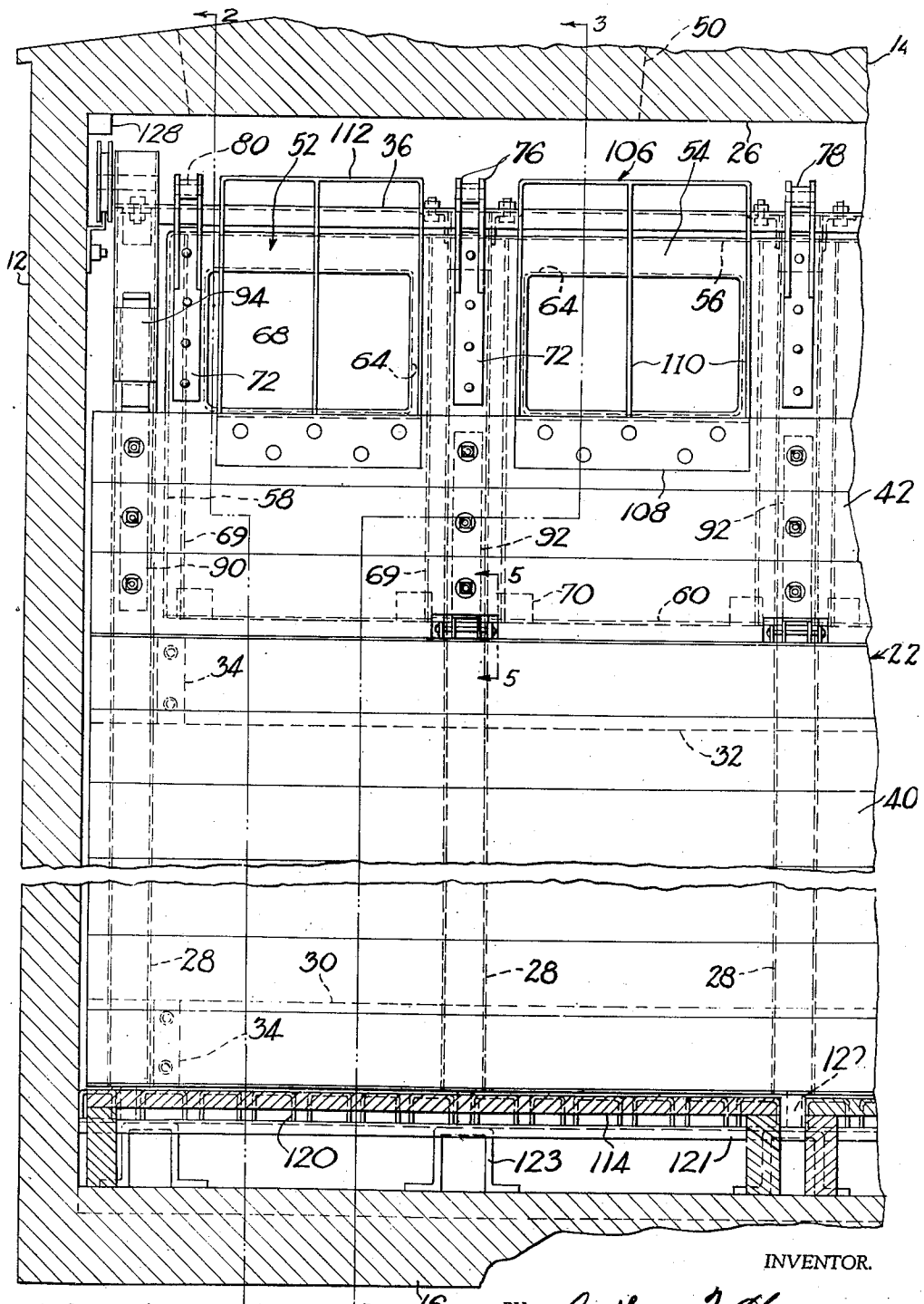
Nov. 9, 1943. A. F. O'CONNOR 2,333,949

CONVERTIBLE BULKHEAD FOR REFRIGERATOR CARS

Filed Sept. 18, 1942 4 Sheets-Sheet 1



INVENTOR.

BY Arthur F. O'Connor

Fig. 1

Nov. 9, 1943. A. F. O'CONNOR 2,333,949

CONVERTIBLE BULKHEAD FOR REFRIGERATOR CARS

Filed Sept. 18, 1942 4 Sheets-Sheet 2

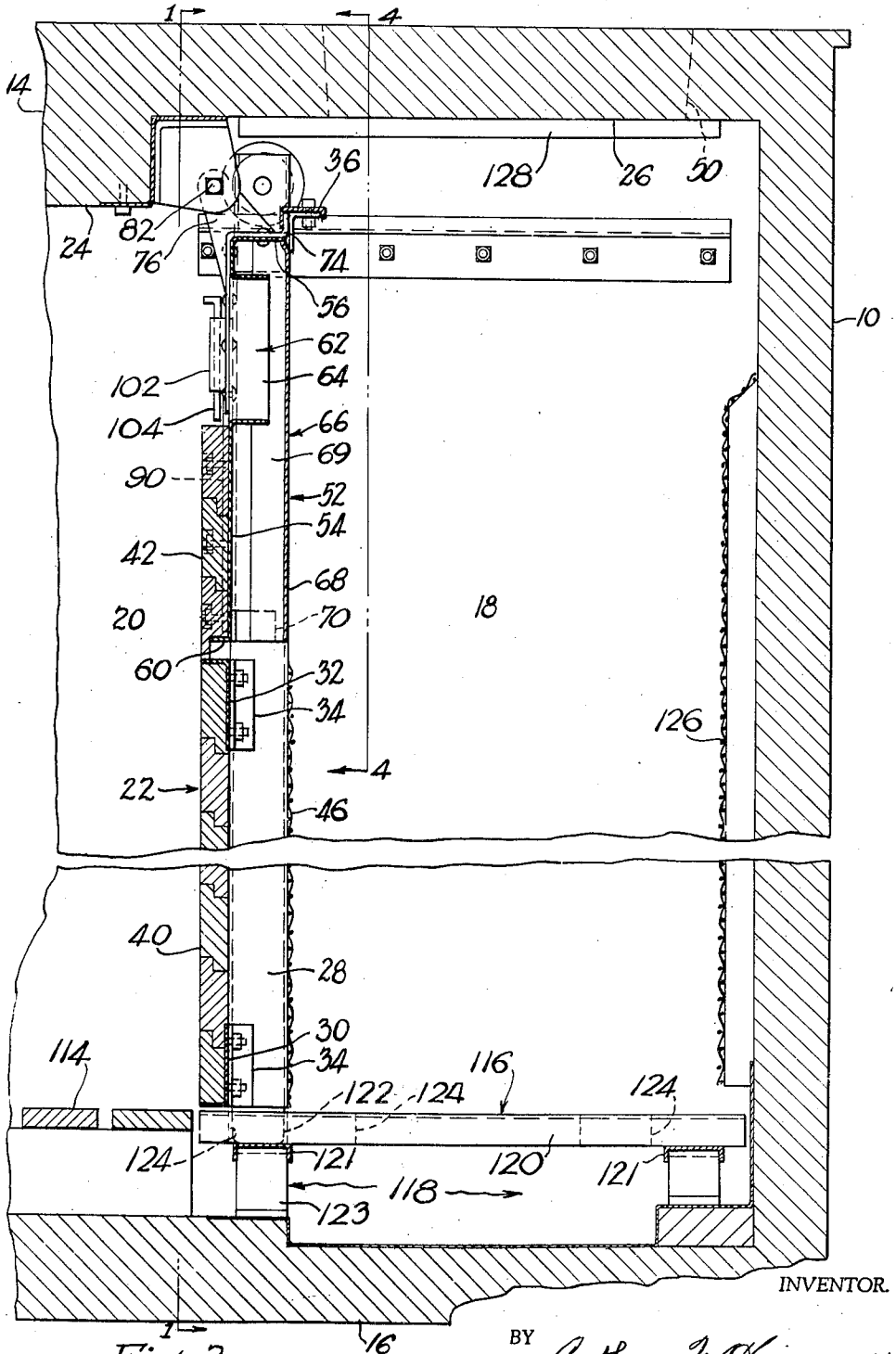


Fig. 2

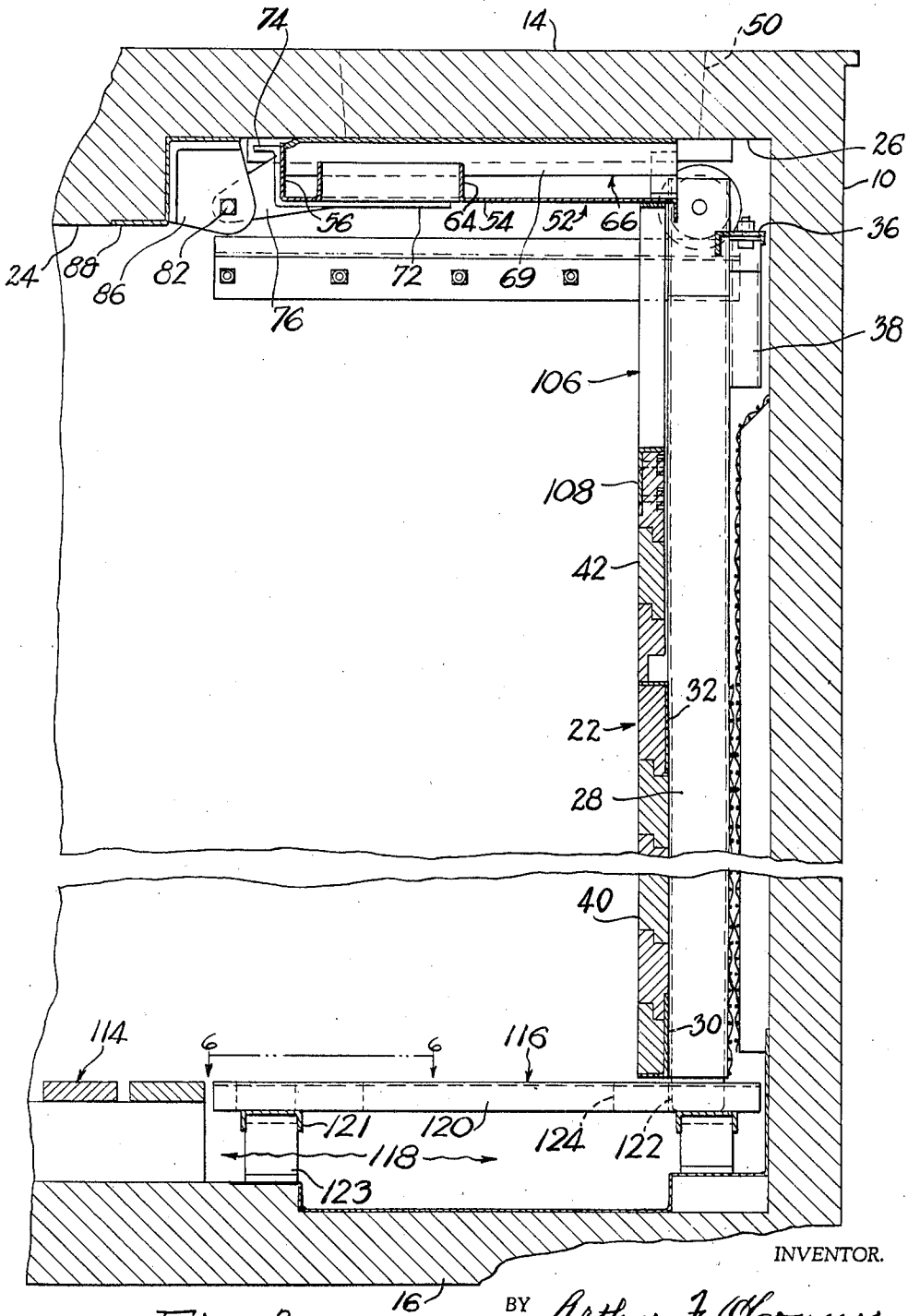
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CONVERTIBLE BULKHEAD FOR REFRIGERATOR CARS

Filed Sept. 18, 1942 4 Sheets-Sheet 3



INVENTOR.

BY Arthur F. O'Connor

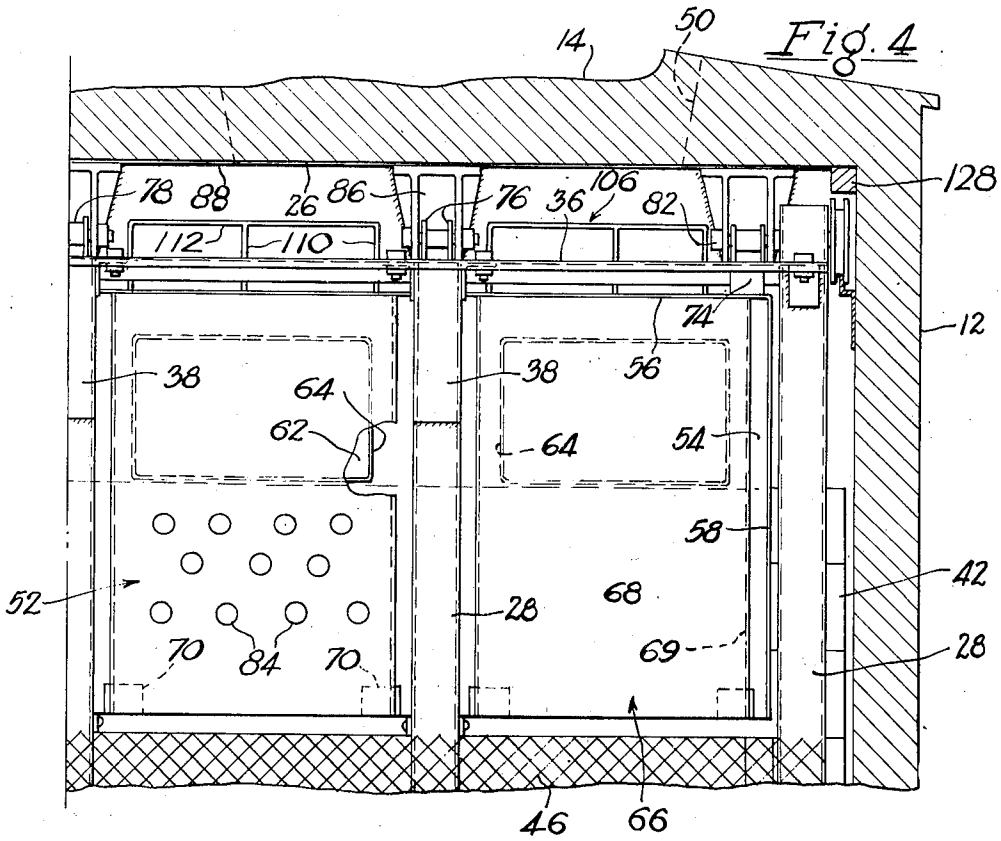
Fig. 3

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CONVERTIBLE BULKHEAD FOR REFRIGERATOR CARS

Filed Sept. 18, 1942 4 Sheets-Sheet 4

Fig. 4



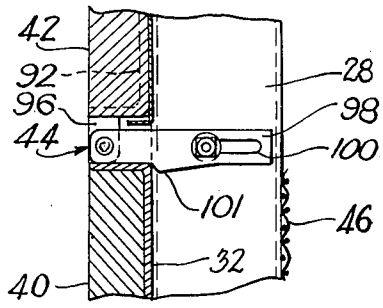


Fig. 5

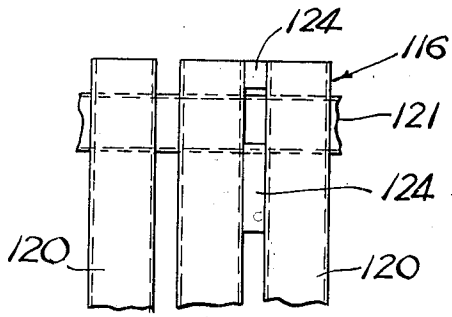


Fig. 6

INVENTOR.

BY Arthur F. O'Connor

Patented Nov. 9, 1943

2,333,949

UNITED STATES PATENT OFFICE

2,333,949

CONVERTIBLE BULKHEAD FOR REFRIGERATOR CARS

Arthur F. O'Connor, Chicago, Ill., assignor to Union Asbestos & Rubber Company, Chicago, Ill., a corporation of Illinois

Application September 18, 1942, Serial No. 458,756

10 Claims. (Cl. 62—19)

The invention relates to refrigerator cars and more particularly to refrigerator cars having a transverse bulkhead forming one of the walls of an ice bunker in the end of the car, the bulkhead being movable from ice bunker forming position to a stored position adjacent the end wall of the car. The purpose of the movable bulkhead is to provide a longer lading compartment in the car when ice bunker refrigeration is not required, thereby increasing the car load as compared with refrigerator cars having permanent bulkheads built in each end of the car.

Refrigerator cars are usually provided with hatch openings in the roof above the ice bunkers, as a means of loading the bunkers with ice. When the bulkhead is movable to a stored position adjacent the end wall of the car, a portion of the car lading will be beneath the hatch openings and, due to the fact that certain types of lading are moved under ventilation (one or more of the hatch covers being partly opened) it will be seen that the lading underneath the hatch openings must be protected from rain, cinders, snow, etc., which may enter the partly opened hatches, to prevent damaging the lading. Certain types of ventilating and lading-protecting panels have been used in the prior art for this purpose, such panels usually being separate from the bulkhead proper.

The principal object of the present invention is to provide a movable bulkhead and a ventilating panel wherein the panel will serve as part of the bulkhead when the latter is in bunker forming position, thereby reducing the cost and weight of the combination.

The weight of a movable bulkhead plus the weight of a separate ventilating panel is considerable as compared to the present invention of using the panel as part of the bulkhead (in bunker forming position). The trend for years has been toward eliminating every excess pound of dead weight from freight cars, for which reason the present invention is an important advance in the art. At this time particularly, and for some time to come, the saving in the use of critical materials (steel) is of great importance, for which reason the present invention is important. The cost of a convertible bulkhead and its associated parts is of great importance to car owners and it will be seen that, by using my ventilator panel as part of the bulkhead there will be a saving in cost, as compared with prior constructions wherein a complete bulkhead was used for one wall of the ice bunker and a complete separate ventilator panel was used to cover the lower portion of the hatch openings.

A further object is the provision of novel means for interlockingly securing the ventilating panel and the bulkhead proper to each other to form a substantially unitary bunker wall.

Another object is to provide means for anchoring the upper ends of the bulkhead posts to the ceiling structure, this anchorage being very important intermediate the side walls of the car as the posts are subject to shocks when the lading shifts against the bulkhead and when the ice shifts against the opposite side of the bulkhead.

A further object is the provision of means whereby the ventilating panel will be held in horizontal position by a portion of the stored bulkhead.

A further object is to provide a ventilating panel of novel construction wherein the outside air may enter the car through the hatch openings and panel but which will prevent the entrance of rain and elements harmful to the lading.

A further object is to provide a ventilating panel which, when in vertical position, will permit the passage of air therethrough into the ice bunker and which will prevent chip-ice from entering the lading compartment when the bunkers are being filled with ice.

Another object is to provide a ventilating panel having spaced apart walls and a bulkhead having spaced apart walls, the panel being nestable into the bulkhead whereby the spaced apart walls of the panel and the bulkhead are in substantially common planes.

A further object is the provision of a bulkhead having substantially vertical spaced apart walls, when in extended and stored positions, providing means for the orderly vertical stacking of crated articles such as citrus fruits, from the bulkhead at one end of the car to the bulkhead at the opposed end of the car.

A further object is to provide novel means for anchoring the lower ends of the bulkhead posts to the floor structure, in cooperation with the beforementioned means for anchoring the upper ends of the posts to the ceiling structure, without the use of manually operated latches or locks.

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

Figure 1 is a fragmentary vertical sectional view taken along line 1—1 of Fig. 2, with the

ventilating panel hinge butts (on ceiling) omitted for clarity.

Fig. 2 is a fragmentary vertical sectional view taken along line 2—2 of Fig. 1, showing the bulkhead extended.

Fig. 3 is a fragmentary vertical sectional view taken along line 3—3 of Fig. 1, showing the bulkhead in stored position and the ventilating panel in raised operative position.

Fig. 4 is a fragmentary vertical sectional view taken along line 4—4 of Fig. 2.

Fig. 5 is a fragmentary sectional view taken along the line 5—5 of Fig. 1, to show the hinge between the upper and lower wooden portions of the bulkhead.

Fig. 6 is a fragmentary plan view taken along line 6—6 of Fig. 3.

In the drawings, the reference numeral 10 indicates the end wall of a refrigerator car while 12, 14 and 16 indicate the side wall, top wall and bottom walls, respectively, all of which may be of conventional insulated construction. The end portion of the car may be provided with an ice bunker 18, separated from an adjacent lading compartment 20 by a transversely extending bulkhead 22. The bulkhead 22 may be movable from its extended ice bunker forming position, as shown in Fig. 2, to a stored position adjacent the end wall of the car, as shown in Fig. 3. The bulkhead may be provided adjacent its upper margins with suitable rollers adapted to travel upon a pair of tracks affixed to the opposed side walls of the car. The ceiling 24 of the car may be provided with an upwardly offset ceiling 26 above the ice bunker.

The bulkhead 22 may comprise a plurality of aligned vertical posts 28 spaced from each other transversely of the car and extending substantially from the lading floor to the ceiling thereof. The posts 28 may be connected adjacent their lower ends by a connecting beam 30 and may be connected intermediate their ends by a connecting beam 32, said beams being disposed perpendicularly with respect to the posts and secured to the posts by angular brackets 34. The upper ends of the intermediate posts 28 may be connected by a transversely extending angular beam 36 affixed adjacent its opposed end portions to the upper portions of the side posts 28. In the preferred form of the invention, as illustrated, the intermediate posts 28 terminate at their upper ends below the upper ends of the side posts 28 and may be provided with upwardly extending extension members 38 offset with respect to and welded to the posts. The lading compartment side of the bulkhead 22 may be provided, intermediate the boundaries of the opposed beams 30 and 32, with a wooden lining 40 which may comprise ship-lap boards affixed to the posts 28 by means of suitable brackets (not shown) similar to bracket 34. A wooden lining 42 may be provided above and in substantially coplanar alignment with the wooden lining 40 and may be hingedly secured to the posts 28 by hinges 44, whereby the lining 42 may be swung downwardly into abutting engagement with the lining 40, for purposes hereinafter explained. The ice bunker side of the posts 28 may be provided with a foraminous wall 46 in parallel spaced relationship with and of substantially the same area as the area of the wooden lining 40, providing an ice retaining wall and providing an air duct between the ice and the lining 40.

Hatch openings 50 may be provided in the top wall 14, above the ice bunker, to provide means for loading the bunker with ice from the roof of the car. A ventilating panel 52 may be hingedly secured to the top wall 14 of the car, adapted for swinging movement from a horizontal position underlying the hatch opening (when the bulkhead is in stored position) to a vertical position coplanar with the bulkhead (when the bulkhead is in bunker forming position).

In describing the form of the invention shown in the drawings, specific terms will be employed for the sake of clarity, but it is expressly understood that the scope of the invention is not thereby limited; each such term being intended to embrace all reasonable equivalents which perform the same function for an analogous purpose.

The ventilating panel 52

In Fig. 2 the ventilating panel 52 is shown in vertical position, where, but for the exception of the bulkhead posts, it serves as the bulkhead proper for approximately one third of the bulkhead. It will be seen that by using the ventilating panel for about one third of the double-walled construction of the bulkhead proper, a considerable amount of material is saved and a reduction in weight is effected, as compared to prior art construction in convertible bulkheads. In Fig. 3 the ventilating panel is shown in its horizontal position underlying the hatch opening 50, in position to permit air to enter the car through the hatch opening, prevent pilferage of the contents of the car through the hatch opening and prevent the entrance upon the lading of rain, cinders, etc., which might damage the lading.

Viewing the ventilating panel 52 in Fig. 2 of the drawings, the panel may comprise a substantially plane metallic sheet 54 in parallel abutting engagement with the vertical intermediate bulkhead posts 28 and extending vertically from the top boundary of the wooden lining 40 to a point adjacent the upper ends of the intermediate posts, and extending substantially from one side post 28 to the opposed side post 28 of the bulkhead. The top margin of the sheet 54 may be provided with a continuous flange 56 and the opposed vertical margins of the sheet 54 may be provided with flanges 58, flanges 56 and 58 may extend toward the end wall of the car and be joined at their intersections, as by welding. The lower margin of the sheet 54 may be provided with a flanged edge 60, extending preferably from one vertical flange 58 to the opposed flange 58, and extending in a direction toward the lading compartment of the car, adapted to serve as a stiffener longitudinally of the sheet 54 as one of its functions. The sheet 54 may be provided with one or more openings 62 adjacent its upper portion intermediate a pair of the posts 28 adapted to permit an exchange of air between the lading compartment 20 and the ice bunker 18. The openings 62 may be provided with marginal flanges 64 extending in the same direction as flanges 56 and 58 but being preferably shorter in depth than flanges 56 and 58.

A deflector 66 may be provided adjacent each opening 62 adapted to deflect air, entering the ice bunker through the opening 62, in a downward direction and to serve as a retaining wall for the ice in the bunker as well as a means for preventing the chip-ice (during ice loading of the bunker) from entering the lading compartment through the opening 62. The deflector 66 may comprise a metallic plate 68 in parallel spaced relationship with the sheet 54, extending vertically from the upper to the lower margin of the ventilating panel 52 and having a transverse

width greater than the space between the opposed vertical flanges 64 of the opening 62 and less than the space between adjacent posts 28. The opposed vertical margins of the deflector 66 may be provided with flanges 69 throughout their length and extending in an opposite direction to that of the adjacent flanges 64. The outer margins of flanges 69 may be in adjacent, spaced, overlapping relationship with the vertical flanges 64 and in spaced relationship with the sheet 54, whereby air, passing from the lading compartment into the ice bunker through the opening 62, will be baffled by the opposed flanges 69 when moving in a direction laterally of the car. The deflector plate 68 and the foraminous wall 46 are in substantially vertical coplanar alignment, both serving as complementary portions of a flush ice retaining wall of the bulkhead proper. The upper margins of the deflector plate 68 and its vertical flanges 69 may be affixed to the flange 56 as by welding and the lower margins thereof may be secured in spaced relationship with the sheet 54 by means of angular clips or brackets 70.

The ventilating panel 52 may be provided with spaced apart hinge straps 72 in vertical abutting affixed relationship with the upper portion of the sheet 54, the upper end portions of the hinge straps being bent over at right angles and affixed in abutting engagement with the upper flange 56 and provided with upwardly extending reflanged portions 74 adapted for interlocking holding engagement with the beam 36 of the bulkhead, when the bulkhead is in extended position, as shown in Fig. 2. The hinge straps may be provided at their upper end portions with spaced apart upstanding lugs 76, a ferrule 78 intermediate the spaced apart lugs and an aperture 80 extending through the lugs 76 and ferrule 78 adapted to receive a hinge pin 82.

The deflector plate 68 may be provided adjacent its lower portion with a series of apertures 84 if ventilation is desired through this plate as well as around it (as shown in Fig. 4 of the drawings).

The means for hingedly securing the ventilating panel to the top wall 14 of the car may comprise a plurality of hinge butts 86, each located coincident with the location of the hinge straps 72 laterally of the car. The hinge butts 86 may be fixed to the ceiling structure of the car as separate units, but I prefer to insure accurate spacing between the butts by welding or otherwise fastening them to an angular metal beam 88 and then bolting the beam 88 to the ceiling structure.

The wooden lining 42

It is important that all of the vertical walls of the lading compartment of a refrigerator car be as close to vertical and as free from projections or recessions as possible (both when the bulkhead is extended and when in stored positions) as lading, such as crated oranges and citrus fruits, carton goods, etc., require orderly vertical stacking from the lading floor to near the ceiling. The wooden lining 42 may comprise a panel of several ship-lap boards secured together by means of spaced apart vertical side straps 90 and intermediate hinge straps 92 which may be bolted to the boards. The side straps 90 may extend above the top margin of the wooden panel adapted to interlockingly engage adjacent locking means 94 affixed to the side posts 28 of the bulkhead. The lower end portion of hinge strap 92 may be provided with spaced apart ears 96 having aligned apertures therethrough adapted for securement to an adjacent post 28 by means of a pair of longitudinally slidable members 98 pivotally secured to the ears 96 at one end and slidably secured to the post 28 at their opposite ends. The slidable members 98 may be provided adjacent their point of securement to the post 28 with horizontally disposed elongated slots 100, one member being on one side of the post and the other member being on the opposite side of the post, and a bolt extending laterally through the post and the opposed slots 100 to movably secure the members 98 to the post.

The purpose of the slidable members 98 is to provide a hinge arrangement which will be flush with the outer surface of the wooden linings 40 and 42 and to permit the lining 42 to swing down into abutting engagement with lining 40. In order to prevent the lower portion of the lining 42 from moving outwardly from the posts 28 (when lining 42 is locked in raised position) the members 98 may be provided with lateral projections 101 adapted to engage the beam 32, as best shown in Fig. 5, it being understood that the upper end of the side straps 90 will abut a portion of the locking means 94 to prevent the lining panel 42 from raising when locked in position.

The locking means 94 may comprise a vertically extending U-shaped socket 102 affixed to the side post 28 and a slide bar 104 mounted therein for vertical movement.

Skeletal frame members 106 may be affixed above and to the upper margin of the wooden lining 42 intermediate the hinge straps 72 and may comprise an angle member 108 bolted to the upper margin of lining 42 and provided with upstanding spaced apart members 110 welded to the member 108 and connected at their upper ends by a transverse member 112 welded thereto.

The beam 36, connecting the upper portions of the posts 28 may comprise an inverted U-shaped elongated member having downwardly extending marginal flanges, one of which flanges is adapted to interlock with the reflanged portions 74 of the hinge straps 72 whereby to anchor the upper end portions of the intermediate posts 28 to the adjacent hinge butts 86 affixed to the top wall 14 of the car. The car may be provided with the usual floor racks 114 in the lading compartment of the car and the ice bunker 18 may be provided with a combined ice grate and floor rack extension 116, intermediate the floor racks 114 and the end wall of the car. The floor racks 114 and the floor rack extension 116 may have their upper load supporting surfaces in a common plane and are provided to keep the car lading and ice in overlying spaced relationship with the floor proper of the car, providing an air duct 118 between the lading and the car floor. The floor rack extension 116 may comprise a plurality of slats 120 extending longitudinally of the car and supported in parallel spaced relationship with each other and with the floor of the car upon transverse beams 121. The beams 121 may be disposed in supporting relationship with the opposed end portions of the aligned slats 120 and may comprise an inverted U-shaped elongated metallic member supported upon pedestals 123. The spacing between the slats 120 may be such that one or more of the spaces will be coincident with the location of one or more of the bulkhead posts 28 transversely of the car. The lower end of one or more of the bulkhead posts may be provided with a rigidly affixed downwardly extending

member 122 adapted normally to extend below the top surface of the slats 120 and adapted to travel within the space defined by a pair of adjacent slats 120 when the bulkhead is moved from one position to another. Each of the spaces coincident with a member 122 may be provided with detent members 124 which may extend across said spaces and be affixed rigidly to the opposed slats 120 defining said spaces, as best shown in Fig. 6 of the drawings. Two detent members 124 may be used to anchor the member 122 when the bulkhead is in its extended position and one detent member 124 may be used to anchor the member 122 when the bulkhead is in stored position. The detent members 124 may be solid metal blocks or they may be made of pressed steel shapes and they may be affixed to the adjacent slats 120 by welding or by fastening bolts or rivets. It will be noted as an item of considerable importance that the bulkhead and its associated parts are arranged to provide for the important circulation of air throughout the car. Looking at the bulkhead as shown in Fig. 2, it will be noted that the chilled air in the ice bunker may descend through the ice grate 116 and may freely pass into the air duct 118 where it will contact the car lading, rise to the ceiling of the car as it becomes warmer and return to pass through the openings 62 and downwardly through the air duct defined by the walls 40—42 and the opposed walls 68—46.

When the bulkhead is in stored position, as shown in Fig. 3, the air may enter the hatchway 50 after which it will be directed, by the ventilator panel 52, into the hollow bulkhead, downwardly through the bulkhead and thence out into the lading compartment of the car through air duct 118. The invention provides ideal air circulation which is of tremendous importance in refrigerator car construction.

The operation of the bulkhead

When the bulkhead is in extended position, as shown in Fig. 2, it may be moved to stored position by raising the slide bar 104, swinging the wooden panel 42 downwardly, pushing the bulkhead back toward the end wall of the car (the upper portion of the bulkhead being pushed forwardly of the lower portion until the members 122 pass over the intermediate detent members 124). The lower portion of the bulkhead may then be pushed forwardly of the upper portion until the members 122 are intermediate the rear detent members 124 and the end wall of the car. The bulkhead may then be pushed back to a vertical position adjacent the end wall screen 126 and secured to the end wall by any of the customary locking means such as hooks and eyes. The ventilating panel 52 is then swung up to horizontal position and the wooden panel 42 is swung upwardly and locked against the bulkhead posts by the locking means 94, the frame members 106 securing the ventilating panel in operative horizontal position. The members 122 of the bulkhead preferably rest upon the beams 121 (when the bulkhead is in stored and extended positions), at which time the bulkhead rollers are slightly raised off the side wall tracks. The side wall tracks may be provided with stop means adjacent their ends farthest from the end walls, to limit the movement of the rollers in a direction away from the end wall of the car.

When the ventilating panel 52 is in horizontal position it will be seen that the deflector plate 66 will prevent passage of air or air borne elements directly through the panel in a vertical direction, such air and air borne elements being required to follow a tortuous course before passing downwardly into the car. It will be further understood that such air borne elements will be prevented, to a great extent, from entering upon the lading underneath the horizontal ventilating panel 52, by the upstanding flanged margins of the opening 62. A wood strip 128 or its metal equivalent may be affixed to the car above the bulkhead rollers to prevent the rollers lifting too far above the tracks.

The bulkhead posts 28 and the post extensions 38 may be made in the form of box girders and are thus shown in the drawings. These posts and post extensions may also be made of wood or other suitable material.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. In a refrigerator car having an ice bunker in an end thereof, including a movable bulkhead having spaced apart walls adjacent its lower portion; a deflector swingably mounted above the bulkhead having spaced apart walls above and in substantially vertical alignment with said first named walls, said spaced apart walls extending in a plane parallel with the plane of the bulkhead with a vertical air duct therebetween.

2. In a refrigerator car having an ice bunker in an end thereof, including a movable bulkhead having spaced apart walls adjacent its lower portion and an upper portion of skeletal construction; a deflector swingably mounted above the bulkhead having spaced apart walls above and substantially coplanar with said first named walls, said spaced apart walls extending in a plane parallel with the plane of the bulkhead with a vertical air duct therebetween.

3. In a refrigerator car having an ice bunker in an end thereof, including a movable bulkhead having spaced apart walls adjacent its lower portion; a deflector swingably mounted above the bulkhead having spaced apart walls substantially coplanar with said first named walls, said spaced apart walls extending in a plane parallel with the plane of the bulkhead providing a vertical air duct therebetween of substantially uniform minor width throughout the vertical dimension of the bulkhead.

4. In a refrigerator car having an ice bunker in an end thereof, including a movable bulkhead having spaced apart walls adjacent its lower portion and an upper portion of skeletal construction; a deflector swingably mounted above the bulkhead and provided with spaced apart walls substantially coplanar with said first named walls, said deflector being nestable with said upper portion of the bulkhead, said spaced apart walls extending in a plane parallel with the plane of the bulkhead providing a vertical duct therebetween of substantially uniform minor width traversing said deflector and said lower portion.

5. In a refrigerator car having an ice bunker in an end thereof, including a movable bulkhead having spaced apart walls adjacent its lower portion; a deflector swingably secured to the car above the bulkhead by hinge means, said deflector having spaced apart walls substantially coplanar with said first named walls, said spaced apart walls extending in a plane parallel with the plane of the bulkhead providing a vertical duct therebetween, said hinge means having cooperative holding engagement with the upper portion of

the bulkhead whereby to anchor said bulkhead against movement longitudinally of the car.

6. In a refrigerator car having an ice bunker including a movable bulkhead having spaced apart walls adjacent its lower portion; a deflector swingably mounted above the bulkhead having spaced apart walls substantially coplanar with said first named walls, said spaced apart walls extending in a plane parallel with the plane of the bulkhead with an air duct therebetween, one of the walls of said deflector having an aperture therethrough and the opposed wall being disposed in front of said aperture whereby to deflect an air current passing through said aperture in a horizontal direction.

7. In a refrigerator car having an ice bunker, including a movable bulkhead having upstanding posts aligned transversely of the car and provided with spaced apart walls affixed to opposed sides of the lower portions of said posts, the upper portion of the bulkhead being of skeletal construction; a deflector swingably mounted above the bulkhead with spaced apart walls in substantially coplanar alignment with said first named walls, one of the walls of the deflector being nestable with the said skeletal construction, said spaced apart walls extending in a plane parallel with the plane of the bulkhead with a vertical air duct of substantially uniform minor width therebetween, said duct traversing said lower portion of the bulkhead and said deflector whereby said deflector constitutes a complementary part of said bulkhead.

8. In a refrigerator car having an ice bunker in an end thereof, a hatch above said bunker, a transverse bulkhead forming a wall of said bunker provided with spaced apart walls adjacent its lower portion; a deflector swingably mounted above the bulkhead provided with spaced apart walls substantially coplanar with said first named walls, said spaced apart walls extending in a plane parallel with the plane of the bulkhead with a vertical duct therebetween, said bulkhead being movable to a stored position adjacent the end wall of the car, said deflector being swingable to a horizontal position underlying said hatch, and a member associated with the bulkhead swingable upwardly to a position supporting said deflector in horizontal position when the bulkhead is in stored position.

9. In a refrigerator car having an ice bunker in an end thereof including a movable bulkhead having upstanding posts aligned transversely of the car and provided adjacent its lower portion with spaced apart walls, the upper portion of the bulkhead being of skeletal construction, a wall section swingably mounted adjacent the upper margin of one of said walls adapted for coplanar alignment with and above said one of said walls; a deflector swingably mounted above the bulkhead including a metal sheet adapted for flatwise engagement with the aligned posts intermediate said wall section and said posts, said sheet having an aperture therethrough and a parallel spaced apart metal sheet in front of said aperture adapted to deflect an air current passing through the aperture in a horizontal direction, said wall section being adapted to cooperatively secure said bulkhead and deflector in engagement when in raised position and to permit said deflector to be swung away from said bulkhead when in lowered position, and means associated with the bulkhead adapted to lock said wall section to said bulkhead.

10. In a refrigerator car having an ice bunker in an end thereof separated from an adjacent compartment by a bulkhead movable to a stored position adjacent the end wall of the car; a hatch above said bunker; a deflector mounted above the bulkhead swingable from a vertical position adjacent the extended bulkhead to a horizontal position across and beneath the hatch when the bulkhead is in stored position, said deflector including a metal sheet disposed in a horizontal plane and provided with an aperture therethrough having an upstanding peripheral flange, and a second sheet in parallel overlying spaced relationship with said metal sheet, said second sheet being imperforate directly above said aperture and provided with depending marginal flanges in outwardly spaced overlapping relationship with said peripheral flange, said flange and flanges being of lesser width than the spacing between the opposed sheets, said second sheet being adapted to deflect air and air borne elements entering the car through the hatch whereby said air and air borne elements will be required to follow a tortuous path before passing through the aperture, said deflector being supported in horizontal position by a portion of the stored bulkhead below said deflector.

ARTHUR F. O'CONNOR.