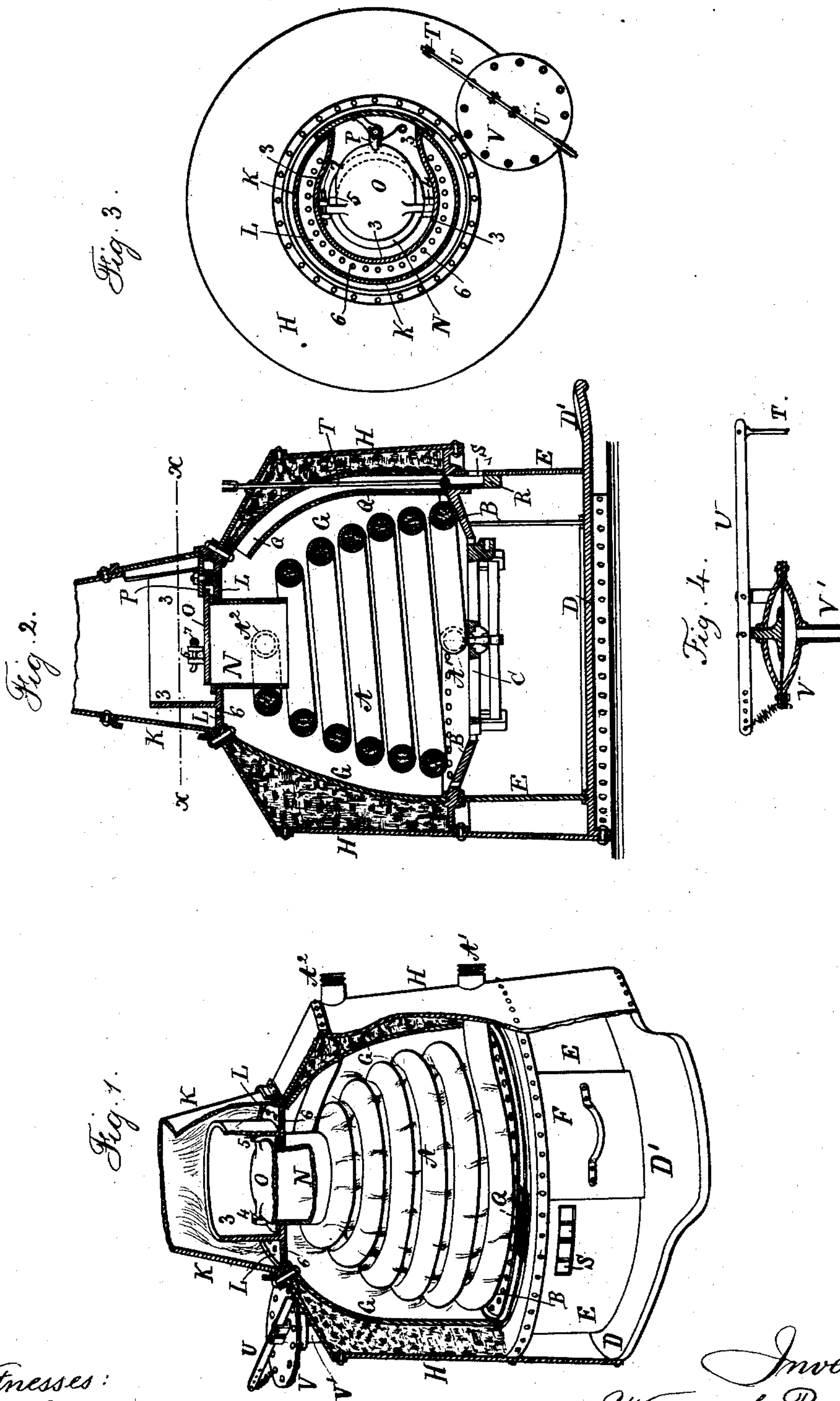


(No Model.)

W. C. BAKER.  
RAILWAY CAR HEATER.

No. 374,336.

Patented Dec. 6, 1887.



Witnesses:  
J. Stail  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

WILLIAM C. BAKER, OF NEW YORK, N. Y., ASSIGNOR TO THE BAKER  
HEATER COMPANY, OF SAME PLACE.

## RAILWAY-CAR HEATER.

SPECIFICATION forming part of Letters Patent No. 374,336, dated December 6, 1887.

Application filed April 11, 1887. Serial No. 234,323. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. BAKER, of the city and State of New York, have invented an Improvement in Railway-Car Heaters, of which the following is a specification.

The object of this invention is to inclose the fire with a coil containing circulating hot water and to provide for a perfect combustion of the fuel, notwithstanding the cooling and dampening action of the coil which contains the water and tends to prevent the perfect combustion of the fuel. The coil I make use of is dome-shaped, with a small opening at the top, only sufficiently large for the introduction of the fuel, and around this is a case preferably made double and containing asbestos, mineral wool, or similar material, there being a space between the coil and the case, within which the products of combustion are perfectly consumed.

In the drawings, Figure 1 is a perspective view. Fig. 2 is a vertical section showing the damper and the rod for operating the same. Fig. 3 is a sectional plan at the line  $x x$ , Fig. 2; and Fig. 4 is a section of the case and diaphragm for operating the damper.

In patents that have heretofore been granted to me on railway-car heaters—such, for instance, as No. 75,345, granted March 10, 1868—hot water is made to circulate from a coil in the fire and pass through pipes that are led around the car, and the fire acts directly upon the coil of pipe; but the products of combustion pass off vertically through the fuel to an escape-flue on the top of the heater.

In my present improvements I have modified the coil A, so as to be approximately dome-shaped, and the return circulating-pipe A' is connected with the lower end of the dome circulating-coil, and the outgoing pipe A<sup>2</sup> extends from the smaller convolution at the top of the coil, and this small convolution is only large enough for the introduction of fuel with facility—say about four or five inches in diameter. The bottom of the dome-shaped coil rests upon a conical ring, B, in the central opening of which is the grate C, which, by preference, is adapted to swing, so that the contents of the fuel-chamber may be dumped, and this conical rim is supported by a cylindrical segment, E, inclosing the ash-pit and resting upon the

base-plate D, which, by preference, is formed with a projecting hearth, D', at the place where there is the opening in the cylindrical segment E; and F is a door for closing the ash-pit.

Above the ring B is a case, G, which is dome-shaped to correspond generally to the dome shape of the coil, there being, however, a combustion-chamber of the proper width between the coil and the case G. I prefer to make use of an outer case, H, surrounding the case G and having an intermediate space filled with asbestos, mineral wool, or similar material, and these cases G and H are brought together at their upper ends and continued as a flue, K, which is preferably conical and provided with an opening covered by a sliding door similar to that shown in my Patent No. 353,839, granted December 7, 1886. Within the base of this flue K is a circular plate, L, to the edge of which the case G is permanently connected, and there is a vertical flange, 3, which is the segment of a cylinder, with its ends terminating at the flue K at each side of the opening therein, and in the center of this plate L is an opening, usually circular, and corresponding, or nearly so, in size to the internal diameter of the dome-shaped coil A at its upper end, and there is a short vertical cylinder, N, having a flange at its upper end, which cylinder is dropped through the central opening in the plate L and hangs therefrom by its top flange, and this short cylinder N passes within the top coil of the dome-shaped coil A.

Upon the plate L and within the flange 3 are the bearings 4 and 5 for the pivots of the safety-plate O, and this safety-plate can be swung upwardly and backwardly upon its pivots in these bearings 4 5, so as to give access for introducing fuel when the door in the flue K is slipped aside, and when this safety-plate O is turned down it is caught and held by a spring-catch, P, similar to that in my aforesaid patent, No. 353,839, and through the plate L and outside the vertical flange 3 there are numerous small perforations, 6, the combined area of which is sufficient for the products of combustion to pass away freely. It will now be understood that the vertical flange 3 prevents the coal being carelessly thrown upon the top of the plate L and obstructing the openings 6, and the short vertical cylinder N



is held down in place by the safety-plate O bearing upon a portion of its upper edge when said plate O is closed; hence in cases of accident the fuel cannot escape, even though the heater may be inverted, so long as the case G and plate L are not broken and the safety-plate O remains closed. These parts are made of the necessary strength, and the coil A also aids in rendering the heater reliable, because it retains the coal and supports the principal part of the weight of the fuel should the car be turned on its side or even inverted.

When the fuel is burning, the gases pass off between the convolutions of the dome-shaped coil, and they are consumed by the action of the air passing through the fire, and also by a supply of air admitted by small openings through the ring B at the base of the coil, and these gases, burning in contact with the pipe of the coil, heat the water that circulates through the same and the products of combustion escape through the opening 6 in the plate L, and as the fuel is consumed it falls away from the inner and under surface of the dome-shaped coil, thereby preventing the space outside of the coil becoming filled with ashes; and this space is easily cleaned and any accumulation of dust or soot removed by pulling out the pin 7 from the bearing 5, unshipping the pivots of the safety-plate O, and lifting the same, and then lifting out the cylinder N, so that a suitable brush can be introduced into the combustion-chamber between the dome-shaped coil A and the case G.

In railway-car heaters difficulty is sometimes experienced in consequence of inattention on the part of the porter or brakeman to the fire. The drafts are sometimes closed too much and the fire is nearly extinguished, or the drafts are kept open and the heat and pressure become excessive, and with my present dome-shaped coil the heating capacity is so great as to render it important to limit the accumulation of pressure. I therefore make use of a nearly vertical flue-casing, Q, cast with or connected to the case G. The upper end of this opens into the combustion-chamber near the under side of the plate L, and the lower end of the flue Q, after passing through the ring B, opens into the ash-pit, and near the lower end of this flue there are lateral openings S through the segmental case E of the ash-pit. There is a block or damper, R, within this flue Q, and to this damper is a vertical rod or sling, T, passing out through the casing and connected to one end of the lever U, and there is an elastic diaphragm within the circular case V, with a disk above the elastic diaphragm and a lifter to act upon the lever U, and to the under side of this circular case V a pipe, V', is connected to the tubes containing the circulating hot water.

The lever U is to be acted upon by a movable weight or variable spring, so that when the heater is not in use the damper R is elevated within the flue Q; hence there is a free open-

ing for the admission of air below the fire through the openings S in the case E into the ash-pit; but as the heat and pressure accumulate in the circulating-pipes the flexible diaphragm in the case V is raised and the lever U moved, so that the damper R descends, gradually closing the openings S and shutting off the supply of air to the fire. If the pressure continues to increase, the damper R descends below the top of the openings S, and air is admitted into the flue Q and passes up to the top of the combustion-chamber and by the opening 6 into the flue K, cooling the same and still further checking the fire. As the pressure lessens the reverse action takes place and more air is admitted to the fire, thus regulating the combustion automatically, saving fuel and preventing the accumulation of pressure beyond a set point in the hot-water-circulating pipes.

I remark that the flexible diaphragm, circular case V, and lever U are similar to those made use of in steam-boilers for regulating the damper.

I claim as my invention—

1. The combination, in a car-heater, of a dome-shaped coil, a ring upon which the coil rests, a grate within the ring, a support for the ring forming the ash-pit, a case surrounding the dome-shaped coil, there being a combustion-chamber between the dome-shaped coil and the case, a flue extending above the case, and a perforated plate at the base of the flue through which the products of combustion pass, substantially as set forth.

2. The combination, in a car-heater, of a coil through which water is caused to circulate, a grate and a support below the coil, a case around that coil, a flue rising above the case and having an opening through which fuel can be inserted, a plate at the base of the flue having a vertical flange and openings through the plate and outside the flange, a central opening through the plate for the passage of the fuel, and a swinging safety-plate to cover the said central opening, substantially as set forth.

3. The combination, in a car-heater, of a coil, a case surrounding the coil, a ring upon which the coil rests, a flue for the escaping products of combustion, with an opening and door for introducing fuel, a plate at the top of the case having small openings through it for the escaping gases, a central opening and a vertical cylinder within the opening for the supply of fuel, and a pivoted safety-plate covering the opening for the fuel, substantially as set forth.

4. The combination, in a car-heater, of a coil through which water circulates, a case surrounding the coil, a supporting-ring, a grate and ash-pit below the coil, a flue passing from the ash-pit to the upper part of the case, a damper within the flue, a case, elastic diaphragm, and a pipe connecting the case to the hot-water pipes, and a lever, and a connection from the lever to the damper whereby the po-



sition of the damper is regulated by the pressure, substantially as set forth.

5 In a furnace, the combination, with the fire-pot, combustion-chamber, and ash-pit, of the inclosure above the grate around the combustion-chamber and the inclosure below the grate around the ash-pit and having an opening through the same to admit air, a flue extending from said ash-pit up above and open-

ing into the combustion-chamber, and a damper therein to regulate the admission of air into the ash-pit or by the flue into the chamber above the fire, substantially as specified.

Signed by me this 21st day of March, 1887.

W. C. BAKER.

Witnesses:

GEO. T. PINCKNEY,

W. L. SERRELL.