(No Model.)

J. J. ROYLE.

STEAM TRAP.

No. 522,496. Patented July 3, 1894.

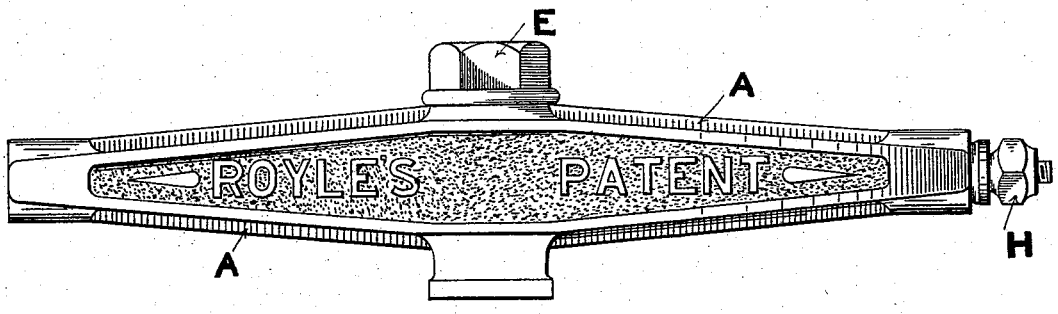

FIG. 1

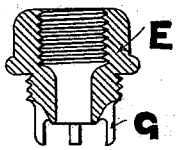

FIG. 4

FIG. 5

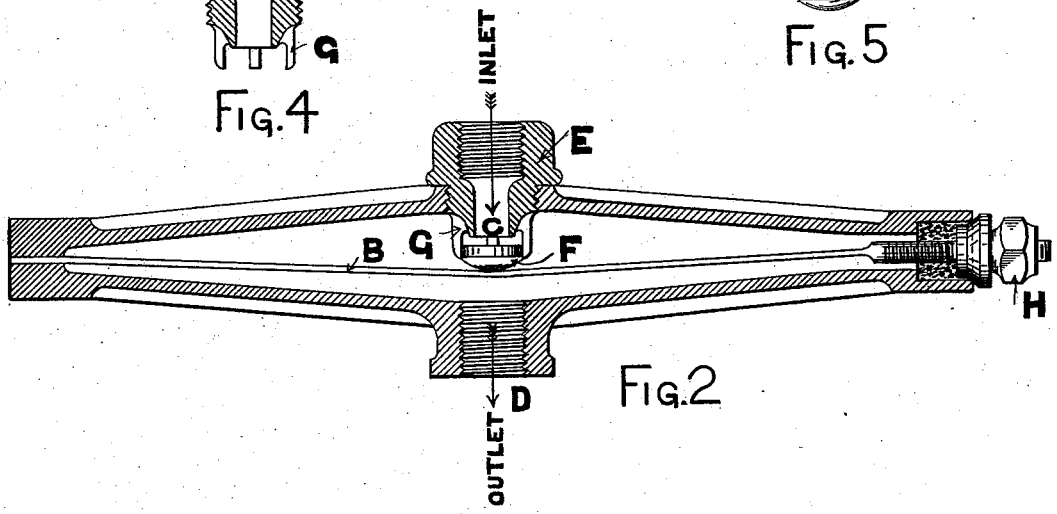

FIG. 2

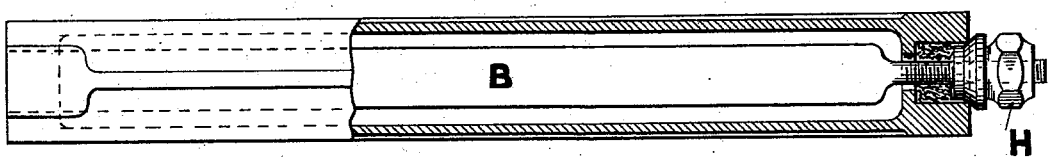

FIG. 3

WITNESSES

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JOHN JAMES ROYLE, OF FLIXTON, NEAR MANCHESTER, ENGLAND.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 522,496, dated July 3, 1894.

Application filed February 13, 1894. Serial No. 500,058. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAMES ROYLE, a subject of the Queen of Great Britain and Ireland, residing at Flixton, near Manchester, England, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification.

My invention has reference to steam traps for automatically discharging air and water of condensation from steam apparatus, which operate by the expansion of metals and has for its object the simplification and improvement of the working parts and the cheapening of the cost of manufacture.

On the accompanying drawings Figure 1 is an exterior view, Fig. 2 a longitudinal section and Fig. 3 a sectional plan of my improved steam trap. Figs. 4 and 5 are detached views showing details.

In carrying out my invention I construct a box or casing A, preferably of brass, and within this casing I fit a bar B of, by preference thin steel having a lower ratio of expansion than the casing A. The steel bar is slightly bowed or set-off as illustrated from the straight line and being connected at each extremity to the casing (as hereinafter explained) is very sensitive to any change of temperature (and consequently in the length) of the casing, such change in length causing a considerable movement at or about the middle of the bar. Opposite this point *i.—e.*, about the middle of the bar B, the casing is provided with inlet and outlet orifices (C) and (D) respectively, the inlet orifice being formed in a screw plug (E) screwing into the casing as illustrated. The plug forms the seating of a flat faced valve (F) resting upon the bar (B) which under the movement of the bar controls the inlet opening. This valve may be either formed with a projection taking loosely into a hole in the bar to keep it in its proper position or the same may be formed without the projection and kept in position by the vertical guides (G) forming part of and depending downward from the plug (E) the under side of the valve being rounded to allow the valve to rock on the bar and find its own seating. Other forms of valve may be used, but I have found the one before described to work well. It is also simple in form and easily and cheaply renewed.

The steel bar (B) may be secured in various ways, but the most effective way is to use it as the core bar in forming the casing and allow the metal of the casing to flow round one end of the bar so fixing it in position as shown at the left hand end of the trap. The other end of the bar passes out at the opposite end of the casing through a packed gland as illustrated and is screw threaded to receive the nut (H) by which the amount of "bow" can be varied and the "setting" of the trap be accomplished.

The trap being connected up to the steam apparatus to be drained by means of the inlet (C) the action is as follows:—The normal position of the parts is as shown in Fig. 2 the valve leaving the inlet orifice open and allowing the water of condensation to pass freely through the trap as indicated by the arrows. On the arrival of the steam, the casing (A) expands more than the bar (B) putting tension on the bar and so lifting the valve (F) until it closes on to its seating. This condition of things continues so long as a steam temperature is maintained in the casing (A), but should any condensed water accumulate in the pipe leading to the trap and the temperature of the casing fall in consequence the contraction thereby caused slackens the bar (B) and the valve falls and lets out the condensed water, closing again immediately the steam arrives.

In this way I produce a very cheap and efficient expansion trap which is also very compact.

Although I have described one end only of the steel bar as cast into the casing it will be clear that both ends might be so cast, but the bar would have to be made in two pieces overlapping in the middle to allow for the contraction of the casing on cooling and be afterward joined by a rivet or rivets. The adjustment of the trap in this case may be effected by advancing the plug (E) nearer to or farther from the valve (F).

In the modification hereinbefore described it will be observed that the action takes place on the atmospheric side of the valve (F) and there is therefore little or no pressure in the casing (A). A similar effect would be produced by admitting the full pressure of the steam into the casing and controlling the out-

let (D) by a valve pulled to its seating by the movement of the bar (B), but this I should consider a modification of my invention and in my opinion it would be less convenient in practice.

Having thus particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I wish it to be understood that I make no claim broadly to the expanding of metals in the construction of a steam trap, but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination in an expansion trap, of a metallic casing having its opposite walls provided respectively with an inlet E and outlet D, a bowed metal bar B of less expansible metal than the casing, arranged inside the latter and fixed at one end, an adjusting device outside the casing and engaged with the other end of said bar for varying the bowed form of the latter, and an inlet valve C controlling the flow of fluid through said inlet and having its inner side bearing against said bar, substantially as described.

2. The combination in an expansion steam trap, of a metallic casing having its opposite walls provided respectively with an inlet and an outlet, a bowed metal bar of less expansible metal than the casing, arranged inside the latter, fixed at one end and provided at the opposite end with a screw-threaded portion projecting through the casing, a nut engaging the screw-threaded portion of the bar for adjusting the latter to vary its bowed form, and an inlet valve governing the flow of fluid through the said inlet and having its inner side bearing against said bar, substantially as described.

In testimony whereof I affix my signature to the foregoing specification.

JOHN JAMES ROYLE.

Witnesses:
WALTER GUNN,
EDWIN SETTLE.