C. F. Pike

Cars for Preserving & Transporting Meats &c.

No. 72895 Patented Dec. 31, 1867.

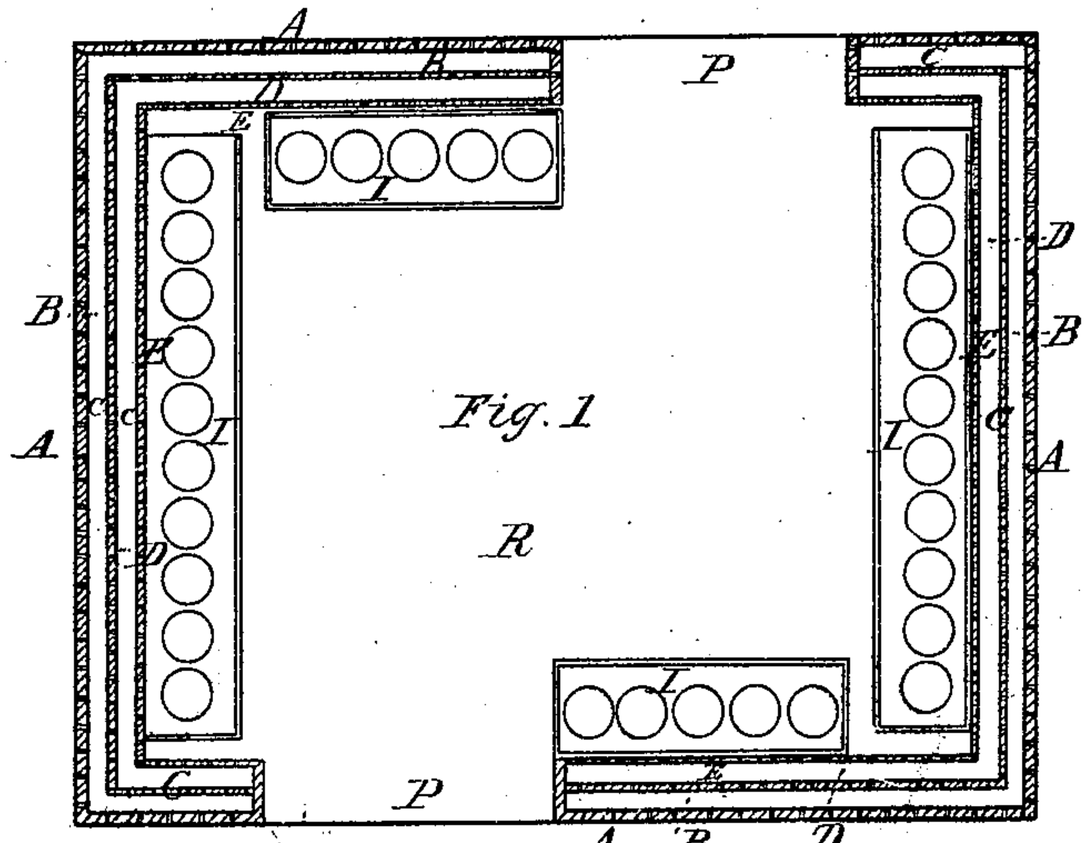


Fig. 1

Fig. 2

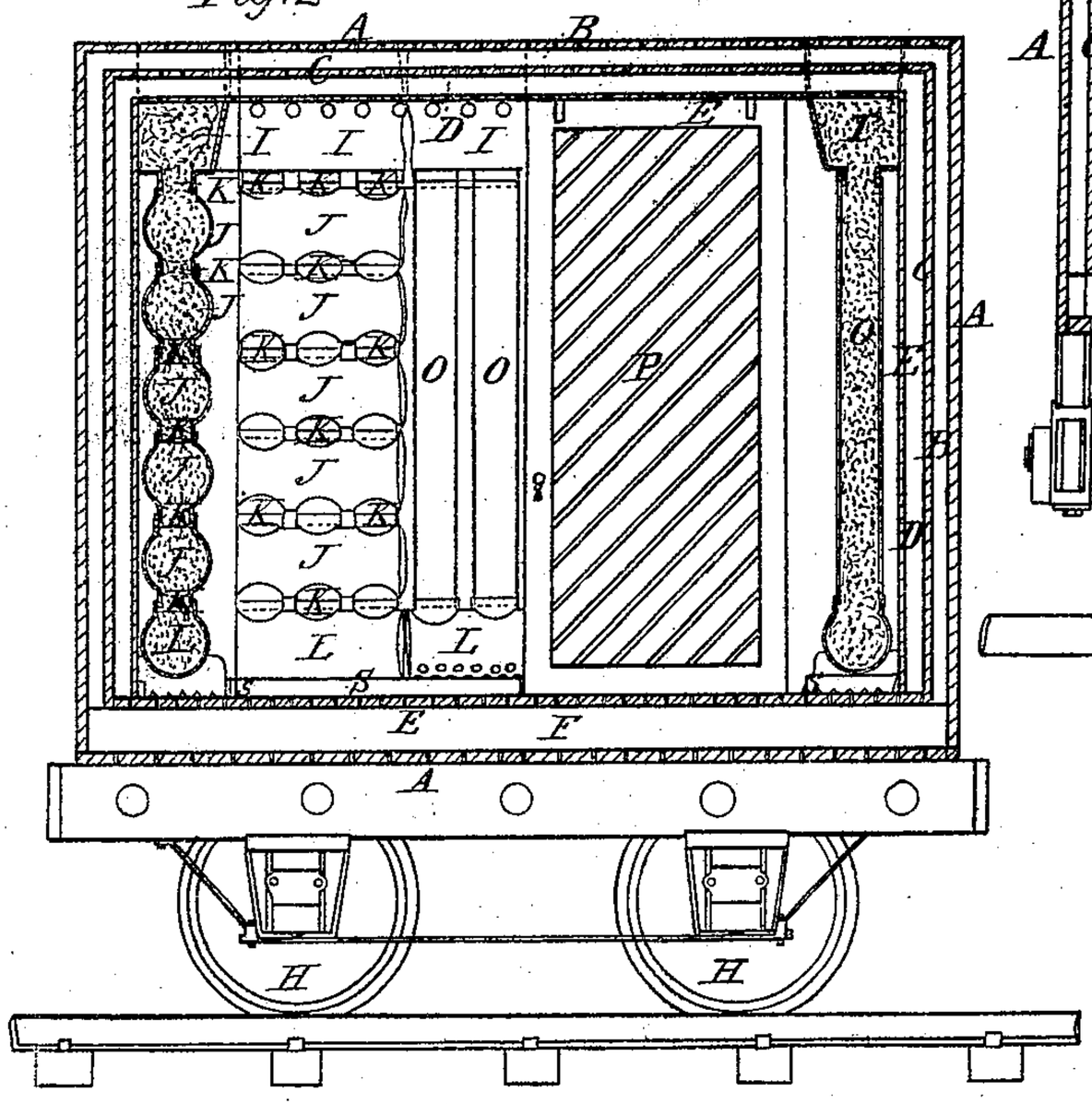
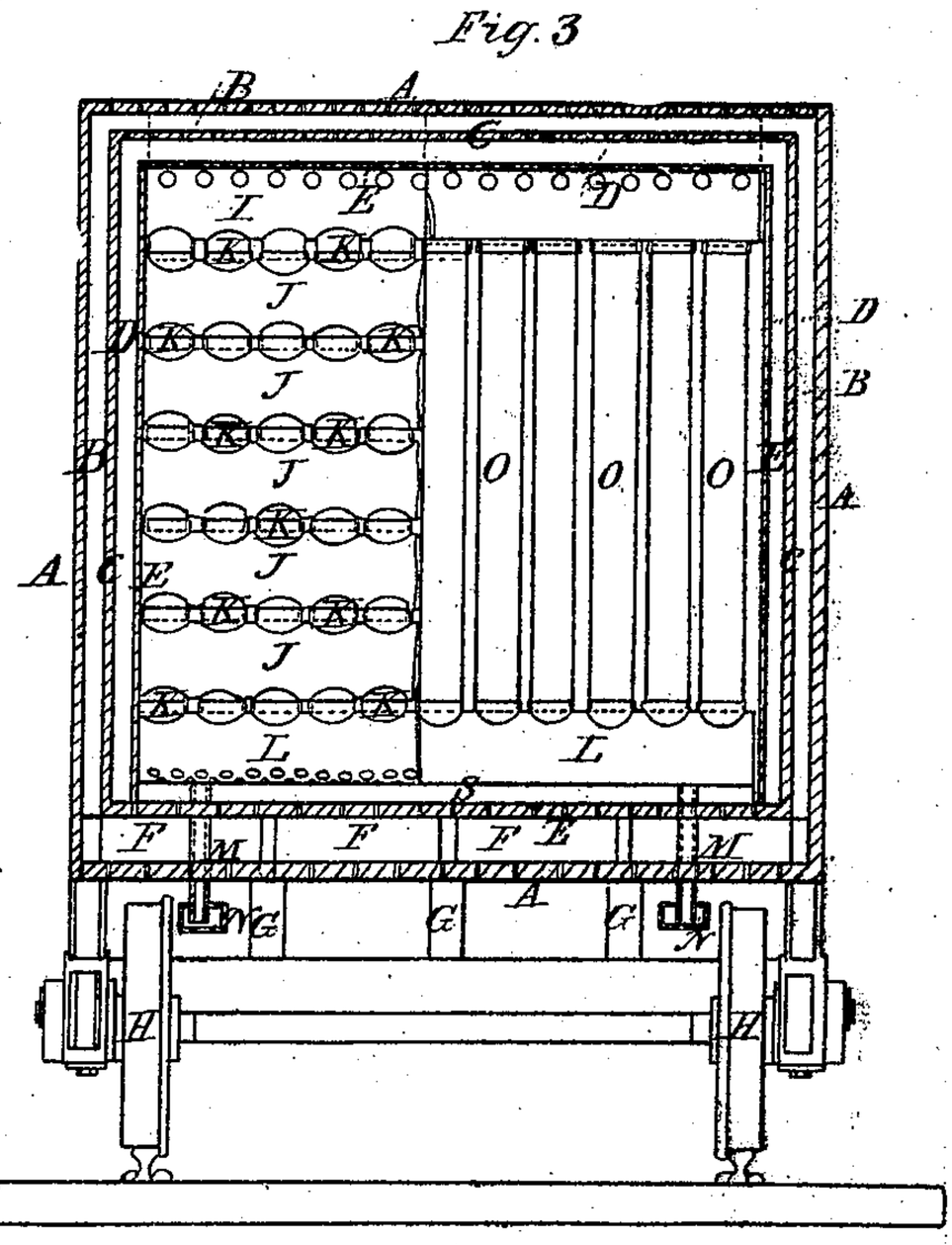


Fig. 3



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IMPROVEMENT IN THE CONSTRUCTION OF RAILROAD-CARS FOR PRESERVING AND TRANSPORTING MEATS, FISH, AND VEGETABLES.

Specification forming part of Letters Patent No. **72,895**, dated December 31, 1867.

To all whom it may concern:

Be it known that I, CHARLES F. PIKE, of the city and county of Providence, State of Rhode Island, have invented a new and Improved Refrigerating Railroad-Car for the Preservation and Transportation of Fruits, Meats, Fish, &c., over railroads from place to place; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in having a car built with the usual running-gear to fit the track, and with the bottom built in the usual form, only double, and filled with tan, sawdust, or other non-conductor—wool or hair will be the best. The sides, top, and ends are constructed triple, two spaces, one for air, the other for wool or hair or other non-conducting substances. On the sides or ends, or on both sides or ends, of the car, there is a row of metallic tubes or pipes, of cast-iron or other metallic substances, made in any of the forms mentioned and described in specifications and drawings of former patents issued to me, dated June 12, December 18, A. D. 1866, and January 1 and December 10, A. D. 1867.

The tubes or pipes are filled with ice, or ice and salt, or other freezing-mixture, together with the reservoirs or depositories to which the tubes are connected for the supplying of these tubes or pipes. The bottom pipe, or the ends of these tubes or pipes, may or may not be perforated or filled with holes or slots to let the air in them out into the preserving-room. This reservoir or depository may or may not have openings into it, so constructed that the air will enter it, and at the same time the ice will not fall out of it into the preserving-room. When so constructed with openings, the object will be to attract the light air that rises in the preserving-room into the reservoir or depository, so to keep up an artificial rotation of the air. When not constructed with the openings, the cold in the preserving-chamber will be by conduction.

To enable others skilled in the arts to make and use my invention, I will proceed to describe its construction and operations.

Figure 1 is a ground-plan of my improved refrigerating railroad-car.

A is the outside casing to the car. The strips that this casing A nails or fastens to should run lengthwise of the car instead of up and down, as between C D, so that there may be openings to let the air pass in between the casing A and C at one end and out at the other; or it may be entirely closed up tight. B is the space between A and C for the circulating air, or dead-air space, as the constructor or operator thinks best, the object being to keep the rays of the sun from striking the preserving-room R. C is the boarding or middle partition between A and E. D is the space filled with hair or wool between the casing E and C, or any other well-known non-conductor of heat. E is the inside casing of the car, which had better be of some hard wood, maple or chestnut. I is the reservoir or depository of ice, to which are attached the tubes or pipes O and K. These reservoirs or depositories I are to carry the ice for supplying the tubes or pipes O and K, and they may be built as high above the top of the car as the top of the smoke-stack to the locomotive, or as will go under the bridges. The constructor will use his judgment in regard to that point. O and K are the tubes or pipes that connect the ice reservoirs or depositories I with the horizontal pipe or tube L, one to the other. And for a more particular reference I refer to my patents granted June 12 and December 18, A. D. 1866, and January 1, A. D. 1867, and are for the constructing of the tubes or pipes, ice-boxes or receptacles, reservoirs, or depositories for ice. P are the doors, on either side, to load and unload the cars. These doors should be made to slide to and from their places, and when shut they should be screwed to the side of the car by bars or straps extending across from one side to the other of the door. At the top, bottom, and center there should be a strip of rubber for this door to bear against, to make it air-tight in the room R. R is the room that is to be refrigerated, and it may be fitted as will be most convenient for the purposes you propose to carry or load it with. If fruit, the better plan will be slat-shelves; for beef, the best plan will be to

have hooks, with strips for the hooks to rest on, to slide to and from, and a light wooden rack to hang between the quarters of beef. If it should be laid down, the racks will be important to keep it apart, to allow the air to pass over and between the sides of the beef, and keep the beef apart.

Fig. 2 is a side view of the improved refrigerating-car.

For a full description of A B C D E in this figure, reference is made to the description in Fig. 1.

F is the space between the inside and outside floors to the car. This space is as wide as the two on the sides or top. The timbers between these two floors in this space F should be strong, and the space between the timbers and the floors should be filled with some non-conductor and made solid. I should prefer hair or wool.

H are the car-wheels or running-gear, made in the usual form of such running-gears to cars. I are the reservoirs or depositories for the ice, which may be extended up as high as you please, (only look out for the bridges.) This reservoir or depository for ice is fastened to the top of the car, and upon the bottom of this reservoir or depository for ice are collars that shut into the tubes or pipes O and K. It is better to have the collars upon the bottom of the reservoir or depository a good length, on account of the ease of putting in and taking out the pipes or tubes. There is no particular form for these depositories or reservoirs. When there is no opening in the sides or ends of the reservoirs or depositories, and no opening in the bottom of the tubes or pipes, then the machine will operate by conduction. When there are openings in the pipes or tubes at the bottom, the air that is in the tubes or pipes will pass out into the room R. As this air will be colder, it will settle to the bottom of the room R, raise the light air in the room R to the top of it, and, if there be openings in the top of the reservoir or depository I, it being colder in there than the air is in the top of the room R, it will enter these openings and deposit its moisture on the ice, the air will become cool, and it will descend the pipes or tubes, and flow out into the room R again, and in this wise an internal circulation will be kept up in the chamber R, as herein described.

K are the collars of the pipes or tubes J, that shut one into the other, to connect the two pipes or tubes J one to the other. J are horizontal pipes or tubes, connected one to the other by the collars K. When the pipes or tubes are made in this wise, you get more surface in the same room than you can with the vertical pipe O. L is a horizontal pipe or tube, with collars only upon one side of it for the pipes or tubes O, and the collars upon the pipes or tubes J to shut into it to connect them together. This tube or pipe L is filled with ice, and is a part of the pipes or tubes that make up the ice-box. When constructed in this wise this pipe L rests in bearings that stand in the pan S. These bearings or stands are three inches high, more or less, as the case may be, so that there shall be a free circulation of the air around this pipe or tube L.

S is the pan that sits in the bottom of the car, up against the sides or ends of the room R, to catch the meltings from the ice and the condensed air on the pipes or tubes O, J, and L. M is the pipe that connects with the pans S at the bottom, passing down through the bottom of the car to carry off the water. On the end of this pipe M is a cup or trap, N, so constructed that it will fill with water and prevent any air from passing into the room R. There should be a number of these pipes M, so that when the car is on the curve, and is canted on one side, the water in the pan S shall not fly out into the room R. These bearings, that stand in the pan S and support the pipe or tube L, should have little holes in them near the bottom, to let the water flow from one to the other, to run out at the pipe M. O is a tube or pipe. P is the door to the car. (For description see Fig. 1.)

Fig. 3 is an end elevation of the car.

All the letters and references in this end elevation are described in Figs. 1 and 2.

This car may be of any usual length of a box-car, and it may be divided into small rooms to carry fish, clams, oysters, and lobsters in one apartment, and fruits in another apartment. The only object in doing this is that in one apartment you may want it colder than in one of the other apartments. A temperature that you would use for fish would not answer for fruits. This degree of cold is or can be regulated by mingling salt with ice, and the surface of the pipes or tubes exposed for the freezing-mixture to act on.

If you do not have the surface of pipe in proportion to the number of cubic feet of space in the preserving-chamber, it does not make any odds how much salt you mingle with the ice. You may use them half ice and half salt. It is the surface of the ice to the chamber that makes the chamber cold. If you want to freeze quick, or get a great degree of cold, you want about two feet of surface for the ice or freezing-mixture to act on to one cubic foot of space—that is to say, if you have a room in which you desire to freeze in, ten feet square and ten feet high, it will contain one thousand cubic feet. To cool that room with a freezing-mixture in the space of a few hours, so that the thermometer will stand within five or ten degrees of zero, it will require two thousand feet of pipe or tubes in length, four inches in diameter, which will require nearly seven thousand pounds of broken or crushed ice to fill the tubes. If you fill the tubes with plain ice—no mixture of salt—the thermometer will fall to 34° above zero, two degrees above the freezing-point. If you have one-half the number of feet of tubes the result will be the same with plain ice.

If you put into the chamber one thousand three hundred feet in length of tubing six

inches in diameter, it will give you nearly the same surface as two thousand feet of four-inch tubing, and it will require nearly ten thousand five hundred pounds of ice, crushed or broken, or fifty per cent. more ice than the four-inch tube. The surface is no greater in the six-inch pipe than the four-inch pipe, and the weight of ice is increased fifty per cent., or the load is increased fifty per cent., while the weight of the pipes or tubes is about the same whether you use four-inch or six-inch pipes or tubes; so it is not the large quantity of ice that is required, but the surface on the pipes or tubes for the ice to act against that is required to get the great degree of cold. If you should take the same room, ten feet square and ten feet high, and inclose it with a metallic case on all sides, you would only expose six hundred feet of surface to act on one thousand cubic feet of space, and you might have the walls of ice or ice and salt one foot thick. The cold would not be greater than if it were four inches thick.

There is no form known in which you can get so much surface with so little space as the round pipe or tube. I do not wish to be understood to say that a four-inch pipe is better than a six-inch one, or any other size.

I have made this calculation to enable others in constructing the machine. A cubic foot of solid ice will weigh fifty-eight pounds; a cubic foot of crushed or broken ice will weigh about forty pounds. By taking the number of square inches of a circle, and then multiply that by the number of inches the pipe is long, will give the number of cubic inches in the pipe. Divide this by one thousand seven hundred and twenty-eight, the number of cubic inches in a cubic foot, and multiply the product by forty, what a cubic foot of broken or crushed ice will weigh, and you have the number of pounds of ice that will be required to fill a pipe or tube.

This car or the room or rooms may be ventilated as described in my former patents, heretofore referred to in this specification, or in any of the well-known forms of ventilation.

I am well aware that refrigerating and preserving railroad-cars have been constructed before me by others under the Lyman patent, with a common ice-box. The great difficulty with them is, you cannot reduce the temperature low enough to make them practically useful on the road under the powerful rays of the sun in warm weather.

Having given a full and exact description of my improved refrigerating and preserving railroad-car, and its mode of operation and the mode of using it, what I claim as new, and desire to secure by Letters Patent, is—

1. The application of tubular ice-boxes to a railroad-car for the purposes of refrigeration, preservation, and transportation of meats, fish, and fruits from place to place, substantially as set forth and described.

2. I claim the combination of the pipes or tubes with the room or rooms R, with the running-gear H, substantially as set forth, when used for the purposes set forth and described.

3. I claim the tubular ice-box, with or without its being perforated at the top and bottom, with the room R, whether the same be constructed as a part of the car or merely put upon a flat, with the running-gear H attached to that flat, and to be removed at will or pleasure, substantially as and for the purposes set forth.

CHARLES F. PIKE.

Witnesses:
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CHARLES SELDEN.