

Jan. 20, 1942.

A. A. HELWIG

2,270,524

REFRIGERATOR CAR CONSTRUCTION

Filed Jan. 8, 1940

3 Sheets-Sheet 1

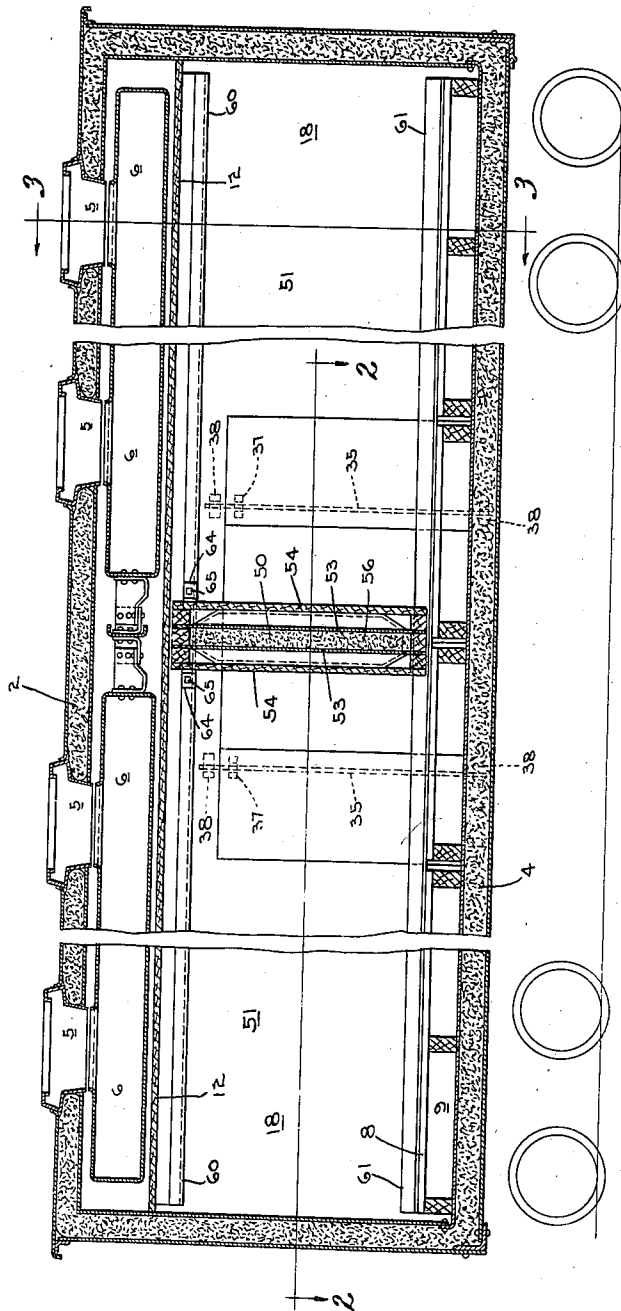


Fig. 1

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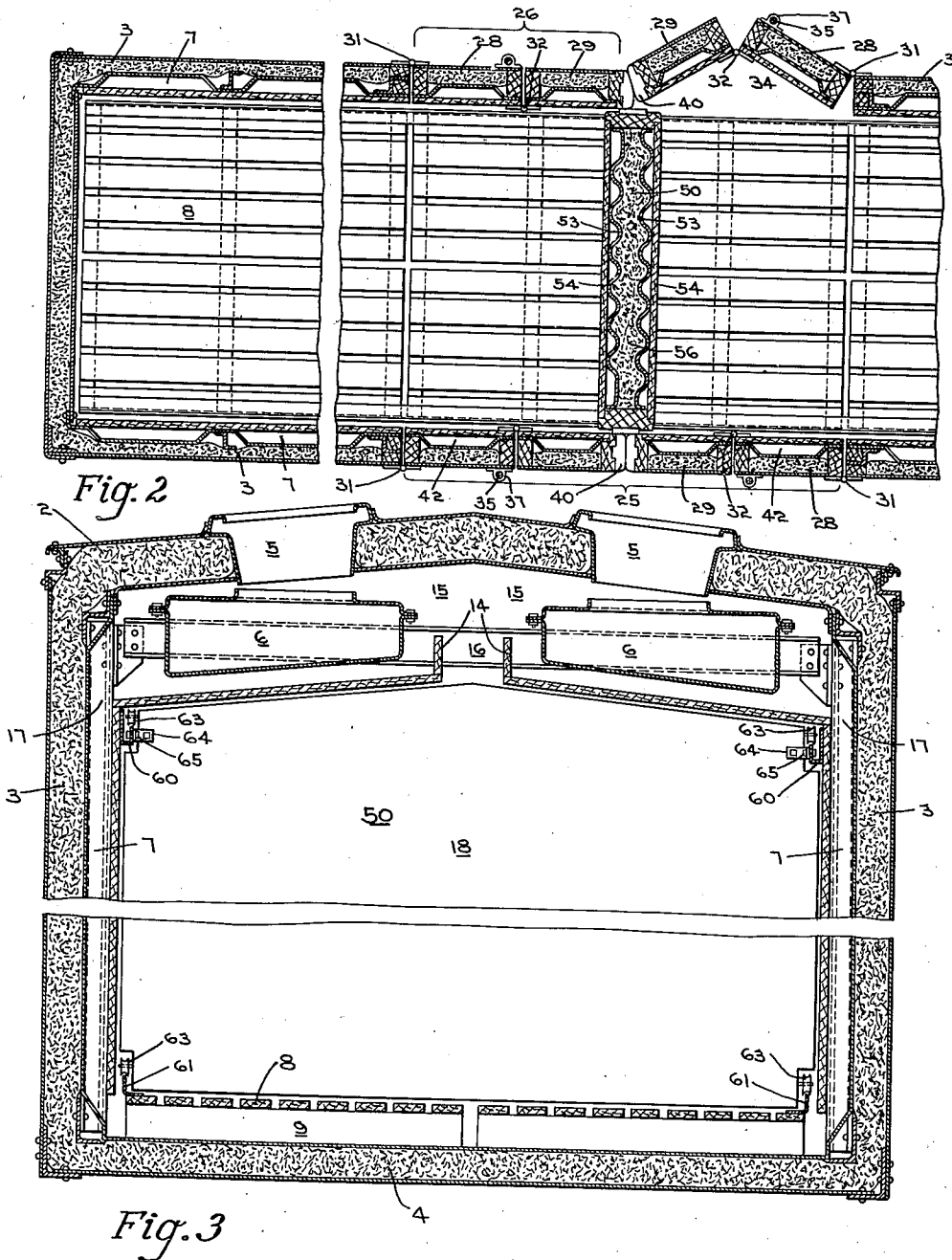
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

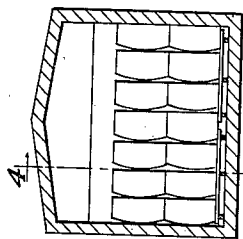


Fig. 5

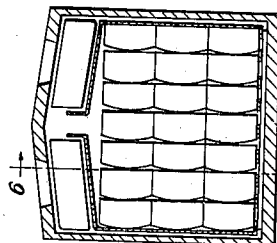


Fig. 7

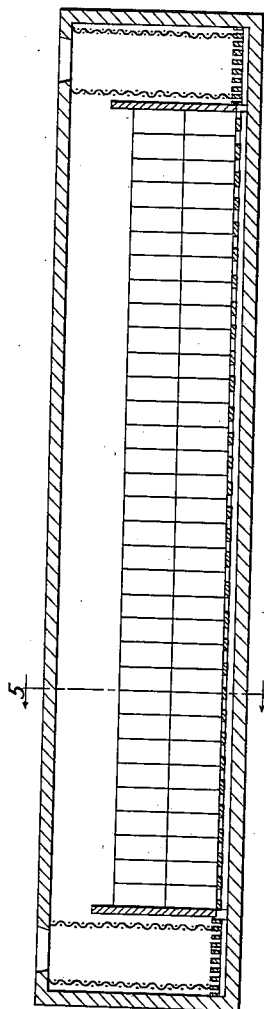


Fig. 4

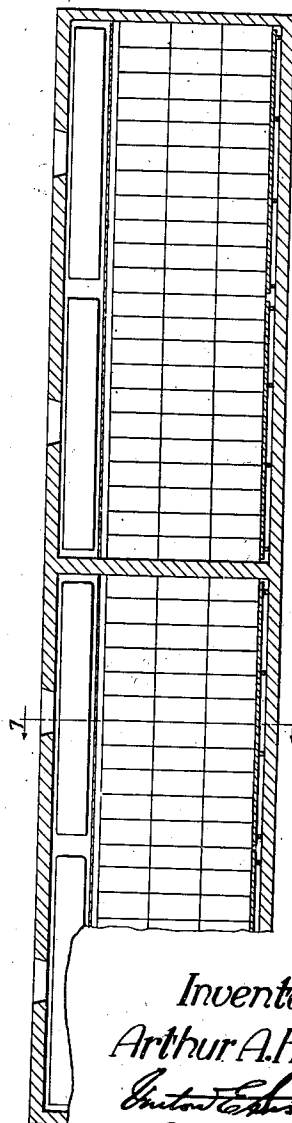


Fig. 6

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## UNITED STATES PATENT OFFICE

2,270,524

## REFRIGERATOR CAR CONSTRUCTION

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Application January 8, 1940, Serial No. 312,822

7 Claims. (Cl. 62—17)

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 enroute 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 stencilled on each box) and the number of such boxes which can be loaded and effectively refrigerated in a standard size end bunker 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 an approximate maximum of 462 boxes of oranges or 420 boxes of lemons from California; such number of boxes is the usual load for an end bunker car and 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 enroute 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 enroute it is consigned to one of the several perishable com-

modity auction markets in the larger cities where it is sold before it becomes unusable.

A new type of refrigerator car has been developed by my assignee which is described and claimed in Bonsall Patent No. 2,136,999 of November 15, 1938, wherein the refrigerant containers are positioned adjacent the ceiling of the car with drip pans spaced therebelow so that air in the space below the refrigerant containers, being cooled by the refrigerant in the containers (preferably ice or ice and salt), flows through vertical flues into a space below a foraminous secondary flooring below the lading and coming into contact with the lading is warmed thereby and rises to the space below the refrigerant container, where it is cooled by contact with the refrigerant and repeats the cycle. This is called lateral or crosswise air circulation.

The Bonsall improved refrigerator car eliminates the necessity of the end ice bunkers, thus increasing the available lading space from 33 feet to 40 feet without increasing the train length of the car. Furthermore, in the conventional end bunker car, hereinbefore described, it is usually necessary to leave at least two feet between the top of the lading and the ceiling of the car for the warmed air to return to the end bunkers, whereas in Bonsall's top bunker car the lading can be loaded up to the ceiling, thus materially increasing the volume and weight of the lading without decreasing the efficiency of the refrigeration of the lading (in fact, tests show better refrigeration). Again to be specific: The usual load of oranges for the conventional forty foot end bunker car is 462 boxes loaded 7 rows wide, 33 stacks long and 2 tiers high (which is a unit for that particular fruit), whereas a Bonsall top bunker car of the same overall length and without a partition was actually loaded and shipped with 840 boxes of oranges loaded 7 rows wide, 40 stacks long and 3 tiers high, or one and eight-tenths units. The sizes and weights of the boxes are commercially recognized standards.

One of the objects of the invention is to provide a refrigerator car that will hold and refrigerate more than an established unit of lading which shall include means to segregate one unit from the remainder of the load so that said unit may be loaded and unloaded without disturbing the remainder of the load. The said remainder may be another unit, in which case a car of slightly greater overall length might be required. A top bunker car approximately 46 feet overall and having two 22' 2" compartments holds 462

boxes of oranges in each compartment, loaded 7 rows wide, 22 stacks long and 3 tiers high.

Another object is to provide a partition between the unit and the remainder which may be removed when not wanted; for instance, when more than a unit load is consigned to an auction market. Another object is to relate the doorway in the side wall of the car and the partition so that the car may be loaded through said doorway to either side of the partition and to provide two doors in the doorway which meet, when closed, at the partition so that either door may be closed and sealed independently of the other door and thereby prevent pilfering from one compartment while loading or unloading the other compartment.

Another object is to provide an insulated partition so that the commodities on opposite sides of the partition may be maintained at different temperatures.

Another object is to provide a wall or partition which is movable longitudinally of the car to divide the lading space of the car into equal or unequal sizes, as conditions may require, and to arrange the car and partition so that the partition may be moved against an end wall of the car when not in use, and to provide means to fasten said wall or partition in any of such positions.

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

In the drawings:

Fig. 1 is a longitudinal elevational sectional view of a refrigerator car embodying my invention.

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

Fig. 3 is a section on line 3—3 of Fig. 1.

Figs. 4 and 5 are longitudinal and transverse sections respectively of a standard size conventional end bunker car showing the usual 420 boxes of oranges loaded therein as hereinabove described.

Figs. 6 and 7 are longitudinal and transverse sections respectively of a two compartment top bunker car showing 420 boxes of oranges loaded in each compartment as hereinabove pointed out.

The general parts of the refrigerator car shown are insulated roof 2; spaced apart side walls 3; floor 4; hatches 5; refrigerant containers 6; side wall flues 7; foraminous floor rack 8 and space 9 between rack 8 and floor 4. Refrigerant containers 6 are positioned directly below the roof 2 and adjacent the side walls 3. Drip pans 12 are provided below the containers 6 and partitions 14 are secured in an upstanding position at the edges of the drip pans 12. The drip pans 12 and partitions 14 cooperate with the roof 2 and side walls 3 to form enclosing structures 11 around the containers 6, air inlet openings 15 being provided by spacing the partitions 14 from the roof 2. Air discharge openings 17 which lead to the flues 7 are formed by spacing the drip pans 12 from the walls 3. Cars of this type commonly have a row of refrigerant containers 6 near each side wall 3 and spaced apart at the center of the car. The partitions 14 are also spaced apart to form a duct 16 which communicates between the lading chamber 18 and openings 15.

Air circulation is as follows: Air in the lading chamber 18 is warmed by contact with the lading and rises through the duct 16 to enter the enclosing structures 11 through the air inlet

openings 15. The air is cooled by contact with the refrigerant containers 6 and falls by reason of its greater density through the discharge openings 17 and flues 7 to the space 9 whence it rises through the rack 8 to the lading chamber 18.

A doorway 25 is formed in each side wall 3 preferably midway between the ends of the car. Each doorway 25 is preferably provided with two doors 26 adapted to provide a closure therefor. Each door 26 comprises two sections 28, 29; the section 28 is hinged (31) to the side wall 3 and the section 29 is hinged (32) to the section 28. The doors 26 are opened as shown at 34 in Fig. 2 by imparting an outward motion to the sections 28, 29 adjacent the hinge 32. The means for imparting such outward motion may be a vertically extending rod 35 rotatably mounted (37) on each door 26 and keepers 38 secured to the side walls 3 of the car. The meeting edges of the doors 26 are preferably provided with relatively thick resilient padding 40. It is apparent from Fig. 2 that either door may be opened individually and without opening or disturbing any of the other doors. The rods 35 and keepers 38 permit the opening, closing and locking of any door individually and means are also preferably provided to seal each door individually. The sections 28, 29 of the doors 26 are preferably provided with flues 42 to assist in the distribution of cold air to the lading chamber 18 of the car.

A substantially vertical partition 50 is preferably provided to divide the lading chamber 18 into two compartments 51. The partition 50 may be constructed in any manner desired and in the form shown comprises spaced apart corrugated metallic plates 53 having linings 54 on the exterior thereof and insulation 56 therebetween. Means are preferably provided for moving the partition 50 to either the position shown midway of the doorways 25 or against one of the end walls of the car. In the former case, the car comprises two compartments, either of which may be loaded or unloaded independently of the other compartment and without breaking the seal thereof. In the latter case, a full size refrigerator car is available for carload lots.

The partition 50 may be moved on tracks 60, 61 extending longitudinally of the car. The upper tracks 60 are shown secured to the side walls 3 and the lower tracks 61 to the floor rack 8, although it is evident that the tracks may be supported by other parts of the car. Wheels or rollers 63 are pivotally mounted upon the partition 50 and engage the tracks 60, 61. Means are preferably provided to clamp the partition 50 in the desired position, such as the clips 64 secured to the partition 50 and the bolts 65 inserted through the clips 64 and upper track 60.

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 roof, floor and spaced apart walls which define a lading chamber, means to refrigerate said chamber, the combination of a substantially vertical partition arranged to divide said chamber into a pair of compartments, and a doorway in one of

said walls arranged to provide access to each of said compartments, said partition being movable to a position in said lading chamber remote from said doorway.

2. In combination with a refrigerator car having a lading chamber adapted to transport a perishable commodity, a foraminous rack spaced above the floor of the lading chamber and arranged to support said commodity, refrigerating means disposed in the upper part of the car and arranged to extend substantially the full length thereof, flue means arranged to conduct cold air from said means and distribute said air under the floor rack along substantially the full length of the lading chamber, partition means extending crosswise of the car arranged to divide said chamber into a plurality of compartments each of the proper size to accommodate substantially one complete unit of said commodity, and means arranged to provide access from the exterior of the car independently into each of said compartments.

3. The combination of a refrigerator car having a lading chamber and a lading in said chamber consisting of a perishable commodity, a floor rack spaced above the floor of said chamber to support said lading and provide a space between said lading and said floor, refrigerating means arranged in the upper part of the car, flue means associated with a wall of the car and arranged to distribute refrigerated air from said refrigerating means into said space substantially uniformly along the length of the car, and partition means extending crosswise of the car arranged to divide said chamber into a plurality of compartments, said commodity being contained in a plurality of packages of substantially uniform size whereof a predetermined number of said packages constitutes a unit of said commodity, one of said units substantially filling each of said compartments and being disposed in condition for effective refrigeration therein.

4. The combination of a refrigerator car having a lading chamber and a lading in said chamber consisting of a perishable commodity, a floor rack spaced above the floor of said chamber to support said lading and provide a space between said lading and said floor, refrigerating means arranged in the upper part of the car, flue means associated with a wall of the car and arranged to distribute refrigerated air from said refrigerating means into said space substantially uniformly along the length of the car, and partition means extending crosswise of the car arranged to divide said chamber into a plurality of compartments, said commodity being contained in a plurality of packages of substantially uniform size whereof a predetermined number of said packages constitutes a unit of said commodity, one of said units substantially filling each of said compartments and being disposed in condition for effective refrigeration therein, said par-

tion means being arranged to prevent access therethrough from one to another of said compartments.

5. The combination of a refrigerator car having a lading chamber and a lading in said chamber consisting of a perishable commodity, a floor rack spaced above the floor of said chamber to support said lading and provide a space between said lading and said floor, ice containing means arranged in the upper part of the car, and flue means associated with a wall of the car and arranged to distribute refrigerated air from said ice containing means into said space substantially uniformly along the length of the car, and partition means extending crosswise of the car arranged to divide said chamber into a plurality of compartments, said commodity being contained in a plurality of packages of substantially uniform size whereof a predetermined number of said packages constitutes a unit of said commodity, one of said units substantially filling each of said compartments and being disposed in condition for effective refrigeration therein.

6. In a refrigerator car having a lading chamber adapted to transport a perishable commodity contained in a plurality of packages an established number of which packages may be effectively refrigerated in a standard size refrigerator car having the refrigerating means disposed only adjacent the end walls thereof, the combination of a foraminous rack spaced above the floor of the lading chamber and arranged to support said commodity, refrigerating means in the upper part of the car, flue means arranged to distribute cold air from said refrigerating means under said rack substantially uniformly along the length of the car, and partition means extending crosswise of the car arranged to divide said chamber into a pair of compartments, each of said compartments having a cubical capacity of the proper size to accommodate substantially said established number of packages, said first mentioned refrigerator car having an overall height, length and width not substantially greater than said standard size refrigerator car.

7. In a refrigerator car having a roof, floor, spaced apart side walls and spaced apart end walls which define a lading chamber, the combination of means to refrigerate said chamber, a relatively wide doorway in at least one of said side walls, a movable partition arranged to extend substantially between said side walls and adapted to be positioned either remote from said doorway to provide access through said doorway to said chamber, or adjacent the center of said doorway to divide said chamber into a pair of compartments so that access may be had to either of said compartments through a portion of said doorway, and door means adapted to close said doorway.

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