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2,265,633

REFRIGERATOR CAR CONSTRUCTION

Filed March 11, 1940

2 Sheets-Sheet 1

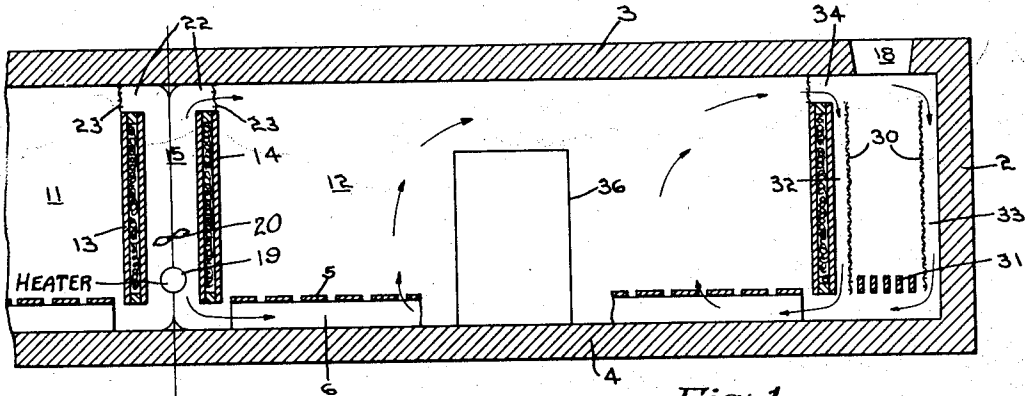


Fig. 1

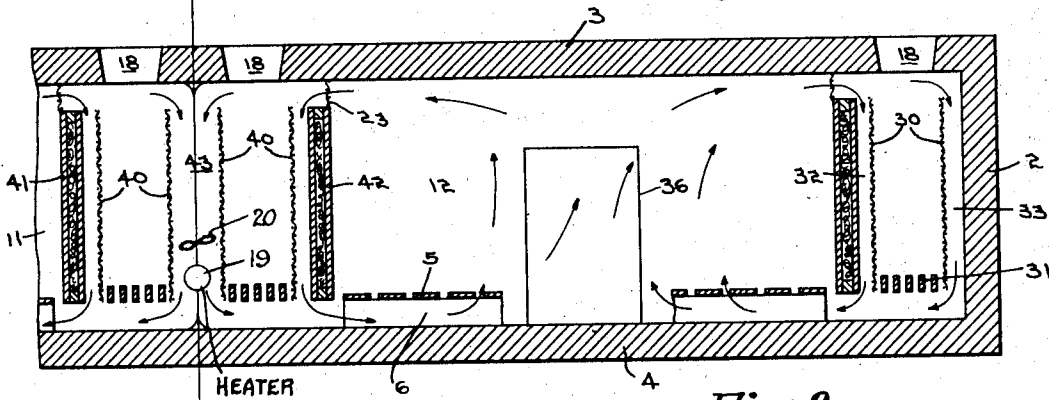


Fig. 2

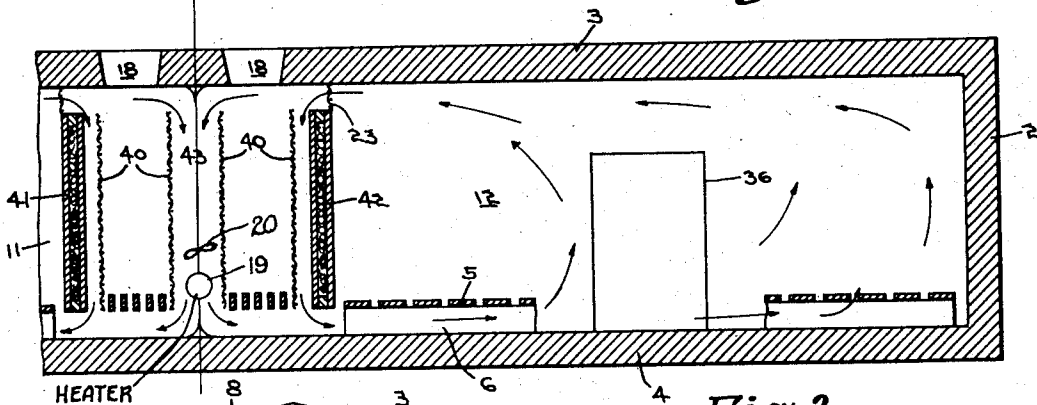


Fig. 3

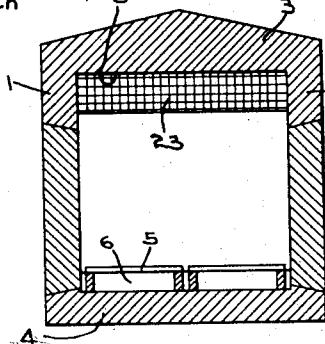


Fig. 4

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2 Sheets-Sheet 2

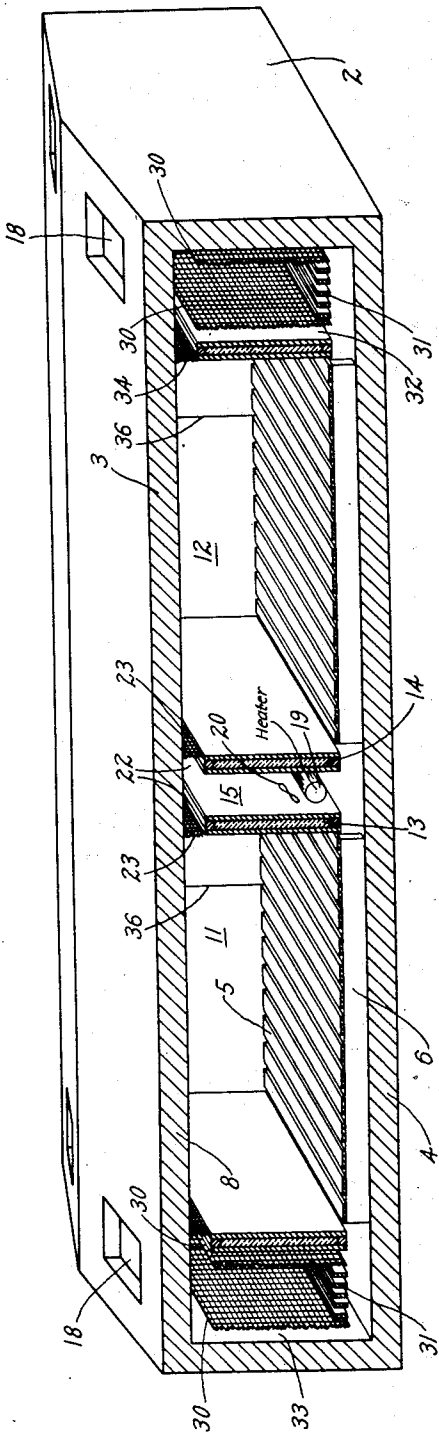


Fig. 5

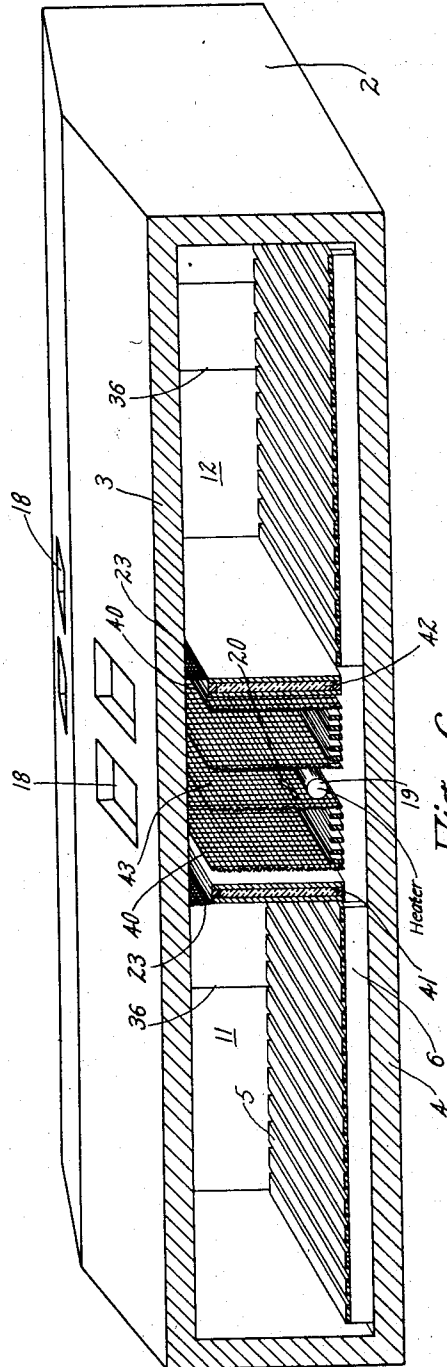


Fig. 6

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UNITED STATES PATENT OFFICE

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REFRIGERATOR CAR CONSTRUCTION

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2 Claims. (Cl. 257—7)

The invention relates to railway rolling stock and more particularly to so-called "refrigerator cars" which are used to transport perishable commodities, such as vegetables, fruits, berries, frozen foods and fish. Such commodities must be maintained at a substantially even temperature to avoid decay. Heat or refrigeration is applied to the commodity while in transit depending upon the weather. Certain commodities (such as potatoes and oranges) generate heat and gases which must be removed by ventilation. A railway car, therefore, to haul perishable commodities must be arranged to cool, heat or ventilate the commodity while in the car. This applies, of course, if the car is running or standing still.

Various fruits, such as oranges from California and Florida, apples from Washington and Oregon, and various vegetables from Salton Sea in California, Colorado, Illinois, and Georgia are loaded into the refrigerator cars and shipped; i. e., the cars actually start moving with destination unknown and without any consignee. To facilitate selling the commodity while en route grades for quality have been established. "Units" for volume have also been established by adoption of a standard size box for each fruit and the size of the fruit is designated by the number of that fruit in the box (which is stenciled on each box) and the number of such boxes which can be loaded in a standard size refrigerator car is a "unit." To be more specific, the inside dimensions of a conventional end bunker refrigerator car are approximately 40' 0" long, 8' 3" wide and 7' 0" high and an ice bunker is positioned at each end of the car so that the loading space between the bunkers is about 33 feet. Such a car will hold and refrigerate 462 boxes of oranges or 420 boxes of lemons from California and such number of boxes constitutes a unit of the specific fruit of a known grade and size.

When the owner (usually through a cooperative association) sells his fruit the shipment is diverted while en route to the purchaser. It requires approximately seven days to transport fruit from California to Chicago; ten days to New York and twelve days to Boston and this system allows the owner to take advantage of changing market conditions.

If the commodity is not sold en route it is consigned to one of the several perishable commodity auction markets in the larger cities where it is sold before it becomes unusable.

One of the objects of the invention is to provide an improved railway car, automotive truck or other transportation vehicle which has insulated walls, floor and roof to retard heat transmission therethrough and is provided with means to refrigerate, heat or ventilate the lading within the vehicle.

Another object is to provide a partition (or partitions) to divide the interior of the vehicle into separated lading compartments so that separate consignments of commodities may be carried in the separate lading compartments, or if desired, different kinds or types of lading may be carried in the separate compartments. The partitions are preferably arranged to prevent pilfering and are strong enough to resist the tendency of the load to shift.

The separate compartments are preferably provided with doors so that the lading may be moved into or out of either compartment without disturbing the lading in the other compartment. A door in each side wall of each compartment is preferably provided, which doors may be opened, closed or locked independently of each other.

Another and very important object is to provide economical transportation for perishable products moving from points of production to distant markets by providing means of loading two full carloads in one car. With the means herein disclosed, the present sales units are not altered and the haul of empty equipment, which is deadweight non-paying tonnage, is reduced by one-half.

One of the objects is to provide a partition having a space therein communicating with the upper and lower parts of both of the lading compartments on opposite sides thereof, and further to provide a heating means within said space so that the heat will rise to the tops of (preferably both of) the lading compartments and the air being cooled by the lading will be drawn in said space from the bottom thereof.

Another object is to provide an air circulating means, such as a rotary fan, to augment the speed of the circulating air and, if desirable, to change the direction of the circulating air so that the heated air will enter the lower parts of the separate compartments and return to said space through the upper part thereof. The air circulating fan is preferably positioned above the heating means.

Another object is to provide such a partition as heretofore described with the addition of refrigerating means within the space in the partition so that the car may be heated or refrigerated therefrom. One of the objects of this arrangement is to humidify the circulating air by melting ice with the heater and circulating the humidified air by means of the air circulating fan.

Another object of the invention is to place refrigerating and humidifying means at the opposite ends of the car; that is, remote from the heating means which may be used with or without the refrigerating and humidifying means within the partition.

The principal object of this invention is to pro-

vide a pilfer-proof partition in a transportation vehicle to divide the interior of the vehicle into two separated and independent lading compartments, wherein each compartment is provided with doors for loading and unloading the compartments independently of each other, and further preferably providing heating and air circulating means within the partition.

In the drawings:

Fig. 1 shows a longitudinal vertical cross section of a railway car having a partition adjacent the middle thereof and heating and air circulating means within the said partition and refrigerating means at the opposite ends of the car.

Fig. 2 is similar to Fig. 1 except that refrigerating means are also shown within the partition.

Fig. 3 is like Fig. 2 except that the refrigerating means in the ends of the car have been omitted.

Fig. 4 is a cross section of the typical refrigerator car shown in Figs. 1, 2 and 3.

Figs. 5 and 6 illustrate the forms of the invention shown in Figs. 1 and 3 respectively.

The drawings are diagrammatic and all structural details have been omitted. The vehicles are preferably symmetrical around the center lines 7.

In the drawings the side walls are designated as 1; end walls 2; roof 3, and floor 4. The vehicles are provided with a foraminous secondary floor 5 spaced above the insulated floor 4 of the vehicle to provide an air circulating space 6 below the lading.

The construction of Fig. 1 shows a partition extending between the opposite side walls 1 and from the top of the secondary foraminous floor 5 to adjacent the ceiling 8 so as to provide two separated lading compartments 11 and 12. The partition comprises spaced apart bulkheads 13-14 with a space 15 therebetween having air communication with a space 6 below the foraminous secondary floor and also with the upper parts of the lading compartments 11 and 12, as shown by the arrows. Within this space 15 I provide a heating means 19 and an air circulating means (preferably a fan) 20 which forces the air heated by the heating means into both of said lading compartments. The bulkheads 13-14 are preferably insulated to retard heat leakage which would interfere with the convective circulation. I preferably place the fan 20 above the heating means 19 so that the fan will drive the heated air into the space 6 below the foraminous floor 5 from whence it rises through or between the lading, and being cooled thereby, returns to the space 15 through the openings 22 above the bulkheads. Any heater may be used, such as the common charcoal heater or gas heater. A small door may be provided in the side wall of the vehicle for fueling, inspecting and servicing the heater. The air circulating fan may be operated from the axle or wheel of one of the trucks or by a storage battery and is preferably arranged to force the air upwardly or downwardly. The netting 23 in the opening 22 between the top of the bulkhead 14 and the ceiling 8 is to prevent pilfering. Fig. 1 shows a refrigerating means at each end of the vehicle, which means comprises a foraminous ice basket 30 and grating 31 to support ice with a vertical flue 32-33 on each side of the basket so that air therein, being cooled by the ice, falls to the

space 6 below the foraminous floor 5 and rises through or between the lading, and being heated thereby, again enters the flues 32-33 through the opening 34 above the bulkhead. Fuel feeding hatches are shown at 18 which are also for ventilation. The side wall door is indicated by the lines 36.

In the modification shown in Fig. 2, the ice baskets 40 and 40 are shown between the bulkheads 41 and 42 and the space 43 is provided between the ice baskets 40-40 for the heater 19 and air circulating fan 20. The convective circulating of air caused by the melting of the ice in the baskets is shown by the arrows. As stated before, the fan may drive the heated or refrigerated air either upwardly or downwardly. The hatch opening 18 communicates with the ice basket 40 for fueling and also with the space 43 between the ice baskets for ventilation.

The modification shown in Fig. 3 is similar to that shown in Fig. 2 except that the refrigerating means at the ends of the car have been omitted.

The description of the ice basket and associated parts in Fig. 1 will also suffice for Figs. 2 and 3.

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 an insulated transportation vehicle having a foraminous secondary floor to provide an air circulating space below the lading, in combination with spaced apart bulkheads adjacent the middle of the car forming separated lading compartments in the vehicle, the space between said bulkheads having air communication with the said space below the foraminous secondary floor and with the upper parts of said lading compartments, heating means, ice containing means and air circulating means all in the space between said bulkheads and arranged to operate simultaneously whereby air heated by said heating means and moistened by the meltage of said ice may be forced into both of the lading compartments.

2. In an insulated transportation vehicle having a foraminous secondary floor to provide an air circulating space below the lading, in combination with spaced apart bulkheads adjacent the middle of the car forming separated lading compartments in the vehicle, the space between said bulkheads having air communication with the said space below the foraminous secondary floor and with the upper part of said lading compartments, a pair of ice baskets in the space between said bulkheads and separated therefrom to provide a vertical flue therebetween, said baskets being spaced apart to provide a space therebetween, a heating means in the space between said baskets, and an air circulating fan in the space between said baskets arranged to circulate air respectively into contact with said heater and the ice in said baskets, thereby humidifying said air, and to deliver the humidified air into said compartments.

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