May 7, 1940.

C. D. BOWSER

2,199,586

PANEL FOR BUILDING CONSTRUCTION

Filed April 25, 1938

Fig. 1.

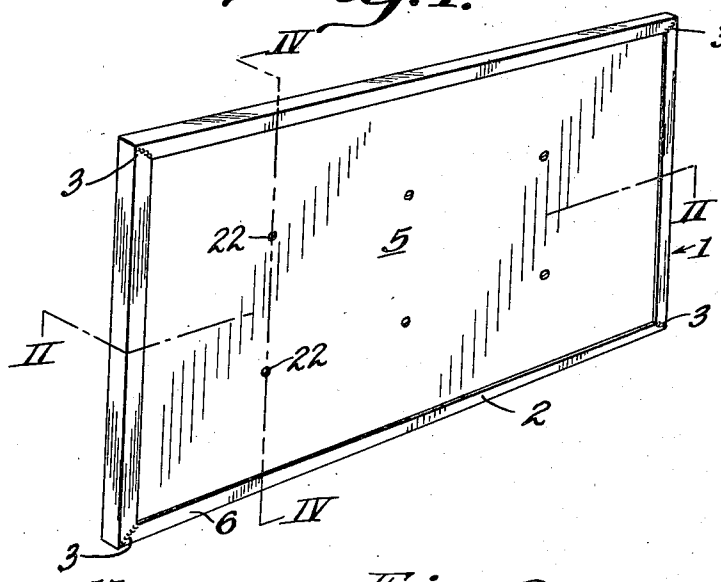


Fig. 4.

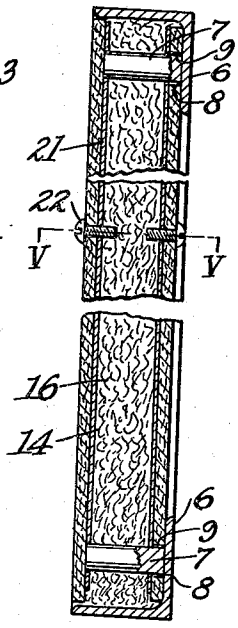


Fig. 2.

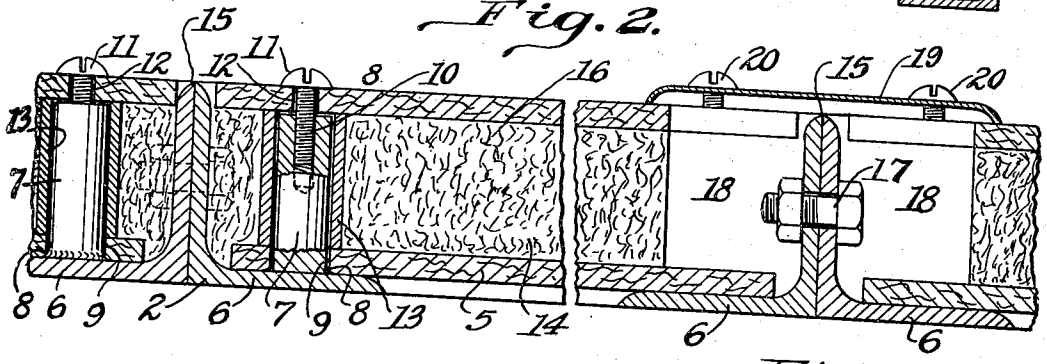


Fig. 3.

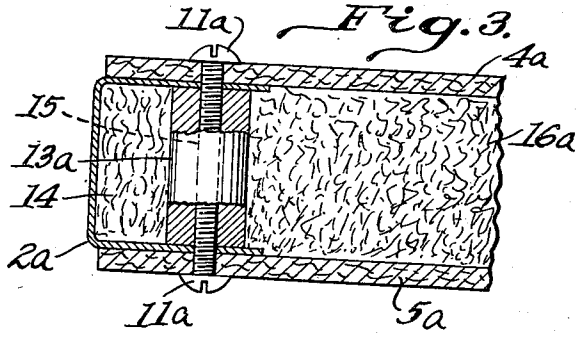
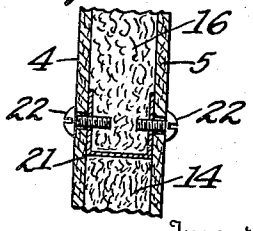


Fig. 5.



Inventor

Clarence D. Bowser

By W. S. McClowell

Attorney

Patented May 7, 1940

2,199,586

UNITED STATES PATENT OFFICE

2,199,586

PANEL FOR BUILDING CONSTRUCTION

Clarence D. Bowser, Columbus, Ohio, assignor to International-Stacey Corporation, Columbus, Ohio, a corporation of Ohio

Application April 25, 1938, Serial No. 203,998

5 Claims. (Cl. 189—34)

The purpose of the present invention is to provide an improved panel unit for building construction, wherein the same is composed of prefabricated parts adapted for factory assembly or for convenient assembly on the building site.

The general object of the invention is to produce a panel unit of strong light weight construction adapted for use in the formation of the sides and roof of a building, or as an interior partition, and wherein the construction of each unit renders the same fully capable of resisting the elements, possesses high heat insulating properties and generally inexpensive design.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawing, wherein:

Fig. 1 is a view in side elevation of a wall-forming panel formed in accordance with the present invention;

Fig. 2 is an enlarged horizontal sectional view taken through a panel in assembled relationship with similar panels, the plane of the section being indicated by the line II—II of Fig. 1;

Fig. 3 is a detail horizontal sectional view taken through a slightly modified form of panel;

Fig. 4 is a vertical transverse sectional view taken through a panel on the plane indicated by the line IV—IV of Fig. 1;

Fig. 5 is a detail horizontal sectional view on the plane indicated by the line V—V of Fig. 4.

Referring more particularly to the drawing, the numeral 1 designates the improved wall-forming panel comprising the present invention in its entirety. The panel comprises a substantially rectangular marginal frame 2 which, in its preferred form, is composed of structural steel angle members having mitered corner joints 3, which are welded or otherwise secured together to produce a rigid frame construction.

In combination with this outer frame, each of the panels includes a pair of rectangular inner and outer sheets 4 and 5 respectively. While these sheets may be formed from any suitable materials possessing requisite strength for wall-forming purposes, I preferably form such sheets from pressed composition materials, such for instance as vegetable or mineral fibers. Thus the inner sheet 4 may be composed of pressed asbestos known commercially as "Flexboard," whereas the outer sheet 5 is preferably composed of pressed wood fiber, sold commercially under the name "Masonite." Each of these sheets may be formed in rectangular sections 4 ft. wide by 8 ft. high, possessing a thickness of approximately ¼ in., while the angle members comprising the frame 2 possess the marginal dimensions of the sheets 4, and each of the flanges of said angle members is approximately 2 in. wide and $\frac{3}{16}$'' thick. When assembled, the adjoining inner faces of the sheets 4 and 5 are spaced approximately 1 and $\frac{5}{16}$ in. apart. While these dimensions are not in any sense critical, nor are the materials for forming the panel, yet the specific description of the same is given in order to afford a more complete understanding of the preferred form of the invention.

The outer flange or leg 6 of each frame angle has its inner surface provided with a plurality of spaced horizontally or perpendicularly extending steel studs 7, spaced approximately 12 in. apart. The inner ends of the studs 7 are welded as at 8 to the inner surfaces of the legs or flanges 6 of the angle frame. This construction is employed in lieu of passing bolts through openings in the legs or flanges 6, thus preventing the studs 7 from being accessible from the outside of the building in which the panels are situated, and enables the outer surfaces of the legs or flanges 6 to be smooth and unbroken and are devoid of bolt heads, rivets, nuts or other fastening devices hitherto employed in securing the sheets to the angle members. The construction presents a more attractive external appearance as well as one of required mechanical strength.

The outer sheets 5, by means of suitable patterns or guides, have their marginal portions drilled or bored at spaced intervals to produce openings 9, which are so arranged as to receive the studs 7, so that the outer marginal faces of the sheets 5 will directly contact the inner surfaces of the frame legs 6, as shown in Fig. 2.

The inner or free ends of the studs 7 are provided with axially disposed threaded bores 10 which are adapted to receive the threaded shanks of headed cap screws 11. These cap screws pass through marginally disposed openings 12 which are formed by factory operations in the inner sheet 4. Surrounding these studs 7 are metallic sleeve-like separators 13 which are interposed between the inner complemental surfaces of the sheets 4 and 5 and serve to maintain said sheets in desired spaced relationship. It is seen that by tightening the screws 11, the assembly comprising the sheets 4 and 5 and the separators 13 may be rigidly and securely bound to and joined with the angle frame 2. The cap screws 11 are disposed on the inner face of the wall-forming panel, where they are conveniently accessible but are, of course, inaccessible from the exterior of the panel. Preferably, the space 14, formed between

the inner surfaces of the sheets 4 and 5, is filled with bats of mineral fiber 16, producing excellent thermal insulation in addition to that normally afforded by the composition materials from which the sheets 4 and 5 are preferably formed. The heads of the screws may be countersunk in the sheet 4, if desired, to provide for a smooth internal finish.

The construction set forth may be easily assembled either in the producing factory or on the site of the building operation, the former procedure being the ordinary course followed. The parts of the panel, however, are all preformed under factory supervision so that at the time of assembly all that is required is the mere placing of the parts of the panel in proper relative order, and the securing of the parts in such order by the tightening of the screws 11. Adjacent wall forming panels may be secured together by suitable fastening devices 17 which pass transversely through the inwardly extending flanges or legs 15 of the angular members comprising the frame 2. As illustrated in Fig. 2, the inner panels and the insulation are provided with recesses 18 in the vicinity of the fasteners 17. After adjacent panels have been firmly secured together, the recesses 18 are closed by means of cap plates 19 and attaching screws 20.

To prevent buckling or bulging on the part of the sheets 4 and 5 at the center thereof, channel-shaped spacing strips 21 are disposed at spaced distances throughout the length of the panel. These strips have the flanges provided with registering openings adjacent their ends to permit the strips to be positioned, as shown in Fig. 4, between the sheets with a stud 7 extending through the openings at each end. This serves to prevent the misalignment of the strips and their accurate location where they are most useful. The sheets are held in engagement with the strips through the use of metal fastening screws 22.

The panels described are preferably employed in the formation of building side walls, and the roof-forming panels are slightly modified in design, as disclosed in Fig. 3. In this figure, it will be noted that the rectangular frame 2*a* is channel-shaped in cross section, being preferably produced from sixteen gage galvanized steel.

The composition sheets 4*a* and 5*a* engage with the outer surfaces of the spaced parallel legs of the channel members comprising the frame 2*a*, and are secured to said frame by means of headed screws 11*a* which pass through registering openings formed in said sheets and frame legs, with the shanks of said screws being received within threaded bores provided in separators 13*a*, the latter serving to strengthen the legs of the channel members and to maintain said legs in properly spaced order. A body of mineral wool 16*a* is preferably disposed between the sheets 4*a* and 5*a* for thermal insulation purposes.

These panel units may be readily joined together in order to produce a strong, light weight inexpensive building construction. It will be understood that the exposed surfaces of the composition panel sheets may be suitably finished as by painting or otherwise to impart a desired appearance. The construction is particularly adapted in the erection of substantial but low cost buildings.

What is claimed is:

1. A wall-forming panel for building construction comprising an outer rectangular structural steel frame composed of united angle members, longitudinally spaced horizontally extending studs welded to the inner surfaces of the outer flanges of the angle members forming said frame, transversely spaced wall sheets occupying said frame, said sheets being formed with marginally disposed openings for registration with said studs, the openings in the first-applied sheet receiving said studs, and securing means engaging with the free or inner ends only of said studs for removably clamping said sheets in secured relationship with said studs and angle members.

2. A wall-forming panel for building construction comprising an outer rectangular structural steel frame composed of united angle members, longitudinally spaced horizontally extending studs welded to the inner surfaces of the outer flanges of the angle members forming said frame, transversely spaced and vertically disposed inner and outer wall sheets occupying said frame, said outer sheet being provided with marginally disposed openings for the reception of said studs so that the marginal portions of said outer sheet engage with the inner surfaces of the flanges of said angle members from which the studs project, said inner sheet being provided with correspondingly disposed openings, and threaded fastening means passing through the openings of said inner sheet and receivable within threaded bores formed axially in the free ends of said studs, said threaded means being accessible only from the interior of the building construction and serving to removably clamp said sheets in secure relationship with said studs and angle members.

3. A wall-forming panel for building construction comprising an outer rectangular structural steel frame composed of united angle members, longitudinally spaced horizontally extending studs welded to the inner surfaces of the outer flanges of the angle members forming said frame, transversely spaced and vertically disposed inner and outer wall sheets occupying said frame, said outer sheet being provided with marginally disposed openings for the reception of said studs so that the marginal portions of said outer sheet engage with the inner surfaces of the flanges of said angle members from which the studs project, said inner sheet being provided with correspondingly disposed openings, threaded fastening means passing through the openings of said inner sheet and receivable within threaded bores formed axially in the free ends of said studs, said threaded means being accessible only from the interior of the building construction and serving to removably clamp said sheets in secure relationship with said studs and angle members, and metallic separator sleeves surrounding said studs, the ends of said sleeve engaging with the inner complemental surfaces of said sheets.

4. A wall-forming panel for building construction comprising an outer rectangular steel frame formed from a plurality of united angle members, longitudinally spaced studs secured to and extending at right angles from the inner surfaces of the outer flanges of said angle members, a wall sheet having marginal perforations for the reception of the studs positioned in engagement with the surfaces of the angles to which the studs are attached, U-shaped reenforcing strips having perforated flanges disposed in engagement with the inner surface of said wall sheet, certain of said studs extending through the perforations in the U-shaped strip to insure the proper location thereof, a second wall sheet engaging said strips and the free ends of said studs, and threaded means extending through said sheet into said

studs and strips to secure the elements of said panel in assembled relationship.

5. A wall-forming panel for building construction comprising an outer rigid metallic frame formed from a plurality of united angle members, stud means secured to and extending from the inner surface of the imperforate outer flanges of said angle members, a wall sheet having marginal perforations for the reception of the studs disposed in engagement with the inner surfaces of the outer flanges of said angles, a second wall sheet positioned in engagement with the free ends of said studs, spacing means disposed between said wall sheets, the exposed surface of said second wall sheet being substantially flush with the free edges of the side flanges of said angle members, said side flanges being formed with spaced perforations, the peripheral portion of said second wall sheet being recessed in registration with the perforations in said side flanges, and threaded securing means extending through said second wall sheet into said studs to join said sheets to said frame.

CLARENCE D. BOWSER.