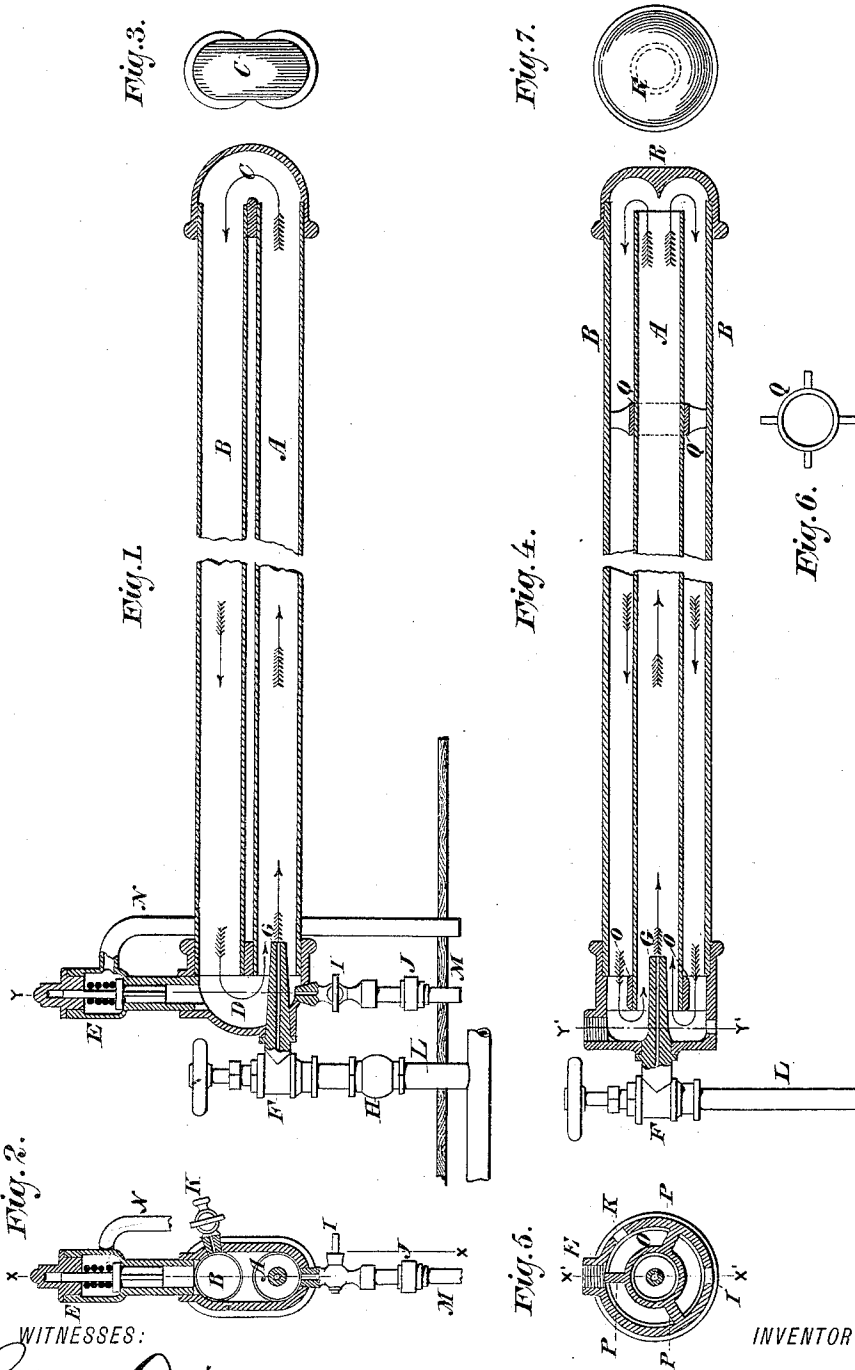


(No Model.)

W. BURNETT.
RAILWAY CAR HEATER.

No. 398,878.

Patented Mar. 5, 1889.



WITNESSES:
Gustav Dietrich
William Goebel

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WILLIAM BURNETT, OF NEW YORK, N. Y., ASSIGNOR TO JOHN B. GRAY, OF
SAME PLACE.

RAILWAY-CAR HEATER.

SPECIFICATION forming part of Letters Patent No. 398,878, dated March 5, 1889.

Application filed March 29, 1887. Serial No. 232,826. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BURNETT, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Devices for Heating the Cars of Steam-Railways, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to heating devices which employ pipes as a means of conveying to every part of the car the heat transmitted from the generator.

The object of my invention is to provide a heating device more simple, compact, and manageable, and at the same time more effective, than any heretofore devised, and entirely free from the danger of fire, all stoves being discarded.

My invention consists in providing within each car separately an arrangement of heating-pipes which presents a continuous and unbroken circuit through which air, steam, or water, or the like is impelled by a steam-jet, which not only causes the medium selected to circulate rapidly through the heating-pipes, but by its condensation imparts its heat to the fluid body impelled by it and indirectly to the interior surface of the pipes through which it is made to circulate, in combination with one or more devices to operate in conjunction with the heating-pipes, the same having reference to the employment of the several heat-conveying mediums enumerated or their equivalents. The steam employed is obtained from the locomotive-boiler through mains situated under the several cars and connected together by suitable hose. From the main so provided a branch pipe enters each car and connects with the heating device.

Referring to the drawings, Figure 1 is a side sectional elevation through the longitudinal axis of the instrument. Fig. 2 is a transverse sectional elevation on the line Y Y, Fig. 1. Fig. 3 is an end view of return-elbow connecting the outer ends of the heating-pipes. Fig. 4 is a side sectional elevation of a modified arrangement of the heating-pipes. Fig. 5 is a transverse sectional elevation on the line Y' Y', Fig. 4. Fig. 6 is an end view

of a metallic support for the inner circulating-pipe shown in Fig. 4. Fig. 7 is an end view of the return-cap employed in Fig. 4.

Similar letters refer to similar parts throughout the several views.

The construction is quite simple. The heating-pipes A and B are united at their outer end by a half-turn elbow, so that a fluid-current passing outward through pipe A may pass through elbow C and back through pipe B without its movement being seriously retarded. The inner ends of the pipes A and B are united in a similar half-turn elbow, D, through which a fluid-current, passing inward through pipe B, may pass through elbow D into pipe A without serious retardation of movement, as before stated in reference to elbow C.

Elbow D is provided with certain subsidiary devices which are used in the operation of the heater, sometimes, however, depending upon the medium or vehicle employed in the heating-pipes to distribute the heat transmitted from the generator. These subsidiary devices are a relief-valve, E; a steam-valve, F, to regulate the steam-jet for heating and impelling the heat-distributing medium through the heating-pipes; a steam-jet pipe, G, the end of which enters the mouth of pipe A or directs the steam-jets into the mouth of said pipe; a check-valve, H, to prevent any discharge of water from the heating-pipes when the valve F is left open; a waste-water valve, I, to permit the escape of water from the heating-pipes when desired; a steam-trap, J, to automatically permit the escape of water from the heating-pipes when valve I is open, but to hinder the escape of steam; an air-valve, K, to discharge air from the heating-pipes when steam is to be employed therein as a medium, or to admit air to the heating-pipes when it is desired to discharge the water contained therein. The pipes represented are connected as follows, viz: Pipe L is connected to the steam-main under the car, and pipes M and N discharge overboard through the car-floor. The heating-pipes A B extend through the car longitudinally and are preferably placed close to the wall on either side and near the floor of the car.

When air is to be employed as a medium,

steam-valve F is opened, and the air contained in the pipes and connections A, C, B, and D is rapidly circulated through them, carrying with it the heat of the steam-jet derived from its condensation. The valve I may now be opened to permit any water of condensation to be discharged through the steam-trap J.

The employment of a current of air with which the steam from the impelling steam-jet intermingles is a very important feature of my invention as supplying a circulating medium capable of assuming a very low temperature, which may, however, be raised to any degree by increasing the volume of the steam-jet, or reduced to any degree not below the temperature of the surrounding atmosphere.

When steam is to be employed as a medium, air-valve K is opened for the escape of the inclosed air. The steam-valve F is now opened. When steam issues through the valve K freely, it should be closed. The valve I should remain open to carry off the water of condensation through steam-trap J.

When hot water, which I use preferably, is to be employed as a medium, the instrument does not require to be charged with water, as this may be supplied by steam-condensation. Supposing all the valves to be shut and the circulating-pipes to contain air only, the steam-valve F is opened, and the steam-jet will now cause a rapid circulation through the heating-pipes, upon the surfaces of which the steam will be condensed, soon filling up the pipes with hot water, which will in continuance be circulated through the heating-pipes and kept at suitable temperature by the impelling steam-jet. When the water of condensation rises up and fills the heating-pipes, it expels through the relief-valve E any remaining or accruing air which may have been present during the operation, and when entirely full the further accumulation of water arising from the condensation of the impelling steam-jet will pass off through the relief-valve, which is but a lightly-loaded valve, in like manner. Without this water-relief the back-pressure would immediately cause the steam-jet to suspend action.

In the modification shown at Fig. 4 the pipe A, through which the outgoing current is conveyed, is placed concentrically within the pipe B, which is enlarged for this purpose. Through the annular space between the two pipes the return-current passes to the place of beginning. The pipe A is open at both ends, the inner end being secured in a central boss, O, supported by three arms or webs, P, Fig. 5. At its outer end and at intervals

throughout its length the pipe A is supported by a "spider," (shown at Q, Fig. 6.) The steam jet-pipe enters the mouth of pipe A in either case, and the steam-current is through A, R, and B to the place of beginning, substantially as shown at A C B, Fig. 1.

The instrument, as shown at Fig. 1, has an amount of heating-surface equal to the arrangement shown at Fig. 4; but, while occupying little more space, the latter has double the capacity for storing heat, especially available when hot water is used as a circulating medium. In case of any temporary interruption of the steam-supply this would be advantageous as providing a reservoir of heat for present use.

The pipes A and B are preferably made straight, but may be bent in any form, as at C, Fig. 1, that admits of the current flowing freely through them under the action of the steam-jet.

I wish it to be understood that any valve operating to permit the escape of the medium as it accumulates in the pipes of the circuit falls within the scope of my invention when combined with the circulating-pipes and jet-pipe.

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

1. The combination, with the circuit of heating-pipes, of a steam-jet pipe extending within the said pipes and an automatic relief-valve on the circuit-pipes, substantially as described.

2. A heater consisting of a continuous and unbroken circuit of pipes through which the circulating medium, consisting of air mingled with steam, is to be impelled, and a steam-jet pipe extending within the pipes of the circuit, the said circuit of pipes having an automatic steam-trap, substantially as described.

3. A heater consisting of a continuous and unbroken circuit of pipes through which the circulating medium is to be impelled, a steam-jet pipe extending within the pipes of the circuit and having a controlling-valve, the said circuit of pipes having a steam-trap and an automatic relief-valve, so as to be employed at will either for heating with the combined medium of air and steam or with the medium of water, substantially as and for the purpose described.

WM. BURNETT.

Witnesses:

GUSTAVE DIETERICH,
C. A. DIETERICH.