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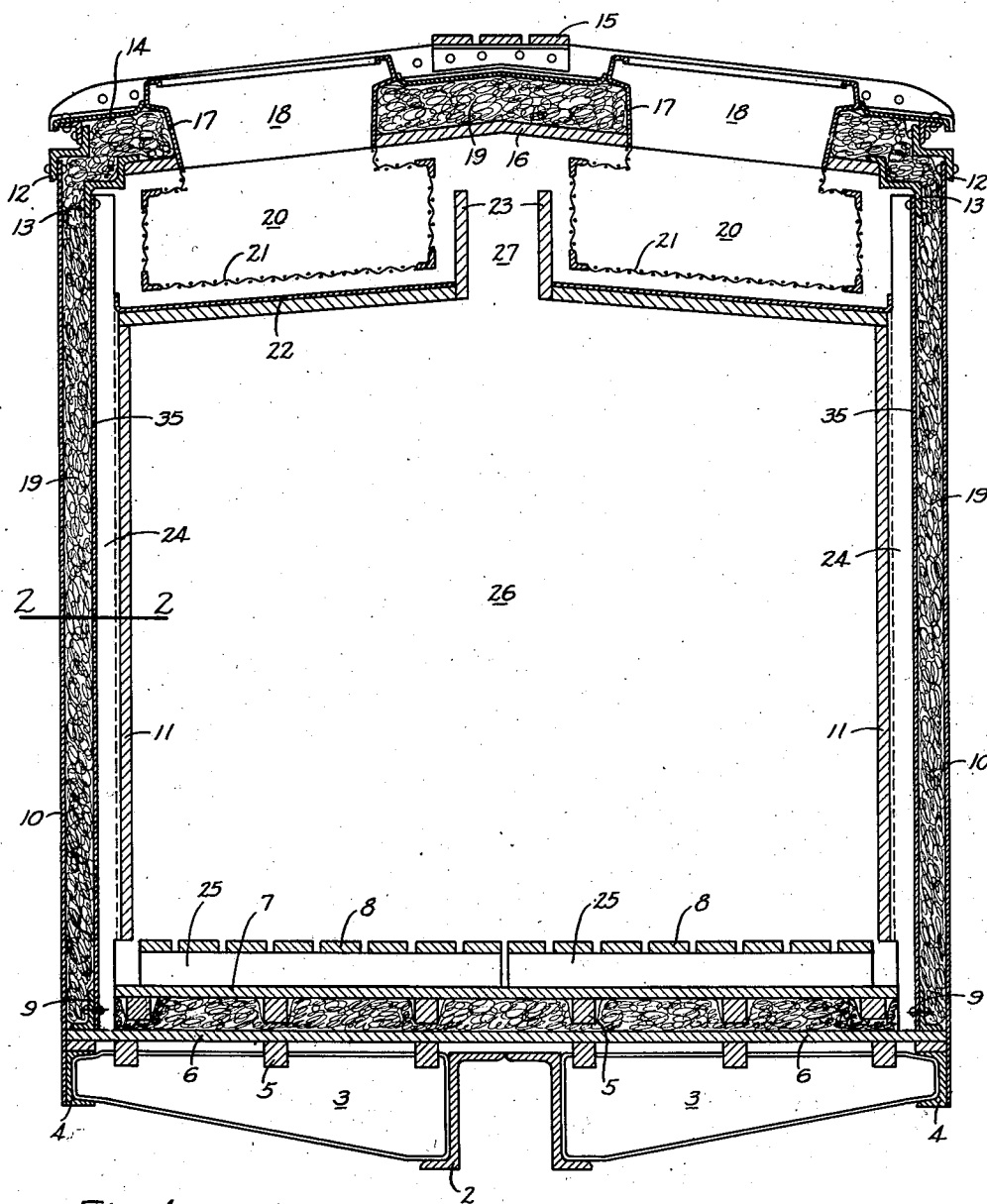
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2,184,819

REFRIGERATOR CAR

Filed Oct. 21, 1938

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

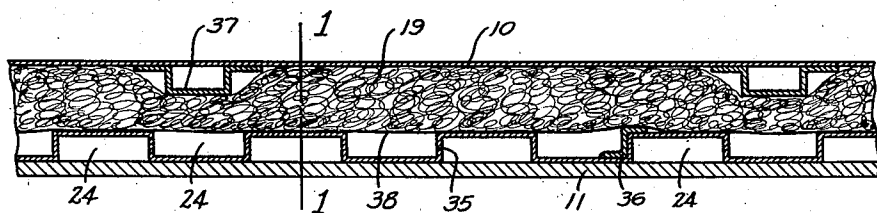


Fig. 2

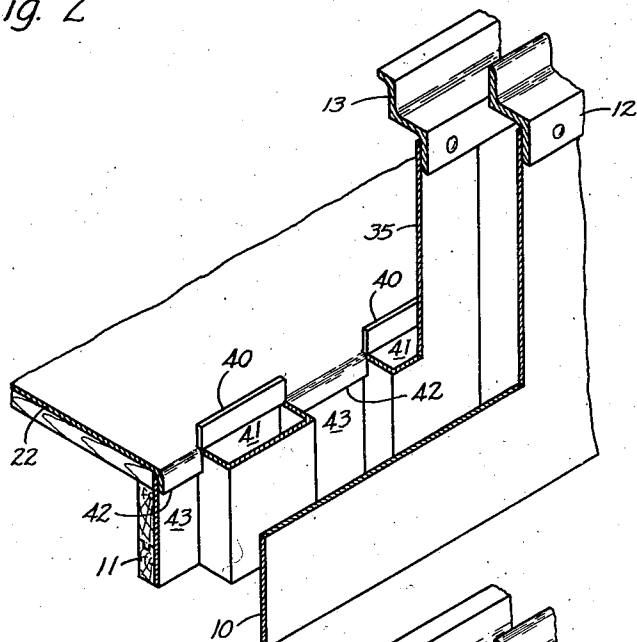


Fig. 3

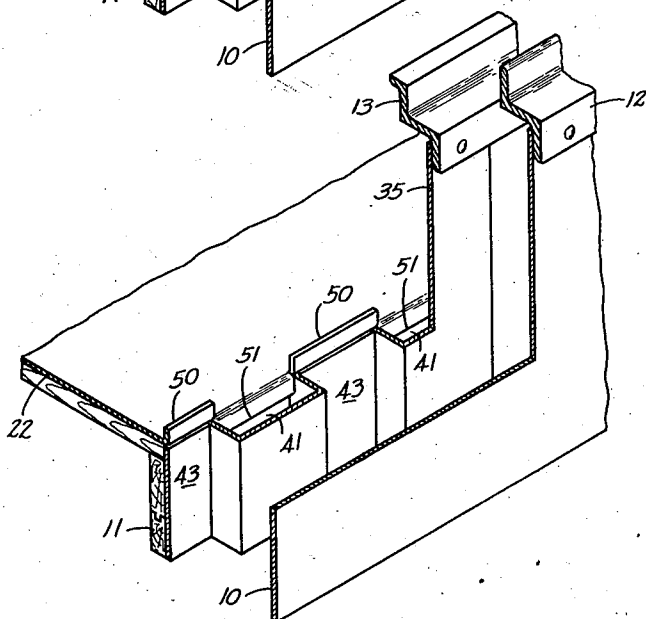


Fig. 4

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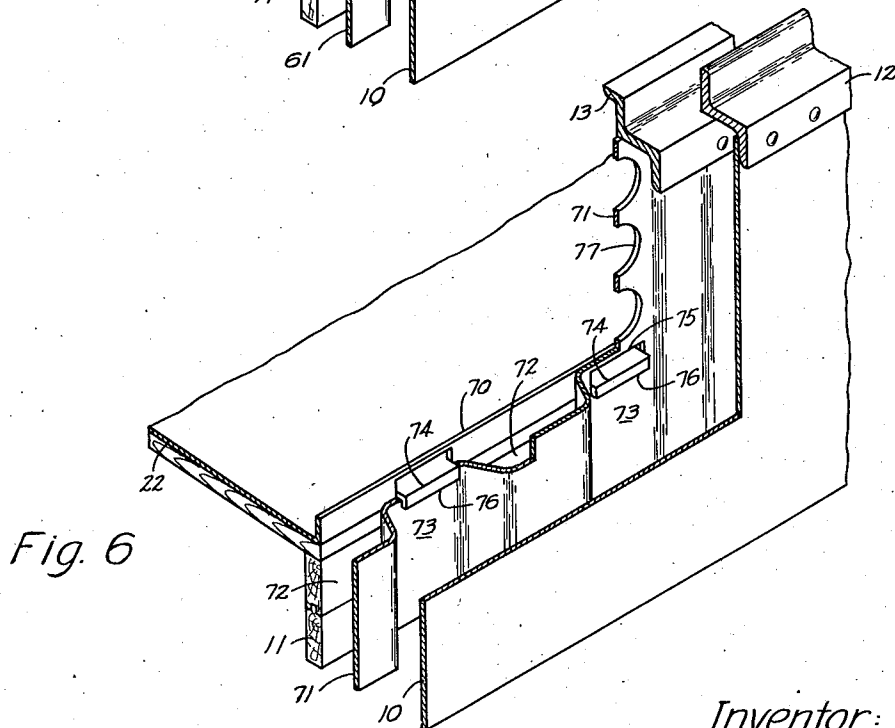
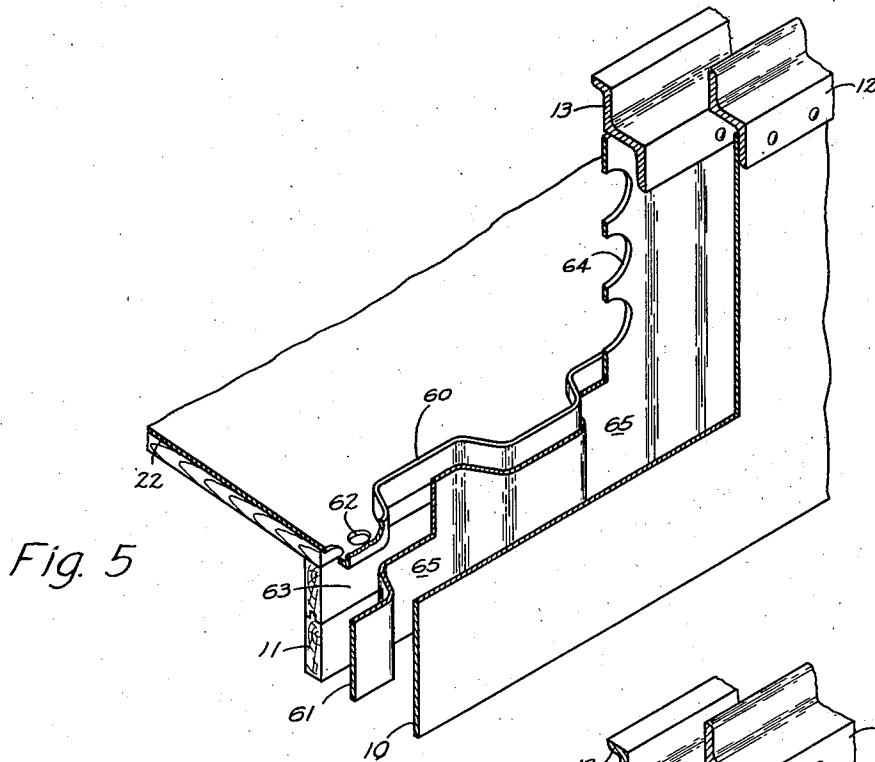
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,184,819

REFRIGERATOR CAR

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ware

Application October 21, 1938, Serial No. 236,150

12 Claims. (Cl. 62—17)

This invention relates to refrigerator cars used to transport perishable commodities at a predetermined temperature. A refrigerator car comprises an insulated body; i. e., insulated floor, walls and roof and cooling means when used in summer or heating means when used in winter.

This invention applies particularly to cars in which the cooling means, preferably containers for water ice, eutectic ice, brine or dry ice are suspended immediately below the ceiling of the car. The lading is supported in spaced relation to the floor of the car by a foraminous rack. Flues, preferably associated with the side walls of the car, communicate between the refrigerant compartment and the space under the foraminous rack to provide a path for the circulation of air. The path is from the refrigerant compartment downwardly through the aforementioned flues, through the space under the foraminous rack, and upwardly through the lading compartment to the refrigerant compartment.

It is an object of this invention to use a corrugated plate for the double purpose of supporting, or partially supporting, a wall and of providing vertical flues for the circulation of air. The plate may be relatively thick to provide the main support for the wall or it may be of relatively thin material reinforced by separate stiffeners.

Another object of the invention is to combine the support for the wall with the flue, thus reducing the overall thickness of the wall by eliminating the conventional frame members. This reduced wall thickness may be used to great advantage to increase the inside width of the car, to decrease the outside width, or to increase the amount of insulation within the wall.

A further object is to utilize substantially the entire length of the car for the flue. There is a certain required flue area for efficient refrigeration so if the length is increased the width may be decreased and, therefore, the wall thickness decreased with the aforementioned advantages.

It is another object of the invention to use only certain of the flues for draining moisture from the refrigerant containers. With certain types of wall construction it may be desirable to keep the lining of the car dry. In this case, only the flues remote from the lining may be used for draining purposes since the amount of liquid to be drained is usually so small that only a few flues are required. In other types of wall construction, flues remote from the insulation may be used for draining liquid, thus eliminating the necessity of

providing a waterproof protection for the insulation.

Another object of the invention is to prevent the accumulation of air and liquid at one end of the car. Trains now travel at high speeds and cold air and water have an inertia which causes them to accumulate at the rear of the car if means is not provided to prevent them from doing so. A plurality of vertical flues thus prevents the front end of the car receiving less refrigeration and prevents flooding the rear of the car by distributing the air and liquid uniformly throughout the length of the car.

In the drawings:

Fig. 1 is a transverse section of a refrigerator car embodying my invention. The section is on line 1—1 of Fig. 2.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary perspective view of the car shown in Fig. 1 but with the insulation omitted.

Figs. 4 to 6 are views similar to Fig. 3 showing modified constructions.

The parts of the refrigerator car shown in Fig. 1 are center sill 2; cross members 3 of the under-frame outer side sills 4; floor stringers 5; sub-floor 6; main floor 7; floor rack 8; inner side sills 9; side sheathing 10; side lining 11; outer side plates 12; inner side plates 13; roof 14; running board 15; ceiling 16; hatch frames 17 surrounding the hatches 18 and insulation 19. The refrigerant compartment 20 containing refrigerant containers 21 is immediately below the ceiling and is defined by the drip pan 22 and the center flue wall 23. Air circulation in the type of car illustrated is from the refrigerant compartment 20 downwardly through the side flues 24, through the space 25 under the floor rack 8, upwardly through the lading compartment 26 where it absorbs heat from the lading, and finally through the center duct 27 to the refrigerant compartment 20.

The flues 24 are formed by a corrugated plate 35 which is secured at the bottom to the inner side sill 9 and at the top to the inner side plate 13. The plate 35 may be thick enough so that it supports the wall or it may be a relatively thin sheet reinforced by stiffeners 36. The members 37 are stiffeners for the outer sheathing. It may be desirable to use a thin metallic sheet or sheet of Sisalkraft paper 38 to protect the insulation.

Fig. 3 shows an arrangement intended to protect the lining 11 from moisture. The drip pan 22 has upturned flanges 40 adjacent the flues 41 and downturned flanges 42 adjacent the flues 43.

The flanges 40 prevent liquid from entering the flues 41 adjacent the lining 11 and divert it to the flues 43, thus keeping the lining dry. All flues are open at both upper and lower ends to allow air circulation.

In the modification shown in Fig. 4 the upturned flanges 50 are adjacent the flues 43, while the downturned flanges 51 are adjacent the flues 41. This arrangement diverts the liquid to the flues 41 which are remote from the insulation, thus assuring that the efficiency of the insulation will not be reduced by its becoming moist.

Fig. 5 shows a modification in which the edge of the drip pan 22 is provided with a continuous upturned flange 60 which has a contour such that it nests in the corrugations of the plate 61. Openings 62 are provided in the drip pan above the flues 63 which are adjacent the lining 11. The openings 62 are for entrance of both air and liquid to the flues 63. Apertures 64 provide a path for air circulation from the refrigerant compartment to the flues 65. With this arrangement, all liquid is diverted to the flues 63 through the openings 62, while air flows through flues 63 and 65 by way of the openings 62 and apertures 64.

Fig. 6 shows the drip pan 22 having a straight continuous flange 70. The plate 71 is corrugated to provide the flues 72 adjacent the lining 11 and the flues 73 remote from the lining 11. The flange 70 is slit adjacent the flues 73 to provide tongues 74 which protrude through openings 75 in the plate 71. The tongues 74 are provided with depending flanges 76 so that liquid from the refrigerant compartment may flow through the openings 75 and downwardly through the flues 73. Apertures 77 in the plate 71 provide a path for air circulation through the flues 73. With this arrangement, liquid flows through the flues 73 by means of the openings 75, while air flows through flues 73 and 72 by means of the apertures 77 and the space above the flange 70 respectively.

The accompanying drawings illustrate 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 described, 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. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment in combination with a vertically disposed plate having portions in one plane alternating with portions in a parallel plane, said portions being connected by webs which cooperate with said portions to form vertical stiffeners to support said wall, said portions and webs forming a plurality of vertical flues communicating between said compartment and said space for circulation of air, and means to also utilize certain of said flues to drain liquid from said container.
2. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment in combination with a vertically disposed plate having portions in one plane alternating with portions in a parallel plane, said portions being connected by webs, vertical stiffen-

ers associated with said plate to support said wall, said portions and webs forming a plurality of vertical flues communicating between said compartment and said space for circulation of air, and means to also utilize certain of said flues to drain liquid from said container.

3. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment, the combination of a plate associated with one of said walls and being formed with alternating and oppositely projecting vertically disposed corrugations which form a plurality of flues communicating between said compartment and said space, and means associated with said drip pan to divert liquid from said container to certain of said flues.

4. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment, said wall comprising a sheathing, insulation adjacent said sheathing, and a plate adjacent said insulation, said plate being formed with alternating and oppositely projecting vertically disposed corrugations which form a plurality of flues communicating between said compartment and said space, and means associated with said drip pan to prevent liquid from entering certain of said flues.

5. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment, said wall comprising a sheathing, insulation adjacent said sheathing, a plate adjacent said insulation and lining adjacent said plate, said plate being formed with alternating and oppositely projecting vertically disposed corrugations which form a plurality of flues between said insulation and lining and communicating between said compartment and said space, and means associated with said drip pan to prevent liquid from entering the flues adjacent said insulation.

6. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment, said wall comprising a sheathing, insulation adjacent said sheathing, a plate adjacent said insulation and lining adjacent said plate, said plate being formed with alternating and oppositely projecting vertically disposed corrugations which form a plurality of flues between said insulation and lining and communicating between said compartment and said space, means associated with said drip pan to prevent liquid from entering the flues adjacent said lining.

7. A structure as defined in claim 3 wherein said drip pan is provided with an upstanding flange adjacent said plate, said flange having openings adjacent said certain flues for flow of liquid therethrough.

8. A structure as defined in claim 3 wherein said drip pan is provided with an upstanding

flange formed to nest in said corrugations, said drip pan having openings communicating with said certain flues for flow of liquid therethrough.

9. In a refrigerator car having insulated floor, roof and walls, a floor rack supported in spaced relation to said floor to provide a space therebetween, a substantially horizontal drip pan below said roof to provide a refrigerant compartment therebetween, and a refrigerant container within said compartment, the combination of a plate associated with one of said walls and being formed with alternating and oppositely projecting vertically disposed corrugations which form a plurality of flues communicating between said compartment and said space, and means associated with said drip pan to prevent liquid from entering certain of said flues, said means comprising upstanding flanges on said drip pan adjacent said certain flues.
10. In combination with the roof, floor and a wall of a refrigerator car, said wall comprising a side plate, a side sill, and a metallic plate extending therebetween and secured thereto; a refrigerant container adjacent the roof of the car, a rack spaced from the floor to support the lading, said rack being foraminous to provide distribution of refrigerated air to the lading space, means providing a plurality of flues in one of the car walls, the lower ends of which communicate with the space between the floor and floor rack, said means comprising vertically disposed alternating and oppositely projecting corrugations in said metallic plate, and an enclosing structure for said refrigerant container substantially closed except for discharge openings for cold air leading to said wall flues, and an air inlet at a higher elevation than the discharge openings, whereby air cooled by the refrigerant is compelled to pass downwardly through the wall flues into the space under the lading, whence it is distributed by the foraminous floor rack throughout the lading space.
11. In combination with the roof, and a wall of a refrigerator car, said wall comprising a side plate, a side sill, and a metallic plate extending therebetween and secured thereto; a refriger-

ant container adjacent the roof of the car, a rack spaced from the floor to support the lading, said rack being foraminous to provide distribution of refrigerated air to the lading space, means providing a plurality of flues in one of the car walls, the lower ends of which communicate with the space between the floor and floor rack, said means comprising vertically disposed alternating and oppositely projecting corrugations in said metallic plate, and an enclosing structure for said refrigerant container substantially closed except for discharge openings for cold air and liquid leading to said wall flues, and an air inlet at a higher elevation than the discharge openings, whereby air cooled by the refrigerant is compelled to pass downwardly through the wall flues into the space under the lading, whence it is distributed by the foraminous floor rack throughout the lading space.

12. In combination with the roof, floor and wall of a refrigerator car, said wall comprising a side plate, a side sill, and a metallic plate extending therebetween and secured thereto; a refrigerant container adjacent the roof of the car, a rack spaced from the floor to support the lading, said rack being foraminous to provide distribution of refrigerated air to the lading space, means providing a plurality of flues in one of the car walls, the lower ends of which communicate with the space between the floor and floor rack, said means comprising vertically disposed alternating and oppositely projecting corrugations in said metallic plate, and an enclosing structure for said refrigerant container substantially closed except for discharge openings for cold air leading to said wall flues, and an air inlet at a higher elevation than the discharge openings, whereby air cooled by the refrigerant is compelled to pass downwardly through the wall flues into the space under the lading, whence it is distributed by the foraminous floor rack throughout the lading space, and means to also utilize some of said flues to conduct liquid from said enclosing structure to the lower part of the car.

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