

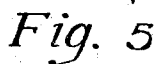
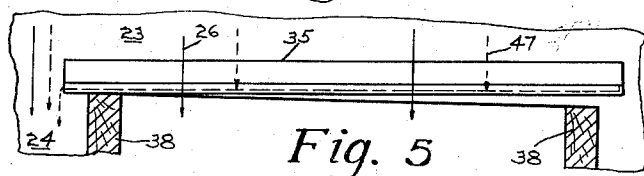
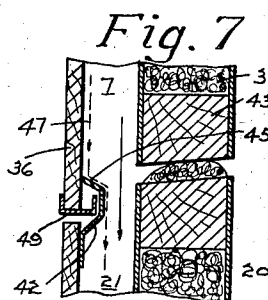
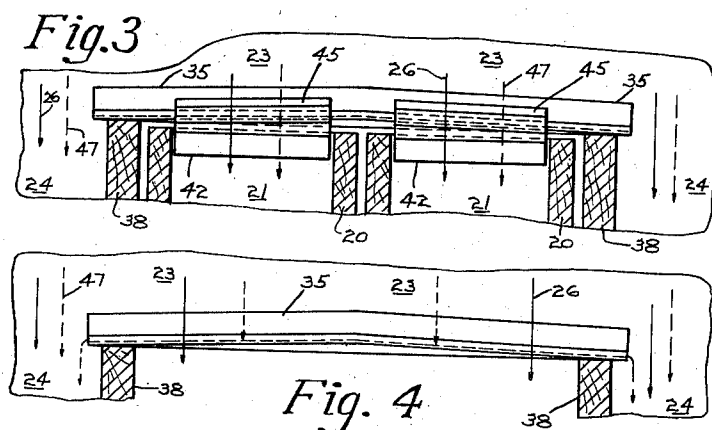
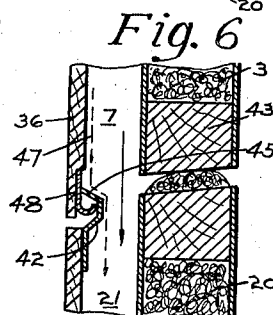
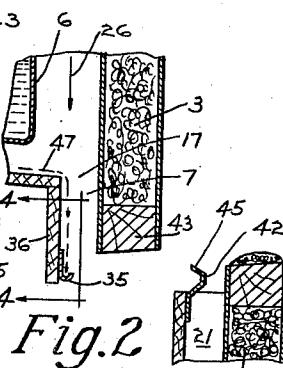
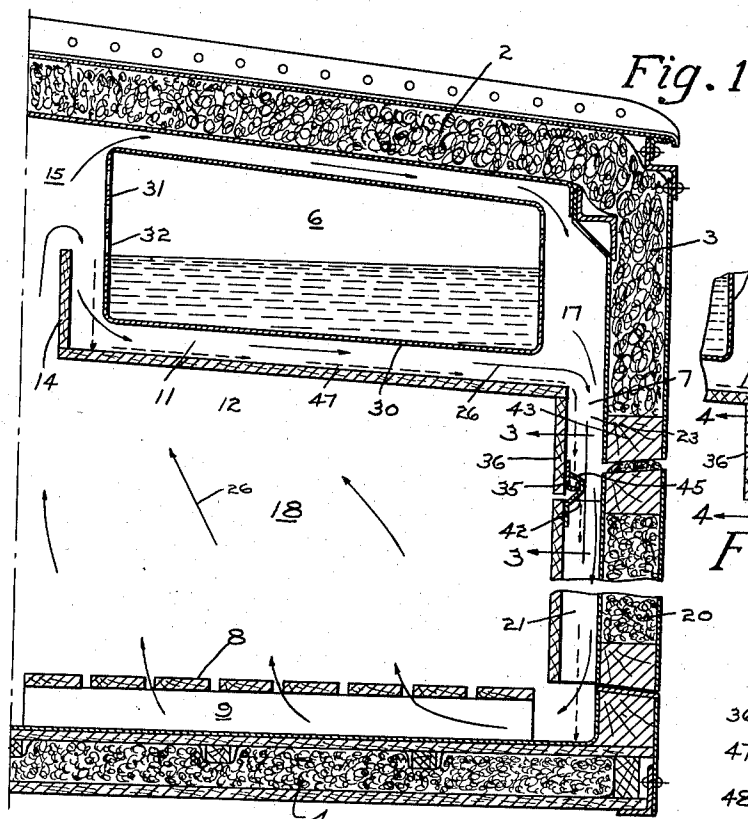
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REFRIGERATOR CAR CONSTRUCTION

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REFRIGERATOR CAR CONSTRUCTION

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mesne assignments, to Standard Railway Re-
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ware

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7 Claims. (Cl. 62-17)

This invention relates to refrigerator cars used to transport perishable commodities at a predetermined temperature. The essential features of such a car are an insulated structure and a refrigerating means for use in warm weather or a heating means for use in cold weather.

The invention relates particularly to refrigerator cars of the overhead bunker type. Cars of this type have the refrigerant containers suspended immediately below the roof. They are often provided with drip pans below the containers to form refrigerant compartments below the roof and adjacent the side walls of the car. It is also common to provide vertical flues associated with the side walls and extending to near the floor. These flues serve as passages for the flow of refrigerated air from the refrigerant compartment to below the floor racks of the car so that it may circulate upwardly through the lading. The flues also serve to drain off melted refrigerant when a foraminous or semi-foraminous container is used or condensation from the container when liquid retaining tanks are used.

Each side wall of a refrigerator car is provided with a door through which lading is transported into the car. These doors must be large enough to allow passage of a truck therethrough and are usually about four feet wide. The refrigeration of the car is dependent upon cold air circulating downwardly through the above mentioned flues which are associated with the side walls of the car.

The refrigerating efficiency is increased by having the melted refrigerant circulate with the air to further cool the air during passage through the side wall flues and to further insulate the walls of the car.

To interrupt a flue for a distance of four feet would obviously lessen the refrigerating efficiency, particularly since the interruption would be at the doorway where more refrigeration is desirable to overcome the effect of insulation deficiencies at the door joints.

The problem of maintaining adequate refrigeration adjacent the doorway has been solved by providing flues or ducts on the doors. When the doors are closed, the ducts are aligned with the side wall flues to form a continuous passage for the air and liquid from the refrigerant compartment to the lower part of the car. In other words, the operation is as if the doors were non-existent.

When the doors are opened, however, the passage becomes discontinuous and the liquid which was flowing through the duct in the door falls through the doorway. The lading which is hauled

through the doorway is often of a type which may be damaged by water. Furthermore, the clothing of the workers would be made moist by the cold liquid, thus creating unpleasant and hazardous working conditions in addition to the danger of having a costly lading damaged.

The amount of liquid flowing through the side wall flues is usually increased by the opening of the doors. Heat enters the car and melts more refrigerant, thus causing a greater flow of liquid. There must also be considered the fact that refrigerator cars are often loaded before they are completely precooled. Precooling melts refrigerant at a rapid rate with a consequent large amount of liquid flowing through the flues.

The object of this invention is to provide a means to prevent the dripping of liquid upon lading and workers which are passing through the doorway during loading or unloading of the car. It is a further object to prevent the aforesaid dripping without impairing in any way the normal flow of air and liquid through the door duct when the door is closed. The operation of the device which I claim as my invention will be completely described by referring to the drawing.

In the drawing:

Fig. 1 is a transverse section through the doorway of a refrigerator car embodying my invention. The door is in the closed position.

Fig. 2 is a fragmentary view similar to a portion of Fig. 1 but showing the door in an open position.

Figs. 3 and 4 are vertical longitudinal sections through the flue as indicated by lines 3-3 and 4-4 in Figs. 1 and 2, respectively.

Fig. 5 is a view similar to Fig. 4 showing a modified construction.

Figs. 6 and 7 are enlarged views similar to a portion of Fig. 1 showing modified constructions.

The general parts of the refrigerator car shown are insulated roof 2; side wall 3; floor 4; refrigerant container 6; side wall flue 7; foraminous floor rack 8 and space 9 between rack 8 and floor 4. A refrigerant container 6 is positioned directly below the roof 2 and adjacent the side wall 3. A drip pan 12 is provided below the container 6 and a partition 14 is secured in an upstanding position at the edge of the drip pan 12. The drip pan 12 and partition 14 cooperate with the roof 2 and side wall 3 to form an enclosing structure 11 around the container 6, an air inlet opening 15 being provided by spacing the partition 14 from the roof 2. An air discharge opening 17 which leads to the flue 7 is formed by spacing the drip pan 12 from the wall

3. A doorway is provided through the side wall 3 and flue 7; a pair of doors 20 are adapted to close the doorway, the doors 20 having associated therewith ducts 21 which are aligned with the flue 7 when the doors are closed.

Air circulation is as follows: Air in the lading compartment 18 is warmed by contact with the lading and rises to enter the enclosing structure 11 through the air inlet opening 15. The air is cooled by contact with the refrigerant container 6 and falls by reason of its greater density through the discharge opening 17. Adjacent the doorway, the cold air flows through the portion 23 of the flue 7 above the doorway and through the ducts 21 to the space 9. Remote from the doorway, the cold air flows through the portion 24 of the flue 7 to the space 9. The cold air then rises through the rack 8 to the lading compartment 18. The solid arrows 26 in the drawing indicate air flow. Cars of this type usually have a row of refrigerant containers near each wall and directly below the roof so that air flowing from the lading compartment flows between the containers disposed on opposite sides of the car.

The refrigerant container 6 shown in the drawing has an imperforate lower portion 30 and a foraminous upper portion 31, although it is to be understood that the invention is not limited to containers of this type. Melted refrigerant overflows through the openings 32 in the upper portion 31 and downwardly through the flue 7 to the floor of the car from where it may be drained off by any suitable means. The liquid remote from the doorway flows through the portion 24 of the flue 7; the liquid adjacent the doorway flows through the flue portion 23 and is disposed of in a manner to be hereinafter described.

One of the objects of the invention is to prevent a liquid dripping through the doorway when the door is open. As shown in Figs. 2 and 4, a trough 35 is provided in the portion 23 of the flue 7 above the doorway, the trough 35 preferably being secured to the wall 36 of the flue so that liquid naturally drips from the drip pan 12 into the trough 35. One or both ends of the trough 35 may be extended over the tops of the parts 38 of the doorposts so that liquid received by the trough 35 is drained into a portion 24 of the flue 7. The trough 35 may be inclined downwardly toward the flue on both sides of the doorway, as shown in Fig. 4, or toward the flue, or only one side of the doorway, as shown in Fig. 5.

Each door 20 has secured thereto a shield 42 at the upper edge thereof. The shield 42 is preferably concave toward the trough 35 and is arranged to cover the trough when the door is in a closed position. The shield must also be arranged to clear the door header 43 during opening and closing of the door. The shield 42 preferably has an upper surface 45 which slopes downwardly away from the wall 36. The liquid which flows downwardly through the flue portion 23 is diverted over the sloping upper surface 45 of the shield 42 and into the door duct 21. It is important that the entire assembly of trough 35 and shield 42 be narrow relative to the flue 7 and duct 21 so that cold air, as well as liquid, may circulate through the duct 21. The dotted arrows 47 of the drawing show the flow of liquid through the flues.

In the modification shown in Fig. 6, the trough 35 is disposed in an offset 48 in the wall 36 to insure that all liquid flowing through the flue portion 23 is trapped by the trough 35. Another

method of accomplishing the same result is shown in Fig. 7 wherein a trough 49 is secured to the lower edge of the wall 36.

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 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 an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough in said flue above said doorway, and means associated with said door to divert said liquid to said duct when the door is closed.

2. In a refrigerator car having an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough in said flue above said doorway, and a shield associated with said door and adapted to cover said trough when the door is closed.

3. In a refrigerator car having an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough in said flue above said doorway, and a shield associated with said door and adapted to cover said trough when the door is closed, said shield having a sloping upper surface to divert said liquid to said duct.

4. In a refrigerator car having an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough in said flue above said doorway, and a shield associated with said door and adapted to cover said trough when the door is closed, said trough and shield being relatively narrow to permit flow of air through said duct.

5. In a refrigerator car having an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough in said flue above said door-

way, and means associated with said door to divert said liquid to said duct when the door is closed, said trough being inclined to drain liquid to the flue beside said doorway.

5 6. In a refrigerator car having an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough arranged to catch liquid flowing downwardly through the flue above said doorway, and means associated with said door to

divert said liquid to said duct when the door is closed.

7. In a refrigerator car having an insulated wall, refrigerating means adjacent said wall, a flue associated with said wall and arranged to transmit air and liquid from said means to the lower part of the car, a doorway through said wall and said flue and a door adapted to close the doorway in said wall, said door having associated therewith a duct which aligns with said flue when the door is closed to form a continuous passage, a trough in said doorway below said flue, and means associated with said door to divert said liquid to said duct when the door is closed.

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