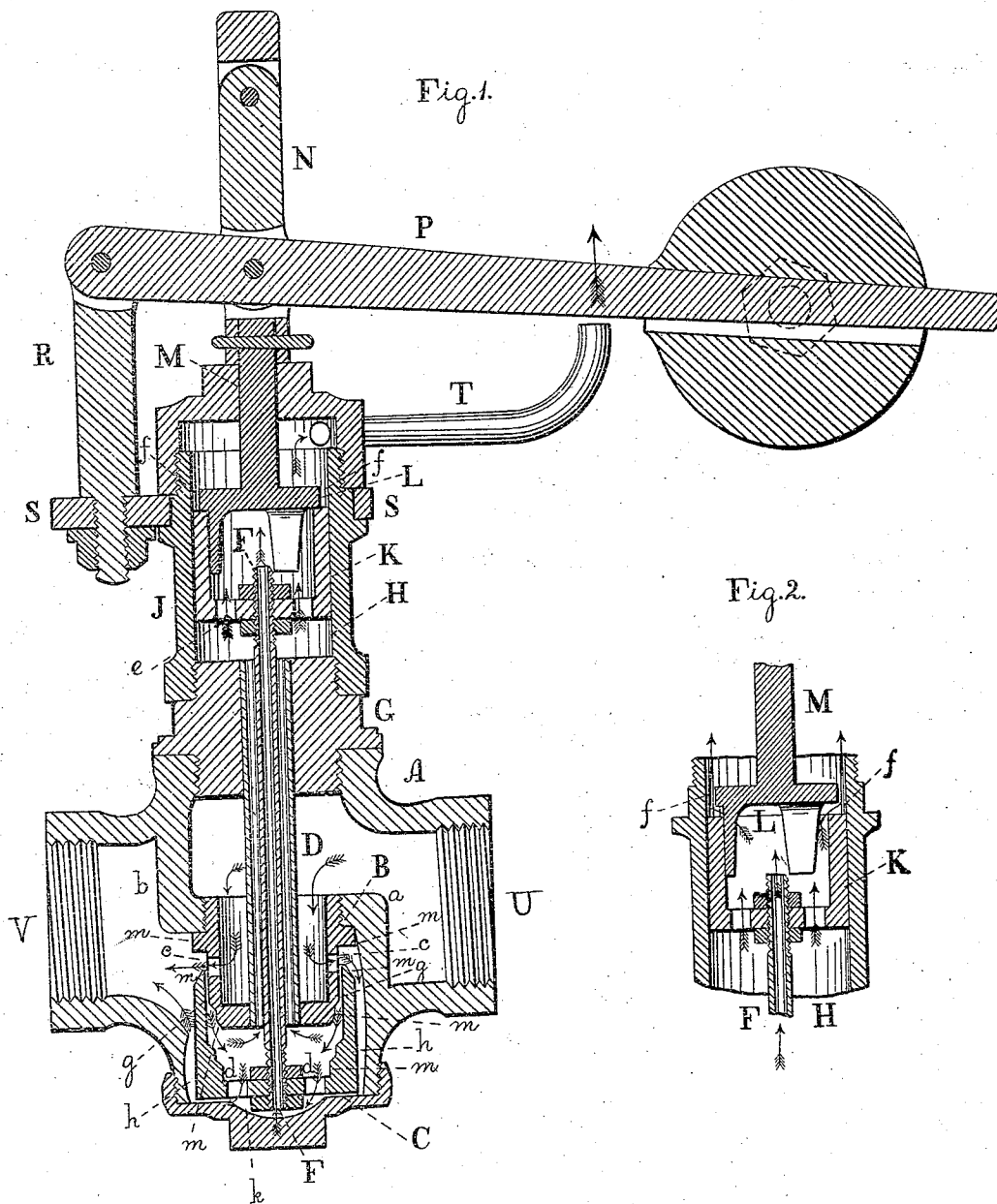


G. SUMNER.
Steam Regulator-Valves.

Patented July 21, 1874.

No. 153,394.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE SUMNER, OF LOWER MERION, PENNSYLVANIA.

IMPROVEMENT IN STEAM-REGULATOR VALVES.

Specification forming part of Letters Patent No. **153,394**, dated July 21, 1874; application filed June 5, 1874.

To all whom it may concern:

Be it known that I, GEORGE SUMNER, of Lower Merion, county of Montgomery and State of Pennsylvania, have invented a new and useful Improvement in Steam-Regulator Valves; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a central longitudinal vertical section of the device embodying my invention. Fig. 2 is a similar view of a detached part.

Similar letters of reference indicate corresponding parts in the two figures.

My invention consists in means for regulating the pressure of steam or other fluids. It also consists in a combined steam-regulator and safety-valve.

Referring to the drawings, A represents the shell or body of the regulating-valve, within which, on one side, is formed an upwardly-projecting semi-cylindrical wall, *a*, and on the opposite side a downwardly-projecting semi-cylindrical wall, *b*, thus leaving a central space, within which, and from the upper and lower ends of the walls *a b*, respectively, is suspended a cylindrical valve-seat, B, which is open at top and closed at bottom, and has a series of perforations, *c*, in its face. C represents a cylindrical valve, which, surrounding the seat B from below, is open at top, has a closed face, and a bottom with a series of perforations, *d*. A tube or pipe, D, is secured to the bottom of the seat B, extends upwardly through the same, then through a plug, G, at the top of the shell A, and opens into a chamber, H, formed by a cylindrical shell or tube, J, above the plug G. To the valve C is secured a hollow stem or pipe, F, which passes through the tube D and is connected to the movable seat K of an escape-valve, L, both of which are arranged in the chamber H. The seat K fits snugly in the chamber H and has its bottom provided with a series of perforations, *e*. The valve L rests on the top of the seat K, and has a diameter less than that of the chamber H, so that a space, *f*, is left between the wall of the chamber H and periphery of the valve L. To the

valve is connected a stem, M, which passes upwardly through the top of the tube J, and from the upper end of said stem is suspended a swinging clevis, N, to which is pivoted the weighted lever or rod P, whose fulcrum is on a standard, R, which rises from a ring, S, journaled to the shell or tube J. T represents a pipe, which is connected to the cylindrical shell J, and provides means of communication between the chamber H and the atmosphere. A space, *g*, is left between the seat B and valve C, and a space, *h*, is left between the valve C and adjacent portion of the shell A and the wall *a*. A space, *k*, will also be left between the bottoms of the valve C and shell A. The two faces of the seat B and valve C are shown at *m m*.

The operation is as follows: The amount or pressure of steam required for a particular purpose having been predetermined, the weight of the lever P is moved so as to uncover the perforations *d* of the valve C, and thus adjust the latter relatively to said amount or pressure. The steam is admitted by the induction-branch U and enters the open-top cylindrical seat B, then escapes through the perforations *c*, one volume passing through the space *g* to the bottom space *k* of the shell A, and another volume passing through the space *h* into the cylindrical valve C, and reaching the bottom space *k* of the shell A through the perforations *d* in the bottom of the valve C. The steam from the bottom space *k* then passes to the eduction-branch V, through the space *m*, between the valve C and adjacent portion of the shell A below the said branch, and joins such steam as may pass from the perforations of the seat B which are on the side toward the branch. When the steam reaches the body of the cylindrical valve C a quantity thereof escapes through the tube D and joins in the chamber H, above the bottom of the seat K, a quantity of steam that passes from the bottom space *k* through the hollow stem F, so that the movable seat K and valve L in said chamber H are acted upon by the steam in a manner to be stated.

It will be seen that steam surrounds the cylindrical valve C on the inside and outside of its surface and on the two faces of its bottom, so that there is an equilibrium of pressure of steam on said valve. The action of the steam on the movable seat K' also serves to hold up

the valve C to its adjusted position, the seat K and valve L being kept to each other by the weight, and moving together as a piston so long as the pressure of steam is not in excess of the weight on the rod P.

When the pressure of steam decreases the valve C falls, and thus uncovers more of the perforations of the valve-seat B, whereby more steam is passed to the eduction-branch. When the determined pressure is attained the valve C again rises and properly acts on the perforations of the valve-seat. Should the pressure increase the valve C is elevated, and thus covers the perforations of the valve-seat. Should the pressure further increase, and thus become dangerous, it overcomes the action of the weight-rod and lifts the valve L in the chamber H, so that steam immediately escapes through the pipe, and the danger is averted.

The journaled or swiveled ring S permits the weight-rod P to be swung around in any desired position, so as to be located relatively to the conveniences of the room in which the device is placed.

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

1. In the case A, the combination of the cylindrical valve C and cylindrical seat B, provided with faces *m* and perforations *c d*, substantially as and for the purpose set forth.

2. The escape-valve, consisting of the two detached parts K L, in combination with the regulating-valve C and intermediate tube F, and with the weight-rod P, substantially as and for the purpose set forth.

3. The cylindrical valve C, and seat B, and piston-valve K, in connection with the hollow rod D, forming a communication between the shell A and piston-valve chamber H, and weighted rod P, substantially as and for the purpose set forth.

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Witnesses:

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