(No Model.) 2 Sheets—Sheet 1.

D. W. RIORDAN.

REFRIGERATOR CAR.

No. 491,496. Patented Feb. 7, 1893.

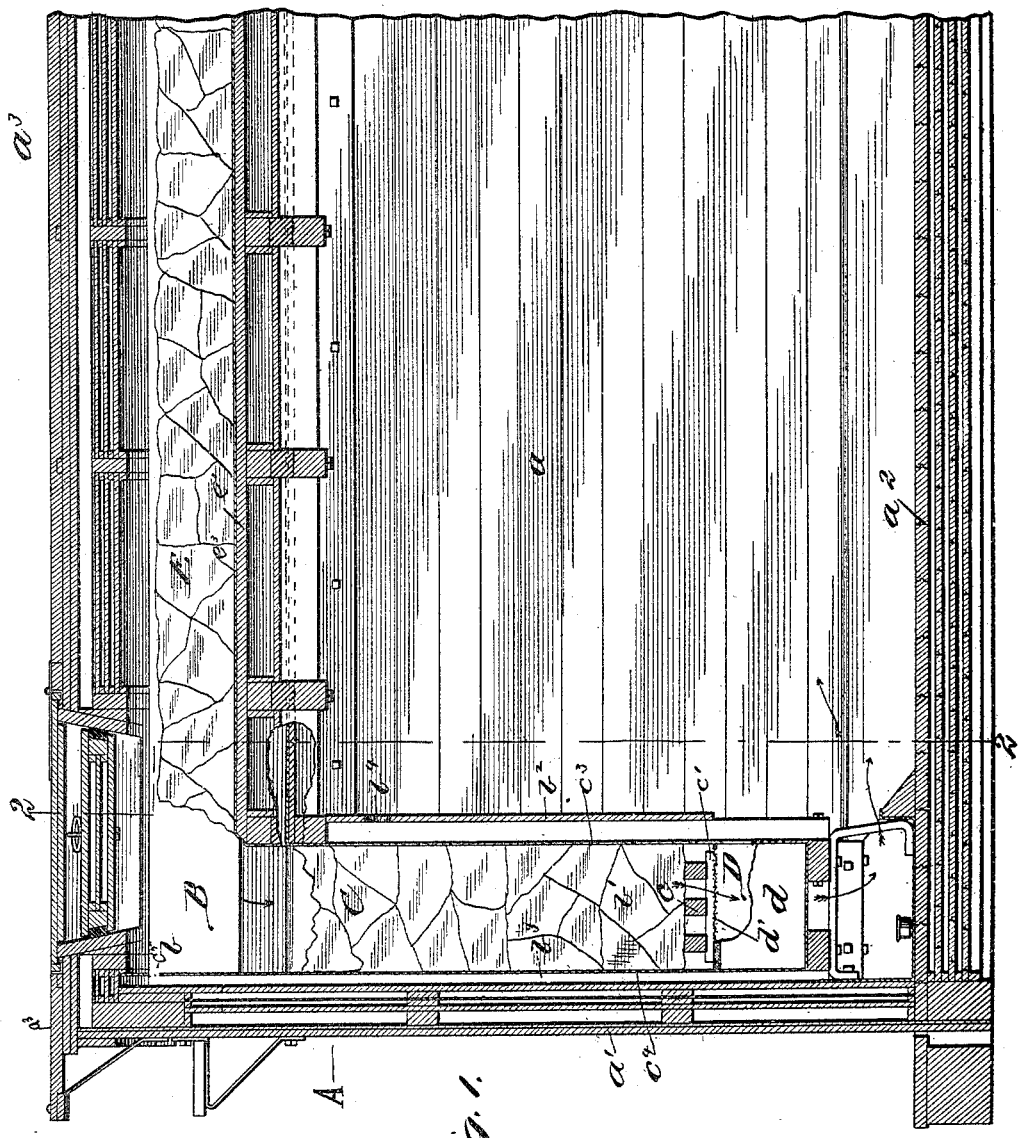

Fig. 1.

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Fig. 2.

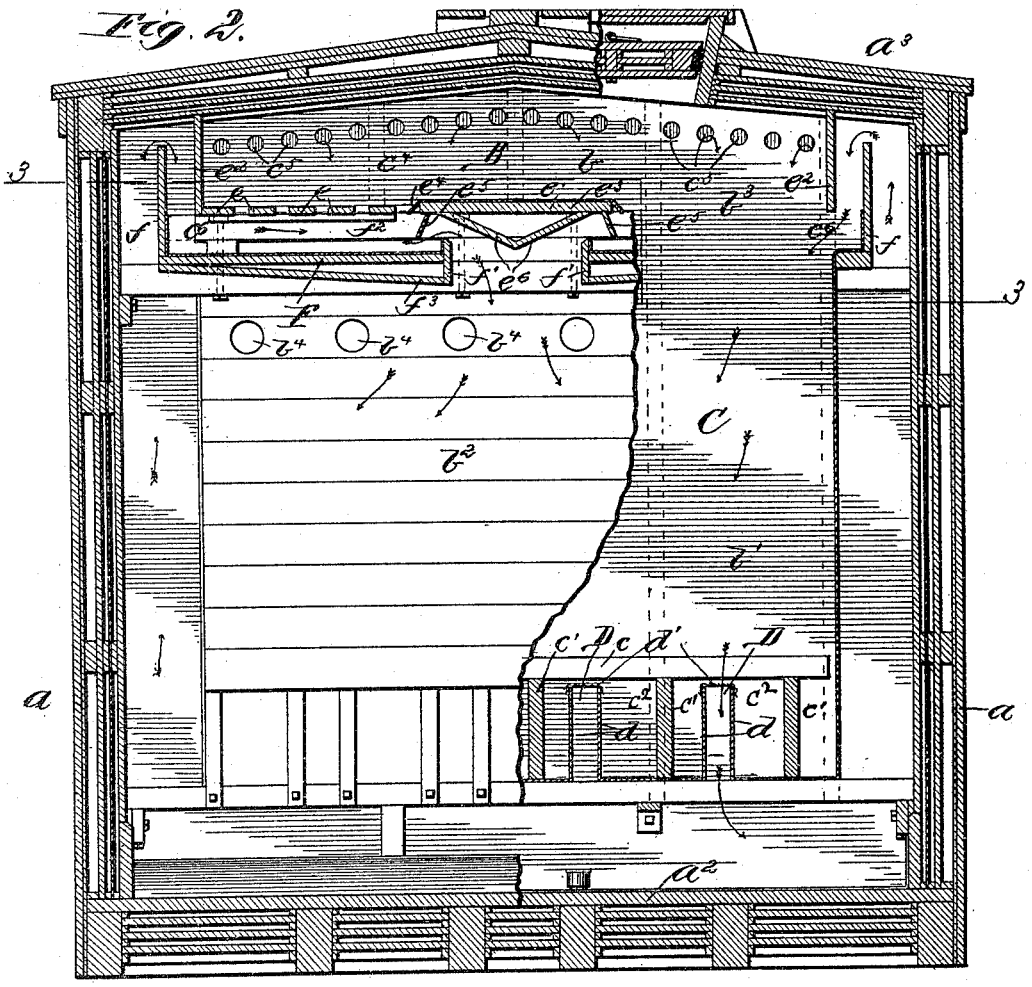
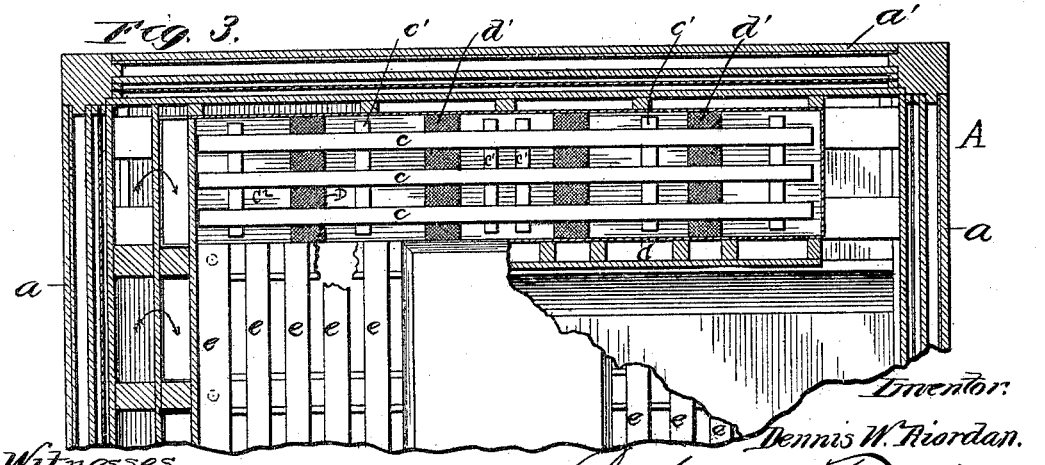


Fig. 3.



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UNITED STATES PATENT OFFICE.

DENNIS W. RIORDAN, OF ELBURN, ILLINOIS, ASSIGNOR TO HELENA RIORDAN, OF SAME PLACE.

REFRIGERATOR-CAR.

SPECIFICATION forming part of Letters Patent No. 491,496, dated February 7, 1893.

Application filed September 11, 1891. Serial No. 405,364. (No model.)

To all whom it may concern:

Be it known that I, DENNIS W. RIORDAN, a citizen of the United States, residing at Elburn, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Refrigerator-Cars, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a central longitudinal section of a portion of a car embodying my improvements; Fig. 2, a cross-section of the same, taken on the line 2, 2, of Fig. 1; and Fig. 3, a detail plan section, taken on the line 3, 3, of Fig. 2.

My invention relates to refrigerator cars intended for use in the transportation of perishable articles long distances, during which they are preserved by maintaining a low degree of temperature within the cars. Ice is generally employed for this purpose and the invention relates to this class of cars in which ice is introduced and the circulation and chilling of the air within the car is effected by induced currents.

The invention relates to certain improvements, whereby I am enabled to successfully use an overhead ice tank, either with or without end tanks; while at the same time the objectionable results, generally attending the use of overhead tanks, are obviated.

I will now give a particular description of the construction and operation of a car in which I have embodied my invention in one practical way and will then point out more definitely in claims the special improvements which I believe to be new and wish to secure by Letters Patent.

In the drawings, A represents the body of the car, a, being the side walls, a', the end walls, a^2, the bottom, and a^3, the roof, all of which are of any ordinary construction used in refrigerator cars.

At each end of the car is an ice chamber, B, the upper section, b, of which extends entirely across the car, while the lower portion, b', is of somewhat less width than the car, so as to leave a free space between it and the respective sides of the car, as seen in Fig. 2. The upper and wider section b of the chamber extends down into the car only a short distance, the main body being the lower and narrower portion. The front, b^2, of the lower section extends down only part way to the floor, but the back, b^3, fills the entire space from roof to floor, as seen in Fig. 1. In the front b^2 there are openings, b^4, in the upper portion just a little below the wide top section b. Within each of these chambers is an ice tank, C, mounted on suitable supports connected to the sides and bottom of the car, but elevated somewhat from the floor, as usual. Within each ice tank is a grating, c, located a little distance above the bottom of the tank, and the ice rests upon this grating, as usual. The tank space below this grating is divided by cross-partitions, c', running from the grating to the bottom, into a series of small chambers, c^2. In each of these small chambers a flue, D, is provided by extending partitions, d, across the chambers and leaving the space between them open at both top, bottom and front, as seen in Fig. 2. These partitions do not extend quite up to the grating and at the top are covered with wire gauze or perforated metal, d', as seen in Figs. 2 and 3. It is evident that the drip from the ice is received in these several small chambers below the grating, in which it is retained until the water reaches the top of the flues, when it passes out through the perforated cover and falls to the drip pan. The air coming down through the ice tanks also passes into these small lower chambers where it is brought in contact with the ice water and finds its outlet down through or out at the front of the flues D to the space below the tank which opens into the body of the car at the bottom thereof. The front of the ice tank, c^3, stands a little back of the front b^2 of the chamber, so as to leave a space between, and it extends up only about as far as this front of the chamber. The back, c^4, of the ice tank is also set a little way in front of the back of the chamber, so as to leave a space between the two as seen in Fig. 1. This back extends to the top of the car and at its upper end is provided with a series of holes, c^5. I also provide an overhead ice tank or holder, E, which is arranged in the top of the car and extends from one end to the other thereof, opening at each end into the end ice tanks C, as seen in Figs. 1 and 2. The bottom of this overhead tank is composed of slatted or grated sections, e,

at each side and between the two a solid section, e', a small space or opening being left between the middle section or table and the gratings. This tank is of less width than the interior of the car and the upright sides e^2 extend in across the end ice chambers and tanks, as seen in Figs. 1 and 2, but there is an opening or space c^6 within the ice tank C between the lower edge of these sides and the upper ends of the tank, which opening provides for the admission of air into the tanks C, and constitutes the inlets thereto, as seen in Fig. 2.

Underneath the overhead tank E are supplementary bottoms, F, one being arranged and extending along underneath each of the gratings of the tank above, but a free space is left between the two at the middle of the car directly underneath the solid or central table of the overhead tank. These supplementary bottoms extend out at each side a little beyond the bottom of the overhead tank and at their outer edges have upright sides, f, extending up not quite to the roof of the car. There is also space left between these upright sides and the sides of the car proper. It will be seen then that this construction provides a passage for air up between the sides of the car and these uprights f, and over the upper edges of the latter, at the ends thereof down into the end ice tanks, as seen at the right of Fig. 2, and between the two end chambers down into the space below the overhead tank, as seen at the left of Fig. 2. At the inner edges of the bottoms F, there is a vertical strip, f', which projects both above and below the bottoms, as seen in Fig. 2. There is thus formed under each grating of the overhead tank a long shallow drip pan, which receives the water formed by the melting of the ice above. Preferably these bottoms are provided with a metallic lining, f^2, to make them better suited for the service as drip pans. The ends of the pans extend in until they nearly meet the fronts of the end ice tanks C, so that the water collected therein will be discharged against the said fronts and trickle down to the main drip pans at the bottom of the car. A supplementary bottom, f^3, is fastened to the lower edge of the strip f' along one of its edges, and at the other to the outer edge of the bottom F. This serves as a protection to the bottom and at the same time provides an air space between the two, as seen in Fig. 2, which tends to prevent condensation on the underside of these long drip pan bottoms. The warm air rising at the sides of the car passes in over the upright sides f along the passage underneath the long gratings and over the ice water in the pan bottoms F and out over the inner edge of the latter, as indicated by the arrows in Fig. 2. The top of the central table e' is covered with sheet metal, e^3, the edges being extended over the edges of the table and bent downward at an incline as seen at e^4 in Fig. 2 to provide guides for the drip from this table. There are also metal strips, e^5, fastened to the underside of this table near each lateral edge and extending downward and outward over the respective pans F, which also serve, as guides, to prevent the drip from flying out into the center of the car and also direct the air around underneath their lower edges and prevent it from coming into contact with the bottom of this table, which will, of course, be very cold, as ice rests upon it, and would tend to produce condensation. As a further aid to this effect I also attach supplementary strips, e^6, to the bottom of the table, which strips are inclined inward and downward until they meet about centrally below the table, as seen in Fig. 2. There is thus formed an air space below the table, which prevents the chilling of these inclined strips, with which the interior air of the car comes in contact and so condensation is prevented.

With this construction it will be seen that both end and side circulation of air is induced, so that there is no possibility of stagnation of the air in any part of the car. At the same time with the appliances which have been described I avoid condensation upon ice chilled surfaces within the body of the car, which has been an objection to the use of overhead tanks heretofore. I also utilize the cold drip from the ice which is always at a very low temperature, especially if salt is used, which is a very common expedient. The openings b^4 in the front of the ice chamber obviate any tendency to stagnation at this point, as the air will pass in through these openings and coming in contact with the chilled front of the ice tanks drop down the space between the two and out at the bottom. So too the openings c^5 in the upper part of the tank back provide for circulation of air at the back of the ice tank, as indicated by arrows in Fig. 2. A large chilling surface is obtained with the construction described above, with provision for securing movement and circulation of the air in all parts of the car, and at the same time the danger of drip from chilled surfaces extending into or projecting over the body of the car is obviated.

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

1. In a refrigerator car, the ice tank C provided with a series of water chambers c^2 arranged below the ice body, in combination with flues D set in said chambers extending part way to the top thereof and provided with perforated covers d', substantially as described.

2. In a refrigerator car, the ice tanks, C, arranged within the ice chambers, B, at each end of the car so as to leave a space between the tanks and the chambers, and the upright sides, e^2, and f, with other suitable devices so arranged as to provide an air passage between the side of the car and the sides, f, up over the top thereof, and down through the ice tanks, C, under the side, e^2, in the re-

frigerator chamber at the bottom thereof, in combination with an overhead ice tank, E, extending the length of the car and opening at each end into the ice tank, C, so as to form a continuous overhead and end ice tank in the same car; said ice tank, E, being closed at its sides, and provided with a bottom composed of gratings, *e*, and a supplementary bottom, F, arranged under said grate bottom, and with an air passage between them, with suitable devices so arranged with reference to the sides, *f*, as to allow an air passage up over the sides, *f*, and down on the outside of the tank, E, and underneath the grated bottom of the tank, and out, into the top of the center of the refrigerating chamber, substantially as described.

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