

UNITED STATES PATENT OFFICE.

FREDERICK A. WALDRON, OF STAMFORD, CONNECTICUT.

STEAM-TRAP.

No. 795,666.

Specification of Letters Patent.

Patented July 25, 1905.

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To all whom it may concern:

Be it known that I, FREDERICK A. WALDRON, a resident of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved steam-trap, the object of the invention being to provide an improved steam-trap of such construction as to overcome the defects in steam-traps heretofore known and obtain permanent and satisfactory results whether there is a full head of steam on the same or no pressure upon it; and the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in section, illustrating my improvements; and Fig. 2 is a detached view of the strainer.

1 represents a casting having a duct 2, with which a pipe 22 communicates, and a valve-chamber 4 is removably secured to said casting by bolts 4^a. A strainer 5 is screwed into the valve-chamber 4, and its inner end fits snugly in a seat at the end of duct 2, compelling all steam and water entering the valve-chamber to first pass through strainer 5 and all foreign matter removed that might interfere with the perfect operation of the valves.

In the lower portion of valve-chamber 4 a valve 6 is mounted and normally held against a seat 7. This valve 6 has a cylindrical bore in which a cylindrical auxiliary 8 is located and secured on a stem 9, which projects through casting 1, across an open space, into a sleeve 10, mounted in a wall 11, and the outer end of the stem 9 is screw-threaded to receive large adjusting-nuts 12 to adjust the stem in the sleeve to regulate the operation of the valves.

Valve 6 is provided with ducts 13, normally closed by auxiliary valve 8, and is provided with a cross-pin 14, located in a recessed or contracted portion 15 of auxiliary valve 8 and adapted to engage and move the valve 6 by the auxiliary valve 8 when the latter moves a certain distance.

The upper end of casting 1 is made with an outwardly-projecting arm 16, having an elongated vertical head 17, provided with three

(more or less) openings 18, in any one of which a lever 19 may be pivotally secured by a bolt 20 to vary the arc of movement of the lever. The lower end of this lever 19 is bifurcated and secured to a cross-head on sleeve 10, and the upper portion of the lever is also bifurcated, permitting its free movement. A brass pipe 22 of the desired length projects through the bifurcated upper portion of lever 19 and connects the duct 2 with the steam-passage, and a coupling 23 is located on this pipe 22 and connected at opposite sides by rods 24 with the lever, the ends of said rods being screw-threaded and provided with nuts 25 at opposite sides of the lugs on the coupling and lever through which the rods pass to adjust the rods as may be found desirable.

The operation of my improvements is as follows: As the brass pipe 22 fills with water from the condensed steam the temperature of the pipe falls and causes the same to contract, which contraction through the medium of rods 24 moves lever 19 to the left, causing stem 9 to move inward and cause auxiliary valve 8 to move in valve 6 far enough to open ports or ducts 13 and permit the water to be driven out by the pressure of the steam. Should, however, there be nothing but water in pipe 22 and not sufficient pressure to eject the proper quantity of water through ports 13, the auxiliary valve 8 is moved by further contraction of pipe 22 until it engages the cross-pin 14 and moves valve 6 from its seat, permitting free escape of the water. As the water is expelled and pipe 22 fills with steam the pipe will expand and one or both valves will be closed by the movement of lever 19 to the right, as will be readily understood.

A great many slight changes might be made in the general form and arrangement of the parts described without departing from my invention, and hence I would have it understood that I do not restrict myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a steam-trap, the combination with a valve-chamber, of a valve therein, an auxiliary valve in said chamber constructed to partially open the water-outlet, and thermostatic means controlling the movement of the auxiliary valve which latter controls the move-

ment of the main valve to fully open the water-outlet.

2. In a steam-trap, the combination with a valve-chamber of a valve therein normally closing the water-outlet, an auxiliary valve within said main valve for partially opening the water-outlet, and thermostatic means controlling the movement of the auxiliary valve which latter controls the movement of the main valve.

3. In a steam-trap, the combination with a valve-chamber, of a valve therein having a cylindrical bore and ducts in its side wall, a cylindrical auxiliary valve in the main valve adapted to open and close said ducts, a stem on the auxiliary valve, and thermostatic means to move said stem and auxiliary valve to open said ducts and move the main valve when the auxiliary valve is moved beyond a predetermined point.

4. In a steam-trap, the combination with a valve-chamber, of a valve therein having a cylindrical bore, and ducts in its side wall, a cylindrical auxiliary valve in the main valve adapted to open and close said ducts, a cross-pin in the main valve projecting through a recess or contracted portion of the auxiliary valve to compel the latter to move the main valve after its initial movement in opening the ducts, and thermostatic means controlling the movement of said auxiliary valve.

5. In a steam-trap, the combination with a valve-chamber, of a valve therein having a cylindrical bore, and ports or ducts in its side wall, an auxiliary valve in said main valve adapted to open and close said ducts or ports

and move the main valve, a stem on said auxiliary valve, a sleeve to receive said stem, nuts on the screw-threaded end of the stem to adjust the valve-stem and sleeve, a lever pivoted at one end and connected at its other end with said sleeve, a brass pipe conveying condensed steam to the valve-chamber, and rods adjustably connecting the pipe with the lever to compel and multiply the movement of the latter and operation of the valves as the pipe expands and contracts due to the accumulation or absence of condensed steam in the pipe.

6. In a steam-trap, the combination with a casting having a supply-duct therein and an outlet for water, of a valve-chamber removably secured to said casting, a strainer removably secured in said chamber and located at the discharge end of the duct, valves in said chamber, a lever fulcrumed at one end in any of a series of openings in an arm on said casting and connected with the operating-sleeve of said valves, a pipe conveying condensed steam to said duct, and rods connecting the pipe with the lever to compel and multiply the movement of the latter as the pipe expands and contracts due to the absence or presence of condensed steam and the temperature thereof.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FREDERICK A. WALDRON.

Witnesses:

CYRUS F. RAYMOND,
CHARLES A. ANDERSON.