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3,087,586

WALL STRUCTURE

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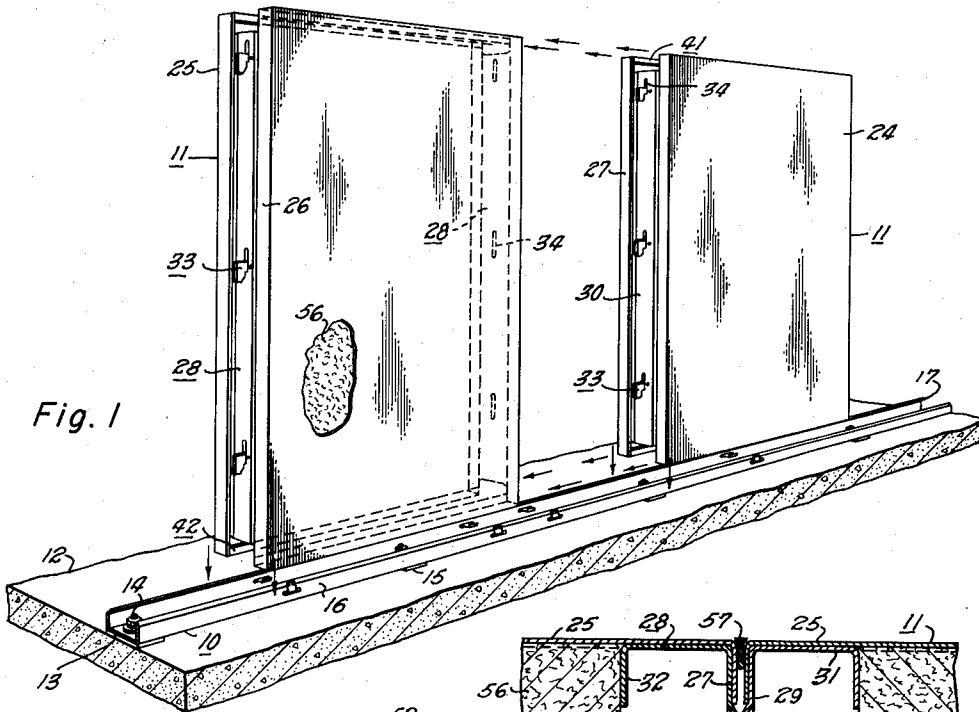


Fig. 1

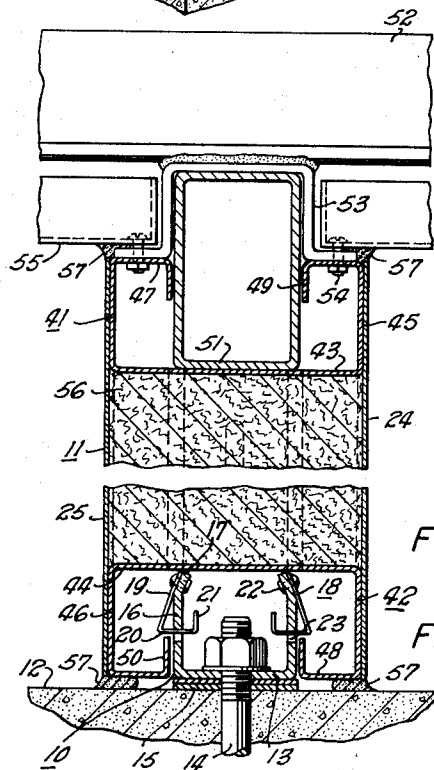


Fig. 2

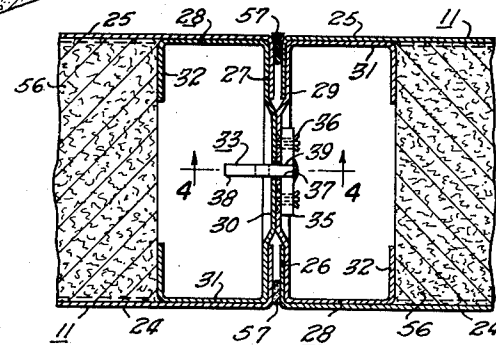


Fig. 3

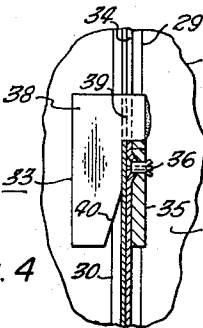


Fig. 4

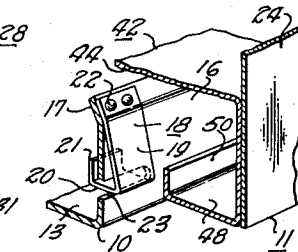


Fig. 5

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WALL STRUCTURE

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This invention relates to new and useful improvements in wall structures.

One object of the invention is to provide an improved wall structure having a plurality of prefabricated panels of such construction that the same may be detachably connected to one another and to a supporting base in any suitable arrangement to form buildings of various dimensions.

Another object of the invention is to provide an improved wall structure which includes a plurality of preformed panels having complementary edge portions to permit the fastening of each panel to adjacent panels in any desired relationship, the lower edge portions of the panels being arranged for connection with sill means which is common to a multiplicity of panels to support and maintain the panels against displacement.

A particular object of the invention is to provide an improved wall structure, of the character described, wherein the sill means and lower margin of each panel have coacting channel members for connecting the panel to a support and means carried by one of the channel members for engagement with the coacting member to fasten said channel members together.

An important object of the invention is to provide an improved wall structure, of the character described, wherein each panel is hollow and has marginal channel members for supporting interior and exterior sheets or skins of relatively thin material, the upright channel members having their webs directed outwardly for abutment with the upright members of adjacent panels and the bottom channel member having its flanges directed outwardly for engaging over the sill channel member.

A further object of the invention is to provide an improved wall structure, of the character described, wherein the flanges of the bottom channel member of each panel are angular and have inner portions directed toward its web for overlying the outer surfaces of the flanges of the sill channel member and for engagement beneath retractable fasteners carried by said flanges of said sill channel member.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawing, wherein an example of the invention is shown, and wherein:

FIG. 1 is an exploded, perspective view of a portion of a wall structure constructed in accordance with the invention,

FIG. 2 is an enlarged, broken, transverse, vertical, sectional view showing the upper and lower ends of one of the wall panels and their relation to the roof and sill members,

FIG. 3 is an enlarged, horizontal, cross-sectional view showing one of the connections between adjacent panels,

FIG. 4 is a transverse, vertical, sectional view, taken on the line 4—4 of FIG. 3, and

FIG. 5 is an enlarged, perspective view showing the connection of one of the clips of the sill member to the bottom member of one of the panels.

In the drawing, the numeral 10 designates the base or sill member of a wall structure for connecting a plurality of prefabricated panels 11 to a support or

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foundation 12 which is shown as being of the concrete slab type. This sill member is of channel or U-shape and has its web 13 overlying and secured to the foundation 12 by the usual nuts and bolts 14 (FIG. 2). If desired or necessary, shims 15 may be confined on the bolts 14 between the foundation and web 13. Preferably, the upstanding flanges 16 of the sill member are parallel and have their upper margins 17 converging or bent inwardly. For connecting the panels 11 to the sill member, a plurality of angular clips or fasteners 18 are mounted on the flanges 16 in aligned, opposed pairs. The clips are formed of spring steel or other resilient metal having greater width than thickness so as to be relatively thin. As shown most clearly in FIG. 5, each clip 18 is substantially J-shaped and has its upper portion or leg 19 extending at an acute angle to its lower horizontal portion or leg 20 which terminates in an upstanding foot or lip 21. The upper ends of the clip legs 19 overlie and are secured to the upper margins 17 of the flanges 16 by suitable means, such as rivets 22, with said legs projecting outwardly in spaced relation to the flanges and the clip legs 20 extending inwardly. Horizontally-elongated openings or slots 23 are formed in the flanges for slidably receiving the lower arms of the clips and permitting retraction thereof.

Each panel 11 includes interior and exterior sheets or skins 24 and 25 of relatively-thin metal or other suitable material, and the sheets may be formed of the same or different materials. When formed of metal, the outer surfaces of the sheets 24 and 25 may be porcelain-enameled or otherwise permanently finished. Preferably, the sheets are identical and have inwardly-directed flanges 26 and 27 coextensive with their upright margins. An upright, parallel member 28, of channel or U-shape, is secured to and connects the flanges 26 and 27 at each end of each panel and has its web 29 directed outwardly with its longitudinal margins in underlying engagement with said flanges (FIG. 3). As shown by the numeral 30, the medial portion of each web 29 is offset outwardly beyond the flanges 26 and 27 for abutment with the complementary web portion of an adjacent panel. Flanges 31 extend inwardly from the longitudinal margins of the web in underlying engagement with the upright margins of the sheets 24 and 25 and, preferably, terminate in inwardly-directed portions or lips 32 which are parallel to said web. The members 28 are of slightly less length than the sheets 24 and 25 and their flanges so as to be spaced from the upper and lower ends thereof.

For detachably connecting adjacent panels to one another a plurality of hooks 33 are carried by one of the upright members 28 of each panel. The medial portion 30 of each web 29 has a plurality of elongated openings or slots 34 extending longitudinally thereof for coacting with the hooks 33. As shown in FIGS. 3 and 4, each hook includes a flat, rectangular base element or inner plate 35 secured by a pair of drive rivets or fasteners 36 in parallel relation to the inner surface of the web portion 30 below each slot 34. Each base plate 35 extends above the lower end of the slot and has a medial recess 37 in its upper margin in registration with said slot. A flat, outer element or plate 38 extends perpendicular to the base plate and has a lateral extension or tongue 39 projecting from its upper portion through the lower portion of the slot 34 and welded in the recess 37 of said base plate. As shown by the numeral 40 in FIG. 4, the inner edge portion of the plate 38 adjacent the web is cut away at an angle to provide a bill for engaging one of the slots of the upright member of the adjacent panel. Since the bill 40 increases in width upwardly, the webs of adjacent panels are forced into snug engagement when the hooks 33 are engaged with the slots. Except for the hooks, the members 28 are identical and said hooks may be mounted on either member of each panel.

Coextensive top and bottom members or headers 41 and 42, of channel or U-shape similar to the members 28, are secured to and connect the upper and lower margins of the sheets 24 and 25 (FIG. 2). Although not shown, the ends of the members 41 and 42 are welded or otherwise secured to the ends of the upright members. The members 41 and 42 are identical and have inwardly-disposed, horizontal webs 43 and 44 and outwardly-directed, upright flanges 45 and 46 which underlie the margins of the sheets and which are angular, terminating outer portions 47 and 48 parallel to the webs and lips 49 and 50 parallel to the flanges and perpendicular to said webs. A tubular member 51 extends longitudinally of the panel between the lips 49 of the upper or top member 41 and rests on its web 43 for supporting a roof member 52. Suitable clips 53 depend from the member 52 and are fastened to the flange portions 47 by nuts and bolts 54 which may also secure the overlying margins of ceiling panels 55. The space between the flange portions 48 and lips 50 of the lower or bottom member 42 is slightly greater than the width of the sill member 10 for receiving the upright flanges 16 of said sill member therebetween. If desired, a core 56 of suitable insulation material may be confined between the sheets 24 and 25 of each panel within the margins defined by its members 28, 41 and 42 and is adapted to be secured to said sheets by an adhesive (not shown).

As shown in FIG. 1, the panels 11 are engaged with the sill member by downward vertical movement to anchor said panels to the foundation 12. Since the horizontal legs 20 of the clips 18 are slidably confined in the slots 23, the upper legs 19 of said clips flex inwardly upon engagement by the flange portions 48 of the bottom member 42 and permit the lips 50 to ride downwardly thereover. The width of the flange lips is slightly less than the distance between the clip legs 20 and the web 15 of the sill member to permit outward flexing of the legs 19 and engagement of said flange lips beneath said clip legs. As shown in FIG. 2, the web 44 of the bottom member rests on the flanges 16 of the sill member and the flange portions 48 may be substantially in contact with the foundation 12. Suitable sealing material 57 may be employed to seal off the joints between the upper margins of the panels 11 and ceiling panels 55, between the foundation and lower margins of said panels and between the upright flanges 26 and 27 of the panel sheets 24 and 25.

From the foregoing, it is readily apparent that the wall panels may be prefabricated in the desired dimensions and assembled at the point of installation. After one of the panels is engaged with the sill member, adjacent panels may be connected thereto by the coaction of the hooks 33 and slots 34 and engaged with said sill member. Although not illustrated, it is contemplated that the panels will vary in size and shape and that some of said panels will have door and window openings therein. The panels are constructed in accordance with the predetermined dimensions of the building to be erected and are adapted to be assembled with minimum effort so as to appreciably reduce the time required for erection. It is noted that the coaction of the panels with the sill member and with one another is essential, but that the roof and ceiling construction are subject to variation and that different types

of members may be supported by the upper channel members 41. The panels are readily removable by inserting a tapered rod (not shown) between the lips 21 of the clips 18 and the flanges 16 of the sill member to retract said clips sufficiently to permit the flange lips 50 to ride upwardly over the clip legs 19.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A wall structure including an upright panel, a member extending longitudinally of the lower margin of the panel, a sill member attaching the panel member to an underlying support, a pair of angular flanges extending longitudinally of one of the members and overlying and directed inwardly toward the other of said members, and retractable fasteners projecting outwardly from the other member for engaging the angular flanges to detachably connect said members.

2. A wall structure including an upright panel, a member extending longitudinally of the lower margin of the panel, a sill member attaching the panel member to an underlying support, a pair of angular flanges extending longitudinally of one of the members and overlying and spaced from the other of said members, the flanges having lateral portions extending inwardly and terminating in upstanding lips adjacent the other member, and retractable fasteners projecting laterally outward from said other member for engaging the upstanding lips of said flanges to detachably connect said members.

3. A wall structure including an upright panel, a longitudinal member at the lower margin of the panel, a sill member attaching the panel member to an underlying support, said panel member being of inverted channel shape and having its upright flanges overlying the sill member in spaced relationship, the flanges having angular lower portions extending inwardly toward and terminating adjacent said sill member, and retractable fasteners projecting laterally outward from said sill member in overlying engagement with the angular lower portions of said flanges to detachably connect said members.

4. A wall structure as set forth in claim 3 wherein the angular lower portions of the flanges of the panel member terminate in upstanding lips, the sill member being of channel shape and having its flanges upstanding between and above the upstanding lips of said angular lower portions, the retractable fasteners including angular clips at the upper portions of the upstanding flanges of said sill member in overlying engagement with said lips.

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