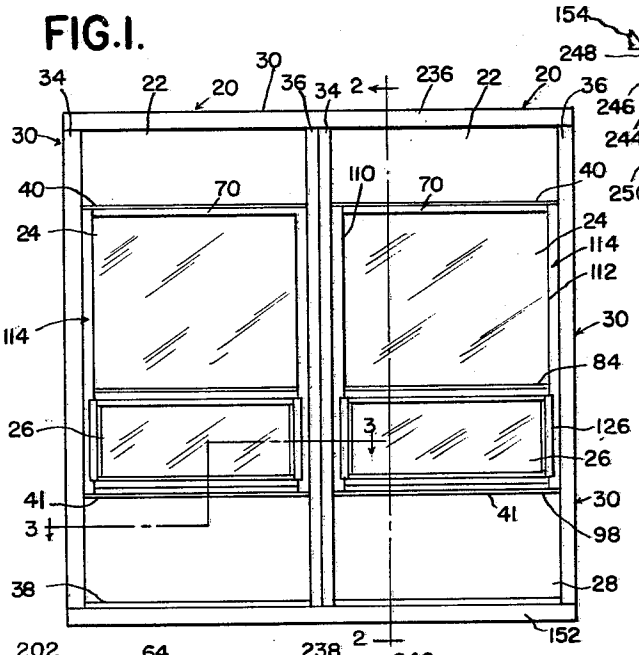
Dec. 8, 1964 C. W. KELLY ET AL 3,160,243

BUILDING STRUCTURE

Filed Jan. 4, 1960

FIG.1.



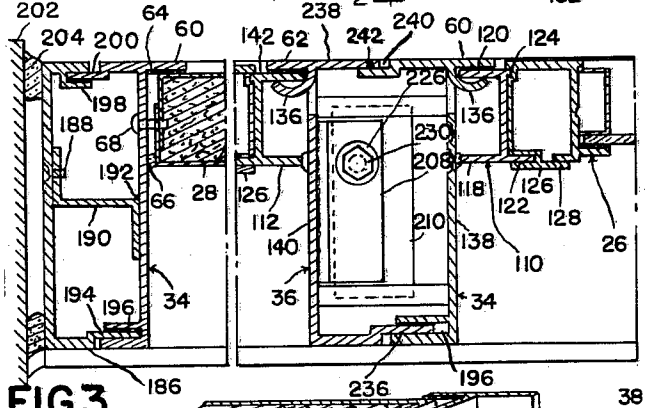


FIG.3.

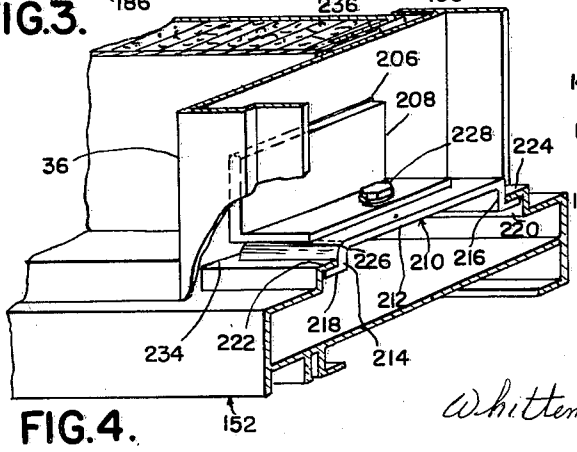


FIG.4.

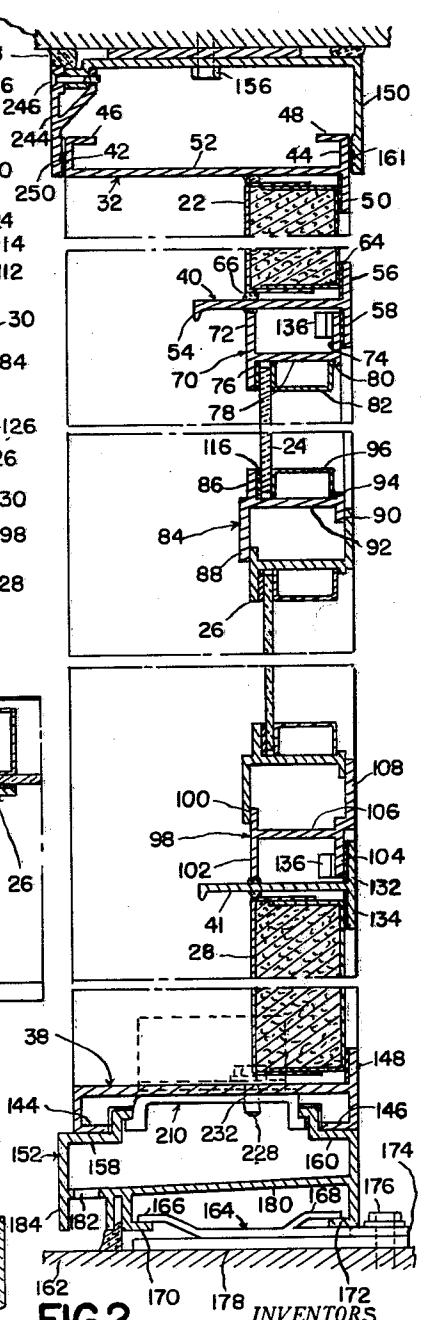


FIG.2.

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BUILDING STRUCTURE

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The present invention relates to building structures and refers particularly to structures that form the exterior walls of a building.

It is an object of the present invention to provide a building wall structure of unitary construction that can be easily installed to form a curtain wall.

It is a further object of the present invention to provide a building wall structure comprising a frame having insulated panels, sash and glazing, with the sash being assembled in the frame by novel means.

It is still a further object of the present invention to provide a building wall structure that is easily installed and held securely in place against the forces of winds and the elements by a novel clip arrangement.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawing, illustrating a preferred embodiment of the invention wherein:

FIGURE 1 illustrates a view of the wall looking from the outside when installed in a building with two like units constructed according to the invention assembled in side by side relationship.

FIGURE 2 is an enlarged sectional view taken through line 2—2, FIGURE 1.

FIGURE 3 is an enlarged partial sectional view taken through line 3—3, FIGURE 1.

FIGURE 4 is an enlarged perspective view partly in section and partly broken away showing the clip arrangement of the invention.

Referring now to the figures, there are illustrated two like wall units 20 assembled in side by side relationship. Each unit 20 has an upper insulated panel 22, a fixed light of glass 24, a sash unit 26 and a lower insulated panel 28 all assembled in a frame 30.

The view of FIGURE 1 is shown looking toward the outside face of the wall that is exposed on the outside of a building structure. The sectional view of FIGURE 2 has the outside face to the left of the illustration and the inside face that is at the inside of the building structure to the right.

Frame member 30 is comprised of a top or head frame member 32, side or jamb frame members 34 and 36, a bottom or sill frame member 38. Horizontal mullion members 40 and 41 divide the frame to provide openings for the panels, fixed lights and sash unit. The members are preferably fabricated from aluminum extrusions, but any suitable material can be used.

Head frame member 32 has upstanding flanges 42 and 44 terminating in portions 46 and 48. A flange 50 extends inwardly of frame member 30 from flange 44 as shown in FIGURE 2. Web 52 joins flanges 42 and 44.

Member 40 terminates at one end in a pointed offset 54 that acts as a drip edge, and at the opposite end in flanges 56 and 58. Members 32 and 40 are attached at their ends to frame members 34 and 36 to form a rectanglular opening to receive panel 22.

Panel 22 abuts against flanges 50 and 56 and also 60 and 62 of members 34 and 36 respectively as seen in FIGURE 3. Sealing strips 64 are attached to flanges 50, 56, 60 and 62 and a calking material as at 66 seals the gap around the opening. The panel is held firmly in

place by screws 68 positioned along both sides of the panel.

Bar 70 has flanges 72, 74 and 76 connected by web 78. Portion 80 is cut back at an angle to form an abutment for glazing bead 82. Bar 84 has flanges 86, 88 and 90 connected by web 92. Portion 94 is cut back at an angle to form an abutment for glazing strip 96.

Bar 98 has flanges 100, 102 and 104 connected by web 106. Flange 108 is offset from flange 104.

Jamb bar 110, FIGURE 3, is of the same cross section as bar 70 and has flanges 118, 120 and 122. Portion 124 is cut back at an angle to form an abutment. Bar 112 is the same as bar 110 and is positioned on the opposite side of the unit from bar 110. Bar 126 is applied to bars 110 and 112 and has the flange 128 and is held in place by abutment 124 and flange 122 of bar 110.

Bars 70, 84 and 98 are joined at their ends to jamb bars 110 and 112 to form a frame 114 having openings to receive the fixed light of glass 24 and sash unit 26. The glass 24 is held in place by strips 82 and 96 with mastic strips 116 sealing the glass. Strips identical to 82 and 96 are also provided on bars 110 and 112 to hold the glass.

The sash unit is of the project-in type with the top of the sash opening inwardly through a lever arm and shoe arrangement (not shown).

Bar 41 is the same as described for bar 40 and has flanges 132 and 134. Bar 41 is joined at its ends to members 34 and 36 and with member 40 forms an opening for frame 114. To hold the frame securely in place against flanges 58, 132, 60 and 62 a section of metal 136 is cut out from web 138 of bar 34 and web 140 of bar 36 and turned over flange 120 of bar 110 and flanges 142 of bar 112. The sections of metal 136 are positioned along bars 110 and 112 at suitable spacing to hold the frame securely in place.

As shown in FIGURES 2 and 3 the sections of metal 136 are adpted to be easily produced during the manufacture of the bars 34 and 36 and provide economical as well as efficient means for securing the frame 114 in the opening provided therefor by bars 34, 36, 40 and 41. In addition since the sections of metal 136 are integral with bars 34 and 36 they are not subject to loss and need not be separately packaged as is the case with loose clips often provided for attachment to bars such as 34 and 36 for securing frames such as 114 thereto.

Member 38 has the same cross sectional shape as member 32 and has flanges 144, 146 and 148. Panel 28 is received in the opening formed by members 41, 38, 34 and 36 and held in place by screws 68 in the same manner as previously described for panel 22.

To install the unit 20 in the opening of a building structure a head member 150 and a sill member 152 are provided. Member 150 is attached to the building structure indicated at 154 by bolts 156. The member 150 extends the length of the opening. The unit is set in place with sill frame member 38 setting on top of 152 with flange 144 resting on flange 158 and flange 146 resting on 160. Portion 44 of top frame member 32 sets against weatherstripping 161 attached to 150.

Member 152 is secured to the building structure indicated at 162 by clamp 164. The clamp has portions 166 and 168 that hold down sill member 152 by clamping over portions 170 and 172. Portion 168 is cut out from extended portion 174. A bolt 176 extends through apertures in clamp 164 and spacer 178 and into building structure 162. Member 152 extends across the opening of the building structure and clamps 164 are positioned along the member 152 at intervals to hold the member securely in place.

Web 180 slopes outwardly towards aperture 182 to

provide drainage for water. Flange 184 shields the aperture.

Prior to the installation of the wall unit 20 in the building structure, jamb member 186 (FIGURE 3) is secured to member 34 by means of screws 188 and Z-shaped bar 190. Bar 190 is welded to 34 as at 192. Flange 194 is received in pocket 196 of member 34 and pocket 198 receives flange 200. The member 186 serves as a jamb trim and closes the space between bar 34 and side 202 of the building structure adjacent which side the unit is installed. Calking material as at 204 closes the gap between the unit and the building structure.

Secured to jamb frame member 36 as by welding as at 206 (FIGURE 4) is angle bar 208. To secure wall unit 20 against still member 152 clip 210 is provided. The clip has web portion 212 terminating in downward extending legs 214 and 216. Flanges 218 and 220 are dimensioned to extend under flanges 222 and 224 of member 152. The clip is rounded at 226 to facilitate insertion of the clip through the slot between flanges 222 and 224.

After the clip has been inserted in the slot in member 152, it is moved over in position under angle bar 208. A bolt 228 is then passed through an aperture 230 in angle bar 208 and is threaded into a tapped hole 232 in clip 210. The clip is drawn up tightly against bar 208 with legs 214 and 216 being dimensioned to allow a slight clearance between flanges 218, 220 and 222, 224 respectively. The clearance allows the panel unit to slide along bar 152 so that the panel can be adjusted in the opening. Frame member 36 is cut away as at 234 to provide clearance for flanges 222 and 224 of member 152.

Alternatively clip 210 may be secured to angle bar 208 before the wall unit 20 is positioned on sill member 152. The clip is rotated so that flanges 218 and 220 extend in the direction of sill member 152 and the wall unit 20 is then positioned on sill member 152. The clip is then rotated so that flanges 218 and 220 extend under flanges 222 and 224 of sill member 152 as before.

The clips hold the panel secure against pressures due to wind and atmospheric conditions that can exert positive forces tending to move the panel structure toward the interior of the building and negative forces tending to move the panel structure outwardly of the building structure. Under certain conditions the negative forces can be greater than the positive forces. To provide for the greater negative forces, bolt 228 is positioned in the panel structure offset from the center toward the interior side of the structure.

Thus according to the invention the angle bar 208 secured to member 36 of wall unit 20 cooperates with clip 210 to secure wall unit 20 to sill member 152 to prevent movement of the wall unit inwardly or outwardly of the building structure while permitting sliding movement of wall unit 20 along sill member 152. Furthermore it will be obvious from inspection that the angle bar 208 and clip 210 are extremely simple in structure, economical to manufacture and are easily installed. In addition the clip and angle bar structure described is efficient in withstanding both positive and negative forces tending to move wall unit 20 as indicated above.

A second wall unit 20 is then positioned adjacent the unit already installed by placing the second unit on the member 152 and sliding the unit over until the flange 236 is received in pocket 196 and flange 238 overlaps flange 240. Weatherstripping 242 seals the joint. The adjacent sides of the first and second wall units 20 are interconnected by the flange 236 and the pocket 196 and the opposite side of the second wall unit is secured to member 152 by a clip 210 in the same manner as previously described for the first wall unit.

As many wall units can be used that are necessary to close the opening provided in the building structure. A jamb member 186 is attached to member 36, of the last unit installed, in the same manner as previously described for member 34.

Jamb member 186 provides sufficient resistance to inward and outward movement of the last wall unit 20 inserted in the opening in the building structure so that clip 210 may be omitted therefrom. Clip 210 may however be installed on the last wall unit in the manner previously described if desired by sliding the other wall units 20 as close together as possible to close pockets 196 and placing jamb member 186 against the side of the building structure to give working room for installation of clip 210. The wall units 20 may then be respaced to provide desirable clearance between the bottoms of pockets 196 and flanges 236 and jamb 186 and the opening in the building structure as shown for example in FIGURE 3.

Cover 244 attached to head frame member 32 by screws 246 extends the length of the opening. Calking 248 and weatherstrip 250 make the structure weathertight.

The drawings and the foregoing specification constitute a description of the improved building structure in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What we claim as our invention is:

1. Building wall structure comprising a head member and a sill member secured to the top and bottom of an opening in a building wall respectively, a wall unit adapted to fit within the opening in the building wall and extending between said head and sill members, said sill member having a web and side walls, said side walls terminating in flanges extending toward each other and defining a channel opening, a clip having oppositely extending flanges positioned within said channel, the clip flanges overlapping the channel flanges, an angle bar secured to said wall unit, and means releasably drawing said clip tightly against said angle bar, the clip flanges being offset with respect to the rest of the clip to provide sliding clearance between the channel flanges and the clip flanges with the clip held tightly against said angle bar allowing movement of the wall unit along the head and sill members in the plane of the building opening for positioning the wall unit during installation thereof, the flanges of said clip being operable in conjunction with the flanges of said channel to prevent pivotal movement of the wall unit about said sill member in a direction inwardly or outwardly of the building wall in response to pressures due to wind and atmospheric conditions.

2. A building panel comprising a wall unit having head, sill and two jamb members including an opening, each of said jamb members having a web and a flange extending inwardly from said web at one side of said unit, a frame having head, sill and two jamb members, the frame jamb members having a web and a flange extending outwardly of said web at one side of said unit, said frame inserted in the opening of said unit with the flanges of said frame bearing against the flanges of said unit, and struck out portions of said first-mentioned webs overlapping and tightly engaging the flanges of the frame to hold said frame securely within said wall unit.

3. In a building structure having a side wall including a rectangular shaped opening, a wall unit in said opening comprising a frame having top, bottom and side members, a channel shaped bar extending longitudinally across said opening and attached to the building structure, said bar having a web and side walls, said walls terminating in flanges extending toward each other and defining a channel opening, a bracket adjacent the end of one of the side members of said wall unit, a clip releasably secured to said bracket extending through said channel opening and having portions spaced to slidably fit against said flanges.

4. In a building structure having a side wall including a rectangular shaped opening, a wall unit in said opening comprising a frame having top, bottom and side members, a channel shaped bar extending longitudinally across said opening and attached to the building structure, said bar having a web and side walls, said walls terminating in

flanges extending toward each other and defining a channel opening, a bracket adjacent the end of one of said side members of said wall unit, a clip adapted to be releasably secured to said bracket before said wall unit is placed in said opening extending through said channel opening and having portions spaced to slidably fit against said flanges.

5. In a building structure having a side wall including a rectangular shaped opening, a wall unit in said opening comprising a frame having top, bottom and side members, a channel shaped bar extending longitudinally across said opening and attached to the building structure, said bar having a web and side walls, said walls terminating in flanges extending toward each other and defining a channel opening, a bracket adjacent the end of one of said side members of said panel, a clip extending through said channel opening and having portions spaced to slidably fit against said flanges, and means eccentric to the plane of said wall unit for releasably securing said clip to said bracket.

6. Structure as claimed in claim 5 wherein the clip portions are offset with respect to the rest of the clip and said eccentric means rigidly secures part of the clip between said portions in surface to surface engagement with said bracket.

7. Building wall structure comprising a head member and a first sill member secured to the top and bottom of an opening in a building wall respectively, a wall unit fitting within the opening in the building wall having a head, second sill and two first jamb members extending between the head and sill members, each of said jam members of the wall unit having a web and a flange extending inwardly of the wall unit from said web at one side of said wall unit, means secured to one of the jam members of said wall unit and said second sill member operable in conjunction therewith to prevent pivotal movement of the wall unit about said second sill member in a direction inwardly or outwardly of the building wall in response to pressures due to wind and atmospheric conditions and to allow sliding movement of the wall unit along the head and sill members in the plane of the building opening for positioning the wall unit during installation and removal, a frame having head, sill and two second jamb members, said second jamb members having a web and a flange extending outwardly of said frame from said web at one side of said frame, said frame being inserted within said wall unit with the flanges of said frame bearing against the flanges of said wall unit and struck-out portions of the wall unit webs extending over the flanges of said frame to hold said frame securely in position in the wall unit.

8. Building wall structure comprising a head member and a sill member secured to the top and bottom of an opening in a building wall respectively, a wall unit having a jamb member at the side thereof fitting within the opening in the building wall and extending between said head and sill members, said sill member having a web and side walls, said side walls terminating in flanges extending toward each other and defining a channel opening, a clip having oppositely extending flanges positioned within said channel, the clip flanges overlapping the channel flanges, an angle bar secured to said jamb member of said wall unit, and means releasably securing said clip to said angle bar positioned eccentrically with respect to the wall unit for providing greater resistance to pivotal movement of said wall unit about said sill member in one direction, the flanges of said clip being operable in conjunction with the flanges of said channel to prevent pivotal movement of the wall unit about said sill member in a direction inwardly or outwardly of the building wall in response to pressures due to wind and atmospheric conditions and to allow sliding movement of the wall unit along the head and sill members in the plane of the building opening for positioning the wall unit during installation and removal.

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