May 11, 1954 J. J. GRUBER 2,678,116

BUILDING STRUCTURE

Filed April 30, 1951 2 Sheets-Sheet 1

FIG.1.

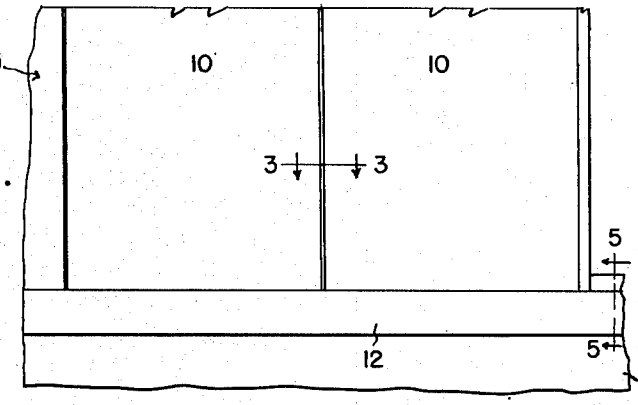


FIG.2.

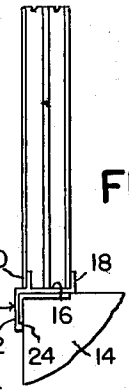
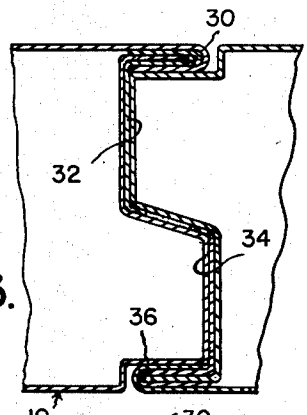


FIG.3.



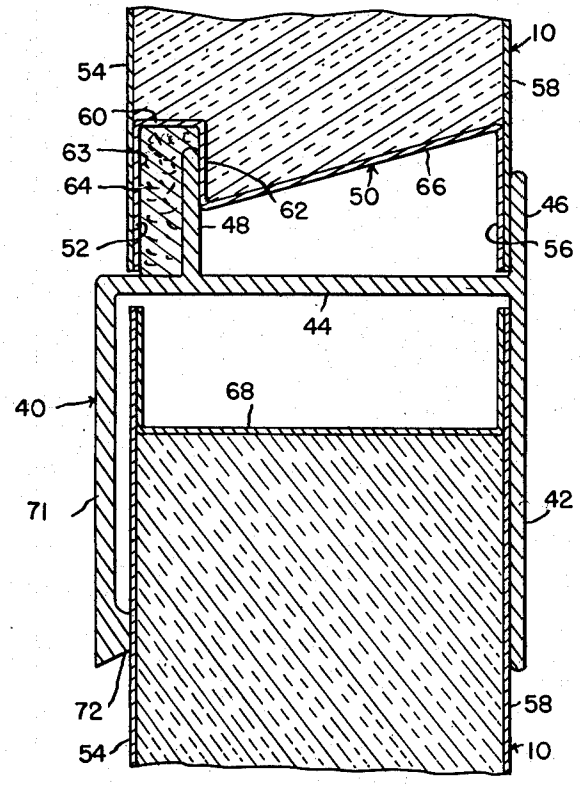


FIG.4.

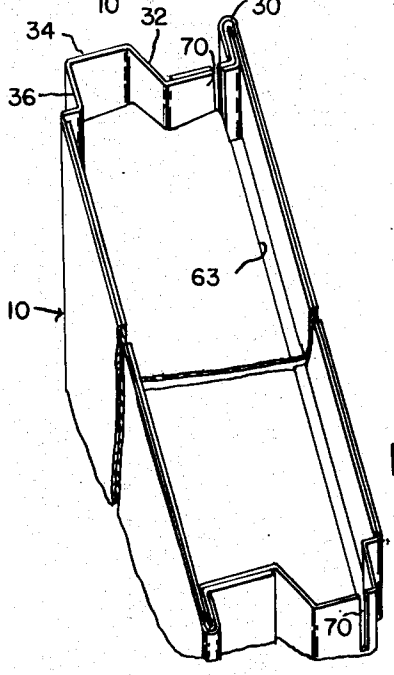


FIG.6.

INVENTOR.
JOSEPH J. GRUBER
BY Whittemore, Hulbert & Belknap
ATTORNEYS

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FIG. 7.

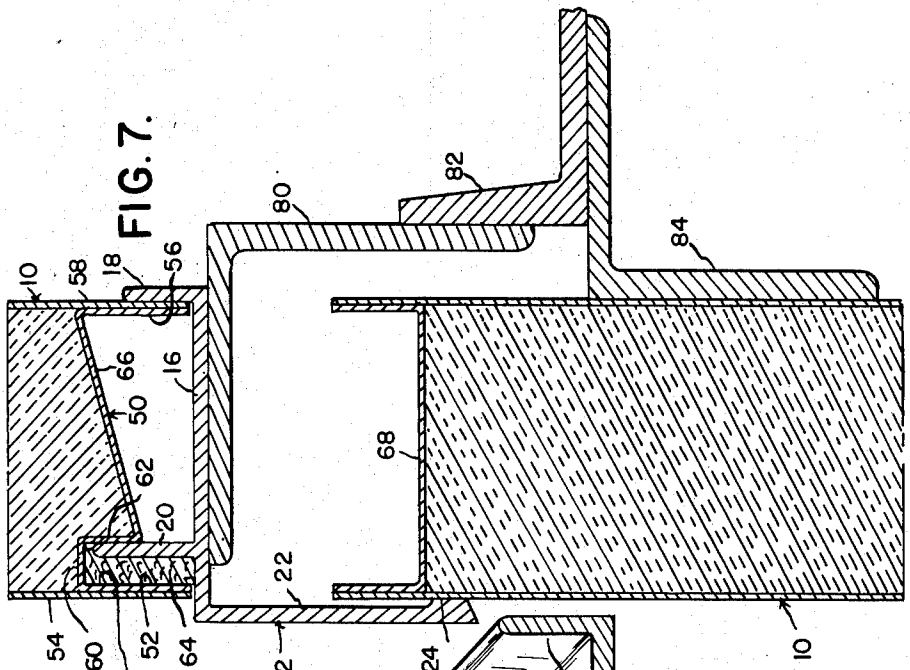
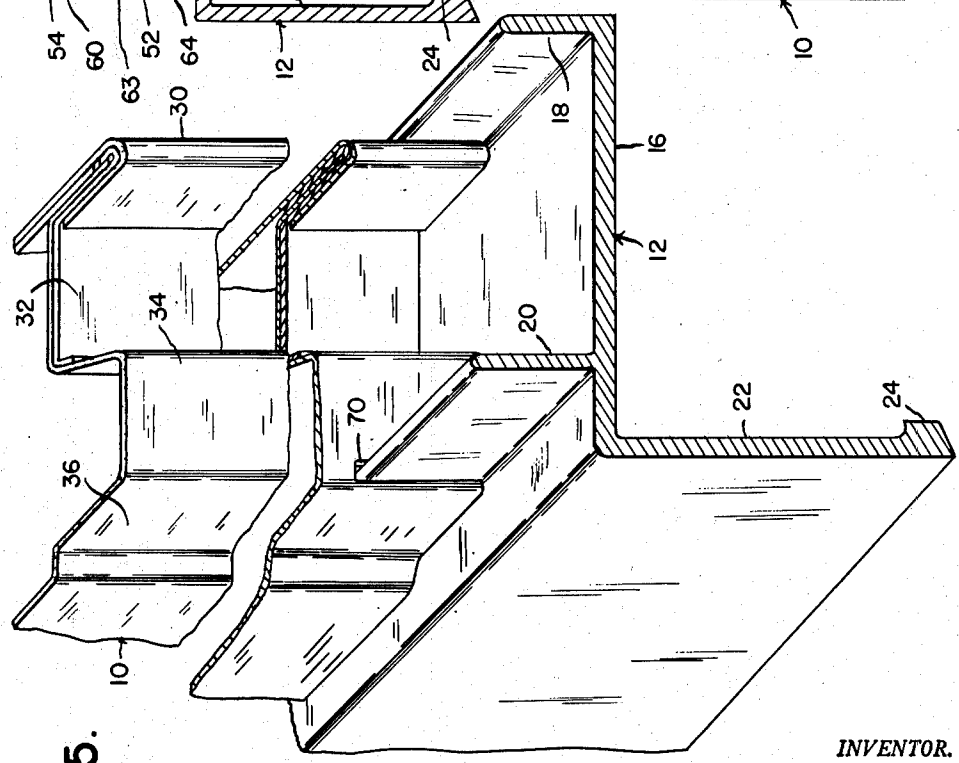


FIG. 5.



INVENTOR.
JOSEPH J. GRUBER
BY Whittemore Hulbert & Belknap
ATTORNEYS

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BUILDING STRUCTURE

Joseph J. Gruber, Buffalo, N. Y., assignor to Detroit Steel Products Company, Detroit, Mich., a corporation of Michigan

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11 Claims. (Cl. 189—34)

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The present invention relates to building structure, and more particularly to an assembly of structural panels.

It is an object of the present invention to provide means for supporting or coupling a plurality of hollow structural panels in a manner which facilitates assembly of the parts.

It is a further object of the present invention to provide a novel panel and supporting construction designed to afford a weather-tight seal automatically upon assembly of the components.

More specifically, it is an object of the present invention to provide a support or coupling member for association with a hollow building panel, the panel having a recessed end provided with a trough extending along one side thereof for receiving a plastic caulking compound, the support or coupling member having a continuous leg extending outwardly therefrom adapted to be received within the trough and to displace caulking compound in a manner to afford a weather-tight seal.

It is a further object of the present invention to provide structure of the character described in the preceding paragraph, in which the coupling member or support is provided with a second leg spaced from and parallel to the first leg and adapted to engage an end of the panel so as to provide mechanical support for the panel against transverse shifting movement.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a fragmentary elevational view showing a plurality of panels in engagement with a support or coupling member.

Figure 2 is an end elevational view of the assembly shown in Figure 1.

Figure 3 is an enlarged sectional view on the line 3—3, Figure 1.

Figure 4 is an enlarged transverse sectional view showing the manner in which a pair of panels are coupled together in end-to-end relationship.

Figure 5 is an enlarged perspective view with parts broken away and sectioned substantially on the line 5—5, Figure 1.

Figure 6 is a fragmentary perspective view of a panel used in the construction.

Figure 7 is a fragmentary transverse vertical section illustrating a modified coupling and support arrangement.

Described in general terms, the present invention comprises building construction including a

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plurality of hollow flat metal panels suitably interconnected along their edges and coupled together or supported at their ends in a novel relationship. The panels are referred to as hollow although of course they may be filled with suitable insulating material if desired. In general, the edges of the panels are provided with interfitting tongues and grooves or the like. The ends of the panels are recessed and preferably are provided with end closures of particular design. The end closures specifically are formed to provide a trough or channel for the reception of a plastic caulking compound.

The individual panels are each connected at one end, and preferably the lower end thereof to a support or coupling member having a pair of continuous parallel outstanding spaced legs, one of which is shaped to enter the trough or channel so as to displace plastic caulking compound in a manner to afford a weather-tight seal. At the same time, this leg engages one side of the trough in a manner to afford mechanical support for the end of the panel against transverse movement. The other leg of the support or coupling member engages an end surface of the panel in such a manner that the two legs positively prevent transverse movement of the panel in either direction.

Referring now to the drawings, in Figure 1 there are illustrated a plurality of panels 10 connected to a support 12. In this instance, the support 12 is shown as mounted on a part 14 of the building, the support comprising a flat portion 16 having a first vertically extending continuous leg 18 at one edge thereof and a second leg 20 intermediate the edges of the portion 16, the leg 20 extending vertically and being continuous and parallel to the leg 18. At the side of the portion 16 adjacent the leg 20 the support 12 is provided with a depending flange 22 having an inwardly extending abutment 24 adapted to engage the part 14 of the building, all as best seen in Figure 5.

The panels 10, as best seen in Figures 3 and 6, each comprise a tongue 30, a groove 32, a rib 34, and a rabbet 36. The rabbet 36 is dimensioned to receive the tongue 30 provided at the edge of the adjacent panel, and the groove 32 is shaped to interfit with the rib 34 of the adjacent panel.

The manner in which the support 12 cooperates with the bottom end of the panel 10 is apparent from Figure 4. In this figure a form of support or coupling member 40 is illustrated which is somewhat different from the support 12 shown in Figure 2, the specific difference being that the member 40 is provided with a sec-

ond depending flange 42 adapted to engage an outer surface of the panel 10. The member 40 however, includes a flat horizontal portion 44 which is identical with the portion 16 illustrated in Figures 2 and 5. The portion 44 is provided at one edge with a continuous upstanding leg 46 and is provided with a second continuous upstanding leg 48 which is spaced from and parallel to the leg 46. The leg 48 is spaced inwardly from the adjacent edge of the flat portion 44 of the support.

The panels 10 at their lower ends are provided with an end closure 50 which is of downwardly open hollow configuration. The closure member 50 includes a first side wall 52 in surface-to-surface contact with an adjacent side wall 54 of the panel 10. The member 50 includes a second side wall 56 which is in surface-to-surface contact with the inner surface of the opposite side wall 58 of the panel 10. Extending inwardly from the side wall 52, the member 50 includes a short bottom wall section 60 and a short outwardly extending wall section 62, the walls 52, 60 and 62 together defining a trough, well or channel 63 for the reception of a suitable plastic caulking compound 64. From the outer end of the wall 62, the member 50 is provided with a diagonally extending bottom wall 66 which connects the trough to the opposite side wall 56.

In use the end closure member 50 is inserted in the panels 10 at one end thereof, thus establishing the end which is to be the lower end of the panel in assembly. End closure members 50 may be suitably secured within the open end of the panels 10 such as by welding if desired, or otherwise. The assembly thus far described accordingly results in the provision of a hollow building panel having a recessed end provided with a trough extending along one side of the recessed end for reception of a suitable plastic caulking compound. The plastic caulking compound is deposited in the trough 63 during manufacture of the panel and remains therein.

The opposite end of the panels 10, as illustrated in Figures 4 and 7, include a second end closure 68.

In alignment with the ends of th trough 63 each of the panels 10 is provided with notches 70 adapted to receive the leg 20 or 48 of the support or coupling member 12 or 40 respectively.

In order to assemble a plurality of panels 10 in the relationship shown in Figure 1 or Figure 4, one of the panels is connected to the support or coupling member in such a manner as to cause the leg 20 or 48 to enter the trough 63. The plastic caulking compound 64 therein is present in such amount that entrance of the leg 20 or 48 into the trough displaces the plastic caulking compound so as to substantially fill a space defined at the top by the wall 60, at one side by the wall 52, at the other side by a portion of the wall 62 and by the leg 20 or 48, and at the bottom by the part of the portion 16 or 44 disposing outwardly from the leg 20 or 48, all as clearly illustrated in Figures 4 and 7. It will be observed at this time that the leg 20 or 48 abuts the trough side surface of the wall 62. At the same time the leg 18 or 46 engages the outer surface of the side wall 58 of the panel. Where the wall construction illustrated in the figures is an outer wall of a building, the trough 63 is located at the weather-side of the wall. Thus, the lower end of the upper panel 10, as seen in Figures 4 and 7, is supported by the leg 20 or 48 against outward movement relative to the support or coupling member 12 or 40 and is supported against movement inwardly of the building by the leg 18 or 46.

A depending flange 42 carried by the coupling member 40, as best seen in Figure 4, engages a portion of the inner wall 58 of the next lower panel member and depending flange 71 has an abutment portion 72 which engages the outer wall 54 of the lower panel at a point substantially below its upper end.

The support or coupling member 40 may conveniently be provided in the form of an elongated continuous extrusion. The depending flange 71 and its abutment portion provide an effective weather-tight seal in cooperation with the upper end of the lower panel 10. The leg 48, by its displacement of the plastic caulking compound 64, provides an effective weather-tight seal for the lower end of the upper panel 10. The upstanding leg 46 and the depending flange 42 of the coupling member 40, shown in Figure 4, provides an attractive cover element concealing the joint between the adjacent ends of the panels 10.

The construction illustrated in Figure 7 involves the same coupling between the parts and differs only in the manner of support. In this illustrated use of the panel and coupling or support member, the member 12 is supported from an angle iron 80 which in turn is supported from a second angle iron 82 carried by a structural element 84. Thus, the structural element 84 may constitute the support for a floor or the like and also provides for support of an upper row of panels 10 through the medium of the angle irons 80 and 82 and the elongated support or coupling member 12.

The present arrangement facilitates the assembly of parts on a building site and avoids the necessity for a separate caulking operation during assembly. The caulking compound is provided in the trough of the recessed lower end of the panel at the factory and remains therein ready for use when shipped to the erecting site. It is only necessary for the workmen to bring the panel and support or coupling member into association in a manner to cause the leg 20 or 48 to enter into the trough 63 in the manner illustrated in Figures 4 and 7. This automatically provides a caulked weather-tight seal and displaces the plastic caulking compound so as to substantially fill the space provided between the trough and the coupling member. Moreover, the assembly of the panel and support or coupling member automatically brings the panel into properly aligned relationship through the interengagement between the upstanding legs of the support or coupling member and a side wall of the trough and a side wall of the panel. Moreover, and as specifically illustrated in Figure 4, the assembly positively insures proper alignment between panels disposed in a vertical tier.

Since the panels are designed to provide a secure sealed interfitting relationship along their edges, it is necessary only to bring a second panel into proper registering relationship with an adjacent panel and the support or coupling member and to force the parts into assembled relationship to complete a strong structural relationship characterized also by an adequate weathertight seal.

The present construction also simplifies the initial construction of the panels inasmuch as the upper end thereof need not be precision

squared. Obviously, the substantial overlap provided in assembly for the upper end of the panels permits these ends to have substantial deviation from an accurate squared relationship.

While the illustrated construction shows panels the opposite sides of which are flat surfaces, the invention is of course equally applicable to a building panel which is modified from the illustrated form by the provision of longitudinally parallel ribs (not illustrated herein) in one of the sides of the panel. With this construction it is of course only necessary to blank out matching notches along one side of the end closure members to accommodate the ribs.

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 I claim as my invention is:

1. In combination, a panel support comprising an elongated member having a flat portion provided with a pair of outstanding spaced parallel legs, one of which is located inwardly from one edge of said flat portion, a hollow structural panel connected to said support, said panel including an elongated outwardly open channel shaped end closure member, the side walls of said member being in abutment against the inner surfaces of the side walls of said panel, the inner wall of said member being shaped to provide a trough for receiving a plastic caulking compound and including a third wall intermediate the said side walls of said member and parallel thereto, said support and panel being assembled with one leg of said support located within said trough and abutting one side of said trough, the other leg of said support engaging the side of said panel remote from said trough.

2. In combination, a panel support comprising an elongated member having a flat portion provided with a pair of outstanding spaced parallel legs, one of which is located inwardly from one edge of said flat portion, a hollow structural panel connected to said support, said panel having a recessed edge cooperating with said support, a trough in said recessed edge for receiving a plastic caulking compound, said trough being at one side of said panel and having one side wall common therewith, one leg of said support extending into said trough and the other leg of said support engaging the side wall of said panel remote from said trough.

3. In combination, a panel support comprising an elongated member having a flat portion provided with a pair of outstanding spaced parallel legs, one of which is located inwardly from one edge of said flat portion, a hollow structural panel connected to said support, said panel including an elongated outwardly open channel shaped end closure member, the side walls of said member being in abutment against the inner surfaces of the side walls of said panel, the inner wall of said member being shaped to provide a trough for receiving a plastic caulking compound and including a third wall intermediate the said side walls of said member and parallel thereto, said support and panel being assembled with one leg of said support located within said trough and abutting the surface of said third wall at the side of said trough, the other leg of said support engaging the outer surface of the side of said panel remote from said trough.

4. A building construction comprising an elongated support member having a flat portion provided with a pair of straight parallel continuous legs outstanding therefrom, one of said legs being spaced inwardly from one edge of said flat portion, a plurality of hollow structural panels connected at their ends to said support member, said support member being of a length at least equal to the width of a plurality of panels, said panels having elongated troughs in their ends adjacent one side thereof into which said one leg extends to engage the side of said trough remote from the said one side of said panel, the other of said legs engaging the outer side wall of said panels at the other side thereof, and notches in the ends of said troughs for receiving said one leg, the transverse width of said troughs being substantially greater than the thickness of the leg received therein.

5. A building construction comprising an elongated support having a flat portion provided with a pair of straight parallel continuous legs outstanding therefrom, one of said legs being spaced inwardly from one edge of said flat portion, a plurality of hollow structural panels connected at their ends to said support, said support being of a length at least equal to the width of a plurality of panels, said panels having elongated troughs in their ends extending along one side of said panels for receiving caulking compound, the said one leg of said support extending into said trough and engaging the inner wall of said trough, the other leg of said support engaging the outer surface of said panel, said panels having notches in their edges in alignment with said troughs to receive said one leg the transverse width of said troughs being substantially greater than the thickness of the leg received therein.

6. A building construction comprising a pair of hollow structural panels disposed end-to-end in a vertical tier, a coupling member comprising a flat portion disposed between the ends of said panels, a depending flange at one edge of said member engaging one side of the lower of said panels, a pair of upstanding spaced parallel continuous legs on said member, the lower end of said upper panel having a recessed trough extending therealong for receiving caulking compound, one of said legs extending into said trough, the other of said legs engaging a side of said upper panel.

7. A building construction comprising a pair of hollow structural panels disposed end-to-end in a vertical tier, a coupling member comprising a flat portion disposed between the ends of said panels, a depending flange at one edge of said member engaging one side of the lower of said panels, a pair of upstanding spaced parallel continuous legs on said member, the lower end of said upper panel having a recessed trough extending therealong at one side thereof for receiving caulking compound, one of said legs extending into said trough, the other of said legs engaging the side of said panel remote from said trough.

8. A building construction comprising a pair of hollow structural panels disposed end-to-end in a vertical tier, a coupling member comprising a flat portion disposed between the ends of said panels, a depending flange at one edge of said member engaging one side of the lower of said panels, a pair of upstanding spaced parallel continuous legs on said member, the lower end of said upper panel having a recessed trough extending therealong at one side thereof for receiving caulking compound, one of said legs ex-

tending into said trough and abutting the side of said trough remote from the adjacent side of said panel, the other of said legs engaging the outer surface of the other side of said panel.

9. Structure as defined in claim 8 in which a plurality of tiers of panels are connected to a single coupling member, and the edges of the upper panels are notched in alignment with the trough to receive said one leg.

10. Structure as defined in claim 9 in which said coupling member comprises a second depending flange engaging the opposite sides of said lower panels.

11. Structure comprising a self-sealing joint between a hollow panel and a support, comprising an elongated flat support having a continuous rib extending therealong at right angles thereto intermediate its sides, a panel having a recessed edge cooperable with said support, a trough extending inwardly from the bottom of the recess in the edge of said panel at one side thereof, said rib being positioned to enter said trough as said panel is relatively moved toward

said support, the transverse width of said troughs being substantially greater than the thickness of the rib received therein, a quantity of plastic caulking compound in said trough, the quantity of compound and the dimension of said trough and rib being proportioned so that said rib displaces compound to substantially fill the space defined by said trough, said rib, the adjacent side of said panel, and said support.

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