C. C. JONES.

VACUUM REFRIGERATING SYSTEM.

APPLICATION FILED SEPT. 5, 1914.

Patented Nov. 13, 1917.

1,246,817.

Fig. 1.

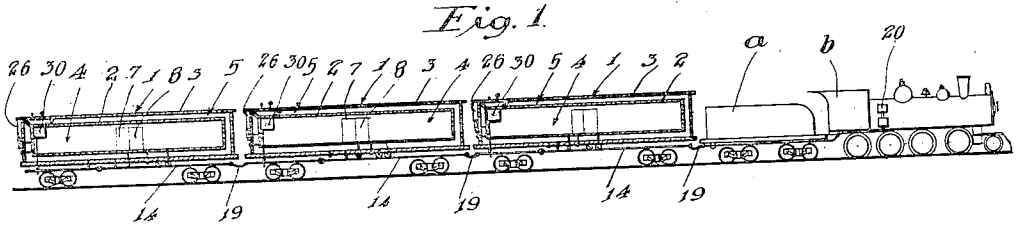


Fig. 2.

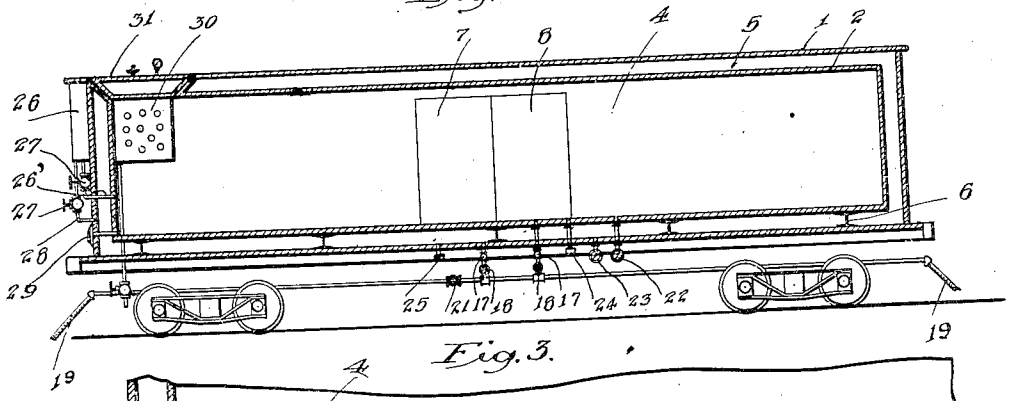


Fig. 3.

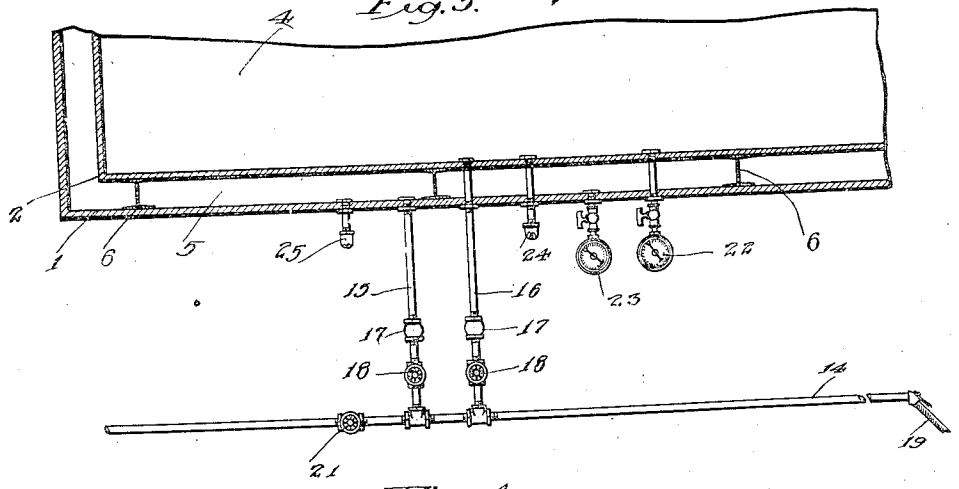
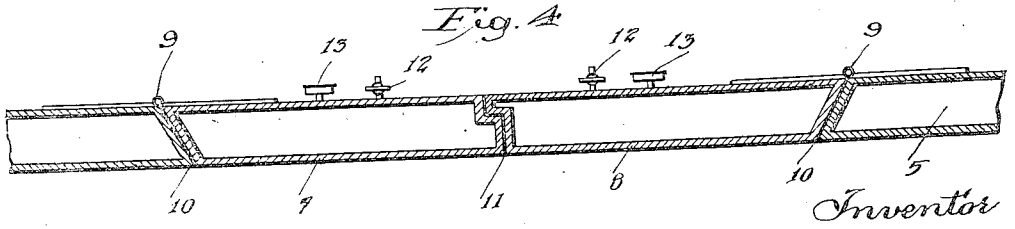


Fig. 4.



Witnesses:

Lully Russo.

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UNITED STATES PATENT OFFICE.

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VACUUM REFRIGERATING SYSTEM.

1,246,817. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed September 5, 1914. Serial No. 860,427.

To all whom it may concern:

Be it known that I, CHARLES COLCOCK JONES, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Vacuum Refrigerating System, of which the following is a specification.

The primary object of this invention is to improve the refrigeration systems of cars to render them more efficient, economical, and practical in every respect.

Another object of the invention is to provide a refrigerating system especially designed for use in connection with trains of refrigerator cars which makes the cars germ and bacteria proof thus preventing decay, fermentation, and deterioration of food products in transit.

A further object of the invention is to provide, in a system of this nature, double walled refrigerator cars of air tight construction which may be very economically manufactured and will possess the requisite amount of strength and durability.

Another and equally important object of the invention is to provide, in a system of this nature, means for creating a vacuum in the cargo receiving portion of the car and a separate vacuum between the spaced steel walls of a car while the train is in motion.

With these and other objects in view, as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts, as will be hereinafter fully described, illustrated and claimed.

Referring to the drawings:

Figure 1 is a side elevation of a train with the improved refrigerator cars shown in section.

Fig. 2 is an enlarged, vertical, longitudinal, sectional view through one of the cars showing various attachments in position thereon.

Fig. 3 is a fragmentary, vertical, sectional view through a car with the arrangement of pipes for the exhaust apparatus shown in elevation and,

Fig. 4 is a detailed, horizontal, sectional view showing the door construction.

In Fig. 1, I have illustrated a train comprising a plurality of refrigerator cars 1 constructed in accordance with my invention, a tender *a* and an engine *b*. The cars are of double steel wall construction having interior walls 2 and exterior walls 3, spaced from the interior walls and completely inclosing the same. Both the inner and outer walls are preferably formed of sheet metal plates connected by air-tight joints so that a vacuum may be maintained both in the chamber 4 and the insulating space or chamber 5. Any suitable spacing and reinforcing elements as I-beams 6, or other form of metal girders may be used to hold the inner and outer walls in spaced relation. Entrance to the cars is provided by double doors 7 and 8, secured to the exterior of the car by the hinges 9 so as to swing outwardly. These doors are hollow as best illustrated in Fig. 4 and close against packing strips or gaskets 10 and 11 so as to form an air tight closure. I prefer to form the doors wedge shape, as illustrated, to better insure a tight fit. Each door is provided with an exhaust valve 12 and a pressure gage 13 to be hereinafter referred to.

In the preferred embodiment of the vacuum creating apparatus, I provide each car with a main exhaust pipe 14, suitably secured in position and extending longitudinally from one end of the car to the other. A branch pipe 15 connects the pipe 14 with the chamber 5 between the walls of a car and a second branch pipe 16 connects the interior chamber 4 of a car with the exhaust pipe 14. Each of these pipe are provided with check valves 17 and cut-out cocks 18.

The exhaust pipes 14 are connected in alinement to one another by lengths of coupling hose 19 so as to form a continuous exhaust service line, the forward end of which may be connected to an exhaust pump 20, mounted on the engine. When the pump 20 is operating and the cut-out cocks 18 open, the chambers 4 and 5 are exhausted of air thus establishing two independent vacuums. It will, of course, be understood that this method of creating a vacuum is only one of many methods which may be employed. To exhaust the air from the hollow doors 7 and 8, a hose may be connected to an auxiliary valve 21, in the pipe 14, and to the exhaust valve 12. The gage 13 and the gages 22 and 23 communicating with the chambers 4 and 5 respectively, show the degree of vacuum produced.

Some means must be provided for breaking the vacuum in the chamber 4 to enable the doors of the car to be opened and to ac-

complish this I provide a relief valve 24. 25 is a relief valve communicating with the insulating chamber 5.

To prevent the rarefied air within the cargo chamber of a car from desiccating fruit, vegetables and other produce containing water, I equip the car with an exterior water tank 26, connected with the interior of the car by a supply pipe 26', the passage through which is controlled through a valve 27. A second supply pipe 28 may be connected to the tank so as to carry water into the chamber 5 to cool the walls of the car by evaporation. Instead of manually controlling the flow of water into the chambers 4 and 5 by operation of the valves 27, I may employ a humidostat 29, of any well known type, automatically controlling the admission of the water.

If desired, an ice bunker 30 may be placed within the cargo chamber of the car to hold ice which will act as a positive cooling agency and which in melting will also supply moisture to the rarefied atmosphere. A door 31 is provided to give easy access to the ice-box.

Although the rarefied atmosphere of the chamber 4 will ordinarily suffice to retard multiplication of all germs and bacteria, under certain conditions, it may be advisable to fill this chamber with a life destroying gas which, of course, may be easily accomplished. Attention is directed to the fact that in my refrigerator car, no appreciable amount of space is consumed to hold ice such as is now the case with the cars in use where frequently as much as 16 tons of ice are packed into the car at one time. The small amount of ice which I employ also results in a great reduction of dead weight and also greatly reduces the cost of refrigeration. Any small leaks or punctures may be quickly stopped by a coating of shellac or paint or calking the metal in the usual way.

From the foregoing description taken in connection with accompanying drawings, it will be apparent that I have devised a refrigeration system for cars which is very economical and efficient in operation and which will maintain the desired temperature in food products chilled before being placed in the cars.

What I claim is:

1. In a refrigerating system, a train of double walled cars each forming an air-tight cargo chamber and forming an air-tight chamber surrounding and independent of the cargo chamber, said cargo chambers being provided with doors, and means connecting the cars together for establishing a vacuum in each of said chambers and for maintaining the vacuum in the surrounding chambers when the doors of the cargo chambers are open.

2. In a refrigerating system, a train of air-tight, double walled cars, and means carried by the train for simultaneously creating a vacuum in the cars and between the double walls thereof.

3. In a refrigerating system, a train of cars each having an air-tight cargo chamber, an exhaust pipe connecting each cargo chamber to an exhaust service line and means for drawing air from each cargo chamber through an exhaust pipe and said service line.

4. A refrigerator car of double walled construction forming an air-tight cargo chamber and forming an air-tight chamber surrounding and independent of the cargo chamber, said cargo chamber being provided with a door, and means for establishing a vacuum in each of said chambers and for maintaining the vacuum in the surrounding chamber when the door of the cargo chamber is open.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 27th day of August, 1914.

CHARLES COLCOCK JONES.

In presence of—
LORRAINE E. DURROW,
RODNEY M. SMITH.