

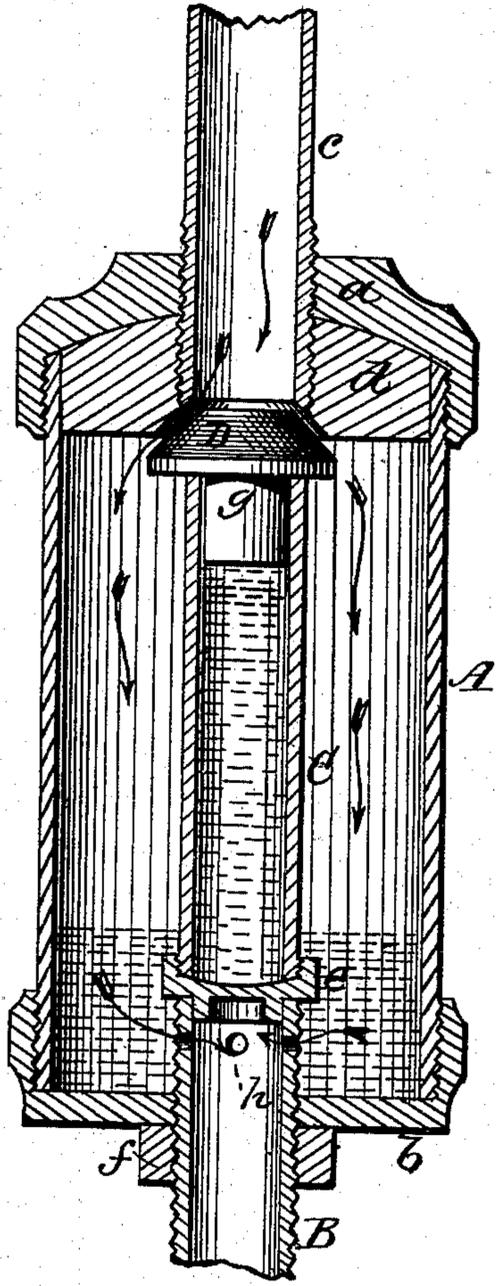
(No Model.)

W. A. HATHAWAY.

STEAM TRAP.

No. 263,175.

Patented Aug. 22, 1882.



*Witnesses.*  
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# UNITED STATES PATENT OFFICE.

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## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 263,175, dated August 22, 1882.

Application filed December 30, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM A. HATHAWAY, a citizen of the United States, residing at North Kingstown, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making a part of this specification, and to the letters and figures of reference marked thereon.

The present invention has relation to certain new and valuable improvements in that class of steam-traps in which is employed a central tube for containing mercury, having secured at its top a diaphragm, so that when the steam passes into the outer chamber the column of mercury will be expanded by the heat and force up the diaphragm to close the opening through which the steam escapes into the casing. This diaphragm, being necessarily of an elastic material—such as rubber—would in a very short time become affected by the heat from the steam, and consequently would lose the greater portion of its elasticity and would cease to operate.

It is the object of the present invention to remove this difficulty, and thus improve the operation of the trap, render the opening and closing of the passage for the steam more certain, and in other respects improve the construction of the trap. These objects I attain by the construction substantially as shown in the drawing and hereinafter described.

In the accompanying drawing, which represents a sectional elevation of my invention, A designates the iron casing or cylinder into which the steam passes. This cylinder A is formed with external screw-threads at its ends for attaching thereto screw-caps *a b*, the former having a short section of pipe, *c*, for making connection of the trap to the steam-pipe in the ordinary manner. The pipe *c* extends below the cap *a*, and has screw-threads thereon for attaching a valve-seat, *d*. Passing up through the lower cap, *b*, is a pipe, B, its end forming a support and seat for the cap *e*, which is connected by screw-threads to the screw-threaded end of a brass tube, C. The pipe B is screw-threaded upon its exterior to engage with a screw-threaded opening in the cap *b* and nut *f*,

thereby enabling the vertical adjustment of said pipe for the purpose hereinafter described.

The tube C contains a suitable liquid, and has at its upper end a check-valve, D, cast with valve-stem, *g*, of suitable length and diameter to nicely fit the tube C. When the valve is open, as shown in the drawing, the steam will pass into the cylinder A, as indicated by the arrows, and by its contact with the exterior of the tube C will heat it and cause the expansion of the liquid therein. As the liquid expands it presses upward against the stem *g* and raises the valve D, thereby closing it against the valve-seat *d* and cutting off the escape of steam into the cylinder. The steam remaining in the cylinder A as it condenses, the water accumulates at the bottom thereof, as shown, cooling off the tube C and the liquid therein, and thus allowing the valve D to open by its own weight.

It should be understood that before the valve D is opened the vacuum caused by the condensation of steam in the cylinder A above the accumulated water at the bottom thereof will prevent the water from passing out or escaping through the holes *h* in the pipe B; but as soon as steam is let into the cylinder the pressure above the water will force it out through said holes into pipe B.

By raising or lowering the pipe B the upper end of the tube C will be brought nearer to or farther from the valve-seat, requiring a lesser or greater expansion of the liquid in the tube C to close the valve.

The valve D, being wholly of metal, is not affected by the heat from the steam, and mercury or any liquid that will serve the purpose can be used. Although the valve D, with its stem *g*, does not differ from the ordinary check-valve commonly used, its application to this class of steam-traps having a central tube, C, containing an expansible liquid, is of great importance, as its operation is assured at all times and under all circumstances, where an elastic diaphragm would soon become worthless as a means for closing and opening the steam-escape.

The cylinder being of iron and the tube C of brass, the cylinder will expand one-eighth of an inch to the foot, while the tube will expand three-sixteenths of an inch to the foot, whereby

said tube will gain in its extent of expansion one-sixteenth of an inch over the cylinder, thereby assisting the expansion of the liquid in closing the valve.

5 Another very important feature of the valve D will be noticed from the fact that, when off the end of the tube C and closed against its seat, the steam, as it expands within the cylinder A, will press upward against the under  
10 side of the valve and assist in retaining it closed until its condensation is completed, thereby forming a perfectly-operating trap, and one not liable to get out of order by the failure of the valve to operate by the expansion  
15 of the liquid in the tube.

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

In a steam-trap, the cylinder A, valve-seat *d*, and the pipe B, having side holes or opening, 20 *h*, said pipe being adjustably connected to the cap *b*, in combination with the liquid-tube C, having screw-cap *e* upon its lower end and at its upper end the metal valve D, constructed to operate as described, and having the stem 25 *g*, located within the end of the tubes, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM A. HATHAWAY.

Witnesses:

JOHN B. PEIRCE,  
THOMAS J. PEIRCE.