

(No Model.)

J. B. ERWIN.

STEAM TRAP.

No. 321,701.

Patented July 7, 1885.

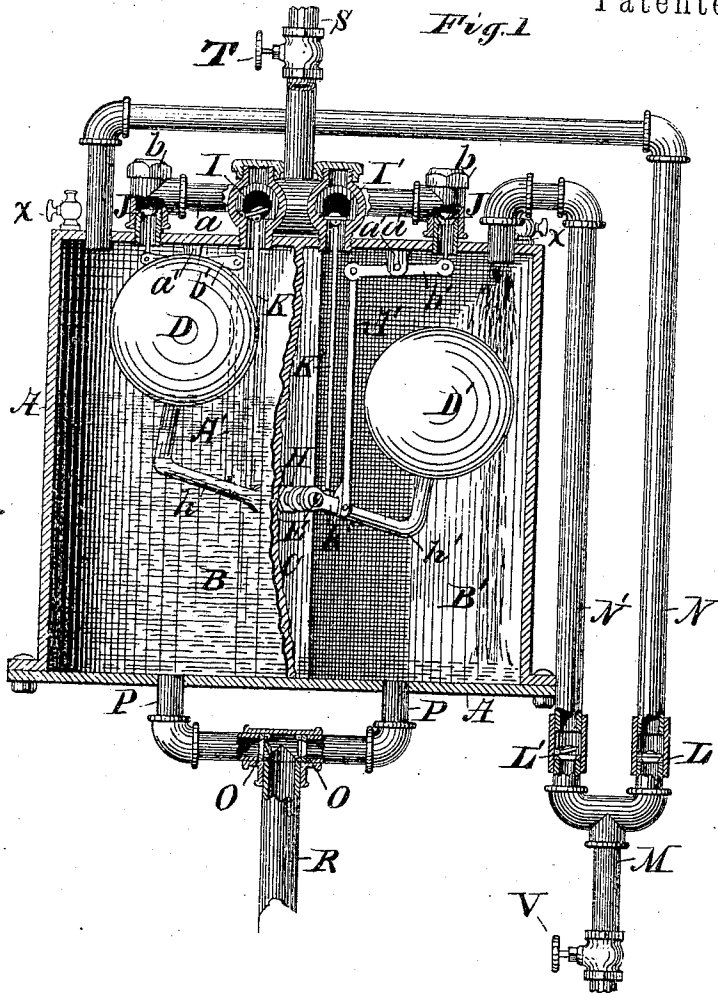
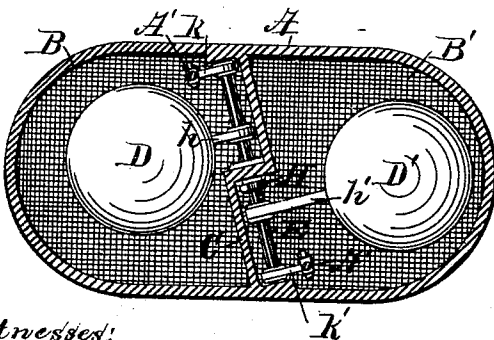


Fig. 2.



Witnesses:
G. M. Gridley
M. J. Schinner

Inventor:
James B. Erwin

UNITED STATES PATENT OFFICE.

JAMES B. ERWIN, OF MILWAUKEE, WISCONSIN.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 321,701, dated July 7, 1885.

Application filed March 27, 1885. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ERWIN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in steam-traps, and pertains to that class which may be used either solely for returning water arising from condensed steam in heating-coils and steam-radiators or for such purpose, and also for introducing a new supply of water from any exterior source located above the boiler.

The construction of my invention is explained by reference to the accompanying drawings, in which—

Figure 1 represents a vertical section of the water-receptacle of the trap and of such parts of the connecting-pipe as disclose the operative mechanism therein. Fig. 2 represents a horizontal section of the water-receptacle.

Like parts are represented by the same reference-letters in both views.

The water-receptacle A is divided into two equal apartments, B B', by the angular partition C, which partition is so shaped as to bring nearly equal parts of the shaft E upon the respective sides of the partition within the respective chambers or apartments B B', whereby I am enabled to attach both floats D D' to the single shaft E within their respective chambers. The shaft E is surrounded by a stuffing-nut, H, which closes all communication of steam or water between the chambers B B'. The floats D D' are made of equal bulk and gravity, so that their buoyant effect will be equal; but the gravity of the material of which they are made is not material, providing the bulk and gravity of each be the same.

As is well known, it is common to make floats hollow or construct them of light, buoyant material.

It is obvious that by the manner shown of attaching both floats to a single pivoted shaft I am enabled to make them, if desired, of solid metal or any material wholly or partially solid without regard to their weight, as it is obvious by thus counterbalancing one float with the other they in effect weigh nothing. The gravity of one counteracts the gravity of the other, and the buoyant effect of either float will be equal to the weight of water displaced by it. The floats D D' are supported slightly above their pivotal shaft, so that when they are moved in either direction toward the right or left past their common center of gravity they will drop quickly in such direction, whereby a quick positive movement is attained for opening and closing the valves of the trap, which positive movement could not be attained were the floats to rise and fall only with the rise and fall of water.

When using my trap for returning water from the heating-coils or radiators, it becomes necessary to operate the steam-valves I I' only by the mechanical action of the floats. The water-valves J J and their connecting-rods A' and levers b', as well as the water-pipes J and a a, leading to them, may be dispensed with. Motion is connected to the steam-valves I I' from the supporting-arms h' h' of the respective floats through the valve-rods K K. The rods K K are suspended from the valves I I' so far above the arms of the floats h h that said arms are not brought in contact therewith until said floats are thrown past their center of gravity, whereby it is obvious that the steam-valves remain closed and undisturbed by the action of the rising floats until the floats in dropping past their center of gravity have acquired a positive motion.

It is obvious that as the valves I I' are located upon opposite sides of the pivotal shaft one valve will be closed as the other is opened, and vice versa. Water from the steam coils or radiators is conducted to a point below the check-valves L L' by the single pipe M, and from thence to the trap through the two branch pipes N N'. The escaping water is conducted from the trap to the check-valves O O through the branch pipes P P, and from thence to the boiler through the single pipe R.

The operation of the trap when returning water from the steam-heaters is as follows: One of the apartments, B', being empty, the float therein descends and permits the steam-valve of such apartment to close, as shown upon the right in Fig. 1, thus excluding the steam-pressure in such apartment, whereupon the pressure of steam upon the condensed water which has accumulated in the drip-receiver of the coils causes the water to ascend the pipes M and N' and enter said apartment of the trap. Simultaneously with the influx of water to the chamber B' steam is admitted upon the surface of the water in chamber B through the open steam-valve I, thus establishing an equilibrium of pressure in said apartment, which causes the water to flow of its own gravity from said apartment to the boiler through the branch pipe P and single pipe R. It is now obvious that as the water recedes from one apartment B and rises in the other apartment the position of the floats will be reversed, whereby the steam-valve I' will be opened and the steam-valve I closed, upon which event the apartment B' will be emptied of its contents, while the apartment B will be filled. It is obvious that as the steam-pressure is reversed from one apartment to the other the respective inlet check-valves L L' to such apartment will be closed, thus excluding water therefrom, and the respective outlet check-valves O O' will be opened, thus permitting the escape of water; also, that as the steam-pressure is excluded from either of the chambers B B' the inlet water-valves L L' to such apartment will be opened by the influx of water, and the outlet check-valves O will be closed by the pressure of steam or water against them from the boiler. Thus the water is reversed from one apartment to the other, one apartment being filled as the other is emptied, whereby a continuous unbroken stream of water may be drawn from the pipes and discharged into the boiler. In starting the trap the air in the respective chambers is permitted to escape as the water enters through the valve x, which is of the ordinary construction.

To provide for introducing an additional supply of water from time to time, as may be required to supply the boiler, the same is readily admitted from any source above the trap or from a city supply, regardless of pressure through the pipe S, by opening the valve T. The valve T being open, the water passes through the branch pipes a a to the valve-chambers b b above the respective valves J J, and as said valves are alternately raised by the action of the respective floats water is admitted, alternating to one apartment and then to the other as the steam is excluded therefrom. The water may be thus admitted either alone or in conjunction with the returning water from the heating-coils, as desired, and when thus admitted it is

caused to flow to the boiler by the admission of the steam, as described, in like manner as the condensed water from the heating-coils. If desirous to admit water other than that from the heating-coils, only the valve V is closed, and the valve T is opened; but for ordinary purposes of the trap the valve V is opened and the valve T is closed.

The inlet water-valves J J are alternately opened by the action of the respective floats D D' as they descend with the escape of water, motion being communicated from the short arms K' K' to said valves through the rods A' A', levers b' b', and valve-rods E' E'.

The levers A' A' are supported by lugs a' a', to which they are centrally pivoted, as shown.

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

1. The combination of two separate chambers, a single pivotal shaft extending into and partially across each of said chambers, and two floats, one in each of said chambers, secured to and adapted to counterbalance each other upon said pivotal shaft within the respective chambers, each of said floats being connected with and adapted to control the action of the valves communicating with the respective chambers, substantially as set forth.

2. The combination, in a steam-trap, of two separate chambers, a single pivotal shaft extending into and partially across each of said chambers, two floats, one in each of said chambers, secured to and adapted to counterbalance each other upon said pivotal shaft within the respective chambers, two inlet steam valves and ducts, and two inlet and outlet water-ducts, and mechanism for communicating motion from the respective floats to said inlet steam-valves, substantially as and for the purpose specified.

3. In a steam-trap, the combination of two separate chambers, B B', partition C, pivotal shaft E, extending through said partition, floats D D', arms K' K', rods A' A', levers b' b', valve-rods E' E', valves d d, and water-ducts a a, communicating from the supply to the respective chambers, substantially as and for the purpose specified.

4. In a steam-trap, the combination, with the two separate chambers B B', of the two branch water-pipes N N', each provided with outward-closing check-valves, single pipe M, communicating between said branch pipes and the heating-coils, outlet branch pipes P P, each provided with inward-closing check-valves, single pipe R, communicating from said branch pipes P P to the boiler, and steam-pipes h' and J', communicating between the respective chambers and the boiler, substantially as set forth.

5. The combination, within the receptacle A, of the partition C, pivotal shaft E, extending through said partition into the re-

5 spective chambers B B', stuffing-nut H, closing communication between said apartments, around said shaft upturned arms *h h*, floats D D', located above said pivotal shaft, and valve-rods K K, suspended by pivotal attachments from the steam-valves I I' above said arms *h*, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES B. ERWIN.

Witnesses:

C. T. BENEDICT,
G. M. GRIDLEY.