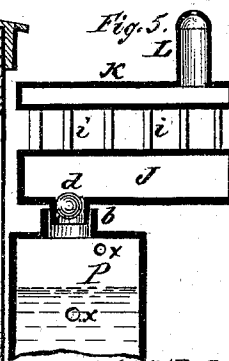
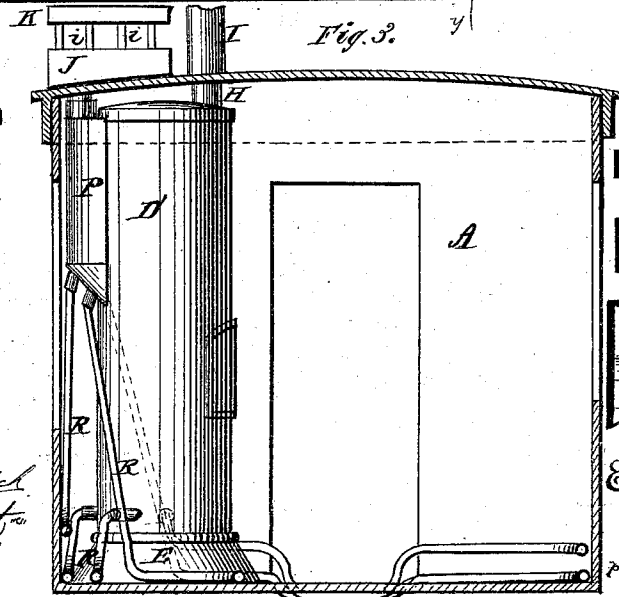
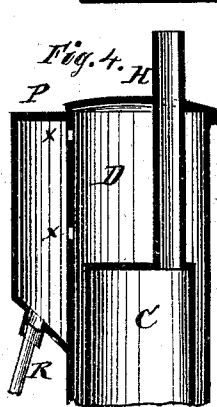
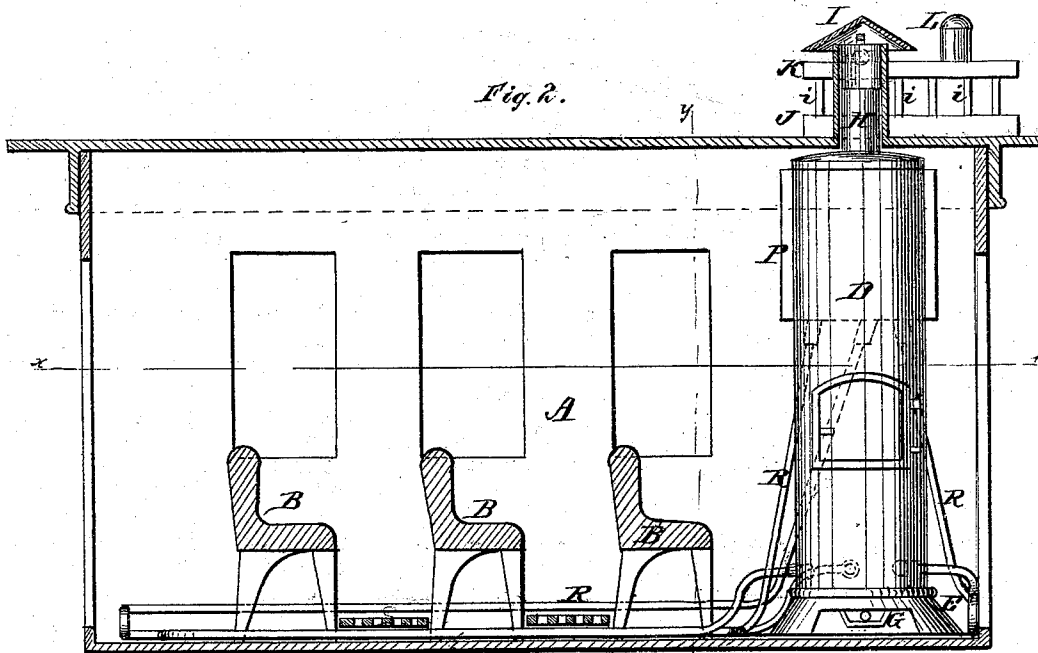
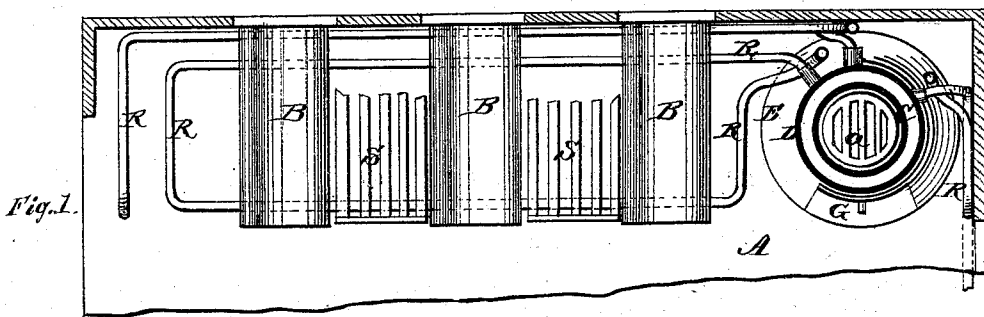


E. DENSMORE.
Car-Heaters.

No. 152,615.

Patented June 30, 1874.



WITNESSES:

P. C. Dietrich
H. B. Scott,

INVENTOR.

Emmett Densmore,

per C. H. Watson & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

EMMETT DENSMORE, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF HIS
RIGHT TO MELCHIOR B. MASON, OF SAME PLACE.

IMPROVEMENT IN CAR-HEATERS.

Specification forming part of Letters Patent No. **152,615**, dated June 30, 1874; application filed
June 12, 1874.

To all whom it may concern:

Be it known that I, EMMETT DENSMORE, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Car-Heaters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to that class of devices for heating railroad-cars by which a continuous current of hot or warm water is maintained through pipes arranged inside of the car, preferably near the floor of the car and the feet of the passengers.

My invention consists in the construction of the heater; also, in the arrangement of the pipes, and in the condenser, all as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a horizontal section of the heater, and part of a railroad-car, through the line *x x*, Fig. 2. Fig. 2 is a longitudinal vertical section of the car, showing a front elevation of the heating apparatus. Fig. 3 is a transverse vertical section of the same. Fig. 4 is a vertical section through the upper end of the heater. Fig. 5 is a vertical section through the condenser and upper end of the contraction-tank.

A represents a railroad-car, constructed in any of the known and usual ways, and provided with seats B B for the passengers. In one corner of the car A, or in any other place therein desired, is located the heater, which consists, principally, of an interior cylinder or fire-chamber, C, and the exterior cylinder or water-jacket D. Both of these cylinders are placed upon, and attached to, a base, E, in which is the ash-drawer G. In the bottom of the interior cylinder C is a grate, *a*, upon which the fire is made. This cylinder may be closed at the top, and provided with a smoke-pipe, H, extending through the top of the exterior cylinder D, and through the roof of the car, and

above said roof provided with an ordinary cap or hood, I. The top of the exterior cylinder may extend above the interior cylinder C a suitable distance, as shown in Fig. 4, so that, when water is admitted into said exterior cylinder, it will entirely surround and cover the interior cylinder or fire-chamber C, and that portion of the cylinder D so extended above the fire-chamber C may be useful as a reservoir; or the fire-chamber may extend the entire length of the heater, of uniform diameter its entire length, or of a gradually reducing diameter from any point above the fire-door, in which case the cylinder D becomes a water-jacket its entire length. On the outside of the exterior cylinder, water-jacket, or reservoir D, is attached a contraction-tank, P, connected with the interior of the cylinder, water-jacket, or reservoir D by passages *x x*, and extending around one-half, more or less, of the cylinder D at the top. From the bottom of the contraction-tank P pipes R R extend down to the floor of the car, and pass under the seats B B, or around the sides of the car, as hereinafter described, and then return and connect with the water-jacket D at or near the bottom thereof. From the top of the contraction-tank P a small collar, *b*, extends up through the roof of the car, and connects with a chamber, J, which rests upon the roof of the car. This chamber, by a series of small vertical pipes, *i i*, may be connected with another chamber, K, which has a steam-dome, L, and in said dome a suitable safety-valve may be inserted, if desired. The two chambers J and K, with their connecting-pipes, form a condenser. In many instances a simple chamber will be found a sufficient condenser. In the connection *b*, between the same and the contraction-tank, is placed a ball-valve, *d*, made of wood or other material that will float in water. Should steam be generated, and the pressure of the steam exceed the weight of the ball *d*, the ball will, of course, be raised, and the steam pass into the condenser, where it is condensed, and in the shape of water returns to the contraction-tank. If the ball is raised by the steam, the condensed water will,

of course, have free passage down to the contraction-tank, and if the steam is not strong enough to raise the ball the water in the condenser will float the ball, so as to allow it to pass down; and, hence, in either case, no condensed water will remain in the condenser, but pass directly back into the contraction-tank.

When this heater is in operation, the water in the cylinder D, as it becomes heated, expands and passes through the passages *x x* into the contraction-tank P. As soon as the water reaches the contraction-tank, it is contracted by cooling. When contracted it has greater specific gravity than the water on the same level in the cylinder D, and a circulation is at once established from the contraction-tank down through the descending pipes, and, through the pipes arranged upon or near the floor of the car, returning to the bottom of the water-jacket D, to be again expanded in the water-jacket, and again contracted in the contraction-tank. The hot water, while passing through the pipes, heats the car by direct radiation.

In this apparatus, as described, I use two or more distinct and separate circulations, as shown, by having two or more pipes extending from the contraction-tank P, whereby, in a given amount of heating-surface, a much more rapid circulation is insured, and only one circulation need cross the aisle of the car. The pipes R R, or branches connected therewith, are arranged under the feet of the passengers,

or around the sides of the car, and may be covered with grating S, if desired. Another feature of my device, making it greatly superior to any now in use, is the arrangement of the pipes in straight lines under the feet of the passengers. By avoiding the curves necessary where the pipes are made to run from the side of the car out and back under each seat, the circulation is much more prompt; at the same time the pipes are constructed and laid with much less expense.

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

1. The chambers K J, vertical pipes *i*, ball *d*, and tank P, with passages *x x*, in combination with water-jacket D, fire-chamber C, and pipes R R, substantially as and for the purpose set forth.

2. The fire-chamber C, with pipe H and water-jacket D, extending around and above the fire-chamber, in combination with tank P, extending below the top of the fire-chamber, and pipe R, as and for the purpose set forth.

3. The water-jacket D and tank P, in combination with the chambers K and J, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

EMMETT DENSMORE.

Witnesses:

THOMAS CLARKE LUBY,
THOMAS HEANEY.