U. J. DUFFIELD.

CAR-HEATERS.

No. 194,418. Patented Aug. 21, 1877.

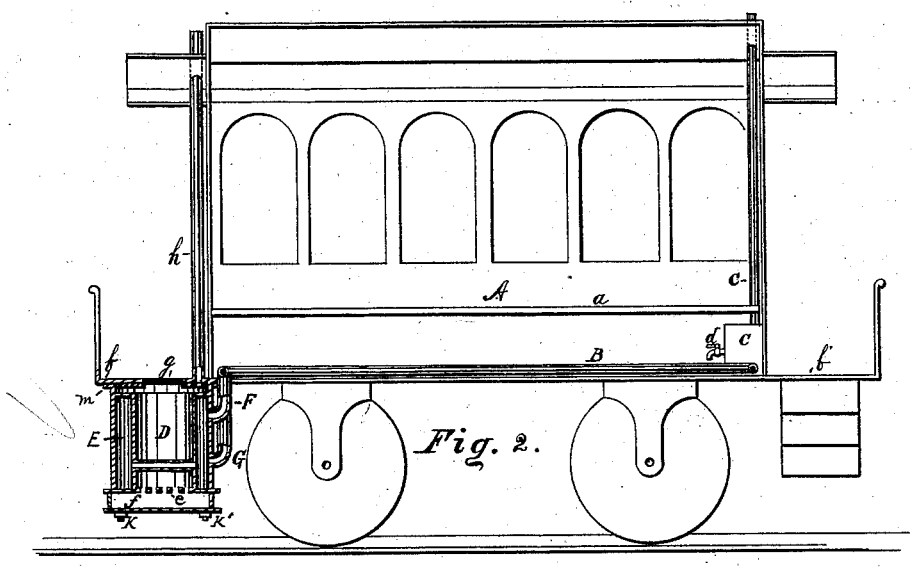

Fig. 2.

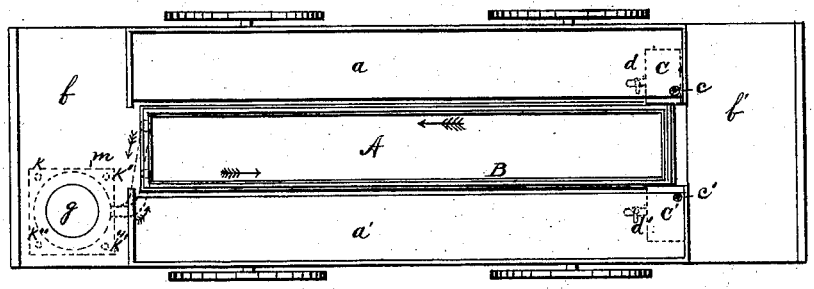

Fig. 1.

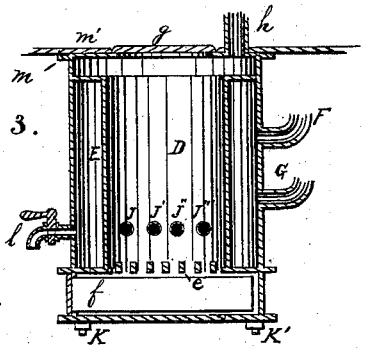

Fig. 3.

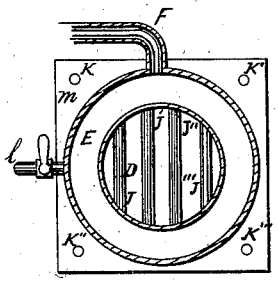

Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

UPTON J. DUFFIELD, OF WHEELING, WEST VIRGINIA, ASSIGNOR TO WM. C. DUFFIELD AND ROBT. C. DUFFIELD, OF SAME PLACE.

IMPROVEMENT IN CAR-HEATERS.

Specification forming part of Letters Patent No. **194,418**, dated August 21, 1877; application filed February 5, 1877.

To all whom it may concern:

Be it known that I, UPTON JACKSON DUFFIELD, of the city of Wheeling, county of Ohio, State of West Virginia, have invented certain Improvements in Warming Street-Cars, of which the following is a description, reference being had to the accompanying drawings.

My invention relates to a hot-water heating apparatus for warming street-cars in a thorough and economical manner, that they may be comfortable for passengers during cold weather; and consists of a cylindrical furnace or fire-box, surrounded with an annular water-chamber, so constructed as to be attached to the under side of the driver's platform, and to which is connected the circulating-pipes extending from the boiler up through the floor of the car and along the sides and across the ends of the same, having water-reservoirs attached to the pipes at the opposite ends of the vehicle, or at such points as may be deemed best for the successful working of the apparatus.

To enable those who are skilled in the art to which my invention pertains to make and use the same, I will now proceed to more fully explain its construction and mode of operation, reference being had to the drawings, in which—

Figure 1 is a floor-plan of a street-car, showing the arrangement of the furnace, circulating-pipes, and reservoir. Fig. 2 is a vertical longitudinal section of the car through center of the furnace. Fig. 3 is an enlarged vertical central section of the furnace. Fig. 4 is a horizontal plan of the same.

In the drawings, A represents the body of the car; *a a'*, seats; *b b'*, platforms. B is a continuous pipe extending around the inside of the car on the top of the floor. C C' are reservoirs attached to the pipe B, and are provided with escape-pipes *c c'*, extending up through the roof, and gage-cocks *d d'*. D is a furnace or fire-pot, with a grate, *e*, and ash-pan *f*, hinged door *g*, level with the top of the platform floor, and smoke-pipe *h* extending up through roof of car. E is the water-chamber or boiler surrounding the fire-pot D, and J J' J'' J''' are circulating-pipes through the fire-pot D. *l* is a gage-cock. The furnace or fire-pot D and boiler E are attached to the floor of the car by means of the end plates *m m'* set in level with the top of the floor and secured by bolts K K' K'' K'''. F is an outflow hot-water pipe, and G a cold-water inlet-pipe, both connecting with the continuous pipe B on the car floor.

When it is desired to heat the car, the reservoirs, pipes, and boiler are filled with water. Fire is started in the furnace, which soon heats the water in the boiler and creates steam, which rises through the outflow-pipe F into the continuous circulating-pipe B, and around the same in the direction of the arrow shown on the drawing, and completely circulating through the reservoirs C C', heating the water contained therein, the excess steam passing off through the exhaust-pipes, and the partially cold or feed-water flowing toward the boiler and entering the same through the lower inlet-pipe G, thus causing a constant circulation of hot water through the entire apparatus, and most effectually warming the car.

The reservoirs in this case, for convenience, are made small, in order that they might be placed under the seat, out of the way of passengers; but this is not essential in all cases, for one reservoir of sufficient capacity will answer the purpose, and can be placed at any other part of the car, or on the platforms, if so desired.

The furnace being placed under the platform, possesses several advantages; it serves as a heater to warm the driver, is convenient for the replenishing of fuel, and is also out of the way of the passengers, thus preventing crowding against it, as is the case with the ordinary stove inside the car.

I deem it best to use charcoal for fuel in the furnace, in order to avoid the smoke which arises from the use of bituminous coal, and for the reasons, also, that it is less expensive, makes a clearer and hotter fire, and lasts longer without replenishing—all of which is of importance in the successful working of the apparatus; although I do not wish to confine myself to the use of charcoal or any particular kind of fuel.

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

1. The apparatus for heating street-railway cars by hot water, consisting of a hot-water furnace, D E, having a series of water-circulating pipes, J J′, &c., placed and secured entirely beneath the platform of the car, with the top of the furnace even with the top of the platform, and suitable pipes and reservoirs connected thereto, whereby a constant circulation of hot water is created around the interior of the car to warm the same, substantially as described and shown.

2. The combination, in a hot-water heating apparatus for warming street-cars, of the fire-pot D, water-chamber or boiler E, grate *e*, hinged door *g*, ash-pan *f*, gage-cock *l*, circulating-pipes J J′ J″ J‴, plates *m m′*, and rods K K′ K″ K‴, all constructed, arranged, and adapted to operate as and for the purposes described and shown.

3. The water-chamber or boiler E, outlet-pipe F, inlet-pipe G, the continuous circulating warming-pipe B, reservoirs C C′, escape-pipes *c c′*, and gage-cocks *d d′*, all combined and arranged substantially as herein shown, and for the purpose set forth.

4. The apparatus for heating street-railroad cars, consisting of fire-pot D, water-chamber E, grate *e*, and circulating-pipes J J′ J″ J‴, the entire apparatus secured beneath the platform of the car, substantially as and for the purposes described and shown.

In testimony of the above I hereby sign my name in presence of two witnesses.

UPTON J. DUFFIELD.

Witnesses:
W. C. DUFFIELD,
W. H. BROWN.