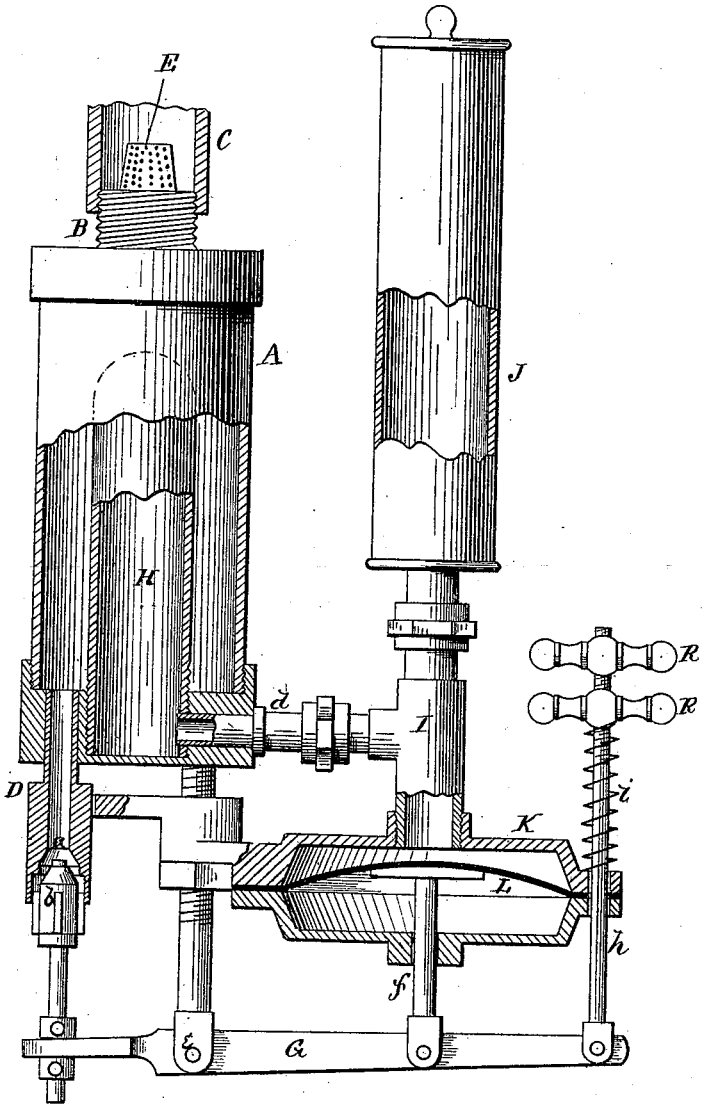
T. G. SPRINGER.

Steam-Trap.

No. 196,494. Patented Oct. 23, 1877.



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UNITED STATES PATENT OFFICE.

THEODORE G. SPRINGER, OF LOUISVILLE, KENTUCKY.

IMPROVEMENT IN STEAM-TRAPS.

Specification forming part of Letters Patent No. **196,494**, dated October 23, 1877; application filed April 24, 1877.

To all whom it may concern:

Be it known that I, THEODORE G. SPRINGER, of Louisville, in the county of Jefferson and in the State of Kentucky, have invented certain new and useful Improvements in Steam-Traps; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a steam-trap, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, which represents a side elevation, partly in section, of my steam-trap.

A represents a cylinder of any suitable dimensions, provided on the top with a hollow screw-projection, B, on which the pipe C is screwed, said pipe being the one through which the condensed steam is to run from the heater or other place where the trap is to be applied. On or in the screw-plug or projection B is arranged a strainer, E, to prevent any foreign substances from passing down into the trap.

From the bottom of the cylinder A extends a short outlet-pipe, D, formed at its lower end with a valve-seat, *a*, and a downwardly-opening valve, *b*, arranged in the same, the stem of said valve being attached or connected to one end of a pivoted lever, G.

Within the cylinder A is a smaller cylinder or pipe, H, extending from the bottom of the outer cylinder A to near the top thereof, and both ends of said interior cylinder or tube are closed, and from near the bottom of the same extends a horizontal pipe, *d*, the outer end of which is, by a T-coupling, I, connected with an air-chamber, J, on top, and a case, K, at the bottom. Within this case is a flexible diaphragm, L, to which is attached a rod, *f*, extending down through the bottom of the case, and connecting with the lever G on the opposite side of the pivot-point *e* from the valve-stem.

The outer end of the lever G has a rod, *h*, attached to it, which extends upward through the rim of the case K, and a spiral spring, *i*, is placed on the upper end of said rod, with handles R screwed on the upper end of the rod to regulate the tension of said spring, which should be such as to withdraw the valve *b* from the seat *a*.

To set this trap the cylinders must be inverted and the air-chamber removed, when sufficient water is poured in, so that when the parts are in the position shown in the drawing the inner cylinder or tube H will be full of water, and the water stand in the pipe *d*, case K, above the diaphragm, and in the coupling nearly to the bottom of the air-chamber, said chamber being full of air.

The air-chamber J should be of about double the capacity of the tube H.

The normal position of the valve *b* is open, so that the water of condensed steam will, after entering the cylinder A, pass out through the pipe D. When, however, the steam enters said cylinder and envelops the inner cylinder or tube H, it heats the water therein and generates steam, which displaces the water, forcing it into the air-chamber J, and compresses the air therein. This air acts as a resistance to the ascending column of water until it is compressed sufficiently to balance the force of the diaphragm L and spring *i*, when the steam and compressed air, acting upon said column of water, force the diaphragm down, and the valve closes, stopping the outlet. As soon as the steam again condenses in the trap the steam generated from the water in the cylinder H also condenses, and the displaced water is forced back into said cylinder by the expansion of the compressed air in the air-chamber J, and the spring *i* opens the valve to allow the condensation in the trap to pass off.

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

1. A steam-trap provided with a water-chamber and an air-chamber, an outlet-valve retained in its open position by a positive force, and closed by steam and compressed air acting upon a column of water, substantially as and for the purposes set forth.

2. In a steam-trap, the combination of a cylinder with interior water-tube, an air-chamber, a case with interior diaphragm, and an outlet-valve held in its open position by a positive force, and closed by steam and compressed air acting upon a column of water, substantially as herein set forth.

3. The combination of the condensing-cylinder A, interior closed water-tube H, connections *d* I, air-chamber J, case K, with diaphragm L, lever G, spring *i*, and valve *b*, all constructed and arranged to operate substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of April, 1877.

THEODORE G. SPRINGER.

Witnesses:

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