

R. M. BIRDSALL.
Refrigerator-Car.

No. 199,019.

Patented Jan. 8, 1878.

Fig: 1.

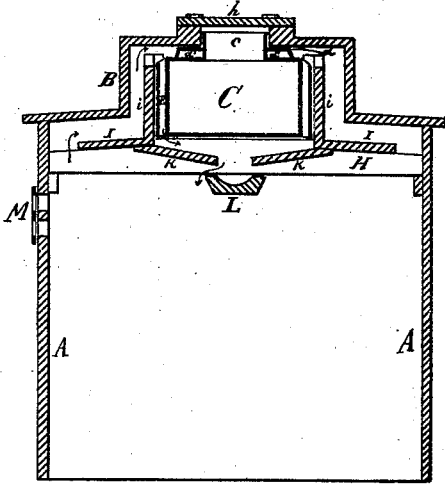


Fig: 2.

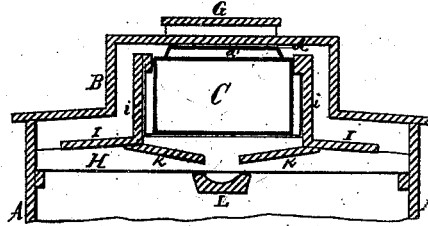


Fig: 3.

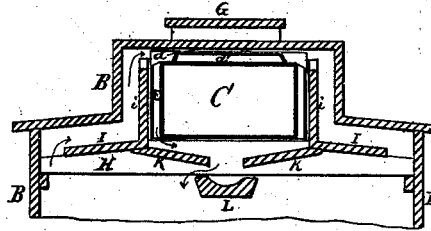


Fig: 4.

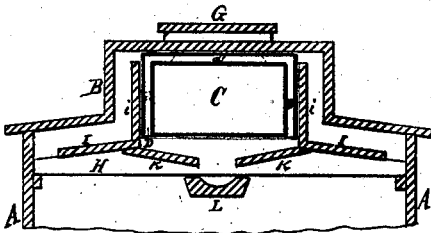


Fig: 5.

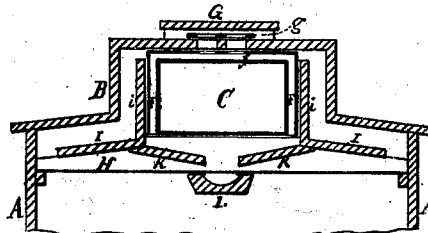
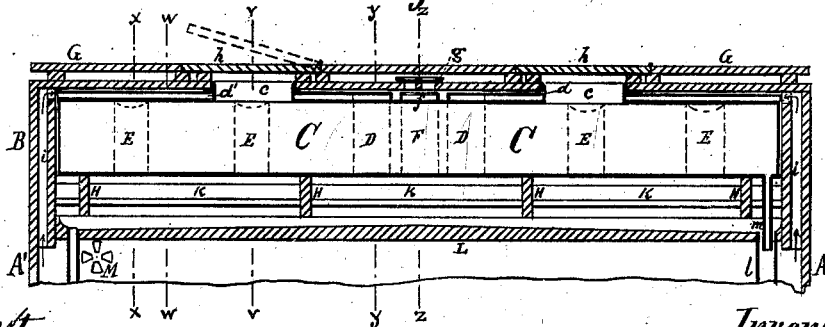


Fig: 6.



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RICHARD M. BIRDSALL, OF CLINTON, WISCONSIN.

IMPROVEMENT IN REFRIGERATOR-CARS.

Specification forming part of Letters Patent No. **199,019**, dated January 8, 1878; application filed November 19, 1877.

To all whom it may concern:

Be it known that I, RICHARD M. BIRDSALL, of Clinton, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Refrigerator-Cars, as fully set forth in the following specification:

The nature of my invention relates to improvements in railway-cars used for transporting fruits, eggs, butter, meats, poultry, game, &c., to remote markets, and for preserving the same in a fresh state.

The object of my invention is to so arrange the ice chest or tank in a refrigerator-car that with a proportionally small consumption of ice a sufficient amount of cold and perfectly dry air is furnished.

My invention consists in the use of hermetically, or nearly so, closed metallic ice-tanks, placed into the roof of the car, and arranged with metallic flues against their outer walls and over their top, through which the air will circulate, and, while being chilled without coming in direct contact with the ice, it will be divested of its moisture.

In the drawings, Figure 1 is a vertical cross-section on line *vv* in Fig. 6. Fig. 2 is a cross-section on line *ww*. Fig. 3 is a cross-section on line *xx*. Fig. 4 is a cross-section on line *yy*. Fig. 5 is a cross-section on line *zz*; and Fig. 6 is a longitudinal vertical section through the roof of the car.

A and A' are the side and end walls of the car-box, which are to be double and packed with a non-conducting material in the usual manner. B is the roof of the car, also packed and raised centrally, to provide the necessary room for the ice-tank C, which is an oblong rectangular box of sheet metal, and which may extend through the whole length of the car, or may be made in several sections independent of each other. This tank is filled with ice through the man-holes *e* in the top of the same, which are hermetically closed by suitable covers. The top face of the tank C is covered by extra sheet-metal plates *d*, in such a manner that two longitudinal shallow flues, *d'*, are formed, which start from the extreme ends of the tank, where they are open, and terminate near the middle of said tank, where they communicate each with two vertical flues, D, formed

against the sides of the tank C, and open at the bottom, so that the air rising in the ends of the car will enter said flues *d'*, and will pass along the top of the tank to flow out through flues D.

E E are a series of vertical flues formed against the side walls of the tank, which are open at top and bottom.

F F are vertical flues, also formed against the sides of the tank, open at the bottom, and connected on the top by a flue, *f*, transversely placed over the top of the tank. This flue *f* is perforated in its central portion to admit out-door air through a register, *g*, placed in the roof of the car, and is intended for ventilation.

A weather-covering, G, is placed over the ridge of the roof, which protects the ventilator *g*, and which is arranged with trap-doors *h*, through which the man-holes *e* of the tank C can be reached.

The tank C is supported by a series of cross-beams, H, and its side and end walls are incased with boards or other non-conducting material *i*, for excluding the air to come in contact therewith except by circulating through the flues D, E, and F. The wooden ceiling I, which is secured upon the cross-beams H, in connection with the space between the casing *i* and the walls of the cupola, forms a passage for the uprising air to the top of the ice-tank.

K K are diaphragms, made of boards, lined on their upper faces with sheet metal or other water-proof covering. They are secured between the cross-beams H, inclining toward the center, with a sufficient open space between, so that the air, after being cooled by contact with the tank, can escape downward. The condensed moisture from the chilled air will drip down upon the inclined boards K, and will collect in a gutter, L, whence it will be led outdoors by the conductor-pipe *l*. *m* is a pipe for discharging the water from the melting ice in the tank into the conductor-pipe *l*. M is a register or valve in the side wall of the car, for discharging the foul air.

The *modus operandi* is as follows: The tank C being filled with ice through the roof, the warm air inside of the car will rise around the casing *i* to the top of the tank, and will pass partly through flues *d* D and partly through

flues E downward into the refrigerating-space again, whereby it is cooled and liberated of its moisture.

For ventilating the car the registers *g* and *M* are opened, when the fresh air, before entering the car, has to pass through flues *f* *F*, where it is cooled and released of its moisture.

With imperfectly-closed ice-chests it frequently occurs that if the waste-pipe for carrying off the melted ice is getting obstructed and choked up, the water thus collecting by the shaking and pounding of the car will spill over, and will wet the articles placed in the car for transportation, all of which is obviated by a hermetically-closed ice-tank; and by shutting off the ice from direct contact with the circulating atmosphere its consumption is economized, while the metallic surfaces of the tank, being good conductors of heat, and being continuously in contact with the circulating air, will cool the same rapidly, and will extract and condense the moisture contained therein, so that perfectly dry air only will pass into the refrigerator-room, whereby not

only the products are preserved in their natural state for a long time, but also the wood-work of the car is kept dry, and is prevented from putrefying and rotting. The surfaces of the chest or tank only being exposed to the downward currents will insure a rapid circulation of the air.

What I claim as my invention is—

1. In a refrigerator-car, the combination, with the roof *B*, of the rectangular ice-tank *C*, placed in the said roof, and the series of vertical metallic flues *E* on the sides of the same, substantially as described.

2. The combination, with the ice-tank *C*, placed in the roof of a car, of the horizontal flues *d'* on top of the tank, the vertical flues at the ends of the tank, and the vertical metallic flues *D* on the sides of the tank, substantially as described.

RICHARD M. BIRDSALL.

Witnesses:

JOSEPH GATES,
J. F. CLEGHORN.