

(No Model.)

W. H. DOUGHTY,

REFRIGERATION FOR RAILROAD CARS, &c.

No. 311,298.

Patented Jan. 27, 1885.

Fig. 1.

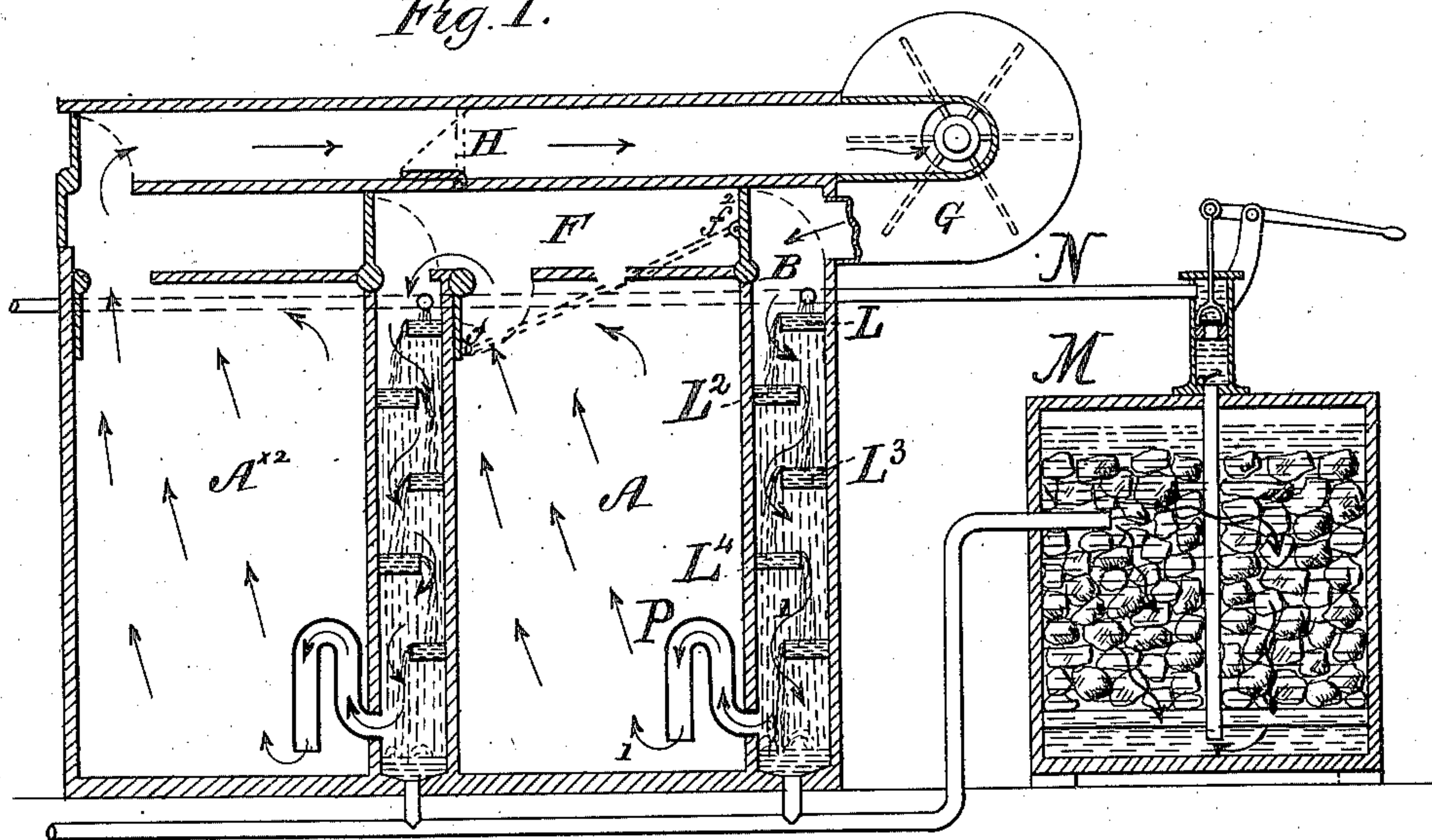
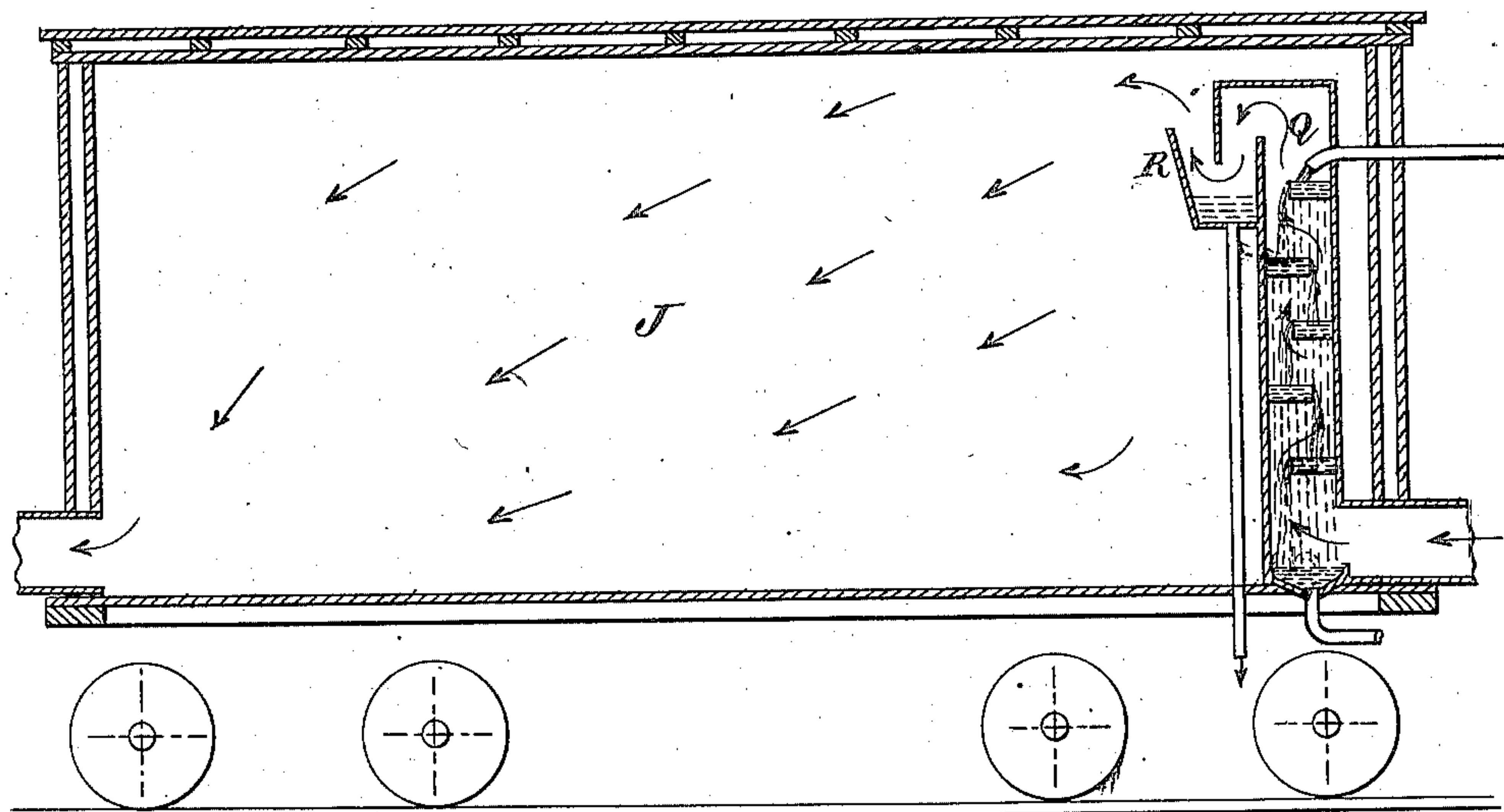


Fig. 2.



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REFRIGERATION FOR RAILROAD-CARS, &c.

SPECIFICATION forming part of Letters Patent No. 311,298, dated January 27, 1885.

Application filed May 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. DOUGHTY, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Refrigeration, of which the following is a specification.

This invention relates to improvements in refrigeration for railroad-cars, &c., and is adapted either for stationary or movable structures, one of the purposes for which it is designed being railroad-cars for the transportation of perishable articles of food.

In Patent No. 294,209, granted to me on the 26th day of February, 1884, I show chambers supplied with ice and arranged to receive currents of air, which are cooled by coming in contact with the ice within said chambers. In the present instance air is forcibly supplied to similar cooling-chambers, which are furnished not with ice but with a series of perforated pans, which receive a stream or streams of cold water from a source outside the refrigerating structure. The air is by this arrangement forced into the cold water, which presents itself to the air in a finely-divided condition and is carried along with it to the bottom of the cooling-chamber, at which point it is liberated and passes into the provision-compartment, the water flowing through a waste-pipe and then conducted back into the water-supply tank for use again. The result of this operation is that the air is greatly reduced in temperature and rendered suitable for purposes of effective refrigeration. The water employed is reduced to a very low temperature, by means of ice and salt or other suitable refrigerating agents, in a chamber or compartment isolated from the provision-chamber, and is conducted by a pipe to the pans with perforated bottoms, as already explained.

The claims at the end of this description define the points of novelty in my present invention.

In the accompanying drawings, Figure 1 shows a longitudinal vertical sectional view of a stationary structure embodying my invention, provided with a series of cooling and provision chambers or compartments; and Fig.

2 is a longitudinal sectional view showing the application of my improvements to a movable structure—a railroad-car in this instance.

In Fig. 1, A represents a compartment in the front end of which is a cooling-chamber, B, and in the upper front corner of which is a fan or blower, G, of any desirable pattern. The fan-chamber communicates with the upper end of the cooling-chamber B, and the lower portion of said chamber B is in communication with the interior of the provision-chamber A.

F represents a flue at the top of chamber A, and it is furnished with valves $f f^2$, connected to each other by a rod, e , so that the air-currents from the fan may be directed into either of the cooling-chambers at will, as may be readily understood.

H is another flue, located above the first-mentioned flue, and provided with a valve, h . The air is extracted from the provision-chambers by the fan G through said flue H in a manner rendered plain by the drawings. It is by this means that the air within the refrigerating structure is kept constantly passing through the cooling-chamber, and thereby retained at a proper temperature for refrigerating purposes.

Near the top of the cooling-chamber B is a pan, L, attached to three sides of the walls of said chamber, with a space between the edge of the pan and the fourth side of the chamber. Beneath this pan is a series of similar pans, $L^2 L^3 L^4$, &c., arranged as shown, and having their bottoms finely perforated.

M is a cooling-chamber for the water with which the pans are supplied. In this instance I show a pump for conveying the water to the pipe which supplies the pans. When deposited in the pans, the water falls from one to the other thereof in sprays or jets through the perforated bottoms, and from the last pan of the series to the bottom of the cooling-chamber, from whence it passes into the drain-pipe to be pumped or otherwise conducted back to the chamber M.

The current of air produced by the fan or blower G is forced through the spaces between the pans, and consequently through the cold sprays or jets of water to the bottom of the ice

cooling-chamber B, from whence it escapes into the provision chamber or compartment A, as indicated by the arrow marked 1.

In order to prevent the current of air from carrying water with it into the provision-chamber, the curved pipe P is secured to the outlet for the air. This pipe extends upward in the provision-chamber and then curves downward, as shown. This is an effectual means for separating the air from the water.

Instead of depositing water in only one pan there may be two or more pipes communicating with a corresponding number of pans; and, if desired, the upper pan may extend to all sides of the chamber B, and the current of air may be introduced into the cooling-chamber below said upper pan.

It is obvious that the arrangement above described may be reversed, the fan or blower located in the lower portion of the apparatus, and the current of air forced upward through the cold sprays or jets and passed into the provision-chamber near the top. Such an arrangement is intended to be shown in Fig. 2 of the drawings. In this view J represents a railway-car fitted up for refrigerating purposes. It is constructed with a cooling-chamber and with a provision compartment, and the cold water conducted from the tank, for instance, is delivered onto the pans at the top of the cooling-chamber, while the air-current is forced, by the fan or blower G, for instance, through the bottom of said chamber into the falling sprays or jets of cold water.

This modified construction of my invention may be provided with flues and valves or dampers similar to those embodied in the construction shown in Fig. 1.

In case the air-current is forced in at the bottom of the cooling-chamber, the pipe through which the air passes may be provided near its upper end with a surrounding bowl or trough, R, into which any water which may be carried up by the current of air will fall of its own gravity, and may be conducted away by a suitable waste, as shown. This bowl R serves as a trap in the same sense as does the bent pipe P in the embodiment of my invention shown in Fig. 1.

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

1. In a refrigerating apparatus, a cooling-chamber, B, provided with a series of perforated pans, as shown, in combination with means for supplying said pans with cold water, and a fan or blower for supplying said cooling-chamber with atmospheric air, substantially as and for the purpose herein set forth.

2. A refrigerating apparatus comprising a refrigerating compartment, a cooling-chamber, as B, means for supplying cold water to said cooling-chamber, a fan or blower for supplying atmospheric air to the cooling-chamber, and a trap located within the refrigerating compartment and guarding the outlet for the cooled air, substantially as and for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 14th day of April, A. D. 1884.

WILLIAM H. DOUGHTY.

Witnesses:

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ALBERT P. MORIARTY.