Oct. 12, 1954 S. B. ROBERTS 2,691,292

PREFABRICATED PANEL

Filed July 7, 1949

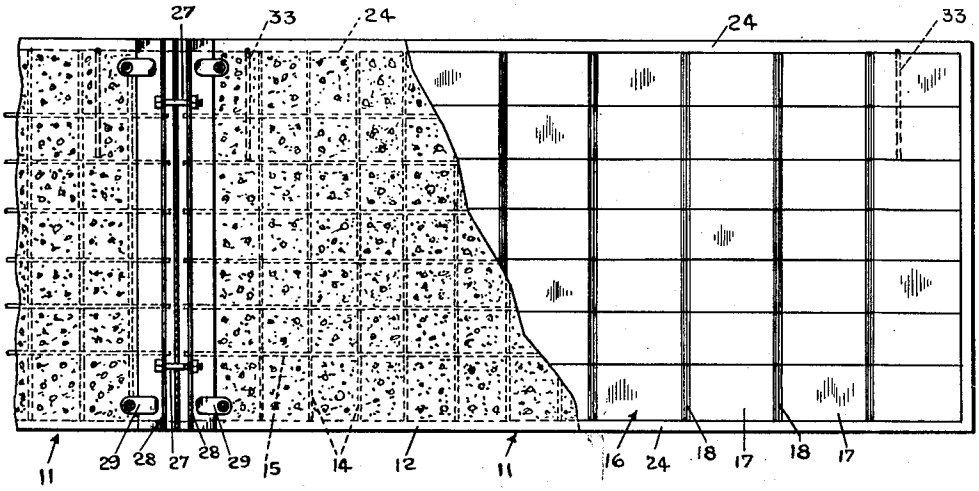


Fig. 1

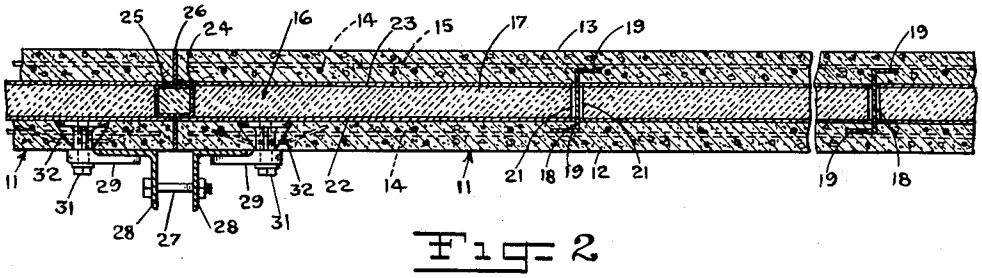


Fig. 2

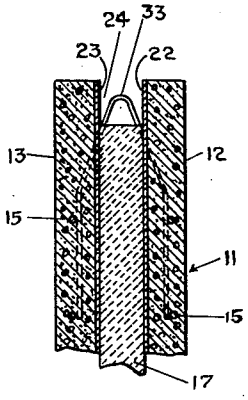


Fig. 3

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Patented Oct. 12, 1954

2,691,292

UNITED STATES PATENT OFFICE

2,691,292

PREFABRICATED PANEL

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Application July 7, 1949, Serial No. 103,336

3 Claims. (Cl. 72—16)

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This invention relates to prefabricated panels and relates more particularly to prefabricated panels that have a high insulating value and are substantially impervious to the passage of moisture.

One of the major problems encountered in the construction of an insulated structure from prefabricated panels is the ease relatively speaking, with which moisture passes through or is formed within said panels. If no means for preventing the passage of moisture through the panels are provided, or if the means provided are not adequate, warm, moist air from the interior of the structure will pass outwardly through said panels. In cold weather, the temperature of the warm, moist air drops during its passage through the panels, causing the moisture to be condensed and deposited within the panels. The condensed moisture seriously impairs the insulating value of the panels and may also cause a structural weakening thereof by inducing decay and rust. In extremely cold weather, the condensed moisture will freeze, causing the panels to crack.

It is an important object of this invention to provide prefabricated panels which will be free from the foregoing and other disadvantages of prior prefabricated panels and which will be especially simple in construction and efficient in use.

A further object of this invention is the provision of prefabricated panels that have a high insulating value and are substantially impervious to the passage of moisture, which panels are strong and light, and may be readily produced and quickly assembled to form an insulated structure.

Other objects of this invention, together with certain details of construction and combinations of parts, will be apparent from the following detailed description and claims.

In accordance with my invention, there is provided a prefabricated panel constructed of outer layers of reinforced concrete and a central layer of glass slabs having therein a myriad of tiny, air-filled cells separated from each other by thin glass walls, hereinafter designated "cellular glass." The cellular glass slabs have a high insulating value and are substantially impervious to the passage of moisture, which properties they impart to the prefabricated panels into which they are incorporated. However, the cellular glass slabs are easily crushed, particularly when subjected to a tensile or shearing stress, in which case their insulating value and moisture resistance are destroyed. To prevent such crushing stresses from being applied to the cellular glass slabs when the prefabricated panel is subjected to a load, my invention contemplates that said cellular glass slabs be positioned between expanded metal members having flanges, which are embedded in the outer layers of the panel, with the concrete of said outer layers extending through and interlocking with the apertures in the expanded metal. The expanded metal members take up the crushing stresses, which would otherwise be applied to the cellular glass slabs, thereby avoiding any loss in the insulating value or the moisture resistance of said slabs. In assembling the prefabricated panels, the cellular glass slabs are spaced from the expanded metal members, so as to prevent the edges of said slabs from being crushed when the members flex under load. As additional means for preventing crushing stresses from being applied to the cellular glass slabs, a layer of a material capable of plastic flow such as, for example, a mastic composition is interposed between the outer layers of concrete and the cellular glass slabs. The mastic composition prevents any bonding between the concrete in the outer layers and the cellular glass slabs and permits said slabs to shift relative to the outer layers when the prefabricated panel is subjected to a load.

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A preferred embodiment of my invention is illustrated in the accompanying drawing wherein,

Fig. 1 is a front elevational view showing two panels assembled to form a portion of a wall,

Fig. 2 is a cross-sectional view, on an enlarged scale, of the wall shown in Fig. 1, and

Fig. 3 is a detail view showing the hooks, by means of which the panels are lifted.

Referring now to the drawing, each panel, generally indicated by reference numeral 11, comprises outer layers 12 and 13 of concrete in which reinforcing rods 14 and 15 are embedded to increase the load carrying capacity thereof. Between the layers 12 and 13 there is a layer 16 of cellular glass slabs 17, which are positioned between expanded metal members 18 having flanges 19, which are firmly embedded in the concrete of the layers 12 and 13, with the concrete of said layers extending through and interlocking with the apertures in the expanded metal. A clearance 21 is provided between the expanded metal members 18 and the edges of the cellular glass slabs 17 to prevent the edges of said slabs from being crushed when the expanded metal members flex under load. As additional means for preventing crushing stresses from being applied to the cellular glass slabs 17, layers 22 and 23 of a mastic composition are interposed between the layers 12 and 13 and the cellular glass slabs 17.

The outer layers 12 and 13 extend beyond the central layer 16 forming a groove 24, which ex-

tends completely around the periphery of the prefabricated panel 11. When a plurality of the prefabricated panels 11 are assembled, a spline 25 of cellular glass is inserted between the panels in the grooves 24 and the joint between said panels is completed by grouting the same with a mastic composition 26. The prefabricated panels 11 are tied together with bolts 27 extending through vertical girts 28, which are fastened to said panels by clamps 29 and bolts 31 engaging anchors 32 in each corner of the outer layer 12. Hooks 33, which are positioned in the groove 24 and whose ends are engaged in the concrete of the layers 12 and 13, are provided to permit the prefabricated panels 11 to be handled easily during their assembly.

The prefabricated panel 11 of this invention is preferably produced in a horizontal mold in which its several layers are successively formed. Then, after the concrete in the outer layers 12 and 13 sets, the prefabricated panel 11 is removed from the mold and is ready for use in the erection of insulated structures.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. A prefabricated panel, comprising outer layers of reinforced concrete, a central layer of spaced-apart cellular glass slabs between said layers of reinforced concrete, layers of a mastic composition between said outer concrete layers and said cellular glass slabs, and flanged apertured expanded metal members between said cellural glass slabs, the construction and arrangement being such that the flanges of said expanded metal members are embedded in the outer layers in such a manner that the concrete of the outer layers extends through and interlocks with the apertures in the expanded metal, said expanded metal members being spaced from the cellular glass slabs to prevent the edges of said slabs from being crushed when the expanded metal members flex under load and said mastic layers preventing the concrete from entering the spaces around said expanded metal members between said glass slabs.

2. A prefabricated panel, comprising outer layers of reinforced concrete, a central layer of spaced-apart cellular glass slabs between said layers of reinforced concrete, said outer concrete layers extending past the edges of said central layer to form a groove at the periphery of the prefabricated panel, layers of a mastic composition between said outer concrete layers and said cellular glass slabs, and flanged apertured expanded metal members between said cellular glass slabs, the consrtuction and arrangement being such that the flanges of said expanded metal members are embedded in the outer layers in such a manner that the concrete of the outer layers extends through and interlocks with the apertures in the expanded metal, said expanded metal members being spaced from the cellular glass slabs to prevent the edges of said slabs from being crushed when the expanded metal members flex under load and said mastic layers preventing the concrete from entering the spaces around said expanded metal members between said glass slabs.

3. A prefabricated panel, comprising outer layers of reinforced concrete, a central layer of spaced-apart cellular glass slabs between said layers of reinforced concrete, said outer concrete layers extending past the edges of said central layer to form a groove extending completely around the periphery of the prefabricated panel, lifting hooks positioned in the groove and having their ends embedded in the concrete of the outer layers, layers of a mastic composition between said outer concrete layers and said cellular glass slabs, and flanged apertured expanded metal members between said cellular glass slabs, the construction and arrangement being such that the flanges of said expanded metal members are embedded in the outer layers in such a manner that the concrete of the outer layers extends through and interlocks with the apertures in the expanded metal, said expanded metal members being spaced from the cellular glass slabs to prevent the edges of said slabs from being crushed when the expanded metal members flex under load and said mastic layers preventing the concrete from entering the spaces around said expanded metal members between said glass slabs.

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