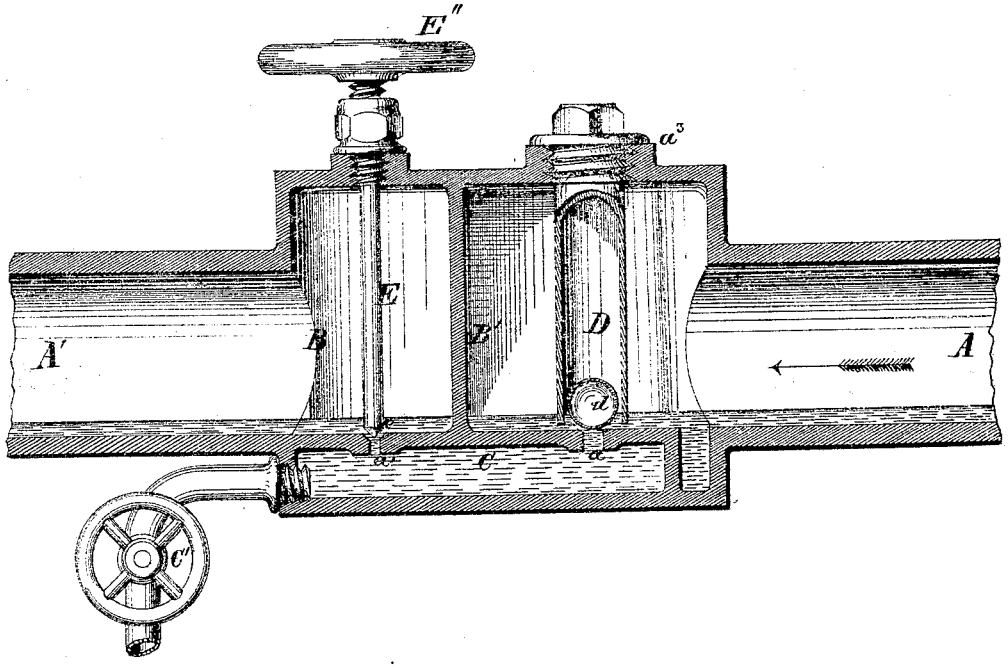
JAMES W. HODGES.

Improvement in Steam-Traps.

No. 114,141. Patented April 25, 1871.



WITNESSES.

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JAMES WILSON HODGES, OF BALTIMORE, MARYLAND.

Letters Patent No. 114,141, dated April 25, 1871.

IMPROVEMENT IN STEAM-TRAPS.

The Schedule referred to in these Letters Patent and making part of the same.

I, JAMES WILSON HODGES, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and improved Steam-Trap, of which the following is a specification.

Nature and Objects of the Invention.

My invention is more especially designed to be applied to the pipes or coils of steam-heating apparatus to prevent the escape of steam while preventing the escape of water of condensation therefrom, and is an improvement on my patent No. 103,184, dated May 17, 1870.

The improvements consist in a more convenient arrangement of the operative parts of the trap, and in rendering the same automatic, so that the flow of the condensed steam may be regulated by the rising and falling of a float and an adjustable rod, which may be made of a metal or metals having such relative expansibility as to enable it to control the discharge independently of the float by partially or entirely closing the aperture through which the water passes to the discharge-outlet of the pipe.

Description of the Accompanying Drawing.

The figure is a vertical longitudinal section of an illustrative form of the trap, some of the parts being shown in elevation.

General Description.

A B A′ represent a portion of a pipe or box forming part of or connected with a steam-coil.

The receiving end A and discharging end A′ of the pipe are separated by a permanent partition, B′, preventing all communication between them except through the duct or chamber C at the lower side of the pipe, which opens toward one end into the receiving branch of the pipe by the orifice a, and toward its other end into the discharging branch of said pipe through the orifice a^1.

Immediately above the orifice a is an orifice through a seat, a^3, cast or otherwise formed on the enlarged portion or box of the trap, and threaded to receive the threaded guide D, which has a cap or head adapting it to be screwed into the seat a^3 so as to make a steam-tight joint.

The threaded guide D, if tubular, may be made with holes near its bottom, or one side may be shorter than the other in order to prevent the stoppage of the outlet a in case the guide has been screwed down too tight through accident or inadvertence.

A float or ball-valve, d, fits loosely in the interior of the guide D, rising or falling on the surface of the water of condensation in the pipe or box and more or less closing the orifice a, the guide D being caused to extend sufficiently far down in the box to keep the valve in its proper position without impeding the discharge of the water.

In the discharge end of the trap, beyond the partition B, and immediately over the orifice a^1, is a threaded seat or stuffing-box, a^2, for receiving a rod, E, adjusted by a hand-wheel, or suitable means, to partially or entirely close the aperature a^1, which its lower end is adapted to accurately fit.

The rod E may be made of metal of greater expansibility than the body of the trap, so as to act automatically and independently after being properly adjusted by the hand-wheel E; or it may be made of metal equally expansible with that of the trap, and the opening or closure of the aperture a^1 be governed entirely by said hand-wheel.

To insure greater sensibility to changes of temperature the rod E, when intended to act by expansion, may be made of two or more pieces of different materials of unequal degrees of expansibility, so as to cause a greater movement of its head e, under given changes of temperature, than could be obtained by the use of a single metal.

I do not intend to limit myself to either of these ways of constructing the rod E, as either may be employed in conjunction with the float-valve d.

C′ represents a cock for drawing off any accumulation of water in the duct C.

Operation.

Steam entering the receiving branch A of the pipe condenses on the lower side of the trap until sufficient water accumulates to lift the float-valve d and permit the water to pass freely into the duct C until it fills this duct and rises through the aperture a^1, whence it flows out through the discharge-pipe B A′, which may be furnished with a cock to prevent the escape of steam when first let on, or this may be effected by screwing down the rod E.

When sufficient water has accumulated to fill the duct C and rise above the level of the bottom of the trap, no steam can pass out so long as the duct continues full, nor can the water flow so long as the ball d closes the mouth of the aperture a.

Any increased condensation by raising the level of the water causes the ball d to rise and allows a small quantity of water to escape through the orifice a, when the ball will sink, closing the mouth of the orifice as at first, and thus a slight alternate upward and downward motion is produced, though confined within very narrow limits, so as to prevent any considerable accumulation of water in the pipe, and occasion it to be expelled nearly as fast as it is condensed.

The outflow of water through B A′ is regulated by the rod E. This is represented as frusto-conical at

its lower end, to adapt it to the flaring mouth of the aperture a^1, though any two forms adapted one to the other so that the aperture may be closed steam and water-tight will answer.

This rod, as before stated, may be made of a material having nearly equal or less expansibility than that of the trap, and the floor from C, through a^1, be regulated entirely by raising or lowering the rod E so as to leave a greater or lesser interval between its lower end and the mouth of the orifice a^1.

When made of a metal having greater relative expansion and contraction than that of the trap the rod is adjusted by its thread to leave the mouth of the orifice sufficiently open to allow the maximum amount of water that can be condensed to escape, the condensation being greatest when the pipes are comparatively cool. As the apparatus becomes heated and the condensation less the expansion of the rod will cause its lower end to approach the mouth of the orifice and reduce or entirely stop the flow of water therethrough, and as the apparatus is again slightly cooled by the water which has now begun to accumulate in the trap, the rod once more contracts and closes the aperture a^1.

This arrangement renders the trap automatic as to both apertures through which the flow of the water of condensation is controlled. It thus provides against the contingency of an accidental injury to the ball-valve, which might tend to prevent its falling sufficiently to properly close the aperture *a*, and it is evident that in this case the expansion and contraction of the rod E will, of itself, operate to control the flow through both the apertures *a* and a^1.

By means of the cock C′ the duct C may be emptied and the moisture withdrawn from all the pipes constituting the coil. It also serves the purpose of a test-cock to indicate if the valve *d* is in order by showing if steam escapes.

By emptying the duct, also, a temporary passage of steam may be allowed from one branch of the pipe to the other, enabling a whole series of coils to be blown through to carry off chemically or mechanically-formed depositions.

Claims.

I claim as my invention—

1. The combination and arrangement of the guide D, float *d*, main-pipe or trap A A′ B′, duct C, and apertures *a* a^1, substantially as and for the purpose specified.

2. The combination and arrangement of the rod or valve E *e*, main-pipe or trap A A′ B′, duct C, and apertures *a* a^1, substantially as and for the purposes set forth.

To the foregoing specification of my improved steam-trap I have set my hand this 19th day of December, 1870.

JAMES WILSON HODGES.

Witnesses:

N. B. MOUNTFORT,

JNO. W. MEDAIRY.