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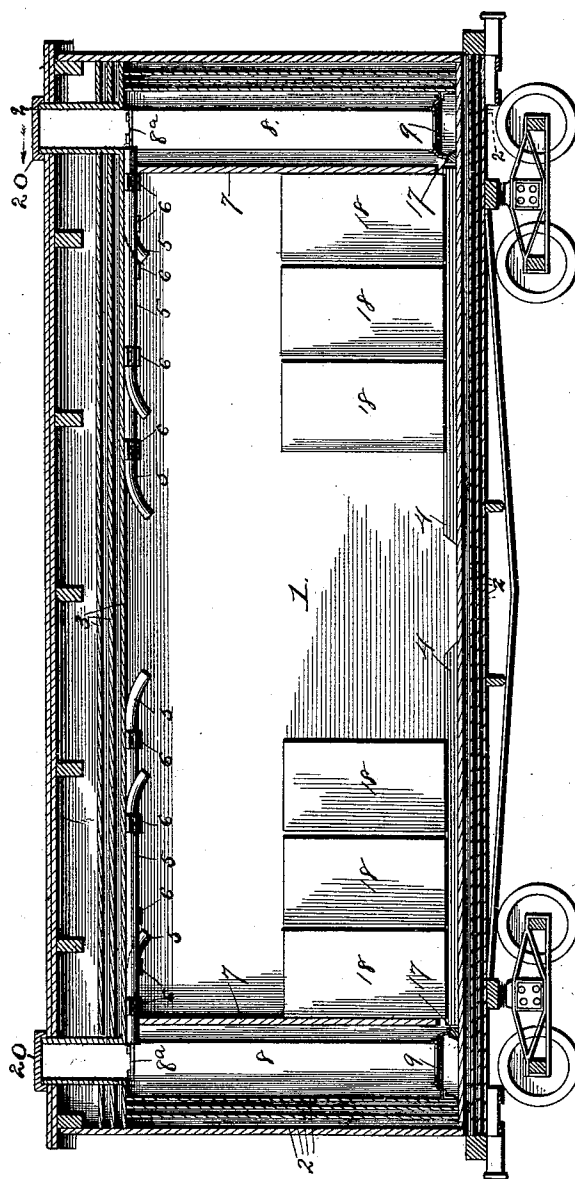
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G. A. FOWLER.  
REFRIGERATOR CAR.

No. 478,995.

Patented July 19, 1892.

Fig. 1.



Witnesses:

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attorneys.

(No Model.)

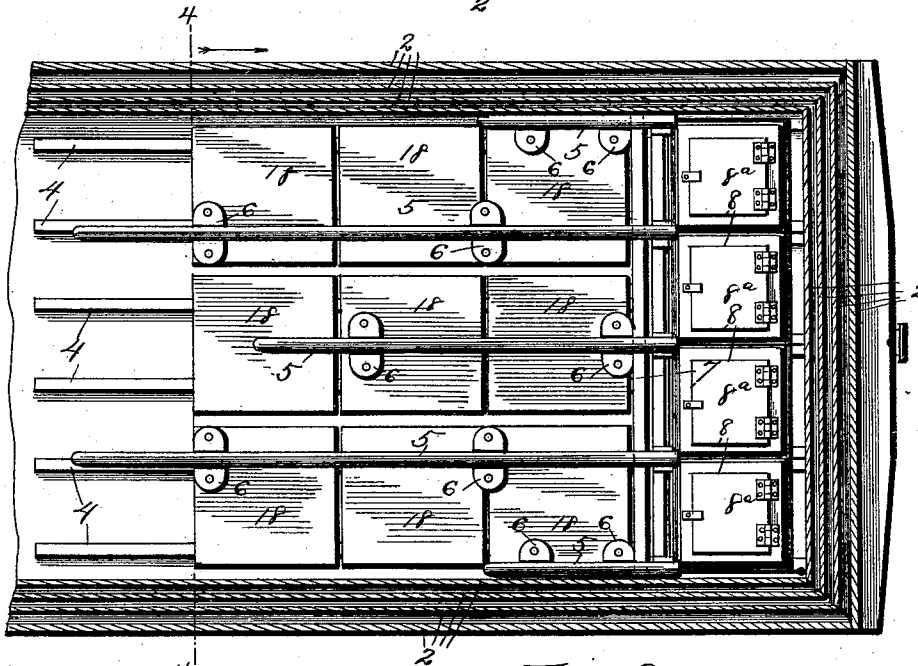
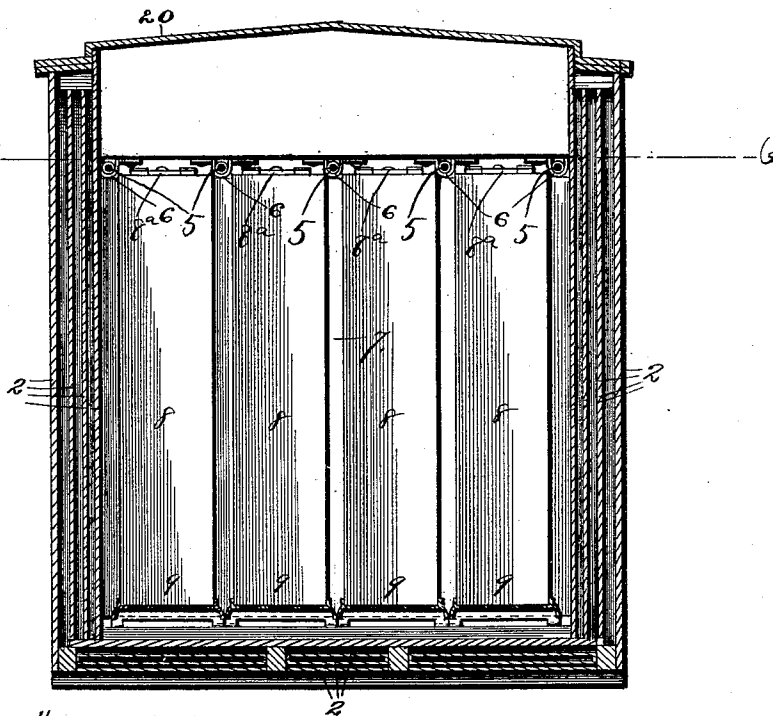
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REFRIGERATOR CAR.

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Fig 2



Witnesses

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Fig. 3.

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(No Model.)

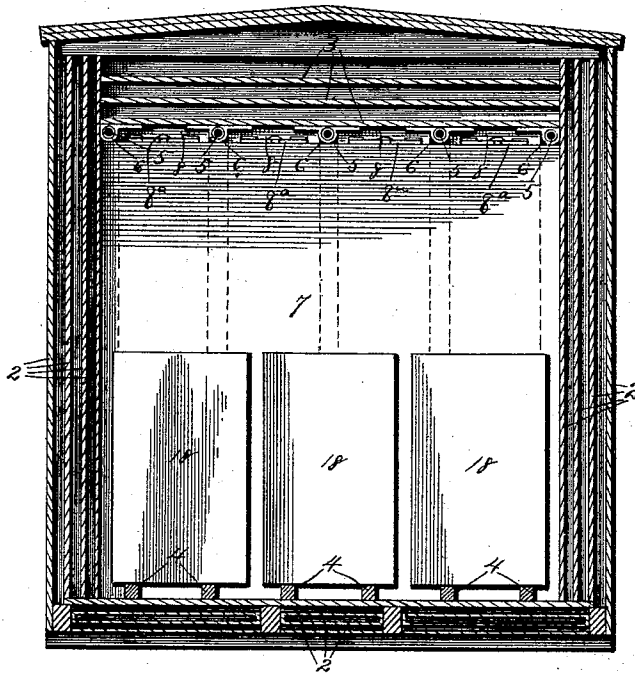
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G. A. FOWLER.  
REFRIGERATOR CAR.

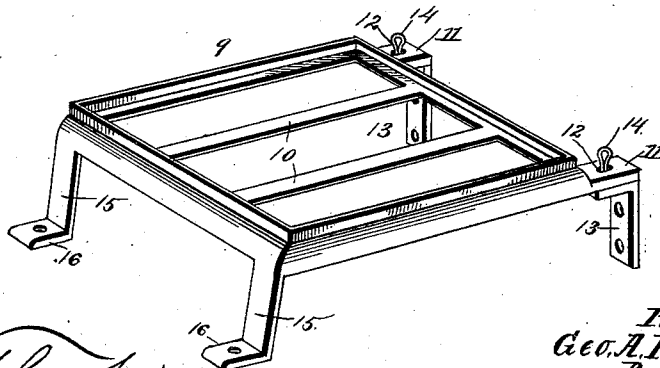
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*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

GEORGE A. FOWLER, OF KANSAS CITY, MISSOURI.

## REFRIGERATOR-CAR.

SPECIFICATION forming part of Letters Patent No. 478,995, dated July 19, 1892.

Application filed October 3, 1891. Serial No. 407,629. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. FOWLER, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improve-  
5 ments in Refrigerator-Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to that class of rail-  
10 way-cars which are particularly designed for the transportation of goods—such as meats, fruits, &c.—which are of a perishable nature and which require to be kept cold during transportation; and the objects of my inven-  
15 tion are to produce means whereby a constant and uniform circulation of air shall be maintained in the car, and by means of which also a most effective and economical use of the refrigerating material shall be insured;  
20 furthermore, to provide means whereby the goods shall be exposed at all parts to contact with the cold air, and finally to so dispose the refrigerating-receptacles as to bring their weight directly and solely upon the floor of  
25 the car, thereby relieving the upper parts of the car-bodies from all strains incident to supporting the weight of the receptacles for refrigerant.

To the above purposes my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with  
35 reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of a refrigerator-car having my improvements applied thereto. Fig. 2 is a transverse  
40 vertical section of the car on the line 2 2 of Fig. 1. Fig. 3 is a horizontal section of the car on the line 3 3 of Fig. 2. Fig. 4 is a transverse vertical section of the car on the line 4 4 of Fig. 3. Fig. 5 is a detached perspective  
45 view of one of the supports of the refrigerating-receptacles.

In the said drawings, 1 designates the car-body, the sides and ends and also the bottom of said body being shown as constructed with  
50 parallel walls 2, the spaces between which are filled with any suitable non-conducting packing, or one or more of which spaces may be left vacant to form a dead-air space, if de-

sired. Beneath the roof of the car are also preferably located a number of horizontal  
55 false roofs or ceilings 3, with vacant or filled spaces between them. It is to be understood, however, that these features of construction are not strictly essential to the spirit of my invention. It may be of course preferable  
60 that the walls and roof and bottom of the car be made air-tight, either by the means described or in any other suitable or preferred manner.

Upon the bottom of the car are placed any  
65 suitable number of longitudinal parallel strips or skids 4, the said strips or skids being arranged in two sets, one at each end of the car, and the outer ends of said strips terminating  
70 some distance from the ends of the car, while a transverse space or gangway intervenes between the inner ends of the strips or skids.

To the under side of the lowest false roof or ceiling 3 are secured a number of air con-  
75 duits or pipes 5, each of said pipes or conduits being supported upon U-shaped brackets or hangers 6, or equivalent devices, bolted or otherwise secured to said lowest false roof or ceiling. These pipes are arranged in two  
80 parallel longitudinal sets, one set being at each end of the car and the pipes of each set being preferably of unequal lengths and curved downwardly slightly at their inner ends. The inner ends of the longer pipes,  
85 however, terminate at each side of the transverse middle of the car-body, while the outer ends of said pipes terminate some distance from the ends of said car-body. At each end of the car is also placed a vertical partition 7,  
90 which extends across the car-body at some distance from the end walls of the car, thus forming a compartment at each end of the car. The outer ends of the air conduits or  
95 pipes 5 pass through or above these partitions 7 and open into the upper parts of the end compartments. Within these end compartments are placed a number of receptacles 8 for ice or other refrigerating material,  
100 and these receptacles 8 are preferably of galvanized iron or other suitable sheet or cast metal. The receptacles 8 are, furthermore, of such dimensions as to reach from near the bottoms of the end compartments of the car, and also of such width as to leave a space  
105 between each adjacent two of the receptacles, and also between the two side receptacles and

the sides of the car near to the lower ceiling-section 3 of car. The inner ends of the air conduits or pipes 5 enter between the receptacles 8 and into the spaces between the sides 5 of the car and the side receptacles, as shown. Each receptacle 8 is shown as provided at its upper end with a hinged cover 8<sup>a</sup> for permitting access to the tank and rests at its bottom upon a support 9, which is more clearly shown in Fig. 5.

In order to afford the required access to the tops of the tanks 8 for charging the same with ice or other refrigerating material, suitable openings are made through the false ceilings 15 3, and also through the roof of the car at each end thereof at points directly above the tanks 8, and a suitable scuttle or trap-door 20 is provided for closing said openings, partitions 19 being also secured in position to exclude heat. Each of these supports is of rectangular shape and of open or skeleton form, a suitable number of cross-bars 10 being formed in the body of the support. The rear ends 11 of the side portions of the support project outwardly from the body portion and are each formed with a hole or opening 12. Two brackets 13 of inverted - L shape are bolted or otherwise suitably secured at the body portions to the ends of the car, and a split key 30 is passed through each opening 12 and the upper end of each bracket 13, as shown. The front of each support 9 is formed with two legs 15, the lower ends of which are bent outwardly to form feet 16, which latter are bolted 35 or otherwise secured to a cleat 17, the said cleats being secured to the floor of the car.

18 designates the receptacles in which the meat or other perishable goods are placed, the said receptacles being preferably of sheet 40 metal and being placed upon the strips or cleats 4, so that the bottoms of said receptacles are raised from the floor of the car. From this description it will be seen that the air in the car constantly flows into the inner ends 45 of the pipes or conduits 5, then through said pipes out of their outer ends and into the compartments at the ends of the car. In these compartments the air is cooled, and owing to the consequent increase in its specific gravity the air descends through the compartments and flows thence outward beneath the receptacles 8 and toward the middle of the car, the air thus absorbing heat from the receptacles 18 rising again and re-entering 55 the pipes 5 to pursue the same course again. Owing to the position of the receptacles 8 the air is exposed to direct contact with their tops and sides, so that the most effective and economical action of the refrigerating material upon the air is insured, and owing to the presence of the skids or strips 4 the air is enabled to come into contact with the bottoms as well as with the sides and tops of the receptacles 18. Consequently the most effective 65 chilling of the receptacles 18 and their contents is insured.

It is to be understood that the receptacles

8 shown and described for receiving the refrigerating material may be either of the precise form and construction shown or of 70 any other suitable or preferred type, these receptacles not constituting, *per se*, an essential feature of this invention. It is also to be understood that the charging-openings in the car-roof may be used or may be dispensed 75 with, according as the form of receptacles 8 are used or other forms employed.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is— 80

1. A refrigerator-car provided at each end with a vertical transverse partition extending from near the floor of the car toward its roof, two sets of parallel longitudinal skids secured to the floor of the car and each set 85 extending from one side of the transverse center of the car to one end thereof and beneath the corresponding partition, and two sets of air-conducting pipes secured beneath the roof and each set of pipes extending from 90 one side of the transverse middle of the car through the corresponding partition and opening into the top of the corresponding end of the car, the ends of the pipes which are adjacent to the transverse center of the 95 car being bent downward, and said pipes being of different lengths, so as to bring their bent ends nearer to and farther from the transverse center of the car, substantially as set forth. 100

2. A refrigerator-car provided at each end with a vertical transverse partition extending from near the floor of the car toward its roof, two sets of parallel longitudinal skids secured to the floor of the car and each set 105 extending from one side of the transverse center of the car to one end thereof and beneath the corresponding partition, two sets of air-conducting pipes secured beneath the roof of the car and each set extending from 110 one side of the transverse center of the car through the corresponding partition and opening into the top of the corresponding end compartment of the car, the pipes of each set being of different lengths and the inner ends 115 of the pipes being bent downward, a number of vertical receptacles for refrigerant located in each end compartment and disposed with vertical spaces between them to receive the ends of the air-pipes, and a number of skeleton- 120 formed supports for the bottoms of the receptacles, each of said supports being attached to the end of the car at the lower part thereof by inverted-L-shaped portions and each having at an opposite end two legs, the feet of which 125 are secured to cleats attached to the bottom of the car, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. FOWLER.

Witnesses:

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M. A. VINCENT.