Dec. 6, 1949 H. C. DONER 2,490,259

WALL STRUCTURE

Filed Dec. 29, 1945 3 Sheets-Sheet 1

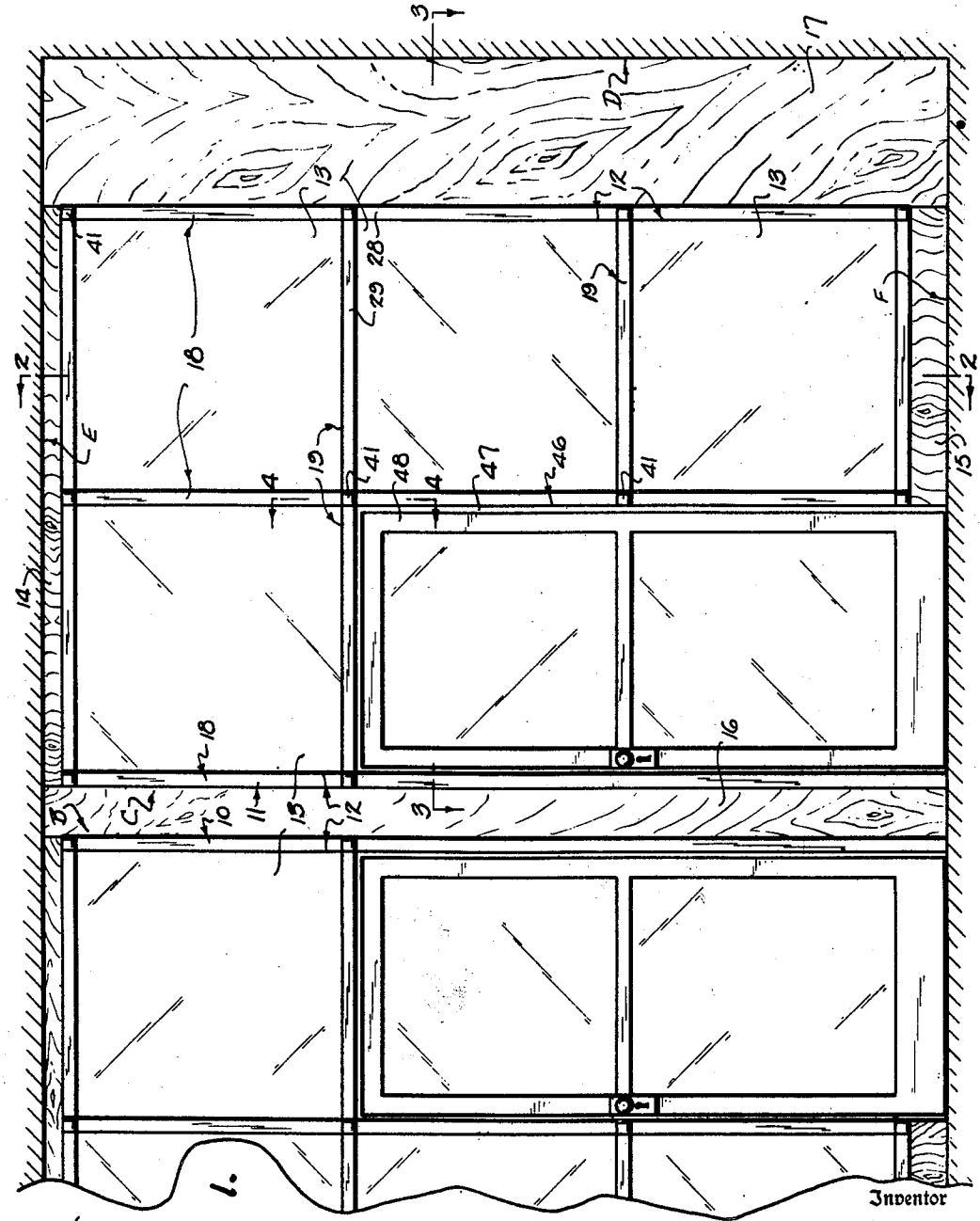


Fig. 1.

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WALL STRUCTURE

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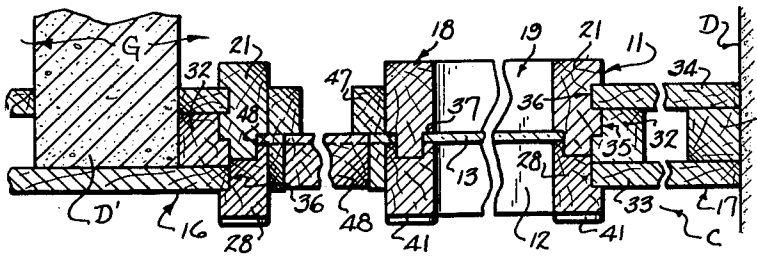


Fig. 3.

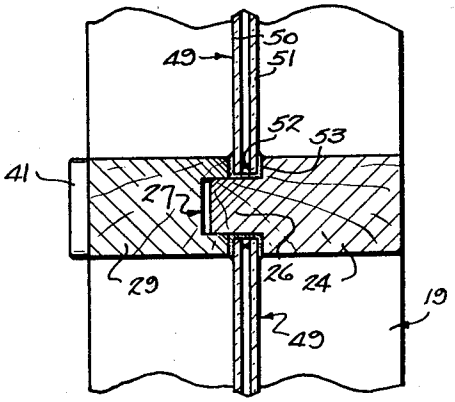


Fig. 8.

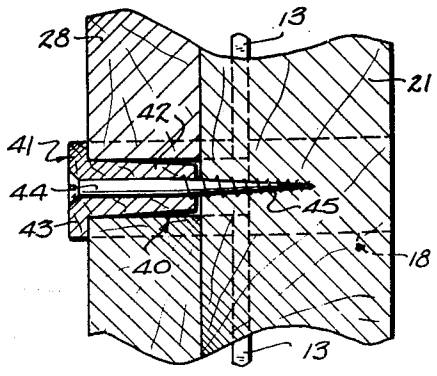


Fig. 4.

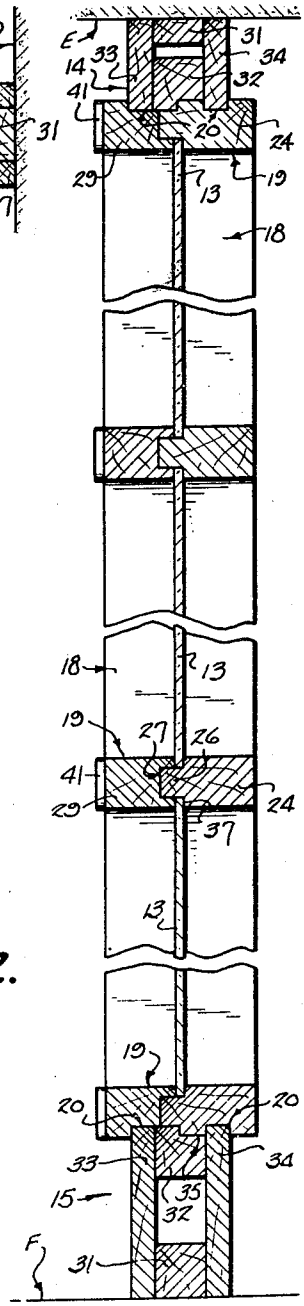


Fig. 2.

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WALL STRUCTURE

Filed Dec. 29, 1945 3 Sheets-Sheet 3

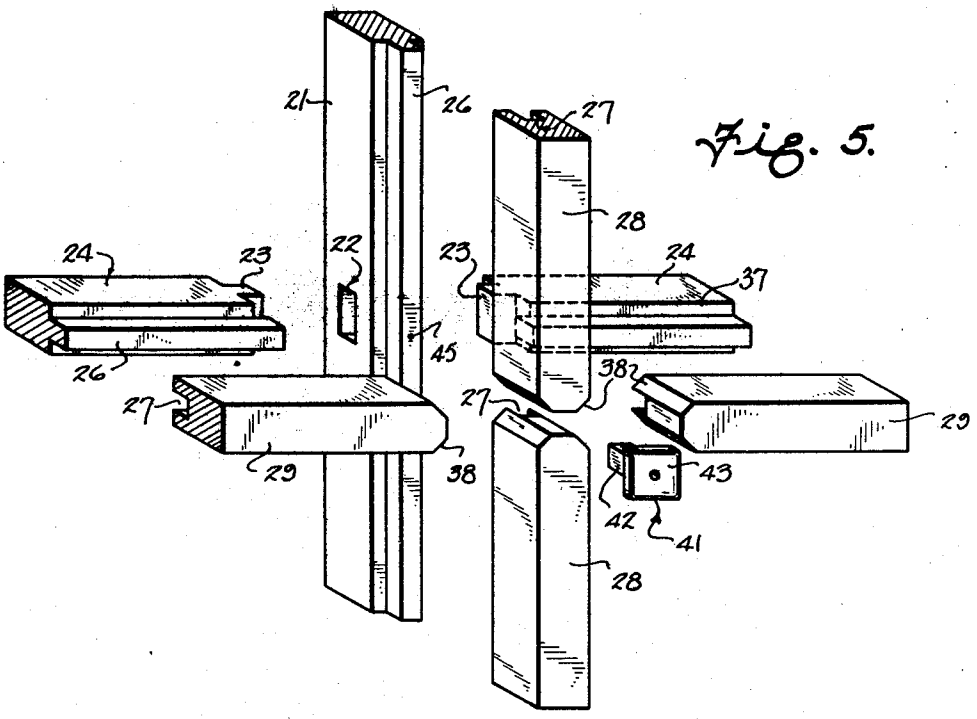


Fig. 5.

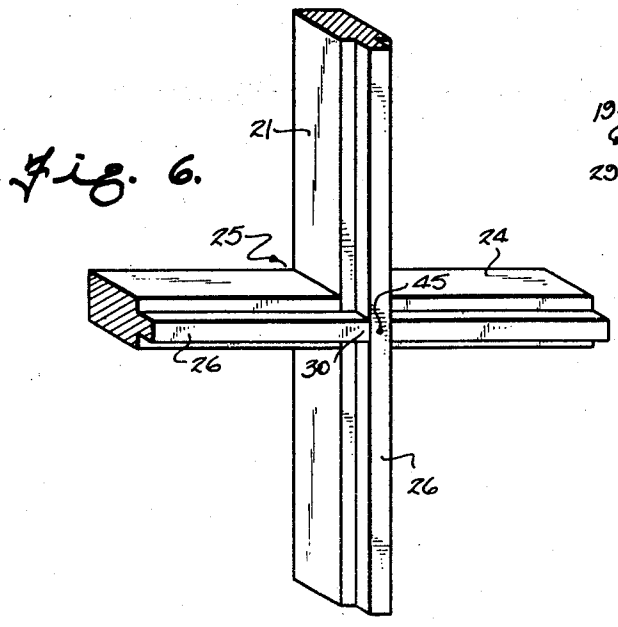


Fig. 6.

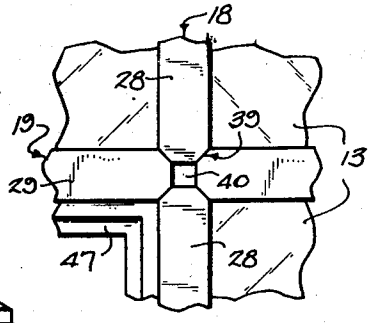


Fig. 7.

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2,490,259

UNITED STATES PATENT OFFICE

2,490,259

WALL STRUCTURE

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Application December 29, 1945, Serial No. 638,231

3 Claims. (Cl. 20—4)

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The present invention relates broadly to walls and partitions. More particularly it has to do with a novel prefabricated, prefinished, knock-down type of building wall, or wall section, that is readily adaptable for enclosing all sizes and shapes of rooms, offices and the like, in either new or existing structures.

Briefly stated, the wall of my invention comprises a prefabricated, grille-like framework, combined with panel members closing the openings in the grille, and filler sections around the periphery of the frame. The framework is made up of a more or less fixed and integral back section, and a plurality of removable front, or cover sections, that interfit with the back section to clamp either single or multiple layer panels therebetween.

An important object of the invention is the provision of a prefinished, as well as prefabricated, wall framework of the above character wherein the frame can be locked in assembled relationship, with the panels held securely in place, solely by means of cap or plug members at the junctures of the cross pieces of the framework.

Another object is the provision in such a wall structure of panels of glass, wood, metal or other materials, which may be transparent, translucent, or opaque; which may be pervious or impervious to air as well as light; and which may be either heat or sound insulating or transmitting.

Still another object is the provision of a custom built, finely finished, wall or wall section which can be sold in a kit; which is simple to install or dismantle, requiring a very minimum of time, tools and skilled labor; and which can be easily combined with other and different wall materials such as plywood, structural glass, masonry and so forth to provide a complete enclosure.

Other objects and advantages of the invention will become more apparent during the course of the following description, when taken in connection with the accompanying drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

Fig. 1 is an elevation of a partition wall embodying my invention;

Fig. 2 is a vertical section taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section taken substantially on the line 3—3 in Fig. 1;

Fig. 4 is a fragmentary sectional view taken substantially on the line 4—4 in Fig. 1;

Fig. 5 is an exploded view of a part of the framework, taken at one of the joints;

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Fig. 6 is a fragmentary perspective view of the rear section of the framework shown in Fig. 5 after it has been assembled;

Fig. 7 is a front elevation of this same part of the completed wall, with the locking cap or plug members removed; and

Fig. 8 is a fragmentary sectional view showing a modified form of panel mounted in the framework.

Heretofore most building walls, whether partition or outside walls, have been of the plaster, or other fixed masonry type; and such walls resist the alterations necessary to the most efficient use of present day commercial, industrial and public buildings. Conditions change rapidly in the modern world, and industry and business must be prepared, not only to meet, but to take advantage of, each new situation that arises.

For example, the requirements of tenants in office buildings change. In any commercial enterprise some departments are continually expanding, others shrink, and all of them change in their relationship to other departments. With the special prefabricated walls of this invention, production systems of all kinds can be improved by new floor layouts as required; apartments and offices can be made larger or smaller, or can be divided into a greater or lesser number of rooms to fit current needs; and school rooms can be made to accommodate larger or smaller classes, or work of a different character. In other words, these walls will keep any building interior completely flexible, permitting constant improvement in interior arrangement, and keeping up with most efficient use of space.

Another important application of the invention is in the modernization of older structures. By this means, old-fashioned, obsolete, or run-down buildings can be converted into attractive, modern apartments or office buildings at reasonable prices and with a minimum of labor cost. Moreover, new buildings equipped with such completely prefabricated interiors, stay constantly young.

The particular embodiment of the invention illustrated in the drawings is especially adapted for use in office buildings where a large room, or a whole floor, is to be divided up into a number of relatively small offices. Thus, the partition wall shown in Fig. 1, and designated in its entirety by the letter A, comprises two separate wall sections B and C made up of the frameworks 10 and 11 respectively, within the openings 12 of which are mounted the glass panels 13. Filler sections 14, 15, 16 and 17 are also part of the two wall sections, and extend out from the

periphery of their respective frameworks to completely close the open area bounded at one side by the wall D and at the top and bottom by the ceiling E and floor F respectively.

As best shown in Figs. 1 and 3, the wall sections B and C are here adapted to close the fronts of a series of adjacent, relatively small offices G which are enclosed on their other three sides by the permanent building walls D, D' et cetera. Since the same construction of wall section, with only very slightly modifications, can be adapted to any wall location, it is believed that a description of the section C will provide a complete picture of the broad concept of the invention.

The framework 11 of this section is made up of a series of vertical members 18, parallel with and equally spaced from one another; and a series of equally spaced, parallel, horizontal members 19; the assembled framework being preferably supported on the bottom filler section 15 in a manner to be more clearly hereinafter described. The vertical and horizontal members 18 and 19 are suitably notched for this purpose as at 20 in Fig. 2.

As already indicated above, both the vertical and horizontal members of the framework C include fixed rear sections and removable front or cap sections. The rear sections 21 of the vertical members 18 are preferably made in continuous lengths being provided with mortise openings 22 at regular intervals to receive the tenons 23 formed on the ends of the rear sections 24 of the horizontal members 19 (Fig. 5). When the rear sections 21 and 24 of the framework 11 are in assembled relation as shown in Fig. 6, the cross pieces 24 will lie between the uprights 21 and will form the joints 25 therewith. Both the vertical and horizontal rear section of the frame are provided with longitudinally extending tongues 26 on their front faces and which are adapted to fit into grooves 27 in the front or cover sections 28 and 29 of the vertical and horizontal members 21 and 24 respectively. (Figs. 2, 3 and 5.) The tongues on the horizontal members overlap as at 30 to butt against the tongue on the vertical members when they are in assembled relationship. (Figs. 5 and 6.)

When the fixed or permanent walls between which the wall sections B and C are to extend are level and a standard distance apart; and when the ceiling height is standard and the floor and ceiling are level; the entire partition wall A can be quickly installed by any ordinary workman with no other tool than a screw driver. On the other hand, if any one or all of the walls, floor and ceiling are out of true or are fractional distances apart, the installation is still simple to make and variations and inequalities in the bordering wall surface can be readily compensated for.

Thus, in installing the wall section C, for example, nailing strips 31 are first secured in any suitable manner to the floor, ceiling and side walls respectively. The filler sections 14, 15, and 17 are then fitted over these nailing strips, as shown in Figs. 2 and 3, and secured thereto to provide a rectangular frame within which the grille-like framework 11 will fit exactly.

It will be noted that the filler sections 14, 15 and 17 are made up of a longitudinally extending block member 32, between a pair of oppositely disposed facing members 33 and 34; the member 32 being arranged along the margins of the facing members, and notched as at 35 to receive the framework 11. The longitudinal member 32, and the facings 33 and 34 are preferably secured together beforehand so that the entire three-piece unit can be handled as one piece. In this way each of the filler sections 14, 15 and 17 can be fitted over its respective nailing strip, and then scribed, so that it can be planed or cut to fit any irregularities in the wall, floor or ceiling. After this has been done, the filler sections are put back in place and secured to the nailing strips by suitable screws or the like to provide a correctly fitted supporting frame for the framework 11.

In the case of the filler section 16 (Fig. 3), the longitudinally extending member 32 also acts as the nailing strip to be originally secured to the wall D'. In this and similar situations, it is desirable to keep the various members of the filler section separate and to mount them into a unit on the job. It may also facilitate erection if only three of the filler sections are installed before the framework, at least the facing strips of the fourth one being attached after the framework is in place.

At any rate, as soon as at least some of the filler sections are in place, the next step is to erect the sections of the horizontal and vertical members 19 and 18 of the framework 11 within the frame formed by these filler sections. This is simplified by the mortise holes 22 in the vertical rear sections, and the tenons 23 formed at the ends of the horizontal rear sections; as well as by the fact that all of the horizontal and vertical rear sections that come into contact with the filler sections 14, 15, 16 and 17 are notched to fit thereover as shown at 28 and 36 respectively.

With the rear or fixed sections of the framework 11 in place, the wall is now ready to receive the panels 13, and these may be of glass, as shown, or of wood or any other suitable material depending on the wall finish desired. Glass has proved to be the best all around substance for the purpose, because it can be transparent, translucent or opaque; it can also be made rough or smooth, figured or plain, colored or colorless; and, if decorative effects are desired, it may be enameled, sand-blasted, etched or otherwise treated to obtain the desired result. To make the glass panels more resistant to breakage, they may be heat-treated; or two or more sheets may be laminated with an interposed interlayer of plastic.

In mounting panels 13 in the framework, each one is first placed with its lower edge on a horizontal ledge formed by the tongue 26 of one of the horizontal back sections and its four rear margins are then pressed against the vertical ledges 37 formed therearound by the adjacent vertical and horizontal rear sections. Forward or cover sections 29 are then fitted over their respective rear sections with the grooves 27 in the former fitting over the tongues 26 on the latter, and clamping the panels therebetween.

As has already been shown, the front or cover sections 29 extend only between the joints 25 formed by the back sections. Moreover, these cover sections have their end corners beveled as at 38 to form a mitered joint 39 wherever four of them come together. This joint is also formed with a square opening 40 running back to the tongue 26 on the corresponding vertical back section 21. In order to lock the cover sections 28 and 29 in position, there is provided a plug 41, having a shank 42 adapted to fit into the opening 40, and a cap portion 43 of a size to cover the mitered joint 39. (Fig. 4.)

The shanks of these plugs are tapered and, by means of a screw 44 passing therethrough and threaded into an opening 45 in the vertical tongue 26, the cover sections 29 will be wedged into proper position and the entire framework with

its paneled openings held in assembled relationship. As a matter of fact, these plugs 41, one at each of the joints in the grille-like framework, do the entire job of fastening all of the parts of the complete wall section together.

The practical advantages of this particular arrangement are of considerable importance. In the first place, it makes it possible to erect or dismantle one of these walls in an incredibly short time and with a minimum number of movements. Moreover, it makes it possible for one relatively unskilled workman to do the job with no other tool than a screw driver. Further, because the direct pressure when the screws are driven home is exerted at the joints only, there is little if any danger of cracking the panels during assembly. Also, the fact that the entire assembly is made with screws only at the joints of the framework, avoids the likelihood of scratching or marring the finish on the frame and is the principal reason why this wall section can be furnished prefinished, to a quality that is comparable to that of a piece of fine furniture.

The panels of these wall sections can be made of any size or shape and for special decorative effects the cross members of the framework may run at other than right angles to one another, and also at angles to the vertical and horizontal. Preferably, for all around use, however, the framework is made to create panels of the shape and size shown, or of multiples thereof. This permits the widest range of desirable variations. With it, partitions may run to the ceiling, or have a cornice with or without a top filler above. Partitions may be solid for their full height or have all glass above the chair rail; or have glass above the chair rail to 7 feet, and solid above.

Also, by eliminating one horizontal cross member 19, space can be provided for a door as at 46. When this is done, a door jamb 47 is secured to the rear sections 21 and 24 in a manner to close the joint 48 between them and the cover sections 28 and 29 (Fig. 3), without preventing removal of the cover sections when desired. A door 48 can then be hinged to the jamb in the usual manner.

By keeping openings to a uniform dimension, both horizontally and vertically, and base filler sections 15 and 34 to a standard height, it is both possible and practical to have the added feature of a standard, prefabricated door and door jamb assembly. To do this successfully, it will be necessary to use relatively heavy door jambs, so that door, door jambs and attached door hinges can be assembled, shipped and sold as a unit. The assembly can be held together during shipment and handling, by merely screwing a base cleat strip to the bottom of the two vertical door jambs. Both the door and the door jambs can be made longer than the vertical opening to allow them to be cut to conform to any irregularities in the floor, at the point where the assembly is to be installed.

In view of the fact that all horizontal and vertical members adjacent to the door jambs must be plumb, level and square to one another, this will tend to eliminate the lengthy and costly installation of typical door assemblies which usually require awkward and primitive methods of shimming door jambs to make them plumb, level and square, before door hinges can be scribed, fitted and attached to the door and door jamb. The door assembly is in alignment with the ceiling, base and side filler sections. This allows the door to be swung in or out, and to the right or left hand side of the opening.

So far the invention has been described principally in connection with inside partitions for offices and the like. However, they make equally attractive and practical outside walls, and can be used in homes as well as in public and commercial buildings. They are ideal for enclosing sun porches, for example, and in this case any or all of the glass panels can be replaced by screens in the summer-time by simply removing the locking plugs at the proper joints and effecting the change.

Where these sections are to be used in outside walls, it is desirable to glaze the open portions of the framework with a multiple glazing unit such as the assignee company's "Thermopane." Such an arrangement is shown in Fig. 8, the double glazing unit 49 comprising two parallel sheets or plates of glass 50 and 51, held in spaced face to face relation by a metal separator strip 52. The exact construction of this glazing unit is described in the patent to Charles D. Haven, 2,235,681, dated March 18, 1941, and the hermetically sealed air space which it provides between the glass sheets provides excellent insulation from heat and cold. It is desirable in outside installations to set the panels in putty or other weatherproof sealing compound as indicated at 52.

Thermopane glazing units can also be used to advantage in other than exterior walls because of their sound insulating qualities, and these can be further improved, where transparency is not important, by enclosing a layer or matte of glass wool in the air space between the glass sheets. Besides the fact that the panels 13 may be made of any one of a wide variety of materials, it should also be mentioned that the framework, too, lends itself to fabrication from a number of different substances. Wood and metal are, generally speaking, preferable, and I have found wood to be especially so. The fact that a framework of wood can be prefinished at the factory by skilled craftsmen using the most complete equipment, rather than on the job by a carpenter or similar mechanic, means the difference between an ordinary partition wall and a fine piece of cabinet work. When sold as a part of a complete office set, the effect of walls that match the office furniture in quality as well as appearance is strikingly rich and attractive.

In connection with the use of different materials, the filler sections also offer considerable scope along this line. Thus, the facing sheets 33 and 34 may be of plywood, structural glass, finished wall board or any other sheet materials that give pleasing effects. When the framework or paneled portion of the wall is substantially the same size as the opening to be closed, as shown in the drawings, it is usually better to supply the filler sections 14 to 17 as a part of the complete wall section kit. However, paneled wall sections of standard size, such as shown at B and C, can be set into walls of any length, and the remainder of the opening filled with any desired wall material. Under these circumstances it is usually less expensive to build that part of the wall, lying outside of the paneled framework, right on the job; the pattern of the filler sections shown of course being followed for this purpose.

It is also to be understood that the permanent building walls D and D' can be replaced either in whole or in part by the prefabricated walls or sections similar to B and C, and that various other changes, such as in the size, shape and arrangement of parts, may be resorted to with-

out departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. In a wall structure, a framework comprising cross members running in two directions, each of said cross members including a rear section and a removable front section, said rear and front sections being shaped to interfit with one another and to clamp a panel therebetween and said front sections being of such length as to form an opening between the ends of said sections at the joint where they meet, and a plug member fitting into said opening and having means for locking said front sections to the back sections.

2. In a wall structure, a framework comprising cross members running in two directions, each of said cross members including a rear section and a plurality of removable front sections, said rear and front sections being shaped to interfit with one another and to clamp a panel therebetween and said front sections being of such length and having their ends shaped to form mitered joints with an opening therein where the cross members running in one direction intersect the cross members running in the other direction, and capped plug members having tapered shanks fitting into the openings in the mitered joints said caps covering said joints, said capped plugs wedging the front sections into proper position and having means for locking them to the rear sections.

3. In a wall structure, a framework comprising vertical members having tongues running along their front faces and mortises in their side faces at intervals along their lengths, horizontal members having tongues running along their front faces and tenons formed at their ends and fitting into the mortises in the side faces of the vertical members, bevel-ended cover sections for said vertical and horizontal members having grooves in their rear faces to fit over the tongues on the forward faces of the vertical and horizontal members, said cover sections being of such length and so beveled as to form a mitered joint having an opening at approximately the center thereof wherever the vertical and horizontal members intersect one another, and a member covering said mitered joint and fitting into the opening therein said member having means to lock the elements of the framework into assembled relationship.

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