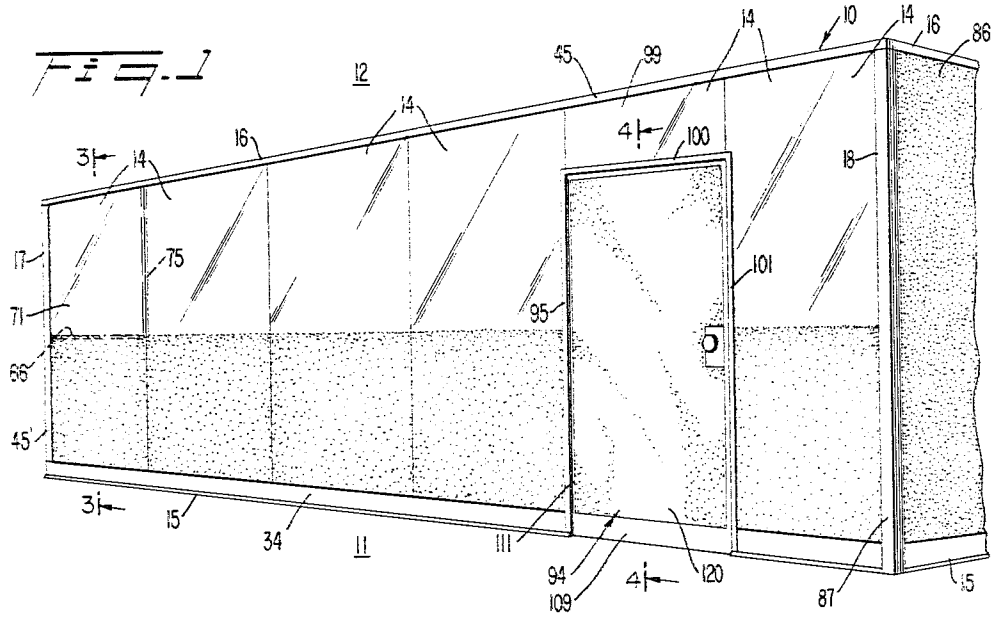
Dec. 8, 1964 J. J. DONLON 3,160,246

BUILDING WALL AND PARTITION STRUCTURE

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FIG. 1



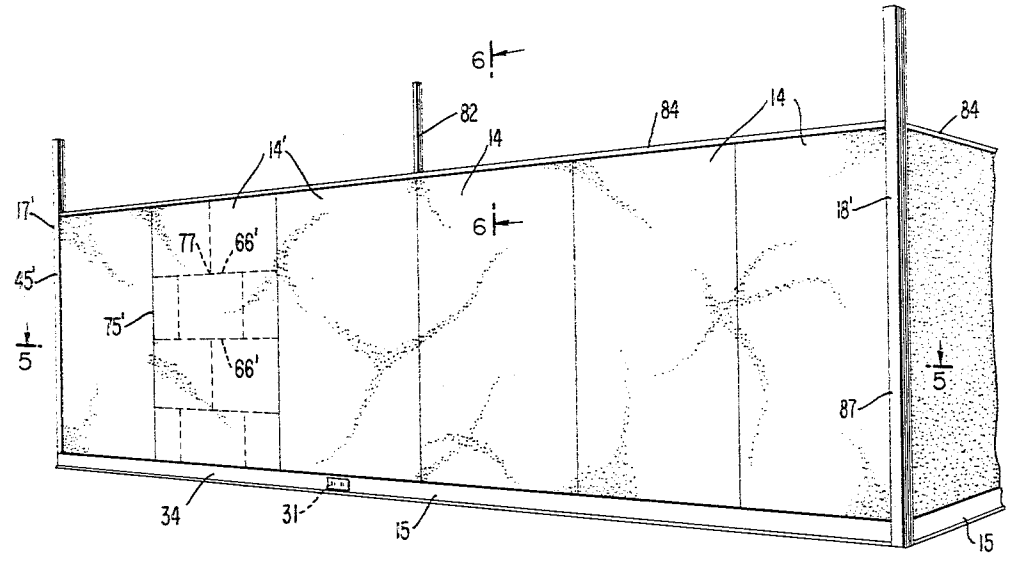


FIG. 2

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BUILDING WALL AND PARTITION STRUCTURE

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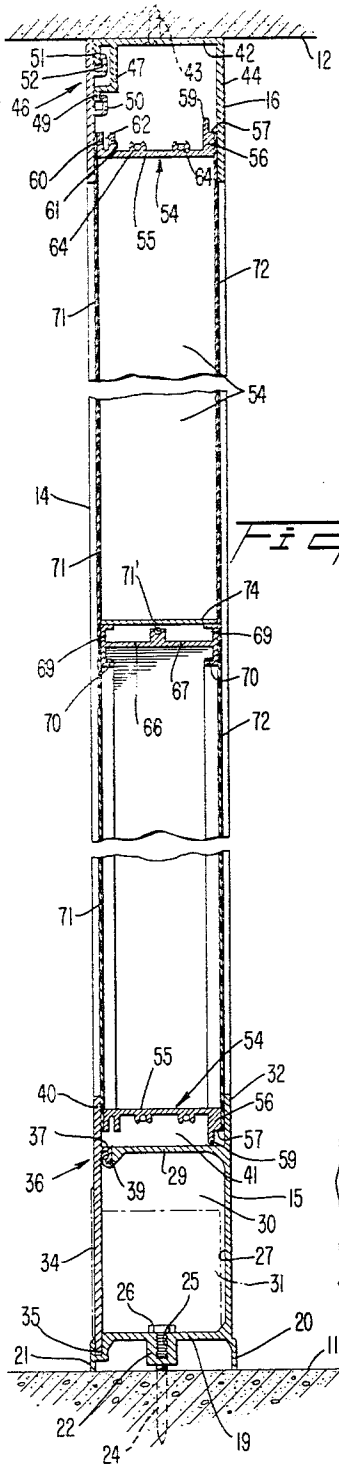


Fig. 3

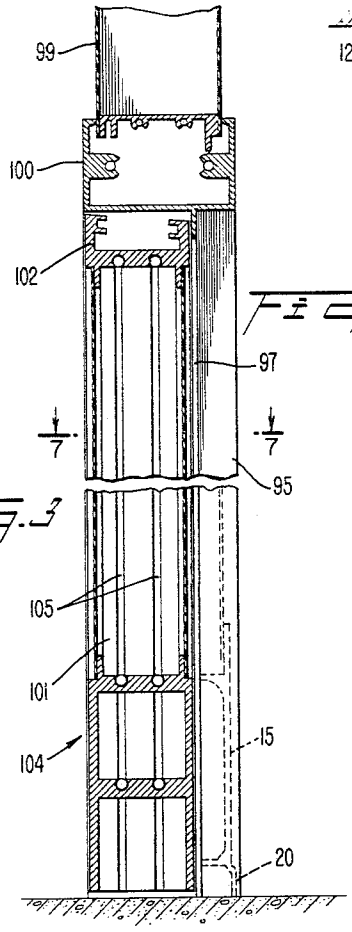


Fig. 4

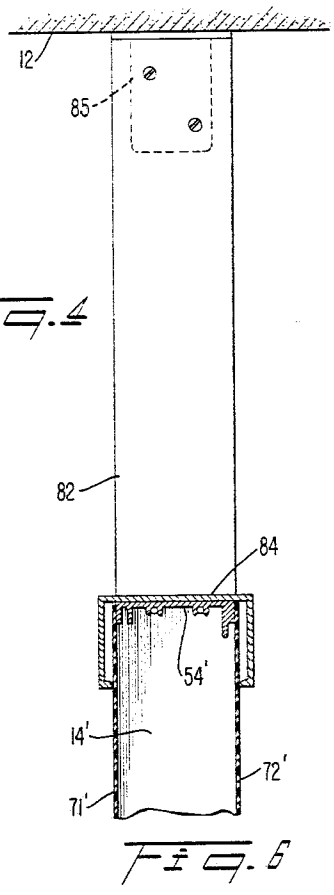


Fig. 6

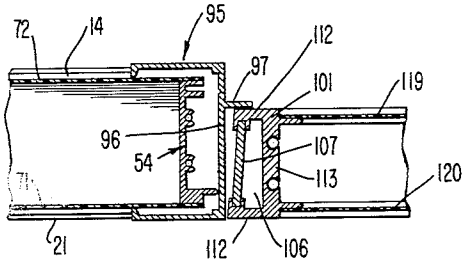


Fig. 7

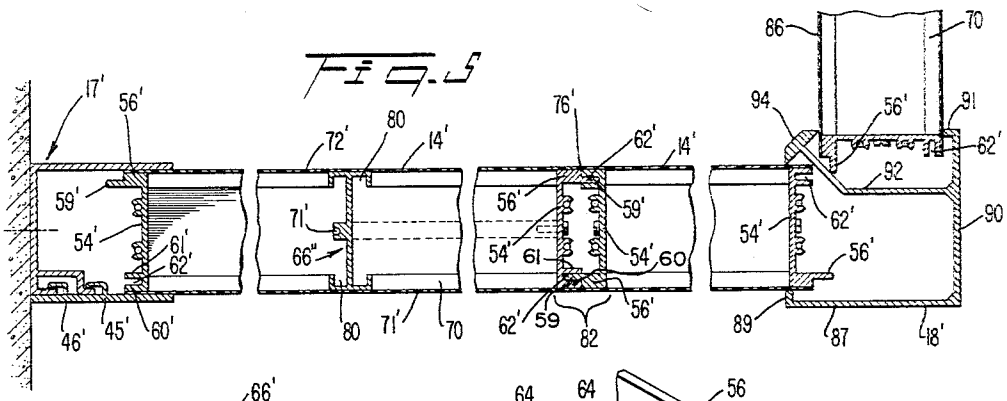
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BUILDING WALL AND PARTITION STRUCTURE

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Fig. 5



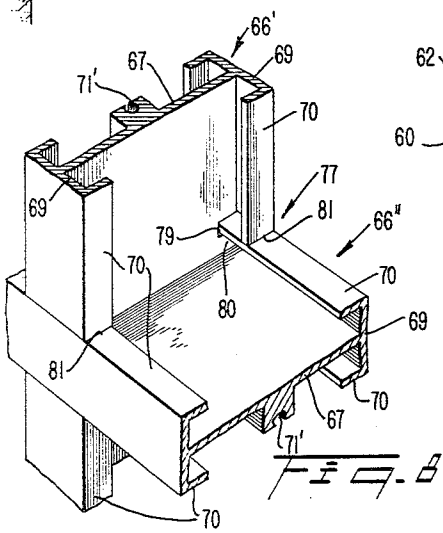


Fig. 8

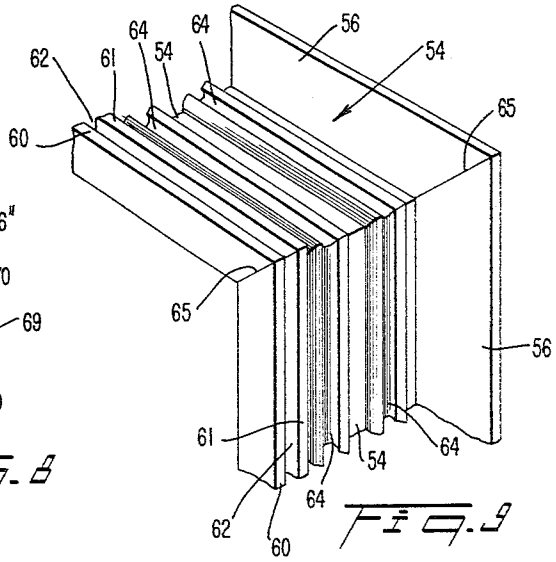


Fig. 9

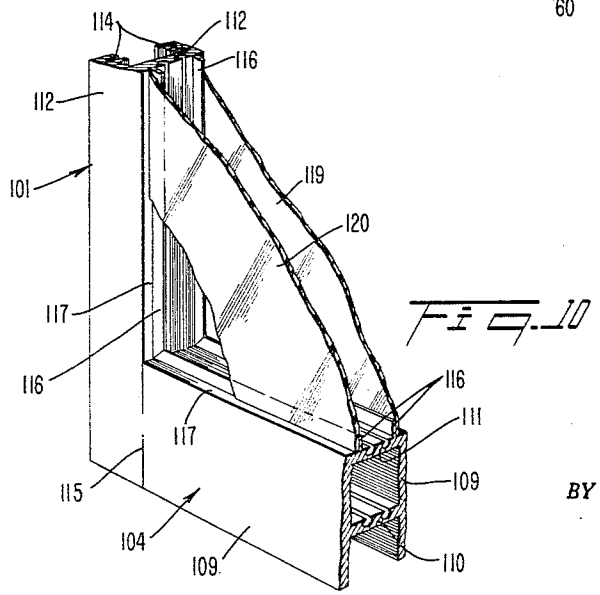


Fig. 10

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3,160,246

BUILDING WALL AND PARTITION STRUCTURE

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Filed Oct. 24, 1960, Ser. No. 64,604
6 Claims. (Cl. 189—34)

This invention relates to improved building structures, and particularly relates to building structures useful as walls, partitions, ceilings, and the like.

The invention has among its objects the provision of an improved panel structure for use as a wall partition or the like, such panel structure being characterized by its economy, its attractiveness of appearance, and the ease with which it may be erected.

Another object of the invention resides in the provision of a novel building structure composed of a plurality of aligned abutting panels, such structure including novel means for joining adjacent panels.

Yet another object of the invention, and particular embodiments thereof, resides in the provision of an improved wall or partition wherein at least some of the vertical supports or mullions thereof are composed of members forming integral parts of the panels of the wall or partition.

Still a further object of the invention lies in the provision of an improved panel for building structures, such panel incorporating novelly connected internal bracing elements therefor.

Another object of the invention is the provision of an improved door and door-supporting structure for use with walls and partitions in accordance with the invention.

The above and further objects and novel features of the invention will more fully appear from the following description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only, and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

FIG. 1 is a fragmentary view in perspective of a first illustrative embodiment of partition made in accordance with the invention;

FIG. 2 is a fragmentary view in perspective of a second embodiment of partition made in accordance with the invention;

FIG. 3 is a view in vertical cross section through the partition of FIG. 1, the section being taken along the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary view in vertical cross section through the partition of FIG. 1, the view showing the structure of the door and door-supporting means associated with such partition, the section being taken along the line 4—4 of FIG. 1;

FIG. 5 is a view in horizontal section through the partition of FIG. 2, the section being taken along the line 5—5 of FIG. 2;

FIG. 6 is a fragmentary view in vertical section through the partition of FIG. 2, the figure particularly showing a vertical support or mullion for such partition, the section being taken along the line 6—6 of FIG. 2;

FIG. 7 is a fragmentary view in horizontal section through the door employed in the first disclosed embodiment of partition, the section being taken along the line 7—7 of FIG. 4;

FIG. 8 is a fragmentary view in perspective of a joint between inner panel-bracing members employed in the partition of FIG. 2;

FIG. 9 is a fragmentary view in perspective of the corner of the frame member employed with the panels in each of the two disclosed embodiments of wall or partition; and

FIG. 10 is a fragmentary view in perspective of a corner of the door employed in the first disclosed embodiment of partition.

The building structure of the present invention is disclosed in connection with two embodiments of inner partion which may be employed, for example, in an office building. It is to be understood, however, that the building structure in accordance with the invention is capable of much wider use, such structure lending itseld admirably to use in exterior walls of buildings, ceilings for rooms of buildings and for false walls to be applied to existing outer or inner wall structures.

In FIG. 1 the partition structure is generally designated 10. Partition 10 is shown extending between a floor 11 and the ceiling 12 and as being secured thereto. The partition structure 10 is made up of a plurality of similar aligned abutting panels 14 in its forward walls, such forward wall including a door 94 and a transom panel 99. The forward wall of the partition is joined at vertical corner member 18 to an end partition structure 86, which may be of the same construction as the forward wall now to be described.

The edge-abutting panels 14 are held between an elongated base member 15 affixed to the floor and an elongated upper member 16 secured to the ceiling. The left-hand and right-hand end panels shown in FIG. 1 are additionally secured to the left-hand and right-hand vertical corner support members 17 and 18, respectively. The structure of members 17 and 18, and their manner of interaction with the panels will be described in connection with the description of similar members 17′ and 18′ shown in FIGS. 2 and 5.

The construction of the lower supporting member 15 for the panels is particularly illustrated in FIG. 3. As there shown, element 15 has a box-like section, having a horizontal bottom wall 19 which is supported horizontally somewhat above the level of the floor by depending parallel flanges 20 and 21. The bottom wall 19 is centrally thickened at 22, and has longitudinally spaced passages therethrough to receive the upper ends of vertical members 24 secured to the floor. Members 24 may be in the nature of bolts having their lower ends imbedded in the floor. Members 24 have upper threaded shanks 25 protruding through the openings in element 22, a nut 26 on shank 25 securely attaching member 15 to the floor. Member 15 has a vertically extending rear wall 27 and a horizontally extending upper wall 29 overlying bottom wall 19. There is thus formed a raceway 30 within member 15, such raceway affording space for electrical outlet boxes such as that shown at 31, where required, and for electrical conduits connecting the outlet boxes.

Above the upper element 29 base member 15 is provided with a longitudinally extending vertical flange 32 which forms, in effect, an extension of wall 27. An elongated cap member 34 is provided to cover raceway 30, cap member 34 conveniently providing openings therethrough for access to the electrical receptacles in the raceway. The plate 34 has its lower edge removably received within a longitudinally extending vertical recess 35 in the outer edge of member 19, an upper extension of flange 21 forming the outer wall of such recess, as shown. Means generally designated 36 is provided to form a snap connection between the upper portion of plate 34 and the outer edge of element 29. Means 36 is formed by an inwardly and downwardly turned bead 37 on the inner face of plate 34, bead 37 resiliently and releasably cooperating with an outwardly and upwardly turned bead 39 on the outer edge of member 29. Above member 29 the plate 34 extends into a flange portion 40 which is parallel to and spaced from flange 32, member 29 and flanges 32 and 40 forming a seat or pocket for the reception of the edge of a panel 14.

The upper elongated panel securing member 16 is likewise shown in detail in FIG. 3. Element 16 is generally in the form of a hollow open-bottomed channel member and has an upper wall 42 which may be secured to the ceiling 12 as by screws 43. Depending from upper wall 42 is a vertical flange 44 which confronts and is aligned with the flange 32 of bottom panel securing member 15. Member 16 is provided with a removable cover strip 45 which is secured to the body of the member 16 by snap attaching means generally designated 46. An inner vertically depending flange or web 47 is attached to member 42 as shown, at the bottom flange 47 being directed outwardly and thence downwardly into a shallow horizontally extending flange 49. An inwardly and thence upwardly directed hook-like member 50 on cover strip 45 resiliently engages and overlies flange 49 when the parts are assembled as shown. Securing means 46 is completed by a depending flange 51 on the outer edge of member 42, and by a further inwardly and upwardly directed hook-like member 52 which resiliently engages the inner face of flange 51. In order that the cover plate may be securely attached to the body of member 16, the inner surfaces of flanges 49 and 51 may be serrated or provided with suitable recesses into which the ends of hook-like members 50 and 52 will snap.

The structure of the panels 14 in the embodiment of FIG. 1 is shown in FIG. 3. Each panel has a bordering frame made up of frame portions 54 which extend along the top, bottom, and vertical edges of the panel. Such frame portions are joined at the corners of the panel as by being mitered and welded or otherwise secured together along joints 65, as shown in FIG. 9. Each such frame member has a main web portion 55 which has a width substantially equaling the panel thickness. Web 55 has a smooth inner surface facing inwardly toward the main extent of the panel. One outer edge of each frame member, shown at the right in FIG. 3, is provided with a relatively thick flange 56; from the laterally inner edge portion of part 56 there extends outwardly a further, thinner flange 59, thereby forming a shoulder 57 lying closer to the web 55. The other edge of each frame member 54, shown at the left in FIG. 3, bears two similar longitudinally and outwardly extending flanges 60 and 61, such flanges being parallel and presenting a groove 62 therebetween. Flanges 60 and 61 have their outer free edges disposed at the same level as shoulder 57. Preferably the outer surface of web 55 is provided with two longitudinally extending screw-receiving channels 64, as shown, whereby the frame members may be additionally secured together or have braces or other similar parts secured thereto by self-tapping screws.

When the panels 14 are of substantial vertical and horizontal extents, it is preferred that they be provided with additional inner bracing members. In the embodiment of partition shown in FIG. 1, the upper portions of the coverings layers of each of panels 14 are clear or transparent, and the lower portions of the covering members for such panels are of either a solid color or are made opaque as by being frosted. Consequently, in the first illustrative embodiment the bracing members for the panels are confined to the lower portions of the panels. Thus as shown in FIG. 3 there is provided an inner cross brace 66 which is located horizontally within the panels at the junction between the clear and opaque portions thereof. Brace member 66 has a main web portion 67 which is of the same length as web 55 of frame members 54. The opposite edges of brace member 66 are provided with flanges 69 connected at their vertical centers to the edges of web 67. The upper and lower edges of vertical flanges 69 are provided with short horizontally and inwardly projecting flanges 70. Brace member 66 may be attached to the vertical frame members of the panel as by being welded thereto, by one or more self-tapping screws received in a screw race such as that shown at 71' in FIGS. 3 and 8, or both. Where it is desired that there be a clear shadow line through the transparent portions of the panels, there may be additionally provided a thin strip or plate 74 which lies upon and is secured to the upper flanges 70 of horizontal brace member 66.

The panels 14 are provided with thin covering skins or layers 71 and 72 which overlie and are secured to the respective outer and inner flanges on frame members 54 and the flanges on the inner brace member or members. Cover members 71 and 72 may be made of plastic, metal, wood, or any other suitable material. In the embodiments shown, members 71 and 72 are made of plastic sheets and are adhesively secured to the inner and outer flanges of the frame members and brace. A pair of mating frame members 54' of the embodiment of FIG. 2 are shown in FIG. 5 where such combination forms a vertical support designated 82. As above explained, members 14' are similar to members 14 of the first embodiment, and interfit in the same manner. As shown in FIG. 5, the width of the bordering portions of the respective mating frame members to which the thin covering layers or skins 71'' and 72'' overlie and to which they are adhered are substantially the same on both the (male) flange 56' and on the mating (female) portion carrying flanges 60 and 61. In other words, the width of flange 60' substantially equals the width of that portion of flange 56' extending from the smooth inner edge of the frame member 54' to the root of the further, thinner flange 59. As a result, not only are the lines of abutment between adjacent panels substantially in alignment, lying substantially in a central transverse plane through the mating frame members 54' forming the combination 82, but the width of the surfaces to which the covering skins or layers 71 and 72 are adhered is uniform completely around the panels on both sides thereof. When the covering members 71 and 72 are made of metal sheets, they may be secured to the frame members and brace by being welded thereto. Cover members 71 and 72 are of such vertical extent that their upper and lower edges lie flush with the upper and lower edges of flanges 60 and 61, as shown at the left in FIG. 3, and lie flush with the shoulders 57, as shown at the right in FIG. 3.

The cover members 71 and 72 are of such width that their vertical edges lie flush with the outer free edges of the flanges 60 and lie flush with the shoulder 57 of the vertical frame members. Such relationship is illustrated in FIG. 5 in connection with the embodiment of partition shown in FIG. 2. As a result of such construction, the panel covering members designated 71 and 72 in connection with the embodiment of FIGS. 1 and 3 and 71'' and 72'' in connection with the embodiment of FIGS. 2 and 5 closely abut along vertical lines so that the joints between panels are not readily visible. The outer line of vertical juncture between contiguous panels 14 is shown at 75 in FIG. 1. An inner junction line between contiguous panels in the embodiment of FIGS. 2 and 5 is shown at 76' in FIG. 5.

In some instances it may be desirable to supplement the single horizontal internal brace 66 shown employed in the panels 14. Thus in the generally similar panels 14' of the embodiment of FIGS. 2 and 5 there are employed a plurality of vertical and horizontal internal bracing members. Such bracing members may have a section similar to that of member 66, and may advantageously be joined in the manner shown in FIG. 8. As shown in FIG. 2, three vertically spaced horizontal bracing members 66' are employed, there being a number of short vertical bracing members 66'' interposed between the horizontal members 66' and/or the horizontal frame members. A typical joint 77 between vertical and horizontal internal bracing members 66' and 66'', respectively, is shown in FIG. 8. As there shown, the web 67 has its lower end lying in a transverse plane lying below the lower ends of the side vertical flanges 69 and of the inwardly projecting flanges 70, which also lie in a transverse plane. The

web 67 of vertical member 66' is inwardly slotted at its lower ends to form grooves 79 and tongues 80. The slots are so located and of such configuration that the flanges 70 of member 66'' are snugly received therein, tongues 80 are accurately received beneath flanges 70 of member 66'', and shoulders 81 at the lower ends of flanges 69 and 70 of member 66' snugly engage the upper surfaces the latter in canted position, following which members 66', thus prepared, may be readily connected to two horizontal brace members 66' by being introduced between the latter in canted position following which members 66'' may be turned to lie transversely of members 66', as shown.

In the embodiment of partition shown in FIGS. 2 and 5, the panels 14' extend only part way from the floor to the ceiling; the partition formed by a plurality of aligned abutting panels 14' is supported by vertical corner members 17' and 18', and, when required, by one or more vertical members 82 which in this instance are formed by interfitting abutting frame members of contiguous panels as shown in FIG. 5. As there shown, the vertical frame members 54' of panel members 14' are the same in section as the side frame members 54 of the above described panels 14. When consecutive panels are mounted in mating engagement, as shown in FIG. 5, the tongue 59' of one such frame member is received within the groove 62' of the other. The inner and outer covering members 71' and 72' meet along vertical lines 75' and 76', respectively.

The upper edges of panels 14' are provided with a cap member 84 which is in the form of a downwardly open channel. Cap member 84 has an opening therethrough at the location of vertical support 82. The upper end of member 82 may be secured to the ceiling 12 through the medium of a bracket 85, as shown in FIG. 6.

The corner member 18 of the first embodiment of partition and the corner member 18' of the second embodiment thereof may be constructed in the manner shown in FIG. 5 in connection with member 18' As there shown, such member is of generally box-like configuration, having a front wall 87 and a side wall 90. The left-hand end and upper faces of member 18' as it is shown in FIG. 5 are open to receive the end of the main partitian and of a side partition 86, respectively. Inwardly projecting vertical flanges 89 and 91, respectively, form closed joints between member 18' and the main and side partitions. In order to close the joint between the inner surfaces of the main and side partitions, member 18' is provided with a vertically disposed inner web member 92 extending inwardly from side 90 of member 18' and thence being angularly directed so as to pass between the confronting inner edges of the two partitions. Web 92 carries a vertically extending filler member 94 on its outer edge, such filler member masking the inner joint between the partitions.

The embodiment of partition shown in FIGS. 1 and 3 incororporates a door 94. To support such door there is provided a vertical door jamb 95 which is connected to the main partition in the manner particularly shown in FIG. 7. Jamb 95 is of box-like configuration, having an open edge receiving the vertical edge of the panel 14 adjacent the door opening. Member 95 has a generally flat web member 96 from which there protrudes inwardly of the door opening a narrow vertical flange 97. Web 96 and flange 97 may be employed to form a seat for either the hinged or the free edge of the door 94, depending upon the manner of mounting of the door. A vertically short transom panel 99 is provided in the partition above the door opening, the lower edge of panel 99 being bordered by a horizontal member having a construction similar to jamb 95. The third edge of the door opening is bordered by a similar vertical member 101.

The construction of the door is shown in detail in FIGS. 4 and 10. As there shown, the door has a frame made up of two vertical frame members, one of which is shown at 101, a top frame member 102, and a bottom frame member 104. The side frame members are of channel configuration, as shown more particularly in FIG. 10, and are provided with longitudinally extending screw races 105 on their inner surfaces to facilitate their assembly. A vertical frame member 101, on the hinged side of the door, is in the form of a channel member having a main web 113 and spaced parallel flanges 112 projecting along the outer edge of such web. Frame member 101 thus presents a longitudinally extending recess 106 which is employed in this instance for the reception of the butts of door-mounting hinges, not shown. Recess 106 may be provided with a cover plate 107 which is received within longitudinally extending confronting grooves 114 on the outer ends of flanges 112.

The bottom frame member 104 of the door is shown more particularly in FIG. 10. As there shown, frame member 104 has spaced parallel longitudinally extending inner and outer webs 109 which are connected at generally their mid portions by a horizontally extending inner web 110. Frame member 104 is completed by an inner, horizontally extending web 111 which is connected to the inner edges of side webs 109. The vertically and horizontally extending frame members of the door are suitably connected as by being interfitted and joined as shown at 115 in FIG. 10. The frame members may be connected as by being welded together, by self-tapping screws extending through the one member and threadedly engaged with the screw races of the other, or both.

The inner edges of the vertical and horizontal frame members of the door have two spaced parallel inwardly projecting flanges 116 extending therealong. Flanges 116 on the respective door frame members are spaced inwardly from the edges thereof to form recesses or seats 117 on the inner and outer edges of the door. Inner and outer covering panels or skins 119 and 120, respectively, are disposed in the respective seats on the door frame. Panels 119 and 120, which may be made of any suitable material such as clear or opaque plastic, metal sheets, or wood, may be secured in the recesses in the door frame in any suitable manner, such as being adhered thereto by a suitable cement.

The wall and partition structure of the present invention is particularly characterized by its attractive appearance, its economy, and the ease with which it may be asembled and disassembled. The various structural parts of the wall and partition member of the invention, such as the frames of the panels, the floor and ceiling-mounted channel members for the partition, the door frame members, etc., may be formed of suitable materials such as metal, plastic, or the like. It is preferred, for reasons of strength, that such parts be formed of metal; because of the uniformity of the sections of the panel frame parts, the braces therefor, the floor and ceiling-mounted channels, and so forth, such parts are advantageously formed by being extruded through suitably shaped dies.

Although only a limited number of embodiments of the invention have been illustrated in the accompanying drawings and described in the foregoing specification, it is to be especially understood that various changes, such as in the relative dimensions of the parts, materials used, and the like, as well as the suggested manner of use of the apparatus of the invention, may be made therein without departing from the spirit and scope of the invention as will now be apparent to those skilled in the art. Thus the wall and partition structure of the invention lends itself admirably, for example, to the use of thermal and sound insulation within it. When panels or portions of panels are opaque, as are the lower portions of the panels 14 in FIGS. 1 and 3, the space between the outer covering members 71 and 72 may be filled with insulating material such as styrene foam. The space between the covering elements on the door may likewise be filled with insulating material if desired.

What is claimed is:

1. A wall structure comprising a plurality of aligned interlocked panels disposed in edge engagement, each panel having a border frame including elongated channel shaped frame members disposed in opposed aligned relationship along abutting edges of the panels at the joints therebetween, the channel shaped frame members being open toward the respective outer edges of the panel, said frame members each forming generally one-half of a hollow rectangular beam and having a broad base extending normal to the broad extent of its respective panel and spaced parallel side flanges at the opposite side edges of the base and extending at right angles to the base, the said side flanges on the elongated frame members of contiguous panels having formations thereon which lie completely between the broad opposite surfaces of the panels, which extend longitudinally of the abutting panel edges, and which mutually interfit, the interfitting formations of contiguous panels being reversed mirror images of each other, the interfitting formations on the side flanges of each of the said interfitting frame members comprising a longitudinally extending tongue on one of said side flanges and a longitudinally extending groove in the other of said side flanges, the width of the groove being substantially equal to the thickness of the tongue, the tongue of one frame member at a joint between contiguous panels being snugly receivable within the groove on the other frame member upon relative movement of aligned panels thus to be joined toward each other in their common plane, there being longitudinally extending transverse end surfaces of substantial lateral extent on the side flanges of contiguous panels disposed, respectively, on the outer side of the tongue, on the said one side flange and on the outer side of the groove of the other side flange, said transverse end surfaces of the side flanges of contiguous panels lying laterally outwardly of the tongues and grooves of the interfitting frame members on both sides of the wall structure abutting each other when the panels are in joined operative position, said frame members having edge portions of appreciable width extending therealong on both sides of the panels and lying parallel to the broad extent of the panels, said edge portions meeting the transverse surfaces on the frame members at the ends of the panels at solid right angles, each panel having a separate covering layer of material lying on each side of the frame and having its edge portions overlying and affixed to the said edge portions on the respective sides of the frame member, the covering layers on each of the panels extending to the outer edges of the frame members of the respective panels, whereby the respective covering layers of contiguous panels abut each other along a line on each side of the panels in the wall structure.

2. A wall structure as claimed in claim 1, wherein the tongue of each of the interfitting frame members extends along the inner edge of the one flange of such frame member, and wherein the groove in said other flange of each of the interfitting frame members is located generally laterally centrally within said other flange.

3. A wall structure as claimed in claim 1, wherein the transverse end surfaces of the side flanges of the interfitting frame members of contiguous panels which lie laterally outwardly of the tongues and grooves of such panels lie in the same plane transverse to the broad extents of said panels, said edge portions of the frame members on both sides of the panels are of substantially the same width, and wherein the covering layers on both sides of each panel are affixed to said edge portions by being adhered thereto.

4. A wall structure as claimed in claim 1, wherein the panels are rectangular, the frame members border all four sides of the panels, all of the border frame members of the panels are similar, wherein the frame members of each panel are all similarly disposed, and wherein the frame members of a given panel are disposed oppositely from the frame members of another panel which is matingly interlocked with an edge of said given panel.

5. A generally channel-shaped structural member generally in the form of one-half of a hollow rectangular beam adapted for use as the border of a panel, said member comprising a base of substantial width having a first flange extending along one side edge thereof, a second flange extending along the other side edge of the base, and a third flange spaced laterally inwardly of, close to, and extending parallel to the second flange so as to present an open groove between the second and third flanges, all of said flanges being positioned on the same side of the base, a fourth flange, thinner than the first flange and having a thickness substantially the same as the width of the groove, extending from the laterally inner edge of the first flange and parallel thereto, there being a shoulder on the laterally outer edge of the first flange at the root of the fourth flange, the shoulder and the outer edge of the second flange remote from the base lying in the same plane parallel to the web, said structural member being adapted to mate with an identical member in reversed position to form a hollow rectangular beam with the fourth flanges of each of the mating members snugly received within the groove between the second and third flanges of the respective opposite member and with shoulder on the first flange in engagement with the outer edge of the second flange, the members when thus mated being retained in accurate alignment by said engagement therebetween.

6. A structural member as claimed in claim 5, wherein the fourth flange has a height measured from said shoulder which approximates but does not exceed the depth of the groove measured from the said outer edge of the second flange.

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