Dec. 7, 1943. H. GIDDINGS 2,336,439

COLLAPSIBLE ICE BUNKER

Original Filed Sept. 26, 1940 2 Sheets-Sheet 1

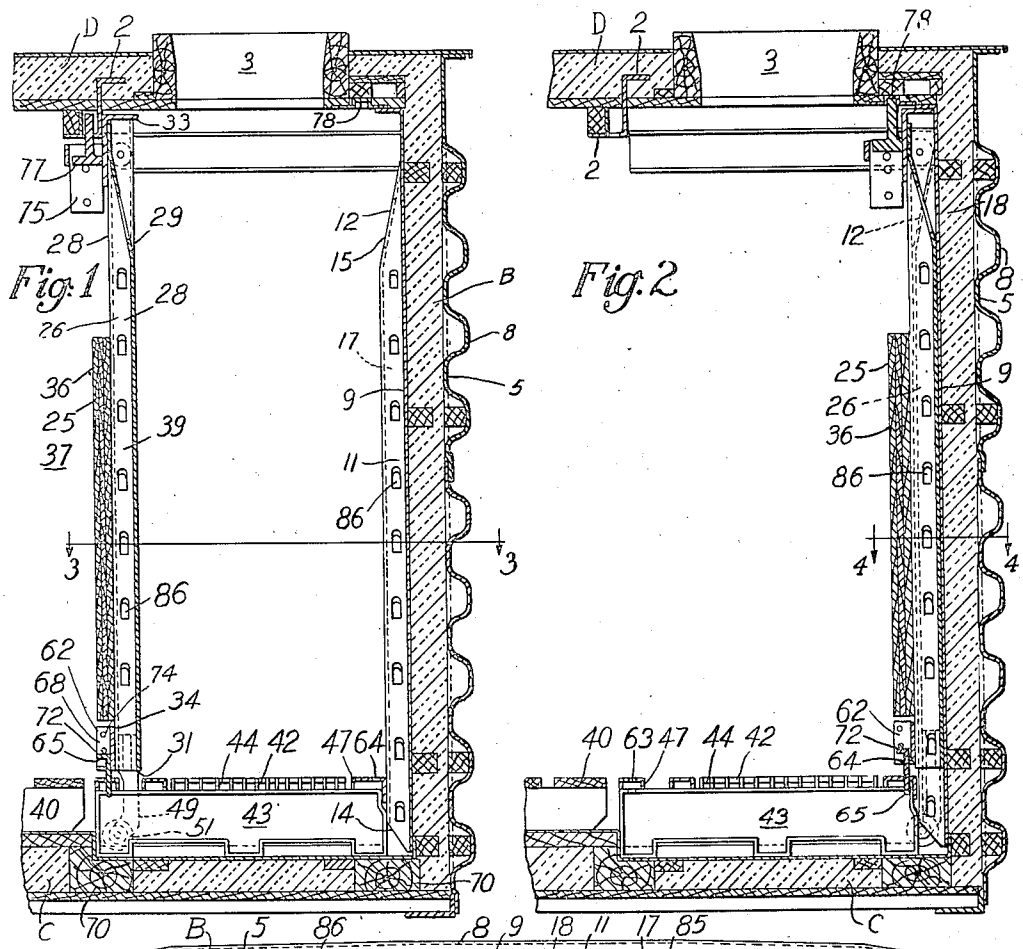


Fig. 1

Fig. 2

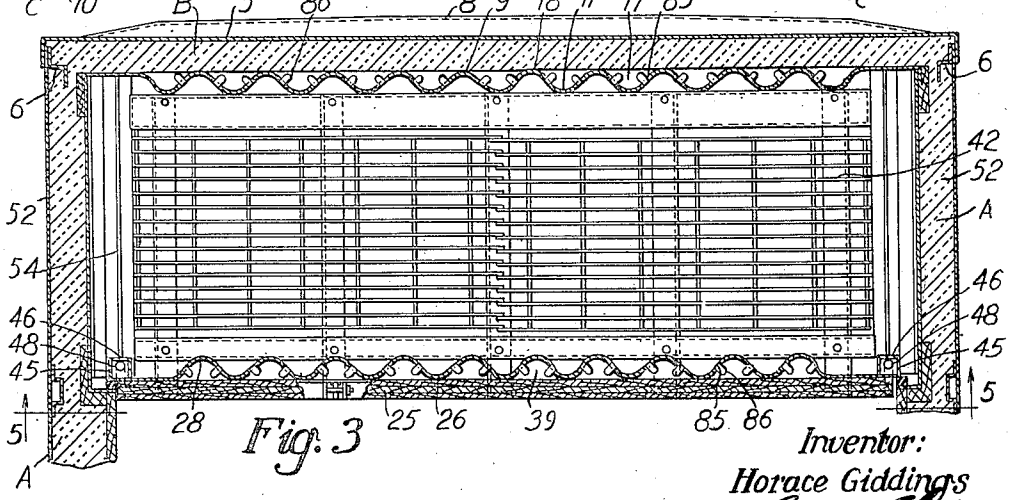


Fig. 3

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COLLAPSIBLE ICE BUNKER

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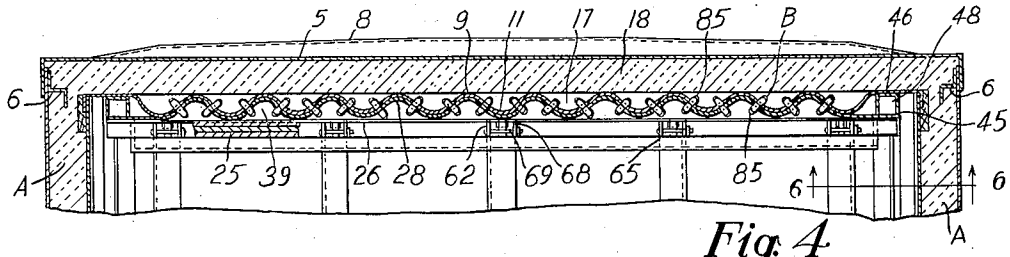


Fig. 4

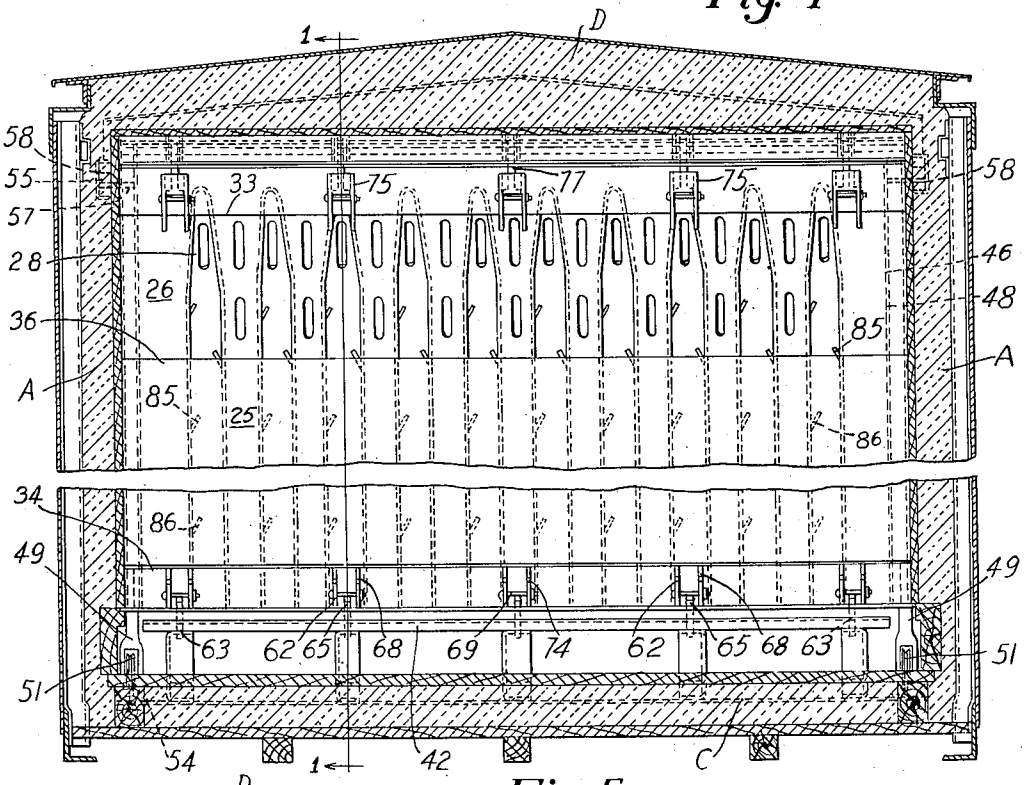


Fig. 5

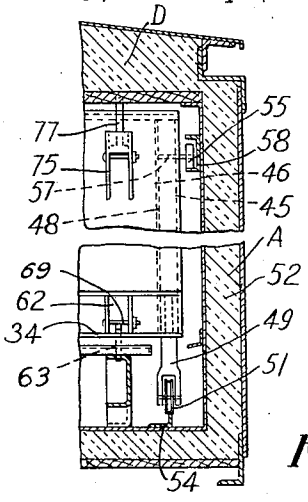


Fig. 6

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2,336,439

COLLAPSIBLE ICE BUNKER

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Original application September 26, 1940, Serial No. 358,381. Divided and this application April 24, 1942, Serial No. 440,365

8 Claims. (Cl. 62—19)

This invention relates to refrigerator cars used to transport perishable commodities at a predetermined temperature. The essential features of a refrigerator car are an insulated body to prevent or retard ingress of heat during warm weather and egress of heat during cold weather and a cooling means and sometimes a heating means to be used during warm and cold weather respectively.

The invention relates particularly to a collapsible ice bunker for a refrigerator car. Such a bunker comprises a bulkhead which extends between the side walls of the car in spaced relation to the end wall, thereby forming the ice bunker between the bulkhead and the wall. Ice in the lump or crushed form is deposited in the bunker and the car is refrigerated by the melting of the ice. When the bunker is collapsed the bulkhead is moved to a position adjacent the end wall in flat-wise relation therewith. This leaves substantially the entire interior of the car available for the lading and the car may be operated in standard box car service, in ventilated service often provided for perishable commodities, or for top icing service sometimes provided for other types of perishable commodities.

An object of the invention is to provide a bunker which, when collapsed, infringes but little upon the lading space of the car. The bulkhead is provided with corrugations which nest in somewhat similar corrugations associated with the end wall of the car.

Another object is to provide a foraminous member which serves the dual purpose of forming a grate for supporting a refrigerant when the bunker is in its extended position or forming an extension of the floor rack for supporting the lading when the bunker is collapsed. Such foraminous member is preferably immovably fixed within the car so that no adjustment thereof is necessary for the conversion from one to the other of said purposes. A further object is to utilize said foraminous member as a support for the lower edge of the bulkhead and a still further object is to align the supporting elements of both said foraminous member and the conventional floor rack for the purpose of providing a path for the unrestricted flow of air.

Another object is to provide a bulkhead having great strength for the purpose of resisting substantially the end-wise thrust of the lading when the bunker is in the extended position and of reinforcing the end wall of the car when the bunker is collapsed.

Another object is to provide a collapsible bunker which may be adjusted to either of its positions without the use of special tools or fittings. All the parts required are attached to the car in such a way that they are readily available for positioning the bulkhead in either position.

It is a further object to provide a plate having vertically extending corrugations in both the bulkhead and the end wall of the car. In addition to adding strength to the bulkhead and end wall, the corrugations form flues for the circulation of air within the car. The plates are cooled by conduction from the ice and tongues or inverted louvers are formed in the plate, which tongues or inverted louvers project into the flues and further cool the air circulating therein.

So-called top icing has recently come into extensive use in the shipment of certain products, principally fresh vegetables. In cases where the products are packed in crates or boxes, ice which may be cracked or in small lumps is inserted within the crates during the packing thereof and also between the crates during loading of the refrigerator car. After the car is loaded more ice, which may be cracked or preferably pulverized, is placed on top of the load. The pulverized ice is commonly loaded by blowing it through a hose into the car. A refrigerator car equipped with the collapsible bunker described herein is particularly suitable for the use of top icing because there are no obstructions under the ceiling to interfere with the blowing of the ice.

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 transverse section through a refrigerator car embodying my invention and showing the bunker in its extended position.

Fig. 2 is a view similar to Fig. 1 but showing the bunker in its collapsed position.

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

Fig. 4 is a plan section taken on line 4—4 of Fig. 2.

Fig. 5 is a transverse vertical section through the lading compartment of the car adjacent the bulkhead as indicated by line 5—5 of Fig. 3.

Fig. 6 is a vertical section through the side wall of the car adjacent the ice bunker as indicated by line 6—6 of Fig. 4.

The refrigerator car shown in the drawings comprises the usual side walls A, end walls B, floor C and roof D. A carline 2 helps support the roof D and also provides a support for the bulk-

head as will be hereinafter described. Hatches 3 are provided in the roof D which are used for loading refrigerant into the bunkers when the car is operated under refrigeration and for directing air into the car when the bunker is collapsed and/or the car is to be used as a ventilator. The end wall B of the car is comprised of a metallic plate 5 extending between and secured to the opposite corner posts 6 of the car and provided with outwardly projecting substantially horizontal corrugations 8 which function as beams extending, effectively, between the corner posts 6.

The inner surface of the end wall B is also a metallic plate 9 formed with inwardly projecting and vertically extending corrugations 11. The corrugations 11 at their upper ends merge (12) into the plane of the plate 9, while at the lower margin of the plate the plate is cut (14) through the corrugations 11. Apertures 15 are provided in the upper merging parts 12 of the corrugations 11 for the entrance of air into the flues 17 which are included between the corrugations 11 of the plate 9 and the end wall insulation 18. Some means, such as a metallic plate or heavy paper, may be provided between the end wall insulation 18 and the plate 9 to keep the insulation out of the flues 17.

The bulkhead 25 comprises a metallic plate 26 formed with vertically extending corrugations 28 which merge (29) at their upper ends into the plane of the plate 26. The plate 26 is cut off (31) through the corrugations 28 at the lower margin of the plate. Horizontally extending reinforcing members 33, 34, preferably angles, are provided at both the upper and lower margins of the plate 26. A relatively rigid sheathing 36, preferably made of wood, is secured to the side of the corrugated plate adjacent the lading compartment 37 of the car to form flues 39 between the sheathing 36 and the corrugations 28. The central part of the car is provided with the conventional floor rack 40 and the end portion of the car is provided with an auxiliary rack 42 which is used as a floor rack when the bulkhead is in the position shown in Fig. 2 and is used as an ice grate when the bulkhead is in the position shown in Fig. 1. The auxiliary rack 42 preferably comprises spaced apart diaphragms 43 having their webs disposed substantially vertically and any suitable type of foraminous floor 44 extending between and secured to the diaphragms 43. The crosswise extending inverted channel members 47 connect the end portions of the diaphragms 43.

The vertical edges of the plate 26 are provided with flanges 45 directed toward the end wall B and angle members 46 are secured, preferably by welding, to the flanges 45 and the body part of the plate 26 to form hollow columns 48 extending from the upper margin to the lower margin of the plate 26. Pedestals 49 depending below the plate 26 are inserted in the lower ends of the hollow columns 48 and rollers 51 are pivotally mounted on the lower ends of the pedestals 49. A part of the side lining 52 adjacent the ice bunker is offset outwardly; that is, the side walls A in this region are thinner than at the central portions of the car. Tracks 54 are mounted upon the floor C of the car upon which the rollers 51 operate; the upper part of the bulkhead 25 is guided by rollers 55 mounted upon horizontally extending journals 57 fixed to the bulkhead 25. The upper rollers 55 operate in inwardly facing channel upper tracks 53 secured to the side walls A of the car. The auxiliary floor rack 42 is spaced from the side wall A on opposite sides of the car to provide openings for the passage of the pedestals 49 during adjusting of the bulkhead 25.

The bulkhead 25 may be adjusted either to the position shown in Fig. 1 wherein the part of the car between the end wall B and the bulkhead 25 is used as an ice bunker or to the position shown in Fig. 2 wherein the entire interior of the car is used to carry the lading. In order to anchor the bulkhead in either of the above described positions the following means are provided:

At the lower part of the bulkhead 25, a plurality of spaced apart vertically extending channels 62 are provided on the lower reinforcing member 34, the channels facing away from the adjacent end wall B. In line with each channel 62 an aperture 63 is provided in the inverted channel members 47 and an angle-shape locking pin 65 is provided within each channel 62 and arranged so that the lower end thereof fits into an aperture 63 in an inverted channel member 47. Holes are provided in the flanges 68 of the channels 62 for the insertion of bolts 69 when it is desired to lock the bulkhead 25 in either position. The pins 65 are inserted through the apertures 63, 64 in either the front or rear channel members 47 of the auxiliary rack 42 and bolts 69 inserted through the flanges 68 of the channels 62 bear against the horizontal legs 72 of the locking pins 65 to prevent the upward movement thereof. It is evident from Fig. 1 that a thrust by the lading upon the bulkhead is transmitted by the locking pins 65 to the auxiliary rack 42 and thence to the lower part of the plate 9 which forms a part of the end wall B. It may be desirable to bolt, or otherwise secure, the diaphragms 43 to the crosswise extending members 70, or any other suitable part of the floor structure C, for the purpose of transmitting a portion of the thrust to the underframe of the car.

When it is desired to free the bulkhead for adjustment, the locking pins 65 may be moved upwardly and bolts inserted through the upper holes 74 and arranged to underlie the horizontal legs 72 of the locking pins 65. At the upper part of the bulkhead 25, a substantially similar locking arrangement is provided. The spaced apart channels 75 are secured to the upper reinforcing member 33 and T-shape locking pins 77 slide in the channels and are arranged to be inserted through holes provided in the carline 2 when the bunker is extended or in the recesses 78 when the bunker is collapsed.

The portions of the metallic plates 9, 26 which form the webs of the corrugations 11, 28 are preferably perforated (85) and the metal removed from such perforations is preferably left attached to the plates 9, 26 at the lower margins of the perforations 85 so as to form inverted louvers 86, or in other words, tongues projecting into the flues 17, 39. It is apparent from Fig. 4 that the tongues formed in the corrugated plate 9 of the end wall B project toward the exterior of the end wall and that the tongues formed in the bulkhead plate 26 project toward the lading compartment 37 of the car. When the bunker is collapsed and the corrugated plates 9, 26 of the end wall and the bulkhead are nested, the tongues 86 do not interfere with such nesting. It is pointed out that the perforations 85 required to form such tongues are substantially in the neutral axes of the corrugated plates so that the strength thereof is not substantially impaired.

When the bulkhead 25 is spaced from the end

wall B so as to form an ice bunker, the ice is in contact with both corrugated plates 9, 26 so that said plates, as well as the tongues 86, are cooled by the ice. Air flowing through the flues 17, 39 is cooled by contact with the plates 9, 26 and the tongues 86 projecting into the flues agitate the air flowing therethrough so as to provide more complete contact between the air and the cold plates 9, 26, including the tongues 86. A portion of the air may also be directed by the tongues 86 through the perforations 85 so as to come in direct contact with the ice in the bunker.

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.

This is a division of my co-pending application filed September 26, 1940, Serial No. 358,381, now Patent No. 2,293,131.

I claim:

1. In a refrigerator car having spaced side walls, an end wall, a roof and a floor structure, the combination of a track mounted upon the floor structure adjacent each side wall, a bulkhead extending substantially between the side walls which when in normal position is spaced from the end wall to provide an ice bunker therebetween, said bulkhead provided with rollers engaging said tracks for movement of said bulkhead to a position adjacent said end wall, a floor rack supported by the floor structure extending to the normal position of the bulkhead which is positioned below said bulkhead, and an ice grate below said ice bunker forming a continuation of the floor rack, whereby the bulkhead is movably supported by said floor structure independently of the ice grate and floor rack.

2. In a refrigerator car having spaced side walls, an end wall, a roof and a floor structure, the combination of a track mounted upon the floor structure adjacent each side wall, a bulkhead extending substantially between the side walls which when in normal position is spaced from the end wall to provide an ice bunker therebetween, said bulkhead having pedestals provided with rollers engaging said tracks for movement of said bulkhead to a position adjacent said end wall, and an ice grate below said ice bunker extending crosswise of the car between said pedestals, whereby the bulkhead is movably supported by said floor structure independently of the ice grate.

3. In a refrigerator car having spaced side walls and a floor structure, the combination of a track mounted upon the floor structure adjacent each side wall, a bulkhead extending substantially between the side walls, said bulkhead having pedestals provided with rollers engaging said tracks and upper guiding means associated with said side walls for movement of said bulkhead lengthwise of the car, and a floor rack supported by the floor structure which is positioned below said bulkhead and extends crosswise of said car between said pedestals, whereby the bulkhead is movably supported by said floor structure independently of the floor rack.

4. In a refrigerator car having spaced side walls and a floor structure, the combination of a track mounted upon the floor structure adjacent each side wall, a bulkhead extending substantially between the side walls provided with rollers engaging said tracks and upper guiding means associated with said side walls for movement of said bulkhead lengthwise of the car, and a floor rack supported by the floor structure which is positioned below said bulkhead and extends crosswise of said car between said tracks, whereby the bulkhead is movably supported by said floor structure independently of the floor rack.

5. A structure as defined in claim 4 wherein the bulkhead is provided with an upper roller adjacent the upper part of each side margin thereof which operate on upper tracks attached to the adjacent side wall of the car.

6. In a refrigerator car having spaced side walls, an end wall and a floor structure, the combination of a bulkhead which when in normal position is spaced from said end wall to provide an ice bunker therebetween, said bulkhead when in normal position extending in close proximity to both of said side walls, a track mounted upon the floor structure adjacent each of said side walls, and rolling means supporting said bulkhead upon said tracks for movement lengthwise of the car through said ice bunker, the portions of said side walls forming the side walls of the ice bunker being offset outwardly, whereby the spaces between the bulkhead and the side walls of the car are increased.

7. In a refrigerator car having spaced side walls, an end wall, a roof, and a floor structure, the combination therewith of a track mounted upon the floor structure adjacent each side wall, a floor rack supported by and in spaced relation to said floor structure and extending between said tracks, a bulkhead extending between said side walls, above said floor rack, rollers depending from the lower outer corners of said bulkhead spanning said floor rack and engaging said tracks, and other rollers extending laterally from the upper outer corners of said bulkhead engaging structure of said side walls for movement of said bulkhead longitudinally of said car.

8. In combination with the side walls, end wall and floor structure of a refrigerator car, a bulkhead extending substantially between said side walls, a rack on said floor structure adjacent said end wall, means to anchor said bulkhead adjacent either of the transversely extending edges of said rack, tracks mounted upon said floor adjacent the side walls, rollers mounted upon pedestals depending from said bulkhead and engaging said track independently of said rack, and upper guiding means associated with said side walls, said rack being spaced from said side walls to provide spaces for passage of said pedestals.

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