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P. E. FINGER

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REFRIGERATOR CAR

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2 Sheets-Sheet 2

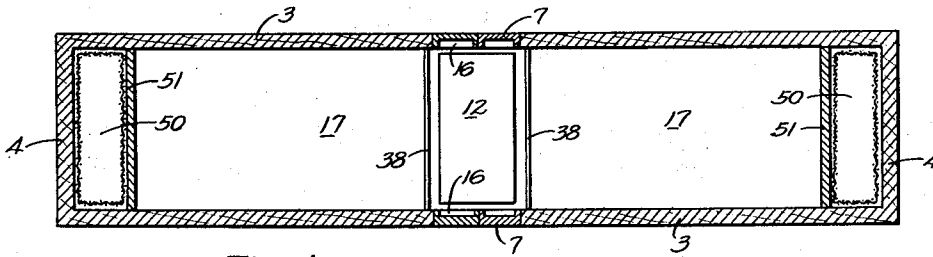


Fig. 4

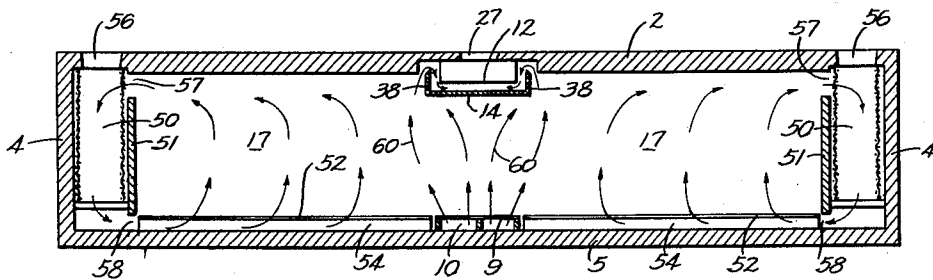


Fig. 5

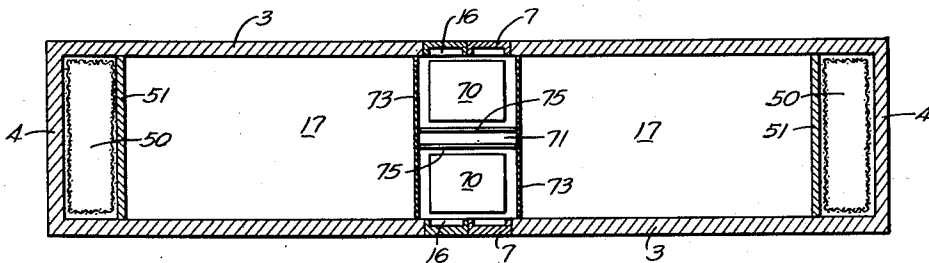


Fig. 6

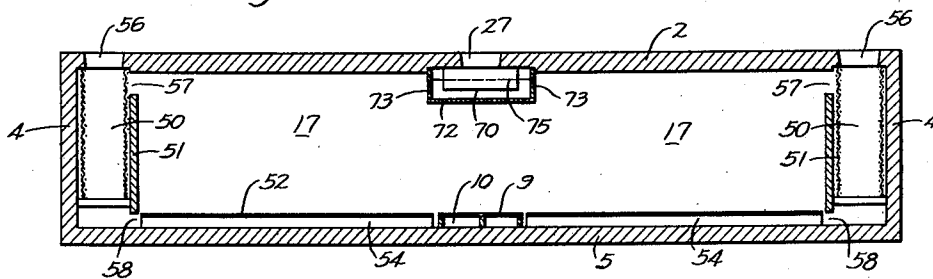


Fig. 7

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UNITED STATES PATENT OFFICE

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REFRIGERATOR CAR

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mesne assignments, to Standard Railway De-
vices Company, a corporation of Delaware

Application April 14, 1939, Serial No. 267,787

5 Claims. (Cl. 62—17)

The invention relates to refrigerator cars and more particularly to the conversion of such cars. The general object of the invention is to render more adaptable for transporting certain types of commodities a large number of refrigerator cars now in use.

The standard refrigerator car for many years has been one with an ice bunker disposed at each end of the car and separated by bulkheads from the lading compartment of the car. Hatches are provided in the roof above the bunker for loading the refrigerant. The lading is commonly supported on floor racks to provide a space between the lading and the floor which communicates with the chamber immediately below the bunker so that air cooled by the bunker flows through the space under the rack and then upwardly to the lading. The rack is foraminous for this purpose.

Refrigerator cars commonly have a length of approximately forty feet; the center portions of the car are therefore almost twenty feet from a source of refrigerant. Moreover, doors are usually provided in the side walls at the center of the car and the interruptions to the insulation inherent in a door further contributes to the difficulty of keeping the center of the car properly refrigerated. As a consequence, perishable commodities are often not loaded near the doors or are loaded only a relatively small height above the floor rack. In addition to the danger of loss due to an excessively high lading temperature near the center of the car, there is loss of revenue caused by a load less than the capacity of the car.

An object of the invention is to add an auxiliary cooling means preferably near the roof at the doorway, to a car of the type described. Said means is intended to supply refrigerated air to the lading compartment at the center thereof, or remote from the ice bunkers, where the temperature is ordinarily a maximum.

It is another object of the invention to add the aforementioned auxiliary refrigerating means without decreasing the capacity of the car. Refrigerating cars are commonly loaded only to the top of the bulkhead to allow a flue between the lading and the roof for return of air to the ice bunker. Furthermore, a car could not be conveniently loaded at the doorway above the upper edge thereof. Therefore, a container between the roof and the upper edge of the doorway would not decrease the capacity of the car. A further object of the invention is to provide flues associated with, and preferably within, the side doors of the car to provide a path for the flow of air from the above-mentioned auxiliary

container to the space below the lading from where it may escape upwardly to cool the lading.

Another object of the invention is to increase the capacity of the car available for loading perishable commodities. Due to the aforementioned conditions, i. e., the distance of the center of the car from the ice bunkers and the inefficient insulation at the doorway, the capacity of the car is limited. To exceed the limits imposed thereby would be to risk exposing the lading to a temperature above that at which the commodities may be safely transported. By the provision of the auxiliary refrigerating means, I provide additional space in which perishable commodities may be loaded.

Other objects and advantages of my invention will be apparent from the following detailed description by referring to the accompanying drawings in which:

Fig. 1 is a transverse section at the doorway of a refrigerator car embodying my invention.

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

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a diagrammatic plan view of a car showing the auxiliary containers which I claim as my invention.

Fig. 5 is a diagrammatic elevation of the car shown in Fig. 4.

Figs. 6 and 7 are views similar to Figs. 4 and 5 respectively showing a modified construction.

The drawings show a refrigerator car having an insulated roof 2, insulated side walls 3, insulated end walls 4 and insulated floor 5. Doors 7 are positioned substantially midway between the end walls 4. A foraminous floor rack 9 supports the lading upon the floor 5 and provides a space 10 therebetween. A refrigerant container 12 is positioned immediately below the roof 2 and preferably alined with the doors 7 as shown in Figs. 4 and 5. A drip pan or partition 14 is spaced from the container 12 to provide the passage 15 and flues 16 are associated with the doors 7 to provide a path for refrigerated air from the container 12 to the space 10 and thence to the lading compartment 17.

The refrigerant container 12 is preferably arranged so that the top 25 thereof supports the roof insulation 26. Hatches 27 are provided in the roof 2 for loading refrigerant into the container 12. Supporting members 29 having horizontally disposed flanges 30 are secured inside the seam cap carlines 31 adjacent the hatches 27. Insulating pieces 33 rest upon the flanges 30 and the brackets 35 are supported from the pieces 33

by means of the bolts 36. The brackets 35 are secured to the container 12 to form the support therefor. The partitions 38 project upwardly from the edges of the drip pan 14 and are spaced from the container 12 and from the roof 2 to provide the openings 40 for air flow from the lading compartment 17.

Figs. 4 and 5 show the method of converting the refrigerator car. Ice bunkers 50 are commonly provided adjacent the end walls 4 of the car and are separated from the lading compartment 17 by the bulkheads 51. The floor racks 52 which are foraminous support the lading and provide the space 54 thereunder. Hatches 56 are provided in the roof above each bunker 50 for loading refrigerant. The bulkheads 51 are spaced from the roof and floor to form the openings 57, 58, thus providing circulatory paths for air. Air, upon being cooled by the refrigerant in the bunkers 50, flows by gravity through the openings 58, the spaces 54, upwardly through the lading compartment 17, thus cooling the lading, and then returns to the bunkers 50 through the openings 57.

As indicated in the drawings, the center portion of the lading compartment 17 is remote from the bunkers 50 and consequently receives only a small part of the refrigerated air. To overcome this deficiency, I provide the refrigerant container 12 near the roof and preferably aligned with the side doors 7. The partition 14 and members 38 form a path for refrigerated air which is indicated by the arrows 60 in Figs. 1, 2 and 5.

The method of converting the refrigerator car consists of removing a portion of the existing ceiling 65 and adding the hatches 27 and container 12 together with the brackets necessary to support the container and the partitions which provide the path for circulating air. It is also necessary to rebuild the doors 7 to provide the flues 16 preferably within the door so as not to decrease the effective width of the car. Since the drip pan 14 is above the upper edge 67 of the door 7, the available loading capacity of the car is not decreased because the space occupied by the container 12 is not ordinarily used. In effect, the capacity of the car is increased because the auxiliary container 12 provides a greater portion of the lading compartment 17 with a temperature safe for the transportation of perishable commodities.

Figs. 6 and 7 show a modified construction in which two refrigerant containers 70 are positioned above the center of the lading compartment 17 and are spaced apart to provide a duct 71 therebetween. A drip pan 72 is provided below each container 70 and upstanding transverse partitions 73 extend substantially to the roof 2. Longitudinally extending partitions 75 are upstanding from the adjacent edges of the drip pans. The partitions 75 extend between the transverse partitions 73 and are spaced from the roof 2 to provide openings from the lading compartment 17 to the refrigerant containers 70. The car shown in Figs. 6 and 7 is otherwise similar to that shown in Figs. 4 and 5.

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 a refrigerant

bunker near an end wall of the car, a doorway in a side wall remote from said bunker, a door adapted to close said doorway, a floor rack for supporting a lading upon the floor and providing a space therebetween, and a bulkhead between said bunker and the lading compartment of the car, said bulkhead being spaced from the floor and roof to provide openings for air circulation, a refrigerant container below the roof aligned with said doorway and extending substantially the width thereof, an enclosing structure for said container having a cold air discharge opening and an air inlet opening, a flue associated with said door and communicating between said cold air discharge opening and said space whereby air cooled by the refrigerant in said bunker circulates under said bulkhead to said space upwardly through the lading compartment and returns over said bulkhead to said bunker and whereby air cooled by the refrigerant in said container circulates through said flue to said space, upwardly through the lading compartment and returns through said air inlet opening to said container thereby refrigerating the lading remote from said bunker.

2. In a refrigerator car having a refrigerant bunker near an end wall of the car, a floor rack for supporting a lading upon the floor and providing a space therebetween, and a bulkhead between said bunker and the lading compartment of the car, said bulkhead being spaced from the floor and roof to provide openings for air circulation, a refrigerant container below the roof and remote from said bunker, an enclosing structure for said container having a cold air discharge opening and an air inlet opening, a flue associated with one of said side walls and communicating between said cold air discharge opening and said space remote from said bunker whereby air cooled by the refrigerant in said bunker circulates under said bulkhead to said space upwardly through the lading compartment and returns over said bulkhead to said bunker and whereby air cooled by the refrigerant in said container circulates through said flue to said space upwardly through the lading compartment and returns through said air inlet opening to said container thereby refrigerating the lading remote from said bunker.

3. In the conversion of a refrigerator car having a refrigerant bunker near an end wall, a lading compartment; a bulkhead separating said bunker from the lading compartment and a floor rack for supporting a lading upon the floor and providing a space therebetween, said bulkhead being spaced from the floor to provide an opening for flow of cold air from said bunker to said space and from the roof to provide an opening for the return of air from the lading compartment to said bunker, the addition of a refrigerant container near the roof and adjacent a doorway in a side wall of the car remote from said bunker, a flue associated with a door adapted to close said doorway and communicating between said container and said space remote from said bunker thereby providing a more uniform temperature in the lading compartment than existed therein originally.

4. In a refrigerator car having a refrigerant bunker near an end wall of the car, a doorway in a side wall remote from said bunker, a door adapted to close said doorway, a floor rack for supporting a lading upon the floor and providing a space therebetween, and a bulkhead between said bunker and the lading compartment of the

car, said bulkhead being spaced from the floor and roof to provide openings for air circulation, a refrigerant container below the roof aligned with said doorway, an enclosing structure for said container having a cold air discharge opening and an air inlet opening, a flue associated with said door and communicating between said cold air discharge opening and said space whereby air cooled by the refrigerant in said bunker circulates under said bulkhead to said space upwardly through the lading compartment and returns over said bulkhead to said bunker and whereby air cooled by the refrigerant in said container circulates through said flue to said space, upwardly through the lading compartment and returns through said air inlet opening to said container thereby refrigerating the lading remote from said bunker.

5. In the conversion of a refrigerator car having a refrigerant bunker near an end wall, a

lading compartment, a bulkhead separating said bunker from the lading compartment, and a floor rack for supporting a lading upon the floor and providing a space therebetween, said bulkhead being spaced from the floor to provide an opening for flow of cold air from said bunker to said space and from the roof to provide an opening for the return of air from the lading compartment to said bunker, the addition of a refrigerant container near the roof and adjacent a doorway in a side wall of the car remote from said bunker, said bunker extending substantially the width of said doorway, and a flue associated with a door adapted to close said doorway and communicating between said container and said space remote from said bunker, thereby providing a more uniform temperature in the lading compartment than existed therein originally.

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