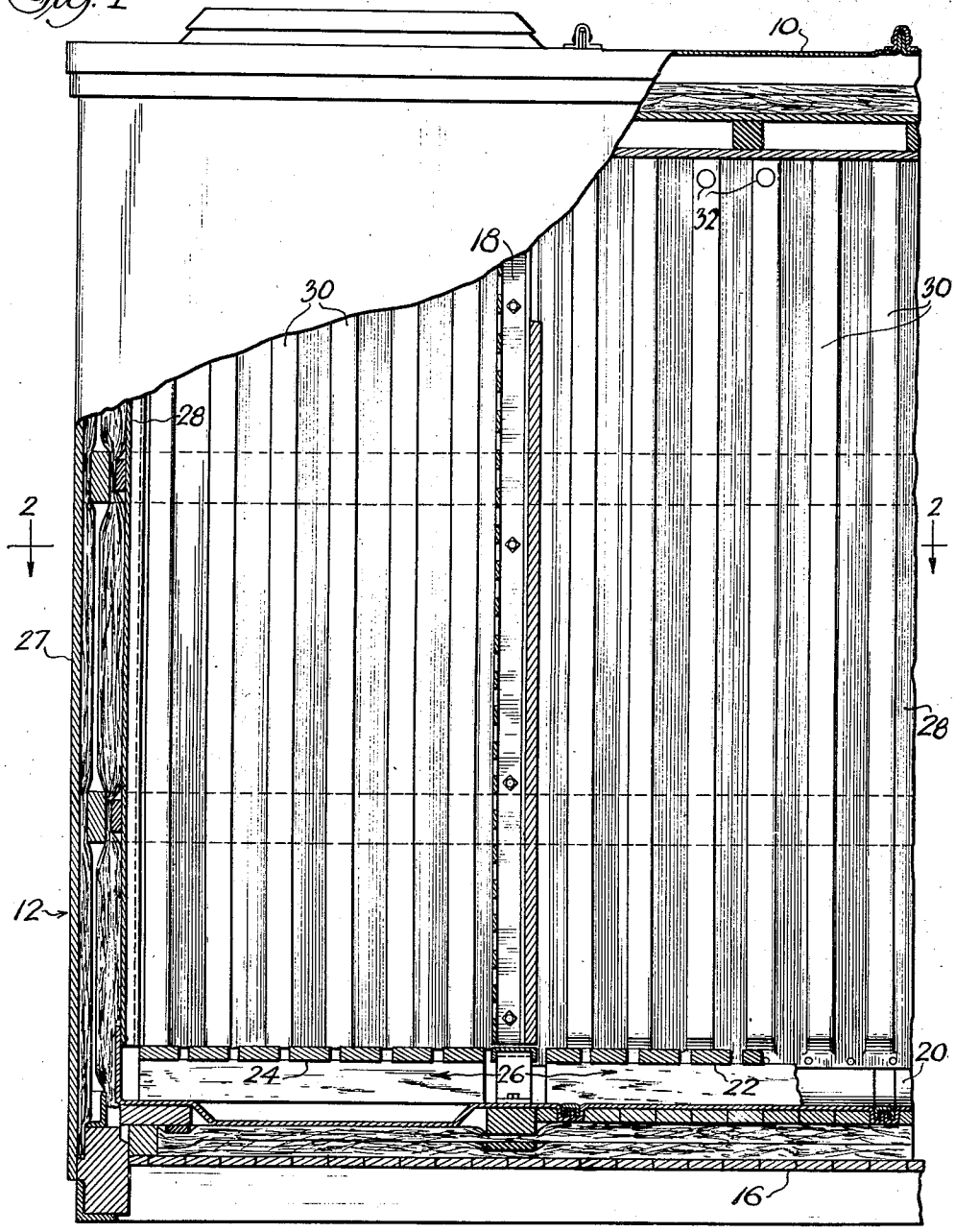
April 3, 1945. J. KING 2,372,961

REFRIGERATOR CAR CONSTRUCTION

Filed March 5, 1943 3 Sheets-Sheet 1

Fig. 1



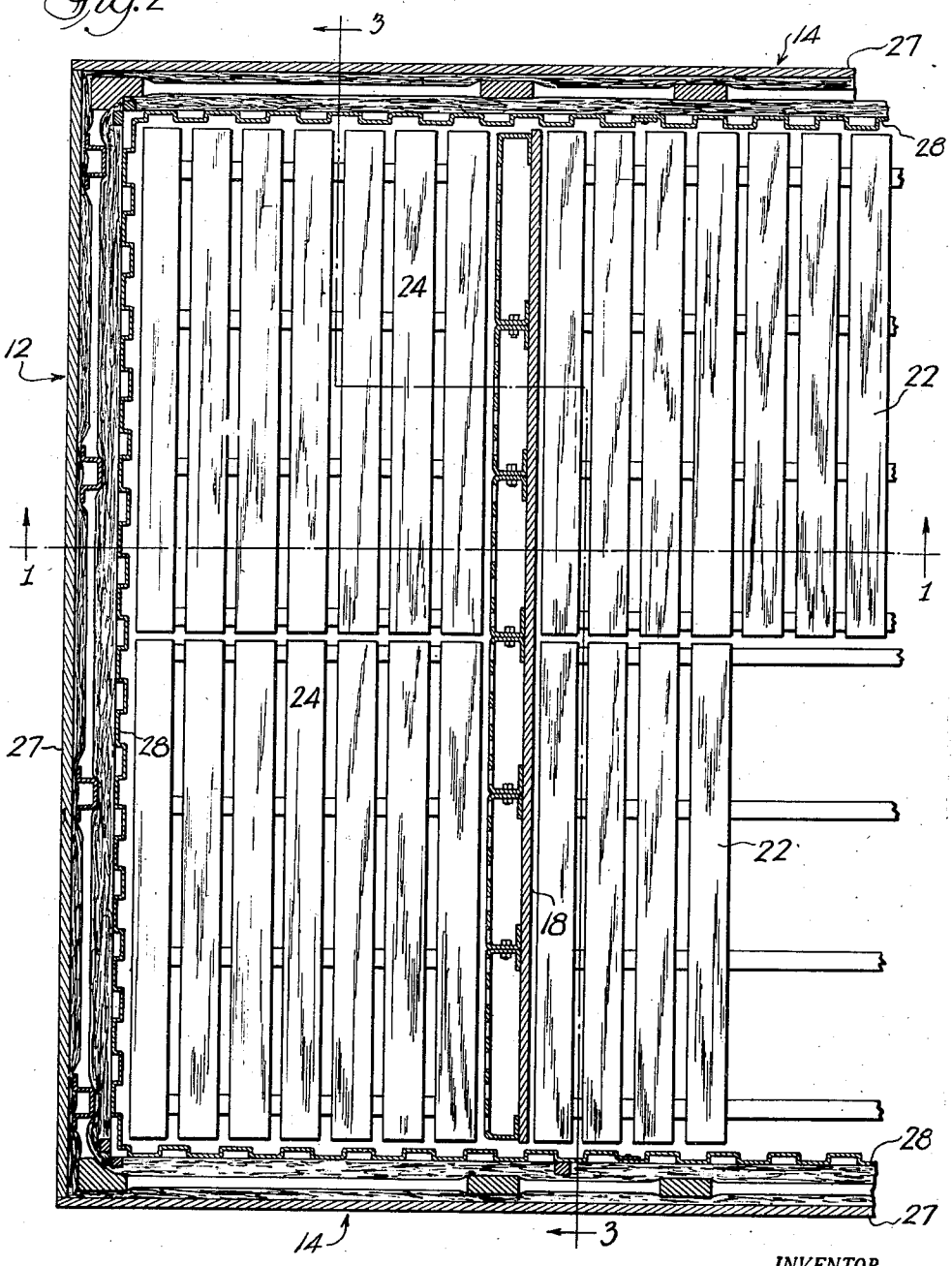
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REFRIGERATOR CAR CONSTRUCTION

Filed March 5, 1943 3 Sheets-Sheet 2

Fig. 2



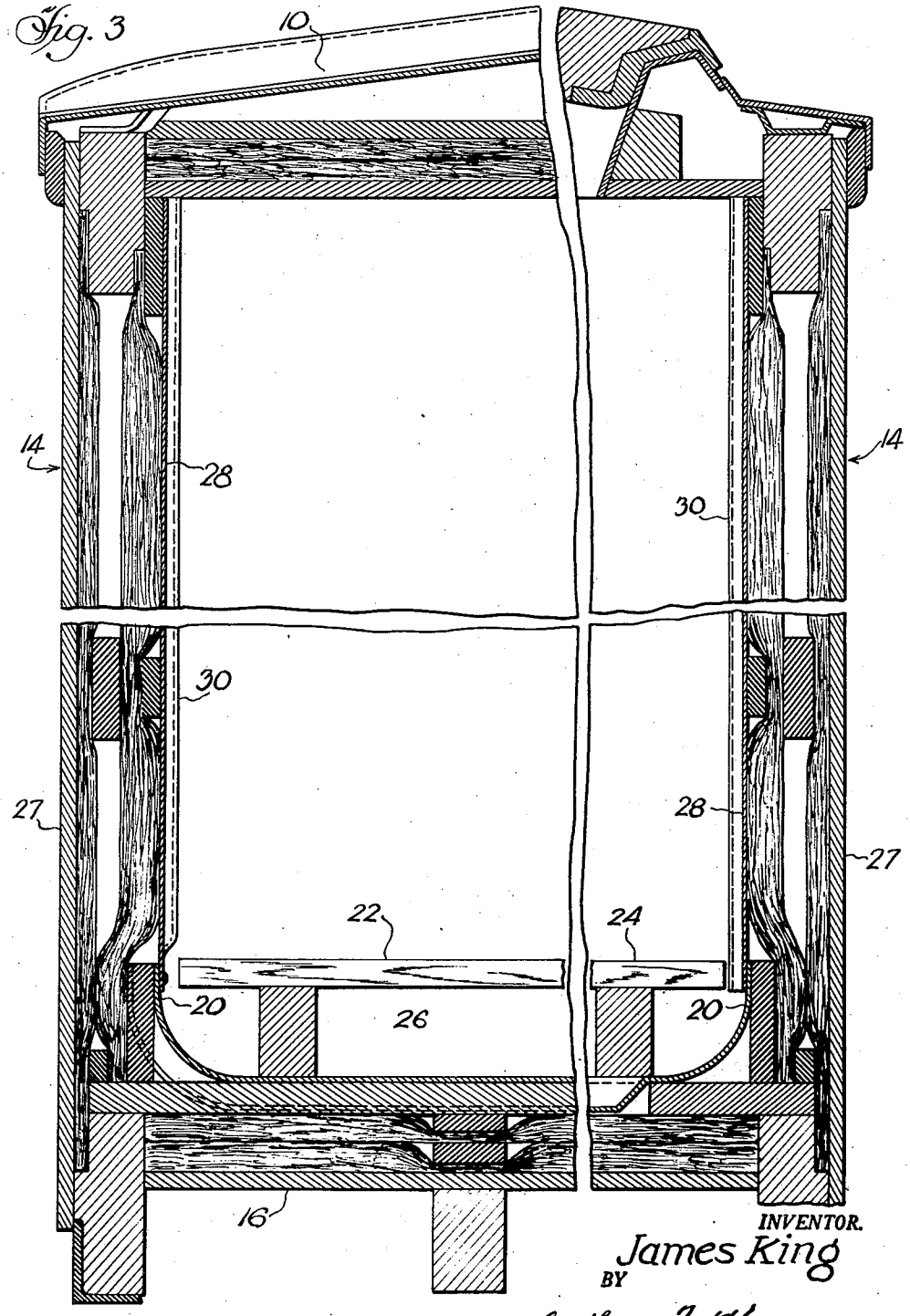
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Filed March 5, 1943 3 Sheets-Sheet 3

Fig. 3



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REFRIGERATOR CAR CONSTRUCTION

James King, Glendale, Calif.

Application March 5, 1943, Serial No. 478,088

3 Claims. (Cl. 62—19)

The invention relates to refrigerator cars used by the railroads in transporting perishable commodities and particularly to cars of this type which are equipped with ice bunkers for refrigerating the lading; and more particularly to cars having convertible ice bunkers.

The conventional refrigerator car has an ice bunker at each end thereof; the bunker being separated from an adjacent lading compartment by a transverse bulkhead. Most of these bunkers are permanently built in the car. Inasmuch as the average refrigerator car is used only about twenty five per-cent of the time in transporting lading under refrigeration, it has been found advantageous to use ice bunkers of the convertible type, which may be folded or otherwise moved to stored positions in the car, thereby lengthening the lading compartment and increasing the lading capacity in cars not requiring ice bunker refrigeration.

The most efficient type of ice bunker is known as the "basket" bunker and was recommended by the Department of Agriculture, in its bulletin No. 1398, as the standard bunker, after exhaustive research and experimentation with different types of ice bunker. The basket bunker, as recommended, owes its greater efficiency to the fact that the ice mass is spaced from the car walls and bulkhead, permitting the air in the car to contact practically the entire vertical side area of the ice mass and permitting the resulting chilled air to descend freely in the bunker and into the lading compartment. In other words, the entire outer area of the ice mass is utilized to chill the air in the bunker (maximum chilling efficiency from a given amount of ice) and the spaces between the ice mass and the walls of the bunker act as flues or ducts to conduct the chilled air into contact with the lading; the rate at which the air is chilled and the volume of air chilled being of great importance in determining the rate of circulation of the air through the car.

Numerous designs of convertible ice bunkers are now available to refrigerator car owners, most of which include a transverse bulkhead movable to a stored position parallel with and closely adjacent the end wall of the car. In order to accommodate the movement of the bulkhead, from extended to stored position, most of these designs omit the space between the ice mass and the side walls of the car and use the opposed side walls of the car as retaining walls for the ice mass. This is done in order that the side walls of the lengthened lading compartment be free from offsets throughout its length; offsets or projections on the lading compartment walls being highly undesirable as they damage boxed or cartoned lading when the lading shifts longitudinally of the car, in transmit. While the omission of the air ducts or spaces, between the ice mass and the side walls of the car, results in a flush side wall in the lading (lengthened) compartment, it also results in decreasing the efficiency of the ice bunker by eliminating approximately eighty four square feet of potential air chilling area of the ice mass, per car; each side of the ice mass (adjacent the car side wall) approximating twenty one square feet. It is an object of the present invention to provide these side wall ducts in the ice bunker, in order to provide the full efficiency of the basket bunker, and to provide a flush side wall throughout the lengthened lading compartment which will not interfere with the movement of the bulkhead from extended to stored position.

The lading in the conventional refrigerator car is supported above the car floor proper upon slatted floor racks, in order that the chilled air in the ice bunker may circulate underneath the lading; the lading being stacked up in direct contact with the ordinary wooden walls of the lading compartment. It will be seen that no means is thereby provided for the circulation of the air intermediate the lading and the side walls of the lading compartment; the circulation being limited substantially to the bottom of the lading. It is an object of my invention to provide improved means whereby the chilled air from the ice bunker may circulate around the lading, adjacent the side walls of the lading compartment, in order that the chilling effect of the air may be more evenly distributed throughout the lading, rather than to chill the bottom of the load and maintain a higher temperature adjacent the sides thereof.

The prior art teaches the use of wooden side walls in the lading compartment, with vertical grooves therein, but the permissible depth of these grooves (without weakening the wall boards) would not exceed one quarter of an inch, providing vertical air ducts of negligible cross-sectional area which might easily be obstructed entirely by the lading pressing itself into the grooves. Such grooves unquestionably weaken the wooden boards as compared with the conventional (ungrooved) wooden boards. It is an object of my invention to provide a lading compartment side wall having vertical ducts of substantially the same depth as the overall thickness of the wall.

The prior art teaches the use of vertical wooden strips affixed to the conventional wooden side

walls, in order to provide vertical side wall ducts. These strips are easily damaged and require frequent replacement, as well as reducing the width of the lading compartment; the latter being highly objectionable in the many cars having lading compartments of predetermined dimensions based upon multiples of crates or cartons of given dimensions, such as egg crates which must be packed in the cars without lateral play in order to eliminate damage to contents. It is an object of my invention to provide a substantially unitary wall member having vertical ducts therein, adapted to serve as lading retaining walls and air circulation means, requiring no additional strips.

The prior art teaches the use of lading compartment walls having outwardly offset vertical ducts therein, at infrequent intervals, and horizontally disposed slats spaced from and affixed to said walls and traversing said ducts. It is an object of my invention to provide a substantially unitary wall structure requiring no slats and provided with integral, closely and substantially uniformly spaced vertical air ducts throughout its area, providing uniform air circulation throughout the outer vertical sides of the lading.

Other objects and advantages of the invention will be apparent from the following description, taken in connection with the accompanying drawings, in which

Figure 1 shows a fragmentary vertical sectional view of the end portion of a car, taken along line 1—1 of Fig. 2.

Fig. 2 is a sectional plan view of the same portion of the car, taken along line 2—2 of Fig. 1.

Fig. 3 is an enlarged, partly broken sectional view taken along line 3—3 of Fig. 2; the bulkhead being omitted for clarity.

In the drawings, the reference numeral 10 indicates the top wall, 12 the end wall, 14 the side wall and 16 the bottom wall of the car; all of which may be of conventional insulated construction. An ice bunker may be provided in the end of the car and may be separated, by a transverse bulkhead 18, from an adjacent lading compartment. The bulkhead 18 may be movably supported in any of the conventional ways, as by rollers affixed to the bulkhead and supporting track means affixed to the car (not shown). When the ice bunker is not required, the bulkhead may be moved from the position shown in the drawings to a stored position adjacent and parallel with the end wall 12. The floor of the car may comprise a metallic sheet or sheets extending transversely of the car and terminating, adjacent the side walls, in upwardly turned margins 20. Slatted floor racks 22 and ice supporting grates 24 may be provided in raised overlying relation with the car floor, adapted to provide an air duct 26 beneath the ice and car lading throughout the length of the car interior.

The car walls 12 and 14 may comprise an outer wooden sheathing 27 and an inner metal lining 28, with insulation therebetween. The metal lining 28 may be provided with integrally formed, substantially uniformly spaced apart vertical corrugations and may extend from the ceiling of the car to a point below and in overlapping relation with the upwardly turned margins 20. While the corrugations in the lining 28 may be of various cross-sectional configurations, I prefer to have the apices (inner and outer) of the corrugations flattened and extending in planes parallel with the plane of the adjacent outer sheathing 27; the connecting walls being preferably perpendicular to the planes of the apices. This last described corrugation structure is designed to provide a lading compartment inner lining of great strength and to provide vertical air ducts having a depth substantially equal to the overall thickness of the lining.

I prefer to have the inwardly extending corrugations 30 of the lining 28 closed at the lower ends thereof, within the regular lading compartment. I prefer to have the lower ends of the inwardly extending corrugations 30 open at the lower ends thereof, in the ice bunker, in order that the corrugations 30 and the alternate outwardly extending corrugations may both serve as vertical air ducts in the ice bunker, in order to permit the maximum downward movement of chilled air in the bunker. While I show the upper ends of the corrugations 30 in abutting engagement with the car ceiling, thereby closing said upper ends, I contemplate providing a space between the upper margin of the lining 28 and the car ceiling, in certain car constructions, or the said upper margin may abut the ceiling, as shown, and an aperture 32 may be provided in the corrugation 30 adjacent its upper end. It is difficult to prevent moisture from entering the insulation and, as this is harmful to the insulation, the apertures 32 may be advantageous in permitting the insulation to dry out.

It will be seen that the corrugated wall of my invention is substantially uniform throughout the lading compartment and the ice bunker and that this wall replaces the conventional wooden inner lining of the car (not an addition thereto). This corrugated wall in the ice bunker eliminates the necessity for the usual panels of wire mesh or other foraminous material on the side walls and end wall of the car (to form ducts between the ice mass and the car walls), resulting in lower cost. The corrugated wall in the lading compartment requires no additional strips to space the lading therefrom and provides uniform air circulation throughout the side areas of the lading.

The accompanying drawings illustrate the preferred embodiment of my 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 side wall, an end wall, an ice bunker adjacent said end wall separated from an adjacent lading compartment by a transverse bulkhead; said side wall being provided with a sheet metal inner lining traversing said bunker and said compartment and extending substantially the full height of the car, said lining having vertical contiguous corrugations formed therein, the apices of the inwardly extending corrugations being in a common plane and defining an ice retaining wall in said bunker and a lading retaining wall in said compartment, the spaces between said last named corrugations forming vertical open air ducts adapted to provide air circulation between the ice and said lining and between the lading and said lining, and lading and ice supporting racks spaced above the floor of the car to leave an air space communicating with said air ducts.

2. The structure defined in claim 1, wherein the bulkhead is movable to a stored position adjacent said end wall thereby lengthening the lading compartment, the apices of the inwardly ex-

tending corrugations being in a common plane throughout the lengthened compartment adapted to provide a substantially flush lading retaining side wall whereby to prevent damage to the lading during the longitudinal shifting thereof in transit.

3. In a refrigerator car having a side wall, a floor, a ceiling and lading and ice supporting racks in overlying spaced relation with said floor with an air space therebetween, a bulkhead separating the car into an ice bunker compartment and a lading compartment, a sheet metal liner for the side wall extending substantially from the ceiling to the floor and provided with vertical contiguous corrugations terminating on the inner side in a common plane to define lading and ice retaining walls, the spaces between the inner corrugations forming vertical open ducts in the lading and ice compartments and the spaces between the outer corrugations in the ice compartment being formed for communication with the upper part of the ice compartment and said air space to provide air circulating channels around the ice compartment.

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