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WALL PANEL CONSTRUCTION

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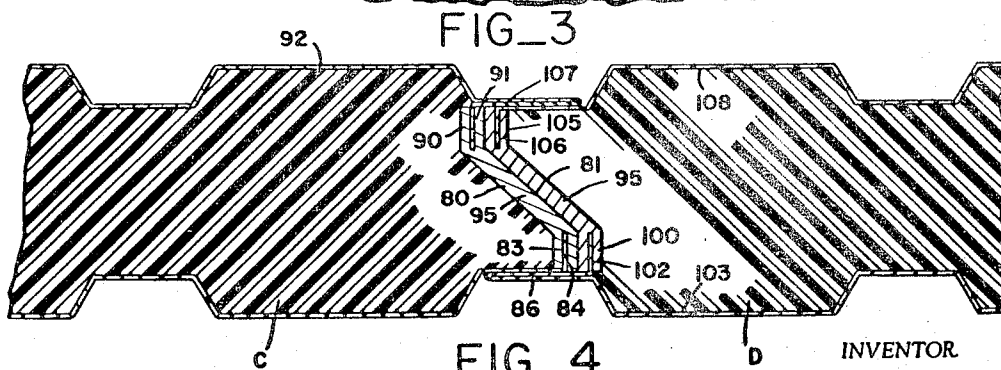
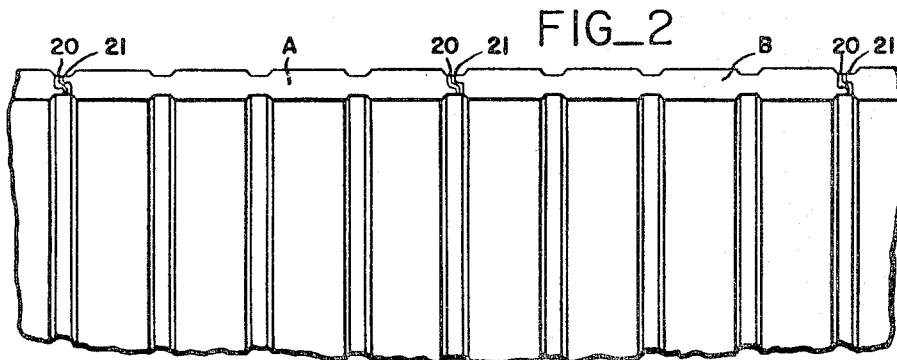
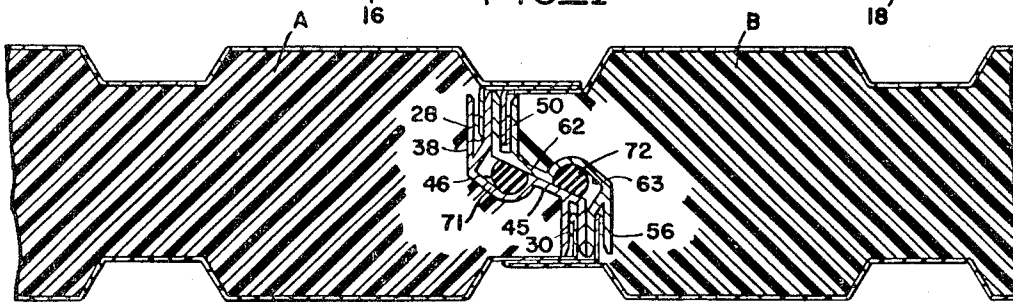
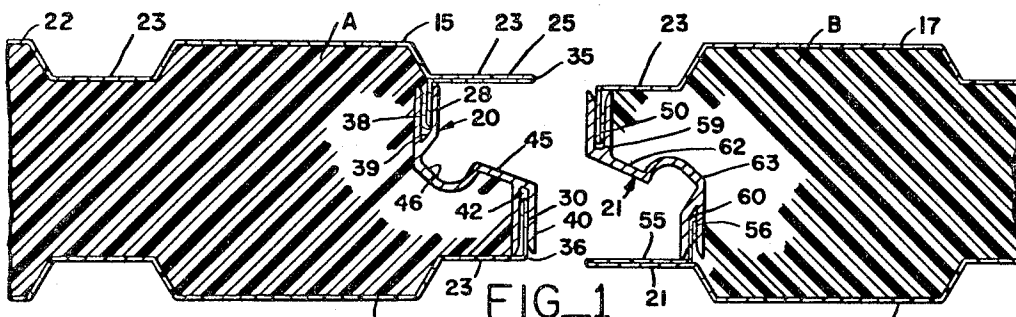


FIG_4

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WALL PANEL CONSTRUCTION

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This invention relates to an insulated foam filled wall panel.

In the construction of buildings and their partitioning, modular panels are employed to form the wall members. It is the object of this invention to provide an improved panel for the aforesaid composed of two spaced-apart metal sheets held in spaced-apart relation at their edges by a novel extrusion and in which the core of the panel is filled with an insulating polyurethane core.

A feature and advantage of the wall panel of this invention lies in the fact that the core functions to provide structural rigidity to the relatively thin facing sheets and, in addition, provide thermal and accoustic insulation for the panel structure.

Another object of this invention is to provide in a panel of the aforesaid type a novel edge structure comprising an extrusion vertically nested between the two sheets which functions as an edge-spacer to retain the two sheets in rigid spaced-apart relationship with respect to each other and which further provides an interlocking function for the edges of adjoining panels.

The edge structure of the panels is formed in such a way as to allow the edges of the sheets or facing material of the two panels to overlie each other in tight juxtaposition in which the extrusion of each of the panels is arranged to similarly abut tightly in juxtaposition in a diagonal relationship with respect to the axis of the panels.

A further feature and advantage of the invention lies in the provision of areas formed longitudinally on the edges of the members to form two vertical hollow columns. These vertical columns are so designed to provide that mastic or a resilient insulating material can be placed in one of them to create a positive seal at the panel junctures.

In the present invention the adjoining edges can be formed with two parallel vertical columns, one of the columns may be filled with mastic and the second of the two columns can be left vacant to form a tubular opening to provide for water or moisture drip in the event of condensation or liquid appearance from exterior sources.

Another object of the invention is the provision of a foam-filled panel structure formed of sheet material faces or skins at which an edge piece or channel is arranged in connected relationship with the edge of one of the skins along one edge thereof, and in which the edge piece is further connected substantially inwardly of the edge along the side of the adjacent sheet to form a longitudinally recessed area between the edge member and one wall or sheet. The recessed area is adapted to receive a complementary and similar edge section of panel in interlocking nested engagement.

A feature and advantage of this invention lies in the fact that the panels can be formed with skins having an outer contour formed in a generally corrugated configuration disposed in a vertical parallel land and groove configuration in which the jointer of adjoining panels occurs in the grooved portion of the facing or skin. The aforesaid construction affords the aesthetic value of providing concealment of the overlapping skin portions of the structure at the abutment of two panels due to their placement in the recessed or grooved portion of the panel.

A further feature or advantage of this invention lies in the fact that the panels may be joined in tightly fitted engagement without the necessity of providing additional

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locking mechanisms, thus rendering the panels self-interlocking, leading to conservation of installation time and equipment.

Another feature or advantage of this invention lies in the fact that the total panel construction provides the combination of high insulating properties both in the body of the panel and at the juncture of abutting panels in a configuration which is both structurally sound and aesthetically pleasing.

Another feature and advantage of this invention lies in the fact that each panel has two edge strips which are identical in configuration but are installed in opposing relationship to provide for nesting or lapping of adjoining panels.

Another feature and advantage of this invention lies in the fact that the metal facing panel on both faces are manufactured on the same rolls and are identical in configuration, but are assembled in a relationship in which identical edges are on opposite edges of the panel, thus providing for the lap inset configuration without additional materials.

Other objects, features, and advantages of the present invention will be more apparent after referring to the following specification and attached drawings in which:

FIG. 1 is a cross-sectional view of two panels disposed in edge to edge spaced-apart alignment.

FIG. 2 is a similar view to FIG. 1 shown with the panels in interlocking nested relationship.

FIG. 3 is a perspective view of the panel construction showing several panels in abutting relationship.

FIG. 4 is a cross-sectional view of an alternative embodiment of the panel construction showing fragmentary sections of two panels with their edges abutting in nested relationship.

The wall panel of the present invention is illustrated in FIGS. 1 and 2 having a panel section designated at A arranged to interlock with a similar panel section designated at B. Each of the panel sections is formed by two spaced-apart skin or face pieces 15 and 16 on panel A and 17 and 18 on panel B. The skins are held in a spaced-apart relation by longitudinal extruded edge members 20 and 21 on panels A and B respectively. The two skin pieces and the edge pieces for each panel form a shell into which expanded polyurethane is placed to completely fill the space within the shell. Each of the skins 15, 16, 17, and 18 is formed in a corrugated configuration having lands 22 and grooves 23.

Skin 15 of panel A is terminated at its edge in a folded over strip 25 continuing backwardly from the termination, which is at the outer edge of a grooved section 23 to the point of beginning of the grooved section. Folded over section 25 thence extends inwardly to form an inwardly projecting lip or foot 28 running the entire length of the panel and preferably disposed normal to the broad face of the panel. The opposite face 16 of panel A is formed with an inwardly projecting lip or foot 30 extending inwardly from the outermost edge of the grooved portion 23 of the face or skin and preferably normal longitudinal axis of face or skin 16.

The two panels 15 and 16 are aligned so that the terminating edges 35 and 36 of faces 15 and 16 terminate on a common plane and in the aforesaid condition lips 28 and 30 project inwardly towards the opposite panel in relatively staggered relationship. Extrusion 20 is formed with an edge 38 which is lengthwise bifurcated or grooved at 39 to receive lip 28 within the groove. The opposite edge 40 of edge piece 20 is similarly bifurcated to form a groove 42 adapted to similarly receive lip 30 of skin or face 16.

The outer area of extrusion edge member 20 is formed with a flat component 45 and a concave component 46

which joins the two bifurcated edges 38 and 40 together. Extrusion 20 is symmetrical through its entire length.

Panel B is formed with its edge member in a similar but complementary configuration with respect to the edge member of panel A.

In panel B the skin 17 which is adapted to nest on the inside edge of the folded over portion 25 of face 15 is formed with inwardly projecting lip 50 from the termination of the edge groove 25. The opposite face 18 is folded over at the edge of the grooved portion 21 at 55, said fold is adapted to nest in juxtaposition against the outermost groove 21 of face 16. Folded over portion 55 at the inner edge projects inwardly to form lip 56. Extrusion or edge piece 21 is formed at one edge with a groove 59 adapted to be engaged with lip 50 and at the opposite edge with groove 60 for engagement with lip 56. The space between the two edges is formed with a flat component 62 and a concave component 63.

In operation, panel A and panel B are situated in edge to edge alignment as shown in FIG. 1. A mastic material 71 and 72 is placed in the two concave components 46 and 63 respectively. The mastic may take the form of a bulk applied mastic material or may conveniently be in the form of a preformed resilient body formed of rubber or plastic material. With mastic 71 and 72 in position in the two concave components 46 and 63, two panels are placed together in edge to edge relation with folded over segment 25 of panel A nested on the outside of the outermost grooved portion of face 17 of panel B and folded over segment 55 of face 18 on panel B positioned on the outside of the grooved portion 23 of face 16 of panel A. The spacing of the respective members is such that the two folded over segments 25 and 55 are in tightly situated juxtaposition with the abutting surfaces of the opposite panel. The two extrusions 20 and 21 are formed of identical widths so that they function as accurate spacers to maintain the skins or faces of the panel in accurate fixed alignment. In the joined position, the two flat components 45 and 62 overlap in abutting relation at their center section and overlay the mastic 71 and 72 respectively contained within the two concave components 63 and 46. The two extrusions 20 and 21 are formed in accurate complementary configurations so that the angles and abutting faces are arranged to overlies each other in juxtaposition. The opposite edge of panel A is formed with an extrusion identical to that described in relation to panel B, and conversely, edge of panel B is formed with an extrusion or edge piece identical to that shown at 20 in panel A. As can be seen in FIG. 3, the panels interlock together in endless procession to form a completed wall of desired length.

It is, of course, believed, obviously, that corner sections and termination pieces can be formed with edges bearing a configuration identical to that shown in relation to panels A and B. It is noted that the overlap of adjoining panel appears at the bend forming the groove 23 which tends to conceal the abutment between panels. It is also noted that the provision of the overlapping edges of two skins provides a seal which is light, air, and acoustically secure. The aforesaid security is further enhanced by the projection of the sealing elements 71 and 72 sandwiched between the two abutting extrusions 20 and 21. Sound integrity is provided by the mating engagement of the abutting walls of the two edge pieces or extrusions 20 and 21. It can further be seen that in the event that it may be necessary to remove the panels, such can be done merely by reversing the procedure and pulling the panels apart. Thus, the panels can be assembled or disassembled without the necessity of interlocking fixtures or tools for assembly or disassembly.

It is noted that in the drawings, both of the cylinders are shown filled with mastic sealers 71 and 72. As an alternative assembly, some of the columns or cylindrical areas formed by the concave walls 46 and 72 can be left open or hollow. In this case, the hollow cylindrical verti-

cal area forms a trap for condensing moisture and the like and in which the moisture will travel to the bottom of the panel for elimination. Thus, in the aforesaid assembly, the panel will be sealed on the one hand by the cylinder containing the mastic and the other column will be provided with a moisture trap within the vacant column.

In FIG. 4 an alternative embodiment of the invention is depicted in which two panels C and D, identical in the skin structures to panels A and B respectively, are formed with edge pieces or extrusions 80 and 81 terminating the edges of panels C and D respectively. The edge piece of panel 80 is arranged with a bifurcated edge 83 which is engaged with an ear 84 mounted on the edge of skin 86 of panel C and is formed with a similar bifurcated opposite edge 90 engaged with ear 91 mounted inwardly from the edge of the opposite face 92 of panel C. Extrusion 80 is joined between the two bifurcated edges 83 and 90 by a flat angular component 95 to form a generally Z-shaped configuration. Extrusion or edge 81 for panel D is similar in construction but complementary to extrusion 80, having a bifurcated edge 100 engaged with an ear 102 projecting from a position inwardly from the edge of skin 103. The opposite edge 105 of extrusion 81 is similarly bifurcated to receive ear 106 projecting inwardly from the edge 107 of the opposite face 108 of panel D.

In operation, panels C and D are interrelated in exactly the same manner as discussed above in relation to FIGS. 1, 2, and 3 excepting that the flat faces 95 of the two extrusions abut each other along their entire length rather than in having the provision of a concave recess for mastic material. In the present embodiment a mastic or caulking compound can be placed on the two abutting faces of the flat areas 95 to effect a positive sealing.

It is to be understood that while the faces described being formed is a corrugated configuration, it is contemplated that the faces could be formed in other configurations, such as, for example, in a straight flat form. It is further noted, while the principal embodiments have been described as being formed with metal skins with polyurethane cores, other facing materials such as plastic, and other cores such as polystyrene can be used.

While one embodiment of this invention has been shown and described, it will be apparent that other adaptations and modifications can be made without departing from the true spirit and scope of the invention.

What is claimed is:

1. A wall structure panel of the type adapted to be nested together in edge to edge relation, said panels being formed of a pair of spaced-apart relatively thin skins, the first vertical edge of each skin having a first inwardly projecting vertical foot mounted along length of the first vertical edge and having the second opposite vertical edge formed with a second inwardly projecting foot positioned substantially inwardly from the second edge and in a parallel, spaced-apart relation with the first edge of each skin being in co-planar alignment with the second edge of the other skin, channel members having a pair of longitudinal grooves along opposite edges thereof receiving oppositely facing said first and second feet to hold said skins in locked, spaced-apart alignment along both edges, the outer face of each channel being disposed in a diagonal, vertical plane extending between the first and second feet to which said channel is attached and solid filler disposed within said panel in the area between the skins and channels.

2. A wall structure panel of the type adapted to be nested together in edge to edge relation, said panels being formed of a pair of spaced-apart relatively thin skins, the first vertical edge of each skin having a first inwardly projecting vertical foot formed by the vertical edge being bent along the entire edge inwardly, and having the second opposite vertical edge formed with a second inwardly projecting foot positioned substantially inward-

ly from the second edge and in a parallel alignment with the second edge, said second edge formed by the thin skin being folded over in a return bend and thence inwardly, said skins being mounted in parallel spaced-apart relation with the first edge of each skin being in co-planar alignment with the second edge of the other skin, channel members having a pair of longitudinal grooves along opposite edges thereof receiving oppositely facing said first and second feet to hold said skins in locked, spaced-apart alignment along both edges, the outer face of each channel being disposed in a diagonal, vertical plane extending between the first and second feet to which said channel is attached and solid filler disposed within said panel in the area between the skins and channels.

3. A wall structure panel of the type adapted to be nested together in edge to edge relation, said panels being formed of a pair of spaced-apart relatively thin skins, the first vertical edge of each skin having a first inwardly projecting vertical foot formed by the vertical edge being bent along the entire edge inwardly, and having the second opposite vertical edge formed with a second inwardly projecting foot positioned substantially inwardly from the second edge and in a parallel alignment with the second edge, said second edge formed by the thin skin being folded over in a return bend and thence inwardly, said skins being mounted in parallel spaced-apart relation with the first edge of each skin being in co-planar alignment with the second edge of the other skin, channel members having a pair of longitudinal grooves along opposite edges thereof receiving oppositely facing said first and second feet to hold said skins in locked, spaced-apart alignment along both edges, the outer face of each channel being disposed in a diagonal, vertical plane extending between the first and second feet to which said channel is attached, said outer face of at least one of said channels forming an inwardly directed groove running the length of a said channel, resilient means mounted within said groove, and solid filler disposed within said panel in the area between the skins and channels.

4. A wall structure of the type having panels adapted to be nested together in edge to edge relation, said panels being formed of a pair of spaced-apart relatively thin skins, the first vertical edge of each skin having a first inwardly projecting vertical foot mounted along length of the first vertical edge and having the second opposite vertical edge formed with a second inwardly projecting foot positioned substantially inwardly from the second edge and in a parallel alignment with the second edge, said skins being mounted in parallel, spaced-apart relation with the first edge of each skin being in co-planar

alignment with the second edge of the other skin, channel members having a pair of longitudinal grooves along opposite edges thereof receiving oppositely facing said first and second feet to hold said skins in locked, spaced-apart alignment along both edges, the outer face of each channel being disposed in a diagonal, vertical plane extending between the first and second feet to which said channel is attached and solid filler disposed within said panel in the area between the skins and channels, said panels being nested together with the second vertical edges over the adjoining panels overlying the skin adjacent the first edge of the adjoining panel, and with the channel members of the abutting panels being in juxtaposition.

5. A wall structure formed of abutting panels comprising at least two panels each formed of a pair of spaced-apart, parallel, relatively thin skins, channel members located adjacent both opposite edges of the skins disposed between said skins and extending the entire vertical length thereof, said channel members mounted to extend from the edge of one of said skins to a point inwardly from the edge of the opposite skin, the channel of the adjoining panel being orientated reciprocally thereto whereby said channels of adjoining panels can lie in juxtaposition with the portion of skin extending between the connection of the channel and the edge of the skin positioned to overlie the skin of the adjoining panel.

6. A wall structure comprising a plurality of edge to edge joined panels, each said panel being formed of a pair of spaced-apart relatively thin skins, said skins being formed in a vertical corrugated configuration comprising areas of lands and areas of grooves, the edge area of each skin defining a grooved portion of the corrugation, said skins disposed in grooves in a channel member, said panels being nested together with the grooved edge portion of the panels arranged in overlying relation, said channel members connected to join vertically the skins of each panel adjacent their edges in abutting relation when said panels are in connected condition, the interior of said panels being filled with a solid filler material, and an elongated strip of resilient sealing material interposed between said abutting panels within said channel members and extending the full length thereof establishing a positive seal between said abutting panels.

References Cited

UNITED STATES PATENTS

2,142,305	1/1939	Davis	52—593
3,122,860	3/1964	Schulze	52—309

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