R. BURROWS.

REFRIGERATOR CAR.

No. 190,416. Patented May 8, 1877.

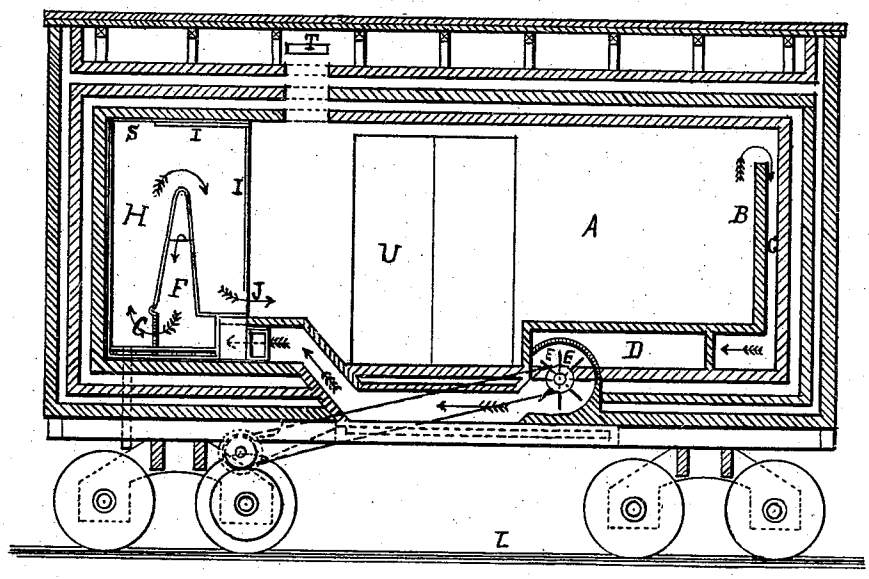

Fig 1

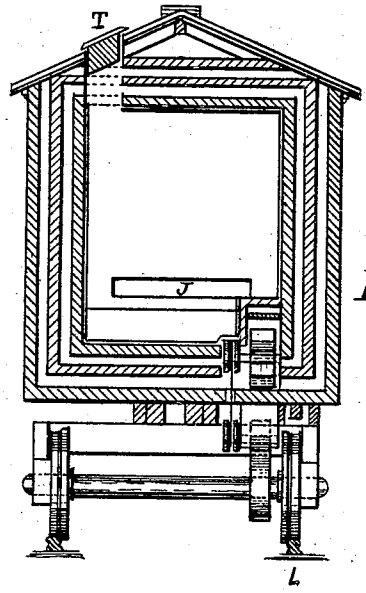

Fig 2

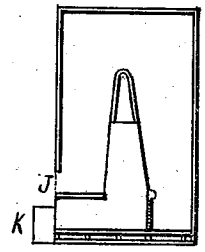

Fig 3

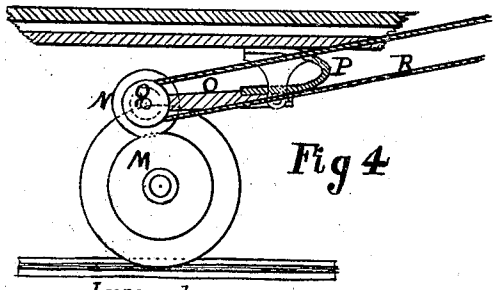

Fig 4

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UNITED STATES PATENT OFFICE.

ROBERT BURROWS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN REFRIGERATOR-CARS.

Specification forming part of Letters Patent No. **190,416**, dated May 8, 1877; application filed December 11, 1876.

To all whom it may concern:

Be it known that I, ROBERT BURROWS, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Refrigerator-Cars, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section of my refrigerator-car; Fig. 2, a transverse section taken on the line *y y*, Fig. 1; Fig. 3, a transverse sectional view of the ice-holder; and Fig. 4, a detached view of the rubber-wheels for driving the fan.

My invention relates to that class of refrigerator-cars or cooling-apartments in which a current of air is created, for the purpose of carrying it in contact with the ice, and keeping a uniformly low temperature in the preserving-chamber.

My invention consists in the construction and combination of the devices hereinafter particularly specified, whereby the air is drawn from the top of the preserving-chamber and passed in a current of fine jets through the ice in the ice-chamber, from which it is returned again into the preserving-chamber.

In the accompanying drawings, A represents the preserving-chamber, which is the interior of a freight-car, the walls, roof, and floor of which I construct of three thicknesses and two air-spaces, as shown in the drawings; but I do not limit myself to any special construction of the car-box, only that I construct it in such a manner as to make it as impervious as possible to the external atmosphere. B is a partition, extending across the preserving-chamber remote from the ice-chamber. There is a space, C, behind this partition, which opens into the upper part of the cooling or preserving chamber A, and leads down into the air-box D. E is an air-fan, so arranged in connection with the box D as to force the air, when operated as hereinafter described, in the direction indicated by the arrows, into the chamber F. The chamber F is a large air-chamber within the ice-chamber, and serves the purpose of a cooling-chamber, in which the air is cooled before it passes in contact with the ice.

It will be seen that this serves to save the consumption of ice in that the air is cooled before it is thrown in direct contact with it; at the same time it cools the air uniformly and thoroughly.

G is a wire-gauze, which covers an opening out of the chamber F into the ice-chamber H. I I are the walls of an ice-chamber. The air becomes more thoroughly diffused in contact with the ice by means of the wire-gauze, and becomes thoroughly cooled as it passes up over the walls of the chamber F within the ice-box and down to the opening J, where it escapes into the preserving-chamber. Directly beneath the opening J there is an open box, K, which I keep filled with bitterns, or other suitable material for absorbing the moisture from the cold air as it passes from the ice-chamber.

I operate the fan E by placing upon one of the axles of the ordinary car-trucks L a rubber wheel, M. This wheel may be entirely of rubber or rubber-faced. N is also a rubber or rubber-faced wheel, placed upon the shaft hung in the jointed frame O. The wheel N rests upon the wheel M, and is forced upon it by the spring P, so as to make sufficient friction, so that the revolution of the axle and the wheel M will revolve the wheel N. Q is a band-wheel, placed upon the same shaft with the wheel N, so as to revolve with it. R is a band, which passes over the pulley Q, and a pulley on the shaft of the fan E.

It will be seen that the revolution of the car-axle on which the wheel M is placed drives the fan E. I make the wheels M and N of rubber, or face them with rubber or other pliable material, in order to make them noiseless, and for the purpose of obviating, in connection with the hinged frame, the difficulties occasioned by the jolting of the car-truck.

The fan E draws the warm air from the top of the cooling or preserving chamber A, and forces it into the air-chamber F, where it is cooled, and from which it passes in contact with the ice, and over the drying material in the box K into the preserving-chamber again. This constant circulation of the air keeps it of a uniformly low temperature. I also force the air up and down through the ice-chamber, so that it becomes thoroughly cooled. T is an opening into the preserving-

chamber, which may be opened to admit external air directly into the preserving-chamber. The fan E being placed so as to exhaust the air from the preserving-chamber, the external air becomes thoroughly diffused in the preserving-chamber, and passes in contact with its contents, and is then exhausted therefrom by the fan, and forced out at some suitable opening into the external atmosphere. The opening J, leading from the ice-chamber into the preserving-chamber, should be closed when this external atmosphere is used. I contemplate using the current of external atmosphere to take the animal heat out of the meats, and partly cool the contents of the preserving-chamber before using the ice. I save ice by so doing. It is also important to extract the moisture as much as possible from the air as it passes into the preserving or cooling chamber A. I provide for this by attaching to the front of the ice-chamber a receptacle, K, in which to place bitterns or other suitable material, for absorbing the moisture directly under the opening J, through which the cold air passes. S is an opening in the top of the ice-chamber, directly under a suitable opening in the top of the car, through which the supply of ice is received into the ice-chamber. T is also an opening for the admission of external air into the cooling or preserving chamber.

It frequently happens that the external air is sufficiently cold to cool and preserve meats, and other substances, if brought in a current in contact with them. It also may be necessary, in some instances, to change the atmosphere in the preserving-chamber by admitting external atmosphere.

I have shown the air-box D placed in one corner of my refrigerator-car, and passing into the floor of the car past the door U, so as not to be in the way of boxes, &c., in loading and unloading the car; but the location of the fan and the air-box D is quite immaterial.

Having thus fully described the construction and operation of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The air-chamber F, in combination with the ice-chamber H, the air-chamber being within the ice-chamber, and serving to cool the air before it passes in contact with the ice, substantially as specified.

2. The combination of the air-chamber F within the ice-chamber and the front of the ice-chamber, provided with the opening J at or near its bottom, so that the air is forced to pass up over the air-chamber through the ice before reaching the preserving-chamber, substantially as specified.

3. The combination of the flexible wheels M and N, the hinged frame O, spring P, and fan E in a refrigerator-car, as specified and shown.

ROBERT BURROWS.

Witnesses:
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