Nov. 17, 1959 W. M. RIES 2,912,725

INSULATED PANEL

Original Filed Sept. 27, 1955 2 Sheets-Sheet 1

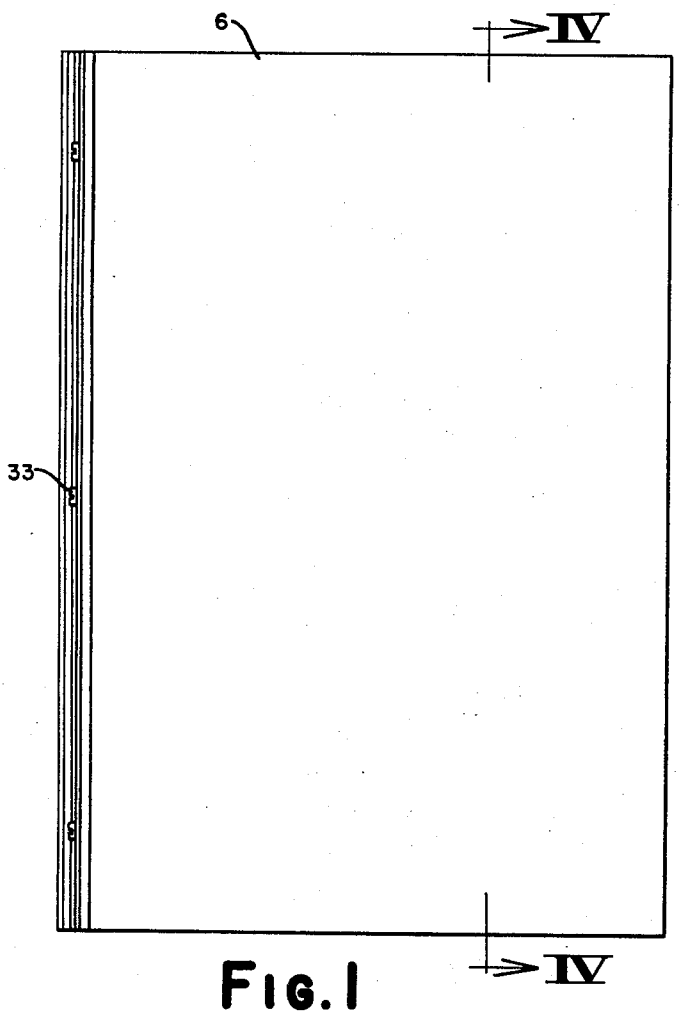
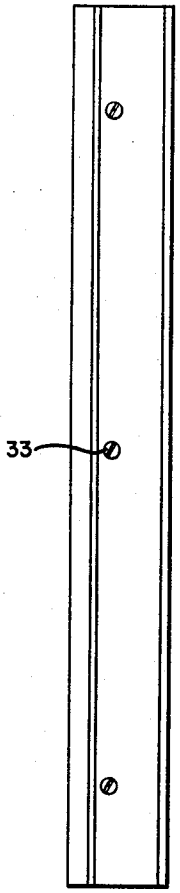


FIG. 1

FIG. 3



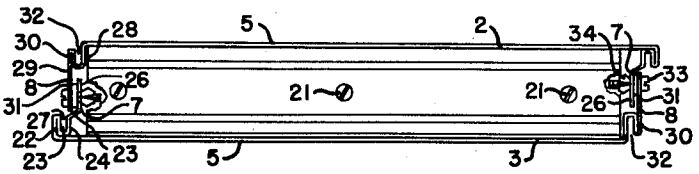


FIG. 2

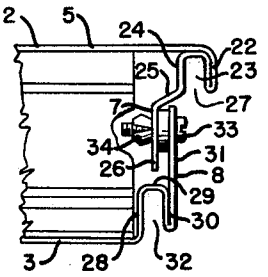


FIG. 6

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Nov. 17, 1959 W. M. RIES 2,912,725

INSULATED PANEL

Original Filed Sept. 27, 1955 2 Sheets-Sheet 2

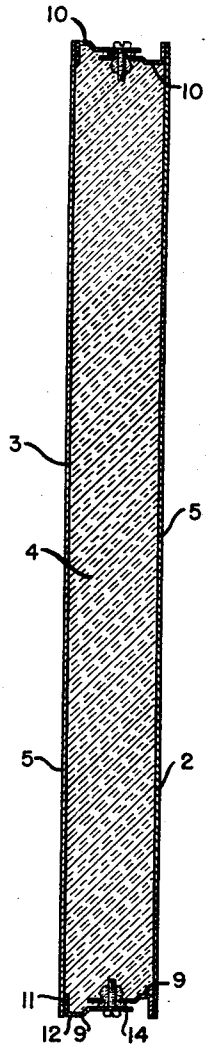

FIG. 4

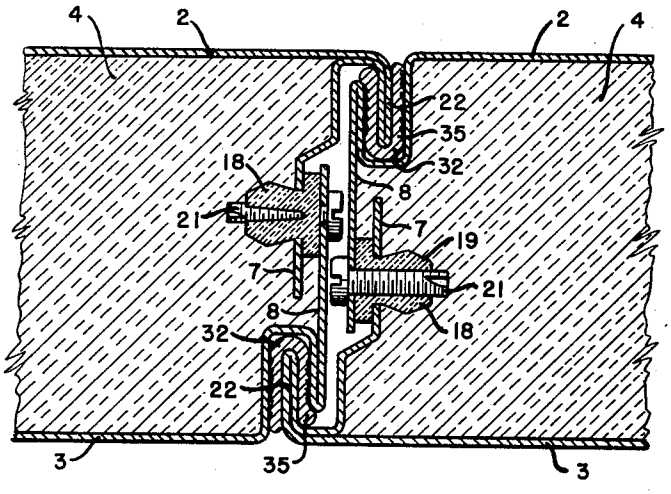

FIG. 5

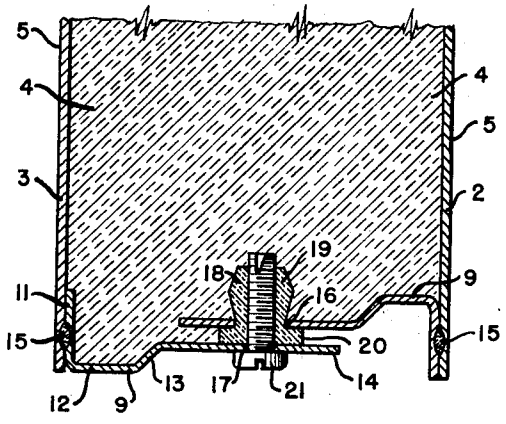

FIG. 7

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2,912,725

INSULATED PANEL

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Continuation of abandoned application Serial No. 536,995, September 27, 1955. This application August 14, 1958, Serial No. 755,067

4 Claims. (Cl. 20—15)

This invention relates to an insulated panel of low cost and which effectively inhibits heat transfer. The panel comprises a shell preferably having insulating material therein. The shell is constructed in novel manner and the insulated panel has advantages which will be pointed out below. This application is a continuation of my copending application Serial No. 536,995, filed September 27, 1955 and now abandoned.

The shell of the insulated panel is preferably made of sheet material. The panel may be utilized either as a load bearing unit or as a non-load bearing unit, the material utilized for fabrication of the shell and the gauge thereof being selected accordingly. For purposes of explanation and illustration I shall describe an insulated panel having a shell made of formed sheet metal but the shell may in certain cases be made of other material such as plastic.

My insulated panel may comprise opposed facing elements which collectively form the shell of the panel. Preferably each of the facing elements has a body and flange means at the periphery of the body, the flange means of each facing element extending generally toward the other facing element and the flange means of each facing element being disposed in generally overlapping relationship to the flange means of the other facing element so that a space is provided which is largely confined by the opposed facing elements. Insulating material is desirably disposed in the space. The flange means of each facing element are preferably fastened to the flange means of the other facing element to maintain the integrity of the insulated panel. Desirably the flange means of each facing element are fastened to the flange means of the other facing element but are out of direct contact therewith and insulated therefrom. Means may be provided maintaining the opposed facing elements out of contact with each other while means are utilized fastening the opposed facing elements together with their respective flange means in spaced apart juxtaposition.

I may employ means including insulating spacers between the flange means of the respective facing elements fastening together in spaced apart juxtaposition the flange means of the respective facing elements and thereby maintaining the integrity of the insulated panel.

In a preferred form my insulated panel may comprise opposed facing elements each having a generally rectangular body and a flange portion of each edge of the body, the flange portion of each facing element extending generally toward the other facing element so that a space is provided which is largely confined by the opposed facing elements. Insulating material may be disposed in the space, and menas are preferably provided fastening the facing elements together in completely spaced apart juxtaposition. Each generally rectangular facing element body may have integral flange portions at two opposed edges thereof and welded-on flange portions at the other two opposed edges thereof. The flange portions of the respective elements are preferably fastened together in spaced apart juxtaposition so that the integrity of the insulated

panel is maintained while the opposed facing elements are completely out of contact with each other.

My insulated panel preferably comprises a panel-shaped shell with insulating material therein, the shell having at an edge thereof a flange portion extending along that edge and projecting in spaced relation to a portion of that edge generally transversely of the general plane of the panel to interfit with a flange portion of another panel in a structure in which the panels are employed. Preferably the shell has such a flange portion at each of two opposed edges thereof, the flange portions at the respective edges extending in opposite directions so that the panel may be interfitted with other similar panels by interengaging each of the flange portions with a flange portion of another panel. A plurality of flange portions may extend along an edge or each edge of the shell, each of such flange portions projecting in spaced relation to a portion of that edge generally transversely of the general plane of the panel so that the flange portions may interfit with simialr flange portions of another panel in a structure in which the panels are employed. Desirably one of the flange portions is disposed adjacent one face of the panel and the other flange portion is disposed adjacent the opposite face of the panel.

Other details, objects and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawings I have shown a present preferred embodiment of the invention in which

Figure 1 is a plan view of an insulated panel;

Figure 2 is an edge view of the panel shown in Figure 1 viewed from the bottom of Figure 1;

Figure 3 is an edge view of the panel shown in Figure 1 viewed from the right hand side of Figure 1;

Figure 4 is a cross-sectional view to enlarged scale taken on the line IV—IV of Figure 1;

Figure 5 is a fragmentary view showing in cross section to large scale a joint between two of the insulated panels;

Figure 6 is an enlarged fragmentary view of the right hand end of Figure 2; and

Figure 7 is an enlarged fragmentary view of the bottom of Figure 4.

Referring now more particularly to the drawings, Figures 1–4, 6 and 7 show one form of insulated panel designated generally by reference numeral 2 and Figure 5 shows fragmentarily in cross section a structure comprising panels 2 interfitting and sealed together.

Each insulated panel 2 comprises a shell 3 with insulating material 4 therein. Preferably the insulating material 4 substantially fills the shell 3 although the insulating material may be disposed in non-continuous arrangement with dead air spaces therein or in any other way in which the insulating value of the insulating material may be realized. Any suitable insulating material may be used. For purposes of example the illustrated material 4 may be considered to be fibrous glass in the form of so-called glass wool or in preformed bats cut to fit the shell.

The shell 3 comprises opposed facing elements 5 which in the structure shown are identical with a minor exception presently to be pointed out. It is not essential that the respective facing elements be so nearly identical and for certain purposes the facing element which is to be on the outside may be formed differently than the facing element which is to be on the inside. However, so far as their provision for interfitting with similar elements of adjacent panels is concerned they are identical.

Each facing element 5 comprises a body 6 with flange means at the periphery of the body. In the form shown the body 6 is substantially rectangular. At the ends of the body are integral flanges 7 and 8, the flange 7 being at one end and the flange 8 at the opposite end. At the sides of the body extending lengthwise of the body are

welded-on flanges 9 and 10, the flange 9 being at one side and the flange 10 at the opposite side. The flanges 9 and 10 applied to one of the facing elements 5 are applied in reverse position relatively to the flanges 9 and 10 which are applied to the other element 5 as shown in Figure 4. Each of the flanges 9 and 10 has a foot 11, a portion 12 connected with the foot 11 at one end thereof and extending substantially at right angles thereto, an inclined portion 13 extending from the portion 12 and an elongated portion 14 generally parallel to the portion 12. As clearly appears in Figures 4 and 7, in each flange 9 the portion 14 lies in a plane intersecting the foot 11 nearer one end of that foot than the other. Consequently when a flange 9 or 10 is applied to a facing element 5 with the portion 12 flush with the edge of the facing element as shown at the left hand side of Figure 4 the portion 14 of the flange will be closer to the edge of the shell or panel than when the flange 9 or 10 is applied in the reverse position as shown at the right hand side of Figure 4. Each of the flanges 9 and 10 is welded to the corresponding facing element 5 by a weld 15.

By reason of the different application of the welded-on flanges 9 and 10 to the respective facing elements 5 as above described the portions 14 of the flanges 9 and 10 of one of the facing elements 5 (the right hand facing element viewing Figures 4 and 7) will lie inside the portions 14 of the flanges 9 and 10 of the other facing element 5 (the left hand facing element viewing Figures 4 and 7) when the facing elements are disposed in opposed relationship with the flanges interfitting. The flanges 9 and 10 are so formed that when they are applied to the facing elements as just described the portions 14 thereof are spaced somewhat apart as shown in Figures 4 and 7. The portions 14 of the innermost flanges 9 and 10 each have a series of spaced apart holes 16 formed therein, which holes in the structure shown in the drawings are square, and the portions 14 of the outermost flanges 9 and 10 each have a series of spaced apart circular holes 17 formed therein, the holes 16 and 17 of the respective flanges being in opposed relationship. The holes 16 are of larger size than the holes 17. A grommet 18 of insulating material is applied to each pair of opposed holes 16 and 17, the shank 19 of each grommet 18 being generally square and passing through the corresponding hole 16 and the flange 20 of the grommet 18 lying between the portions 14 of the respective flanges 9 or 10 as the case may be to separate the same as shown in Figures 4 and 7. A self tapping screw 21 is passed through each hole 17 and screwed into the corresponding grommet 18 as shown in Figures 4 and 7, expanding the shank 19 of the grommet inside the inner flange. In this way the flanges 9 at one side of the shell or panel and the flanges 10 at the other side of the shell or panel are rigidly fastened together in relatively insulated spaced apart juxtaposition as shown in Figure 4. Figure 2 shows the spacing of the screws 21 along the shell or panel. Thereby the facing elements 5 are rigidly fastened together but completely out of contact with each other so that heat cannot be conducted directly from one facing element to the other.

As mentioned above the flanges 7 and 8 are shown as being formed integrally with the facing elements 5. It is not essential that those flanges be formed integrally with the facing elements as they may be welded thereto, but it is desirable to form the flanges integrally with the facing elements for lower cost and added assurance of weatherproofness. Each flange 7 has an inwardly projecting portion 22 of double thickness as shown in Figures 2 and 6 and then extends along the inside of the facing element 5 at 23 and thence inwardly at 24 parallel to the portion 22, thence diagonally inwardly and away from the portion 22 at 25 and thence inwardly at 26 generally parallel to the portion 22. The flange thus provides an inwardly open pocket 27. Each flange 8 extends inwardly at 28, thence longitudinally at 29 and thence outwardly and inwardly to form a double thickness portion 30 and an inwardly extending portion 31 extending inwardly therefrom. Thus each flange 8 forms an outwardly open pocket 32. Each pocket 27 is inwardly open in the sense that it opens from one face of the shell toward the opposite face of the shell and each pocket 32 is outwardly open in the sense that it opens at one face of the shell away from the opposite face of the shell.

The two substantially identical facing elements 5 are relatively positioned as shown in Figure 2 with the portion 26 of the flange 7 of each inside the portion 31 of the flange 8 of the other and spaced therefrom, similarly to the relationship between the portions 14 of the flanges 9 or 10 as above described. The flange portions 26 and 31 are connected together by self-tapping screws 33 and insulating grommets 34, the connections being identical with the connections effected by the self-tapping screws 21 and insulating grommets 18 described above. A number of screws 33 and grommets 34 are utilized at intervals along the shell or panel as shown in Figures 1 and 3 and thereby cooperate with the screws 21 and grommets 18 in rigidly fastening together the facing elements 5 as above described. At no point are the facing elements in contact with each other so they cannot conduct heat directly from one to the other. A negligible amount of heat may be conducted through the grommets 18. The bodies of the facing elements and the flanges thereof cooperate to maintain the insulating material 4 in place in the shell.

The insulated panels are adapted for either inside or outside use, being adapted to interfit and be sealed together which renders them especially suitable for outside application. Figure 5 shows in horizontal cross section a vertical joint between two of the panels. The flange portion 22 of each panel enters the pocket 32 of the other panel, sealing material 35 being provided to effect a weather-tight seal between the panels and at the same time maintain each panel completely out of thermoconductive relationship to each other panel. Thus not only are the facing elements of each panel completely out of contact with each other but each panel is completely out of contact with each other panel when the panels are assembled and interfitted yet the panels are sealed together in weatherproof manner both at the inside and at the outside of the structure.

The panels are adapted to sustain loads, their formation with the flanges 7 and 8 affording considerable rigidity and vertical strength. A structure made up of a number of the panels interfitted as shown in Figure 5 may constitute the entire wall of a building with the outside surface of the structure and of the panels constituting the outside surface of the building exposed to the elements and the inside surface of the structure and of the panels constituting the inside surface of the building. The inside surface may be decorated in any desired manner as by painting, papering, veneering, etc. The panels effectively inhibit heat transfer and the joints between panels form an effective weather-tight seal. The panels may be provided in any desired length depending upon the vertical extent of the structure.

While I have shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A generally rectangular insulated panel comprising a panel-shaped shell comprising opposed facing elements of sheet-like material each having a body having at each of two opposed edges thereof a formation extending generally normal to the panel adapted to interfit with a complementary formation of a similar panel when the panels are assembled in generally edge-to-edge cooperative relationship, making a total of four such formations on the

panel, two of said four formations being of male form extending generally normal to the panel adapted to interfit with complementary female formations of a similar panel and the other two of said four formations being of female form extending generally normal to the panel adapted to interfit with complementary male formations of a similar panel, insulating material between the facing elements, the respective facing elements having flanges extending substantially continuously along said opposed edges from and integral with said formations generally inwardly of the panel and overlapping, and means including insulating means fastening together said overlapping flanges while maintaining the same insulated from each other, the facing elements having at the other two edges of the panel flanges retaining the insulating material in the panel.

2. A generally rectangular insulated panel comprising a panel-shaped shell comprising opposed facing elements of sheet-like material each having a body having at each of two opposed edges thereof a formation extending generally normal to the panel adapted to interfit with a complementary formation of a similar panel when the panels are assembled in generally edge-to-edge cooperative relationship, making a total of four such formations on the panel, two of said four formations being of male form each comprising a projection comprising a plurality of thicknesses of the sheet-like material extending generally normal to the panel adapted to interfit with complementary female formations of a similar panel and the other two of said four formations being of female form each comprising a generally U-shaped socket extending generally normal to the panel adapted to interfit with complementary male formations of a similar panel, insulating material between the facing elements, the respective facing elements having flanges extending substantially continuously along said opposed edges from and integral with said formations generally inwardly of the panel and overlapping, and means including insulating means fastening together said overlapping flanges while maintaining the same insulated from each other, the facing elements having at the other two edges of the panel flanges retaining the insulating material in the panel.

3. A generally rectangular insulated panel comprising a panel-shaped shell comprising opposed facing elements of sheet-like material each having a body having at each of two opposed edges thereof a formation extending generally normal to the panel adapted to interfit with a complementary formation of a similar panel when the panels are assembled in generally edge-to-edge cooperative relationship, one of such formations at each edge of the panel having an inwardly projecting portion of double thickness, a portion adjacent thereto extending along the

inside of the facing element and thence inwardly generally parallel to the double thickness portion, thence diagonally inwardly and away from the double thickness portion and thence inwardly generally parallel to the double thickness portion providing a connecting portion, the other of such formations extending inwardly, thence longitudinally, thence outwardly and inwardly to form a double thickness portion and a connecting portion extending inwardly therefrom, insulating material between the facing elements, the connecting portions extending substantially continuously along said respective edges of the facing elements and overlapping, and means including insulating means fastening together the overlapping connecting portions while maintaining the same insulated from each other, the facing elements having at the other two edges of the panel flanges retaining the insulating material in the panel.

4. A generally rectangular insulated panel comprising a panel-shaped shell comprising opposed facing elements of shell-like material each having a body having at each of two opposed edges thereof a formation extending generally normal to the panel adapted to interfit with a complementary formation of a similar panel when the panels are assembled in generally edge-to-edge cooperative relationship, one of such formations at each edge of the panel having an inwardly projecting portion of double thickness, a portion adjacent thereto extending along the inside of the facing element and thence inwardly generally parallel to the double thickness portion, thence generally longitudinally away from the double thickness portion and thence inwardly generally parallel to the double thickness portion providing a connecting portion, the other of such formations extending inwardly, thence longitudinally, thence outwardly and inwardly to form a double thickness portion and a connecting portion extending inwardly therefrom, insulating material between the facing elements, the connecting portions extending substantially continuously along said respective edges of the facing elements and overlapping, and means including insulating means fastening together the overlapping connecting portions while maintaining the same insulated from each other, the facing elements having at the other two edges of the panel flanges retaining the insulating material in the panel.

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