(150.)

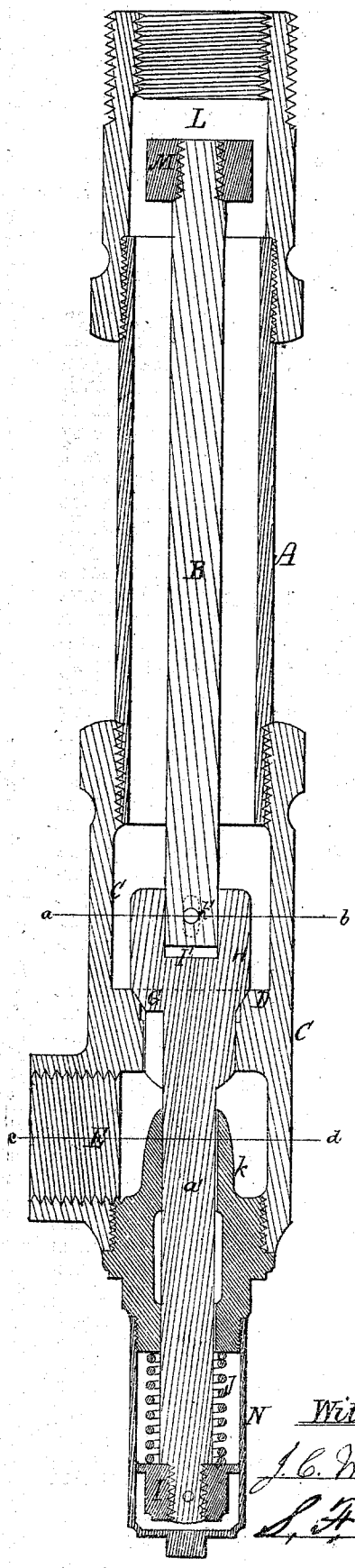
JOSEPH E. WATTS.

Improvement in Steam Traps.

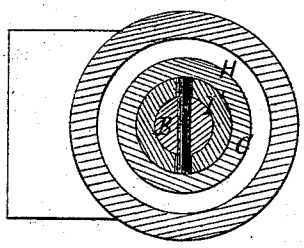
No. 122,086.

Patented Dec. 19, 1871.

Fig. 2.



on line a.b. of Fig. 2.



on line c.d. of Fig. 2.

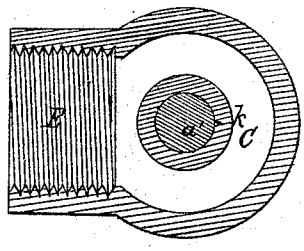


Fig. 5.

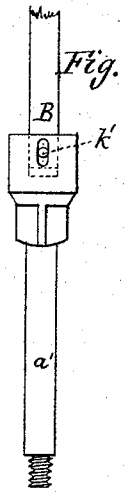


Fig. 6.

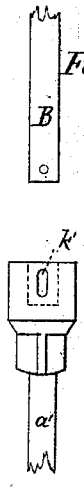
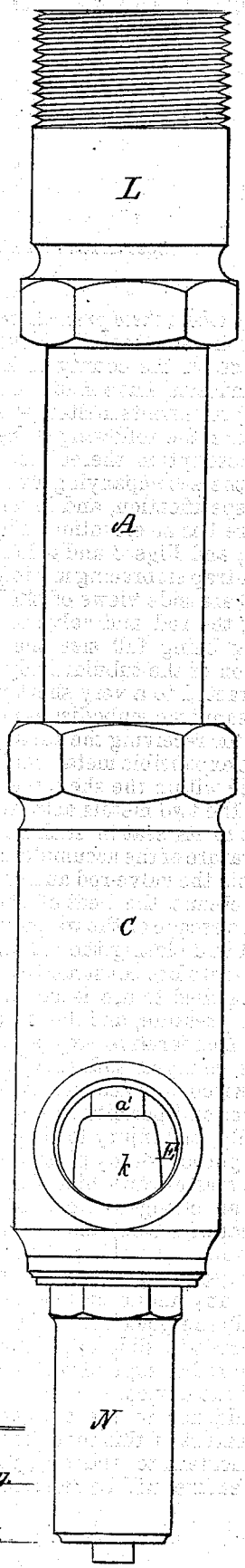


Fig. 1.



Witnesses.

J. C. Wightman

L. F. Van Choate, Frederick Curtis

Joseph E. Watts.

by his Attorney.

UNITED STATES PATENT OFFICE.

JOSEPH E. WATTS, OF LAWRENCE, MASSACHUSETTS.

IMPROVEMENT IN STEAM-TRAPS.

Specification forming part of Letters Patent No. 122,086, dated December 19, 1871.

To all to whom these presents shall come:

Be it known that I, JOSEPH E. WATTS, of Lawrence, in the county of Essex and State of Massachusetts, have made an invention of certain Improvements in Steam-Traps; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawing making part of this specification, and in which—

Figure 1 is an elevation; Fig. 2, a longitudinal section; and Figs. 3 and 4, horizontal sections of a steam-trap embracing my improvements. Figs. 5 and 6 are side views of the sliding joint connecting the rod and valve to be explained, this drawing being full size the original with the exception of the tubular body of the trap, which is contracted to a very short piece.

A steam-trap embodies an outer case or shell of iron for receiving the steam, and a rod or tube of more expansible metal, carrying the valve and disposed within the shell, the differential expansion of the two metals actuating the valve with respect to its seat in such manner that the low temperature of the accumulated condensed water contracts the valve-rod and opens the valve-port for its escape, the heat of the steam which follows the escape of the water instantly expanding the rod and closing the valve.

As heretofore constructed, a steam-trap upon being applied to use is adjusted to operate at a certain pressure, and heat vary to any extent; or the comparative expansion of the case and rod are changed suddenly, as often occurs, the valve without an accumulation of condensed water opens and permits loss of steam or closes prematurely, and injury to the instrument results.

The purpose of my present invention is to produce a steam-trap which shall operate perfectly under all changes of condition of the pressure and heat of steam, and to this end I unite the valve and expansible rod of the trap by a longitudinally-sliding connection in such manner that should any undue or unexpected elongation of the rod take place after the valve is closed, the two parts will slide upon one another, and permit the rod to expand without injury to any portion of the device.

In addition to the above-mentioned preliminary feature of this invention several minor details, incident to and operating with such primary feature, will be referred to.

The drawing accompanying this specification represents at A the iron tubular case or cylinder of the trap, within which is disposed the expansible rod or tube B of a more expansible metal, the comparative fluctuations in the length of which open or close the valve, as the case may be. Upon the lower end of the cylinder A I screw a cylindrical case or valve-box, C, and within this case, and at about its center I locate the valve-seat D, an outlet or discharging orifice, E, being disposed at the bottom of the case to permit of escape of condensed water, and in some cases steam from the valve-chamber. The valve of this instrument is shown at G as formed upon a cylindrical block, H, disposed within the valve-chamber, and operating with its valve-seat D, before named, the stem a' of the valve extending downward to the valve-case C, and having screwed upon its extremity a nut, I, a spiral or other suitable spring, J, being interposed between the said nut and the end of the valve-case, in order to maintain the valve upon its seat against slight disturbances of any nature. A thin annular flanch or wall, k, is formed in the metal of the lower part of the valve-case and surrounding the valve-stem a', the same being to arrest small quantities of water which might otherwise collect and leak through into the apartment into which the trap is situated.

The nature and operation of steam-traps are now so generally understood as to need no particular description; but it may be well to say that heretofore they have all been calculated to operate at slightly-varying pressures and degrees of heat of steam, for the reason, necessarily, that a slight movement only of the valve must be permitted, or steam will be wasted. Should this pressure of heat be exceeded the expansible rod, having no provision by which to guard against the danger, becomes elongated to an undue extent and fracture of some part of the instrument takes place, while on the other hand a sudden contraction of the outer casing in excess of that of the rod drives the latter upon its seat, and upsets, cripples, or fractures it. To remedy this I form the valve-block H cavernous or socketed, as shown at I′, and into the socket I′ I extend the end of the expansible rod B, the connection between the two being a pin and slot one, as shown at k' in Fig. 2 of the drawing, by which means latitude is left for a short endwise movement of the rod within

the valve-block. The parts are so calculated that at a certain temperature of the steam the contraction of the rod by the action of the condensed water lifts the valve from off its seat and permits of escape of said condensed water.

Should the exterior case A become suddenly or unduly and improperly contracted, the valve-seat and valve will first meet, and the expansible rod then enter the socket I′ and adapt itself to the diminished length of the case A. By this telescopic principle or its equivalent I am enabled to adapt one instrument to any pressure of steam from ten to one hundred pounds, and I entirely avoid the liability of fracture or derangement which would follow a like contraction of the case in other steam-traps. The opposite or upper end of the expansible rod screws within a sleeve, L, which is fixed to the upper end of the case A and the nut I enables the length of the rod or its position with respect to the valve and valve-seat to be varied and adjusted when first applying the instrument to use.

The spring J should be sufficiently powerful to maintain the valve upon its seat against light thrusts, while it should be sufficiently weak to enable the contraction of the rod to lift the valve from off its seat, and permit of escape of condensed water through the latter. The interior of the sleeve L is formed with a brace or shelf, M, into which the end of the expansible rod is screwed, and this construction enables me to connect the trap with any suitable pipe without danger of interfering with the expansible rod.

By this construction of the valve and case and their adjuncts I am enabled to dispense with a stuffing-box, and thus secure one point of durability, simplicity, and economy.

N in the accompanying drawing represents a cup, having a female screw to screw upon a male screw, cut upon the periphery of the lower part of the case A, such cup serving to conceal and protect the nut, and to prevent loss or leakage of steam when the trap is connected to a pipe subjected to pressure.

I claim—

1. The combination, in a steam-trap, of the valve with its operating expansible rod, connected with the same substantially in the manner shown and described, and for the purposes stated.

2. The combination, with the case A, the valve-seat D, the valve G, and valve-stem a', of the tubular piece k located in the valve-chamber and surrounding the valve-stem, as and for the purposes shown and described.

3. The combination in steam-trap, with the valve G and expansible rod, connected substantially as described, of the valve-stem a' and spring J, operating substantially as herein shown and set forth.

4. The combination of case A, expansible rod B, valve G, valve-stem a', tubular piece k, spring J, and nut I, said parts being constructed and arranged for joint operation in the manner shown and set forth.

Witnesses: JOSEPH E. WATTS.
ORAN J. RANDLETT,
THOMAS BRIDGE, JR.,
FRED. CURTIS.

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