Jan. 31, 1950 E. S. OSBORN 2,495,862

BUILDING CONSTRUCTION OF PREDETERMINED CHARACTERISTICS

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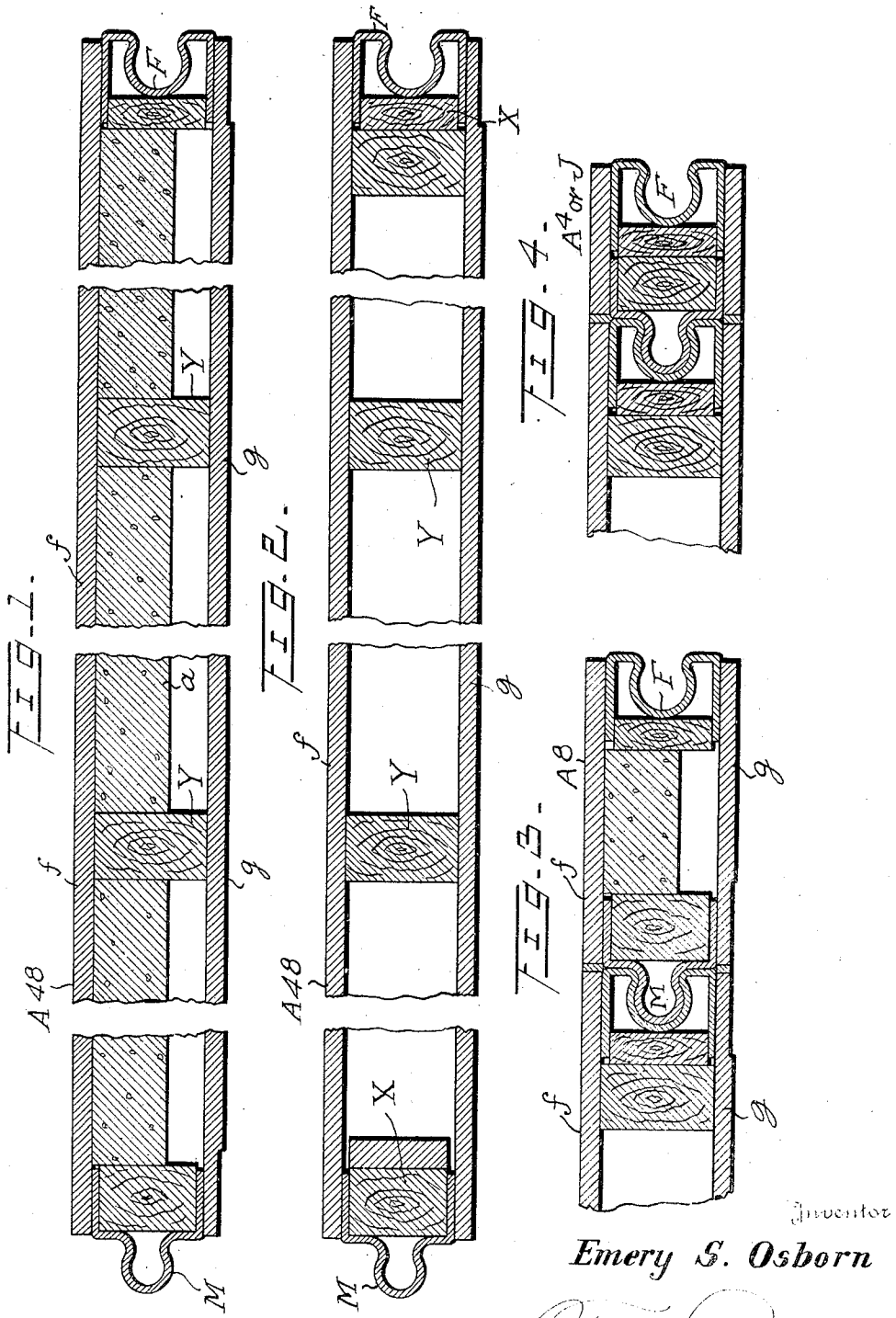

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BUILDING CONSTRUCTION OF PREDETERMINED CHARACTERISTICS

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FIG. 5.

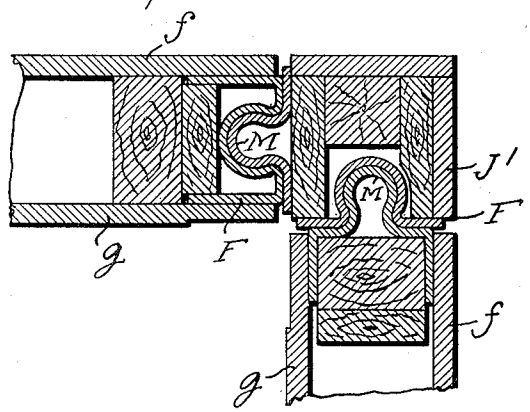


FIG. 6.

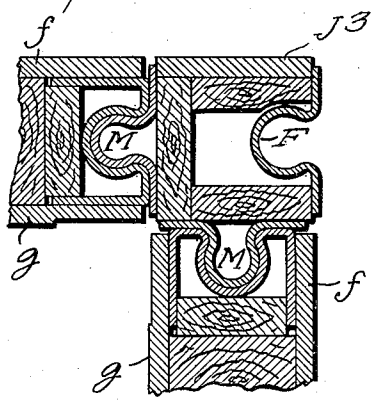
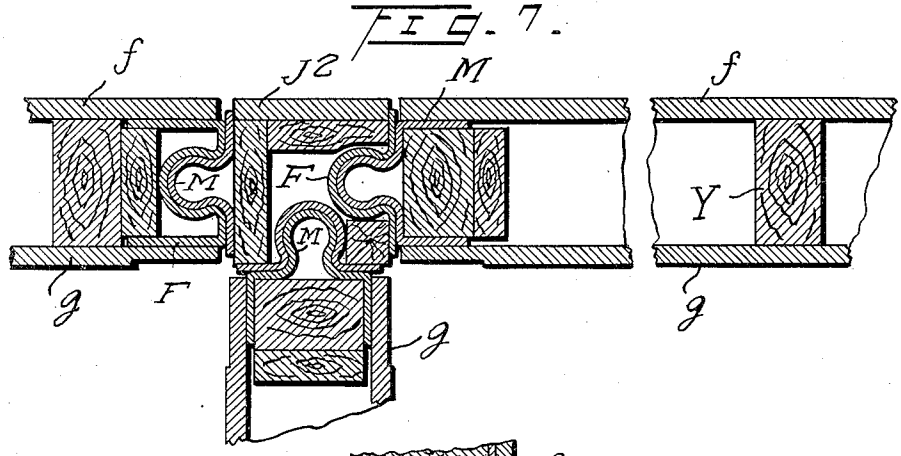


FIG. 7.



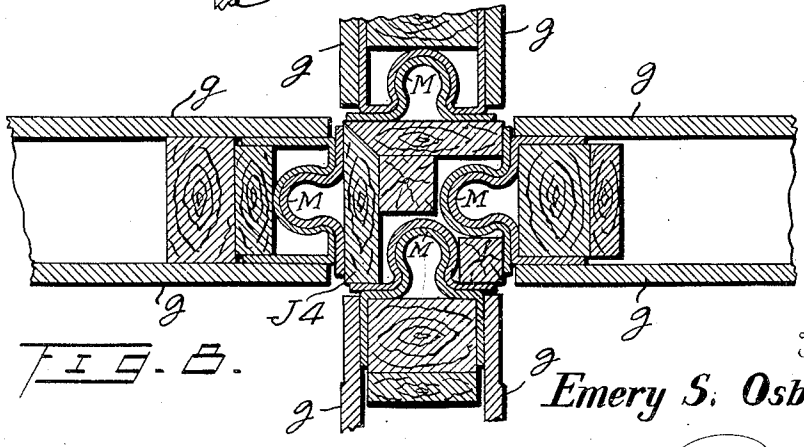


FIG. 8.

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FIG. 10.

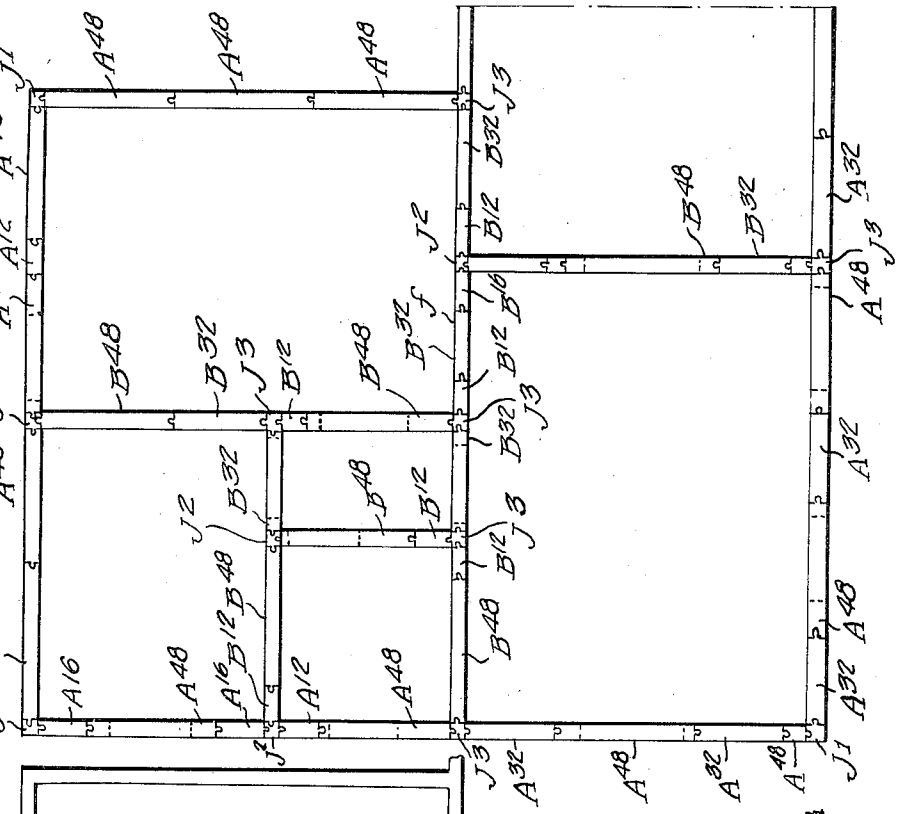

FIG. 9.

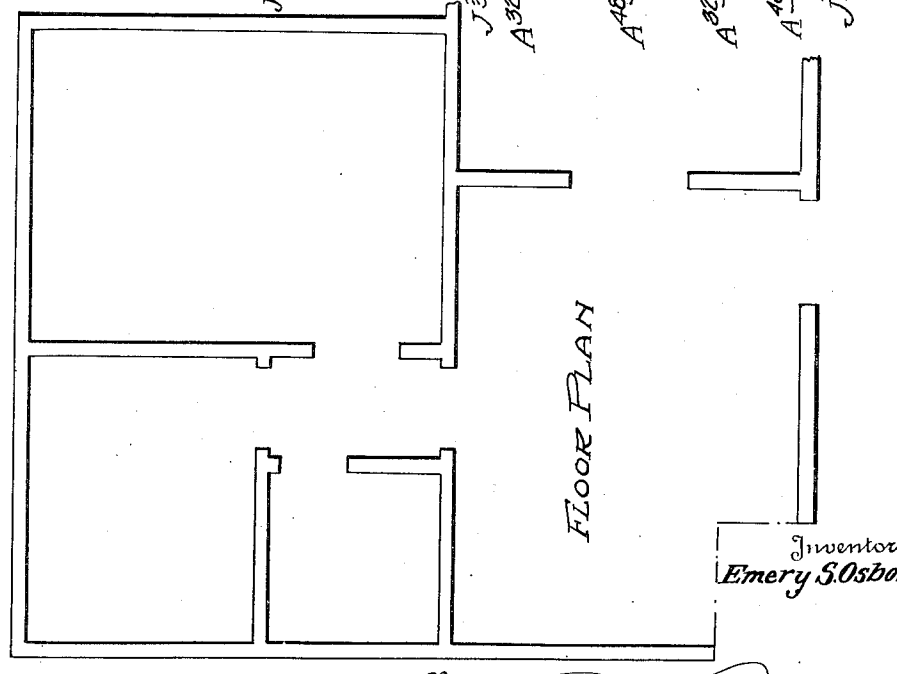

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Fig. 11.

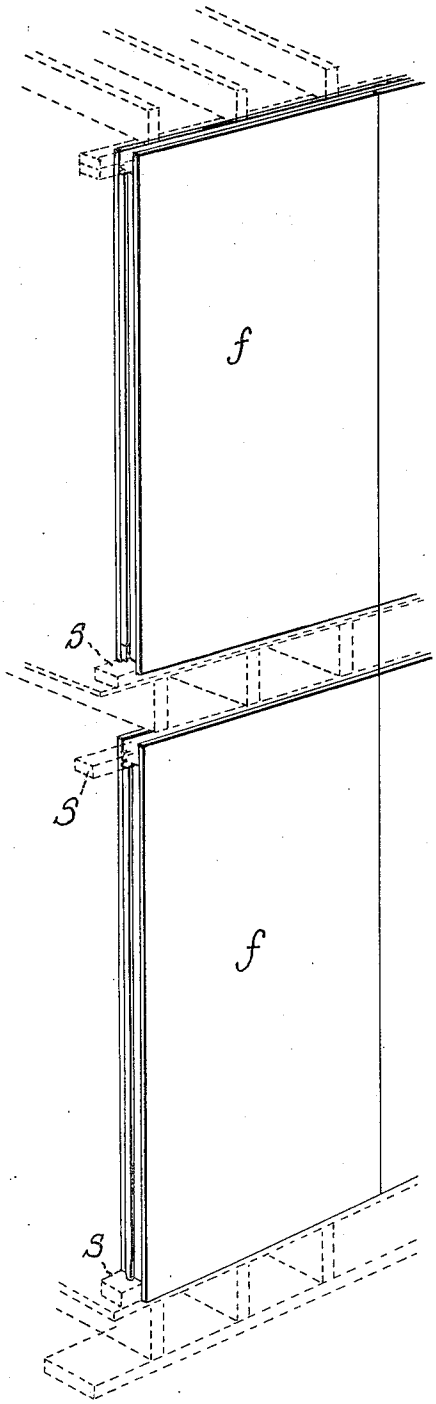


Fig. 13.

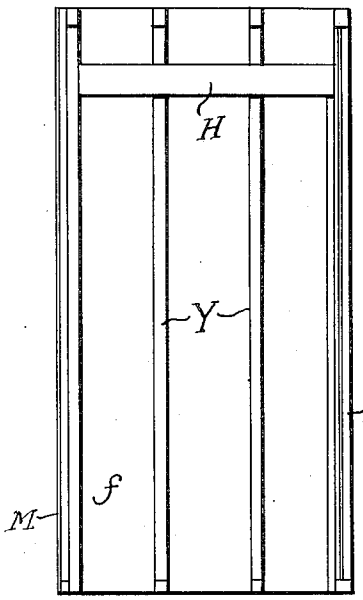
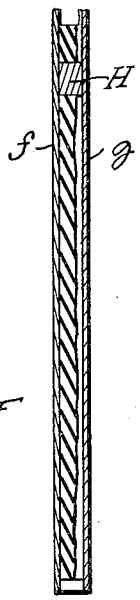


Fig. 12.



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BUILDING CONSTRUCTION OF PREDETERMINED CHARACTERISTICS

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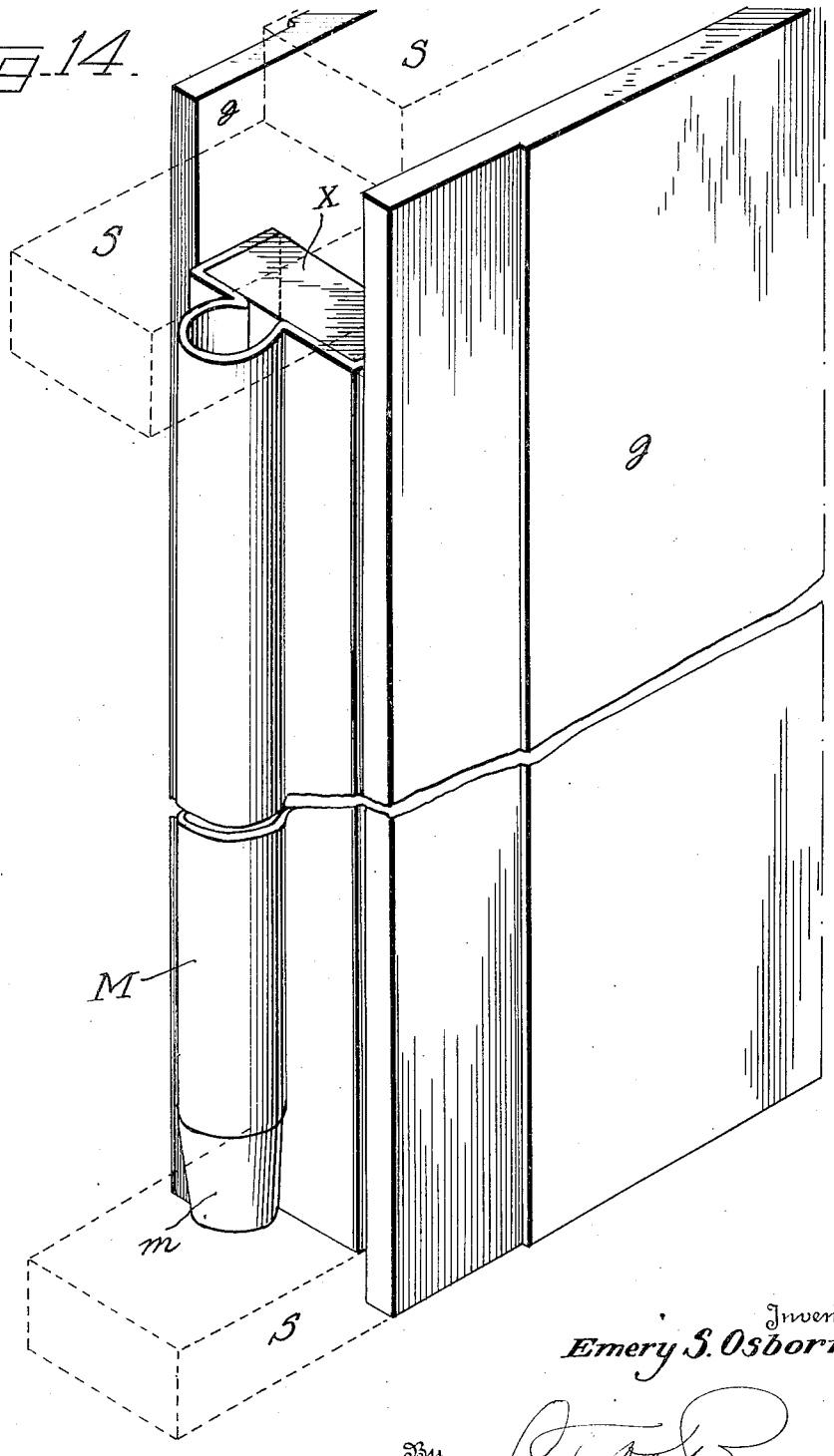
FIG. 14.



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Patented Jan. 31, 1950 2,495,862

UNITED STATES PATENT OFFICE

2,495,862

BUILDING CONSTRUCTION OF PREDETERMINED CHARACTERISTICS

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Application March 10, 1945, Serial No. 581,981

4 Claims. (Cl. 20—4)

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This invention relates to building construction of pre-fabricated characteristics, and is designed to meet the conditions of the modern developments in the field of building construction in which housing structures are fabricated in the form of units produced at the manufacturing plant, shipped to the point of use and then assembled, the building of the structures thus becoming a matter of assembly of units, thus facilitating the building; such structures are generally of the wooden type. The modern development has included the making of window and door units, as well as interior features, but the present invention is concerned mainly with the building construction features.

While there are a number of advantages present in connection with pre-fabricated housing structures, such as rapid completion of the structure, and its lower costs, there are certain disadvantages present, due to the fact that the structure, produced at the manufacturing plant, needs to be more or less standard, since the lower cost condition can be met only through quantity production. Since the producer cannot profitably stock up with a large number of different types of housing structures, he is compelled to limit his housing types to a comparatively few forms and dimensions, which thus become standardized; hence, the purchaser is limited to such standardized housing structures, with no opportunity of varying from them structurally or dimensionally. As a result, the market for the structures is limited to purchasers willing to accept one of the standardized forms; obviously, this tends to reduce the marketing possibilities in a community where the preference is for structures more or less individualized. As a result, the advantages in such pre-fabrication are limited to but a comparative few, excepting where the housing is to be more or less regimented.

The disadvantages thus apply to both the manufacturer and to the customer. The former must carry in stock a supply of units to provide for the pre-fabrication supply, and cannot maintain a vast stock such as would be required by the presence of many different forms and types—a small stock would defeat the advantages of quantity production. The customer lacks freedom of choice beyond a limited number of types or dimensions, and thus is restricted to standardized structures and loss of individualized desires; through the fact that specialists in trimming effects provide a larger field of choice, it is possible to vary slightly as to doors and windows, but the

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overall characteristics available are limited to the few standardized types. As a result, the customer desiring individuality or material variations, utilizes "made to order" conditions, thereby affecting the ability of the manufacturer to reduce costs, since the orders are then based on individual rather than quantity production.

One of the factors permitting the reduced price by the manufacturer is the fact that his raw material can be utilized under regimens through which he can obtain almost complete values from the material—made possible by uniformity in production through a few standardized types; where the structures are individual such regimens cannot be used, and wastage is a factor requiring consideration.

The present invention is designed to overcome many of these disadvantages and make possible to both manufacturer and customer the advantages accruing through quantity-production conditions, and at the same time permit a quasi-individualizing of the housing structures to largely increase the types and forms of structures available for selection; partial standardization is present, but inasmuch as this conforms to general practice, its presence is not objectionable. For instance, the height of rooms or floors is more or less uniform—the variations in this respect are generally few, so that it is possible to provide a few standardized sizes, even though the floor plans vary widely; in other words, this particular standardization is effective on both manufacturer and customer.

Under the present invention, however, the floor-plan characteristics are changed as compared with the prior pre-fabricated housing practices. Obviously, there must be standardization so far as the manufacturer is concerned in order to produce the quantity-production condition, but the standardized units are of such type as to provide for ready production and may embrace many variations in dimensions other than the ceiling heights, so that the individual units then become of quantity producing condition. But such standardization does not extend to the customer other than as a basis of supply. The customer, after accepting the architect's plans—the latter being based upon the use of such units—is supplied with the particular units needed to provide the construction called for by the floor plan, the supply coming from the unit stockpiles of the manufacturer; the units are then assembled in accordance with the floor-plan presentation, thus setting up say the first story of the house; the units for the next story

are then added, etc. As a result, the overall form of the house is more or less individualized and made to conform to the desires of the customer, while the manufacturer is providing the supply under quantity production conditions, and is thus able to provide the advantage of lower costs and more rapid house erection.

To secure these combined results, the present invention provides a number of variations from the regimens normally practiced under pre-fabricated housing conditions. Instead of providing the material for the complete structure, the prefabricated portion supplied by the manufacturer pertains to the vertical framing—essential with all building structures—thus providing the basic features or core of the structure, and making possible the inside and outside finishing, the floor assemblages, etc., as activities of the builder who is able to meet the individual desires of the customer as to these features. In other words, the prefabricated material pertains more particularly to housing features which are more or less concealed within the completed structure, thus leaving the exposed surfaces of the building conformable to the desires of the consumer.

Since the vertical framing constitutes the core of the vertical walls of the building—both external and internal—it is possible to permit wide variations in floor plans as to dimensions of the building and of the room floors, provided the vertical walls present the essential stability required, and the pre-fabricated structures are such as to permit such development and stability, conditions which are met by the present invention. But to produce the result, the usual methods of erecting buildings are varied in certain respects; for instance, the framing is erected by completing one story before beginning the next. In addition, the erection of the framing of a story is varied in such way that the development of the assembly is progressively in the horizontal direction, as compared with the vertical direction usually employed, the development being according to the floor plan but the progression being by unit accretion individually, with the result that the completion of the wall assembly produces the wall core of the story as contemplated by the floor plan. If a second story is to be added, the joists for the floor and ceiling are added by the builder, and the added story then progressively developed according to its floor plan.

While such assembly and its methods of production provide for almost unlimited freedom of selection as to design and dimensions, complete freedom in this respect is limited by the need for limiting the assortment of units, etc., produced by the manufacturer. Hence, the present invention utilizes the principle of a base width dimension of units, etc., and multiples thereof; as a result, the building dimensions on a horizontal plane need to conform to this principle. In addition, the normal assortment of units, etc., of the manufacturer is based on the assumption of walls extending in a plane or at right angles, these being the most common forms of wall construction. The invention, however, contemplates variations from this, by the use of joint elements modified to meet the changed conditions.

The invention includes also the selective use of insulation as a part of the framing of the external walls, the insulation, when desired, being supplied by the manufacturer as a permanent portion of the units, etc.

To these and other ends, therefore, the nature

of which will be more fully set forth as the invention is hereinafter disclosed, said invention consists in the vertical framing construction for buildings, the methods of assemblage, and the units, etc., utilized in the assemblage, hereinafter more fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views,

Fig. 1 is a sectional view taken transversely of the length of a unit forming one of the members of the assembly, the unit being of the insulating type.

Fig. 2 is a similar view with the insulation omitted.

Fig. 3 is a section taken on a similar plane and showing the uniting of two units to form a wall section, the width of one of the units being complete, the other unit being incomplete.

Fig. 4 is a section similar to Fig. 3 but with the complete unit of lesser width.

Fig. 5 is a section taken on a similar plane and showing one form of joint element used in connection with a corner of the building.

Fig. 6 is a section of a form of joint element used in connecting an internal wall to an intermediate position in an external wall length.

Fig. 7 is a section of the type of Fig. 6 but with the joint element of a slightly different configuration.

Fig. 8 is a section showing one form of joint element used where the intersection is that of four walls.

Fig. 9 is an illustrative view of a portion of a typical floor plan of the vertical framing.

Fig. 10 is a view similar to Fig. 9 and showing the application of the present invention thereto.

Fig. 11 is a fragmentary perspective view showing the arrangements used under multi-story conditions, the pre-fabricated framing assembly being illustrated by one of the units from a wall of each of a pair of stories, the sill or shoe assemblies and the joist assemblies being indicated in dotted lines, these being supplied by the builder.

Fig. 12 is a vertical longitudinal section of a unit of the maximum width type.

Fig. 13 is a view of the unit of Fig. 12 with the inner face member omitted.

Fig. 14 is a fragmentary perspective view of one of the units, with the shoe or sill members shown in dotted lines.

An underlying characteristic of the present invention is the use of units or sections of substantially similar dimensions as to length and thickness, but which differ as to width, with this difference presenting a base width dimension and multiples of such dimension. For instance, in the disclosure, the base width dimension presents a width of four inches, while the multiple dimension units have widths of eight, twelve, sixteen, thirty-two and forty-eight inches respectively; the thickness of each is four inches, and the length approximately that of the ceiling height. Each unit is formed with at least one male and one female joint member; joint members connecting internal walls with external walls may have an additional male or female member, and those used for connecting similarly positioned internal walls may include additional male and female members; the male joint member projects beyond the dimension edge of the unit of section, while the female member lies within the

section in such position that when a male and female joint member are assembled, the opposing edge faces of the connected sections will be substantially in contact on the opposite sides of the assembly. The assembly of the joints is by movement of the male member in the direction of the axis of the female member, so that, in the assembly, the male and female members have a common axis.

Due to the different widths of the units or sections it is possible to develop floor plans of wide variety, both as to the external walls as well as internal walls, the one limiting factor being that the width dimension of a wall shall be some multiple of the base dimension, the latter being four inches in the form indicated in the drawings, by a judicious selection of units, the width of the wall can be obtained, and with the units properly united, the wall will be of the desired dimensions. No specific provision is made in the units supplied by the manufacturer for door and window frame structures, the openings for these being made by the builder—a reason for the wider-dimensioned unit, the dimension of which is such as to exceed the width of the normal door or window frame, so that the desired opening can be readily cut within such unit intermediate the opposite joint members. As a result, the positions of the doors and windows can be accurately fixed by the positioning of the unit of wider dimensions, and the remainder of the wall formed from the assortment of different width units.

A similar flexibility is present in connection with the internal walls or partitions. The proper joint element is positioned at the desired location, and the remainder of the wall fashioned from the different width units, units for the external walls being utilized for the outer walls, and units of the internal wall type utilized for the partition walls, doors in the latter being accommodated by the builder by cutting the unit as above indicated.

As is apparent from this brief explanation, the present invention presents a building regimen more or less in contrast with that usually followed, in that the sectional characteristic of the structure is provided in the horizontal direction instead of vertically, the vertical dimension of the unit being fixed to correspond to the ceiling height of a story. Consequently, the floor plan arrangement of the house is not limited to a few standardized types, as to dimensions, positions of door and window openings, etc., but, on the contrary, permits of a rather wide range of individuality on the part of the architect in carrying out the customer's desires, as long as the dimensions are such as to come within the characteristic of being a multiple of the base width dimension, as explained above. Obviously, if the floor plans of the various stories are supplied to the manufacturer, the latter is able to select the proper units required to translate the plans into structure of the house frame-work from his stock-pile, and can supply the ones needed to produce the result.

The advantage to the manufacturer comes through the fact that while he needs to have a stock-pile of each of a considerable member of units and joint elements, each of these is itself standardized, so that he is required only to maintain his stock-piles. Since each assembly of the latter is standardized, such maintenance becomes of routine character and can be undertaken at any time since the manufacturer is not dependent upon orders for a particular type of house, and is able to obtain his lumber and other base materials under quantity conditions and then utilize it to maximum advantage and reduce wastage, since regimens can be developed and the production carried out under such regimens.

The customer not only is able to utilize the services of an architect, but the basic system of the invention provides advantages to the architect who may be furnished with a detailed disclosure of the various units supplied by the manufacturer. Given the general characteristics of the house desired by the customer, the architect is able to formulate his floor plans without difficulty, since the units provide a flexibility in width dimensions such as enable him to meet the desired characteristics as to dimensions of a horizontal section of each story by a judicious selection of units. While the invention deals only with the vertical walls of the building, thus presenting the general dimensional characteristics of the building, the flexibility in unit width dimensions permits a complete lay-out of the floor plans, the foundation of the architect's activities.

For the purpose of illustrating these conditions, a partial typical floor plan is shown in Figures 9 and 10, the latter diagram showing the zone of the building story with the unit widths indicated. One of the rooms shown is 9′ x 12′; another room is shown as 10′ x 13′4″; a third room is shown as 6′8″ x 8′; a fourth room is shown at 5′ x 5′, together with a hall-way 2′8″ x 5′—the three latter rooms are at the end of the building, the depth of the building at such end being 23′, the wall including four joint elements each of 4″, the room dimensions given being the internal dimensions, and with each of the walls having a depth of 4″. Fig. 9 shows the architect's plan, Fig. 10 showing the unit diagram. The section of the building shown presents dimensions indicating the use of different units and joint elements included within the invention; where an opening or door is indicated, the opening is within a unit of greater width than that of the opening, the opening being formed in the unit by the builder before or after the unit has been placed in position; in other words, when the position of a window or door has been determined in the total width of the wall, the unit of a width dimension which will contain the opening is located in such position, and the remainder of the wall width made up of unit widths which will total the distance on each side of the unit carrying the opening.

Specifically, the units of the external walls are indicated as A while those of the internal walls are indicated as B, the specific width of the unit being indicated by the exponent used in connection with the designating character. For instance, the 48″ width unit for the outer or external wall is indicated as A^{48} while the similar width unit of the inner or internal wall is indicated at B^{48}, the 32″ units being indicated respectively as A^{32} and B^{32}, etc. Units of similar width of both series are generally of similar construction with the exception that the A series has the outer face member formed of a standard vapor-sealed ½″ insulation board *f* and the inner face member formed of a standard recessed-edge gypsum board *g* of ½″ thickness—in the B series both faces are of the gypsum board (*g*) type. The overall thickness of the units of each series is 4″.

The units of both series have their inner and outer face members spaced in their vertical edge

zones by a composite formation composed of a uniting element and a framing member. The uniting elements each present the characteristics of either the male or female member of a mortise and tenon assembly the axis of which extends vertically when the units are assembled; one edge zone carries the male element and the opposite edge zone carries the female element, these being located in similar relation in all of the units, thus making possible the development of the wall by assembling a male element of one unit with the female element of another unit.

The mortise and tenon effect can be provided by structures of varied configurations, a preferred arrangement, however, presenting the cooperating portions as an incomplete circular characteristic, the male element presenting the axis of the circle as beyond the edge of the zone—the axis of the female element lying within the edge zone of the unit—the two elements thus setting up the conditions of an interlocking joint assembled by inserting the lower end of the male member within the upper end of the female member and moving the male member in the direction of the axes of the two elements, the dimensions of the two being such as to set up a working fit between them; preferably, the lower zone of the male member is formed slightly tapered as at *m* to aid in assembling the elements. Each of the elements is shown as formed of sheet material—which may be plastic or metallic—shaped to provide the interlocking zone and wing zones with the latter secured to the inside of the inner and outer face members of the unit. The male element is indicated at M and the female element at F; the wings or flanges of the element are supported by frame members X. In practice, the axial length of the elements is less than that of the length of the inner and outer face members of the unit, for a purpose presently described.

The male and female interlocking joint elements are each of two forms differing from each other within the flanged portions, one form having simply a straight flange and the other having an angular flange; the straight flange form is generally used where the joint members contain more than a pair of the interlocking members—the cross-section dimensions of the joint element does not permit the use of the angular flange where more than two of the joint members are used with the joint element.

In addition, the inner and outer face members of the units—excepting the unit of 16" width—is spaced by a header H which extends across the top zone of the unit at a suitable distance from the top of the unit and the larger width units additionally carry studding, extending vertically, the 32" width having a single stud, while the 48" width utilizes two studs, the studs being indicated at Y. The stud length approximates that of the elements M and F. The header H is generally omitted from the 16" width unit of the external and/or internal wall (the A and/or B series) since the latter units are designed to be used for conduit purposes—as for heat or cold air, etc., the usual metallic heating ducts being readily positioned therein; for this purpose, this dimensioned unit is also supplied in multiple lengths for multiple story houses; where the units are not used for this service, a header is added by the builder.

The units of the A series—those of the external walls—are also of an additional type, the second type carrying a 2" thickness of insulation *a*, which may be of mineral or fibrous character, preferably in blanket or batt form, and which can be readily stapled to the inside of face member *f*.

In addition to the units the invention includes a number of forms of joint elements each of which is approximately similar to the length of the units but has a width dimension corresponding to the base width dimension (4") of the multiple unit system which forms the foundation of the present invention, the thickness dimension being similar to that of the units. Two series of the joint elements are provided, as with the units, due to the fact that one series is used with the external wall—thus requiring the outer face member construction of the units of that wall—while the other series is used with the internal walls and thus has its opposite faces conforming to the unit face members for such walls; excepting for the material used for one of the face members therefore, the elements generally are similar for both walls.

Each of these elements has at least one male joint member and one female joint member as with the units, and in the simpler form—indicated at J—the member contains one of each of the two joint members these being located on opposing edges of the member—this form of the latter, in effect, setting up the conditions of a unit with a width dimension of 4", and usable as a unit when necessary. A second element—indicated at J'—also contains one of each of the male and female joint members, but these are arranged on adjacent sides; the element is thus applicable for use as a corner member. A third form—indicated at J2—has the male and female joint members as in the J form and, in addition, has a second female member on an intermediate side; the fourth form—indicated at J3—is similar thereto, excepting that the additional joint member is a male member instead of a female member. A fifth form—indicated as J4—is similar to the J3 form, and, in addition, carries a female joint member on the fourth side of the element, thus placing a joint member on each of the fourth sides of the element. Structurally, these elements are internally completed—as by the use of blown-in insulation—to fill the interior thereof—the form of the latter depending upon the cross-sections produced by the number and arrangements of the male and female joint members.

Since a wall will generally be made up of a plurality of units and joint elements in interlocked relation, stability of the wall against pressures, etc. would be somewhat dependent upon the interlock itself; where the latter is of circular characteristic—as indicated—it is essential that additional means be utilized to secure such stability. In the present invention this result is obtained by a pseudo "keying" effect through the use of shoes or sills—indicated at S; these are of lumber dressed to rectangular cross-section, with the longer dimension of the cross-section substantially 3" (filling the space between the opposite face members of a unit) and having a thickness sufficient to provide a portion extending between such unit walls and a portion exposed relative to the face members of the units. In practice, one of such sills will be located at the bottom, and two of them in superposed relation at the top of the unit—one of the shoes will be housed by the units in the latter case, with the other having the exposed portion. The length of the shoes is dependent upon

the floor plan; since the shoes are designed to retain the alinement of adjacent units—thus anchoring or keying the assembly—the lengths are such as to present a shoe as extending across an interlocking joint, the length of the members of such joint being such that the lower end rests on the lower sill and the upper end forms a support for the housed upper sill.

In practice, the lower sills are properly positioned and secured on the foundations of the building, after which the bulider begins assembling from one of the corners, following the directions of the floor plan in selecting the particular unit to be employed. The correct joint element is positioned, and then the units are successively added according to the floor plan instructions, the workman advancing from right to left—or vice versa—as the particular conditions require, but following the selected course after the direction of advance has been decided upon. This is due to the fact that the male member of the joint normally must be entered into the female member of a positioned unit by movement in the direction of the axis of the female member. The joint elements for the connection of the internal walls are positioned during this progression, so that after the external wall has been completed, the internal walls can be similarly assembled relative to the positioned joint elements. Since the lower end zones of a unit straddle the sill, it is apparent that the assembled walls will present the arrangement of the floor plan for the ground floor.

During or after the assembly of the units, the housed sills are positioned at the upper end of the units, thus anchoring both ends of the unit against displacement. Due to the presence of the sills to prevent lateral displacement, and the presence of the vertical interlocking joints, it is apparent that the resulting structure is so braced as to resist strains and stresses. The addition of the second sill at the top not only increases the stability, but additionally supplies a support for the joists used in developing the ceiling and other laterally-extending structures of the building.

In other words, while the invention pertains more particularly to the vertical framing of the building, leaving the horizontally-extending portions of the building, such as ceilings, floors, roofs, etc., to be provided in the usual manner, the shoes or sills S—although extending horizontally—are included within the invention, since they are acting more particularly to stabilize or key the assembly of units and joint elements, although these shoes or sills are generally supplied by the builder rather than by the manufacturer.

As indicated in Fig. 11, if a second story is present in the structue, the procedure of the first story is followed, the lower shoes or sills S being mounted on the positioned joists, and the walls of this story then developed by the procedure followed in the first story. If but one story and attic is present, the roof structure is developed upon the positioned joist assembly.

It is possible that in developing the unit-by-units wall structure, the final unit to be positioned to complete the wall may have a female member as the movable unit member in completing the interlocking joint. To meet the possibility, some of the male joint members M have the tapered zone *m* at both ends to permit of readier assembly by permitting the female member of the interlocking point to have the endwise movement.

As is apparent, the question of the presence or absence of hot and cold air ducts for the building is determined by the architect with the decision carried out by the builder. Such ducts include a sheet metal lining for the channel, and this is added by the builder—the sixteen-inch width unit being designed for this purpose by omitting the header from this unit, as heretofore pointed out. Since such duct may extend through each of the stories of a multi-story building, this width unit is made in various lengths additional to the normal story-lengths.

In practice, the manufacturer will provide his units in lengths of several different ceiling heights—the variations generally being six inches; however, in supplying the units, the manufacturer selects units of the same length for the production of a story. While this increases the assortment of units held in stock, it has the advantage of permitting the manufacturer to obtain greater benefits from his virgin supplies through decrease of wastage.

As is evident from the above the erection of the vertical framing of the building story by story by practicing the present invention, does not complete the building—that which is provided is the core of the building. The exterior and the interior finish of the vertical walls must be added, as must the windows and doors; the ceiling and floors must also be added, as well as the roof structure. These are provided by the builder—the manufacturer supplies the units and joint elements which, with the exception of the shoes or sills (the latter being of standard stock available to the builder), constitute the vertical core of the building. The windows and doors may not be supplied by the manufacturer, but his unit arrangement is such as to permit the builder to install a desired construction, generally secured from specialists, as previously explained.

The advantages of the invention, as heretofore pointed out, pertain to both the manufacturer and the customer, through the ability to provide housing under partial pre-fabrication conditions and thus under lower cost conditions with respect to material. In addition, the cost reduction reaches to the builder through the fact that he is able to rapidly develop the vertical framing of a story of the building since the construction is that of assembling pre-formed units in accordance with a definite plan, thus decreasing labor costs and providing more rapid completion. Since these advantages are obtained without material loss in the freedom of selection of the type and characteristics of the building to be erected, the fact that pre-fabrication is that of but a portion of the building is not of disadvantage.

Structurally, the framing provides for complete stability and serviceability, with the units of a form which not only provide for rapid assembly into the positioned framing, but when positioned, provide a core upon which the external and internal finishing can be applied under high-speed development due to the form of the exposed face members of the core assembly. As a result, the building progresses more rapidly with reduced labor cost conditions.

As will be understood, the successful attainment of these results flows from the fundamental change made in construction methods by which the framing of the story is developed progressively in a generally horizontal direction instead of vertically, through the use of preformed units of substantially uniform vertical lengths and

which are secured in interlocked series in accord with the floor plan of the vertical core of the story of the building. Such method is made possible by the use of the system of unit width dimensions which are multiples of a base width dimension or of such base width dimension itself; this permits the production of units under pre-fabrication conditions without the need of excessive assortments of units, yet capable of meeting the conditions of a wide selection of floor plans, thereby eliminating the need for regimenting of pre-fabricated housing structures.

As is apparent, the normal structures of units and joint elements is based on the principle that walls will extend in alinement, parallelism or at right angles. It is obvious, however, that the joint elements may be constructed to provide for a variation from the right angle conditions, and that the units may be formed curved or angular to meet individual desires; such changed forms would, in practice, not be carried in stock by the manufacturer for pre-fabrication usage, but can be supplied when desired and thus permit the construction of a building of such type under the advantageous method conditions outlined above.

While I have herein shown and described methods of carrying out the invention, a structure which results from such methods, and unit structures usable in such methods in producing the structure, it is apparent that the invention, in practice, may take on various changes and modifications as to form and characteristics to meet the exigencies of service and the desires of the user, and I therefore reserve the right to make any and all such changes or modifications therein as may be found necessary or desirable, insofar as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims.

What is claimed as new is:

1. A preformed structural unit for forming building walls and partitions including a body portion, a male element of an interlocking key means extending along one side edge of said body portion for substantially the full length thereof and a female element of an interlocking key means extending along the opposite side edge for substantially the full length thereof, said body portion including a pair of spaced parallel panel elements, at least two stud members placed between said panel elements in parallel relation to and spaced predetermined distances inwardly of said side edges, each of said male and female elements having a pair of inwardly directed parallel flange portions, said flange portions being integral with and extending the full length of said male and female elements and engaging the side edges of each of said stud members for the full length thereof and lying between said side edges and the inner faces of the panel elements.

2. A preformed structural unit for forming building walls and partitions including a body portion, a male element of an interlocking key means extending along one side edge of said body portion for substantially the full length thereof, and a female element of an interlocking key means extending along the opposite side edge for substantially the full length thereof; said body portion including a pair of spaced parallel panel elements, a plurality of spaced intermediate stud members between and engaged with said panel elements and parallel to the side edges thereof, and an end stud member of slightly less width than the intermediate stud members attached to the outer face of each of the two outermost intermediate stud members, said end stud members being spaced inwardly a pre-determined distance from the side edges of the panel elements; each of said male and female elements having a pair of inwardly directed, parallel flange portions, said flange portions being integral with and extending the full length of said male and female elements and engaging the side edges of each of the end stud members of less width for the full length thereof and lying between said side edges and the inner faces of the panel elements.

3. A preformed structural unit for forming building walls and partitions including a body portion, a male element of an interlocking key means extending along one side edge of said body portion for substantially the full length thereof and a female element of an interlocking key means extending along the opposite side edge for substantially the full length thereof, said body portion including a pair of spaced parallel panel elements, at least two stud members placed between said panel elements in parallel relation to and spaced predetermined distances inwardly of said side edges, each of said male and female elements being of substantial U-shape in cross section, providing side legs adapted to engage the side edge of each of said stud members for the full length thereof and lying between the side edges of said stud members and the inner faces of the panel elements, the closed side of each of said male and female elements being bent to form a substantially cylindrical key of less diameter than the distance between the side legs of the elements.

4. A preformed structural unit for forming building walls and partitions including a body portion, a male element of an interlocking key means extending along one side edge of said body portion for substantially the full length thereof, and a female element of an interlocking key means extending along the opposite side edge for substantially the full length thereof; said body portion including a pair of spaced parallel panel elements, a plurality of spaced intermediate stud members between and engaged with said panel elements and parallel to the side edges thereof, and an end stud member of slightly less width than the intermediate stud members attached to the outer face of each of the two outermost intermediate stud members, said end stud members being spaced inwardly a pre-determined distance from the side edges of the panel elements; each of said male and female elements being of substantial U-shape in cross section, providing side legs adapted to engage the side edge of each of said end stud members for the full length thereof and lying between the side edges of said stud members and the inner faces of the panel elements, the closed side of each of said male and female elements being bent to form a substantially cylindrical key of less diameter than the distance between the side legs of the elements.

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