Feb. 11, 1941. K. T. NYSTROM 2,231,216

INSULATED PANEL

Filed Dec. 31, 1938

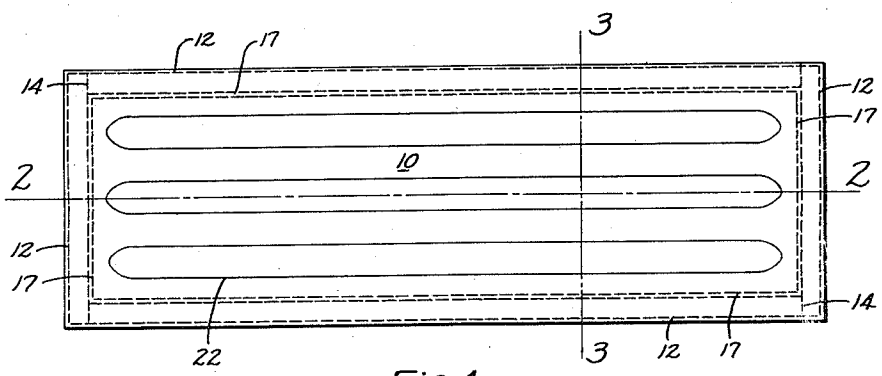


Fig. 1

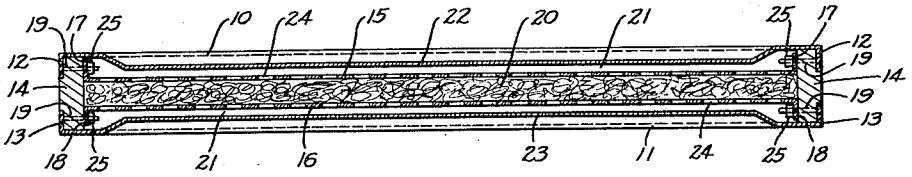


Fig. 2

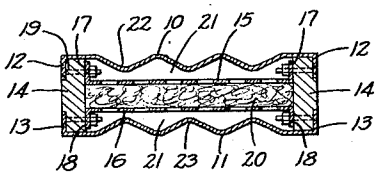


Fig. 3

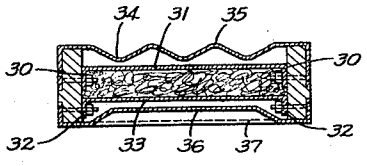


Fig. 4

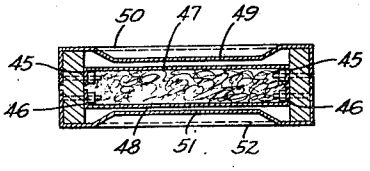


Fig. 5

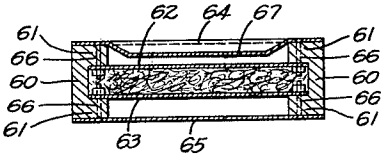


Fig. 6

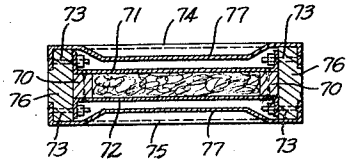


Fig. 7

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INSULATED PANEL

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Application December 31, 1938, Serial No. 248,858

2 Claims. (Cl. 189—34)

The invention relates to insulated panels, such as are commonly used on refrigerator cars. Refrigerator cars usually have a doorway in each side wall and insulated doors adapted to close the doorways. Hatches are also usually provided in the roof of a refrigerator car for the loading of refrigerant and the panel hereinafter described may be adapted for use as a hatch plug for closing the hatches and doorways. Panels of the type described may also be used for floor, walls, or roof of a refrigerator car.

It is an object of this invention to provide a well insulated panel. There is usually a difference in temperature between the inside and outside of a refrigerator car, the inside being colder during summer when the car is used under refrigeration and the outside being colder during winter when the car is supplied with heat. It is a further object of the invention to provide a substantially metal panel in order to obtain strength and endurance, and a further object to insulate metal parts from each other. Metal is a very good conductor of heat and an unobstructed path of metal for the floor of heat between the inside and the outside would detract to a considerable extent from the efficiency of the car as a refrigerator or as a heater.

Another object of the invention is to provide a panel which may be easily assembled. A feature which contributes to ease of assembly is the insulation retainer which also functions as a jig for assembly purposes.

A further object of the invention is to provide an air space adjacent the insulation. If an object has a temperature below the dew point of the air in contact therewith, moisture will be condensed from the air upon said object. Since the efficiency of insulation is greatly impaired by moisture, I have provided retainer plates which space the insulation from the bounding plates, thereby preventing contact between the insulation and cold plates with the consequent dampening of the insulation by condensation.

Other advantages of my invention will be apparent from the following description by referring to the drawing in which:

Fig. 1 is a plan view of a panel.

Figs. 2 and 3 are sections on lines 2—2 and 3—3 respectively.

Figs. 4, 5, 6 and 7 show modified constructions.

In the construction shown in Figs. 1 to 3, the metallic sheets 10—11 are provided with flanges 12—13 which preferably extend completely around the plates 10—11. Insulating members 14 are made of wood, fibre or other material having both great strength and low thermal conductivity. A pair of spaced apart metallic plates 15—16 are disposed between the sheets 10—11 and are provided with flanges 17—18. The bolts 19, or other fastening means, preferably extend completely through the members 14 and secure the flanges 12—13 and the flanges 17—18 thereto. The nuts 25 which engage the bolts 19 should be welded to the flanges 17—18 to facilitate assembly.

In actual service, the sheets 10 and 11 would be at different temperatures and are insulated from each other by the members 14, thus retarding heat conductivity through the panel. Insulation 20 is provided between the plates 15—16 and the air spaces 21 protect the insulation 20 from moisture which may condense on the inside surfaces of the sheets 10—11. The sheets 10—11 are preferably provided with corrugations 22—23 to increase the stiffness thereof and the plates 15—16 may have perforations 24 to decrease the weight thereof.

Fig. 4 shows a modification in which the flange 30 of the plate 31 projects in the same direction as the flange 32 of the plate 33. The corrugations 34 in the sheet 35 are shown extending parallel with the long side of the panel, while the corrugations 36 in the sheet 37 extend transversely to the long side of the panel.

In Fig. 5 the flanges 45—46 of the plates 47—48 project toward each other. The corrugations 49 in the sheet 50 and the corrugations 51 in the sheet 52 extend transversely to the long side of the panel.

In the modification shown in Fig. 6 the members 60 have the parts 61 which project beyond the plates 62—63. The sheets 64—65 are secured by the bolts 66 through the parts 61 of the members 60, said bolts also securing the plates 62—63. The sheet 64 is shown with the corrugations 67 extending transversely to the long side of the panel.

Fig. 7 shows a panel having pieces 70 disposed between and secured to the plates 71—72. The pieces 70 serve to space apart the plates 71—72 so as to facilitate the insertion of the bolts 73 which secure the plates 71—72 and sheets 74—75 to the members 76. Transversely extending corrugations 77 are shown in the sheets 74—75.

The accompanying drawing illustrates the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and de-

scribed, as it is obvious that various modifications thereof, within the scope of the claims, will occur to persons skilled in the art.

I claim:

1. A panel comprising a pair of substantially parallel spaced apart metallic sheets, a pair of spaced apart foraminous plate members between said sheets in spaced relation thereto, insulation between said plate members and insulating members secured to the marginal portions of said sheets and said plate members and arranged to maintain said spaced apart relations, said panel being substantially free of heat conducting means between said sheets and plate members.

2. A panel comprising a pair of substantially parallel spaced apart foraminous plate-like members, insulation between said members, a metallic sheet spaced outwardly from each of said members, insulating members interposed between the marginal portions of said sheets, and means to secure said sheets and said plate-like members to said insulating members comprising nuts welded to said plate-like members and bolts extending through said sheets and said insulating members and engaged with said nuts, said plate-like members having outwardly projecting flanges arranged to space said sheets so that the bolts may be inserted in engagement with said nuts.

KARL T. NYSTROM.