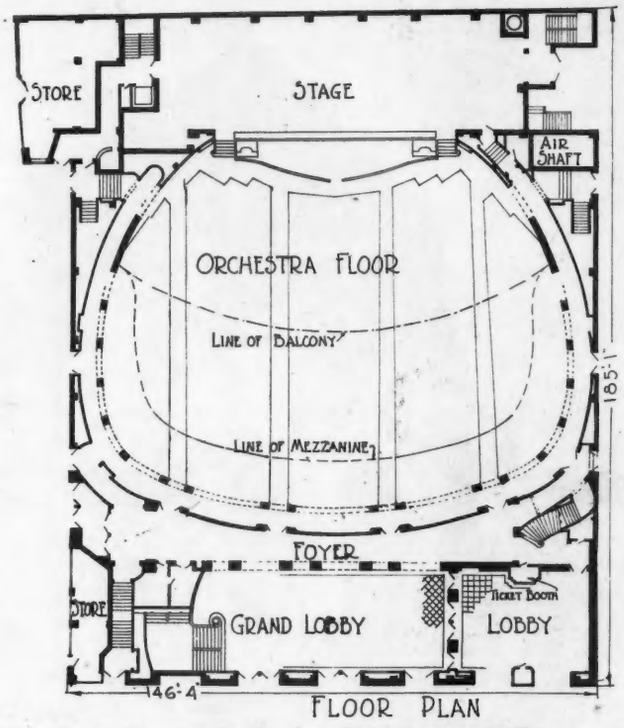
C. W. and G. L. RAPP, Architects

NOTABLE among the many magnificent theater buildings which have made their appearance during the past few years is the St. Louis Theater, recently built in St. Louis, Missouri, from the plans by C. W. and G. L. Rapp, Chicago architects. This theater is not only the third largest of its kind but is a strikingly graceful development from the historic theaters of France, the Grand Opera House of Paris, the Theater of Versailles and the Theater of Bordeaux.

The spacious entrance lobby presents a truly impressive picture. It is done in the style of the French Renaissance and is 30 feet wide, 75 feet long and 48 feet high. From this lobby the patrons pass into a main auditorium containing seats for 4,100 persons. Like all the equipment of the theater, these seats are both beautiful and luxurious, being three panel, cushioned arm chairs.

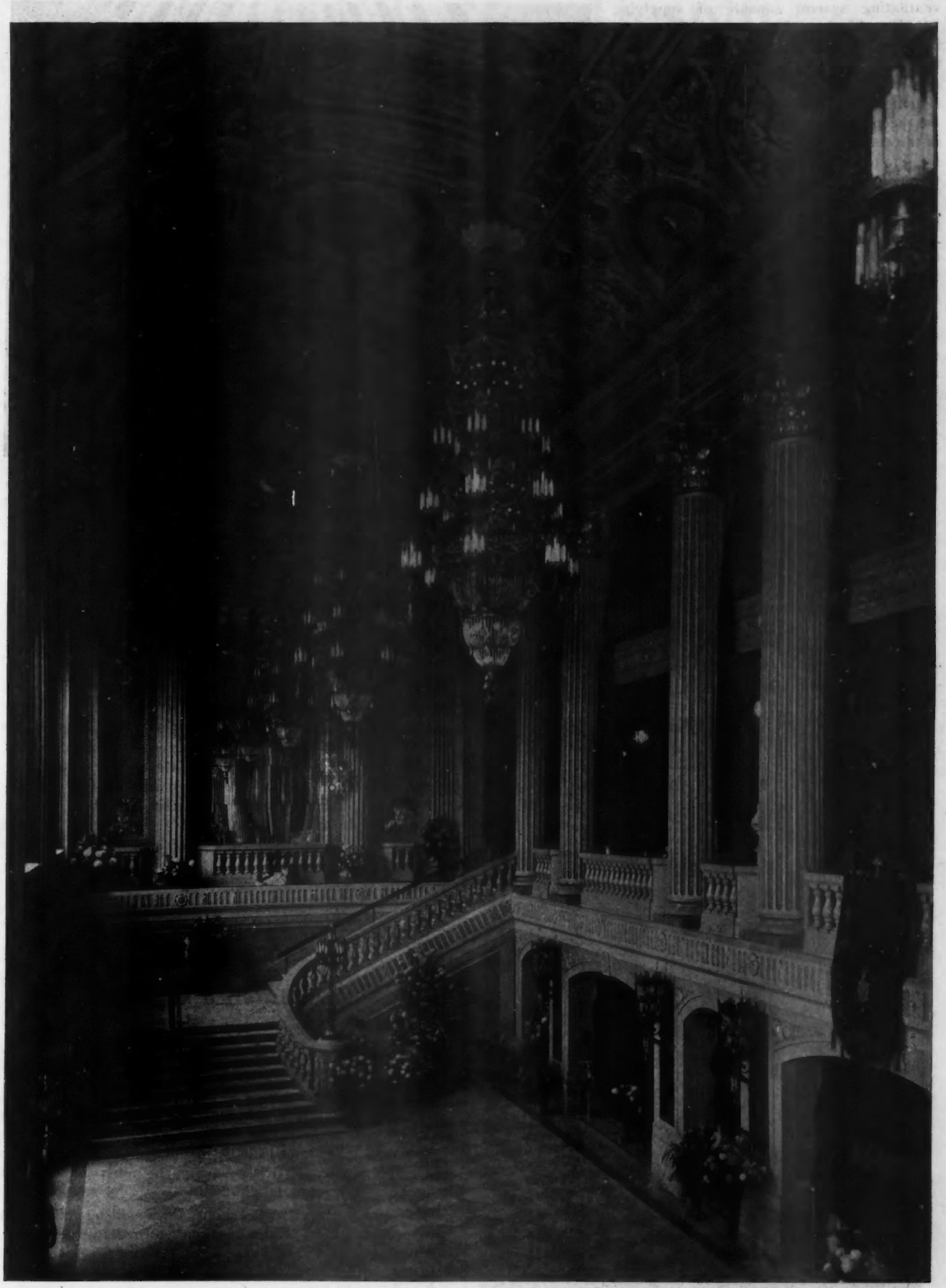
The lighting arrangements are of particular interest and contribute greatly to the artistic effects which are possible in this really palatial entertainment hall. In all, 11,000 lights have been used in the building. Of these 4,000 are indirect, cove lights built into the auditorium. All of the lights on the stage and in the body of the auditorium are arranged for three color lighting, controlled through dimmers, making it possible to obtain any desired color shading or degree of lighting.

The second largest refrigerating system in the country has been provided for keeping the theater at a comfortable temperature at all seasons. This system has a capacity of 325 tons of refrigeration per day. It is supplemented by a



This Great Theater Auditorium Will Seat 4,100 Persons at One Time and Is Lighted by 4,000 Cove Lights.

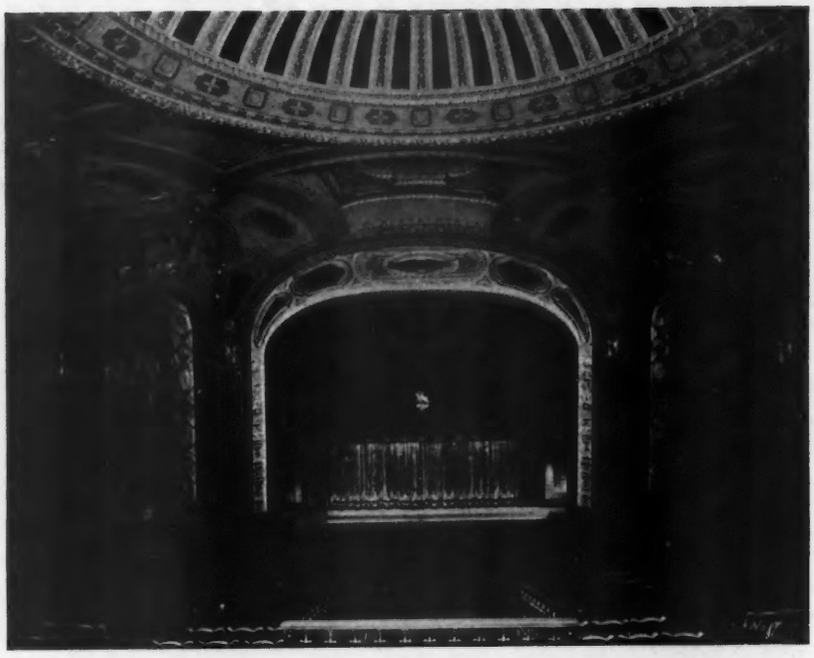
The New St. Louis Theater Is a Beautiful Addition to the Architecture of the City. It is the third largest of its kind.



The Spacious Lobby of the St. Louis Theater Is Done in the Style of the French Renaissance in a Dignified and Impressive Manner. It carries the atmosphere of rich luxuriousness which is found throughout this building.

ventilating system capable of supplying 129,000 cubic feet of air per minute, assuring an adequate supply of pure, fresh air for a full capacity audience. Though the construction is all of the approved fire resistant type, further protection against fire has been provided by means of sprinklers in the stage section and dressing rooms and by stand pipes and hose connections throughout the auditorium.

The building itself is of structural steel, reinforced concrete and light, Brazil brick. All column footings rest on a solid rock foundation. The framework is made up from 1,300 tons of steel, the floors are of reinforced concrete and the roof is of precast, reinforced, concrete slabs. The balcony is supported by three trusses, two diagonals of steel weighing 42 tons each and a main truss of 96 tons, the largest steel ever placed in a building in St. Louis. The Koplar Company, of St. Louis, was the contracting company. JOHN R. WEST.



This View of the Stage of the New St. Louis Theater, as Seen from the Balcony, Gives an Excellent Idea of the Skillful Planning Which Has Made Even the Fartherest Balcony Seats Highly Desirable.

Gypsum and Wood Prove Fire Resisting

(*Continued from page 177*)

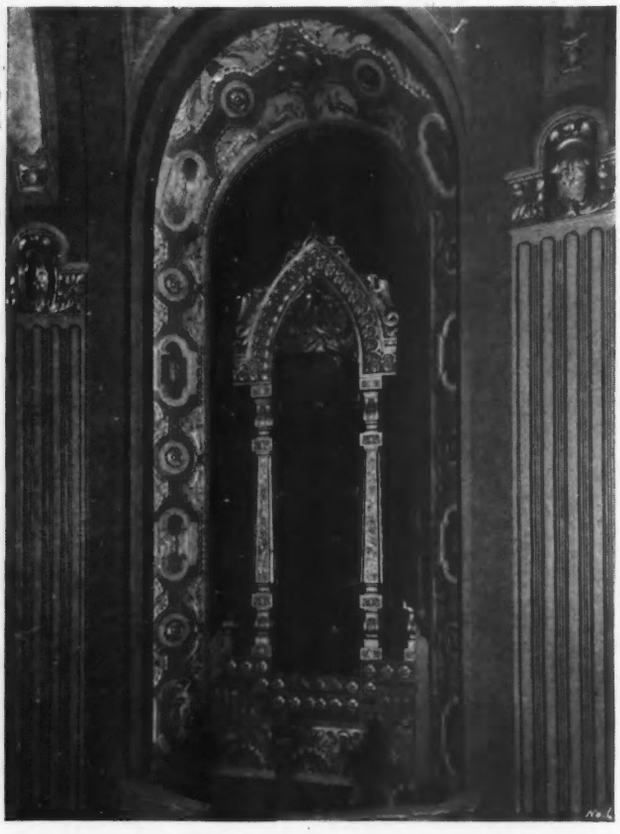
expanded gypsum insulation, Insulex by name, was poured between studs and upper ceiling joists to their full thickness, making the house a veritable hollow gypsum box, with only the narrow edges of the 2 by 4s exposed.

The builder, to achieve the decorative effect he desired, had a fibre insulation wallboard laid over the Insulexed walls and covered with a plastic paint.

When the fire broke out inside the house, this wallboard was burned completely off the walls, but the flames stopped when they reached the gypsum insulation. After the fire was put out the house looked almost as it had appeared before the wallboard had been put on the walls—the wall studding and upper ceiling joists were still in good conditions, and between them the gypsum insulation was still in place, just as it had been installed. The partitions were consumed and the floors burned. The roof rafters were not touched by the fire.

In only one place had the fire broken through to the outside, and that was in one corner where workmen had carelessly failed to fill up between the studding with the gypsum insulation. Here the flames ate through, proving that it was due only to the insulation that they had not broken through at other spots.

The company manufacturing the insulation had claimed for it that it would make a wood house fire resisting, but the claims had been based only on tests made in the laboratory. The accidental fire in Highland Park served as a practical and unexpected confirmation of the results of the laboratory tests.



A Grill at Either Side of the Stage Hides the Pipes of the Great Organ Which Entertains the Patrons of the St. Louis Theater.

End Matched Lumber

(*Continued from page 173*)

to demand these items from the retailer so often that he finally orders.

In presenting these discussions of end-matched items, I am trying to show the architect, the contractor and the house-builder where money can be saved and a better piece of construction obtained in the use of wood. If the reader desires to accomplish these savings he must demand the items from the retail lumberman.

Here and there, at least I hope, there will be retail lumbermen who will see the opportunity to make more money, carry a smaller stock, have a quicker turn-over, and sell actually more lumber by laying in stocks of end-matched yellow pine.

NOTE—*A third article by Mr. Carter on this very important subject of end matching and short length lumber will be presented in an early issue of* AMERICAN BUILDER.—EDITOR.

Filling Station Design

PART 1—The Four Types of Filling Stations Suited to the Four Classes of Trade, Namely: *One,* in the Business District; *Two,* in the Residential District on Arterial Highway; *Three,* the Neighborhood Station in a Residential District; and *Four,* the Small Town Station Serving the Touring Public

A series of four articles prepared by a member of the American Institute of Architects for S. F. Bowser & Co., pioneer manufacturers of gasoline pumps and other filling station equipment.—Editor.

WHEN a motorist thinks of a filling station he naturally thinks first of the station where he buys most of his gasoline and oil. Then he pictures to himself some particular station he once saw in the course of his motoring about the country that left a pleasing and lasting impression with him. When he trys to figure out the reason for this impression it gradually opens up before him like the unfolding of a panorama. In the first place, its location on a busy thoroughfare; its wide, long sweeping drive up to the beautifully appointed and proportioned building where the sturdy, business-like pumps awaited his pleasure; the air and water tower and the drain pit in just the right places; the well-kept lawn, with flowers and shrubs and hedges artistically placed about the grounds; all these things blending together harmoniously stamped themselves indelibly on his mind. Did he stop for gasoline? He did if he was able to cram another gallon into his tank!

It is the combination of all these essentials that we have in mind when we speak of the "design" of filling stations. It is the whole thing as a unit; the ground itself; the drives and the building; the pumps, drain pits and greasing rack; all the things necessary to make the station complete; and it is the arrangement of all these in their proper places, as well as the architectural treatment of the buildings that goes to make the design of the station good or bad.

The design of the station is then one of the first things to be considered after the location has been decided upon. The arrangement of the drives with respect to the accessibility from the streets, the relation of the drives to the building proper, and the location of the drain pits, air and water service with respect to maximum service with the minimum space and time for service; all of these, being arranged harmoniously and intelligently, with good design of buildings, will be a decided asset to the station itself, as well as to the neighborhood in which it is located.

Filling stations were at first simply bases for the distribution of gasoline and oil to the motoring public and such a place needed only a small building for the shelter of the attendant and the storing of three or four drums of oil and generally had only one pump for the dispensing of gasoline.

However, competition entered into the scheme of things, along with the increase in the number of automobiles and the increased demand for gasoline and oil, and soon the filling station had begun to unfold and blossom out until now some of them have developed into regular department stores for the automobile, where one may have his car washed, polished, greased, oiled, supplied with gasoline, tires changed and repaired, battery looked after, in addition to supplying accessories or parts that may be needed or desired, all this being done literally "while you wait."

And, so that the waiting will not be tedious, rest rooms supplied with magazines, newspapers, road maps and road bulletins, and wash rooms and toilet rooms for both men and women are provided. All work is done with the idea of the best service possible for a minimum charge and all gasoline and oils are dispensed by the highest types of accurate self-measuring pumps.

This advance of the filling station has not occurred all at once, but, nevertheless, it has been quite rapid, and the present requirements of the motoring public have made it advisable, for the sake of discussion, to classify them into four general groups, viz.:

First, filling stations in the business district; second, filling stations in residential sections on arterial highways; third, filling stations in residential sections whose business is dependent upon the people in that district and upon whatever transient business might come that way; and fourth, filling stations in small towns that handle the local trade but in reality cater to the touring public.

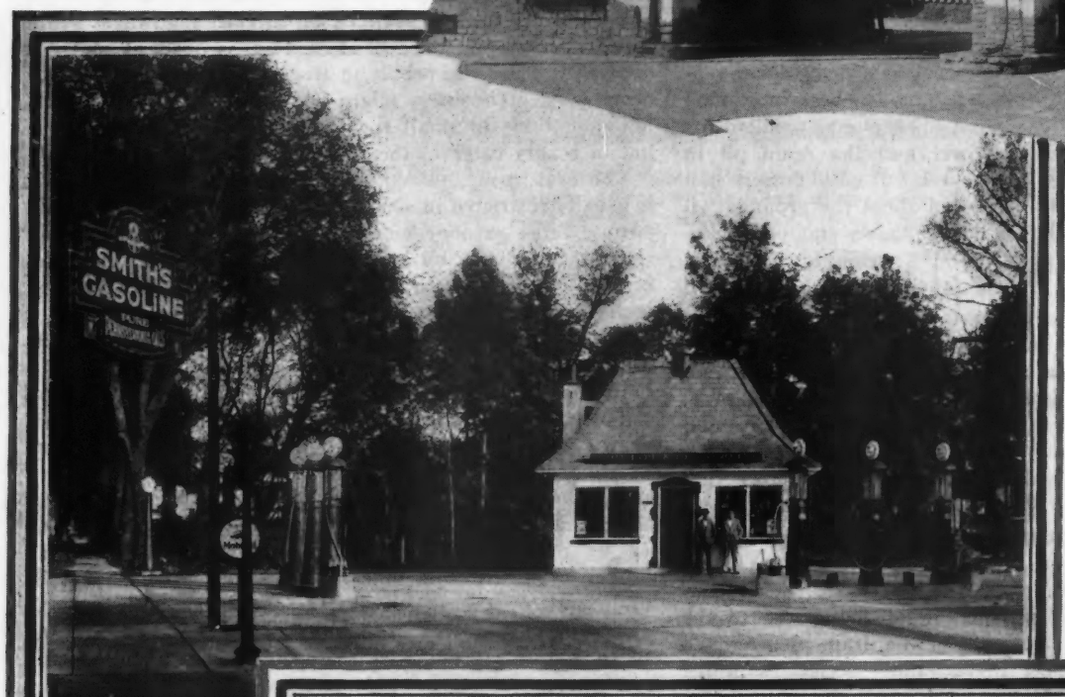
The first group, that of stations in the business district, is usually restricted in size and may have one or two drives, two or three gasoline pumps, a small building for housing the oil and providing shelter for the attendant, and may or may not have drain pits. Usually only a small building is needed with just space enough for three or four oil outfits, air tank and compressor, heater and desk space for the attendant.

In the second group, that of filling stations in residential districts on arterial highways, most of the trade is drawn from transients, although a good portion is also drawn from the neighborhood. But, as it is the transient trade that is sought, the station should handle two or three grades of gasoline, several grades and brands of oil (if an oil company station it should have on hand all grades of its own oil and gasoline) and there should be drain pits or greasing racks, air and water service and ample parking space. The building itself should have an office and sales room, with a men's toilet room opening from it, and a rest room for women with a separate toilet room. The entrance to the sales room should be from the drives, while the entrance to the women's rest room should be at one side of the building and be screened from the public view by a vine-covered lattice, or high shrubbery. The atmosphere of the station should be inviting and the arrangement and character of the whole place should be such as to appeal to the approaching motorist. And the site should be of sufficient size and so located that it may be seen by the approaching motorist from a distance. He should have plenty of time in which to decide to drive in.

The requirements of the third group, that of stations located in residential districts, are somewhat the same as those of the second group, except that the building does not need to be quite so complete. The drives should be easy of approach, and wide and straight enough to inspire confidence in the timid driver, as many women in the neighborhood will use such a station. Greasing racks and drain pits are quite essential since the convenience of such a station to the people in the neighborhood is one of the best drawing points. The building itself need be only large enough to contain the oil outfits with plenty of room for the necessary furniture, equipment, and toilet room. It is better to have an outside entrance for the toilet room, which is primarily for the use of the attendant, as it can then be used without embarrassment by anyone patronizing the station.

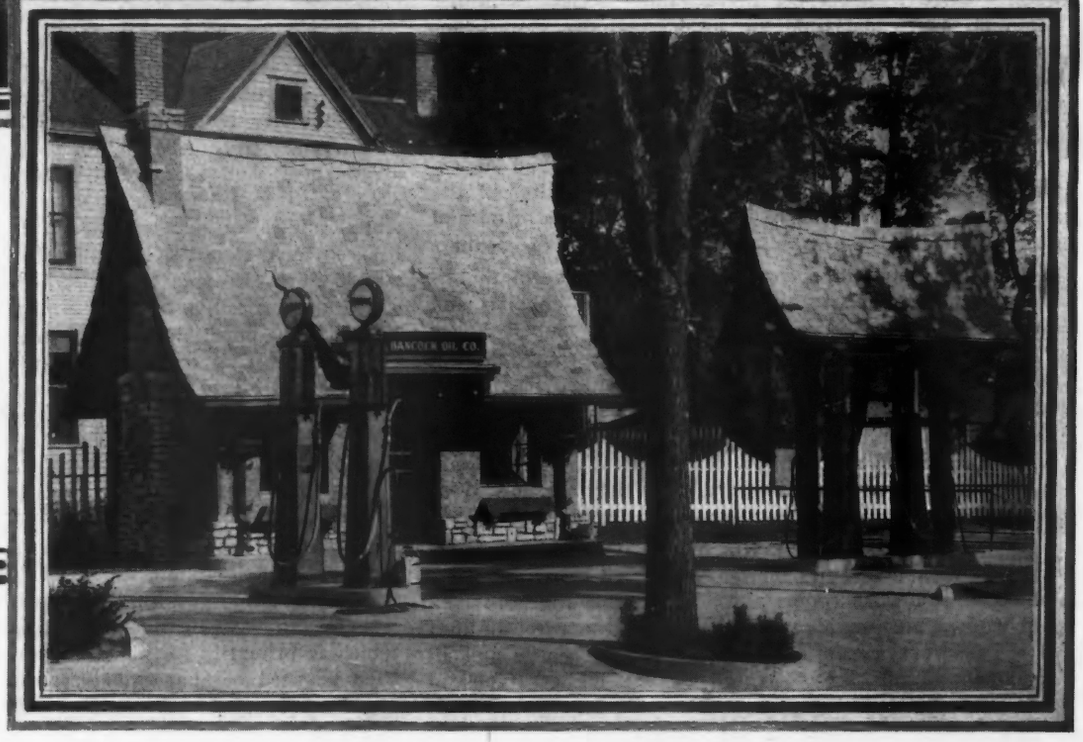
The fourth group, comprising filling stations in small towns, constitutes a more complex problem and one which requires considerable preliminary study and observation of touring conditions. The small town generally has a garage or store which is equipped with a curb pump.

The filling station in this group usually starts as a competitor of the curb pumps, and since the motorist generally prefers to patronize a concern catering to him exclusively, it gradually builds up a good business. This generally leads to the need of handling certain accessories and sometimes to the building of a service station in connection therewith. In turn, this may lead to the establishing of a freshment stand,



Above — Filling Station with Canopy Designed by J. A. Brown.

To the Left — A Rockford, Ill., Filling Station Designed by R. A. M. Anderson, Architect, Chicago.



To the Right — Very Attractive Filling Station at Minneapolis designed personally by Mr. John Hancock, President, The John Hancock Oil Co.

To Left — St. Paul, Minn., Station designed and Built by Wm. Tell, of Minneapolis.

Below — A Striking Advertisement in Windmill Style; W. L. Alban, Architect.

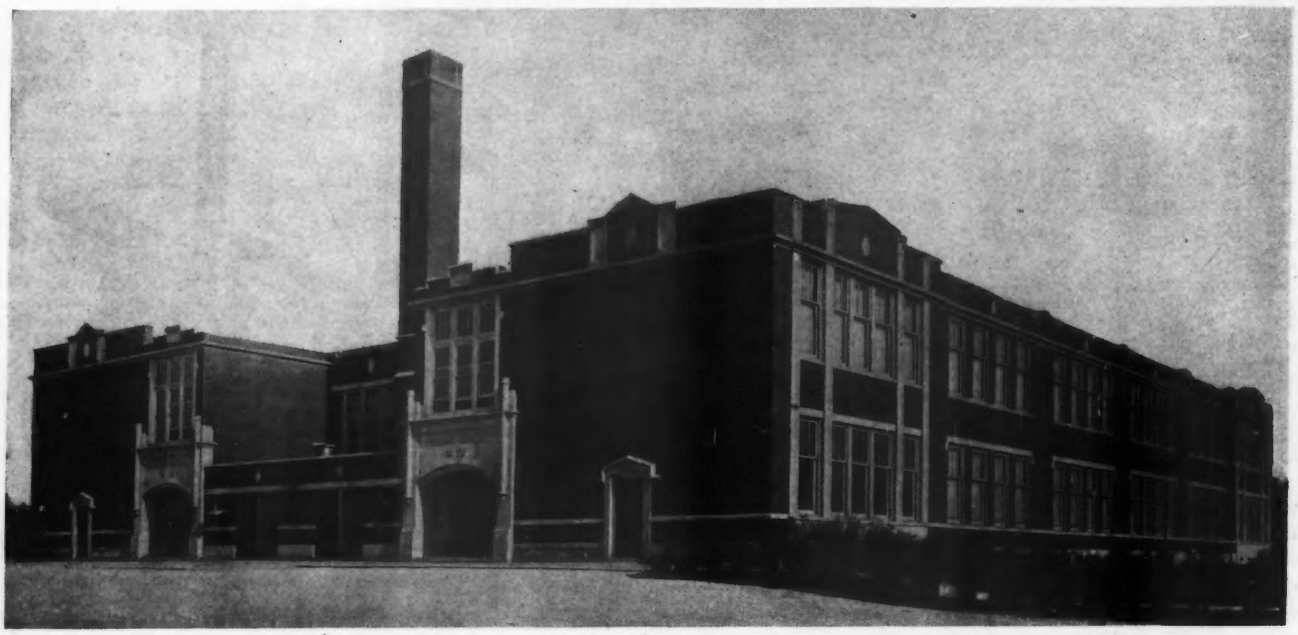
lunch room or restaurant and finally to the opening of a tourist camp. The latter is more common in the sparsely settled districts, or in small towns a few miles from a large city, and adds quite a bit to the general business of the station. Where there is a good restaurant and a reliable garage in the town it is probably better for the filling station to omit these features and to recommend the regular established places to customers.

In this group the building should be similar to the building in group two; sales room and office, men's toilet and women's rest room and toilet. The grounds should be large enough to provide parking space without obstructing the drives.

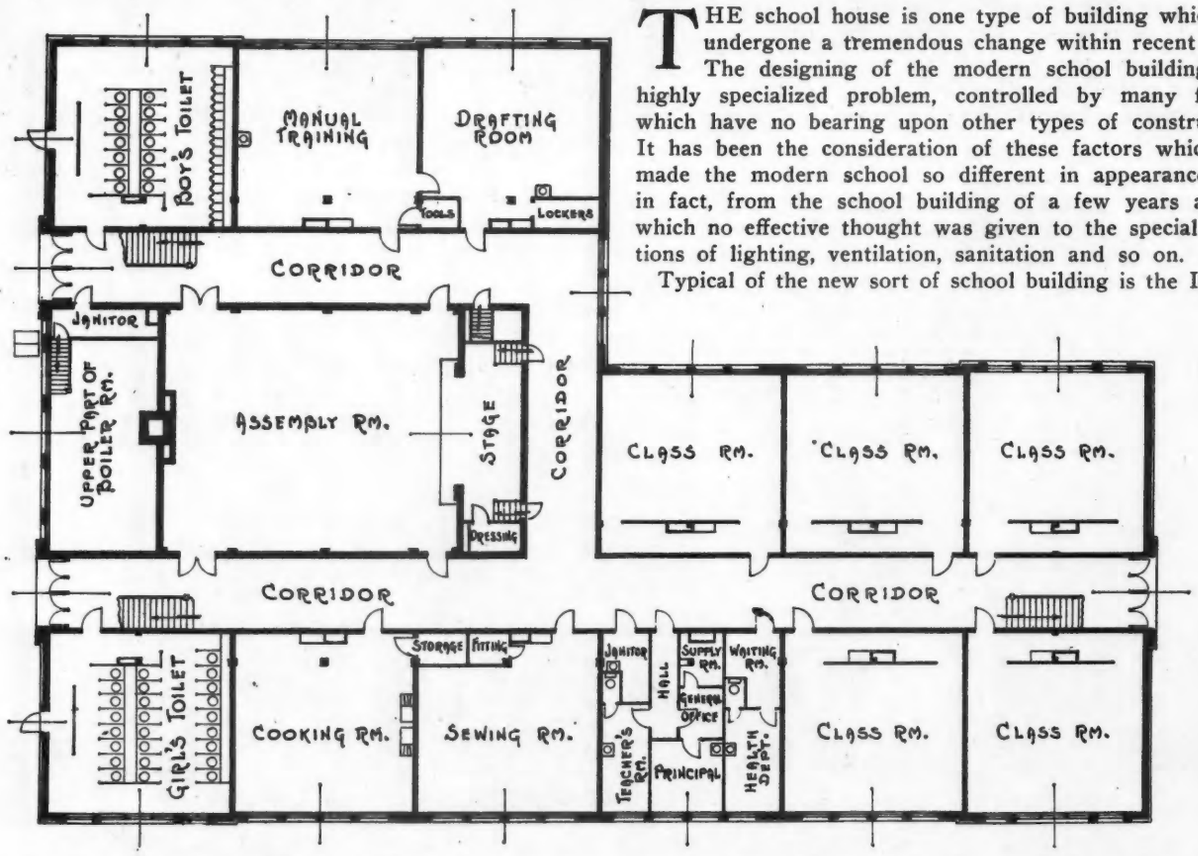
[The next article of this series will be presented in an early issue of American Builder.]

Indianapolis School No. 76 is a Typical Modern Grade School

CHARLES H. BYFIELD, Architect



A Two-Story Building Without Basement Except for Heating and Mechanical Equipment, the Latter Feature Designed to Reduce the Cost of Construction, the Largest Grade School in Indianapolis, Ind., Displays Most of the Features of School Design Which Are Today Accepted as Requisites to a Truly Modern School Building.

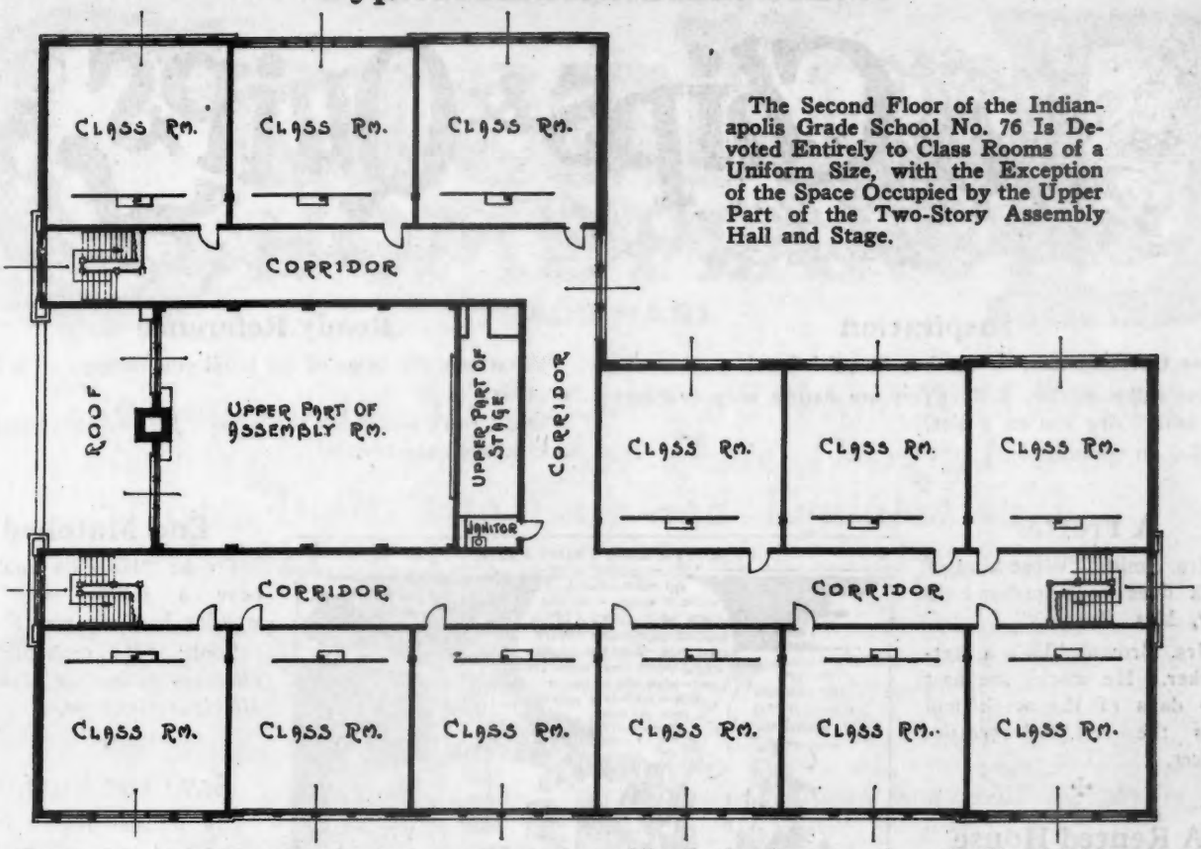


The First Floor Plan of This Building Shows an Interesting Provision for the Assembly Hall Which Makes Possible a Quick Filling or Emptying of That Room from the Corridors Which Surround It on Three Sides. This floor also contains such special departments as manual training shops and drafting room and domestic science laboratories.

THE school house is one type of building which has undergone a tremendous change within recent years. The designing of the modern school building is a highly specialized problem, controlled by many factors which have no bearing upon other types of construction. It has been the consideration of these factors which has made the modern school so different in appearance and, in fact, from the school building of a few years ago in which no effective thought was given to the special questions of lighting, ventilation, sanitation and so on.

Typical of the new sort of school building is the Indian-

Typical Modern Grade School



The Second Floor of the Indianapolis Grade School No. 76 Is Devoted Entirely to Class Rooms of a Uniform Size, with the Exception of the Space Occupied by the Upper Part of the Two-Story Assembly Hall and Stage.

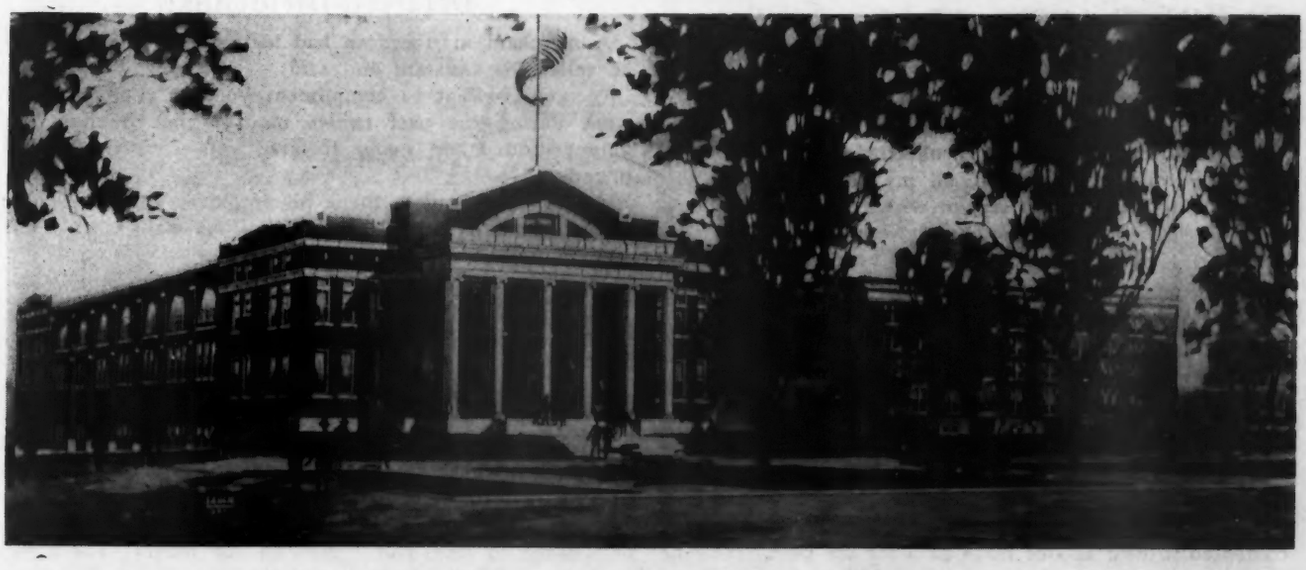
apolis, Ind., grade school No. 76, which is the largest grade school in that city. It was built at a cost of $206,557 and was designed by Charles H. Byfield, architect, of Indianapolis. The contractor was the John A. Schumacher Company, also of Indianapolis.

This is built without basement except for the heating plant and mechanical equipment, this being one of the modern developments in school construction designed to reduce the building cost. The building consists of an assembly room and 17 class rooms, as well as the manual training and domestic science departments and various offices, toilets, locker and storage space.

The exterior is finished in red face brick with Bedford stone trim. Structural steel framing was used to attain the maximum fire safety and the stairs are of steel and the floors of reinforced concrete slab construction. In the toilet and corridors these floors are finished in terrazzo while all other floors are of wood. Glazed brick wainscoting is used in the assembly room and also in the corridors and toilet rooms. Paneled metal ceilings are to be found throughout the building.

Military School Builds Gymnasium

THE new gymnasium of Kemper Military School, Boonville, Mo., which is now under construction will be by far the largest gymnasium in Missouri and one of the largest gymnasiums in the country. It will be approximately 100 feet wide by 200 feet long and two stories high. The main floor will have several offices and a spectators' gallery at one end but the rest of the space, about 100 feet by 180 feet, will be an open area for military and athletic activities. It will be possible to drill an entire battalion in the room at one time. Ample space is provided for four basketball courts.



New Gymnasium for Kemper Military School, Ludwig Abt, Moberly, Mo., Architect. Besides the main floor equipment noted above, the basement will contain a running track, shooting galleries, showers, locker rooms, handball courts, etc. The building is of steel, concrete and brick.

Inspiration

One traveling man to another in quick-lunch restaurant: "What's the matter, Bill? You are eating only crackers and milk. Are you on a diet?"

"No, on commission."

✣

A Fretter

Mrs. Smith: "What kind of work does your husband do now, Mrs. Brown?"

Mrs. Brown: "He's a fret-worker. He works the first two days of the week and frets the rest."—*Progressive Grocer.*

✣

A Rented House

I love my rented house!
I love each flower that grows
Before my rented door;
I love the polished sheen
Of my fine rented floor.

I love my rented house!
I love the low protecting sweep
Of my dear rented roof—
(I'll love it better when I know
For sure it's waterproof.)

I love my rented house!
I love to purchase rugs and draperies
For living room and hall,
Although they may not fit
My next DEAR rented house at all.

I love my rented house!
And when the "1st" comes round,
I love to have a stern collector stand
Before my door, take all my kale,
And leave a rent receipt within my hand.

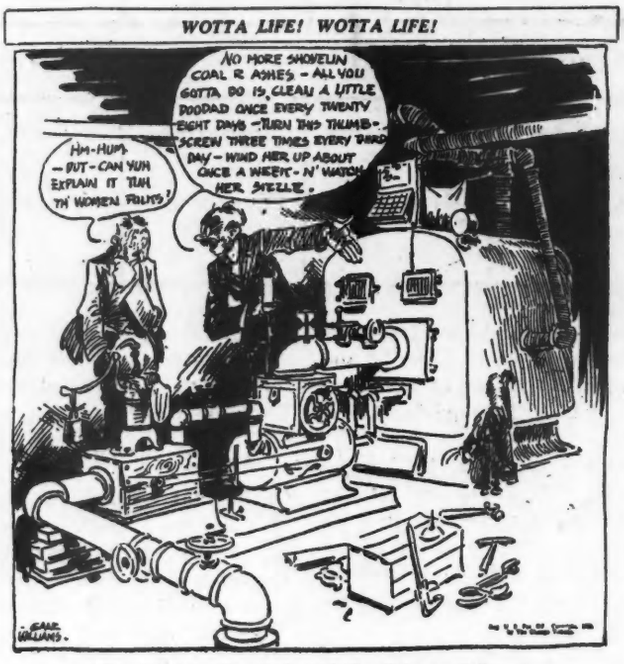
I love my rented house!
And yet—sometimes—at night—
When Tom's away, and I'm alone,
I wonder why we've never had
A HOME—to call OUR OWN.

A. M. C.

✣

How We Progress

In the old days, if anybody missed a stage coach he was contented to wait two or three days for the next. Now he lets out a squawk if he misses one section of a revolving door.



(Reprinted by Permission of the Chicago Tribune)

Ready Reference

"What was the name of the hotel you stopped at in Denver, dear?"

"Oh, I can't remember the name. Just a second and I'll look through my towels."

✣

End Matched

Frosh: "How do you suppose a fellow with two wooden legs can walk?"

Soph: "He probably just manages to lumber along."—*Michigan Gargoyle.*

✣

Save the Surface

"Is it true that statistics show that women live to be older than men?"

"They ought to. Paint's a great preservative, you know."—*Flamingo.*

✣

Qualified

Father: "I want to apprentice my boy to you."

Plumber: "Where is he?"

Father: "Well—er—he forgot his references and has gone back for them."

Plumber: "Righto—I'll take him."—*The Look Box.*

✣

Deferred Dividends?

A merchant in Aberdeen had had a very good year, so he called his assistant and said:

"Angus, I want to compliment you on your excellent work during the past twelve months and to show my appreciation I am going to give you a check for 100 pounds."

Angus was about to thank his employer when the latter added, "And if next year turns out as well as this one has, I'll sign it for you."

✣

When a man can find nothing else on earth to laugh at, there is always himself.

✣

True Love

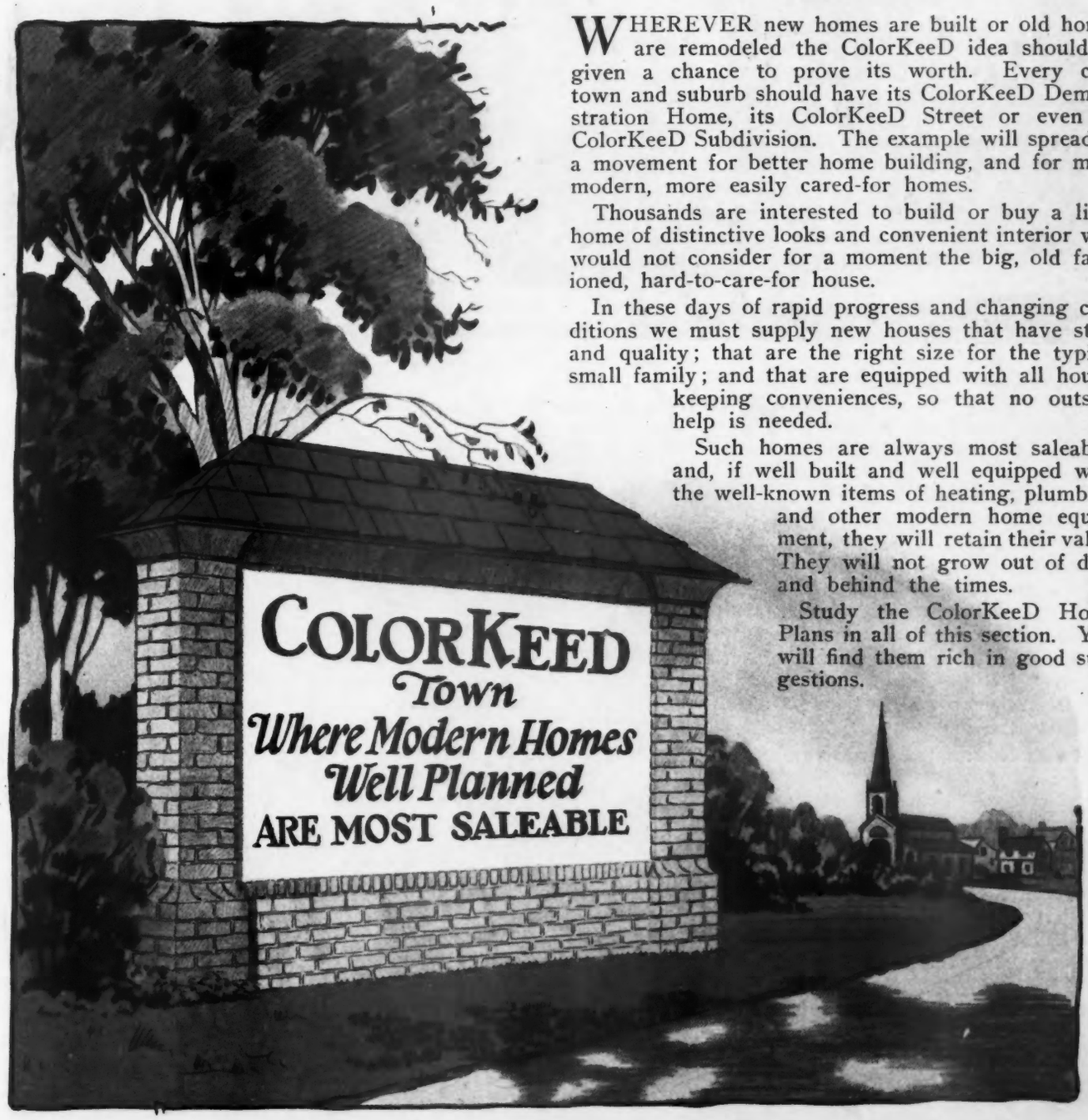
About a year after Jim Smith got married, his wife said to him one night: "Jim, you do not speak so affectionately to me as you used to when we were first married. I fear you have ceased to love me."

"Ceased to love you?" growled the man. "There you go again. Why I love you more than life itself. Now, shut up and let me read the baseball news."

COLORKEED HOME PLANS

TRADE MARK

"The Homes That Are Quickest to Sell and Will Retain Their Value Longest Are Those Designed with Taste, Built with Care and Equipped with All Modern Appliances."—William A. Radford.



WHEREVER new homes are built or old homes are remodeled the ColorKeeD idea should be given a chance to prove its worth. Every city, town and suburb should have its ColorKeeD Demonstration Home, its ColorKeeD Street or even its ColorKeeD Subdivision. The example will spread as a movement for better home building, and for more modern, more easily cared-for homes.

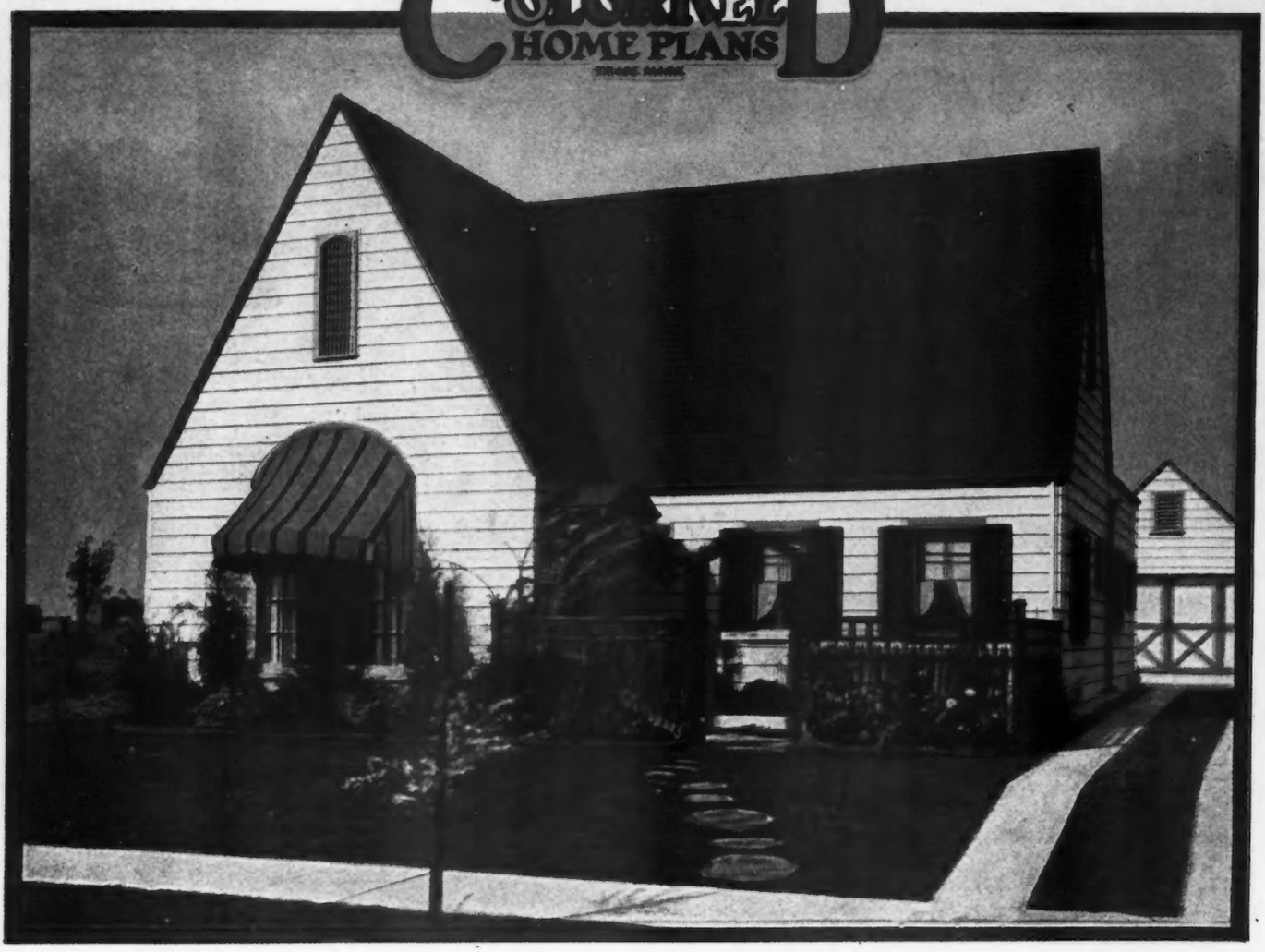
Thousands are interested to build or buy a little home of distinctive looks and convenient interior who would not consider for a moment the big, old fashioned, hard-to-care-for house.

In these days of rapid progress and changing conditions we must supply new houses that have style and quality; that are the right size for the typical small family; and that are equipped with all housekeeping conveniences, so that no outside help is needed.

Such homes are always most saleable; and, if well built and well equipped with the well-known items of heating, plumbing and other modern home equipment, they will retain their value. They will not grow out of date and behind the times.

Study the ColorKeeD Home Plans in all of this section. You will find them rich in good suggestions.

COLORKEED HOME PLANS



The FAIRBANKS

Photograph in Colors of this Delightful English Cottage Shown Above. ColorKeeD Plans on the Opposite Page.

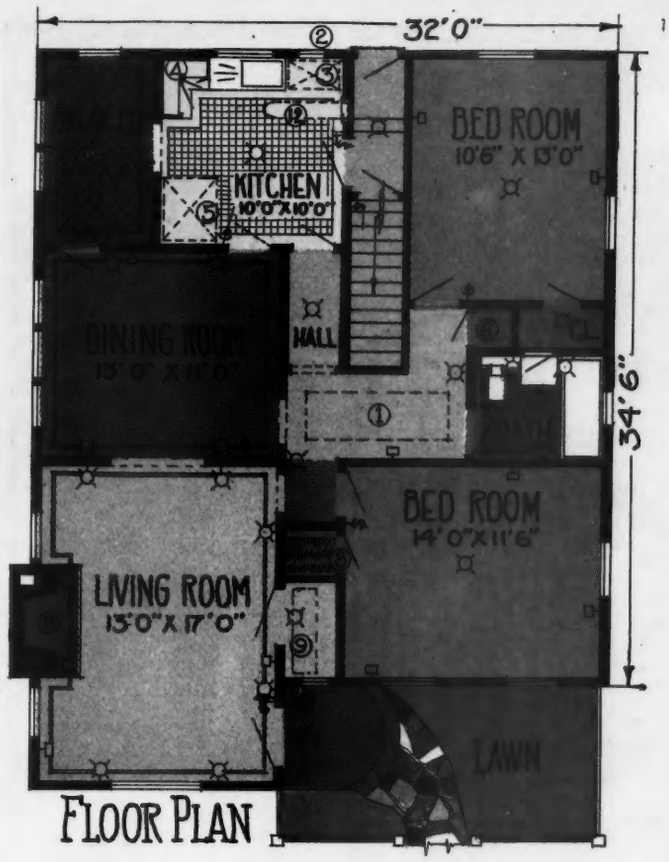
THERE is a quaint charm to this little home with its private flower garden around the front door, screened from the street by ornamental fence and arched gateway. Passing through this delightful entrance we come to the big livingroom with its connecting dining room. At the rear is the tiled kitchen with adjoining breakfast room or breakfast porch as it is often called.

The wing at the right accommodates two bedrooms with connecting bath, all opening from an inside hall.

The basement stairs go down from the rear entry beside the kitchen door. The basement is perhaps the most important part of a modern home for it contains the heating plant, the fuel supply, the laundry, cold storage space for fruits and vegetables, the home workshop, storage space, etc. The modern basement is not dirty and ill kept but has become one of the show places of the home. With the amount of special machines and appliances required to give service in the modern home, the basement has become too important to be neglected. Clean fuels have made the basement more usable; and even where soft coal is burned we have found that the dust is easily controlled by washing out the basement once a week with the hose; and for this reason the concrete floor should be pitched to drain to several convenient outlets.

Study the basement plan of the Fairbanks and adapt its suggestions to each of the other home designs in this collection.

On all of these plans notice the small numbered circles which indicate special equipment recommended for these designs. The accompanying Key to Equipment explains what they are. For instance, number one indicates a disappearing stair operating from the ceiling of the hall. This takes up no space yet makes available the large, high attic. Number two is a fan ventilator for the kitchen. Three is the electric refrigerator. Four the kitchen cabinet and so on all the way through. These suggestions are made for equipment and appliances that are well worth considering. Even though you may not build them in when the house is new still provision is made for them and they can be added later.



FLOOR PLAN

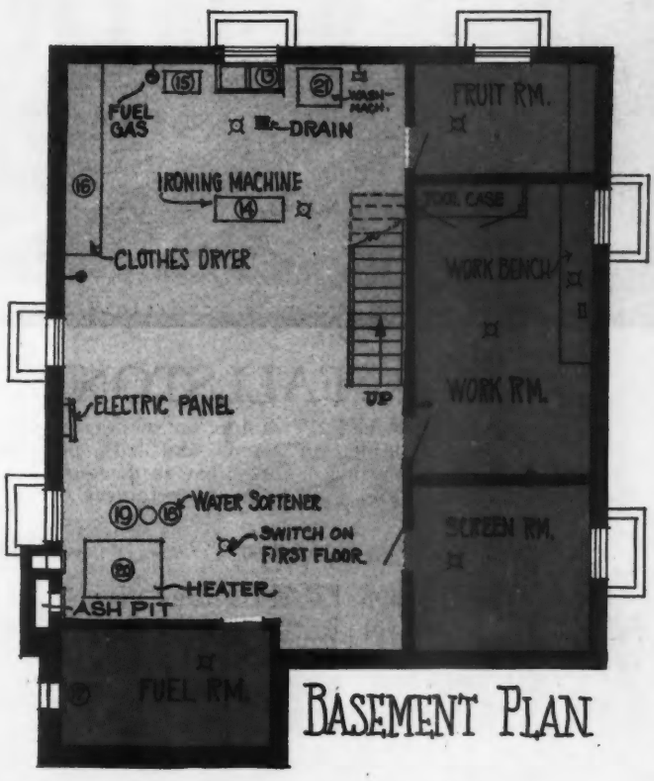
Key to Equipment

① Disappearing Stairway
② Ventilating Fan
③ Refrigerator
④ Kitchen Cabinet
⑤ Range
⑥ Clothes Drier
⑰ Coal Chute
⑱ Water Softener
⑲ Hot Water Supply
⑳ Heating Plant

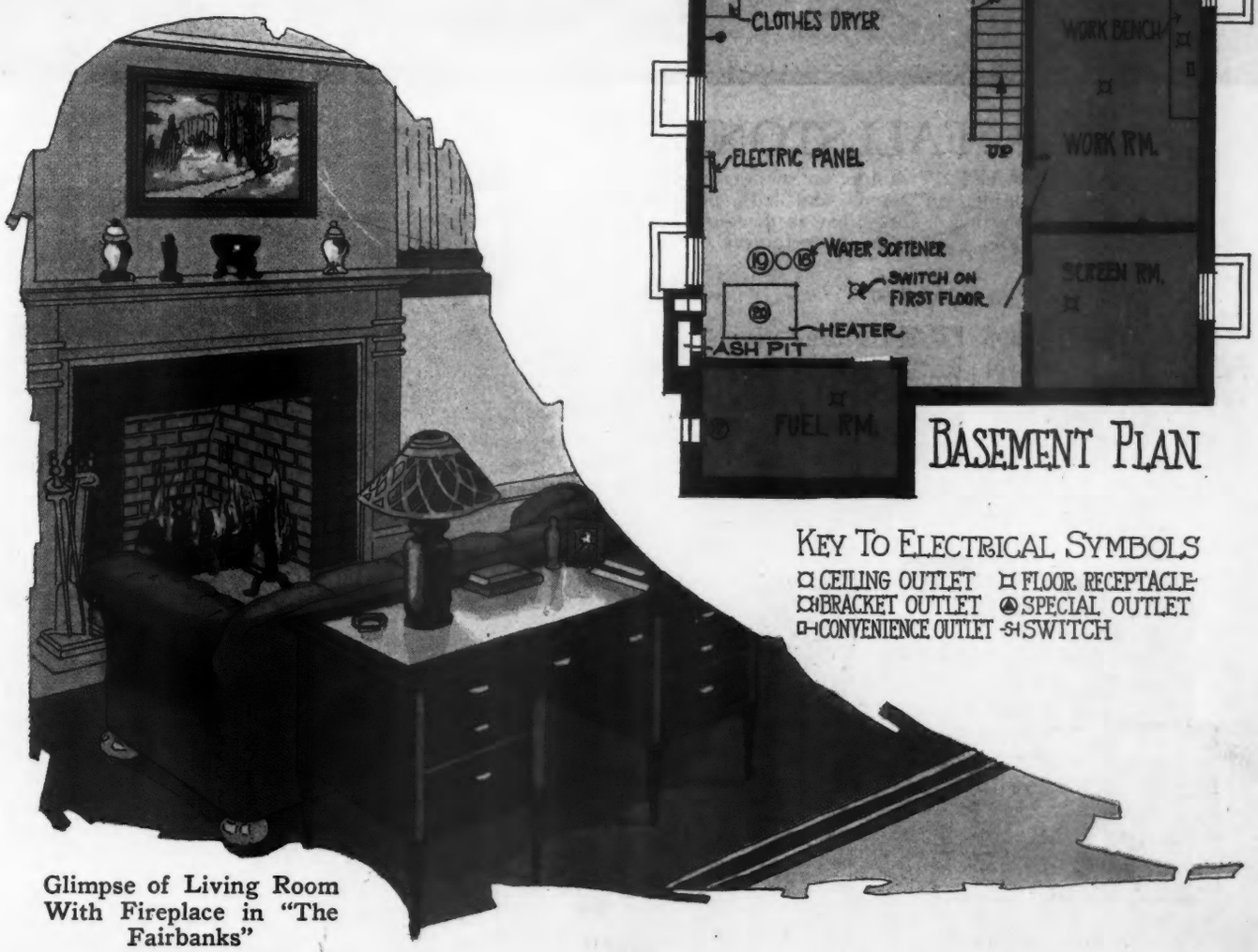
COLOR KEY TO PLANS

LIVING ROOM
DINING ROOM
KITCHEN
PANTRY
HALLS
CLOSET
BED ROOM
BATH AND LAV.
PORCH
ROOF
BASEMENT
FRUIT CELLAR
FUEL ROOM
STAIRS

⑥ Moth-proof Closet
⑦ Thermostat
⑧ Efficiency Wardrobe
⑨ Bed Closet
⑩ Built-in Mail Box
⑪ Fireplace Throat and Damper
⑫ Ironing Board
⑬ Laundry Trays
⑭ Ironing Machine
⑮ Stove
㉑ Washing Machine
Weatherstrips
Storm Sash
Screens
Lighting Fixtures
Convenience Outlets
Electric Panel



BASEMENT PLAN



Glimpse of Living Room With Fireplace in "The Fairbanks"

KEY TO ELECTRICAL SYMBOLS

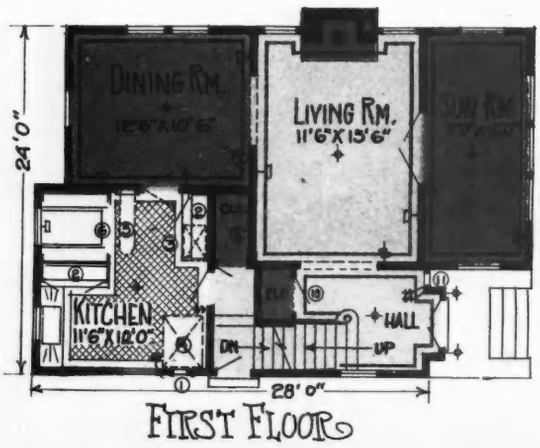
CEILING OUTLET
FLOOR RECEPTACLE
BRACKET OUTLET
SPECIAL OUTLET
CONVENIENCE OUTLET
SWITCH

The FALLSTON

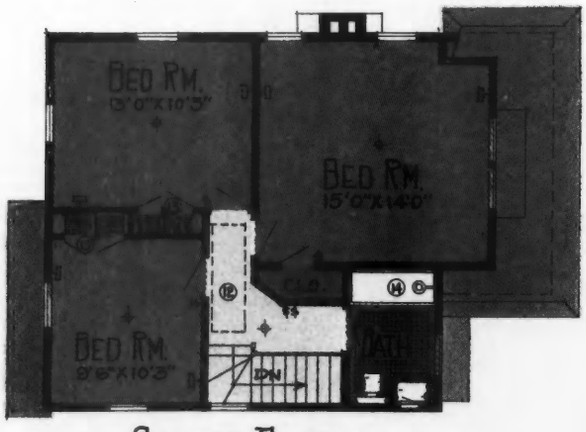
A PERMANENT home on a narrow lot containing six rooms and bath besides the big solarium. This home is designed for a maximum of light and cheerfulness.

COLOR KEY TO PLANS

- LIVING ROOM
- DINING ROOM
- KITCHEN
- PANTRY
- HALLS
- CLOSET
- BED ROOM
- BATH AND LAV.
- PORCH
- ROOF



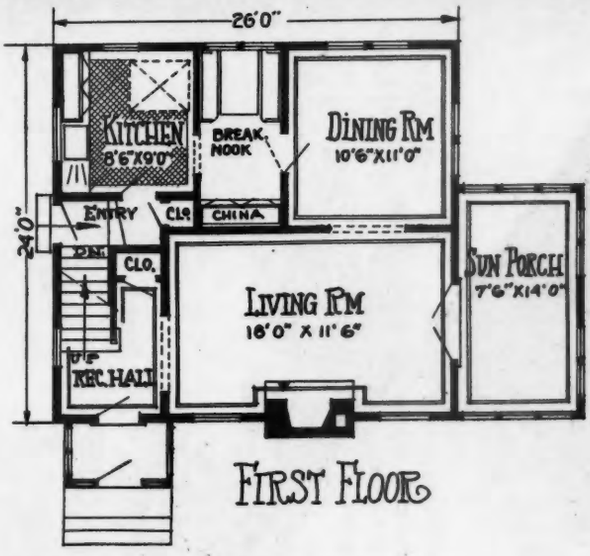
FIRST FLOOR



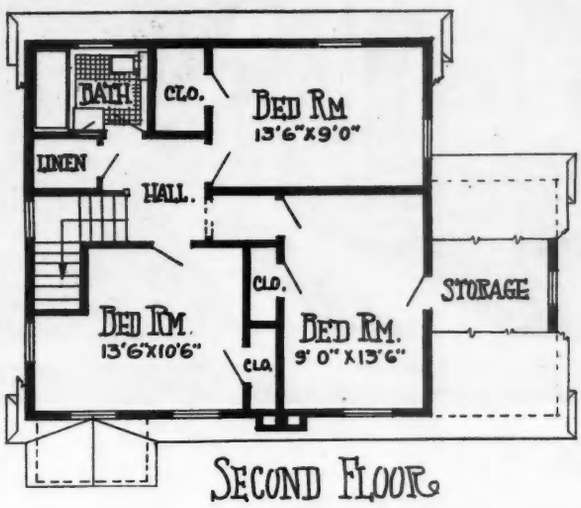
SECOND FLOOR

Key to Equipment

1. Ventilating Fan
2. Kitchen Cabinets
3. Refrigerator
4. Range
5. Ironing Board
6. Breakfast Nook
7. Thermostat
8. Broom Closet
9. Fireplace Throat and Damper
10. Mirror Door
11. Built-in Mail Box
12. Disappearing Stair
13. Space-Saving Closets
14. Tub Shower
- Weatherstrips
- Storm Sash
- Screens
- Lighting Fixtures
- Convenience Outlets
- Electric Panel
- Washing Machine
- Clothes Drier
- Coal Chute
- Heating Plant
- Hot Water Supply
- Water Softener
- Garbage Incinerator
- Radiant Gas Heaters
- Casement Windows



FIRST FLOOR



SECOND FLOOR

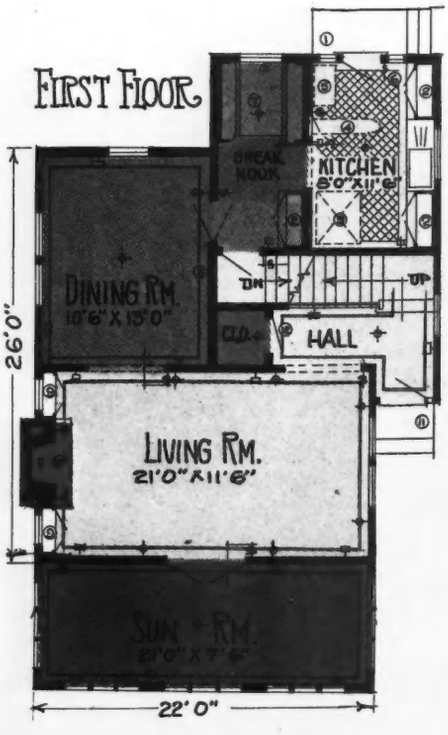
The FARMDALE

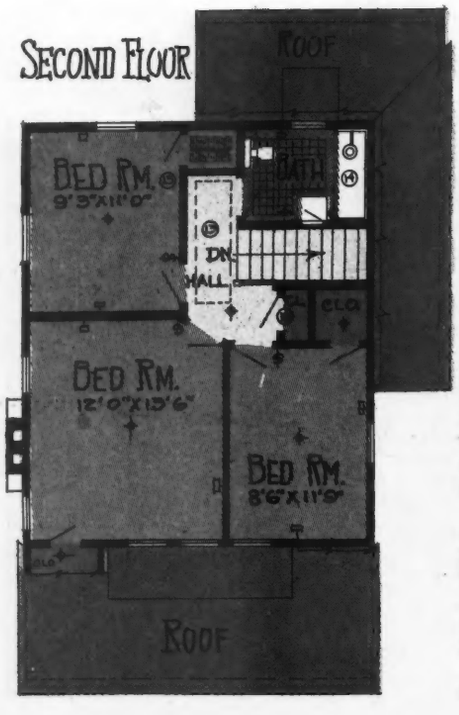
HERE is a Colonial home of six rooms, bath, breakfast nook and sun porch. The main house measuring only 26x24 feet. This is a popular selling design and makes a delightful home.

Above in the circle is a suggestion for window drapes and furnishing for the large front bedroom.

The FARMINGTON

THE trim compact lines of this stucco home of early English design are well liked in the cities and suburbs where ground value is high and lots are small. Six rooms, bath, breakfast nook and sun room are provided. The arrangement is ideal.



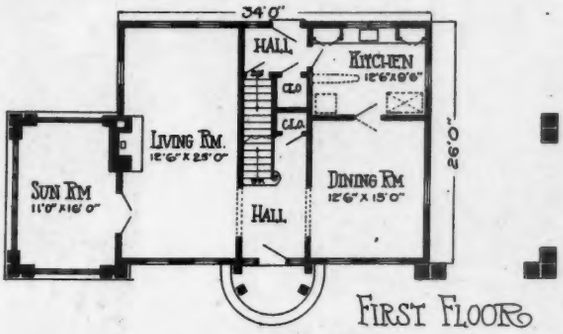


COLOR KEY TO PLANS

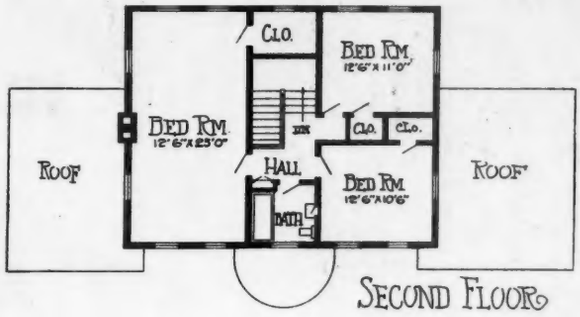
LIVING R.	CLOSET
DINING R.	BED R.
KITCHEN	BATH
PANTRY	PORCH
HALLS	ROOF

Key to Equipment

① Ventilating Fan
② Kitchen Cabinet
③ Range
④ Ironing Board
⑤ Refrigerator
⑥ Package Receiver
⑦ Breakfast Nook
⑧ Thermostat
⑨ Bookcases
⑩ Fireplace Throat and Damper
⑪ Built-in Mail Box
⑫ Mirror Door
⑬ Disappearing Stair
⑭ Tub Shower
⑮ Space-Saving Closet
⑯ Moth-proof Closet
Weatherstrips
Storm Sash
Screens
Lighting Fixtures
Convenience Outlets
Electric Panel
Washing Machine
Clothes Drier
Coal Chute
Heating Plant
Hot Water Supply
Water Softener
Garbage Incinerator
Radiant Gas Heaters
Casement Windows



FIRST FLOOR

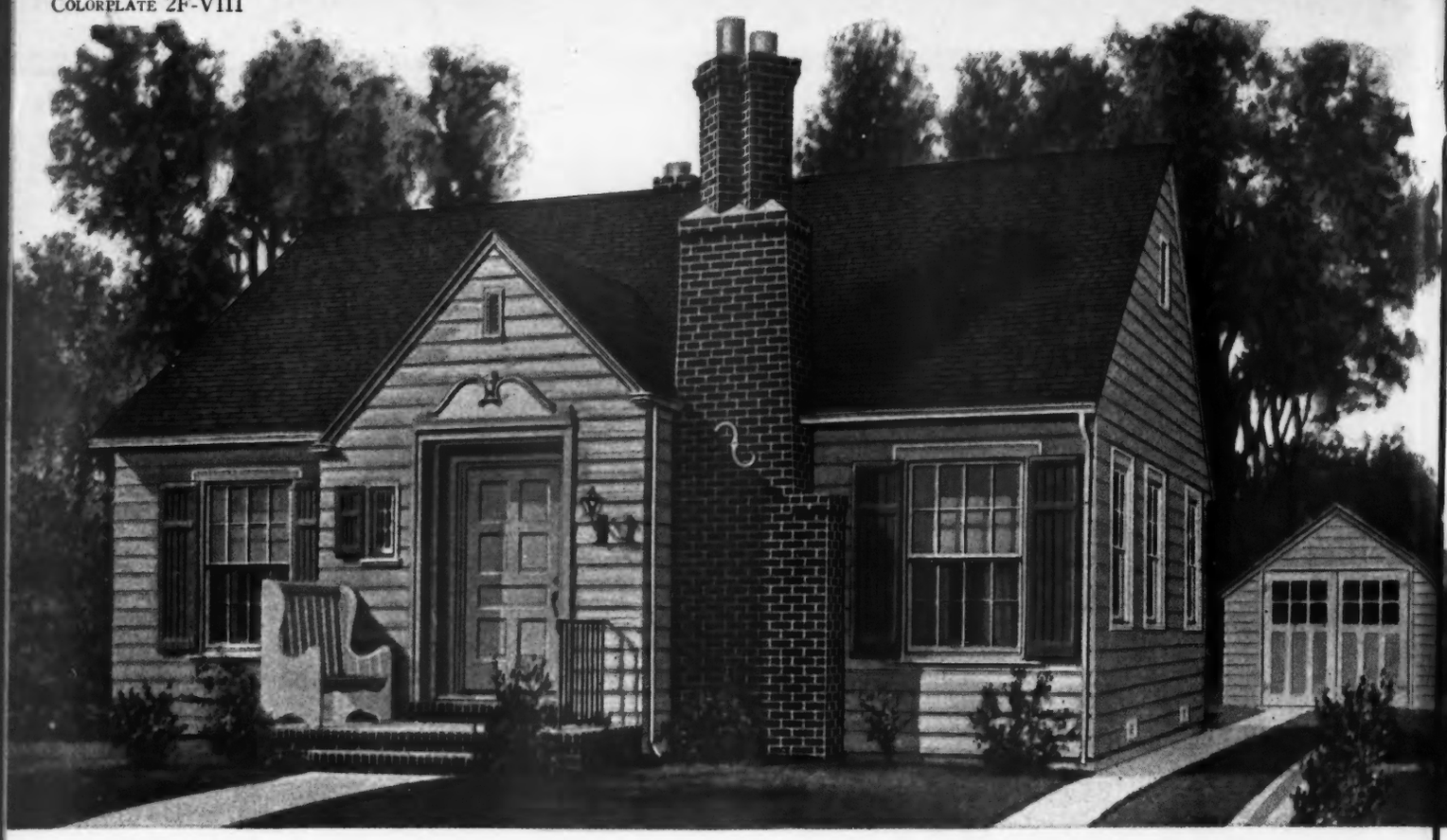


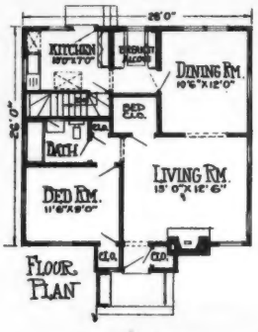
SECOND FLOOR

The FELLSMERE

HERE is a stately Colonial home perfect in the symmetry and balance of its parts. The living room with large adjoining sun room makes a magnificent apartment. The master's bedroom above is the same size as the living room.

COLORPLATE 2F-VIII



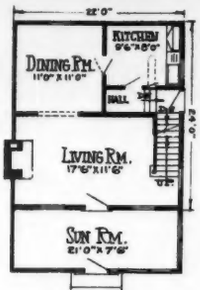


The FENTRESS

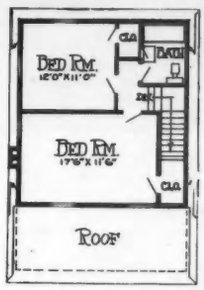
Above and to the left is a four-room cottage 26x28 feet.

The FERNLEY

Below and to the right is a clever little English design 24x30



FIRST FLOOR



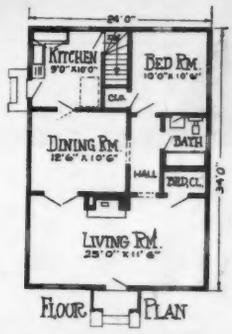
SECOND FLOOR

The FIDELITY

Above and to the left is a narrow lot five-room and sun porch home 22x24 feet.

The FINDLAY

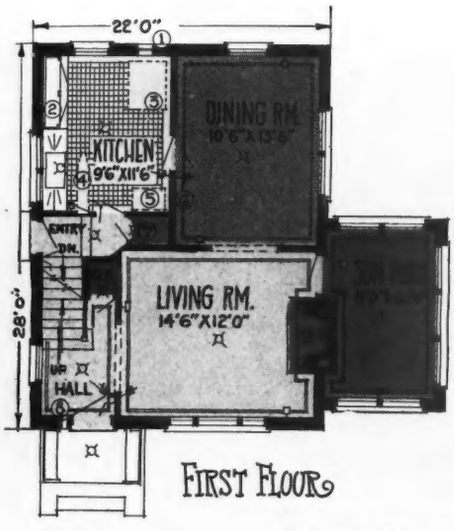
Below and to the right is a charming cottage of four rooms 24x34 feet.



FLOOR PLAN

The FLETCHER

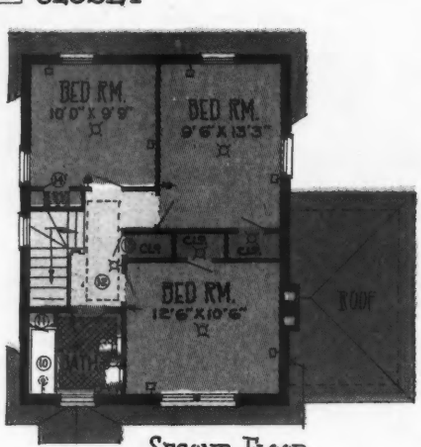
A POPULAR design for close-in city construction is the six-room brick home pictured above. Where space permits the sun room addition is worth all that it costs. Such a home can be made very attractive.



FIRST FLOOR

COLOR KEY TO PLANS

- LIVING ROOM
- DINING ROOM
- KITCHEN
- PANTRY
- HALLS
- CLOSET
- BED ROOM
- BATH AND LAVATORY
- PORCH
- ROOF

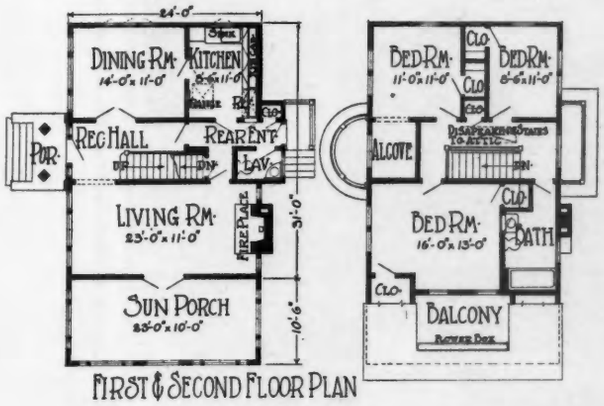


SECOND FLOOR

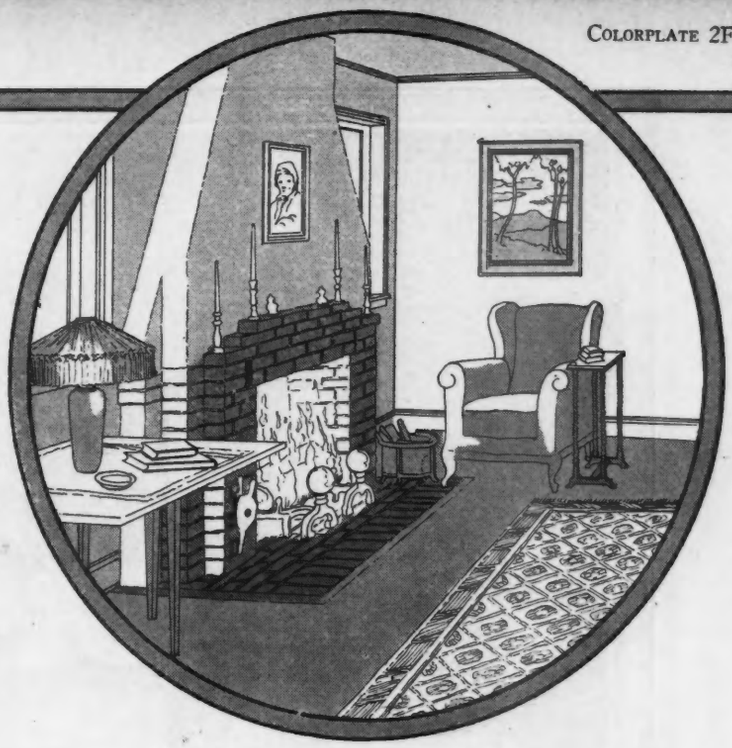
Weatherstrips
Storm Sash
Screens
Lighting Fixtures
Convenience Outlets
Electric Panel
Washing Machine
Clothes Drier
Coal Chute
Heating Plant
Hot Water Supply
Water Softener
Garbage Incinerator
Radiant Gas Heaters
Casement Windows

Key to Equipment

① Ventilating Fan
② Kitchen Cabinet
③ Range
④ Ironing Board
⑤ Refrigerator
⑥ Thermostat
⑦ Broom Closet
⑧ Built-in Mail Box
⑨ Fireplace Throat and Damper
⑩ Tub Shower
⑪ Linen Case
⑫ Disappearing Stair
⑬ Moth-proof Closet



FIRST & SECOND FLOOR PLAN



The FLOWERFIELD

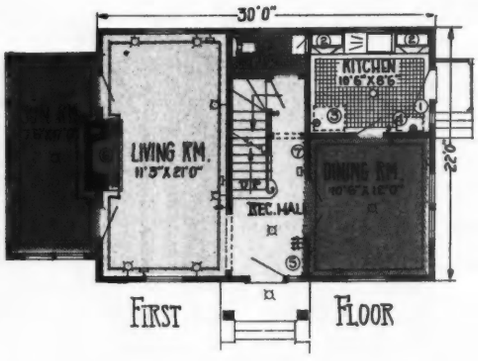
CITY builders have learned how to compress a lot of home value into a narrow space, thus gaining light and air on all four sides even where the building lots are narrow. This home of stucco construction and English design is a popular type.

UNIQUE ideas for living rooms—the upper photograph showing a vaulted ceiling and the lower a very heavy beamed effect. These styles are favored for the interiors of Spanish and Italian homes.

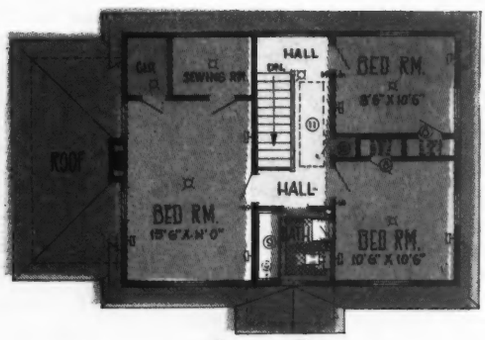
THE Maximum contrast in living rooms is illustrated here. The rough plaster surface and curving, melting lines of a Spanish Mission set off strikingly the trim paneled walls which characterize the New England Colonial.

The FORDVILLE

THE Dutch Colonial home with gable end toward the street makes an impressive, satisfactory home for a small building site. This design 22x30 feet contains six rooms, bath and sun room besides the large reception hall and extra lavatory. This design is always popular.



FIRST FLOOR

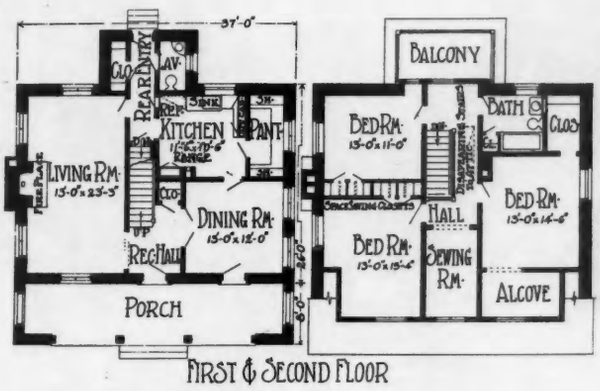


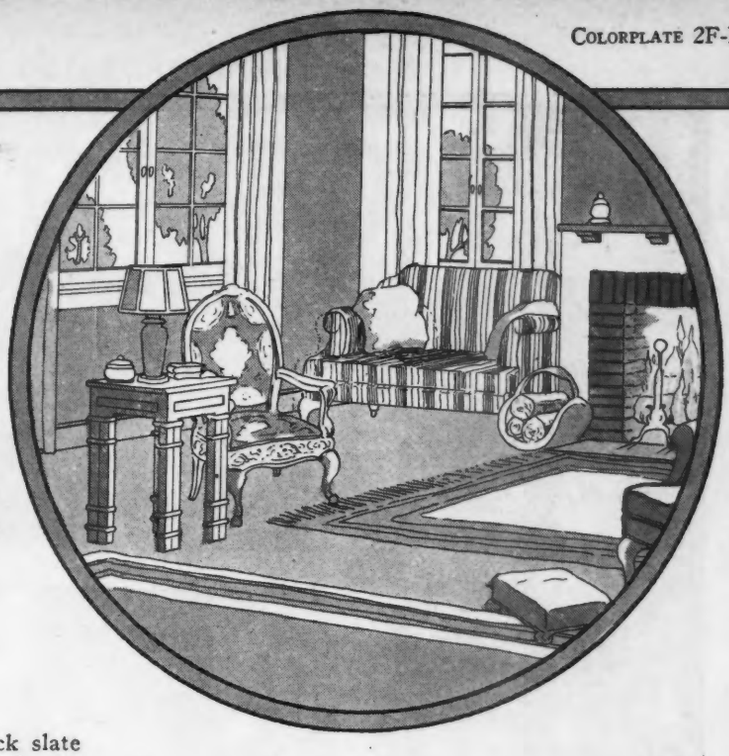
SECOND FLOOR

COLOR KEY TO PLANS

- LIVING ROOM
- DINING ROOM
- KITCHEN
- PANTRY
- HALLS
- CLOSET
- BED ROOM
- BATH AND LAVATORY
- PORCH
- ROOF

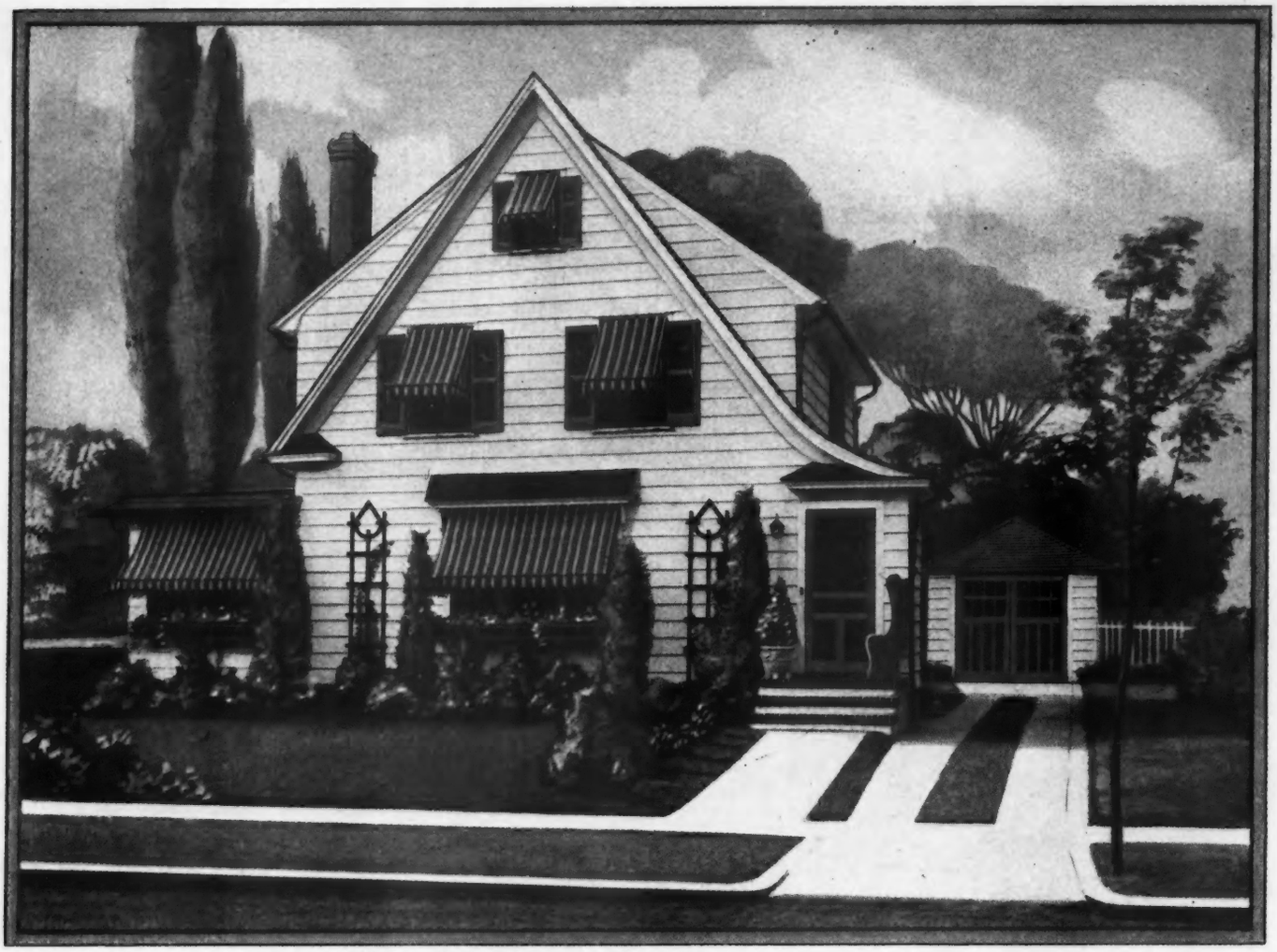
① Ventilating Fan
② Kitchen Cabinets
③ Range
④ Refrigerator
⑤ Built-in Mail Box
⑥ Fireplace—Throat and Damper
⑦ Thermostat
⑧ Efficiency Wardrobe
⑨ Tub Shower
⑩ Linen Closet
⑪ Disappearing Stairway
Weatherstrips
Storm Sash
Screens
Lighting Fixtures
Convenience Outlets
Electric Panel
Washing Machine
Clothes Drier
Coal Chute
Heating Plant
Hot Water Supply
Water Softener
Garbage Incinerator
Radiant Gas Heaters
Casement Windows





The FORT ANN

HERE is a home of grey stone, pink stucco and a blue-black slate roof—always an effective combination for the better class home. There is something very solid and satisfying about this design. The interior is arranged conveniently.

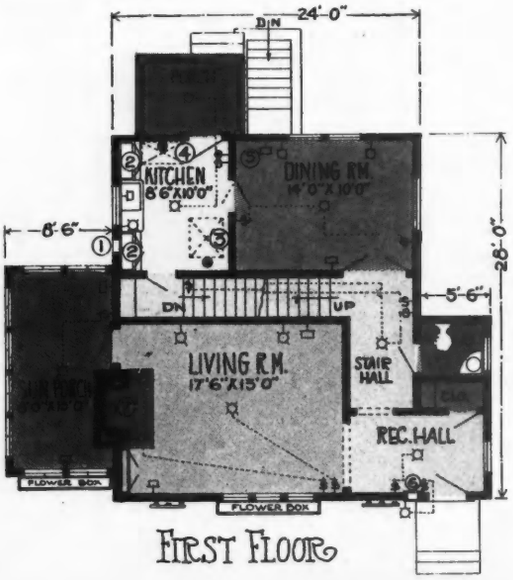


The FREDERICK

HERE is a very artistic home of six rooms, bath and sun porch. The reception hall, stair hall and adjoining lavatory are a special feature of this design. These ColorKeeD Plans deserve close study for the wiring and equipment suggestions they present.

COLOR KEY TO PLANS

- LIVING ROOM
- DINING ROOM
- KITCHEN
- PANTRY
- HALLS
- CLOSET
- BED ROOM
- BATH AND LAVATORY
- PORCH
- ROOF



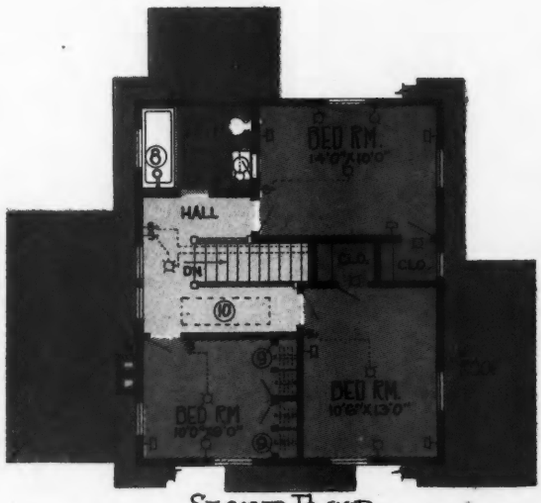
FIRST FLOOR

Key to Equipment

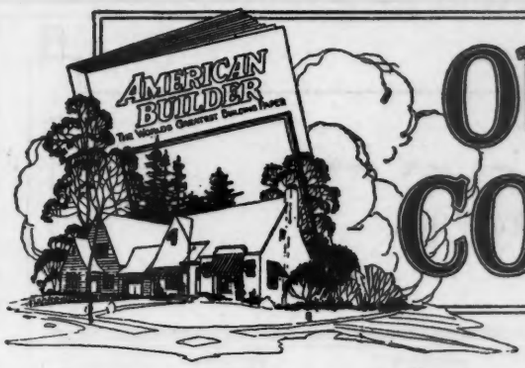
① Ventilating Fan
② Kitchen Cabinets
③ Range
④ Refrigerator
⑤ Thermostat
⑥ Built-in Mail Box
⑦ Fireplace Throat and Damper
⑧ Tub Shower
⑨ Efficiency Wardrobe
⑩ Disappearing Stair

Weatherstrips
Storm Sash
Screens
Lighting Fixtures
Convenience Outlets
Electric Panel
Washing Machine
Clothes Drier
Coal Chute

Heating Plant
Hot Water Supply
Water Softener
Garbage Incinerator
Radiant Gas Heaters
Casement Windows



SECOND FLOOR



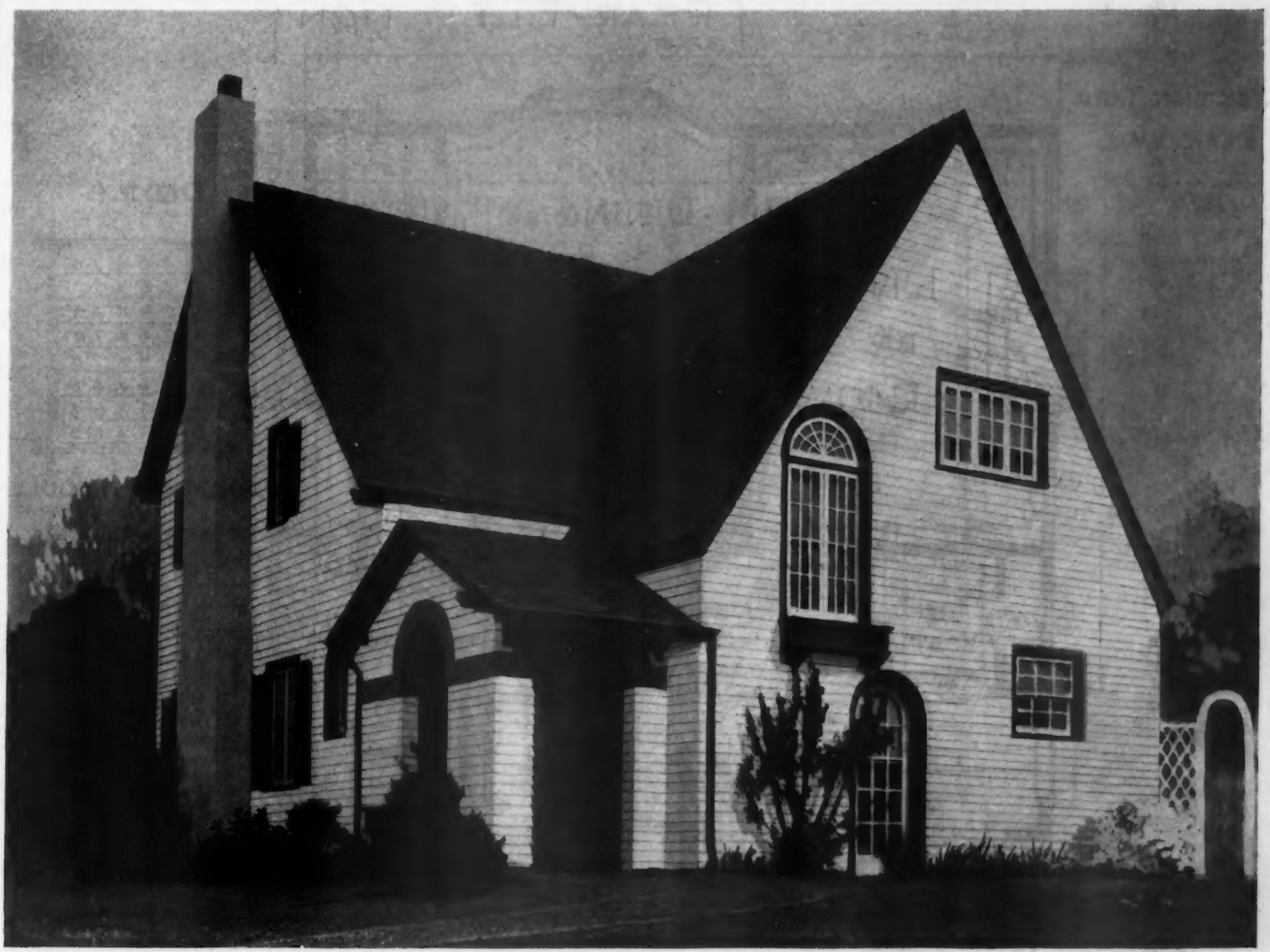
OUR FRONT COVER HOME

Neat and Compact, This Simple Cottage Includes All the Living Accommodations of a Far More Spacious Dwelling

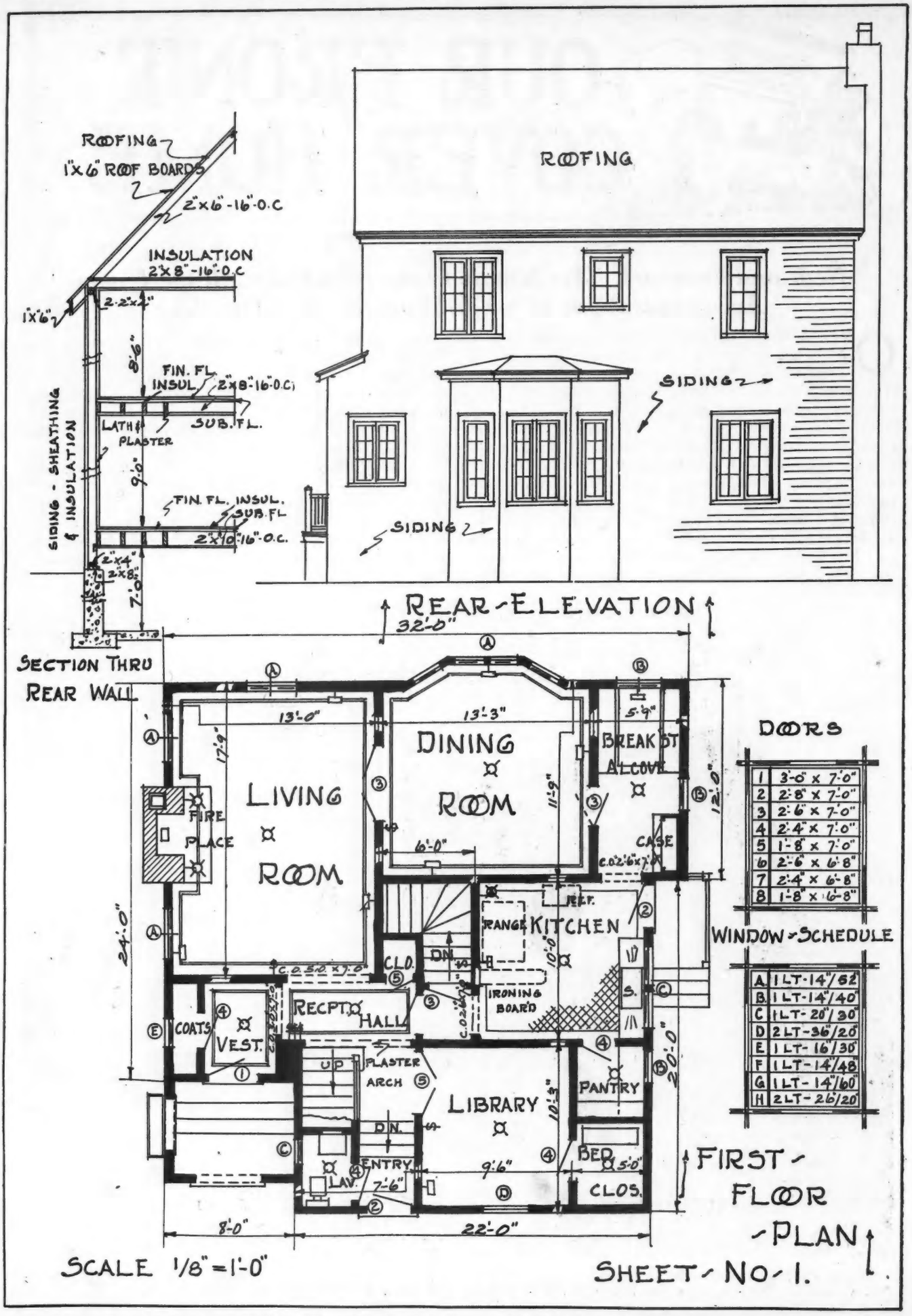
ONE can hardly speak too highly of the ingenuity of the first floor plan of Our Front Cover Home which, together with other floor plans, elevations and details is reproduced to scale on the pages which follow this. Here we find, in the limited space of a 32-foot square, one of the most complete provisions of living accommodation which could be asked. About the only sort of room not included is a sun room and that might be added without great cost and without detracting from the appearance of the house.

And this brings to mind an interesting feature of this design and one which gives it a wider range of possible use—that is, its adaptability to many variations of exterior treatment. Though in this particular house the builder has chosen to finish the exterior with clapboards, either shingles, stucco or brick would have been equally appropriate. So, too, might the chimney, an important feature of the exterior, have been built of other materials than the stucco which was used. The windows might have been of the casement type or old fashioned shutters might have been used to add their quaint touch.

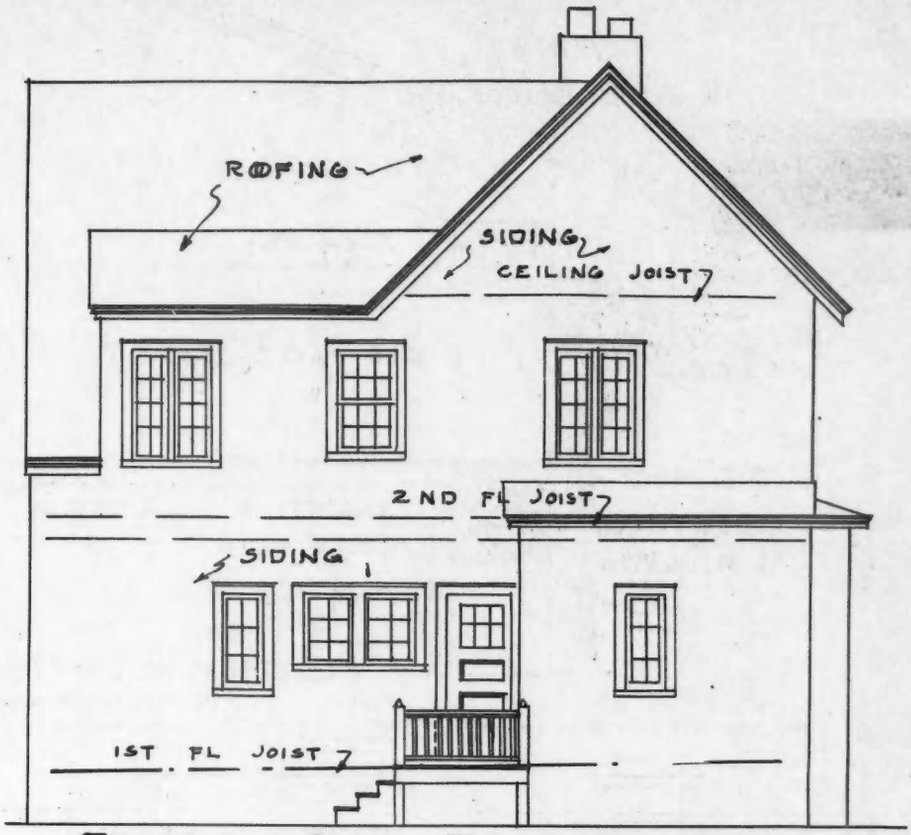
This adaptability is a valuable characteristic, for not infrequently the prospective home owner has quite definite tastes as to the materials for his new home. If these materials do not fit the design he may not realize the fact and when the house is completed be dissatisfied with the result. If he does realize it, he must abandon the design for some other.



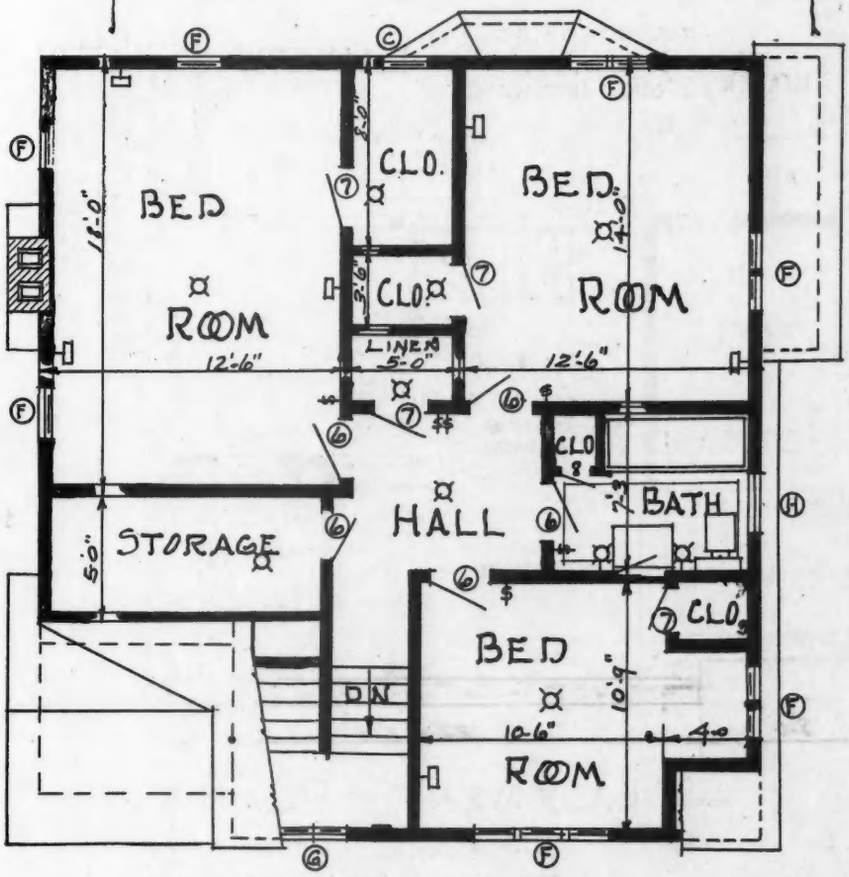
Here We See How Our Front Cover Dream Home Appears When the Skill of the Builder Has Turned the Dream Into a Reality. On the pages that follow this will be found the plans which the builder has used, worked out in full detail, to scale.



Surprisingly Complete Accommodations Have Been Provided in the Limited Space Available in Our Front Cover Home and Every Detail Is Complete, from Built-in Fixtures to Roof and Wall Insulation, to Make a Livable House.



RIGHT - SIDE - ELEVATION

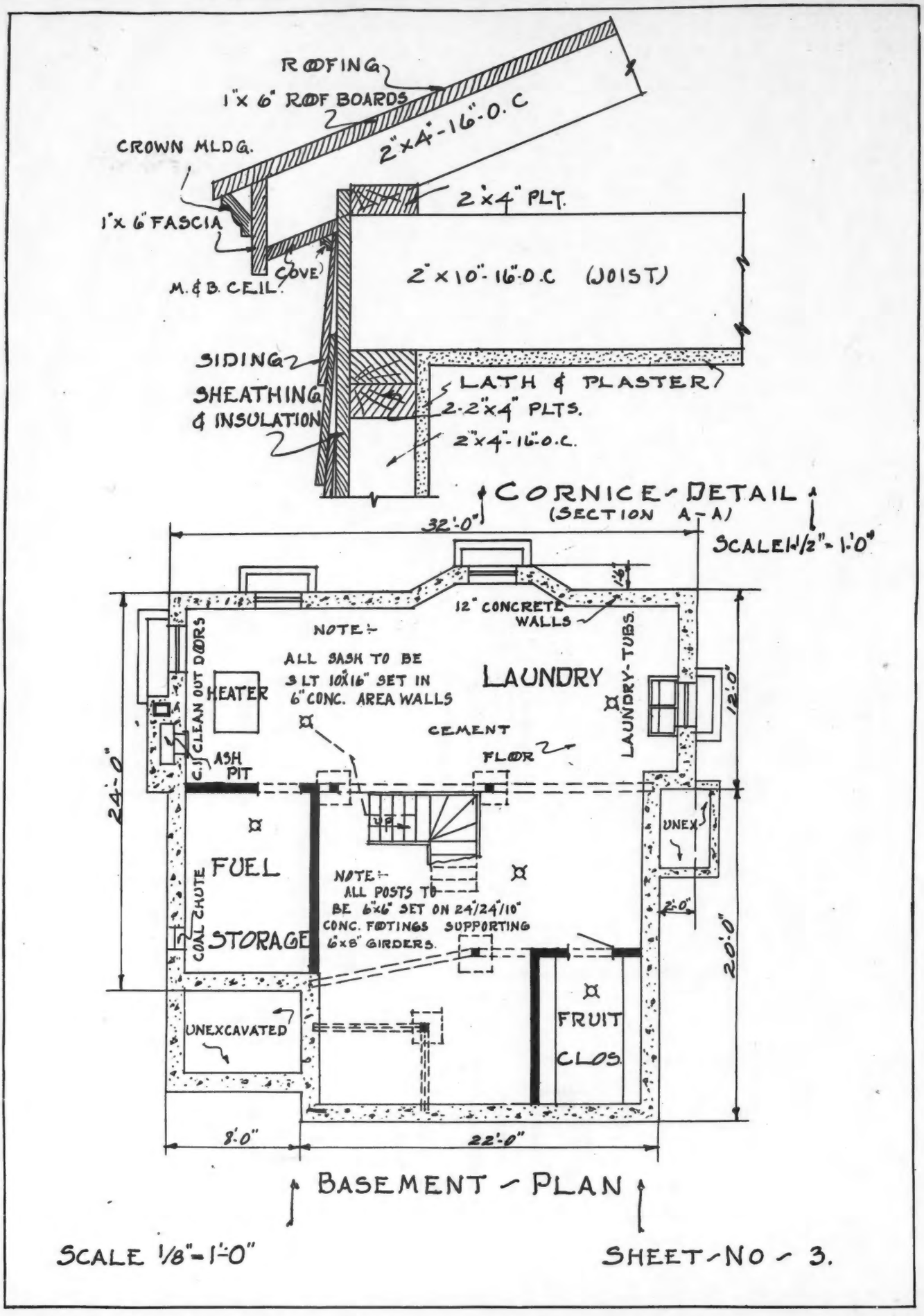


SECOND - FLOOR - PLAN

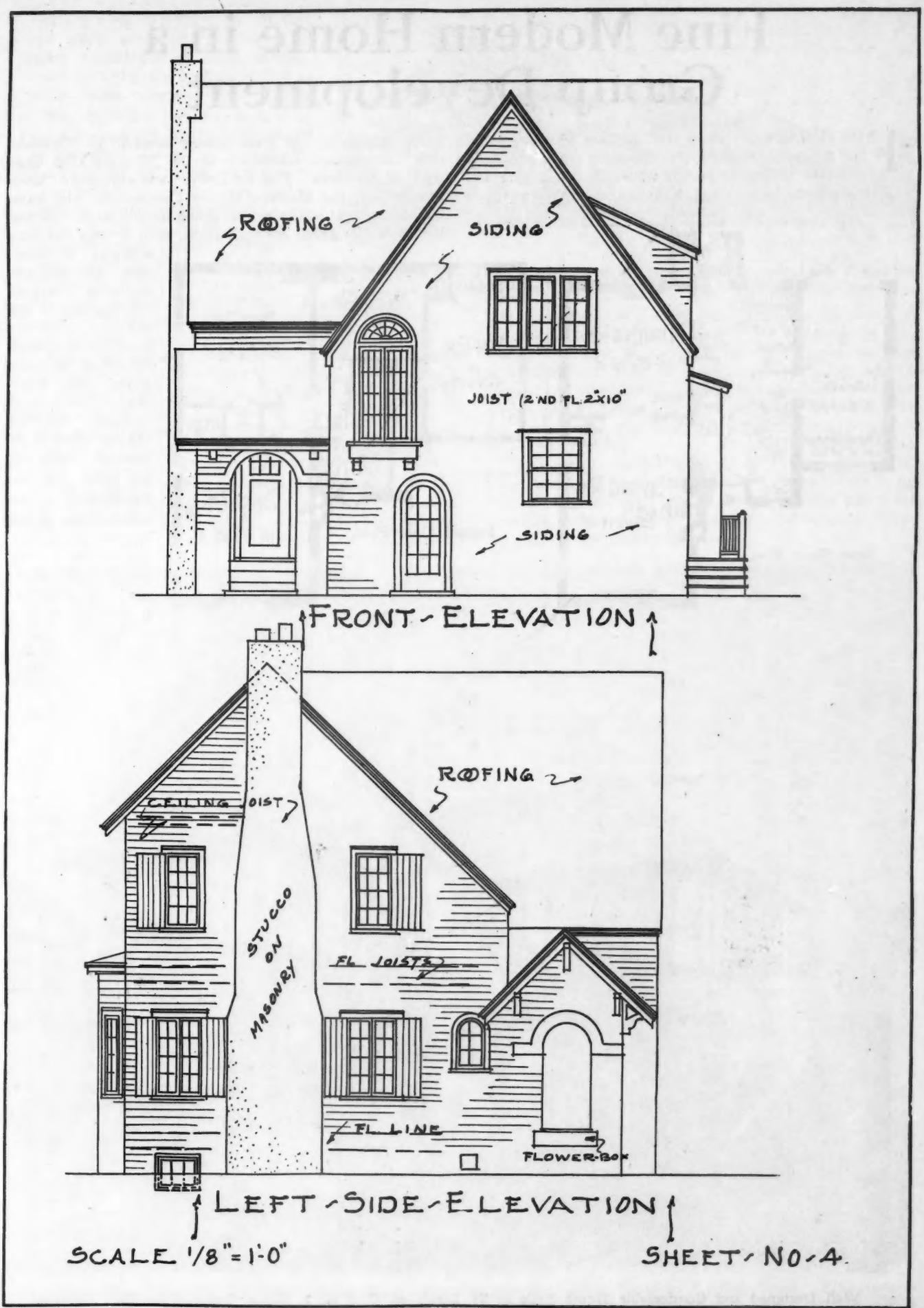
SCALE 1/8" = 1'-0"

SHEET - NO - 2.

The Second Floor Affords Space for Three Bedrooms and Bath and Ample Closet and Storage Space. Further plans, elevations and details are shown on the following pages.



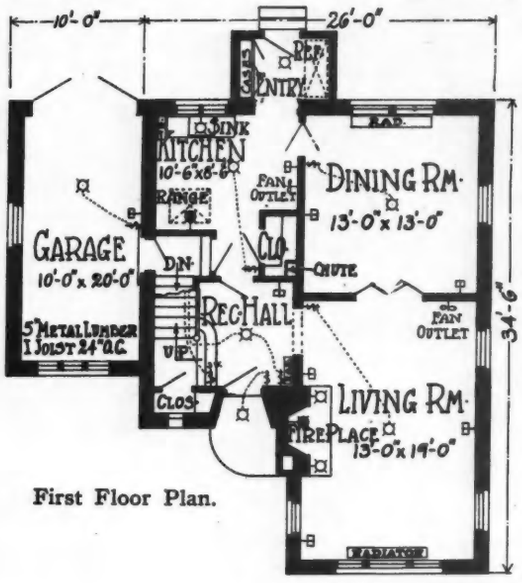
The Basement of Our Front Cover Home Is Fully Excavated and Well Lighted with Area Windows and the Coal Room Is Partitioned to Keep Its Dirt Confined. Above is a cornice detail.



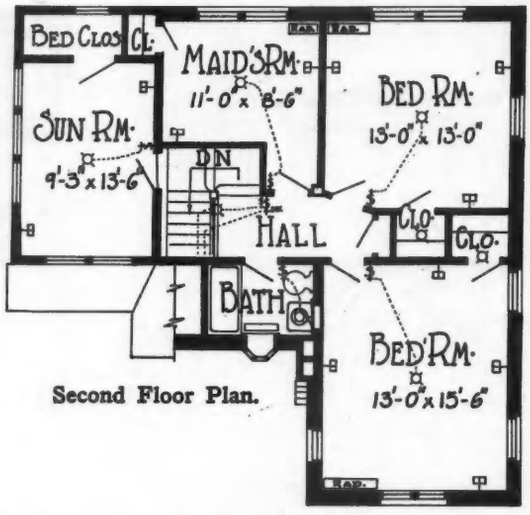
Front and Left Side Elevations Show How the Roof Lines Have Been Handled, with Particular Reference to the Vestibule Roof to Show Its Drainage, and the Placing of the Windows and Doors.

Fine Modern Home in a Group Development

FORTUNATE are those city dwellers who can avoid the congested districts and choose a home site amid park-like surroundings, out where the air is pure and there are green lawns, trees, flowers and shrubbery. Such is the setting for the home shown herewith in "Gannondale," a restricted subdivision in the "Country Club District" of St. Louis. This subdivision was christened "Gannondale" by the Majestic Homes Corporation, who have already built 50 houses in this group development. All the homes in this group are high grade, with varying but harmonious architecture; not an unsightly or incongruous building in the whole neighborhood—no monotony but all of the same grade, with winding streets and parkways, so laid out that there is no through traffic of any kind. This arrangement minimizes high speed, dust, noise and danger, and adds to the charm of the neighborhood and its ex-



First Floor Plan.



Second Floor Plan.

Well Designed and Comfortable Home Built in St. Louis as One of a Group Development in "Gannondale" Subdivision by the Majestic Homes Corporation. The garage is built in as an integral part of the house. Over the garage is a sun room equipped with disappearing bed. This house was designed by W. P. Manske, Architect.

clusively residential character. In fact, the whole subdivision illustrates the many advantages of group development by builders, who thus control so many factors otherwise left to chance.

For wholesale building on a large tract, the land can usually be purchased at reasonable prices on an acreage basis and the builders secure the benefit of what is called the "unearned increment," caused by the influx of population. In the case of a large group development where a home building company enters on an extensive program of new construction, the phrase quoted is inapt because the increment in values is distinctly earned by the builders making the improvements.

A Glimpse Down One of the Blocks in Gannondale Showing the Varied but Harmonizing Architecture, All Built by the Same Home Building Company.

The home chosen for illustration has no counterpart in the neighborhood, but is original in design. From the front, the house has the effect of an L shape, with an arched entrance in the center, above which rises a sharply pitched gable roof, with an attractive oriel window under the peak.

A feature of this house design is that the garage is built in as an integral part of the house. The concrete driveway which shows in the picture passes the side door and leads around to the main garage entrance at the back. This garage has a concrete floor, electric lights and is supplied with hot and cold water. The beams above are of metal lumber and the ceiling has a metal lath base. An entrance from the garage leads into a hallway which connects the main hall in front and the kitchen at the rear. The dining room is an attractive room, with folding French doors into the living room which has a fireplace with gas logs. Over the garage is a good-sized sun room equipped with a disappearing bed, giving the facilities of four bedrooms on the second floor.

There are two master bedrooms of good size, one maid's room and a tiled bathroom at the front, with built-in tub and shower. A metal clothes chute from the upper hall connects with the basement laundry. The house is heated by a hot water heating plant.

The Dining Room in the Home Illustrated Is Connected with the Living Room by Folding Doors. This room is decorated with appropriately chosen wall paper giving a painted tapestry effect. The individual lights on the central lighting fixture each have shades and there is an elaborate torchere on the buffet.

A Small Apartment Building in the Western Style

WALTER H. SIMON, Architect

HERE is pictured a building which shows an interesting divergence from the style of building ordinarily associated with apartments and which offers a suggestion to all who would avoid the tendency toward monotony resulting from adherence to what might be called the standardized apartment building style. This is a two-story building with a high basement, accommodating, on the three floors, 31 apartments of identical size and plan.

Twelve of these apartments are placed on each of the upper two stories while seven others, including one for the janitor, are provided in the basement. The plan shows each unit arranged with a living room measuring 12 by 17 feet, with an adjoining bed closet, a dressing room with closet and bath connecting with it, and a kitchen large enough for the dining use of two people.

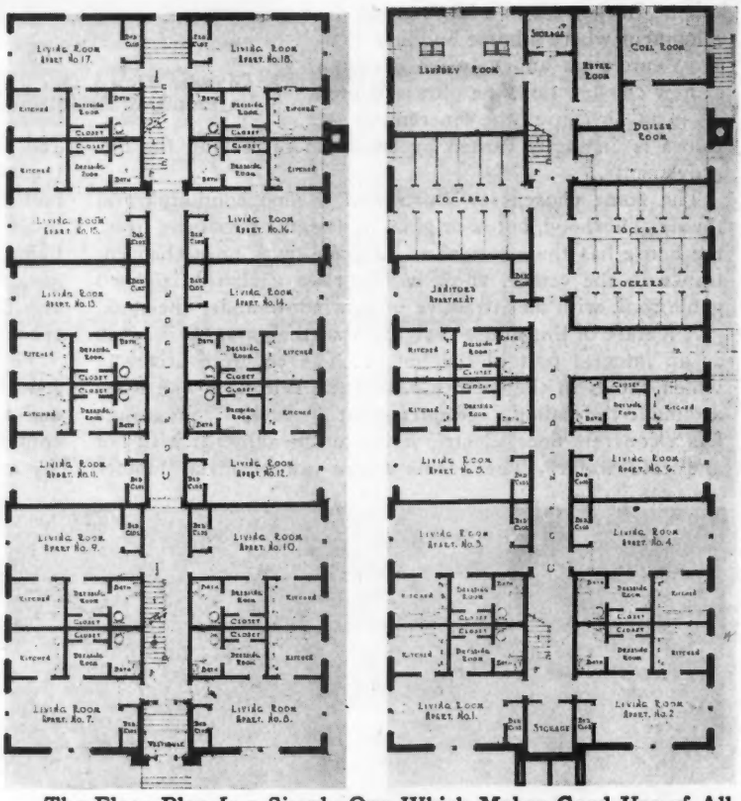
The living rooms have mirror doors and oak floors are used throughout, except in the bathrooms, which are tiled. Each apartment is provided with a special package delivery door. The kitchens contain all the usual built-in kitchen conveniences.

In addition to the apartments, the basement provides space for the heating plant, which is a steam system, a meter room, a community laundry and individual lockers for each of the tenant apartments. The entrance to the basement floor is from the side and there are first floor entrances on the street level at both ends of the building.

The corner location of this building, with a space left on the side away from the street so that nothing can be built too close, assures excellent light and ventilation for every apartment.

The exterior is of an attractive, rug face brick with darker, burned brick used for trim. The entrance has a bit of carved, artificial stone by way of simple decoration.

THEO. N. FISHER.



The Floor Plan Is a Simple One Which Makes Good Use of All Available Space by Ranging the Apartments Down Each Side of a Long Central Corridor.

A Style Not Generally Associated with Apartment Buildings in Many Parts of the Country Has Been Adopted for the Ambassador Apartments in Denver, Colorado. Walter H. Simon, of that city, was the architect.

City Apartment Features Four and Five Room Homes

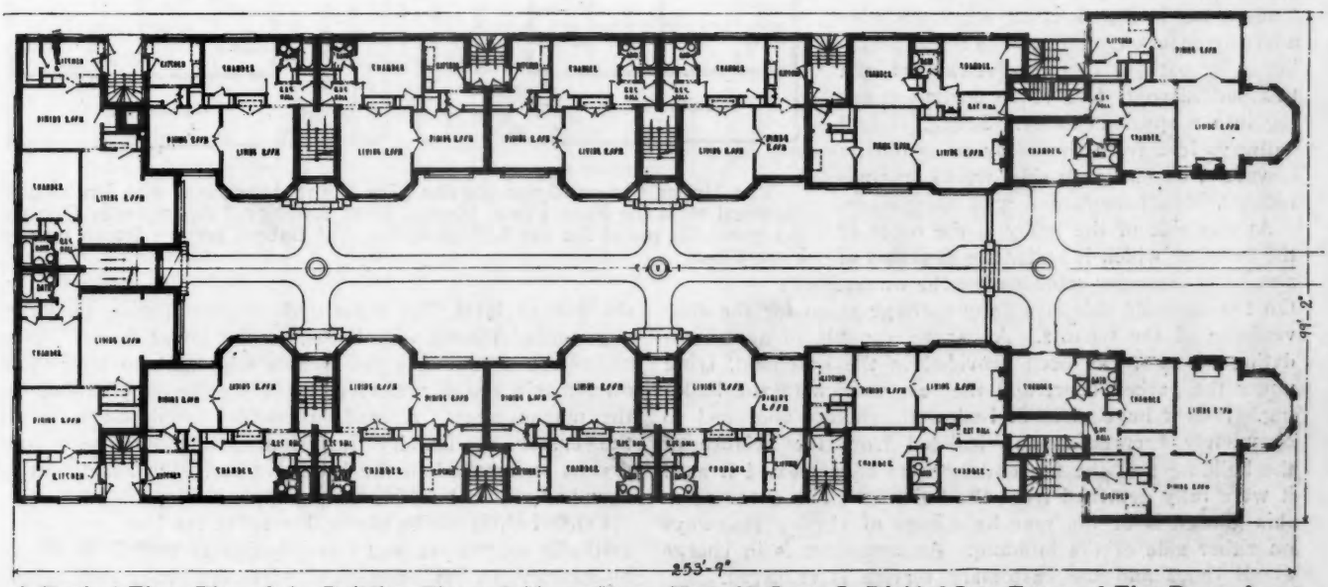
DUBIN AND ENSENBERGER, Architects

A Chicago Apartment House, Characteristic of the Better Residential Sections of a Larger City, Follows the Now Popular "U" Shaped Plan Giving Good Light and Ventilation for Each Apartment.

IN the construction of the city apartment buildings the "U" shaped plan, or a modification with one arm of the "U" removed, seems to have taken precedence over all other designs. Such an apartment as may be seen lining the better residence streets of all the larger cities is illustrated in the picture here, showing one of the newer buildings in the Hyde Park district of Chicago.

By referring to the typical floor plan below it will be seen that this building has been laid out in four and five-room apartments fronting on the court of the building. Each of the five-room apartments contains a living room, with fireplace, two bedrooms, dining room, kitchen and bath. The smaller apartments contain a living room, with the fireplace omitted, one bedroom, dining room, kitchen and bath.

These are provided with a disappearing bed, hidden in a bed closet off the living room so that this room may be converted into a sleeping room at night.



A Typical Floor Plan of the Building Pictured Above Shows How the Space Is Divided Into Four and Five-Room Apartments, the Latter Provided with Disappearing Beds in the Living Rooms to Afford Extra Sleeping Accommodations.

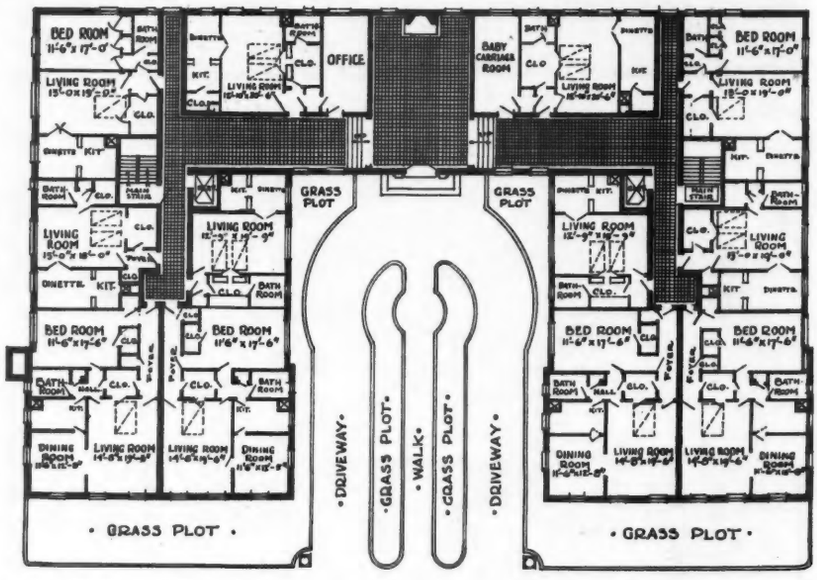
Garden City Court, a Suburban Apartment Building

SCHWARTZ & GROSS, Architects

The Garden City Court Apartments, at Garden City, Long Island, New York, a New Building of the Suburban Apartment Type, Offers the Combined Advantages of the City Apartment Building and the Suburban Residence Location Well Removed from the Noise, Dirt and Confusion of the City.

A COMPARATIVELY recent development is the suburban apartment building which combines the advantages of the compact, well serviced, city apartment with those of the suburban home, removed from the noise and confusion of the city and surrounded by the natural charm of the country landscape. One center in which this type of apartment may be seen at its best is Garden City, Long Island, New York, and the Garden City Court Apartment, pictured on these pages, is one of the most attractive.

Its architectural dignity and skillful planning have been augmented by a generous provision, at front and sides, for artistic landscaping in a park effect which includes a large central court. Entrance to the building is by path or motor driveway through this parked court to a stone portico, opening into a spacious lobby. Broad, 10-foot hallways lead from the lobby to automatic elevators, one on each side, which communicate with all floors and with the garage.



The Upper Floors of the Garden City Court Apartment Are Practically Identical with the First Floor, Except That Additional Apartments Occupy the Space Required for the Lobby, Office and Baby Carriage Room on the First Floor.

At one side of the lobby is the office of the building which is under the direction of a resident manager representing the owner. On the opposite side is a baby carriage room for the convenience of the tenants. A garage, capable of accommodating 35 cars, has been provided in the basement, lying under the parked court and the rear portion of the building. It is a huge piece of hollowed concrete and steel so completely fireproofed and isolated from the balance of the building that the fire underwriters have treated it as if it were fully detached from the building. The entrance to this garage is at the rear by means of sloping stairways on either side of the building. An attendant is in charge at all times and the customary service is rendered.

Cutting down of the roadway, to allow cars to reach the garage level, has permitted the installation of light, airy, maids' rooms, with baths, on the lower floor. These rooms are available to the tenants who wish to have their own maids or, if preferred, maid service is provided by the management. A modern laundry, equipped with all the customary laundry furnishings, including automatic dryers, is installed in the basement and each apartment is equipped with a built-in, cabinet type, ironing board.

Central refrigeration plants, located in the basement, automatically supply ice and refrigeration to the ice boxes in all apartments. In addition to these ice boxes each apartment kitchen contains white, vitrified porcelain, steel, kitchen

Most of the Apartments, in the Garden City Court Apartment, Have a Dressing Room Off the Living Room, in Addition to the Usual Rooms, so That It May Be Used, with Disappearing Beds, as an Extra Sleeping Room.

units, including stove, storage bins, pot and pan closets and so forth.

The rooms are all large, light and airy, outside rooms well supplied with closets. Most of the apartments, in addition to the usual rooms, have a dressing room adjoining the living room, equipped with built-in chests of drawers, wardrobes, and mirrors and containing disappearing beds which may be used in the living room when it is desired to convert that room into a sleeping place.

All floors are finished in oak parquet and one door in each chamber is equipped with a full length, beveled plate glass mirror. Such items as properly sound-deadened walls and floors, and ample base plugs have been provided for and all main halls and stairways have been fully fireproofed as well as the doors to each apartment. All bathroom fixtures are of the most modern pedestal type.

All these desirable features in the building itself are augmented by those which pertain to the suburban type of apartment, the advantages of a suburban community. Here are found golf and country clubs within a short distance, including a public course. The beaches for ocean bathing are close at hand. The community affords the most excellent schools, both public and private, and electric service permits the residents to reach the city in 40 minutes on any of the many daily trains. It is this combination of features which is making the suburban apartment popular.

Socketing Wire Rope

By Walter Voigtlander—*Rope Engineer*

THERE is generally a right way and a wrong way to do any job. It has been found that the following method of socketing, as illustrated, gives the strongest and most uniform results.

Measure back from the end of the rope a distance equal to the length of the tapered basket of the socket. Tie securely at this point with soft iron annealed wire and add two additional tie wires below the first.

Open up the strands as in Fig. 1 and cut out the hemp core as far down toward the tie wire as possible.

Unlay each wire and straighten so as to form a "brush" as at 2. On large ropes, it would be necessary to use a small pipe over each wire to straighten and approximately remove all curl from the wire.

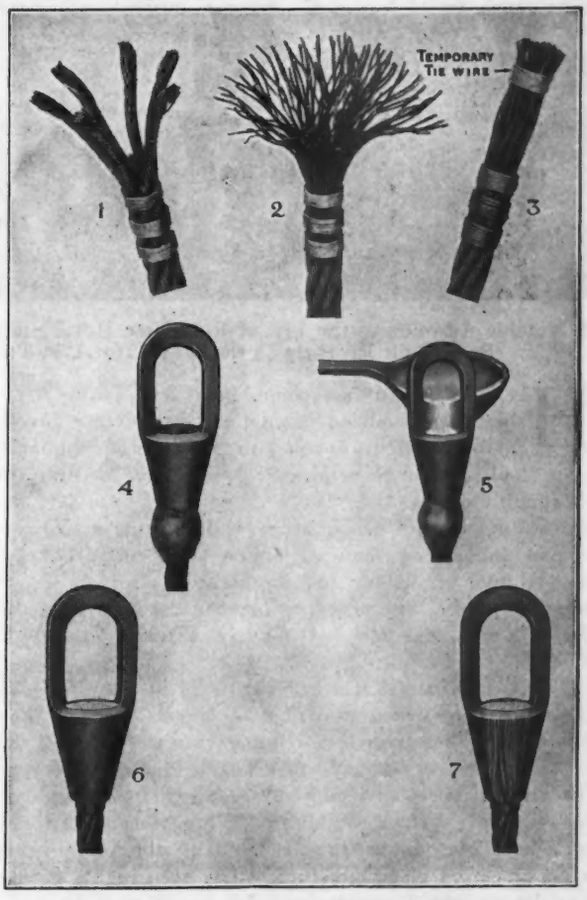
If wire is very greasy, hold the "brush" over a pail of gasoline with wires down and wipe off the grease with waste or paint brush dipped in the gasoline. Wipe dry.

Dip the "brush" holding the wires point down, into a pot of muratic acid solution (50 per cent water, 50 per cent commercial acid). Insert to a depth so as not to immerse the ends of the hemp core. Keep in the acid until the wires are clean. Still holding the wires down, withdraw from the acid and knock the rope sharply with a stick.

Place a temporary tie wire, as in Fig. 3 over the ends of the "brush" taking care not to handle the cleaned wires with greasy hands or tools. Insert the rope end into the socket. Cut the temporary tie wire. Set the rope vertically in a vise; set the socket so that the wires came flush with the top of the basket of the socket with wires spread out; seal the bottom of the socket with clay or asbestos as at 4. If cold, warm the socket moderately.

Pour with pure zinc (not babbitt, lead or other alloy) as at 5. Tap the side of the socket with light hammer while the zinc is still fluid, so as to jar the zinc into crevices between the wires. When cool, remove the fire clay and the serving wires, and the joint as at 6 will result. It will help slightly in the flowing of the zinc among the wires to put a small quantity of salammoniac crystals over the wires just prior to pouring the zinc.

Fig. 7 shows a phantom view of the zine cone with imbedded wires.



How to Resocket Wire Rope. Accompanying text gives full details of each successive step.

The Best in Hotel Design Found in Mayo Hotel, in Tulsa

GEORGE WINKLER, Architect

A Notable Addition to the List of Fine New Hotel Buildings Which Have Been Built Recently Is the Mayo Hotel, in Tulsa, Okla.

HOTEL design has come, of recent years, to be a highly specialized branch of architecture involving many problems peculiar to this type of building, and as a result certain principles of design have become pretty thoroughly established. But even with this necessary standardization of hotel design there still remains a wide range of unstandardized features which give the architect an opportunity to display his originality as an artist. Such originality, of a high order, is found in the new Mayo Hotel, Tulsa, Okla., designed by George Winkler, architect, of Tulsa.

The two principal limiting factors in planning this building were the accommodation of guests and economical operation. The main factor influencing the external design lay in the use of materials of a lasting quality as best fitted for the purpose and expressing, as far as possible, the function of such a building. While the design cannot well be classed under the head of any commonly accepted style or period of architecture, it has been highly influenced by the Italian Renaissance.

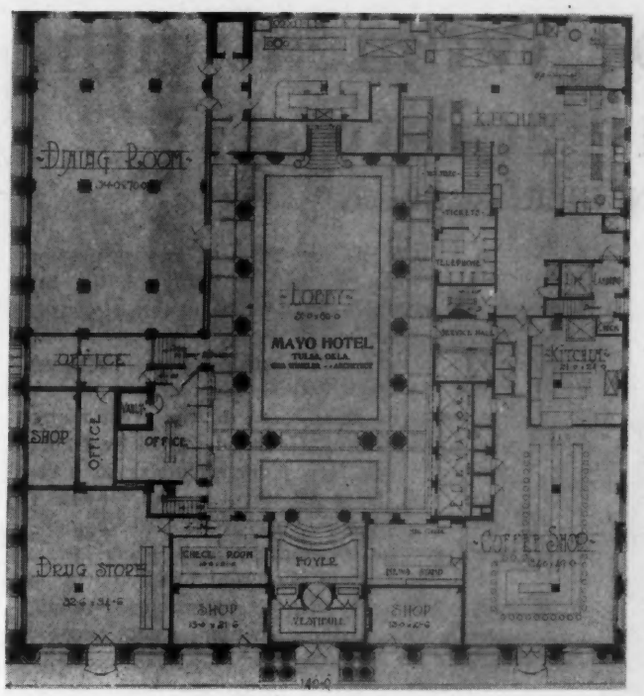
Below the columns, at the pavement line, this building is constructed with a base course of light pink, polished granite. The columns along the street front, as well as all the exterior trim, are of terra cotta of a warm gray tone. The main body of the building is of variegated, matt faced brick in colors ranging from a dark brown to a warm red and is laid up in natural cement mortar with struck joints.

This building is placed upon a corner lot with a main entrance on one street, a taxi entrance on the other street and a service entrance in the alley, keeping all service operations private and inconspicuous. The main entrance leads directly into the lobby while the taxi entrance is dropped a half story below the lobby floor with stairs leading to the lobby and to the basement level where wash rooms, barber shop and similar accommodations may be found before entering the lobby, if desired.

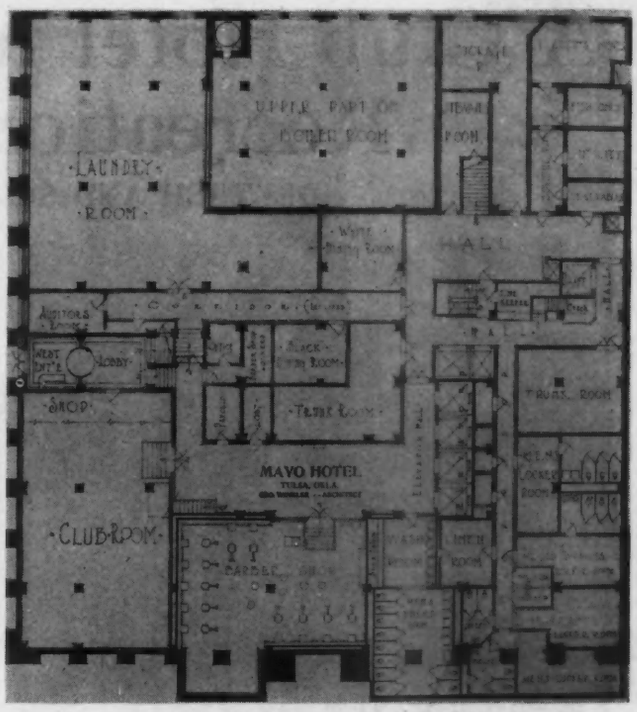
On reaching the lobby the clerk's desk, elevators, check room, news stand, coffee shop and so forth are found placed at one side where the constant passage of guests will not disturb those seated in the main lobby. This floor also contains the main dining room and various other accommodation features to be found in modern hotels.

The two basements, and the first three floors, which cover the entire lot area, provide space for the service features, shops and public rooms. Above the third floor the building takes the form of a "U" with one wing cut partially off. This wing can be completed to the full height of the building when it is desired to increase the capacity of the hotel.

The Main Entrance of the New Mayo Hotel Which Leads Directly Into the Main Lobby.



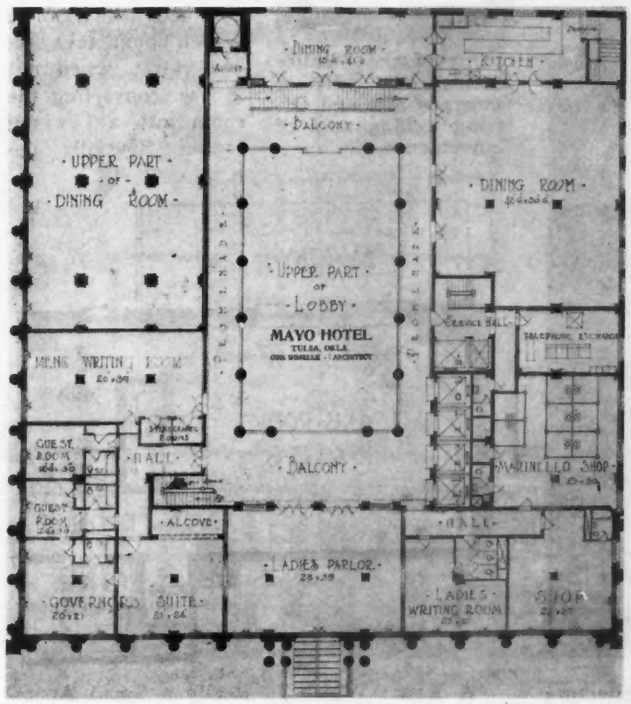
The Offices, Check Room and Other Accommodations Are Inconspicuously Placed at One Side Where Guests Seated in the Lobby Will Not Be Disturbed.



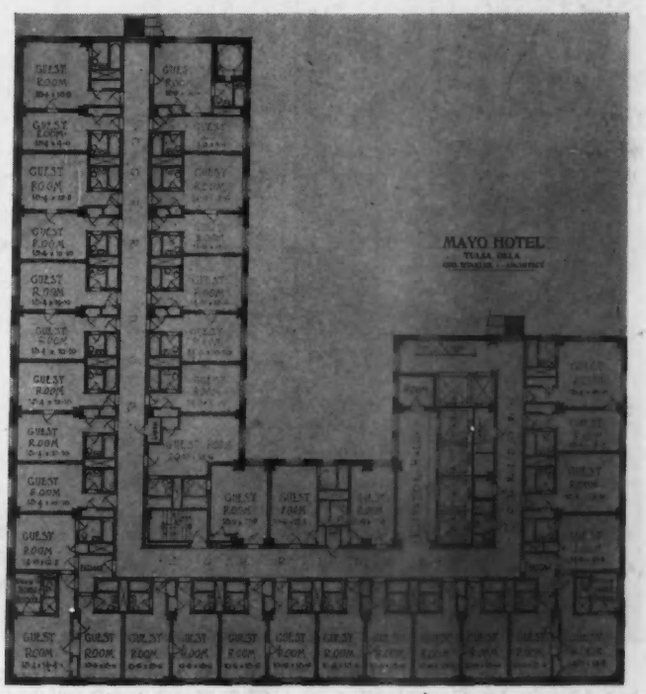
Half a Story Below the Lobby Level, at One Side, Is a Taxi Entrance with Steps Leading Both Up to the Lobby and Down to the Basement Rooms.

From the fourth to fourteenth floors the space is divided into guest rooms, each provided with a bath. The fifteenth floor contains guest rooms and apartments, while the sixteenth floor provides for a ballroom and banquet hall, which can also be used as a theater or picture house, being two stories in height, with a stage. Here also are found a parlor and additional dining rooms. The seventeenth floor accommodates more guest rooms and apartments and the motion picture booth. Between the seventeenth floor and the roof there is a storage and utility room, while surmounting the whole a roof garden is provided.

The structural frame of this building is steel and the window frames, doors and all trim throughout are also of steel. The only wood used is found in the carpet tacking strips embedded in the concrete floors about the edges of all guest rooms. The stub trim of the bathrooms, toilets, barber shop, kitchen and pantries is finished in white, baked enamel, while all other trim is finished to imitate walnut. The corridor floors are covered with soft rubber tile and hard rubber base boards are used. Main lobby, entrance and mezzanine promenade floors are all of marble, the main dining room is carpeted over concrete, while other dining rooms have rubber tile, and the basement floors are of terrazzo. The ballroom floor is of course wood, maple, laid in herringbone pattern.



A Mezzanine Provides Space for Two Dining Rooms, Writing Rooms, Ladies' Parlor, Beauty Shop and so Forth.



This Typical Plan Shows the Arrangement of Guest Rooms on All Floors from the Fourth to the Fourteenth.

A Club Hotel for Women with Recreation Facilities

DEUTSCH AND SCHNEIDER, Architects

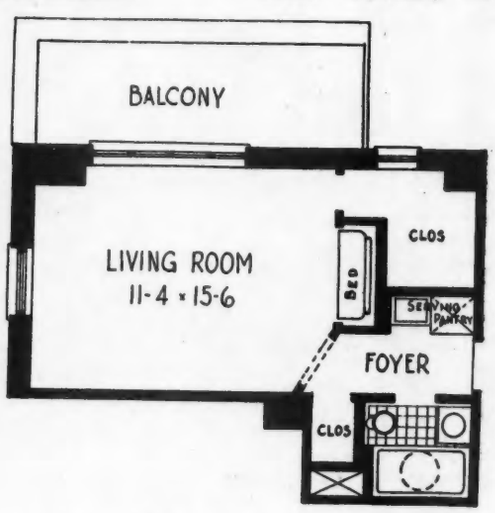
The Preston House Will Be Distinctive Not Only in Its Architecture but Also in Its Organization as a Club-Hotel for Business and Professional Women Providing a Real Home Within a Short Distance from 42nd Street and Broadway, New York City.

A HOTEL for business and professional women, possessing many of the most attractive features of a club, is rapidly nearing completion in New York City and, when finished, will furnish a home for several hundred women within easy reach of the most important business center of the great metropolis. The Preston House, designed by Deutsch and Schneider, New York architects, as a club-hotel, will be a 20-story structure with the upper stories providing terraced balconies to conform with the building and zoning laws.

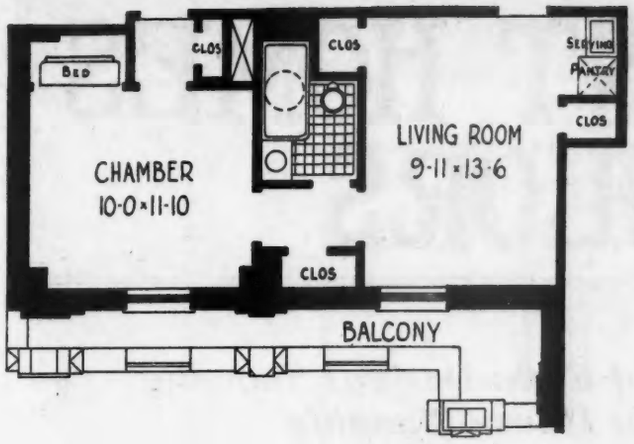
This steel frame, fireproof building will contain 339 rooms and 319 bathrooms. In addition, it will provide a swimming pool and gymnasium for the free use of guests as well as a restaurant, library-lounge and ballroom. On each floor there will be a laundry chute providing immediate removal of laundry from each apartment to the basement laundry which is a part of the equipment of the building. The street floor, in addition to the entrance hall, lounge, restaurant and ballroom, will provide rest rooms and several shops catering to the requirements of the guests.

One of the Smaller Rooms but Still of Generous Size and Offering a Maximum of Convenience.

Each room will, in reality be a small compartment, for it will be equipped with either a three-quarters bed or twin beds which can be hidden completely in a bed closet, when not in use, converting the room into a living room. Specially de-



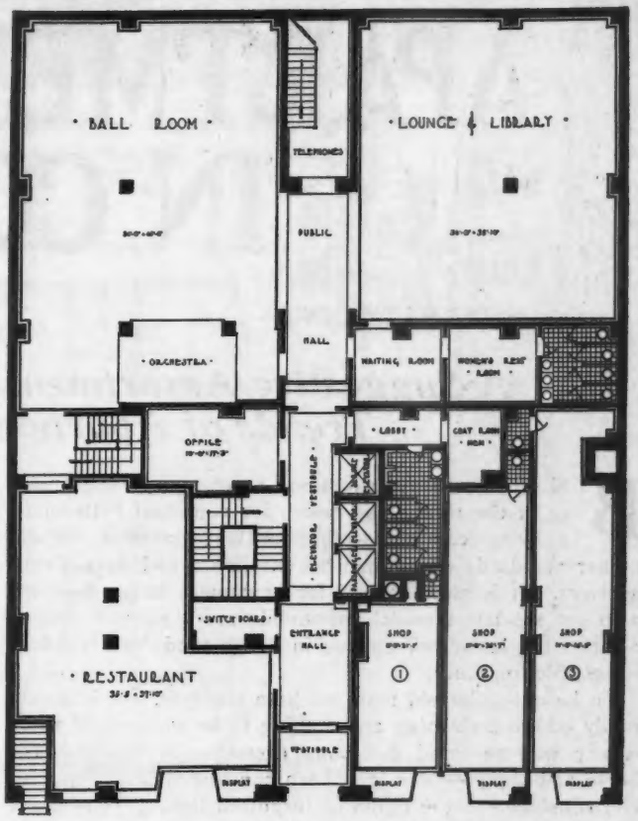
A Room Which Is Really a Small Apartment with Every Living Convenience and a Charming Balcony in Addition.



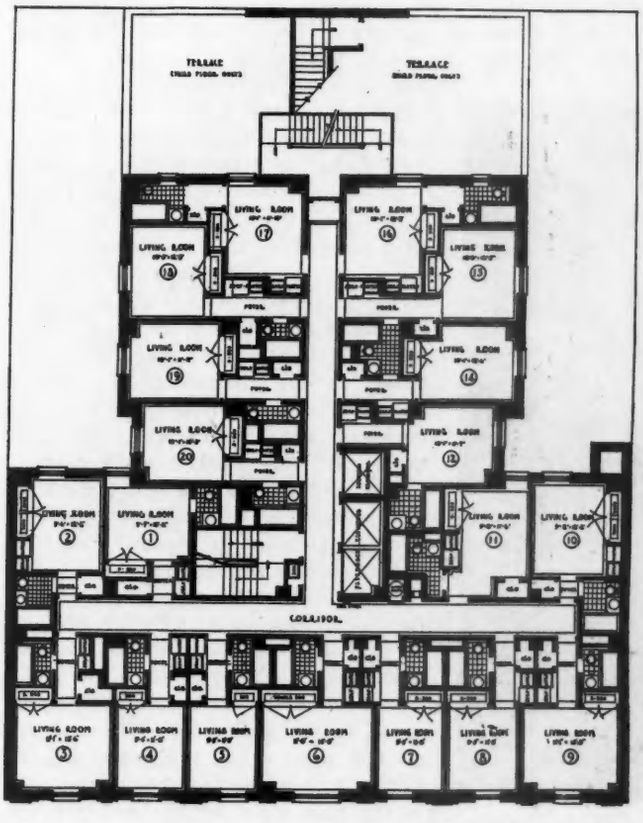
One of the Two-Room Suites of the New Preston House Which Is Also Provided with a Balcony Overlooking the City from High Above the Noise and Dirt of the Streets.

signed furniture will also be provided, including a console-bureau, writing desk, gateleg table and appropriate chairs. A serving pantry in all rooms will contain mechanically cooled refrigeration, a sink, cupboard and electrical outlets so that meals can be prepared quite easily. There will also be a number of two and three-room suites and some of the rooms will have balconies as shown in the typical floor plans illustrated.

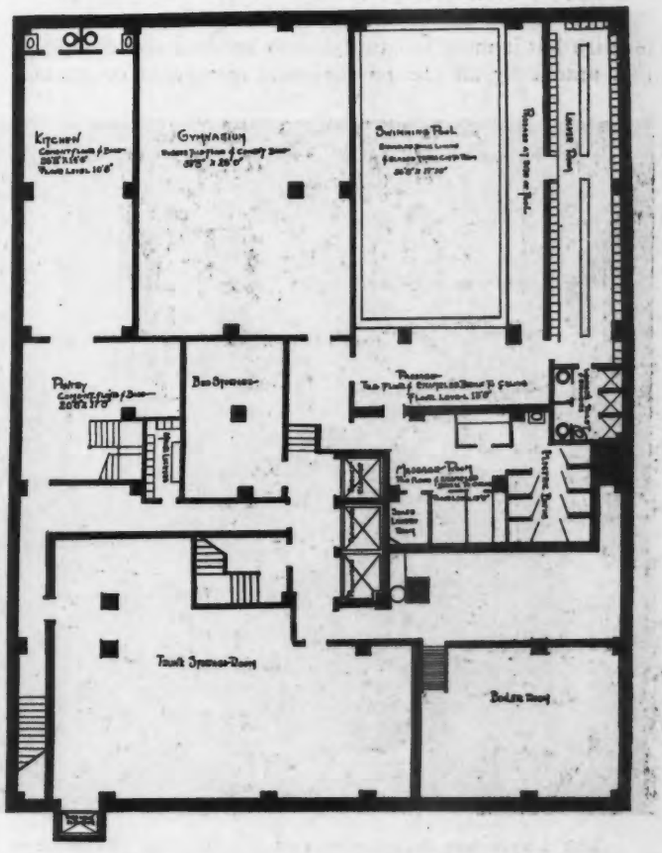
A reference to the plans will show that these rooms are all of generous size and that all have ample closet space which, together with the private bath with both tub and shower, assure true comfort to the occupants.



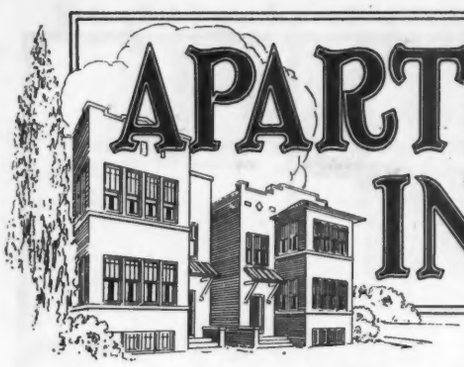
The Main Floor of the Preston House Provides Much for the Comfort and Conveniences of the Guest, a Restaurant, Ballroom, Lounge and Library and Handy Shops Beside.



And Here Is a Typical Floor Plan of the Upper Floors Showing the Arrangement of Rooms and Apartments and Terraces.



In the Basement Will Be Found a Gymnasium, Swimming Pool and Trunk Storage Room for the Use of Guests.



APARTMENT HOMES IN COLORS

A Suggestive Assortment of Eight Designs Showing Trends of Apartment House Planning

BUILDING, today, expresses quite plainly the thinking of the times—the desire for continual betterment in living conditions—the constant progress to still higher standards of mechanical excellence and finer living quarters. It is quite natural for apartment house dwellers who get the latest model automobile every year or two to demand the latest refinements in living conditions which it is possible to secure.

To be old-fashioned may not be a disgrace, but it is certainly odd and amusing and a thing to be shunned, if there is any way to avoid it. Long dresses—gas lighting—the horse and buggy—have long been considered Mid-Victorian and consigned to the limbo of forgotten things. The latest electric fixtures or bridge and table lamps; convenience outlets in every room—for vacuum sweepers, fans, radiant heaters, toasters, coffee percolators, curling irons, radio sets, electric sewing machines, etc.—these have taken the place of the old gas lights and are demanded in apartment buildings tenanted by even average families.

Some of the developments of modern life are rather feverish but it must be gratifying to builders and designers that practically all the developments in modern residential buildings are wholesome. In design, more and more provision is being made to admit fresh air and sunlight. In the bathrooms, more sanitary conveniences, more tubs and showers; in the kitchens, more hygienic garbage disposal and labor-saving conveniences of all kinds.

In the equipment of these buildings, there is a constant tendency towards automatic equipment, or, at least, labor-saving and convenience-saving devices. Automatic heat and automatic regulation of heat; automatic refrigerators; automatic elevators and dumbwaiters; automatic regulation of gas ovens; automatic dishwashers. Doubtless, some day, there will be an automatic way to put out the cat.

The tendency towards smaller suites—or rather, suites with a smaller number of rooms—while pronounced, is offset, in a measure, by the space-saving features provided. An ever-increasing number of disappearing bed installations are being made in all kinds of apartment buildings and apartment hotels. And the disappearing bed is a great space-saver. There is even the possibility of its displacing quite generally the old style beds in single dwellings where it is now frequently utilized. The bed closet and dressing room, adjoining the bath, has many advantages and is popular with ladies as quarters especially equipped for personal adornment.

The Luxurious Equipment and Furnishings Installed in the Modern Apartment Hotel Are Well Indicated by This Picture. As fast as new devices come on the market which add to the comfort and convenience of guests, they are installed by designers and builders.

The apartment hotel method of living now finds its devotees in practically every large city. It removes many of the objectionable feature of transient hotel life and offers many advantages which could not, otherwise, be secured. In fact, the trend in designing apartment hotels is to provide many club features, to make life more enjoyable for their resident guests. Some of these buildings are being equipped with ballrooms, swimming tanks, billiard, card and recreation rooms, and, occasionally, roof gardens and promenades. The responsibilities of housekeeping in these hotels are almost entirely avoided but many suites are provided with sufficient accommodations to prepare an occasional meal, or, at least, to have meals from the cafe conveniently served in the apartment. For this latter purpose, many apartment hotels have serving rooms on each floor from which elaborate meals can be served, the food being prepared in the main hotel kitchen and sent up in elevators or electric dumbwaiters.

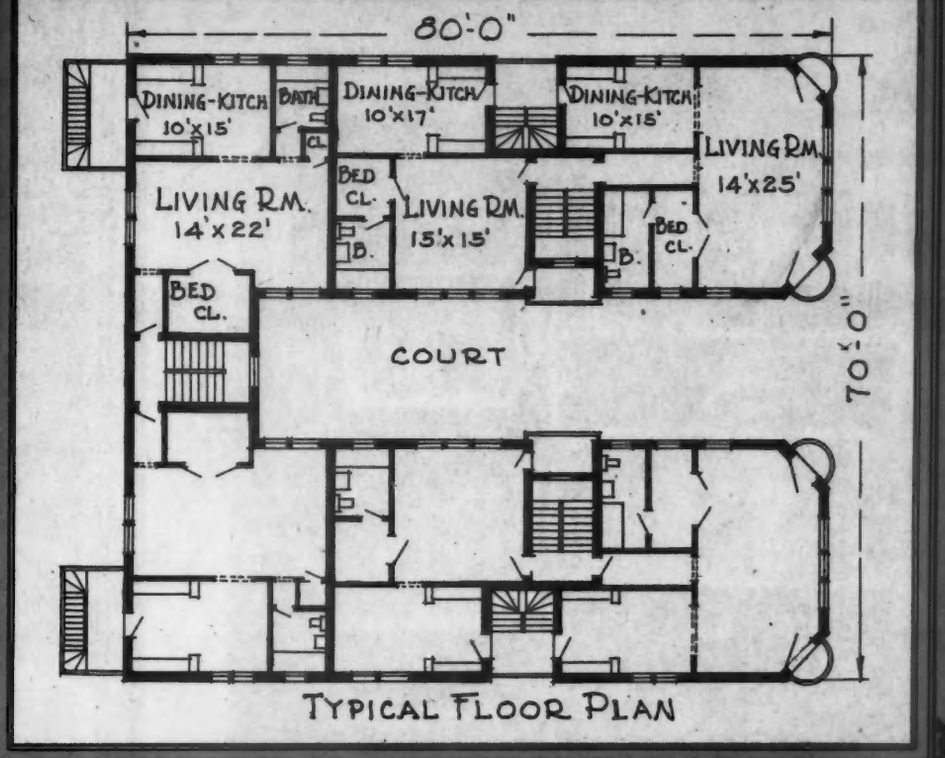
The three-story apartment buildings

(*Continued to page 268*)

THE QUEEN'S COURT APARTMENTS

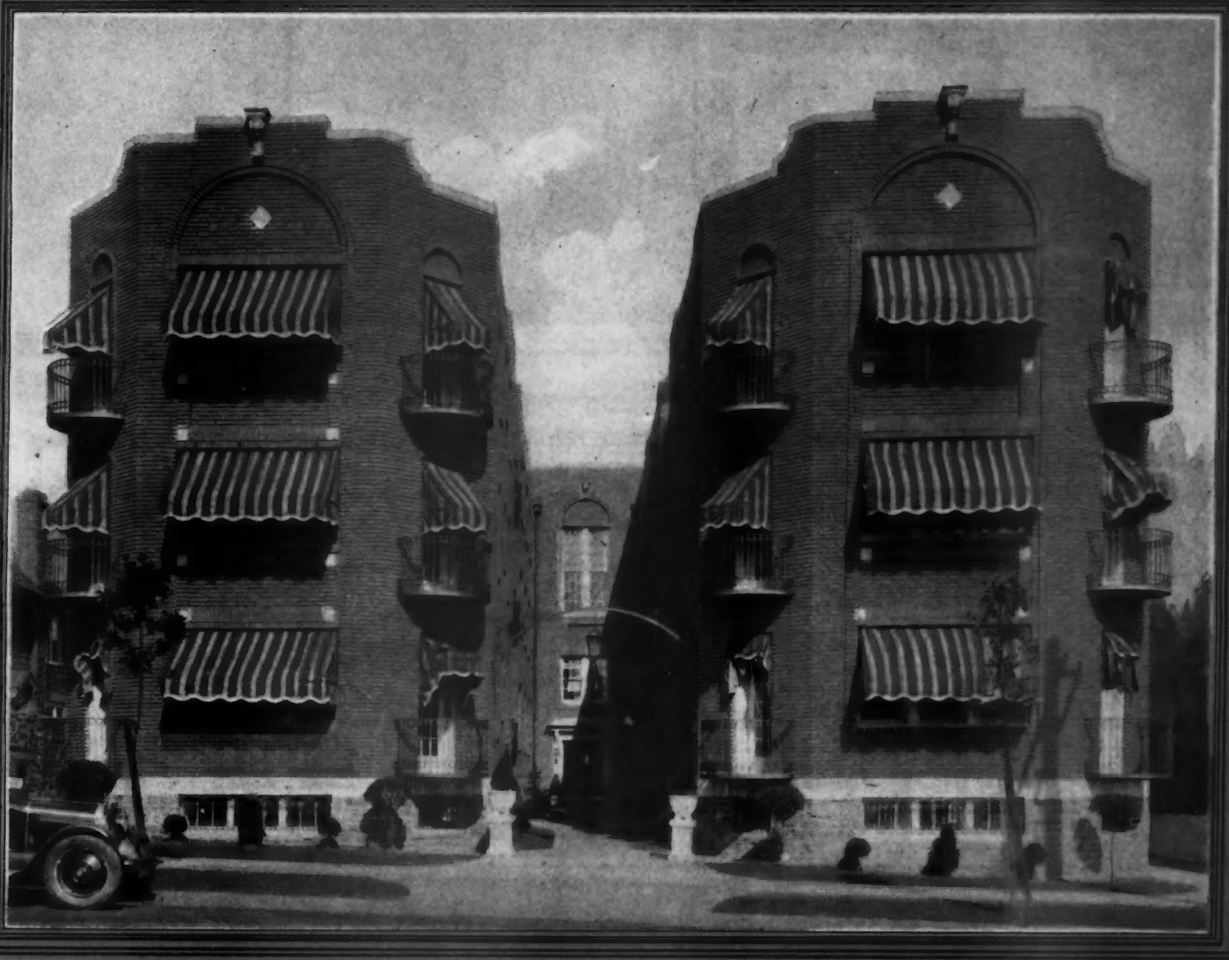
PHILADELPHIA

EDWARD A. ROTH, *Architect*



TYPICAL FLOOR PLAN

PLATE I



An interesting U type modern apartment containing six small apartments on each floor. Thirty-six apartments altogether. This is designed to go on an eighty-foot lot and secure light on all four sides. Bed closets and combined dining room-kitchenette give these small apartments large efficiency.

AN ENGLISH BASEMENT THREE-FLAT BUILDING

Six Rooms to each Apartment

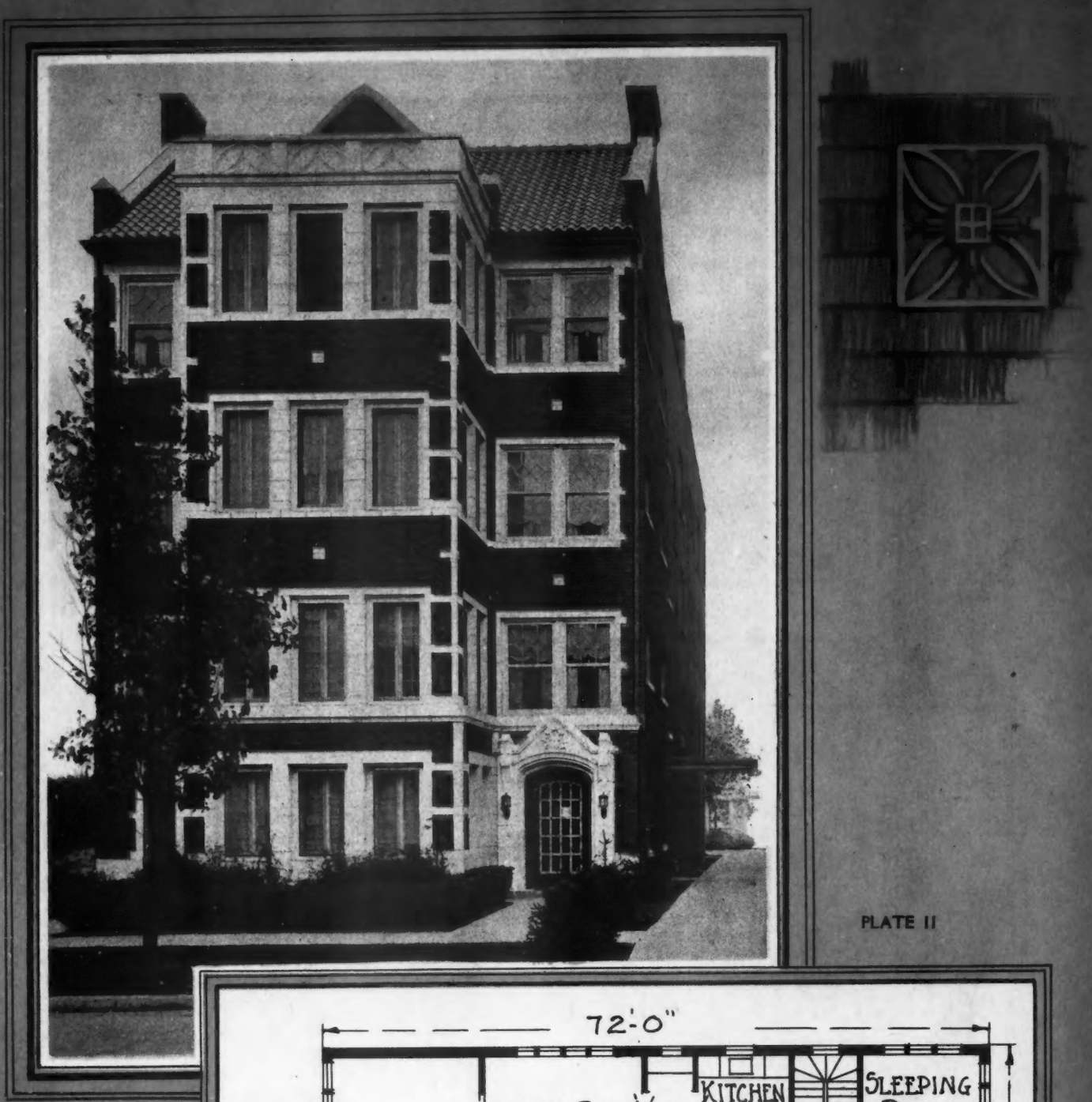
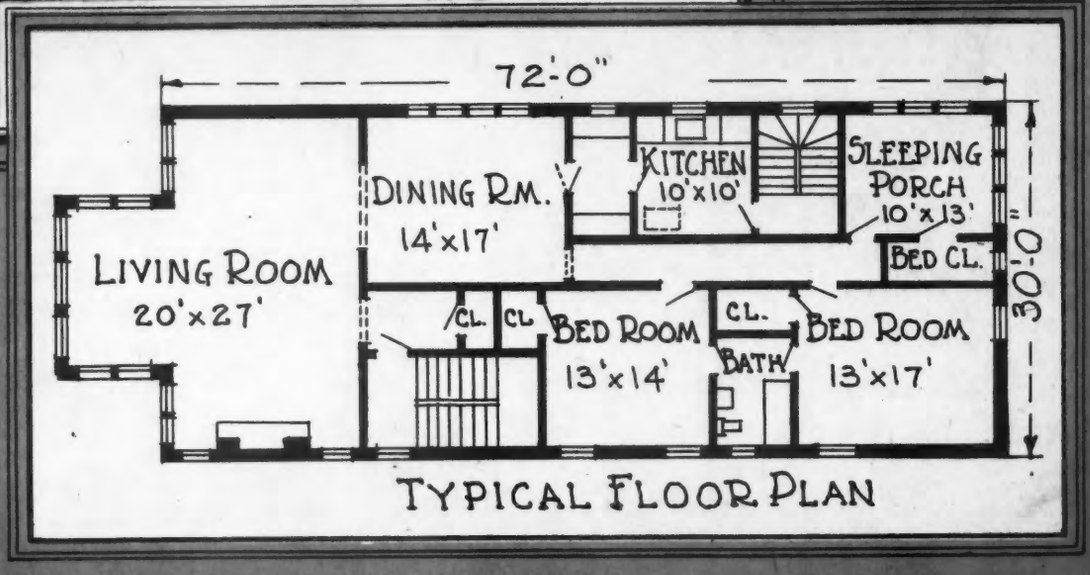


PLATE II

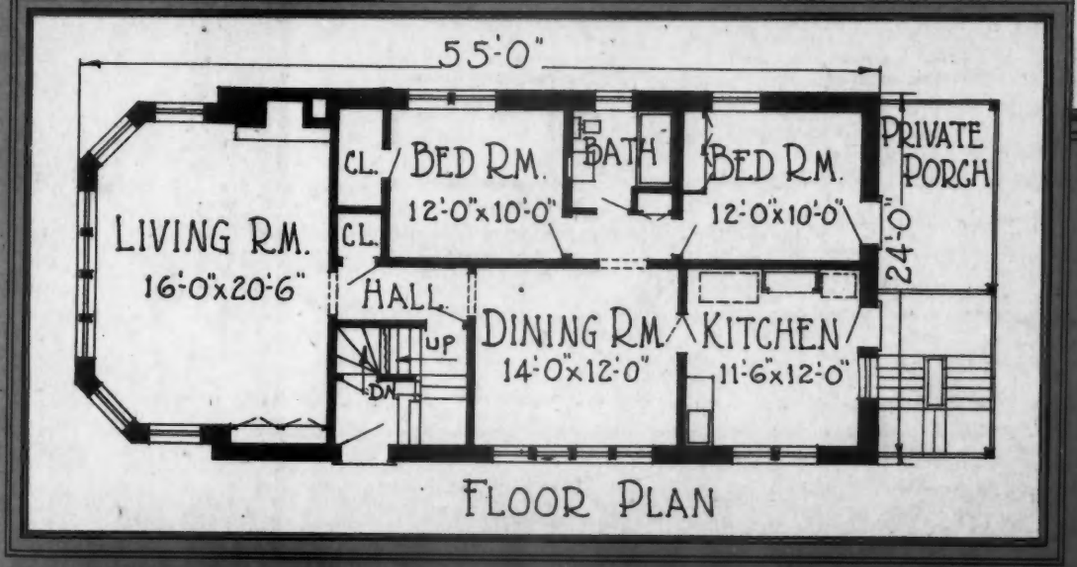


TYPICAL FLOOR PLAN

Here is a popular income-producing home where ground value is fairly expensive. A fifty-foot lot gives light on all sides and a driveway through to the garage. The English basement rooms at the front can be connected by private stair with the first apartment or can be arranged as a fourth small apartment. At the back of the basement are heating plant, laundry and store rooms.

A GLASS FRONT THREE-APARTMENT BUILDING

Five large rooms to each apartment—goes on a thirty-foot lot.



FLOOR PLAN

PLATE III

The big living room with eight windows making this entire room a solarium or sun parlor is the feature of this design. The two bedrooms with bath and the private porch are well separated from the rest of the plan. This is one of the most successful three-apartment designs.

Apartment Hotel at Sarasota, Florida

H. J. Klutho, *Architect*

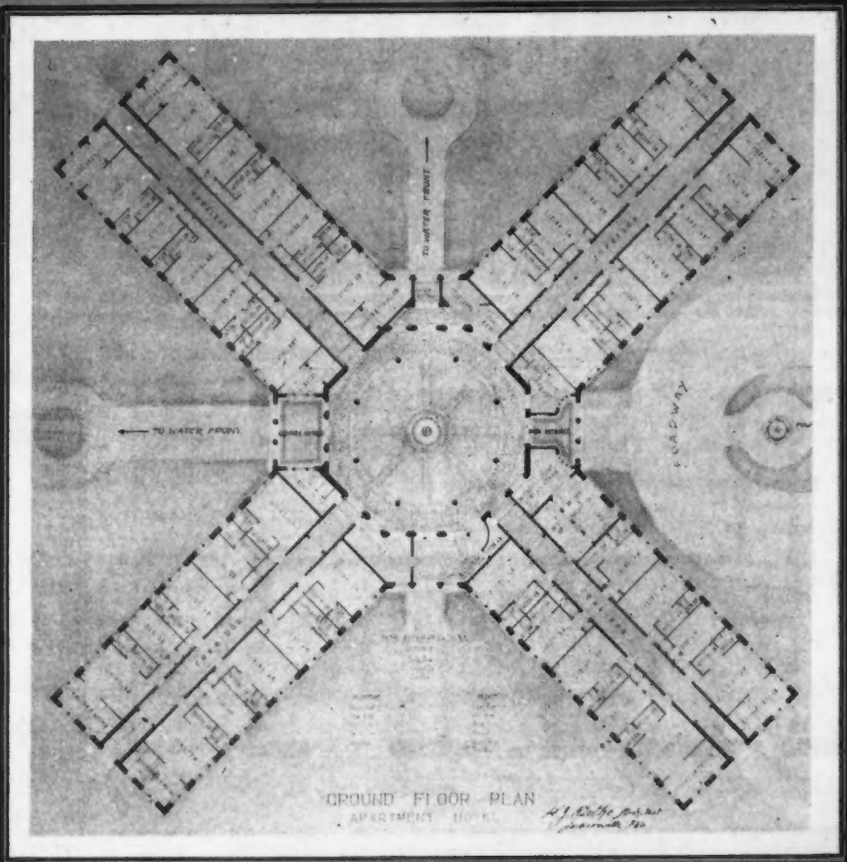


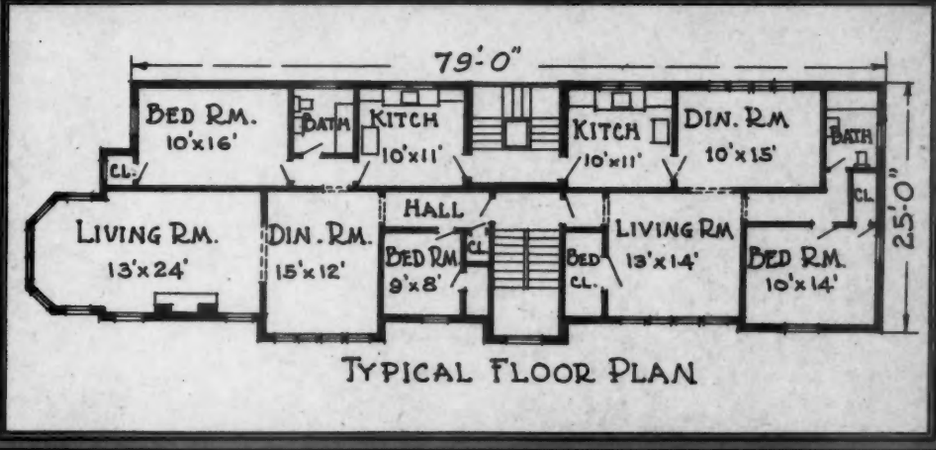
PLATE IV

This is a three-story, cross shaped building with dome. The floor plan shows arrangement for ninety-five apartments. The total width of the building is 236 feet. Each arm or wing is 43 feet wide.

A CORNER LOT FOUR-APARTMENT BUILDING

ALEXANDER V. CAPRARO, *Architect*

This building is located at Quincy and Lotus Streets, Chicago, and presents five room apartments at the front and four-room apartments at the rear. It is of the popular modern type.



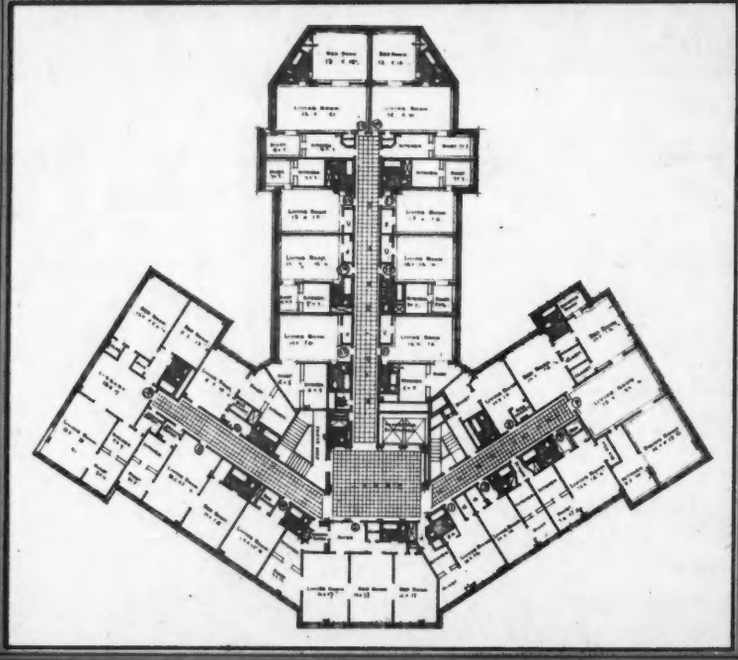
TYPICAL FLOOR PLAN

THE FAIRFAX APARTMENT HOTEL

WASHINGTON, D. C.

Building at 2100 Massachusetts Avenue, valued at $1,100,000

The floor plan of the Fairfax is of unusual shape like an arrow-head. Apartment suites both large and small are provided.



THE SCARSWOLD, SCARSDALE MANOR

NEW YORK

TOWNSEND, STEINLE & HASKELL, *Architects*

This 100% co-operative apartment house contains apartments of four rooms two baths, five rooms two baths, six rooms three baths and seven rooms three baths.
It is being built by HASKELL ASSOCIATES, INC.

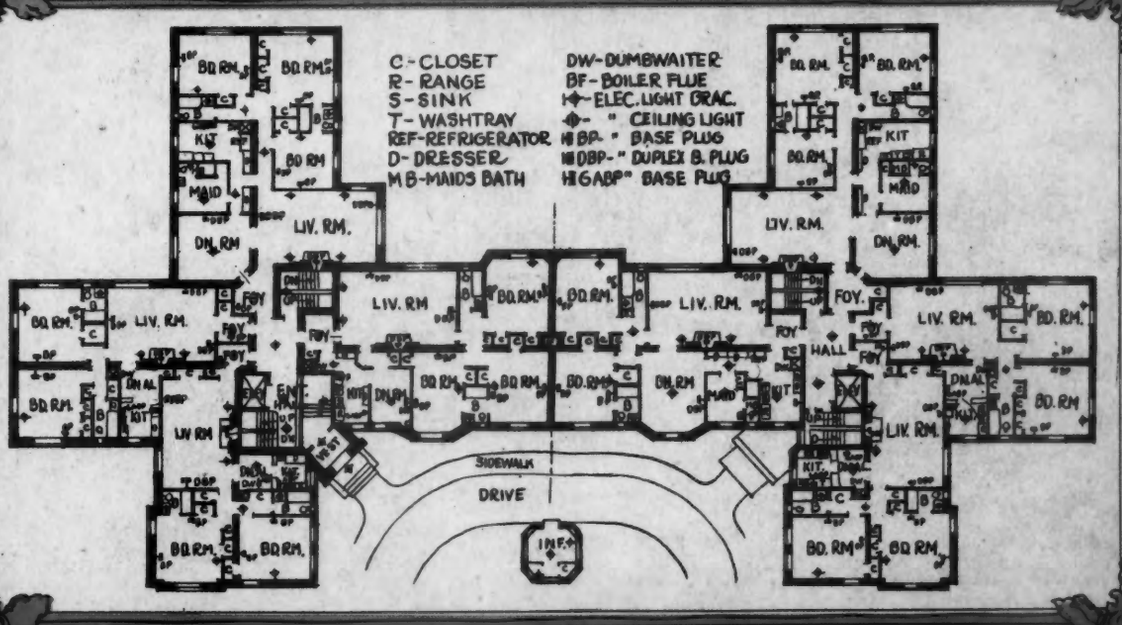
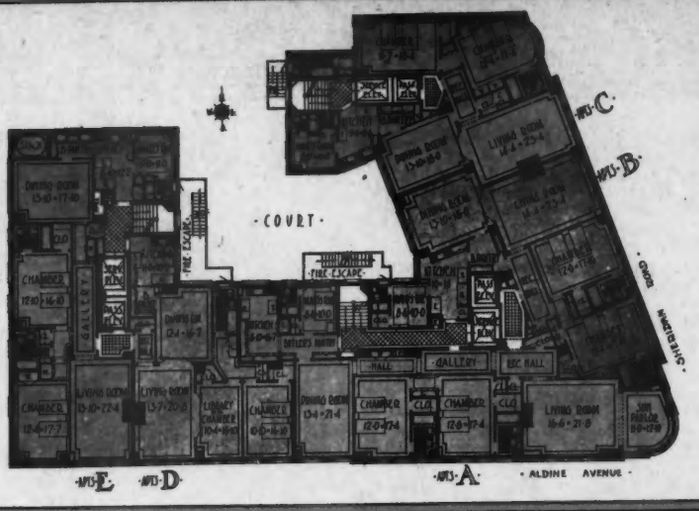


PLATE VII

3300 SHERIDAN ROAD, Chicago

RISSMAN & HIRSCHFELD, *Architects*. EDWIN D. KRENN, *Associated Architect*.

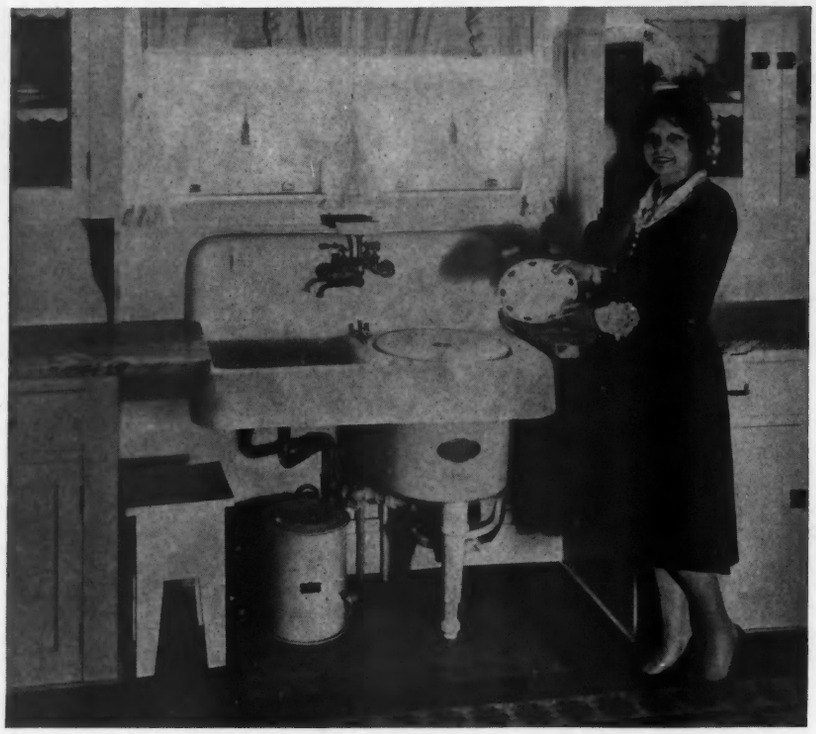


This is one of the outstanding new co-operative apartment projects in Chicago. There are five apartments on each floor.

The Influence of Elaborate Stage Settings as Constantly Presented in the Movies Is Having a Marked Effect on American Home Decoration. This glimpse of a Brooklyn apartment interior with its wrought iron gates and exactitude of period furnishings suggests indeed a "Castle in Spain."

Many Builders Are Installing Complete Kitchen Conveniences

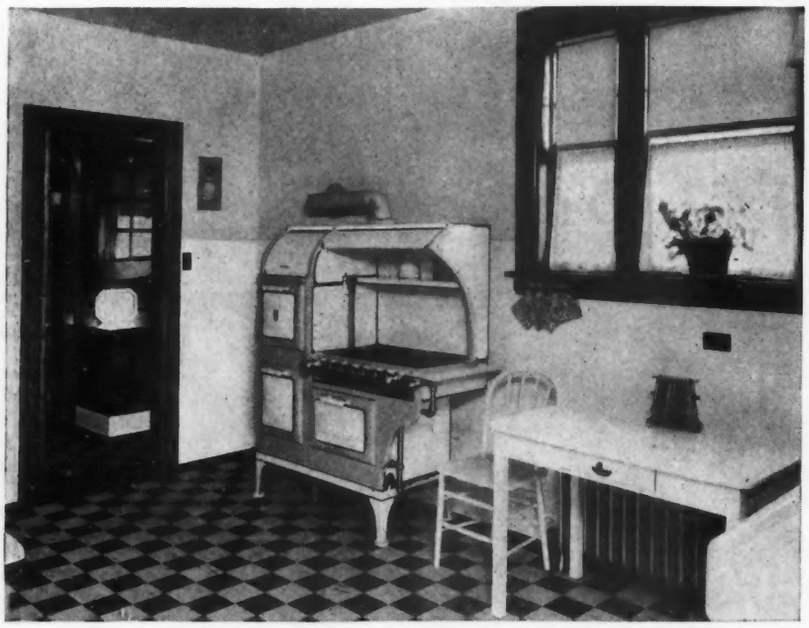
THE builder who would be most successful in building for resale must, to a certain extent, be a student of psychology. He should remember that he is selling, not merely houses or apartment buildings. He is really selling more comfortable, enjoyable home life and the desire for this better and more enjoyable living is the real motive on which his prospect will act. Therefore, the builder should select those house designs, materials and convenient equipment which will stimulate the desire of these home buyers. Desire will be aroused in the breasts of these prospects as the builder or his salesmen explains the advantages of this better built and better equipped home. And the builder should always remember when he is planning a new house or apartment building that the public is being educated to—and is demanding—better equipped residential buildings than have been common in the past.



The Most Complete Modern Sink Has an Electric Dishwasher Installed in One Compartment. This convenience removes one of the "bugbears" of housekeeping and helps to make housekeeping easy and pleasant.

Let us start with the kitchen, and here, particularly, we must consider equipment from the standpoint of the housewife.

The purpose of a kitchen is primarily to prepare food and the cooking range is a primary consideration. While coal and oil stoves must still be used in rural areas beyond the gas and electric lines, gas today is more universally used than any other type of fuel, both for its efficiency and economy. An important feature of economical gas ranges is the manner in which they are insulated. Since heat costs money, economy is gained by preventing the loss or waste of heat; the better the insulation, the better the gas range. This applies particularly to ovens, but the hoods are also being insulated. A gas range is illustrated in this article which is said to be so perfectly insulated that the fireless principle is claimed for it; namely, that it will cook by retained heat after the gas is turned off. As is well known, this method of cooking retains the juices and the flavor better than the direct application of heat and the food is correspondingly nutritious, healthful and economical.



In the Corner of This Attractive Looking Kitchen Is Seen a Gas Range with Three Ovens Besides the Warming Oven. There is a deep hood extending completely over the burners and connected with a chimney vent to carry off fumes or odors. This is a very complete and well finished range.

There is a great variety of choice offered to builders and owners in the selection of gas ranges for apartment house, hotel, hospital, club, school, cafeteria and single dwelling use. In addition to insulation, the points to be considered are size, design, burner design, porcelain finish, quality of metal used and such added conveniences as pilot lighting and oven regulators.

The oven regulator automatically shuts off the oven gas at the time set, so that roasts and other foods will get exactly the temperature for the time previously determined to give perfect cooking results. The housewife or her cook may safely absent themselves without danger of burning the food in the oven where one of these oven regulators is on guard.

Some gas range manufacturers are lining their ovens with special rust-resisting metal —an excellent feature in view of the steam from basting water and moisture in foods.

In apartment buildings and small kitchens in single dwellings, compactness and space-

saving are valuable in gas range design. To meet this requirement, some manufacturers offer models which utilize the space beneath the burners in which is fitted cabinet drawers for convenient storage of cooking utensils or dishes. In fact, one design places a small gas range in the central space of a complete kitchen cabinet built around it.

Electric ranges are being used in greater numbers every year and are extremely convenient and clean to use—the use of matches being unnecessary. They are easy to control for any degree of heat desired and there are no fumes to be vented. It is, however, necessary to provide special power wiring with outlet in the kitchen where an electric range is to be installed.

Kitchen cabinets contribute greatly to the appearance and convenience of any kitchen. By establishing a well designed "place for everything and everything in its place," confusion and disorder are avoided, time and steps are saved and housekeeping made more attractive.

Here, too, builders and owners are offered a wide range of choice. Kitchen cabinets can be made of either wood or steel and with every sort of compartment for convenient storage of cooking utensils, flour, spices, flavoring extracts, and similar cooking accessories. They can also be had mounted on casters as portable cabinets or in sections or units which can be mounted up together and extended as desired or as space permits. These separate units are usually for permanent installation attached to the wall.

Special shelving and compartments for dishes and everything used in a kitchen are obtainable. Indeed, many designers take advantage of the very complete storage facilities which may be had in kitchen cases to conserve floor space by eliminating the pantry which would, otherwise, be necessary. This has a tendency to reduce building costs.

This Well Insulated Gas Range Is Said to Cook by Retained Heat with the Gas Turned Off on the Fireless Principle. In addition to the gas saving, there is said to be a substantial saving in the weight and value of the cooked foods.

A special knock-down feature has been introduced in a wooden cabinet recently placed on the market. It is shipped in sections, as shown in the illustration, which the builder can place in position and attach to the wall. As many units can be assembled in this way as desired and they match and fit into the completed whole. Sections can be extended across under a window and the upper sections attached to the wall on each side, which will often solve a problem of limited wall space. In fact, it is good practice to carefully consider the kitchen cabinet and cases at the time the building is being planned, so that there may be suitable wall space provided where it will make a convenient kitchen. The wooden knock-down units shown are classed as portable because they can be so easily disassembled and repacked, should it become necessary to move them.

Here Is a "Knock-Down" Kitchen Cabinet of Wood Which Comes in Sections, but Is Easily Installed by the Builder. A hammer and screwdriver are all the tools required to assemble and place these kitchen cabinets. They can be adapted to almost any wall space.

Most of the complete kitchen case installations include a compartment for brooms, vacuum sweepers and the like and often include a compartment with folding ironing board. However, these latter are frequently provided and built in as separate millwork features.

No modern house or apartment building is considered complete today without adequate kitchen cases and cabinets, as well as gas or electric ranges and refrigerators. Refrigerators are mechanical or for outside icing.

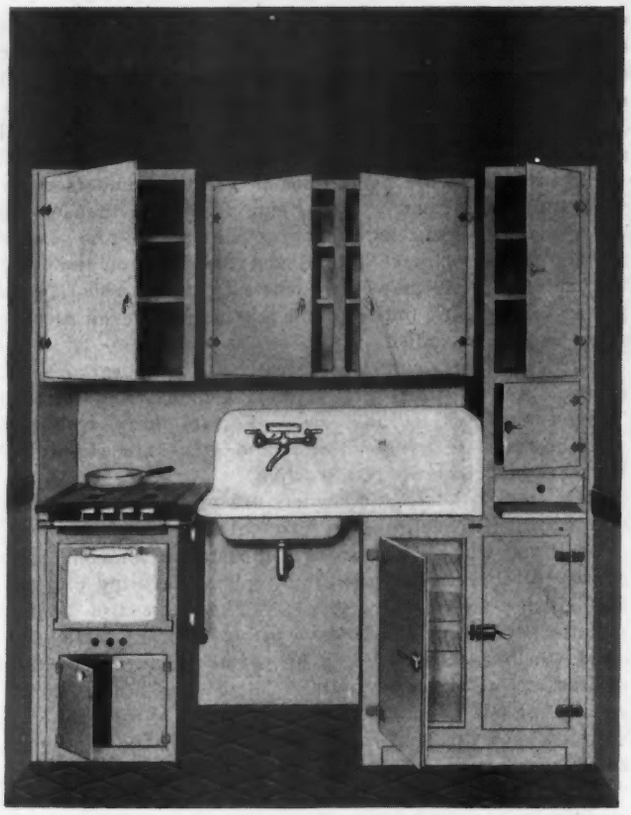
Convenient and sanitary disposal of refuse and garbage is a problem to be solved in every type of residential building. Accumulating garbage is a nuisance and the ordinary garbage can arrangement is scarcely adequate. Heavy metal receptacles to be buried underground are obtainable and this arrangement is neater and more sanitary, as prowling dogs and cats cannot reach it nor are swarms of flies attracted to it.

Immediate burning in an incinerator is an extremely effective method of garbage and refuse disposal and few kitchen conveniences are appreciated more by housewives than the flue type of incinerator built into a special chimney and connecting with grates in the basement. With the chimney-fed incinerator all garbage and waste material is dropped into a handy hopper door in or near the kitchen of a home (or hopper doors on different floors of an apartment building) and falls down a flue connecting with the incinerator in the basement. This consists of a brick combustion chamber with fire brick lining. It is built with a special arrangement of grates and by-pass flue, to provide proper draft control which insures complete and odorless combustion of garbage and waste. The opening into the flue from the kitchen is automatically closed while the hopper door is open to receive refuse or garbage. This device prevents smoke or odor in the kitchen and also prevents back-drafting of the incinerator fire. It is a simple matter for any mason to build the chimney or flue which contains the special incinerator grates and accessories. Blueprints and full instructions are furnished by the manufacturer of this device.

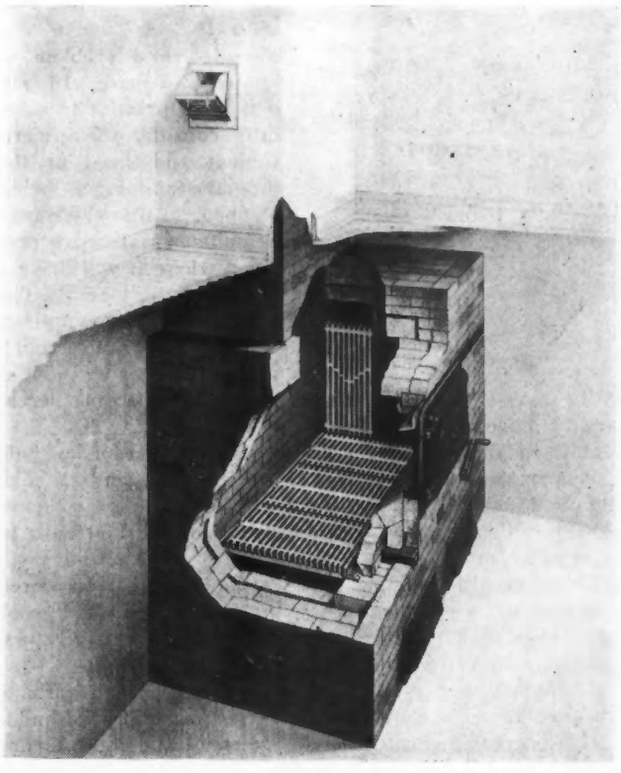
The incinerator is lighted at intervals (a match does it) and the whole mass burns without further attention. Noncombustibles (tin cans and the like) are flame sterilized and dropped into the ash pit for later removal with the ashes. In some incinerators a gas flame drys the garbage and aids combustion, in others the combustible waste deposited is fuel for its own destruction.

When this device was first put on the market, sales were mainly to apartment buildings, hospitals and other large residential buildings, but it is now sold in large quantities for installation in single family dwellings where incineration contributes greatly to easy and convenient housekeeping and the comfort and health of the whole family.

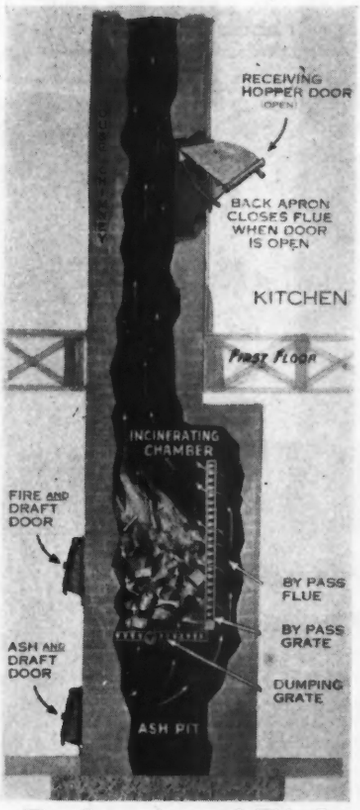
A breakfast nook off the kitchen has been a feature of house design for a number of years and is still popular. Built-in table and seats are integral parts of these alcoves and can be had in substantial and attractive millwork all ready for the builder to install. The kitchen, of course, must be well finished, well lighted, clean and attractive where the dining alcove opens off it. This is a feature of American home designs which speaks well for the American kitchen and its attractiveness.



Steel Cabinets Similar to the Above Are Now Being Installed in 271 Kitchenettes in a Large New Apartment Hotel in Chicago. Note the small but complete sink, drainboard, mixing faucet and gas range incorporated in this steel cabinet, thus conserving space in each of the 270 similar suites.



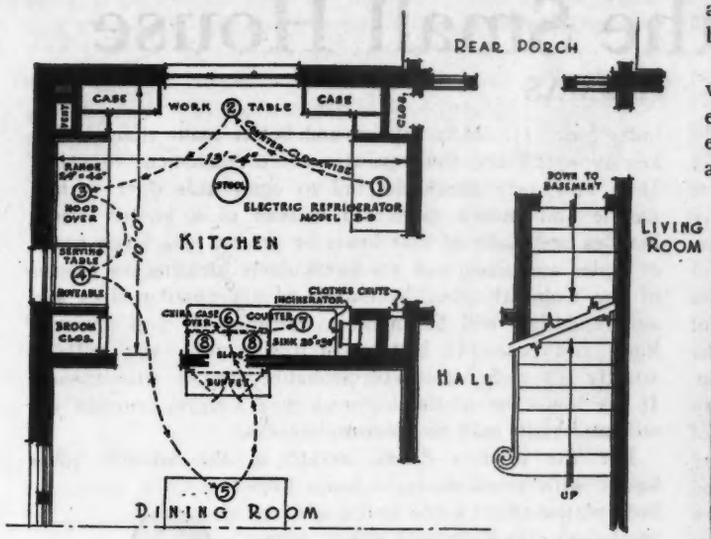
Cut-Away View of One Make of Incinerator Which Has Grates, Fire Door and Ashpit Installed in the Basement. The refuse or garbage drops down through the flue and is consumed without odor or smoke in the house.



The Convenience of This Incinerator Can Be Appreciated by Looking at the Picture. Garbage, paper or refuse of any description can be instantly disposed of through the hopper doors at each floor above.

Milk and package receivers are certainly called for under modern delivery conditions. They more than pay for themselves in added comfort and quiet—to say nothing of the wear and tear on the side or back door. Such a receiver is an added convenience when there is no one at home and deliveries have to be made. Meat and groceries left on the back porch are quite apt to be devoured or injured by stray dogs and cats.

Even the kitchen sink —so long a standard article — has started



The Electric Refrigerator, the Work Table, the Range, Serving Table and Sink Make Up a Circuit for Efficiency in Preparing and Serving a Meal.

its evolution towards a higher plane of usefulness. The latest is the electric sink, with an electric dishwasher in one compartment. Even the husband will appreciate this if he has been impressed into domestic service and the average woman will go into raptures over it, for it removes her pet "bugaboo" if she desires to dispense with a maid.

Even without the dishwasher, the compartment sink seems to have come to stay and the old, familiar rattle of the dishpan will be a thing of the past.

Over the sink, a mixing faucet with convenient handle and nozzle is a kitchen convenience which should have been thought of years ago, but has only been available in recent years. Tempered water is more often required than water which is scalding hot.

Besides the wiring and lighting fixtures—and modern kitchens are well lighted—convenience outlets should be installed for electric irons, dishwashers, etc. Even electrically operated coffee percolators, toasters and waffle irons, beaters and mixers, while not generally installed by builders, must at least have outlets for cord connection and if an electric range is to be used a special power outlet must be provided.

Not the least of these electric conveniences and one which builders are finding it profitable to install is the electrically operated ventilating fan, usually set as an exhaust fan in one of the kitchen windows. These fans absoutely eliminate disagreeable cooking odors in the living rooms and keep the kitchen pleasantly cool in the summer time. Indeed, the kitchen of tomorrow bids fair to be one of the most orderly, comfortable, convenient and interesting rooms of the modern household.

Kitchen Cabinet Assembly in the Model House at the Indianapolis Home Builders' Show.

✣

1927 Safety Congress in Chicago

FOR the first time in years the annual convention of the National Safety Congress will be held in a hotel large enough to house under one roof its several thousands of representatives, its hundreds of exhibits and its scores of sessions. The Sixteenth Annual Safety Congress will be held at the Stevens Hotel, Chicago, September 26 to 30.

The Built-In Ironing Board Is a Favorite with the Housewife. This model has some special features.

The Pullman or Breakfast Nook Is a Worth-While Addition to the Kitchen. Lunches served here save many steps.

Hardware for the Small House

By W. N. THOMAS

THE small house, designed to be a real home, should be a place of comfort and simple refinement. In order that this shall be accomplished painstaking care should be observed in the choosing of each of the many products that are brought together and built into this house. Usually the most obstinate element to subdue is cost, and because this inconvenient obstacle is forever rearing its head is all the more reason for the exercise of careful judgment in the selection of materials to see that the money to be spent yields the utmost in enduring satisfaction.

It is reasonable to say that for the amount of money spent, no other material entering into the construction of the small house offers so much in the way of utility and decorative possibilities as hardware. Each piece is called upon almost daily to actively perform its duty, and at the same time, if properly chosen, it lends to its surroundings a decidedly artistic effect. For the small house it is not expected that the heaviest and most expensive hardware will be used—it would not be in keeping. Neither should the cheapest the market offers be selected—it is quite apt to prove unsatisfactory in operation, endurance and design. But between these extremes hardware designed especially to meet the requirements of the small house is made by manufacturers with national reputations, hardware that is well constructed, of good appearance and at the same time moderate cost.

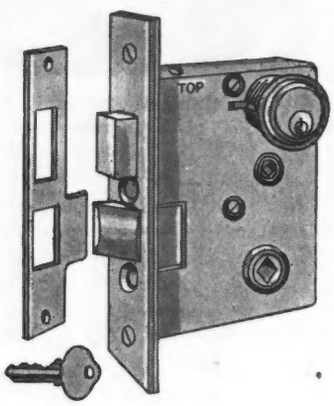


Fig. 1.

Generally speaking, hardware is made of cast iron, wrought steel, brass and bronze. Brass and bronze are alloys of copper, and in all practical ways are of equal value. Their chief difference is in their color. As we know, the natural color of brass is of a *lemon* yellow, while bronze is of an *orange* yellow. Both brass and bronze are used in cast and wrought. *Cast* brass and bronze may, except for the "front door," be generally eliminated in this case as being unnecessarily expensive for the small house. Iron and steel are subject to rust, while brass and bronze are not and, therefore, retain their good appearance indefinitely. Iron and steel are so successfully plated to imitate real brass and bronze that the average person cannot distinguish the real from the imitation. The best safeguard on this point is to buy from a reputable dealer and rely upon his word. Each of these metals is regularly furnished in a number of finishes produced by artificial oxidation to give color effects that will best bring out the design and to harmonize with the various woods.

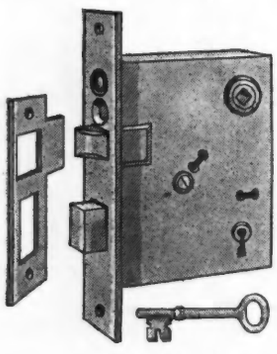


Fig. 2.

These finishes when well chosen are reasonably satisfactory and contribute largely to the artistic effect.

The front door offers a special opportunity for the expression of individuality and good taste. It is quite worth while to choose for this door a cylinder lock (1). It is heavier and better made than the bit key type (2) and the keys are more convenient to carry. It is now very much the fad to equip this door with a handle and thumb piece (3) instead of a knob. These handles are made of cast brass or bronze in a large range of styles and sizes, and are particularly pleasing on houses of the Colonial type. A handle of the smaller sizes and simple design will be most in keeping. If you prefer a knob and rose (4) instead of the handle, you will be strictly all right and will probably save a ittle money. If the house be of the Colonial type a brass knocker (5) will materially add to its completeness.

For the interior doors, except in the kitchen, glass knobs with small wrought brass keyhole plates (6), (if the knobs are not too large) give a pleasing effect. About the most that can be offered against glass knobs is their popularity. If you would like to have "something different" a small brass or bronze knob (7) with small keyhole plates will be modest and very good looking and at the same time be "up to the moment" in style.

Fig. 3.

As bathrooms and toilets are usually done in white, and all the plumbing fixtures are nickel plated, all hardware showing in these rooms when the doors are closed should be nickel plated, and it should be nickel plated on brass or bronze so there will be no chance for rust coming through as would very likely occur if the nickel plate were on iron or steel because of the dampness common in these rooms. The knobs may quite properly be of opal-glass as they produce a pleasing harmony with the general white surroundings. Locks for the entrance doors to baths and toilets should be made to lock on the inside with a small turn knob (8) instead of a key. The turn knob will always be in place while keys are apt to be lost. These same locks may be had, at very slight additional cost, so they may be opened in emergency by a key from the outside. This is an important feature that will be appreciated by an owner. The small knob for the medicine closet should match the inside knob on the entrance door.

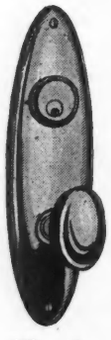


Fig. 4.

In these days kitchens and pantries are usually bright and cheery with white paint and to complete the effect white porcelain knobs with nickel plated brass trimmings (9) may be chosen. These white knobs can be indefinitely cleaned with a damp cloth without injuring them.

Fastenings (10) for top dresser doors should be placed low and those for the bottom doors high so they will be within easy reach. For dresser drawers you will find bar pulls (11) much more convenient than the old fashioned drawer pulls because you can take hold of them from the top or bottom with equal ease. Unless the drawer is wide, one pull is better than two as the force to open the drawer is better balanced.

Fig. 5.

In years past there has been a larger variety of fastenings for double-hung windows than

of any other one item of hardware, but a few years ago a type of fastener (12) was invented that has gradually, because of its merit, pushed all other kinds into the discard, and it has become the standard for all double-hung windows in all kinds of buildings. This style of fastener is made in several sizes. A medium size should be chosen as the smallest size is too light for satisfactory service.

Fig. 6.

Fig. 7.

While it may cost a little more to put on flush sash lifts (13) still the finished effect will be attractive to an owner. Sash bead screws and washers are a convenience and make a good finish.

Fig. 8.

Fig. 9.

Casement windows usually open out and should be hung on galvanized hinges with brass pins so rust will not put them out of use. There are a number of adjusters or openers on the market, designed to be operated by a handle from the inside. It is best to adopt the one your hardware dealer has tried out and knows to be satisfactory. The fastener may be of a simple but effective kind, something like (14), which has a handle for drawing the window tight.

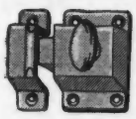


Fig. 10.

Fig. 12.

Fig. 11.

Fig. 13.

For all interior doors in the small house steel butts, plated to match the other hardware, may properly be used, as the higher quality ones of brass or bronze would be rather expensive for this type of house. If you wish something a little better than the regular steel butts, you can get them at a little extra cost with ball bearings. The additional wear will justify the expense.

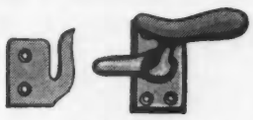


Fig. 14.

The illustrations accompanying this article were chosen to represent types rather than special designs. Several of the leading hardware manufacturers can show a number of designs from which suitable selections can quite well be made.

✣

Successful Year for Demonstration Homes

New Program for 1927 Announced

AMERICAN families living in modest six-room houses now demand two bathrooms, enclosed porches and two-car garages, according to a survey made in 21 cities throughout the United States by the Home Owners' Institute in connection with the annual model demonstration homes campaign inaugurated by the Institute last July. The Institute is composed of national organizations and associations in the building and allied field who have undertaken to raise the standards of residence construction through a modern version of an old-fashioned idea.

The terms of this program provided for the construction during 1926 of 360 model homes in 28 key cities from coast to coast of standard, nationally known building materials and equipment. This set up was surrounded with an elaborate, accurately gauged publicity program that has been followed to the letter and even expanded beyond the original provisions to the ultimate benefit of the realtors on whose property the houses were erected, the builders, the material and equipment manufacturers and the local co-operating organizations who were drawn into the picture.

Early in February 223 of these 360 scheduled houses were under bond to be built in 21 of the 28 cities and by early spring the first national model homes program will have been completed. The overlapping of the 1926 and 1927 work of the Institute is due to the fact that the original plans called for an April, 1926, start and development of the program delayed this date until last July.

However, the 1927 activities of this progressive organization are already under way and builders in Boston, Pittsburgh, Detroit and Westfield, N. J., who have just turned the last visitor from a 1926 model home are now preparing to build again.

Moreover, the Home Owners' Institute, whose headquarters are in New York City, and the various co-operating builders throughout the country, have raised a fund of nearly a quarter of a million dollars to spend during 1927 to advertise brass piping, proper wiring, accurate construction and other items that produce efficient homes. Seventy-five thousand dollars will be spent in national magazines, both class and trade publications, and $150,000 will be placed in newspapers in cities where the demonstrations will be enacted.

Architects, builders, realtors, manufacturers and the Home Owners' Institute itself learned a thing or two during the first eight months of this campaign as to what the public wants in the way of small homes, according to L. Porter Moore, president of the Home Owners' Institute. So great was the clamor from Buffalo, N. Y., to Atlanta, Ga., for two bathrooms in a six-room house that Arthur Bates Lincoln, architect, consultant for the Institute, is now redrawing three of the six basic designs prepared for this program and including the extra bath. In addition, two-car garages were used in almost every city instead of the modest one-car structures originally planned and this change, too, was made because of the public desire.

Moreover, it was specially noted in each city where the demonstrations have been held that the rank and file of people who tramped in and out of these houses talked glibly of building materials and equipment by their trade marked names. This, says Mr. Moore, is the reward of organizations who have been engaged in educating the public along these lines.

"A few years ago it was quite unusual for the layman to speak of building materials by their trade marked names," writes Mr. Moore in the Institute report. "Now we find the public surprisingly familiar with the products of national manufacturers. I believe this is due in part to the educational effects of the national model homes campaign and partly due to the great care with which advertising is being written for organizations in the building and allied fields. When the public begins to talk of G. E. wiring, Crane plumbing and Long-Bell lumber, we can be assured that our task will be easier in the future. They are half sold on the merits of standard materials and equipment when they have gone so far."

Other findings of the Institute include a desire on the part of builders throughout the country to construct brick homes, an increasing use of plate glass in windows, and a demand on the part of the public for from four to six convenience outlets in the living rooms and dining rooms. The use of plate glass for small home windows is due, according to Mr. Moore, to the popularity of casements.

Except in one instance, all of the model demonstration houses that have been opened for public inspection were sold before the closing date. The Miller-Storm Company of Detroit sold seven houses, representing sales totaling $125,000.00, directly traceable to the model home visitors.

The 1927 program provides for 360 new model demonstration houses in 28 cities—some to be the same cities selected for the 1926 campaign, and some to be new centers.

DETAILS OF HOME BUILDING

Developing the House Plan, Part II

By V. L. SHERMAN,
Lewis Institute of Technology

RESUMING a discussion of the development of house-plans from a picture. It is of first importance to know something of the interior beforehand beyond conjecture. Some architects can forecast in their own minds when a floor-plan has been prepared. Some builders can do the same, and, perhaps with more accuracy, because of their experience. The ordinary mortal cannot. The writer of this is no immortal.

The floor-plan as worked out for the picture is shown in Fig. 1, and registers only one change so far. The chimney has been moved back along the ridge about 10 feet. Supposing the arrangement to be more or less acceptable according to the specifications for the first floor. There still exists in the mind of the future owner a desire to see something of the inside of the house. If he is a ravenous reader he will have seen in print sketches of many delightful interiors completely furnished with everything except owners. Some of these sketches are accurate drawings and some are very inaccurate; but to the ordinary mortal a distinction is hard. The sketch of one prize-winning breakfast-room, 9 by 10 feet, comfortably accommodated a dining-table, three dining-room chairs, a tea-cart, a floor lamp, and a chaise-lounge, besides a swinging door. Another, a second floor bed-chamber with a dandy little fireplace, took a dresser, chairs, and twin beds. When drawn out to scale the foot of one bed could have been used for a fire log. A new moon heralds this month, spring comes with the moon's full, and lunacy is especially rife. To the hopeful future owner I would say: trust to your architect's or builder's experience and the plans, but do not trust to the imagination of an illustrator.

To back the statement the drawings have been arranged for the opposite page to show how interiors can be gaged, just as exteriors are, by merely reversing one phase of the operation. These sketches over diagrams, Figs. 2, 3 and 4, are in fact more accurate than photographs because the vision limits are easily defined in a sketch, whereas a camera lens may overreach the eye or may warp the lines unnaturally.

Coming in to the hall the person stops at B, Fig. 1, and looks to the left as shown by the arrow. Assuming that his eyes are 5 feet above the floor, he will see about as much as is shown in Fig. 3. Should the door opening from the lounge into the heater-room be open, he will see more than the average hostess would deem necessary. Better swing that door into the lounge or from the opposite jamb. From this sketch a gairish amount of wall space is shown along the south wall and room for a settee next to the fireplace.

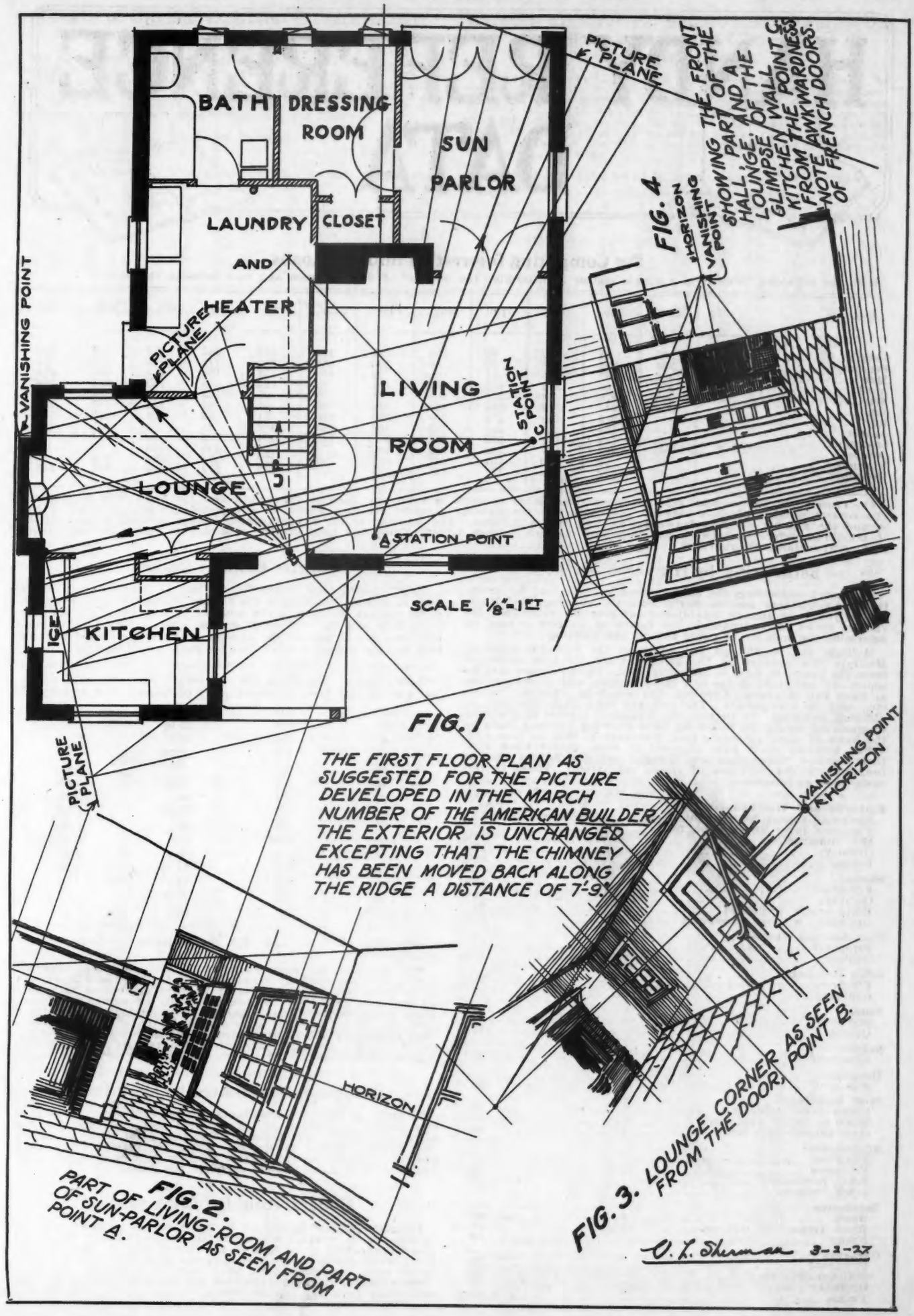
Turning in to the living-room, the observer stops at the point A to look toward the sun-parlor, as in Fig, 2. In this case he is given a chair and his eye level is about 3 feet 6 inches. Probably the first thing noticed will be a predominance of doors which, in a plan, look very innocent. According to specifications this sun-parlor is to double as an emergency bed-room. But for ordinary use the doors could happily be out of the picture. Better place a jointed door to the left, one which could be folded back against the chimney. This sort obliterates itself and does not cover usable wall space. A composition floor, when brought across with the hearth line, contrasts pretty strongly with the hardwood of the living-room. That seems open to change. Possibly the observer registers other items on his cuff and walks across to the window. Here he faces about and looks across the hall into the lounge.

Here again are noticed the unnecessary doors. The opening from the living-room into the hall should either be narrow enough to make the closing and opening of a door of little moment, and thereby accord real separation between the rooms, or there should be no doors. French doors properly used are to be appreciated. A coarse batten door would look well from the lounge side only. Here again from a scale perspective one can see the loss of wall space.

The kitchen is to open into the lounge. Not much of the kitchen-case is visible, and a step to the right would put it entirely out of sight. Such sketches show just how much of other rooms can be seen from any particular point, and it may be in order to say here that too little regard is given to a nosey pair of eyes. They are not welcome in any home and are especially active in homes that are poorly planned as regards doorways. Many owners would sacrifice personal convenience, furniture arrangement, almost anything to hide a bath room. Now take a straight edge, and by placing it in various positions on the floor-plan, Fig. 1, calculate the visibility of the bathroom from the sun-parlor or living-room. If the doors were moved to the opposite ends of the partitions how much would that improve matters. Try swinging the doors into the left. It is a curious game to play through the house but excellent practice.

All of this may seem outside the general run of house construction and entirely unnecessary—unless you have to live in the house. It is not however. Paper and pencil cost little. The time of one man, even that of a highly paid architect, doesn't equal that of a crew. And material is especially costly when it has to be ripped out. No good builder or architect but hopes for an uninterrupted job.

The construction of these sketches follows that shown on page 187 of the March number of the AMERICAN BUILDER. The picture plan is drawn in at 90 degrees to the line of sight from the station point. The various corners are carried over to the picture plan from the station point and returned to any suitable horizon in parallel lines. The vanishing points are carried down to the same horizon, and the floor, trim, and ceiling lines are run from their respective vanishing points as shown. Running out of the picture from right to left is easily detected because of the apparent absurdity of proportions. Sixty degrees is about the limit of vision, except for those gifted with wall-eye.


BATH
DRESSING ROOM
SUN PARLOR
LAUNDRY
CLOSET
AND
HEATER
LIVING ROOM
LOUNGE
KITCHEN
ICE
PICTURE PLANE
VANISHING POINT
STATION POINT
SCALE 1/8"-1FT
FIG. 1
THE FIRST FLOOR PLAN AS SUGGESTED FOR THE PICTURE DEVELOPED IN THE MARCH NUMBER OF THE AMERICAN BUILDER. THE EXTERIOR IS UNCHANGED EXCEPTING THAT THE CHIMNEY HAS BEEN MOVED BACK ALONG THE RIDGE A DISTANCE OF 7'-9".
FIG. 4
VANISHING POINT
HORIZON
SHOWING THE FRONT PART OF THE HALL, AND A GLIMPSE OF THE LOUNGE. NOTE AWKWARDNESS OF WALL FROM THE KITCHEN. POINT C. FROM WHICH THE DOORS.
FRENCH
HORIZON
FIG. 2.
PART OF LIVING-ROOM AND PART OF SUN-PARLOR AS SEEN FROM POINT A.
FIG. 3. LOUNGE CORNER AS SEEN FROM THE DOOR, POINT B.
O. L. Sherman 3-1-27

HANDY REFERENCE DATA

For Computing Interest on Building Loans

With the following table it is a simple matter to determine the number of days between any two dates in the year.

From / To	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
January	365	31	59	90	120	151	181	212	243	273	304	334
February	334	365	28	59	89	120	150	181	212	242	273	303
March	306	337	365	31	61	92	122	153	184	214	245	275
April	275	306	334	365	30	61	91	122	153	183	214	244
May	245	276	304	335	365	31	61	92	123	153	184	214
June	214	245	273	304	334	365	30	61	92	122	153	183
July	184	215	243	274	304	335	365	31	62	92	123	153
August	153	184	212	243	273	304	334	365	31	61	92	122
September	122	153	181	212	242	273	303	334	365	30	61	91
October	92	123	151	182	212	243	273	304	335	365	31	61
November	61	92	120	151	181	212	242	273	304	334	365	30
December	31	62	90	121	151	182	212	243	274	304	335	365

The crossing of two months' columns gives the number of days between any date in one month and the same date in another. The correct number of days between that date and the date in question are then added, or subtracted, giving the total. Thus, to find the number of days between Feb. 2nd and Aug. 16th. The crossing of the February and August columns gives a figure of 181. The difference between the 16th and the 2nd is then added, giving the total of 195. One day is added in Leap Years if interval includes February 28.

Estimating by the Cube Method

For rough estimating, the cube method is often used by architects and builders and is fairly accurate on large buildings. Where you have already established the cost per cubic foot for various styles of construction, the following method is used to determine the number of cubic feet in the building:

Multiply the length and the width of the building together. Multiply this product by the height of the building measured from the basement floor to mid-attic level. Open porches may be separately estimated at one-half their contents and closed porches at their full measure. Cornices, bay windows, chimney stacks, etc., may be disregarded. The cost per cubic foot will vary in different localities. In Detroit, the Municipal Bureau of Building Engineering issued the following table showing building costs on the basis of cents per cubic foot, February 1, 1923, in that city. While building costs have changed to some extent since 1923, their relative values have not changed and the figures will be found useful for purposes of rough estimating. These Detroit costs were as follows:

	Per Cubic Foot
Factories and Warehouses:	
Fireproof (under 300,000 cubic feet)	$0.21
Fireproof (over 300,000 cubic feet)	.20
Mill construction	.14½
Ordinary	.13½
Frame	.11½
Stores:	
Fireproof	.36
Ordinary	.24½
Flats (above ordinary)	.27
Ordinary, without basements	.18½
Churches and Theaters:	
Fireproof	.33
Ordinary	.21½
Office Buildings:	
Fireproof	.51½
Ordinary	.31
Hotels:	
Fireproof	.52
Ordinary	.41½
Schools:	
Fireproof	.40
Hospitals:	
Fireproof	.40
Steel Buildings:	
Under 20,000 cubic feet	.18
20,000 to 100,000 cubic feet	.14
Over 100,000 cubic feet	.10
Apartments:	
Fireproof	.50
Protected	.43½
Brick (ordinary)	.35
Brick (veneer)	.34
Residences:	
Brick	.44
Brick (veneer or stucco)	.34
Frame	.29
Garages:	
Fireproof	.21
Mill construction	.14
Ordinary	.13
Frame	.10½

Water Cement Ratios

Water cement ratio means the relation of the volume of water used in making concrete to the volume of cement. For example, if the amount of water in the concrete as it leaves the mixer is a cubic foot and the amount of cement used is also a cubic foot, the ratio is 1.0 Should the amount of water be 0.86 of a cubic foot and the cement a cubic foot the ratio would be 0.86.

Water Cement Ratio by Volume	Gal. Water Per Sack of Cement	Lb. Water Per Sack of Cement	Lb. Water Per 10 lb. of Cement
0.40	3.0	24.9	2.65
.46	3.5	29.05	3.09
.53	4.0	33.2	3.53
.59	4.5	37.35	3.97
.66	5.0	41.5	4.41
.73	5.5	45.65	4.85
.80	6.0	49.8	5.29
.86	6.5	53.95	5.73
.93	7.0	58.1	6.17
1.00	7.53	62.5	6.61
1.06	8.0	66.4	7.05
1.12	8.5	70.55	7.49
1.19	9.0	74.7	7.94
1.25	9.5	78.85	8.38
1.32	10.0	83.0	8.82

Allowance must be made for the moisture in damp or wet aggregate.

Not only does the water added to the mixer combine with the cement but also much of the moisture in the sand and stone. At times there may be enough water in these aggregates to supply all that is required by the cement. Tests on actual work have given results of more than 5 gallons of water in the quantity of sand and gravel required for a one-bag batch of 1:2:4 concrete. Since this water will be present in the concrete when it leaves the mixer and will affect the strength and durability of the cement, it must be included as part of the total amount of mixing water.

Dampness Eliminated by Cork Paint

Moisture in the air often condenses on cold-water pipes that run through a warm room. To prevent this condition, give the pipes a priming coat of metal protection paint, then a coat of spar varnish colored as desired. Before the varnish dries, press ground cork against the surface to form a thick coating. Two coats of oil paint or enamel complete the finish.

General Rule for Brick Stacks

Diameter of base should not be less than one-tenth of height if square, or if round, one-twelfth of height. Batter of stacks three-hundredths of an inch to the foot in height. Thickness of brick work should be not less than one brick from top to 25 feet below same, changing to 1½ brick from 25 to 50 feet below top, increasing ½ brick in thickness for each succeeding 25 feet, measuring from the top downward.

Length of Hip and Common Rafters in Sizes Most Commonly Used

As all builders know, hip rafters are those which occur at the intersection of two roof planes where the plates on which the rafters rest are at an angle to each other—usuallly a right angle. The tables published below show lengths of both common and hip rafters for buildings or projections from 21 to 32 feet wide and for pitches from 4 to 12 inches rise per foot:

Width of Building

Inch Rise	21 Feet Common Feet	Common Inches	Hip Feet	Hip Inches	22 Feet Common Feet	Common Inches	Hip Feet	Hip Inches
4	11	7/8	15	3 1/8	11	7 1/8	15	11 7/8
5	11	4 1/2	15	5 5/8	11	11	16	2 3/4
6	11	9	15	9	12	3 5/8	16	6
7	12	2	16	3/4	12	8 1/8	16	10
8	12	7 1/2	16	5	13	2 5/8	17	2 3/8
9	13	1 1/2	16	9 3/4	13	9	17	7 5/8
10	13	8	17	2 7/8	14	3 7/8	18	3/4
11	14	3	17	8 3/8	14	11 1/8	18	6 1/2
12	14	10 1/4	18	2 1/4	15	6 5/8	19	5/8

Inch Rise	23 Feet Common Feet	Common Inches	Hip Feet	Hip Inches	24 Feet Common Feet	Common Inches	Hip Feet	Hip Inches
4	12	1 1/2	16	8 5/8	12	7 3/4	17	5 1/4
5	12	5 1/2	16	11 5/8	13	0	17	8 3/8
6	12	10 5/8	17	3	13	5	18	0
7	13	3 7/8	17	7 1/8	13	10 3/4	18	4 3/8
8	13	9 1/8	17	11 3/4	14	5	18	9 1/8
9	14	4 1/2	18	5	15	0	19	2 1/2
10	14	11 3/4	18	10 5/8	15	7 1/2	19	8 5/8
11	15	7 1/4	19	4 5/8	16	3 5/8	20	2 5/8
12	16	3 1/8	19	11	16	11 5/8	20	9 3/8

Inch Rise	25 Feet Common Feet	Common Inches	Hip Feet	Hip Inches	26 Feet Common Feet	Common Inches	Hip Feet	Hip Inches
4	13	2 1/2	18	2	13	8 1/2	18	10 3/4
5	13	6 1/2	18	5 1/4	14	1	19	2 1/8
6	13	11 3/4	18	9	14	6 1/2	19	6
7	14	5 3/4	19	1 1/2	15	3/4	19	10 5/8
8	15	1/4	19	6 1/2	15	7 1/2	20	3 1/8
9	15	7 1/2	20	1/8	16	3	20	9 3/4
10	16	3 5/8	20	6 1/4	16	11 1/8	21	4 1/8
11	16	11 1/2	21	3/4	17	7 5/8	21	10 7/8
12	17	8 1/8	21	7 3/4	18	4 5/8	22	6 1/8

Inch Rise	27 Feet Common Feet	Common Inches	Hip Feet	Hip Inches	28 Feet Common Feet	Common Inches	Hip Feet	Hip Inches
4	14	2 7/8	19	7 1/2	14	9 1/8	20	4 1/8
5	14	7 1/2	19	11	15	2	20	7 5/8
6	15	1	20	3	15	7 5/8	21	0
7	15	7 3/8	20	7 3/4	16	2 5/8	21	5
8	16	2 3/4	21	1 1/4	16	9 1/8	21	10 5/8
9	16	10 1/2	21	7 5/8	17	6	22	5
10	17	7	22	2	18	2 5/8	22	11 7/8
11	18	3 3/4	22	9	18	11 1/8	23	7 1/8
12	19	1 1/8	23	4 1/2	19	9 5/8	24	3

Inch Rise	29 Feet Common Feet	Common Inches	Hip Feet	Hip Inches	30 Feet Common Feet	Common Inches	Hip Feet	Hip Inches
4	15	3 1/2	21	1/8	15	9 3/4	21	9 5/8
5	15	8 1/2	21	4 3/4	16	3	22	1 1/2
6	16	2 5/8	21	9	16	9 1/4	22	6
7	16	9 5/8	22	2 1/8	17	4 1/2	22	11 3/8
8	17	5 1/8	22	8	18	3/8	23	5 1/8
9	18	1 1/2	23	2 5/8	18	9	24	1/8
10	18	10 3/8	23	9 1/4	19	6 3/8	24	7 1/2
11	19	8	24	5 1/4	20	4 1/4	25	3 3/8
12	20	6 1/8	25	1 3/8	21	2 1/2	25	11 3/4

Inch Rise	31 Feet Common Feet	Common Inches	Hip Feet	Hip Inches	32 Feet Common Feet	Common Inches	Hip Feet	Hip Inches
4	16	4 1/8	22	6 3/8	16	10 3/8	23	3
5	16	9 1/2	22	10 5/8	17	4	23	7 1/4
6	17	4	23	3	17	10 5/8	24	0
7	17	11 1/2	23	8 1/2	18	6 3/8	24	5 3/4
8	18	7 3/8	24	2 3/4	19	2 3/4	25	1/8
9	19	4 1/2	24	9 3/4	20	0	25	7 3/8
10	20	2 1/4	25	5 3/8	20	10	26	3 1/4
11	21	3/8	26	1 1/2	21	8 1/2	26	11 5/8
12	21	11	26	9 1/8	22	7 1/2	27	8 1/2

Lumber Required Per Square Foot of Forms for Floors of Combination Metal or Gypsum Tile and Concrete Joist Construction

Lumber quantities given in feet per square feet of forms.

Height Ceiling in Feet	Thickness of Slab in Inches 8" *101 lbs.	10" *106 lbs.	12" *111 lbs.	14" *116 lbs.
8	2 1/4	2 1/4	2 1/2	2 1/2
9	2 1/4	2 1/2	2 1/2	2 1/2
10	2 1/4	2 1/2	2 1/2	2 3/4
11	2 1/2	2 1/2	2 3/4	2 3/4
12	2 1/2	2 1/2	2 3/4	3
13	2 1/2	2 1/2	3	3
14	2 1/2	2 1/2	3	3
15	2 3/4	2 3/4	3	3 1/4
16	2 3/4	2 3/4	3 1/4	3 1/4
17	2 3/4	2 3/4	3 1/4	3 1/4
18	2 3/4	2 3/4	3 1/4	3 1/4
19	3	3	3 1/2	3 1/2
20	3	3	3 1/2	3 1/2

*Weight of concrete floor slab and live load per square foot placing concrete.

Lumber Required Per Square Foot of Forms for Flat Slab, or Beam and Girder Floor Construction

This table shows the amount of form lumber which should be figured per square foot of concrete joists and clay tile floor construction. First multiply the length and width of the proposed floor to secure the area in square feet. This, in turn, may be multiplied by the factors shown for the desired thickness of floor and height of ceiling as shown in the table. The product is the number of feet board measure required to construct the floor and joist forms.

Lumber quantities given in feet per square foot of forms.

Height Ceiling in Feet	Thickness of Slab in Inches 3" *102 lb.	4" *116 lb.	5" *130 lb.	6" *144 lb.	7" *158 lb.	8" *172 lb.	9" *186 lb.	10" *200 lb.	11" *214 lb.	12" *228 lb.
8	2 1/2	2 1/2	2 3/4	2 3/4	3	3	3 1/4	3 1/4	3 1/4	3 1/4
9	2 1/2	2 3/4	2 3/4	3	3	3 1/4	3 1/2	3 1/2	3 1/2	3 1/2
10	2 1/2	2 3/4	3	3	3 1/4	3 1/4	3 1/2	3 1/2	3 1/2	3 3/4
11	2 3/4	3	3	3 1/4	3 1/4	3 1/2	3 1/2	3 1/2	3 3/4	3 3/4
12	2 3/4	3	3	3 1/4	3 1/4	3 1/2	3 1/2	3 3/4	3 3/4	3 3/4
13	3	3	3 1/4	3 1/2	3 1/2	3 1/2	3 3/4	3 3/4	3 3/4	4
14	3	3	3 1/4	3 1/2	3 1/2	3 1/2	3 3/4	3 3/4	3 3/4	4
15	3	3 1/4	3 1/2	3 3/4	3 3/4	3 3/4	4	4	4	4 1/4
16	3	3 1/2	3 1/2	3 3/4	3 3/4	3 3/4	4	4	4	4 1/4
17	3 1/4	3 1/2	3 1/2	4	3 3/4	4	4	4	4 1/4	4 1/2
18	3 1/4	3 1/2	3 3/4	4	3 3/4	4 1/4	4	4	4 1/4	4 1/2
19	3 1/2	3 3/4	3 3/4	4	4	4 1/4	4 1/4	4 1/4	4 1/2	4 3/4
20	3 1/2	3 3/4	4	4	4	4 1/2	4 1/4	4 1/2	4 1/2	4 3/4

*Weight of concrete floor slab and live load per square foot placing concrete.

Effect of Painting Radiators

The effect of painting is to change the amount of radiation from the radiating surface. Consequently, it makes no difference what paints are placed on the radiator as a priming coat, the results are always dependent on the last coat of paint put on the radiator. And, naturally, the effect of painting will be more marked in radiators that have a large proportion of radiating surface than in those with a small radiating surface in proportion to their connecting surface.

All paints having finely ground pigments will give about the same effect. Metals have a poor radiating effect so that any paint involving flake metal, such as bronze, will have a lower amount of radiation. The following table shows the heat loss from a 2-column, 38-inch radiator, 10 sections long, when painted with different kinds of paints:

Condition of Surface—	Per Cent Efficiency
Cast iron, bare	100
Painted with aluminum bronze	83
Painted with gold bronze	85
Painted with white enamel	101
Painted with maroon japan	100
Painted with white zinc paint	101
Painted with no-lustre green enamel	96

Motor Car Dimensions

The dimensions shown below will be found useful in designing garages. The dimensions are those of the latest models displayed at the 1927 New York Automobile Show, as follows:

Make	Length*	W. B.	Width	Height
Whippet	12' 5"	100"	5' 5"	5'10"
Nash	12' 9"	108"	5' 6"	6' 0"
Chevrolet	12'11"	102"	5' 5"	6' 1"
Star	13' 1"	103"	5' 5"	5'11"
Erskine	13' 3"	108"	5' 5"	5' 8"
Paige	13' 7"	109"	5' 5"	6' 3"
Chandler	13' 7"	109"	5' 5"	6' 1"
Jordan	13' 8"	105"	5' 5"	5'10"
Chrysler	13' 9"	107"	5' 7"	6' 0"
Essex	14' 0"	110"	5' 5"	6' 0"
Moon	14' 0"	110"	5' 6"	5'10"
Studebaker	14' 2"	113"	5' 9"	6' 4"
Hupmobile	14' 2"	114"	5' 5"	6' 0"
Oakland	14' 2"	113"	5' 7"	6' 1"
Buick	14' 4"	114"	5' 5"	6' 2"
Oldsmobile	14' 5"	112"	5' 4"	6' 0"
Willys Knight	14' 6"	114"	5' 5"	6' 1"
Dodge	14' 7"	117"	5' 5"	6' 0"
Peerless	14' 7"	118"	5' 8"	5'10"
Franklin	14' 8"	119"	5' 7"	6' 2"
Wills St. Clair	15' 4"	127"	5' 9"	6' 6"
Studebaker	15' 5"	119"	5' 7"	6' 4"
Paige	15' 6"	125"	5' 6"	6' 4"
Hudson	15' 9"	128"	5' 8"	6' 2"
Stutz	16' 0"	130"	5' 8"	6' 0"
Buick	16' 0"	127"	5' 5"	6' 2"
Nash	16' 1"	127"	5'10"	6' 3"
Packard	16' 3"	135"	5' 8"	6' 3"
Cadillac	16' 4"	132"	5'11"	6' 4"
Peerless	16' 4"	138"	5' 8"	6' 3"
Chrysler	16' 5"	132"	5'11"	6' 4"
Lincoln	16'11"	136"	5' 9"	6' 3"
Marmon	17' 3"	138"	5'10"	6' 3"
Pierce Arrow	17' 4"	139"	5'10"	6' 7"
Locomobile	17' 6"	138"	6' 0"	6' 4"
McFarlin	18' 0"	141"	5'10"	6' 6"

*Includes front and rear bumpers.

The important development brought to light by these figures is the increase in the number of small cars whose lengths are under 15'0".

Size of Floor Joists for Given Weight and Span Based on the Use of Long Leaf Pine

(Douglas Fir Has About Two-Thirds the Strength of Long Leaf Pine)

This table will be found useful to indicate at a glance the sizes of floor joists which should be used for various spacings with loads varying from 40 pounds per square foot up to 60 pounds per square foot. These are the floor loads most commonly specified by building ordinances for several classes of buildings. (See table printed in last year's Reference Number, page 624, which shows the live floor load requirements in 16 of the leading cities of the United States for practically all classes of buildings.)

Span in Feet	Joists Spaced 12" Apart	Joists Spaced 14" Apart	Joists Spaced 16" Apart	Joists Spaced 18" Apart
When Total Load Is 40 Pounds per Square Foot				
8	2x 8"	2x 8"	2x 8"	2x 8"
10	2x 8"	2x 8"	2x 8"	2x 8"
12	2x 8"	2x 8"	2x10"	2x10"
14	2x10"	2x10"	2x10"	2x12"
16	2x12"	2x12"	2x12"	2x14"
18	2x12"	2x14"	2x14"	2x14"
20	2x14"	2x16"	2x16"	2½x16"
22	2x16"	3x16"	3x16"	3x16"
24	3x16"	3x16"		
When Total Load Is 45 Pounds per Square Foot				
8	2x 8"	2x 8"	2x 8"	2x 8"
10	2x 8"	2x 8"	2x 8"	2x 8"
12	2x 8"	2x10"	2x10"	2x10"
14	2x10"	2x12"	2x12"	2x12"
16	2x12"	2x12"	2x14"	2x14"
18	2x14"	2x14"	2x14"	2x16"
20	2x16"	2x16"	2½x16"	3x16"
22	2½x16"	3x16"	3x16"	
24	3x16"			
When Total Load Is 50 Pounds per Square Foot				
8	2x 8"	2x 8"	2x 8"	2x 8"
10	2x 8"	2x 8"	2x 8"	2x 8"
12	2x 8"	2x10"	2x10"	2x10"
14	2x10"	2x12"	2x12"	2x12"
16	2x12"	2x14"	2x14"	2x14"
18	2x14"	2x14"	2x16"	2x16"
20	2x16"	2½x16"	3x16"	3x16"
22	2½x16"	3x16"		
24	3x16"			
When Total Load Is 60 Pounds Per Square Foot				
8	2x 8"	2x 8"	2x 8"	2x 8"
10	2x 8"	2x 8"	2x 8"	2x10"
12	2x10"	2x10"	2x10"	2x12"
14	2x12"	2x12"	2x12"	2x14"
16	2x14"	2x14"	2x14"	2x16"
18	2x14"	2x16"	2½x16"	2½x16"
20	2½x16"	3x16"	3x16"	
22	3x16"			

To Find How Many Tons of Coal a Bin Will Hold

Rule—Multiply the length, breadth and height (all in feet) together, and this product by 56 for anthracite, or by 50 for bituminous coal. Divide by 2,000 and the result will be the number of tons.

Example—How many tons of bituminous coal will a bin hold which is 12 feet long, 10 feet wide and 6 feet high?

$12 \times 10 \times 6 = 720$ (cubic feet) $\times 50 = 36{,}000$ pounds.

$36{,}000 \div 2{,}000 = 18$ tons of bituminous coal.

Board Measure Per Lineal Foot of Length for Different Sizes of Timber

End Size, in Inches	Feet, Board Measure	End Size, in Inches	Feet, Board Measure	End Size, in Inches	Feet, Board Measure
1 x 2	0.17	1¼x10	1.04	3x 8	2.00
1 x 3	0.25	1¼x12	1.25	3x10	2.50
1 x 4	0.33	1½x 2	0.25	3x12	3.00
1 x 5	0.42	1½x 3	0.37	3x14	3.50
1 x 6	0.50	1½x 4	0.50	4x 4	1.33
1 x 8	0.67	1½x 5	0.62	4x 6	2.00
1 x10	0.83	1½x 6	0.75	6x 6	3.00
1 x12	1.00	1½x 8	1.00	6x 8	4.00
1 x14	1.17	1½x10	1.25	8x 8	5.33
1 x16	1.33	1½x12	1.50	8x10	6.66
1 x18	1.50	2 x 4	.67	8x12	8.00
1 x20	1.67	2 x 6	1.00	10x10	8.33
1¼x 2	0.21	2 x 8	1.33	10x12	10.00
1¼x 3	0.31	2 x10	1.67	12x12	12.00
1¼x 4	0.42	2 x12	2.00	14x14	16.33
1¼x 5	0.52	2 x14	2.33	16x16	21.33
1¼x 6	0.62	3 x 4	1.00		
1¼x 8	0.83	3 x 6	1.50		

How to Make a Hole in Glass

Place a piece of stiff clay or putty on the part where you wish to make the hole. Make a hole in the putty reaching to the glass and just the size you want the hole in the glass. Pour a little molten lead into this hole and the piece of glass will drop out. This will not fail unless the glass is very thick.

Lumber Required Per Square Foot of Forms for Floors of Combination Clay Tile and Concrete Joist Construction

Lumber quantities given in feet per square foot of forms.

Height Ceiling in Feet	Thickness of Slab in Inches: 4" *100 lb.	5" *115 lb.	6" *120 lb.	7" *125 lb.	8" *130 lb.	9" *135 lb.	10" *140 lb.	11" *145 lb.	12" *150 lb.	15" *165 lb.
8	2½	2½	2½	2¾	2¾	2¾	2¾	2¾	3	3
9	2½	2¾	2¾	2¾	2¾	3	3	3	3	3¼
10	2½	2¾	2¾	2¾	2¾	3	3	3	3	3¼
11	2¾	3	3	3	3	3	3¼	3¼	3¼	3½
12	2¾	3	3	3	3	3	3½	3½	3½	3½
13	3	3	3	3¼	3¼	3¼	3½	3½	3½	3½
14	3	3	3	3¼	3¼	3¼	3½	3½	3½	3½
15	3	3¼	3¼	3¼	3¼	3¼	3½	3½	3½	3¾
16	3	3¼	3¼	3¼	3¼	3¼	3½	3½	3½	3¾
17	3	3½	3½	3½	3½	3½	3¾	3¾	3¾	3¾
18	3	3½	3½	3½	3½	3½	3¾	3¾	3¾	3¾
19	3¼	3½	3½	3¾	3¾	3¾	4	4	4	4
20	3¼	3½	3½	3¾	3¾	3¾	4	4	4	4

*Weight of concrete floor slab and live load per square foot placing concrete.

The above tables are based on using yellow pine, Douglas fir, or woods of equal strength, and are based on economical design.

To Remove Wood Screws

Try this when other methods fail to remove an obstinate screw. Heat a piece of iron red hot and hold it against the head of the screw. After the screw has cooled off, it can be easily started.

Maximum Spans for Dwelling House Floor Joists with a Plastered Ceiling on Underside*

These spans are limited by the stiffness of the piece and calculated so the maximum deflection when supporting the full live and dead load shall not exceed 1/360 of the span length. Live load assumed as 40 pounds per square foot of floor area. Dead load includes a lath and plaster ceiling estimated to weigh 10 pounds per square foot and double flooring at 5 pounds per square foot plus the weight of the joist itself. These span lengths apply to all grades in each species indicated. Utilizing the full bending strength of the joists and disregarding deflection would allow greater spans but the plaster ceiling would then be likely to crack. Calculations based on the actual sizes of joists according to American Standards for Lumber.

Species of Lumber	Joist Spacing Center to Center	Maximum Spans for Joists (for All Grades) 2x6	2x8	2x10	2x12	2x14	3x6	3x8	3x10	3x12	3x14
Cedar, Northern and Southern White	12"	7'11"	10'11"	13' 4"	16' 2"	18' 7"	9' 2"	12' 2"	15' 4"	18' 4"	21' 4"
Spruce, Engelmann	16"	7' 2"	9'10"	12' 3"	14' 9"	17' 0"	8' 5"	11' 2"	14' 1"	16'11"	19' 8"
	24"	6' 4"	8' 8"	10'11"	12' 9"	15' 0"	7' 5"	9'10"	12' 5"	14'11"	17' 5"
Balsam Fir											
Western Red Cedar	12"	8' 6"	11' 5"	14' 4"	17' 3"	20' 0"	9'11"	13' 1"	16' 5"	19' 9"	23' 1"
Idaho and Northern White Pine	16"	7' 9"	10' 5"	13' 1"	15' 9"	18' 4"	9' 1"	12' 0"	15' 1"	18' 2"	21' 3"
California, Sugar and Pondosa Pine	24"	6'10"	9' 2"	11' 6"	13'10"	16' 3"	7'11"	10' 8"	13' 4"	16' 1"	18' 9"
Lodgepole Pine											
Alaska Cedar	12"	8'10"	11' 9"	14' 9"	17' 9"	20' 8"	10' 3"	13' 7"	17' 0"	20' 5"	23'10"
Fir, Noble, Golden, Silver and White	16"	8' 0"	10' 9"	13' 6"	16' 3"	18'11"	9' 4"	12' 5"	15' 7"	18' 9"	21'11"
Hemlock, Eastern	24"	7' 1"	9' 5"	11'10"	14' 4"	16' 8"	8' 3"	10'11"	13' 9"	16' 7"	19' 5"
Fort Orford Cedar											
Douglas Fir, Rocky Mountain Type	12"	9' 1"	12' 0"	15' 2"	18' 3"	21' 2"	10' 6"	13'11"	17' 6"	20'11"	24' 5"
Norway Pine; Redwood	16"	8' 3"	11' 0"	13'10"	16' 9"	19' 6"	9' 8"	12' 9"	16' 1"	19' 4"	22' 6"
Spruce, Red, White and Sitka	24"	7' 3"	9' 8"	12' 2"	14' 9"	17' 3"	8' 5"	11' 3"	14' 2"	17' 1"	20' 0"
	12"	9' 4"	12' 4"	15' 7"	18' 9"	21'10"	10'10"	14' 4"	18' 0"	21' 8"	25' 1"
Larch, Western	16"	8' 6"	11' 4"	14' 3"	17' 2"	20' 0"	9'11"	13' 2"	16' 6"	19'10"	23' 2"
Tamarack, Eastern	24"	7' 5"	9'11"	12' 6"	15' 2"	17' 8"	8' 8"	11' 6"	14' 7"	17' 7"	20' 6"
	12"	9' 6"	12' 8"	16' 0"	19' 3"	22' 6"	11' 2"	14' 8"	18' 5"	22' 1"	25' 9"
Cypress, Southern	16"	8' 8"	11' 7"	14' 7"	17' 7"	20' 6"	10' 2"	13' 5"	16'11"	20' 4"	23' 9"
Hemlock, West Coast	24"	7' 7"	10' 2"	12'10"	15' 6"	18' 1"	8'11"	11'10"	14'11"	18' 0"	21' 0"
	12"	10' 0"	13' 3"	16' 8"	20' 1"	23' 5"	11' 8"	15' 4"	19' 3"	23' 1"	26'11"
Douglas Fir, Coast Type	16"	9' 1"	12' 1"	15' 3"	18' 5"	21' 5"	10' 8"	14' 0"	17' 8"	21' 3"	24'10"
Southern Yellow Pine	24"	8' 0"	10' 8"	13' 5"	16' 2"	18'11"	9' 4"	12' 4"	15' 7"	18' 9"	22' 0"

*Prepared by Richard G. Kimbell, Architectural Engineer, National Lumber Manufacturers' Association.

Heating Surface in Square Feet for Various Sizes of Steam and Hot Water Radiators

(To find the capacity of any radiator, multiply by the number of sections.)

Single Column			
	2½"x38"	2½"x32"	2½"x26"
Square Feet Per Section	3 sq. ft.	2½ sq. ft.	2 sq. ft.
		2½"x23"	2½"x20"
Square Feet Per Section		1⅞ sq. ft.	1½ sq. ft.
Two Column			
	2½"x45"	2½"x38"	2½"x32"
Square Feet Per Section	5 sq. ft.	4 sq. ft.	3⅛ sq. ft.
	2½"x26"	2½"x23"	2½"x20"
Square Feet Per Section	2⅞ sq. ft.	2⅛ sq. ft.	2 sq. ft.
Three Column			
	2½"x45"	2½"x38"	2½"x32"
Square Feet Per Section	6 sq. ft.	5 sq. ft.	4½ sq. ft.
	2½"x26"	2½"x22"	2½"x18"
Square Feet Per Section	3¾ sq.ft.	3 sq. ft.	2¼ sq. ft.
Four Column			
	3"x45"	3"x38"	3"x32"
Square Feet Per Section	10 sq. ft.	8 sq. ft.	6½ sq. ft.
	3"x26"	3"x22"	3"x18"
Square Feet Per Section	5 sq. ft.	4 sq. ft.	3 sq. ft.
Low Window Radiators			
	3"x20"	3"x16"	3"x13"
Square Feet Per Section	5 sq. ft.	3¾ sq. ft.	3 sq. ft.

This table will be found useful in connection with the "Simple Rule for Computing Radiation for Steam and Hot Water Heating," as published in last year's Reference Number, page 630.

Dimensions of Standard Radiators

	Width, Inches	Width Legs, Inches	Thickness, Inches	Shipping Weight Sq. Ft. Radiation
One Column	4½	5 1/32	2½	6⅔
Two Column	7⅛	7 13/32	2½	6⅔
Three Column	9	9 5/16	2½	6⅔
Four Column	12½	12 13/16	3	6⅔
Five Column	13	13	3	6⅔

For Contractors' Pay Roll Work

Minutes Expressed in Decimal Parts of an Hour

Minutes	Decimal of an Hour	Minutes	Decimal of an Hour
1	0.0167	31	0.5167
2	.0333	32	.5333
3	.0500	32	.5500
4	.0667	34	.5667
5	.0833	35	.5833
6	.1000	36	.6000
7	.1167	37	.6167
8	.1333	38	.6333
9	.1500	39	.6500
10	.1667	40	.6667
11	.1833	41	.6833
12	.2000	42	.7000
13	.2167	43	.7167
14	.2333	44	.7333
15	.2500	45	.7500
16	.2667	46	.7667
17	.2833	47	.7833
18	.3000	48	.8000
19	.3167	49	.8167
20	.3333	50	.8333
21	.3500	51	.8500
22	.3667	52	.8667
23	.3833	53	.8833
24	.4000	54	.9000
25	.4167	55	.9167
26	.4333	56	.9333
27	.4500	57	.9500
28	.4667	58	.9667
29	.4833	59	.9833
30	.5000		

EXPLANATION:

A man works three hours and 39 minutes at the rate of $1.37 per hour. Referring to the table, we see that 39 minutes is .65 demical part of an hour. Therefore, to calculate the amount due him for this time, multiply the rate $1.37 by 3.65 (three hours plus the decimal for 39 minutes), or $5.00 due.

Number of Common Bricks Required for Walls of Different Thicknesses

This table will be particularly useful for estimating purposes; also when ordering brick for any given job, it is well to know the exact number required. We frequently see large piles of brick left over, even on private dwelling jobs, and there is considerable expense involved in the loading, unloading and cartage of this unused brick. Also excess brick taken on to a job are usually returned to the yard in a somewhat damaged condition.

Surface Area of Wall (Square Feet)	Number of Bricks Needed for Thickness of— 4 Inches	8 Inches	12 Inches	16 Inches	20 Inches	24 Inches
1	7	15	23	30	38	45
2	15	30	45	60	75	90
3	23	45	68	90	113	135
4	30	60	90	120	150	180
5	38	75	113	150	188	225
6	45	90	135	180	225	270
7	53	105	158	210	263	315
8	60	120	180	240	300	360
9	68	135	203	270	338	405
10	75	150	225	300	375	450
20	150	300	450	600	750	900
30	225	450	675	900	1,125	1,350
40	300	600	900	1,200	1,500	1,800
50	375	750	1,125	1,500	1,875	2,250
60	450	900	1,350	1,800	2,250	2,700
70	525	1,050	1,575	2,100	2,625	3,150
80	600	1,200	1,800	2,400	3,000	3,600
90	675	1,350	2,025	2,700	3,375	4,050
100	750	1,500	2,250	3,000	3,750	4,500
200	1,500	3,000	4,500	6,000	7,500	9,000
300	2,250	4,500	6,750	9,000	11,250	13,500
400	3,000	6,000	9,000	12,000	15,000	18,000
500	3,750	7,500	11,250	15,000	18,750	22,500
600	4,500	9,000	13,500	18,000	22,500	27,000
700	5,250	10,500	15,750	21,000	26,250	31,500
800	6,000	12,000	18,000	24,000	30,000	36,000
900	6,750	13,500	20,250	27,000	33,750	40,500
1,000	7,500	15,000	22,500	30,000	37,500	45,000

Inches Expressed in Fractions and Decimals of a Foot

Inches	Fractional Part of Foot	Equivalent Decimal of Foot
1	1/12	0.0833
1¼	5/48	.1042
1½	⅛	.1250
1¾	7/48	.1458
2	1/6	.1667
2¼	3/16	.1875
2½	5/24	.2083
2¾	11/48	.2292
3	¼	.2500
3¼	13/48	.2708
3½	7/24	.2917
3¾	15/48	.3125
4	⅓	.3333
4¼	17/48	.3542
4½	9/24	.3750
4¾	19/48	.3958
5	5/12	.4167
5¼	21/48	.4375
5½	11/24	.4583
5¾	23/48	.4792
6	½	.5000
6¼	25/48	.5208
6½	13/24	.5417
6¾	27/48	.5625
7	7/12	.5833
7¼	29/48	.6042
7½	15/24	.6250
7¾	31/48	.6458
8	⅔	.6667
8¼	33/48	.6875
8½	17/24	.7083
8¾	35/48	.7292
9	¾	.7500
9¼	37/48	.7708
9½	19/24	.7917
9¾	39/48	.8125
10	5/6	.8333
10¼	41/48	.8542
10½	7/8	.8750
10¾	43/48	.8958
11	11/12	.9167
11¼	45/48	.9375
11½	23/24	.9583
11¾	47/48	.9792

EXPLANATION:

There are many ways in which this table will be found useful; for instance, in calculating wall, ceiling and floor areas. To estimate the cost of terrazzo, tile, marble or composition flooring, the plans may show a dimension of 100 feet in one direction and 25 feet 4¾ inches in the other and the exact surface area should be figured. By referring to the table, we see that the decimal equivalent of 4¾ is .3958 of a foot. Then, multiply 25.3958 (the equivalent of 25 feet 4¾ inches) by 100 (the other dimension) which gives us 2539.6 square feet. Supposing the estimating figure to be $1.02 per square foot, the estimate for the entire floor would then be $2,590.39. If the ¾ inch was neglected in making this estimate, there would be a loss of 6¼ square feet, or $6.38 on this floor.

Concrete Walls

MATERIALS REQUIRED PER 100 LINEAL FEET OF WALL.

Size of Wall		Cu. Ft.	1:2:4 Mixture			1:2½:5 Mixture			1:3:6 Mixture		
Feet High	Inches Wide	Contained	Bags Cement	Cu. Yds. Sand	Cu. Yds. Stone	Bags Cement	Cu. Yds. Sand	Cu. Yds. Stone	Bags Cement	Cu. Yds. Sand	Cu. Yds Stone
4	6	200	44.4	3.28	6.56	37.0	3.42	6.84	31.0	3.48	6.96
	7	233	51.8	3.83	7.66	43.2	3.99	7.98	36.2	4.06	8.12
	8	267	59.2	4.37	8.74	49.3	4.56	9.12	41.3	4.64	9.28
	9	300	66.6	4.92	9.84	55.5	5.13	10.26	46.5	5.22	10.44
	10	333	74.0	5.47	10.94	61.7	5.70	11.40	51.7	5.80	11.60
4½	6	225	50.0	3.69	7.38	41.6	3.85	7.70	34.9	3.92	7.84
	7	263	58.3	4.31	8.62	48.5	4.49	8.98	40.7	4.57	9.14
	8	300	66.6	4.92	9.84	55.5	5.13	10.26	46.5	5.22	10.44
	9	338	74.9	5.54	11.08	62.4	5.77	11.54	52.3	5.87	11.74
	10	375	83.3	6.15	12.30	69.3	6.41	12.82	58.1	6.53	13.06
5	6	250	55.5	4.10	8.20	46.3	4.28	8.56	38.8	4.35	8.70
	7	292	64.8	4.78	9.56	54.0	4.99	9.98	45.2	5.08	10.16
	8	333	74.0	5.47	10.94	61.7	5.70	11.40	51.7	5.80	11.60
	9	375	83.3	6.15	12.30	69.4	6.41	12.82	58.1	6.53	13.06
	10	417	92.5	6.83	13.66	77.1	7.13	14.26	64.6	7.25	14.50
5½	6	275	61.1	4.51	9.02	50.9	4.70	9.40	42.6	4.79	9.58
	7	321	71.2	5.26	10.52	59.4	5.49	10.98	49.7	5.58	11.16
	8	367	81.4	6.01	12.02	67.8	6.27	12.54	56.8	6.38	12.76
	9	413	91.6	6.77	13.54	76.3	7.05	14.10	63.9	7.18	14.36
	10	458	101.8	7.51	15.02	84.8	7.84	15.68	71.0	7.98	15.96
6	6	300	66.6	4.92	9.84	55.5	5.13	10.26	46.5	5.22	10.44
	7	350	77.7	5.74	11.48	64.8	5.99	11.98	54.3	6.09	12.18
	8	400	88.8	6.56	13.12	74.0	6.84	13.68	62.0	6.96	13.92
	9	450	99.9	7.38	14.76	83.3	7.70	15.40	69.8	7.83	15.66
	10	500	111.0	8.20	16.40	92.5	8.55	17.10	77.5	8.70	17.40
6½	6	325	72.2	5.33	10.66	60.1	5.56	11.12	50.4	5.66	11.32
	7	379	84.2	6.22	12.44	70.1	6.48	12.96	58.8	6.60	13.20
	8	433	96.2	7.11	14.22	80.2	7.41	14.82	67.2	7.54	15.08
	9	488	108.2	8.00	16.00	90.2	8.34	16.68	75.6	8.48	16.96
	10	542	120.2	8.89	17.78	100.2	9.26	18.52	84.0	9.43	18.86
7	6	350	77.7	5.74	11.48	64.8	5.99	11.98	54.3	6.09	12.18
	7	408	90.7	6.70	13.40	75.5	6.98	13.96	63.3	7.11	14.22
	8	467	103.6	7.65	15.30	86.3	7.98	15.96	72.3	8.12	16.24
	9	525	116.6	8.61	17.22	97.1	8.98	17.96	81.4	9.14	18.28
	10	583	129.5	9.57	19.14	107.9	9.98	19.96	90.4	10.15	20.30
7½	6	375	83.3	6.15	12.30	69.4	6.41	12.82	58.1	6.53	13.06
	7	438	97.1	7.18	14.36	80.9	7.48	14.96	67.8	7.61	15.22
	8	500	111.0	8.20	16.40	92.5	8.55	17.10	77.5	8.70	17.40
	9	563	124.9	9.22	18.44	104.1	9.62	19.24	87.2	9.79	19.58
	10	625	138.8	10.25	20.50	115.6	10.68	21.36	96.9	10.87	21.74
8	6	400	88.8	6.56	13.12	74.0	6.84	13.68	62.0	6.96	13.92
	7	467	103.6	7.65	15.30	86.3	7.98	15.96	72.3	8.12	16.24
	8	533	118.4	8.75	17.50	98.7	9.12	18.24	82.7	9.28	18.56
	9	600	133.2	9.84	19.68	111.0	10.26	20.52	93.0	10.44	20.88
	10	667	148.0	10.93	21.86	123.3	11.40	22.80	103.3	11.60	23.20
8½	6	425	94.4	7.97	13.94	78.6	7.27	14.54	65.9	7.40	14.80
	7	496	110.1	8.14	16.28	91.7	8.48	16.96	76.9	8.63	17.26
	8	567	125.8	9.29	18.58	104.8	9.69	19.38	87.8	9.86	19.72
	9	638	141.5	10.46	20.92	117.9	10.90	21.80	98.8	11.09	22.18
	10	708	157.3	11.62	23.24	131.0	12.11	24.22	109.8	12.33	24.66

Masonry Wall Construction Definitions

Bearing Wall.—A wall which supports any vertical load in addition to its own weight.

Non-Bearing Wall.—A wall which supports no load other than its own weight.

Panel Wall.—A non-bearing wall in skeleton construction, built between columns or piers and wholly supported at each story.

Inclosure Wall.—An exterior non-bearing wall in skeleton construction anchored to columns, piers, or floors, but not necessarily built between columns or piers.

Curtain Wall.—A non-bearing wall between columns or piers and which is not supported by girders or beams.

Party Wall.—A wall used or adapted for joint service between two buildings.

Fire Wall.—A wall which subdivides a building to restrict the spread of fire, by starting at the foundation and extending continuously through all stories to and above the roof.

Fire Division Wall.—A wall which subdivides a fire resistive building to restrict the spread of fire, but is not necessarily continuous through all stories nor extended through the roof.

Veneered Wall.—A wall having a masonry facing which is not attached and bonded to the backing so as to form an integral part of the wall for purposes of load bearing and stability.

Faced Wall.—A wall in which the masonry facing and backing are so bonded as to exert common action under load.

Masonry—Stone, brick, concrete, hollow tile, concrete block or tile, gypsum block, or other similar building units or materials, or a combination of same, bonded together with mortar to form a wall, pier, or buttress.

Piers.—All bearing walls having a horizontal cross section of 4 square feet or less and not bonded at the sides into associated masonry shall be considered as piers.

Fireplace Flue Areas

For three-story building; area at top of smoke chamber should be one-twelfth of area of fireplace opening.

Two-story building; area at top of smoke chamber should be one-tenth of area of fireplace opening.

One-story building; area at top of smoke chamber should be one-eighth area of fireplace opening.

Throat of fireplace should never be less than 8 inches or more than 4½ inches by the width of fireplace opening.

Front edge of arch should never be thicker than one-half brick, approximately 4 inches.

Splay of sides of flue from throat opening up to flue lining should be 2 inches to the foot. The raise from soffit or lintel, or from the highest point of soffit to arch should be 6 inches.

Flow in Gallons Per Minute Delivered by Ordinary Plumbing Fixtures

Fixtures—	Fair Flow	Good Flow	Excellent Flow
Kitchen Sink Bibbs	2	4	6
Pantry Sink—High Gooseneck Bibbs	2	2	3
Pantry Sink—Large Plain Bibbs	4	6	8
Vegetable Sink Bibbs	2	4	6
Laundry—Tray Bibbs	4	6	8
Slop Sink Bibbs	3	4	6
Lavatory Sink Bibbs	2	3	4
Bath Tub Bibbs	3	4	6
Shampoo Spray	½	1	2
Shower Baths—			
5-in. Rain Heads	2	3	4
6½-in. Rain Heads	2	3	5
8-in. Rain Heads	4	6	8
8-in. Tubular Heads	6	8	10
Needle Baths	20	30	40
Manicure Table	1	1½	2

The above was compiled from tests on water pressure at 30 pounds per square inch.

Reinforcing Steel—Weights of Square and Round Reinforcing Bars

One cubic foot of steel weighing 489.6 pounds.

Thick. or Diam. in In.	Weight of Sq. Bar 1 Ft. Long	Weight of Rd. Bar 1 Ft. Long	Thick. or Diam. in In.	Weight of Sq. Bar 1 Ft. Long	Weight of Rd. Bar 1 Ft. Long
3/16	0.119	0.094	1	3.400	2.670
¼	.212	.167	1⅛	4.303	3.379
⅜	.478	.375	1 3/16	4.795	3.766
½	.850	.667	1¼	5.312	4.173
⅝	1.328	1.043	1 5/16	5.857	4.600
¾	1.913	1.502	1⅜	6.428	5.049
⅞	2.603	2.044	1½	7.650	6.008

The weights given for plain square bars will also apply to square twisted bars.

Mortar Color Required Per 1000 Face Brick

The amount of mortar color required depends upon the width of the joints and the lightness of the color or tint required. The table beneath will be found useful.

Colors	Width of Joints Inches	Pounds Required	Width of Joints Inches	Pounds Required	Width of Joints Inches	Pounds Required	Width of Joints Inches	Pounds Required	Width of Joints Inches	Pounds Required	Width of Joints Inches	Pounds Required	Width of Joints Inches	Pounds Required
Black	⅛	25	¼	50	⅜	75	½	100	⅝	125	¾	150	⅞	175	1	200
Buff or Brown	⅛	40	¼	80	⅜	120	½	160	⅝	200	¾	240	⅞	280	1	320
Red or Amber	⅛	50	¼	100	⅜	150	½	200	⅝	250	¾	300	⅞	350	1	400

Cement Floors or Sidewalks

MATERIALS REQUIRED PER SQUARE

BASE		FACING		SAND AND STONE			SAND AND GRAVEL		
Ins. Thick	Mixture	Inches Thick	Mixture	Bags Cement	Cu. Yds. Sand	Cu. Yds. Stone	Bags Cement	Cu. Yds. Sand	Cu. Yds. Gravel
2	Stone 1:2½:5 or Gravel 1:5	½	1:1½	5.5	.42	.57	5.5	.13	.71
			1:2	5.1	.43	.57	5.1	.15	.71
			1:3	4.6	.45	.57	4.6	.17	.71
		¾	1:1½	6.7	.49	.57	6.7	.2	.71
			1:2	6.0	.50	.57	6.0	.22	.71
			1:3	5.3	.53	.57	5.3	.25	.71
		1	1:1½	7.9	.55	.57	7.9	.27	.71
			1:2	7.0	.58	.57	7.0	.29	.71
			1:3	6.0	.62	.57	6.0	.33	.71
	Stone 1:3:6 or Gravel 1:6	½	1:1½	5.0	.42	.58	5.0	.13	.72
			1:2	4.6	.44	.58	4.6	.15	.72
			1:3	4.1	.46	.58	4.1	.17	.72
		¾	1:1½	6.2	.49	.58	6.2	.2	.72
			1:2	5.5	.51	.58	5.5	.22	.72
			1:3	4.8	.54	.58	4.8	.25	.72
		1	1:1½	7.4	.56	.58	7.4	.27	.72
			1:2	6.5	.58	.58	6.5	.29	.72
			1:3	5.5	.62	.58	5.5	.33	.72
3	Stone 1:2½:5 or Gravel 1:5	½	1:1½	7.	.56	.86	7.	.13	1.07
			1:2	6.6	.57	.86	6.6	.15	1.07
			1:3	6.1	.59	.86	6.1	.17	1.07
		¾	1:1½	8.2	.63	.86	8.2	.2	1.07
			1:2	7.6	.65	.86	7.6	.22	1.07
			1:3	6.8	.68	.86	6.8	.25	1.07
		1	1:1½	9.4	.70	.86	9.4	.27	1.07
			1:2	8.6	.72	.86	8.6	.29	1.07
			1:3	7.6	.76	.86	7.6	.33	1.07
	Stone 1:3:6 or Gravel 1:6	½	1:1½	6.3	.57	.87	6.3	.13	1.08
			1:2	5.8	.58	.87	5.8	.15	1.08
			1:3	5.4	.6	.87	5.4	.17	1.08
		¾	1:1½	7.5	.64	.87	7.5	.2	1.08
			1:2	6.8	.65	.87	6.8	.22	1.08
			1:3	6.1	.68	.87	6.1	.25	1.08
		1	1:1½	8.7	.7	.87	8.7	.27	1.08
			1:2	7.8	.73	.87	7.8	.29	1.08
			1:3	6.8	.77	.87	6.8	.33	1.08
4	Stone 1:2½:5 or Gravel 1:5	½	1:1½	8.6	.7	1.14	8.6	.13	1.42
			1:2	8.1	.72	1.14	8.1	.15	1.42
			1:3	7.6	.74	1.14	7.6	.17	1.42
		¾	1:1½	9.8	.77	1.14	9.8	.2	1.42
			1:2	9.1	.79	1.14	9.1	.22	1.42
			1:3	8.4	.82	1.14	8.4	.25	1.42
		1	1:1½	10.9	.84	1.14	10.9	.27	1.42
			1:2	10.1	.86	1.14	10.1	.29	1.42
			1:3	9.1	.90	1.14	9.1	.33	1.42
	Stone 1:3:6 or Gravel 1:6	½	1:1½	7.6	.71	1.16	7.6	.13	1.44
			1:2	7.1	.73	1.16	7.1	.15	1.44
			1:3	6.6	.75	1.16	6.6	.17	1.44
		¾	1:1½	8.8	.78	1.16	8.8	.2	1.44
			1:2	8.1	.80	1.16	8.1	.22	1.44
			1:3	7.4	.83	1.16	7.4	.25	1.44
		1	1:1½	9.9	.85	1.16	9.9	.27	1.44
			1:2	9.1	.87	1 16	9.1	.29	1.44
			1:3	8.1	.91	1.16	8.1	.33	1.44

How to Mix Paints of Various Colors

Buff—White, yellow ochre and red.

Chestnut—Red, black and yellow.

Chocolate—Raw umber, red and black.

Claret—Red, umber and black.

Copper—Red, yellow and black.

Dove—White, vermilion, blue and yellow.

Drab—White, yellow ochre, red and black.

Fawn—White, yellow and red.

Flesh—White, yellow ochre and vermilion.

Freestone—Red, black, yellow ochre and white.

French Grey—White, Prussian blue and lake.

Grey—White lead and black.

Gold—White, stone ochre and red.

Green Bronze—Chrome green, black and yellow.

Green Pea—White and chrome green.

Lemon—White and chrome yellow.

Limestone—White, yellow ochre, black and red.

Olive—Yellow, blue, black and white.

Orange—Yellow and red.

Peach—White and vermilion.

Pearl—White, black and blue.

Pink—White, vermilion and lake.

Purple—Violet, with more red and white.

Rose—White and madder lake.

Sandstone—White, yellow ochre, black and red.

Snuff—Yellow and Vandyke brown.

Violet—Red, blue and white.

The first named color is always the principal ingredient, and the others follow in the order of their importance. Thus in mixing a limestone tint, white is the principal ingredient, and the red the color of which the least is needed. The exact proportions of each color must be determined by experiment with a smaller quantity. It is best to have the principal ingredient thick, and add to it the other paints thinner.

How to Avoid Plaster Painting Troubles

Not many types of surface are so difficult to finish as the plaster wall. There are, however, a few fundamental reasons for failure, the correction of which will do away with a large percentage of plaster painting troubles.

Much of the trouble results from painting a newly plastered wall before it has thoroughly seasoned or dried out. No plaster wall should be painted under any circumstances while it is still "green." Six or eight months should be allowed for drying and a year is still better. During this time the walls should remain without covering of any sort. If the property owner is not willing to wait this length of time, emphasize the fact that the job is done at his own risk. The usual result is that the active alkali in the damp plaster acts upon the paint vehicle; the paint film softens and finally comes off.

How to Write Your Name on Iron Tools

1. Melt a little beeswax or hard tallow and pour it on the iron at the place intended to be marked. After the wax or tallow cools, take an awl or sharp piece of iron and write your name on it.

2. Pour a little nitric acid on the wax, where you have written your name, and allow it to remain a few minutes. Then wipe off the wax, and your name remains indelibly marked as written on the wax.

3. Be careful and allow none of the acid to come in contact with your clothes or hands.

Snow Loads

The snow loads on roofs vary with the geographical location, the altitude and humidity of the place, and with the slope of the roof. Where snow is likely to occur, the minimum load per horizontal square foot of roof should be taken at 25 pounds for all slopes up to 20 degrees; this load to be reduced one pound for each degree of increase in slope up to 45 degrees, above which no snow load need be considered. In severe climates these loads should be increased in accordance with actual conditions. Regard should also be taken to the possibility of partial snow load with local concentration.

Materials for 100 Square Feet of Concrete Floor

	Base, 1:2½:5 Mixture — Thickness, Inches						Wearing Coat, 1:2 Mixture — Thickness, Inches					
	2½	3	3½	4	4½	5	½	¾	1	1¼	1½	2
Cement, Barrels	1.10	1.30	1.50	1.78	1.99	2.21	0.56	0.85	1.13	1.41	1.69	2.26
Sand, Cubic Yards	0.40	0.47	0.55	0.63	0.70	0.78	0.16	0.24	0.32	0.40	0.47	0.64
Stone, Cubic Yards	0.80	0.94	1.10	1.26	1.40	1.56						

EXPLANATION:

The explanation of this table is simple. For instance, if you wish to install a concrete floor 5 inches thick using a concrete mixture 1:2½:5, you will require for each 100 square feet surface area 2.21 barrels of cement, .78 cubic yards of sand, 1.56 cubic yards of stone. If the top or wearing coat is to be a 1:2 mixture 2 inches thick, you will also require 2.26 barrels of cement and .64 cubic yards of sand as indicated in the table.

Excavation Table

Multiply the factors corresponding to length and width by depth in feet. For instance, a cellar 8 feet deep, 25 by 30 feet, would contain 8 × 27.7, or 221.6 cubic yards.

Number of Cubic Yards of Excavation per Foot of Depth in Spaces of Various Size

Length in Feet	WIDTH IN FEET 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
5	.37	.55	.74	.92	1.1	1.3	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8	2.9	3.2	3.3	3.5	3.7	3.9	4.1	4.3	4.4	4.6	4.8	5.0	5.2	5.4	5.5
6	.44	.67	.89	1.1	1.3	1.5	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.3	3.5	3.8	4.0	4.2	4.4	4.7	4.9	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.7
7	.52	.78	1.04	1.3	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.6	3.9	4.1	4.4	4.6	4.9	5.2	5.4	5.7	6.0	6.2	6.5	6.7	7.0	7.2	7.5	7.8
8	.59	.89	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.5	3.8	4.1	4.4	4.7	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.7	8.0	8.3	8.6	8.9
9	.67	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3	4.7	5.0	5.3	5.7	6.0	6.3	6.7	7.0	7.3	7.7	8.0	8.3	8.7	9.0	9.3	9.7	10.0
10	.74	1.1	1.5	1.8	2.2	2.6	3.0	3.3	3.6	4.0	4.4	4.8	5.2	5.6	5.9	6.3	6.7	7.0	7.4	7.8	8.1	8.5	8.9	9.2	9.6	10.0	10.4	10.7	11.1
11	.82	1.2	1.6	2.0	2.4	2.8	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.1	6.5	6.9	7.3	7.7	8.1	8.5	9.0	9.4	9.8	10.2	10.6	11.0	11.4	11.8	12.2
12	.89	1.3	1.8	2.2	2.7	3.1	3.5	4.0	4.4	4.9	5.3	5.8	6.2	6.7	7.1	7.6	8.0	8.4	8.9	9.3	9.7	10 2	10.6	11.0	11.5	12.0	12.4	12.8	13.3
13	.97	1.4	1.9	2.4	2.9	3.4	3.9	4.3	4.8	5.3	5.8	6.2	6.7	7.2	7.7	8.2	8.7	9.1	9.6	10.1	10.6	11.0	11.6	12.0	12.5	13.0	13.5	14.0	14.4
14	1.04	1.6	2.1	2.6	3.1	3.6	4.1	4.7	5.2	5.7	6.2	6.7	7.2	7.8	8.3	8.8	9.3	9.8	10.4	10.9	11.4	11.9	12.4	13.0	13.4	14.0	14.5	15.0	15.5
15	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.5	6.1	6.6	7.2	7.8	8.3	8.9	9.4	10.0	10.6	11.2	11.7	12.2	12.8	13.3	13.9	14.4	15.0	15.6	16.1	16.6
16	1.2	1.8	2.4	3.0	3.6	4.2	4.7	5.3	5.9	6.5	7.1	7.7	8.3	8.9	9.5	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.4	16.0	16.6	17.2	17.8
17	1.3	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.3	6.9	7.5	8.2	8.8	9.4	10.0	10.7	11.3	11.9	12.6	13.2	13.8	14.4	15.1	15.7	16.4	17.0	17.6	18.2	18.9
18	1.3	2.0	2.7	3.3	4.0	4.7	5.3	6.0	6.7	7.3	8.0	8.6	9.3	10.0	10.6	11.3	12.0	12.6	13.3	14.0	14.6	15.3	16.0	16.6	17.3	18.0	18.6	19.3	20.0
19	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.6	11.2	12.0	12.7	13.4	14.0	14.8	15.5	16.2	16.9	17.8	18.3	19.0	19.7	20.4	21.1
20	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	7.4	8.1	8.9	9.6	10.4	11.2	11.8	12.6	13.3	14.0	14.8	15.5	16.3	17.0	17.7	18.5	19.2	20.0	20.7	21.4	22.2
21	1.6	2.3	3.1	3.9	4.7	5.4	6.2	7.0	7.8	8.5	9.3	10.2	10.9	11.6	12.4	13.2	14.0	14.8	15.5	16.3	17.1	17.8	18.6	19.4	20.2	21.0	21.7	22.5	23.3
22	1.6	2.4	3.3	4.0	4.9	5.7	6.5	7.3	8.1	9.0	9.8	10.6	11.4	12.2	13.0	13.8	14.6	15.5	16.3	17.1	17.9	18.7	19.5	20.4	21.2	22.0	22.8	23.6	24.4
23	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	9.4	10.2	11.0	11.9	12.8	13.6	14.4	15.3	16.2	17.0	17.8	18.7	19.5	20.4	21.3	22.1	23.0	23.8	24.6	25.5
24	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.6	11.5	12.4	13.3	14.2	15.1	16.0	16.9	17.8	18.6	19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.7	26.6
25	1.8	2.8	3.7	4.6	5.5	6.5	7.4	8.3	9.2	10.2	11.1	12.0	12.9	13.8	14.8	15.7	16.6	17.6	18.5	19.4	20.4	21.3	22.2	23.1	24.0	25.0	25.9	26.8	27.7
26	1.9	2.9	3.9	4.8	5.8	6.7	7.7	8.7	9.6	10.6	11.6	12.5	13.5	14.4	15.4	16.4	17.3	18.2	19.2	20.2	21.1	22.1	23.0	24.0	25.0	25.9	26.9	27.8	28.8
27	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0
28	2.1	3.1	4.1	5.2	6.2	7.2	8.3	9.3	10.4	11.4	12.4	13.4	14.5	15.5	16.6	17.6	18.6	19.7	20.7	21.7	22.7	23.7	24.8	25.9	26.9	28.0	29.0	30.0	31.0
29	2.1	3.2	4.3	5.4	6.5	7.5	8.6	9.6	10.7	11.8	12.8	13.9	15.0	16.1	17.2	18.2	19.3	20.4	21.4	22.5	23.6	24.6	25.7	26.8	27.9	29.0	30.0	31.1	32.1
30	2.2	3.3	4.4	5.5	6.7	7.8	8.9	10.0	11.1	12.2	13.3	14.4	15.5	16.6	17.8	18.9	20.0	21.1	22.2	23.3	24.4	25.5	26.6	27.7	28.8	30.0	31.1	32.2	33.3

Moisture in Aggregates

In order to give some idea of how much moisture there may be in the aggregates used with one bag of cement and how much this may vary in the same quantities of aggregates, the following table has been prepared.

Because of variations in the moisture content of aggregates and different weights per cubic foot for other aggregates, the values in this table are necessarily approximations and only intended to indicate what may be found under average conditions.

Condition of Aggregates	1:2½	1:3	1:2:3	1:2:3½	1:2:4	1:2½:5	1:3:6
Dry	0.6	0.8	0.5	0.5	0.5	0.6	0.7
Damp	1.5	1.8	1.5	1.6	1.7	2.1	2.5
Wet	2.7	3.2	3.2	3.4	3.6	4.6	5.3

Miscellaneous Masonry Data

One hundred yards of plastering will require 1,400 laths, 4½ bushels of lime, 4/5 of a load of sand, 9 pounds of hair and 5 pounds of nails, for two-coat work.

A load of mortar measures a cubic yard, requires a cubic yard of sand and 9 bushels of lime, and will fill 30 hods.

A bricklayer's hod, measuring 1 foot 4 inches by 9 inches, equals 1,296 cubic inches in capacity, and contains 20 bricks.

A single load of sand or other materials equals a cubic yard.

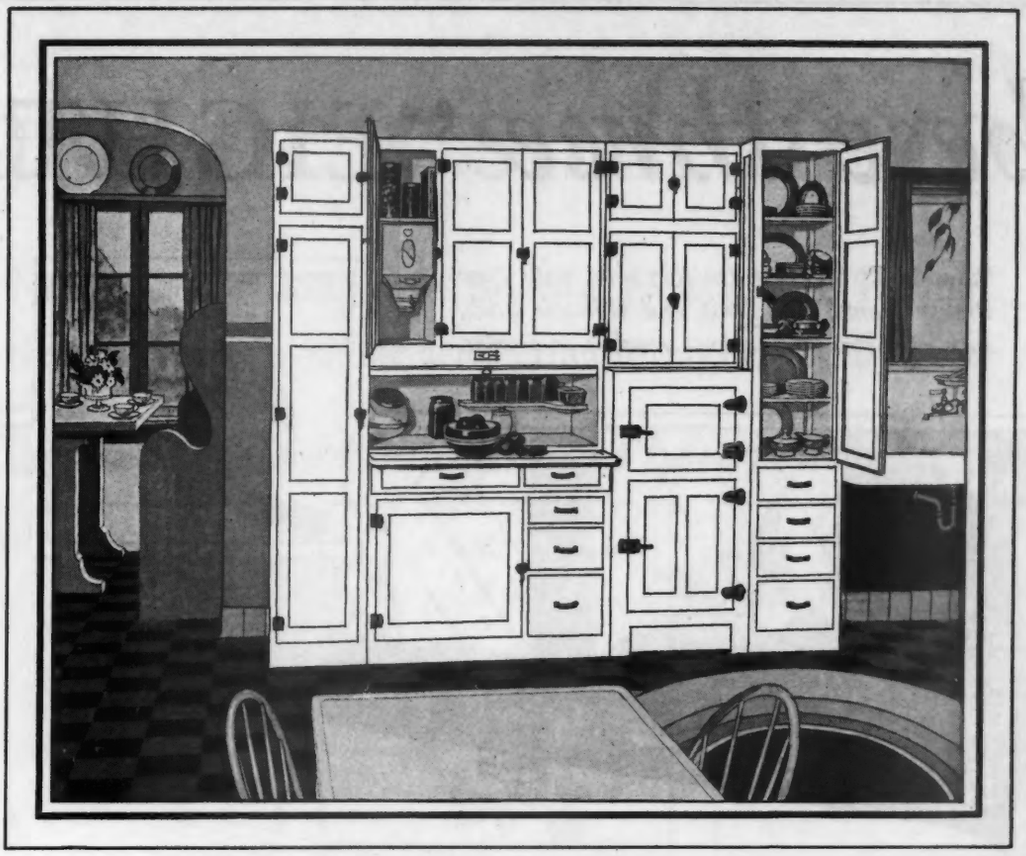
Circumferences and Area of Circles

INCHES OR FEET

Diam.	Circum.	Area	Diam.	Circum.	Area	Diam.	Circum.	Area
1	3.1416	.7854	44	138.23	1520.53	87	273.32	5944.68
2	6.2832	3.1416	45	141.37	1590.43	88	276.46	6082.12
3	9.4248	7.0686	46	144.51	1661.90	89	279.60	6221.14
5	12.5664	12.5664	47	147.65	1734.94	90	282.74	6361.73
6	15.7080	19.635	48	150.80	1809.56	91	285.88	6503.88
7	18.850	28.274	49	153.94	1885.74	92	289.03	6647.61
8	21.991	38.485	50	157.08	1963.50	93	292.17	6792.91
9	25.133	50.266	51	160.22	2042.82	94	295.31	6939.78
10	28.274	63.617	52	163.36	2123.72	95	298.45	7088.22
11	31.416	78.540	53	166.50	2206.18	96	301.59	7238.23
12	34.558	95.033	54	169.65	2290.22	97	304.73	7339.81
13	37.699	113.1	55	172.79	2375.83	98	307.88	7542.96
14	43.982	153.94	56	175.93	2463.01	99	311.02	7697.69
15	47.124	176.71	57	179.07	2551.76	100	314.16	7853.98
16	50.265	201.06	58	182.21	2642.08	101	317.30	8011.85
17	53.407	226.98	60	185.35	2733.97	102	320.44	8171.28
18	56.549	254.47	61	188.50	2827.43	103	323.58	8332.29
19	59.690	283.53	62	191.64	2922.47	104	326.73	8494.87
20	62.832	314.16	63	194.78	3019.07	105	329.87	8659.01
21	65.973	346.36	....	197.92	3117.25	106	333.01	8824.73
22	69.115	380.13	64	201.06	3216.99	107	336.15	8992.02
23	72.257	415.48	65	204.20	3318.31	108	339.29	9160.88
24	75.398	452.39	66	207.34	3421.19	109	342.43	9331.32
25	78.540	490.87	67	210.49	3525.65	110	345.58	9503.32
26	81.681	530.93	68	213.63	3631.68	111	348.72	9676.89
27	84.823	572.56	69	216.77	3739.28	112	351.86	9852.03
28	87.965	615.75	70	219.91	3848.45	113	355.	10028.75
29	91.106	660.52	71	223.05	3959.19	114	358.14	10207.03
30	94.248	706.86	72	226.19	4071.50	115	361.28	10386.89
31	97.389	754.77	73	229.34	4185.39	116	364.42	10568.32
32	100.53	804.25	74	232.48	4300.84	117	367.57	10751.32
33	103.67	855.30	75	235.62	4417.86	118	370.71	10935.88
34	106.81	907.92	77	241.90	4656.63	119	373.85	11122.02
35	109.96	962.11	78	245.04	4778.36	120	376.99	11309.73
36	113.10	1017.88	79	248.19	4901.67	121	380.13	11499.01
37	116.24	1075.21	80	251.33	5026.55	122	383.27	11689.87
38	119.38	1134.11	81	254.47	5153.	123	386.42	11882.29
39	122.52	1194.59	82	257.61	5281.02	124	389.56	12076.28
40	125.66	1256.64	83	260.75	5410.61	125	392.70	12271.85
41	128.81	1320.25	84	263.89	5541.77	126	395.84	12468.98
42	131.95	1385.44	85	267.04	5674.50			
43	135.09	1452.20	86	270.18	5808.80			

To find the diameter of circle when circumference is given, multiply the given circumference by .3183.

To fine the circ imference of a circle when diameter is given, multiply the given diameter by 3.1416.



Beautiful When Installed—

and superior material keeps it beautiful

THE beauty of Napanee Kitchen and Pantry Units is the beauty of thorough-going quality. High grade hardwood *throughout*, sawed in our own mills, dried in our own kilns, preserves the attractiveness and smooth operation of Napanee units against kitchen humidity. Hardware nickel plated over *brass* instead of iron is absolute insurance against rust. And in other important respects, which upon request we will gladly itemize for you, Napanee units possess a superiority which makes for longest life—smoothest efficiency.

These are reasons why Napanee equipped kitchens in homes and apartments are so valuable as sales or rental stimulators. They will work effectively for you in this capacity—as they are working for many of the owners of the country's finest buildings.

• • • •

The combination illustrated above includes a 40½ inch kitchen cabinet, a refrigerator, a refrigerator top cupboard, a deep broom closet with ironing board and a deep dish cupboard. The over-all width is 97½ inches; height 85½ inches; depth of base 21 inches; depth of cabinet top 12 inches. There is a Napanee unit, or group of units, for all needs—to fit any size space, or any arrangement of doors and windows.

COPPES BROS. & ZOOK · Nappanee, Indiana

Agent Territories

If you are the right man there is a splendid opportunity for you in one of a few localities still open for a Napanee manufacturer's agent.

Write Us!

NAPANEE

DUTCH KITCHENET

Built Like Fine Furniture

OUR GOLDEN ANNIVERSARY YEAR

COPPES BROS. & ZOOK, Nappanee, Indiana AB4

Gentlemen:—Please send me your illustrated catalog of Napanee Dutch Kitchen Units.

(Please check square) I am ☐ Builder ☐ Architect ☐ Home Owner.

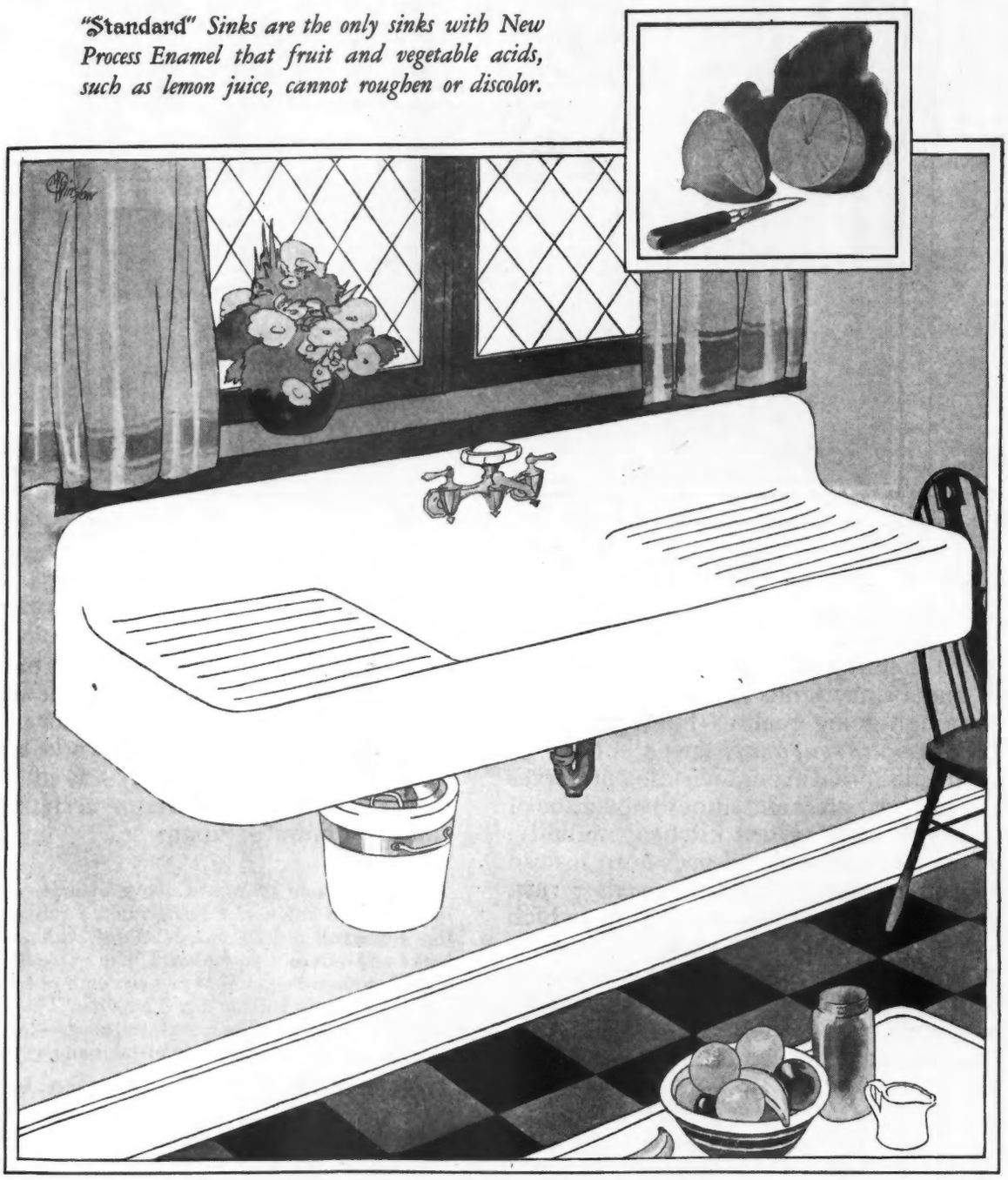
Name _____

Address _____

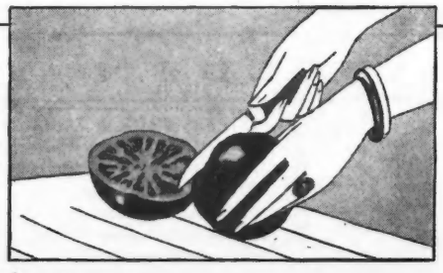
City _____ *State* _____

These three "EIGHTS"

"Standard" Sinks are the only sinks with New Process Enamel that fruit and vegetable acids, such as lemon juice, cannot roughen or discolor.



Every time the owner of one of your houses slices tomatoes or fruit on this new sink she becomes a booster for you. With their harder, more durable enamel they are really easy to keep clean, white and glistening.

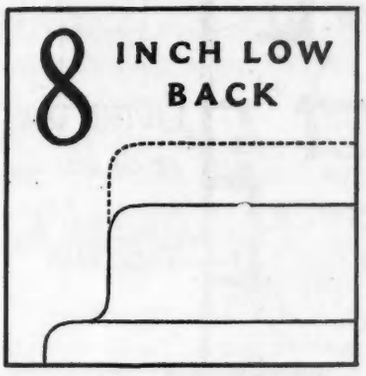


FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

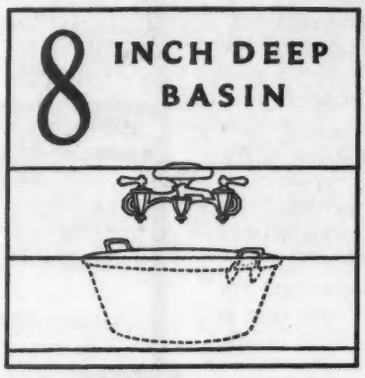
make new sink history

New "Standard" designs in "Standard" New Process Enamel that fruit and vegetable acids cannot roughen or discolor.

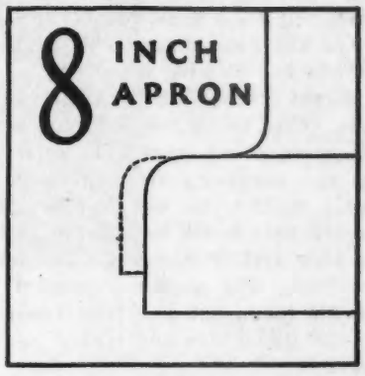
Selling features which kitchen sinks have never had before



Four inches lower than others, these are the first modern one-piece enameled sinks to fit under a really low kitchen window.



A big dishpan sits two inches lower in these sinks than ever before, thus stopping over-the-rim splashes. Women want this extra depth.



Gives a smart, low, massive line. These sinks add good looks *to their more serviceable enamel and new design features.*

These new sinks are all twenty-two inches wide, this giving the utmost working space.

Swinging-Spout Faucet is of new design. Finished in Chromard, so it will not tarnish or corrode. Thirteen-inch clearance between mouth of faucet and drain.

Convenient new garbage container of white vitreous china; slides in and out under the sink, as shown. Built into the sink—not attached to trap.

Women have long wanted sinks with new design features, and here they are! Taken in conjunction with "Standard" New Process Enamel, these design improvements offer you fresh aid in selling houses. They set a new pattern for kitchen beauty and convenience. They constitute the greatest forward step since the perfection of the one-piece sink idea.

These newest "Standard" Sinks are made in three styles and seven sizes—all distinctively trade-marked. Write for Catalogue and full particulars—or ask your usual source of supply.

See these newest sinks on display in all "Standard" Showrooms.

Standard Sanitary Mfg. Co., PITTSBURGH

"Standard" PLUMBING FIXTURES

Building Costs and Limited Space Require Modern Bedrooms

NOW, builders can sell six-room homes with the spaciousness of eight rooms at a saving of $1,000 a room. The modern bedroom must be light and cheery and above all sanitary. It must contain a comfortable bed—a sanitary bed. High building costs, however, require that in order to build fair-sized rooms, they be designed to give the utmost in service and be efficient as well as attractive. Rooms used only eight hours out of 24 do not pay, but 24-hour rooms certainly will.

Modern concealed beds give you 24-hour rooms—rooms that can be transformed from bedrooms into play rooms, sewing rooms, living rooms and sun rooms at a moment's notice. Similarly these same rooms can be made into bedrooms. And the concealment adds to the beauty of the interior in new and pleasing ways.

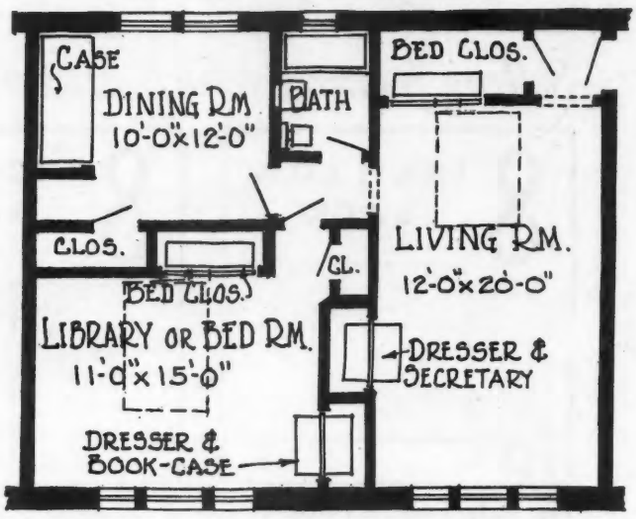
Large Rooms are possible with the use of modern concealed beds. They enable the builder to secure in one room all the efficiency of two rooms. In accomplishing this, the builder is not sacrificing sleeping comfort or beauty of the rooms. In fact, he will find whether he builds to rent or to sell, that it will be a distinct asset to build large rooms, as they most certainly are in demand.

A large room, with modern concealed beds, means not only a livable room, but a 24-hour room—a room that is attractive and usable day and night. Large rooms enable you to have—

Sanitation—which usually means cleanliness. This is to be had only when the concealed bed installation offers free access to all points at all times for cleaning. There is no place for the accumulation of dust in the modern concealed bed installation. Sanitation, when used with sleeping quarters, is generally used in connection with ventilation. By careful study and development direct drafts have been eliminated in modern concealed bed installations. A modern concealed bed, a sanitary one, located in a position where correct ventilation is had, is one of the best promoters of a comfortable night's rest. To encourage this the modern concealed bed offers perfect

Operation. By perfect operation we not only mean an installation that is practically effortless to operate, but one that is noiseless as well as simple and positive in operation. It is fool-proof no matter how slowly or quickly and carelessly the bed may be lowered into sleeping position. It is so designed that it is possible for the bed to come into sleeping position only in the proper manner—and that automatically. The operation of the modern concealed bed is so easy, so simple and positive that it has assisted materially in solving the problem of

The Servant. Should servants be necessary, however, and it is necessary for them to have sleeping quarters of their own, it is indeed a great step forward to install modern concealed beds in their rooms. This enables the servants to have the privacy of living rooms of their own, which

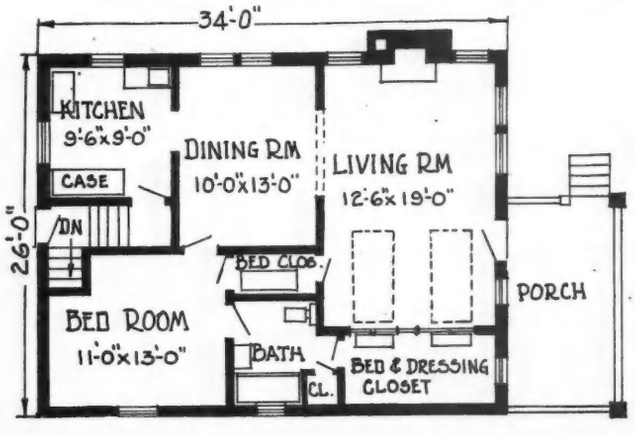


In the Modern Small Apartment the Concealed Bed Makes Possible 24-Hour Use of Every Room, for Each Room Is Made to Do Double Duty.

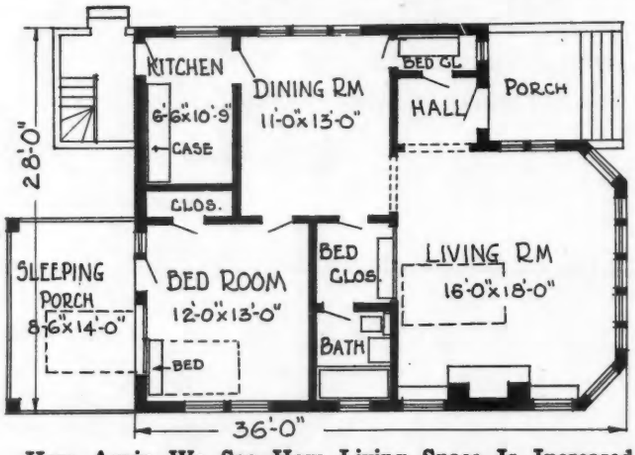
are refined and restful. It has been found that the modern concealed bed has not only made the servant more efficient, due to a comfortable night's rest and better hours, but makes them more content with their surroundings.

In the same way, the use of modern concealed beds is helping architects and builders solve all kinds of space problems. There are many types of

Concealment, which can readily be made in many striking and inexpensive ways, doing so in such a manner that the concealment harmonizes perfectly with the interior of any room. It is not always necessary to have a closet designed for the modern concealed bed, but beautiful and effective concealment can now be made with drapes, etc., not interfering in the least with the original layout or design either in furnishings or attractiveness of the room.



A Suggested Plan for a Four-Room Bungalow Which, with Its Concealed Beds Gives You the Facilities of a Five-Room Cottage.



Here Again We See How Living Space Is Increased by the Use of Beds Which Can Be Put Entirely Out of the Way in Daytime.

Build up your business by building better homes

with this easily applied insulation

"Celotex makes the home owner better satisfied with his house," says Peter Sundquist, Builder, Minneapolis, Minnesota, "that's why I use it constantly in my building. Its fuel-saving qualities are as well known to the consumer as to the builder."

BOTH contractor and home owner benefit when Celotex is built into homes.

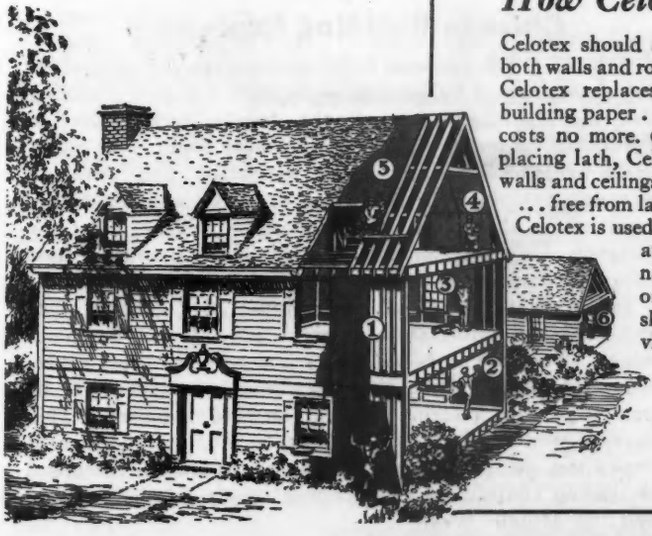
The high insulating value of Celotex keeps out winter's icy blasts and summer's stifling heat—makes homes more livable all year 'round. Winter fuel bills can be reduced about one-third. This new comfort and money saving makes homes easier to sell. Home owners are better satisfied . . . your reputation as a builder is increased.

Celotex is also quicker to apply than narrow wood lumber, and gives the owner a more comfortable house with walls that are stronger than those as ordinarily sheathed with wood lumber.

Used as sheathing or under plaster, broad Celotex boards (4′ wide, 8′ to 12′ long, 7/16″ thick) speed up the job and save labor. And Celotex is easy to work with; it is sawed and nailed just like wood. But, unlike wood, every board of Celotex is usable—free from cracks, knotholes or stain. That cuts waste to the minimum.

Because Celotex is not an extra item in building it adds little or nothing to costs. As sheathing it replaces wood lumber; under plaster it replaces wood lath. As interior finish, plain or decorated, Celotex combines attractive appearance with greater comfort. Attics or basements lined with Celotex also help to cut fuel bills and make homes more livable. Celotex makes an ideal garage lining, too.

All lumber dealers can supply Celotex. Mail the coupon for the Celotex Building Book and Specifications showing how to apply it.



How Celotex Is Used

Celotex should always be built into both walls and roofs. (1) As sheathing, Celotex replaces wood lumber and building paper . . . adds strength . . . costs no more. (2) Under plaster, replacing lath, Celotex builds stronger walls and ceilings . . . less apt to crack . . . free from lath marks. (3) and (4) Celotex is used as interior finish and attic lining either in its natural tan color or decorated. (5) As roof sheathing Celotex provides insulation where it is most needed. (6) As garage lining it helps protect the car against freezing.

CELOTEX
INSULATING LUMBER

THE CELOTEX CO., Chicago, Ill.
Mills: New Orleans, La.
Branch Sales Offices in many principal cities (See telephone books for addresses)
Canadian Representatives:
Alexander Murray & Co., Limited, Montreal, Toronto, Halifax, Winnipeg, Vancouver

THE CELOTEX COMPANY, Dept. T-504
645 No. Michigan Ave., Chicago, Ill.

Please send me the Celotex Building Book and Specifications Book showing how to apply it.

Name _____

Address _____

City _____ *State* _____

Am. Bldr., 4-27

Modern concealed beds offer the modern builder an unlimited variety of methods of unusual concealments; whether the doors be paneled or mirrored, or of the French door type, all lend themselves readily to very charming effects. It is very often found that where a room is large and paneled, with beds concealed back of the panels, that

Quality usually is a very import factor. For this reason you can now offer your prospects quality in concealment as well as in modern concealed beds themselves. In addition to meeting the economy of present day building costs, modern concealed beds have been perfected and built to "stand up" and give unlimited service, in addition to lending attractiveness to a room. In the manufacture of modern concealed beds quality is uppermost from the time of the purchase of the raw material through the period of making and finally, while not least, through the period of installation. In this manner only is any manufacturer able to place before the builder a quality product.

The honest and experienced builder will agree that his experience and knowledge have taught them that the permanent and satisfactory job—from skyscraper hotel to bungalow—must be built of quality material. The building cost must be economical. And when finished the building must be livable—and to be livable, it must possess

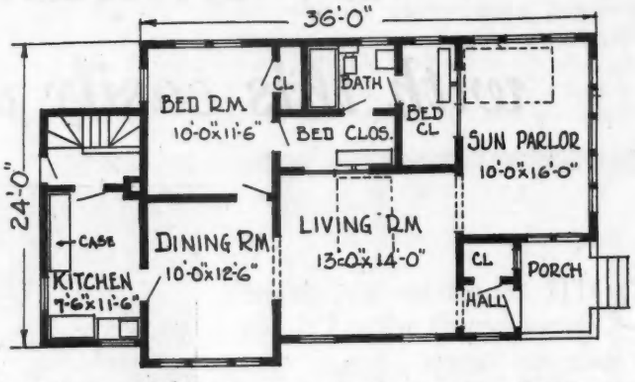
Beauty. It is not possible for a manufacturer to design but one or two models and expect them to satisfy the fastidious builder, architect or owner who is anxious to have every item conform strictly with the interior which he so carefully and conscientiously designed. In order that the concealed bed may harmonize with every interior it is absolutely necessary that the manufacturer present to the builder a very complete line both in design and finish, should it be in steel or wood, that it may conform with the building operation under consideration, should it be the most elaborate hotel or the home of a working man, for the

Cost can be brought to a surprisingly low point with the use of modern concealed beds. Their installation enables the working man to have a home with all the comfort, quality and efficiency of eight rooms and yet, in all probability, have but the building cost of five or six rooms.

Modern concealed beds are surprisingly low in cost and with them the progressive builder should be able to build for his prospect a home which contains not only two or three bedrooms, with living rooms, dining rooms and kitchens, but in addition a home that has the advantages of a library, den, sewing room, etc., at practically no extra cost.

There is no limit to the use of modern concealed beds. They make the children's nursery a play room by day, and the sun room may become a sleeping porch at a moment's notice, the living room a modern bedroom, etc.

Building Costs are not prohibitive to offer these comforts even in the homes you plan and build for the working man.



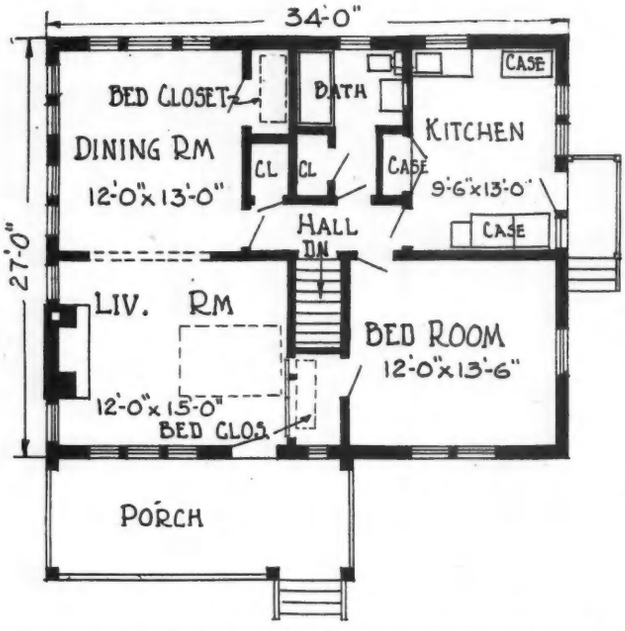
Even the Sun Parlor May Be Put to Work at Night by the Use of the Concealed Bed, and It Makes an Excellent Sleeping Porch with Windows on Three Sides.

We believe that $1,000 a room is a conservative figure as an average cost of building. If an eight-room houses costs $8,000 and you can build a five-room house for $5,000, we certainly believe that it is to the interest of every builder to be informed on the improvements offered in the installation of modern concealed beds. Beyond question the builder who can prove that he can build an attractive hotel or home for less than his competitor is bound to get the business.

Builders will find that they can please their prospects by planning and building with economy, yet with up-to-date efficient layouts, which in turn will prove beyond all question that you are progressive and aware of modern conditions and the modern ways in which to meet them.

A service department maintained by the AMERICAN BUILDER will be glad to assist you, without obligation, in designing a bed or an installation which will offer a successful solution to your problem.

It will be interesting for you to know that this department is conducted by men who have been recognized as solving some of the most difficult floor plan problems offered by architects and builders in the last few years. Their ideas and suggestions have been gathered from intimate contact with architects and builders all over the country.



With the Arched Doorway Between Living Room and Combination Dining Room-Sleeping Room, the Latter Also Serves as an Extension of the Living, Between Meals.

Chicago Building Exposition

CHICAGO'S permanent building materials and equipment exposition, to be housed in the new Builders' Building now nearing completion on the double decked Wacker Drive, will be open to the public on May first. Two entire floors will be devoted to the exposition with building materials exhibited on the second floor and building equipment on the third floor. The exposition will be under the direction of a permanent manager with attendants and information desks on each floor.

Exhibitors will have all the facilities of a general office and a special information research service will be maintained. For exhibitors wishing space without direct representation on the floor, the exposition attendants will be trained to give information and forward inquiries. This exposition is not to be a promotion event but a permanent exposition, owned and managed by a corporation composed of leading contractors and building supply men of Chicago and the Middle West.

Residence of Mr. Milton Jones, Downer Place, Aurora, Ill. Frank B. Gray, Archt., Aurora, Ill. Completely equipped with Chamberlin Weather Strips.

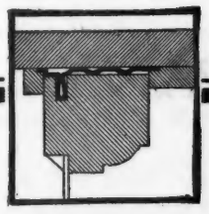
Satisfaction for Users— Dependability for Architects— Simplicity for Contractors

All concerned will be best satisfied if you entrust the entire matter of weather stripping to Chamberlin. Chamberlin manufactures a suitable type of weather strip for every kind of door and window opening—trained Chamberlin mechanics do all the work of installation—and Chamberlin guarantees and services its equipment for the "life of the building".

Chamberlin equipment includes—zinc, cold-rolled bronze or spring bronze weather strips for outside doors and windows, Sill-Dor-Seals for entrance thresholds, In-Dor-Seals for bottoms of inside doors, and Plasti-Calk for sealing cracks between window and door frames and masonry.

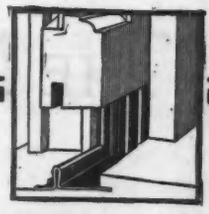
Chamberlin equipment assures a more comfortable, liveable building—one easier to keep clean—more economical to heat—and one that possesses higher resale value. Your customers will appreciate Chamberlin—the nationally accepted weather strip and the standard for 34 years.

CHAMBERLIN METAL WEATHER STRIP COMPANY
West Lafayette Boulevard, Detroit, Michigan
Over 100 Sales and Service Branches Throughout the United States

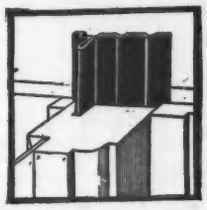


34 years' experience has proved Chamberlin Tongue-in-wood-Groove Contact sound in principle and over 90% efficient. The groove is always of standard width, an important detail necessary to obtain effective weather strip installations.

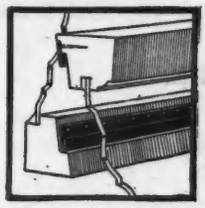
CHAMBERLIN WEATHER STRIPS
"SINCE 1893-THE STANDARD"



In both lower and upper corners of sliding windows, Chamberlin Weather Strips are perfectly joined or mitred. Chamberlin design requires this operation—an installation detail necessary to obtain maximum weather tightness.



Weather stripped windows should be practically airtight yet easy to operate. Chamberlin covers entirely the runways of sliding windows but raised track-like corrugations reduce sliding friction to a minimum.



Chamberlin equipment includes a strong metal interlocking strip at meeting rails. Chamberlin installation practice requires that sash be properly dressed, trimmed and trued if necessary before Chamberlin is installed.

F.C.-189

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

MASSILLON

STANDARDIZED STEEL BUILDING PRODUCTS

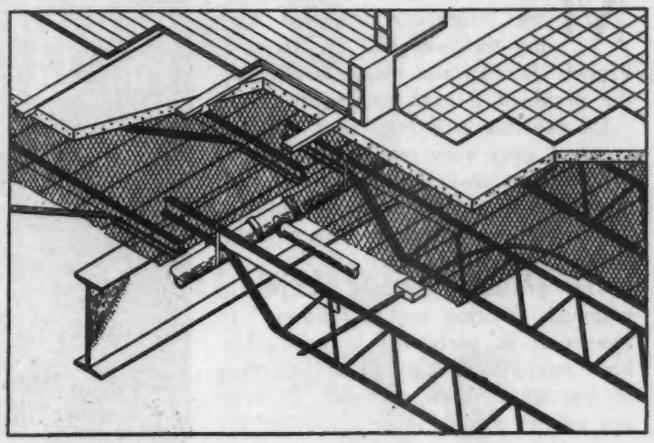
Massillon Bar Joists

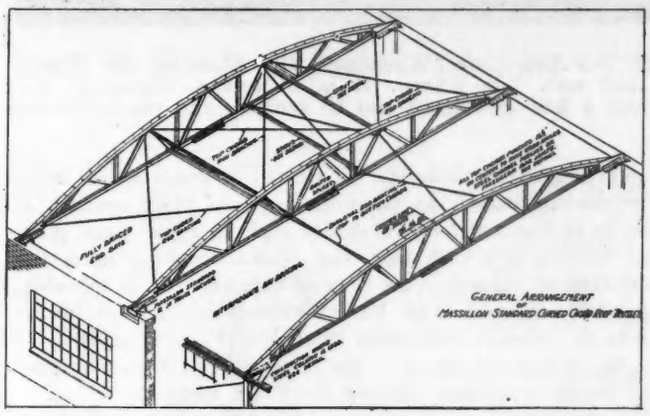
—are rugged structural units.

No metal less than 1/4″ thick.
Solid Steel arc welded connections.
Open web construction.

—shipped from stock for building fireproof floors and roofs in all types of buildings.

—are erected without cutting or fitting in the field. No special plant equipment is required.





Massillon Roof Trusses

—provide clear open floor space for garages, auditoriums, gymnasiums, and in commercial and industrial buildings.

—are standardized for all spans in both the "A" Type and Curve Chord (bow-string) Type. Specially designed for ease in handling and erecting.

—are shipped from stocks of finished trusses for normal orders. No cutting or fitting required on the job.

Other MASSILLON Products

METAL LATH AND LATH ACCESSORIES for walls, ceilings, partitions, floors and roofs.

COPPER BEARING STEEL WINDOWS for residential, school, office, public, commercial and industrial buildings. All types.

BANK VAULT REINFORCING—standardized for large and small vaults for banks, financial and commercial institutions, and isolated plants.

Partition Studs, Lintels, Standard Steel Doors, Sidewalk Doors, Mixing Boxes and Mortar Boards, etc.

Fabricated Structural Steel

Steel Reinforcement.

Special Service to Builders

Realizing the tax on the architect's and builder's time, our sales policy does not contemplate general sales calls. Please bear in mind that our engineers are available for going over the plans for your building and preparing estimates and layout drawings. Special attention is given special conditions not covered economically by standard designs.

Send us a sketch or plans of your proposed building, or call in our authorized sales representatives. Descriptive literature sent on request.

THE MACOMBER STEEL COMPANY

909 Belden Ave., N. E.

CANTON, OHIO

Canadian Manufacturing and Sales Agents; Sarnia Bridge Co., Ltd., Sarnia, Ont.

Oxy-Chloride Cement Flooring

More Generally Known as Plastic Magnesia Flooring

By W. R. SMYTH

MAGNESIA oxy-chloride cement was originally produced during the year 1867 by Sorel, a French chemist, and was first used on the decks of French battleships.

Its valuable properties as a flooring material were very readily recognized, so much so that since that time the manufacture and installation of plastic magnesia flooring has become a large and important industry.

The principal qualities of plastic magnesia flooring are as follows: It attains at an early age a remarkably high strength, much higher than that of any other plastic material. It does not exhibit a high volume change due to variations in temperature or other causes—is resilient, easy to the tread, hygienic and fire resisting.

Interior View of Tip Top Cafe, Waukegan, Ill., Showing the Plastic Magnesia Flooring Laid with Tile Effect. It is, of course, important that restaurant floors present a fine appearance and be sanitary and easily cleaned as well.

It is particularly suitable for the requirements of hotels, hospitals, courthouses, office and other public buildings, but also has many advantages for use in apartment buildings and private dwellings. After being thoroughly cleaned, floors should be properly waxed with preferably a liquid floor wax, and should be re-waxed from time to time as may be required. These floors can be cleaned without injury by using soap and water, or any of the recognized floor cleaning materials such as gold dust and water, etc., etc.

The chief constituents of plastic magnesia flooring upon which depends its binding properties are calcined magnesite and magnesium chloride. Calcined magnesite, or more technically known as magnesium oxide when ground, is to be had in a variety of shades such as white, gray, pink, or with a yellowish cast, the color depending upon the amount of impurities the mineral contains. It is infusible, insoluble in cold acids, but effervesces easily with liberation of carbonic acid when treated with warm acids.

Apart from its use as a raw material for the manufacture of plastic magnesia flooring there are many other industries in which this material is used. For instance, that of insulation materials, refractories, stucco plaster, pharmaceutical and technical chemicals where magnesia is used extensively.

A Class Room in the Freeport, Ill., High School. This class room is floored with plastic magnesia flooring which is used elsewhere in the building to a total of 52,833 square feet. Royer, Danley and Smith, of Urbana, designed this school.

The source of plastic calcined magnesia is a mineral magnesium carbonate known in mineralogy as "magnesite." This mineral when theoretically pure contains 100 per cent magnesium carbonate and gives by calcination approximately 47.6 per cent magnesia and 52.4 per cent carbonic acid, but ordinarily it contains from 85 to 96 per cent magnesium carbonate, the balance being calcium and iron carbonates, and a small quantity of silica.

The massive material is of two distinct varieties—the crystalline and the compact. The compact form which serves as a raw material for plastic magnesia as used in the manufacture of flooring, is usually white in color, often of high purity, and has the appearance of chalk or unglazed porcelain. Its specific gravity is 2.9 to 3.0 and the density is thus about 185 pounds per cubic foot.

The compact variety of magnesite occurs as an alteration product of ser-

Here is the D-8 Saw you know

Now... try this Lightweight D-8

Here are a few Disston Lightweight models which carpenters are finding so desirable for present-day sawing.

Disston No. 7 Lightweight (Ship Pattern) Saw. Disston Steel blade. Beechwood handle.

Disston No. 16 Lightweight (Ship Pattern) Saw. Disston Steel Blade. Applewood handle.

Disston D-115 Saw. The finest hand saw Disston makes. Rosewood handle. Highly polished Disston Steel blade.

A Lightweight D-8.

Lighter in weight! Narrower in the blade. It takes less of your strength when you're sawing all day long.

Yet the same stiffness is there; the same temper and tension; the same keenness in the teeth; the same balance of handle on the blade.

Modern building methods make such a saw desirable.

Disston has filled the need. Not only the D-8, but practically every Disston Saw can be secured in a Lightweight model.

Today... ask your hardware man to show you these Disston Lightweight (Ship Pattern) Saws. Write us if he cannot supply you.

HENRY DISSTON & SONS, Inc.
Makers of "The Saw Most Carpenters Use"
Philadelphia, U. S. A.

DISSTON

pentine rocks (serpentine is a mineral silicate of magnesia) in which it forms veins. Although deposits of this kind are widely scattered throughout the world, only large deposits can be profitably worked. The commercial sources of the compact variety are in California, the Island of Euboia in the Greek Archipelago; Salem in Madras, India; the Transvaal in South Africa; Piedmont, France, and several other localities on a smaller scale.

Magnesia, as stated above, is obtained from magnesite by calcination. This treatment is made in order to drive off more or less completely the carbonic acid with which the magnesia is chemically combined. Calcination causes a loss of approximately 50 per cent in weight, a considerable decrease in volume, and marked changes in physical properties of the material. The character of the resultant product is dependent upon the time and temperature of calcination, and the amount and character of impurities present. Magnesite that has been calcined at comparatively low temperatures is known as "caustic burned magnesia" and is prized as a structural material on account of its setting and cementing properties when mixed with a solution of magnesium chloride. If the temperature of calcination is raised too high, a sintering of the particles of magnesia then occurs, and the resulting material is called "dead burned magnesia." This latter variety of magnesia has no setting and cementing properties, but it constitutes an invaluable refractory material for the steel industry.

Magnesium chloride, the other chief constituent of oxy-chloride cement, is a salt of magnesia occurring in sea water, and in many mineral waters—sometimes combined with chloride of other metals it forms immense beds of minerals. For instance, carnallite, which is a double salt of potassium and magnesium chloride. This mineral is worked up for its potassium content for fertilizer purposes and the magnesium chloride generally used in this country for plastic magnesia products is derived from a salt deposit found in Michigan.

When caustic burned magnesia powder is mixed with a strong solution of magnesium chloride into a thick paste, the mixture sets in a few hours to a hard, stone-like mass. The chemical explanation of this phenomenon lies in the fact that each molecule of magnesia combines with a molecule of magnesium cloride to form one molecule of magnesia oxy-chloride. The latter is a complex compound of magnesia which crystallizes as soon as formed, and this crystallization is what causes the setting of the material, just as the liberation and crystallization of hydrated lime resulting from the hydration of calcium aluminate and calcium silicate is the cause of the setting of portland cement; but in order to obtain the most desirable results in the use of oxy-chloride cement, both its constituents should fulfill some well determined requirements regarding their purity. For instance, the magnesia should be practically free from active lime, and the magnesium chloride should contain not more than 2 percent CaO (as CaC12) not more than 2 per cent SO3 (as MgS04) not more than 3 per cent NaCl and KCl.

The Attractive Appearance of This Office Is Enhanced by Its Plastic Magnesia Flooring Laid with a Tile Pattern. An increasing number of offices are having this type of flooring installed.

In the manufacture of plastic magnesia flooring all raw materials should be carefully tested by an experienced, qualified chemist in order to check their purities, and formulas altered accordingly.

A neat mix of oxy-chloride cement is a useless material in masses, its only practical use being in thin films as an adhesive. In order to be used as a structural material, or, say, a plastic magnesia flooring, magnesium oxy-chloride cement should always be mixed with different aggregates in well determined proportions.

The problem of aggregate grading in plastic magnesia flooring is principally one of void filling. The magnesium oxy-chloride binder must be present only in films throughout the cement mass without any appreciable voids being filled with small masses of neat oxy-chloride. Only under such conditions of manufacturing an oxy-chloride cement mortar will it give the highest possible strength. In the preparation of plastic magnesia flooring particular attention must be given to the selection of aggregates, not only for the size of the respective particles, but also for the purity. The blending of aggregates is made such as to meet the requirements that are now definitely defined for plastic flooring.

It will be noted in the above that the manufacture of plastic magnesia flooring is a highly technical process. It is a mistake to suppose that this flooring can be made to give good satisfaction without ever giving a thought to the necessity of changing formulas in accordance with the variations in the raw materials received by manufacturers.

As a matter of fact, the manufacture of plastic magnesia flooring and plastic magnesia stucco are highly technical industries, and should not be engaged in unless under the supervision of trained and experienced chemists.

Employers Have Learned the Value of Good Finish, Bright and Clean Surroundings in Factories and Workshops as Well as Offices. Note the well finished, sanitary appearance of this plastic magnesia flooring laid in tile pattern.

Blue Print Plans

and 24 Page Book "How to Read Blue Prints"

Sent FREE

Our gift to every man in the building game. Sent absolutely free. For we want you to see for yourself . . . at our expense how easily and quickly you learn to read blue prints . . . and can get the knowledge that will make you more money. Don't send a penny. Just mail the coupon.

The Book Tells How

"How to Read Blue Prints" is written in plain, every day English. It is easy to understand . . . and will prove to you immediately how quickly you can get the training that has given other men the chance to work with their heads . . . and to make more money than just the wage scale.

We know this is true. For 22 years we have been training men . . . in their spare time, at home . . . to advance and succeed in the building field. Many have now got good contracting or building businesses of their own. Many are salaried men, foremen or superintendents.

This book is really a Free Trial Lesson in Plan Reading . . . written by a practical building expert. It costs you nothing . . . will teach you how to read Blue Prints . . . and may point the way for you to big money. It will show you how easy our instruction is . . . how quickly you can become an expert . . . can get the practical knowledge that you must have to get ahead quick.

Another Book FREE

We will send you also a book about the Chicago Technical School for Builders. It is free, too. It tells you all about our method of training by correspondence. It shows you how you can make your spare time pay you a handsome profit in a very short while. It tells all about our practical instructors . . . shows every branch and department of our Builder's Courses . . . gives you photographs of our men and departments . . . tells what others have done and what you can expect to do.

Chicago Technical School for Builders is one of the oldest and best equipped schools of its kind in America. Many big builders owe their first step to success to our training. Hundreds of practical men from the building trades attend our day and evening classes at our school for builders here in Chicago. You get this same training . . . from the same practical instructors . . . in your own home by mail.

Train by Mail

Go right on with your work. Your spare time . . . as little or as much as you wish . . . is all you need. Our practical lessons and actual blue print building plans come to you by mail. And the cost is little.

Send the coupon . . . today. It will bring you with the **free** Blue Print Plans and the two books, full information about the Chicago Technical School for Builders. Shows what we have done for hundreds of other men, gives the facts about their success. Tells how some became superintendents in a few months. How others established contracting businesses of their own. Gives all details of this practical builder's course with descriptions, photographs and illustrations.

Start now. It costs you nothing to find out what this practical builder's course is . . . and what it can do for you. If you want to make more money in the building game . . . get the facts about the Chicago Technical School for Builders.

You Can Become a Building Expert

Plan Reading. Every man who has got very far ahead in any building trade can read blue prints. No man can expect to be a first rate foreman or superintendent until he knows what every line on a plan means and how to lay out and direct work from the architect's plans. By the Chicago Tech. Method you quickly learn to read any plan as easily as you read these words.

Estimating. Of course a man who wants to be a contractor or to hold a big job in a contracting organization must know how to figure costs of labor, material, and everything else that goes into any kind of building. The Chicago Tech. Course covers every detail of this important branch—shows you just how it is done from actual blue print plans.

Superintending. How to hire and direct men, how to keep track of every detail of construction as it goes on, how to get the work done in the least time at the lowest cost is also fully covered in the Chicago Tech. Builders' Course.

Also special courses in Architectural Drafting for builders, taught by practical men. These explained in Special Catalog "D" sent on request.

Mail the Coupon—NOW

CHICAGO TECHNICAL SCHOOL FOR BUILDERS

Dept. D-120, Chicago Tech. Bldg., 118 East 26th St., Chicago, Ill.

Please send me your Free Books and Blue Prints for men in the Building Trades. Send postpaid to my address below. It is understood that no salesman will call on me.

Name.....

Address.....

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

CHICAGO TECHNICAL
SCHOOL FOR BUILDERS
Dept. D-120, Chicago Tech. Building, 118 E. 26th St., Chicago, Ill.

When the proper materials are used, mixed and expertly laid, the plastic magnesia type of flooring is one of the best and most enduring floors known to science. Any composition floors of this type that have failed in the past have not been laid by reliable, scientific manufacturers. Architects and builders may have perfect confidence in plastic magnesia flooring when furnished and laid by manufacturers equipped with chemical laboratories and experienced workers who make full use of the information gained in the testing laboratory. It is unfortunate that some architects and builders have seen failures of plastic magnesia flooring and gained the impression that it is unreliable, whereas, as a matter of fact, any such flooring which failed was neither scientifically manufactured nor laid.

There are no secrets in respect to the manufacture of plastic magnesia flooring. Formulas are to be had from the United States Bureau of Standards, and any reputable manufacturer will gladly supply architects with basic formulas on the distinct and clear understanding that basic formulas have to be changed from time to time, dependent upon the raw materials.

It will probably surprise the members of the architectural profession to learn that France with a population of a little over one-third of that of the United States, uses approximately the same amount of calcined magnesite as does the United States; and Germany and England a great deal more on a per capita basis. This is due to the fact that plastic magnesia flooring in the aforementioned countries is manufactured on purely scientific principles.

This industry at the present time is passing through a similar phase to that which the Portland cement industry passed through some twenty to twenty-five years ago. At that time every Tom, Dick and Harry who could secure a formula for the manufacture of portland cement thought all that he required was a formula to become a portland cement manufacturer. Time has cured that condition and time and co-operation on the part of the members of the architectural profession will cure the present condition in the plastic magnesia flooring industry.

In conclusion it might be suggested that when members of the architectural profession or builders are considering the use of plastic magnesia flooring, they also look into the financial standing of the firms from whom they might invite bids, and better still, they should visit their plants and laboratories and make sure that the product is scientifically compounded, based on full chemical knowledge of the ingredients and their reactions.

View in a Hospital Ward Where the Floor Is of Plastic Magnesia. Many thousand square feet have been successfully installed in hospitals and institutions. The sanitary and good wearing qualities of this type of flooring make it appropriate for use in buildings of this character.

✣

Trend in Apartment House Planning

(*Continued from page 230*)

continues popular and are probably being erected in larger numbers than any other type. The U-shape, with the parked court, seems to offer the greatest advantages—providing opportunities for plenty of light and air and taking full advantage of the depth of the lots for maximum floor space. Most of these buildings are being completely equipped with refrigeration, gas ranges, laundry facilities, garbage and refuse incinerators, electric kitchen ventilation, disappearing beds, garment hangers, fireplaces, casement windows, shades, weather strips, screens, awnings, laundry and clothes dryer equipment, the latest plumbing fixtures, tiled bathrooms with showers and other modern features. It is also customary to equip them with the latest electric lighting fixtures and wiring, with plenty of convenience outlets.

The co-operative apartment idea continues its steady growth in popularity and many large projects of this nature are under way in the metropolitan cities. The bond houses always seem willing to finance these undertakings and we have never heard of a failure yet. The idea is also spreading to the smaller cities. These buildings usually reach to a considerable height and have elevator service, in order to take full economic advantage of the site. They are almost always of fireproof construction and have handsome lobbies, reception and ball rooms and have practically all the labor-saving and convenient equipment it is possible to install. They are a good investment from every point of view and stock ownership can be readily sold on short notice, such is the demand. Most of these buildings contain three, four and five-room suites. Is the American family becoming smaller?

✣

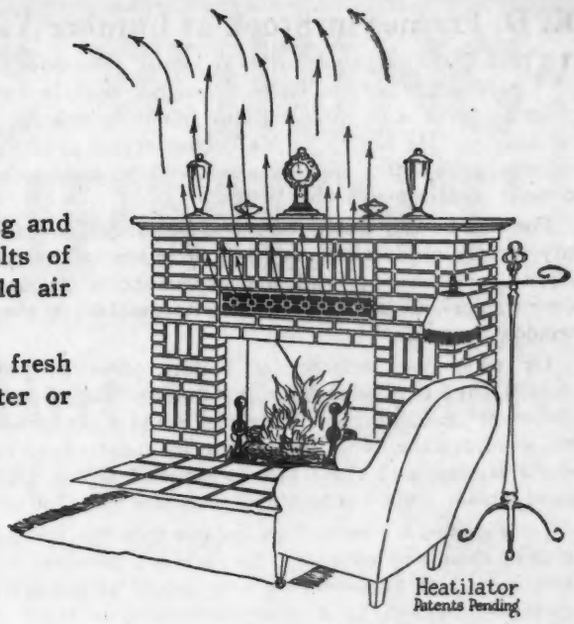
Another Plan Contest

AN architectural competition covering the use of West Coast woods in home construction has been announced by the West Coast Lumber Bureau, 562 Stuart Building, Seattle, Wash., and is being sponsored by and conducted under the auspices of the Washington State Chapter of the American Institute of Architects. This competition is open to any architect, architectural firm, designer or draughtsman. The closing date is August 1, 1927. The West Coast Lumber Bureau will award a first prize of $2,000, a second prize of $500 and ten mentions of $100 each.

The special purpose of this competition is to develop and bring forth the uses, applications and methods of construction and finishing of the woods of the Pacific Northwest, Douglas fir, West Coast hemlock, Sitka spruce, and Western red cedar. Full information on the rules governing this competition in the design of a residence and garage can be obtained from the bureau.

HEATILATOR FIREPLACE

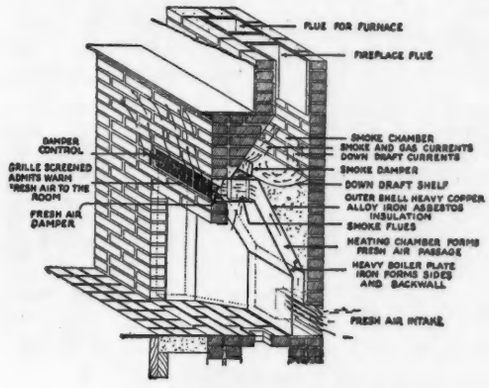
Warm fresh air—
no drafts---no smoke



The Heatilator Fireplace is offered as a practical heating and ventilating unit. Its use will correct the common faults of fireplace design and construction—such as smoking, cold air drafts and insufficient heat.

The principle is the same as the hot-air furnace with its fresh air intake, its heating chamber and its warm air register or grille. Instead of being entirely enclosed like a furnace it becomes an open hearth or fireplace, adding charm and attractiveness to the home.

The Heatilator insures an efficient and satisfactory fireplace—especially valuable in building new fireplaces. Desirable also for remodeling.



SPECIFICATIONS

The inner shell or part exposed to the fire is of 10-gauge copperoid non-rusting iron. The outside or back wall of the heating chamber is of 14-gauge copperoid iron. All seams electric welded.

The front grille outlet for warm air is of bronze, size 5″ x 33½″. Louvre type of grille at back furnishes the intake for fresh air. If fireplace is located in center of building a fresh air box may carry into bottom of the heating chamber.

The smoke damper and control are part of the Heatilator. The same attachment controls the intake of fresh air, making a perfect ventilating system at all times.

Simple installation directions and plan are included with each unit. Ask for other specifications, measurements and detail drawings, etc.

HEATILATOR FIREPLACE *Saves Material and Labor Then Saves Heat*

Saves one-half its cost in material and labor. Then earns money for you in the use of fuel for heating.

Advantages of the Heatilator

Saves much heat formerly wasted.

Makes more common use of fireplaces an economy instead of a luxury.

Furnishes perfect fresh air ventilation at all times.

Insures scientifically correct construction, thus saving disappointment in results.

Saves most of the firebrick and much labor.

Prevents drafts (referred to in U. S. Gov't Bulletin as a common fault) by furnishing plenty of fresh pre-heated air to warm the room and to feed the open fire.

Will popularize the use of fireplaces and benefit health thereby.

Adds greatly to the value of the home for owner's use or resale.

See the Heatilator---then decide

Shipment will be made to any reliable dealer for inspection. If not O. K. in every way, shipping instructions will be given and freight refunded.

No. 34A, Heatilator.

Complete unit ready to install, carefully crated, shipping weight 290 lbs. Price F. O. B. Syracuse, N. Y. **$87.00**

Heatilator Company

631 Glen Ave., Colvin Sta. P. O.
SYRACUSE, N. Y.

K. D. Frames in Stock at Lumber Yards

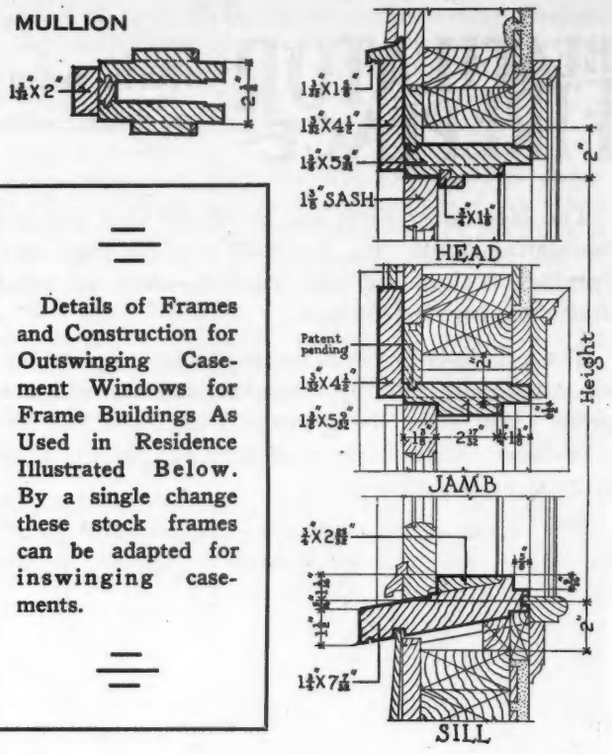
WHEN the carpenter of today wants a window frame, he doesn't have to make it; neither does he have to place an order with the local mill and then wait for them to make it. He can go to his lumber dealer and buy, out of stock, a neatly bundled knock-down frame that is cheaper and in every way better.

For this he can thank the economies arising from quantity factory production, and the perfection of the product due to constant study and long experience in making window frames—all kinds of window frames and nothing but window frames.

Or when the architect or builder plans a home he doesn't have to worry about the window frames—whether they will be of proper quality and made right to exclude the wind and the rain. He can specify standardized knock-down frames; and these can be supplied out of stock by most lumber dealers in practically any size and style desired.

Such frames are erected on the job with the greatest degree of speed and accuracy. All parts are rabbeted, beveled and dadoed to fit accurately and snugly in place. Blind stops are marked by a patented method to show where casings should be set. No trimming or refitting of parts is necessary.

Using only a hammer and 19 nails, one man can completely erect the seven units which make up the complete frames in less than 10 minutes.



Details of Frames and Construction for Outswinging Casement Windows for Frame Buildings As Used in Residence Illustrated Below. By a single change these stock frames can be adapted for inswinging casements.

Standardized Knock-Down Window Frames Out of Stock Contribute to the Success of This Well Constructed Minneapolis Residence. Tyrie & Chapman, Architects.

ELECTRIC WIRING AND EQUIPMENT

Adequate Today, But Inadequate Tomorrow

Our Growing Needs in Electrical Matters

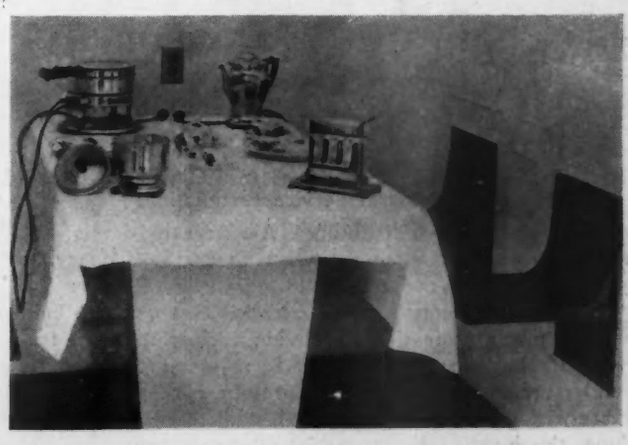
By JOHN W. SAVAGE

PROBABLY in no other branch of construction do ideas of adequacy change as rapidly as they do in relation to electricity. This is particularly true of ideas relating to the wiring requirements in residential buildings whether these buildings be detached homes, apartment houses, apartment hotels or hotels.

Yesterday it was enough to provide light. Today scientifically distributed illumination, free from glare, and flexibly controlled by conveniently placed switches is the common desire. Where before the lamp socket was considered sufficient to accommodate the few appliances used, several convenience outlets are now necessary for the accommodation of the innumerable portable lamps, motor driven devices and heating appliances in every day use.

What the requirements will be five years hence are almost impossible to forecast but one thing we may be sure—the conception of adequacy as evidenced in the average residential building being constructed today will be hopelessly inadequate within a short space of time. Casual observation of the common uses of ugly multiple socket devices and the accompanying network of unsightly surface wires will confirm this.

Considerable study has been given to the past and present applications of electricity in residential buildings and attempts have been made to visualize the wiring require-



Breakfast Nook Showing Suitable Location for Convenience Outlet.

Bathroom Showing Location of Convenience Outlet and Mirror Lights.

Bedroom Showing Ceiling and Wall Light Outlets and Convenience Outlets. The latter are generally located in the baseboard; however, in many sections the higher location is preferred.

Symbols Used on Building Plans to Indicate Features of the Electrical Service Installation.

ments of the immediate future. As a result of this study certain specific recommendations both as to adequacy and quality have been evolved.

These recommendations are intended as a guide to builders who take a professional pride in anticipating future tendencies in the construction field. In recommending to these builders that they revise their present conception of adequate wiring to accord, in general, with these recommendations, the incidental commercial advances have been subordinated to the immeasurable advantages of complete and permanent wiring to future occupants of residental buildings now contemplated.

Because of the diversity of entrance requirements in the larger multiple residence buildings, it is obviously difficult to treat them as specifically and completely as detached dwellings but insofar as the actual wiring requirements of the living quarters are concerned, there is but little distinction.

An initial recommendation is that minimum of 3 per cent of the total estimated cost of the building be budgeted for the wiring (exclusive of lighting equipment). Experience has indicated that this figure represents the minimum necessary to insure an adequate installation composed of quality materials. As a matter of fact builders would undoubtedly secure the highest value for their dollar if, at the outset, they informed electrical contractors that a sum equivalent to 3 per cent of the total estimated value of the building had been set aside for the wiring; and awarded the contract to the electrical contractor who offered to provide the most complete service and the most dependable materials for that amount of money.

This percentage applies more particularly to multi-family apartment houses or apartment hotels designed to accommodate 50 families or less. In larger and more pretentious buildings 4 per cent should be allowed.

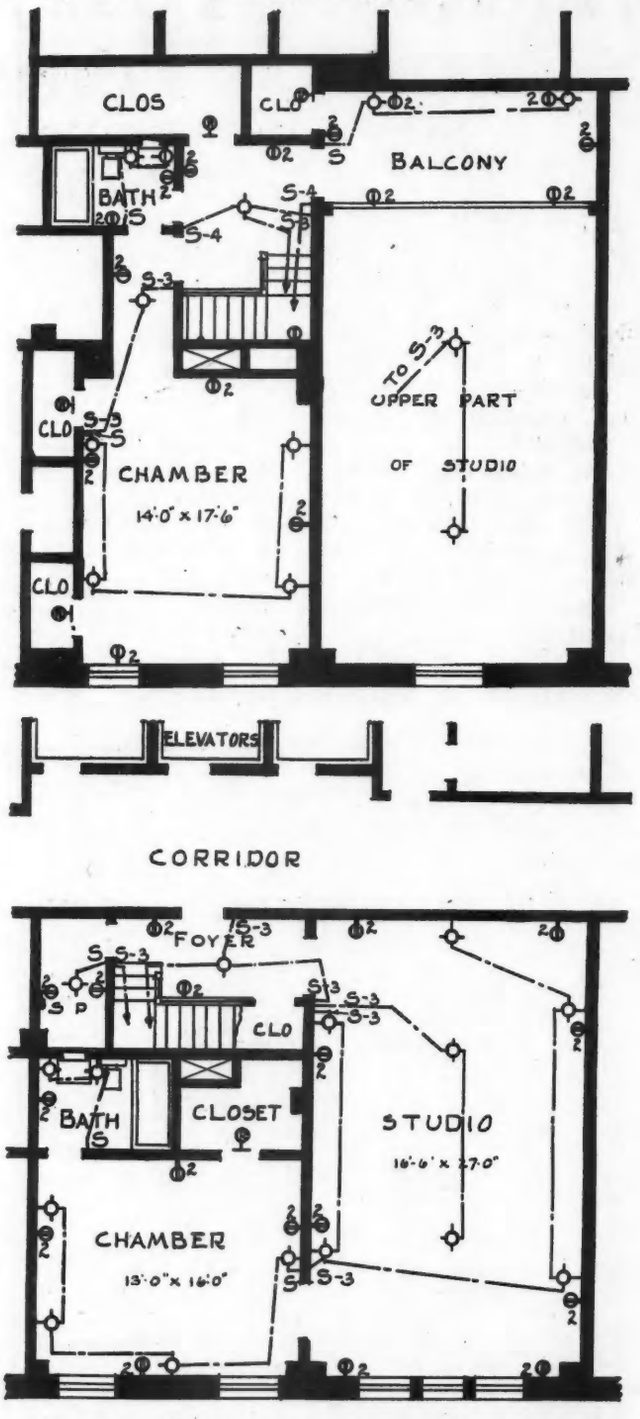
The recommendations for adequate wiring in the living quarters are as follows:

1. Individual panelboards should be provided for each apartment or suite. These should be located at an accessible point in the service quarters. This recommendation is made so that the occupant may promptly and conveniently replace blown fuses.

2. In the panelboard, one spare circuit should be provided for future extensions which cannot be anticipated.

3. A lighting outlet should be provided for each 60 square feet of floor space. These should be divided between ceiling lights and wall lights to provide both general illumina-

(*Continued to page 286*)



Main Floor and Corresponding Upper Floor of a Duplex Studio Apartment, Showing Recommended Wiring. This type of building is in considerable vogue in our larger cities in what is known as apartment hotels.

HOUSEWIRING DATA FOR BUILDERS

What Home Seekers Want

HOW TO PLAN IT
HOW TO SPECIFY IT

AND

HOW TO SELECT YOUR
ELECTRICAL CONTRACTOR

GENERAL ELECTRIC COMPANY
MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

WHAT THE HOME SEEKER WANTS

To sell a house you build into it those things which appeal to the buyer—and feature them.

For example: hardwood floors, tile bath, breakfast nook; nationally advertised plumbing fixtures and heating systems; nationally advertised wiring.


been interested several years, a... been identified with the Continental some time.

REAL ESTATE—SUBURBAN

YOUR FAMILY DESERVES THE BEST HOME

WHY NOT GIVE IT TO THEM NOW?

$500 DOWN

REALLY BUYS A HOME

An actual example of a builder's ad capitalizing nationally advertised products as an aid in selling houses

This is *merchandising* houses—the plan now followed by practically every successful builder.

This is a *logical* plan for several reasons, prominent among which are two.

First, because of the spot light cast upon them by publicity, nationally advertised products must of necessity be good products.

Second, the greatest advantage a builder can hold in his community is a reputation for *sound* building. Nothing carries to the skeptical buyer more assurance of quality than the fact that the house offered for sale is equipped with material which he knows and considers good.

Consider for a moment the countless millions of pages of advertising and magazine articles through which the public is being educated to the advantages of complete electric service. The backbone of electric service is the wiring installation. Without complete, permanent wiring, complete service is impossible. Your customers know it.

More than two million copies of General Electric advertisements appear each *day*.

To be specific there are three essentials in housewiring:

(1) A sufficient number of outlets to provide for every lamp or appliance any buyer of a

G-E Wiring System advertisements to the Public, as now appearing in The Saturday Evening Post and Woman's Home Companion.

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

home might have or desire. The tastes of different prospects vary. For this reason it is essential that wiring be complete—that it suit the taste of every prospect.

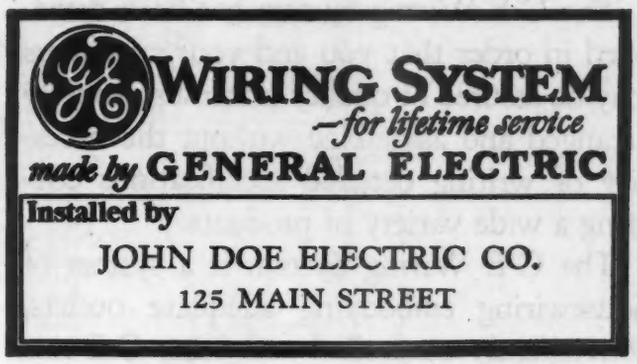
(2) Convenient control is one of the greatest advantages of electric service. No wiring can be said to be complete unless there is a switch accessible to each doorway for control of light.

(3) Permanence is essential, for wiring is buried behind lath, plaster and floor boards. It must be of the highest quality to last for the life of the house.

Your buyer wants these things and the distinction, prestige and resale value that goes with them. This is just as true for the buyer of a co-operative apartment as for the buyer of an individual home.

Let us consider a definite case. McWilliams & Meloney, leading Philadelphia suburban builders, have written us as follows:

Millions of people have stood in line to learn the lesson of complete wiring and the comfort it brings. In this interest there is a lesson for us all.



This nationally advertised sign on your houses is an assurance to home seekers of quality within.

"Last fall we built and featured a Nationally Advertised Products Home. It was purchased (we can hardly say 'sold') before we had a chance to exhibit it. We are now building another on our large Overbrook Hills development. We put a 'sold' sign on it as soon as it was above the ground because the value of this house as an advertisement far exceeds the profit we would make by a prompt sale.

"Any builder who fails to take advantage of the prestige of nationally advertised products is throwing away the greatest selling force at his command."

In connection with this letter it is important to note two things.

First, as to quality; McWilliams & Meloney permanently guarantee their homes against all defects in workmanship and material.

Second; there is only one nationally advertised wiring installation—it is the G-E Wiring System.

More than two million copies of General Electric advertisements appear each *day*.

Continued on the following page

HOW TO PLAN WIRING

The G-E Wiring System has been developed in order that you and your customers may be assured of quality materials properly arranged and assembled without the necessity of writing detailed specifications covering a wide variety of products.

The G-E Wiring System is a system of housewiring embodying adequate outlets, conveniently controlled and using G-E materials throughout.

It consists of the following elements:

A G-E Safety Meter Service Switch.
A G-E Safety Panelboard.
A G-E Bell Ringer.
G-E Code Wire.
G-E Metal-covered Conductors (BX or Rigid Conduit).
G-E Metal Boxes for Switches, Convenience Outlets and Lighting Outlets.
G-E Tumbler Switches.
G-E Convenience Outlets.

The following standards of adequacy are based on an analysis of a large number of adequately wired homes. If they seem to exceed present practice it should be remembered that—

(1) Even those who have long been users of electricity are increasing their consumption at an average of nearly ten per cent each year.

(2) A house is purchased for use over a long period of years. Houses built five years ago are totally inadequate in the matter of wiring today.

(3) A complete nationally advertised wiring installation is one of your greatest sales points. Some six million people have shown the truth of this statement by their attendance at Electrical Homes in various parts of the country. To the best of our knowledge, every one of these homes has been sold at or before the conclusion of the showing for a price well in advance of the normal price plus the cost of the additional wiring which they featured.

The standards of adequacy are:

A Tumbler Switch accessible to each doorway for control of lights.

A minimum of one convenience outlet for every 50 square feet of floor space.

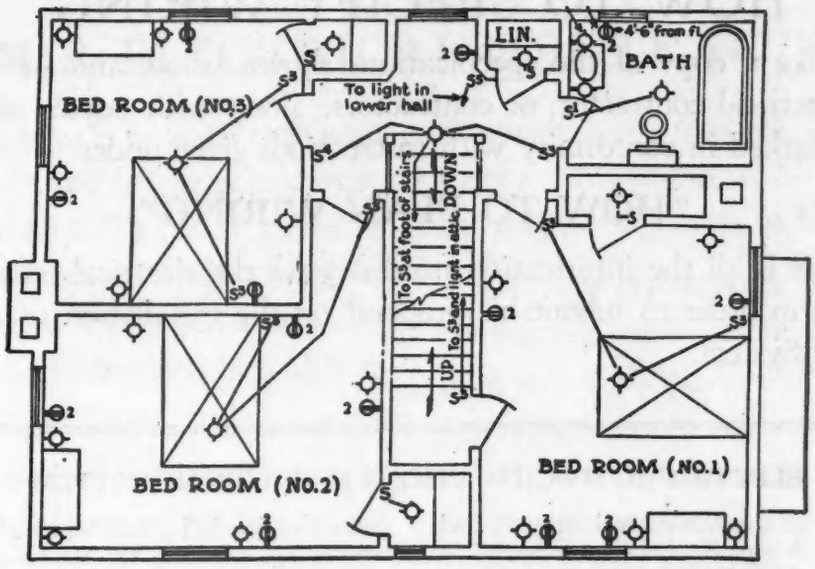
A minimum of one lighting outlet for every 50 square feet of floor space.

To plan the wiring it is simply necessary to indicate on the room plans of your house the necessary switches and outlets, following the above standards as a guide.

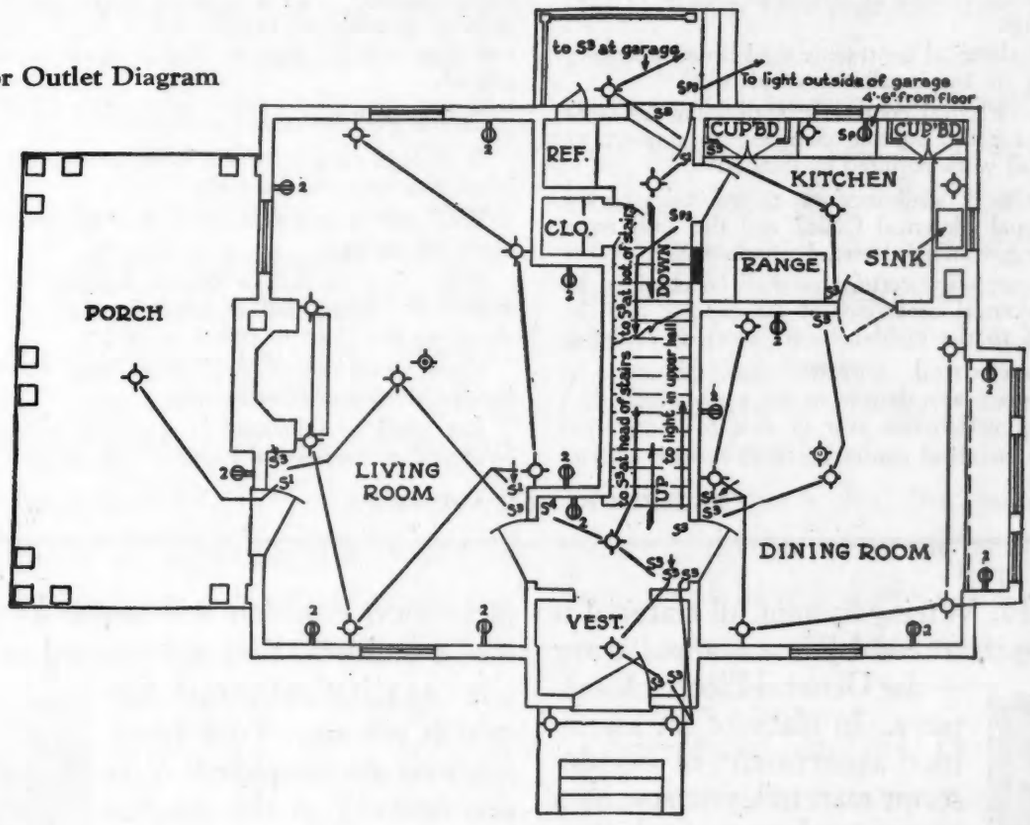
The following typical layouts will aid you in arrangement. The symbols used have been standardized and should be followed in order that the electrical contractor may easily interpret your instructions.

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

Second Floor Outlet Diagram



First Floor Outlet Diagram



KEY

- = Ceiling Outlet
- = Wall Outlet
- S^{P3} = Switch, Pilot and Convenience Outlet
- $\ominus_2$ = Double Convenience Outlet
- = Floor Outlet
- = Panelboard
- S^1 = Single-pole Tumbler Switch
- S^3 = Three-pole Tumbler Switch
- S^4 = Four-way Tumbler Switch
- S^{P3} = Three-way Tumbler Switch and Pilot
- S^P = Tumbler Switch and Pilot

Continued on the following page

HOW TO SPECIFY WIRING

Make a copy of the specifications shown below and submit to your electrical contractor, or contractors, along with copies of floor plans marked in conformity with instructions given under

"HOW TO PLAN WIRING"

This is all the information necessary for the electrical contractor to have in order to submit his proposal on the installation of a G-E Wiring System.

ELECTRICAL SPECIFICATIONS FOR WIRING SYSTEM

The electrical contractor shall furnish and install the G-E Wiring System (Group 1—1926) complete from the lighting company's service to all outlets; locating all outlets as indicated on the drawings.

The electrical contractor shall do all necessary cutting for the installation of his work.

The electrical contractor shall leave his work ready for the lighting company to connect to, doing all work required by their rules.

The work shall conform to the rules of the "National Electrical Code" and the local regulations governing electrical installations.

All necessary certificates shall be obtained by the electrical contractor at his expense and delivered to the builder before work is accepted.

The electrical contractor shall guarantee to make good any defects in his work which shall develop within one year of date of acceptance.

The electrical contractor shall furnish and install a complete bell system locating bells and buzzers as indicated on the drawings. The bell system shall be operated by a bell-ringing transformer feeding from a separate circuit on the lighting distribution panel. All bells, buzzers, and push buttons shall be of high grade as approved.

Outlets shall be located as follows:

Wall light outlets: 5 feet 6 inches above finished floor to center of outlet.

Wall switches: 4 feet above finished floor to center of outlet.

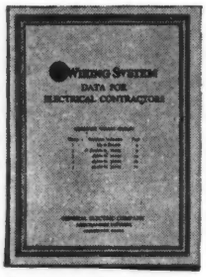
Convenience outlets in kitchen, laundry, basement and garage, and in combinations: 4 feet above finished floor to center of outlet.

Convenience outlets in all other locations: In baseboard, mounted horizontally.

Bids shall be submitted in duplicate on G-E Wiring System proposal forms.

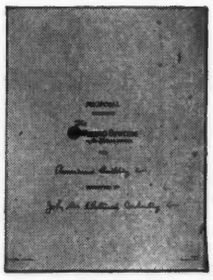
EXCEPTIONS AND ADDITIONS

In the G-E Wiring System, all material is made and guaranteed by one manufacturer —the General Electric Company. In place of an assembled assortment of nondescript material, you specify a *system*, each part of which is designed and made to fit the other.



Any electrical contractor who installs the G-E Wiring System can obtain a copy of this book from the G-E Merchandise Distributor from whom he buys his wiring materials.

When the G-E Wiring System is specified your customer is assured of a complete service which will last as long as the house endures. You are assured of getting the quality material for which you pay. Your specifications are simplified. You are relieved of the trouble of examining, classifying and specifying the diversified products of a number of manufacturers, yet enabled to tell bidding contractors exactly what you want.



This G-E Wiring System Proposal Form is furnished to electrical contractors through G-E Merchandise Distributors, so they can submit their bids in the form most acceptable to you.

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

HOW TO SELECT YOUR ELECTRICAL CONTRACTOR

The contractor who is to do the job must be able to interpret and follow your specifications. He must be able to make an installation worthy of the material he is using—to install a job which will help *sell* a house or make it a more desirable place in which to live.

The selection of the electrical contractor is obviously not a matter to be decided on price alone—there are other considerations. However, when the plans and specifications have been drawn and submitted to contractors, and the proposals start to come in, the question of price does arise.

The amount to be invested in wiring naturally varies with the size and quality of the house. A careful analysis of a large number of adequately wired homes indicates 3 per cent of the total cost of the building, exclusive of ground, as the correct amount to be budgeted for wiring.

So you have an index of cost on which to base your judgment and if bids are in the neighborhood of this 3 per cent figure, they may be considered satisfactory from the price standpoint.

In the great majority of cases, bids which are substantially lower than this figure will be found to be lower at the sacrifice of *workmanship, material* or *adequacy*. These are the factors which require your closest attention—for these mean *sales value*. Your specifications have covered these points—and these are the things which you must be sure the contractor covers in his proposal.

For your convenience we have furnished contractors who install the G-E Wiring System, a Proposal Form which covers your specifications and which enables you to quickly compare bids and see that they are on a real competitive basis. Proposals submitted on this form may be compared and checked in a few minutes time. On it the contractor specifically indicates exactly what he intends to furnish and where it is to go. You know what you are getting for your money and it is only logical that you should have confidence in the contractor who gives you such a straightforward statement of what he proposes to do.

Choose your contractor from those whose prices are found to be fair in accordance with the above index, but select the contractor to do the job on the basis of the confidence you have in him to give you the adequacy, quality and sales value your specifications call for.

Any builder who fails to take advantage of the prestige of nationally advertised products is overlooking one of his greatest opportunities for profit.

There is only one nationally advertised housewiring installation. It is the G-E Wiring System.

Continued on the following page

MATERIALS COMPRISING

ENTRANCE

¾-in. Sprague duct Rigid Conduit with suitable Weatherdrip Fittings. Black Enamel Finish (From lighting companies' lines to panelboard)

No. 10 Code Wire (From lighting companies' lines to panelboard)

No. 8 Code Wire with Suitable Clamps, etc. (For all grounding)

METER SERVICE SWITCH

Cat. No. GE2351 Safety Meter Service Switch Complete with Fuses (For two-wire service Cat. No. GE2354 is used)

Note.—In Communities where the local lighting company has standardized on a meter service switch of a type other than that illustrated above, the contractor will substitute an approved switch.

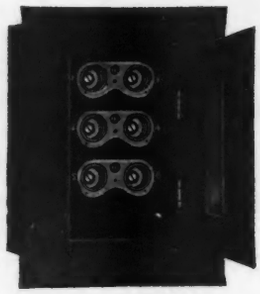
BELL RINGER

Cat. No. 179541 Bell-ringing Transformer (Feed from a separate circuit on the panel-board)

PANELBOARD

The location of the panelboard on the main floor is recommended.

Cat. No. GE2363 Safety Panelboard Complete with Fuses (For two-wire service Cat. No. GE2368 is used)



BRANCH CONDUCTORS

Cat. No. 14BXSS "BX" Armored Conductors. Galvanized Finish —Two Conductors

Cat. No. 14BX3SS "BX" Armored Conductors, Galvanized Finish. Three Conductors (For three-way switches)

No. 18 Code Wire (For bell wiring)

No. 14 Code Wire (For overhead wiring to detached garage)

Armored conductors provide protection against mechanical injury both during and after installation. Furthermore, their use minimizes the fire hazard which may result from short circuits, overheated wires, etc. Therefore, a metal installation is always preferable to a knob and tube installation.

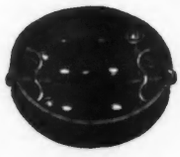
However, where knob and tube wiring is the prevailing custom and local regulations permit, G-E No. 14 Code Wire with suitable loom, knobs, tubes and cleats may be specified for branch conductors.

In transcribing the specifications, it will be necessary to indicate whether "BX" or "Knob and Tube" wiring is desired.

SWITCH AND OUTLET BOXES

Cat. No. SP6972 Sectional Switch Box, Black Enamel Finish (For switches and convenience outlets)

Cat. No. SP24151 3¼-in. Octagon Outlet Box with Fixture Stud, Black Enamel Finish (For wall light outlets)



Cat. No. SP26625 Ceiling Outlet Box with Fixture Stud Black Enamel Finish (For ceiling light outlets)

THE G-E WIRING SYSTEM

CONVENIENCE OUTLETS

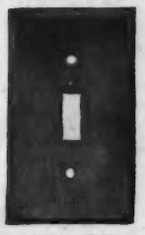
Cat. No. GE2258
Twin Convenience Outlet
(For baseboard mounting)

Cat. No. GE2257
Single Convenience Outlet
(For combination mounting)

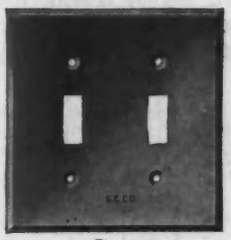
PILOT LAMP RECEPTACLE

Cat. No. GE853
Pilot Lamp Receptacle

FLUSH SWITCH PLATES



Cat. No. GE1701
Single Flush Switch Plate 0.040-in. Metal



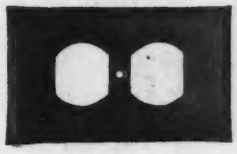
Cat. No. GE1702
Two-gang Flush Switch Plate 0.040-in. Metal

FLUSH SWITCHES

Cat. No. GE1688
Single-Pole Tumbler Switch.
Porcelain Box

Cat. No. GE1690
Three-Way Tumbler Switch.
Porcelain Box

CONVENIENCE OUTLET PLATE



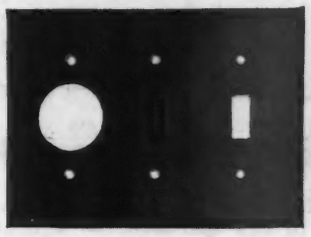
Cat. No. GE695
Twin Convenience Outlet Plate 0.040-in Metal

COMBINATION PLATES

The combination of switch and pilot lamp receptacle is recommended for the control of all remotely located lights.

The combination of switch, pilot lamp and convenience outlet is recommended for the connection and control of heating appliances.

Cat. No. GE1702
Two-gang Plate with GE2331 Removable Bull's Eye, for Switch and Pilot Lamp Receptacle
0.040-in Metal



Cat. No. GE2456
Combination Plate with GE2331 Removable Bull's Eye, for Switch, Pilot Lamp Receptacle and Single Convenience Outlet.
0.040-in. Metal

CEILING LAMP RECEPTACLES

Cat. No. GE721
Pull Socket Receptacle
(For closets, pantry, etc.)

Cat. No. GE1245
Porcelain Pull Socket Receptacle
(For independently controlled ceiling lights in cellar, garage, etc.)

Cat. No. GE088
Porcelain Keyless Socket Receptacle
(For switch controlled ceiling lights in cellar, attic, garage, etc.)

LIGHTING EQUIPMENT

An allowance of approximately 3 per cent of the cost of the house is recommended to cover the lighting equipment. The use of lighting fixtures equipped with G-E sockets is recommended.

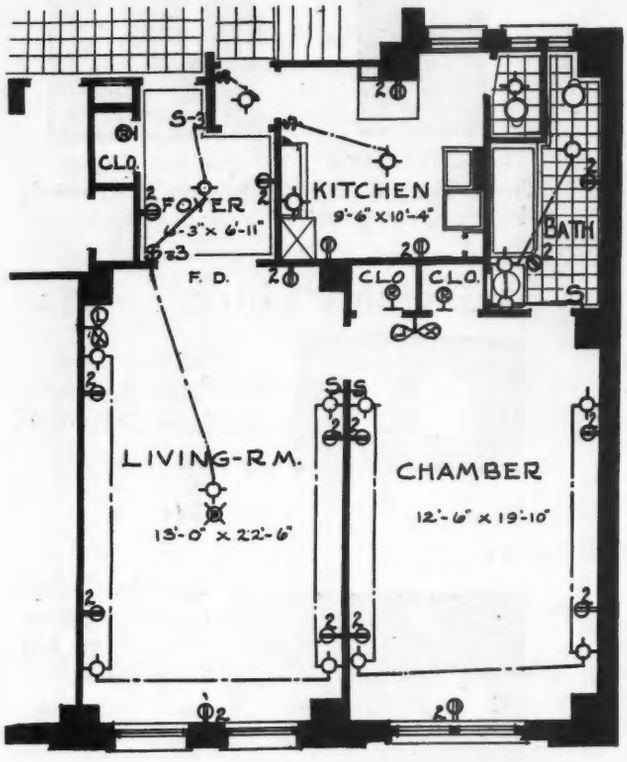
NOTE

Where local ordinances, the rules of the lighting company or the requirements of the connected load conflict with any item of material covered by this specification, the electrical contractor will substitute material having local approval making the selection where possible from the G-E Wiring System Data Book for Electrical Contractors.

(*Continued from page 276*)

tion and decorative lighting according to the character of the room. The purpose of this recommendation is to provide for even illumination free from glare. Closets should be included in determining areas and alloting light outlets.

4. A twin convenience outlet should be provided for every 50 square feet of floor space. The purpose of this recommendation is to provide for the convenient use of portable lamps and appliances regardless of the furniture arrangement; and to provide for present and future developments in such devices as electrically operated phonographs, household motion-picture projection machines, radio sets, etc.



Suggested Wiring for a Typical Three-Room Apartment of the Better Sort. In this apartment no separate dining room is used, the living room serving for both.

5. Combination switch, pilot lamp and convenience outlet units should be provided in kitchens, laundries, breakfast nooks and other service rooms for the connection and control of heating appliances. The purpose of this recommendation is to provide for a convenient means of controlling heating devices such as flat irons, ironing machines, toasters, etc., without the necessity for constantly removing and replacing the connecting plug.

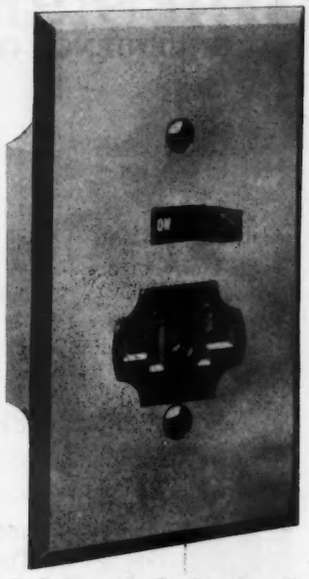
6. Switch control should be accesible at every doorway. Passage through any room and any doorway should be as convenient at night as it is during the day time. The inconvenience of groping in the dark for inconveniently located switches is a common experience resulting from the omission of accessible switches at every doorway.

7. Fan outlets should be provided in the principal living rooms. Finding a suitable place for the electric fan is always a seasonal problem in homes and more particularly in apartments. The purpose of this recommendation is to help in the solution of this problem by providing a place for the suspension of the electric fan which is both safe and convenient; and a place which can be located so as to provide the best circulation of air without regard for the location of furniture and furnishings.

In the diagrams presented, practical applications of these recommendations as applied to apartment houses, apartment hotels and hotels are shown.

Two New Electric Outlets

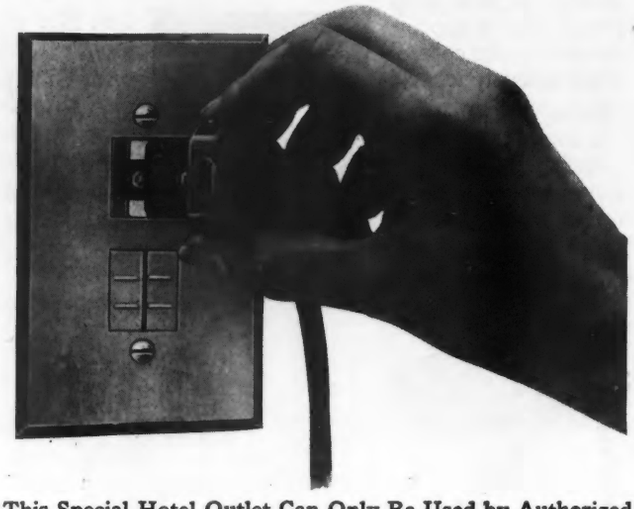
KEEPING abreast of the times one manufacturer is supplying a number of new wiring devices that hold particular interest for architect, contractor, and builder because of the economies, and because of the efficiency of these switches, receptacles and other devices for the control of light and power in homes, offices, and other buildings. A combination flush receptacle and double-pole tumbler switch is offered which also fits into a single gang box and takes a single gang plate. This device has the advantage of offering a standard wall receptacle with the added convenience of the switch, again saving in material costs, and in time and labor of installing.



Switch and Outlet in the Same Plate.

This combination device has the further advantage that it can be used in many installations where single gang flush switches are already installed and where additional convenience outlets are needed. This device can very easily and quickly be substituted in double-pole circuits for flush switches already in use.

In some installations, particularly medium sized hotels, a high "overhead" expense is often unavoidable because of the unwarranted use by guests, of receptacles in the rooms, for curling irons, heating pads and other devices which they bring with them.



This Special Hotel Outlet Can Only Be Used by Authorized Hotel Equipment.

The manufacturer above referred to has a new "Disappearing Door" flush receptacle both single and duplex type that fits into a single gang outlet box and its installation prevents the use of the current except by means of the regular equipment in the hotel, as miscellaneous plugs cannot be used. Both of these devices, the receptacle and the special plug are sturdy in construction, durable, and aid materially in cutting down this serious expense.

The "Disappearing Door" feature is another advantage. The accompanying plate is very attractive in any installation and minimizes the chances of short circuiting. It is impossible to fit any other type of plug into this receptacle.

Equip your homes with nationally known Riddle Fitments

Dependable standard quality—beautiful design and decoration—priced within your lighting fixture allowance—styles for every type of home.

Riddle-equipped homes sell more quickly, and with greater satisfaction to the buyer. There is no question about a fitment that bears the Riddle name. And with these decorative fitments in place, the home shows to the greatest advantage.

Riddle Fitments are priced to meet the lighting fixture allowance of the average home. Styles for homes of Colonial, English, Italian or Spanish type, for living-room, dining-room, hall, sun-room, breakfast-room, bed-chambers and porch—five-light, four-light, three-light, two-light and one-light pieces. Send coupon for folder-catalogue and name of Riddle Dealer.

TOLEDO LIGHTING FITMENTS

Riddle-made

Specially designed for large building developments with definite price limits on the lighting installations. *Five-light fitments as low as $12.50 retail. Write for complete catalogue in color, with prices.*

THE EDWARD N. RIDDLE CO.
TOLEDO, OHIO

The Edward N. Riddle Company, Toledo, Ohio

☐ *Send Riddle folder-catalogue and dealer's name.*

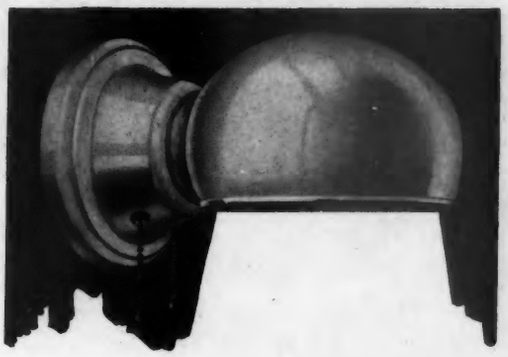
☐ *Send Toledo catalogue.*

We will build____homes during 1927.

*Name*_____

*Address*_____

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE



In Castle or Cottage Dim-a-Lite Denotes Good Taste

WHETHER the plans are for a magnificent mansion or a simple, suburban cottage—specification of DIM-A-LITE electric fixtures proves the good judgment of the architect or builder. Both the sumptuous apartment hotel and the unpretentious row of little houses profit in beauty, convenience and safety by the installation of DIM-A-LITE fixtures.

The DIM-A-LITE Porcelain Bathroom Bracket illustrated above deserves its present popularity among designers of the best type of modern home. In material and design it meets every requirement of good taste in interior decoration. Its changes of light increase the convenience and safety of ordinary home life. When guests are entertained it makes embarrassing questions unnecessary, establishes the reputation of the hostess for thoughtfulness.

In the event of sickness the reassuring "nite" light provided by DIM-A-LITE is an imperative necessity.

Provided with an outlet for the attachment of bedroom and boudoir appliances this bracket still further endears itself to women.

Fortunately, too, it has been possible to produce this attractive fixture at a price that is in keeping with the estimates for even the most modest type of home.

Listed under re-examination service of Underwriters' Laboratories

WIRT COMPANY

5227 Green Street Philadelphia, Pa.

New Styles in Electric Light Fitments

WHEN electric lights were first used any sort of lighting fixture, even the most unattractive, was accepted without question for merely the new and superior light itself was enough to give the householder satisfaction. But times have changed and today no one is satisfied with the sort of fixture that was in vogue 20 years ago. Today the lighting fixtures are an important part of the decorative plan of the house, and rightfully so.

For this reason the builder should give as much consideration to the planning of the lighting equipment as he does to the heating equipment and it will pay him to do so. Only the house which is adequately wired, both for lighting and for electric appliances, and equipped with attractive and appropriate fitments, will find a ready sale and a house that is so planned and equipped will command a relatively higher price than one in which these features have been skimped.

The manufacturers of lighting fitments are now providing designs, at moderate prices made possible by large production and scientific production methods, which are appropriate for every type of architecture and for every requirement of practical efficiency. One line of fitments has been developed in styles that have their origin in Renaissance period design. A sufficient variety is available to cover the requirements of the various types of modern American homes and apartments. Fixtures of cast aluminum are especially adapted to Colonial, Georgian, French or Italian Renaissance and Louis XVI forms of architecture. Other fitments in which heavy bar iron, not strap iron, is used are particularly suited to homes of Early Italian, Spanish and Early English Style.

A Dining Room Light of Grace and Beauty.

In accord with the trend towards color in home decoration the manufacturers of this line of fitments originated the use of color in the decoration of cast aluminum, developing a style which embellishes and harmonizes with practically any interior scheme. Because of its porous character, aluminum is able to retain the color indefinitely thus permitting a lasting decoration. It is guaranteed to be permanent in fact, even in coastal climates where deterioration is ordinarily quite rapid. This decoration does not tarnish or discolor. It is particularly effective when the aluminum is used in combination with wrought iron, the aluminum carrying the decorative colors and the wrought iron having a hand hammered effect.

The periodical polishing of the lighting fixtures, which was formerly one of the regular duties adding its burden to housekeeping, is no longer necessary with the new type of fitment which never requires polishing.

From the point of view of the investment builder there is another feature of such equipment which is of truly vital importance. Time and time again it has been demonstrated that products which are known through national advertising require far less sales effort and sales expense than those, perhaps equally as good, which are unknown to the buying public. Nor is there any exception to this demonstrated fact in the case of fixtures and materials which form only a portion of the builders product.

Fixtures and material of a quality known to the buying public make the house more readily salable. Progressive builders everywhere are taking advantage of this fact and are telling their prospective buyers that the brand of roofing, or bath fixtures, or water heater or lighting fixtures have been used in the house and "everyone knows that they stand for the highest quality." The fixtures described here have long been the subject of an advertising campaign which has familiarized prospective home owners the story of quality material and design and economical production which places them among the leaders in the lighting fitment field.

✣

Novo Appoints Distributors

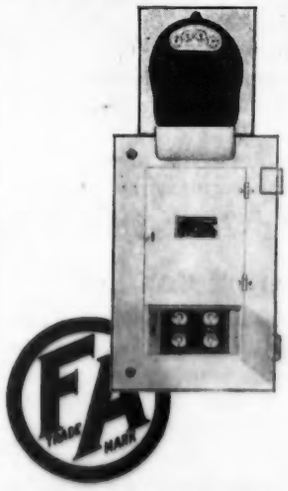
THE Novo Engine Company, Lansing, Mich., announces the appointment of the following concerns as distributors of its products: Contractors Sales Co., Inc., Albany, N. Y.; The Wheeler Murray Co., Rochester, N. Y.; McCracken-Ripley Co., Portland, Ore.; Hudson Supply & Equipment Co., Washington, D. C.

✣

Corporate Name Changed

ANNOUNCEMENT has been made that, in order to have its corporate name correspond with its well established trade name, the Mutual Electric & Machine Company, Detroit, Mich., has changed its name to the Bull Dog Electric Products Company, effective March 1, 1927.

FA PANELBOARDS *form the finest, most complete* line ever built



From the small cottage or store to the huge skyscraper there is a type and size of FA Panelboard that costs less to install and gives more service per dollar over a longer period of years than any other.

Along with superior worth you have, with FA, that reputation for better work that always has been associated with FA Panelboards—everyone says they are the "Sign of a Better Job."

A new calalog just off the press awaits your request. Send for it and call for estimates when you need them. Free of course

The NRSS is a combination Service Switch and Panelboard for the small store and home. It combines in a practical, pleasing manner all the requirements for these several needs and always gets enthusiastic praise from the home buyer

Frank Adam ELECTRIC COMPANY

ST. LOUIS

DISTRICT OFFICES

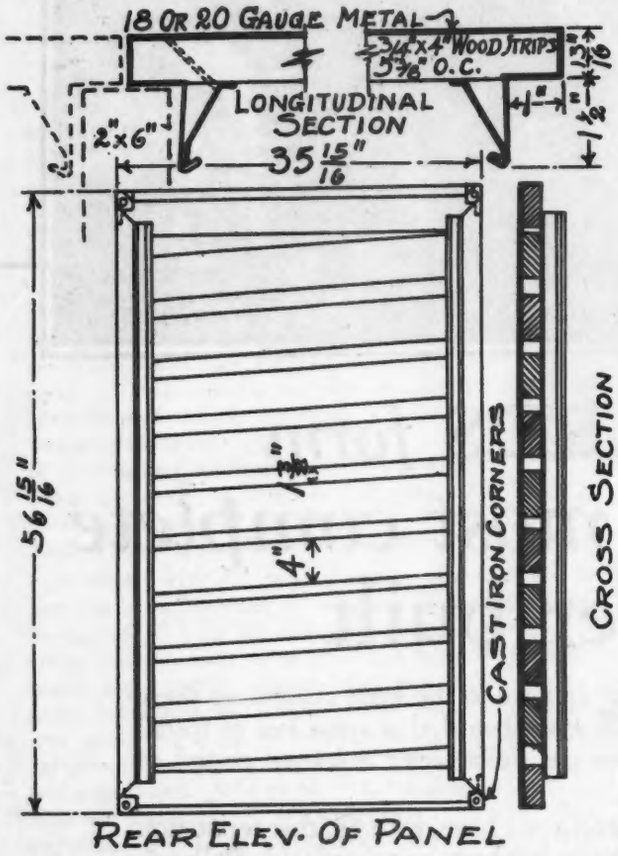
Atlanta, Ga.	Buffalo, N. Y.	Denver, Colo.	Minneapolis, Minn.	Philadelphia, Pa.	San Francisco, Cal.
Baltimore, Md.	Chicago, Ill.	Detroit, Mich.	Miami, Florida	Pittsburgh, Pa.	St. Louis, Missouri
Boston, Mass.	Cincinnati, O.	Kansas City, Mo.	New Orleans, La.	Portland, Oregon	Winnipeg, Canada
Brooklyn, N.Y.	Dallas, Texas	Los Angeles, Cal.	Omaha, Nebraska	Seattle, Wash.	

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.*

Metal Concrete Forms

THE greatest waste of lumber in connection with concrete forms is in the use of one-inch dressed boards for decking. By the use of the metal form shown here, it is said that about 97 per cent of the decking lumber may be replaced without special framing and that there is less breakage of framing lumber due to the small amount of nailing required. It is also stated that the cost of labor



Details of New Patented Concrete Form of Wood and Sheet Metal.

is reduced and that, because these forms are so simple, most of the work can be done by unskilled labor.

The standard panels can be used for any size of ceiling layout as any small portion not covered by the panels is filled in with 13/16 inch boards in the usual way. The edges of the panels are the same thickness as the boards, leaving no uneven joints in the concrete.

The small amount of nailing required makes the removal of both decking and supports very easy as, after the shoring is slightly lowered, the two by six deck supports are turned sideways, permitting the panels to be removed one at a time, also reducing the chance of accidents.

The largest standard panels measure 36 inches by 57 inches (14¼ square feet) and weigh only 60 pounds, making it easy for one man to handle them. Three additional sizes are so made that they can be turned two ways, either across or parallel with the two by six supports, to take care of various size spaces, leaving a space never more than six inches at one side to fill with board. These sizes are 18 by 36 inches, nine by 36 inches and six by 36 inches.

The rails on the back of the panels form a pocket where the panels join, into which the two by six support fits, preventing the panels from slipping from their supports and making it simple for the laborers carrying materials to put the panels directly in place.

In places where it is necessary to cut large openings in the decking, or where a row of inserts have to be nailed to the decking, a board is placed between the panels. However, nails may be driven through the metal without seriously damaging the panels. Each panel is provided with a hole in each corner so that it may be nailed down if desired or it may be clamped to its support from beneath by a "U" shaped spring clamp and wedge.

These panels are made from a single piece of sheet metal with no joints to break open. The ends of the wood cleats are protected in the pockets of the rails and, in manufacturing, the cleats are placed slightly on a slant and forced into the pockets of the rails, causing a wedging effect which stretches and stiffens the sheet. The usual bending and twisting which froms are subjected to does not have much effect on panels of this construction as they spring back to their original flat, even surface no matter how roughly handled.

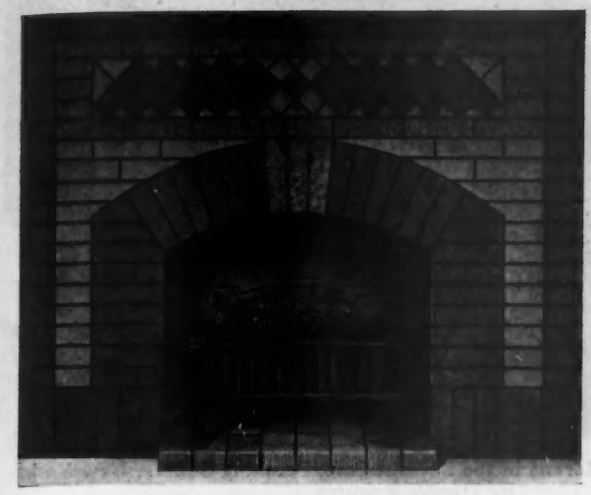
The sheets are of copper bearing steel and highly rust resisting. Being not only light in weight but strong and durable, they may be used a great number of times, making the cost per square foot for each time used a very small fraction of a cent.

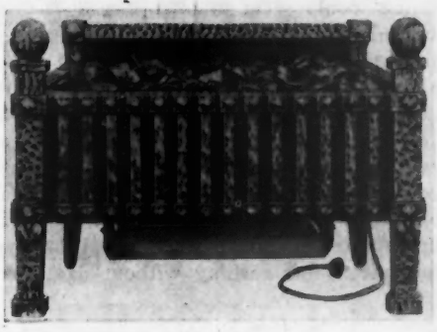
The use of these panels gives a dense, smooth and even surface and, by removing the small ridges at joints of panels, a surface practically equal to plaster is said to be obtained. ✣

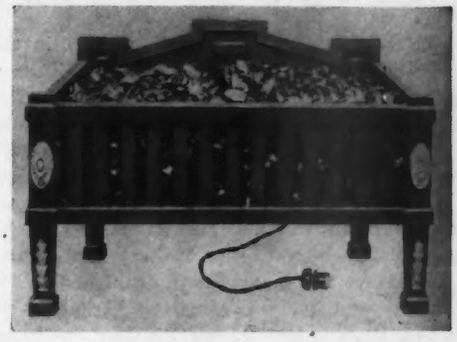
Quick Drying Brushing Enamel

THE manufacturer of one of the most notable developments in the paint field has just announced another new product which has now been perfected and is ready to be placed on the market. This product combines the gloss and luster of a gum varnish with the quick drying of a nitrocellulose enamel, to which class it belongs. It is a new form of the paint product mentioned above and is a colorless, brush enamel, whereas the older product was for spray application only. Its most outstanding advantage is that fact that it can be used for refinishing floors and furniture without the delay and inconvenience of waiting for varnish to dry. It is stated that with this product the kitchen floor may be refinished after the breakfast dishes have been washed without interferring with the serving of lunch.

Ready Made Ornamental Mantels







Quickly, Easily Installed at a Low Price

You can now supply your client with a fireplace at a lower cost. The Ready Made Fireplace meets the approval of any prospective buyer or occupant. A fireplace is a valuable selling force in any house.

The Ready Made Fireplace is quickly and easily installed. Saves many hours of labor. The cost is much less and the weight is about one-quarter of a brick fireplace.

They are more artistic. Made of reinforced concrete and have a natural colored stone facing of various colors and cannot fade. They can be used for electricity or gas.

Our Ruby Coal Electric Grate fits into any of our ready-made fireplaces. No flue needed, clean, odorless and attractive. Let us send you full details of Ready Made Fireplaces and Ruby Coal Electric Grates.

DEALERS WANTED

ELECTRIC FIREPLACE MANUFACTURING CO., Inc.

400-408 North Union Ave., Chicago, Ill.

Gentlemen: Please send me full particulars on READY MADE FIREPLACES and RUBY COAL ELECTRIC GRATES, also dealer proposition.

My name is..... *Address*.....

Dealer's name is..... *Address*.....

New Plastic Wall Finishes

SEVERAL years ago an entirely new type of plastic wall finish was perfected; and it has so caught the fancy of home builders and of building owners, and has proved so satisfactory and so adaptable in the hands of painters and decorators that we now find the best work all over the country being finished in this method.

Where comparatively smooth finishes are required the material is usually applied by plasterers who are accustomed to handling such finishes. Where the rougher textures are found desirable or where the work is of a two-tone nature made up by applying coats of different colors, the work is usually done by painters. Depending on the type of finish required, the material may be brushed on or troweled on, the texture being worked up while the material is still in plastic condition. Colors are introduced in many ways, including the mixing of pigments with the material before application; the staining of the surface with colored glazes and the introduction of colored sand or other surface aggregate to complete the required design.

Mural Executed in Morene in the Savarin Cafe, Pershing Square, New York, by Danish Painters.

It is obvious that with so much variety in the types of finishes, some of which require very little labor and others calling for painstaking surfacing, the full cost of this type of finish varies considerably depending on the desired results. It is quite evident that the nature of this material is such that plaster can often be eliminated with considerable saving. This type of surface requires no maintenance as it is washable and also because most of the finishes present antique effects which mellow rather than deteriorate with age. The exact life of an interior finished in this manner is not known, but it is conservatively estimated that at least ten years may pass by with no maintenance or replacement cost whatsoever. This seems logical because the resultant surface is hard and the colors and texture, being integral, do not need any retouching or refinishing during the life of the wall surfacing.

This condition would seem to offer special inducements from an investment viewpoint and has been borne out by a recent examination of several interiors finished with plastic materials in an effort to ascertain how they stood the test of the soft coal smoke. It was found that in the antique finishes the discoloration merely added to the effect and the walls required practically no cleaning. In the lighter colored surfaces it was found that the blackening due to adherence of carbon particles to portions of the surface on which condensation had taken place could be corrected by the simple means of washing without damage to the interior finish.

The popularity of this type of interior finish for replacements and in new buildings has grown in an amazing way in the past three or four years. Interiors of this material are to be found in large and small residences in apartment buildings, hotels, office buildings, and this system is particularly adaptable for restaurants, retail stores and show-rooms where unusually effective interiors are desired at moderate cost.

The Louis Sherry Tea Room, French Exposition, Grand Central Palace, New York City. An example of Travertine marble effect obtained by applying plastic material over fibre board.

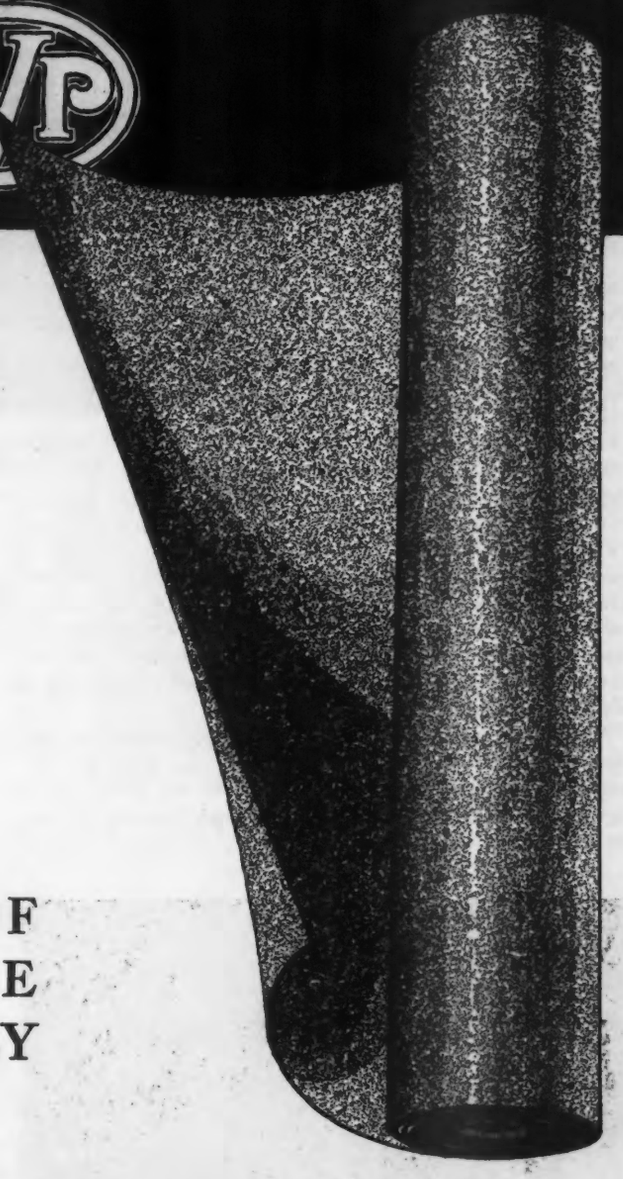
Hitherto the resurfacing of the walls and ceilings of remodeled dwellings and apartments required that they be stripped to the furring or studding. New plaster would not adhere to the old; nor, as a general thing, would it key to the original lath unless great pains were taken to clean out the interspace. This is an expensive operation. It is cheaper to relath throughout.

With the plastic material, on the other hand, it is quite unnecessary to prepare the old walls to any greater extent than to thoroughly cleanse them, removing only the conspicuously defective areas. Even the common plaster cracks offer no difficulty as long as the original coat is solidly keyed to the lath where the cracks occur, since they were then caused by drying out of the wood which has probably long since ceased.

The new finishes can be applied expeditiously and cheaply and, because of their nature, they dry out quickly—a distinct advantage, since the paint can be applied almost at once.

BUILDING PAPER

KVP



Outlasts the Building!

INSULATES
AIR-PROOF
SUN-PROOF
VERMIN-PROOF
MOISTURE-PROOF
EASY TO HANDLE
TOUGH—NOT EASILY TORN

THREE WEIGHTS—LIGHT, MEDIUM, HEAVY
STANDARD ROLLS—USE THE COUPON

DISTRIBUTED BY
Wholesale Lumber and Hardware Dealers
Building Supply Companies
Wholesale Paper Merchants

"World's Model Paper Mill" KVP PRODUCTS **Kalamazoo Vegetable Parchment Co.**
Kalamazoo, Michigan, U. S. A.

Kalamazoo Vegetable Parchment Co.
Kalamazoo, Mich.

Please send samples of your K.V.P. Building Paper in three weights.

Name

Address

Business

Plastic Wall Finish Affords Interesting Possibilities

A NOTEWORTHY development of recent years has been the introduction of what are known as plastic wall finishes. These have opened up new possibilities in the field of interior decoration which have gone far toward creating a new interest in artistic design and adding new beauty to homes, apartments, hotels and every type of public or semi-public building.

Such a wall finish possess a number of characteristics which highly recommend it for a wide variety of applications. In the first place it is simply and easily applied. It comes in the form of a powder and is merely mixed with water, at the job, and applied to the wall with a brush. Its main constituent is pure ground marble and when it has hardened it becomes so rock-like that the bumping of furniture and scuffing which ordinarily ruins a wall has no effect upon it.

With a Plastic Wall Finish Many Things Are Possible Including an Exceedingly Close Duplication of Certain Kinds of Cut Stone.

This material can be finished in any color and in a wide variety of patterns and textures, such as Italian, Spanish, Travertine or Old English, to harmonize with the architecture of the home or building in which it is used. The textures are obtained by working the material after it is applied to the wall. For this purpose a scraper, brush, sponge or other instrument, or the fingers may be used, according to the texture desired. Some of the finishes are quite simple, though attractive, while others require more skill in their execution.

As a base, any of the usual walls may be used, for this plastic material will bond perfectly to any type of wallboard, to plaster, concrete, wood or painted walls. It is applied to a thickness of 1/32 to 1/16 inch, depending upon the coarseness of the texture desired. In the same way the covering capacity is dependent upon the thickness of application though the average is from ¾ to 1½ square yards per pound.

One of the most valuable uses for this material has been found in covering of hotel and office building walls. Here it is a particularly economical finish as it can be thoroughly washed with soap and water, when soiled, thereby renewing the finish without the expense of redecorating. When so treated it will, because of its durability, maintain its original beauty for many years without refinishing.

For the Home as Well as for the Public or Semi-Public Building Walls May Be Treated with the Plastic Material to Good Effect.

✣

Improved Dumb Waiter

THIS new type of geared, automatic brake, dumbwaiter, designed for use in hospitals, hotels, clubs, restaurants, schools, churches, libraries and for other institutional, commercial and industrial purposes, marks a distinct improvement in this sort of equipment. Its main features are:

It is a complete, self-contained unit; it in corporates an automatic brake operating whether the counter-weight is located at right or left of the car and allowing smooth and safe operation, the device adjusting itself automatically to the load carried; anti-friction roller bearings make easy operation, quiet running and increased life; machine cut gears eliminate unevenness and permit a one-pound pull on the rope to raise from four to 10 pounds load; a full diameter hoist wheel permits cable to drop straight to both car and counter-weight without the use of intermediate leading sheaves or idlers.

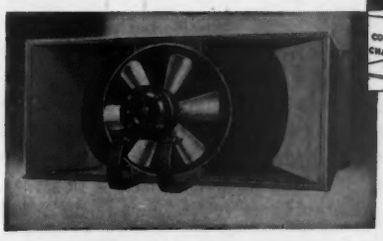
Wherever a Dumbwaiter Is Required This Improved Type Will Give Satisfying Service.

Give your buyers a FORCED AIR *HEATING SYSTEM*

Warm air winter—*Cool* air summer

HOUSE buyers are looking for the extras—the new, the modern, the up-to-date. Often a sale trembles in the balance for lack of them, or goes over because of them. The most important extra you can offer your prospect is a heating system that does a wonderful heating job in winter and then becomes a cooling and ventilating system in warm weather. FORCED AIR, the new, modern system.

FORCED AIR is sold on a guaranteed heating performance basis. It assures all the heat units needed and guarantees to deliver them to any room in the house, no matter whether in distant wings or in the third story. It guarantees to deliver what every physician knows contributes to good health, AIR IN MOTION. Air in constant motion and frequent air changes, plus extra heating efficiency, are what you give buyers when you deliver a modern FORCED AIR Heating system.



Miles Automatic Furnace Fan with Fan idle—louvers open

Showing general idea of installation permitting alternating gravity and Forced Air System

Miles Automatic Furnace Fan with louvers closed—fan in operation

The illustration shows the two important essentials in a FORCED AIR heating system. (1) A good warm air furnace. (2) The Miles Automatic Furnace Fan with patented automatic louvers. Forced Air is *warm* air plus *positive pressure* air circulation.

Positive Pressure Air Circulation

The positive pressure air circulation is built up by the Miles Automatic Furnace Fan. It is placed in the cold air duct. It draws the cold air from the rooms and blows it over the furnace castings at high velocity. This means cooler castings and consequently a larger volume of warm air. It means less chimney waste. It means more heat units delivered into the house. It also means positive pressure, blowing or "forcing" the air up the pipes through every register.

1. **Doubles Heating Capacity of Any Furnace**
2. **Saves 30 to 40% Fuel—Any Fuel**
3. **Gives 4 Changes of Air Every Hour in Every Room**
4. **Supplies Cool Air in Summer**

Best For Any Home

FORCED AIR is the best heating system for any house—no matter what the size. It can be used with any fuel—any make of furnace.

The Miles Automatic Furnace Fan permits an alternating gravity and forced air system.

Your furnace dealer probably has a demonstrator set up to show you. Ask him. Or, write us at once for catalogue and data. It will be sent you free of charge. Please tell us from what standpoint you are interested. We don't sell direct but only through dealers and furnace manufacturers.

Get "Forced Air" Heating Plans Without Cost to You

Send blue prints of floor plans and our engineers will lay out "Forced Air" plans on which you can get figures. Remember, you get guaranteed results when you install Forced Air according to our plans.

We co-operate with architects, builders, furnace manufacturers and furnace dealers. We want to co-operate with you. Use the Coupon or your own letterhead.

THE WARM AIR FURNACE FAN COMPANY
6515 Cedar Avenue ∴ ∴ Cleveland, Ohio

USE THIS COUPON TO GET INFORMATION

THE WARM AIR FURNACE FAN CO., 6515 Cedar Ave., Cleveland, O.

Kindly send me the following:

☐Catalogue of Miles Automatic Furnace Fan and complete data.
☐Proofs showing big residence jobs.
☐Proofs showing garage jobs.
☐Proofs showing church jobs.

NOTE: If you want plans for Forced Air Heating free of charge send us blue prints of all floor plans.

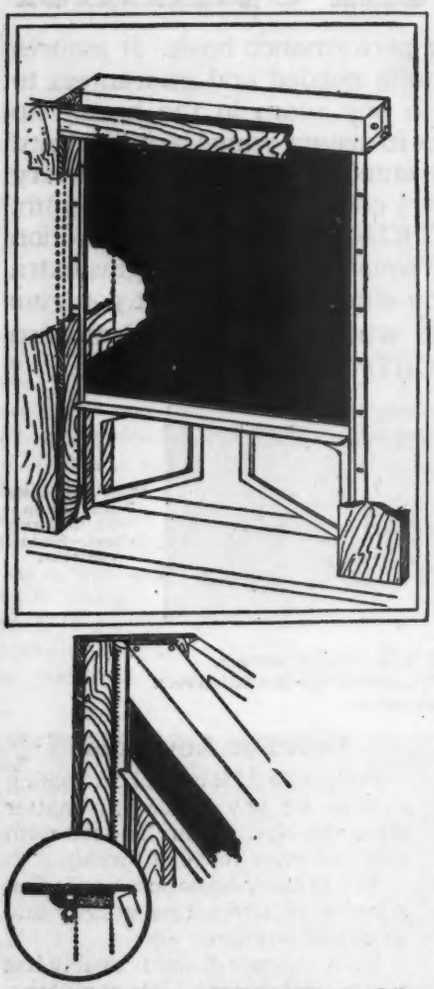
*Name*_____

Street _____

*City*_____ *State*_____

This Screen Rolls

WINDOW screens that roll up like shades on the inside of the windows are revolutionizing the window designs for the modern home. Architects have long acknowledged that out-swinging casement windows were by far the most desirable type. "Sunshine Windows" is the alluring name which someone has aptly applied to these. But the general use of these swinging casements has been largely restricted by the fact that satisfactory screens had not been designed. Today the home builder is able to use these pleasing and practical casement windows due to the fact that a rolling screen of simple yet durable construction is being marketed at a very reasonable price. These screens may be raised or lowered as needed, require no annual storing or handling and are a permanent part of the home. The entire mechanism is guaranteed by the manufacturer for ten years.



The Roll Screen, Which Works Like a Window Shade, Is a Big Advantage on Any Window and Epecially the Out-swinging Casement.

Many advantages accrue through the use of inside screens. They are well protected from dirt and inclement weather. As every housewife knows, one of the most common causes of dirty windows is the rain beating through screens that have accumulated a season's dust and smoke. Furthermore, window drapes are often frequent sufferers from the effects of dirty screens. The advantages of inside installation of rolling screens are obvious when these various conditions are considered. They are easily accessible from the inside of the home. Even in midwinter, when ventilation is desired, the screen can be lowered to prevent draperies blowing out.

This new rolling screen has many novel and practical features. It is built so that it will not wear out and it is practically indestructible.

A patented floating roller on which the screen wire is wound moves forward as the screen lowers and the roll of screen wire gets smaller. This eliminates all wear and "drag" of the screen wire on the edge of the screen box as the screen is operated.

The cost of these rolling screens compares favorably with that of good quality wood screens which require special hardware and cost less if "under screen" operators are used with the wood screens.

A Valve for Life Time Service

A NEW flushing valve has been perfected and is on the market which has a hard rubber ball with a removable flat washer of specially treated chrome leather and a universal joint attachment for the lift wire, which prevents ball from sticking open. The lower part of hard rubber ball is so shaped that it is guided to seat with positive action.

The one-piece cast brass integral guide post eliminates the shifting guide arm and corroding set screws.

Efficient flushing of closet is guaranteed by unrestricted water way and permanent buoyancy of ball. The valve is built for "life-time service."

By Using a Hard Rubber Ball Exclusively in Place of a Soft One, the Valve Shown at the Right Eliminates the Greatest Objection to the Low Tank.

Effective Garage Door Holder

TO be a successful builder in this day and age, one must include in his product every possible detail of construction that will make the home more convenient, safer and a more comfortable and happy place to live. It is such detail that makes the successful builder what he is, because his houses and his services are more in demand. One of the conveniences which holds a position of great importance in this age of motor cars is the garage door hold.

The old methods of holding garage doors open with hooks attached to stakes or walls or by props were never satisfactory and one of the greatest annoyances of the private garage has been doors which persisted in blowing shut just as one was about to drive in. Props are always insecure and hooks do pull out. The holder illustrated here, however, overcomes all these difficulties in a manner which insures satisfaction for the garage owner and user.

This holder is made with a "U" shaped bar attached to one end to the door and sliding through a catch fastened to the head jamb. The door is held open when a notch in the "U" bar drops into the catch. In closing the door, a lever bar extending through the "U" bar responds to a pull on the chain and lifts the bar out of the catch and allows it to slide through. When the doors are closed the "U" bar folds back against the head jamb.

Garage Doors Will Stay Open When You Want Them Open, if You Install This Door Holder.

This device holds the door rigidly open in any kind of weather and prevents the doors swinging in front of the car when entering or leaving the garage. In this way it saves broken headlights and bent fenders, as well as wear and tear on the disposition. It costs very little and is easily attached.

Why not You

DUNTILE *in* Full range of Color

GREATER use of color is the dominant trend in architecture today. California and Florida have helped bring this about by sponsoring the bright, cheery Spanish type of home.

The new effects require masonry materials—rich colorings, subtle harmony of tones, interesting texture effects.

With most masonry materials, the cost is very high and the color range limited. Mat glazed Duntile, however, brings these colorful beauties within the reach of every builder.

The mat glazing process produces a range of forty attractive shades and tones, touched with interesting glints of color and characterized by a rich, distinctive texture.

The structure built of Duntile is beautiful, dignified, fashionable, permanent, fire resistant, low in upkeep—offering every advantage of masonry construction at its best. Yet the Duntile building costs **no more than frame.**

Visualize what this means to the building profession and what opportunities it will bring to Duntile manufacturers. You owe it to yourself to be fully informed. Use the convenient coupon.

Duntile working specifications in "Sweet's"

W.E.DUNN MFG.CO.
415 W. 23d Street, Holland, Mich.

W. E. Dunn Mfg. Co.
415 W. 23rd St.
Holland, Mich.

☐ Show me how I can build homes, stores, factories, garages and other buildings of permanent Mat Glazed Duntile, at a cost 30% below that of other masonry materials.

☐ Show me how I can manufacture and sell Duntile in my community to builders who want to obtain best permanent construction at cost of frame and make 30% to 60% profit for myself.

Name.....

Address.....

City.....

A New Steel Specialty for Efficient Fireplace Construction

By C. F. COLUMBIA, C. E.

THE fireplace, until the last century, was always regarded as the chief feature of the room. Then, for a period of years, it lapsed into disgrace. Fine old fireplaces were boarded up as if they were some form of family skeleton. This decadence was, to a large extent, due to the poor construction of the throat and smoke chamber, resulting in volumes of smoke entering the room, much to the discomfort of the occupants. This difficulty has been changed upon the introduction of iron fireplace dampers. As a result the popularity of fireplaces is now increasing at a tremendous rate.

The Satisfactory Operation of the Fireplace Depends on the Design of Throat, Smoke Chamber Flue and Damper and Is Assured by the Use of This Steel Specialty.

All building material dealers now carry in stock, dampers in sizes ranging from 2 feet 6 inches to 4 feet in width. The damper, as is well known, insures the proper throat formation, acts as a lintel for the arch brick and provides a means of regulating the draft.

The use of dampers, then, eliminates much of the smoke trouble and may truthfully be said to be a necessity in fireplace construction. It so happens, however, that all dampers are not built alike. Fortunately there exist dampers which are scientifically designed and meet complete requirements provided the mason is closely supervised, follows his blueprints, and carries on his construction work in accordance with manufacturers' instructions.

The seat of most of the difficulties which occur today may not be the fault of the damper, but is usually found to be the result of a poorly constructed smoke chamber. As a successful fireplace depends largely on the elimination of friction to the rising smoke, it is evident that if the smoke chamber is constructed with ragged brick work, friction is sure to occur, thus resulting in poor draft.

Recently there has come upon the market a patented steel smoke chamber which, in the opinion of engineers, will eliminate whatever difficulty has been experienced in fireplace construction.

This smoke chamber consists of two steel plates, a collar the same size as the flue lining, and four bolts for fastening. The mason bolts the two plates to the collar, places this form over the damper, and builds his brick work around it. Thus a smoke chamber with practically no friction is assured. This is absolutely impossible when brick alone is used. Thus we have a correct form, scientifically designed for ample capacity, and the work will be completed in far shorter time than under the old methods.

The steel smoke chamber is shipped knocked down and packed in a flat carton, which means easy handling and small storage space. Furthermore, the mason supply dealer need carry but two sizes in stock, as they are so constructed that they will take care of all fireplaces up to and including 48 inches in width.

What is called the 8½ by 13-inch smoke chamber is used to connect with an 8½ by 13-inch flue in fireplaces from 30 inches to 36 inches wide. The 13 by 13-inch steel smoke chamber is designed to connect with a 13 by 13-inch flue lining, and is used in fireplaces 42 inches to 48 inches wide.

✣

A Flanged House Lining

ONE of the causes of heat loss, according to research in the engineering department of the University of Illinois, is the circulation of air in the walls of a house.

A house lining is now on the market which has considerable insulating value both by reason of the dead air spaces contained in it and also because it is made with flanges which can be joined together so as to block any movement of air in the walls of a house. These flanges can be seen in the halftone illustration which shows how this insulation is installed between studs and joists. Its first cost is reasonable and the consequent coal saving is said to be considerable—to say nothing of the added comfort of a house warmer in winter and cooler in summer.

This Insulating Material Not Only Insulates but Also Prevents Circulating of Air in the Walls, a Cause of Much Heat Loss.

BEST-WALL

an ingredient that can't be duplicated is in each slab of Bestwall

An ingredient that no other can claim helps make Bestwall the superior plaster wall board. That ingredient is the ***experience*** of the Beaver people—the oldest and most thorough wall board manufacturing experience in the world.

This is your assurance that in Bestwall's rigid core of finest quality rock plaster and wear-proof facing of smooth, tough Beaver-made ***fibre*** you get everything that you expect or consider necessary in a plaster wall board.

Bestwall identifies itself by its distinctive CREAM-colored surface, which no other plaster wall board has. Approved by Underwriters' Laboratories, Inc. —and an excellent insulator. Despite its advantages, it costs no more.

The swing toward Bestwall is due simply to the ever-increasing recognition of Bestwall's real worth, as broadcast constantly through powerful advertising in national publications.

For sample and literature, address Dept. 1304

THE BEAVER PRODUCTS CO., Inc., Buffalo, N. Y.

THE BEAVER PRODUCTS CO., Inc., Dept. 1304
Buffalo, N. Y.

Gentlemen: Please send me a sample of Bestwall and the interesting Bestwall literature.

My Name .....

Address .....

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

BEAVER
BESTWALL
THE SUPERIOR PLASTER WALL BOARD

The Unit Idea in Kitchen Equipment

THE "unit idea" organizes the kitchen into a complete system of compact storage and working units—each unit complete in itself yet built so that it can be used together with one or more other units, exactly according to the kitchen plans of the user.

The standard units now available are built to conserve space, save labor, organize kitchen work and make the kitchen generally more efficient, clean and beautiful. They can be installed in kitchens already built or can be built into a kitchen specially designed to receive them. Units are standardized in construction—made for economy as well as quality. They cost no more than old-fashioned cupboards.

These units include everything from kitchen cabinet to refrigerator, from folding breakfast nook to dish and broom closets, from linen cupboards to sink, from kitchen range to disappearing ironing board.

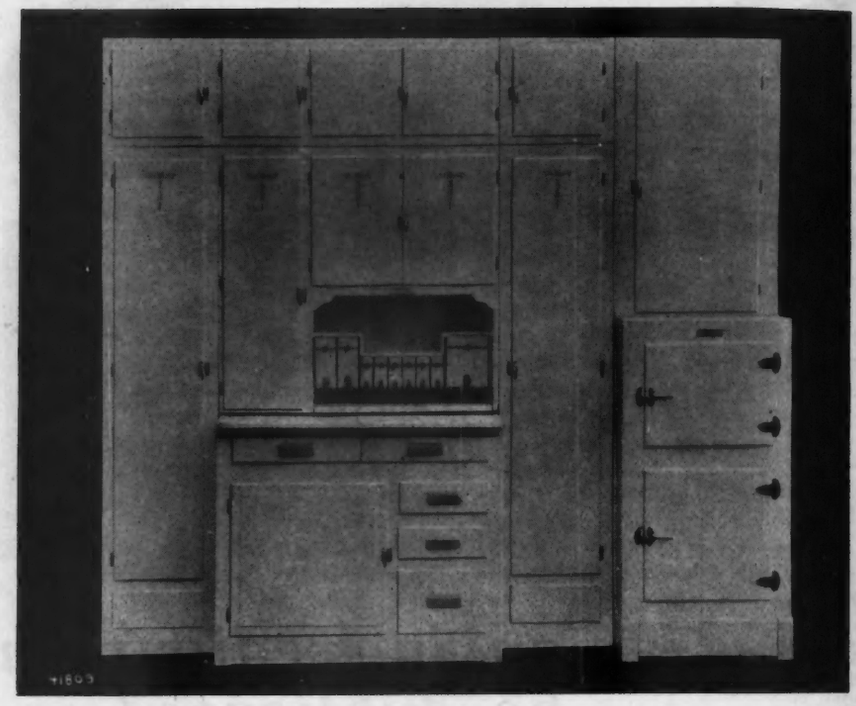
These units represent the highest development of cabinet-craftsmanship. They are built from carefully kiln-dried woods and are never shipped unless protected from humidity changes by at least two coats of white paint, applied immediately after they are finished.

A special feature of the units of one manufacturer is the smooth door construction which eliminates common panel doors. The doors are guaranteed not to warp or get out of line. Another good feature is that all interior corners of these particular units are rounded, leaving no space for dirt to collect. The smooth door construction, hidden hinges and rounded corners make possible an entirely new degree of cleanliness.

Units are finished in choice of white enamel, gray enamel or two coats of flat undercoat. They are equipped with hinges, latches and other hardware that are substantial and practical.

The photographs show one of these popular unit assemblies, open and closed. The important parts are:

The top cupboard shown at top to right can be used as a package receiver through the rear or side of the compartment between the base and lower shelf.



Ingenious Cupboard Units Supplement a Popular Kitchen Cabinet to Provide a Complete Modern Pantry.

A popular size refrigerator just below for apartment or home usage is included, 24 inches wide. This two-door box is of unusual ice capacity as it is 23¼ inches deep instead of 18 inches as is usually found. This added depth makes the refrigerator conform to the bases of other units and fit into the combinations without any offset.

The vertical dish closet to left of refrigerator contains five roomy shelves. This unit is used in combination with any of the cabinets and top cupboards and it also may be used alone in a corner of the kitchen or on an open wall space, providing valuable storage room for dishes, utensils, canned goods, etc. This unit may also be used as a desirable linen and utility cupboard for the bathroom; 16½ inches wide, 70⅞ inches high, 11¼ inches deep.

The horizontal dish cupboard across the top is 15 inches in height and made in varying widths to fit various-sized kitchen cabinets and unit combinations.

The broom closet and ironing board shown at left fits any kitchen or unit combination. Holds average vacuum cleaner, brooms, mops, etc. Ironing board suspends flat against door; can be quickly set into use—solid, rigid, strong as an ironing board can be.

As a part of the unit system, or by itself, the kitchen cabinet brings to any kitchen a convenience and cleanliness which are practically indispensable.

Doors Open to Show Roomy Spaces for All the Housewife's Dishes, Utensils and Supplies.

LATITE

With roofing and re-roofing going on all around you, why shouldn't you be the man to do the work and make the profits?

Get started with Genasco!

Because Genasco Latite Shingles make a roof that is both waterproof and fire-retardant, that is attractive and durable and economical, they present a wonderful opportunity that means good business and steady profits for you—and by starting a roofing department you can handle it to advantage in addition to your present business.

Every building you roof with Genasco Latite Shingles helps you to get more of this roofing business, and we are also constantly telling people about Latite through our series of color advertisements in the Saturday Evening Post. The number of insertions has been more than doubled in this year's campaign, and every advertisement reaches more than ten million readers.

You can depend upon people to appreciate the distinctive Latite qualities. Genasco Latite are made of long-fibred, asphalt saturated rag felt, coated *on both sides* with nature's own waterproofer—Trinidad Lake Asphalt Cement. This undercoating is the exclusive "Sealbac" feature which protects against condensation from beneath.

The granulated slate surface—red, green, blue-black or "mixtone"—makes a beautiful appearance. And Genasco Latite Shingles have this advantage—on re-roofing jobs they are laid right over the old shingles, avoiding trouble and dirt and expense.

Wouldn't you like to have the complete Genasco plan that tells you how to get this roofing business, how to handle it, and how to make it profitable for you? There's no obligation—just use the coupon at the bottom of this page.

The Barber Asphalt Company
Philadelphia

New York Chicago Pittsburgh St. Louis Kansas City San Francisco

Front view

The patented "key," *invisible on the completed roof*, locks each shingle tightly to those underneath.

Genasco
Reg. U. S. Pat. Off.
Latite Shingles

Back view

The turned-under corner holding the "key" makes a double-thick butt that adds distinction.

Write your name and address at the bottom of this page and mail the coupon to us.

The Barber Asphalt Company, Philadelphia A

Please send me full information regarding products I have checked:

Genasco Latite Shingles ☐ Genasco Roll Roofing ☐ Genasco Sealbac Shingles ☐ Genasco Building Papers ☐

The Development of the Built-up Softwood Door

EVER since the days of the Pharoahs man has made built-up, veneered doors of hardwood; but in the United States they have been manufactured in stock quantities only for the past twenty years. It is almost impossible, due to the extreme tendency of all hardwoods to warp and twist, to frame up a hardwood door with solid stiles and rails, and for the same reason almost all doors of these woods contain a softwood core upon which a veneer of the finer stock is cemented.

But despite the age old practice of laminating hardwood doors, it has been only during the past three years that this method of construction has been employed in the manufacture of a stock softwood door which can be said to have entire freedom from those natural faults of all wood, warping and twisting. The reason for this delay in developing a satisfactory and economic method of manufacturing veneered softwood doors has laid largely in the difficulty of producing a cement which would successfully resist the influence of climatic conditions, and at the same time retain its faculty of adhering to the structure of the softwoods. Once this waterproof cement was developed it was comparatively easy to manufacture, on a quantity basis, a softwood door which would undergo rapid changes from extreme moisture to extreme heat without the usually resultant warping and twisting, or separating of parts.

The advantages of lamination, as we have said, have been known for centuries and include mainly the qualities, strength and durability. In the manufacture of a veneered door these qualities are obtained by building up the various members of the door of small, clear blocks and strips of stock into what is known as a core. This core is composed of short blocks of clear stock cemented and dovetailed together lengthwise. To this core is cemented the face veneer. Since the annual rings of each block invariably run in a direction different from that of the adjoining ones, any tendency of one block to warp is counteracted by the opposing action of its neighbors. The result is that throughout the entire core the tendency to warp or twist is neutralized. The panels of the door are built up of three layers of veneer with the grain of the middle layer running across that of the outer plies so that there is still the balancing of stresses. The result of this process of lamination and the use of a waterproofing cement is a softwood door which is insured against the distorting effects of moisture or heat, and which, when once hung, never requires refitting. The builder can leave the new house with the satisfaction of having entirely finished the job, and the owner can move in assured that he will never be annoyed by rattling or sticking doors.

In the Process of Building Up the Stiles and Rails of Doors, They Go Through a Dovetailing Machine Similar to the Above, Where the Dovetailing Is Done so Perfectly That There Is an Exact Match When the Separate Parts Are Joined.

Here Is Seen the Assembly Work on the Doors After the Various Parts Have Been Built Up and as the Pins Are Placed for the Final Joining. After the joining parts have been coated with glue, they are given a squeeze in the powerful machine shown in the foreground.

The softwood door, contrary to the common opinion, can be made to take a finish rivaling in beauty that of the finest hardwood doors. It is the usual practice for finishers, who feel that, since the softwood door is cheaper than the hardwood, it deserves only a cheap finish and it is natural that the best results are not obtained. But if a reasonable amount of care is taken in the finishing from the setting to the final polish and a high grade material is used, some very beautiful effects will result. This is especially true of the flat or slash grain cuts of softwood which display a marking similar to that of watered silk.

The carefully manufactured, built-up softwood door has gained tremendous popularity in the past three years solely upon its advantages of durability and beauty. It is inexpensive, and in the end it is the least expensive door that can be obtained, for the reason that it is entirely trouble-proof.

Materials that actually

HELP YOU GET JOBS

and increase both the SALE *and* RESALE *value of the home*

Today your home building prospect is building material wise. For years national advertising has been educating him in the choice and use of quality materials. He knows steel — its economy and strength. Here are a few ideas on YPS Steel Building Materials that will help get jobs with more profit for you.

* * *

Exterior stucco reinforced with YPS Stuccomesh applied with YPS Economy Stucco Nails gives the most economical, permanent construction.

* * *

In the foundation YPS Copper Steel Basement Windows are cheaper and better in every way; and the rugged, good-looking YPS Copper Steel Coal Door is more evidence that you have used the best of materials.

* * *

For bridging between joists — YPS Steel Floor Bridging is cleaner and costs less in place than wood. Anchoring wood joists in masonry walls with YPS Joist Pin Anchors will save the time and expense of having them made locally.

* * *

Where steel joists are used, lay your base floors on YPS Ideal Rib Lath. Also use Ideal Rib for the basement ceilings furred with YPS Pencil Channel attached to the joist with the new YPS special clip.

* * *

On the interior, YPS Z-Rib, a metal lath that competes with wood, reinforced on the outside corners with YPS Corner Beads, eliminates plaster streaks and cracks.

* * *

For more expensive jobs YPS Mahoning Metal Lath is the strongest metal plaster base known. If the owner is unable to handle the small added expense of metal lath, reinforce all inside corners and openings with YPS Cornerite.

* * *

The YPS dealer carries all these materials in stock. He can give you immediate deliveries and the best of service on YPS and all other building materials.

FREE

New YPS Catalog

The YPS Catalog describes the YPS complete line of steel building products with facts that will help you get jobs. Use the coupon.

THE YOUNGSTOWN PRESSED STEEL CO., *Warren, Ohio*
Boston—Philadelphia—Dayton—Detroit—
Chicago—Los Angeles—San Francisco

BETTER PLASTERING ON METAL LATH

Send

The Youngstown Pressed Steel Co.
Warren, Ohio

Please send the new YPS Catalog by return mail and have your YPS Dealer look me up.

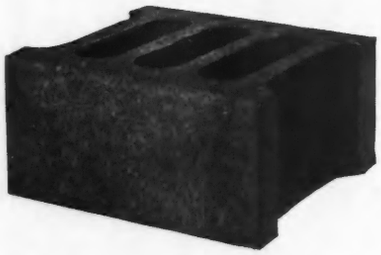
Name _____ *Address* _____

Business _____ *City* _____ *State* _____ A.B.-4-27

Progress in Block Equipment

THE many advantages claimed for concrete masonry units have led contractors and builders to investigate their possibilities more carefully as general building costs have risen and it has become necessary to seek out every possible means for cutting costs without decreasing the quality of construction work.

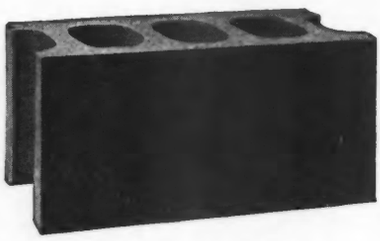
There are three concrete units generally accepted among builders—the block, the brick and wall tile. With the popular demand for these units on the increase and with many builders becoming interested in their manufacture, designers of equipment have been forced to provide automatic equipment capable of large output, because the modern concrete products plant is organized on a quantity production basis. Where a few years ago concrete units were used chiefly in foundation work, today they are competing in the open market with older materials for superstructure work. This competition is on the basis of proven quality, not price.



Stripper (Troweled Face) Block.

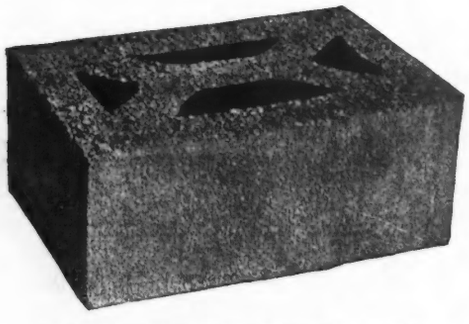
One of the pioneer manufacturers of concrete machinery now announces several new models in its large line of concrete products plant equipment and in each case the new machine reveals refinements in design and new ruggedness in construction intended to meet the demand for molding machines of greater output.

The "stripper" type of block shown here is the most popular in the large centers of building activity. It is generally a plain block, made wet, and stripped from the mold by an action which automatically trowels all four sides. Stripper machines are made in several models, of various capacities and the new model now announced is a power machine which makes two blocks at one time. The design of the block is largely in the hands of the manufacturer as simple changes in cores, pallets and tampers enable the same machine to make any desired type of stripper block. The manufacturers have just perfected an attachment with which rock face block may be made by the stripper method.



Popular Faced Block.

While stripper block are the bulk of the production in many of the largest concrete products plants, there is still a heavy demand for the faced units — concrete block of panel, plain or rock face design, faced with special mixtures of granite, marble, mica and other materials. Now this manufacturer has brought out a heavy duty model, power-operated, for the production of faced blocks in large quantities. The cores are inserted by tripping a foot lever; power feeds the concrete mixture into the mold, the block is tamped by power, the top is struck off and finished by power and the cores are withdrawn by power. Opening the mold box automatically releases the face plate. The equipment is heavily designed, the one-piece cast frame alone weighing 650 pounds. This weight eliminates vibration and results in a product of uniform size and shape.



High Test Tile with Diagonal Webs.

Building tile—light weight wall units—are growing in popularity with architects due to the economy of their bulk in bearing walls. These tile are made in various designs, but the standard unit in the greater part of the country is 5 inches high, 8 inches wide and 12 inches long. The webs of the tile are thin, but the entire unit is so strong as to support many times as much load as it will ever be asked to bear. The webs widen at the top of the tile to afford an adequate bed for mortar and to offer convenient handhold so masons can handle them easily. They are ideal as back-up for brick and in many cases are cast with corrugated surfaces to provide bond for stucco and plaster. One of the types preferred by many builders is the high test tile, with diagonal cross webs. The machines, however, may be fitted to make any of the standard designs of tile. Machines are available for making one, two or three tile at a time and a new model just brought out makes four standard tile at a time or a series of standards and fractionals. This new machine again is the result of a demand for equipment to make concrete masonry units in large quantities. A single foot lever controls the operation of the feed drawer and the stripping device.

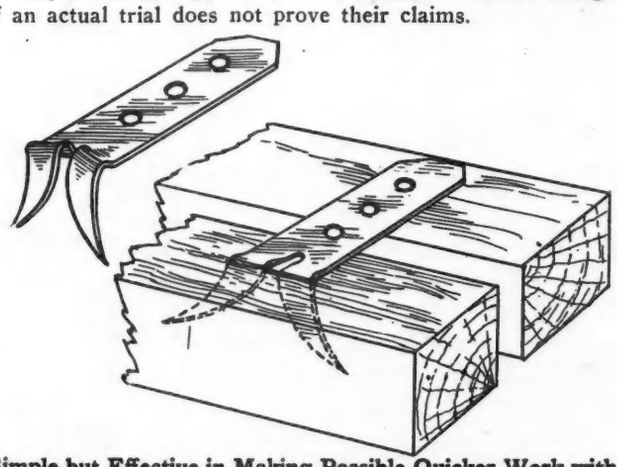
✣

A Handy Jamb Fastener

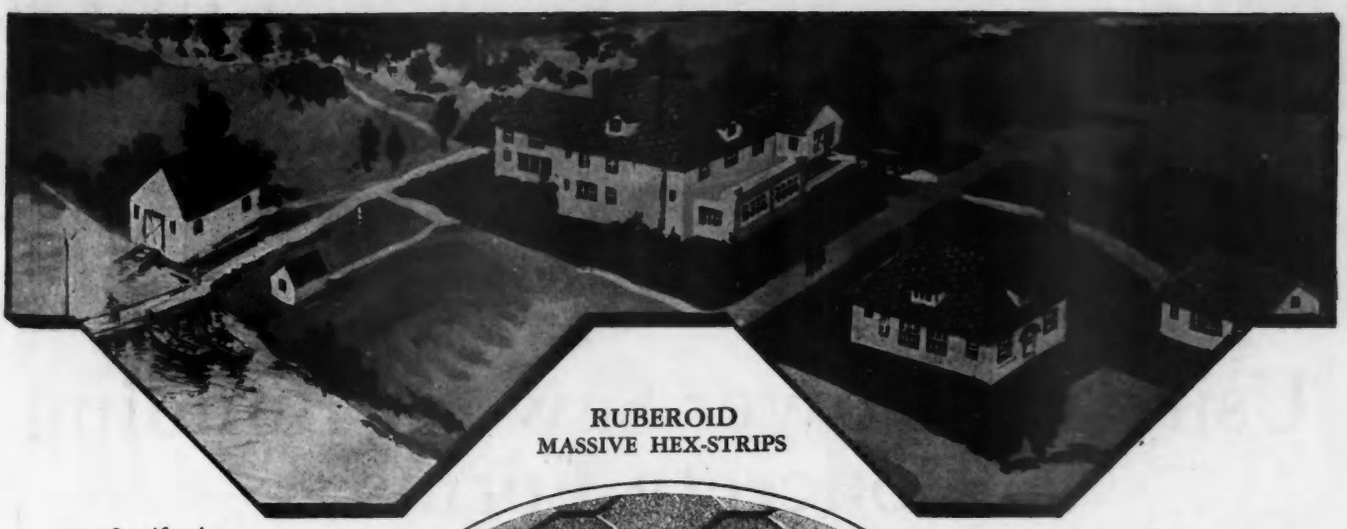
EVERY builder should find the little device shown in the accompanying illustration an aid to better, quicker and more economical work, hence more profitable work. This device is clearly shown at the right while at the left is a phantom view showing how, when it is driven into wood, it spreads in such a manner that it cannot work loose.

This device is used for jambs in doors and windows and also for fastening shelving and in many other tight places. According to the manufacturers, it sets the frame square and accurate, drives in without cracking the wood, requires less fitting on doors, saves puttying up of nail holes by painters, holds better than nails and is more quickly put in and enables a carpenter to do more work in a day and to do it faster and more easily.

The fastener is made in three sizes, 1¾ inches long, 2¼ inches long and 3 inches long. The manufacturers offer to ship a box on approval, to be returned without charge if an actual trial does not prove their claims.



Simple but Effective in Making Possible Quicker Work with Assured Accuracy Is This Handy Fastening Device.

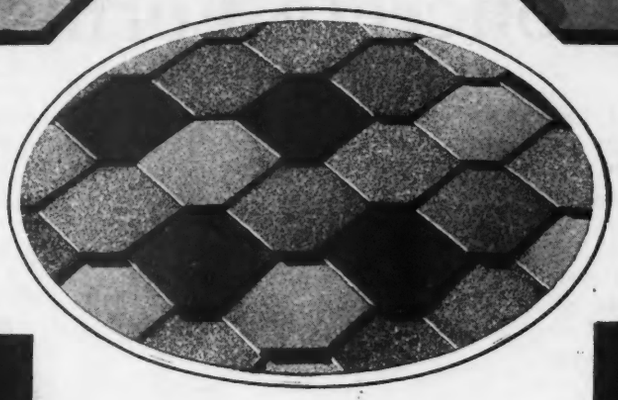


RUBEROID
MASSIVE HEX-STRIPS

Specifications

Thickness ... ... 40% thicker
Length ..... 36 inches
Width ... ... 13⅓ inches
Headlap .... 3 inches
Weight per shingle, approx. 3 pounds

(Hex-strips may also be had in 12⅓ inch, 165-175 lbs. and 10 inch, 160-170 lbs. per square.)



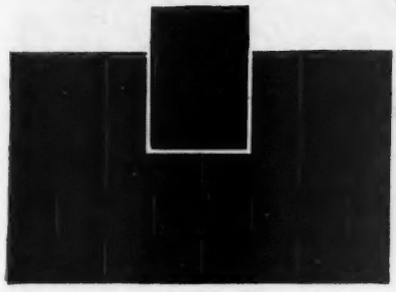
Colors

Terra Cotta — Valley-green
Mountain-purple — Midnight-blue
Heather-brown — Tweed-grey

Red 4-tone
(Terra Cotta, Brown, Purple and Grey)

Green 4-tone
(Green, Purple, Brown and Grey)

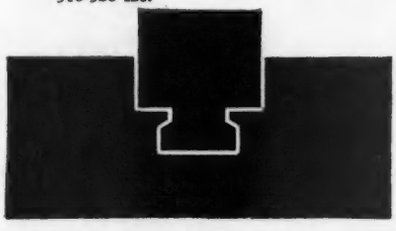
UNIT SHINGLES



RUBEROID MASSIVE UNITS

Extra size, extra weight, extra rigidity and extra large headlap provide absolute protection against leakage. Same beautiful colors as Massive Hex-strips.

Size: 12 x 16 inches, laid 5¼ inches to the weather—allowing 5⅓ inch headlap. There are 220 shingles per square—weighing approximately 310-320 lbs.



RUBEROID GIANT TEE-LOKS

Giant in size, T shaped in design, tile-like in appearance. Each shingle locks down at 4 points—cannot lift in a wind! Colors: Sage-green, Tile-red, Steel-blue and Purple.

Size: 16 x 19¼ inches, headlap 6 7/16 inches, 144 shingles per square, weight approx. 195-205 lbs.

PERHAPS you, too, have purchased roof coverings you thought were Ruberoid, only to find another brand name on the label. It pays to insist on *genuine* Ruberoid Shingles and Roofings. They take the speculation out of buying.

Remember—there's a Ruberoid Shingle and Roofing for use on every type of roof.

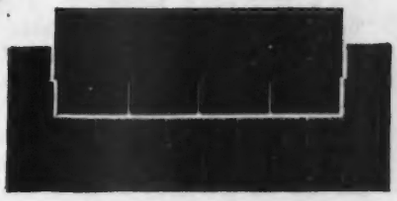
The lumber or building supply dealer in your community who sells *genuine* Ruberoid Shingles and Roofings will show you Ruberoid Products. If he hasn't just what you want on hand—send us the coupon. We'll be glad to mail you samples and descriptive literature.

The RUBEROID Co.

Chicago New York Boston

In Canada:
RUBEROID
(division of Building Products, Ltd.)
Montreal.

STRIP SHINGLES



RUBEROID SQUARE-TABS

Gives the effect of an individual shingle and saves 60% in labor. Colors: Sage-green, Tile-red or Steel-blue. Also Vari-tone (3 colors harmoniously shaded across each strip.)

12⅓ inch provides headlap of 4⅓ inches, weight 235-245 lbs. 10 inch allows 2 inches headlap, weight 185-195 lbs. 100 strips per square.

RUBEROID OCTABS

This shingle provides 50% greater headlap than the usual strip. Octangular in design. No corners to lift with the wind. Colors: Sage-green, Tile-red, Steel-blue and Vari-tone (3 colors harmoniously shaded across each strip.)

Size: 33⅓ x 11 inches. 108 strips per square—approximate weight is 200-210 lbs.

RU-BER-OID
SHINGLES ~ ROOFINGS

The RUBEROID Co., Dept. 1
95 Madison Ave., New York, N. Y.

Send me the name of the nearest Ruberoid Dealer and information regarding the products checked below.

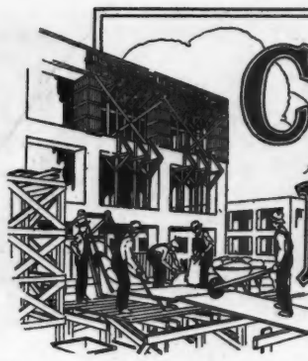
Ruberoid Strip-shingles
☐ Octagonal ☐ Square ☐ Hex-agonal

Ruberoid Unit-shingles
☐ Massive ☐ Standard ☐ Lock-down

Ruberoid Roll-roofing
☐ Slate-surfaced ☐ Smooth-surfaced

Name .....

Address .....



CONTRACTORS' EQUIPMENT

Using the Power Saw for Building Concrete Forms

By JOHN T. NEUFELD

WHEN thinking of using the power saw for building concrete forms there are some questions that come up. We often think of form building as a job that must be done right on the sight of operation and of a job where the boards must be measured, sawed and nailed into place almost as it were "one by one." For this reason the first question to be answered is whether it is practical to use a power saw for work of this kind.

To put this question in a more definite form we would put it this way: "Is any or all form work of such a nature that it can be fabricated in units in a place where there is sufficient room to operate a good power saw and later erected in units?"

We further think of form building as of building something temporary and unimportant. This thought, therefore, brings up another question which we will put in this manner: Is there enough work on a job to warrant the use of a power saw for building the forms?

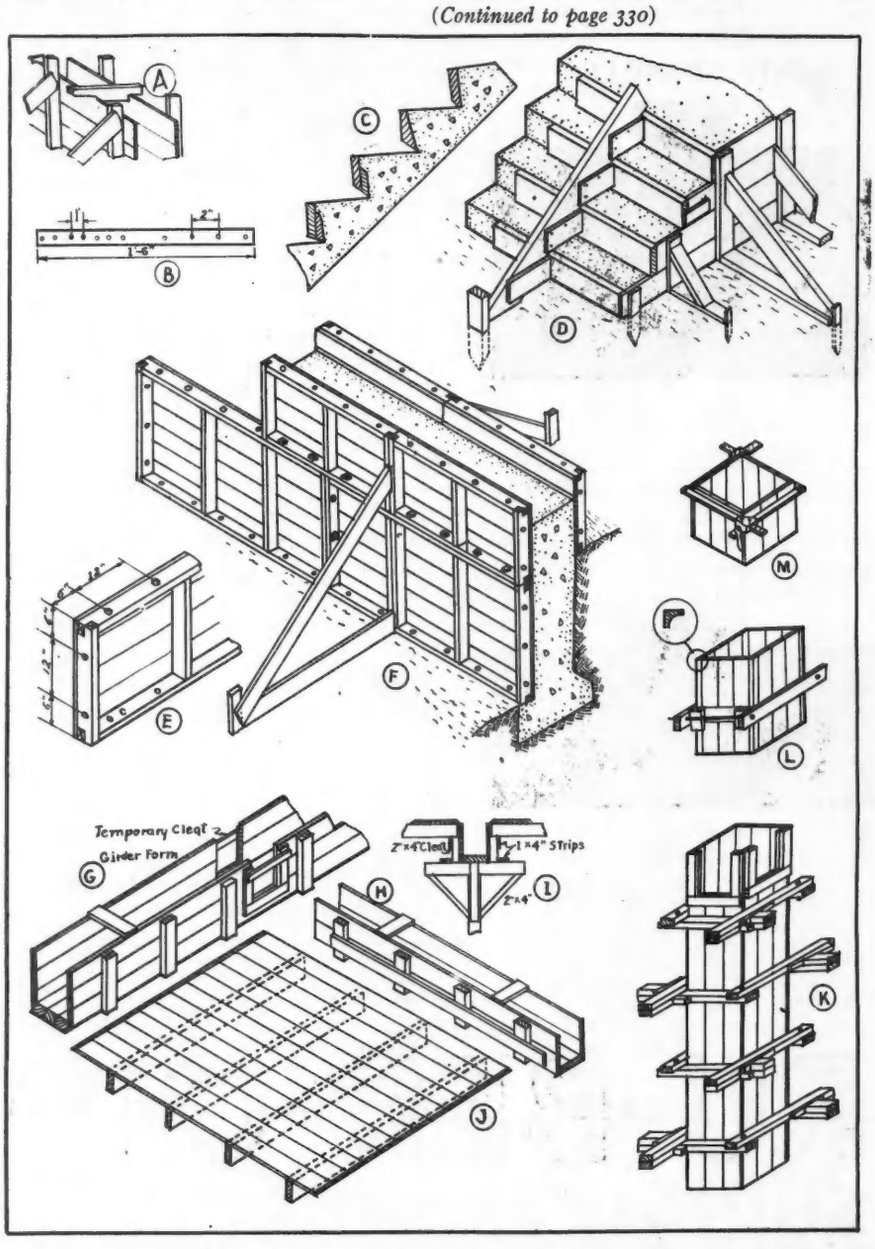
It seems advisable to answer this last question first. Every wall constructed is to have forms on two sides and each side requires from two to three board feet of lumber per square foot of wall, making a total of from four to six board feet of lumber per square foot of wall.

Floors require only forms from the underside but even then it requires from three to four board feet of lumber for every square foot of floor. (This, of course, includes bracing and supports.)

Columns require forms on four sides, beams on three sides. We see from this that on every job using concrete, there will be almost as much lumber to be put in place as if the building were a wooden structure and sometimes even more. Much of this lumber is heavy material and hand sawing is very slow and expensive. We can, therefore, see that there is no question as to whether there is sufficient work for a power saw on even ordinary jobs.

In regard to the first question, whether form work is of such a nature that it can be fabricated in units in a con-

(Continued to page 330)



A Power Saw Is a Great Time and Money Saver in Making Forms for Concrete Work.

DEPENDABLE MIXERS

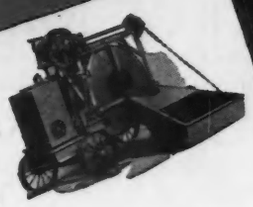
SMITH

T. L. SMITH CO. MILWAUKEE

a Book to Have

TO BOOST YOUR 1927—1928

The New 7-S Non-Tilting Mixer



With Power Loader

The Smith 7-S Non-Tilter is a one bag mixer with batches up to 1-3-6 proportions.

The simple yet rugged construction insures dependable service and long life. As a result hundreds of contractors depend on it to do all their mixing, even on large apartment and hotel buildings where larger mixers were formerly used.

The mixing and discharge are unusually fast because of the full-width bucket construction. This high speed operation means more yards at the end of the day and more profits for the contractor.

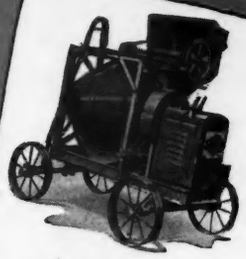
The New 5-S Non-Tilting Mixer with Power Loader

There is a rapidly growing tendency among architects and engineers to specify concrete of 1-2-4 proportions for reinforced concrete buildings, grain elevators, wearing surfaces such as driveways, garage and industrial floors and also for bridges and culverts in highway work. The 5-S holds a one bag batch of these proportions and it is being widely adopted by contractors.

Compact and Portable

The compact construction of this mixer makes it very desirable for these classes of work. Rubber cushion type tires can be provided for mixers which are to be moved considerably. Its capacity of 50 to 80 cu. yds. per day is ample for all requirements. Either power loader or low charge hopper and platform can be provided.

The 5-S Tilting Mixer With Power Loader



Architects and engineers are specifying concrete of 1-2-3 and 1-2-4 proportions for driveways, garage and industrial floors, and reinforced concrete buildings; with mixes of the same proportion specified for bridges and culverts, in highway work. This machine is especially designed to handle such work—one bag batch capacity up to 1-2½-4 proportions. It is light and easily portable and can be equipped with rubber tired wheels for city work. Daily capacity of 50 to 80 cu. yds.

The 10-S Non-Tilting Mixer with Power Loader

The 10-S Non-Tilter like the 10-S Tilter is particularly designed for the contractor whose jobs call for concrete of 1-2-4 proportions. It has a two bag batch capacity on these proportions giving double the output of a 5-S with but a slightly larger crew.

It can be moved from job to job and shifted as readily as the smaller size. The price is low and the output big.

The lower cost per yard means more profit to the contractor.

The 7-S Tilting Mixer with Power Loader

The 7-S Tilter is of one bag capacity, with mixes of all proportions up to 1-3-6. It is easily portable and gives the contractor a daily capacity of 70 to 120 cu. yds., slightly higher than with the one-bag 5-S.

Easy Tilting Discharge

It is practically self-tilting because the batch quickly shifts to the discharge side when tilting starts. The Smith 7-S Tilter is the sturdiest, fastest one bag mixer built.

It can be furnished with low charge hopper and platform, as well as power loader. Four rubber cushioned tired wheels can be provided for rapid city moving.

The Smith Line, you know, includes machines to meet every demand—from 2½-S Smith Mascot for the small repair job to the 112-S Smith Tilter—the largest Mixer in the world.

The line includes Tilting Mixers in the 2½, 3½, 5, 7, 10, 14, 21, 28, 40, 56 and 112 cu. ft. per batch sizes—Non-Tilters in the 5-7, 10, 14, 21 and 28-S capacities—besides the famous 27-S (Six Bag) Smith paver.

Suggest you send today for the book that covers this line in detail—use the coupon at the right.

THE T. L. SMITH COMPANY
Milwaukee, Wisconsin

Please send me a copy of your Mixer Catalog No. 526.
We are especially interested in a ..... mixer.
(Size of mixer)

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

Date 1928

SMITH MIXERS

329

(*Continued from page 326*)

venient place and will be later erected in units, we want to study some of the methods of building forms.

For small jobs the forms can be built up by following the general drawings. On larger jobs it will often pay to make special form drawings. A manufacturer of wrought iron castings does not go about making his molds in a haphazard way.

He makes several sets of drawings, one of which must go to the pattern shop. The pattern maker must be skilled and work according to accurate dimensions. From the patterns the molds are made up.

By forgetting that form work is temporary, and considering it as something of vital importance in relation to the finished product, just as the manufacturer does his pattern, we will have made a decided step forward in the solving of our problem.

The dimensions for the finished product in concrete work are definitely fixed by the drawing and for this reason the dimensions for the forms are definitely fixed and it is nearly always easier to follow the drawings when building up the forms than it is to build up the forms by the "cut and try method."

Take for example the stair form shown at "D." The dimensions for the steps must be taken from the drawing given by the architect and the entire form can be built up from the drawing of the architect.

In building the forms for a small foundation it will be entirely possible to build up the forms in units as the size of foundation is definitely fixed. In many cases each stretch of wall needs only two units, one for the inside and one for the outside. By building these to the exact required length, and allowing for thickness of forms where they overlap at the corners, we will not only save lots of measuring but will also have something definite to go by when erecting the forms. If a stretch of wall is too long for one unit, then two units can be used.

A contractor may also build up standard units such as are illustrated at "E" and "F." These are very often built in sizes of 5 feet by 6 feet. However, some contractors have found a narrower and longer section more practical. Let us consider, for example, what may be done by having forms of two different widths, say 2 feet wide and 3 feet wide? These two widths used together will build almost any desired height of wall as shown by the table below:

A 2′ high wall requires a 2′ section.
A 3′ high wall requires a 3′ section.
A 4′ high wall requires two 2′ sections.
A 5′ high wall requires one 3′ section and one 2′ section.
A 6′ high wall requires two 3′ sections.
A 7′ high wall requires two 2′ sections and one 3′ section.

By making these sections in a variety of lengths we can even take care of different lengths in the foundation and will require only the building of a few extra sections on each job.

In the illustration we also show column, beam and slab forms:

"G" is a girder form.
"H" is a beam form.
"I" illustrates the support for a beam or girder form.
"J" is a built-up slab form.
"K" is a built-up column form showing one method of clamping the form together.
"L" shows a method of holding the form together using steel rods.
"M" shows the use of patented form clamps.

We can see that all these are built up in sections, but must be built according to the dimensions on drawings. We see that all this work can be done before hand and that the power saw would be very convenient in cutting the material. As much of the material is heavy we may also cut such things as the wedges. These are hard to cut with the ordinary hand saw but the power saw makes quick work of such items.

There is, however, a part of the form work, especially the bracing, supports, etc., which cannot all be built in units. For such work we have the electric hand saw. This can be used almost anywhere where an ordinary hand saw can be used.

Some of the advantages gained from the use of the power saw for form building are:

(a) A saving of time.
(b) Better forms, that is, forms that are more accurate and stand up better.
(c) Better resulting concrete work.
(d) Forms that are more easily removed.

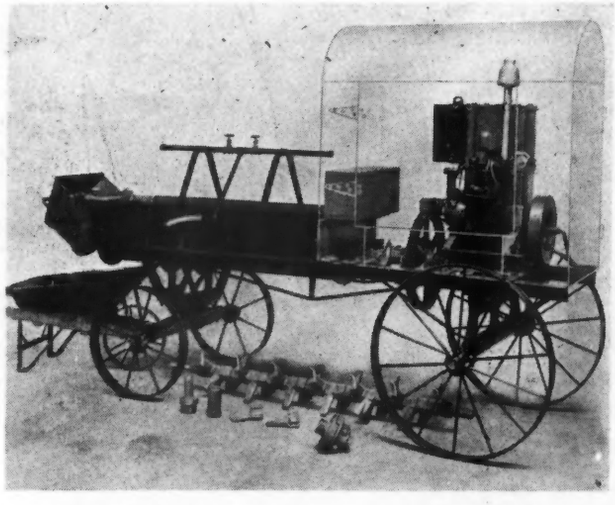
✣

Fast Working Mortar Mixer

THE mortar mixer shown here will do better work than a hoe or a batch mixer and do it faster, it is said. The free, open end dumper-end actually saves time, labor and materials. Time and labor are saved by the rapid but thorough mixing which is done, more than equalling the work ordinarily done by three hoes. Time is further saved by the fast discharge into the wheelbarrow, giving the workman a chance to load a barrow in less than 10 seconds.

This mixer saves material at the discharge end by the secure and positive closing of the dumper. There is no drippage. Savings as high as 20 per cent of lime and, on color jobs, savings of 20 per cent on tint, have been reported.

This mixer is suitable for either big or small plastering jobs, saving time and producing a smooth, easy to handle, plaster, which means more yardage per day. It is simple in design, the steel paddles working in the long drum mash

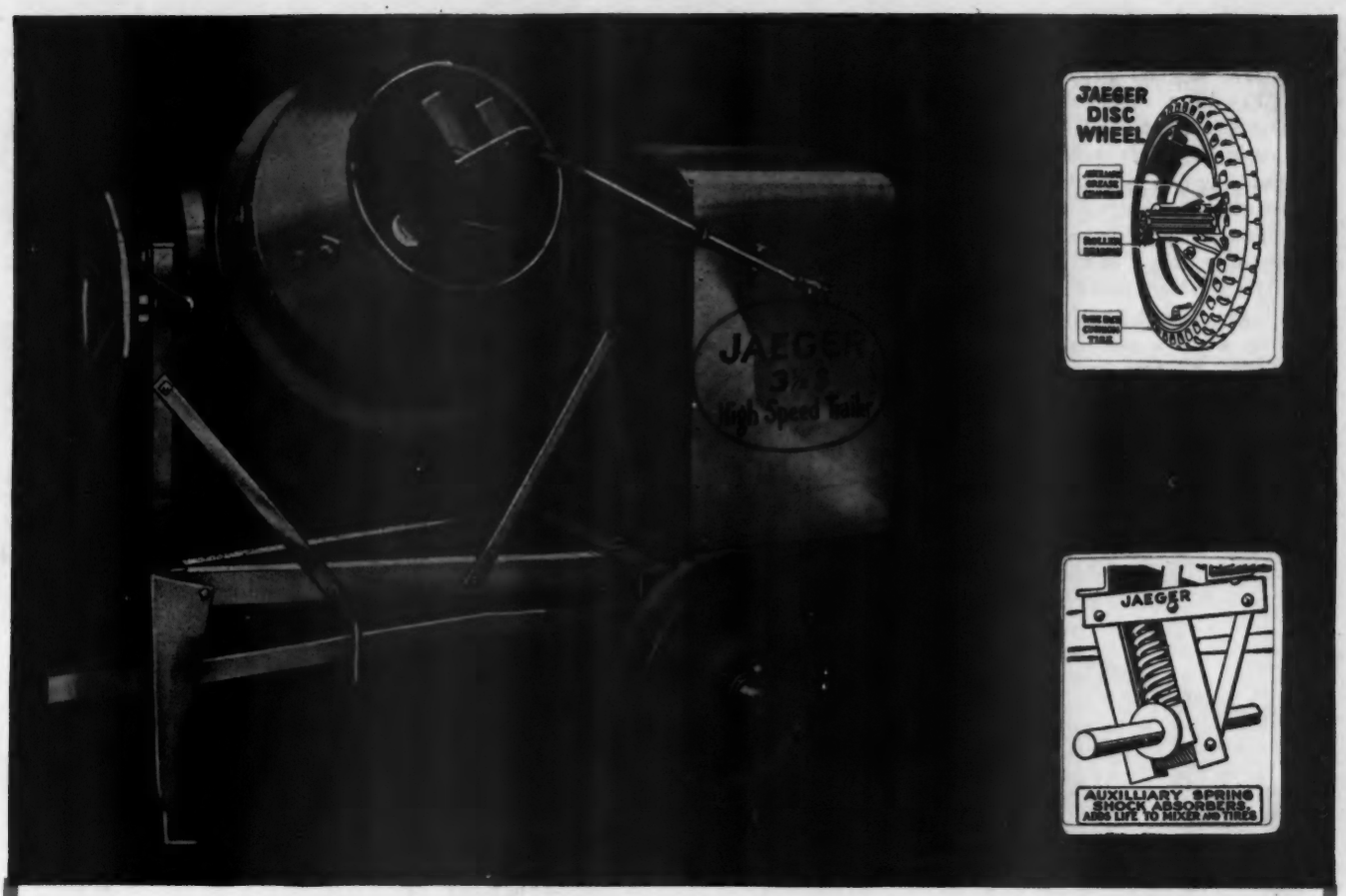


A New Mortar Mixer Shows Great Efficiency.

out the lumps and thoroughly mix the lime, sand and cement to produce a mortar that masons do not have to work over on the board.

The particular feature of design is the drum-size open dumper-end, which makes possible the quick loading of the wheelbarrow and saves, it is said, one laborer as one man can supply the elevator which usually carries two wheelbarrows at a lift. One laborer will supply 20 to 30 masons and more laborers shoveling into the mixed will supply 70 masons.

The drum is of heavy gage sheet iron reinforced with angle and the shaft carries 21 paddles and seven spikes arranged to hasten the mortar toward the dumper fast enough to keep a free space in the drum for the raw material and addition of lime and cement.



Get The Amazing Low Price on Jaegers New High Speed Trailer

BUILT FOR FAST HAULS OVER BAD ROADS

The Genuine Jaeger Tilting Mixer costs less to buy or operate than the imitations now on the market — Jaeger is the largest selling mixer in the world today, not on account of its moderate price (due to big volume of production) but on account of the many patented labor-saving features that cannot be duplicated:

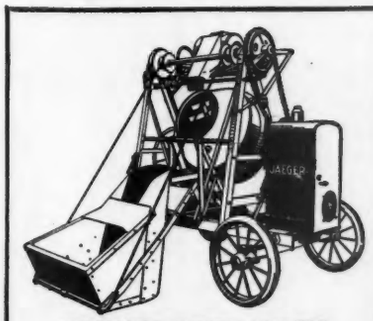
"Flat Spot" drum with its thorough mix and five-second discharge, semi-automatic dumping drum (A boy can operate it). Cushion tires — springs — roller bearings used on trailers. Accurate measure water tank, acknowledged the best. "SKIP SHAKER" vibrates load out — no pounding on skip.

WRITE FOR NEW PRICES AND CONVENIENT TERMS

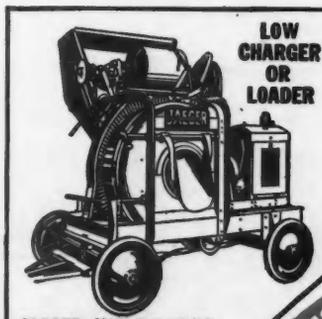
THE JAEGER MACHINE COMPANY

521 DUBLIN AVE COLUMBUS, OHIO

Over 100 service stations, distributors and branches located in all the principal cities— Standardize on Jaeger and profit by our quick service.



AUTOMATIC POWER LOADERS
All sizes—3½-5-7-10-14 Ft. Cap—
36 Labor-Saving Models
and Attachments



JAEGER NON-TILTERS
100% Roller
Bearings
10-14-21-28
Ft. Sizes

Ask About Jaeger Plaster Mixer

MAIL THIS SLIP TO-DAY FOR BIG CATALOG

Jaeger Machine Co., Columbus, Ohio.
521 Dublin Ave., Please send catalog, prices and terms on
☐ NON-TILT MIXERS ☐ PLASTER MIXER ☐ TILTING MIXERS

Date .....

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

Color in Concrete

THE original gray tone of portland cement concrete has been superseded in recent years by a variety of color effects, secured by applying colored stucco finishes, by using special cement paints, etc. The newest development now is a matt glaze finish in a great variety of attractive colors and tints which can, with simple equipment, be applied cheaply to the face of concrete building blocks, tile, cement brick or any other precast concrete unit.

The concrete units are manufactured in the regular way and are stored in the yard in their natural gray color. Then when a sale is made the color glaze is put on in exactly the tint specified, and only as many units are processed as the order calls for.

It is expected that this color glazing is going to prove a great boon to cement products men, as it will put them in line to compete on favorable terms for all building walls above grade.

An Inexpensive Garage at Muskegon, Mich., Built of Matt Glazed Tile of an Attractive Tan Color.

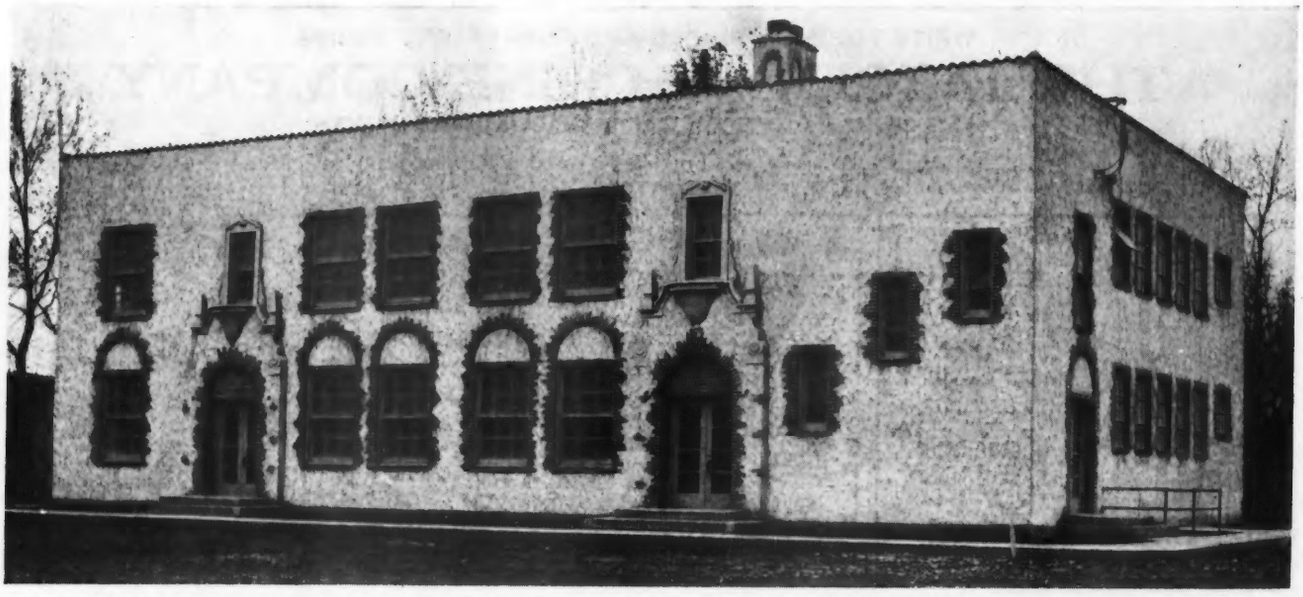
The Studebaker Garage, Morgantown, W. Va., Is a Fine Example of Light Glazed Concrete Building Tile.

The people want masonry fire-resistive materials and they want color. The concrete products men who are enterprising and in step with the times will investigate this latest development, which, although new, has been very thoroughly tested, and will equip himself to furnish building tile, blocks and brick matt glazed.

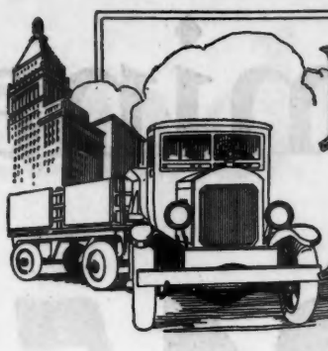
✣

Washable Shade Cloth

FOR those who have had the disagreeable experience of seeing their window shades become soiled, cracked and unsightly within a comparatively short time after they were installed, and that includes the vast majority of us, a distinctly different type of shade cloth, which is available in many colors, will prove most attractive. This shade cloth, no matter how soiled, can be restored to its original freshness and beauty with soap, hot water and a brush. It is a cloth impregnated with a cellulose material.



New Office of the Marquette Portland Cement Company, Cape Girardeau, Mo.; R. K. Knox, Architect. Constructed of gray duntile overcoated with cream-colored stucco. Rough texture brick of a reddish brown hue around the door and window openings make a vivid contrast.



MOTOR TRUCKS AND TRAILERS

Improving Truck Operation

LITTLE things mean a lot to successful truck operation. A number of plans that require very little effort for the builder to use, are given in this article. They represent 11 things he may do to get better service from his truck at less cost. In every case, they are new ideas which have been successfully used and which are practical for any builder's business, regardless of size.

1. Make Drivers "Trouble Shooters"

Don't wait for serious trouble to develop. Check truck repairs in their early stages. Make every driver a "trouble-shooter" and hold him responsible for reporting irregularities. Print a simple little form with a list of the major truck parts and headed, "Driver's Daily Repair Recommendations."

Should any repairs be needed or symptoms noticed, the driver merely checks off the ailment on the list. If nothing is needed, he checks in a space marked "O.K." and writes his signature. In any case, require the driver to fill out and hand in a slip at the end of each day's run as evidence that he has not forgotten or neglected the matter.

2. This Blackboard Cuts Costs

Keep in touch with the movements of each truck by placing a good-sized blackboard in the garage or main office from which, at a glance, the status of every truck owned by the company can be seen. Rule the board permanently with white paint in the manner of a daily journal with columns with a line for each truck and a column for each day. Reading across, you will then have a square for each day of the month for each truck.

Indicate the status of each truck for the day in the proper square by a symbol, such as: R, repairs required; RA, repairs required because of accident; P, paint shop; OH, overhaul; ID, idle; and (x) in regular service. Take a photograph of this board at the end of each month as a service record. This plan provides a valuable check on the truck service. If a truck has been in the repair shop or paint shop or idle for a long period of time, and also helps to compare service records of the different trucks in the interests of future economies.

TEN COMMANDMENTS FOR DRIVING

1. Drive on the right side of the road; it's just as good as the left.
2. Slow down when approaching a cross-road; it is nearly as dangerous as a railroad crossing.
3. Look out for children. You can never tell what they will do, and you are always in the wrong if you hit one.
4. Try to help instead of hinder the traffic officer; he is there for your good, and he's got a tough job.
5. Be sure that your "dimmers" really dim; it's no joke driving into a blinding glare, as you probably know.
6. Read and obey the warning signs; they are not put up as ornaments.
7. If you feel you've got to speed—do it where it won't kill anybody but yourself.
8. When making repairs, stop where your car may be seen from both directions; otherwise you may stop longer than you anticipate.
9. Speeding around corners is a straight route to the hospital. Don't race past a stopped street car. Some day the jury may call it manslaughter.
10. Use discretion. The fact that you had the right of way don't bring anybody back to life, least of all yourself.

3. Keep Drivers Out of Trouble

Give your drivers a "boiled-down" list of the parking and other automobile regulations of the cities and towns in their territories. Ask your local police or traffic court for these. Write a digest of these with headings such as the following:

"No Commercial Traffic on the Following Streets."
"No Parking in These Areas."
"Parking Limit 30 Minutes Here."
"One-Way Streets as Follows."
"Speed Limits as Follows," etc.

4. Encourage the Courtesy Idea

Form a "Courtesy Club" among your drivers under the supervision of the man responsible for deliveries. It is good business for you to keep the good-will of passenger-car owners and this can be done by encouraging your drivers to extend courtesy to other motorists on the road. No rewards are necessary for such a "club." At intervals, give a banquet and have a talk on the subject of courtesy by someone outside of the business such as your local traffic-court judge or a popular traffic policeman. Encourage the drivers to tell of their experiences at these meetings. Call the public's attention to this "club" in your newspaper advertising. Letter on the back of your truck something like this:

"Sound Your Horn.
We'll Pull Over"
The Blank Courtesy Club.

5. Making Safety Certain

You can stop reckless driving and reduce accident costs by having a number of neat little signs lettered on metal or wood about 6 by 12 inches so that they can be screwed to the side of each truck near the driver's cab. Use this wording:

"This car has never been in
an accident. Safety always."

This makes an unforgettable incentive to drivers to keep out of traffic accidents. In using the plan, do not count minor accidents in the company's garage, such as the slight bending of a fender caused by backing into the building.

(*Continued to page 342*)

Power, Stamina a

$670
¾-Ton Chassis F.O.B. Detroit

$1245
1½-Ton Chassis F.O.B. Detroit

$885
1-Ton Chassis F.O.B. Detroit

$1445
2-Ton Chassis F.O.B. Detroit
Dual Rear Wheels Optional at Same Price

Quality—
Volume—
Low Price

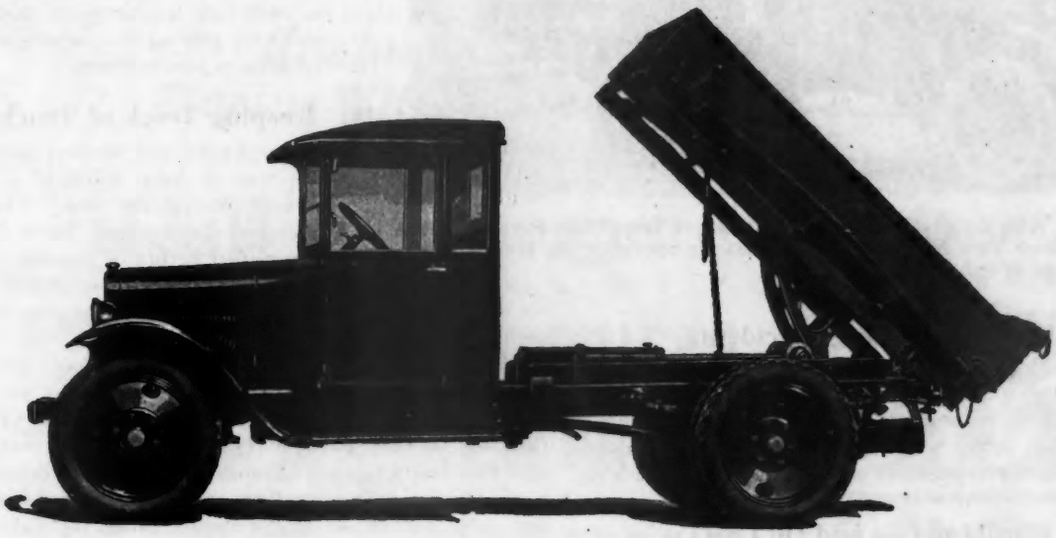
Ask your local Dodge Brothers dealer for the Vocational Book which features the use of trucks and Commercial cars in your particular line of business.

GRAHAM

SOLD BY DODGE BROTHERS
DEALERS EVERYWHERE

GRAHAM BROTHERS GB DETROIT

and Pay Loads



Your Trucks Must be Dependable —Graham Brothers Trucks ARE

Thousands of Graham Brothers Trucks are at work daily in the service of contractors and handlers of building material. In this rigorous work they are piling up their share of the evidence that Graham Brothers Trucks are money makers.

Power, stamina, freedom from excess body weight, service available always and everywhere—these are only a few of the items that have made Graham Brothers Trucks the standard by which motor trucks are being judged.

GRAHAM BROTHERS
EVANSVILLE — DETROIT — STOCKTON
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

BROTHERS —TRUCKS—

That Man Who Drives Your Truck Is a More Important Part of Your Organization than You May Realize for His Co-operation Is Essential to Economical Operation.

(*Continued from page 339*)

6. Preventing Garage Accidents

Accidents in the garage can be greatly reduced by building concrete bocks approximately 12 inches wide and six or seven feet long to separate the parking spaces. Even the most careless driver will thus be prevented from denting or scraping the fenders of another car when backing into position.

7. Checking Gas and Oil Costs

Gasoline and oil expenditures may be accurately checked when the concern does not have its own storage tanks, by using the regular gasoline and oil coupon books issued by most gas companies. These books are very handy and helpful in systematizing this cost item. With the books, blank forms should be provided so that the mileage of the truck and the amount purchased at each time can be recorded and turned in to the bookkeeping department. When a driver applies for a new book, previous purchases on the old book are checked with mileages. Oil should be changed every 500 miles. This plan enables the man in charge of deliveries to see that instructions on oil changing are carried out.

8. Watching Route Changes

Make someone in your organization responsible for keeping abreast of street repairs and route conditions. See that he informs drivers of any points that will help them to make quicker time. Have him make a study of places where trucks are likely to get caught in a traffic jam and inform drivers as to the best ways to avoid these points.

It will be worth the cost to let a man test the time required to reach a certain section by different routes and to recommend the best routes to drivers. Let him be the driver's "information bureau" and have him keep a map always marked with blue and red pencils covering important route data.

9. Posting Drivers on Truck Care

It saves money on repair costs to be sure drivers are informed on the principal points of truck care. A good many concerns do this by putting out at intervals, certain short typewritten or printed "Talks to Drivers."

A satisfactory way of doing this is to prepare a loose-leaf cover a little larger than the 8½ by 11 letter head size and to print on this cover a title such as "What You Should Know About Your Truck." At intervals, prepare short talks to the drivers, covering points of truck care, to be inserted in the printed binder.

At one time, for example, the subject might be the care of brakes. Another would take up the care of the storage battery. Subsequent bulletins would discuss the care of the ignition system, care of motor fan, lubrication, causes of lost power, mis-firing, smoke from motor, etc. These are all points that the driver should know and that will help him to better understand the means for getting best results with the least possible repair expense.

10. Keeping Track of Truck Time

Mechanical recording devices provide an accurate way to keep track of a truck's performance during the day. There are several types of recorders. Some of these make a complete record of operation including stops, time, mileage and speed. Thus the owner of the truck can see at a glance exactly what each driver has done.

There is some opposition to the use of mechanical recorders, yet there can be no doubt that they are helpful in providing precise and accurate information. It is said that the drivers particularly object to their installation, and look upon them as a sort of mechanical detective set to watch them because they cannot be trusted, that they are suspected of wasting time or using the vehicles for purposes other than the business of the owners.

Yet other truck users argue that with a permanent record of this kind there can never be any dispute over the amount of work done or the time consumed by the driver. The men at all times know that they can show and prove what they do and they come to take a pride in the fact that there exists an undeniable record of their work. As a result they take special care to see that this record measures up to their standard:

11. Ten Driving Commandments

Many concerns find that it pays to give drivers a short list of suggestions on care in driving, presented in a fashion that will interest them. A very good list used by one concern for this purpose is shown on page 339.

✣

New Indiana Flooring Branch

THE Indiana Flooring Co., 234 Rider Ave., New York City, has recently opened another branch office and warehouse, this time at New Haven, Conn., at 161 Day St., for maple, oak and yellow pine flooring.

The Truck Driver Should, Besides Driving His Truck, Be Something More than a Mere Laborer to Load and Unload the Truck. As a "trouble shooter" he can discover needed repairs before they become serious.

WHITE ENTERS LOW PRICE LIGHT DELIVERY FIELD

Announcing Reduced Prices Placing WHITE Transportation within the Reach of Everyone

Model 15 ¾-1 TON CHASSIS		Model 20 1½ TON CHASSIS
$2150 NET	← OLD PRICES →	$2950 NET
$1545 F.O.B. FACTORY	← NEW PRICES →	$2125 F.O.B. FACTORY
$605	← SAVING →	$825

WHITE transportation is today within the reach of every field of business and industry. Because of the increasing demand for quality truck performance, The White Company announces a broadening of its merchandising policy resulting in reductions in the prices of two models of four-speed light delivery trucks.

White is extending its area of transportation service—entering a wider field of fast, light delivery and establishing a complete range of truck capacity and price never before equaled by any high-grade truck manufacturer.

The name and reputation of White is insurance of continued high quality. These are the same high-grade White Trucks—at lower prices—the same standard specifications. For years the four speed White Model 15 and Model 20 have been the outstanding quality trucks in the light delivery field. No truck of the same size or capacity (¾-ton, 1-ton and 1½-ton) compares with them in dependable, low-cost transportation over hundreds of thousands of miles.

Throughout the chassis construction of the White Model 15 and Model 20 you will find inbuilt quality, ruggedness and exclusive White mechanical features that are not duplicated in any other light delivery truck at any price.

THE WHITE COMPANY, CLEVELAND
Please send me complete specifications, etc., covering White Light Delivery Trucks at reduced prices.

NAME .....
FIRM .....
STREET .....
CITY .....

American Builder

Terms—Operators wishing to buy trucks on terms can do so

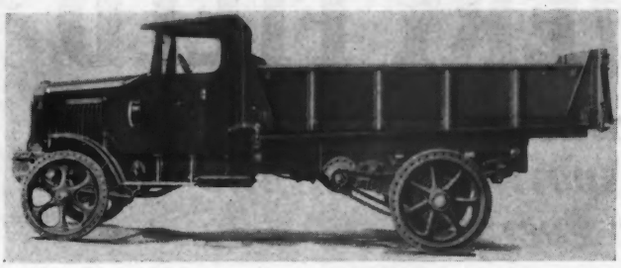
THE WHITE COMPANY, CLEVELAND

WHITE TRUCKS

and WHITE BUSSES

Two New Dump Trucks

TWO new types of four-cylinder dump trucks, with nominal ratings of 2½ tons and 3½ tons, have recently been added to a well-known and already very complete line



A Motor Truck Designed for Contractors.

of motor trucks. The smaller truck has a capacity of 2½ to 3 yards and the larger 4 to 5 yards. These are both chain drive trucks, a type known for simplicity of mechanism, ease of adjustment and repair and ability to pull out of gravel pits and excavations.

Both models are provided with a wide range of gear ratios suited to all kinds of work. The transmission includes four speeds forward and one reverse. In the larger truck, in addition to the reduction gear type of drive, the live axle has a two-speed range, which provides an exceptionally wide choice of power applications.

A very simple arrangement for adjusting the tension of the chains is incorporated in the steel radius arm which transmits the torque from the rear wheels to the frame. Other features include: removable cylinders; worm and wheel steering gear, with post carrying wheel at a 30-degree angle and connecting shaft vertical, thus giving maximum foot clearance, comfort and convenience for the driver; auxiliary rear springs that go into action after the load reaches a certain amount, thereby providing additional cushioning effect when loads are heavy.

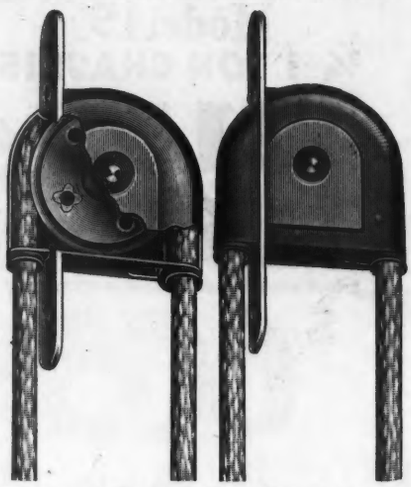
✣

Improved Sash Pulley

AN old and well-known manufacturer who pioneered in the wrought steel hardware business has recently brought out a new and improved sash pulley. As may be seen from the illustration, the housing completely encloses the wheel, thereby excluding all draft and dirt as well as forming a tube-like guide for the cord. This, it is said, positively prevents cutting and jamming of the cord.

One of the interesting features of the pulley, for the carpenter, is that the cord pushes right through the pulley down to the frame pocket without a mouse. Sash chain will not push through but a steel tape mouse, which is furnished, draws the chain through the pulley considerably faster than the chain can be pushed through the open pulley with the fingers.

This enclosed type of construction not only adds greater strength and rigidity but closes the usual unsightly opening around the wheel. This is a big step forward in appearance and cleanliness.



Improved Sash Pulley Cut Away to Show Construction.

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to the readers of American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., offers the following booklets: "Electrical Equipment for Heating and Ventilating Systems," "The Arc Welding of Structural Steel," "Modern Electrical Equipment for Buildings," "Variable Voltage Control Systems as Applied to Electric Elevators," and "Electric Power for Buildings."

The Armstrong Cork Company, Linoleum Division, Lancaster, Pa., offers two booklets under the titles "Enduring Floors of Good Taste" and "The Attractive Home, How to Plan Its Decoration." These are both beautifully illustrated in colors.

The United Hardware and Tool Corp., 76 Reade St., New York City, offers its catalog No. 30, of "High Grade Guaranteed Tools, Hardware and Abrasives."

The Miles Manufacuring Company, Dept. 4, Jackson, Mich., has prepared a new general catalog covering in detail its complete line of concrete equipment.

The A. S. Aloe Co., 1810 Olive St., St. Louis, Mo., has published a "Builder's Bulletin" of labor-saving equipment and supplies offered on the payment plan.

"Veneer and Plywood," edited by E. Vernon Knight and Meinrad Wulpi, published by The Ronald Press Company, 15 E. 26th St., New York City, is a book based on several years' work by members of the Plywood Manufacturers' Association setting forth the facts, historical and technical, relating the origin and present-day production of veneers and plywoods. Price $6.

The Goldblatt Tool Co., 1522 Walnut St., Kansas City, Mo., has issued its Catalog and Handy Book for 1927 covering its complete line of plastering, cement and masonry tools of all kinds.

The Standard Sanitary Mfg. Co., P. O. Box 1226, Pittsburgh, Pa., has published a group of revised catalog and price pages for its plumbing fixtures catalog including information on its new acid-proof enamel and new Chromard plating for brass.

The Rowe Manufacturing Co., 128 Liberty St., Galesburg, Ill., offers a booklet under the title "New Beauty Spots for Every Home," which illustrates and describes its line of trellises, arches, pergolas, lawn seats, summer houses and sectional fences.

The Lincoln Electric Co., Cleveland, Ohio, has just issued the 1927 edition of its "Instruction Manual," which is revised annually to cover the latest practices and uses in manual, electric arc welding. Price $1.

The Kewanee Manufacturing Co., 307 Tremont St., Kewanee, Ill., has issued a pamphlet describing and illustrating its copper steel basement windows.

The Jackson Lumber Co., Lockhart, Ala., offers a handy booklet of "Specifications for Lockhart End-matched Flooring," which is a high grade, long leaf, yellow pine flooring.

The Fireproof Structural Orrite Mfg. Co., East St. Louis, Ill., has published a booklet describing the Orrite building blocks which it manufactures.

The North American Cement Corporation, P. O. Box 105, Hagerstown, Md., has published "The Cal Book" covering the use of Cal, its oxychloride of calcium for use in portland cement mixtures to obtain high early strength, for densifying, for easy workability, as a hardener and for placing in cold weather.

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

-POSTS-

Levels and Builders Transits Are Known for Their Accurate Performances, for Their Sturdy Qualities and Comparatively Low Prices.

No. 2268A—2268D Jefferson Table

In Laying Out Your Building Job with a POST Instrument You Are As Good As Insured Against Errors

No. 3900 Convertible Level in Transit position

We have sold hundreds of No. 3900 ***Convertible Levels,*** and the sales of them keep on increasing, speaking well for the high quality and usefulness of the instrument. You cannot afford to be without one. ***A Request*** by postal or letter, giving clearly your name and address will bring you free of charge a copy of our ***Catalog*** wherein our BUILDERS TRANSITS AND LEVELS are fully described and illustrated, as well as a listing is given, in numerical order of our entire LINE of DRAWING MATERIALS, all of our OWN MAKE, manufactured in our own shops.

We carry and offer the greatest selection of DRAWING TABLES and STANDS, DRAWING INSTRUMENTS, DRAWING and TRACING PAPERS, TEE SQUARES, TRIANGLES, SCALES, BLUE PRINT and BROWN PRINT PAPERS, etc., etc.

If you are in need of COPIES on TRACING CLOTH of your Tracings, at low cost and in the shortest possible time, ask us. We can either furnish you the material to make your own copies in a mechanical way or we can do the work for you by our PHOTO LITHO PROCESS.

Post Quality is a recognized ***Standard.*** Do not fail to ask for catalog and prices.

THE FREDERICK POST COMPANY

General Offices and Factories:
3635 N. Hamlin Ave.

Address all mail to:
P. O. Box 803

Central Business District Salesrooms:
319-21 S. Wabash Ave.

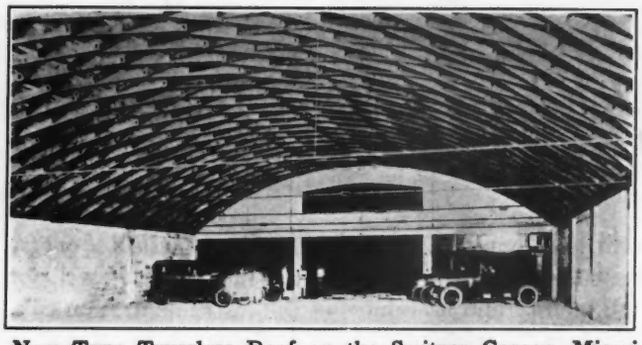
CHICAGO, ILL.

A Roof Construction Featuring Economy, Stability and Beautiful Architectural Appearance

GOOD acoustics, clear unobstructed view and stability are some of the problems the designer and builder of large halls, auditoriums, churches, etc., have to solve. They obtain considerable assistance through the new type of roof construction which has been brought on the market.

This new roof represents an arch formed in a net-like shape. It consists of a great number of units all being of the same size, called lamellas. These are securely bolted together in such a way as to be self-supporting, doing away with any girders, interior columns, trusses, etc.

The construction is highly standardized; the lamellas are milled in the shop by a simple process, ready for erection. Ordinary commercial bolts and washers specially designed for this purpose are used to assemble the roof. No crane or other lifting device is required as the different parts of the roof are light in weight and can be easily handled. The roof is erected in sections and only a light scaffolding is necessary to support the roof until joined in the center.



New Type Trussless Roof on the Switzer Garage, Miami Beach, Fla.

The construction is very economical; short lengths of lumber can be utilized. No special skill is required and the construction of the roof can be carried on with local labor and material in accordance with detailed drawings and specifications worked out by expert engineers and based on extensive experience.

Besides being more economical in cost, this construction greatly improves the appearance of industrial buildings on account of its graceful lines and beautiful architectural appearance. It can be used for single spans up to 150 feet; any architectural effect that may be desired can be arranged.

The completed roof has remarkable strength on account of its combination of arch and net work. The construction has been proved in the most severe tests especially during the hurricane at Miami, Florida, in September, 1926. When sheathed on both sides, the enclosed air spaces afford a high degree of insulation. On account of the absence of disturbing cross beams, columns and trusses, there is always a good distribution of light. Another great advantage is the full use of space, which makes this construction particularly suitable for ice skating rinks, dance halls, auditoriums, garages, fair buildings, etc.

✣

Heavy Duty Door Hangers

A DISTINCTLY new line of sliding door hangers and track has been designed and brought out, especially for use on doors that are called upon to do heavy duty. The track, of structural steel, consists of a channel iron with a specially shaped cold drawn steel runway fastened to the lower flange for single sliding and bi-parting doors. For doors sliding by each other an I-beam section is used. The hanger wheels are accurately machined to fit the runway and have high-grade, self-lubricating, dust-proof and rust-proof ball bearings. The pendants, of forged steel, are made adjustable, non-adjustable and ball bearing swivel.

The channel track is furnished in sizes from 2 to 12 inches and the I-beam track in sizes from 3 to 12 inches. This practically indestructible type of track has no open or loose joints, requires less head room and less fastenings than any other type, it is stated. It is easy to erect and aligns itself perfectly and permanently. Brackets, either rigid or adjustable, are furnished to fasten the track to the wall or to suspend the track from any overhead truss work or girders. The track can also be used as a lintel when desired.

Two Styles of Heavy Duty Sliding Door Hangers Operating on Channel Iron and I-Beam Tracks.

The proper size track and hangers of this type will slide a door of any size or weight with the greatest ease and satisfaction. It is particularly adaptable to large doors for garages, bus sheds, car barns, freight houses, piers, hangars, gates and heavy duty small doors for elevators, subway cars, baggage and freight cars.

✣

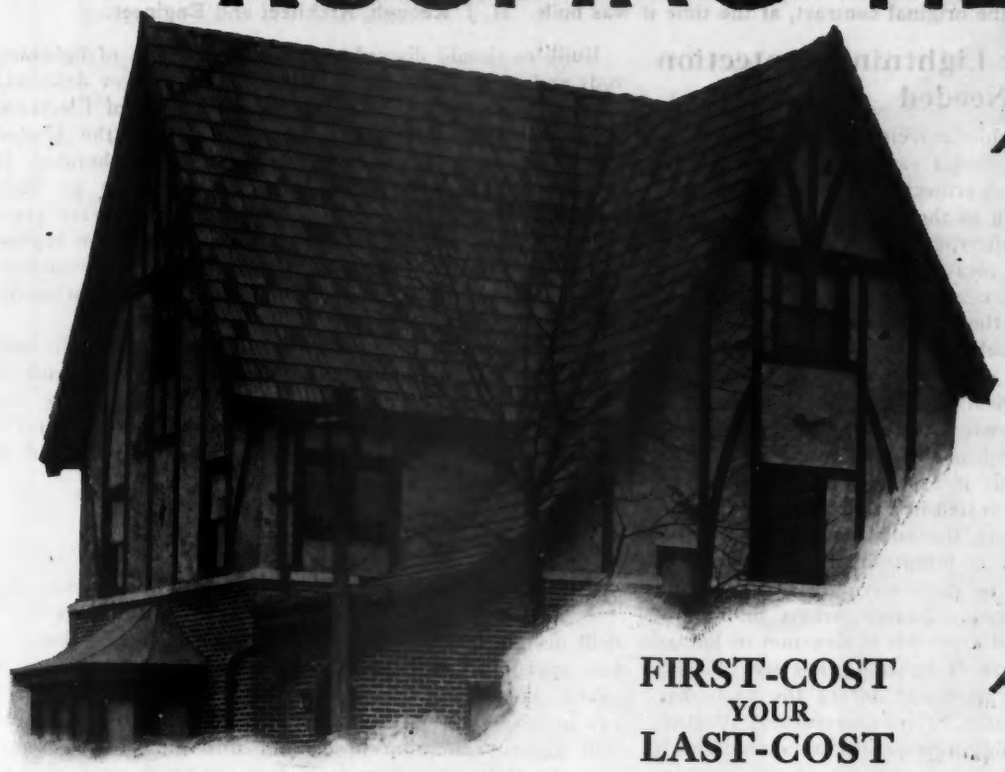
Colonial Shutter Hooks

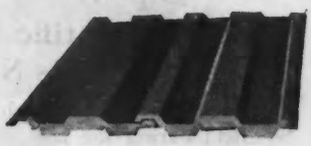
THE illustration shows a new and interesting type of shutter hook which, with its Colonial design, should find a wide field of favor in this day when so many homes are being built in the Colonial and Dutch Colonial styles. This hook has two features which are particularly emphasized by the manufacturers. The first of these is the fact that it is a knock-down device which is a great convenience in packing and shipping.

The second important feature is the spring which is attached to the drive on the hook. This spring is of phosphor bronze and is so designed as to entirely eliminate the rattling of shutters. In addition to the plate style of hook, shown in the illustration, this hook is also furnished in two other styles, with a brick drive and with a lag screw in place of the screw plate.

This New Colonial Shutter Hook Has a Spring Which Prevents Rattling of the Shutters.

Hawthorne
ROOFING TILE





FRENCH TILE

Upon the roof depends the life of the house. A Hawthorne Tile Roof will last as long as the foundation.

SPANISH TILE

FIRST-COST
YOUR
LAST-COST

Roofs of Permanence and Beauty

Every builder or contractor who expects to roof or reroof any house this spring should consider *Hawthorne Roofing Tile.*

Talking over this matter of a roof, one suggestion is all important—*permanence. Hawthorne Tile* is permanent. *Made by a patented method on automatic power machines.* Reasonable cost, superior to other roofings in strength and imperviousness. Permanent colorings with pure metallic oxides that are integral with the tile and are guaranteed not to craze, dust or fade.

Hawthorne Tile is beautiful. Made in thirteen colors and two styles, Spanish and French. Always clean, rain washes the dirt off and not in. All colors have a rich matt finish. The wide ranges of color tone enables the builder to order any color blend effect he desires, thereby insuring a beautiful roof in harmony with the rest of his design.

No reroofing problems can arise where Hawthorne Tile is used. Easily laid, no nailing, no breakage, no extra cost.

Quick delivery to all parts of the country at a minimum transportation cost. Write your nearest dealer listed below for full details.

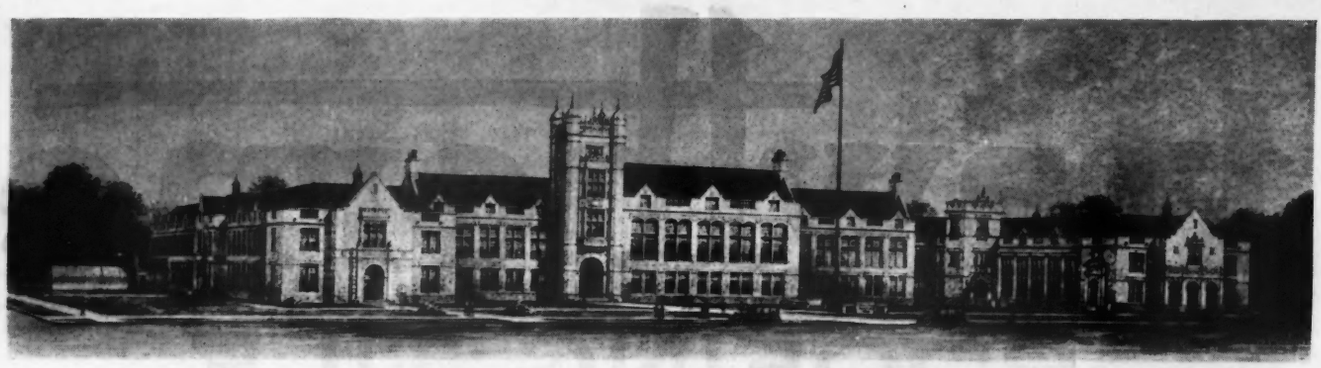
HAWTHORNE ROOFING TILE CO. OF NEW YORK
507 So. Fifth Ave., New York

HAWTHORNE PACIFIC TILE CO.
3326 San Fernando Rd., Los Angeles, Calif.

SOUTH MILLS HARDWARE CO.
1018 W. Warrington Ave., Pittsburgh, Pa.

HAWTHORNE ROOFING TILE CO. OF MICHIGAN
Box 125, Ferndale Branch, Detroit, Mich.

HAWTHORNE ROOFING TILE CO.
2136 S. 48th Ave., Cicero, Ill. (Chicago Suburb)



The Fordson High School, in Detroit, One of the Finest in the Country. Lightning rod protection was specified for this building in the original contract, at the time it was built. H. J. Keough, Architect and Engineer.

Modern, Scientific Lightning Protection Is Needed

ONE of the most notable movements in the building field during the last several years, both in the larger and the smaller construction projects, has been the increasing recognition being given to the need for proper protection against lightning on all types of structures.

"Lightning rods," if you please to call it that; only today so-called lightning rods are a thing of the past. Their place has been taken by thoroughly scientific systems of lightning protection, virtually invisible to the passer-by, which render a building completely immune to danger from even the worst electrical storms.

Many of the better-known architects now hold that a building is not complete unless such protection is specified in the original plans. This is especially true where considerable money is being invested in a fine home, or in some large public building, where the small additional cost of providing such protection is infinitesimal compared with the damage which would be done were the structure hit. The New Jersey Naval Station disaster, where millions of dollars in property loss and a terrible destruction of human life were caused by one bolt of lightning, has served especially to drive home this argument during the past year.

A recent report of the United States Government Weather Bureau recommends that lightning protection should surely be installed on homes in those sections of the country where storms are frequent and severe. And this recommendation is borne out universally by the reports of all the leading fire insurance companies and fire insurance associations. These companies not only urge the installation of a lightning protection system on every building, but go farther and in many states make substantial reductions on fire insurance rates where buildings are properly rodded. The New England Insurance Exchange is giving credit in insurance rates on old buildings, in cities and towns, having an approved lightning protection system. Working with Professor West Dodd, well-known authority on lightning protection, the fire companies have been conducting an aggressive movement along this line for a number of years.

There has, in times, past, existed a fallacy that city homes were secure from lightning, because they were not isolated. This has been thoroughly discredited by the recent report of the Iowa fire commissioner who showed that during the last five years, 17 out of every 100 buildings struck by lightning were in cities and towns.

The advent of radio has served even more to increase the danger from lightning in cities and towns. The number of lightning fires in city homes, being caused by the flash attracted to aerials or other radio apparatus, has been increasing yearly. There are instances on record of the same house being struck in two or three successive storms, the lightning being attracted by the aerial, until rods were installed for protection.

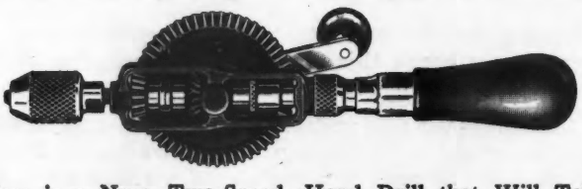
Builders should discard entirely the old idea of lightning rods and of lightning rod agents. These are now definitely a thing of the past. The American Institute of Electrical Engineers, and the Bureau of Standards of the United States Department of Commerce have collaborated in numerous tests and experiments and have set up rigid standards to which present-day protection systems must adhere. These standards are as thorough as those applied to portland cement or other items used in construction. The present day protection system is thorough, scientific and complete.

The architect, the engineer or the builder will do well to investigate this important subject. Lightning is one of the forces of nature which the owner of a building will always have to combat, and the designer should, wherever possible, see that every building is properly protected at the time it is constructed.

✣

Two-Speed Hand Drill

A NEW hand drill has been placed on the market, the special feature of which is that it is the only hand drill designed to hold smaller than ¼-inch drills, that has two speeds. This is a practical and important feature in saving breakage of small drills. The shift to slow speed can be made without removing the drill from the work and will prevent jamming in drilling through. In the same way the shift may be made to fast, for quick work, and to the locked position for inserting or removing drills. The over-all length of this drill is 11 inches and it weighs



Here is a New, Two-Speed, Hand Drill that Will Take Drills Smaller Than One-Fourth Inch.

1 pound 3 ounces. It has a three-jaw chuck for round shanks and a capacity of ¼ inch.

The manufacturers of this drill are mounting it on a demonstration board together with another model drill which, while not new, incorporates special features not found in other small drills, including a double ratchet for drilling in close quarters. This demonstration board makes it possible for any one interested in the drills to try them and demonstrate to himself their advantages.

✣

"Fundamentals in Real Estate" by Blake Snyder and Ralph W. Roby, published by Harper & Brothers, 49 E. 33rd St., New York City, is described as a book which provides a basis from which to attack the everyday problems of real estate such as buying, selling, appraisal and management. Price $3.

CANNON BALL
BEATS 'EM ALL

No Wonder—No building is better than its doors. The door is the only part of a building that works and no door is better than its hangers.

Any closed track protects hangers from weather, dust and birds but from there on Cannon Ball wins in a walk. The track is 13-gauge *hard* steel. Won't bend. Can't twist out of line at joints. Self cleaning—no flat or grooved surface at the bottom of the track to gather condensed moisture, dust and rust to block the wheels or make them run hard. Hangers under-slung. Ball wheels of hollow pressed steel stay at the bottom of the round track. Never have to be guided—never rub the sides of the track.

A ball wheel bears even, wears even, runs even in round track no matter how building sags or settles. Runs on 10 cold rolled steel bearings, 1⅛" long—too long to pile up, twist or bind. Thousands and thousands used daily for years and not a single complaint.

CANNON BALL HANGERS

Bring doors close up to the bottom of the track. Three adjustments: One for thickness of doors; one to set doors in or out; and one up or down.

TRACK IN ANY LENGTHS

Holes to oil hangers. All Styles of Brackets for single or parallel tracks fastened to side wall or ceiling. Storm cover if wanted.

Builders who know say it is the easiest to put up. Special hangers and fittings for garage doors. Insist on Cannon Ball for your next door installation.

Send for 228-page catalog with complete description of this and other building equipment.

Hunt-Helm-Ferris & Co., Inc.
Albany, N. Y. Harvard, Ill. San Francisco, Calif.
Manufacturers of

STAR Equipment

If You Want a Hall Clock—Make It

Blueprint Plans and Clock Works 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.

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 the added satisfaction that you had made it yourself? And how much would its value be enhanced to your children?

Proud of His Handicraft! Many American Builder readers are making Grandfather clocks.

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.

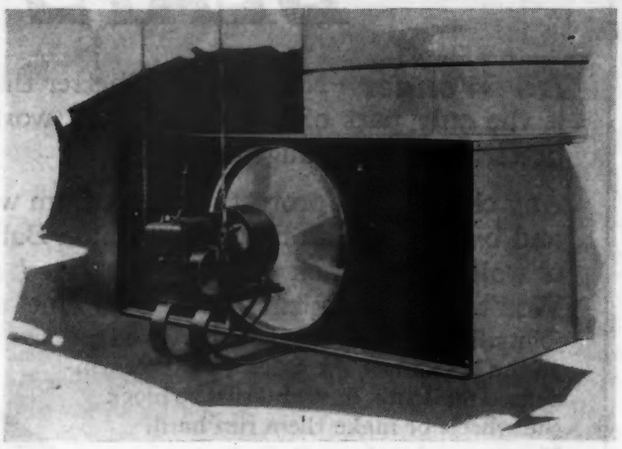
To others the real value and ready market for a superior hand-made article means an opportunity to combine the pleasure of making such a clock with the profit to be received from the sale of the completed article.

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 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 proves to be too large for an individual student, a high grade clock might well be built for the school as a fitting class memorial.

Domestic Warm-Air Furnace Fan

TESTS made at the University of Illinois have shown that the heating capacity of a warm-air furnace can be increased as much as 288 per cent by the use of a fan to force the circulation. This fact is of the utmost importance because zero conditions require 200 per cent of the normal heating requirements, from which it is seen that the increased heating capacity made possible by forced



With the Louvres Closed and the Fan in Operation This Makes an Effective Forced Circulation System.

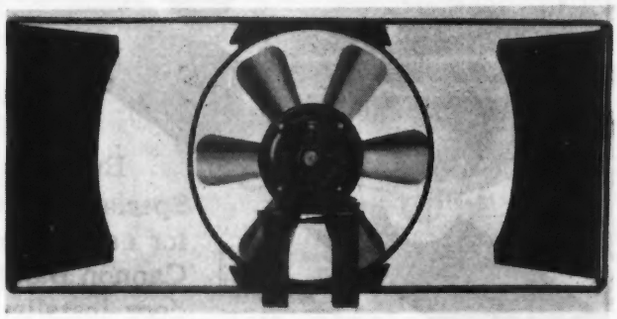
circulation, and somewhat modified for domestic use, meets the extra demands of zero conditions.

This extra heating capacity is made available to the warm-air furnace user through the development of a furnace fan unit that allows natural circulation when the fan is not running. This makes the system both a gravity and forced circulation system, the alternating feature being automatic.

The convenience and practical value of this furnace fan unit is especially apparent in very cold weather and in the morning when increased heating capacity is necessary. It is obtained by using forced circulation and, when the house is warmed, the fan can be shut off and the natural flow of air suffices.

A patented, automatic, by-pass louvre, on either side of the fan and inside the cold air duct, is the solution of the problem of supplying sufficient air to protect the furnace and for gravity heating. It will be readily seen that the fan orifice alone, in the proper size fan, would not allow sufficient air supply for gravity heating. This new invention is placed inside the cold air duct, as shown in the illustrations.

When the fan is idle the by-pass louvres on either side of the fan are open, allowing area for gravity air flow.

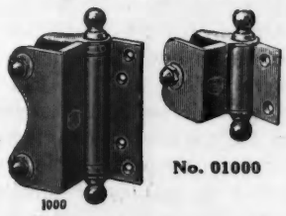


When the Fan Is Not in Operation the Louvres Open and Permit a Natural Gravity Circulation.

When increased heating capacity is necessary the fan is turned on, which necessarily develops a pressure inside the furnace chamber and this pressure automatically forces the louvres closed.

BOMMER
SPRING HINGES
ARE THE BEST

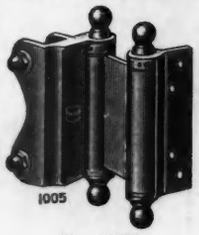
Double Action
Standard Type No. 29



No. 01000

No. 1000
Lavatory Door Spring Hinges

No. 1001
Lavatory Door Spring Hinge



No. 1005
Lavatory Door Spring Hinge

The Standard Over Fifty Years

The reason is simple, use of selected materials, handsome appearance and perfect design making a hinge that is not only efficient and quiet but attractive as well. You'll find them installed in the finest public buildings, the greatest office buildings and all types of homes.

Gold Medal Awarded

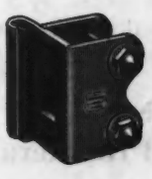
Sesquicentennial Exposition
Philadelphia, Pa.
1926

BOMMER SPRING HINGE COMPANY
BROOKLYN, NEW YORK, U. S. A.

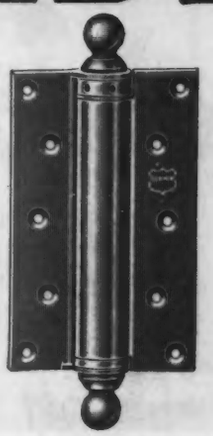
ESTABLISHED 1876

TRADE MARK
BOMMER

No. 1052
Lavatory Door
Strike



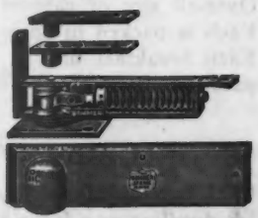
No. 1051
Lavatory Door
Strike



Single Action
Standard Type No. 0

No. 2100 Screen Door Hinge

Type No. 1032
Lavatory Door Spring Pivot



Floor Spring-Pivot Type 18

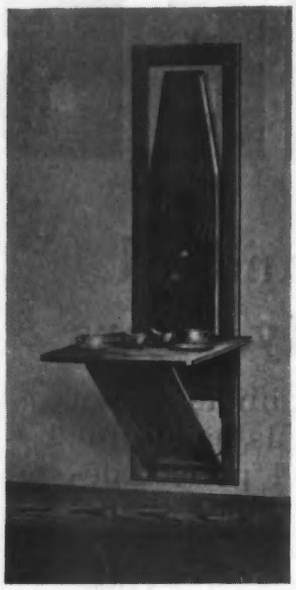
Ironing Board and Breakfast Table in Handy Wall Case

THIS novel kitchen convenience is screwed onto the wall. Projects only 1¾ inches into the room. No troublesome cutting of plaster, extra casing, hardware, etc., necessary, thereby saving an installation cost of $6.00 to $8.00 when put into a new home, and $15.00 to $20.00 when the home is already built.

A screwdriver is all that is needed to install this ironing board case. Anyone can do it in about ten minutes. Holes have been drilled in the frame for this purpose and are located so that the screws will enter the studding of the wall, which are invariably placed 16 inches on centers.

This cabinet is shipped completely assembled, ready to use. The doors are fitted and hung, with all hardware applied. A high grade wool pad ¼ inch thick is even applied to the ironing board.

This Combination Unit Screws to the Wall and Avoids Cutting of Plaster, Extra Casing and Hardware.



With the Table Unit in Use the Ironing Board Remains Against the Wall.

The breakfast unit which is used with this is really a wall cabinet. It provides, however, in an instant's time, a full size breakfast, kitchen or utility table which is always a much desired convenience in every home. It consists of two leaves hinged together with flush hinges. When the table top is placed into service position it automatically clamps itself around the metal knob which projects from the supporting panel near its outer end. The wall end of the table is notched between the front frame of the cabinet. Thus a table 24 by 36 inches is provided and held securely in place. While the table unit is being used the ironing board remains in its vertical position against the wall.

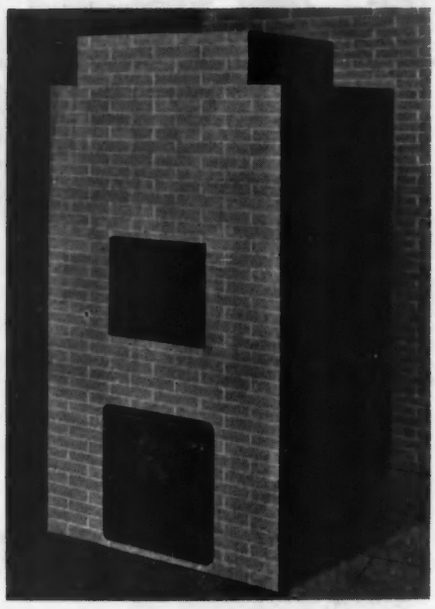
The wall case is made of solid white pine with fir panels. Over-all size of cabinet is 18 inches by 5 feet 10 inches. Each is packed in an individual dustproof shipping carton. Each breakfast unit is packed separately in a dust-proof package.

✣

Chimney Fed Incinerator

THE truly modern home, whether it be a single family dwelling or a large apartment building, is provided with an incinerator which makes possible the immediate disposal of all waste, cleanly, without odor and without the annoyance of the garbage collector. Such an appliance is a highly effective aid to sanitation as it eliminates one of the most serious breeding places for flies and disease germs.

An incinerator which is suitable for installations of all kinds and sizes is shown. As illustrated it is particularly adapted to the apartment house where it provides a disposal place to each apartment, the basement incinerator being fed from each apartment through a chimney which also serves as the smoke outlet. The system is built right into the building when it is erected and can be easily constructed from the simple instructions furnished by the manufacturers.



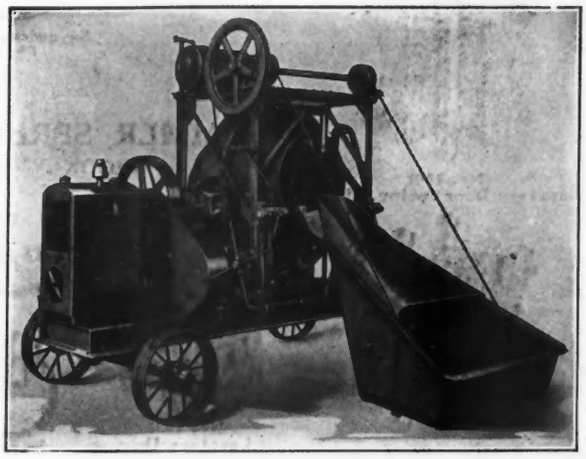
The Feature of this Incinerator is a Step Grate Without Moving Parts to Stick.

The particular feature of this incinerator is the step grate construction which eliminates dumping or rocking grates with their liability to stick. It has no moving parts and nothing to get out of order. A large opening between the step grate and the flat grate makes possible the raking out of ashes from the grates and the ash pit at one operation.

✣

Two-Bag Concrete Mixer

HERE may be seen a concrete mixer especially designed to speed up work on concrete of 1-2-4 proportions, which has recently been announced by one of the leading manufacturers of concrete mixers. This machine has a 10-cubic foot mixed capacity and while it has been designed to handle a two-bag batch up to 1-2½-4 proportions, it has been especially built with very compact construction so that it may be as easily handled as mixers of smaller capacity. This mixer, shown in the illustration, is equipped with a power loader and the water tank discharges in eight seconds. It has a daily capacity of 100 to 150 cubic yards.

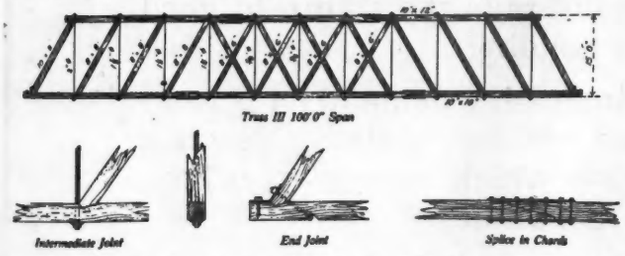


A Concrete Mixer, Designed to Speed Up Work, Which Is Compact and Easily Handled.

Slow-Burning Wood Trusses

THE heavy mill, show-burning truss shown in the accompanying illustration is strictly in accordance with the specifications of both the National and the Mutual Fire Insurance Underwriters and is acceptable to them at as low a rate of insurance, in one-story buildings, as an unprotected steel truss, and at lower rate in buildings of two or more stories, says a statement from the manufacturers.

In the construction of these trusses only long leaf, yellow pine is used in the solid timbers, none of which measures less than 6 inches in the rough, in their narrowest dimension. All rods, plates and bolts used are in accordance with the current specifications of the American Society of Testing Materials. All rod verticals are covered with heavy grade asbestos pipe tubing and the rods and nuts



This Wood Truss Is Suitable for Spans Up to 125 Feet and Its Vertical Rods Are Protected With Asbestos Pipe Tubing.

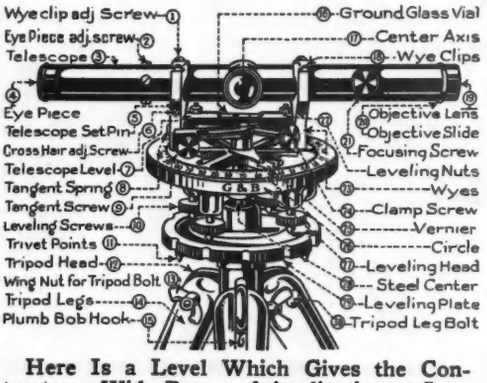
at the ends with a coating of plaster, so as to develop the full fire resistance of the truss.

Because of improved machinery and source of supply, low labor costs and production methods this company states it is able to place its trusses on the market at as low a price as a wood truss made of light material. Where height does not exceed railway carrying facilities the trusses are shipped completely assembled, or built in two or three sections, depending on the length and the quantity ordered. When shipped in sections all that is necessary at the job is to bolt the sections together. Where height necessitates knock-down shipments, all members are marked numerically, in which case the detailed erection drawing furnished with the trusses is marked with corresponding numbers so that the assembly, on the ground, is a simple matter. Spans of 25 feet to 125 feet are manufactured.

Accurate Inexpensive Level

THE illustration shows a convertible level which has been made for some time but which has just been radically improved to the extent that two patents have already been issued and another is pending covering these improvements. This level has now been made a standard product with the manufacturer.

Through the new patented construction, no extra or interfering parts are necessary for the convertible feature and the same wyes which give accuracy to the instrument as a wye level will serve equally well when used as a transit.



Here Is a Level Which Gives the Contractor a Wide Range of Application at Low Cost.

This instrument is of the universal approved wye level construction with larger reversible telescope; higher power lens; rack and pinion to the objective slide; cross hair adjusting device; clamp and tangent screws; steel center, 4-inch nickel silver circle graduated in degrees, 0 to 90 each way; movable vernier reading to 15 minutes; leveling plate and trivet; permanent adjustment and a broad guarantee against accidental damage.

The instrument comes complete including extension level rod with target, instrument case and straps, adjusting wrench, plumb-bob, strong split leg tripod and instruction book. It is easy to operate and it is said that 30 minutes' practice will enable one to use it with confidence for leveling foundations, irrigation, grading, drainage, determining and finding angle; and, in fact, all work where a good level is required. In addition there is the transit feature whereby sights can be taken below and above the horizontal, plumbing with the plumb-bob, running straight lines, concrete form lines, walks, pipe lines and roads. It is an exceptionally low-priced, accurate instrument.

✣

Concrete Septic Tanks

IN every place where there is no public sewer system the problem of sewage disposal is one of the utmost importance to the home owner. The most satisfactory method of solving this problem is the use of septic tanks.

Pre-Cast, Concrete Septic Tanks Loaded Onto a Truck for Delivery at the Job. These units are suitable for every sort of installation.

In villages and on farms, for homes, schools and industries this system is completely adaptable. Concrete septic tanks, such as those shown in the illustration above, have proven highly satisfactory in practical every day use.

In installing this type of tank the excavation is made with the right slope so that there will be sufficient drop from one unit to the next. The bottom is then covered with a 3-inch layer of concrete and the units are lowered into the excavation. Each unit is made with a dome shaped top and an open bottom. The lower edge sinks slightly into the fresh concrete and the tank is completely sealed. The reinforced top is sufficiently strong so that, after being covered with earth, it will not be injured even by heavy wagons passing over it.

After the units are properly placed, connected and proved water tight they are filled with water, the covers are sealed on and the excavation is filled. The whole process of installation is simple for any contractor who will carefully follow the instructions furnished by the manufacturers, and the cost of such a system is low, especially when the protection it affords is considered.

Units of this system are furnished to take care of any requirements from the small home to the industrial plant with large numbers of persons employed.

✣

The Savogran Company, India Wharf, Boston, Mass., offers a pamphlet describing painters' Savogran, a product for removing ground in dirt, paint, varnish and wax.

SAVE A DAY THE TRIMPAK WAY

ARE YOU CASHING IN ON THIS *New Method of Applying Trim*

TRIMPAK
REG. U.S. PAT. OFF. MAR
Highest Grade
INTERIOR FINISH

Is cut-ready-to-fit-Trim, assembled and packed in two cartons—one for the horizontals and one for the verticals. With TRIMPAK three carpenters can completely trim a six room house in one day.

Saves: Delays, Errors, Bother, Time, Losses

ELIMINATES CHANCE—TRIMPAK guarantees the success of a job. No chance of errors in cut and fit, no possibility of imperfect wood, no expensive delays, no waste of material.

COSTS NO MORE—TRIMPAK is of guaranteed quality and workmanship. It is delivered to the job in perfect condition, protected in its cartons. Each package contains the correct number of pieces for the horizontal or vertical trim of a door or window, as indicated by the label at the end of the package. A quick, satisfactorily finished job is assured by using TRIMPAK.

YET TRIMPAK COSTS NO MORE THAN ORDINARY TRIM.

TRIMPAK CORPORATION

44 Whitehall St., New York City

TRIMPAK is obtainable in all woods

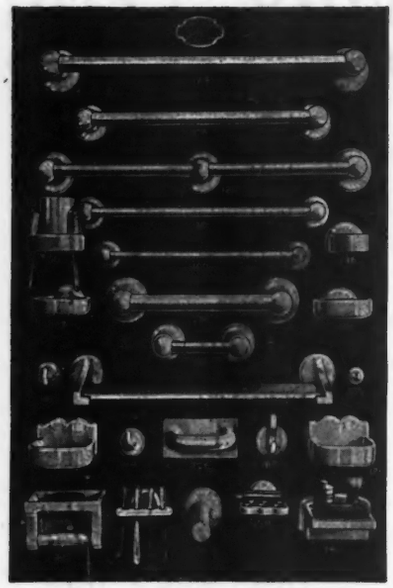
TRIMPAK
REG. U.S. PAT. OFF. MAR
Highest Grade
INTERIOR FINISH

Further information on TRIMPAK will be furnished upon request

DEMAND TRIMPAK OF YOUR FAVORITE LUMBER DEALER

Colored Bathroom Fixtures

A MOST interesting announcement has recently been made by a company long known for its bathroom fixtures. This announcement is that one of its best known line of recess fixtures may now be obtained in five different colors. These colors are azure, pool green, orchid, fawn and ebony, and are strikingly beautiful in their delicate tones.



Bathroom Fixtures in Colors Are Now Available to Meet the Vogue for Color in the Bathroom.

The colored fixture which is in line with the present day vogue of color in the bathroom, is a development which has taken a considerable amount of time to perfect. The final product is the result of much thought and experiment so that the colors are such as to give lasting satisfaction. The manufacturers state that while these five colors are stressed in its announcements, they can create any other color to harmonize with special or unusual bathroom color schemes. This opens up unlimited and attractive possibilities for the designers of finer homes.

✣

Revolving Door Plan Service

UNTIL the revolving door was invented the problem of outside doors through which much traffic passed was a serious one. The heavy doors required for large buildings, combined with the outside air pressure make the swinging door difficult, almost impossible, to open at times. Besides, with many people passing through a door, cold air was being admitted constantly which increased the cost of heating. Drafts near entrances made much practically unusable and when used employes near the entrances were constantly sick. Retailers found that their trade suffered. Not only that but in dry weather an excessive amount of dust and dirt was admitted and the swinging door took up valuable space.

The Revolving Roor Has Been Accepted as the Solution of the Door Problem in Buildings Where There is Much Passing in and Out.

But now, with the revolving door perfected to a point where it can be made to meet any requirement, the old problem of the outside entrance has been solved and the entrance may be made at once attractive, economical, efficient, and easy to operate. The manufacturers of these doors offer designs which are adapted to every sort of situation, including motor controlled doors, automatic burglar locks and fixed walls which open, leaving the full width of the entrance space clear when desired. In addition the company maintains an efficient drafting room which is at the disposal of architects and builders and will submit plans and specifications covering any form of construction, without charge.

✣

Safe Wall Safes

A NEW company, recently formed to continue the manufacture and distribution of a well-known wall safe, has announced that it will continue all the former popular sizes and in addition will offer many new styles, sizes and improvements. The new company has purchased the patents, assets and good will, of the former manufacturers who ceased doing business after 20 years of successful safe making owing to the sudden death of both partners.

Wall Safes With a Record of Service Which Are Again Being Manufactured After a Short Lapse.

This safe has proved to be one of the most satisfactory on the market with a record of no known losses through either fire or theft. The construction differs from other wall sales, this safe having a round, heavy door, machined to a close fit and hung on sagless hinges, placed on the inside of the safe so that no hinges show or protrude when the door is closed. A countersunk combination dial renders the door and casing practically flush with the finished wall, making it easily hidden behind a mirror, picture, tapestry or false panel.

All working combination parts and bolt work are of heavy solid brass which prevents rusting. There are no springs to wear out. The body, or wall box, of this safe is of heavy cast iron, lined with heavy asbestos lumber with an air pocket between the asbestos and iron walls, preventing dampness and insuring adequate insulation

The wall-box is placed in the masonry as the walls are built and the detachable door with door frame is easily secured to the wall-box with bolts, from the inside, after plastering and decorating of the walls is finished. For frame constructed walls these boxes can be furnished already set in fireproof material encased in sheet metal containers, thus giving maximum fire protection.

Reinforcing Stucco Base

THE application of a new type of plaster and stucco base and reinforcing material is pictured in the photograph shown here. This material comes 50 sheets in a crate. Each sheet measures 34 by 50 inches, a convenient size for one man to handle, and is applied either directly to the studding or over sheathing.

The surface of the fabric is a flat, uncrimped, electric welded mesh, of galvanized wire spaced two inches both ways. This is backed with a tough, waterproof, kraft paper, of special manufacture, which acts as a stop, support or form of the plastic material. The paper is securely held to the wire by means of stay wires welded to the back of the fabric through holes in the paper, with a slight

As a Plaster or Stucco Base This Material Gives Excellent Results Assuring an Effective Reinforcement.

trowel pressure the plaster or stucco is forced behind and entirely around the wire, face fabric, assuring a dense wall of uniform thickness with the reinforcing completely imbedded. The walls are thus automatically back plastered with no plaster waste.

The welded stay wires are an important feature of this base. They run lengthwise with the sheet and are spaced every four inches. This welded anchorage, at every intersection of the stay wires and fabric, results in rigidity for both the plaster material and for the building. Sufficient galvanized hook head nails for proper application of the fabric are supplied with each crate of material. This nail is a special design which has been found to give the best results with this base.

For maximum strength and stability it is advisable to apply the sheets so that the back stay wires run across or at right angles to the supports. The paper back is of a texture which has the necessary adhesion or suction, but does not absorb excessive moisture from the plaster before it has set.

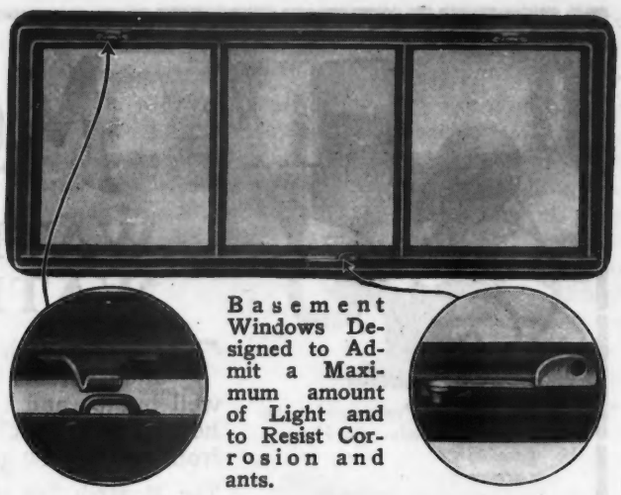
Where this base is used over sheathing, as a base for cement stucco, furring strips are first applied 16 inches on centers and the base is nailed to these. As a base for magnesite stucco construction, the base is applied directly to the sheathing.

✣

Copper Steel Basement Windows

LIKE every other portion of the house the basement has, of late years, been the object of much improvement. One of the important changes in basement planning is the provision of windows which make the basement light and usable, not only for the familiar purposes of heating plant and laundry but also for billiard rooms, children's play rooms and similar uses.

The basement window shown in the illustration is a copper steel window which, according to the manufacturers, admits 75 per cent more light than the ordinary wooden windows. It is durable and attractive in appearance. It



Basement Windows Designed to Admit a Maximum amount of Light and to Resist Corrosion and ants.

has a one-piece frame which makes it absolutely rigid with no possibility of distortion. Constructed of rust-resistant copper steel it will last indefinitely and cannot be injured by white ants or termites.

When closed the hanger hinge at the top and cam action lock at the bottom of this window draw the sash and frame tightly together all around in a flat contact so that there is no rattle or binding. Also this construction, in connection with the drip bar projecting over the bottom edge of the frame makes the window exceptionally weatherproof. When closed the sash is firmly held in place by the hanger hinge but when swung open, into the horizontal position, it can be readily lifted out for glazing or cleaning.

These windows are shipped complete with all hardware attached and coated with the best metallic paint ready to set into the openings and the clips needed for glazing are also included. Screw holes in the frame permit the ready attaching of screens. The outward projecting flange of the frame makes it possible to anchor the window into the wall on all sides making it windproof, dustproof and verminproof. The installation of these windows is easy and the workman has a clean, definite masonry guide on all sides so that he is not called upon to exercise any judgment as to the amount of clearance he should allow to insure a sightly job and free operation of the window. Standardization and quantity production have made it possible to put out these windows at low cost and the manufacturers state that the cost installed is about the same as for wooden windows. They are made in four stock sizes or in special sizes to special order.

✣

Useful Bench Jointer

THE bench jointer shown in the accompanying illustration is a handy and useful machine for carpenters and contractors or in any place where it is necessary to dress or plane any kind of rough lumber. It can be run with an electric motor, a gasoline engine, or from a line shaft and is made with 4-inch, 6½-inch, 8-inch, 12½-inch and 16-inch knives.

These heads are the round safety type. The machine is made regularly with three high speed steel knives. The bearings are lined with high speed babbitt metal and the tables are raised and lowered by hand screws. The 4-inch and 6½-inch jointer frames are 32 inches long. The 8-inch, 12½-inch and 16-inch jointer frames are 48 inches long. The speed is from 3,250 to 3,500 revolutions per minute.

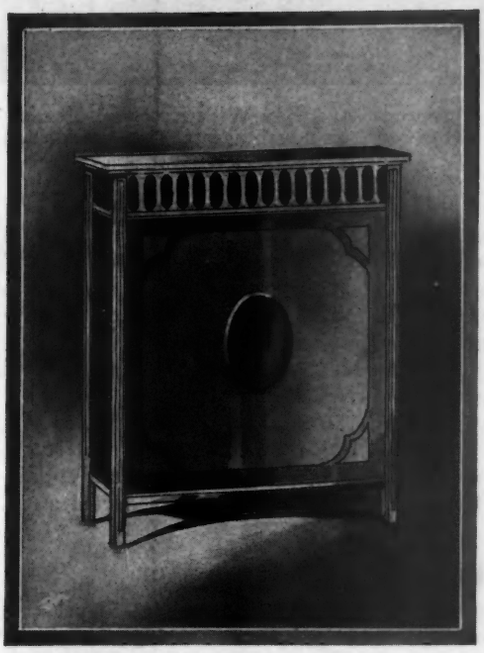
A Handy Bench Jointer Operated by Electric Motor, Gasoline Engine or From a Line Shaft.

Heat Cabinets in the Wall A New Idea in Radiation

ONE of the outstanding achievements in heat engineering is the new form of radiation known as the heat cabinet. It has many advantages, not only for homes but for practically all types of buildings.

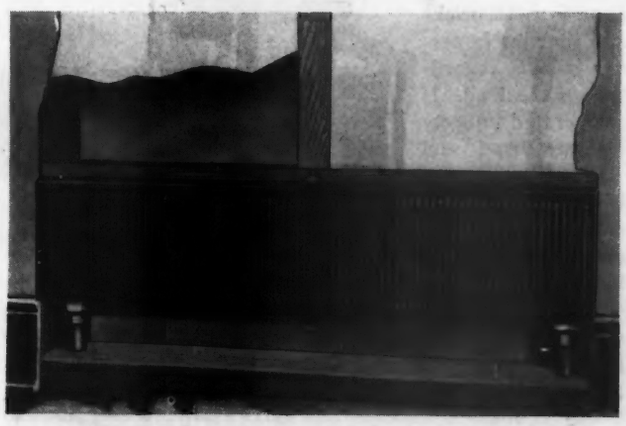
In the first place, it does away with all visible radiation when built into the wall, so that there is a direct saving in floor space in every room where it is used. If preferred, however, beautifully finished heat cabinets can be obtained which are designed to stand in the room, as with an ordinary radiator.

Whether the recessed wall type or the visible units are used, the heating principle is the same; that is, by air circulation. The air is heated as it enters the cabinet from the floors by passing over hot radiation of a special type. As this heated air rises, it draws additional cool air off the floors. At the top of each cabinet is a vent, taking the form of an ornamental grille. The heated air from the vent expands out into the room and forces more cool air off the floor, thus completing the circulation. This tends to produce an even heat throughout the room and prevents an excess of heat radiating straight outward from the radiator.

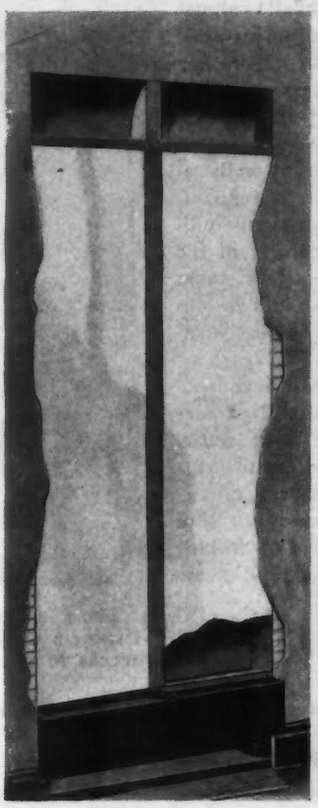


Type of Cabinet Heater Which Stands Away From the Wall. It is very handsomely finished and works on the same heating principle as the recessed wall type.

Where the vent is near the ceiling, the circulating air is said to gain a speed of 100 feet per minute, due to the chimney effect of the heat cabinet in the wall. This would mean that all the air contained in an average sized living room would pass through the heat cabinet in from 10 to 20 minutes. If the room were 11 by 14 feet in size, the entire volume of air in the room would pass through the heat cabinet in 15 minutes.



Close-Up of Recessed Wall Type Cabinet Heater Showing the Heating Element and Its Copper Fins. Space is left under the heating element to admit air from the room.



A "Cut-Away" View of the Wall Showing the Stacks of the Wall Type Heat Cabinet.

The Grille Over the Heat Vent of This Type Cabinet Heater Is Quite Ornamental.

The heating element itself is a radical departure from heavy cast iron radiation. It uses metal of lighter section and greater heat conductivity—having copper fins spaced closely together which are attached to and integral with the pipe containing the steam, vapor or hot water.

Two types are available, one having connections at both ends and the other making use of a U shaped pipe with both connections at the same end.

Some idea may be gained of the weight saved in this form of radiation by comparing it with the regular standard hot water radiator. The latter is said to weigh five times as much for the same heating capacity.

One great advantage connected with the new form of radiation is the speeding up of the heating action. With the smaller volume of hot water to be moved and the greater heat conductivity and lighter section of radiating metal, it is claimed that the heating action is much faster and that rooms can be warmed up in a fraction of the time formerly required for radiator action.

It is said that the radiators of an ordinary hot water plant contain 60 per cent of all the water in the entire plant. A one hundred foot heat cabinet, however, contains less than one quart of water and the heating up of the plant is thereby accelerated nearly two and one-half times.

Another form of extended-surface radiator is now available, which makes use of a single steam, vapor or hot water compartment made of aluminum and silicon alloy which extends almost the full height of the heating element. It is entirely surrounded by a great number of copper fins which give it about the shape of a small, low window radiator. In fact, wall cabinet radiators are being successfully installed under windows, although, of course, they will not circulate the air as fast as where the vent can be placed high up in the wall.

The cabinets are 3⅝ inches deep so that they fit into interior or exterior walls of wood frame buildings or brick veneer construction. It is usually necessary to omit one or more two-by-fours, framing in the same manner as over windows. The stacks are of galvanized metal and should be entirely covered by some form of heat insulation.

The method of controlling the heat from the various radiators is a radical departure from former methods. The heat outlet at the vent can be closed by means of a damper which will stop the warm air circulation. As the steam, vapor or hot water is never shut off, there is no trouble due to condensation, air pockets and steam "hammer."

But the main advantage is that the flow of heat into the room can be absolutely stopped, when desired, by this damper. Therefore, the heat consumption for that particular room is practically stopped.

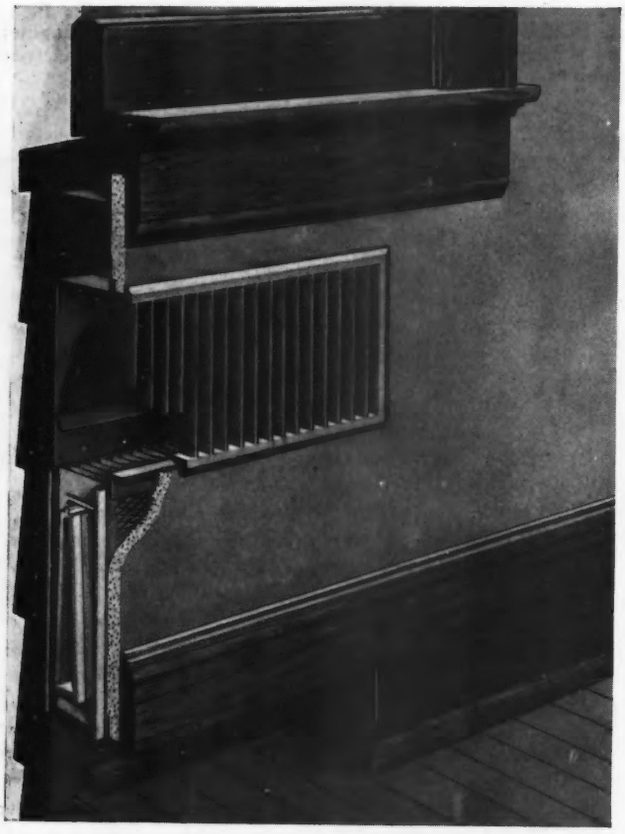
In some ways, the action of a heat cabinet can be compared to the action of electricity. Electrical equipment—a toaster, for instance—does not use electricity unless it is turned on. When it is turned on, electricity flows through the connecting wires and the owner pays for the amount of current registered by his meter.

In the case of a heat cabinet, the piping system represents the electric wires. The pipes carry the heat to the heating element of the heat cabinet, but unless the heat cabinet is turned on—that is, unless air is permitted to circulate through the heating element—this heat is not used to any great extent but is retained in the system as the cabinet is insulated. The radiating fins do not give up their heat unless air circulates around them.

The fire in the boiler can be correspondingly reduced and the heat saving thus transformed into a fuel saving.

As will be seen from the illustrations, these new heat cabinets leave a clear open floor, thus saving space for the designer and owner. The grilles are attractive in appearance and the heated air coming through is deflected away.

Here Is Seen the Attractive Appearance of a Bay With Recessed Heating Cabinets Under the Windows. It is quite an advantage to have unimpeded access to the windows.

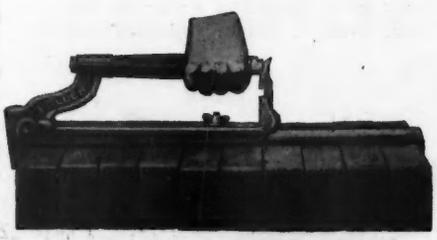


Details of Installation of This Wall Type Cabinet Heater Are Quite Clearly Shown for Position Under a Window. It will be noted that metal lath is used as a plaster base under the heated wall plaster.

✣

Practical Brick Carrier

ACTUAL experience has proven that about 50 per cent more brick can be handled when using the carrier shown here than is possible by hand loading, according to the manufacturer of the carrier. It is adjustable to carry from 6 to 10 bricks and remains in perfect balance regardless of the load. It is operated entirely by one hand and engages and releases automatically, without the use of the other hand.



For Quick, Economical Handling of Brick and Tile This Carrier Is of Practical Value.

This carrier has a full wood handle which is round and non-irritating to the hand. It is strong, well made, simple and easy to operate. All parts are numbered for easy replacement. When it is used damage from chipping is practically eliminated because this carrier cannot drop its load until released by the natural motion of setting it down and therefore does not drop a load. It is also suitable for handling tile.

For Better Fireplaces

ALMOST everyone who plans a new home wants a fireplace and dreams of the open fire with blazing logs are one of the most fascinating parts of home planning. But all too many of the fireplaces which such dreams have produced are standing idle, unused because they give little or no heat, but much of smoke and gas. These common defects are due to faulty construction and with a fireplace that is properly constructed there need be no disagreeable gas or smoking.

An Open Fireplace With Assured Draft and Heating Efficiency Will Be Welcomed by Many.

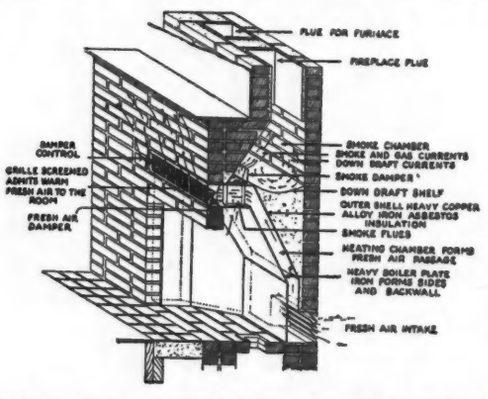
At the same time, with even a well constructed fireplace a large proportion (it has been estimated as high as 90 per cent) of the heat goes up the chimney. This is a serious loss in these days of expensive fuel when we feel that the open fire should be not only ornamental but should contribute its share to the heating.

To overcome this difficulty a new fireplace invention has lately been placed on the market. This consists of a metal form. This has double walls of heavy steel plate forming the sides and back of the fireplace. The smoke damper is included lending itself to perfect the down draft shelf. This gives a properly designed fireplace which will always have an effective draft. The inner shell or front, exposed to the fire, is of 10-gauge, copperoid, boiler plate iron. The outside or back wall, forming a heat chamber, is of 14-gauge copperoid and is insulated with asbestos. All seams are electrically welded.

These two walls form a heating chamber which receives fresh air from outdoors through a fresh air intake. Where the fireplace is in an outer wall this intake is direct; where it is in an inner wall it is simply connected by means of an air duct.

The air passing into the heating chamber is heated and passes out into the room through a grille just above the fireplace opening. This grille is the only portion of the device that is seen from the room. It is substantial, neat, artistically designed, has a bronze finish and is lined with copper screen. A louvre grille provides the fresh air intake. The smoke damper with control handle is a part of the installation and the same lever controls the warm air grille and thus provides a perfect ventilating system at all times.

This fireplace will burn any kind of fuel ordinarily used in fireplaces and it can be installed in old fireplaces as well as in new construction. Where an old fireplace is to be remodeled full description and measurements should be sent to the manufacturers who will assist with plans and instructions without charge.

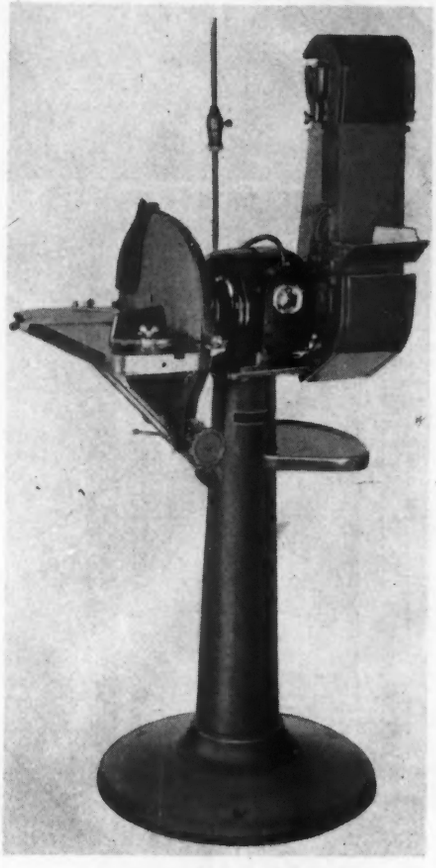


This Sketch Shows How Outside Air Passes Into the Air Chamber, Is Warmed and Forced Into the Room.

Combined Belt and Disc Machine

THIS machine was designed for those wishing to rough and finish grind at the same time and on the same machine. It would also be useful for those wishing to combine the advantages of both types of machine and economize on instrument and floor space. Two men can work at the same time or one man can handle some jobs on both the belt and disc at once.

The disc side of the machine has a large table which tilts up and down through a range of 55 degrees and it may also be removed in order to use the entire face of the disc. An angle gage and a core print gage operating in a slot in this table makes it possible to secure compound angles and also a variety of curves. A patented vacuum dust collecting system is built into this machine.



This Machine Makes It Possible to Both Rough and Finish Grind at the Same Time.

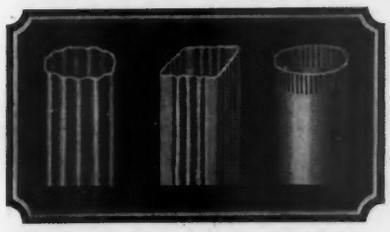
A ¾ horsepower, ball-bearing motor furnishes the power to operate both the disc and the belt. The belt is driven by a 7½-inch pulley and runs over the idler 4 inches in diameter at the top of the machine. The belt side also has a table and angle gage which may be readily removed and tilted up and down. One advantage of the belt is that when the table and upper dust gage is removed, pieces 18 inches in length or longer may be uniformly sanded by moving them back and forth along the belt.

The bed under the belt may be placed in either a horizontal or vertical position by merely removing four cap screws which allows it to be moved through an arc of 90 degrees. This enlarges its capacity and makes it more convenient for certain operations and really provides three machines in one.

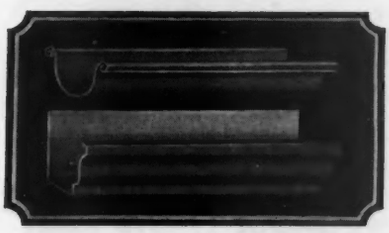
Ball-bearing construction is used throughout this machine which, together with the substantial cast iron frame, insures long life and absence of wear.

"Simplified Roof Framing," by J. Douglas Wilson and S. O. Werner, is a new book published by the McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City. It is a well organized textbook on the principles of roof framing. Price $1.40.

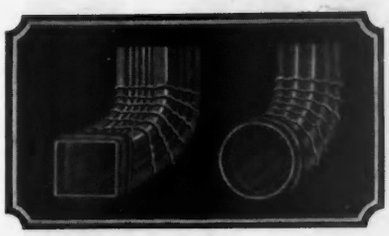
Defying age and time



Leadclad Conductor Pipe is obtainable in all standard shapes and sizes.



Leadclad can be obtained in box gutter form or in any style of Eaves Trough.



Leadclad shoes for conductor pipe outlast ordinary shoes many times over. They remain rust proof years longer.

LEAD guards alike the stately cathedral and the coffin'd dead. Lofty domes and spires of lead rear themselves against the elements, while far beneath in crypt and vault, the great of earth, shrouded in their leaden sarcophagi, sleep through the centuries.

Ancient shrines and temples were roofed with lead. The Wheel of Time still turns on: the shuttle of the Weaver passes ever back and forth, but those monuments to Man's genius still stand, their leaden roofs secure against the ravages of decay.

LEADCLAD

EAVES TROUGH AND SPOUTING

Leadclad Eaves Trough and Spouting provides a much needed, long-service eaves trough and spouting.

Leadclad Eaves Trough and Spouting is made from high grade, tough, sheet steel coated with a heavy jacket of pure lead. (Not a mixture of tin and lead.) It is the only genuine pure lead coated material of this kind manufactured. It will outwear, many times over, the ordinary galvanized or painted eaves trough or spouting.

Leadclad does not require painting, but may be painted if color is desired.

Learn more about Leadclad -the Lead Protected sheet metal

Mail this Coupon

Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Dept. A. B.
Gentlemen:
Please send me a free copy of "Defying Age and Time" and information concerning Leadclad products checked:

Name .....
Address .....
Name of Firm.....
We are interested in products checked.
Shingles Tile Eavestrough Conductor Pipe
Siding Sheets Roll

Whether you are building for resale or rental purposes, it will pay you to insist upon the use of genuine Leadclad Eaves Trough and Spouting in your construction.

"Leadclad Metal Work Throughout" makes a good selling argument because it assures the owner of minimum repair and replacement costs.

WHEELING METAL & MANUFACTURING CO.
Wheeling, W. Va.

LEADCLAD

REG. U.S. PAT. OFFICE 1923

SHEET STEEL COATED WITH PURE LEAD

Residential Steel Casements for Style and Satisfaction

THE phenomenal rise in popularity which the residential steel casement has enjoyed since its introduction in this country about four years ago may be attributed to several factors.

Architects have accepted it because of its mechanical efficiency and its beauty as an element of residential architecture. Prior to the advent of steel casements, dwelling designers were compelled to use either double hung wood sash or wood casements. Double hung wood sash, because of its thick rails and heavy horizontal line, marred any endeavor in the direction of real architecture. The sources —Tudor, Norman, Spanish, etc.,—inspiring most architectural motifs call for casement windows and much of the design's effectiveness is lost if double hung sash must be used.

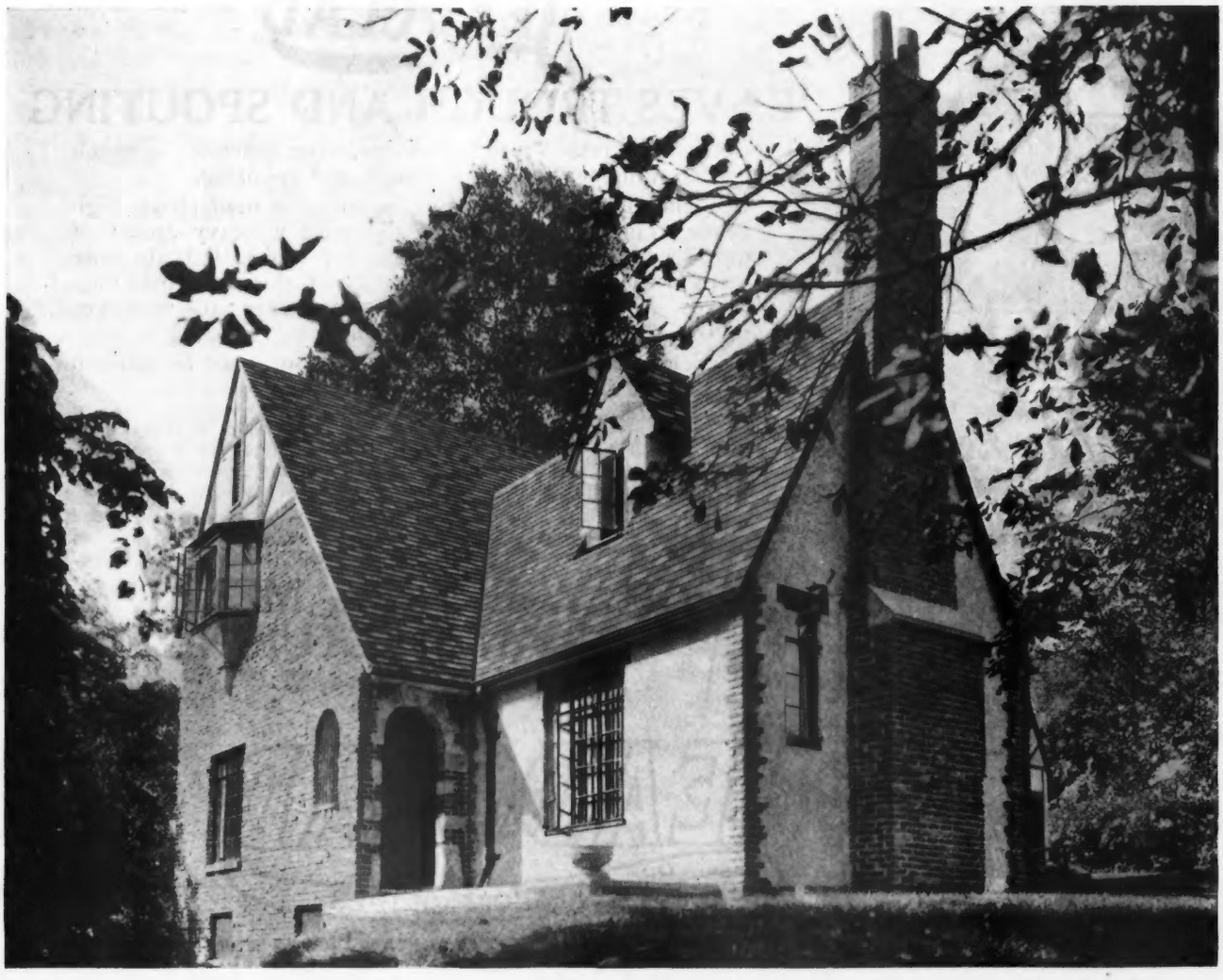
Wood casements, on the other hand, are so frequently subject to mechanical imperfections that architects hesitate to use them.

Steel, however, solved the architect's problem. Entirely amenable to virtually all architectural motifs, it is at the same time mechanically practical.

From the standpoint of the dwelling's occupant, the steel casement is equally satisfactory. Its slender rails and muntins allow an increase of 20 per cent in the glass area in the opening of a given size, and this makes for exceedingly cheerful interiors. Ventilation is as satisfactory as the light. Whereas a double hung window will catch only such breezes as blow directly into it, the swinging leaf of a casement may be set at the proper angle to catch breezes blowing parallel to the wall of the building and direct them inside.

The increased glass, or light, area which steel casements provide is also a boon to the architect. It means that he may obtain the same degree of natural light and at the same time use a smaller window opening. In apartments, or even small single dwellings, wall space is always a problem to the designer. Anything—such as the steel casement—which makes it possible to increase wall space is a very welcome building material. Doors and windows must be provided, yet enough unbroken wall space must be left for the placing of furniture which, especially in small rooms, cannot be situated far from the walls.

In selecting a steel casement, three main points must be considered. These are the hinges, the cam locking handles, and the staybars. An extension hinge is almost essential. Such a hinge gives space between the swing leaf's hinged side and the jamb to pass an arm through when the swing leaf is opened. The entire outer surface of the casement

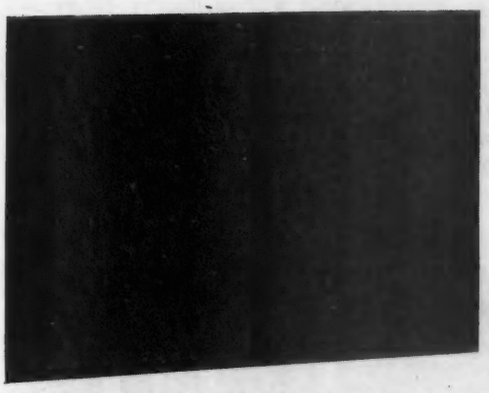


The Steel Casements in This Beautiful Home Emphasizes Its Smartness of Design and Give It an Old-World Flavor.

INSULEX
GYPSUM INSULATION

REG. U. S. PAT. OFF.

FIRE-SAFE HOME INSULATION



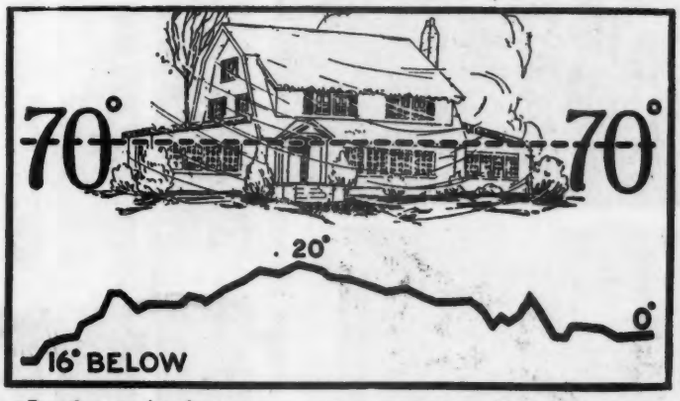
Section of wall showing Insulex poured between studding. Note that there is no shrinkage from the wood, and that the wall is practically fire-proofed.

INSULEX weighs only 12 pounds per cubic foot. It is used for insulation between studs, rafters, joists or walls, forming a permanent honeycomb structure of fire-safe, cellular gypsum. (See page 177.) It is vermin-proof and decay-proof. Insulex is delivered in bags as a powder, which is readily mixed into water and poured in place on the job.

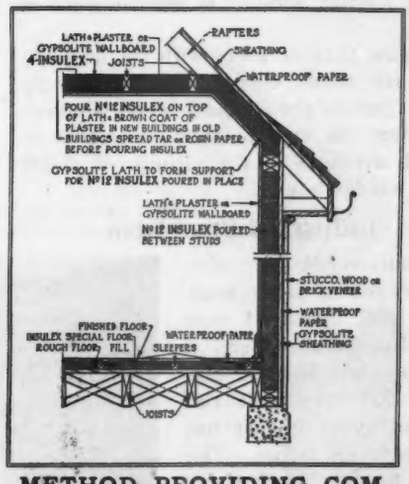
Bulk Insulation

Thorough insulation depends upon **thickness.** Insulex provides light weight, permanent, bulk insulation of the proper thickness to be effective. It insures uniform heating in Winter, and provides cool comfort in Summer.

Reduced Radiation Plus Fuel Savings and Summer Comfort



Insulex maintains warm even temperature in every room, with normal heating regardless of severe weather; assures sufficient humidity and eliminates drafts. Reduces yearly fuel bill.



METHOD PROVIDING COMPLETE HOME INSULATION

A major installation of INSULEX in an average home, poured in the exterior walls and top floor ceiling to the thickness of 2x4 studding (3⅝"), will reduce radiation from 30% to 40%, cutting fuel bills from 30% to 50% as compared with the same house uninsulated—an average annual return of 35% on the investment. In summer, INSULEX makes a home more comfortable because it effectively excludes outside heat, thus improving health and living conditions. Provide this fire-safe insulation for **your** home at no extra cost.

MANUFACTURED BY

UNIVERSAL GYPSUM & LIME CO.
111 West Washington Street, A. B., Chicago, Illinois

In five years the house not properly insulated will not be modern; will not have reasonable resale value!

may thus be washed by a person standing within the house. It is also necessary that the hinge be so designed that it will not permit binding between the swing leaf and its frame when the swing leaf is opened or shut.

Staybars are of several types—peg and hole (and ramifications of this type) and friction are the most important. Principally the staybar must be absolutely dependable even in strong winds. If it is possible for it to give, the window may slam with consequent glass breakage. Some staybars require one hand to operate and some require two. Each has its advantages and choice is largely up to the particular preference of the individual purchaser.

Cam locking handles must be attached in such a way that it is impossible for them to loosen. When the window is locked, a ball face on the cam climbs onto a bronze strike plate thereby exerting a powerful leverage and drawing the window shut very tightly. If the cam loosens it will not draw the swing leaf shut with sufficient tightness to be weather-tight.

Weathering in steel casements is obtained by overlapping flat surface contacts between the Z bars which compose its rail members. In some brands both flanges of the Z make a tight contact and in some only one. Double contact casement manufacturers hold out the obvious argument of double weathering. Single contact manufacturers, on the other hand, present a very sound argument to the effect that with only one absolutely tight contact, a much tighter close can be perfected than where two are used. Also the single contact is said to eliminate the binding which sometimes proves troublesome when the double contact window is being opened or closed.

Because they do away with the necessity for much costly carpenter work and the greater part of the ordinary wood window's trimming, the cost of steel casements installed, averages in the vicinity of double hung window's cost.

Industrial Steel Sash

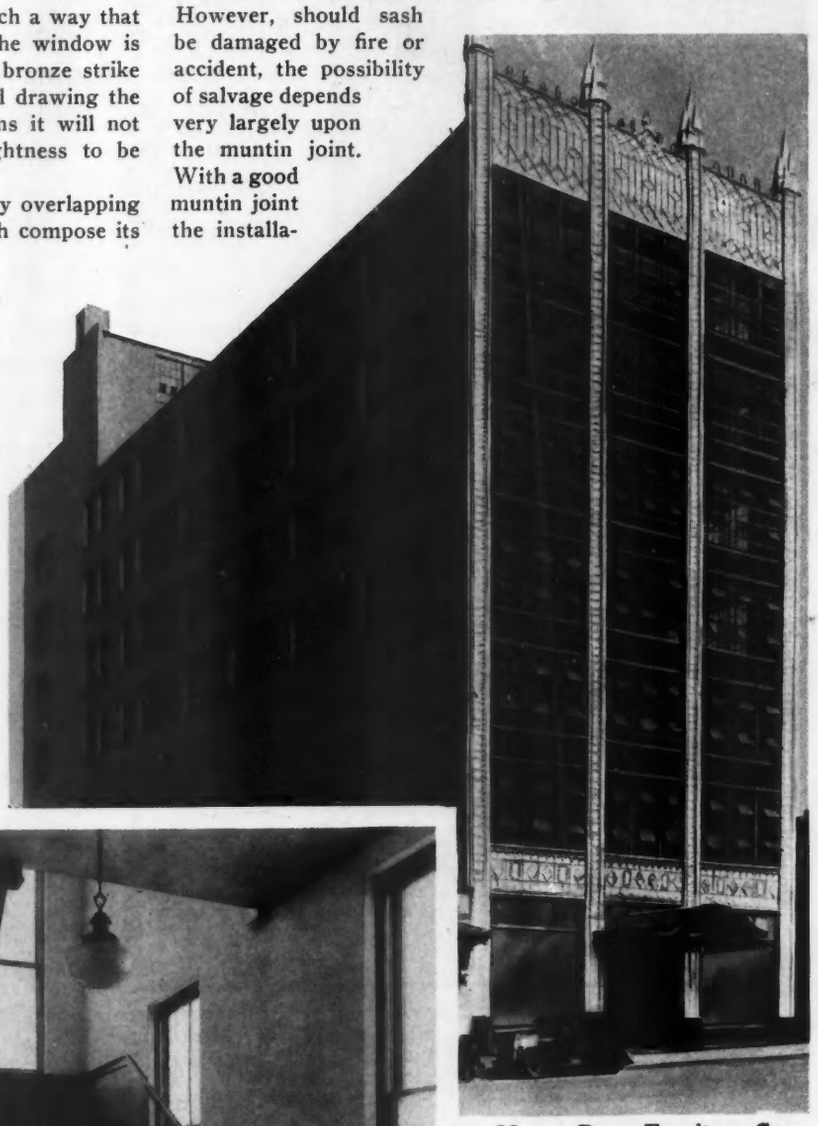
Manufactured in this country on a large scale since 1908, industrial steel sash has become such a commonplace building material that very little can be said about it that has not been said before. The Detroit Steel Products Company is the original American steel sash maker, John G. Rumney, then the firm's president and now chairman of its directorate, having purchased the patent from English interests almost 20 years ago.

However, a review of certain features may be of interest even to men who have used industrial steel sash since its inception. Particularly is this true of features which either long usage or laboratory experiments have brought to light. In referring to industrial steel sash, it is understood that this discussion deals strictly with windows of solid rolled steel.

The strength or weakness of industrial steel sash lies mainly in the joints by which vertical and horizontal muntins are joined. This point of construction is undoubtedly the most vital in the entire unit. Each manufacturer has a method of his own for constructing these joints. Most of them are merely mortised. One maker, however, joins the bars by passing the horizontal muntin through the vertical muntin with a loss of metal amounting to only 20 per cent.

In ordinary day in and day out service, the nature of the muntin joint does not make a great deal of difference. However, should sash be damaged by fire or accident, the possibility of salvage depends very largely upon the muntin joint. With a good muntin joint the installation can usually be straightened and re-installed even when badly distorted. When joint fails under stress, however, the sash can rarely be saved from the junk heap.

Iron Stairs Are Favored for Industrial Plants and Office Buildings.



Manne Bros. Furniture Co. Building an Example of Steel Sash Construction.

A specific example of the salvage possibilities in good steel sash is to be found in a recent round house fire at Frankfort, Ind. The Clover Leaf System's round house was totally destroyed by fire in May, 1926. Originally the sash installation had cost

San-Equip SEPTIC TANKS

For Builders

AS a builder your judgment and reputation is at stake with every new home you build.

This is true whether you build under contract or build homes and sell them.

In fact, the most important of all the home equipment is buried in the ground—the septic tank. If it's a concrete or tile (in which you wouldn't store even gasoline) and is cracked by frost, there are no indications of danger until it is necessary to call a physician.

Builders everywhere are recommending and using the San-Equip heavy gauge copperoid iron tanks.

First, because of superior reliability and a desire to give honest, efficient service to their customers.

Secondly, because of the convenience of having the complete plumbing job handled together in one contract, saving time on supervision and getting the detail off their hands.

DESIGN—Follows findings of U. S. Public Health Service, proven by years of experience.

MATERIAL—Copperoid Iron—12 and 14 ga. Special rust resisting. Further rust-proofed with mineral asphalt enamel.

DURABILITY—San-Equip Septics are protected by a heavy coating of mineral asphalt enamel, melted on inside and outside. Unaffected by moisture, acids or soil. The perfecting of this process insures durability.

San-Equip Advantages

Furnishes important health protection.
Simple design, requires minimum attention.
Light weight, easy to handle and install.
A complete unit, no assembling of parts.
Water tight, unbreakable, no seepage.
May be sent to the job with other fixtures.
Prompt deliveries everywhere in U. S.
Sent on approval for inspection, if desired.

No.	Net Gallons	Rating No. of People			Dimensions—Inches		Shipping Wgt., lbs.	Price
		Home	School	Factory	Diameter	Depth		
402	200	6	12	10	38	48	295	$ 44.00
403	300	10	20	15	48	48	325	56.00
405	500	20	35	30	52	Length 60	420	90.00
410	1000	50	65	60	60	Length 96	950	180.00

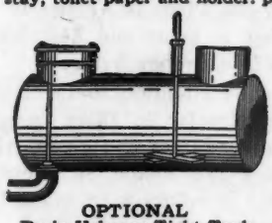
San-Equip is known to be a reliable advertised septic tank. It will help to sell your homes. No matter where you build, you can have San-Equip Septics installed right along with the other plumbing fixtures. Ask your plumbing dealer to figure the complete job, including a septic tank.

San-Equip Waterless Toilets

THESE systems provide a modern sanitary toilet for use wherever water supply is limited or difficult to secure. Also preferred in some districts where water carried sewage cannot be safely disposed of. Country homes, camps and rural schools, churches, mills, gas stations, roadside inns, tourist camps, parks, fair grounds, etc., can now have this toilet service conveniently located within or adjacent to occupied buildings. The unsightly disease-breeding outhouse is thus replaced—property values increased and living conditions improved.

EACH SYSTEM CONSISTS OF THE FOLLOWING

1 Best Grade Vitreous China Bowl with oak-finish non-split seat.
12 ft. ventilation (10 ft. white enameled, 2 ft. galv.), roof flange and vent cap.
1 Storage Tank of heavy gauge copperoid iron with simple, effective mixer. Full charge of chemical, pipe stay, toilet paper and holder. putty and roof cement.



OPTIONAL
Drain Valve or Tight Tank

All Storage Tanks are Rust-Proofed

Chemical analysis of mineral enamel: "Not appreciably affected by organic acids or moisture."

Sizes and Ratings of Self-Drain Systems

No.	Capacity Gallons	Rating No. of People			Size of Tanks		Shipping Weight	List Price
		Home	School	Mill	Diam.	Lgth.		
360A	60	4			22½"	36"	200	$64.00
380A	80	7	15	12	22½"	48"	275	76.00
3128A	128	12	25	20	28"	48"	325	88.00

Improved Self-Drain Storage Tank

Provides intensive chemical treatment in the first chamber. Solids are retained until liquefied and sterilized and then discharged automatically into a small filter pool close to the top of the ground. A small chemical supply monthly is the only care or expense. No handling of sewage or apparatus. Easier installation. Less care.

Ask for further information

CHEMICAL TOILET CORP. 931 East Brighton Avenue, Colvin Station P. O. **Syracuse, N. Y.**

$2,000.00. After the conflagration sash for the entire installation was reordered. When the manufacturer's erection men arrived on the scene, however, they found that the original sash, though somewhat damaged, could be easily repaired and used. The total expense involved in this operation was but $280.00.

Of course, the fire and accident is the exception rather than the rule. Installation and maintenance costs of sash jobs in regular, unspectacular service are likely to prove of more interest to the average builder, who rarely anticipates the unexpected.

In making a comparative estimate of steel and wood sash costs, care should be taken to add to the mill price of wood sash, the cost of frames, fitting sash, painting with a priming coat, and furnishing and attaching hardware. Steel windows come with sash fitted to the frame, a priming coat already applied, and with the necessary hardware.

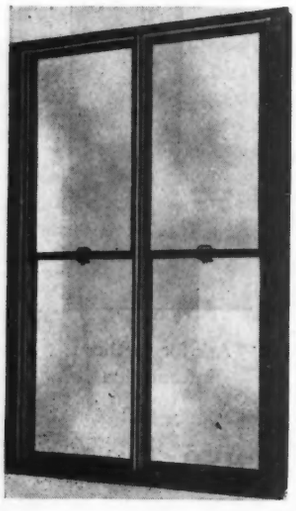
Steel and wood sash must both be properly maintained to secure length of service. Wood sash should receive one priming coat and two field coats. Steel sash receives its priming coat at the factory. To secure best results, two field coats should be given it before glazing.

Besides the very apparent superiority of steel to wood sash in the matters of durability and fireproofness, it has several other important considerations in its favor. Under ordinary construction it gives 20 per cent more glass area, and consequently 20 per cent more daylight, than wood sash in the same size window opening. In some structures, such as round houses, heavier wood members are ordinarily used and under such circumstances the natural lighting will be increased 30 per cent through the use of steel sash.

To industry this means a great deal from two standpoints. Bettered lighting conditions may afford a greater immunity from accidents to employes, and artificial lighting costs may be materially reduced.

In the matter of ventilation steel sash is vastly superior. A much increased proportion of each window opening may be utilized for actual ventilation and the operation of ventilating units may be much more readily controlled. Mechanical operator, manually or electrically governed, may be used, thereby permitting the control of inaccessible windows from more or less remote locations.

In the discussion of weather-tightness three sources of leakage must be considered. These are:



Popular Type of Industrial Window

1. Leakage through the crack between the vent, or movable part of the sash and its frame. This is called "Crack Leakage."

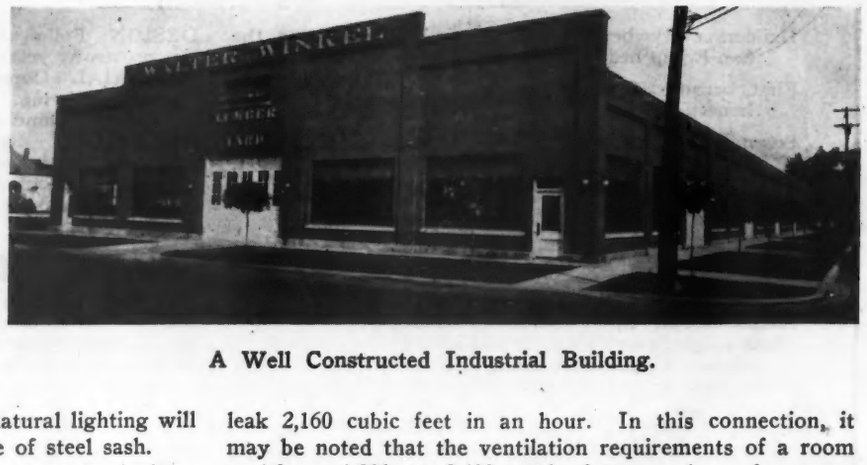
2. Leakage through the cracks which may exist between the wall and window frame. This is called "Frame Leakage."

3. Leakage through pulley holes, poorly puttied glass, and the joints in the frame. This is called "Elsewhere Leakage."

In the case of the double hung window, leakage is made up of all three kinds. Steel sash, however, virtually eliminates the "Frame Leakage" as it is the general practice to caulk or grout the steel frame in the masonry construction. Wood sash, even if originally grouted into place, will shrink and warp, eventually developing cracks between the frame and wall sufficient to create an excessive "Frame Leakage."

In steel sash the perimeter of the crack between sash and frame is less than for a double hung wood window having the same maximum opening. Laboratory tests have shown the comparative weather resisting qualities of wood and steel sash very clearly. Two sample sections of steel sash—both made by prominent manufacturers—were compared with a double hung window of the same size. With a wind velocity of 15 miles an hour the wood window leaked 5,466 cubic feet of air in an hour while the steel sash only leaked 1,590 cubic feet in the same length of time. Weathering on this steel sash was carefully adjusted, as was that of the wood window.

A similar test conducted with steel sash in which the weathering was not so carefully adjusted—an average crack of 1/32 inch being permitted—showed the steel windows to leak 2,160 cubic feet in an hour. In this connection, it may be noted that the ventilation requirements of a room are from 1,800 to 2,400 cubic feet per hour for every occupant. Therefore, it is hardly logical to demand that windows ever be tighter than steel sash can be made.



A Well Constructed Industrial Building.

✣

"The Small American House," by Ethel B. Power, published by Little, Brown & Company, 34 Beacon Street, Boston, Mass., is a very handsome new book containing illustrations and plans of 55 houses of the less expensive type selected from the recent work of architects in all parts of the country. Price $3.

The Trane Company, La Crosse, Wis., calls attention to the fact that its bulletin No. 14, listed last month in these pages, does not include the reprint of the series of articles on Vacuum Pump Heating Systems, the latter being a separate bulletin which is also available.

The J. H. Balmer Co., 259-267 Plane St., Newark, N. J., offers a pamphlet, illustrating in color and describing its new Rainbow line of colored bathroom fixtures.

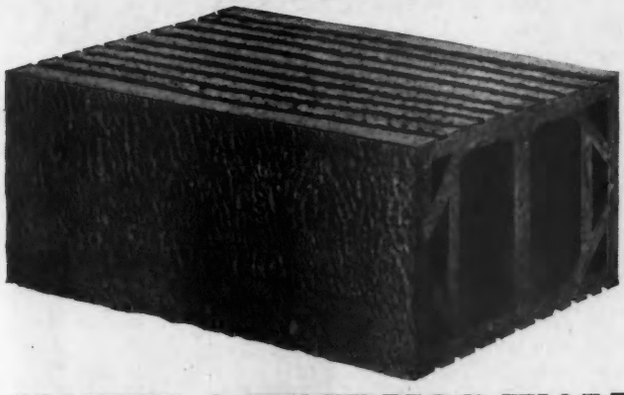
John Boyle & Co., Inc., calls attention to the fact that in listing its awning fabric circular in these pages last month the company's St. Louis address was given, whereas the address should have been 112 Duane St., New York City. This circular illustrates in colors a complete line of awning fabrics, hardware and supplies.

The Hart & Cooley Company, New Britain, Conn., whose catalog of wrought steel registers and grilles was listed in these columns last month, calls attention to the fact that this is not a new catalog and that it contains just the same information as has been carried for the past two years.

"Duntile Builder" is the name of a new periodical publication the first issue of which was put out by the W. E. Dunn Mfg. Co., 415 W. 23rd St., Holland, Mich., dated February, 1927, and which will illustrate each month the profitable application of Duntile to the needs of the builder.

HOOSIER Giant Holo-Brix

WIRE CUT FINISH



MAKES A THERMOS WALL

Combining Beauty, Durability and Economy

Consider the HOOSIER GIANT HOLO-BRIX advantages

SIZE OF UNIT—5x12 face furnished in 4, 8 or 12" widths for 4, 8, or 12" wall construction. Lays up quickly and saves time and mortar.

CRUSHING STRENGTH—2000 pounds per square inch. Many times greater than required by any building code.

HEAT INSULATION—No insulating material needed when you build with **HOOSIER GIANT HOLO-BRIX.** The dead air space provides the most efficient heat insulation known. A cool house in the summer and a warm house in winter.

INSURANCE—Lower rates because of fire-resisting construction.

PLASTER BASE—None needed. Plastering is applied directly to the inside face of the wall without requiring furring strips or lath.

SHAPES AND OPENINGS—Special **CORNER** block is provided which makes a perfect bond on the corner, also **Cloture**s with closed ends to be used in connection with door or casement openings and grooves are provided to receive wood strips in wood frame construction or metal angles in steel frame construction insuring air tight connection. **Box Jambs** are also finished with recesses to receive box frames. **SEE WALL SECTION, LOWER RIGHT HAND CORNER.**

JOIST—A 4" block is used covering the ends of the joist. Fill in between the joist with brick or damaged tile and proceed with wall construction.

PAINT—None needed. The rich, beautiful color of **HOOSIER GIANT HOLO-BRIX** is a strikingly handsome exterior finish. It is absolutely permanent and superior to any paint combination.

COSTS—In residence construction are about the same as good frame construction and approximately 25% less than Face Brick.

SHADES—When **HOOSIER HOLO-BRIX** are specified our special shading of wire cut finished blocks are furnished which are manufactured in shades of dark or light brown, gray, cream and special mingles, all of which are specified by shade number.

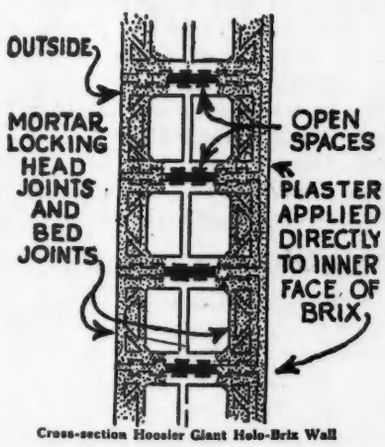
APPEARANCE—Finished wall will have the appearance of a high class tapestry brick with an individuality and a striking effect appealing to the most exacting trade.

DON'T CONFUSE HOOSIER GIANT HOLO-BRIX WITH THE ORDINARY BUILDING TILE OFFERED ON THE MARKET.

LAYING HOOSIER GIANT HOLO-BRIX—Use a good hard brick mortar, water-proofed. Mortar should be well mixed and tough so that it will stay placed. After the mortar has had a chance to partially set, the outer joints should be tooled.

SINGLE UNIT WALL—In laying a single unit wall, spread the mortar on the inner and outer edges of the bed joints, leaving 2" space in the center. Fill and tool head joints and when wall is completed, you will have two independent and firmly constructed walls tied together with the cross webs of the brix forming a continuous dead air chamber in the wall. **SEE CROSS SECTION OF WALL, LOWER LEFT HAND CORNER.**

TWO UNIT WALL—Use **HOOSIER HOLO-BRIX** in 5x4x12 for exterior veneer, backing up with the ordinary 4 or 8" back-up tile, depending on the thickness of the wall desired.



Cross-section Hoosier Giant Holo-Brix Wall

This beautiful home constructed of HOOSIER GIANT HOLO-BRIX

Hundreds of homes are being built of **HOOSIER GIANT HOLO-BRIX** by individual owners and realtors. A Better Home for Less Money is a subject of nation wide interest. **HOOSIER HOLO-BRIX** meets the requirements.

Mr. Home Owner. Are you interested in a **Better Home for Less Money?** If so, investigate **HOOSIER HOLO-BRIX.**

Mr. Realtor Builder. Encourage permanent home building. It is a better deal for the owner and will improve your addition. A Better Home for Less Money gives you a better deal for your customer and a better opportunity for profit, if needed. **HOOSIER HOLO-BRIX** will do the work.

Mr. Contractor. It is to your interest to acquaint yourself with the use of **HOOSIER HOLO-BRIX** in the building program which offers you an opportunity to broaden your present field of activity.

HOOSIER GLAZED BUILDING TILE

When a Smooth Glaze surface is desired for interior or exterior, use **HOOSIER GLAZED BUILDING TILE.** The Smooth Glaze surface provides the wall that is easy to keep clean and sanitary. Particularly desirable in public buildings, garages and out buildings on the farm such as barns and poultry houses wherein there is plenty of dirt, dust and impurities to keep cleaned up.

HOOSIER GLAZED TILE makes an ideal basement wall and adds greatly to the beauty and comfort of the home.

INTERIOR FINISH

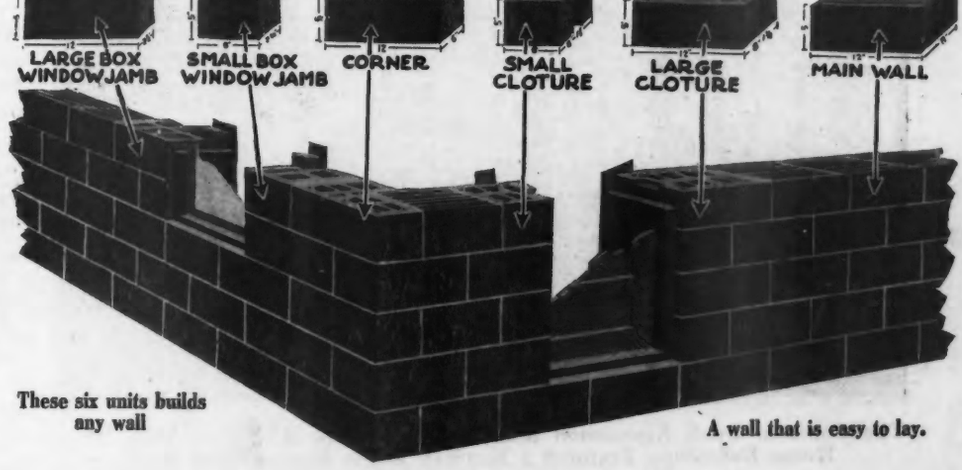
We manufacture a special quality of Buff Glazed tile for high class interior finish, used very extensively for the construction of interior walls of gymnasiums, lavatories of public buildings, etc. Special information furnished on this subject on request.

FINALLY

If your dealer is not handling **HOOSIER HOLO-BRIX** or **Glazed Tile,** send in your plans to our office and let us give you estimates. If you are interested in Better Buildings for Less Money I am sure that we will hear from you. Write today to

The Hoosier Bldg. Tile & Silo Company

Dept. B-5 Albany, Indiana



These six units builds any wall

A wall that is easy to lay.

NEWS of the FIELD

Slate Industry Well Represented in "Own Your Home" Exposition

VISITORS at the recent "Own Your Home" Exposition held at the Grand Central Palace in New York City showed considerable interest in the display of roofing slate exhibited by the Bangor State Association. The three principal buildings in the court of homes at the entrance to the exposition were the model homes of the Architects' Small House Service Bureau, Atlantic Division, the Common Brick Association of New York, and the Meadowbrook Nurseries.

Each of these houses was roofed with genuine Bangor slate applied to show the unusual effects that may be obtained by the proper use of standard thickness roofing slate.

The common brick house showed a particularly attractive roof, where the effect was secured by using random width slates in 14 and 16-inch lengths. The two sizes were used in the same courses so that the butts of the slate were staggered. This treatment roughened the roof to harmonize with the texture of the walls. The common brick were laid in various bonds to bring out the beauty and color of the natural fire burned product.

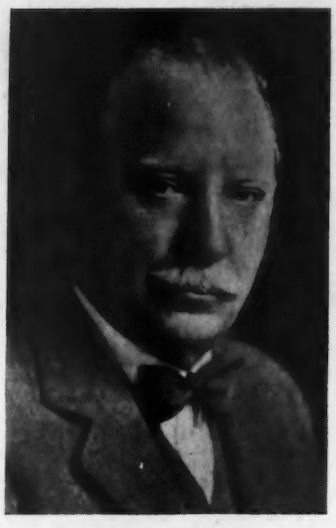
An unusual feature was the use of corbel slate beneath the overhang of the roof to further carry out the idea that, like common brick, ordinary genuine Bangor slate will lend itself to attractive, permanent construction at moderate cost.

The Common Brick Association Model House at the New York Own Your Home Exposition Featured a Random Width Bangor Slate Roof.

✣

Heckert Made Managing Director

SIDNEY F. HECKERT, prominent Pittsburgh architect, has been elected managing director of the National Fire Proofing Company, according to an announcement from that company's general offices, Fulton Building, Pittsburgh, Pa. Mr. Heckert will have complete charge of the operations of the company which manufactures Natco hollow building tile. Mr. Keasbey, one of the founders of the company, an officer for many years and for the past eight years president, has been named chairman of the board of directors to succeed Mr. Heckert, who has served in that capacity for many years. The position of managing director, which Mr. Heckert will now occupy, is a newly created office.



Sidney F. Heckert.

✣

Cinder Concrete Convention

THE fourth annual convention of the National Cinder Concrete Products Association was held at the Benjamin Franklin Hotel, Philadelphia, Pa., February 14 to 16. The following officers were elected for the year 1927: Chas. P. Minning, Cinder Block Corporation, of Baltimore, president; Paul Fogel, Cinder Block Co., of Kansas City, first vice-president; J. O. Dibert, Juniata Reconstructed Stone Co., Juniata, Pa., second vice-president; J. Edwin Rutter, Straub Block Co., of Warren, Ohio, treasurer; Walter S. Giddings, Philadelphia Partition & Building Block Co., secretary.

New Director of Sales

THE Koehring Company, of Milwaukee, Wis., announces the appointment of K. H. Talbot, as director of sales, in charge of domestic and foreign sales. Mr. Talbot was formerly associated with the Koehring Company as manager of field service.

As far as the eye can reach

Banner SAVED MONEY

DOWN CLEMENTS AVENUE, block after block, went the L. F. Crane Corporation's plasterers. And all the way, in house after house, Banner saved 10 per cent on finishing lime costs.

Banner is perfect finishing lime: gas burned, continuous-process hydrated, and air-separated for purity and uniformity. It spreads easily and goes farther; it does not pop or pit; its quality never varies. Ask Crane; ask any builders, contractors or real estate people who have ever used Banner!

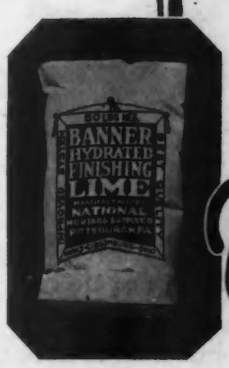
NATIONAL MORTAR AND SUPPLY COMPANY
PITTSBURGH · PENNA.

IN Detroit, where everything is on a *production* basis, a la Ford, L. F. Crane Corporation, builders, proved there *is* a difference.

This progressive concern finished 520 houses in various parts of the city, in 1926—an average of ten a week—using Banner Hydrated Finishing Lime in every one. Banner met every test—handled easily, spread farther, saved time, saved lime, saved money.

A. J. Mahoney, General Superintendent of the L. F. Crane Corporation, made the tests and directed operations.

Let's build better walls—you can with lime. A three-coat lime job is ideal for double houses, duplexes, apartments. It's the only thing for larger construction—halls, libraries, public buildings, institutions, fine homes. Why not utilize the acoustical properties of Banner Lime?



Easy to Spread · Hard to Beat

Banner LIME

Power Tools for Door Fitting and Mortising

SOME very interesting new items in the line of The R. L. Carter Co., Inc., Phoenix, N. Y., are referred to as the Carter Door Set for fitting doors, including lock mortising and butt routing, all by electric power. These handy power tools, as illustrated below, are the power hand plane, the electric door lock mortiser, the router and the adjustable templet for hinge butt routing on doors and jambs. These tools take the accuracy and speed of factory production right out onto the job, to speed up door fitting—long a troublesome and expensive item.

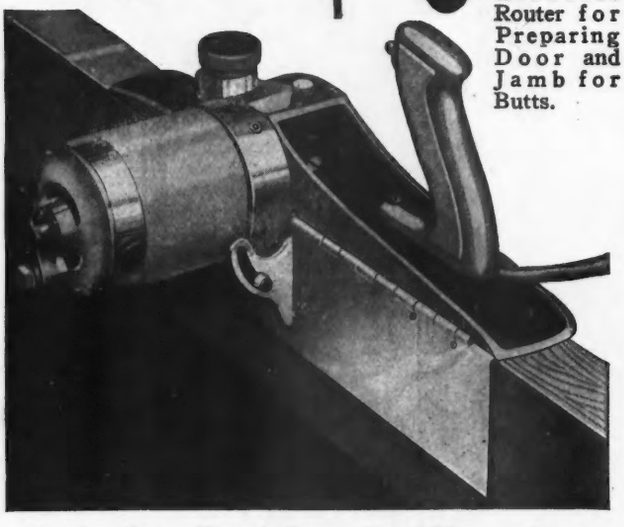
The power hand plane is driven by a ⅜-H.P. motor and weighs, complete, about 10 pounds. In addition to the planing head there is a grinding attachment and a bench bracket for utilizing as a bench jointer. The door lock mortiser is driven by a ¼-H.P. motor, and feeds automatically by merely moving the handle up and down. It is quickly adjustable for position, length and depth of mortise.

The adjustable templet for hinge butt routing consists of three sections of aluminum adjustably mounted on a steel rod. The power router rides on top of templet as shown; all measuring and laying out are eliminated.

These tools, together with the many other interesting items of the Carter line, are illustrated in their new Catalog No. 7, which will be sent to any AMERICAN BUILDER reader on request.—Advertisement.

The Carter Power Lock Mortiser in Use.

The Carter Patented Templet and Electric Router for Preparing Door and Jamb for Butts.



Showing Carter Electric Power Hand Plane on Door

Prepare Interesting Displays

THE Gilbert & Bennett Mfg. Co., Chicago, manufacturer of pearl wire cloth has prepared a series of very striking and effective window and counter displays which will be released to dealers this spring. This material is beautifully colored and features the cut-out idea, showing houses with the windows and porches cut out and screen wire inserted in the openings.

Giant Fly Cut-Outs in Many Colors Feature the Gilbert & Burnett Cut-Outs this Spring.

✣

Steel Companies Are Merged

THE Macomber Steel Company, Canton, Ohio, is the new organization formed by the merger of the Massillon Steel Joist Company and the Canton Bridge Company, of the same city. Stanley Macomber, president and general manager, will head the new company with the same organization that has operated the Massillon Steel Joist Company since its inception.

This new company will market the complete line of Massillon standard steel building products and in addition will give special attention to concrete reinforcement and structural steel fabrication not covered by the standard designs. The Sarnia Bridge Company, Ltd., Sarnia, Ontario, Canada, has charge of the distribution of these products in Canada and the Massillon Steel Joist Company of the Pacific Coast, San Francisco, is distributor on the Pacific Coast.

✣

Duntile Makers Consolidate

AT the first meeting of the Duntile Corporation of Florida, held at Orlando, Florida, E. A. Hoselton, of Orlando, was elected president. Other officers elected were: A. D. Cranston, of Lake Worth, first vice-president; A. Humphrey, of Tampa, second vice-president; E. H. Lasseter, of Deland, secretary, and J. W. Sage, of St. Cloud, treasurer. The company is capitalized at $500,000. Duntile, a concrete building unit now being manufactured in 25 cities throughout Florida, will in the future be manufactured and sold by the new consolidated organization.

✣

Knox Wall Safes Available

THE Knox Wall Safe Company, 1614 Maple Ave., Los Angeles, Calif., has purchased the patents, assets, and business of the Knox Safe Co., of Galesburg, Ill., and has moved the factory to Los Angeles, where they are getting into production and will be able to supply former customers, dealers and exporters, with all the sizes formerly manufactured as well as many more new styles and sizes.

✣

Johnson Joins Celotex Company

ANNOUNCEMENT has been made by B. G. Dahlberg, president of the Celotex Company of Chicago, that William Johnson, formerly of the New York World, has been made vice-president of the Celotex Company in charge of public relations. Mr. Johnson has long been a prominent figure in editorial and promotional work on the New York World and has been active in public affairs.

Win-Dor

Modern Casement Hardware

Surface-Type Operator

Operates either wood or metal casements through the screen. A slight pressure on the handle releases the positive lock and allows you to swing the casement to any position between full-closed and 90° open. Release of pressure allows the lock to take hold again, positively. Cannot loosen or rattle. Very inexpensive and easy to install on new or old buildings. Fully guaranteed.

Automatic Stay

Where screens are not necessary this one-hand-operated automatic locking stay holds the casement securely in position even in a high wind. Positive lock in any position. An exceptionally neat and inexpensive casement stay that can be used with both wood and metal casements on new or old construction.

Flush-Type Operator

An equally effective method of controlling casements under the screen. Can be used with both wood or metal casements and is particularly adapted for use with metal—frame or roll-up type of screens. Operation is the same as for the surface type operator. Almost invisible because the pivot plate is sunk into the stool—flush!

Screen Hardware

Simplest to use and quickest to install, on the market. Screens "snap-in, snap-out" with a minimum of effort. Spring-clip handles with corrugated contact surfaces snap over round-headed screws at each side of window frame. Top of screen slides behind angle plate at top of window frame. Very inexpensive.

New Geared Operator

This handsome new addition to the Win-Dor line offers advantages never before available. Only four turns of the crank are needed to swing the casement full open. The action is exceptionally easy and is free from play. Bearings and gears are completely enclosed and cannot "freeze" because one member of any two working parts is always made of non-corroding bronze. The most compact, the most beautiful and the longest-wearing geared operator now on the market.

Cam-Action "Bolt-Fasts"

A new development to meet the demand for a combination bolt and fastener which will close a casement tight enough to exclude wind and rain. Win-Dor "Bolt-Fasts" draw a casement so tight that letter paper is firmly held between sash and frame and cannot be withdrawn. Made in five sizes, all finishes.

For full information and prices write to

THE CASEMENT HARDWARE COMPANY
402A North Wood Street, Chicago, U. S. A.

CASEMENT HARDWARE HEADQUARTERS

Memorial Theatre Competition

COMPETITION for the design of the new Shakespeare Memorial Theatre, at Stratford-on-Avon, England, to replace the old structure destroyed by fire on March 6, 1926, has now been formally opened. Complete specifications may be secured from the secretary, Shakespeare Memorial Theatre, 150 Nasau St., New York City.

Although a large theatre is not desired, a difficult problem must be solved in designing a building which will be in harmony with the surroundings and with the fifteenth century atmosphere of Stratford-on-Avon. In addition the new building will be visible from all sides instead of the facade only as with most theatres. In order that the new structure may be worthy and adequate to the objects for which it is erected, the selection of the design has been placed in the hands of the Royal Institute of British Architects.

✣

To Handle Milcor Products

AN announcement has been received that C. A. Reams, well known among the building trade of the Detroit, Mich., territory, has been appointed as a representative of the Milwaukee Corrugating Company. Architects, contractors and building material dealers of the Detroit, Cleveland and Cincinnati sectors will be included in his territory.

✣

Will Build More Demonstrations

THE Southern Pine Association, New Orleans, La., has decided, because of the success of its two model hurricane-proof houses, in New Orleans and Miami, Florida, to erect similar demonstration houses in various other parts of the pine consuming territory. Memphis, Tenn., will be the location of the next model house to be sponsored by the organization and completed in the near future.

✣

Hurricane-Proof Windows

THE Zouri Drawn Metals Company, Chicago Heights, Ill., is particularly proud of a letter received from the Turtle Construction Company, Nassau, Bahamas, shortly after the hurricane which caused such great destruction there. This letter tells of a new installation of Zouri store fronts which, though entirely unprotected and receiving the full force of the 120-mile an hour gale, came through the storm without damage.

✣

Honor Universal Official

A NEW 600-foot steamship is now being built for the Pittsburgh Steamship Co., to be used in the iron ore, limestone and coal trade on the Great Lakes. This modern 10,000-ton steel freighter, one of two ships being added to the fleet, is to be named the "B. F. Affleck," for Benjamin Franklin Affleck, president of the Universal Portland Cement Co., a United States Steel Corporation subsidiary. Enlargement of lake carrying service is in line with the activities of the Universal Portland Cement Company's $3,000,000 expansion program at its Chicago (Buffington, Ind.), plant.

✣

Keller Joins Paper Company

THE New York Blue Print Paper Company, 96-102 Reade St., New York City, announces that O. B. Keller, who was formerly associated with the Keuffel & Esser Company for many years, is now connected with the sales department of the New York Blue Print Paper Company.

FOR ADVERTISERS' INDEX SEE NEXT TO LAST PAGE

INDEX OF TRADE NAMES

American Builder's Quick Reference List of Leading Trade Names and Special Brands of Manufacturers of Building Materials, Contractors' Equipment and Machinery, Home Conveniences, Tools, etc., Represented in This Annual Reference Number

See Advertisers' Index, Pages 531 and 533, for Advertisements of These Concerns in This Issue

ABESTONE Felt Roofing, H. W. Johns-Manville Co., New York, N. Y.
ACCELO Anti-Freeze Solution, Anti-Hydro Waterproofing Co., Newark, N. J.
ACKERMAN-JOHNSON Screw Anchors & Expansion Bolts, Ackerman-Johnson Co., Chicago, Ill.
ACME Clothes Lines, Samson Cordage Works, Boston, Mass.
ADAMANT Screen Cloth, New Jersey Wire Cloth Co., Trenton, N. J.
ADAMANTS Wall Finish, United States Gypsum Co., Chicago, Ill.
ADMIRAL Measuring Tape, Eugene Diezgen Co., Inc., Chicago, Ill.
ADMIRALTY Tubing, Chase Metal Works, Waterbury, Conn.
ADVANCE Concrete Machines, Lansing Company, Lansing, Mich.
ADVANCE Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
AETNA Sash Cord, Samson Cordage Works, Boston, Mass.
AGATEX Chemical Cement Floor Hardener, The Truscon Laboratories, Detroit, Mich.
AGILIS Quick Compression Cocks, Crane Co., Chicago, Ill.
AIKEN Saw Sets, Sargent & Co., New Haven, Conn.
AIR-WAY Casement Window Hardware, Richards-Wilcox Mfg. Co., Aurora, Ill.
AIRID Air Valves, American Radiator Co., New York, N. Y.
AJAX Insulating Compounds, Sherwin-Williams Co., Cleveland, Ohio.
AJAX Saw Mill Dogs, American Saw Mill Machy. Co., Hackettstown, N. J.
AJAX Spring Hinges, Chicago Spring Hinge Co., Chicago, Ill.
AKRON Wheelbarrows, Concrete Carts, Coal Chutes, Salamanders & Drag Scrapers, The Akron Barrow Company, Akron, Ohio.
ALABASTER Wall Plasters, U. S. Gypsum Co., Chicago, Ill.
ALBA Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
ALBANESE Transparent Pencil Tracing Cloth, Keuffel & Esser Co., Hoboken, N. J.
ALBERENE Sinks & Stone, Alberene Stone Co., New York City.
ALEXANDRIA Baths, Crane Company, Chicago, Ill.
ALFRESCO Dampproof Cold Water Paints, Reardon Co., St. Louis, Mo.
ALL-STEEL Locks & Sash, National Mfg. Co., Sterling, Ill.
ALL-STEEL Portable Garages, Edwards Mfg. Co., Cincinnati, Ohio.
ALLITH & PROUTY Door Hangers, Hardware for Sliding Doors, etc., Allith & Prouty Co., Danville, Ill.
ALLOVE Drinking Fountains, Crane Co., Chicago, Ill.
ALOE Levels, A. S. Aloe Co., St. Louis, Mo.
ALPHA Cement, Alpha Portland Cement Co., Easton, Pa.
Alva Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
AMBLER Asbestos Building Products, Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
AMBRO TEX Varnish, Truscon Laboratories, Detroit, Mich.
AMERICAN Base & Wall Polisher, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN Blue Print Paper, Eugene Dietzgen Co., Inc., Chicago, Ill.
AMERICAN Chains, American Chain Co., Bridgeport, Conn.
AMERICAN Cuckoo Clocks, Alarm & Hall Clocks, American Cuckoo Clock Co., Philadelphia, Pa.
AMERICAN Lawn Fence, American Steel & Wire Co., Chicago, Ill.
AMERICAN Metal Tiles, Milwaukee Corrugating Co., Milwaukee, Wis.
AMERICAN Pattern Chain, American Chain Co., Inc., Bridgeport, Conn.
AMERICAN Poultry & Fox Netting, American Steel & Wire Co., Chicago, Ill.
AMERICAN Radiators, American Radiator Co., New York, N. Y.
AMERICAN Saw Mill Machinery, American Saw Mill Machy. Co., Hackettstown, N. J.
AMERICAN Steel Fence Posts, American Steel & Wire Co., Chicago, Ill.
AMERICAN Wire Fences, American Steel & Wire Co., Chicago, Ill.
AMERICAN CONVERTIBLE Floor Polisher, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN HANDY Grinder, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN HIGH SPEED Floor Polisher, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN OLD STYLE Roofing Tin Plates, American Sheet & Tin Plate Co., Pittsburgh, Pa.
AMERICAN RAPID GRINDER Tile, Marble & Terrazzo Floor Surface, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN UNIVERSAL Wood Floor Sander, American Floor Surfacing Machine Co., Toledo, Ohio.
ANCHOR Automatic Tampers, Strippers, Block, Brick & Concrete Machines, Anchor Concrete Stone Co., Columbus, Ohio.
ANCHOR Drawing Instruments, Keuffel & Esser Company, Hoboken, N. J.
ANCHOR Wall Plaster, American Gypsum Co., Port Clinton, O.
ANCHOR BRAND Dry Colors & Fillers, C. K. Williams & Co., Easton, Pa.
ANCHOR HIGH TEST Tile Machines, Anchor Concrete Machinery Co., Columbus, Ohio.
ANDREWS Heaters, Furnaces, Water Supply Systems, etc., Andrews Heating Company, Minneapolis, Minn.
ANGLO Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
ANHYDROSOL Transparent Damp-Proofing Paints, Toch Bros., Inc., New York, N. Y.
ANSBAR Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
ANTI-HYDRO Waterproofing, Anti-Hydro Waterproofing Co., Newark, N. J.
ANTI-PYRE, Samuel Cabot, Inc., Boston, Mass.
ANTICLOG Floor Drains, H. W. Covert Co., New York, N. Y.
ANVIL Drawing Paper, Keuffel & Esser Co., Hoboken, N. J.
ANYFORCE Shower Head, Speakman Co., Wilmington, Del.
APARTO Lavatory, Crane Co., Chicago, Ill.
APEX Galvanized Sheets, Wheeling Metal & Mfg. Co., Wheeling, W. Va.
APOLLO KEYSTONE Copper Steel Galvanized Sheets, American Sheet & Tin Plate Co., Pittsburgh, Pa.
AQUA Self-Closing Cocks & Bibbs, Crane Co., Chicago, Ill.
ARCO Thermostats & Regulators, American Radiator Co., New York, N. Y.
ARCOLA Hot Water Radiator Outfit & Boiler, American Radiator Co., New York, N. Y.
ARENO Drinking Fountains, Crane Co., Chicago, Ill.
ARCUS Lavatories, Crane Co., Chicago, Ill.
ARDEN Wall & Gauging Plasters, U. S. Gypsum Co., Chicago, Ill.
ARDMORE Lavatories, Crane Co., Chicago, Ill.
ARGOTILE Strip Shingles, Beckman-Dawson Roofing Co., Chicago, Ill.
ARKONA Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
ARMOR Tapes, Keuffel & Esser Co., Hoboken, N. J.
ARMORTOP Concrete Floor Hardener, Anti-Hydro Waterproofing Co., Newark, N. J.
ARMPLEX Cooler Door Closers, Chicago Spring Hinge Co., Chicago, Ill.
ART-ROC Coloring & Hardener for Cement, The Truscon Laboratories, Detroit, Mich.
ASEPTICOTE Flat Wall Paint, The Truscon Laboratories, Detroit, Mich.
ASFALTSLATE Shingles, Philip Carey Mfg. Co., Lockland, Ohio.
ASHLAND Pumps, Jacks & Swings, The F. E. Myers & Bro. Co., Ashland, Ohio.
ASYLUM Bath Tubs, Crane Co., Chicago, Ill.
ATABOY BAROS Wheelbarrow, Sterling Wheelbarrow Co., Milwaukee, Wis.
ATHERMOS Refrigerators, Gurney Refrigerator Co., Ltd., Fond du Lac, Wis.
ATLANTIC Paints, White Lead, National Lead Co., New York City.
ATLAS Concrete Mixers, Self-Propelling Loader & Conveyor, Atlas Engineering Co., Milwaukee, Wis.
ATLAS Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
ATLAS Paints, National Lead Co., New York City.
ATLAS Water Closets, Crane Co., Chicago, Ill.
ATLO Water Closets, Crane Co., Chicago, Ill.
AUSTRAL Windows and Sash Holders, Austral Window Co., New York City.
AUTOMATIC Floor Surfacing Machine, Wayvell, Chappell & Co., Waukegan, Ill.
AVOLYN Drinking Fountains, Crane Co., Chicago, Ill.

B

BABY Bath Tubs & Closets, Crane Co., Chicago, Ill.
BABY Blow Torches, McGill Mfg. Co., Valparaiso, Ind.
BAKER Eave Trough Hangers, W. C. Hopson Co., Grand Rapids, Mich.
BALTIC Sash & Bell Cord, Silver Lake Co., Newtonville, Mass.
BANKNOTE Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
BANNER Measuring Tapes, The Lufkin Rule Co., Saginaw, Mich.
BANNER Poultry Fence, American Steel & Wire Co., Chicago, Ill.
BANNER Steel Fence Posts, American Steel & Wire Co., Chicago, Ill.
BANTAM Concrete Mixers, Ransome Concrete Machinery Co., Dunellen, N. J.
BANTAM JUNIOR Concrete Mixers, Ransome Concrete Machy. Co., Dunellen, N. J.
BAR-OX Inhibitive Steel Paint, Truscon Laboratories, Detroit, Mich.
BARRACKS Lavatories, Crane Co., Chicago, Ill.

BARSH-PAYZANT Lettering Pens, Keuffel & Esser Co., Hoboken, N. J.
BATCHERPLANT (Central Porportioning Plant), Blaw-Knox Co., Pittsburgh, Pa.
BATES Steel Poles, Bates Expanded Steel Truss Co., East Chicago, Ind.
BAYLEY-SPRINGFIELD Steel Sash & Operators, Wm. Bayley Co., Springfield, O.
BAYONNE Duck and Waterproof Cloth and Roof and Deck Cloth, John Boyle & Co., Inc., New York City.
BEARCAT Sawing Machinery, Sanders, etc., The Paxson Co., Dowagiac, Mich.
BEAVER Alsa Plaster, Woodville Lime & Cement Co., Toledo, Ohio
BEAVER Saws, Henry Disston & Sons, Philadelphia, Pa.
BEAVER Woodworking Machines, Hutchinson Mfg. Co., Norristown, Pa.
BEAVER AMERICAN Gypsum Plaster, Beaver Products Co., Inc., Buffalo, N. Y.
BEE Clothes Lines, Samson Cordage Works, Boston, Mass.
BEE HIVE Pitch & Roofing Felt, Samuel Cabot, Inc., Boston, Mass.
BERKELEY Tape, Keuffel & Esser Co., Hoboken, N. J.
BESSLER Movable Stairway, Bessler Movable Stairway Co., Akron, Ohio.
BESTWALL Plaster Wall Boards, Beaver Products Co., Inc., Buffalo, N. Y.
BEVERLY Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
BIG FOUR Gauging & Wall Plasters, U. S. Gypsum Co., Chicago, Ill.
BIG FOUR Door Hangers & Track, National Mfg. Co., Sterling, Ill.
BILCO Metal Hatchways, Builders Iron Co., New Haven, Conn.
BISHOPRIC Stucco & Plaster Base, The Bishopric Mfg. Co., Cincinnati, Ohio.
BITU-MORTAR Waterproofing Compound, Bitu-Mortar Waterproofing Co., Inc., New York City.
BLACK BIRD Clothes Lines, Samson Cordage Works, Boston, Mass.
BLACK JACK Tank Heaters, Hunt, Helm & Ferris Co., Harvard, Ill.
BLACKFORD Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
BLAW-KNOX Pressed & Welded Steel Products, Blaw-Knox Co., Pittsburgh, Pa.
BLAW-KNOX STANDARD Steel Buildings, Blaw-Knox Co., Pittsburgh, Pa.
BLAWFORMS for All Kinds of Concrete Construction, Blaw-Knox Co., Pittsburgh, Pa.
BLUE RIVER Lime (for Masons' & Chemists' Uses), Louisville Cement Co., Louisville, Ky.
BOGALUSA Logs, Great Southern Lumber Co., Bogalusa, La.
BOMMER Spring Hinges, Floor Surface Spring Hinges, Door Pivots, Lavatory Stall Hardware, Screen Door Hinges and Door Springs, Bommer Spring Hinge Co., Brooklyn, N. Y.
BONDCRETE Concrete Plaster, U. S. Gypsum Co., Chicago, Ill.
BONDEX Waterproofing Cement Paint, Beardon Co., St. Louis, Mo.
BOSS Mixing Machinery for Concrete & Hoists, American Cement Machine Co., Inc., Keokuk, Iowa.
BOSTON Copper Boilers, Dahlquist Mfg. Co., Boston, Mass.
BOSTON Self-Closing Cocks & Bibbs, Crane Co., Chicago, Ill.
BOSTWICK Y Lath, Corner Beads, Brick Bonds, Wall Ties, Picture Moulding, etc., Bostwick Steel Lath Co., Niles, Ohio.
BOVEE Furnaces, Bovee Furnace Works, Waterloo, Iowa.
BOYLSTON Lavatories, Crane Co., Chicago, Ill.
BRASCO Metal Store Fronts, Brasco Mfg. Co., Chicago, Ill.
BRASCO HESTER Store Fronts, Brasco Mfg. Co., Chicago, Ill.
BRIDGEPORT Bronze Rods, Bridgeport Brass Co., Bridgeport, Conn.
BRILLIANT Radiant Heaters, Ohio Foundry & Mfg. Co., Steubenville, Ohio.
BRIXMENT (for Brick & Stone Masonry), Louisville Cement Co., Louisville, Ky.
BRONCHO Concrete Mixers, Lansing Co., Lansing, Mich.
BROOKS Ready Roofing, Johns-Manville, Inc., New York City, N. Y.
BRUCETON Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
BUCKHORN Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
BUENA Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
BULL DOG Adjusters, Casement Hardware Co., Chicago, Ill.
BULL DOG Chains, Chain Products Co., Cleveland, Ohio.
BULL DOG Concrete Mixers, Raber & Lang Mfg. Co., Kendallville, Ind.
BULL DOG Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
BULLDOZER Power Pumps & Working Heads, F. E. Myers & Bro. Co., Ashland, Ohio.
BULLY BOY Saw Sets, Henry Disston & Sons, Philadelphia, Pa.
BURLINGTON Drinking Fountains, Crane Co., Chicago, Ill.

C

CABOT Paints, Paper, Wood Preservatives, Shingle Stains, etc., Samuel Cabot, Inc., Boston, Mass.
CABRANETTE Porcelain Kitchen Equipment & Medicine Cases, Cabranette Corp., Chicago, Ill.
CAL Pine, California White & Sugar Pine Mfrs. Assn., San Francisco, Cal.
CANNON BALL Door Hangers, Hunt, Helm & Ferris Co., Harvard. Ill.
CAN'T GET OFF Door Hangers, J. E. Porter Corp., Ottawa, Ill.
CAPITAL Barrows, Lansing Co., Lansing, Mich.
CAPITAL Boilers, U. S. Radiator Corp., Detroit, Mich.
CARDINAL Toggery Racks, Chas. Fischer Spring Co., Brooklyn, N. Y.
CAREY'S Cements & Asbestos Roofing. Asbestos Roofing & Coating. Asbestos Mats & Table Covers. Philip Carey Mfg. Co., Lockland, Ohio.
CARLTON Bath Tubs, Crane Co., Chicago, Ill.
CARNEY Brick & Tile Mortar Cement, The Carney Co., Mankato, Minn.
CARTER Shaper & Router. R. L. Carter Co., Inc., Phoenix, N. Y.
CARTER Woodworking Mach., R. L. Carter Co., Inc., Phoenix, N. Y.
CECO Column Forms. Reinforcing Bars. Column Spirals, Expanded Metal Reinforcing. Metal Lath. Weatherstrip, Base & Rail Beads. Concrete Engineering Co., Chicago.
CEL-O-GLASS Substitute Glass, Acetol Products, Inc., New York City.
CELOTEX Insulating Lumber, The Celotex Company, Chicago, Ill.
CEMENTICO Wall Finish, United States Gypsum Co., Chicago, Ill.
CENTURY Air & Hand Pumps, Paint & Whitewash Spraying Machines, The F. E. Myers & Bro. Co., Ashland, Ohio.
CENTURY Motors, Fans, Century Electric Co., St. Louis, Mo.
CENTURY Pumps & Spraying Machines, F. E. Myers & Bro., Ashland, Ohio.
CEPECO Chains, Chain Products Co., Cleveland, Ohio.
CHABELCO Chains, Chain Belt Co., Milwaukee, Wis.
CHALLENGE Coal Screens, Gilbert & Bennett Mfg. Co., Georgetown, Conn.
CHALLENGE Finished & Gauging Plasters, U. S. Gypsum Co., Chicago, Ill.
CHALLENGE Measuring Tapes, Lufkin Rule Co., Saginaw, Mich.
CHAMBERLIN Weather Strips, Chamberlin Metal Weather Strip Co., Detroit, Mich.
CHAMET Bronze, Chase Metal Works, Waterbury, Conn.
CHAMPION Band Chains, Keuffel & Esser Co., Hoboken, N. J.
CHAMPION Door Lock Mortiser, Colgan Machy. & Supply Co., Columbus, Ohio.
CHAMPION Door Springs, Sargent & Co., New Haven, Conn.
CHAMPION Drag Saws, American Saw Mill Machinery Co., Hackettstown, N. J.
CHAMPION Finishing & Gauging Plasters, U. S. Gypsum Co., Chicago, Ill.
CHAMPION Saw Sets, Henry Disston & Sons, Philadelphia, Pa.
CHAMPION Pipe & Boiler Covering, Johns-Manville, Inc., New York City.
CHAMPION Sanding & Polishing Machy., Gallmeyer & Livington Co., Grand Rapids, Mich.
CHAMPION Saw Mill Dogs, American Saw Mill Machy. Co., Hackettstown, N. J.
CHAMPION Windmill Regulators, Hunt, Helm & Ferris Co., Harvard, Ill.
CHASE Brass, Chase Metal Works, Waterbury, Conn.
CHATTERTON Insulating Compounds, McGill Mfg. Co., Valparaiso, Ind.
CHICAGO Cabinet Spring Hinges, Chicago Spring Hinge Co., Chicago, Ill.
CHICAGO Door Springs, Chicago Spring Hinge Co., Chicago, Ill.
CHICAGO Spring Butts, Door Springs & Spring Hinges, Chicago Spring Hinge Co., Chicago, Ill.
CHICAGO Unions, Crane Co., Chicago, Ill.
CHINA FLAT White Interior Washable Paint, A. C. Horn Co., Long Island City, N. Y.
CHINA WOOD Spar Varnish, A. C. Horn Co., Long Island City, N. Y.
CHISEL-EDGE Claw Hammers, Chisel Edge Claw Hammer Co., Hoboken, N. J.
CHROMOL Hack Saws, Henry Disston & Sons, Philadelphia, Pa.
CHRYSOLINE Paints, Solvay Sales Co., New York, N. Y.
CINCH Expansion Bolts, National Lead Co., New York, N. Y.
CINCHETTE Expansion Anchors, National Lead Co., New York City.
CLARKE VACUUM Portable Sander, Clarke Sanding Machine Co., Chicago, Ill.
CLERMONT Lavatories, Crane Co., Chicago, Ill.
CLEVELAND Chains, Chain Products Co., Cleveland, Ohio.
CLIFTON Lavatories, Crane Co., Chicago, Ill.
CLIMAX Barrows, Lansing Co., Lansing, Mich.
CLIMAX Spray Pumps, Dayton Mfg. Co., Dayton, Ohio.
CLINTON Face Brick, Finser Bros. Clay Co., Sugar Creek, Ohio.
CLINTON Metallic Paint, Mortar Colors and Cement Colors, Clinton Metallic Paint Co., Clinton, N. Y.
CLINTON SILK FIBRE Elastic Roof Cement, Clinton Metallic Paint Co., Clinton, N. Y.
CLINTON SUPER HEAT Fire Brick Cement, Clinton Metallic Paint Co., Clinton, N. Y.
CLOSIN Lavatories, Crane Co., Chicago, Ill.
CLOVER LEAF Hay Carriers, The F. E. Myers & Bro. Co., Ashland, Ohio.
COG GEAR Well, House, Tank, Spray & Cistern Pump, The F. E. Myers & Bro. Co., Ashland, Ohio.
COLD WAVE Refrigerators, Gurney Refrigerator Co., Ltd., Fond du Lac, Wis.
COLON Barrows, Lansing Co., Lansing, Mich.
COLONIAL Lavatories, Crane Co., Chicago, Ill.
COLONIAL Wall Radiator, American Radiator Co., Chicago, Ill.
COLONNA Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
COLOR-TEX Cement Finish, The Truscon Laboratories, Detroit, Mich.
COLUMBIA Baths, Crane Co., Chicago, Ill.
COLUMBIA Blueprint Paper, Cloth, Indelible Ink & Tapes, Keuffel & Esser Co., Hoboken, N. J.
COLUMBIA Clothes Lines, Samson Cordage Works, Boston, Mass.
COLUMBIAN Hay Tracks, J. E. Porter Corp., Ottawa, Ill.
COMBINATION Hay Unloaders, F. E. Myers & Bro. Co., Ashland, Ohio.
COMBINO Drawing Instruments, Frederick Post Co., Chicago, Ill.
COMMERCIAL Blue Print Paper, Frederick Post Co., Chicago, Ill.
COMMERCIAL Blue Print Paper, Eugene Dietzgen Co., Inc., Chicago, Ill.
COMPACTO Bath Tubs & Water Closets, Crane Co., Chicago, Ill.
CONRED Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
CONSERVO Wood Preservatives, Samuel Cabot, Inc., Boston, Mass.
COOPER'S Metallic Shingles, National Sheet Metal Roofing Co., Jersey City, N. J.
COPLEY Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
COPPERED METAL, Milwaukee Corrugating Co., Milwaukee, Wis.
COPTIC Lavatories, Crane Co., Chicago, Ill.
CORINTH Baths, Crane Co., Chicago, Ill.
CORNELL Tapes, Keuffel & Esser Co., Hoboken, N. J.
CORNELL WOOD-BOARD in Place of Lath & Plaster for Ceilings, Walls & Partitions. Cornell Wood Products Co., Chicago, Ill.
CORNR-WISE Garage Door Hardware, Richards-Wilcox Mfg. Co., Aurora, Ill.
CORONA Drawing Instruments & Blue Print Paper, Frederick Post Co., Chicago, Ill.
CORONET Baths, Crane Co., Chicago, Ill.
CORRECTO URINALS, Crane Co., Chicago, Ill.
CORRUGATED KNO-BURN Self-Furring Metal Lath, North Western Expanded Metal Co., Chicago, Ill.
CORSYN Water Closets & Tanks, Crane Co., Chicago, Ill.
CORTO Radiators, American Radiator Co., New York, N. Y.
CORTRIGHT Shingles, Cortright Metal Roofing Co., Philadelphia, Pa.

CORWITH Lavatories & Baths, Crane Co., Chicago, Ill.
COTTAGE Fencing, Gilbert & Bennett Mfg. Co., Chicago, Ill.
COUGAR Saws, Henry Disston & Sons, Philadelphia, Pa.
COVERT Fireplace Dampers, Throat Dampers, H. W. Covert Co., New York, N. Y.
CRACO Closet Tanks, Crane Co., Chicago, Ill.
CRANE Steam Specialties & Plumbing Supplies, Crane Co., Chicago, Ill.
CREOLEUM Dampproofing for Wood, The Truscon Laboratories, Detroit, Mich.
CRESCENT Band Saws & Woodworking Machinery & Swing Saws, Crescent Machine Co., Leetonia, Ohio.
CRESCENT Brick & Sewer Pipe Machines, Concrete Mixers, Molds, Tampers, Raber & Lang Co., Kendallville, Ind.
CRESCENT Coloring Fluid for Elec. Lamps, Compounds, Lamp Guards, Soldering Fluxes, McGill Mfg. Co., Valparaiso, Ind.
CRESCENT Laboratories, Crane Co., Chicago, Ill.
CRESCENT Lump Lime, Kelley Island Lime & Transport Co., Cleveland, Ohio.
CRESCENT Sash Fasteners, H. B. Ives Co., New Haven, Conn.
CRESCENT Woodworking Machinery, The Crescent Machine Co., Leetonia, Ohio.
CRESCENT BRAND Wire Rope & Cables, American Cable Co., New York, N. Y.
CRESTO Wall Finish, Reardon Co., St. Louis, Mo.
CRETA Drinking Fountains, Crane Co., Chicago, Ill.
CRIMPEDGE Eave Troughs, Milwaukee Corrugating Co., Milwaukee, Wis.
CRITTALL Casement Windows, Crittall Casement Window Co., Detroit, Mich.
CROFOOT Tackers & Staples, J. B. Crofoot Co., Chicago, Ill.
CROMAR Finished Oak Flooring, Crooks-Dittmar Co., Williamsport, Pa.
CROWN Concrete Reinforcements, American Steel & Wire Co., Chicago, Ill.
CRYSTALLINE Ink, Keuffel & Esser Co., Hoboken, N. J.
CURTIN Flush Valves & Levers, A. F. Curtin Valve Co., Medford, Mass.
CYCLONE Dust Collectors, Knickerbocker Co., Jackson, Mich.
CYCLONE Lift Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.

D

D. C. Mail Receptacles, American Device Mfg. Co., St. Louis, Mo.
DACOR Clothes Hangers, Davis Tool & Eng. Co., Detroit, Mich.
DAHLQUIST Copper Boilers, Dahlquist Mfg. Co., Boston, Mass.
DANDIE Concrete Mixers, Koehring Co., Milwaukee, Wis.
DANDY Bag Truck, Lansing Company, Lansing, Mich.
DANVILLE Malleable Iron Castings, Allith-Prouty Co., Danville, Ill.
DARTMOUTH Tapes, Keuffel & Esser Co., Hoboken, N. J.
DAVIS Bronze Store Fronts, Brasco Mfg. Co., Chicago, Ill.
DAYLIGHT Hog House Window, Milwaukee Corrugating Co., Milwaukee, Wis.
DAYTON Water Supply Systems, Dayton Pump & Mfg. Co., Dayton, Ohio.
DEFIANCE Pump Stands & Spray Pumps & Working Heads, The F. E. Myers & Bro. Co., Ashland, Ohio.
DEFIANCE Woodworking Machy., Sidney Machine Tool Co., Sidney, Ohio.
DEHYDRATINE Compound, A. C. Horn Co., Long Island City, N. Y.
DELCO-LIGHT Incand. Lighting Plants & Accessories for Same & Electric Washing Machines, Delco-Light Co., Dayton, Ohio.
DE LUXE Chests, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
DENTAL Lavatories, Crane Co., Chicago, Ill.
DENTUS Lavatories, Crane Co., Chicago, Ill.
DETROIT FENESTRA Steel Factory Windows, Detroit Steel Products Co., Detroit, Mich.
DE VILBISS Portable Painting Equipment, The De Vilbiss Co., Toledo, Ohio.
DE VILBISS Spray-Finishing System, The De Vilbiss Co., Toledo, Ohio.
DE VILBISS Spray-Painting System, The De Vilbiss Co., Toledo, Ohio.
DEVORO Closet, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
DE WALT Woodworker, De Walt Mfg. Co., Leola, Pa.
DIAMOND Lawn Fence, American Steel & Wire Co., Chicago, Ill.
DIAMOND Metal Lath, Truscon Steel Co., Youngstown, Ohio.
DIAMOND Prepared Plaster, U. S. Gypsum Co., Chicago, Ill.
DIAMOND Screen Cloth, New Jersey Wire Cloth Co., Trenton, N. J.
DIAMOND A Expanded Metal Lath, Bostwick Steel Lath Co., Niles, Ohio.
DIAMOND B Tool Steel, Joseph T. Ryerson & Son, Inc., Chicago, Ill.
DIAMOND POINT Saws, Henry Disston & Sons, Philadelphia Pa.
DIAMOND WAY Metal Weather Stripping, Diamond Metal Weather Strip Co., Columbus, Ohio.
DIM-A-LITE Electric Light Attachments & Pull Chain Sockets, The Wirt Co., Philadelphia, Pa.
DIRECT Stove Co., Div. American Stove Co. of St. Louis, Mo., Lorain, Ohio.
DIRECT DRIVE Conductor Hooks, Milwaukee Corrugating Co., Milwaukee, Wis.
DISSTON Crucible Steel Saws, Files, Rasps, Henry Disston & Sons, Inc., Philadelphia, Pa.
DOHERTY Self-Closing Cocks & Bibbs, Crane Co., Chicago, Ill.
DONLEY Devices, Donley Bros. Co., Cleveland, Ohio.
DONLEY Laundry Tray & Sink Frames & Hose Reel, Donley Mfg. Co., Cleveland, Ohio.
DORIC Baths, Crane Co., Chicago, Ill.
DORIS Bath Tubs, Crane Co., Chicago, Ill.
DOUBLE JACK Wire Stretchers, American Steel & Wire Co., Chicago, Ill.
DOUBLE WHITE Paints, Samuel Cabot, Inc., Boston, Mass.
DREADNAUGHT Road, Forms, Clamshell Buckets, Blaw-Knox Co., Philadelphia, Pa.
DRENDUL Sand Screens, Gilbert & Bennett Mfg. Co., Chicago.
DUFLEX Door Hangers, Richards-Wilcox Co., Aurora, Ill.
DUL-VAR-TEX Varnish, The Truscon Laboratories, Detroit, Mich.
DUMPY Saws, Henry Disston & Sons, Philadelphia, Pa.
DUNTILE Machinery W. E. Dunn Mfg. Co., Holland, Mich.
DUPLEX Drawing Papers & Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
DUPLEX Flush Valve, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
DUPLEX Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
DURITE Abrasive, Cloth Paper, etc., Manning Abrasive Co., Inc., Troy, N. Y.
DURO Household Water Supply Systems, Pumps, etc., The Duro Co., Dayton, Ohio.
DUROBAR Chains, Chain Belt Co., Milwaukee, Wis.
DUROPLATE Blackboards, E. W. A. Rowles, Chicago, Ill.
DURUNDUM Abrasive Cloth Paper, etc., Manning Abrasive Co., Inc., Troy, N. Y.
DURUS Drinking Fountains, Crane Co., Chicago, Ill.
DUTCH BOY Bearing Metals (Babbitts), Solder, etc., National Lead Co., New York City.
DUTCH BOY White & Red Lead, Linseed Oil Babbitt Metal, Solder, etc., National Lead Co., New York City.
DUTCH BOY KITCHENET Kitchen Cabinets, Coppes Bros. & Zook, Nappanee, Ind.
DWARF Tapes, Keuffel & Esser Co., Hoboken, N. J.

E

E. Z. Garage Fixtures, Frantz Mfg. Co., Sterling, Ill.
E. Z. Shingle Bunchers, American Saw Mill Machinery Co., Hackettstown, N. J.
E. Z. KLEEN Garage Trap, A. L. Swett Iron Works, Medina, N. Y.
E. & T. Blue Print Paper, Keuffel & Esser Co., Hoboken, N. J.
EAGLE Clothes Lines, Samson Cordage Works, Boston, Mass.
EAGLE Sash Pulley, Grand Rapids Hardware Co., Grand Rapids, Mich.
EAST LAKE Metallic Shingle, Crane Co., Chicago, Ill.
EASY-DRAFT Heat Regulators, Heyman Mfg. Co., New York, N. Y.
EASY-SET Bath Room Fixtures, J. H. Balmer Co., Newark, N. J.
EATON Lavatories, Crane Co., Chicago, Ill.
EBCO Sanitary Toilet Fixtures, D. A. Ebinger Sanitary Mfg. Co., Columbus, Ohio.
EBUR Drinking Fountains & Lavatories, Crane Co., Chicago, Ill.
ECCENTRIC Swages, Henry Disston & Sons, Philadelphia, Pa.
ECCENTRIC BULL DOG Wire Stretchers, American Steel & Wire Co., Chicago, Ill.
ECLIPSE Door Springs & Door Checks, Sargent & Co., New Haven, Conn.
ECLIPSE Windmills, Fairbanks, Morse & Co., Chicago, Ill.
ECONO Expanded Metal for Concrete Reinforcement & Machine Guards, North Western Expanded Metal Co., Chicago, Ill.
ECONOMY Compasses, Eugene Dietzgen Co., Chicago, Ill.
ECONOMY Pumps, Stands and Door Hangers, The F. E. Myers & Bro. Co., Ashland, Ohio.
ECONOMY Sketching & Drawing Paper, Keuffel & Esser Co., Hoboken, N. J.
EDDY-SINK Kitchen Sinks, D. A. Ebinger Sanitary Mfg. Co., Columbus, Ohio.
EDDYSTONE Sash Cord, Silver Lake Co., Newtonville, Mass.
EDELWEISS White Enamel (Exterior), The Truscon Laboratories, Detroit, Mich.
EDGELY Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa. Pa.
EDINBURGH Colors for Mortar, Toch Bros., Inc., New York N. Y.
EDMANCO Metal Ceilings, Shingles, Rolling Doors, Shutters, etc., Edwards Mfg. Co., Cincinnati, Ohio.
EDWARDS Ceiling & Shingles, Rolling Doors, Shutters, etc., Edwards Mfg. Co., Cincinnati, Ohio.
EG-SHELL Mill White, Sherwin-Williams Co., Cleveland, Ohio.
EJECTO Closet, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
ELASTITE Expansion Joints, Philip Carey Co., Lockland, Ohio.
ELDORADO Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
ELECTROBESTOS Insulating Material, Inc., Johns-Manville, Inc., New York City.
ELECTROMATIC Garage Door Operators, Allith-Prouty Co., Danville, Ill.
ELEGIA Lavatories, Crane Co., Chicago, Ill.
ELEXITS Receptacles, General Electric Co., Schenectady, N. Y.
ELLWOOD Wire Stretchers, Hunt, Helm & Ferris Co., Harvard, Ill.
EMPIRE Bolting Machines, American Saw Mill Machy. Co., Hackettstown, N. J.
EMPIRE Clothes Lines, Samson Cordage Works, Boston, Mass.
EMPIRE Levels, Empire Level Mfg. Co., Milwaukee, Wis.
EMPRESS Baths, Crane Co., Chicago, Ill.
EUREKA Joint Cement, Jos. T. Ryerson & Son, Chicago, Ill.
EUREKA Rock Crushers, Universal Crusher Co., Cedar Rapids, Iowa.
EVENDRAFT Chimney Caps, Milwaukee Corrugating Co., Milwaukee, Wis.
EVERETT Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
EVERLITE KOATING Wall Paint, Toch Bros., Inc., New York, N. Y.
EXCELSIOR Band Chains, Drawing Instruments, Pocket Tapes, Tracing Cloth, Keuffel & Esser Co., Hoboken, N. J.
EXPANSION Metal Trim & Corner Bead, Milwaukee Corrugating Co., Milwaukee, Wis.
EXPEDIO Water Closets, Urinals & Slop Sinks, Crane Co., Chicago, Ill.
EXPULSO Closets, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
EXTRA CLEAN Bright Tin Plates, American Sheet & Tin Plate Co., Pittsburgh, Pa.

F

F. A. Panelboards, Switchboards, Cabinets, etc., Frank Adams Elec. Co., St. Louis, Mo.
F. & J. Attachments, Engines, Fuller & Johnson Mfg. Co., Madison, Wis.
FAHNESTOCK-JEWETT White Lead, National Lead Co., New York, N. Y.
FAHRIG Babbitt Metal, Jos. T. Ryerson & Son, Inc., Chicago, Ill.
FAIRBANKS Scales, Fairbanks, Morse & Co., Chicago, Ill.
FAIRBANKS-MORSE Gasoline, Kerosene Engines, Air Compressors, Centrifugal, Circulating, Deep Well, Power, Railroad & Steam Pumps, Dynamos & Motors, Motor Cars, Motor Generator Sets, Central Station Power Plants, Railway Appliances, Farm Machinery, Lighting Plants & Water Systems, Fairbanks, Morse & Co., Chicago, Ill.
FAIRFAX Lavatories, Crane Co., Chicago, Ill.
FALCON Saws, Henry Disston & Sons, Philadelphia, Pa.
FAMOUS UNIVERSAL Woodworking Machines Sidney Mach. Tool Co. Sidney Ohio.

FAULTLESS Spray Pumps, Carriers, Hay Forks, Pulleys, Door Hangers & Pumping Jacks, The F. E. Myers & Bro. Co., Ashland, Ohio.
FAVORITE Measuring Tapes, Keuffel & Esser Co., Hoboken, N. J.
FAY Calipers & Dividers, L. S. Starrett Co., Athol, Mass.
FAYS Saws, Henry Disston & Sons, Philadelphia, Pa.
FEDERAL Blue Printing Machines, Keuffel & Esser Co., Hoboken, N. J.
FELTEX Asphalt Saturated Rag Felt, Philip Carey Mfg. Co., Lockland, Ohio.
FENESTRA Steel Windows, Doors, etc., Detroit Steel Products Co., Detroit, Mich.
FENWICK Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
FERRIS Hay Tracks, Hunt, Helm, Ferris & Co., Harvard, Ill.
FERRI-TEX Damp-proofing Compound, The Truscon Laboratories, Detroit, Mich.
FERRO-FAX Concrete Hardener, A. C. Horn Co., Long Island City, N. Y.
FIBREEN Waterproof Paper, American Reenforced Paper Co., Attleboro, Mass.
FIBRWOVE Insulating Paper, Philip Carey Mfg. Co., Lockland, Ohio.
FIBROTEX TOPPING Roof Paint, The Truscon Laboratories, Detroit, Mich.
FIBRO-TEX Roof Cement, The Truscon Laboratories, Detroit, Mich.
FIFTH AVE. Closets, Crane Co., Chicago, Ill.
FIRE FELT Pipe & Boiler Covering, Johns-Manville, Inc., New York, N. Y.
FITSTITE Barn Door Hardware, Richards-Wilcox Mfg. Co., Aurora, Ill.
FLAT TONE Wall Finish, Sherwin-Williams Co., Cleveland, Ohio.
FLAXLINUM Insulation, Flaxlinum Insulating Co., St. Paul, Minn.
FLEXA-TILE Asphalt Roofing & Shingles, Richardson Co., Lockland, Ohio.
FLEX SICCO Ready Mixed Paints, Toch Bros., Inc., New York, N. Y.
FLEXIBLE Door Hangers, F. E. Myers & Bro. Co., Ashland, Ohio.
FLEXO Barn Door Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
FLEXSTONE Asbestos Roofing, Johns-Manville, Inc., New York, N. Y.
FLINT Cement Plaster, U. S. Gypsum Co., Chicago, Ill.
FLINTOX Concrete Floor Hardener, Toch Bros., Inc., New York, N. Y.
FLORIAN Drinking Fountains, Crane Co., Chicago, Ill.
FLYING DUTCHMAN Wood Carving Machry., Gallmeyer & Livingston Co., Grand Rapids, Mich.
FOLEY Clamps Cleanouts, Hays Mfg. Co., Erie, Pa.
FOLEY Saw Filer, Foley Saw Tool Co., Minneapolis, Minn.
FORMULA QUALITY House Paint, The Truscon Laboratories, Detroit, Mich.
FORSTNER Auger Bits, The Progressive Mfg. Co., Torrington, Conn.
FORTY-FORTY 21 E. Paver, Ransome Concrete Machinery Co., Dunellen, N. J.
FOUNTAIN Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
FREDERICKTOWN Bells, J. B. Foote Foundry Co., Fredericktown, Ohio.
FREEPORT Gasoline Engines, Stover Engine Works, Freeport, Ill.
FRIGIDAIRE Iceless Frigerators, Delco-Light Co., Dayton, Ohio.
FUME-SAF WHITE Enamel, The Truscon Laboratories, Detroit, Mich.
FYER-WAL Fire Doors, Richards-Wilcox Mfg. Co., Aurora, Ill.

G

G-F Metal Lath, Bridging, Steel Lumber, Sash, Tile, Corner Beads, Trussit, Channels, Casements, Wire Mesh, Lintels, Doors, Basement Windows, etc., General Fireproofing Building Products, Youngstown, Ohio.
G & B Levels, Geier & Bluhm, Inc., Troy, New York.
G. & B Poultry Netting & Wire Cloth, Gilbert & Bennett Mfg. Co., Chicago, Ill.
G & B JUNIOR Convertible Level, Geier & Bluhm, Inc., Troy N. Y.
GABRIEL Reinforcement Material & Construction Hardware; Gabriel Steel Co., Detroit, Mich.
GARCY Wardrobe Hangers, Garden City Plating & Mfg. Co., Chicago.
GEM Furnaces, Robinson Furnace Co., Chicago, Ill.
GEM Tapes, Eugene Dietzgen Co., Inc., Chicago, Ill.
GENASCO LATITE Shingles, The Barber Asphalt Co., Philadelphia, Pa.
GENASCO SEALBAC Shingles, The Barber Asphalt Co., Philadelphia, Pa.
GENASCO STANDARD TRINIDAD Built Up Roofs, The Barber Asphalt Co., Philadelphia, Pa.
GENESEE Wheelbarrows, Lansing Co., Lansing, Mich.
GENFIRE Sheet Lath, General Fireproofing Bldg. Products, Youngstown, Ohio.
GENUINE FRANKLIN TUNNEL Roofing Slate, Slatington Slate Co., Slatington, Pa.
GEYSER Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
GIANT Door Hangers, Tracks & Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
GIANT Door Hangers & Steel Adjustable Stanchion, Hunt, Helm & Ferris Co., Harvard, Ill.
GIANT Padlocks & Chains, Smith & Egge Mfg. Co., Bridgeport, Conn.
GIANT R. R. Barrows, Lansing Co., Lansing, Mich.
GIANT Saw Mill Dogs, American Saw Mill Machinery Co., Hackettstown, N. J.
GIANT Steel Adjustble Stanchions, Hunt, Helm, Ferris & Co., Harvard, Ill.
GLIDE Door Hangers & Tracks, Frantz Mfg. Co., Sterling, Ill.
GLOBE Chimney Caps, Globe Ventilator Co., Troy N. Y.
GLOBE Ventilated Ridgings & Ventilators, Globe Ventilator Co., Troy, N. Y.
GLOBE Wheelbarrows, Lansing Co., Lansing, Mich.
GLO-HOT Electric Fireplaces, Colonial Fireplace Co., Chicago, Ill.
GOLD MEDAL FINISH Hydrated Lime, Woodville Lime Products Co., Toledo, Ohio.
GOLD MEDAL Scaffold Brackets, Patent Scaffolding Co., Chicago, Ill.
GOOD ROADS Paver, Ransome Concrete Machinery Co., Dunellen, N. J.
GOULD QUALITY Doors, Sash & Millwork, Gould Mfg. Co., Oshkosh, Wis.
GOULDING Saws, Henry Disston & Sons, Philadelphia, Pa.
GRAHAM BROTHERS Trucks, Graham Bros., Inc., Detroit, Mich.
GRAND Garage Door Holder, Sasgen Derrick Co., Chicago, Ill.
GRAND PRIZE Hydrated Lime, U. S. Gypsum Co., Chicago, Ill.
GRAND RAPIDS Grinding Machinery, Gallmeyer & Livingston Co., Grand Rapids, Mich.
GRAND RAPIDS Sash Pulleys, Grand Rapids Hardware Co., Grand Rapids, Mich.
GRANI TEX Transparent Coating for Cement Foors (Non-Staining & Dustless), The Truscon Laboratories, Detroit, Mich.
GRANITE Wall Plaster, United States Gypsum Co., Chicago, Ill.
GREAT SOUTHERN Saws, Henry Disston & Sons, Philadelphia, Pa.
GREENLAW AMERICAN Saws, Henry Disston & Sons, Philadelphia, Pa.
GRIPLOCK Chains, Chain Belt Co., Milwaukee, Wis.
GULF STREAM Duck & Roofing Canvas, John Boyle & Co., Inc., New York, N. Y.
GUMMER CUTTER Grinding Machines, Henry Disston & Sons, Philadelphia, Pa.
GURNEY Refrigerators, Gurney Refrigerator Co., Fond du Lac, Wis.
GUSHER Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
GYP-LAP Fireproofing Sheathing, U. S .Gypsum Co., Chicago, Ill.
GYPSOLITE Wallboard, Universal Gypsum & Lime Co., Chicago, Ill.

H

H B DREDGE Chains, American Chain Co., Inc., Bridgeport, Conn.
H. & A. Machinery, Heston & Anderson, Fairfield, Iowa.
H. & H. Electric Switches & Radio Products, Hart & Hegeman Mfg. Co., Hartford, Conn.
HAIRINSUL Hair Insulation, Johns-Manville, Inc., New York, N. Y.
HANDY Door Pulls, Hunt, Helm, Ferris & Co., Harvard, Ill.
HANDY Fire Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
HANDY Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
HANDY HUTCH Woodworking Machine, Hutchinson Mfg. Co., Norristown, Pa.
HANDY MAN Hay Hoists, American Saw Mill Machinery Co., Hackettstown, N. J.
HART Electric Switches, Hart & Hegeman Mfg. Co., Hartford, Conn.
HART Oil Burners, W. B. Wilde Co., Peoria, Ill.
HART HEAT Oil Burners, W. B. Wilde Co., Peoria, Ill.
HARTFORD Lavatories, Crane Co., Chicago, Ill.
HARVARD Carriers, Hangers, Hinges, Heaters, Latches, Rails, Slings, Hunt, Helm, Ferris & Co., Harvard, Ill.
HARVARD Tapes, Keuffel & Esser Co., Hoboken, N. J.
HARVESTER Hay Carriers, Hunt, Helm & Ferris Co., Harvard, Ill.
HAUSER Adjustable Hangers, Martin Hauser Mfg. Co., Toledo, Ohio.
HAWTHORNE Roofing Tile, Hawthorne Roofing Tile Co., Cicero, Ill.
HAYMAKER Carriers, The F. E. Myers & Bro. Co., Ashland, Ohio.
HAYS Drilling Machines, Hays Mfg. Co., Erie, Pa.
HAYSCO Cocks & Bibbs, Hays Mfg. Co., Erie, Pa.
HAYSMITE Cocks & Bibbs, Hays Mfg. Co., Erie, Pa.
HEACOCK Saw Mill Machinery, American Saw Mill Machinery Co., Hackettstown, N. J.
HELDERBERG Portland Cement, North American Cement Corp., Albany, N. Y.
HELIOS Blue Print Paper, Keuffel & Esser Co., Hoboken, N. J.
HELTZEL Steel Forms for Concrete, Heltzel Steel Form & Iron Works, Warren, Ohio.
HENNEN'S Elastic Caulking Paste, Weatherproof Caulking Co., Minneapolis, Minn.
HERALD Carts, Lansing Company, Lansing, Mich.
HERCULEAN Dumbwaiters, Highwood Dumbwaiter Co., Closter, N. J.
HERMITAGE Lavatories, Crane Co., Chicago, Ill.
HERRICK Refrigerators, Herrick Refrigerator Co., Waterloo, Iowa.
HESS Steel Furnaces, Hess Warming & Ventilating Co., Chicago, Ill.
HIBBEN Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
HIGGINS AMERICAN Drawing Inks, Chas M. Higgins & Co., Brooklyn, N. Y.
HIGH HEAT Fire Resisting Cement, Clinton Metallic Paint Co., Clinton, N. Y.
HILLSBORO Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
HI-LO Door Hangers & Track, Frantz Mfg. Co., Sterling, Ill.
HITCHINGS Sash Operating Devices, Hitchings & Co., Elizabeth, N. J.
HOBBS Block Machines, Anchor Concrete Machinery Co., Columbus, Ohio.
HODELL Chains, etc., Chain Products Co., Cleveland, Ohio.
HOFFMAN Steam Traps & Valves, Hoffman Specialty Co., Waterbury, Conn.
HOLTON Tapes, Keuffel & Esser Co., Hoboken, N. J.
HOOSIER Pumps, Water Systems, Jack, Rams, Regulators, Towers, Tanks, Flint & Walling Mfg. Co., Kendallville, Ind.
HOOSIER GIANT HOLO BRIX, Hoosier Building Tile & Silo Co., Albany, Ind.
HORNET Mantels & Tile, Hornet Mantel Co., St. Louis, Mo.
HOSPITAL Lavatories & Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
HOSPITAL Water Closets, Crane Co., Chicago, Ill.
HUMMER Barn Door Hangers, J. E. Porter Corp., Ottawa, Ill.
HUTHER Dado Heads & Saws, Huther Bros. Saw Mfg. Co., Rochester, N. Y.
HY-PO-RIB Reinforcement Steel Lathes, Truscon Steel Co., Detroit, Mich.
HY-RIB Metal Lath, Truscon Steel Co., Youngstown, Ohio.
HYDRATITE Waterproofing Compounds for Cement, A. C. Horn Co., Long Island City, N. Y.
HYDRO Ring Packing, H. W. Johns-Manville Co., New York City.
HYPERION Blue Print Paper, Eugene Dietzgen Co., Inc., Chicago, Ill.

I

I. H. C. Com'l Autos, International Harvester Co., Chicago, Ill.
IDALIA Lavatories, Crane Co., Chicago, Ill.
IDEAL Blind & Shutter Hinges, Barn Door Latches, Hammers, Screen Door Holdbacks & Hinges, Spring Door Hinges, Stover Mfg. Co., Freeport, Ill.
IDEAL Boilers, Brackets, Cements, Water Heaters, Valves, Shields, Packless Valves, etc., American Radiator Co., New York, N. Y.
IDEAL Concrete Mixers, Tumbling Barrels & Metal Cleaning Machinery, Ideal Concrete Machinery Co., Cincinnati, Ohio.
IDEAL Elevator Door Hangers, Door Closer & Check & Locking Devices, Richards-Wilcox Mfg. Co., Aurora, Ill.
IDEAL End & Corner Posts & Fence Posts, American Steel & Wire Co., Chicago, Ill.
IDEAL Hoists, Universal Hoist & Mfg. Co., Cedar Falls, Iowa.
IDEAL Rib Lath, Youngstown Pressed Steel Co., Warren, Ohio.
IDEAL Roofing Nails, American Steel & Wire Co., Chicago, Ill.
IDEAL Steam & Hot Water Heaters, American Radiator Co., Pittsburgh, Pa.
ILG Self-Cooled Motor Fans, Blowers, Shutters, etc., Ilg Electric Ventilating Co., Chicago, Ill.
ILGAIR Air Washing Unit & Humidifier, Ilg Electric Ventilating Co., Chicago, Ill.
ILGAIR Heating System (Unit), Ilg Electric Ventilating Co., Chicago, Ill.
ILGAIR Kitchen Ventilator, Ilg Electric Ventilating Co., Chicago, Ill.
ILLINI Water Closets, Crane Co., Chicago, Ill.
ILLINOIS Tapes, Keuffel & Esser Co., Hoboken, N. J.
IMPERIAL Cement Plaster & Prepared Finish, U. S. Gypsum Co., Chicago, Ill.
IMPERIAL Metal Shingles, Cortright Metal Roofing Co., Philadelphia, Pa.
IMPERIAL Pumps & Carriers, F. E. Myers & Bro. Co., Ashland, Ohio.
IMPERIAL Tracing Papers, Frederick Post Co., Chicago, Ill.
IMPERIAL Wall Plasters, U. S. Gypsum Co., Chicago, Ill.
IMPROVED Fireplace Dampers, Stover Mfg. & Engine Co., Freeport, Ill.
IMPROVED O. G. Fir Gutters, E. M. Long & Sons, Cadiz, Ohio.
IMPROVED ASBESTOCEL Pipe Covering Sheets, Johns-Manville Inc., New York, N. Y.
IN-A-DOR Beds, Murphy Door Bed Co., Chicago, Ill.
INADOR Ironing Board, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
INDUSTRIAL White Enamel (Mill White), The Truscon Laboratories, Detroit, Mich.
INKOFF Tracing Cloth Ink, Keuffel & Esser Company, Hoboken, N. J.
INLAND Copper Alloy Sheets, Inland Steel Co., Chicago, Ill.
INNOVATE Cord Adjusters, McGill Mfg. Co., Valparaiso, Ind.
INSULEX Insulation, Universal Gypsum & Lime Co., Chicago, Ill.
INTERLOCK Casement Window Adjuster, The Lyons Mfg. Co., New Haven, Conn.
INTERLOCK Conductor Pipe, Milwaukee Corrugating Co., Milwaukee, Wis.
INTERLOX Master Slide Rules, Master Rule Mfg. Co., New York, N. Y.
INTERNATIONAL Casements, International Casement Co., Jamestown, N. Y.
INTERNATIONAL Motor Trucks, International Harvester Co., Chicago, Ill.
INTERNATIONAL Store Front Construction, Zouri Drawn Metals Co., Chicago, Ill.
INVINCIBLE Chisel Tooth Saw, Henry Disston & Sons, Inc., Philadelphia, Pa.
INVISIBLE JOINT Steel Ceilings, Milwaukee Corrugating Co.,
IONIC Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
IRON CLAD Band Chains, Keuffel & Esser Co., Hoboken, N. J.
IRON KING Tank Heaters, Hunt, Helm, Ferris & Co., Harvard, Ill.
IROQUOIS Road Building Machinery, Barber Asphalt Co., Philadelphia, Pa.
IVERSEN Window Adjusters, H. B. Ives & Co., New Haven, Conn.
IVERSEN MORTISE Door Bolts, The H. B. Ives Co., New Haven, Conn.

J

J. C. M. Floor Machines, The Kent Company, Inc., Rome, N. Y.
JACK JUNIOR Engines, Fairbanks, Morse & Co., Chicago, Ill.
JACKSON Auto Trailers, Miles Mfg. Co., Jackson, Mich.
JACKSON Hay Forks, The F. E. Myers & Bro. Co., Ashland, Ohio.
JACKSON Saws, Henry Disston & Sons, Philadelphia, Pa.
JAEGER Concrete Mixers, Jaeger Machine Co., Columbus, Ohio.
JERSEY Vises, Stanley Rule & Level Co., New Britain, Conn.
JERSEY Wire Cloth, Copper Screen Cloth, Wire Netting & Fencing, New Jersey Wire Cloth Company, Trenton, N. J.
JESTER-SACKETT SYSTEM Plaster Boards on Metal Studs, U. S. Gypsum Co., Chicago, Ill.
JEWEL Planer, American Saw Mill Machinery Co., Hackettstown, N. J.
JEWETT Ring Packing, Johns-Manville, Inc., New York, N. Y.
JIFFY Saw Rig, A. S. Aloe Co., St. Louis, Mo.
JOHNSON'S PATTERN Gate Latches, Sargent & Co., New Haven, Conn.
JOHNSON'S Wood Dye, Varnishes, Stains, Wax, S. C. Johnson & Son, Racine, Wis.
JOSEPH Barrows, Lansing Company, Lansing, Mich.
JUMBO Land Plaster, U. S. Gypsum Co., Chicago, Ill.
JUNIOR Spray Pumps & Pumping Jacks, The F. E. Myers & Bro. Co., Ashland, Ohio.
JUSTRYT Pitch & Roofing Felt, Samuel Cabot, Inc., Boston, Mass.

K

K-V Clothes Closet Fixtures, Knape & Vogt Mfg. Co., Grand Rapids, Mich.
K. & E. Alphabet Books, Calculators, Transits, Levels, Compasses, etc., Keuffel & Esser Company, Hoboken, N. J.
KAHN Trussed Bar, Truscon Steel Co., Youngstown, Ohio.
KALAMAZOO Tanks, Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
KANNER Tin Plate, American Sheet & Tin Plate Co., Pittsburgh, Pa.
KAS-BRAS Shower Head, Speakman Co., Wilmington, Del.
KAUSTINE Sewage Disposal Systems, Septic Tanks, etc., Kaustine Co., Inc., Buffalo, N. Y.
KAWNEER Nickel Silver Windows, Kawneer Company, Niles, Mich.
KAWNEER Store Fronts, Copper & Bronze Covered Windows, Kawneer Mfg. Co., Niles, Mich.
KEES-GOSSETT Screen & Storm Sash Hangers, F. D. Kees Mfg. Co., Beatrice, Neb.
KELVINATOR Refrigerating Units (Domestic), Kelvinator Corp., Detroit, Mich.
KEMISOL Waterproofing Liquid for Masonry Surfaces, Morene Products Co., New York City.
KENNEBAGO Saws, Henry Disston & Sons, Philadelphia, Pa.
KENT Lavatories & Sinks, Crane Co., Chicago, Ill.
KENT Stationary Vacuum Cleaners, Floor Machines, Bench Type Sanding, Scrubbing & Polishing Machines, The Kent Company, Inc., Rome, N. Y.
KERAMIK Chemical Coloring for Cement, A. C. Horn Co., Long Island City, N. Y.
KERNER Incinerators, Kerner Incinerator Co., Milwaukee, Wis.
KERNERATOR BUILT IN THE CHIMNEY Incinerators, Kerner Incinerator Co., Milwaukee, Wis.
KEWANEE Pneumatic Air Tanks, Pumping Machinery & Electric Lighting Plants, Kewanee Water Supply Co., Kewanee, Ill.
KEY Expanded Metal Lath, General Fireproofing Co., Youngstown, Ohio.
KEY BRAND Instruments, Keuffel & Esser Co., Hoboken, N. J.
KEYRIDGE Reinforcement, Edwards Mfg. Co., Cincinnati, Ohio.
KEYSTONE Copper Steel Black & Galvanized Sheets & Roofing Tin, American Sheet & Tin Plate Co., Pittsburgh, Pa.
KEYSTONE Hair Felt, Johns-Manville, Inc., New York, N. Y.
KIMBALL Drinking Fountains, Crane Co., Chicago, Ill.
KIMBALL Elevators, Kimball Bros. Co., Council Bluffs, Iowa.
KING Block Machines, The Miles Mfg. Co., Jackson, Mich.
KING Spring Hinges, Allith-Prouty Co., Danville, Ill.
KING DRAG Road Scrapers, Lansing Co., Lansing, Mich.
KING'S Sash Supports & Bolts, Smith & Egge Mfg. Co., Bridgeport, Conn.
KING'S WINDSOR Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
KING'S WOOD FIBRE Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
KITCHEN MAID Cabinets, Wasmuth-Endicott Co., Andrews, Ind.
KLEEN GLASS Window & Skylight Cleaner, Truscon Laboratories, Detroit, Mich.
KLONDYKE Barrows, Lansing Co., Lansing, Mich.
KLOVER-KROP Agricultural Lime, Woodville Lime Products Co., Toledo, Ohio.
KNICKERBOCKER Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
KNICKERBOCKER Carts, Lansing Co., Lansing, Mich.
KNICKERBOCKER Concrete Mixers & Sawrigs, Knickerbocker Co., Jackson, Mich.
KNO-BURN Expanded Metal Lath, North Western Expanded Metal Co., Chicago, Ill.
KNOX Water Cooled Appliances, Blaw-Knox Co., Pittsburgh, Pa.
KNOXALL Door Hangers, Tank Heaters, Wire Stretchers, Hunt, Helm, Ferris & Co., Harvard, Ill.
KOEHRING Heavy Duty Concrete Mixers & Crane Excavators, Koehring Co., Milwaukee, Wis.
KOHLER OF KOHLER Enameled Plumbing Ware, Kohler Co., Kohler, Wis.
KOLL'S Columns, Hartmann-Sanders Co., Chicago, Ill.
KONCREX Concrete Floor Filler, A. C. Horn Co., Long Island City, N. Y.
KONKERIT Paints, Toch Bros., New York City, N. Y.
KOVERFLOR Concrete & Cement Paints, Standard Varnish Works, New York, N. Y.
KROMICK Structural Steel Primer, Sherwin-Williams Co., Cleveland, Ohio.
KUHLMANN Weatherstrips, Kuhlmann Metal Weatherstrip Co., St. Louis, Mo.
KWICKWORK Enamels, Standard Varnish Works, New York, N. Y.
KWIK-MIX Concrete Mixers, Kwik-Mix Concrete Mixer Co., Port Washington, Wis.

L

LA BELLE Refrigerators, Gurney Refrigerator Co., Ltd., Fond du Lac, Wis.
LABRUM Bath Tubs, Crane Company, Chicago, Ill.
LACQUERET Varnish Stains, Standard Varnish Works, New York, N. Y.
LADD Hammers, Sargent & Co., New Haven, Conn.
LAMINEX Wooden Doors, Wheeler-Osgood Co., Tacoma, Wash.
LAMNECK Pipe & Fittings, W. E. Lamneck Co., Columbus, Ohio.
LANCET Saws, Henry Disston & Sons, Philadelphia, Pa.
LANSING Mixers & Trucks, Lansing Co., Lansing, Mich.
LANSING COLONIAL Hand Cart, Lansing Company, Lansing, Mich.
LASTILE Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
LATTIS-TRUSS Roof, McKeown Bros. Co., Chicago, Ill.
LAVA Drawing Piper, Keuffel & Esser Co., Hoboken, N. J.
LAWSON Surface Floor Hinges, Milwaukee Stamping Co., Milwaukee, Wis.
LEADCLAD Sheets, Roofing, Wheeling Metal & Mfg. Co., Wheeling, W. Va.
LEHIGH Zinc Oxide, The New Jersey Zinc Sales Co., Inc., New York, N. Y.
LEVER BUCKET Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
LIGHTHOUSE Lump Lime, Kelley Island Lime & Transport Co., Cleveland, Ohio.
LIGHTNING Floor Surfacing Machines, National Sanding Machine Co., Chicago, Ill.
LIGHTNING Sprayers, F. E. Myers & Bro. Co., Ashland, Ohio.
LILIPUT Tapes, Keuffel & Esser Co., Hoboken, N. J.
LINCOLN Twin Disc Waxing, Polishing & Scrubbing Machine, Lincoln-Schleuter Machinery Co., Inc., Chicago, Ill.
LINOCREX Linoleum Preservative, A. C. Horn Co., Long Island City, N. Y.
LINOVA Bath Tubs, Crane Co., Chicago, Ill.
LINOVUS Bath Tubs, Crane Co., Chicago, Ill.
LIQUID KONDERIT Cement Paints for Dampproofing, Toch Bros., Inc., New York, N. Y.
LISPENARD Trucks, Lansing Company, Lansing, Mich.
LITERA Dental Lavatories, Crane Co., Chicago, Ill.

LITHOTEX Concrete Floor Hardeners, Living-Stone Co., Baltimore, Md.
LITTLE DEVIL Concrete Mixers, Marsh-Capron Co., Chicago, Ill.
LITTLE GIANT Hand Trucks, Lansing Co., Lansing, Mich.
LITTLE GIANT Jack Screws, L. S. Starrett Co., Athol, Mass.
LITTLE GIANT Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
LITTLE WONDER Molds, Raber & Lang Mfg. Co., Kendallville, Ind.
LIVING STONE Concrete Bond, Living-Stone Co., Baltimore, Md.
LOG LOG DUPLEX Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
LOK TOP Shingles, Richardson Co., Lockland, Ohio.
LONE STAR METAL Shingle, Edwards Mfg. Co., Cincinnati, Ohio.
LONG-BELL Lumber, Timber, Sash & Door Products, etc., The Long-Bell Lumber Co., Kansas City, Mo.
LONGSPAN Expanded Metal Lath, North Western Expanded Metal Co., Chicago, Ill.
LORAIN Oven Heat Regulators, American Stove Co., Lorain, Ohio.
LOTT Wire Stretchers, American Steel & Wire Co., Chicago, Ill.
LOW DOWN Tank Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
LOXO Compound Level, B. L. Makepeace, Boston, Mass.
LOXON Lamp Guards & Reflectors, McGill Mfg. Co., Valparaiso, Ind.
LUFKIN Rules & Tapes, Lufkin Rule Co., Saginaw, Mich.
LUNO Hand Lamps, Bridgeport Brass Co., Bridgeport, Conn.
LUPTON Window Sash Elbows, Conductor Pipes, etc., David Lupton's Sons Co., Philadelphia, Pa.
LUXFER Prism Glass, American Luxfer Prism Co., Chicago, Ill.
LUXTON Drinking Fountains, Crane Co., Chicago, Ill.
LUXURIA Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
LYDON Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
LYMAN Barbed Wire, American Steel & Wire Co., Chicago, Ill.
LYMCO Casement Window Adjuster, The Lyons Mfg. Co., New Haven, Conn.
LYNDEN Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.

M

M. C. Concrete Mixers, The Marsh-Capron Co., Chicago, Ill.
M. F. Roofing Tin Plates, American Sheet & Tin Plate Co., Pittsburgh, Pa.
McCABE Expansion Bolts & Door Hangers, McCabe Hanger Mfg. Co., New York, N. Y.
McNAMARA Hydrants, Hays Mfg. Co., Erie, Pa.
MADISON Tapes, Keuffel & Esser Co., Hoboken, N. J.
MAGIC Concrete Mixers, A. S. Aloe Co., St. Louis, Mo.
MAGNESTONE Stucco, Flooring, Wall Bond, Roof Cement, etc., American Magnestone Corp., Springfield, Ill.
MAHONING Expanded Metal Lath, Youngstown Pressed Steel Co., Warren, Ohio.
MAILO-BOX Mail Boxes, Penn-Greg Mfg. Co., St. Paul, Minn.
MAINE Tapes, Keuffel & Esser Co., Hoboken, N. J.
MAJESTIC Chutes, Dumps, Furnaces, Receivers, Windows, etc., Majestic Co., Huntington, Ind.
MAJESTIC Garbage Burners, Majestic Co., Huntington, Ind.
MAJESTIC Lavatories, Crane Co., Chicago, Ill.
MAJESTIC Steel Cabinets, Majestic Steel Cabinet Co., Chicago, Ill.
MAJOR REMOTE Control System for Stage Lighting, Frank Adam Electric Co., St. Louis, Mo.
MALLORY Standard Shutter Workers, Mallory Mfg. Co., Flemington, N. J.
MANCO Asphalt Cement, Philip Carey Mfg. Co., Lockland, Ohio.
MANHATTAN Dumbwaiters, Storm Mfg. Co., Newark, N. J.
MANHATTAN Lavatories & Urinals, Crane Co., Chicago, Ill.
MANNING SPEEDGRITS Abrasives on Paper, Cloth & Combination Sand Paper, Manning Abrasive Co., Inc., Troy, N. Y.
MANSHEAD Lump Lime, Kelley Island Lime & Transport Co., Cleveland, Ohio.
MARCO Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
MARCOSA Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
MARINE Sash Balances, Pullman Mfg. Co., Rochester, N. Y.
MARINE CEMENT for Damp-proofing Foundations, Toch Bros., Inc., New York, N. Y.
MARINERO Cotton Duck, John Boyle & Co., Inc., New York, N. Y.
MARMOR Lavatories, Crane Co., Chicago, Ill.
MAR-NOT Varnish for Floors, Sherwin-Williams Co., Cleveland, Ohio.
MARSH CAPRON Concrete Mixer, The Marsh-Capron Mfg. Co., Chicago, Ill.
MARVEL Gas Water Heater, Crane Co., Chicago, Ill.
MARVEL Terrazzo Grinding Machine, Lincoln-Schlueter Machinery Co., Inc., Chicago, Ill.
MARVEL Themostats, American Thermostat Co., Newark, N. J.
MASBESTIC Pipe Joint Compound, The Truscon Laboratories, Detroit, Mich.
MASCOT Ship Range, The Thatcher Co., Newark, N. J.
MASGA Varnish, A. C. Horn Co., Long Island City, N. J.
MASON Safety Tread, Jos. T. Ryerson & Son, Inc., Chicago, Ill.
MASONITE Structural Insulation, Mason Fibre Co., Chicago, Ill.
MASTER Pumping Jacks, The F. E. Myers & Bro. Co., Ashland, Ohio.
MASTER Slide & Folding Rules & Stucco Machines, Master Rule Mfg. Co., Inc., New York City, N. Y.
MASTER Woodworking Machinery, The Master Woodworker Mfg. Co., Detroit, Mich.
MATCHER Bits, Henry Disston & Sons, Philadelphia, Pa.
MATCHLESS Hinges, Milwaukee Stamping Co., Milwaukee, Wis.
MAURETANIA Water Closets, Crane Co., Chicago, Ill.
MEADOW KING Carriers, J. E. Porter Corp., Ottawa, Ill.
MEADOW LARK Carriers, J. E. Porter Corp., Ottawa, Ill.
MEADOW QUEEN Carriers, J. E. Porter Corp., Ottawa, Ill.
MEDIA Drinking Fountain, Crane Co., Chicago, Ill.
MEDIO Bath Tubs, Crane Co., Chicago, Ill.
MEL-ROCK Air Washers, Mellish-Hayward Co., Chicago, Ill.
MERITAS Table Leather & Shelf Oil Cloth, Standard Textile Products Co., New York City, N. Y.
MERTENS Hydrants, Hays Mfg. Co., Erie, Pa.
MERUS Drinking Fountains, Crane Co., Chicago, Ill.
METAL SLATE Shingles, Cortright Metal Roofing Co., Philadelphia, Pa.
METAL LUMBER Steel Joists & Studs, Berger Mfg. Co., Canton, Ohio.
METALASTIC Metal Protective Paints, Sherwin-Williams Co., Cleveland, Ohio.
METALITE Abrasive Cloth, Manning Abrasives Co., Inc., Troy, N. Y.
METALLIC Measuring Tapes, The Lufkin Rule Co., Saginaw, Mich.
METEOR Hot Air Furnaces, The Thatcher Co., Newark, N. J.
METRIC Closet Valves, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
MIAMI Pure White Steel Bathroom Cabinets, Miami Cabinet Co., Middletown, Ohio.
MICA KOTE Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
MICHIGAN Gauging Plasters, U. S. Gypsum Co., Chicago, Ill.
MICHIGAN DRAG Road Scrapers, Lansing Co., Lansing, Mich.
MICRO Adjustable Boring Heads, Porter Cable Machine Co., Syracuse, N. Y.
MICOR Cupolas, Metal Corner Beads, Stock Tanks, Hog Troughs & Ventilating Systems, Milwaukee Corrugating Co., Milwaukee, Wis.
MILES Cement Block Machines, Concrete Mixing Machines, Miles Mfg. Co., Jackson, Mich.
MILLER DRIP EDGE Edging for Prepared Roofing, Miller & Gleason, Olean, N. Y.
MILWAUKEE Hardware, Hinges, etc., Milwaukee Stamping Co., Milwaukee, Wis.
MINIER Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
MINNEAPOLIS Bag Truck, Lansing Co., Lansing, Mich.
MINNEHAHA Fountains, Kohler Co., Kohler, Wis.
MINUSA Drawing Instruments, Keuffel & Esser Co., Hoboken, N. J.
MIRACLE Doors, Paine Lumber Co., Oshkosh, Wis.
MIRR-O-RING Mirror Rings, Ren Mfg. Co., Winchester, Mass.
MIXOMETER Valves, Speakman Co., Wilmington, Del.
MOISTITE Waterproofed Duck, John Boyle & Co., Inc., New York, N. Y.
MONARCH Measuring Tapes, Eugene Dietzgen Co., Inc., Chicago, Ill.
MONARCH Metal Weatherstrip, Monarch Metal Products Co., St. Louis, Mo.
MONARCH Odorless Gas Heaters, Otto E. Hansen & Sons, Perth Amboy, N. J.
MONARCH Planer, Matcher & Moulder, American Sawmill Machy. Co., Hackettstown, N. J.
MONARCH Saw Sets, Henry Disston & Sons, Philadelphia, Pa.
MONARCH Water Supply Systems, Monarch Engineering Co., Dayton, Ohio.
MONCRIF House Heating Furnaces, The Henry Furnace Foundry Co., Cleveland, Ohio.
MONCRIF Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
MONCRIF Wire Rope, Woven Wire Fence, American Steel & Wire Co., Chicago, Ill.
MONROE Lavatories, Crane Co., Chicago, Ill.
MORENE Wall Finish on Concrete, Morene Products Co., New York, N. Y.
MORGAN Doors, Morgan Company, Oshkosh, Wis.
MORRISON Furnaces, Jos. T. Ryerson & Son, Chicago, Ill.
MORSE Dust Collectors, Knickerbocker Co., Jackson, Mich.
MOVA Bath Cocks, etc., Hays Mfg. Co., Erie, Pa.
MUELLER Bibbs, Cocks, Stops, Valves & Forges, H. Mueller Mfg. Co., Decatur, Ill.
MUELLER Furnaces & Boilers, L. J. Mueller Furnace Co., Milwaukee, Wis.
MUELLER CONVECTOR Pipeless Heating System, L. J. Mueller Furnace Co., Milwaukee, Wis.
MUELLER FURNACETTE Cabinet Heater, L. J. Mueller Furnace Co., Milwaukee, Wis.
MULTIPLEX Reinforcing Plates, Berger Mfg. Co., Canton, Ohio.
MULTIPLEX Stripper, Multiplex Concrete Machinery Co., Elmore, Ohio.
MYERS CENTURY Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS DUPLEX Painting & Spraying Machines, The F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS IMPROVED Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS O. K. Spray Pumps, Pulleys, Door Hangers, Tracks, The F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS PERFECT Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS SURE LOCK Sling Unloaders & Door Hangers, The F. E. Myers & Bro. Co., Ashland, Ohio.

N

NAPPANEE DUTCH KITCHENET Kitchen Cabinets, Coppes Bros. & Zook, Nappanee, Ind.
NATCO Double Shell Tile, National Fire Proofing Co., Pittsburgh, Pa.
NATCO Tex Tile, National Fire Proofing Co., Pittsburgh, Pa.
NATCO XXX Load Bearing Tile, National Fire Proofing Co., Pittsburgh, Pa.
NATIONAL Burners, Bridgeport Brass Co., Bridgeport, Conn.
NATIONAL Door Hangers, Hinges, Tracks & Builders' Hardware, National Mfg. Co., Sterling, Ill.
NATIONAL Fences, American Steel & Wire Co., Chicago, Ill.
NATIONAL Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
NATIONAL Reinforcing for Concrete, Plaster, Stucco, Cement, Gypsum, National Steel Fabric Co., Pittsburgh, Pa.
NATIONAL Wire Fence, American Steel & Wire Co., Chicago, Ill.
NATIONAL ELECTRIC Floor Surfacing Machine, National Sanding Machine Co., Chicago, Ill.
NATWIRE Wire Goods & Bathroom Fixtures, Wickwire Spencer Steel Co., New York City.
NEAPOL Water Closets, Crane Co., Chicago, Ill.
NEDUS Drinking Fountains, Crane Co., Chicago, Ill.
NERWALL Water Closets, Crane Co., Chicago, Ill.
NESCO DIAMOND BRAND Tin Plate & Steel Sheet, Granite City Steel Works of Natl. Enameling & Stamping Co., Granite City, Ill.
NETMESH Expanded Diamond Metal Lath, Milwaukee Corrugating Co., Milwaukee, Wis.
NEUMAR Lavatories, Crane Company, Chicago, Ill.
NEVADA Baths & Lavatories, Crane Company, Chicago, Ill.
NEVADA Saws, Henry Disston & Sons, Philadelphia, Pa.
NEVER BREAK Corner Beads, Milwaukee Corrugating Co., Milwaukee, Wis.
NEW CENTURY Power Pumps, the F. E. Myers & Bro. Co., Ashland, Ohio.
NEW CRESCENT Wheelbarrows, Lansing Co., Lansing, Mich.
NEW CYCLONE Dust Collectors, Knickerbocker Co., Jackson, Mich.
NEW HARVARD Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.

NEW LEADER Washing Machines, J. B. Foote Fdy. Co., Fredericktown, Ohio.
NEW MODEL Force Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
NEW SAFETY Dumb-Waiters, Storm Mfg. Co., Newark, N. J.
NEW STAR Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
NEW WAY Door Hangers & Tracks, The F. E. Myers & Bro. Co., Ashland, Ohio.
NEW WAY GIANT Door Hangers & Tracks, F. E. Myers & Bro. Co., Ashland, Ohio.
NEW YORK Brick Trowels, Henry Disston & Sons, Philadelphia, Pa.
NEW YORK Tapes, Keuffel & Esser Co., Hoboken, N. J.
NEW YORK CITY MILLS Moulding Plaster, U. S. Gypsum Co., Chicago, Ill.
NIAGARA Insulating Materials, Inc., Johns-Manville, Inc., New York City.
NIAGARA Pattern Chains, American Chain Co., Inc., Bridgeport, Conn.
NIAGARA Showers, Speakman Company, Wilmington, Del.
NOAH'S PITCH Roof Repair Cement, Philip Carey Mfg. Co., Lockland, Ohio.
NO RINKLE Tracing Cloth Color, Keuffel & Esser Co., Hoboken, N. J.
NORFOLK Lavatories, Crane Co., Chicago, Ill.
NORMAL Drawing Paper, Keuffel & Esser Co., Hoboken, N. J.
NORN-BURN Asbestos Paper, Johns-Manville, Inc., New York, N. Y.
NORTHLAND Refrigerators, Gurney Refrigerator Co., Fond du Lac, Wis.
NORWOOD Drawing Paper, Frederick Post Co., Chicago, Ill.
NO-SLAM Screen Door Checks, Sargent & Co., New Haven, Conn.
NOVA Lavatories, Crane Co., Chicago, Ill.
NOVO Kerosene & Gasoline Engines, etc., Novo Engine Co., Lansing, Mich.
NOWELD Chains, Chain Products Co., Cleveland, Ohio.
NU Jamb Spring Hinges, Milwaukee Stamping Co., Milwaukee, Wis.
NU AIR Ventilators, Milwaukee Corrugating Co., Milwaukee, Wis.
NUROID Roofing, The Richardson Co., Lockland, Ohio.
NUTMEG Switches, Hart & Hegeman Mfg. Co., Hartford, Conn.

O

O. B. Insulating Compounds, Standard Varnish Works, New York, N. Y.
O. D. P. White Lead, Sherwin-Williams Co., Cleveland, Ohio.
O. K. Carriers, Door Hangers & Tracks, The F. E. Myers & Bro. Co., Ashland, Ohio.
O. K. Friction Clutches & Hoists, O. K. Clutch & Machinery Co., East Columbia, Pa.
O. K. Gauging & Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
O. K. Hay Hoist, O. K. Clutch & Machinery Co., East Columbia, Pa.
O. K. Pulleys & Slings, Hunt, Helm & Ferris Co., Harvard, Ill.
OHIO Fireplace Equipment, Ohio Fdry & Mfg. Co., Steubenville, Ohio.
OHIO Tapes, Keuffel & Esser Co., Hoboken, N. J.
OKOLONA Water Closets, Crane Co., Chicago, Ill.
OKOLONA, Jr. Water Closets, Crane Co., Chicago, Ill.
OLD DUTCH Enamel, Sherwin-Williams Co., Cleveland, Ohio.
OLD RELIABLE Lath Expanded Metal, Bostwick Steel Lath Co., Niles, Ohio.
OLD VIRGINIA WHITE Paints, Samuel Cabot, Inc., Boston, Mass.
OLIVER Lavatories & Water Closets, Crane Company, Chicago, Ill.
OLYMPIC Baths, Crane Co., Chicago, Ill.
ON-A-WALL Ironing Board, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
OPEX Lacquers, Sherwin-Williams Co., Cleveland, Ohio.
OPHIR Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
OPINE Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
ORBIS Fountains, Crane Co., Chicago, Ill.
OREGON Saws, Henry Disston & Sons, Philadelphia, Pa.
ORIENTAL Metal Shingles, Cortright Metal Roofing Co., Philadelphia, Pa.
ORIENTAL STUCCO Exterior Plaster, U. S. Gypsum Co., Chicago, Ill.
ORIGINAL McNAMARA Hydrants, Hays Mfg. Co., Erie, Pa.
ORIOLE Saws, Henry Disston & Sons, Philadelphia, Pa.
ORION Lamps & Table Lamps, Bridgeport Brass Co., New York City, N. Y.
ORNATUB Lavatories, Crane Co., Chicago, Ill.
OSBORNE Closet Valves, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
OSHKOSH Logging Tools, Leach Co., Oshkosh, Wis.
OTHELLO Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
OTT'S Pumps, J. E. Porter Co., Ottawa, Ill.
OUR LEADER Laundry Trays, Alberene Stone Co., Chicago, Ill.
OUT-O-WALL Registers, Rock Island Register Co., Rock Island, Ill.
OVATUS Lavatories, Crane Co., Chicago, Ill.
OVER-WAY Conveying Systems, Richards-Wilcox Mfg. Co., Aurora, Ill.
OXFORD Drinking Fountains, Crane Co., Chicago, Ill.

P

P. C. Lathes, Portable-Cable Machine Co., Syracuse, N. Y.
B. & B. Acid Resisting Paint, Ruberoid Co., New York, N. Y.
PAISTE Electric Products, Hart & Hegeman Mfg. Co., Hartford, Conn.
PALMERS Traps, A. L. Swett Iron Works, Medina, N. Y.
PANAMA Cement Block Machines, J. B. Foote Fdry. Co., Fredericktown, Ohio.
PANAMA Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
PARACOTE Asphalt Roofing & Shingles, Chatfield Mfg. Co., Cincinnati, Ohio.
PARAFLINT Asphalt Shingle, Chatfield Mfg. Co., Cincinati, Ohio.
PARAGON Drawing Paper Instrument & Scales, Keuffel & Esser Co., Hoboken, N. J.
PARAGON Dumb-Waiters, Storm Mfg. Co., Newark, N. J.
PARA-HEX Asphalt Shingle, Chatfield Mfg. Co., Cincinnati, Ohio.
PARAHEX Strip Shingles, Beckman-Dawson Roofing Co., Chicago, Ill.
PARAMOUNT Pressed Steel Clamps, L. S. Starrett Co., Athol, Mass.
PARCHMENT Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
PARKER Corner Bead, Youngstown Pressed Steel Co., Warren, Ohio.
PARKS Woodworking Machinery, Parks Ball Bearing Machine Co., Cincinnati, Ohio.
PARKWAY Drinking Fountains, Crane Co., Chicago, Ill.
PAUL Pumps & Water Systems, Fort Wayne Engineering & Mfg. Co., Fort Wayne, Ind.
PAYZANT Lettering Pens, Keuffel & Esser Co., Hoboken, N. J.
PEARL Wire Cloth for Doors & Windows, Gilbert & Bennett Mfg. Co., Chicago, Ill.
PEARSON Cement Coated Nails, American Steel & Wire Co., Chicago, Ill.
PECOPROOF Waterproofing, Philip Carey Mfg. Co., Lockland, Ohio.
PEERLESS Carriers, Hay Fork Pulleys, Hunt, Helm, Ferris & Co., Harvard, Ill.
PEERLESS Radiators, American Radiator Co., Chicago, Ill.
PEERLESS Roofing, Edwards Mfg. Co., Cincinnati, Ohio.
PEERLESS Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
PELHAM Sash Cord, Silver Lake Co., Newtonville, Mass.
PENBERTHY Washing Machine Drainer, Injectors & Cellar Drainers, Penberthy Injector Co., Detroit, Mich.
PERFECT Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
PERFECT Radiators, United States Radiator Co., Pittsburgh.
PERFECT PATTERN Door Springs, National Mfg. Co., Sterling, Ill.
PERFECTION Brand Oak Flooring, Arkansas Oak Flooring Co., Pine Bluff, Ark.
PERFECTION Door Springs & Gate Springs, American Steel & Wire Co., Chicago, Ill.
PERFECTION Glass Boards, Lufkin Rule Co., Saginaw, Mich.
PERFECTION GUMMERS, E. C. Atkins & Co., Indianapolis, Ind.
PERFECTION Indirect Radiators, American Radiator Co., New York, N. Y.
PERFECTION Sanitary Closet, Chemical Toilet Mfg. Co., Syracuse, N. Y.
PERFECTION Saw Tables, American Saw Mill Machy. Co., Hackettstown, N. J.
PERMAROC Blackboard, E. W. A. Rowles, Chicago, Ill.
PETROFLUID Plaster Waterproof Compound, Morene Products Co., New York, N. Y.
PHAETON Auxiliary Heaters, Excelso Specialty Works, Inc., Buffalo, N. Y.
PHENIX Screens, Awnings, Storm Doors & Windows, Phenix Mfg. Co., Milwaukee, Wis.
PHENIX Storm & Window Screen Hangers & Fasteners, Phenix Mfg. Co., Milwaukee, Wis.
PHILADELPHIA Carts, Lansing Company, Lansing, Mich.
PHILCO Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
PHOENIX Sash Cord Awning Line, Samson Cordage Works, Boston, Mass.
PICCOLO Tapes, Keuffel & Esser Co., Hoboken, N. J.
PIERCON Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
PILOT Drawing Instruments, Keuffel & Esser Co., Hoboken, N. J.
PITMAN Power & Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
PLASTA-SAVER Expanded Metal Lath, North Western Expanded Metal Co., Chicago, Ill.
PLASTERTOX Trowel Application for Damp-proofing, Toch Bros., Inc., New York, N. Y.
PLASTINT Colored Finish Plaster, U. S. Gypsum Co., Chicago Ill.
PLUG-A-LEAK Roofing Paint & Compounds, Toch Bros., Inc., New York, N. Y.
PLUMRITE Pipe, Bridgeport Brass Co., Bridgeport, Conn.
PNEU-GUN Painting Machines, Mellish-Hayward Co., Chicago, Ill.
POLISHOL Furniture Polishes, Sherwin-Williams Co., Cleveland, Ohio.
POLYPHASE Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
POLYPHASE DUPLEX Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
POND Continuous Steel Sash & Sash Operators, David Lupton's Sons Co., Philadelphia, Pa.
POPULAR Tapes, Keuffel & Esser Co., Hoboken, N. J.
PORCELAIN Enameled Ware, Wheeling Sanitary Mfg. Co., Wheeling, W. Va.
POR-SEAL Transparent Dampproofing for Brick, Cement, etc., The Truscon Laboratories, Detroit, Mich.
PORTER Forks, Hangers, Pulleys, J. E. Porter Co., Ottawa, Ill.
PORTER CABLE Machinery & Tools, Porter-Cable Machine Co., Syracuse, N. Y.
PORTER'S COLUMBIAN Carriers, J. E. Porter Corp., Ottawa, Ill.
POSTEX Drawing Papers, Frederick Post Co., Chicago, Ill.
PRAIRIE Woven Wire Fence, American Steel & Wire Co., Chicago, Ill.
PRAIRIE QUEEN Carriers, J. E. Porter Corp., Ottawa, Ill.
PREMIER Automatic Storage Gas Water Heater, Crane Co., Chicago, Ill.
PREMIER Saws, Henry Disston & Sons, Philadelphia, Pa.
PREMO Lavatories, Crane Co., Chicago, Ill.
PRENTRILL Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
PRESTO Sliding Stairs, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
PRIMO Brown & Blue Print Paper & Drawing Instruments & Tables, Frederick Post Co., Chicago, Ill.
PRINCETON Tapers, Keuffel & Esser Mfg. Co., Hoboken, N. J.
PRISON Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
PRISON Lavatories, Crane Co., Chicago, Ill.
PROGRESS Cross Section Paper, Keuffel & Esser Co., Hoboken, N. J.
PROGRESS House Boiler, The Thatcher Co., Newark, N. J.
PRO-LINO Feltbase Floor Covering, W. & J. Sloane, New York, N. Y.
PROTECTOR Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
PROTEX Corner Bead, Youngstown Pressed Steel Co., Warren, Ohio.
PURDUE Tapes, Keuffel & Esser Co., Hoboken, N. J.
PURIMO Closets, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
PURUS Water Closets, Crane Co., Chicago, Ill.
PUTTYLESS Window & Sash, Gould Mfg. Co., Oshkosh, Wis.
PYRAMID Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
PYRAMID BRAND Structural Slate, The Structural Slate Co., Pen Argyl, Pa.
PYROTEX Fireproof Paint, The Truscon Laboratories, Detroit, Mich.
PYROBAR Roof Tile, Floor Tile, Partition, etc., U. S. Gypsum Co., Chicago, Ill.

PYROCELL Insulation & Floor Fill, U. S. Gypsum Co., Chicago, Ill.
PYROFILL Gypsum Poured Roof & Floor System, U. S. Gypsum Co., Chicago, Ill.

Q

QUAKER CITY Brick Trowels, Henry Disston & Sons, Philadelphia, Pa.
QUALITY Finishing & Gauging Plasters, U. S. Gypsum Co., Chicago, Ill.
QUALITYBILT Millwork, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
QUICK COMFORT Gas Heaters, American Stove Co., St. Louis, Mo.
QUICK DONE for Accelerating Setting of Portland Cement Construction & Lowering Freezing Point, Toch Bros., Inc., New York, N. Y.
QUICK MEAL Stoves, Ranges, Burners, Furnaces, Ovens, Heaters, Torches, American Stove Co., St. Louis, Mo.
QUILT Sheathing, Samuel Cabot, Inc., Boston, Mass.
QUIXSET Steel Garages and Joist Hangers, Blaw-Knox Co., Pittsburgh, Pa.

R

R. F. D. Padlocks, Sargent & Co., New Haven, Conn.
R. I. W. Paints for Damp-proofing, Protecting Cut Stone, Resist Acid Alkalis, Electrolysis & Water, Toch Bros., Inc., New York, N. Y.
RACINE Floor Spring, Single & Double Acting Jamb, etc., Hinges, Milwaukee Stamping Co., Milwaukee, Wis.
RADIANT Blue Print Paper, Eugene Dietzgen Co., Inc., Chicago, Ill.
RAIL TRACK Concrete Mixers, Equipment Corp. of America, Chicago, Ill.
RANDALL Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
RANSOME STANDARD Building Mixer, High Carbon Concrete Chutes, Ransome Concrete Machinery Co., Dunellen, N. J.
RAPIDAYTON Oil Tanks & Pumps, Dayton Pump & Mfg. Co., Dayton, Ohio.
RECEPTOR for Shower Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
RECESS Drinking Fountains, Lavatories & Bath Tubs, Crane Co., Chicago, Ill.
RECESS Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
RECONA Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
RECORD Padlocks, Sargent & Co., New Haven, Conn.
RED HOOP GALVANIZED Shingle Nails, American Steel & Wire Co., Chicago, Ill.
RED METAL Chains, Smith & Egge Mfg. Co., Bridgeport, Conn.
RED SEAL Oxide of Zinc, The New Jersey Zinc Sales Co., New York, N. Y.
RED TOP Wall Plaster, U. S. Gypsum Co., Chicago, Ill.
REED Hay Forks, Pullers, The F. E. Myers & Bro. Co., Ashland, Ohio.
REGAL Roofing, Johns-Manville, Inc., New York City, N. Y.
REGLAR Clothes Lines, Samson Cordage Works, Boston, Mass.
RELAX Spring Hinges, Chicago Spring Hinge Co., Chicago, Ill.
RELIABLE Scaffold Brackets, Elite Mfg. Co., Ashland, Ohio.
RELIABLE Door Hangers, Rolling Ladders & Overhead Carriers, Allith-Prouty Co., Danville, Ill.
RELIABLE Jacks, Elite Mfg. Co., Ashland, Ohio.
RELIABLE Measuring Tapes, Lufkin Rule Co., Saginaw, Mich.
RELIABLE Squares, L. S. Starrett Co., Athol, Mass.
RELIANCE Door Springs, Chicago Spring Hinge Co., Chicago, Ill.
RELIABLE Measuring Tape, Eugene Dietzgen Co., Inc., Chicago, Ill.
RE-MOVE-ABLE Poles & Posts, Newark Steel Post Co., Newark, N. J.
REN-LOCKS Electric Lamp Lock, Ren Mfg. Co., Winchester, Mass.
RENNSELAER Tapes, Keuffel & Esser Co., Hoboken, N. J.
RE-PEL-LO Waterproofed Duck, John Boyle & Co., New York, N. Y.
REVERE Lavatories, Crane Co., Chicago, Ill.
REX Chains, Chain Belt Co., Milwaukee, Wis.
REX Concrete Mixers & Pavers, Chain Belt Co., Milwaukee, Wis.
REX Elevator & Conveyor & Traveling Water Screens, Chain Belt Co., Milwaukee, Wis.
REX CHABELCO Chains, Chain Belt Co., Milwaukee, Wis.
REX DUROBAR Chains, Chain Belt Co., Milwaukee, Wis.
REX GRIPLOCK Chains, Chain Belt Co., Milwaukee, Wis.
REX UNICAST Chains, Chain Belt Co., Milwaukee, Wis.
REXPAR Varnishes, Sherwin-Williams Co., Cleveland, Ohio.
RIBPLEX Ribb Metal Lath, Berger Mfg. Co., Canton, Ohio.
RICHARDSON Wall Boards, The Richardson Co., Lockland, Ohio.
RID-O-SKID Skid Tire Chains, American Chain Co., Inc., Bridgeport, Conn.
RIGO Drinking Fountains, Crane Co., Chicago, Ill.
ROBINSON Tubular Furnaces & Pipeless Furnaces, Robinson Furnace Co., Chicago, Ill.
ROBINSON'S Anemometers, Frederick Post Co., Chicago, Ill.
ROCK ISLAND NO STREAK Registers, Rock Island Register Co., Rock Island, Ill.
ROCKFORD Shapers, Jos. T. Ryerson & Son, Chicago, Ill.
ROCKLATH Plasterboard, U. S. Gypsum Co., Chicago, Ill.
ROCKWALL Wallboard, Atlantic Gypsum Co., Boston, Mass.
ROEBLING Wire Lath, New Jersey Wire Cloth Co., Trenton, N. J.
ROLLAWAY Door Hangers & Track, Frantz Mfg. Co., Sterling, Ill.
ROMANESQUE Wire Glass & Not Wired, Mississippi Glass Co., New York, N. Y.
ROOF SEAL Roof Paints, The Truscon Laboratories, Detroit, Mich.
ROOFRITE Metal Shingles, W. C. Hopson Co., Grand Rapids, Mich.
ROSELLE Fountains, Crane Co., Chicago, Ill.
ROYAL Lavatories, Crane Co., Chicago, Ill.
ROYAL Shingle Machines, American Saw Mill Machy. Co., Hackettstown, N. J.
ROYAL Wire Fences (Zinc Insulated) American Steel & Wire Co., Chicago, Ill.
ROYAL Woodworking Machy., American Saw Mill Machy. Co., Hackettstown, N. J.
RUBBEROID Felt, etc., Roofing & Shingles, Ruberoid Co., New York City.
RUBBERTEX Roofing, The Richardson Co., Lockland, Ohio.
RUBY COAL Fireplace Grates, Electric Fireplace Mfg. Co., Inc., Chicago, Ill.
RUBEROID Roofing & Shingles, Ruberoid Co., New York, N. Y.
RUGBY Lavatories, Crane Co., Chicago, Ill.
RUNWEL Door Hangers & Track, Frantz Mfg. Co., Sterling, Ill.
RUST BAR Coating for Steel, A. C. Horn Co., Long Island City, N. Y.
RYERSON High Speed Friction Saws, Joseph T. Ryerson & Son, Inc., Chicago, Ill.
RYERSON Horizontal Drilling & Boring Machines, Joseph T. Ryerson & Son, Inc., Chicago, Ill.

S

S. W. P. Prepared Paint, Sherwin-Williams Co., Cleveland, Ohio.
SACHEM Sash Cord, Samson Cordage Works, Boston, Mass.
SACKETT Plaster Board Slabs, etc., U. S. Gypsum Co., Chicago, Ill.
SAFEGUARD Water Gauges, Penberthy Injector Co., Detroit, Mich.
SAFETY FIRST Paints (Street Marking), The Truscon Laboratories, Detroit, Mich.
SAGLESS Gate Spring, Pivot Hinges, Chicago Spring Hinge Co., Chicago, Ill.
SAMS Wire Stretchers, Hunt, Helm, Ferris & Co., Harvard, Ill.
SAMSON Chains, Chain Products Co., Cleveland, Ohio.
SAMSON Diggers, Saw Sets, H. Disston & Sons, Inc., Philadelphia, Pa.
SAMSON Sash Cord, Shade Cord, Masons' Lines, Solid Braided Rope, Signal Cord, Bell & Register Cord, Samson Cordage Works, Boston, Mass.
SAMSON Windmills, Stover Mfg. & Engine Co., Freeport, Ill.
SAMSON SPOT Sash Cord, Clothes Lines, Trolley Cord, Arc Lamp Cord, Samson Cordage Works, Boston, Mass.
SAN-A-EQUIP Septic Tanks, Chemical Toilet Corp., Syracuse, N. Y.
SANDER PLANE Hand Sander, American Floor Surfacing Machine Co., Toledo, Ohio.
SANETO Water Closets, Crane Co., Chicago, Ill.
SANICOTE Wall Finish, Reardon Co., St. Louis, Mo.
SANISON Tapes, Keuffel & Esser Co., Hoboken, N. J.
SANITARY School Indirect Radiators, American Radiator Co., New York, N. Y.
SANITEX Sanitary Closet Seat Spring Hinges, Chicago Spring Hinge Co., Chicago, Ill.
SANTO Urinals, Crane Co., Chicago, Ill.
SANWALL Water Closets, Crane Co., Chicago, Ill.
SARGENT Builders' Hardware, Mechanics' Tools, etc., Sargent & Co., New Haven, Conn.
SARGENT Steel Squares, Planes, Day & Night Latches, Padlocks, Liquid Door Checks & Springs, Fire Exit Bolts, Sargent & Co., New Haven, Conn.
SASGEN Derricks, Sasgen Derrick Co., Chicago, Ill.
SATINETTE Enamels, Standard Varnish Works, New York, N. Y.
SAWYERS FAVORITE Mill Board, American Saw Mill Machinery Co., Hackettstown, N. J.
SCAR-NOT Varnish, Sherwin-Williams Co., Cleveland, Ohio.
SCHLAGE Locks, Schlage Lock Co., San Francisco, Calif.
SCHLUETER Rapid Floor Surfacers, Lincoln-Schlueter Machinery Co., Inc., Chicago, Ill.
SCHOLA Drawing Paper, Keuffel & Esser Co., Hoboken, N. J.
SCHRODER Eaves Trough Hanger, F. D. Kees Mfg. Co., Beatrice, Neb.
SEACTO Water Closet, Crane Co., Chicago, Ill.
SECURITY Cements, North American Cement Corp., Albany, N. Y.
SECURITY Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
SECURITY Portland Cement, North American Cement Corp., Albany, N. Y.
SEDGWICK Elevators, Sedgwick Machine Works, New York, N. Y.
SEHMI Milling Saws, Huther Bros. Saw Mfg. Co., Rochester, N. Y.
SELF-LOCK Wire Stretchers, Hunt, Helm, Ferris & Co., Harvard, Ill.
SELFLOCK Eavetrough Hangers, Milwaukee Corrugating Co., Milwaukee, Wis.
SELLERS Kitchen Cabinets, G. I. Sellers & Sons, Elwood, Ind.
SEMCO Elevators, Sidney Elevator Mfg. Co., Sidney, Ohio.
SENIOR Spray Pumps & Pumping Jacks, The F. E. Myers & Bro. Co., Ashland, Ohio.
SERENO Drinking Fountains, Crane Co., Chicago, Ill.
SERVICE Sheet Packing, Johns-Manville, Inc., New York, N. Y.
SERVOLEUM Floor Composition, Special Service Flooring Corp., New York, N. Y.
SEVILLE Lavatories, Crane Co., Chicago, Ill.
SHARON Channels, Youngstown Pressed Steel Co., Warren, Ohio.
SHEETROCK Wall Board & Crack Filler, U. S. Gypsum Co., Chicago, Ill.
SHEETROCK FINISHER, U. S. Gypsum Co., Chicago, Ill.
SHELBAS Lavatories, Crane Co., Chicago, Ill.
SHELDON Concrete Mixer & Portable Saw Rig, The Sheldon Mfg. Co., Inc., Nehawka, Neb.
SHELDON'S Slates, F. C. Sheldon Slate Co., Granville, N. Y.
SHEELAV Lavatories, Crane Co., Chicago, Ill.
SIDNEY Elevators, Sidney Elevator Mfg. Co., Sidney, Ohio.
SIDNEY Woodworking Machinery, Sidney Machine Tool Co., Sidney, Ohio.
SILENT Door Hangers & Track, National Mfg. Co., Sterling, Ill.
SILICO Prepared Finish, U. S. Gypsum Co., Chicago, Ill.
SILICO Wall Finish, United States Gypsum Co., Chicago, Ill.
SILOTITE Protection Against Ensilage Acids, The Truscon Laboratories, Detroit, Mich.
SILVER LAKE Awning, Dumbwaiter, Sash, Shade, Ball Trolley & Ventilator Cords, Silver Lake Co., Newtonville, Mass.
SIMPLEX Concrete Mixer, The Miles Mfg. Co., Jackson, Mich.
SIMPLEX Door Hangers, Richards-Wilcox Mfg. Co., Aurora, Ill.
SIMPLEX Drawing Paper, Keuffel & Esser Co., Hoboken, N. J.
SIMPLEX Pumps, Standards, Jacks & Door Hangers, The F. E. Myers & Bro. Co., Ashland, Ohio.
SIMPLEX Single & Double Acting Hinges, Chicago Spring Hinge Co., Chicago, Ill.
SIMPLICITY Saw Mill Dogs, American Saw Mill Machinery Co., Hackettstown, N. J.
SINTON Lavatories, Crane Co., Chicago, Ill.
SIR FABRIC Reinforcing for Concrete, Plaster and Stucco, Nation Steel Fabric Co., Pittsburgh, Pa.
SITZ Baths, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
SIX LEVER Padlocks, Sargent & Co., New Haven, Conn.

SKY LINE Asphalt Roofing & Shingles, Chatfield Mfg. Co., Cincinnati, Ohio.
SLATILE Roofing, Beckman-Dawson Roofing Co., Chicago, Ill.
SLIP-A-PART Hinges, Stover Mfg. & Engine Co., Freeport, Ill.
SLYPHON Regulators, Air Brakes, Radiator Valves, American Radiator Co., Chicago, Ill.
SMITH Concrete Mixers, T. L. Smith Co., Milwaukee, Wis.
SMITH Tilting & Non-Tilting Concrete Mixers, T. L. Smith & Co., Milwaukee, Wis.
SMITH'S COLONIAL Mortar Colors, American Magnestone Corp., Springfield, Ill.
SNAPCATCH Porcelain Sockets & Receptacles, General Electric Co., Schenectady, N. Y.
SNO-WHITE Enamel, The Truscon Laboratories, Detroit, Mich.
SNOW WHITE Enamel, Toch Bros. Co., New York, N. Y.
SNOW WHITE Filler, U. S. Gypsum Co., Chicago, Ill.
SNOWFLAKE Hydrated Lime, Kelley Island Lime & Transport Co., Cleveland, Ohio.
SOLARITE Wall Coating, Reardon Co., St. Louis, Mo.
SOLVAY Super Cleanser & Super Alkali, Solvay Process Co., New York, N. Y.
SOLVAY Snowflake Crystals, Solvay Process Co., New York, N. Y.
SOUTHERN Barrows, Lansing Co., Lansing, Mich.
SPEAKMAN Showers, Speakman Company, Wilmington, Del.
SPEED Portland Cement, Louisville Portland Cement Co., Louisville, Ky.
SPEED MARVEL Wood Working Machinery, Hutchinson Mfg. Co., Norristown, Pa.
SPEEDGRITS Abrasive Paper, Cloth & Combination, Manning Abrasive Co., Troy, N. Y.
SPIRO Water Closets, Crane Co., Chicago, Ill.
SPRA RITE Nozzles, Blinks Spray Equipment Co., Chicago, Ill.
STANDARD Attaching Plugs & Receptacles, General Electric Co., Schenectady, N. Y.
STANDARD Bath Room Fixtures, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
STANDARD Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
STANDARD Lump Lime, Kelley Island Lime & Transport Co., Cleveland, Ohio.
STANDARD Profile & Cross Section Paper, Keuffel & Esser Co., Chicago, Ill.
STANDARD Roofings, Beckman-Dawson Roofing Co., Chicago, Ill.
STANDARD Trowels, Henry Disston & Sons, Philadelphia, Pa.
STANLEY Tools, Stanley Rule & Level Co., New Britain, Conn.
STANLEY Zig Zag Rules, Nail Sets and Center Punches, Stanley Rule & Level Co., New Britain, Conn.
STANLEY FOUR-SQUARE HOUSEHOLD Tools, Stanley Rule & Level Co., New Britain, Conn.
STAR Cement, Louisville Cement, Co., Louisville, Ky.
STAR Paint & White Washing Machines, Binks Spray Equipment Co., Chicago, Ill.
STAR Tanks, Towers & Windmills, Flint & Walling Co., Kendallville, Ind.
STARRETT Screw Drivers, Indicator Pliers, Saws, Steel Tapes, Rules, etc., L. S. Starrett Co., Athol, Mass.
STAY RIB Metal Lath, Milwaukee Corrugating Co., Milwaukee, Wis.
STAYON Door Hangers & Tracks, The F. E. Myers & Bro. Co., Ashland, Ohio.
STEELCOTE Portable Garages, Edwards Mfg. Co., Cincinnati, Ohio.
STEELCRETE Expanded Metal, Consolidated Expanded Metal Cos., Braddock, Pa.
STERLING Surveying & Engineering Instruments, Warren-Knight Co., Philadelphia, Pa.
STERLING INDIRECT Radiators, American Radiator Co., New York, N. Y.
STEVENS Levels, E. A. Stevens, Newton Falls, Ohio.
STEVENS Measuring Tapes, Keuffel & Esser Co., Hoboken, N. J.
STEWART Concrete Mixers, Stewart Mfg. Co., Waterloo, Iowa.
STORM PROOF Hangers, National Mfg. Co., Sterling, Ill.
STOVER Engines, Grinders & Feed Mills, Motors, Stover Mfg. & Engine Co., Freeport, Ill.
STOVALA Heaters, Stover Mfg. Engine Co., Freeport, Ill.
STRAIGHT-WAY Garage Sets, J. E. Porter Corp., Ottawa, Ill.
STRUCTOLITE Structural Gypsum, U. S. Gypsum Co., Chicago, Ill.
STUCCO TEX Hydraulic Paint, The Truscon Laboratories, Detroit, Mich.
STUCCO Waterproof Cement Paint, The Truscon Laboratories, Detroit, Mich.
SUBSIDO Closets, Crane Co., Chicago, Ill.
SUCCESS Chemical Fire Extinguisher, Johns-Manville, Inc., New York City.
SUN Radiators, U. S. Radiator Corp., Pittsburgh.
SUNRAY Coal Grates, Ohio Foundry & Mfg. Co., Steubenville, Ohio.
SUPER GIANT Shingles, Richardson Co., Lockland, Ohio.
SUPER-POR-SEAL Transparent Dampproofing for Concrete & Masonry, The Truscon Laboratories, Detroit, Mich.
SUPER SIX Steam Generator, S. R. M. Orum, Inc., Philadelphia, Pa.
SUPERIOR Metal Corner Bead, Milwaukee Corrugating Co., Milwaukee, Wis.
SUPERIOR Woodworking Machinery, Jones Superior Machine Co., Chicago, Ill.
SUPREME Roofings, Beckman-Dawson Roofing Co., Chicago, Ill.
SURBAS Lavatories, Crane Co., Chicago, Ill.
SURROL Lavatories, Crane Co., Chicago, Ill.
SURE GRIP Carriers, Door Hangers & Tracks, Hay Forks, Pulleys, The F. E. Myers & Bro. Co., Ashland, Ohio.
SURE LOCK Carriers, Unloaders, The F. E. Myers & Bro. Co., Ashland, Ohio.
SURETY Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
SURLAV Lavatories, Crane Co., Chicago, Ill.
SUWANEE Saws, Henry Disston & Sons, Inc., Philadelphia, Pa.
SYENITE Wire-Glass (and Not Wired), Mississippi Glass Co., New York City.
SYMMETRIC Stone Crushers, The T. L. Smith Co., Milwaukee, Wis.
SYNTRON Electric Hammers, Tampers, etc., Syntron Co., Pittsburgh, Pa.
SYRACUSE Sanders, Porter-Cable Machine Co., Syracuse, N. Y.

T

T. N. RE-MOVE-ABLE Steel Posts, Newark Steel Post Co., West Orange, N. J.
TAGGERS Tin, American Sheet & Tin Plate Co., Pittsburgh, Pa.
TAKE DOWN Hay Rack Brackets, The F. E. Myers & Bro. Co., Ashland, Ohio.
TANDEM Sash Balances, Pullman Mfg. Co., Rochester, N. Y.
TARINA Baths, Crane Co., Chicago, Ill.
TASGON Penetrating Oil, Rust Solvent, Samuel Cabot, Inc., Boston, Mass.
TASITE Paint & Varnish Remover, Sherwin-Williams Co., Cleveland, Ohio.
TAXITE Paint & Varnish Remover, Sherwin-Williams Co., Cleveland, Ohio.
TAXLOXPORE Paints, Toch Bros., New York, N. Y.
TAYLOR Clamps & Clamp Carriers, Jas. L. Taylor Mfg. Co., Poughkeepsie, N. Y.
TELENDURON Moulded Products, Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
TELSA Compression Cocks, Crane Co., Chicago, Ill.
TELSA JR. Compression Faucets, Crane Co., Chicago, Ill.
TELSMITH Rock Crushers, Bucket Elevators & Belt Conveyors, Smith Engineering Works, Milwaukee, Wis.
TEMPERITE Quick Set & Anti-Freeze for Concrete, The Truscon Laboratories, Detroit, Mich.
TEN TEN Door Hangers, Allith-Prouty Co., Danville, Ill.
TENSO Pattern Chains, American Chain Co., Inc., Bridgeport, Conn.
TEXAS Tapes, Keuffel & Esser Co., Hoboken, N. J.
THATCHER Boilers & Furnaces, The Thatcher Co., Newark, N. J.
THE STANDARD Scales, Concrete Mixers, Standard Scale & Supply Co., Pittsburgh, Pa.
THE YANKEE JAW Pipe Wrenches, Richards-Wilcox Mfg. Co., Aurora, Ill.
THERMOFILL Dry Fill Insulation, U. S. Gypsum Co., Chicago, Ill.
THESPIAN Drinking Fountains, Crane Co., Chicago, Ill.
THREADED CATCH Sockets, General Electric Co., Schenectady, N. Y.
THREE WAY Prismatic Vault & Sidewalk Lights, American 3-Way Luxfer Prism Co., Cicero, Ill.
THRU-CORD Switches, General Electric Co., Schenectady, N. Y.
THUMB-SWITCH Lamp Guard, McGill Mfg. Co., Valparaiso, Ind.
TIGER BRAND White Rock Finish Mason's & Agricultural Hydrated Lime, Kelley Island Lime & Transport Co., Cleveland, Ohio.
TIME SAVER Drill Tap & Wire Gauge, L. S. Starrett Co., Athol, Mass.
TIP TOP Tapes, Keuffel & Esser Co., Hoboken, N. J.
TITELOCK American & Spanish Metal Tiles & Shingles, Milwaukee Corrugating Co., Milwaukee, Wis.
TOCHSEDO Varnishes, Toch Bros., Inc., New York City, N. Y.
TOCKOLITH Anti-Corrosive Priming Paints for Coatings & Preserving Iron & Steel, Toch Bros., Inc., New York, N. Y.
TOLEDO Lighting Fitments, Edward N. Riddle Co., Toledo, Ohio.
TOLEDO Saws, Henry Disston & Sons, Philadelphia, Pa.
TOLVA Lavatories, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
TONCAN Rust Resisting Steel, United Alloy Steel Corp., Canton, Ohio.
TONCAN METAL Rust Resisting Iron, United Alloy Steel Corp., Canton, Ohio.
TORPEDO Ventilating Skylights, Milwaukee Corrugating Co., Milwaukee, Wis.
TORREY Spring Door, Sargent & Co., New Haven, Conn.
TOURAINE Fountains, Crane Co., Chicago, Ill.
TOXEMONT Integral Waterproofing & Acid Proofing Compound for Concrete, etc., Toch Bros., Inc., New York, N. Y.
TOXLOXPORE Colorless Dampproofing for Brick, etc., Toch Bros., Inc., New York City.
TRANE Vapor Heating Systems, Trane Co., LaCrosse, Wis.
TRANSIT Levels, Geier & Bluhm, Inc., Troy, N. Y.
TRANSITE ASBESTOS Smoke Jacks, Johns-Manville, Inc., New York, N. Y.
TRETON Radiators, U. S. Radiator Corp., Detroit, Mich.
TRI-COAT Insulated Cable, General Electric Co., Schenectady, N. Y.
TRIANGLE Wire Mesh for Concrete Reinforcement, American Steel & Wire Co., Chicago, Ill.
TRIMBAK for Painting Back of Wood Trim, Toch Bros., Inc., New York City.
TRINEX Paint Remover, Trinity Chemical Corp., New York.
TRINIDAD Native Lake Asphalt, The Barber Asphalt Co., Philadelphia, Pa.
TRIPLEX Single & Double Acting Spring Hinges, Chicago Spring Hinge Co., Chicago, Ill.
TRIUMPH Drinking Fountains, Crane Co., Chicago, Ill.
TRIUMPH Jacks, The F. E. Myers & Bro. Co., Ashland, Ohio.
TRIUMPH Lawn Sprinklers, National Brass Co., Grand Rapids, Mich.
TRIUMPH Planer, Matcher & Moulder, American Saw Mill Machinery Co., Hackettstown, N. J.
TRIUMPH Saw Sets, Henry Disston & Sons, Philadelphia, Pa.
TRIUMPH Self-Closing Cocks & Bibbs, Crane Co., Chicago, Ill.
TRIUMPH Self-Closing Faucets, Crane Co., Chicago, Ill.
TRIUMPH STANDARDIZED Panel Boards & Cabinets, Frank Adam Electric Co., St. Louis, Mo.
TROUBLE-SAVER Brackets, Jacks, Scaffolds, Masons Trestles, etc., Steel Scaffolding Co., Evansville, Ind.
TROYAN Loud Speakers, Geier & Bluhm, Inc., Troy, N. Y.
TRU-LAY Wire Rope & Cables, American Cable Co., Inc., New York, N. Y.
TRU LOC Fittings, American Cable Co., Inc., New York, N. Y.
TRUCK JACK Lifting Jacks, Elite Mfg. Co., Ashland, Ohio.
TRUSCON Metal Lath, Expanded Metal Post Caps, Concrete Reinforcing Materials, Steel Window Sash, Pressed Steel Sill Plates, Angles, Furring Strips, Beams, Platforms, Roofing, Steel Doors, etc., Truscon Steel Co., Youngstown, Ohio.
TRUSCON Dampproofings, Waterproofings, Paints, Varnishes, Enamels & Mill White Paints, Stains and Maintenance Products. Truscon Laboratories, Detroit, Mich.
TRUSS-LOOP Metal Lath, Bostwick Steel Lath Co., Niles, Ohio.
TRUTEST Instruments & Sterilizers, Frank S. Betz Co., Hammond, Ind.

TRUS-V-RIB Light Reinforcement, Bostwick Steel Lath Co., Niles, Ohio.
TRU-TYE Steel Bridging, Blaw-Knox Co., Pittsburgh, Pa.
TUBULAR Furnace, The Thatcher Co., Newark, N. J.
TUNGSTEN Incandescent Lamps, General Electric Co., Schenectady, N. Y.
TUXEDO Lavatories, Crane Co., Chicago, Ill.
TWENTIETH CENTURY Woodworker, Cresson-Morris Co., Philadelphia, Pa.
TWIN Receptacles, General Electric Co., Schenectady, N. Y.
TWIN SOCKET Plugs, General Electric Co., Schenectady, N. Y.
TYCRETE Texture Paint, A. C. Horn Co., Long Island City, N. Y.
TYPE A Heat Machines, American Radiator Co., New York, N. Y.
TYPHOON Pumps, Fairbanks, Morse & Co., Chicago, Ill.
TYRONE Drinking Fountains, Crane Co., Chicago, Ill.

U

UNION Blue Print Paper, Eugene Dietzgen Co., Chicago, Ill.
UNION Tracking Cloth, Keuffel & Esser Co., Hoboken, N. J.
UNION Woodworking Machinery, Gallmeyer & Livingston Co., Grand Rapids, Mich.
UNION LOCK Poultry Fences, American Steel & Wire Co., Chicago, Ill.
UNIQUE Trestles, Keuffel & Esser Co., Hoboken, N. J.
UNIT Lavatory Fixtures, Speakman Co., Wilmington, Del.
UNIT Sash Balances, Pullman Mfg. Co., Rochester, N. Y.
UNITED Fences, American Steel & Wire Co., Chicago, Ill.
UNITED STATES Fences, American Steel & Wire Co., Chicago, Ill.
UNITED STATES Door Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
UNITED STATES Mineral Wool, U. S. Mineral Wool Co., New York, N. Y.
UNITED STATES Woven Wire Fence (Zinc Insulated), American Steel & Wire Co., Chicago, Ill.
UNITED STATES EAGLE Roofing Tin Plates, American Sheet & Tin Plate Co., Pittsburgh, Pa.
UNITY Bath Room Fixtures, J. H. Balmer Co., Newark, N. J.
UNIVERSAL Cement, Universal Portland Cement Co., Chicago, Ill.
UNIVERSAL Drawing Paper, Keuffel & Esser Co., Hoboken, N. J.
UNIVERSAL Measuring Tapes, Try & Mitre Squares, The Lufkin Rule Co., Saginaw, Mich.
UNIVERSAL Mixer, The Marsh-Capron Co., Chicago, Ill.
UNIVERSAL Pivot Spring Hinges, Milwaukee Stamping Co., Milwaukee, Wis.
UNIVERSAL Plasterers' Steel Corner Beads, General Fireproofing Co., Youngstown, Ohio.
UNIVERSAL Prepared Finish, U. S. Gypsum Co., Chicago, Ill.
UNIVERSAL Rock Crushers, Universal Crusher Co., Cedar Rapids, Iowa.
UNIVERSAL Saws, Henry Disston & Sons, Philadelphia, Pa.
UNIVERSAL Steel Forms, Blaw-Knox Co., Pittsburgh, Pa.
UNIVERSAL Test Indicators, Scrapers, L. S. Starrett Co., Athol, Mass.
UNIVERSAL Wall Finish, United States Gypsum Co., Chicago, Ill.
UNIVERSAL Woodworking Machinery, Sidney Machine Tool Co., Sidney, Ohio.
UPRIGHT Scrapers, National Mfg. Co., Sterling, Ill.
UP-TO-DATE Shingle Machines, American Saw Mill Machinery Co., Hackettstown, N. J.
USAMP Mildewproof Cotton Duck, Fulton Bag & Cotton Mills, Atlanta, Ga.
UTILITY Floor Machines & Water Trucks, The Kent Co., Inc., Rome, N. Y.

V

V. C. Disc Emery Surface & Tool Grinders, Polishing, Metal Grinding & Wood Working Machinery, Gallmeyer & Livingston Co., Grand Rapids, Mich.
VACUNA Portable Vacuum Cleaners, The Kent Co., Inc., Rome, N. Y.
VALLEY CITY Milling & Drilling Machinery, Gallmeyer & Livingston Co., Grand Ripads, Mich.
VAN DYKE Solar Paper, Eugene Dietzgen Co., Inc., Chicago, Ill.
VARI-UNI-CAB Kitchen Units, Variable Unit Cabinet Co., Indianapolis, Ind.
VELVET EDGE Oak Flooring Strips, Arkansas Oak Flooring Co., Pine Bluff, Ark.
VENTO Radiators & Heaters, American Radiator Co., New York, N. Y.
VENUS Tracing Cloth, Keuffel & Esser Co., Chicago, Ill.
VENT RITE Ventilators, W. C. Hopson, Grand Rapids, Mich.
VERNA Bath Tubs, Crane Co., Chicago, Ill.
VERNON Lavatories, Crane Co., Chicago, Ill.
VERTE ANTIQUE for Corroded Copper Effect, Toch Bros., Inc., New York, N. Y.
VICTOR Door Springs, Sargent & Co., New Haven, Conn.
VICTOR Gummers, Henry Disston & Sons, Philadelphia, Pa.
VICTOR Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
VICTOR Tools, Stanley Rule & Level Co., New Britain, Conn.
VICTORIA Metal Shingles, Cortright Metal Roofing Co., Philadelphia, Pa.
VICTORY Bath Fixture, Chicago Faucet Co., Chicago, Ill.
VICTORY Hand Saw, Henry Disston & Sons, Inc., Philadelphia, Pa.
VIRGINIAN Saws, Henry Disston & Sons, Inc., Philadelphia, Pa.
VISKALT Roofing, Richardson Co., Lockland, Ohio.
VITRIBESTOS Pipe & Boiler Covering, Johns-Manville, Inc., New York, N. Y.
VITROLITE "Better Than Marble," Vitrolite Co., Chicago, Ill.
VOLTALAC Insulating Varnish, Standard Varnish Works, New York City.
VOL-YUM Register, Rock Island Register Co., Rock Island, Ill.
VORCY Urinals, Crane Co., Chicago, Ill.
VORTEX Weatherstrips, Kuhlmann Metal Weatherstrip Co., St. Louis, Mo.
VORTO Urinals, Crane Co., Chicago, Ill.

W

W. P. Insulating Varnish, Standard Varnish Works, New York, N. Y.
W. & B. Tool Cases, Wedell & Boers, Detroit, Mich.
WAGNER Fine Stops, Clamps, Clippers, Fasteners, Gauges, Hinges, Ladder & Scaffold Brackets, Latches, Pulls, Sash & Screen Holders, Hangers & Braces, Sleds, Speeds, Wagons, Wheel Catches, Wagner Mfg. Co., Cedar Falls, Iowa.
WAGNER LEADER Door Hangers, Wagner Mfg. Co., Cedar Falls, Iowa.
WAGNER STEEL Ball Bearing Sliding Elevator, Doors, Hangers, etc., Wagner Mfg. Co., Cedar Falls, Iowa.
WALKER Dishwasher, Walker Dishwasher Corp., Syracuse, New York.
WALLACE Woodworking Machinery, J. D. Wallace & Co., Chicago, Ill.
WALSYN Water Closets, Crane Co., Chicago, Ill.
WARLO Automatic Water Systems, Crane Co., Chicago, Ill.
WASHBURNE Sliding Door Locks & Latches, National Mfg. Co., Sterling, Ill.
WATER CONTROLLED Flush Valves, Crane Co., Chicago, Ill.
WATERLOO Bar Bending Machines, Construction Machinery Co., Waterloo, Iowa.
WATERPROOF SPEED GRITS, Manning Abrasive Co., Inc., New York, N. Y.
WEARPROOF Roofings, Beckman-Dawson Roofing Co., Chicago, Ill.
WEATHERBEST Stained Shingle, Weatherbest Stained Shingle Co., Inc., North Tonawanda, N. Y.
WEED Chain Jacks, American Chain Co., Inc., Bridgeport, Conn.
WESTMINSTER Clocks, American Cuckoo Clock Co., Philadelphia, Pa.
WHEELING Porcelain Vitreous Ware, Wheeling Sanitary Mfg. Co., Wheeling, W. Va.
WHISLER Splitters, Whisler Mfg. Co., Ottumwa, Iowa.
WHITE ENAMEL Finish Hydrated Lime, Woodville Lime Products Co., Toledo, Ohio.
WHITE LILY FINISH Hydrated Lime, Woodville Lime Products Co., Toledo, Ohio.
WHITE ROCK Wallboard, American Gypsum Co., Port Clinton, O.
WHITE STAR Hydrated Lime, Louisville Cement Co., Louisville, Ky.
WHITE STEEL Bathrom Medicine Cabinets, Mirrors & Toilet Fittings, White Steel Sanitary Furniture Co., Grand Rapids, Mich.
WHITE'S IMPROVED Instruments, David White Co., Milwaukee, Wis.
WHITEKRAFT Aseptic Steel Furniture, Frank S. Betz Co., Hammond, Ind.
WHITNEY Drinking Fountains, Crane Co., Chicago, Ill.
WICKWIRE SPENCER Wire Rope, Wickwire Spencer Steel Co., New York, N. Y.
WILDER LIFETIME Bathroom Cabinets, Wilder Mfg. Co., Brooklyn, N. Y.
WILDER All-Steel Folding Chairs, Wilder Mfg. Co., Brooklyn, N. Y.
WILTON Lavatories, Crane Co., Chicago, Ill.
WINDOW Coal Chutes, Holland Furnace Co., Holland, Mich.
WINLOK Window Locks and Fasteners, Cur-Man-Co., Inc., Astoria, New York.
WINTHROP Asphalt Shingles, Beckman-Dawson Roofing Co., Chicago, Ill.
WIRT Radio Lightning Arresters, Wirt Co., Philadelphia, Pa.
WIZARD Saws, Henry Disston & Sons, Philadelphia, Pa.
WOCO Doors, Wheeler-Osgood Co., Tacoma, Wash.
WODACK Hand Power Saws, F. L. Rogers & Co., Chicago, Ill.
WOLVERINE Barrows, Contractors' Material, Hoists, Lansing Co., Lansing, Mich.
WONDER Concrete Mixers & Hoists, Backfillers & Trench Pump, Construction Machinery Co., Waterloo, Iowa.
WOODMERE Bath Tubs, Standard Sanitary Mfg. Co., Pittsburgh, Pa.
WOODWORKERS' FRIEND Jointer Heads, Whisler Mfg. Co., Ottumwa, Iowa.

X

X. L. 96 Ejectors & Pumps, Penberthy Injector Co., Detroit, Mich.
XX CENTURY Expanded Metal Lath, North Western Expanded Metal Co., Chicago, Ill.
XX CENTURY Metal Lath, North Western Expanded Metal Co., Chicago, Ill.

Y

Y Oil Engines, Fairbanks, Morse & Co., Chicago, Ill.
Y. P. S. Copper-Steel Basement Windows, Copper-Steel Coal Doors, Box Channel, Pencil Channel, Stucco Mesh, Joist Pin Anchors, Steel Bridging, Youngstown Pressed Steel Co., Warren, Ohio.
Y & S Transits & Levels, Keuffel & Esser Co., Hoboken, N. J.
YANKEE Calipers & Dividers, L. S. Starrett Co., Athol, Mass.
YANKEE Tools, North Bros. Mfg. Co., Philadelphia, Pa.
YANKEE JAW Pipe Wrenches, Richards-Wilcox Mfg. Co., Aurora, Ill.
YECTO Heaters, American Radiator Co., New York, N. Y.
YONDA Boilers, American Radiator Co., New York, N. Y.
YORK Drinking Fountains, Crane Co., Chicago, Ill.
YOUNG & SONS Transits & Levels, Keuffel & Esser Co., Hoboken, N. J.

Z

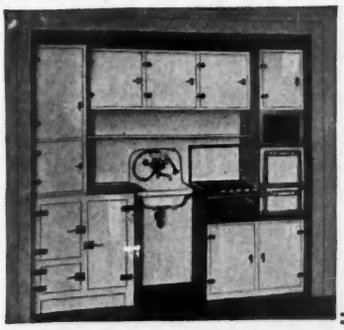
Z Gasoline Engines, Fairbanks, Morse & Co., Chicago, Ill.
ZEE Self-Furring Metal Lath, Youngstown Pressed Steel Co., Warren, Ohio.
ZIG-ZAG Rules, Stanley Rule & Level Co., New Britain, Conn.
ZINC INSULATED Wire Fences, American Steel & Wire Co., Chicago, Ill.
ZIP Saws, Henry Disston & Sons, Philadelphia, Pa.
ZOURI Safety Key-Set Store Front Construction, Zouri Drawn Metals Co., Chicago Heights, Ill.

NUMERALS

No. 1 Combined PIECE Window Stop Screws, National Mfg. Co., Sterling, Ill.
No. 40-40-20 Paint, The New Jersey Zinc Sales Co., Inc., New York, N. Y.
No. 1 MOULDING, Moulding Plaster, U. S. Gypsum Co., Chicago, Ill.
No. 2 MOULDING Moulding Plaster, U. S. Gypsum Co., Chicago, Ill.

What Every Builder Wants

A Compact Kitchenette—Flexible Arrangement



MAJESTIC No. 3000 KITCHENETTE
Widely Adopted

The first Kitchenette to be really "accepted" by apartment dwellers. Saves time, work, space. Unusually attractive and durable. Greatest convenience. Your choice of combination of units to meet any requirements and space.

Write for details today.

MAJESTIC STEEL CABINET CO.
Household Steel Cabinet Headquarters
4211 Belle Plaine Ave., Chicago

THE GROWING DEMAND FOR

FIRE-SAFE ROOFING

of Permanent Beauty and Service at Reasonable Cost can only be met by CONCRETE TILE ROOFING

Our U. S. CHAMPION TILE MACHINES turn out Light-Weight French and Spanish Concrete Roof Tiles at Minimum Cost. Anyone can make them and lay them profitably. Proof of more than 30 years successful service is there.

You, too, can do it—make your own tile roofing—it be independently or as a side line on dull days and th ough the winter, and sell the surplus to others at a profit when season starts, thus putting actual cash money in your pocket.

Write us for Facts and Figures

L. HANSEN CO., 2303 Ward Ave., Kansas City, Mo.

BILCO METAL HATCHWAYS For the Home

Outlasts Wood
Waterproof
Fireproof, Neat
Save Space

Write for details and prices on Model M Metal Hatchway for the home, shown above—also on metal sidewalk doors for all commercial requirements.

Representatives Wanted.

BUILDERS IRON CO., Inc.
Dept. B. New Haven, Conn.

UNIQUE FOOT SCRAPERS

These unusual Foot Scrapers are painted black and are ready to attach to wood, brick, cement or stone. All designs copyrighted.

No. 108, Scotch Terrier, 8 inches high

$3.50 each or $6.50 per pair

No. 112, Social Cat 10 inches high

METAL SILHOUTTES

Cut out of non-rusting metal. They are reversible, painted black and ready to attach to surface of chimney, gable, over doorways fireplace. etc. Other designs **$7.00** to **$25.00** each.

No. 127, 22 inches high **$9.00**

BRASS DOOR KNOCKERS

This 7 inch Colonial reproduction and other designs all ready to attach at **$5.00 each**

No. 23

Prices include delivery. Circulars sent on request.

Special discount to Builders

HOUSEHOLD PATENT CO. Norristown, Pa.

Make Wash Day Easier

BY USING BANKS (PATENTED) Removable, Green Enameled, Ornamental Clothes Posts. Made of high carbon steel tubing, 1½ inches in diameter. Stand 6 feet above ground. Easily to install. Prices within the reach of everybody.

Nationally known. Last long as your house. A money-back guaranteed. The "Ace of Clubs Top" identifies. If your dealer cannot supply, *write for folder describing Banks Clothes Posts and Flag Poles.*

Banks Steel Post Company
128 Wakeman Ave., (North) Newark, N. J.
Telephone Branch Brook 1218

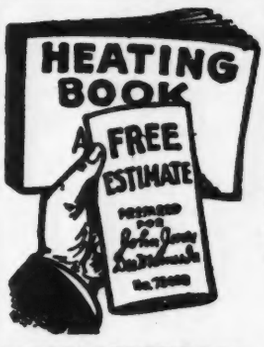
CANADIAN BUILDING MATERIALS

Are you interested in building or construction in Canada either as architect or contractor? If so, you will want to know what Canadian materials are available. Canada has large resources of fine building stones suitable for external or internal use, clays from which local brick and tile are made, aggregated for concrete, roofing materials, timber and lumber for all purposes.

Before specifying for Canadian work communicate with

THE DEVELOPMENT BRANCH
DEPARTMENT OF COLONIZATION & DEVELOPMENT
CANADIAN PACIFIC RAILWAY
MONTREAL.

An expert staff is at your service to obtain and give you free of charge full information about such materials in all parts of Canada.



Ask for Agency Offer and Catalog

All Kinds of Heating—Hot Water—Steam—Hot Air—Pipeless—Pipe—Sewage Disposal—Water Supply—Plumbing—Low Prices.

ANDREWS HEATING CO.
1500 Heating Bldg.
MINNEAPOLIS, MINN.

ANDREWS HEATING COMPANY
Please Send Catalog and Agents Offer
Name.....
Address.....
Town.....
State.....

Water Softener Takes Place of Cistern in the Modern Home

IN half the cities of the United States the municipal water supply is "hard water," consisting principally of lime or magnesia dissolved in the water. Hard water adds greatly to the housewife's duties, making laundering and dishwashing difficult on account of the fact that soap forms curds or small greasy particles in hard water instead of lathering freely into foamy suds as in soft water. Hard water is also bad for the skin and complexion. It causes scale to form in kettles and hot water pipes, meaning loss of heat and often expensive repair work to plumbing.

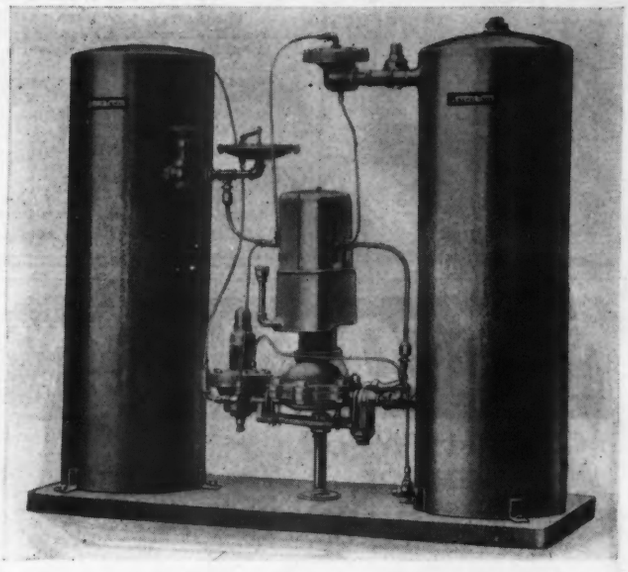
It has been computed that 1,000 gallons of water with only one grain of hardness will waste 1.17 pounds of soap. In some hard water districts the water contains from 20 to 50 grains hardness. The average is about 18 grains. This means 18 grains of mineral (in weight) to one gallon of water.

Professor A. M. Buswell, chief of the Illinois State Water Survey Division of the Department of Education, says: "One ton of soap is wasted in hard water every day in the average Illinois town of forty thousand population. This means a loss of ten million dollars a year in the state due to the hardness of the water we use."

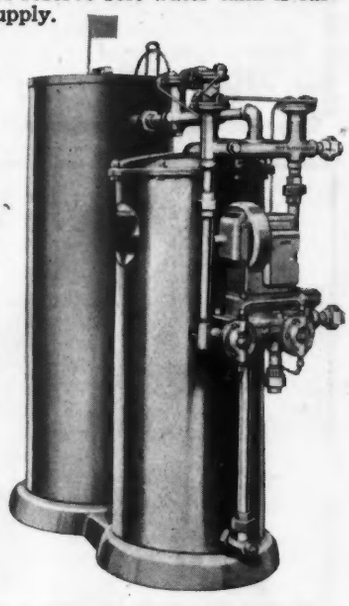
For years people have suffered from the lack of soft water and not until recently has it been possible to comfortably attain for the home what canning factories, laundries and the like have enjoyed for years. Now there has been made for domestic uses a type of household water softener which is placed in the basement of the house and connected to the city water pipes.

Zeolite, a natural mineral, absorbs all the mineral matter from the water as it passes through the softener. The mineral needs to be reconditioned occasionally and this is done by the use of common salt, and by turning a few valves.

Since they were introduced a few years ago, improvements have been made in softeners for the home. And it is possible to give the housewife today a water softening device which requires neither care nor attention, operating automatically. The water softened by the household softener is as clean and pure as the city water and so soft that only a comparatively insignificant quantity of soap produces a shampoo lather.



An Automatic Water Softener Which Uses Specially Treated Natural Mineral. A reserve soft water tank is furnished insuring an ample supply.

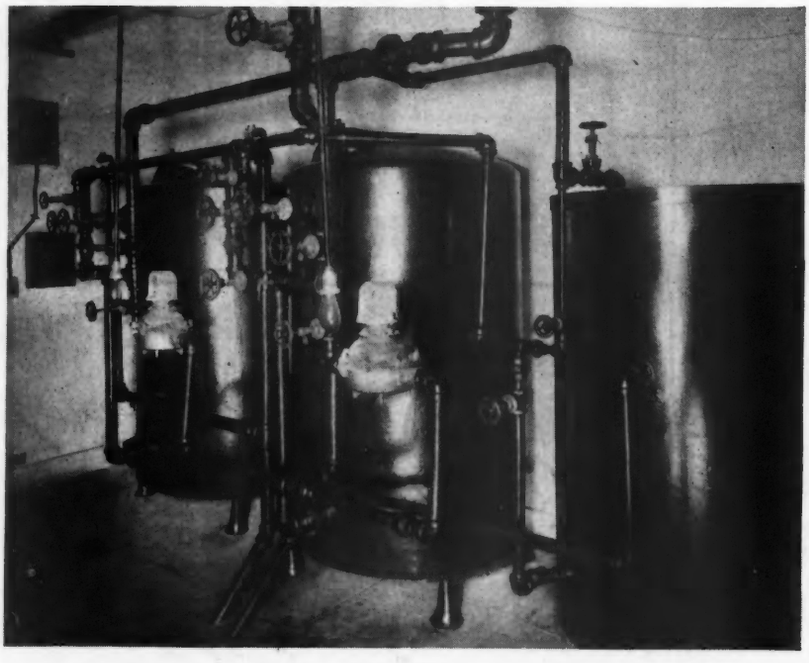


An Automatic Water Softener that Reconditions Itself on the Principle of Upward Softening and Downward Regeneration.

This water, of course, has obsoleted tanks or cisterns for the collection of rain water. Cistern water is usually contaminated, things get into it, the tanks become messy and the supply is uncertain.

The use of hard water is fast becoming obsolete also, for it is cheaper to have soft water than hard water! Pipes become filled with mineral scale, making necessary expensive plumbing repairs—clothes are ruined by soap curds and the skin is irritated by the use of hard water.

Years ago industrial concerns got tired of putting in new pipes at great expense, because they became filled eventually with hard mineral matter. They adopted water softeners to save time, money and products.



Zeolite Water Softening Apparatus of the Vertical Type. Salt is used to recondition the zeolite mineral and restore its water softening properties. On a strainer near the bottom of the tank, a bed for the zeolite is built up with coarse, medium and fine gravel, then fine quartz and then the zeolite.

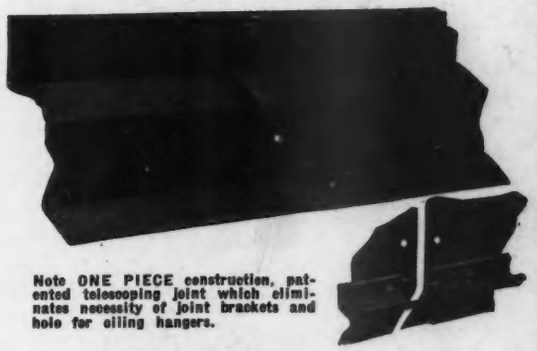
The FIRST installation of "Glide" Hangers and Track was made in 1911, on the John Phillips Farm, west of Dixon, Illinois. After 16 years of service the Track is intact and the Hangers are still carrying the door with the same ease and smoothness as when new.

The First "Glide" Hanger and Track Installation Is Still In Operation

RIGHT from the start, "Glide" Hangers and Track were built to give years of satisfaction wherever installed. The above, unretouched photograph of the first "Glide" installation that has been giving perfect satisfaction since 1911 is conclusive proof of "Glide" quality.

"Glide" is the **original** "watershed" Track and Hanger. Today it has "57 varieties of imitations," none of which equal it in simplicity, quality, convenience, ease of operation nor length of service-life.

The **one piece** construction of "Glide" Track, the **inside** drop strap of the Hanger (permitting any thickness of door to be hung without blocking out the track), the special formula steel used to prevent "rusting out," and the elimination of joint brackets are some of the many features that have made "Glide" the leading **covered** Track and Hanger.



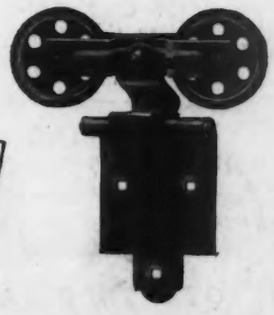
Note ONE PIECE construction, patented telescoping joint which eliminates necessity of joint brackets and hole for ceiling hangers.

Contractors, Carpenters, Builders and Architects are invited to send for their copy of the Wall Hanger showing every item in the Frantz line of Guaranteed Builders' Hardware. It is an excellent aid in estimating or specifying the hardware on a home, garage or barn.

Write Dept. A-5

FRANTZ MANUFACTURING COMPANY
Sterling, Illinois

FRANTZ
TRADE MARK
Red Label
GUARANTEED
BUILDERS'
HARDWARE



The inside drop strap of the "Glide" Hanger allows any thickness door to be hung without it being necessary to block out the track. Wheels have steel roller bearings and axles.

"No Hardware Is Genuine FRANTZ QUALITY *Without the Red Label"*