No. 881,902. PATENTED MAR. 17, 1908.

M. COOPER.

REFRIGERATOR CAR.

APPLICATION FILED MAY 2, 1903.

2 SHEETS—SHEET 1.

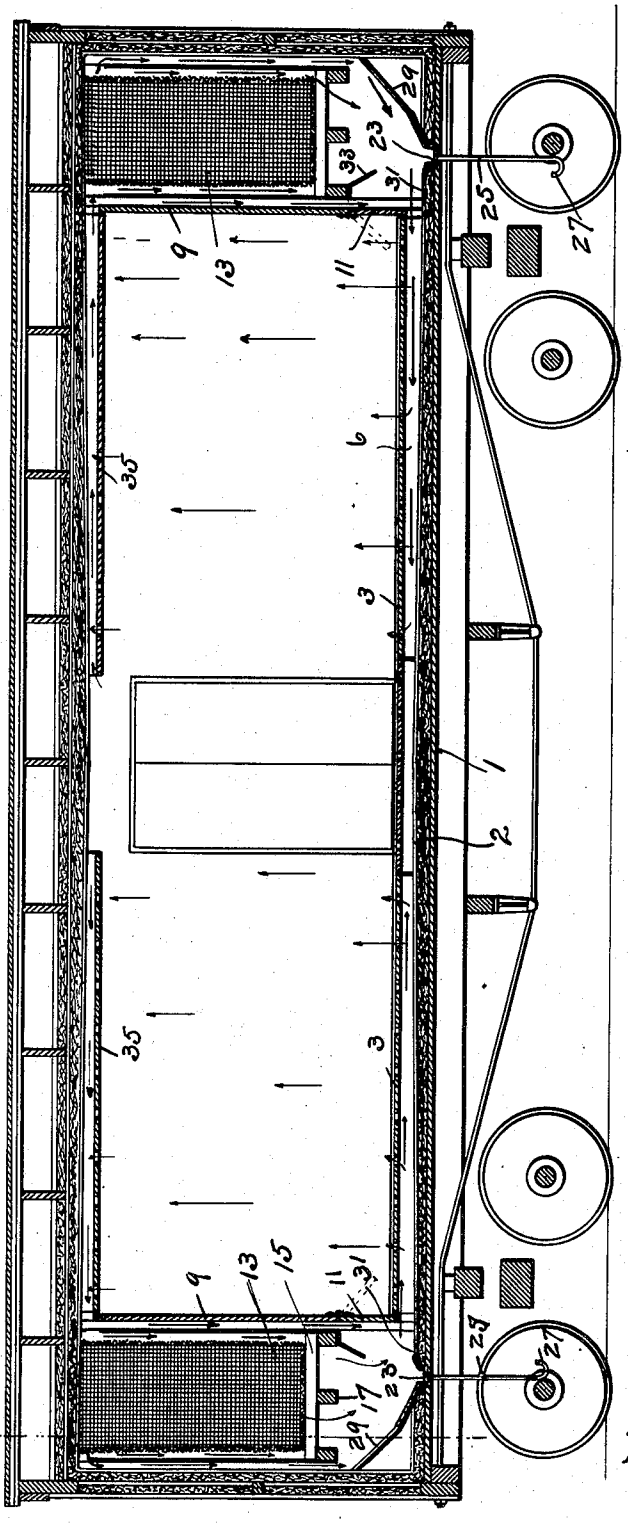


FIG. 1.

WITNESSES

E. H. Hanson

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INVENTOR

MADISON COOPER

BY Paul & Paul

HIS ATTORNEYS

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2 SHEETS—SHEET 2.

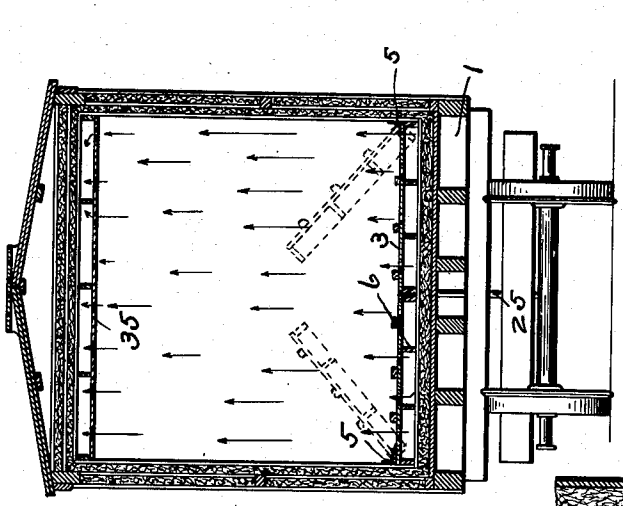


FIG. 3.

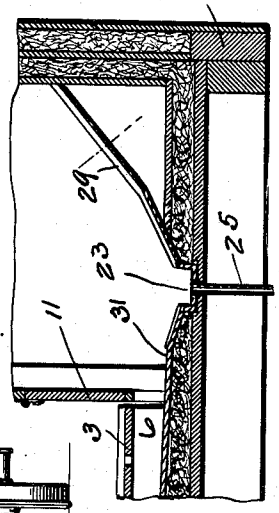


FIG. 4.



FIG. 5.

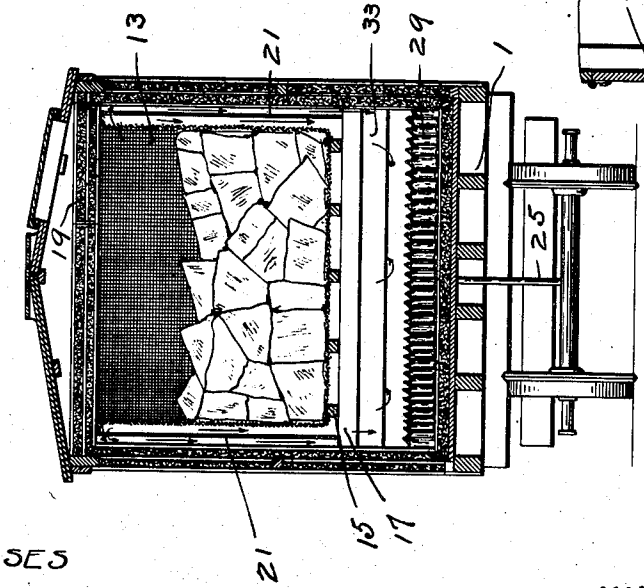


FIG. 2.

WITNESSES

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UNITED STATES PATENT OFFICE.

MADISON COOPER, OF MINNEAPOLIS, MINNESOTA.

REFRIGERATOR-CAR.

No. 881,902. Specification of Letters Patent. Patented March 17, 1908.

Application filed May 2, 1903. Serial No. 155,290.

To all whom it may concern:

Be it known that I, MADISON COOPER, of Minneapolis, in the county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Refrigerator-Cars, of which the following is a specification.

This invention relates to improvements in refrigerator cars, and the object of the invention is to provide a refrigerator car of simple and inexpensive construction in which a complete and uniform circulation of the air through the body of the car will be secured.

The invention consists generally in the constructions and combinations, hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification; Figure 1 is a longitudinal vertical section of a refrigerator car embodying my invention. Fig. 2 is a transverse vertical section through the air cooling chamber and ice receptacle. Fig. 3 is a transverse section through the body of the car. Figs. 4 and 5 are details. Fig. 5 being an enlarged cross section of plate 29.

In the drawings, 1 represents the body of the car which may be of any preferred or usual construction. The walls of the car are preferably provided with suitable non-conducting material preventing the admission of heated air through the walls of the car. The car is preferably provided with a perforated false floor 3, arranged a short distance above the main floor 2 and preferably made in sections so as to be removed in order to permit the cleansing of the car, also to permit the car to be used for other purposes. The sections may be made so as to be removable from the car body or, as shown in Fig. 3, each section may be hinged at 5 to the wall of the car so as to be capable of being turned into a vertical position against the side wall of the car in which position the sections may be secured by any suitable means. Each section is provided below the perforated floor with a series of longitudinal strips 6 which form supports for the floor and also provide air ducts below the floor, permitting the free circulation of the air lengthwise of the car below the floor.

At each end of the car, I prefer to provide an air cooling chamber, preferably formed by a transverse partition 9 that extends across the car at a suitable distance from the end and partitions off a space at the end of the car. The partition 9 does not extend quite to the roof of the car nor to the bottom of the car although its lower end is below the level of the perforated floor 3. I prefer to provide a hinged section 11 at the lower edge of the cross partition 9, this section being capable of being turned upward to permit access to the lower part of the air cooling chamber when it is desired to clean the same. Arranged within the air cooling chamber, preferably at each end of the car, is an ice bunker or receptacle 13. This receptacle is preferably formed of wire netting and is supported upon suitable bars 15 and 17. The ice receptacle is open at the top and access may be had thereto through a suitable door 19 which may be removed when desired for permitting filling the receptacle with ice. The ice receptacle is smaller than the air cooling chamber so that a clear space is left all around the ice receptacle between its walls and the inner wall of the air cooling room. Surrounding the ice receptacle and between said receptacle and the walls of air cooling room, I prefer to arrange the metallic plates 21. These plates are preferably vertically arranged with a space between each plate and the wall of the air cooling room and with a space also between each plate and the wire netting forming the wall of the ice receptacle. There is, therefore, a clear space for the passage of air between each of these plates and the wall of the air cooling room and another space between each plate and the ice receptacle.

Arranged in the lower part of the air cooling chamber, is a trough or gutter 23 extending transversely of the car and connecting with a waste pipe 25 provided with a suitable trap 27 at its lower end. In order to conduct the water that drips from the ice receptacle into this trough I prefer to provide the inclined plates 29 and 31 that extend transversely of the car body and are arranged to conduct the water into said trough. These plates are preferably corrugated as shown in detail in Fig. 5, so as to prevent spattering of the water that drips upon them. The water passes into the recesses formed by the corrugations and running down such recesses passes into the trough or gutter by which it is conducted to the waste pipe 25. The inclined plate 29, which is nearest the end of the car, is preferably of greater height than the plate 31 arranged between the trough and the body of the car. This plate is nearly

flat so that it forms a continuation of the floor of the car. This leaves a free space for the passage of air from the air cooling room below the partition 9 and into the space below the perforated false floor 3 (see Fig. 4). This arrangement also permits draining any water that may get onto the floor of the car into the gutter 23, the floor 2 being inclined in opposite directions from the center of the car towards the ends. I also prefer to provide a transverse deflecting plate 33 arranged above the plate 31 and below the portion of the ice receptacle that is towards the body of the car. This plate tends to deflect the water that drips from that side of the ice receptacle and to direct it into the gutter 23.

I also prefer to provide the car body with a perforated false ceiling 35, preferably made in two sections, one at either side of the door opening and the space above this false ceiling communicates with the air cooling room through the open space above the partition 9 (see Fig. 1). The ceiling 36 above the false ceiling is preferably inclined so that the air space above the false ceiling increases in size towards the air cooling room thus permitting free passage of the air.

The operation of the apparatus is as follows: The ice bunkers or receptacles are supplied with ice through the door 19 and the car being loaded and closed, the cold air flows down through the air cooling room and ice receptacle and passes into the space beneath the perforated false floor 3. It travels along in this space and rising through the perforations, travels upwards the car to the false ceiling into the space above such ceiling and along in said space over the top of the partition 9 and enters the upper part of the air cooling chamber. A circulation of air is thus obtained downward through the air cooling chamber under the false floor, upward through the perforations in said floor, through the body of the car, through the perforations in the false ceiling, along the space above such ceiling and into the upper part of the air cooling room. The ice being surrounded by a wire netting only, as the air passes downward, along and through the ice receptacle, it is cooled by being brought in a direct contact with the ice. A portion of the air passes through the space between the plate 21 and the wall of the air cooling chamber and therefore in contact with such plate 21. A portion of the air also passes between said plate and the ice receptacle. As the ice becomes melted from absorption of heat, the water drips from the ice receptacle onto the plates 33, 29 and 31, which largely increase the effective cooling surfaces, and is conducted into the trough or gutter 23 from which it passes through the waste pipe 25. This operation is continued at each end of the car so long as any ice remains in the ice bunkers or receptacles. By this means a rapid cooling of the air is obtained and a thorough and uniform circulation throughout the body of the car. Any water or other liquid that gets onto the floor of the car will pass into the gutter and out through the drain pipe. The interior of the car can also be washed or flooded and the water will be carried off through the gutter.

I claim as my invention:

1. The combination, in a refrigerator car, with an air cooling room at each end, of a main floor inclined in opposite directions from the center, a perforated false floor arranged above said main floor, suitable gutters at the ends of the main floor, a main ceiling inclined in opposite directions from the center towards the ends of the car, and a perforated false ceiling arranged below said main ceiling, substantially as described.

2. The combination, in a refrigerator car provided with an air cooling room at each end, of a main floor, a perforated false floor arranged above said main floor, a main ceiling inclined in opposite directions from the center to the ends of the car, and a perforated false ceiling arranged below said main ceiling, substantially as described.

In witness whereof, I have hereunto set my hand this 31st day of March, 1903.

MADISON COOPER.

In presence of—
A. C. PAUL,
C. G. HANSON.