

(No Model.)

3 Sheets—Sheet 1.

E. R. HUTCHINS.  
REFRIGERATOR CAR.

No. 454,869.

Patented June 30, 1891.

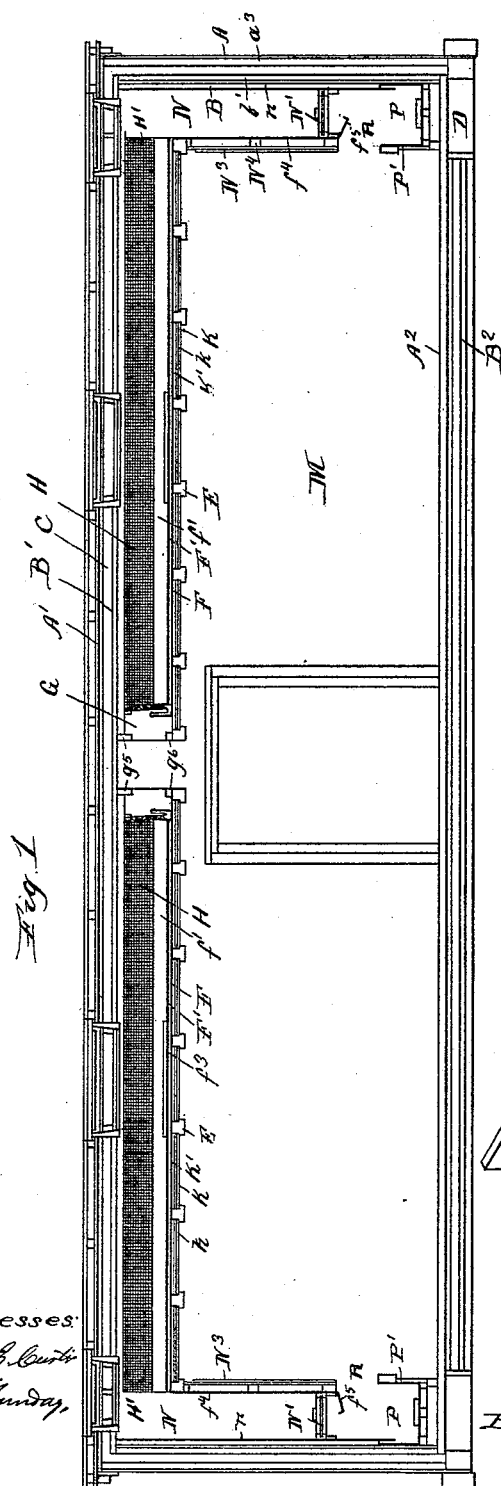


Fig. 1

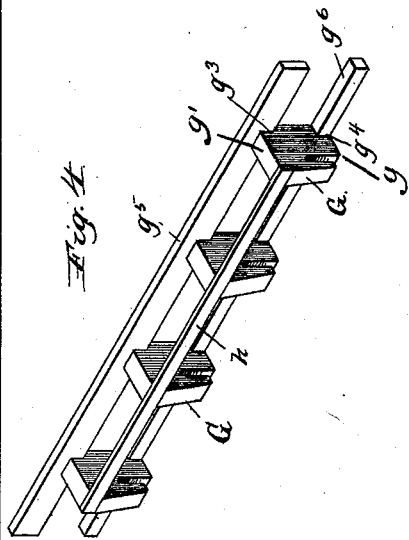


Fig. 4

Witnesses:  
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H. W. Munday

Inventor:  
Eugene R. Hutchins  
By Munday, Evans & Adeock  
His Attorneys.

(No Model.)

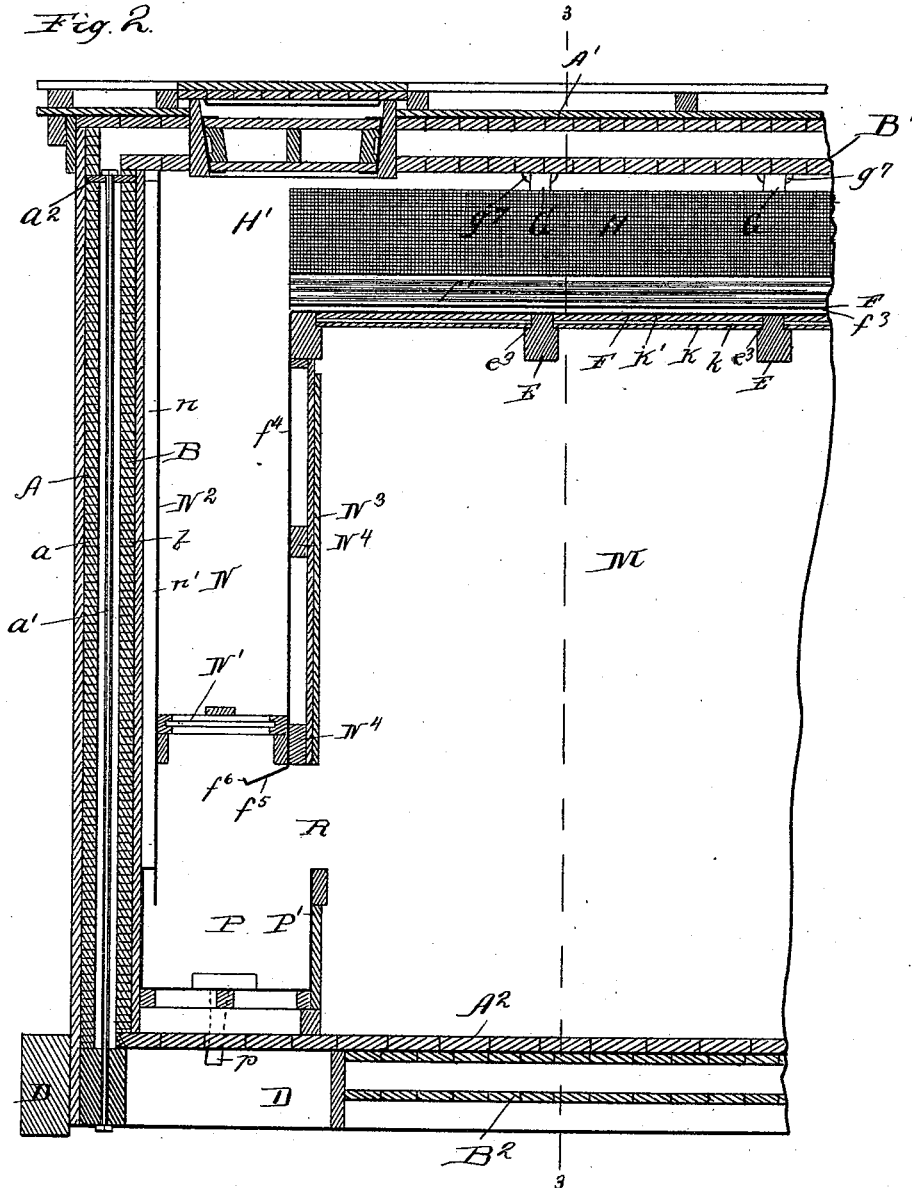
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Fig. 2.



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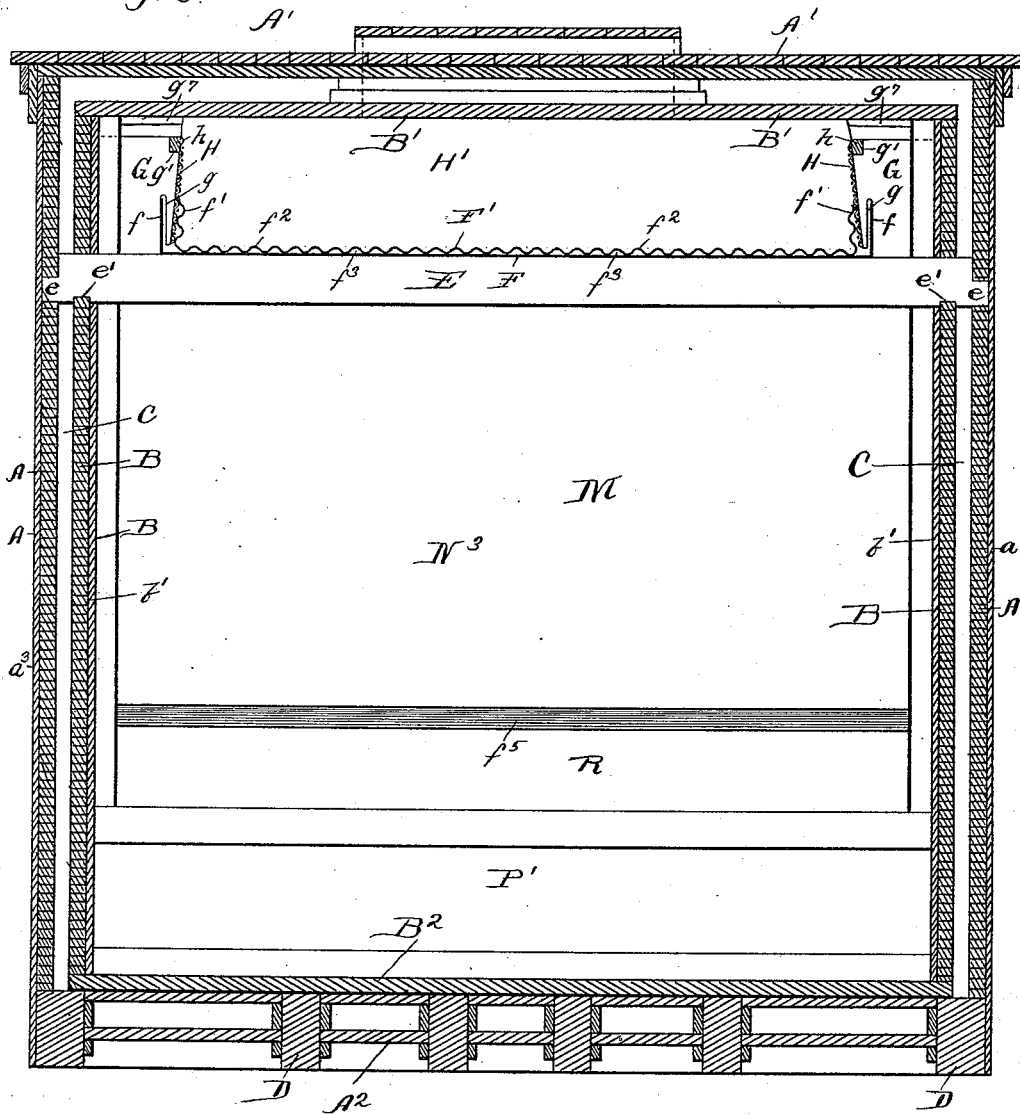
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Fig. 3.



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# UNITED STATES PATENT OFFICE.

EUGENE R. HUTCHINS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE HUTCHINS REFRIGERATOR CAR COMPANY, OF SAME PLACE.

## REFRIGERATOR-CAR.

SPECIFICATION forming part of Letters Patent No. 454,869, dated June 30, 1891.

Application filed June 19, 1890. Serial No. 356,000. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE R. HUTCHINS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Refrigerator-Cars, of which the following is a specification.

My invention relates to improvements in refrigerator-cars, and more particularly to improvements in that class of refrigerator-cars which employ the principle of overhead refrigeration, or wherein the ice is supported over the cooling chamber or body of the car—such, for example, as shown and described in Letters Patent No. 339,184, granted April 6, 1886, to Carleton B. Hutchins.

It is unquestionably the true theory in the construction of refrigerator-cars to have the ice located in the upper portion of the car, so that the natural tendency of the warm air to rise and pass freely over and through the ice, and when cooled to again descend, may be utilized for the purpose of maintaining throughout every portion of the car or cooling-chamber the requisite uniform and low temperature; but, notwithstanding that this is the true principle of refrigeration so far as air-currents and the distribution of the cold air throughout the cooling-chamber of the car and the utilization of the ice are concerned, it has been found that "overhead icing," so called, has in the practical operation of refrigerator-cars been attended with so much danger to the load of goods in the cooling-chamber by the dripping, leaking, or overflowing of water from the ice above that a great many—indeed, I believe a great majority—of the refrigerator-cars heretofore have been constructed with ice-holding devices, tanks, or pans at the ends of the car. Where the ice-pan or ice-holding device is located at the upper portion of the car and above the cooling-chamber, the great weight of the ice, together with the jolting and racking action due to the motion of the car in transit, tends to punch, break, wear, or otherwise cause holes in the ice-pans, and thereby allow water from the melting ice to escape into the cooling-room of the car; and, however great care may be exercised in examining for and patching up the holes or leaks at the beginning of each trip, it

frequently happens in practical operation that valuable loads of goods are destroyed by the dripping water in many refrigerator-cars where overhead icing is employed.

Where the ice-pans are located at the ends of the car, the danger to the goods from leakage is of course obviated; but it is done at the expense of the proper refrigerating action of the car, both in point of economy of ice and efficiency.

It is the object of my invention to produce a construction of refrigerator-car employing the principle of overhead icing, which will guard against all possible chance of the leakage of water into the cooling-room. This result I accomplish, and herein my invention consists, first, by employing double ice-pans or tanks at the upper portion of the car, one to support the ice and receive its wearing and breaking action due to the jolting and racking action of the car, and the other to hold the water and prevent leakage.

It further consists in making the upper or ice-holding pan removable, so that breaks or injuries to the lower pan may be readily seen and repaired.

It further consists in employing two sets of double pans, one set extending from near the middle of the car to each end, so as to leave an open space between the adjacent ends of the pans to permit the better circulation of the cold air from the ice down to and through the middle portion of the cooling-chamber.

It further consists, in connection with the double pans, of means for separating the upper and lower pans, so that an open space shall be left between them through which the air may circulate for the purpose of preventing any condensation of moisture upon the under surface of the lower pan.

It further consists, in connection with the double pans, of a non-heat-conducting or insulating sheathing below the pans and constituting the ceiling of the cooling-chamber.

It further consists in the particular means of combining this insulating-sheathing with the ice-pans and the cross-beams which support the ice-pan, and whereby I am enabled somewhat to diminish the vertical height of the car or economize the space within the car.

It further consists in the means employed

for holding the ice-pans rigidly and firmly in place in the car, with a space all around them at sides and ends between the vertical sides or walls of the car, and which space is necessary to permit the free and proper distribution of cold air throughout the cooling-chamber.

The means which I have found for holding the ice-pans with their heavy loads of ice rigidly in place and withstanding the pitching jostling strains due to the motion of the car and the momentum of the ice therein consists in a series of blocks located at intervals between the sides of the ice-pans and the walls of the car and resting, preferably, upon the cross-beams which support the ice-pans.

It further consists in securing the perforated or wire screen side and end walls of the ice-chamber directly to said supporting-blocks, so that these side and end walls of the ice-chamber, which are liable to receive knocks or blows from the blocks of ice, may be entirely independent and free from the ice-pans, to the end that the ice-pans may receive no injury.

My invention further consists in the novel devices and novel combinations of parts and devices herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a longitudinal sectional view of a refrigerator-car embodying my invention. Fig. 2 is an enlarged partial longitudinal section showing simply one end of the car. Fig. 3 is a cross-section taken on the line 3 3 of Fig. 2. Fig. 4 is a detail perspective view showing the construction of blocks by which the ice-pans are rigidly held in place.

In practicing my invention I prefer to employ the general construction of refrigerator-car which is shown and described in Patent No. 339,184, and for this reason I have in the accompanying drawings shown my invention as applied to the car of Patent No. 339,184, although it may be applied to other suitable constructions of refrigerator-cars.

In the drawings, A and B represent the outer and inner main walls of the car, with the insulating-packing C between, preferably composed of woolen rags.

A' and B' are the inner and outer layers or walls of the roof of the car, and A<sup>2</sup> and B<sup>2</sup> the inner and outer floors constituting the bottom of the car-body.

D represents the sills or frame-work of the car, and E the cross-beams which support the ice-pans F F' and F F'.

The side and end walls A B of the car preferably consist of flat strips *ab*, laid and spiked down one on top of another and bound firmly together by bolts *a'*, extending from the sills D to the cap-plate *a<sup>2</sup>*, which rests upon the inner and outer walls A B near the top thereof. The cross-beams E extend through the inner and outer walls B A, so as to receive

support from both walls and serve at the same time as braces between them. The cross-beams E have tenons or notches *e* upon their ends, which fit in suitable mortises in the outer walls A, and the beams E are also provided with notches or recesses *e'*, the shoulders of which or recesses embrace the inner wall B. The shoulders or tenons upon the beams E thus serve to brace the inner and outer walls in respect to each other. The beams E do not extend through the outer sheathing of boards *a<sup>3</sup>* of the wall A. The inner wall B has a similar board sheathing *b'*.

G G represent the blocks resting, preferably, upon the cross-beams E, and which fit between the side walls B and the sides *f f'* of the ice-pan to hold the ice-pans firmly in place.

The lower ice-pan F is preferably made of plain flat galvanized iron and rests upon the cross-beams E. The holding-blocks G are preferably made of wood and about two inches thick. The blocks are furnished or preferably furnished with slots or recesses *g* to receive the turned-up sides *f* of the lower and immovable ice-pan F. The depth or extent of the saw-slot *g* should be preferably about equal to the vertical height of the sides *f* of the ice-pan F. These slotted blocks will thus serve to support and hold the sides of the ice-pan. The upper ice-pan F' is made or preferably made of corrugated galvanized iron, the corrugations *f<sup>2</sup>* extending longitudinally of the car and being preferably each about an inch or such matter in height, so as to form air-spaces *f<sup>3</sup>* between the lower and upper ice-pans F F'. The ice-pan F' fits removably within the ice-pan F. The sides *f'* of the ice-pan F' should extend up far enough to insure the carrying away of the water from the melting ice by the pan F' and to prevent the water from overflowing into the lower pan F.

H H are the side walls of the ice-chamber, preferably made of wire screen and which serve to confine the ice laterally. The wire-screen sides H are the parts which are liable to receive the greatest blows and strains from the blocks of ice from the jostling or other movements of the car, and these sides H are secured directly to and supported from the blocks G and have no connection whatever with either the inner or outer ice-pan or sides thereof, so that both the inner and outer ice-pans may thus be protected and entirely free from any strains or blows which are received by the sides H of the ice-chamber H'. To support and strengthen the upper edge of the wire-screen sides H of the ice-chamber, I secure the same to rails or bars *h*, attached to the blocks G. The rails *h* fit in notches *g'* in the blocks G. The side walls *f'* of the upper and corrugated ice-pan F' fit snugly against the blocks G, so that this ice-pan will thus be held rigidly in place by the blocks. The corrugated upper ice-pan F' affords by its corrugations an extended and smooth bearing upon

the lower ice-pan F, so that there is little, if any, danger of a hole being broken or worn through the lower ice-pan, while at the same time an air-space is formed between the two ice-pans. This air-space tends to prevent any condensation of moisture upon the under surface of the lower ice-pan.

The two upper pans F' F' extend nearly to the middle of the car, each being somewhat less than half the length of the car, so that either one may be moved endwise upon the other, and thus leave the lower ice-pan F exposed to view throughout its entire surface, so that it may be readily and easily examined and repaired.

To examine and repair either one of the lower ice-pans F F, it is only necessary to remove the cross-bars  $g^5 g^6$ , and then move the removable corrugated ice-pan F' above it endwise onto its fellow, and then the lower ice-pan becomes as accessible for examination and repair as though only a single ice-pan were used. By thus making the upper ice-pan in two or more movable parts or sections, one part being adapted to be moved or slipped endwise onto the other, I am enabled to employ double ice-pans or an upper and a lower one and still have them both easily accessible for examination and repair.

The non-heat-conducting or insulating sheathing below the ice-pan is preferably composed of two layers of matched boards K K' with a layer of woolen rags or similar material  $k$  between. The thickness of this insulating-sheathing may ordinarily be an inch and a half or two inches, and to prevent this from increasing the necessary height of the car, (which is objectionable, as refrigerator-cars are necessarily made of more than the ordinary height of freight-cars, and as the ice necessarily makes a heavy load at the top of the car,) or, on the other hand, diminishing the available space of the car, I provide the cross-beams E with shoulders or ledges  $e^3$ , upon which this insulating-sheathing rests and is supported. The ice-pan thus rests upon the top face of the beams E and the insulating-sheathing on the shoulders  $e^3$ . The blocks G at the ends of the ice-pans near the middle of the car have notches  $g^3 g^4$  at their back edges to receive the supporting rails or bars  $g^5 g^6$ , which extend across the car and are removably attached to inner walls of the car. The blocks G at the side of the ice-pan are held in place by quarter-rounds  $g^7$ .

The lower ice-pan F is furnished at each end of the car with a depending flange or wall  $f^4$ , which forms the inner wall of the ice-chamber N at the end of the car.

N' represents an ice rack or support, upon which the ice rests in the end ice-chamber N, and N<sup>2</sup> its back wall, also formed of galvanized iron. The wall N<sup>2</sup> of the end ice-chamber N is secured to vertical strips or bars  $n$ , attached to the end wall of the car. These

strips thus form an air-space  $n'$  between the wall N<sup>2</sup> and the end wall of the car.

N<sup>3</sup> represents an inner wall near each end of the car between the cooling-chamber M and the galvanized-iron wall  $f^4$  of the end ice-chamber N. Cross beams or bars N<sup>4</sup> serve to support the walls  $f^4$  and N<sup>3</sup>, and also form an air-space between them.

P represents the drip-pan which receives the drip-water from the melting ice, and from which it is discharged through the trapped discharge-pipe  $p$ . The inner side P' of this drip-pan does not extend up as far as the lower edge of the wall N<sup>3</sup>, but leaves an air-passage R between, through which the cold air passing down through the ice in the end ice-chamber N may escape into the cooling-room M. The insulating or non-heat-conducting wall N<sup>3</sup> at the end of the car may preferably be composed of two layers of matched boards. It serves to aid in keeping the atmosphere of the car dry by preventing the air of the cooling-room M from coming directly in contact with the galvanized-iron wall  $f^4$  of the end ice-chamber, upon which moisture from condensation may collect. The sheathing N<sup>3</sup> also protects the galvanized-iron wall  $f^4$  and keeps the goods in the car from coming in direct contact therewith.

To direct the dripping water with certainty into the drip-pan P, a flange  $f^5$  is turned on the depending wall  $f^4$ , and the edge of this flange is turned up to form a trough or channel  $f^6$  to convey the water to one end of the drip-pan P. The perforated or wire-screen side walls H of the ice-chamber extend across the adjacent ends of the two ice-chambers near the middle of the car, being secured to the supporting-blocks G, which are attached to the cross-bars  $g^5 g^6$ , and the vertical flanges  $f$  and  $f'$  of the ice-pans also extend across the adjacent ends of the ice-pans, as is clearly shown in Fig. 1.

The ice pan or chamber, it will be observed, is surrounded on all sides by an open space or passage communicating with the cooling or preserving chamber M, so that the cold air from the ice may pass freely down between the sides of the ice-pan and the side walls of the car, or between the two adjacent ends of the ice-pans at the middle of the car, or through the passage R into the cooling-chamber. The ice is thus, in fact, suspended over the cooling-chamber with a free communication all around it for the cold air to pass down to the cooling-chamber, and at the same time, by reason of the blocks G and the screen side walls H of the ice-chamber rigidly secured to the car, the ice and ice-pans are firmly held in place and protected from injury.

I claim—

1. The combination, in a refrigerator-car, of a cooling-chamber, a metal pan or trough immovably secured over that chamber, another metallic pan or trough having a corru-

gated bottom resting on the bottom of the first-mentioned trough, and means for securing it removably therein, both pans or troughs being water-tight over the cooling-chamber, as and for the purpose set forth.

2. The combination, in a refrigerator-car, of a cooling-chamber, two sets of devices, each comprising a metal pan or trough immovably secured over that chamber, another metallic pan or trough having a corrugated bottom resting on the bottom of the first-mentioned trough, and means for securing it removably therein, both pans or troughs being water-tight over the cooling-chamber, each set extending nearly to the middle of the car and having an open space or air-passage between their adjacent ends at the middle of the car, the upper ice-pan of each set being removable, so that it may be moved or slipped endwise onto its fellow, substantially as specified.

3. The combination, in a refrigerator-car, of a cooling-chamber, a metal pan or trough immovably secured over that chamber, another metal pan or trough having a corrugated bottom resting on the bottom of the first-mentioned trough, and means for securing it removably therein, both pans or troughs being water-tight over the cooling-chamber, and an insulating-sheathing below the under pan, substantially as specified.

4. The combination, with the sides or walls of a refrigerator-car, of cross-beams E and ice-pan supported on said cross-beams, a cooling-chamber below the cross-beams, and an ice-chamber above, having perforated side walls H, supported rigidly and independently of the sides of the ice-pan, substantially as specified.

5. In a refrigerator-car, the combination, with its walls, of cross-beams E, blocks G, perfo-

rated side walls H of the ice-chamber, secured to said blocks, and an ice-pan supported on said beams E and held in place by said blocks G, there being an open space or air-passage between the walls of the car and the ice-chamber, substantially as specified.

6. In a refrigerator-car, the combination, with its walls, of cross-beams E, blocks G, perforated side walls H of the ice-chamber, secured to said blocks, and an ice-pan supported on said beams E and held in place by said blocks G, there being an open space or air-passage between the walls of the car and the ice-chamber, said blocks G having slots *g* to receive the sides *f* of the ice-pan F, substantially as specified.

7. In a refrigerator-car, the combination, with its walls, of cross-beams E, blocks G, perforated side walls H of the ice-chamber, secured to said blocks, and an ice-pan supported on said beams E and held in place by said blocks G, there being an open space or air-passage between the walls of the car and the ice-chamber, said blocks G having slots *g* to receive the sides *f* of the ice-pan F and an inner ice-pan F', having sides *f'*, substantially as specified.

8. The combination, in a refrigerator-car, of two overhead ice-pans extending nearly to the middle of the car, with an open space between, cross-beams *g*<sup>5</sup> *g*<sup>6</sup> at the two adjacent ends of the ice-pans, and blocks G, secured thereto for holding the ice-pan in place, said blocks G having slots *g* to receive the upturned side or flange *f* of the ice-pan, substantially as specified.

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Witnesses:

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