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3,598,686

WALL PANEL FOR BUILDING STRUCTURE COMPRISING A FIBREGLASS
OUTER SHELL AND A FRAME ASSEMBLY POSITIONED
WITHIN THE SHELL

Filed Feb. 19, 1969

3 Sheets-Sheet 1

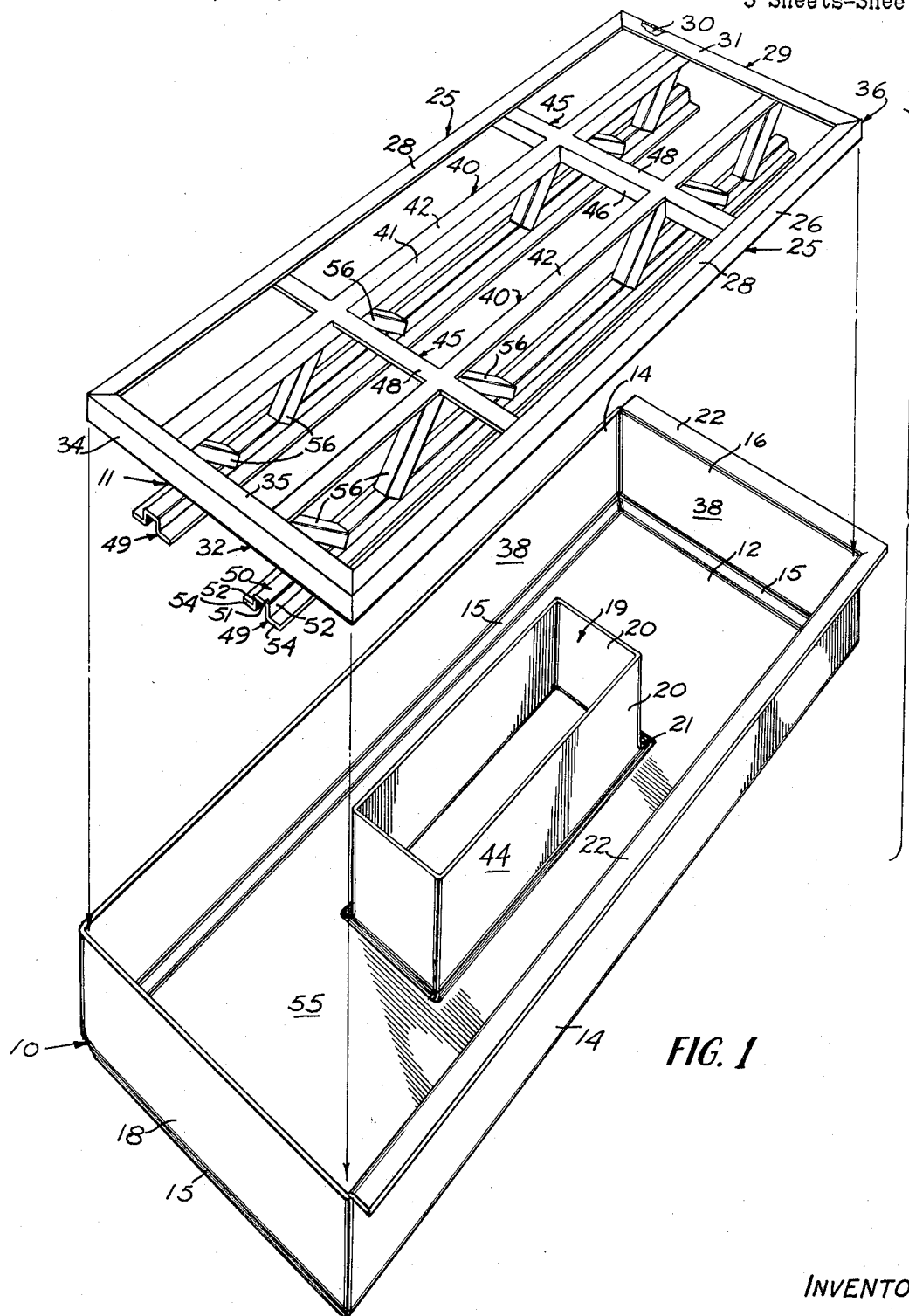


FIG. 1

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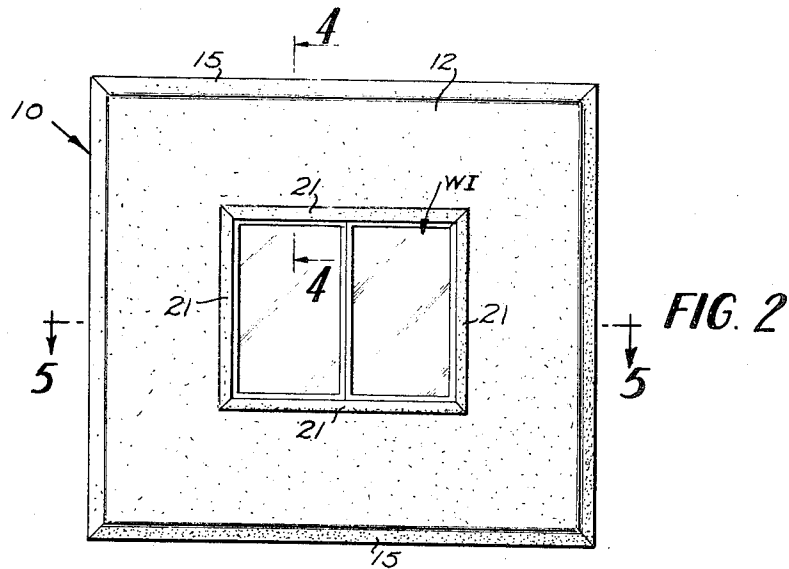
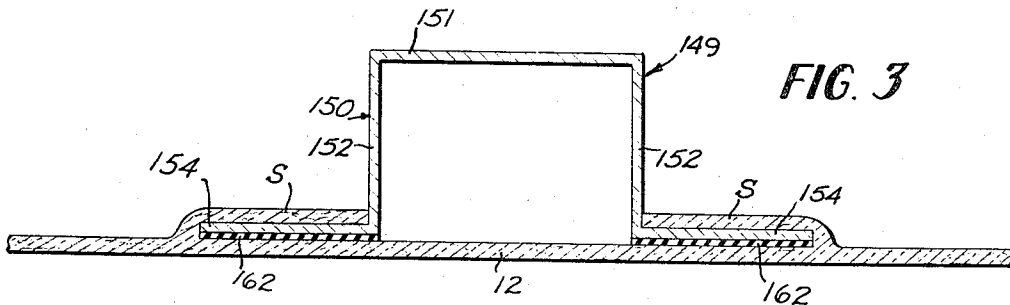
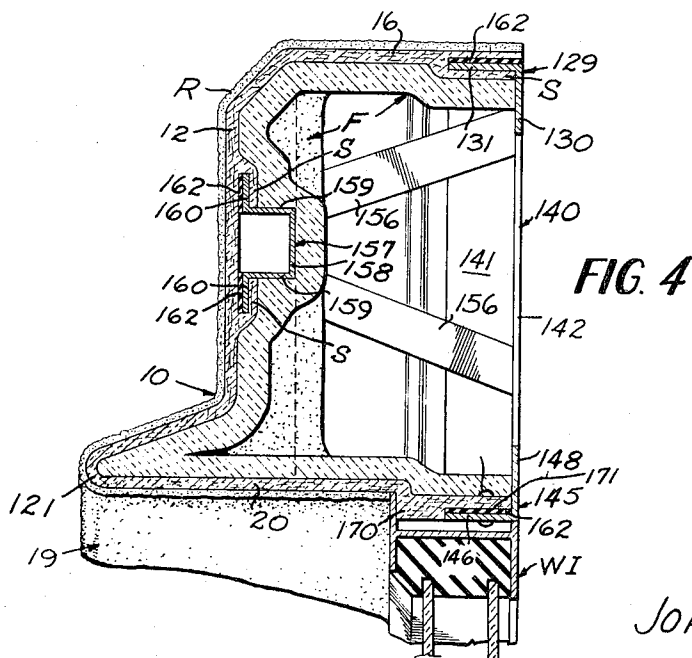
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

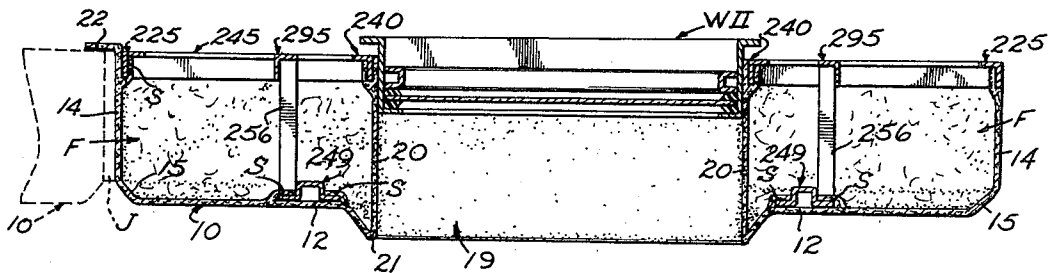


FIG. 5

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WALL PANEL FOR BUILDING STRUCTURE COMPRISING A FIBREGLASS OUTER SHELL AND A FRAME ASSEMBLY POSITIONED WITHIN THE SHELL

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8 Claims

ABSTRACT OF THE DISCLOSURE

A wall panel and method of making same having a desired shape fiberglass base member and a plurality of metallic support members affixed thereto for welding the wall panel to a building structure. The metallic support members are of a hat or angle shape and are fiberglassed to the base member. An adhesive tape is placed between the support members and the base member to insulate the base member from changes in the weather conditions and from heat being applied to the support member. The exterior of the fiberglass base member is sandblasted and coated with an epoxy compound for providing any desired appearance.

BACKGROUND OF THE INVENTION

This invention relates generally to wall panels and more particularly to a shaped fiberglass wall panel for use in building construction.

In the past, wall panels for use in construction buildings were generally made of metal or concrete. Such wall panels were found to be both expensive and to lack the flexibility needed for readily forming a number of different shaped panels. Moreover, concrete wall panels were found to be extremely heavy thereby requiring heavy equipment to install same.

Because of the difficulties encountered with metal wall panels, others have tried to use fiberglass. While somewhat satisfactory, one of the problems immediately encountered was that the fiberglass discolored in the welding process due to temperature changes. Another problem was that the supporting members had to be attached to the fiberglass panels so that the same could be welded to the building structure. However, difficulties were immediately encountered in attaching the support members to the fiberglass panel. Moreover, a need existed for a wall panel that could take on a plurality of different aesthetic appearances as desired.

SUMMARY OF THE INVENTION

Accordingly, one object of the present invention is the provision of a new and improved wall panel.

Another object of the present invention is the provision of a new and improved fiberglass wall panel which is capable of taking on a number of different shapes.

A further object of this invention is the provision of a new and improved fiberglass wall panel which is both inexpensive and easy to construct.

Still another object of the present invention is the provision of a new and improved fiberglass wall panel which uses a panel member with a plurality of readily attachable and different shaped support members.

Yet a further object of the invention is to provide a new and improved fiberglass wall panel which is capable of withstanding greater changes in temperature conditions than heretofore existed.

One other object of the instant invention is the provision of a new and improved fiberglass wall panel which

is capable of taking on any desired exterior appearance and which is light in weight.

Briefly, in accordance with this invention the foregoing and other objects are attained by fiberglassing metallic support members to a fiberglass base member with insulation provided therebetween in such a fashion that both a strong connection and insensitivity due to temperature is readily realized.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is an exploded perspective view of one embodiment of the invention;

FIG. 2 is a front elevational view of a modification of the embodiment shown in FIG. 1;

FIG. 3 is partial cross-sectional view showing the connection of a hat-shaped channel used in the invention;

FIG. 4 is a cross-sectional view taken along line 4—4 in FIG. 2; and

FIG. 5 is a cross-sectional view of a modification of the invention taken along line 5—5 as in FIG. 2.

These figures and the following detailed description of the invention disclose specific embodiments thereof, however, the inventive concept is not limited thereto since it may be embodied in other specific embodiments.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Referring now to the drawings wherein like reference numerals designate corresponding parts throughout the several views, it will be seen that the wall panel comprises generally a fiberglass shell 10 which is carried by a frame assembly 11. The frame assembly 11 is fiberglassed into the shell 10 and the frame assembly 11 is welded to the supporting structure of the building (not shown). The wall panel may be made with various openings therein depending on what is to be inserted into the wall panel after it is placed on the supporting structure. The particular wall panel shown in the figures is designed for use with a window, however, it is to be understood that spaces for door, as well as other openings, may be provided therein or the panel may be left blank. It is further understood that the wall panel as illustrated in the figures has a rectangular shape, however, the shape thereof is not limited to the particular shape shown but may be formed into any desired configuration.

The wall panel shown in FIG. 1 illustrates one embodiment of a fiberglass shell 10 which may be part of the invention. In this particular embodiment of the fiberglass shell 10, it will be seen that the shell 10 is of a molded fiberglass construction which includes a front panel 12, a pair of opposed side panels 14 integrally molded with the front panel 12 and connected thereto through a bevel portion 15. The shell 10 also includes a top panel 16 and an opposed bottom panel 18 which are also integral with the front panel 12 through the bevel portion 15 and integral with the side panels 14 at their ends. A window opening 19 is provided through the shell 10 and includes a plurality of sub-panels 20 which extend from the inside surface of the front panel 12 as do the side panels 14 and the top and bottom panels 16 and 18. The sub-panels 20 are integrally formed with the front panel 12 through a lip portion 21 which extends forward to the front surface of the front panel 12 to define the window opening. A sealing flange 22 is provided along the rearmost edge of one of the side panels 14 and the top panel 16 generally parallel to the front panel 12 and extending outward of

the shell 10. The shell 10 is usually molded in a conventional fiberglass mold in the desired configuration and, removed therefrom when dry so that the shell 10 is ready for receipt of the frame assembly 11 therein.

The only difference of the embodiments of the invention shown in FIG. 1, and the embodiment of the invention shown in FIG. 2, with regard to the shell 10 is that the opening 19 in the shell 10 in FIG. 2, is wider than that shown in FIG. 1. The shell 10 shown in FIG. 5, is the same as that shown in FIG. 1.

One embodiment of the frame assembly, designated 11, is shown in FIG. 1, a second embodiment, designated 111, is shown in FIGS. 2 and 4, and a third embodiment designated 211, is shown in FIG. 5. The differences therebetween will be explained more fully hereinafter.

Referring particularly to FIG. 1, the frame assembly 11 comprises a pair of opposed side reinforcing angles 25 of L-shape configuration, each having a shell mounting flange 26 and an exposed panel mounting flange 28. The upper ends of the angles 25 are joined by an L-shaped top reinforcing angle 29 having a shell mounting flange 30 corresponding to flange 26 and an exposed panel mounting flange 31 corresponding to flange 28. The lower ends of the angles 25 are joined by an L-shaped bottom reinforcing angle 32 having a shell mounting flange 34 corresponding to flanges 26 and 30 and an exposed panel mounting flange 35 corresponding to flanges 28 and 31. The angles 25, 29, and 32 are assembled with the flanges 26, 30, and 34 on the outboard side of the angles with the size and overall shape formed by the angles being such that the sub-assembly 36 formed thereby will be slidably received in the rearmost edge of the inboard surfaces 38 of the panels 14, 16, and 18. The particular configuration shown is rectangular, however, any desired configuration may be achieved by appropriately shaping and assembling the angles 25, 29, and 32.

A pair of spaced parallel, opposed, intermediate angles 40 extend between and are attached to the angles 29 and 32. The angles 40 each have an L-shaped cross-section and extend parallel to the side angles 25 in the same plane therewith. Each angle 40 includes a shell mounting flange 41 corresponding to flanges 26, 30, and 34 and an exposed panel mounting flange 42 corresponding to flanges 28, 31, and 35. The flanges 41 are so positioned that when the sub-assembly 36 is positioned inside the shell 10, the flanges 41 will be in juxtaposition with the rearward edges of the outboard surfaces 44 of the sub-panels 20.

A pair of spaced parallel intermediate cross-braces 45 extend between the side angles 25 and are connected with the side angles 25 and intermediate angles 40. The cross-braces 45 are parallel to the angles 29 and 32 and have an L-shaped cross-section. Each cross-brace 45 has a shell mounting flange 46 corresponding to the flanges 26, 30, 34, and 41, and an exposed panel mounting flange 48 corresponding to the flanges 28, 31, 35, and 42. The cross-braces 45 are so positioned that the flanges 46 lie in juxtaposition with the rearward edge of the top and bottom outboard surfaces 44 of the sub-panels 20 when the sub-assembly 36 is in position within the shell 10.

The frame assembly 11 further includes a pair of spaced parallel hat-shaped support members 49 which are spaced forward of and substantially in alignment with the intermediate angles 40. Each support member 49 includes a U-shaped central portion 50 having a central web 51 and aligned legs 52 integral therewith and extending from opposite edges of the web 51. The extending edge of each of the legs 52 has integral therewith an outwardly extending lip 54 parallel to the web 57. The members 49 are so positioned with respect to the sub-assembly 36 that the lips 54 lie in juxtaposition with the inside surface 55 of the front panel 12.

A plurality of truss braces 56 extend between and are attached to the members 49 and intermediate angles 40 to properly position the members 49 with respect to the sub-assembly 36. When the frame assembly 11 is attached

to the panels 12, 14, 16, and 18, and the sub-panels 20, in a manner similar to that shown in FIG. 5, the wall panel becomes a strong unit which is also light in weight.

The frame assembly shown in FIG. 4, has a construction similar to the frame assembly 11 with side angles, a top angle 129, a bottom angle, intermediate angles 140, cross braces 145, hat-shaped support members and truss braces 156 corresponding respectively to the side angles 25, the top angle 29, the bottom angle 32, the intermediate angles 40, the cross-braces 45, the hat-shaped support members 49, and the truss braces 56 in FIG. 1. In addition the frame assembly of FIG. 4 also includes a horizontally extending hat-shaped cross member 157 which has a cross-sectional shape the same as the member 49 with a web 158, legs 159, and lips 160. The member 156 serves to reinforce the panel 12 and has the lips 160 lying in juxtaposition with the inside surface 55 of panel 12.

The frame assembly in FIG. 5, has a construction similar to the frame assembly 11 with side angles 225, a top angle, a bottom angle, intermediate angles 240, cross-braces 245, hat-shaped support members 249, and truss braces 256 corresponding respectively to the angles 25, 29, 32, and 40, the cross-braces 54, the members 49, the truss braces 56, in FIG. 1. In addition, auxiliary angles 295, having a cross-section like angles 240, extending between the top and bottom angles (not shown) and in alignment with members 249. The braces 256 extend between the angles 295 and members 249 to form the truss system.

In all three embodiments of the frame assembly and fiberglass shell, a strip of insulation material 162, such as an adhesive tape or rubber strip coated on both sides thereof with an adhesive is positioned between each lip of the hat-shaped members 49, 149, or 249, and the fiberglass front panel 12 as seen in FIG. 3. The insulation material 162 serves the initial purpose of enabling the support members 49 to be positioned until they have been fiberglassed in place and more importantly, serve to insulate the support members 49 from the fiberglass front panel 12 to prevent direct transfer to heat thereto. Such heat transfer, which could be caused either in the process of welding the frame assembly to a building structure or from weather changes, has heretofore been a great problem in causing discoloration of the fiberglass shell 10. Likewise, insulation material 30 is also positioned between all points where the frame assembly of FIGS. 1, 4 or 5 contact the shell 10. For sake of simplicity, the insulating material 162 is shown in FIGS. 3 and 4 only, however, it is understood that such material 162 would be used in the other embodiments shown.

It is to be further understood that, by using the adhesive strips of material 162 to hold the components of the frame assembly of FIGS. 1, 4 or 5 in place, the assembly may be assembled right in the shell 10. While the components of the assembly are held in place by the strips of material 162, the shell mounting flanges of the side angles 25, 125, 225 are fiberglassed in place with a sub-layer of fiberglass as indicated in FIG. 5, by the reference character S. Likewise, the shell mounting flanges of angles 29, 32, 40 and 45, or 129, 132, 140 and 145, or 229, 232, 240, and 249, are fiberglassed in position by a sub-layer S. The lips 54, 154, or 254 are fiberglassed in position by sub-layer S also. The lips 160 as shown in FIG. 4, are likewise fiberglassed in position by the layer S. This creates a sturdy structure with the shell 10 firmly attached to the frame assembly 11, 111 or 211. The panel is placed on the building by attaching the frame assembly thereto.

The window openings 19 in the shell 10 may be formed for any shape window. Further, such openings 19 may be plain on the inside thereof as seen in FIG. 5, or may have a rib 170 extending around the inside thereof adjacent the rearmost edge of the opening 19 as seen in FIG. 4. An appropriate groove 171 may be formed in the rib 170 to receive the angles 145 and 140. A window unit WI may be placed in the opening 19 as seen in FIG. 4 or a window unit WII placed in the opening 19 as seen in FIG. 5.

It should also be noted that the exterior of the fiberglass shell may be either sanded or sandblasted to provide a roughened surface whereby a coating R such as an epoxy resin may be applied to the exterior of the shell 10 as seen in FIG. 4, for enabling any desired outside appearance, such for example, as concrete, cast stone, exposed aggregate, or the like. Coating R may be mixed with a sand aggregate prior to being applied to shell 10.

It should now be apparent that the wall panel of the herein described invention is both inexpensive and easy to construct and may conform to any particular shape desired. It should also be apparent that while the invention has been described with reference to particular shaped support members, that it is not so limited and that any desired shape or number of support members may be readily used.

A plurality of the wall panels are attached to a building structure to define the exterior appearance thereof. The sealing flanges 22 overlap the adjacent wall panels as seen in dashed lines in FIG. 5, and a joint compound J, also seen in dashed lines in FIG. 5, is placed between the panels to seal the same. The joint compound J serves as an expansion joint between wall panels. Moreover, since the front panel 12 is connected to the frame assembly 11, 111, or 211, at a minimum number of points, each of the wall panels will act as an expansion joint as well.

The wall panel is usually constructed by first forming the shell 10. The frame assembly of FIGS. 1, 4 or 5 may be first attached to the shell 10 with the strips of material 162 component by component and then fastening the components together. On the other hand, the components may be attached together and then placed in the shell 10 with the strips 162. After the frame assembly is in place, the fiberglass sub-layers S are formed to hold the frame assembly in place in the shell 10. Next the shell 10 is sanded or sandblasted on the exterior thereof and the resin R with the appropriate finish therein is applied. Finally, the window unit WI or WII is installed and the wall panel is finished.

The inside of the completed panel may be filled with an insulating material or foam F as seen in FIGS. 4 and 5. The material F in FIG. 4 is thinner than that shown in FIG. 5.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings without departing from the scope of the invention otherwise than as specifically described herein.

What is claimed as my invention is:

1. A wall panel for a building structure to define its exterior appearance and configuration comprising a fiberglass outer shell, a frame assembly at least partly positioned within said shell, and at least one fiberglass sub-layer connecting said shell with said frame assembly; said fiberglass shell including a front panel, a pair of opposed side panels integral with the edges of said front panel and extending rearwardly therefrom, a top panel integral with the top edge of said front panel, extending rearwardly therefrom and joined with the upper ends of said side panels, and a bottom panel integral with the bottom edge of said front panel, extending rearwardly therefrom and joined with the lower ends of said side panels; said frame assembly including a pair of opposed side members, a top member joining said side members at one end thereof, a bottom member joining said side members at the opposite end thereof, at least one intermediate member joining said top and bottom members intermediate their ends, a support member spaced from and aligned with said intermediate member, and at least one truss member connecting said support member with

said intermediate member; said top, side and bottom members slidably received in juxtaposition with the rearward inside surface of said side, top and bottom panels of said shell, and said support member being positioned in juxtaposition with the rear surface of said front panel; and said fiberglass sub-layer connecting said side, top and bottom members with said side, top and bottom panels respectively and said support member with said front panel.

2. A wall panel as set forth in claim 1 further including insulation means positioned between said shell and said frame assembly at the points of contact therebetween for substantially reducing the heat transfer between said shell and said frame assembly.

3. A wall panel as set forth in claim 1 wherein the exterior surface of said shell is coated with resinous finishing coating.

4. A wall panel for a building structure comprising a front panel; top, bottom and side panels extending from the rear of said front panel and integrally united with the front panel and with each other to form a continuous wall surrounding the rear face of said front panel, a second set of top, bottom and side panels, parallel respectively to the first mentioned top, bottom and side panels, integral width and extending rearwardly from the rear face of the front panel to provide a window opening, and a frame assembly comprising top, bottom and side members joined together to form a frame fitting slidably within the said continuous wall, said frame assembly including a pair of longitudinal members parallel to each other and to the side panels of the second set and so spaced as to slidably engage the said side panels of said second set when the frame assembly is fitted within said continuous wall being formed of fiberglass; and a fiberglass sub-layer connecting said first mentioned side, top and bottom panels to said side, top and bottom members, respectively, of said frame assembly.

5. The wall panel of claim 4 wherein said frame assembly further includes a pair of spaced parallel members extending transversely of the frame and adapted to respectively engage the top and bottom panels of said second set.

6. The wall panel of claim 5 wherein the panels of the second mentioned set are united to the adjacent members of the frame assembly by a fiberglass layer.

7. A wall panel as set forth in claim 6 wherein insulation is positioned between the frame and the adjacent panel surfaces to reduce heat transfer.

8. A wall panel as set forth in claim 7, further comprising a support member, engaging the rear surface of said front panel, said support member being spaced from and parallel to one of said first mentioned longitudinal members, and a truss connecting said support with said last mentioned member.

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U.S. Cl. X.R.

52—309, 615, 630, 650, 654, 655; 161—69