L. H. LISTER.

REFRIGERATING APPARATUS.

APPLICATION FILED MAR. 17, 1911.

1,042,015.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.

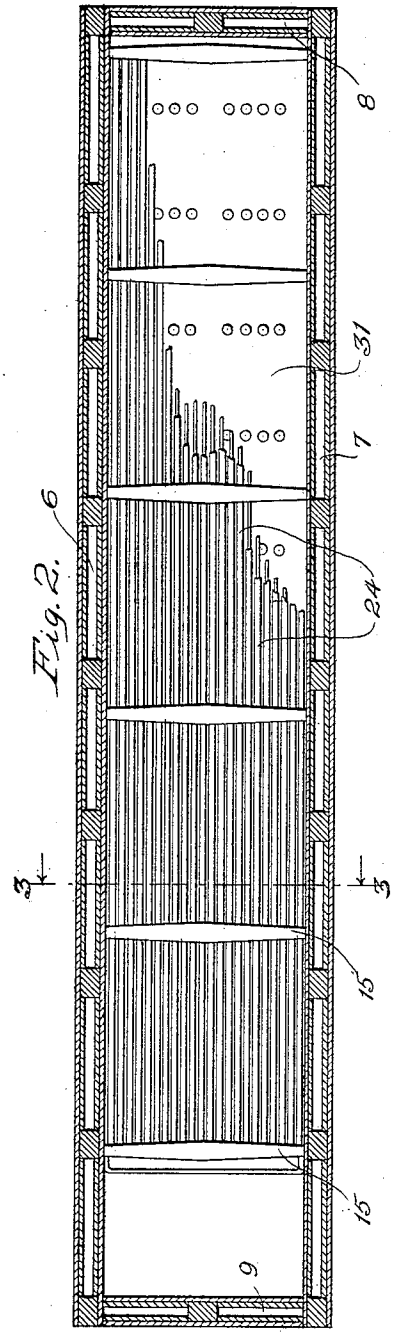

Fig. 2.

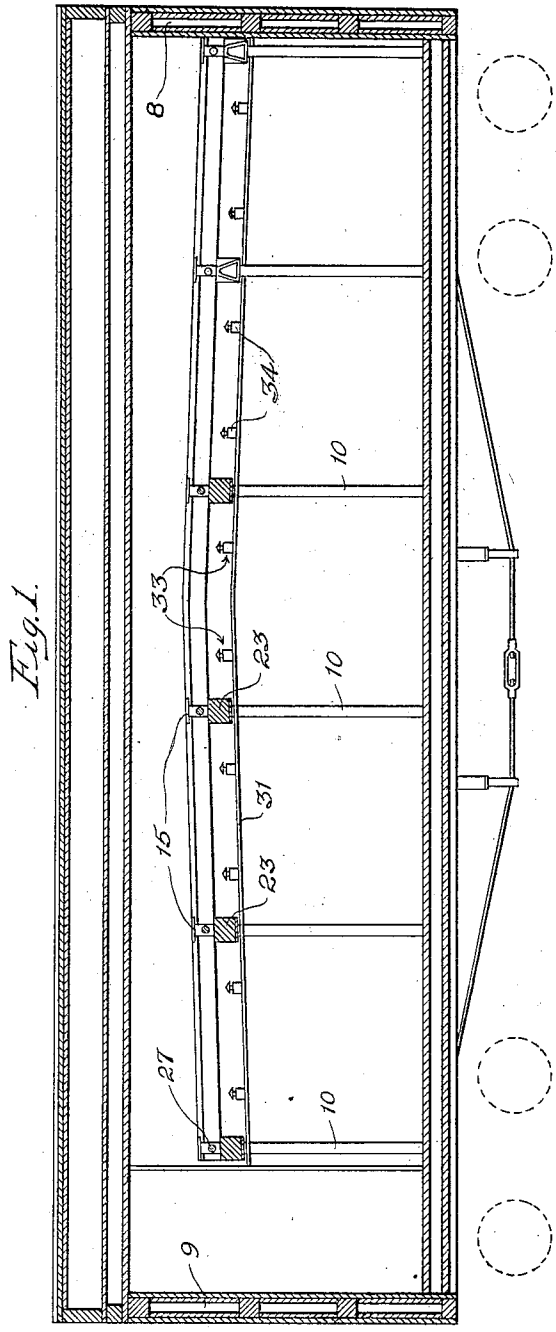

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

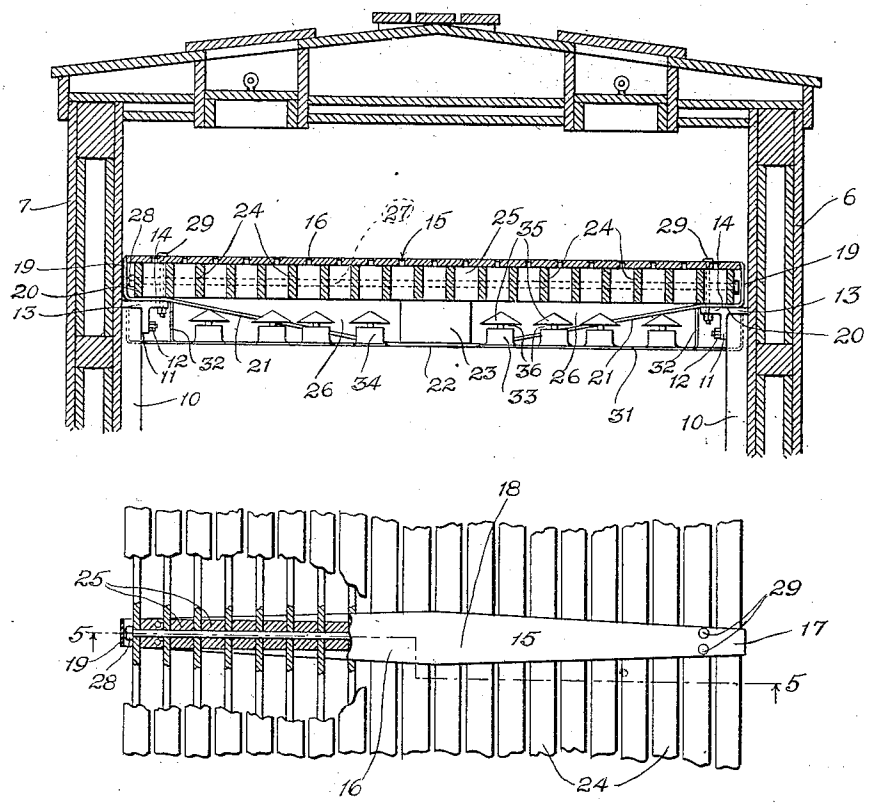

Fig. 4.

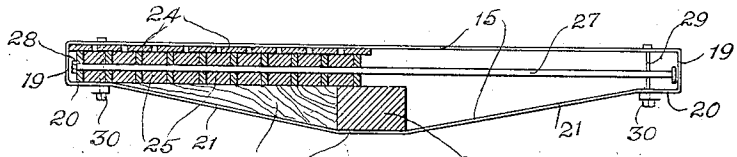

Fig. 5.

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UNITED STATES PATENT OFFICE.

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REFRIGERATING APPARATUS.

1,042,015. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed March 17, 1911. Serial No. 615,102.

To all whom it may concern:

Be it known that I, LEVI H. LISTER, a citizen of the United States, residing at Bay St. Louis, in the county of Hancock and State of Mississippi, have invented certain new and useful Improvements in Refrigerating Apparatus, of which the following is a specification.

This invention relates to a refrigerating apparatus of the general type shown and described in Letters Patent No. 977,412, issued to me as inventor and assignee on the 29th day of November, 1910.

The present invention, however, has for its main object to generally improve the details of construction and general arrangement of the ventilating floor as used in the apparatus of the general type shown and described in the aforementioned Letters Patent.

It will be understood that the refrigerating apparatus to which the apparatus of the present invention relates is intended particularly for use in the cooling and ventilating of railway cars. The apparatus in general comprises the use of an overhead ice chamber or bunker in combination, when desired, with one or two end bunkers. The overhead bunker is in general formed by the provision of a partition extending across the car in its upper portion and lengthwise of the same, and preferably draining in both directions.

Objects of the present invention are to provide a new and improved form of partition for separating the ice bunker above from the body of the car below; to form this partition in such way that it can be removed from the car with the least amount of difficulty; to form the partition so that it is virtually self-contained; to provide a new form of pan for receiving the drippings from the melting ice to convey the same off in the proper direction, so that it may finally drain from the car; to provide a form of partition which will cool the contents of the car both by circulation of the air within the same and by radiation; to provide a form of partition adapted to secure the necessary amount of air circulation so as to continually remove foul air from the food products in the body of the car; to provide a form of partition, which may be cheaply made and repaired from time to time, and in other ways and manners to generally improve the construction of this form of refrigerating apparatus.

Other objects and uses will appear from a detailed description of the invention, which consists in the features of construction and combination of parts hereinafter described and claimed.

Referring now to the drawings, in Figure 1 I show a longitudinal sectional view through the body of a car, equipped with the form of partition and refrigerating and ventilating structure of the present invention; Fig. 2 is a horizontal section of the car looking down on the partition of the present invention, a portion of the slats and truss bars being cut away to show the pan and ventilators beneath; Fig. 3 shows a cross section of the upper portion of the car taken on line 3—3 of Fig. 2, looking in the direction of the arrows; Fig. 4 shows a plan detail of one of the trusses and the slats, a portion of the upper part of the truss bar being cut away to show the arrangement of the slats beneath and some of the slats being in section; and Fig. 5 shows a detail cross section through one of the trusses taken on the line 5—5 of Fig. 4, looking in the direction of the arrows.

In the embodiment of my invention, I provide the side of the car with a number of vertical sills, which extend up a sufficient distance to serve as supporting means for the partition. Each of these sills is preferably provided on its upper end with a bracket for reinforcing the same, and to provide means for attaching the partition to the same. The partition itself comprises a number of cross trusses which support the slats, on which the ice blocks rest. These slats extend longitudinally of the car and preferably pass through the trusses so as to occupy the least amount of space and be supported in the strongest possible manner. The sills along the sides of the car are disposed opposite to each other so that the trusses may rest directly on the sill brackets. When desired, the trusses may be secured to the brackets, as by means of bolts, so as to provide a more rigid construction. In order to catch the drippings from the melting ice and to improve the circulation of air and the cooling within the body of the car, I provide a metallic pan and support the same beneath the entire length of the partition. This pan should be of thin

metal so that it may easily transmit the heat from the air in the body of the car to the cold water which constitutes the drippings from the ice. It is a well known fact that a large metallic surface very quickly absorbs heat and when thin enough readily transmits the heat from one side to the other. This being the case, a large amount of cooling is secured by absorbing the heat into the lower face of the pan. In order to provide the necessary amount of ventilation and circulation of air within the car, and in order to increase the cooling effect, I provide a number of ventilators in the pan. These ventilators serve to transmit air from the ice chamber to the body of the car or vice versa, and thus they improve ventilation and aid in the cooling.

Referring now to the drawings, the side walls of the car are designated by the numerals 6 and 7, and the ends by the numerals 8 and 9. Along each side of the car I provide a number of sills 10, of height gradually increasing from each end of the car toward its center. As before stated, these sills are oppositely disposed, and the opposite sills are of equal height. On the top of each sill is provided a T-shaped bracket 11, suitably secured to the sill as by means of bolts 12. Each T-shaped bracket has one arm 13, extending inwardly over the top of the sill to protect the same, and its other arm 14 extends outwardly and serves as a means for attaching the cross truss to the bracket. It will be understood that, when desired, these sills may form a part of the permanent structure of the car, so that the partition may be removed by merely unbolting it from the brackets, although, of course, the sills may also be removed, if desired.

Referring now to the partition proper, the same comprises a number of trusses 15, each one adapted to rest on the brackets of the corresponding sills. Each truss is preferably composed of a loop of metal, having its upper side 16 flat and tapering from its ends 17 toward its middle 18. The bar from which the truss is made has its ends 19 carried straight down and then bent at right angles in the portions 20 to provide seats which may rest flat on the upper faces of the brackets. It then tapers downward in its portions 21, its middle portion 22 again being flat, and adapted to the reception of a block 23 of wood or the like. The lower side of each truss is preferably tapered to correspond to the tapering of the upper side. The ice floor comprises a number of T-shaped longitudinal slats 24 which extend across the spaces between the trusses and through the loops of the latter, and which slats are evenly spaced at the trusses by means of blocks 25, best shown in Figs. 4 and 5.

The slats and spacer blocks in the central part of the car rest at each truss directly on the blocks 23, while at the sides of the car they rest on the portions 20 of the trusses. In order to provide a support for all the intermediate slats, I provide triangular filler blocks 26, the lower faces of which rest on the slanting portions 21 of the trusses. In order to hold the slats securely against longitudinal displacement, and in order to provide a smooth floor for the ice bunker, the upper sides 16 of the trusses are countersunk into the upper faces of the slats. The filler blocks 26 are of such size that when inserted after the slats are in place they will hold the same securely and prevent any rattling or jarring, which would be objectionable. In order to still further reinforce the slats and to cause all of the parts to act as a unit, I provide a transverse tie rod 27, extending through all of the slats and filler blocks at each truss. Each tie rod may be provided with a nut 28, so that it can be drawn up tightly and so that its tension can be adjusted from time to time.

In the construction herein illustrated, each of the slats is T-shaped. This permits me to secure the necessary openings in the bunker floor with the fewest number of slats, and consequently at the smallest expense. At the same time, if desired, a different material may be used for the wearing portions of the slats than for the vertical portions thereof, thus enabling me to provide in each slat a wearing surface of considerable toughness combined with a vertical member having the necessary strength to sustain the ice load.

In the construction illustrated, each end of each truss is secured to the corresponding bracket by means of bolts 29, which pass down through the spacer blocks, and nuts 30, which are threaded onto the ends of the bolts. These bolts are equally spaced on both sides of the tie rods 27.

As before stated, in the present construction I make special provision for collecting the drippings from the melting ice, for increasing the heat absorbing efficiency of the ice chamber, and for improving the ventilation and circulation of air in the car. To this end, I provide a pan 31, which extends straight across the car beneath the slats, and is suitably secured at its sides to the trusses. The sides 32 of this pan are offset at the points where they pass the brackets, while between the latter they extend clear to the car walls, so as to insure collecting all of the drippings from the ice. A number of ventilators 33 are provided in this pan for permitting circulation of air between the ice chamber and the body of the car. Each of these ventilators preferably comprises a thimble 34 either struck up from the pan or attached thereto in a water-tight manner, a hood 35 extending entirely over the open-

ing of each ventilator so as to prevent water from dripping down through the same, while also providing a space 36 through which the air may circulate. These ventilators are disposed over the pan in any suitable manner, preferably that illustrated, in which they are placed in rows across the pan, the rows being spaced in such a way that the ventilators come between the slats. It will be understood that the cooling in the body of the car is accomplished in a two-fold manner. In the first place, the ventilators provide means for insuring a direct circulation of air back and forth between the body of the car and the ice chamber above, the air, which enters the ice chamber, being cooled by direct contact with the ice. This circulation of air not only aids in cooling the body of the car, but also insures a proper circulation so as to carry off the noxious gases which may be generated by the fruit or other food product beneath. In the second place, the large exposed surface of the pan will serve as a means for absorbing heat from a large amount of air without the necessity of this portion of air coming into direct contact with the ice. As before stated, the cold water dripping down from the ice will insure that the pan is always cold throughout the entire surface, so that a very considerable amount of cooling will be secured in this way.

It will be understood that the ventilators in the pan serve to allow cold air from the ice chamber to pass freely down into the body of the car below, or to allow the warm air to circulate up into the ice chamber. In either case, a uniform temperature is finally established in the body of the car, and the warm air moving up and the cool air falling down mix in such a way that their temperatures are equalized either in the ice chamber or in the body of the car.

I claim:

1. In a refrigerating apparatus of the class described, the combination of an ice partition floor comprising a plurality of longitudinal slats, spacer blocks between the same, tie-rods extending through the slats and spacer blocks, and means on the tie-rod for drawing the slats and spacer blocks together, with a plurality of loop-shaped trusses substantially flat in their upper portions and suitably formed in their lower portions to provide end and central bearing points for the slatted floor, substantially as described.

2. In a refrigerating apparatus of the class described, an ice partition comprising a plurality of transverse trusses, means for supporting the same at their end portions, and a plurality of longitudinal T-shaped slats extending through said trusses and suitably spaced to provide therebetween openings to permit of the drainage of water from the melting ice and the circulation of air therethrough, substantially as described.

3. In a refrigerating apparatus of the class described, an ice support comprising a plurality of longitudinally extending slats, spacer blocks between them, means for retaining the spacer blocks and slats in solid engagement together, a plurality of trusses for sustaining the ice partition, supports for the ice partition at the ends of the trusses, and supporting blocks carried by the trusses for supporting the central portion of the partition, substantially as described.

4. In a refrigerating apparatus of the class described, the combination with an ice support comprising a plurality of longitudinally extending slats, trusses surrounding the same, means for supporting the end portions of the trusses, supporting blocks carried by the trusses for supporting the central portions of the slats, of a drip pan extending beneath the trusses and the slats and having its edges upwardly extended to a level with the lower portions of the slats, at the outer edges of the ice support, whereby all drippage from between the slats is caught by said pan, substantially as described.

5. In a refrigerating apparatus, the combination of an ice support comprising a plurality of longitudinally extending slats, spacer blocks between consecutive slats, trusses surrounding the slats and spacer blocks, supporting members carried by the lower portions of the trusses for supporting the slats throughout the entire width of the partition, and means for supporting the trusses in their end portions, substantially as described.

6. In a refrigerating apparatus, the combination of a plurality of longitudinally extending slats, means for spacing the same to provide drainage and ventilating openings between them, trusses surrounding the slats, blocks carried by the lower portions of the trusses and serving to support the slats in the central portion of the partition, and means for supporting the end portions of the trusses, substantially as described.

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