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G. G. GILPIN
REFRIGERATOR CAR
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2,268,332

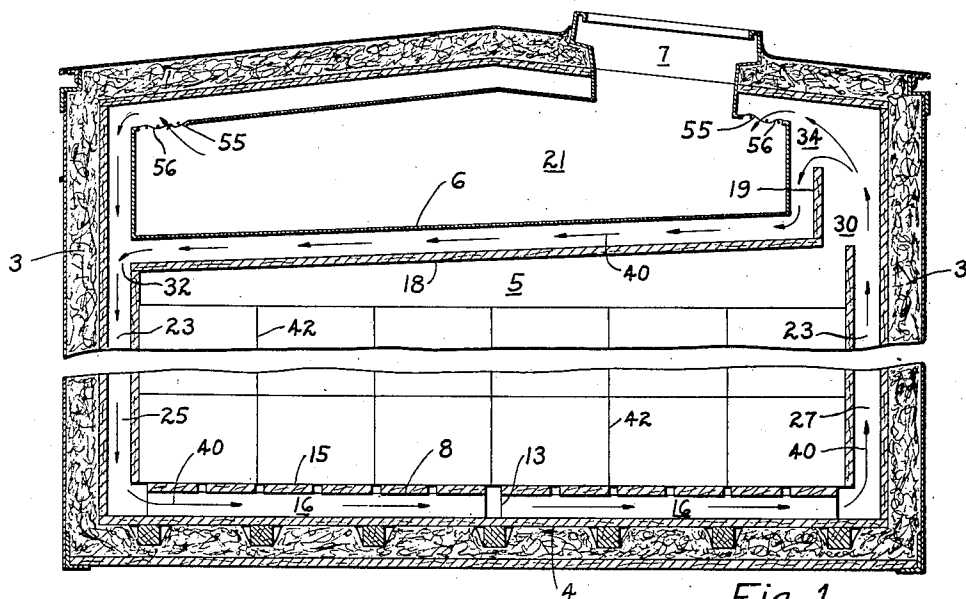


Fig. 1

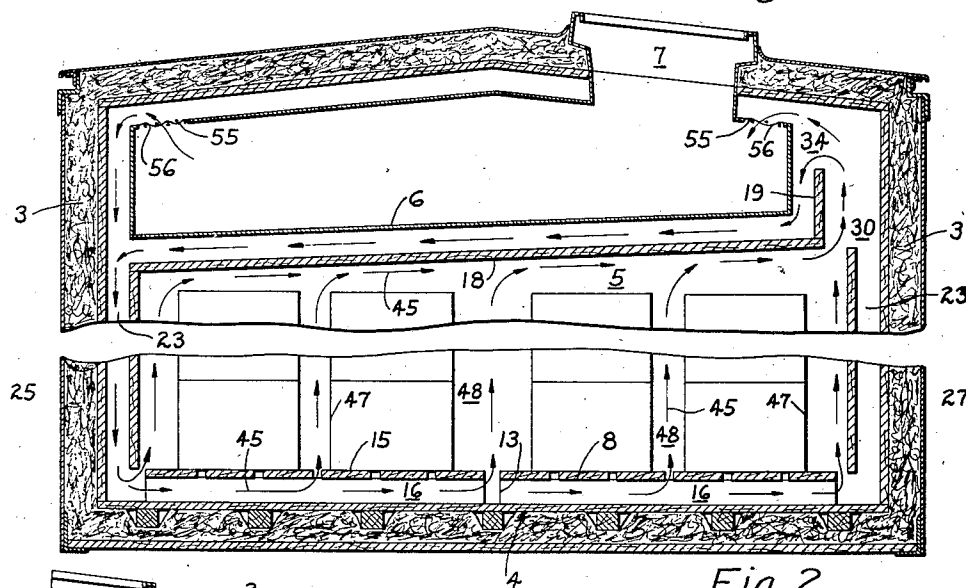


Fig. 2

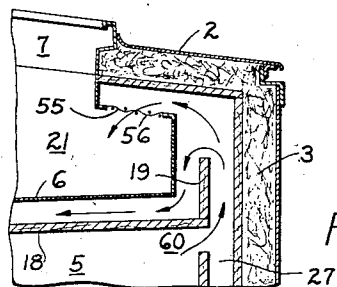


Fig. 3

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REFRIGERATOR CAR

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5 Claims. (Cl. 62-17)

The invention relates to refrigerator cars, and more particularly to refrigerator cars of the overhead bunker type in which the refrigerant containers are disposed adjacent the roof. The essential features of a refrigerator car are an insulated structure to retard ingress of heat during warm weather and egress of heat during cold weather and a cooling or heating means for use in warm or cold weather respectively.

Refrigerator cars of the overhead bunker type have recently come into considerable use, one of the reasons for this use being the high refrigeration efficiency which is due to the position of the refrigerating means. Cold air, being heavier than warm air, flows downwardly by natural convection. Flues are commonly associated with one or more walls of the car to provide a path for the cold air from the cooling means to the lading compartment, thereby providing a direct and efficient circulating system.

Various types of lading are hauled in refrigerator cars. The lading may be a product, such as fresh strawberries, apples or other fruits or vegetables, which is often loaded into the car at the atmospheric temperature and cooled by the refrigerating means of the car to a safe transit temperature. Such a product is usually loaded with numerous air passages therein for circulation of cold air. Another product commonly hauled is meat; this is loaded at a low temperature and is retained at the low temperature by cold air passing thereover.

Another type of lading commonly hauled is frozen products. This may include frozen fish, which are often at a temperature of ten degrees below zero, or frozen fresh fruits and vegetables (such as the product known by the trade name "Birdseye"). Products of the frozen type are usually loaded so as to form a substantially solid mass. This form of loading is due partly to the physical properties of the product and partly to the fact that air circulation therethrough is not required. It is necessary only to insulate the lading from the outside air.

It is an object of this invention to provide a car having means to circulate cold air through the load, such as is required in the transportation of fresh meats, fruits and vegetables.

Another object is to provide a car well adapted to the transportation of frozen products. I accomplished this by providing a circulatory system in which cold air circulates substantially around the lading, thereby preventing flow of warm air from the exterior of the car to the lading.

A further object is to provide a refrigerator car

which may be adapted to the transportation of either fresh or frozen products without making any changes in the construction of the car. I accomplish this by providing means by which the cold air may flow either into or around the lading compartment, according to the manner in which the lading is loaded.

Other objects and advantages of my invention will be apparent from the following detailed description by referring to the accompanying drawing.

In the drawing:

Fig. 1 shows the refrigerator car which I claim as my invention loaded with a solid load.

Fig. 2 shows the car of Fig. 1 loaded with a load having spaces therein.

Fig. 3 shows a modified construction.

The parts of a refrigerator car shown in the drawing are a roof 2, side walls 3, floor 4, lading compartment 5, refrigerant container 6 below the roof 2, a hatch 7 in the roof 2 for loading refrigerant into the container 6, and a floor rack 8 on the floor of the car. The refrigerant container 6 extends substantially between the side walls 3 of the car and the hatch 7 is preferably disposed adjacent one of the eaves. The hatches of adjacent containers may alternate between the sides of the car.

The floor rack 8 preferably comprises transversely extending stringers 13 resting upon the floor 4 and longitudinally extending, spaced apart slats 15 secured to the upper surfaces of the stringers 13 to provide a space 16 therebelow. A drip pan 18 is spaced below the container 6 with a partition 19 upstanding from an edge of said drip pan to form a refrigerant chamber 21 near the roof. A flue 23 is associated with each of the side walls 3, which flues communicate at the lower ends thereof with the space 16 under the floor rack slats. The upper end of the flue 25 communicates with the refrigerant chamber 21 opposite from the partition 19 while the upper end of the flue 27 communicates with the refrigerant chamber 21 adjacent the partition 19. An opening 30 is provided between the lading compartment 5 and the chamber 21, the opening 32 to the flue 25 being at a lower elevation than the opening 34 to the flue 27 and lading compartment 5.

Fig. 1 shows by the arrows 40 the path of the air circulation which takes place when the lading 42 within the car is loaded substantially solid between the side walls 3, thereby preventing the flow of air through the lading space. In this case, the air adjacent the container 6 is cooled,

and therefore densified, by contact with said container; it flows downwardly through the side wall flue 25, through the space 16 under the floor rack slats 15 and upwardly through the side wall flue 27 to the refrigerant chamber 21 where it is again cooled and repeats the cycle just described. An insulating blanket of cold air is thereby formed substantially around the lading compartment.

Fig. 2 shows by the arrows 45 the path of the air circulation when the lading 47 is of the type which provides spaces 48 between certain parts thereof, thereby allowing air to flow through the lading space. In this case the air which descends through the side wall flue 25 flows through the space 16 below the floor rack slats 15 and then permeates upwardly between the slats 15 through the lading space 5, thereby cooling the lading by contact therewith.

A portion 55 of the top of the container may be formed of wire netting 56 or other foraminous material so that a portion of the circulating air may flow therethrough into the container and be cooled by contact with the refrigerant. The wire netting 56 may also be used when it is desired to ventilate the car, in which case air would flow from outside the car through the hatch 7, and then through the wire netting and eventually into the lading space 5.

In the arrangement shown in Figs. 1 and 2, the partition 19 is provided so that the cold air within the refrigerant chamber 21, having a greater density, naturally flows through the lowest opening. The lowest opening is through the flue 25, thereby establishing a positive convective circulation of air. Fig. 3 shows a modification wherein an opening 60 is provided between the lading space 5 and the side wall flue 27 near the top thereof for flow of air to the refrigerant chamber 21 from the lading compartment 5.

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 combination with the roof, floor and spaced side walls which define the lading compartment of a refrigerator car, a vertically extending flue associated with each of said walls, a foraminous floor spaced above the first mentioned floor to form a space communicating at its opposite ends with the lower ends of said flues, refrigerating means disposed immediately below said roof, means cooperating with said refrigerating means to form an air cooling passage extending substantially between said walls and communicating at one end with one of said flues for discharging cold air thereinto, the other of said flues and said lading compartment being arranged to communicate with said passage opposite to the first mentioned flue, whereby said air may return to said passage either through said other flue or said compartment depending upon whether the lading is loaded tightly or loosely respectively.

2. In combination with the roof, floor and spaced side walls which define the lading compartment of a refrigerator car, a vertically extending flue associated with each of said walls, a foraminous floor spaced above the first mentioned floor to form a space communicating at its opposite ends with the lower ends of said flues, refrigerating means disposed immediately below said roof and extending substantially between said walls, means cooperating with said refrigerating means to form an air cooling passage extending substantially between said walls and communicating at one end with one of said flues for discharging cold air thereinto, the other of said flues and said lading compartment being arranged to communicate with said passage opposite to the first mentioned flue, whereby said air may return to said passage either through said other flue or said compartment depending upon whether the lading is loaded tightly or loosely respectively.

3. In combination with the roof, floor and spaced side walls which define the lading compartment of a refrigerator car, a vertically extending flue associated with each of said walls, a foraminous floor spaced above the first mentioned floor to form a space communicating at its opposite ends with the lower ends of said flues, a refrigerant container disposed immediately below said roof and extending substantially between said walls, means cooperating with said refrigerant container to form an air passage extending substantially between said walls and communicating at one end with one of said flues for discharging cold air thereinto, the other of said flues and said lading compartment being arranged to communicate with said passage opposite to the first mentioned flue, whereby said air may return to said passage either through said other flue or said compartment depending upon whether the lading is loaded tightly or loosely respectively.

4. In combination with the roof, floor and spaced side walls which define the lading compartment of a refrigerator car, a vertically extending flue associated with each of said walls, a foraminous floor spaced above the first mentioned floor to form a space communicating at its opposite ends with the lower ends of said flues, refrigerating means disposed immediately below said roof and extending substantially between said walls, means cooperating with said refrigerating means to form an air cooling passage extending substantially between said walls and communicating at one end with one of said flues for discharging cold air thereinto, the other of said flues being arranged to communicate with said passage opposite to the first mentioned flue, whereby said air may return to said passage either through said other flue or said compartment depending upon whether the lading is loaded tightly or loosely respectively.

5. A structure as defined in claim 3 wherein said passage is inclined downwardly toward said first mentioned flue.

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