Nov. 1, 1932. D. L. REYNOLDS 1,886,225

REFRIGERATOR CAR

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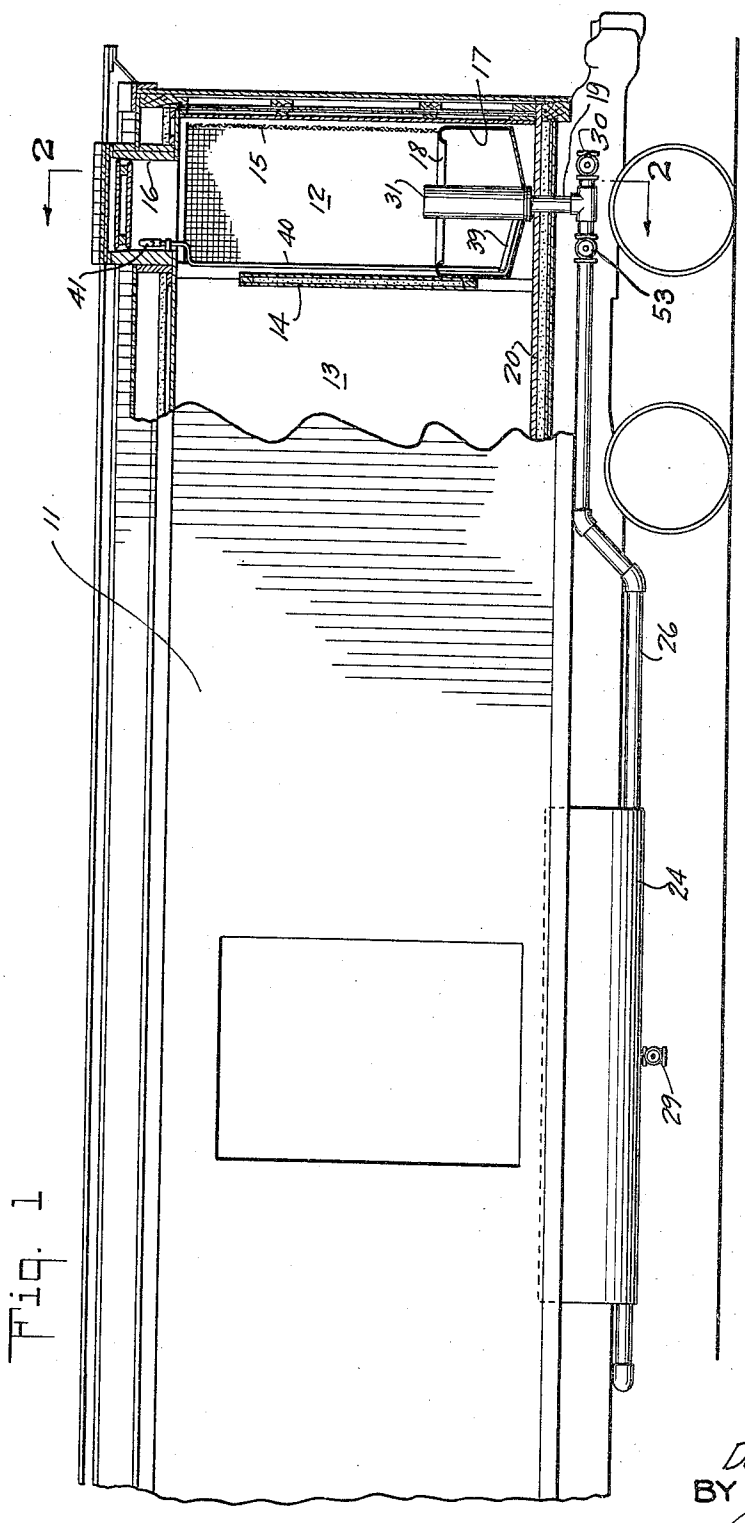


Fig. 1

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REFRIGERATOR CAR

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Fig. 2

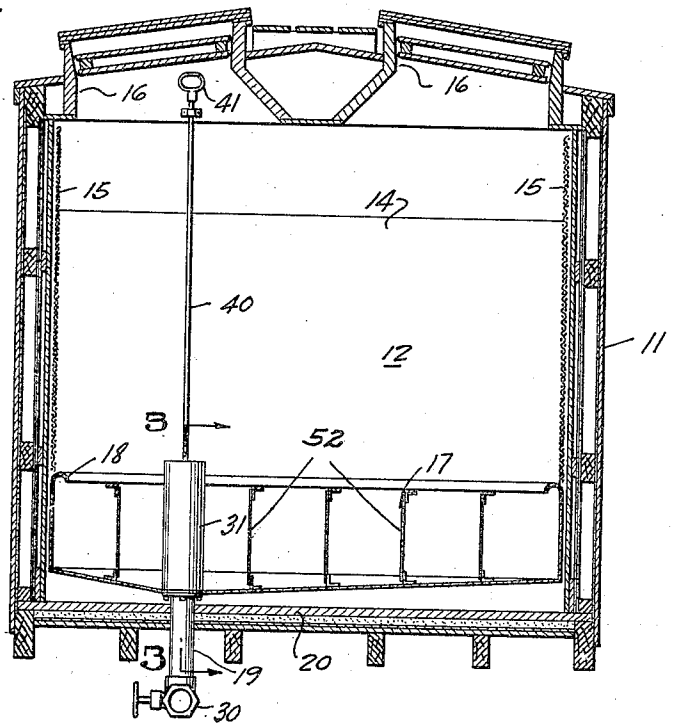


Fig. 3

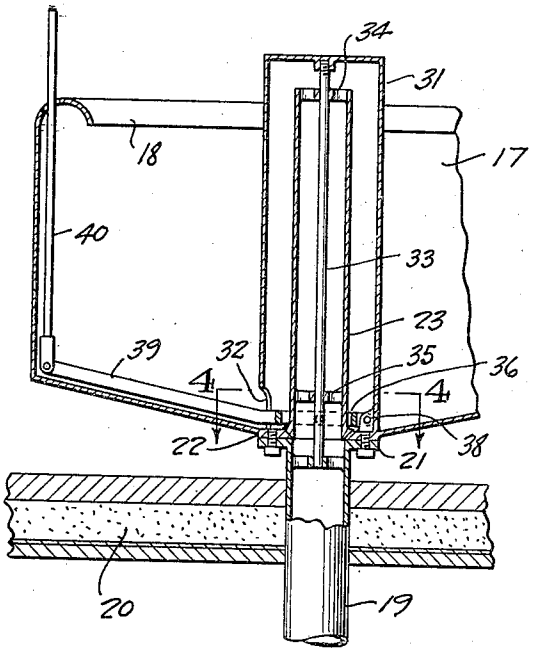
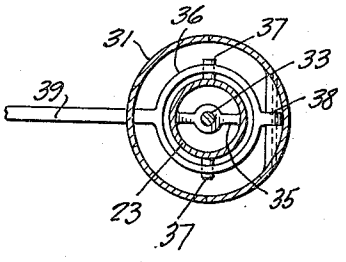


Fig. 4



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REFRIGERATOR CAR

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Fig. 5

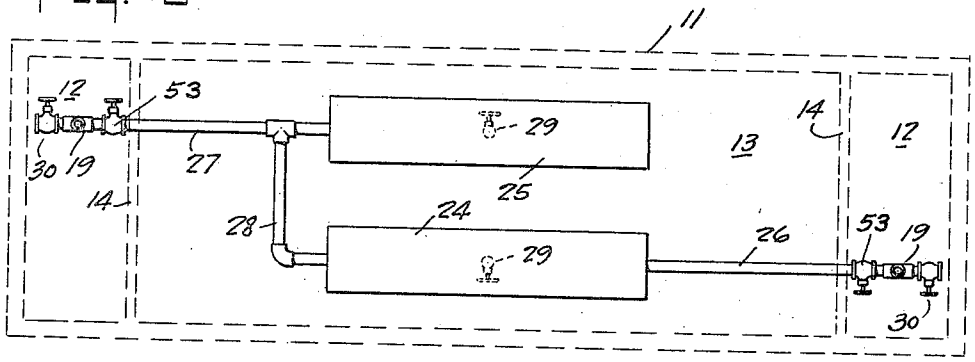
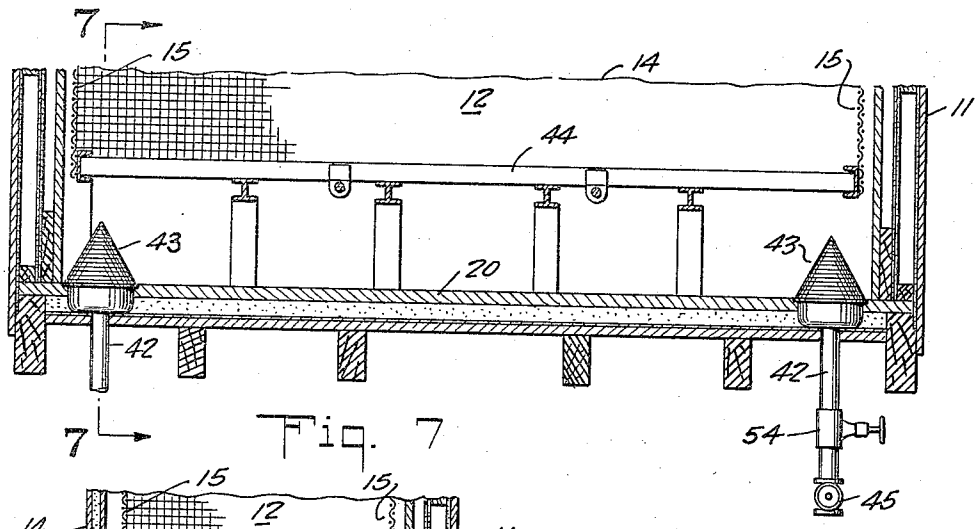
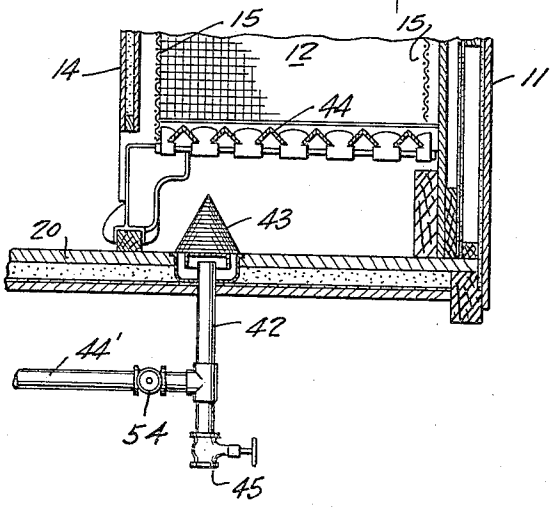


Fig. 6



7

Fig. 7



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REFRIGERATOR CAR

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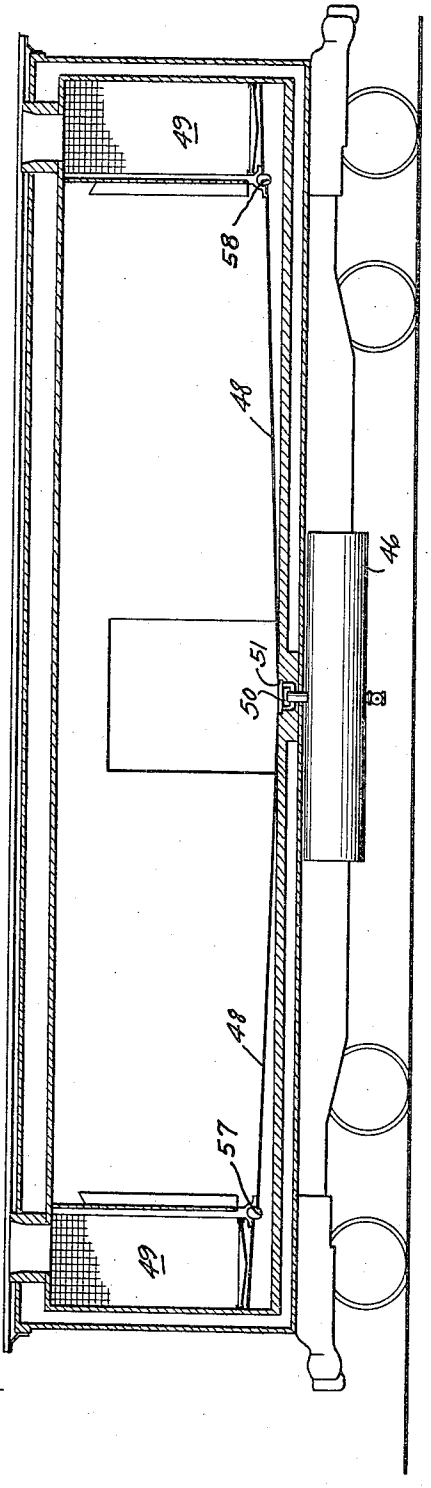


Fig. 8

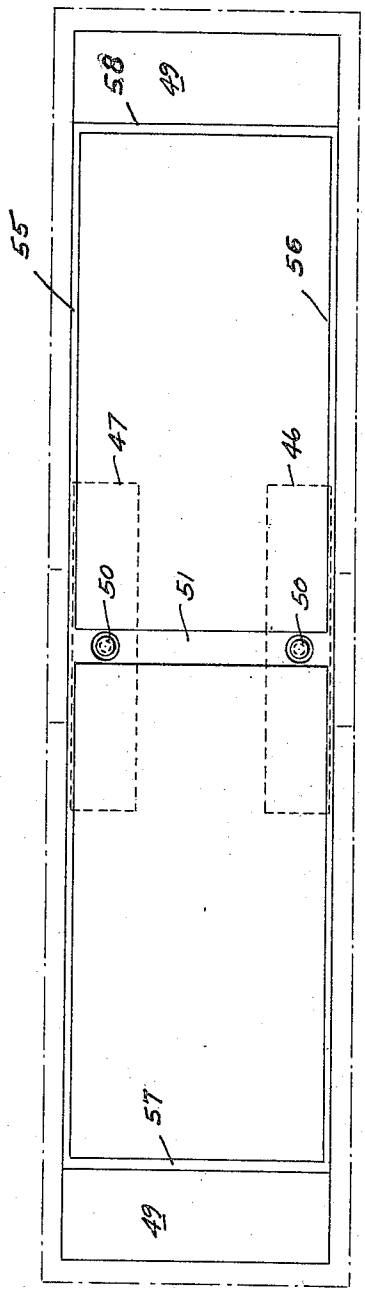


Fig. 9

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Patented Nov. 1, 1932 1,886,225

UNITED STATES PATENT OFFICE

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REFRIGERATOR CAR

Application filed May 13, 1929. Serial No. 362,674.

This invention relates to refrigerator cars that utilize ice bunkers for keeping the cargo in the car in proper condition during transit and between ladings.

Such cars as now built usually include ice bunkers at each end of the car, separated by a bulkhead from the cargo compartment, and each having a closely fitting hatch cover for filling the bunker with ice. In order to take care of the melted ice, drains are provided for the ice bunkers, and the water is discharged as it melts, on the right of way.

While the car is in transit, such drainage is not apt to be harmful, as comparatively little water is discharged in any particular spot. However, it often happens that the cars with ice in the bunkers are left for long periods without unloading, as in switching yards, or sidings. Under such circumstances, the drainage may cause serious corrosion of the equipment associated with the right of way. Expensive switching mechanism and electrical equipment may in fact become so damaged as to hamper efficient operation thereof; and thus not only is there a direct loss due to the damage to the equipment, but also a serious loss in the efficiency due to the derangement of the apparatus, interfering with its effective operation. This serious condition is rendered still worse by the addition to the ice of such material as salt, or calcium compounds, which may be used for lowering the temperature at which the ice melts. Under such circumstances, the drainage is much more harmful, for corrosion is facilitated.

It is one of the objects of my invention to obviate all these disadvantages, and especially by providing a storage space in which the meltage can accumulate; and which can be emptied where it can do no harm.

It is another object of my invention to improve the refrigeration by keeping the melted water in the car so that it can continue to absorb heat.

It is still another object of my invention to provide in general an improved structure for refrigerator cars.

It is still another object of my invention to make it possible to empty the collected water rapidly, so that the train of refrigerators can be serviced without undue delay.

My invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of several embodiments of my invention. For this purpose I have shown a few forms in the drawings accompanying and forming part of the present specification. I shall now proceed to describe these forms in detail, which illustrate the general principles of my invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of my invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a side elevation of a portion of a refrigerator car embodying my invention, the ice bunker being shown in section;

Fig. 2 is a transverse section thereof, taken along plane 2—2 of Fig. 1;

Fig. 3 is an enlarged detail section, taken along plane 3—3 of Fig. 2;

Fig. 4 is a detail section taken along plane 4—4 of Fig. 3;

Fig. 5 is a diagrammatic plan view, showing the piping associated with the car, and which forms a part of my invention;

Fig. 6 is an enlarged transverse sectional view through the lower portion of the ice bunker in a car that is a modification of that shown in Figs. 1 to 4;

Fig. 7 is a sectional view, taken along plane 7—7 of Fig. 6;

Fig. 8 is a diagrammatic longitudinal section of a further modified form of refrigerator car; and

Fig. 9 is a diagrammatic plan view thereof.

In the form shown in Figs. 1 to 5, inclusive, I indicate a refrigerator car body 11 the walls and roof of which can be constructed in any conventional way. At each end of the car is located an ice bunker or compartment 12 separated from the cargo compartment 13 as by bulkheads 14. The bunker 12 in this instance is shown as provided with a wire mesh basket 15 into which ice can be loaded as through the hatches 16.

As the ice melts, I make provisions for collecting and later discharging the water re-

sulting therefrom. For this purpose, I permit the ice to rest in a deep metal pan 17 in the bottom of the bunker 12. This pan has a sloping or converging bottom to an outlet that is arranged to be opened to discharge the liquid, in a manner to be hereinafter described. It is to be noted that the pan 17 has a turned in edge 18, to ensure against slopping of the liquid collected therein. The pan 17 of course is rigidly held in place, and it has sufficient strength to support the ice loaded thereon. It is also provided with a series of splash plates or surge baffles 52, that are apertured to permit the collected water to pass freely between the compartments.

As shown most clearly in Fig. 3, the bottom of pan 17 is arranged in this instance to discharge into a pipe 19. This pipe passes through the flooring 20 of the car, the flooring, just as the walls and roof, being heat insulated in any conventional manner. Flange 21 of pipe 19 fastens to the outlet 22 of pan 17. This outlet is normally closed by a valve closure 23. This closure is arranged to be operated to discharge the liquid into storage tanks 24, 25 (Figs. 1 and 5) supported beneath the car 11 and joined as by pipes 26, 27 to the outlet pipe 19 for each ice bunker. The tanks are also provided with a connecting pipe 28 to ensure that both tanks will be simultaneously filled. Drain cocks can be located near the bottom of each tank, such as indicated at 29; or alternately, a drain cock 30 can be provided near the bottom of the outlet pipe 19. An additional cock 53 can be provided to control communication to tanks 24, 25. Thus the liquid can, if desired, be discharged to atmosphere directly instead of to the tanks, by closing these valves.

It is intended that the pans 17 be emptied of their liquid contents as needed by attendants, and to store the liquid in the tanks 25, 24 until such a locality can be reached where the storage tanks 25, 24 can be harmlessly discharged. Furthermore, it is advantageous so to arrange the valve mechanism that the pan 17 can be quickly emptied, once the valve is lifted from its seat. For this purpose I provide a siphon device, one form of which I shall now describe.

Referring more particularly to Figs. 2 and 3, valve 23 is shown as formed of a hollow tube, having a conical bottom portion cooperating with the outlet opening in outlet 22. Surrounding this tube is a stationary shell 31 fastened to the bottom of pan 17. It has an opening 32 at its bottom part, to permit liquid to flow from the pan 17 upwardly in it. Assuming that the valve 23 is lifted off its seat and that there is liquid in pan 17 for a considerable depth, the discharge through pipe 19 will create a suction effect through valve 23, which is open at the top. This causes a siphon effect to be established; liquid will rise in shell 31 and flow out through the top of valve 23 at a very rapid rate.

This siphoning can be initiated by merely lifting the valve 23. It continues until the liquid is reduced to the level of aperture 32, when the siphon breaks.

In order to permit manual operation of valve 23, I provide a central stationary guide rod 33, and upon this rod is slidable a pair of spiders 34, 35 fastened to the inside of valve 23. The valve is thus guided in its vertical movement. A fork 36 encompasses the valve, and is pivoted thereto at diametrically opposite points thereof, as by the aid of pins 37 (Fig. 4). The fork 36 also carries a rear ear 38 by the aid of which it is pivoted to the inside of shell 31. It is apparent that rotation of fork 36 in a clockwise direction about the pivot of ear 38 as viewed in Fig. 3 will cause valve 23 to be lifted. To accomplish this rotation, I provide an arm 39 fastened to fork 36, and extending near the edge of pan 17. This arm can be moved by a link 40 leading to the hatch opening 16 where it is provided with a convenient handle 41 for manual operation at the top of the car 11.

In the form just described, the emptying of pans 17 is accomplished intermittently, in order to retain as much liquid therein for as long a time as possible. Since the liquid formed from the melted ice is yet cool, this retention permits it to absorb still more heat; furthermore, it provides a humid atmosphere for the cargo, which is advantageous to overcome the drying out effect of refrigeration.

However, the retenion of the cool liquid is not absolutely essential. In the form shown in Figs. 6 and 7, I show ordinary drains 12 protected as by guards 43, located beneath the ice grate 44. These drains lead the liquid into tanks beneath the car, through pipes 44'. No appreciable amount of liquid can collect in the bottom of the ice bunker. A drain cock 45 can be provided at a low point of the pipe system to drain out the liquid from the tanks. Additional cocks 54 can be provided to permit draining to atmosphere instead of into the tanks.

In some instances it may be advisable to lead the cool liquid to the cargo compartment in a thin stream so that it can more readily absorb heat and impart moisture to the compartment. Such a form is shown diagrammatically in Figs. 8 and 9.

In these figures, the storage tanks 46, 47 are located beneath the center of the car floor. The flooring 48 is made preferably of metal, and forms a waterproof pan extending beneath the ice bunkers 49. The floor slopes to the center where there is a transverse groove 51. In this groove are located one or more drains 50 leading directly into the tanks 46, 47. As the ice melts, it trickles onto floor 48, and finds its way to the center of the car and

finally to groove 51, drains 50, and tanks 46 and 47. The central channel or groove 51 communicates with the side longitudinal channels 55, 56. These in turn communicate with the transverse channels 57, 58 near the bulkheads.

I claim:

1. In a refrigerator car, means forming an ice bunker therein, means forming a storage space beneath the car, a pan having turned in edges in the bottom of the bunker, and means for draining the pan into the storage space.

2. In a refrigerator car, an ice bunker, means forming a large storage space beneath the car, a pan in the bottom of the bunker to collect liquid, a siphon discharge valve for said pan, and means for draining the pan into the storage space.

3. In a refrigerator car, an ice bunker, a pan in the bottom of the bunker to collect liquid, a siphon discharge valve for said pan, and means for operating the valve from the top of the ice bunker.

In witness whereof I have hereunto set my hand.

DAMIAN L. REYNOLDS.