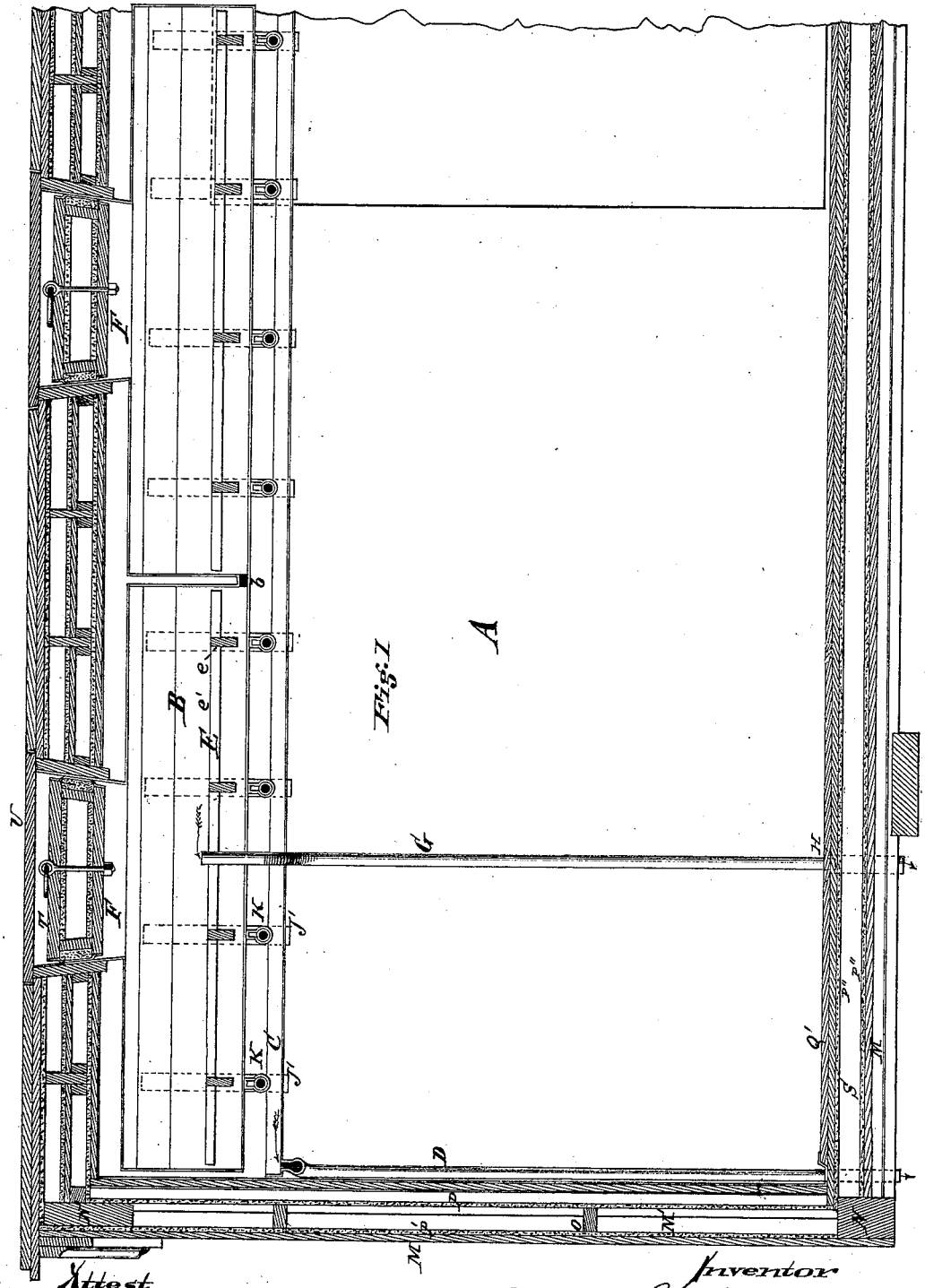
2 Sheets—Sheet 1.

A. W. ZIMMERMAN.

Refrigerator-Car.

No. 199,343. Patented Jan. 15, 1878.



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2 Sheets—Sheet 2.

A. W. ZIMMERMAN.

Refrigerator-Car.

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Fig. 2

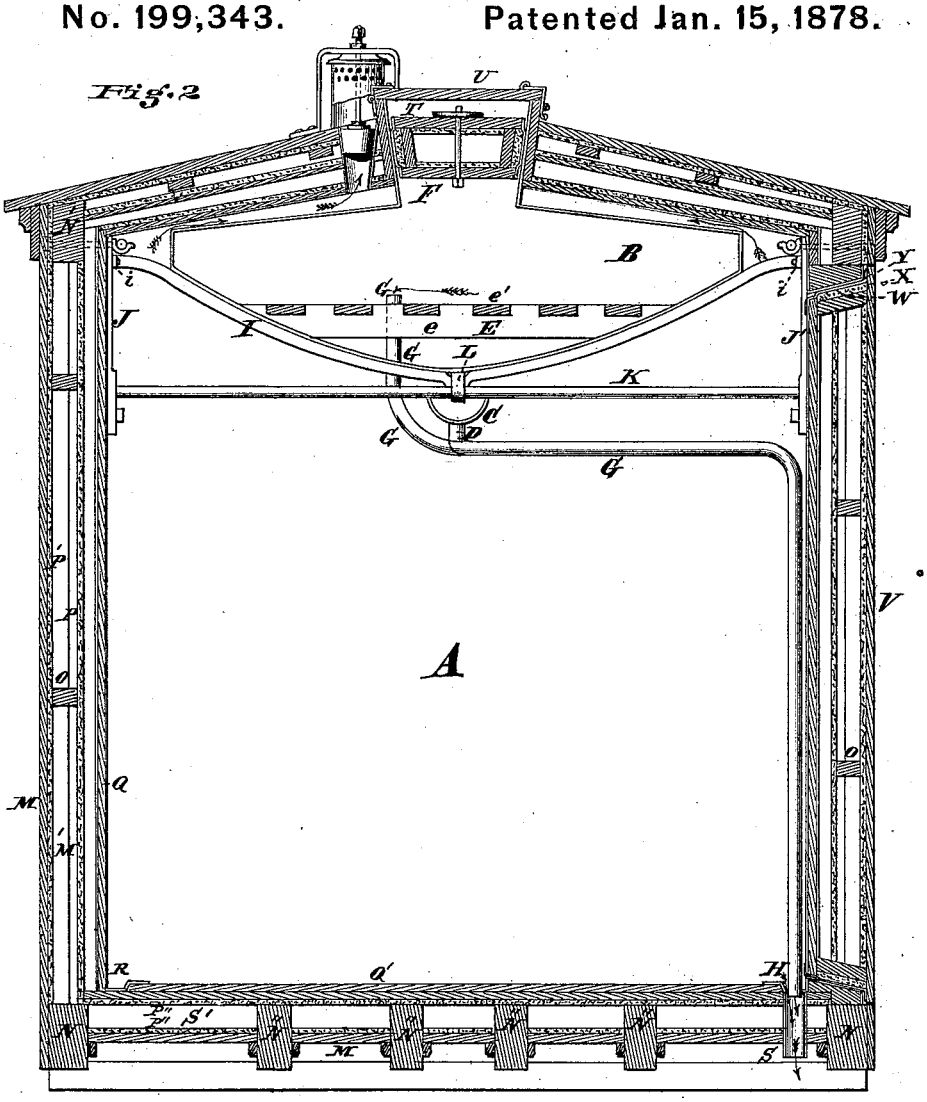
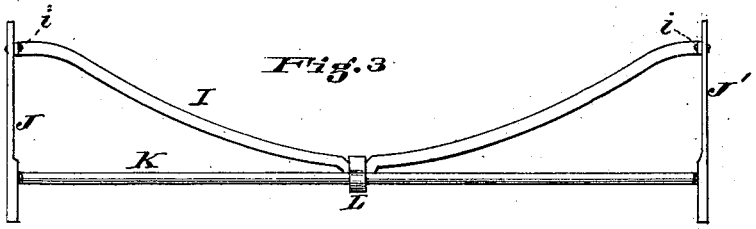


Fig. 3



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UNITED STATES PATENT OFFICE.

ARNOLD W. ZIMMERMAN, OF DAYTON, OHIO, ASSIGNOR TO HIMSELF, CHARLES W. MILES, OF MILFORD, CONNECTICUT, AND SAMUEL PILLSBURY, OF NEW YORK, N. Y.

IMPROVEMENT IN REFRIGERATOR-CARS.

Specification forming part of Letters Patent No. **199,343**, dated January 15, 1878; application filed May 14, 1877.

To all whom it may concern:

Be it known that I, ARNOLD W. ZIMMERMAN, of Dayton, Montgomery county, State of Ohio, have invented an Improvement in Refrigerator-Cars, of which the following is a specification:

My improvement relates to the construction of railroad refrigerator-cars; and consists, first, in a new and improved construction of ice-receptacle and means for supporting ice in the receptacle, by which the brine formed by the use of salt and ice, usual in refrigerator-cars, is collected and retained mostly below the ice, so that its presence is utilized for refrigerator purposes, in place of being discharged, as it heretofore was, as soon as made; second, in connection with the ice-receptacle, a truss device for supporting the same, which not only firmly supports the ice-receptacle in an improved manner, but affords facilities for the hanging up of meats, &c., within the car.

In the accompanying drawings, Figure 1 is a vertical section of the half of a railroad refrigerator-car. Fig. 2 is a cross-section of the same through the central door of the car and the hatchway of the ice-receptacle. Fig. 3 is a detached view in elevation of the truss used to support the ice-receptacle.

The interior space A of the car is that used for the occupancy of the meats, &c., to be preserved in transportation, and B is the ice-receptacle.

The form and general construction and arrangement of this ice-receptacle answers mainly to the description of the ice-receptacle shown and described in Letters Patent granted to me January 18, 1876, it having a concave bottom interiorly, and a convex exterior surface at the bottom, which collects the condensed vapors, and discharges the same into a gutter, C, the gutter having a discharge-pipe, D.

Under the provisions of my present improvement I construct a platform, E, within the ice-receptacle B, for the support of the ice above the bottom of said receptacle, the same being formed of cross-pieces *e* and slats *e'*, or in any other preferred manner. By the use of this platform I am enabled to support the ice at a position so high above the convex bottom of the receptacle that a chamber is formed below the platform for the collection of brine, and the platform, at the same time, prevents the ice from injuring the bottom of the receptacle in falling down as it is supplied through the hatchway F.

In shipping fresh meats in hot weather, it is usual to use one pound of salt to fifteen pounds of ice, which produces a brine twenty degrees colder than the ice itself. This brine, under the old system, escapes as fast as made, and thus the principal refrigerating agent is lost too soon.

By my improvement I am enabled to retain this brine below the ice until it has reached a height and a temperature which renders its escape desirable. To provide for its escape at the proper time I attach the overflow-pipe G to the ice-receptacle, in which it is hermetically sealed, its upper end rising a short distance above the upper surface of the platform E, and its lower end discharging into the cup H, which overflows into a pipe leading out of the car, the cup acting as a hydraulic trap, to prevent the entrance of air into the ice-receptacle from the exterior.

In the operation of this improvement the brine and water from the ice are caught under the ice-platform, and rises a little above said platform, so that when the ice is put in and the car set in motion the liquid is washed against the ice backward and forward, and the continued application of the salt to the ice, therefore, becomes automatic, while at the same time the brine formed by such application is retained in the receptacle so long that its presence as a cooling agent is fully utilized before it is permitted to escape through the overflow-pipe G.

To support the ice-receptacle within the car I use a series of trusses, one of which is shown in Fig. 3 detached. Each truss is formed of four bars, I J J' K, secured together at the ends, and attached at the center by the band L. The bar I is a flat bar of iron, set edgewise, its upper edge being grooved to fit the bottom of the ice-receptacle, as shown, and its

center depressed to accommodate the uniting-band L. The outer ends of this bar I are bolted to the upright pieces J J′ by bolts *i*, these upright pieces being secured to the sides of the car in any preferred way. The lower ends of the bars J J′ are doubled up so as to form a sufficient thickness for tapping a screw-thread and the insertion therein of the ends of the bar K, which is a gas-pipe. The band L is formed around the bars I and K, and, by welding or otherwise, made to permanently hold these bars together. The bars or pipes K of all the trusses in the car may be used to support rods on which meats in the car may be hung; and thus, while these bars K serve as members each of a truss which supports the ice-receptacle, they also act in the capacity of supporting-rods for the meat to be transported—a very important item, as by this I am enabled to save at least a thousand pounds in weight in the manufacture of a refrigerator-car. This may, of course, be applied to any refrigerators now in use.

The casing of my refrigerator-car is composed of outside shell M, secured to the sills N and timbers N′, and uprights or studding M′, the studding having longitudinal pieces O mortised into them, to which I attach a sheet of felt or combined felt and paper P, between which and the shell M an air-space is left, as shown, the inner surface of the shell being lined with felt, P′. I also provide an inner shell, Q, of wood, faced with paper on the outside and sheet-iron on the inside, the sheet-iron at the bottom being bent or otherwise formed into a trough, R, for the collection of condensed vapors and the discharge of the same into an exit-pipe, S. An air-space is formed, therefore, between the inner shell Q and the lining of felt P or combined felt and paper on the sides of the car. The bottom of the car is also formed of inner shell Q′, outer shell M, secured to sills N″ and N, with the air-space S′ and felt lining P″, the air-space having no connection with the air-spaces in the sides of the car. The top of the car is also formed so as to leave air-spaces, as shown, between strips of felt similar to that used in the sides and bottom.

The hatchway F of the ice-receptacle is an extension of the receptacle itself, as shown, and is of tapering form, fitted with a plug-door, T, which can be forced in till a tight joint is effected, and a trap-door, U, may be used above it and locked after the plug T is put in. The side door of the car V is formed in a similar way to the construction of the sides of the car, and made tapering to fit a tapering receptacle, fitted in the car in the manner shown.

In order to enable the side doors and hatch-covers to be made conveniently, and yet always of a construction to enable a joint to be securely made, I construct them with a chamber, W, around the edges, into which I insert the felt X, and I retain the felt in the chambers of the edges by means of a piece of duck, Y, secured at the edges at a lower plane than the surface of the felt by means of a row of nails or otherwise. By this construction the surface of felt and ducking is made to project above the surface of the row of nails, so that a smooth surface is afforded, which is compressible and wholly exterior to the row of nails, and the fastening, therefore, of the ducking forms no obstruction to the forcing in of the doors and hatch-covers.

In order to facilitate the supply of ice and distribution of the same properly, I separate the ice-receptacle into compartments, as shown in Fig. 1, and connect them together by short pipes *b*, each compartment having its own hatch-cover T.

What I desire to claim, and secure by Letters Patent, is—

1. The ice-receptacle B, having an elevated ice-carrying platform, E, and elevated overflow-pipe G, substantially as and for the purpose specified.

2. In combination with the ice-receptacle B, the supporting-truss I J J′ K, constructed substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

ARNOLD W. ZIMMERMAN.

Witnesses:

JOHN E. JONES,

J. L. WARTMANN.