G. C. BOVEY.

Street-Car Heater.

No. 211,963. Patented Feb. 4, 1879.

FIG. 1.

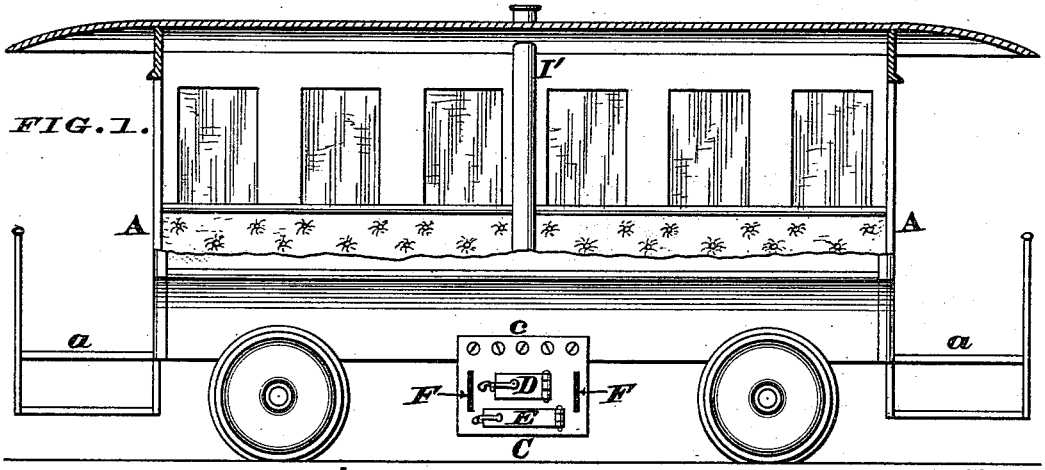


FIG. 2.

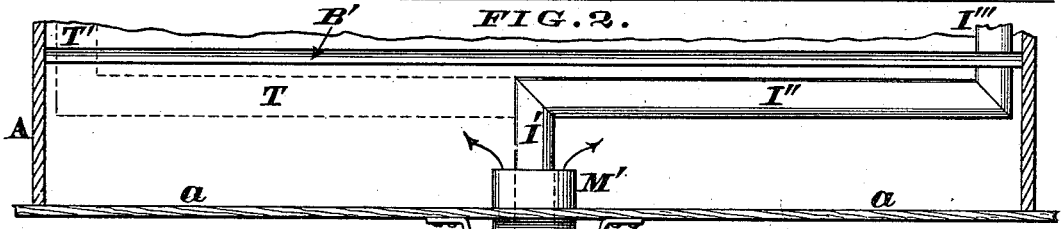


FIG. 3.

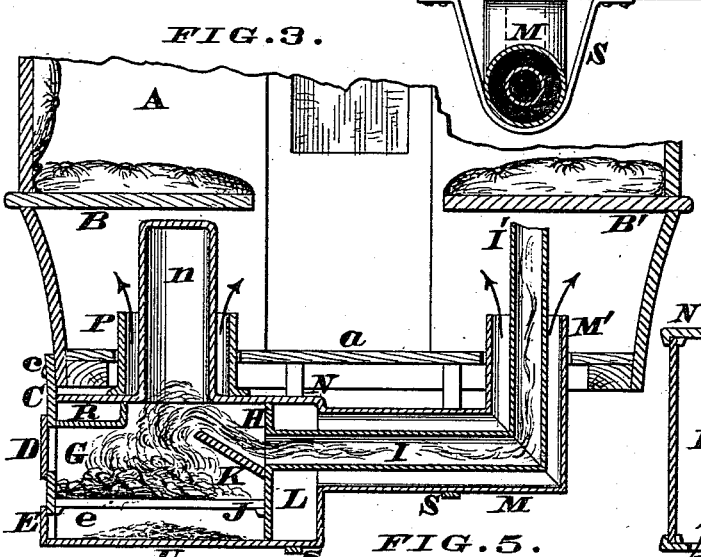


FIG. 4.

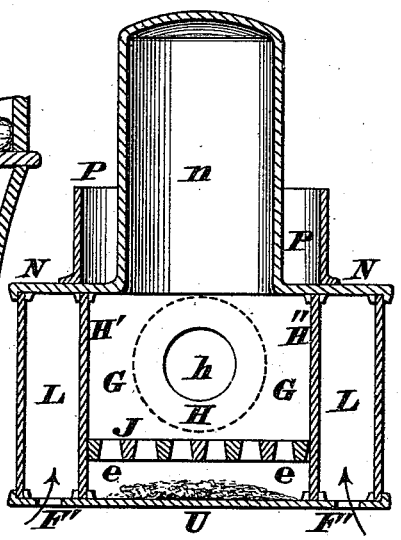
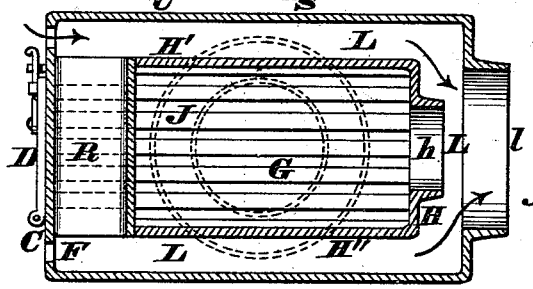


FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE C. BOVEY, OF COLUMBUS, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE B. KERPER, OF CINCINNATI, OHIO.

IMPROVEMENT IN STREET-CAR HEATERS.

Specification forming part of Letters Patent No. **211,963**, dated February 4, 1879; application filed November 29, 1878.

To all whom it may concern:

Be it known that I, GEORGE C. BOVEY, of Columbus, Franklin county, Ohio, have invented certain new and useful Improvements in Street-Car Heaters, of which the following is a specification:

This invention relates to those heaters which are placed transversely beneath the floor of a street-car for the purpose of discharging warm air directly into the same; and the first part of my improvements comprises a novel construction of the heater proper. This part of the apparatus consists of a furnace or fire-box having a fuel-door at one end, and a horizontal smoke-pipe attached to the opposite end of said furnace, the horizontal pipe being furnished with a vertical extension passing up into the car under one of the seats. The pipe is then carried along under this seat to one end of the car, where a vertical outlet is fitted to said pipe. Air-chambers are arranged on the sides of the furnace, but not at the top of the same, and these air-chambers communicate with a drum that incloses the horizontal smoke-pipe, the discharging end of said drum being provided with a vertical extension that surrounds the vertical extension of the smoke-pipe.

The top plate of the furnace has cast with it, or otherwise applied thereto, a cylinder or dome, closed at its upper end, but open at bottom, to allow the fire and smoke to circulate freely within said dome. This closed cylinder or dome projects upwardly a suitable distance into the car, and is located under the opposite seat, beneath which is situated the vertical extension of the drum.

By this arrangement heat is radiated directly under one seat from the dome, while hot air is discharged under the opposite seat from the vertical extension of the drum.

The second part of my invention consists in applying a deflecting-plate to the rear end of the above-described furnace, so as to divert the products of combustion upwardly into the closed dome, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a partially-sectionized elevation of a street-car provided with my heater. Fig. 2 is a longitudinal section through the lower portion of the car. Fig. 3 is a transverse section of the same. Fig. 4 is a vertical section of the fire-box and heater, taken transversely of the grate-bars; and Fig. 5 is a horizontal section of said fire-box and heater.

A represents the body, *a* the floor, and B B′ the opposing seats, of an ordinary street-car. Attached to one side of this car by bolts *c* is the front plate, C, of the heater and furnace, and said plate is provided with a fire-door, D, an ash-door, E, and one or more air-inlets, F; but, if preferred, said inlets may be made in the bottom plate, U, of the heater, as shown at F′ in Fig. 4. The fire-chamber G is formed by this plate C, a rear plate, H, and two side plates, H′ H″, said rear plate, H, being provided with a collar or neck, *h*, to which is attached the smoke-pipe I. J are the grate-bars, beneath which is situated the ash-pit *e*.

If preferred, the fire-chamber G may be provided with a plate, K, to deflect upwardly the products of combustion and prevent them being discharged too directly into the smoke-pipe I.

Fire-chamber G is surrounded on both sides and at its rear end with an air-heating chamber, L, having a collar, *l*, for attachment of the drum M, which drum is traversed axially by the smoke-pipe I. Furthermore, this drum is furnished with a vertical extension, M′, to receive the corresponding extension I′ of said smoke-pipe. The top plate, N, of the fire-chamber has cast with it, or otherwise applied thereto, a dome, *n*, open at bottom, so as to allow the products of combustion to enter the same, as represented in Fig. 3.

P is a jacket or shield attached to this top plate, N, and surrounding the dome *n*, so as to afford an annular space between these members *n* and P of the heating apparatus. Located at the front upper portion of the fire-chamber is a passage, R, that allows a free circulation of air to take place between the side chambers of the heater L. (See Figs. 3 and 5.) This passage also prevents the top plate, N, becoming so hot as to burn the sills of the car. S are straps or rods wherewith the heating apparatus is suspended from the floor *a*. The extension I′ of the smoke-pipe

may project vertically through the roof of the car, as seen in Fig. 1; but I prefer carrying said pipe horizontally along and under the seat B′, as represented at I″ in Fig. 2, and thence up in the corner of the car at I‴; or this extension I′ may have a second horizontal branch extending to the other end of the car, and provided with a vertical outlet, by which arrangement two independent channels will be afforded for the escape of smoke from fire-chamber G. This secondary smoke-pipe is represented by the dotted lines T T′ in Fig. 2. In fitting my heater to a street-car, the shield P is made of such length as to project, say, five or six inches above the floor *a*, and the dome *n* is carried up almost to the seat B. The drum M is then applied to neck *l*, so as to locate the extension M′ under the opposite seat, B′, the open upper end of said extension being about on a level with the top of jacket P. By this arrangement the extension M′ and jacket P serve as guards or shields to prevent contact of the passengers' feet or clothing with the heated pipe I′ and dome *n*.

The pipes I″ and I‴, and also the ones T T′, if desired, are then slipped onto the extension I′, as seen in Fig. 2. Fire is now started in furnace G, and the cool air entering at the inlets F or F′ is thoroughly warmed by contact with plates H H′ H″, pipe I, and extension I′, the heated air escaping from the open end of extension M′ directly into the car and under seat B′, as indicated by arrows in Figs. 2 and 3.

Radiation also takes place from the sections I″ and I‴ of the smoke-pipe. In addition to the heat thus thrown off by the apparatus, considerable radiation takes place from the top plate, N, and dome *n*, and is conducted into the car by means of the jacket P, as indicated by arrows in Fig. 3. It will thus be seen that all the heat thrown off by the apparatus is utilized in warming the car, and, consequently, the fire need be replenished only at the beginning of each trip, which economy in the use of fuel enables me to locate the fire-door D on the outside of the car, where the passengers cannot tamper with it. Another advantage due to this external location of said door is, that smoke and soot cannot escape into the car when the fire is replenished. It will be apparent that my heater does not interfere in the least with the capacity of the car for carrying passengers, while, at the same time, sufficient space is afforded below the apparatus for applying the brake-rods and other attachments.

The drum M, being made of sheet-iron, can readily be cut of any desired length to adapt the apparatus to the car; and said drum, together with the furnace G and air-chamber L, can be united with bolts, flanges, &c., in the same manner as are stoves and ranges. Finally, the vertical portions I′ or I‴ of the smoke-pipe may be incased in a jacket or shield to prevent contact with said pipes.

Instead of carrying the pipe I‴ up in the corner of the car, as shown, it can be attached to the outer end of the car in such a manner as to warm the driver and passengers occupying the front platform.

I am aware it is not new to locate a hot-air apparatus beneath the floor of a street-car, and arrange the heater to discharge the warm air under the seats of the same, as such a device is seen in Letters Patent No. 191,056, issued May 22, 1877, to E. O. Huntington; and therefore, my claim to the heater proper is expressly limited to the construction herein illustrated and described, in which a heat-radiating dome is located under one seat, while the only exit for the warm air is situated under the opposite seat.

I claim as my invention—

1. An improved street-car heater consisting of furnace G, smoke-pipe I, and extension I′, said members G I I′ being incased, respectively, within the air-heating chambers L M M′, the exit M′ of said chambers being located under the seat B′ of the car, while the opposite seat, B, has situated beneath it a cylinder or dome, *n*, completely closed at its upper end, and communicating at its lower or open end with the furnace G, in the manner described, and for the purpose set forth.

2. In a car-heating apparatus of the class specified, the combination of plate K and dome *n*, said plate being placed in the furnace G and disposed athwart the entrance of smoke-pipe I, to deflect the products of combustion upwardly into the closed dome *n*, whose lower end communicates directly with said furnace, in the manner herein described.

In testimony of which invention I hereunto set my hand.

GEORGE C. BOVEY.

Witnesses:
JAMES H. LAYMAN,
RANKIN D. JONES.