

GEORGE F. STONE.

Improvement in Railroad-Car Heaters.

No. 126,343.

Patented April 30, 1872.

Fig. 1.

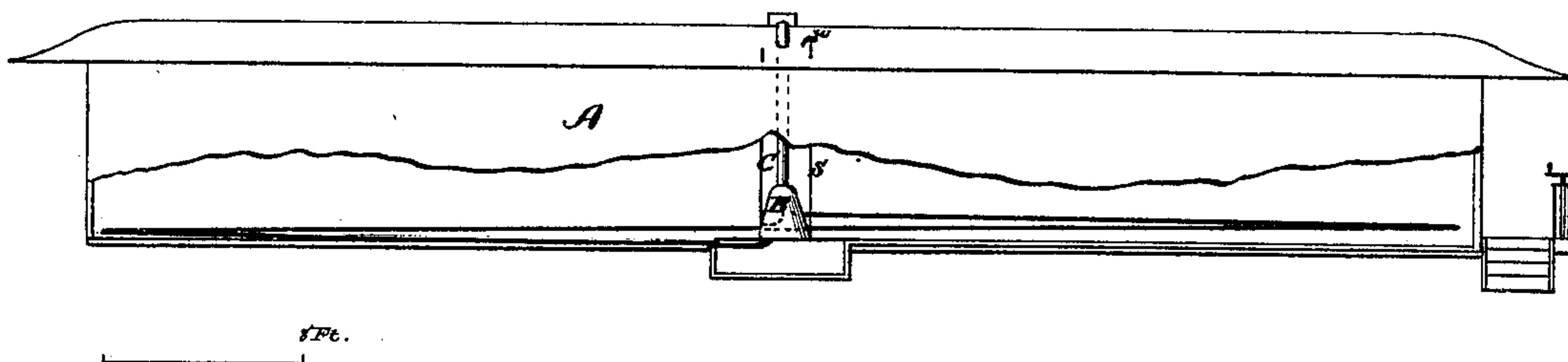


Fig. 2.

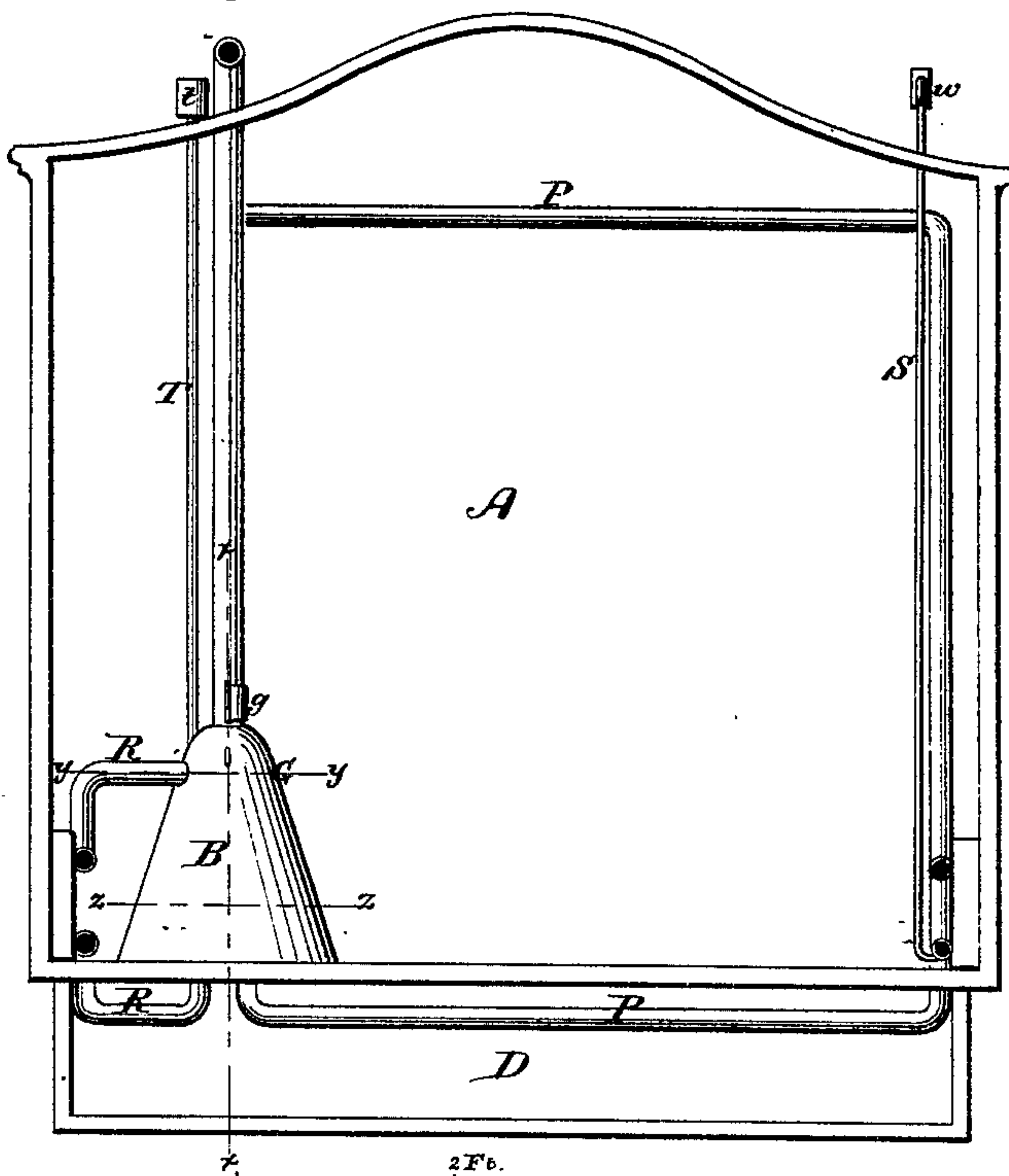


Fig. 3.

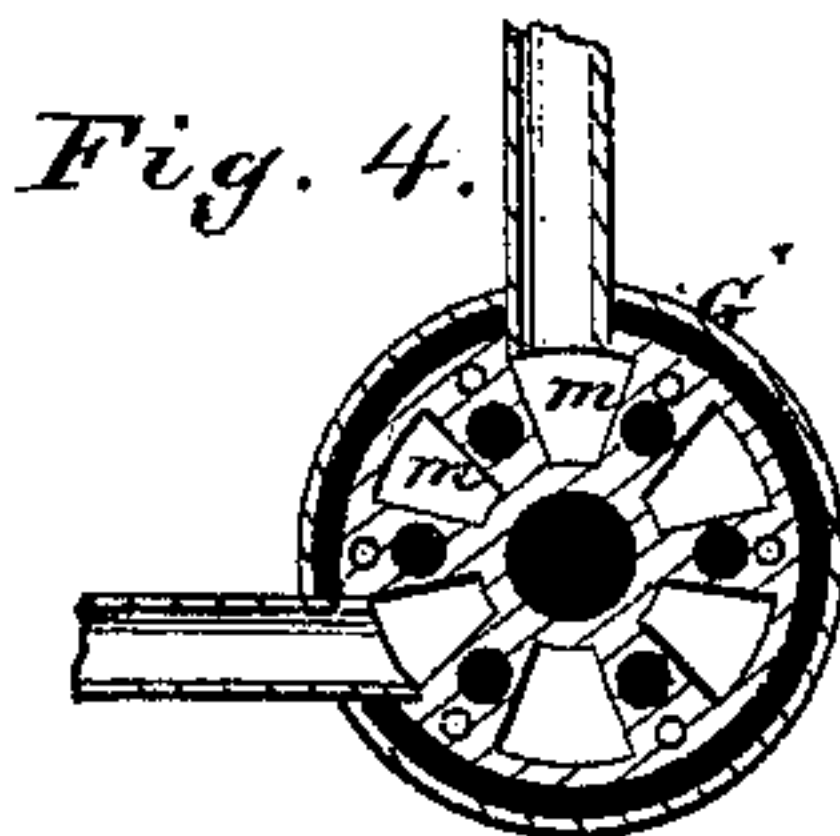
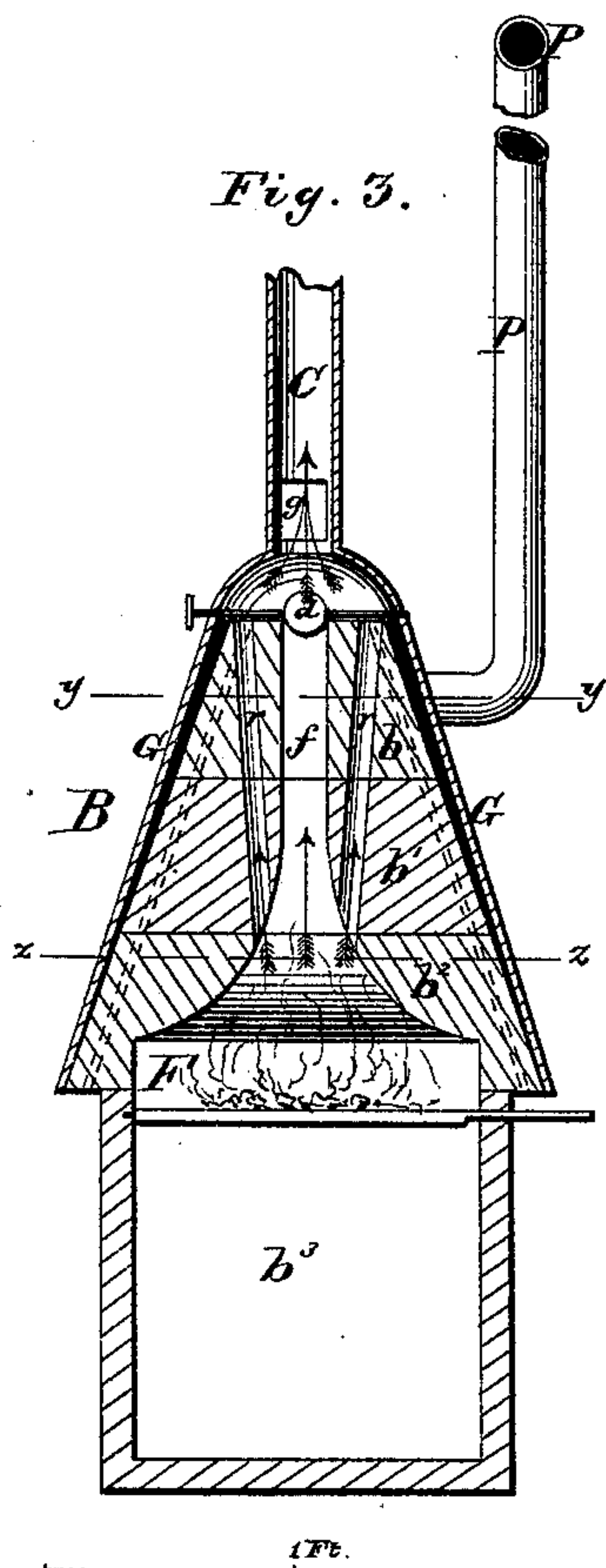
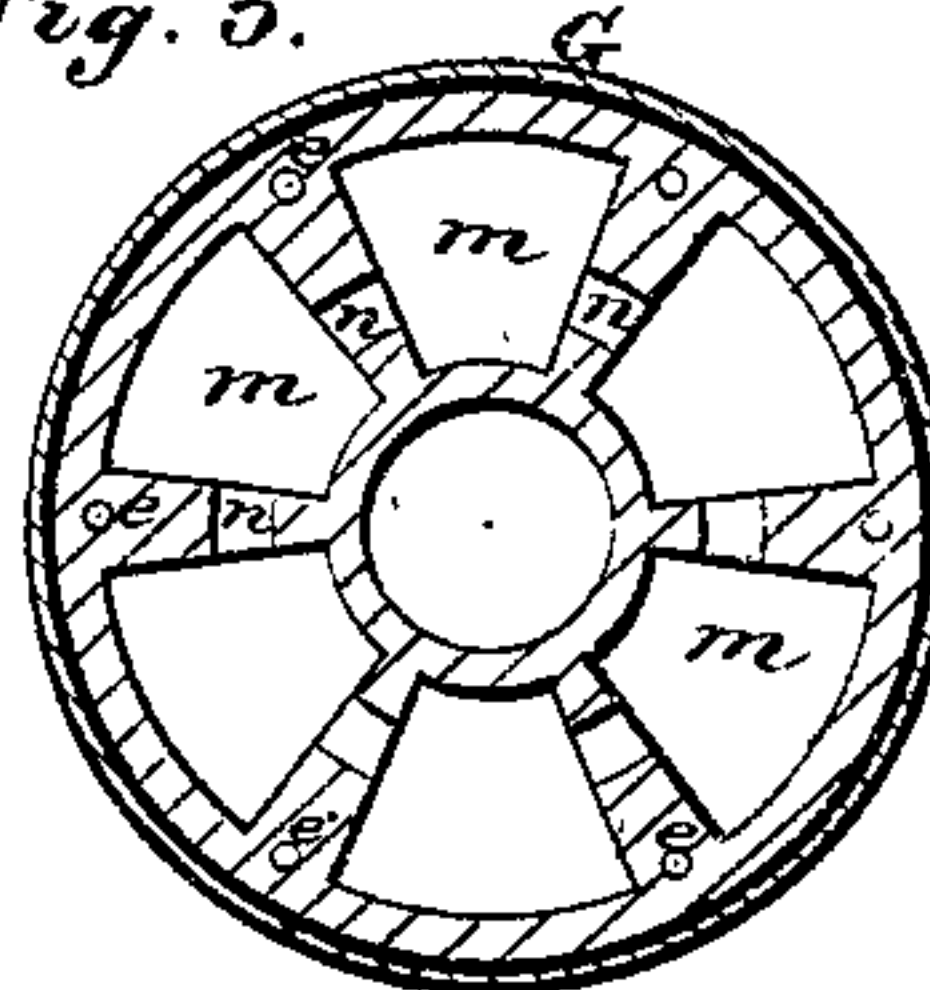


Fig. 5.



Witnesses.

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GEORGE F. STONE, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN RAILROAD CAR-HEATERS.

Specification forming part of Letters Patent No. 126,343, dated April 30, 1872; antedated April 18, 1872.

To all whom it may concern:

Be it known that I, GEORGE F. STONE, of the city and county of Baltimore and State of Maryland, have invented an Improved Railroad Car-Heater; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a side elevation, a portion of the wall of the car having been broken away to reveal the apparatus within. Fig. 2 is a vertical transverse section of the car taken on a line immediately in rear of the heater. Fig. 3 is a vertical section of the heater in the line $x x$ of Fig. 2. Fig. 4 is a horizontal section of the same in line $y y$; and Fig. 5, a similar section in line $z z$.

Similar letters of reference in the accompanying drawing denote the same parts.

This invention relates to that class of heating apparatus for railroad cars, in which a system of pipes is employed connected with a heater, so arranged and operating as to cause a circulation of the water through the pipes to every part of the car; and the object of the invention is, first, to so improve the construction and arrangement of the pipes and heaters as to avoid the "trapping" of the hot water, and the consequent want of uniformity in the distribution of the heat to the car; and, secondly, to improve the construction of the heater, so as to better adapt it to railroad cars, and to the peculiar apparatus designed to be used in connection with it thereupon. To these ends the invention which I am about to describe consists, first, in the improved arrangement of the heater and pipes; and, secondly, in the improved construction of the heater, substantially as hereinafter set forth.

In the drawing, A indicates the car; B, the heater; C, the smoke-stack of the heater; and D, a box or compartment extending across the car under the floor to accommodate the ash-pit of the heater, and the return-water pipes, and protect the latter from the weather. This box, set near the middle of the car, occupies the space between two of the cross-beams of the frame, so as to render any change in the ordinary construction of the latter unnecessary. The heater B is constructed in the form of the frustum of a cone, in three sections, b

$b^1 b^2$, which are united together by inclined rods $e e e$, extending through it from top to bottom, as shown in dotted lines in Fig. 3. The joints between the sections may be made water-tight by any kind of luting or cement ordinarily used for such purposes. The lower section and the base or ash-pit b^3 may be cast in a single piece if preferred. From the fire-box at F, a large vertical smoke-flue, f , rises through the center of the heater, having a damper, d , at or near its upper end, by which the draught up through it can be at pleasure checked or cut off altogether. A series of smaller smoke-flues, $r r r$, are arranged around it, inclining outward from their lower end, as shown in Fig. 3, their object being to afford a passage for the products of combustion when the damper d is closed. The upper and lower sections $b b^2$ are cast with chambers $m m m$, arranged in regular order around the central flue. The middle section b^1 is cast with corresponding openings through it, so that when the three are secured together the chamber and openings come in line from top to bottom, and form a series of inclined water-compartments arranged around the heater. These compartments are connected by lateral passages $n n$, which permit a free circulation through all parts of the boiler. Over the whole apparatus thus constructed, is placed a conical sheet-iron drum, G, which fits closely around the bottom of the lower castings, but is a little wider than the upper castings, so as to leave a narrow space between it and the stove at the upper end of the latter. The drum extends a few inches above the top of the stove, and terminates at the lower end of the smoke-pipe C. Either the pipe or the upper end of the drum may be provided with a door, g , through which to introduce the fuel. The fuel, of course, goes into the central flue and thence down upon the grate, and a guard of any suitable construction may be provided to prevent the coal from entering and choking the small flues as it is poured into the stove.

In connection with the heating apparatus thus constructed, I arrange a system of pipes on each side of the car, as follows, viz: First, a pipe, P, proceeding from the extreme upper edge of the water-compartment m ; thence passing upward nearly to the roof of the car; thence across overhead to the opposite side;

thence down to the truss-plank; thence forward in a straight horizontal line nearly to the end of the car; thence back in a straight horizontal line nearly to the opposite end of the car; thence back in a horizontal line to a point opposite to the stove; thence down into the box or compartment D under the car; and thence across under the floor to the stove, entering the latter at the lower end of the water-chambers, preferably on the side opposite to that from which it proceeded. And, secondly, a pipe, R, proceeding from the side of the stove at the extreme upper end of one of the water-compartments; thence straight to the nearest wall of the car; thence down to the truss-plank; thence backward and forward to the ends of the car, and again to a point near the stove, the same as the pipe P on the opposite side of the car; thence down into the chamber D; and thence to the stove, which it enters in the same manner as the pipe P, but preferably at the side opposite to that to which its upper end is connected, so as to cause a more perfect circulation. The return-pipes may enter the stove through its legs, (made hollow for the purpose,) or through its base in any manner the constructor may prefer. The boiler is filled by means of a pipe, T, which extends from it up through the top of the car, terminating in a covered reservoir, care being taken either to have the reservoir higher than any part of the water-pipes P R; or else to provide it with some kind of an apparatus that will exert a constant pressure upon the water to force it over the elevated portion of the pipe P. The water may be fed to the reservoir simply by running the car under the tank-pipe, and filling it in the same manner as the water-tank of the tender is filled; or the water may be forced into it by means of a force-pump, and then shut in by a water-tight valve, so as to force it through the pipes P R, as described. Steam-escape pipes S S' are provided, one for each system of hot-water pipes. They extend from the lowest part of said pipes, near or under the floor, up through the roof of the car, where they are provided with a trap, w, that permits the steam to flow off, but does not allow atmospheric air to enter to take its place. There are many forms of such traps, and I propose to use any of them for the purpose as may be most convenient to the manufacturer. An ornamental bronzed fret-work or screen may be employed to cover the horizontal pipes along the truss-plank of the car.

The great advantage of my arrangement of pipes over all others heretofore used for a similar purpose, consists in the perfectly uniform and easy circulation of hot water which they maintain through all parts of the car, and in absolutely preventing all possibility of the water's "trapping" and stopping, as has always been the case in other car-heaters. This successful operation results from the fact that I take the hot water or steam from the upper end of the heater, and conduct it around

the car in a series of descending gradations, never allowing any of the pipes to bend upward, but leaving the hot water or steam to descend from the moment it leaves the stove till it gets back again. The ascent into the pipe P cannot, of course, operate as a trap, for the upward bend of said pipe, being immediately at the boiler, may be regarded as a mere extension thereof. The heat forces the water up over this bend, the hydrostatic pressure from the pipe T counteracts any tendency in it to fall back, and the circulation through this pipe thus starts as easily and freely as through the other. Were the pipe carried down to the floor, then across under instead of over the door, and then up to the level of the horizontal side pipes, the cooling off of the water or steam within it would have the effect to cause a partial trap at the upward bend, and a consequent resistance to the rising of the water or steam even into the side pipes, and at every downward and subsequent upward bend such resistance would be repeated, until the tendency to a circulation through the pipes would be almost, if not quite, counteracted, and while the system of pipes would give off great heat, perhaps too much, near the middle of the car, it would give little or none at the ends. It is easy to see that no such result can take place with my pipes, but, as before remarked, the circulation will always be perfectly free and unobstructed. I am not therefore obliged, like Baker and Smith, to increase the heating capacity of the water by dissolving salt and other similar substances in it, which soon corrode and destroy the pipes and joints, but my apparatus works with pure fresh water just as well as with any other. Another advantage of my arrangement of pipes is, that in heating up it is perfectly noiseless, while in all others, in consequence of the traps formed at the upward bends as described, which trap the steam as well as the hot water, the heating up of the water causes a series of explosions in the pipes, which is of a nature to terrify persons not familiar with it and aware of its cause. In consequence of these explosions and their effect upon the nerves of the passengers, it has always been the custom to heat up several hours before the train is ready to start, or else to keep the apparatus heated up all the time. A great saving of time and of fuel therefore results from the use of my arrangement, which removes the cause of the explosions, and renders the circulation noiseless from the outset.

Having thus described my invention, what I claim as new therein, is—

1. The pipes P R, arranged in such a manner that the heated water, after entering them from the upper end of the boiler, circulates through them in a descending course to the lower end of the boiler, without passing over upward bends in the line of the pipes, substantially as described for the purposes specified.

2. In combination with the heater B, con-

structed as described, and provided with a large central flue, *f*, and smaller surrounding flues *r r*, I claim the conical jacket *G*, constructed and applied as described, so as to form a chamber above the heater, and the damper *d* arranged so as to open or close the large flue, substantially as above set forth.

3. The combination of the supply-pipe *T*, extending nearly to or through the roof of

the car, with the system of pipes *P R*, having a descending circulation with the closed heater, and with the steam-escape pipes *s s'*, substantially as and for the purposes specified.

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Witnesses:

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